



Civil Engineering and Development Department
East Development Office
8/F, South Tower, West Kowloon Government Offices
11 Hoi Ting Road
Yau Ma Tei
Kowloon

Your reference:

Our reference: HKCEDD08/50/106261

Date: 14 January 2020

Attention: Mr Lo Sai Pak, Sunny

BY FAX & POST
(Fax no.: 2739 0076)

Dear Sirs

Agreement No.: NTE 06/2016
Independent Environmental Checker for Tseung Kwan O – Lam Tin Tunnel
Silt Curtain Deployment Plan for Road P2 and Associated Works

We refer to emails of 6 and 7 January 2020 from CRBC – Build King Joint Venture attaching the Silt Curtain Deployment Plan (Revision No.10) for Road P2 and Associated Works.

We have no comment and hereby verify the captioned submission in accordance with Clause 2.8 of the Environmental Permit no. EP-458/2013/C. We have no objection to the updated design of silt curtain proposed in the captioned plan subject to EPD's approval.

Should you have any queries, please do not hesitate to contact the undersigned or our Ms Hazel Chan at 2618 2831.

Yours faithfully
ANEWR CONSULTING LIMITED

Ad Loo
Independent Environmental Checker

LYMA/CYYH/csym

cc CEDD – Mr Simon Wong (email: simonwong@cedd.gov.hk)
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Our Ref: MA16034/Corres/Out/hf200107

Civil Engineering and Development Department
East Development Office
East Division 1
Project Division (1)
8/F, South Tower, West Kowloon Government Offices,
11 Hoi Ting Road,
Yau Ma Tei, Kowloon

By E-Mail
07th Jan 2020

Attn: Mr. LO Sai Park, Sunny

Dear Mr. Lo,

Agreement No. CE 59/2015 (EP)
Environmental Team for Tseung Kwan O – Lam Tin Tunnel - Design and Construction
(Environmental Permit (EP) No. EP-458/2013/C)
Contract No. NE/2015/02 – Silt Curtain Deployment Plan (Rev. 10.1)

We refer to the Silt Curtain Deployment Plan (Rev. 10.1) submitted by CRBC – Build King Joint Venture on 07th January 2020 via email.

We are pleased to inform you that we have no further comment on your plan with reference to the approved Silt Curtain Deployment Plan (Rev. 9).

Should you have any queries, please contact our Mr. Betty Choi at 2151 2072 or the undersigned at 2157 3880.

Yours faithfully,

For and on behalf of
Cinotech Consultants Limited



Dr. H.F Chan
Environmental Team Leader

c.c. AECOM
ANewR
CBJV

Mr. KY Chan
Mr. Adi Lee
Mr. Gary Fung

By E-mail
By E-mail
By E-mail



ISO 9001 : 2015
Certificate No.: CC 2289



ISO 9001 : 2015
Certificate No.: CC 2289



ISO 9001 : 2015
Certificate No.: CC 2289

Contract No.: NE/2015/02

Project Title:

Tseung Kwan O – Lam Tin Tunnel – Road P2 and Associated Works

Silt Curtain Deployment Plan

Document No: CSF/O/0029
Revision: 10.1
Date: 07 January 2020

Silt Curtain Deployment Plan

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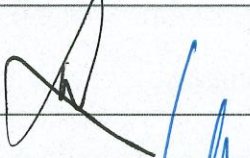
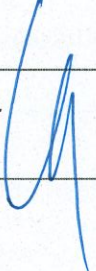
Revision History

Revision No.	Description	Revised by	Date
00	First Issue		22 September 2016
01	Second Issue	Joonwon Lee	11 November 2016
02	Third Issue	Joonwon Lee	13 December 2016
03	Fourth Issue	Gary Fung	28 September 2017
04	Fifth Issue	Gary Fung	30 December 2017
05	Sixth Issue	Gary Fung	22 August 2018
06	Seventh Issue	Gary Fung	5 July 2019
07	Eighth Issue	Gary Fung	15 August 2019
08	Ninth Issue	Gary Fung	24 September 2019
09	Tenth Issue	Gary Fung	21 November 2019
10	Eleventh Issue	Gary Fung	03 January 2020

Silt Curtain Deployment Plan

Document No: CSF/O/0029
Revision: 10.1
Date: 07 January 2020

Checked by:

Position	Signature	Name	Date
Construction Works Manager		Wyman Wong	07 January 2020
Deputy Site Agent		Andy Yu	07 January 2020

Prepared by:

Environmental Officer		Gary Fung	07 January 2020
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Appendix I – Implementation Schedule of Enhanced Silt Curtain for Marine Works

1. GENERAL

1.1 Purpose of this update

This submission is to include an implementation schedule of enhanced silt curtain for marine works (table as shown in **Appendix I**).

1.2 Introduction

1.1.1 Prior to the commencement of any works in the sea under Contract No. NE/2015/02, CRBC – Build King Joint Venture (JV) will be responsible for the installation, operation and maintenance of the silt curtain against water impact. The silt curtain act as a double measure to the temporary cofferdam to maintain the water quality in the vicinity of the marine works. JV will also be responsible to remove the aforementioned silt curtain after the completion of the works.

1.1.2 This deployment plan describes in details the design, method of installation, operation and maintenance of the proposed silt curtain.

1.3 Reference Specifications and Drawings

1.2.1 The deployment plan shall be read in conjunction with the following reference Specifications and Drawings:

- General Specification Sections 21 and 25
- Particular Specification Sections 21 and 25
- Environmental Permit (EP No. EP-458/2013/C) Condition 2.8
- Working Drawings Nos. 60308751/C2/R00/1000 to 1070

1.4 Construction Plants

1.3.1 Plant and equipment to be used for the proposed silt curtain deployment include, but not limited to, the followings:

- Split Hopper 1 no.
- Derrick Lighter 1 no.
- Grab Dredger 1 no.

1.3.2 Adequate resources shall be deployed to suit the construction programme.

2. SILT CURTAIN DESIGN

- 2.1 In general, floating single silt curtain will be deployed to fully enclose the works area of dredging and filling works prior to commencement of dredging works.
- 2.2 The floating silt curtain will typically consist of a layer of geotextile tied on 300mm diameter buoys and extended to the seabed level secured by steel chain ballast. The buoys will be further positioned by nylon ropes tied on nearby existing structures. Sufficient length of geotextile shall be allowed such that the silt curtain can be extended from the water surface to the seabed during high tide condition. The typical section of the proposed silt curtain is attached in **Appendix A**.
- 2.3 In addition to the silt curtain enclosing the works area, frame-type silt curtain (10-12m x 10-12m) comprising geotextile tied to the steel circular hollow section will be locally installed around the grab of the dredger in order to prevent migration of sediment plume. The length of the geotextile will be sufficiently extended to seabed during high tide conditions.
- 2.4 Specification of the proposed geotextile for the silt curtain is attached in **Appendix B**.

3. WITHDRAWAL OF SILT CURTAIN PILOT TEST

- 3.1 The purpose for design of temporary steel cofferdam is to minimize water quality impact due to the dredging and filling works. The temporary impermeable steel cofferdam has been 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. The installation for the silt curtain is the further enhancement and prevention of any sediment loss to the surrounding environment during dredging / filling works. Since the deployment of silt curtain is not the major concern of the entire system to prevent sediment loss to the surrounding environment, the silt curtain efficiency testing is not therefore considered in the silt curtain deployment plan.

Temporary impermeable steel cofferdam has been installed to minimize the water quality impact from the dredging and filling works of this Project. The installation of the silt curtain around the steel cofferdam serve as further enhancement to safeguard the water quality near the marine works area. With the implementation of the temporary impermeable steel cofferdam and silt curtain system, deterioration in water quality resulting from the dredging and filling works of this project is anticipated to be minimal.

Marine water quality monitoring has been carrying out by the Environmental Team (ET) to monitor any potential water impact from the reclamation works of the Project. Some of the marine water quality monitoring stations locate in close vicinity of our marine works site. Therefore, it is considered that the monitoring conducted by the ET is also effective in examining the performance of the temporary impermeable steel cofferdam and silt curtain system.

The monitoring results have further confirmed the capability and effectiveness of our temporary cofferdam and silt curtain system. The temporary cofferdam and silt curtain system have been functioning properly and are effective in containing sediment release and restricting the spreading of sediment plumes within our marine works area.

4. SILT CURTAIN INSTALLATION

- 4.1 Link up 300mm buoys together by a net.
- 4.2 Tie the top end of the geotextile to the buoys net and the bottom end with steel chain ballast before transportation.
- 4.3 Transport the silt curtain to the location for fixing via a marine pontoon.
- 4.4 Workers tie the buoys to the water and then slowly put the geotextile with the steel chain ballast into sea.
- 4.5 Put the buoys to the water and then slowly put out the geotextile with the steel chain ballast into sea.
- 4.6 In order to maintain the position of the silt curtain especially at location with strong current, place concrete sinkers to the seabed if required and tie the silt curtain to the sinkers with nylon strings by divers. Diving inspection and report will be carried at least once a week to ensure the silt curtain is functioned properly.

5. FRAME TYPE SILT CURTAIN INSTALLATION

- 5.1 The silt curtain system will comprise of a rectangular-shaped prefabricated steel floating frame, woven geotextile fabric and ballast steel chains.
- 5.2 The rectangular floating frame will be of approximately 12m by 12m in plan size. It will be fabricated by 600mm diameter steel circular hollow sections with closed ends to maintain the frame in floating condition throughout the course of the works.
- 5.3 The top end of geotextile fabric will be fixed to the floating frame, while its bottom end will be tied with ballast steel chains to maintain the silt curtain in upright position under current and tidal flows. Pieces of geotextile fabric will be seamed by heavy-duty rope ties to form a continuous silt curtain. The geotextile curtain will be trimmed to suitable length which would allow it to extend from the sea surface to the seabed under the varying tidal levels.
- 5.4 The dredging works under the Project will be carried out by a closed grab dredger and the frame-type silt curtain will be mounted adjacent to the dredger barge such that

the whole operation is confined inside the enclosed water column. The frame-type silt curtain will be deployed in similar manner in case of using closed grab dredger for filling works within the temporary cofferdam.

6. SILT CURTAIN DEPLOYMENT PLAN

6.1 Installation of Temporary Steel Cofferdam and Double Water Gate System

6.1.1 During the installation of temporary steel cofferdam, silt curtains will be locally installed around the derrick barge and enclose the cofferdam being installed. The silt curtain will remain around the derrick barges as they move along to install next cofferdam units.

6.1.2 During the installation of double water gate system, silt curtain will be deployed to enclose the gap between the temporary steel cofferdam. Once the installation works are complete, silt curtain will be deployed to fully enclose the entire works area.

6.1.3 The proposed arrangement of the silt curtain during the installation works is illustrated in **Appendix D**.

6.2 Major Marine Works

6.2.1 During the major marine works including dredging, reclamation, construction of seawalls and modification of existing seawalls, silt curtains have been deployed outside the temporary steel cofferdam to fully enclose the entire marine works area. To allow other contractor(s) to carry out marine pile installation works for the marine viaducts, it is proposed to remove the temporary cofferdam in phases. The remaining major work activities to be carried out together with the details arrangements of floating single silt curtains at the various stages area discussed below and also illustrated in **Appendix D**.

Stage 1-3: At these stages, rock core for the sloping seawall have been completed up to +2.5mPD. The rockfill and geotextile within the rock mount can act as physical barrier to enclose the muddy water and silt inside the rock mount in replacement of the temporary cofferdam to avoid water flowing out from the reclamation area (Refer section 6.2.2). The work activities to be carried out at these stages include placing armour rock to form the sloping profile for the sloping seawall, unloading rockfill G400 (or sorted public fill) to the area surrounded by rock core and removal of steel cofferdam by phases.

Stage 4A & 4B: At this stages, rockfill G400 (or sorted public fill) placing is completed and all the reclaimed area is filled up to +2.5mPD. The stage 4A silt curtain arrangement will be applied same as stage 3 for the recent marine works including the placement of armour rock by the dredger and the removal of the temporary steel cofferdam. The silt curtain will be rearranged from stage 4A to stage 4B progressively along with the marine works progress. The localize silt curtain will be deployed and

surrounded the derrick barge for the placing of armour rock at stage 4B. (shown as blue in the figure)

Stage 5: At this stage, all the reclaimed area is finished and the removal of double water gate is commenced.

All marine vessels will access into and out the site through the double water gate system and the perimeter silt curtains will be in place to enclose the reclaimed area in Stage 1-3. For Stage 4A, where the dredging and filling works are completed, and the double water gate has not yet been removed, the gates of the system will keep open and silt curtain will be in place to control the vessels from entering and leaving out the site. Localized silt curtains or perimeter silt curtain will also be deployed around the derrick barges when placing armour rock and rockfill G400 (or sorted public fill). Furthermore, localized silt curtain will be deployed around the work area for the removal of temporary cofferdam and double water gate.

- 6.2.2 The rock core was demonstrated in the water quality measurement on 19 June 2019. The sampling was carried out at 3 locations inside and outside the rock core (Refer to **Appendix H**). The measurement was carried out in the ebb tide therefore the monitoring was in the worst case and the suspend solid was flow from shore to open sea. The result illustrated that Station C was able to comply with Marine Water Quality Standard in the EM&A manual.

Another water quality measurement was conducted on 16 August 2019. At that time, the rock core was completely enclosed. The sampling was carried out at 2 locations inside and outside the rock core (Refer to **Appendix H**). The measurement was carried out in the ebb tide therefore the monitoring was in the worst case and the suspend solid was flow from shore to open sea. The result illustrated that Station D was able to comply with Marine Water Quality Standard in the EM&A manual. Showing that the rock core could act as a physical barrier to isolate the muddy water inside the rock mount from the outside. Hence, it is reasonable to infer that there will be no adverse water quality outside the rock core.

- 6.2.3 In addition to the silt curtain enclosing the works area, frame-type silt curtain (10-12m x 10-12m) will be locally installed around the grab of the dredger in order to prevent migration of sediment plume. Details of the frame-type silt curtain are illustrated in **Appendix E**.

6.3 Operation of Double Water Gate System

- 6.3.1 Besides the silt curtain enclosing the marine works area, silt curtain will be installed at both ends of the double water gate to act as doors when barges enter and leave the Site.

- 6.3.2 Once a barge approaches the water gate to enter the Site, the outer silt curtain will be opened. After the barge comes into the gate, the outer silt curtain will be closed and the silt curtain at the other end of the gate will be opened for the barge to eventually enter the Site. The inner silt curtain will be subsequently closed. Same arrangement will be made when the barge leaves the Site.
- 6.3.3 Silt curtains at both ends of the gate will be kept closed when there is no barge leaving or entering the Site.
- 6.3.4 Proposed arrangement of the silt curtain during the operation of the double water gate system is illustrated in **Appendix F**.

7. SILT CURTAIN MAINTENANCE

- 7.1 On-board supervisors will be assigned to check the condition of the silt curtain before commencement of works every day. An inspection checklist will be prepared and filled in by the site supervisors. All checklists will be kept on site for record purpose. A sample of silt curtain inspection checklist is attached in **Appendix G** for reference.
- 7.2 For the tentative arrangement of silt curtain under adverse weather, the silt curtain will not be temporary removed during adverse weather. However, related works will be suspended immediately if silt curtain is found any damaged. Lift up the silt curtain from the water by grab dredger / derrick barge. Sew (double-line sew) a new piece of geotextile to the existing geotextile to cover the damage area, with sufficient overlapping length (300mm). Nearby marine works will resume after repairing of the damaged silt curtains.
- 7.3 Refuse around the silt curtains will be collected at regular intervals on a daily basis so that water behind the silt curtains will be kept free from floating debris.
- 7.4 Sufficient spare geotextile will be kept on site for replacing of damaged silt curtains. The spare geotextile shall be kept in place to avoid direct contact with water and sunlight.

8. SILT CURTAIN REMOVAL / REPOSITIONING

- 8.1 Removal of silt curtain shall be carried out by derrick lighter barges after the removal of water gate and cofferdam in order to reduce negative impact on water quality during the demolition or removal works of the water gate and cofferdam.
- 8.2 Tentatively, there will not be any plan for repositioning of silt curtain. The actions upon re-deployment will be submitted separately if necessary.
- 8.3 Refer to stage 2 of the silt curtain deployment plan after removal of steel cofferdam, the rock mound up to +2.5mPD was completed which can effectively prevent

sediment loss from the remaining filling works inside the rock mound. In addition, geotextile and granular filter would be placed before the placement of rockfill G400. Thus only insignificant sediment loss would be expected in stage 2 and a continuous silt curtain would be deployed to enclose the marine works area to minimize the impact to the water quality.

- 8.4 Specification of the proposed geotextile Type A for seawall construction is attached in **Appendix C**.

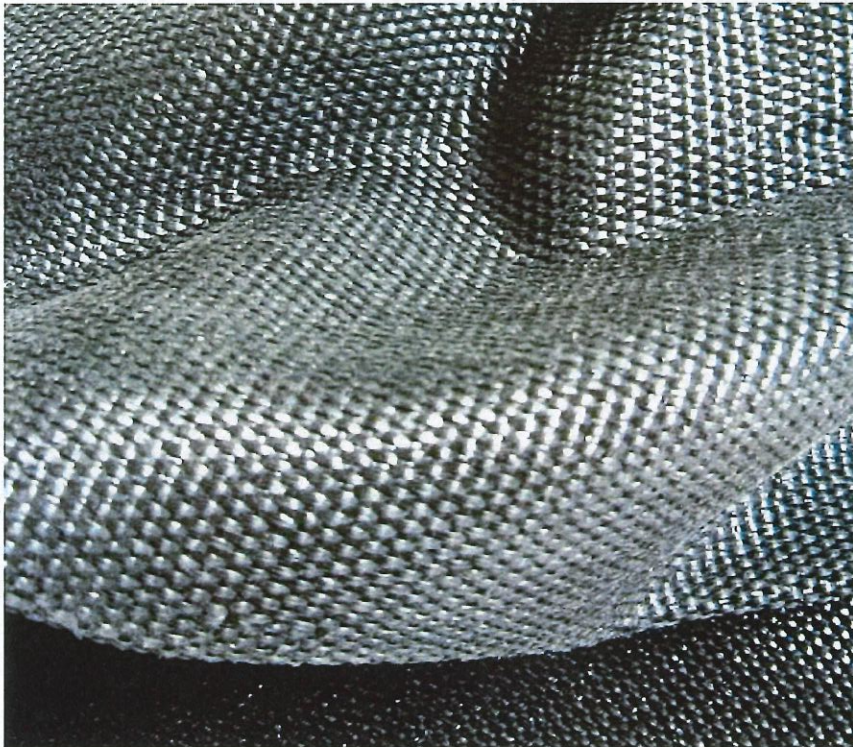
Appendix A – Design of Proposed Silt Curtain

Appendix B – Specification of Geotextile for Silt Curtain



Material Submission

BONTEC SG110/110 Woven Polypropylene Geotextile



G AND E COMPANY LIMITED

14/F., Kiu Yin Commercial Building,
361 - 363 Lockhart Road,
Wanchai, Hong Kong
Tel: 2570 0130 Fax: 2570 0089
website: www.g-and-e.com

August 2016



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 - Bontec SG Range Technical Data Sheet
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 - Name and details of Project
 - Photo reference
- 6) **Approval Letters**

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- 7) **About the Supplier – G and E Company Limited**

 - An introduction to G and E Company Limited

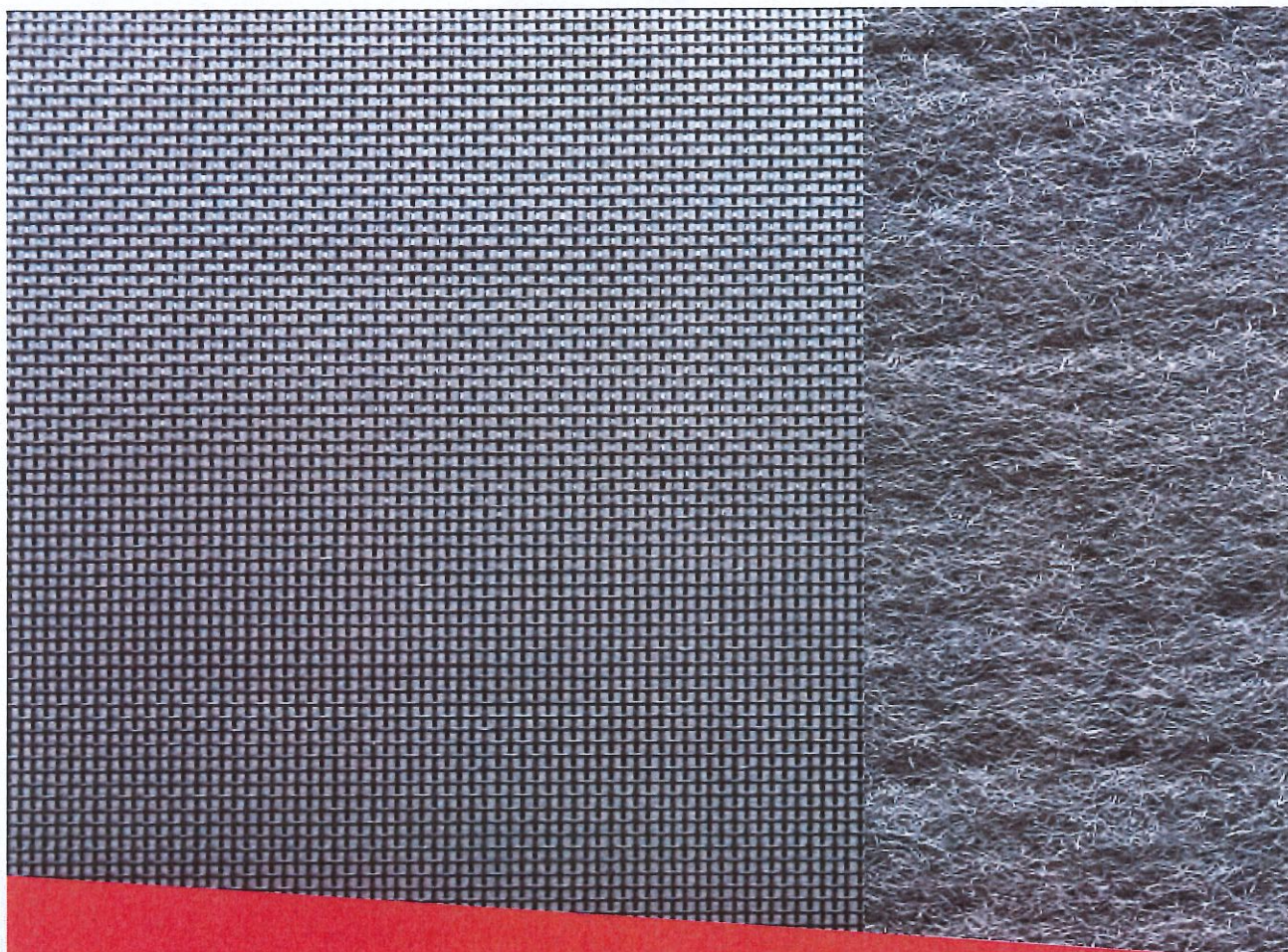


**Bontec SG110/110
Woven Geotextile**

Manufacturing Company Profile

bontec

woven and nonwoven geotextiles



GEOTEXTILE

WE UNDERCOVER
THE WORLD



Bonar
partners in performance

Bontec Geotextile

Bontec is an internationally renowned brand of geotextiles. We have earned this reputation over the past thirty years thanks to our quality, service and flexible production processes. This flexibility is a result of the vertical integration of our production. We control the entire process – from raw materials to finished product – for both our woven and nonwoven varieties.

We are therefore not dependent upon the quality or delivery time of others, and we can guarantee your success. Our Bontec brand offers state of the art woven and nonwoven geotextiles that provide answers to meet all of your challenges. Thanks to continuous research and investment in the latest technology, we provide the best solutions for all possible functions of geotextiles.

Nonwoven process Woven process

Starting with polypropylene granules,

we extrude endless synthetic filaments. After stretching and shrinking, these filaments are cut into fibres.

These fibres are then deposited in layers by a crosslapper.

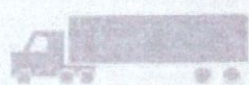
By means of our own unique process we needle punch the layers into each other, after which they are thermo fixated. The result is an extremely high performance geotextile.

Starting with polypropylene granules,

we extrude an endless synthetic foil. This foil is then cut into fine tapes.

After stretching, the tapes are wound on spools that form the basis of a beam. That beam feeds the loom in the machine direction.

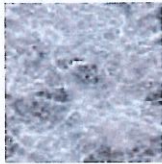
Subsequently the tapes are woven on a loom to a fabric with the desired specifications.



Nonwoven Geotextile

NW

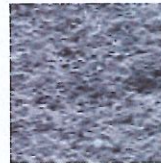
Thermally Bonded Nonwoven Geotextiles



Produced by applying mechanical and thermal bonding processes. NW has the highest tensile strength of the range and is used primarily for lightweight separation and filtration. Its excellent hydraulic properties are ideal for use in filtration applications. Typical uses include the encapsulation of a trench drain.

VNW

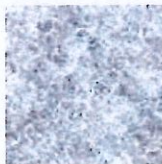
Nonwoven Needle Punched (Colored) Geotextile



Produced by needle punching colored polypropylene fibres. The range varies from 200 to 2,000 g/m². VNW is used for protection of membranes, as a component for drainage composites, or as a component for erosion control composites.

SNW

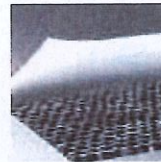
Superior Needle Punched Nonwoven Geotextiles



Produced in a manner similar to NW, SNW offers extraordinary properties for its very low weight. SNW is used primarily in circumstances that require both high tensile strength and elongation. Typical areas of application include membrane protection in reservoirs and landfills.

LG

Geocomposites

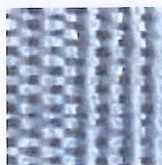


For the production of LG, woven and nonwoven geotextile are needle punched together. This process combines the properties of the two types in a single layer. These products are used in situations that require a high tensile strength as well as extreme protection.

Woven Geotextile

SG

Lightweight 'Standard Grade' Woven Geotextile



These lightweight, woven geotextiles from 65 to 250 g/m² are used primarily for separation. For example, SG prevents good quality sand or granules from mixing with underlying soil. It is used for the construction of roads, parking lots and airport runways.

HF

'High Flow' Woven Geotextile

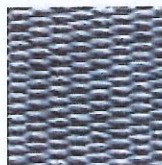


Thanks to their specific structure, HF geotextiles have high permeability. This quality is very important for erosion control and infiltration applications. Typical applications include:

- As an under layer for concrete revetment blocks or between dissimilar layers of quick draining granular fill consisting of fine sand and rounded gravel.
- The envelopment of infiltration crates or tubes for rainwater management.

SG

Heavyweight 'Standard Grade' Woven Geotextile



These heavyweight, woven geotextiles vary from 250 to 600g/m² and they possess tensile strengths up to 200 kN/m and above. Heavyweight SG is used in heavy load circumstances, such as temporary basal reinforcement, coastal reinforcement and soil stabilization.

HS

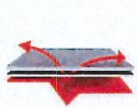
'High Strength' Woven Geotextile



The polyester wovens have a very high tensile strength of up to 600 kN /m. This strength and their very low stretch make them ideal for situations where:

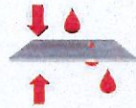
- Reinforcement of the ground is essential.
- The construction of very steep, or even vertical, slopes with different types of soil is required.

Use of Geotextiles



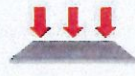
1 Erosion control

In erosion control, the geotextile protects soil surfaces from the friction forces of moving water or wind and rainfall erosion.



2 Filtration

The use of geotextiles in filter applications is probably the oldest, most widely known, and most used function of geotextiles. The geotextile is used to prevent fine soil particles from moving with the water flow normal to the plane.



3 Protection

A geotextile can be used as a protective layer against mechanical damage during installation and after the completion of a particular construction project. It will help prevent the puncturing of geomembranes used in constructions such as tunnels, landfills or reservoirs.



4 Drainage

When functioning as a drain, a geotextile acts as a conduit for the movement of liquids or gases in the plane of the geotextile. Relatively thick nonwoven geotextiles are the products most commonly used. Selection should be based on transmissivity, which is the capacity for in-plane flow.



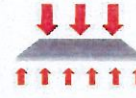
5 Stress relief

The geotextile provides a stress-relieving interlayer between the existing pavement and the overlay that reduces and relays reflective cracks under certain conditions. It also acts as a moisture barrier to prevent surface water from entering the pavement structure.



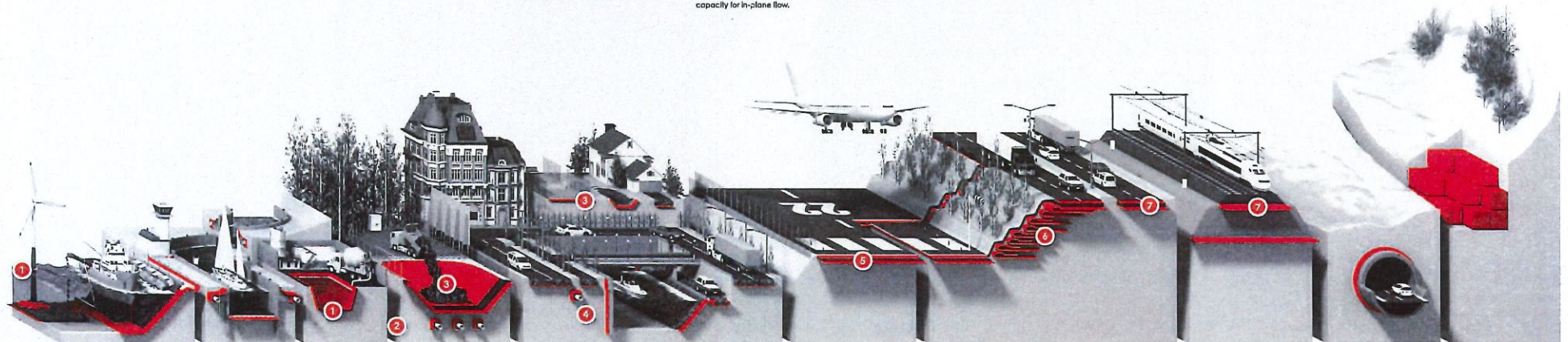
6 Reinforcement

The geotextile interacts with soil through friction or adhesion forces to resist tensile or shear forces. To provide reinforcement, a geotextile must have sufficient strength, low elongation and low creep to avoid movement of the structure.



7 Separation

Separation is the process of preventing two dissimilar materials from mixing. In this function, a geotextile is most often required to prevent the undesirable mixing of fill and natural soils or of two different types of fill.



Value chain

World player with local market presence

- Most complete product range
- Vertically integrated production - from raw material to finished stock
- Strong logistic service and stock supported key products to meet market needs
- Health and Safety from production right through delivery on site as an absolute priority
- Over 30 years of experience in a constantly evolving hi-tech market:
 - > Innovation driven
 - > Project specific engineered solutions

Advantages of Bontec Geotextiles

- Intelligent installation techniques
- Cost and energy saving
- Increased life-span of projects



PRODUCTION SITES

- Belgium - Zele & Lokeren
- China - Yizheng
- Germany - Groß Ippener & Obernburg
- Hungary - Tiszaújváros
- Saudi-Arabia - Yanbu
- The Netherlands - Arnhem & Emmen
- USA - Asheville, NC

Development Centers in the Netherlands, Belgium and USA
Sales offices in UK, France and China



PRODUCT PORTFOLIO

- Geotextiles**
- Geocomposites**
- Geogrids**
- Geocells**
- Vertical Drains**
- Erosion Control Systems**
- Construction Fibres**

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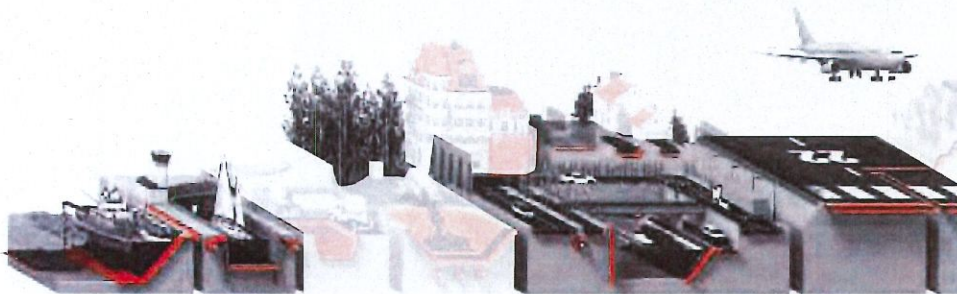
Bonar
partners in performance

www.bontec.be



**Bontec SG110/110
Woven Geotextile**

Product Specification



SG WOVEN GEOTEXTILES

we under^{cover} the world

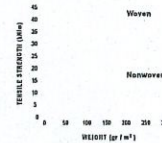
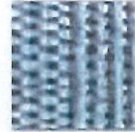
A TOTAL RANGE OF GEOTEXTILES

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For UK and Ireland:
BONAR YARNS & FABRICS Ltd
 31, Salvador Street
 Dundee Scotland
 DD3 7EU
 T: +44 (0)1382 346102
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 E-MAIL: geotextiles@bonaryarns.com

website: www.bonartf.com

bontec
 woven and nonwoven geotextiles



SEPARATION



REINFORCEMENT

Other geotextiles available within the Bontec range include Highflow, High strength Wovens and Thermally Bonded & Needle-punched Nonwovens

Visit us at our website:
www.bonartf.com

For UK and Ireland: **BONAR YARNS & FABRICS Ltd**
 31, Salvador Street | Dundee | Scotland | DD3 7EU
 T: +44 (0)1382 346102 | F: +44 (0)1382 229238
 E-MAIL: geotextiles@bonaryarns.com

SG Woven Geotextiles PRODUCT PROFILE

"An exciting range of Standard Grade geotextiles that offer the perfect solution to your Separation requirements. With tensile strengths ranging from 10 to 300 kN/m you can be certain that an SG fabric will be available with the performance that you are looking for."

DAILY SEPARATION, SOIL STRENGTHENING
 OR GROUND REINFORCEMENT?

Bontec SG woven geotextiles are manufactured from polypropylene tapes & yarns, and exhibit an excellent chemical resistance to commonly encountered acids and alkalis at ambient temperatures. Available in a lightweight range with products from 80 to 200g/m², and a heavyweight range from 200 to 800g/m².

Bontec SG facts include:

Tensile strengths up to 300 kN per metre (kN/m) width
 CBR Puncture Strengths ranging from 1,800 N to 12,500 N
 SG Mechanical Properties that offer maximum strength at minimal cost and ensure the products survivability both against installation damage and in the longer term.

Lightweight woven geotextiles typically offer greater mechanical strengths per unit weight than comparable nonwoven grades. This makes lightweight woven geotextiles the ideal choice for separation

Waterflows normal to the plane that are generally several times more than that required by design

A range of consistent opening sizes suited for use in soils ranging from clay to coarse granular fill.

SG hydraulic properties that are suited to the demands of everyday separators.

Available ex-stock in 4.5m and 5.25m wide rolls or other widths to order

Typical applications for SG woven geotextiles include:

As a general purpose separator for use under site access roads and areas of hardstanding.

As a separation and strengthening layer under new roadways, car parks, industrial units etc.

As an erosion control layer under heavy rock armour in coastal defence projects.

For any separation application where there exists a need to prevent the intermixing of soft foundation soils with good clean granular fill.

SG Woven Geotextiles have been manufactured as a cost effective solution to your soil separation and stabilisation applications. They are manufactured from highly durable polypropylene polymer and have a long life expectancy when used in permanent structures.

For further product information, be it a technical data sheet or to discuss your project with one of our in-house geotextile experts please do not hesitate to contact one of our offices listed below.

Headquarters: **BONAR TECHNICAL FABRICS NV/SA**
 Industriestraat 39 | B-9240 Zele | BELGIUM
 T: +32 (0) 62 457 487 | F: +32 (0) 62 457 495
 E-MAIL: geotextiles@bonartf.com

Bontec® SG 110/110

Standard Grade Woven Geotextiles

Technical data sheet

Product description

Polymer	Density	Melting Point	Construction
100% Polypropylene	0,91 kg/dm³	165 °C	Tapes

Properties

Mechanical Properties	Standard	Performance	Tolerance
Tensile strength - MD	EN ISO 10319	110 kN/m	-9,9 kN/m
Tensile strength - XD	EN ISO 10319	110 kN/m	-9,9 kN/m
Elongation at break - MD	EN ISO 10319	10 %	+/-2,3 %
Elongation at break - XD	EN ISO 10319	7 %	+/-1,6 %
Static puncture resistance (CBR)	EN ISO 12236	12,5 kN	-2,5 kN
Dynamic perforation resistance (cone drop)	EN ISO 13433	10 mm	+2,0 mm

Hydraulic Properties	Standard	Performance	Tolerance
Water permeability normal to the plane (Vlh50)	EN ISO 11058	25x10 ⁻³ m/s	-8x10 ⁻³ m/s
Waterflow in the plane @20 kPa	EN ISO 12958	-	-
Characteristic Opening Size (O90)	EN ISO 12956	230 µm	+/-69,0 µm

Physical Properties	Standard	Performance	Tolerance
Thickness under 2 kPa	EN ISO 9863-1	1,53 mm	+/-0,31 mm
Weight	EN ISO 9864	464 g/m²	+/-46,4 g/m²
Length x width		100 x 525 m	
Roll Diameter		-	

Durability	Standard	Performance
Predicted minimal durability in years in natural soils with 4 < pH < 9 and soil temperatures < 25°C	Annex B	25,0

The Quality Management System of Bonar has been approved to the ISO 9001 Quality Management System Standard. Certificates are available on request.



The information set forth in this data sheet reflects the best knowledge at the time of publication. The document is subject to change pursuant to new developments and findings. The same reservation applies to the properties of the products described. No liability is undertaken for results obtained by usage of the products and information.



**Bontec SG110/110
Woven Geotextile**

Certification

QUALITY MANAGEMENT SYSTEM CERTIFICATE

ISO 9001 : 2008

The BQA sa hereby declares that the management system of:

Bonar NV – Site in Zele en Lokeren



*located at Industriestraat 39 - 9240 Zele - Belgium, has been examined on 24-03-2014
and found in conformity with the ISO 9001, edition 2008, standard for the following application field:*


Development, manufacture and sales of a standard range of fibres and textiles such as agrotextiles, building textiles and geosynthetics, as well as similar products especially designed to customer specifications

This certificate has been issued by the BQA sa according to its quality manual concerning the certification of systems, and after concluding the contract of certification N° CER_AJ_QMS_24-03-2014_301_N, under which the company accepts a regular control of its management system.

*Certificate N° BQA_QMS019_C_2004301
Valid until 23-03-2017*



BQA N° 019-QMS


D. SIMOENS
Directeur



Any person aware of misuse of this certificate may address himself to the BQA sa. This certificate may only be disclosed in its entirety.

BQA sa - rue Montoyer 24 (b9) - 1000 Brussels.

DS/AJ/C24-03-2014

CERTIFICATE OF ENVIRONNEMENTAL MANAGEMENT SYSTEM ISO 14001 : 2004

*The BQA, nv hereby declares that the environmental management system of the company
Bonar NV – Site in Zele en Lokeren*



*located at Industriestraat 39 – 9240 Zele – Belgium, has been examined on 24-03-2014
and found in conformity with the ISO 14001, edition 2004, standard for the following application field:*


***Development, manufacture and sales of a standard range of fibres and textiles such as agrotextiles, building
textiles and geosynthetics, as well as similar products especially designed to customer specifications.***

*This certificate has been issued by BQA, nv according to its quality manual EMS concerning the certification of environmental
management systems, and after the contract of certification N° CER_AJ_EMS019_24-03-2014_N,
under which the company accepts a regular control of its environmental management system.*

*Certificate N° BQA_EMS019_C_200402
Valid until 23-03-2017*



BQA N° 019-EMS


D. SIMOENS
Directeur



Any person aware of misuse of this certificate may address himself to the BQA, nv. This certificate may only be disclosed in its entirety.

BQA, nv - rue Montoyer 24 (b9) - 1000 Brussels

DS/AJ/C24-03-2014

Zele, 09/05/2016

CERTIFICATION OF COMFORMANCE

The undersigned supplier BONAR NV, hereby states under his responsibility that the following product complies with the indicated technical properties :

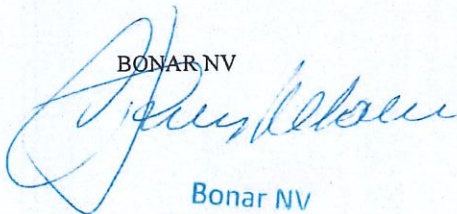
order 225136 your order 160506

Type	NW 10 525	7875	m ²
	NW 20 525	5250	m ²
	SNW 120 525	1837,50	m ²
	SG 110/100	7875	m ²

Delivery docs : Packing list N. T1604251-T1604255

Manufacturer : Bonar NV, Industriestraat 39, 9240 Zele, Belgium
Goods are of Belgian (EU) origin

BONAR NV



Bonar NV
Industriestraat 39
B-9240 Zele
BTW BE 0421 053 442



**Bontec SG110/110
Woven Geotextile**

Installation Guideline

BONTEC: Woven and Non Woven Geotextiles manufactured by Bonar Technical Fabrics – Belgium.



RECOMMENDATION FOR THE INSTALLATION OF GEOTEXTILES

- The **BONTEC** geotextiles shall be kept in its original packaging in order to protect it from damaging UV-rays and high temperatures.
- The **BONTEC** geotextiles shall be stored protected from wind, rain, excess moisture or sunlight.
- The **BONTEC** geotextiles shall only be unpacked just before use. The material shall be covered within 1 week
- The **BONTEC** geotextiles shall be labelled and show the following data :
 - roll number
 - quality
 - name of the manufacturer
 - roll length & width
 - roll weight
- The **BONTEC** geotextiles shall be laid with the longitudinal ascis down slopes
- A minimum overlap of 500 mm between the different sheets shall be respected. Sewing of the different fabrics shall be done with a double prayer stitching technique with non deteriorating thread.
- Wherever visibility or installation of the **BONTEC** geotextile is poor an extra safety overlap of +/- 1 m shall be respected
- The surfaces to be covered with **BONTEC** geotextiles shall be smooth and free of sticks, roots, sharp objects, and all debris that may damage the fabric. The surface to be covered shall be firm and unyielding, with no sudden changes or brakes in grade.
- The compacted sub-base shall be maintained in a smooth, uniform and compacted condition during installation of the fabric.
- In area's where wind is prevalent, fabric installation shall be started at the upwind side of the project and proceed downwind. The leading edge of the fabric shall be secured at all times with sandbags or other means sufficient to hold it down during high winds. Sandbags or rubber tires may be used as required to hold the fabric in position during installation. Tires shall not have exposed steel cords or other sharp edges which may snag or cut the fabric. Materials, equipment or other items shall not be dragged across the fabric or be allowed to slide down slopes on the fabric.
- Should the fabric be damaged during any step of the installation, the damaged section shall be repaired by covering it with a piece of fabric which extends at least 0,6 meter in all directions beyond the damaged area. The fabric shall be secured as directed by the engineer.
- Smoking shall not be permitted by personnel working on the fabric.



**Bontec SG110/110
Woven Geotextile**

List of Project Reference



Bontec SG Range Woven Geotextile

Date	Project	Client	Consultant	Product	Qty
Feb-05	CV/2003/06 Stanley Waterfront Improvement Project - Construction Pier and Boardwalk	Sun Fook Kong (Civil) Ltd	Civil Engineering and Development Department	NW10 SG100/100	3,150 2,080
Feb-05	99/9028 Lamma Power Station	Wai Kee (Zens) Construction & Transportation Co Ltd	Maunsell Geotechnical Services Ltd	SG100/100	1,040
Feb-05	CV/2004/02 Reconst. of Wong Shek & Ko Lau Wan Public Piers	Kin Shing Construction Co Ltd	Civil Engineering and Development Department	SG100/100	4,680
Apr-05	CV/2002/04 Penny's Bay Reclamation Stage 2	Gammon Skanska Ltd Shun Tat Construction Engineering Ltd	Scott Wilson Ltd	SG100/100 SG100/100	4,160 3,150
Apr-05	HK/12/02 CED, Central Reclamation Phase III, Engineering Works	Best Leader Engineering Ltd Leighton - China State - Van Oord Joint Venture	Atkins China Ltd	SG100/100 SG100/100	1,040 2,615
May-05	03/8013 Lamma Island to Cyberport	Leader Marine Contractors Ltd Honwin Engineering Ltd	Maunsell Geotechnical Services Ltd	SG100/100 SG100/100	1,040 1,050
Jul-05	Shenzhen to Tai Po Twin Submarine Gas Pipeline Project	Honwin Engineering Ltd		SG100/100	3,675
Sep-05	TP37/03 Remaining Engineering Infrastructure Works for Pak Shek Kok Development Package 2A	Leader - Wai Kee (C&T) Joint Venture	Hyder Consulting Ltd	SG100/100	1,040
Nov-05	HY/2002/26 Stonecutter's Bridge	Hong Kong River Engineering Co Ltd	Ove Arup & Partners HK Ltd	SG100/100	1,050
Feb-06	CV/2005/12 Fill Reception Facilities at Tseung Kwan O Area 137 Quarry Bay and Mui Wo	Penta-Ocean Construction Co Ltd	Civil Engineering and Development Department	SG100/100	525
Mar-06	Maintenance Dredging at Castle Peak Power Station (CPPS) Jetty	New Concepts Engineering Development Ltd	Civil Engineering and Development Department	SG100/100	525
Mar-06	CV/2004/04 Maintenance and Repairs to Government / Public Piers and Immersed Tubes of Hung Hom Cross-Harbor Tunnel	China Harbour Engineering Co. Ltd	Civil Engineering and Development Department	SG100/100	1,050
Mar-06	HY/2005/06 Castle Peak Road Improvement West of Tsing Lung Tau	Shun Tat Construction Engineering Limited Chun Wo Construction & Engineering Co Ltd	Mouchel Halcrow JV	SG100/100 SG100/100	1,050 525
May-06	212 Main Works for the Proposed Third Golf Course Development at Kau Sai Chau, Sai Kung	China Harbour Engineering Co. Ltd	Ove Arup & Partners HK Ltd	SG100/100	3,150



Jun-06	Hong Kong Convention and Exhibition Centre Project - Silt Screen for Intake Pipe	Wai Kee (Zens) Construction & Transportation Co Ltd Kaden - Wai Kee (C&T) JV	NA	SG100/100	2,100
Aug-06	EP/SP/52/06 Development of EcoPark in Tuen Mun Area 38	Kaden Construction Limited	Scott Wilson Ltd	SG100/100	1,050
Sep-06	CV/2004/06 Management and Capping of Contaminated Mud Pit IV at East of Sha Chau - Phase III	Kaden - Wai Kee (C&T) Joint Venture	Civil Engineering and Development Department	SG100/100	1,050
Oct-06	Lamma Island Cable Landing	United Marine Co Ltd	Hong Kong Electric Co Ltd	SG100/100	2,100
Nov-06	CV/2004/01 Maintenance and Repairs to Seawalls, Piers and Other Port Works	Kin Shing Construction Co Ltd	Civil Engineering and Development Department	SG100/100	2,625
Dec-06	Private project	Friendly Benefit Engineering Ltd	NA	SG100/100	525
Feb-07	Prebored Socketted H-Piles at Hong Kong Convention & Exhibition Centre	Yee Hop Engineering Co Ltd	NA	SG100/100	3,623
May-07	HY/2005/06 Castle Peak Road Improvement - West of Tsing Lung Tau	Chun Wo Construction & Engineering Co Ltd	Mouchel-Halcrow JV	SG100/100	525
May-07	CV/2004/05 Maintenance Dredging	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG100/100	2,100
Aug-07	Dredging Project in Lai Chi Kok Shipyard	Maritime Mechanic Ltd	NA	SG100/100	525
Aug-07	6/WSD/06 Construction of Salt Water Supply System for Penny's Bay	Univic Engineering Ltd	Water Supplies Department	SG100/100	1,050
Nov-07	Permanent Aviation Fuel Facility Hong Kong International Airport (Contract No. H2104)	UDL Dredging Ltd	Babtie Asia Ltd	SG100/100	1,050
Dec-07	Seawall Modify, Tuen Mun Area 38	Cheer Engineering Ltd	Scott Wilson Ltd	SG100/100	525
May-08	DC/2007/10 Design and Construction of HK West Drainage Tunnel	Tapbo Civil Engineering Co Ltd	Ove Arup & Partners HK Ltd	SG100/100	5,486
Sep-08	CV/2006/05 Maintenance of Seawalls and Navigation Channels	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG100/100	6,825
Sep-08	Marine Works at Maldives	Kwan Sing Engineering & Construction Co Ltd		SG100/100	525
Nov-08	DC/2007/06 River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River	Kwan Lee Construction Co Ltd	Maunsell Consultants Asia Ltd	SG100/100	10,500
Mar-09	DC/2007/01 Drainage Improvement Works in Ki Lun Tsuen, Kwu Tung, Ma Tso Lung and Sha Ling	Shanghai Urban Construction Group Corp	Mott Connell Ltd	SG100/100 SG40/40	7,875 71,925



Jun-09	CHEC247 Lamma Power Station - Navigation Channel Improvement	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG100/100	7,350
Jan-10	Tsing Yi	Sam Woo Bore Pile Foundation Ltd		SG110/110	525
Feb-10	HY/2009/11 Central - Wanchai Bypass - North Point Reclamation	China Harbour Engineering Co UDL Ship Management Ltd	AECOM Asia Co Ltd	SG110/110 SG110/110	21,541 1,050
Mar-10	KL/2009/01 Site formation for Kai Tak Cruise Terminal Development	Penta-Ocean Construction Co. Ltd Kwan Sing Construction Ltd Crown Asia Engineering Ltd	Scott Wilson Ltd	SG110/110 SG110/110 SG110/110	28,875 5,775 1,050
Apr-10	TK/2009/01 Infrastructure Works at Town Centre South and Tiu Keng Leng, Tseung Kwan O	Shun Tat Construction Engineering Ltd	Meinhardt (C&S) Ltd	SG110/110 SG40/40	9,450 1,050
Apr-10	Lau Fau Shan	Wang Hip Iron Works Wirks Co Ltd		SG110/110	525
May-10	HK/2009/01 Wan Chai Development Phase II Central Wanchai Bypass	Leader Civil Engineering Corp Ltd Chun Wo-Leader Joint Venture	AECOM Asia Co Ltd	SG110/110 SG110/110	5,250 28,875
Jun-10	9/WSD/08 Laying of Western Cross Harbour Main and Associated Land Main Form West Kowloon to Sai Ying Pun	Shun Tat Construction Engineering Ltd	Mott Connell Limited	SG110/110	10,470
Oct-10	DC/2007/12 Design and Construction of Tsuen Wan Drainage Tunnel	Shun Tat Construction Engineering Co Ltd	Hyder Consulting Ltd	SG110/110	2,100
Oct-10	TP/2010/02 Cycle Tracks from Sheung Shui to Ma On Shan	Richwell Machinery Engineering Ltd	Civil Engineering and Development Department	SG110/110	525
Dec-10	CV/2010/03 Maintenance Contract for Seawalls and Navigation Channels	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG110/110	12,075
Dec-10	HK/2009/02 Wan Chai Development Phase II	Tung Wo Engineering Co Ltd Chun Wo-CRGL Joint Venture	AECOM Asia Co Ltd	SG110/110 SG110/110	4,200 2,625
Jan-11	HY/2009/15 Central-Wanchai Bypass-Tunnel Causeway Bay Typhoon Shelter	Shun Tat Construction Eng Ltd China State Engineering Co Ltd Tung Wo Engineering Ltd Hong Kong River Engineering Co Ltd	AECOM Asia Co Ltd	SG110/110 SG110/110 SG110/110 SG110/110	50,400 2,625 1,050 10,831
Jan-10	DC/2008/09 Submarine outfall Aberdeen	Paul Y Construction Co Ltd	AECOM Asia Co Ltd	SG110/110	525
Jan-10	KL/2008/07 Kai Tak Development - Advance	Crown Asia Engineering Ltd	AECOM Asia Co Ltd	SG110/110	1,050
Jan-10	DC/2011/04 Reconstruction, improvement and rehabilitation of Kai Tak River	Leader - Sunnic JV	Scott Wilson Ltd	SG110/110	525
Jan-11	CV/2009/02 Handling of surplus public fill	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG110/110	525
Mar-11	HK/2010/06 Wanchai Development Phase II-Central- Wanchai Bypass over MTR Tsuen Wan Line	Leader Civil Engineering Corp Ltd Gammon Construction Ltd	AECOM Asia Co Ltd	SG110/110 SG110/110	8,400 1,575



Apr-11	HY/2009/19 Central-Wanchai Bypass-Tunnel (North Point Section)	S W Marine Works Ltd Chun Wo Foundations Ltd Cheer Engineering Ltd	AECOM Asia Co. Ltd	SG110/110 SG110/110 SG110/110	3,150 19,950 525
May-11	DC/2009/13 Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan	Leader Civil Engineering Corp Ltd	Scott Wilson CDM Joint Venture	SG110/110	1,575
May-11	DC/2009/22 Drainage Improvement Works in Shuen Wan, Tai Po- Contract 1	Kwan Lee-Kuly Joint Venture	AECOM Asia Co. Ltd	SG110/110	2,625
Jul-11	SIL (E) 903 Stage 2 Ocean Park Station Wong Chuk Hang Station, Viaducts and Aberdeen Channel Bridge	Leighton Contractors (Asia) Ltd Cheer Engineering Ltd	Vector International Ltd	SG110/110 SG110/110	4,725 1,575
Aug-11	KL/2010/02 Kai Tak Approach Channel Improvement Works Stage 1	Kwan Sing Contractors Ltd	AECOM Asia Co. Ltd	SG110/110	7,350
Sep-11	DC/2010/02 Drainage Improvement Works in Shuen Wan And Shek Wu Wai	Kwan Lee-Kuly Joint Venture	Drainage Services Department	SG110/110	10,500
Oct-11	DC/2007/16 Design and Construction of Lai Chi Kok Transfer Scheme	Fortress Development Ltd	Maunsell Consultants Asia Ltd	SG110/110	2,100
Dec-11	HY/2010/02 HK-Zhuhai-Macau Bridge - HK Boundary Crossing Facilities Reclamation Works	China Harbour Engineering Co Ltd Sharon Asia Waste Sorting Eng Ltd Chung Kong Marine Engineering Ltd	Ove Arup & Partners HK Ltd	SG110/110 SG110/110 SG110/110	68,775 525 10,500
Jul-12	GSPD/SP/TKW-NP/089/2011 Installation of Submarine Gas Pipeliners and Associated Facilities from to Kwa Wan to North Point	Macdow - Kaden Joint Venture	Mott Connell Limited	SG110/110	3,150
Aug-11	HY/2011/03 HK-Zhuhai Macau Bridge - Hong Kong Link Road - Scenic Hill and Hong Kong Boundary Crossing Facilities	China State Construction Eng (HK) Ltd Hong Kong River Eng Co Ltd Will Pak Eng Ltd	Ove Arup & Partners HK Ltd	SG110/110	23,100
Mar-13	1017EM10 Kai Tak Former Runway	Crown Asia Engineering Ltd	Civil Engineering and Development Department	SG110/110	1,050
Mar-13	2/WSD/09 Salt Water Supply for Northwest New Territories - Construction of Lok On Pai Salt Water Pumping Station and Associated Works	Sunrise Enterprises Ltd	Water Supplies Department	SG40/40	525
Apr-13	Yuen Long	Kwong Wah Electrical Co Ltd	-	SG40/40	525
May-13	HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West	Hong Kong River Engineering Co Ltd China State - Leader JV	AECOM Asia Co. Ltd	SG110/110 SG110/110	41,475 525
Jun-13	SCL1111 Hung Hom North Approach Tunnels	Gammon - Kaden Joint Venture	AECOM Asia Co. Ltd	SG40/40	19,425



Aug-13	Near Hoi Sum Park, King Wan, Tokuawan	Hong Kong Marine Contractors Ltd		SG110/110	525
Sep-13	HY/2012/07 Tuen Mun - Chek Lap Kok Link-Sothorn Connection Viaduct Section	Gammon Construction Ltd	AECOM Asia Co. Ltd	SG110/110	8,925
Oct-13	Mongkok	S W Marine Works Ltd		SG110/110	525
Jan-14	2/WSD/09 Construction of Lok On Pai salt water pumping station and associated works	CPC Construction Hong Kong Ltd	Water Supplies Department	SG40/40	1,050
Jan-14	CV/2013/02 Maintenance contract for seawalls and navigation channels	China Harbour Engineering Co Ltd	Civil Engineering and Development Department	SG110/110	25,725
Feb-14	16/WSD/11 Replacement and rehabilitation of water mains at Peng Chau, Sunshine Island and Hei Ling Chau	MIRDTEC HK Ltd.	AECOM Asia Co. Ltd	SG110/110	2,625
Mar-14	New World Centre Remodeling at Salisbury Road	Kaden Construction Ltd		SG110/110	1,050
Apr-14	KL/2011/01 Kai Tak Development - Reconstruction and Upgrading of Kai Tak Nullah	Chit Cheung Construction Co Ltd	AECOM Asia Co. Ltd	SG110/110	2,100
Jul-14	CV/2013/05 Construction of Cycle Parking Area near Yung Shue ferry pier, Lamma Island	Tak Cheong Construction Co Ltd	Civil Engineering and Development Department	SG110/110	525
Oct-14	MTRC SIL (E) 902 Nam Fung Tunnel and Ventilation Buildings	Nishimatsu Construction Co. Ltd	Scott Wilson Ltd	SG110/110	7,875
Nov-14	HY/2010/08 Central-Wanchai Bypass-Tunnel (Slip Road 8 Section)	Shun Tat Construction Eng Ltd	AECOM Asia Co Ltd	SG110/110	3,150
Jan-15	SCL1121 Shatin to Central Link - NSL Cross Harbour Tunnel	Penta Ocean - China State JV	AECOM Asia Co. Ltd	SG110/110	17,850
Apr-15	KL/2013/01 Site Formation for Kai Tak Cruise Terminal Development - Remaining Works	Zhen Hua Engineering Company Limited	URS Hong Kong Ltd	SG110/110	15,750
May-15	Yau Tong Bay Redevelopment - Land Decontamination Works	Hong Kong River Engineering Co Ltd	AECOM Asia Co Ltd	SG110/110	2,100
Sep-15	MTRC810A West Kowloon Terminus Station North	Leighton - Gammon JV	AECOM-Aedas JV	SG110/110	11,025
Oct-15	Private job in Crooked Island	Maritime Mechanic Ltd		SG110/110	1,050
Nov-15	Private job in Tung Chung	Fortress Development Ltd		SG110/110	525
Jan-16	MTRC810B West Kowloon Terminus Station South	Laing O'Rourke - Hsin Chong - Paul Y. Joint Venture Tapbo Civil Engineering Co Ltd	AECOM - Aedas JV	SG110/110	1,050



Jan-16	Proposed revitalization of Avenue of Star and east TST Promenade Waterfront	Kaden Construction Ltd		SG110/110	1,050
Feb-16	HY/2013/01 HKZMB - Construction of Passenger Clearance Building	Leighton-Chun Wo Joint Venture	AECOM Asia Company Limited	SG110/110	2,100
Mar-16	KL/2014/01 Kai Tak Development - Stage 2 Infrastructure Works for Developments at Southern Part of the Former Runway	CEC-CCC Joint Venture	AECOM Asia Company Limited	SG110/110	525
Mar-16	1/WSD/15 Term Contract for Waterworks District E - New Territories East	Yick Sing Civil Engineering Ltd	Water Services Department	SG110/110	2,625
Mar-16	Fill Bank at Tuen Mun Area 38	Fortress Development Ltd	CH2M Hill (China) Limited	SG110/110	525
May-16	SCL 1128 Causeway Bay Typhoon Shelter to Admiralty Tunnels	Dragages-Bouygues J.V. Tapbo Civil Engineering Co Ltd	VSL	SG110/110	525



G AND E COMPANY LIMITED

14/F Kiu Yin Commercial Building
361 - 363 Lockhart Road,
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	Jan 2016
Project	Proposed revitalization of Avenue of Star and east TST Promenade Waterfront
Client	New World Development
Main Contractor	Kaden Construction Ltd
Works	Silt Protector
Material	Woven Geotextile Bontec SG110/110
Quantity	1,050 sqm



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website: www.g-and-e.com



Date	Jan 2015
Project	Contract No. SCL1121 Shatin to Central Link - NSL Cross Harbour Tunnel
Client	MTRC
Consultant	AECOM Asia Co. Ltd
Main Contractor	Penta Ocean - China State JV
Works	Silt Curtain
Material	Woven Geotextile Bontec SG110/110
Quantity	8,400 sqm



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Date	May 2014
Project	HY/2012/07 Tuen Mun - Chek Lap Kok Link- Sothern Connection Viaduct Section
Client	Highway Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Gammon Construction Ltd
Material	Woven geotextile Bontec SG110/110
Works	Silt Protector
Quantity	8,925 sqm



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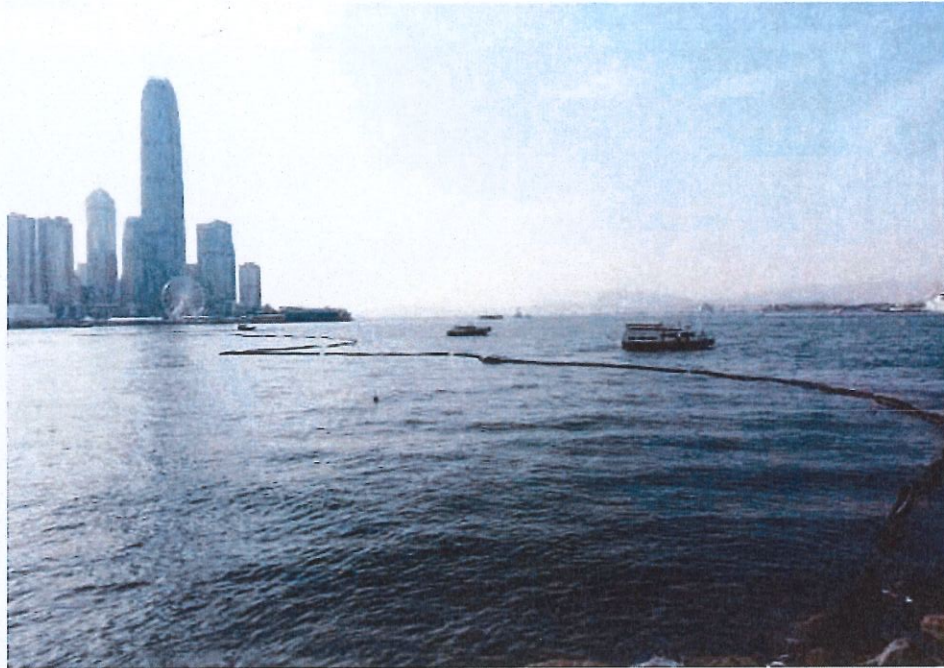


Date	Nov 2014
Project	Contract No. HY/2010/08 Central-Wanchai Bypass - Tunnel (Slip Road 8 Section)
Client	Highway Department
Consultant	AECOM Asia Co Ltd
Main Contractor	China State Construction Engineering (HK) Ltd
Works	Silt Curtain
Material	Woven Geotextile Bontec SG110/110
Quantity	1,575 sqm



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Date	May 2013
Project	Contract No. HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West
Client	CEDD
Consultant	AECOM Asia Co. Ltd
Main Contractor	China State Construction Engineering Co. Ltd
Works	Silt Curtain
Material	Woven Geotextile SG110/110
Quantity	42,000 sqm



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Date	June 2013
Project	Contract No: HY/2011/03 HK-Zhuhai Macau Bridge Hong Kong Link Road - Scenic Hill and Hong Kong Boundary Crossing Facilities
Client	Highway Department
Consultant	Ove Arup & Partners HK Ltd
Main Contractor	China State Construction Engineering
Works	Tailor-made Silt Protector
Material	Woven Geotextile Bontec SG110/110



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Date	Jan 2014
Project	Contract No. CV/2013/02 Maintenance contract for seawalls and navigation channels
Client	CEDD
Consultant	CEDD
Main Contractor	China Harbour Engineering Co Ltd
Works	Silt Protector
Material	Woven Geotextile Bontec SG110/110



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Date	Feb 2014
Project	Contract No. DC/2011/04 Reconstruction, improvement and rehabilitation of Kai Tak River from Wong Tai Sin Police Station to Tung Tau II Estate
Client	Drainage Service Department
Consultant	Scott Wilson Limited
Main Contractor	Leader - Sunnic JV
Works	Silt Curtain to Kai Tak Nullah
Material	Woven geotextile SG110/110



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Date	Dec 2011
Project	Contract No. HY/2010/02 HK-Zhuhai-Macau Bridge - HK Boundary Crossing Facilities Reclamation Works
Client	Highway Department
Consultant	Ove Arup & Partners HK Ltd
Main Contractor	China Harbour Engineering Co Ltd
Works	Tailor-made Silt Protector
Material	Woven Geotextile Bontec SG110/110



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Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	November 2005
Project	Contract No. HY/2002/26 Stonecutters Bridge
Client	Highway Department
Consultant	Ove Arup and Partners HK Ltd
Main Contractor	Hong Kong River Engineering Co Ltd Maeda - Hitachi - Yokogawa - Hsing Chong Joint Venture
Material	Woven geotextile Bontec SG110/110
Works	Tailor-made Silt Curtain
Size	1,050 sqm



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Date	May 2011
Project	Contract No. DC/2009/22 Drainage Improvement Works in Shuen Wan, Tai Po
Client	Drainage Service Department
Consultant	AECOM (Asia) Ltd
Main Contractor	Kwan Lee - Kuly Joint Venture
Works	Separation
Material	Woven geotextile SG110/110



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Date	June 2013
Project	Contract No. HY/2009/15 Central-Wanchai Bypass-Tunnel (Causeway Bay Typhoon Shelter Section)
Client	Highway Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	China State Construction Engineering (HK) Limited
Works	Tailor-made Silt Curtain
Material	Woven Geotextile Bontec SG110/110



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Wanchai, Hong Kong

Tel: 852-2570 0103 Fax: 852-2570 0089

website: www.g-and-e.com



Date	March 2010
Project	Contract No. HK/2009/01 Wan Chai Development Phase II -Central - Wanchai Bypass at Hong Kong Convention and Exhibition Centre
Client	Civil Engineering and Development Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Chun Wo - Leader Joint Venture
Materials	Woven Geotextile SG110/110
Size	34,125 sqm
Application	Intake Silt Curtain



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website: www.g-and-e.com



Date	March 2010
Project	KL/2009/01 Site formation for Kai Tak Cruise Terminal Development
Client	CEDD
Consultant	Scott Wilson Ltd
Main Contractor	Penta-Ocean Construction Co. Ltd
Materials	SG110/110
Size	1,050 sqm



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Date	May 2014
Project	HY/2012/07 Tuen Mun - Chek Lap Kok Link- Sothorn Connection Viaduct Section
Client	Highway Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Gammon Construction Ltd
Works	Silt Curtain
Material	Woven geotextile Bontec SG110/110



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Date	March 2010
Project	Contract No. DC/2007/01 Drainage Improvement Works in Ki Lun Tsuen, Kwu Tung, Ma Tso Lung and Sha Ling
Client	Drainage Services Department
Consultant	Mott MacDonald
Main Contractor	Shanghai Urban Construction (Group) Corporation
Material	Woven Geotextile Bontec SG110/110 Woven Geotextile Bontec SG40/40



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Date	April 2011
Project	Contract No. HY/2009/11 Central - Wanchai Bypass - North Point Reclamation
Client	Highways Department
Consultant	AECOM Asia Ltd
Main Contractor	China Harbour Engineering Company
Works	Tailor-made Silt Curtain
Materials	Woven Geotextile SG110/110
Quantity	22,066 sqm



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Date	May 2004
Project	Contract No. CV/2001/12 Reconstruction of Cheung Chau and Wu Kai Sha Public Piers
Client	Civil Engineering and Development Department
Engineer	Civil Engineering and Development Department
Main Contractor	Hong Kong and Macau Scent On Engineering & Construction Ltd
Works	Tailor-made Silt Curtain
Material	Woven Geotextile Bontec SG110/110



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Date	October 2006
Project	Lamma Island Cable Landing
Client	Hong Kong Electric Co Ltd
Consultant	Hong Kong Electric Co Ltd
Main Contractor	United Marine Co Ltd
Works	Tailor-made Silt Curtain
Material	Woven Geotextile SG110/110
Quantity	2,100 sqm



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website: www.g-and-e.com



Date	March 2006
Project	Contract No. HY/2005/06 Castle Peak Road Improvement West of Tsing Lung Tau
Client	Highway Department
Consultant	Mouchel Halcrow JV
Main Contractor	Chun Wo Construction & Engineering Co., Ltd.
Material	Woven Geotextile Bontec SG110/110
Works	Tailor-made Silt Curtain
Quantity	1,050 sqm



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Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	February 2005
Project	Contract No. CV/2003/06 Stanley Waterfront Improvement Project - Construction Pier &
Client	Civil Engineering and Development Department
Consultant	Civil Engineering and Development Department
Main Contractor	Sun Fook Kong (Civil) Ltd
Works	Silt Curtain - SG110/110
Quantity	2,080 sqm



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Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	May 2011
Project	Contract No. DC/2009/13 Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan
Client	Drainage Service Department
Consultant	Scott Wilson CDM Joint Venture
Main Contractor	Leader Civil Engineering Corp Ltd
Material	Bontec SG110/110 woven geotextile
Works	Silt Curtain



**Bontec SG110/110
Woven Geotextile**

Approval Letters

**ENGINEER'S OFFICE
BLACK & VEATCH
HONG KONG LTD.**

25th Floor, Millennium City 6
392 Kwun Tong Road, Kowloon, Hong Kong.
Tel : 2601 1000
Fax : 2601 3988



**ENGINEER'S
REPRESENTATIVE'S
OFFICE**

Butterfly Valley Fresh Water Primary Service Reservoir
Kowloon, Hong Kong
(Not a postal address)

Your ref. : C9103/BVSR/WF/0076/10/13
Our ref. : 4991/(4/WSD/11)/M25/120/L100071

Date: 22 October 2013

Contract: 4/WSD/11 Project Office
c/o China Geo – Engineering Corporation
Rooms 2421-2425, 24/F, Sun Hung Kai Centre
30 Harbour Road
Wan Chai
Hong Kong

By Hand

Attn: Mr. Wong Fai (Site Agent)

Dear Sirs,

**Agreement No. CE 55/2008 (WS)
Contract No. 4/WSD/11
Construction of Butterfly Valley Fresh Water Primary Service Reservoir Extension and
Associated Mainlaying
Material Submission – Geotextile Filter**

We refer to your letter of 10 October 2013 supplementing the additional information for your proposal to use the following material:

<i>Item</i>	<i>Material</i>	<i>Manufacturer</i>	<i>Supplier</i>
1.	Geotextile Filter	Bonar Technical Fabrics	G & E Co. Ltd.

Please be advised that we have no objection in principle to your proposal, provided that the application of such materials shall be in full compliance with the manufacturer's recommendations and the Contract Specification.

You are reminded, pursuant to PS Clause 7.196S(3)(d), to provide the sieve size of the base soil upon collection of soil sample on Site for our information.

Yours faithfully,

Peter K H Ng
Engineer's Representative

PNg/AC/JT/dt



Drainage Services Department
 Drainage Projects Division
 44/F, Revenue Tower, 5 Gloucester Road,
 Wan Chai, Hong Kong

渠務署
 排水工程處
 香港灣仔告士打道5號
 稅務大樓44樓

來函編號 Your Ref: KLKJV/DC201002/140/0173
 本署編號 Our Ref: () in DP/B/4109CD/DC1002/30
 電話 Tel: (852) 2435 7031
 傳真 Fax: (852) 2827 8700

By fax and post
 (Fax No. 2674 6688)

29 August 2011

Kwan Lee -- Kuly Joint Venture
 Unit 6, 16/F Yuen Long Trading Centre,
 33 Wang Yip Street West,
 Yuen Long, N.T.

(Attention: Mr. CHAN Wing-kai -- Project Manager)

Dear Sirs,

Contract No. DC/2010/02
 Drainage Improvement Works in Shuen Wan and Shek Wu Wai

Material Submission - Type B Geotextile

I refer to your above quoted letter dated 19 August 2011 and the attached email dated 29 August 2011 enclosing further information in response to the comments given in my letter dated 25 August 2011 regarding the captioned subject.

Please be advised that I have no objection to your proposal of using "Bontec SG110/110 Woven Polypropylene Type B Geotextile" manufactured by "Bonar Technical Fabrics" and supplied by "G and E Company Limited" as the geotextile filter Type B / Geotextile Type 2 for this Contract subject to its satisfactory performance on site.

Yours faithfully,

(W. L. YIP)

Engineer's Representative
 Drainage Projects Division
 Drainage Services Department

Encl.

cc. DC/2010/02 Site Office

Internal (to note in file): E/D19

WLY/



AECOM
8/F Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, Hong Kong
www.aecom.com

+852 2605 6262 tel
+852 2691 2649 fax

D1045

RECEIVED
08 JUN 2011

BY:.....

Your Ref.: KLKJV/DC200922/M60/1498
Our Ref.: (DC/2009/22)/R20/106(0019)

8 June 2011

Kwan Lee – Kuly Joint Venture
Unit 6, 16/F, Yuen Long Trading Centre
33 Wang Yip Street West, Yuen Long
New Territories, Hong Kong

Shuen Wan RE's Office
Fo Chun Road, Pak Shek Kok, Tai Po, H.K.
T +852 2603 6933
F +852 2603 7998

Attn : Mr. WONG Ching Lung (Site Agent)

Dear Sirs

Contract No. DC/2009/22
Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1

Material Submission – Type B Geotextile

I refer to your above referenced letter dated 31 May 2011 enclosing further information in response to the comments given in my letter ref. (0017) in the same series dated 27 May 2011 on the captioned material submission for my approval.

Please be advised that I have no objection to your proposal of using "Bontec SG 110/110" manufactured by "Bonar Technical Fabrics Company" and supplied by "G & E Company Limited" as the geotextile filter Type B / Geotextile Type 2 for this Contract subject to its satisfactory performance on site.

You are reminded to strictly follow the manufacturer's guidelines on storage, handling and installation procedures for application of the material.

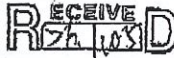
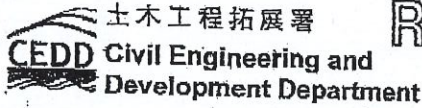
Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.


Eddie LUK
Resident Engineer
Water & Urban Development

cc AECOM - Attn : Mr. Joseph HO
M/F

EL/VH/pc
✓\

Reg No 1396



土木工程處
Civil Engineering Office

Web site 網址 : <http://www.cedd.gov.hk>
E-mail 電子郵件 :
Telephone 電話 : (852) 2760 5737
Facsimile 傳真 : (852) 2714 2054
Our reference 本署編號 : () in PW WC/CV0402/R20/340 Pt.1
Your reference 來函編號 : KS330/2005

香港九龍公主道101號
土木工程拓展署大樓四樓
4/F, Civil Engineering and
Development Building,
101 Princess Margaret Road,
Kowloon, Hong Kong

Kin Shing Construction Company Limited
1/F,
27 Yin Chong Street,
Mong Kok
Kowloon
(Attn.: Mr. Patrick P K Chau – Site Agent)

24 January 2005

BY MAIL & FAX No. 2780 2035

Dear Sirs,

Contract No. CV/2004/02
Reconstruction of Wong Shek and Ko Lau Wan Public Piers

Material Submission – Geotextile for Silt Curtain

I refer to your letter of 14.1.2005 enclosing the particulars of the geotextile for fabrication of silt curtain.

In accordance with PS Clause 26.08(2), the proposed "SG 100/100" woven geotextile manufactured by Bonar Technical Fabrics is approved to be used under the captioned Contract.

Pursuant to PS Clause 26.08(1), you are required to submit details of the silt curtains 3 weeks before their deployment.

Contract No.	Initial	Copy	Action
CM	✓		
PM	✓		
SA			
Sub-A	✓		
Eng.(1)	✓		
Eng.(2)			
G.F.			
Formal			
Q.S.	✓		
Safety	✓		
Material	✓		
Survey			

Yours faithfully,

(W H LEE)

Engineer's Representative
Port Works Division
Civil Engineering and Development Department

c.c.
S10W/P2B – Site Copy

cls

24-FEB-2005 18:57 FROM SFK

TO 25700089

P.01/01

10:1 7010L

CEDD Civil Engineering and Development Department

Web site 網址 : <http://www.cedd.gov.hk>
 E-mail 電子郵件 :
 Telephone 電話 : (852) 2762 5035
 Facsimile 傳真 : (852) 2714 2054
 Our reference 本署檔案 : (15) in PW WC/CV0306/R20/340 Pt.01
 Your reference 來函編號 : CIV-002091/1.2/HW/SY/CC/mc(S0087), CIV-002091/1.2/HW/SY/CC/mc(S0118)

土木工程處
 Civil Engineering Office

112

香港九龍公主道 101 號
 土木工程發展部大樓 4 樓
 4/F, Civil Engineering and Development Building,
 101 Princess Margaret Road,
 Kowloon, Hong Kong

18 February 2005

Sun Fook Kong (Civil) Limited
 Rms. 3207-10,
 Great Eagle Centre,
 23 Harbour Road,
 Wan Chai,
 Hong Kong
 (Attn: Mr. Howard KONG - Fax No.2827 6275)

Dear Sirs,

Contract No. CV/2003/06
Stanley Waterfront Improvement Project -
Construction of Pier and Boardwalk

Fabric for Silt Curtain

I refer to your above letters dated 21.1.2005 and 15.2.2005 proposing the SG100/100 fabric supplied by "Bonar Technical Fabrics" for silt curtain.

I have no objection to your proposed material for silt curtain.

Yours faithfully,

Paul YK MA
 (Paul YK MA)

Engineer's Representative
 Port Works Division
 Civil Engineering and Development Department

c.c.
 Site Office (Attn: S10W/P1A)
 CEG/P1A

File PW WC/CV0306/M10/300

YKM/ama

Post-It® Fax Note	7871	Date	24/2/05
To	MR. STANLEY WAN	From	CHANG SIK HO
Co./Dept.	G&E	Co.	SEK
Phone #	25700026	Phone #	63417003
Fax #	25700009	Fax #	

Maunsell Consultants Asia Ltd

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, N.T., Hong Kong

茂盛(亞洲)工程顧問有限公司

香港新界沙田鄉委會路 138 號新城市中央廣場第 2 座 8 樓

T +852 2605 6262 F +852 2691 2649 www.maunsell.aecm.com

SRE's Office T +852 2669 0708 F +852 2631 2889 E sre@triv.com.hk

Your Ref. : DC0706/M1.2/1512 & 1529
Our Ref. : (DC/2007/06)/R20/106(0023)

Chiu Hing Construction & Transportation Co. Ltd.
Room 201, 2/F Fuk Shing Commercial Building
28 On Lok Mun Street
On Lok Tsuen, Fanling
New Territories, Hong Kong

Attn : Mr. Roger Lau (Site Agent)

13 November 2008

Dear Sir,

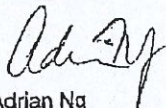
Contract No. DC/2007/06
River Improvement Works in Upper Lam Tsuen River,
She Shan River and Upper Tai Po River

Proposed Geotextile at Gabion Wall in She Shan River and Upper Tai Po River

I refer to your letter dated 7 November 2008 and 12 November 2008 respectively..

Please be advised that since the water flow rate of the proposed geotextile model Bontec SG100/100 meets the requirements in accordance with P.S. Clause 7.150, I have no further objections to your proposed use of woven geotextile model Bontec SG100/100, supplied by "G and E Company Ltd." at gabion wall in She Shan River and Tai Po River, subject to its satisfactory performance on site.

Yours faithfully,



Adrian Ng
Resident Engineer

cc MCAL - Attn : Mr. Conder Yan
Chiu Hing H.O.

AN/BC/ek

RECEIVED
13 NOV 2008

BY:



**Bontec SG110/110
Woven Geotextile**

G and E Company Introduction



G AND E COMPANY LIMITED

14/F Kiu Yin Commercial Building

361 – 363 Lockhart Road,

Wanchai, Hong Kong

Tel: 2570 0103

Fax: 2570 0089

website: www.g-and-e.com

G and E – a Perspective

G and E, founded in 1984, is a geosynthetics specialist who distributes a wide variety of geosynthetics from a list of renowned global manufacturers. The Company also manages a competent installation contracting service. To better serve our clients, design and engineering service have also been established in our portfolio. We aspire to provide our client comprehensive engineering solutions, from technical application and design, the supply of materials and their installation, to the conformance testing and project commissioning.

G and E takes a strong vision on geosynthetics application and development by working closely with international consultants, academics, professional organizations, research institutions, testing laboratories and renowned manufacturers, a mission to broaden the versatility of geosynthetics and its innovation.



Our vast product range covers:

Geotextile, geomembrane, geodrain, geocomposite, geogrid, geocell, band drain, erosion control systems, geosynthetic clay liner, rockfall barrier, gabion, geofoam, silt curtain, concrete mattress and geotextile container, extending a very wide scope of application in most civil, geotechnical and marine engineering.

We offer our clients:

- Extensive product knowledge and installation method statement
- Comprehensive services, application, design, contracting and commissioning
- Highly attentive and superior professional work
- Superb quality products at competitive price



G and E is ISO9001:2008 quality management certified, and a VSRS registered subcontractor. G and E has a remarkably successful working relationship with a long list of clients, the Government, project owners, contractors, designers, consultant engineers, overseas distributors and trading partners. The clientele extends to Macau, Southeast Asia and Southern China.

Talk to us today and see how we can work together for cost-effective and time saving solutions. We are stepping into our 32nd year in the field and have valuable experience to share with you.

ISO9001:2008



Product Endorsement



A Registered Subcontractor





G AND E COMPANY LIMITED

14/F Kiu Yin Commercial Building

361 – 363 Lockhart Road,

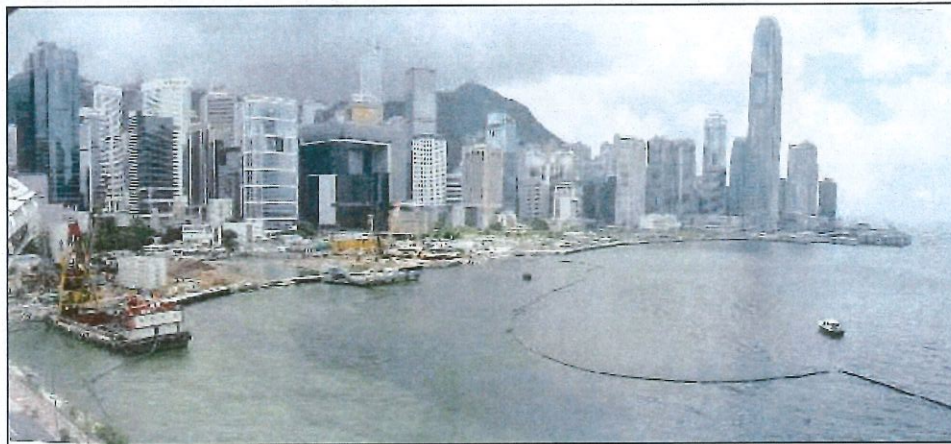
Wanchai, Hong Kong

Tel: 2570 0103

Fax: 2570 0089

website: www.g-and-e.com

G and E is a distribution network and sourcing agent of geosynthetics, as well as a provider of professional design and installation services.



Central – Wan Chai Bypass - seawall separation using heavy non-woven geotextile Bontec SNW120

The company handles a comprehensive range of geosynthetic materials:

<u>GEOTEXTILE:</u>	PP, PET woven, non-woven, thermal bonded, needle punched, spun bond, special weave & composite
<u>GEOMEMBRANE:</u>	HDPE, LLDPE, PVC, keyed preformed, tunnel lining, concrete protection liner, gas barrier, basement waterproofing, leakage collection & effluent containment
<u>GEODRAIN:</u>	Geonet, geocomposite, band drain, sheet drain & roof drain
<u>GEOGRID:</u>	HDPE, PET, PP for reinforced slope and wall, MSEW, stabilization geogrid, special composite
<u>EROSION CONTROL:</u>	Erosion mat, concrete mat, coir mat, geocell, gabion, rockfall mesh, flexible rockfall fence
<u>MARINE ENGINEERING:</u>	Silt curtain, turbidity control, block mat, geotextile tube, trash boom, geotextile container
<u>GCL:</u>	Geosynthetic clay liner, bentonite liner and composite
<u>HDPE PIPE:</u>	Sewer pipe, dual wall pipe, submarine outfall
<u>TUNNELING:</u>	GFRP rebar for soft eye, tunnel support & invert drainage
<u>SPECIAL SERVICE:</u>	Geomembrane leak location survey, HDPE pipe welding, HDPE lining repair

Dec 2015

Registration Certificate

This is to certify that the Management Systems of

G & E Company Limited

have been assessed by AJA Registrars and registered
against the requirements of

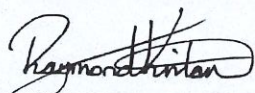
ISO 9001:2008

Certificate No. : **AJA14/17026** Date of Original Registration : **22/01/2014**

Expiry Date : **14/12/2016** Date of Re-Registration : **N/A**



0059


Chief Executive - AJA Registrars Ltd



This certificate is issued in respect of the locations & scope of registration detailed in the Associated Registration Schedule.
This certificate is the property of AJA Registrars Ltd Unit 6 Gordano Court Gordano Gate Business Park Serbert Close Portishead Bristol UK BS20 7FS
and must be returned on request. A member of the AJA Group of Companies

Geonia® is a registered trademark of DAEYOUN GEOTECH.

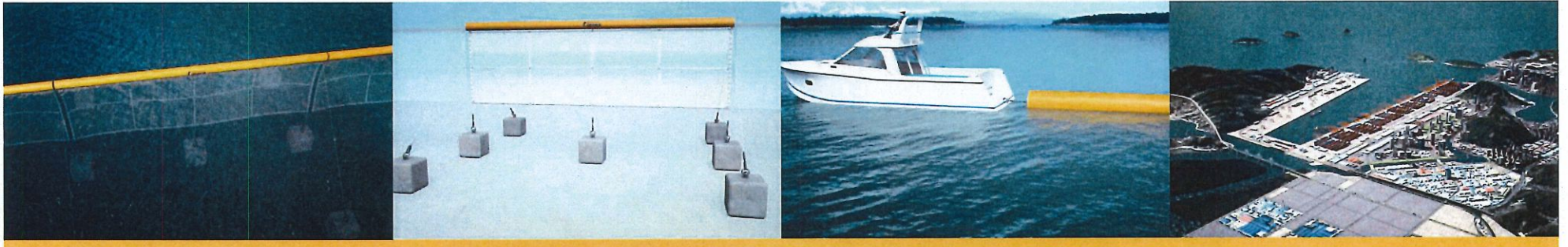
www.DYGEOTECH.com



GEONIA®

Silt Protector

We develop geosynthetics, under the mission of protecting environment as well as human, and supplying highly efficient and cost-effective solutions to global clients.



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Printed in Jun. 2015

DAEYOUN
GEOTECH



SILT PROTECTOR



PRODUCT

GEONIA® Silt Protector

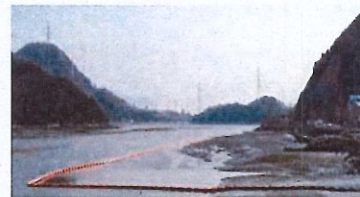
GEONIA® Silt Protector is a silt fence installed in water for preventing spread of environmental contaminants induced by coastal and riverside construction. Leakage of silt from marine and sewage constructions has a serious influence on marine resources and natural environment of surrounding regions.

GEONIA® Silt Protector is used to preserve the natural environment and protect marine resources. By blocking a specific water zone with a special membrane composed of high strength synthetic fiber, soil particles that occur in the area are filtered and precipitated to prevent leakage and spread of silt water.



Application

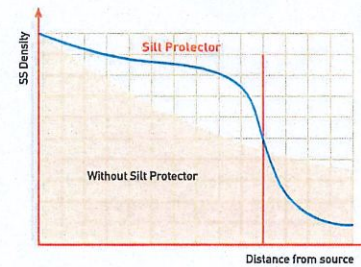
- Protection of sea farming and swimming beach from nearby coastal construction
- Reclamation Protection
- Protection of revetment contamination
- Revetment of contaminant



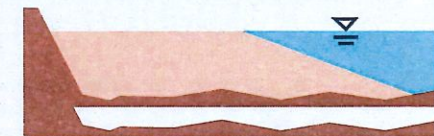
Function

The main function of the GEONIA® Silt Protector is to enclose turbidity and to minimize the influences on outside sensitive areas. Enclosed by Silt Protector, current velocity inside is much lower than outside velocity. This means the GEONIA® Silt Protector is accelerating sedimentation of silt by reducing the flow of velocity.

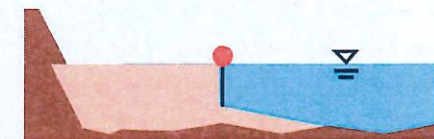
- The acceleration of the settlement of silt by interference of particles – The installation of GEONIA® Silt Protector suppresses the diffusion of the pollution and make the soil particles interfere with each other to accelerate their settlement.
- The reduction of distance required to settle the silt – As shown, the installation of GEONIA® Silt Protectors narrows the settlement range, resulting in minimizing the diffusion of pollution after the unit.



Without GEONIA® Silt Protector



With GEONIA® Silt Protector

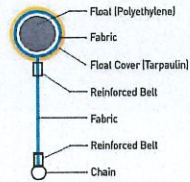
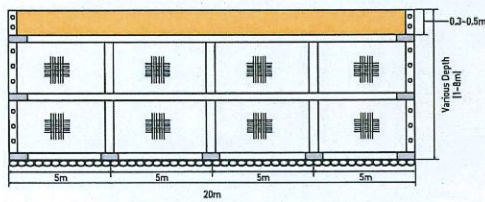


GEONIA® SILT PROTECTOR

TYPES

Tube Type

High external force of tide, wave and wind.



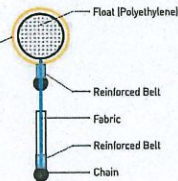
Durable Tube Type

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



A broken PVC coated fabric in a part of the float

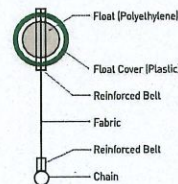
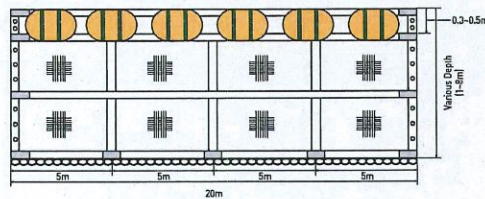
A durable fabric for the float using high tenacity colored yarn



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

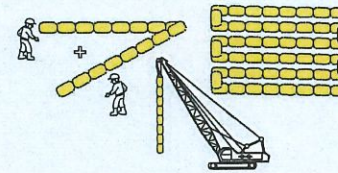
Less external force than tube type / easy to install



INSTALLATION

Installation of Tube Type GEONIA® Silt Protector

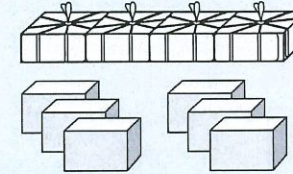
Assembly



Connect each unit of Silt Protectors (Assemble on land)



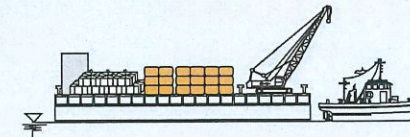
Production of Anchors



Make Ton Bag Anchors or Concrete Blocks



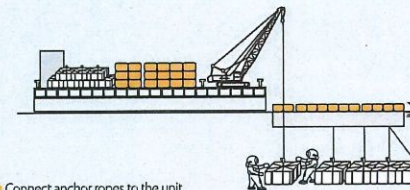
Transportation



Load on to barge and move to where you want to install



Installation



Connect anchor ropes to the unit



TON BAG ANCHOR



PRODUCT

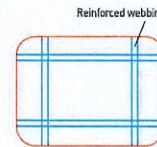
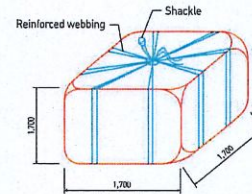
GEONIA® Ton Bag Anchor

The problem of the most commonly used concrete Anchor Block is that it is difficult to collect, a large area is required for assembly, dust scattering occurs and high payback leads to high expenses. In terms of environmental impact, the concrete's exposure to the sea may adversely affect the ecosystem.

GEONIA® Ton Bag Anchor has the advantage of overcoming the limitations and high cost of the concrete anchor.



Rubble being added to GEONIA® Ton Bag Anchor

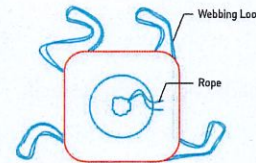


Comparison of Anchors

	Concrete Anchor	Ton Bag Anchor
Material	Concrete	Polypropylene
Recovery	Less than 50%	More than 90%
Production Area	A large area is required	A small area is required
Environmental	Generates dust scattering during production, adverse aquatic effects	Recyclable
Workability	Difficult to carry	Easy to handle



GEONIA® Ton Bag Anchor being installed



GEONIA® TON BAG ANCHOR is a perfect alternative, that overcomes all the problems of existing anchors in the economical, constructible and environmental aspects.

SPECIFICATION

GEONIA® Silt Protector

Property	Unit	TEST METHOD	DSP 15	DSP 20	DSP 25	DSP 30
Fabric Unit Weight	g/m ²	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 ~ 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/m ²	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 ~ 4 (α=1~9.9)	ASTM D 4491
Raw Material		Polypropylene	ASTM D 276
Size	m	1.5 × 1.5 × 1.5 1.6 × 1.6 × 1.6 1.7 × 1.7 × 1.7	

Appendix C – Specification of Geotextile Type A for Seawall Construction

Bontec® SNW 120

Superior Needle Punched Nonwoven Geotextiles

Technical data sheet

Product description

Polymer	Density	Melting Point	Construction
100% polypropylene	0,91 kg/dm ³	165 °C	Fibres

Properties

Mechanical Properties	Standard	Performance
Tensile strength MD - CMD	EN ISO 10319	70 kN/m - 70 kN/m
Elongation at maximum load MD - CMD	EN ISO 10319	70 % - 70 %
Grab strength MD - CMD	ASTM D 4632 (M-08 2013)	4000 N - 4000 N
Grab elongation MD - CMD	ASTM D 4632 (M-08 2013)	80 % - 80 %
Static puncture resistance (CBR)	EN ISO 12236	11,5 kN
Puncture resistance	ASTM D 4833	1600 N
Dynamic perforation resistance (cone drop)	EN ISO 13433	0 mm

Hydraulic Properties	Standard	Performance
Water permeability normal to the plane (Vlh50)	EN ISO 11058	20 l/m ² .s
Water flow in the plane at 20kPa - at 200 kPa	EN ISO 12958	8,5x 10 ⁻⁶ m ² /s
Permeability	BS 6906 Part 3	21 l/m ² .s
Characteristic Opening Size (O90)	EN ISO 12956	55 µm

Physical Properties	Standard	Performance
Thickness under 2 kPa	EN ISO 9863-1	6,5 mm
Thickness under 2 kPa	ASTM D 5199-02	6,5 mm
Weight	EN ISO 9864	1000 g/m ²
Weight	ASTM D 5261-10	1000 g/m ²
roll length - roll width		35 m - 5,25 m

Durability	Standard	Performance
Predicted minimal durability in natural soils with 4 < ph < 9 and soil temperatures <25°C	EN ISO 13438-A1	25 years
Maximum allowed time between installation and covering of the geosynthetics	EN 12224	2 weeks

The Quality Management System of Bonar has been approved to the ISO 9001 Quality Management System Standard. Certificates are available on request.





Material Submission: Geotextile Type A
NE/2015/02 TKO-LT Tunnel
Bontec SNW120



G AND E COMPANY LIMITED

14th Floor, Kiu Yin Commercial Building
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Tel: 2570 0103 Fax: 2570 0089 website: www.g-and-e.com

January 2017



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- 1) **Manufacturing Company Profile**

 - Bonar Company profile
- 2) **Product Specification**

 - Product Profile of Bontec SNW Geotextile
 - Bontec SNW120 Technical Data Sheet
 - PS and SNW120 Comparison
- 3) **Certification**

 - ISO 9001:2008 by BQA
 - ISO 14001:2004 by BQA
 - Certificate of Conformity of the Factory Production Control
 - Conformance Certificate
- 4) **Installation Guideline**

 - Recommendation on Installation
- 5) **List of Project Reference**

 - Name and detail of projects
- 6) **Approval Letter**

 - Approval letters for SNW120
- 7) **An Introduction to G and E Co. Ltd**

 - Why G and E Co. Ltd

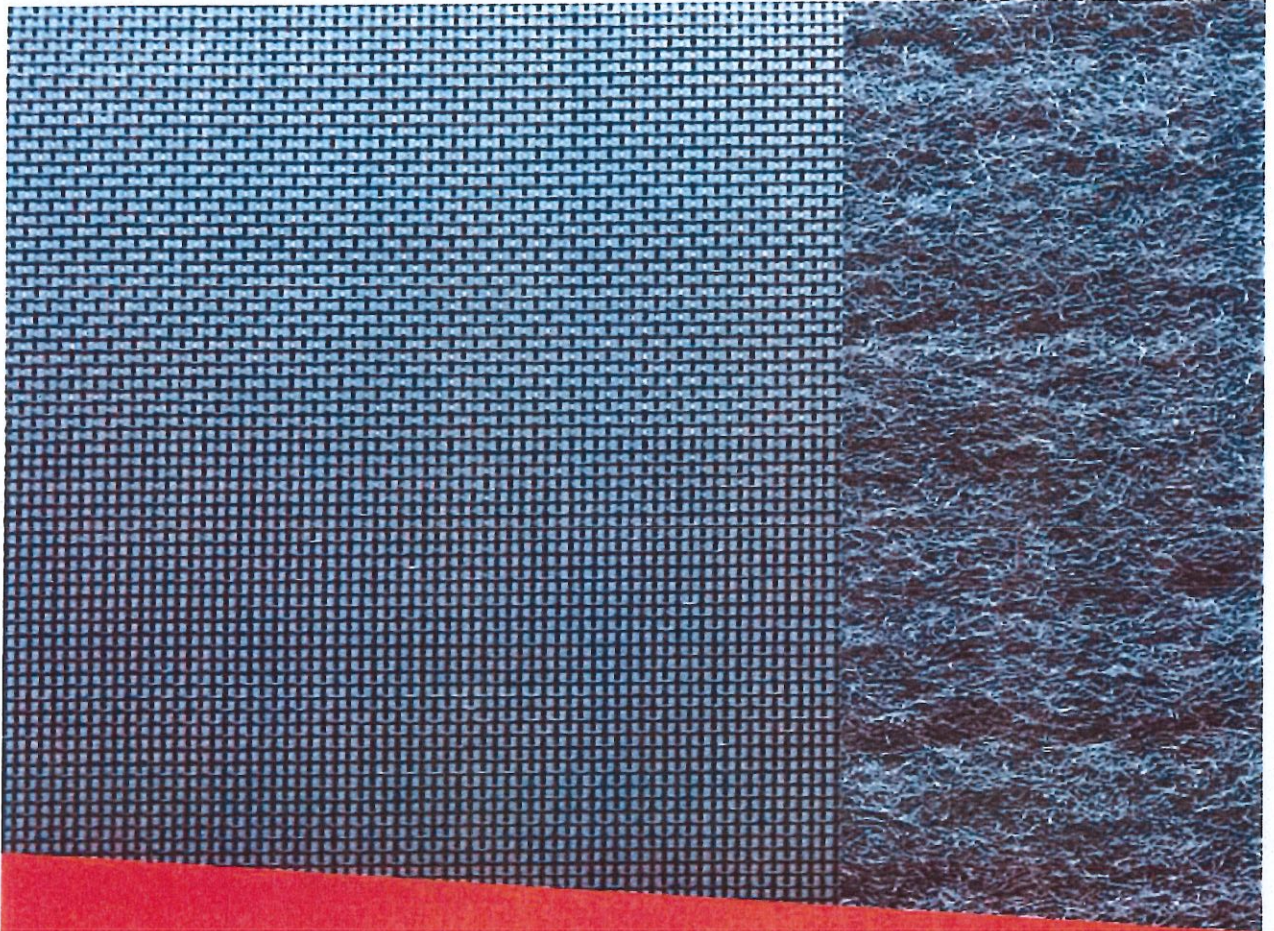


**Bontec SNW120
Non Woven Geotextile**

Manufacturing Company Profile

bontec

woven and nonwoven geotextiles



GEOTEXTILE

WE UNDERCOVER
THE WORLD



Bonar
partners in performance

Bontec Geotextile

Bontec is an internationally renowned brand of geotextiles. We have earned this reputation over the past thirty years thanks to our quality, service and flexible production processes. This flexibility is a result of the vertical integration of our production. We control the entire process – from raw materials to finished product – for both our woven and nonwoven varieties.

We are therefore not dependent upon the quality or delivery time of others, and we can guarantee your success. Our Bontec brand offers state of the art woven and nonwoven geotextiles that provide answers to meet all of your challenges. Thanks to continuous research and investment in the latest technology, we provide the best solutions for all possible functions of geotextiles.

Nonwoven process Woven process

Starting with polypropylene granules,

we extrude endless synthetic filaments. After stretching and shrinking, these filaments are cut into fibres.

These fibres are then deposited in layers by a crosslapper.

By means of our own unique process we needle punch the layers into each other, after which they are thermo fixated. The result is an extremely high performance geotextile.

Starting with polypropylene granules,

we extrude an endless synthetic foil. This foil is then cut into fine tapes.

After stretching, the tapes are wound on spools that form the basis of a beam. That beam feeds the loom in the machine direction.

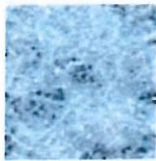
Subsequently the tapes are woven on a loom to a fabric with the desired specifications.



Nonwoven Geotextile

NW

Thermally Bonded Nonwoven Geotextiles



Produced by applying mechanical and thermal bonding processes. NW has the highest tensile strength of the range and is used primarily for lightweight separation and filtration. Its excellent hydraulic properties are ideal for use in filtration applications. Typical uses include the encapsulation of a trench drain.

VNW

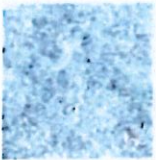
Nonwoven Needle Punched (Colored) Geotextile



Produced by needle punching colored polypropylene fibres. The range varies from 200 to 2,000 g/m². VNW is used for protection of membranes, as a component for drainage composites, or as a component for erosion control composites.

SNW

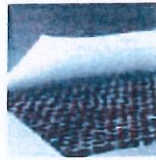
Superior Needle Punched Nonwoven Geotextiles



Produced in a manner similar to NW, SNW offers extraordinary properties for its very low weight. SNW is used primarily in circumstances that require both high tensile strength and elongation. Typical areas of application include membrane protection in reservoirs and landfills.

LG

Geocomposites

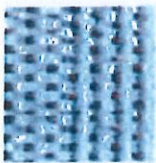


For the production of LG, woven and nonwoven geotextile are needle punched together. This process combines the properties of the two types in a single layer. These products are used in situations that require a high tensile strength as well as extreme protection.

Woven Geotextile

SG

Lightweight 'Standard Grade' Woven Geotextile



These lightweight, woven geotextiles from 65 to 250 g/m² are used primarily for separation. For example, SG prevents good quality sand or granules from mixing with underlying soil. It is used for the construction of roads, parking lots and airport runways.

HF

'High Flow' Woven Geotextile

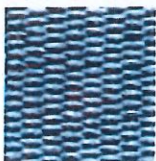


Thanks to their specific structure, HF geotextiles have high permeability. This quality is very important for erosion control and infiltration applications. Typical applications include:

- As an under layer for concrete revetment blocks or between dissimilar layers of quick draining granular fill consisting of fine sand and rounded gravel.
- The envelopment of infiltration crates or tubes for rainwater management.

SG

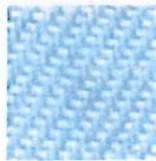
Heavyweight 'Standard Grade' Woven Geotextile



These heavyweight, woven geotextiles vary from 250 to 600g/m² and they possess tensile strengths up to 200 kN/m and above. Heavyweight SG is used in heavy load circumstances, such as temporary basal reinforcement, coastal reinforcement and soil stabilization.

HS

'High Strength' Woven Geotextile



The polyester wovens have a very high tensile strength of up to 600 kN/m. This strength and their very low stretch make them ideal for situations where:

- Reinforcement of the ground is essential.
- The construction of very steep, or even vertical, slopes with different types of soil is required.

Use of Geotextiles



1 Erosion control

In erosion control, the geotextile protects the surface from the negative effects of moving water or wind and rainfall erosion.



2 Filtration

The use of geotextiles in the construction is probably the oldest, most widely known, and most used function of geotextiles. The geotextile is used to prevent the soil particles from moving with the water flow normal to the plane.



3 Protection

A geotextile can be used as a protective layer against mechanical damage during installation and after the completion of a particular construction project. It will help prevent the puncturing of geomembranes used in constructions such as tunnels, landfills or reservoirs.



4 Drainage

When functioning as a drain, a geotextile acts as a conduit for the movement of liquids or gases in the plane of the geotextile. Relatively thick nonwoven geotextiles are the products most commonly used. Selection should be based on permeability, which is the capacity for in-plane flow.



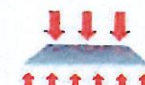
5 Stress relief

The geotextile provides a stress-relieving interlayer between the existing pavement and the new one, lessening and preventing reflective cracking in the new pavement. It also acts as a moisture barrier to prevent surface water from entering the pavement structure.



6 Reinforcement

The geotextile interacts with soil through friction or pressure to resist tensile or shear forces to provide reinforcement. To provide reinforcement, a geotextile must have sufficient strength, low elongation and low creep to avoid movement of the structure.



7 Separation

Separation is the process of preventing two dissimilar materials from mixing. In this function, a geotextile is most often required to prevent the penetration of fine soil and reduce contact of the different types of fill.



Value chain

World player with local market presence

- Most complete product range
- Vertically integrated production - from raw material to finished stock
- Strong logistic service and stock supported key products to meet market needs
- Health and Safety from production right through delivery on site as an absolute priority
- Over 30 years of experience in a constantly evolving hi-tech market:
 - > Innovation driven
 - > Project specific engineered solutions

Advantages of Bontec Geotextiles

- Intelligent installation techniques
- Cost and energy saving
- Increased life-span of projects



PRODUCTION SITES

- Belgium - Zele & Lokeren
- China - Yizheng
- Germany - Groß Ippener & Obernburg
- Hungary - Tiszaújváros
- Saudi-Arabia - Yanbu
- The Netherlands - Arnhem & Emmen
- USA - Asheville, NC

Development Centers in the Netherlands, Belgium and USA
Sales offices in UK, France and China



PRODUCT PORTFOLIO

- Geotextiles**
- Geocomposites**
- Geogrids**
- Geocells**
- Vertical Drains**
- Erosion Control Systems**
- Construction Fibres**

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**Bontec SNW120
Non Woven Geotextile**

Product Specification



SNW NONWOVEN GEOTEXTILES



we under cover the world

bontec

woven and nonwoven geotextiles

A TOTAL RANGE OF GEOTEXTILES

INDUSTRIAL
BONAR TECHNICAL FABRICS NV/SA
Industriepark 25
B-1340 Laha
Belgium
Tel: +32 (0) 25 457 487
Fax: +32 (0) 25 457 490
E-MAIL: geotextiles@bonartf.com

For UK and Ireland
BONAR VERBODEN & FABRIEK LTD
31, Salsburgh Street
Purton - Gloucester
GL53 9SE
Tel: +44 (0)1362 227338
Fax: +44 (0)1362 227340
E-MAIL: geotextiles@bonartf.com

website: www.bonartf.com

bontec

woven and nonwoven geotextiles

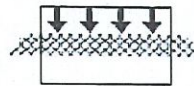
SNW Superior Nonwoven Geotextiles PRODUCT PROFILE

A high performance range of white needle punched polypropylene nonwoven geotextiles that have been developed to offer outstanding performance at minimum weight. The SNW product range offers a superior puncture resistance when compared with most other needle punched nonwoven products of comparable weight.

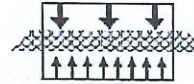
USED TO PROVIDE LONG TERM MEMBRANE PROTECTION IN LANDFILL LINING SYSTEMS AS WELL AS IN THE MORE FREQUENT APPLICATIONS OF SEPARATION & FILTRATION



PROTECTION



SEPARATION



FILTRATION

Bontec SNW nonwoven geotextiles are value for money at its best. Produced using state of the art computer controlled production lines the resulting SNW fabrics offer unrivalled CBR puncture and tensile strengths for maximum protection at optimum cost. Product is available in weights ranging from 120 to 800g/m² and in rolls of 5.25 m wide.

Bontec SNW fabrics provide:

- In excess of 1000N CBR Puncture Resistance per 100g/m² fabric weight
- High tensile strengths with corresponding high elongations
- SNW Mechanical properties setting standards within the Industry.
- A combination of fine filtration properties together with high water permeabilities SNW Hydraulic properties that offer long term filter success

SNW fabrics are produced using staple polypropylene fibres. They are 100% virgin PP and are the result of a focused R&D programme. Being polypropylene, the fibres used in the production of the SNW product range are extremely durable and (i) exhibit excellent chemical resistance to acids and alkalis at ambient temperatures (ii) have an exceptionally low moisture absorption such that the action of water at ambient temperature has no effect on their mechanical properties and (iii) are resistant to micro organisms and insects and will not support the growth of mildew or fungi

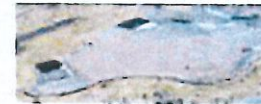
SNW needlepunched nonwoven geotextiles are employed to provide:

- Protection: high puncture and tensile strengths that offer outstanding protection to membranes and liners in landfill and reservoir engineering
- Separation: preventing the intermixing of two dissimilar soil layers. Their high mechanical properties combined with high elongation ensures that the SNW products offer a very high damage resistance to even the most demanding fill types
- Filtration: Durable in the most extreme site conditions the SNW hydraulic properties of high permeability and fine pore size make this product the ideal choice for use in the more demanding filtration applications such as coastal engineering



Other geotextiles available within the Bontec range include Standard Grade, Highflow, High strength Wovens and Thermally Bonded & Needlepunched Multicoloured Nonwovens

■ Visit us at our website: www.bonartf.com



SNW Nonwoven Geotextiles offer outstanding mechanical properties at lower weights thus ensuring maximum performance per unit cost. Through the optimum combination of polymer and plant technology our SNW product range is the perfect choice for use in the protection of impermeable membranes in landfill and reservoir construction as well as for protecting the beach material from erosion/wash out below the rock armour coastal defences.

For further product information, be it a technical data sheet or to discuss your project with one of our in-house geotextile experts please do not hesitate to contact one of our offices listed below.

For UK and Ireland: BONAR VERBODEN & FABRIEK Ltd
31, Salsburgh Street | Purton | Gloucester | G53 9SE
Tel: +44 (0)1362 227338 | Fax: +44 (0)1362 227340
E-MAIL: geotextiles@bonartf.com

Headquarters: BONAR TECHNICAL FABRICS NV/SA
Industriepark 25 | Laha | Belgium
Tel: +32 (0) 25 457 487 | Fax: +32 (0) 25 457 490
E-MAIL: geotextiles@bonartf.com

BONAR TECHNICAL FABRICS

100% virgin polypropylene

bontec

a bonar technical fabrics product



woven and non woven geotextiles

Ref: G&E121511

Date: 15December 2011

Attn: To whom it may concern

Manufacturer Certificate - Bontec SNW120 Non-Woven Geotextiles

We hereby would like to confirm that Bontec SNW120 non-woven geotextiles are needle punched from polypropylene staple fibers. Special UV-stabilizer is contained in the Bontec SNW120 non-woven geotextiles in order to resist a certain UV-radiation. The geotextiles are being produced in accordance with:

- ISO 9001:2000 – Quality Certificate (in annex)
- ISO 14001: Environmental Certificate (in annex)

Bontec SNW120 non-woven geotextiles are:

- Resistant to all naturally occurring soil acids and alkalis;
- Resistant to biological attack;
- Resistant to deterioration caused by the effects of exposure to weather and burial; and
- Durable, non-decayable, oil and sea-water stable.

The geotextiles have the following characteristics

Tensile Strength (EN ISO 10319)	70kN/m (*) both directions
Mass per Unit Area (ASTM D5261)	1000g/m ² (*)
Thickness under 2kPa (EN ISO 9863-1)	6mm (*)
Elongation (EN ISO 10319)	70% (*) both directions
CBR Puncture Resistance (EN ISO 12236)	11.5kN (*)
Water Permeability (EN ISO 11058)	30 l/m ² /s (at 50mm head) (*)

(*) The common tolerances around the avg which are used in the industry are applied and are stated on the CE datasheets

Should you require further information, please do not hesitate to contact us.

Best Regards,

Koen Van Compernelle
Sales Manager Geotextiles

BONAR TECHNICAL FABRICS
Industriestraat 39
B-9240 Zele
BTW BE 421.053.442
T. 003252457493 - F. 003252457495



Invisibly good

BONAR TECHNICAL FABRICS nv/sa
Industriestraat 39 • B-9240 Zele • Belgium
Tel +32 (0) 52 457 493 • Fax +32 (0) 52 457 495
E-mail geotextiles@bonartf.com

BONAR Yarns & Fabrics Ltd
St. Salvador Straat • Dundee DD3 7EU • United Kingdom
Tel +44 (0) 1382 346102 • Fax +44 (0) 1382 202378
E-mail geotextiles@bonaryarns.com



A Low & Bonar
Company

Bontec® SNW 120

Superior Needle Punched Nonwoven Geotextiles

Technical data sheet

Product description

Polymer	Density	Melting Point	Construction
100% polypropylene	0,91 kg/dm ³	165 °C	Fibres

Properties

Mechanical Properties	Standard	Performance
Tensile strength MD - CMD	EN ISO 10319	70 kN/m - 70 kN/m
Elongation at maximum load MD - CMD	EN ISO 10319	70 % - 70 %
Grab strength MD - CMD	ASTM D 4632 (M-08 2013)	4000 N - 4000 N
Grab elongation MD - CMD	ASTM D 4632 (M-08 2013)	80 % - 80 %
Static puncture resistance (CBR)	EN ISO 12236	11,5 kN
Puncture resistance	ASTM D 4833	1600 N
Dynamic perforation resistance (cone drop)	EN ISO 13433	0 mm
Hydraulic Properties	Standard	Performance
Water permeability normal to the plane (Vlh50)	EN ISO 11058	20 l/m ² .s
Water flow in the plane at 20kPa - at 200 kPa	EN ISO 12958	8,5x 10-6 m ² /s
Permeability	BS 6906 Part 3	21 l/m ² .s
Characteristic Opening Size (O90)	EN ISO 12956	55 µm
Physical Properties	Standard	Performance
Thickness under 2 kPa	EN ISO 9863-1	6,5 mm
Thickness under 2 kPa	ASTM D 5199-02	6,5 mm
Weight	EN ISO 9864	1000 g/m ²
Weight	ASTM D 5261-10	1000 g/m ²
roll length - roll width		35 m - 5,25 m
Durability	Standard	Performance
Predicted minimal durability in natural soils with 4 < ph < 9 and soil temperatures <25°C	EN ISO 13438-A1	25 years
Maximum allowed time between installation and covering of the geosynthetics	EN 12224	2 weeks

The Quality Management System of Bonar has been approved to the ISO 9001 Quality Management System Standard. Certificates are available on request.





**Bontec SNW120
Non Woven Geotextile**

Certification

QUALITY MANAGEMENT SYSTEM CERTIFICATE

ISO 9001 : 2008

The BQA sa hereby declares that the management system of:

Bonar NV – Site in Zele en Lokeren



*located at Industriestraat 39 - 9240 Zele - Belgium, has been examined on 24-03-2014
and found in conformity with the ISO 9001, edition 2008, standard for the following application field:*

Development, manufacture and sales of a standard range of fibres and textiles such as agotextiles, building textiles and geosynthetics, as well as similar products especially designed to customer specifications

This certificate has been issued by the BQA sa according to its quality manual concerning the certification of systems, and after concluding the contract of certification N° CER_AJ_QMS_24-03-2014_301_N, under which the company accepts a regular control of its management system.

*Certificate N° BQA_QMS019_C_2004301
Valid until 23-03-2017*



BQA N° 019-QMS

*D. SIMOENS
Directeur*



*Any person aware of misuse of this certificate may address himself to the BQA sa. This certificate may only be disclosed in its entirety.
BQA sa - rue Montoyer 24 (b9) - 1000 Brussels.*

DS.AJ/C24-03-2014

CERTIFICATE OF ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001 : 2004

*The BQA, nv hereby declares that the environmental management system of the company
Bonar NV – Site in Zele en Lokeren*



*located at Industriestraat 39 – 9240 Zele – Belgium, has been examined on 24-03-2014
and found in conformity with the ISO 14001, edition 2004, standard for the following application field:*

Development, manufacture and sales of a standard range of fibres and textiles such as agrotexiles, building textiles and geosynthetics, as well as similar products especially designed to customer specifications.

This certificate has been issued by BQA, nv according to its quality manual EMS concerning the certification of environmental management systems, and after the contract of certification N° CER_AJ_EMS019_24-03-2014_N, under which the company accepts a regular control of its environmental management system.

*Certificate N° BQA_EMS019_C_200402
Valid until 23-03-2017*



BQA N° 019-EMS

*D. SIMOENS
Directeur*



Any person aware of misuse of this certificate may address himself to the BQA, nv. This certificate may only be disclosed in its entirety.

BQA, nv - rue Montoyer 24 (b9) - 1000 Brussels

DS-AJ/C24-03-2014



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

Certificate of Conformity of the Factory Production Control 1213–CPR–5945

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product(s)

NW 5, 6, 6 UV, 7, 8, 8 D, 8/8 ABG, 8.5, 9, 10, 10 UV, 10 UV IT, 11, 12, 12 UV, 13,
130 N, 15, 15 I, 15 UV, 150 I, 16, 16 ABG, 160 N, 18, 18 UV, 19 UV, 20,
20 XUV, 200 I, 21, 21 UV, 23 P, 250 I,

GTX-N, needle punched, thermally treated; PP; used for the functions: S + F + D

25, 25 R, 26, 29, 30, 32, 32 R, 40, 40 R, 45,

GTX-N, needle punched, thermally treated; PP; used for the functions: S + F + D + P

Forte, Light, Medium, Supra, UNI, X Forte, X Light

GTX-N, needle punched, thermally treated; PP; used for the functions: S + F

SNW 100, 120, 140, 25, 25 XUV, 31, 40 UV, 46, 50, 50 SP, 55, 55 M, 55 XUV, 62,
70, 75, 75 XUV, 80, 85, 90,

GTX-N, needle punched; PP; used for the functions: S + F + D + P

14, 17, 17 T,

GTX-N, needle punched; PP; used for the functions: S + F + D

VNW 200-PP-K, 200-PP-Z, 300-PP-K, 350-PPZ30, 400-PP-K, 450-PP-K, 500-PP-K,
600-PP-K, 600-PPZ30, 700-PP-K, 800-PP-K, 1000 PP-K, 1200-PP-K,
1500-PP-K, 1800-PP-K, 2000-PP-K,

GTX-N, needle punched; PP; used for the functions: S + F + D + P

produced by or for

Bonar NV
Industriestraat 39
9240 Zele / Belgium

and produced in the manufacturing plant(s)

615

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard(s)

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

EN 13252:2000/A1:2005; EN 13253:2000/A1:2005; EN 13254:2000/A1:2005;

EN 13255:2000/A1:2005; EN 13257:2000/A1:2005; EN 13265:2000/A1:2005

under system 2+ for the performances set out in this certificate are applied and that the factory production control

fulfils all the prescribed requirements for these performances.

This certificate was first issued on 2014-11-04 and will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard(s), used to assess the performance of the declared essential characteristics, do not change, and the construction product, and the manufacturing conditions in the plant are not modified significantly, unless suspended or withdrawn by the factory production control certification body.

i. V.

Würzburg, 04 November 2014

Dipl.-Ing. Helmut Zanzinger
Certification Body



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

Certificate of Conformity of the Factory Production Control 1213–CPR–5945

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product(s)

**PROTEC 250, 250 FR, 300, 33, 400, 500, 500 SP, 600, 700, 750, 750 XUV, 800 FR,
800, 800 XUV, 1000 FR,**

GTX-N, needle punched; PP; used for the functions: S + F + D + P

X 1000, X 1200

GTX-N, needle punched; PP; used for the functions: F + D + P

TS

1, 2,

GTX-N, thermally bonded; PP; used for the functions: S + F

3, 4, 5,

GTX-N, thermally bonded; PP; used for the functions: S + F + D

produced by or for

Bonar NV
Industriestraat 39
9240 Zele / Belgium

and produced in the manufacturing plant(s)

615

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard(s)

**EN 13249:2000/A1:2005; EN 13250:2000/A1:2005; EN 13251:2000/A1:2005;
EN 13252:2000/A1:2005; EN 13253:2000/A1:2005; EN 13254:2000/A1:2005;
EN 13255:2000/A1:2005; EN 13257:2000/A1:2005; EN 13265:2000/A1:2005**

under system 2+ for the performances set out in this certificate are applied and that the factory production control
fulfils all the prescribed requirements for these performances.

This certificate was first issued on 2014-11-04 and will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard(s), used to assess the performance of the declared essential characteristics, do not change, and the construction product, and the manufacturing conditions in the plant are not modified significantly, unless suspended or withdrawn by the factory production control certification body.

Würzburg, 04 November 2014

i. V.

Dipl.-Ing. Helmut Zanzinger
Certification Body



Progress through performance

Zele, 8/11/2016

CERTIFICATION OF CONFORMANCE

The undersigned supplier BONAR NV, hereby states under his responsibility that the following product complies with the indicated technical properties :

order 230090 your order 161026

Type	NW 20 525	13,781.25 m ²
	NW 10 525	10,500.00 m ²
	SNW 120 525	735.00 m ²
	SG 110/110	6,300.00 m ²

Delivery docs : Packing list N. T1609444-T1609454

Manufacturer : Bonar NV, Industriestraat 39, 9240 Zele, Belgium
Goods are of Belgian (EU) origin

LOW AND BONAR NV

A handwritten signature in blue ink, appearing to read 'K. Kustulau', is written over the printed company name.

Low & Bonar NV
Industriestraat 39
B-9240 Zele
BTW BE 0421 053 442



**Bontec SNW120
Non Woven Geotextile**

Installation Guideline

BONTEC: Woven and Non Woven Geotextiles manufactured by Bonar Technical Fabrics – Belgium.



RECOMMENDATION FOR THE INSTALLATION OF GEOTEXTILES

- The **BONTEC** geotextiles shall be kept in its original packaging in order to protect it from damaging UV-rays and high temperatures.
- The **BONTEC** geotextiles shall be stored protected from wind, rain, excess moisture or sunlight.
- The **BONTEC** geotextiles shall only be unpacked just before use. The material shall be covered within 1 week
- The **BONTEC** geotextiles shall be labelled and show the following data :
 - roll number
 - quality
 - name of the manufacturer
 - roll length & width
 - roll weight
- The **BONTEC** geotextiles shall be laid with the longitudinal ascis down slopes
- The simplest and quickest method of ensuring product continuity is to overlap adjacent layers. Rolls placed side by side should have a minimum overlap of 300 mm whilst length on length should have a minimum overlap of 500 mm. Should special circumstances identify a need for a mechanical joint then further details may be obtained from our office.
- Wherever visibility or installation of the **BONTEC** geotextile is poor an extra safety overlap of +/- 1 m shall be respected
- The surfaces to be covered with **BONTEC** geotextiles shall be smooth and free of sticks, roots, sharp objects, and all debris that may damage the fabric. The surface to be covered shall be firm and unyielding, with no sudden changes or brakes in grade.
- The compacted sub-base shall be maintained in a smooth, uniform and compacted condition during installation of the fabric.
- In area's where wind is prevalent, fabric installation shall be started at the upwind side of the project and proceed downwind. The leading edge of the fabric shall be secured at all times with sandbags or other means sufficient to hold it down during high winds. Sandbags or rubber tires may be used as required to hold the fabric in position during installation. Tires shall not have exposed steel cords or other sharp edges which may snag or cut the fabric. Materials, equipment or other items shall not be dragged across the fabric or be allowed to slide down slopes on the fabric.
- Should the fabric be damaged during any step of the installation, the damaged section shall be repaired by covering it with a piece of fabric which extends at least 0,6 meter in all directions beyond the damaged area. The fabric shall be secured as directed by the engineer.
- Smoking shall not be permitted by personnel working on the fabric.



**Bontec SNW120
Non Woven Geotextile**

List of Project Reference



Bontec Heavy Duty Non-Woven Geotextile

Date	Project	Client	Consultant	Model	Qty (sqm)
Aug-03	CV/2000/09 Infrastructure for Penny's Bay Development, Contract I	China State Construction Engineering Corporation	Maunsell Consultants Asia Ltd	SNW600 NW10	110,000 1,575
Oct-05	EP/SP/12/92 Development and Management of North East New Territories (NENT) Landfill	Rankine Engineering Co Ltd	Halcrow China Ltd	NW20 NW15 VNW200 SNW46	6,300 11,000 16,410 10,500
Jan-10	KL/2008/07 Kai Tak Development - Advance Infrastructure Works for Developments at the Southern Part of the Former Runway, Stage 1	Friendly Benefit Engineering Ltd	AECOM Asia Co Ltd	NW10 SNW120	1,050 6,431
Apr-10	HY/2009/11 Central-Wanchai Bypass North Point Reclamation	Crown Asia Engineering Ltd	AECOM Asia Co Ltd	SNW120	33,259
Nov-10	HK/2009/02 Wan Chai Development Phase II	Kwan Sing Contractors Ltd Tung Wo Engineering Co Ltd Chun Wo-CRGL Joint Venture	AECOM Asia Co Ltd	SNW120 SNW120 NW20 SNW120	19,661 5,431 5,775 2,205
Sep-11		Crown Asia Engineering Ltd		SNW120	4,594
Mar-13		Will Pak Eng Ltd		SNW120	5,611
Jul-15		Hin Sum Engineering Co Ltd		SNW120	4,410
Aug-16					
Mar-11	HK/2009/01 Wan Chai Development Phase II Central Wanchai Bypass	Chun Wo-Leader Joint Venture	AECOM Asia Co Ltd	SNW120	17,640
Aug-11	DC/2010/02 Drainage Improvement Works in Shuen Wan And Shek Wu Wai	Kuly Construction & Engineering Co Ltd	Drainage Services Department	NW10 SNW120	2,100 368
Dec-11	HY/2009/19 Central Wanchai Bypass - IEC Link	Harvest Engineering Development Ltd Cheer Engineering Ltd	AECOM Asia Co. Ltd	SNW120 SNW120	1,638 368
May-12	DC/2009/13 Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan	Shun Tai Construction Eng Ltd	Scott Wilson CDM Joint Venture	SNW120	3,964
Jul-13	HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West	China State Construction Eng HK Ltd	AECOM Asia Co. Ltd	SNW120	37,669
Dec-13	CV/2012/09 Lianlang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 3	Luen Hing Construction & Eng Ltd	CEDD	SNW120	368
May-14	CV/2012/08 Lianlang/Heung Yuen Wai Boundary Control Point and associated works - site formation and infrastructure works	Dragages Hong Kong Ltd	AECOM Asia Co. Ltd	NW20 NW10 SNW120	21,000 12,600 368
May-14	HY/2011/09 HKZMB HK Link Road Section Between HKSAR Boundary and Scenic Hill	Dragages (HK) Ltd	Highway Dept	SNW120	2,573
Mar-15	Stock Inventory	PMS Eng Ltd		NW10 SNW120	2,625 525



Date	Project	Client	Consultant	Model	Qty (sqm)
Apr-15	MTRC1121 Shatin to Central Link Temporary off-site works at casting basin at Shek O	Crown Asia Engineering Ltd	AECOM Asia Co Ltd	NW20 SNW120	1,050 2,756
Dec-15	11/LD/2015 Ecological enhancement works at Ma Wat River	Yick Hing Construction Co Ltd		SNW120	1,471
Mar-16	13/Lands/2015 Tai Po Lam Village	Yick Hing Construction Co Ltd		SNW120	368
Oct-16	NE/2015/09 Site Formation and Roadworks in Area 16 and Area 58D, Shatin	Ming Shing Construction Engineering Co. Ltd	Atkins China Ltd	SNW120	735



G AND E COMPANY LIMITED

14th Floor, Kiu Yin Commercial Building
361-363 Lockhart Road
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com

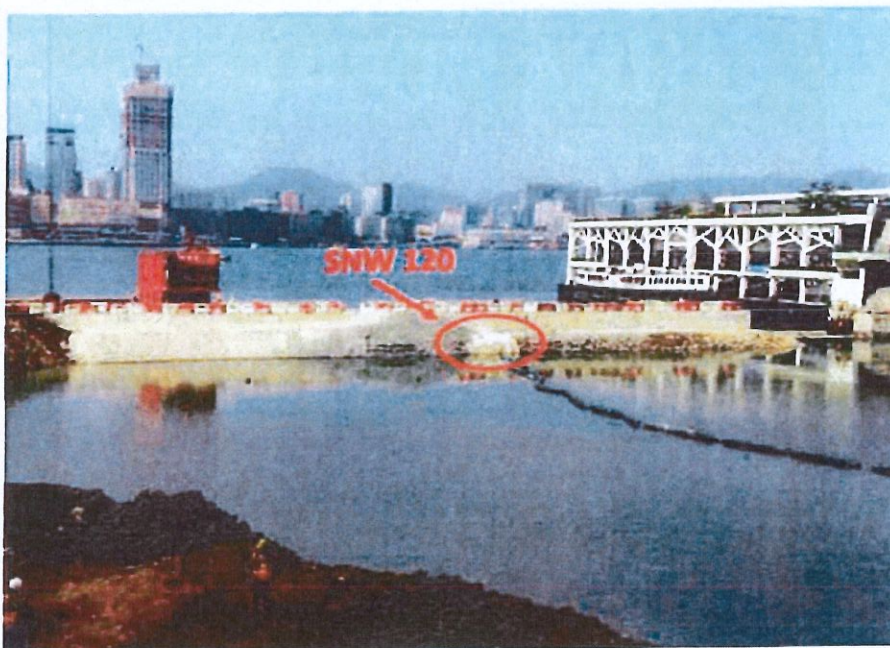


Date	March 2014
Project	Contract No. HK/2009/02 Wan Chai Development Phase II Central - Wan Chai Bypass Wan Chai East
Client	Civil Engineering and Development Department
Consultant	AECOM (Asia) Ltd
Main Contractor	Chun Wo Construction & Engineering Co.Ltd
Application	Seawall separation
Material	Non-woven geotextile Bontec SNW120



G AND E COMPANY LIMITED

14th Floor, Kiu Yin Commercial Building
361-363 Lockhart Road
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	March 2014
Project	Contract No. HK/2009/02 Wan Chai Development Phase II Central - Wan Chai Bypass Wan Chai East
Client	Civil Engineering and Development Department
Consultant	AECOM (Asia) Ltd
Main Contractor	Chun Wo Construction & Engineering Co.Ltd
Application	Seawall separation
Material	Non-woven geotextile Bontec SNW120



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361 - 363 Lockhart Road,
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	May 2013
Project	Contract No. HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West
Client	CEDD
Consultant	AECOM Asia Co. Ltd
Main Contractor	China State Construction Engineering Co. Ltd
Works	Fill material separation at the seawall
Material	Non Woven Geotextile SNW120
Quantity	37,669 sqm



G AND E COMPANY LIMITED

14th Floor, Kiu Yin Commercial Building
361-363 Lockhart Road,
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



Date	March 2010
Project	Contract No. HK/2009/01 Wan Chai Development Phase II -Central - Wanchai Bypass at Hong Kong Convention and Exhibition Centre
Client	Civil Engineering and Development Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Chun Wo - Leader Joint Venture
Works	Seawall separation
Material	Non-woven Geotextile Bontec SNW120
Quantity	17,456 sqm



G AND E COMPANY LIMITED

14th Floor, Kiu Yin Commercial Building
361-363 Lockhart Road
Wanchai, Hong Kong
Tel: 852-2570 0103 Fax: 852-2570 0089
website: www.g-and-e.com



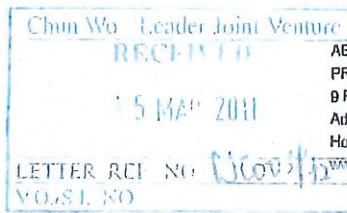
Date	September 2010
Project	Contract No. HY/2009/11 Central - Wanchai Bypass - North Point Reclamation
Client	Highways Department
Consultant	AECOM Asia Ltd
Main Contractor	China Harbour Engineering Company
Works	Seawall Separation
Materials	Non-woven geotextile SNW120
Size	9,739 sqm



**Bontec SNW120
Non Woven Geotextile**

Approval Letters

AECOM



AECOM
PRE Office
8 Performing Arts Avenue
Admiralty
Hong Kong
www.aecom.com

+852 2587 1778 tel
+852 2587 1877 fax

Your Ref : CL0907/MSF/M/0109
Our Ref : WDII/(HK/2009/01)/C60/300/B02094

12 March 2011

The Agent
Chun Wo – Leader Joint Venture
5C, Hong Kong Spinners Industrial Building, Phase I
601 – 603 Tai Nan West Street
Cheung Sha Wan
Kowloon

Dear Sir,

Contract No. HK/2009/01
Wan Chai Development Phase II –
Central – Wan Chai Bypass at Hong Kong Convention and Exhibition Centre

Type A Geotextile for Reclamation

I refer to your captioned submission dated 24 February 2011 proposing the use of Bontec SNW 120 Non-Woven Geotextile manufactured by Bonar Technical Fabrics Company and supplied by G&E Engineering as an alternative Type A geotextile for reclamation.

I have no objection in principle to the proposal subject to further submission of the following being found satisfactory:-

1. Certificates for the geotextile showing the manufacturer's name, the date and place of manufacture and test results demonstrating that the geotextile complies with the requirements as stated in PS Clause 7.196(3).
2. Calculations to substantiate that the proposed geotextile can fulfil the functions as required by PS Clause 7.204(d).
3. Further information to demonstrate that the proposed geotextile is non-decayable, oil and seawater stable as required by PS Clause 7.196(3).
4. Samples of the proposed geotextile as stipulated by PS Clause 7.212(b).

You are also reminded that the method of construction for the proposed geotextile shall be submitted to cover the particulars as stated in GS Clauses 7.204(1)(f) to (j) and PS Clause 7.220(4). Please submit a sample form that you will adopt to record the installation of the proposed geotextile as per GS Clause 7.222.

.../Cont'd

Your Ref : CL0907/MSF/M/0109
Our Ref : WDII/(HK/2009/01)/C60/300/B02094

Please also clarify whether you intend to use both Type A geotextile supplied by G&E Engineering and by Tracki Building Technology Ltd. at the same time. If so, please advise and confirm whether the 2 materials are compatible and provide the interface details.

Yours faithfully,



Henry Chan
Engineer's Representative
Chief Resident Engineer
AECOM Asia Co. Ltd.

c.c. AACL - Attn: Mr. Francis Leong

FF/HC/KOL/SKL/KW/YCK/si



AECOM

CONTRACT NO.: KL/2008/07	
Rec'd Date	Rec'd Code
11 MAR 2010	ERT398

AECOM
8/F Grand Central Plaza, Tower 2
188 Shatin Rural Committee Road
Shatin, Hong Kong
www.aecom.com

+852 2885 6262 tel
+852 2881 2649 fax

Your Ref : KL200807/CSF/MTL/000191/B
Our Ref : ER60022408/AW1/C20/300-B0605

Mr. Ben Chow
Chit Cheung Construction Co., Ltd.
Room 215A-B, Central Services Building
Nan Fung Industrial City
18 Tin Hau Road
Tuen Mun, N.T.

Kai Tak Development Site Office
1 Cheung Yip Street, Kwun Tong
Kowloon
Telephone No. 852-2798-0771
Fax No. 852-2798-0788

10 March 2010

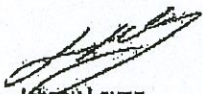
Dear Mr. Chow,

Contract No. KL/2008/07
Kai Tak Development – Advance Infrastructure Works for Developments at the Southern Part
of the Former Runway, Stage 1

Geotextile Type 2 for Public Landing Steps Cum Fireboat Berth

I refer to your above referenced submission dated 20 February 2010 in reply to our letter ref. ER60022408/AW1/C20/300-B0566 dated 10 February 2010 regarding the captioned subject. Please be advised that I have no objection to the proposed type 2 geotextile – Bortec SNW120 supplied by G and E Company Ltd.

Yours sincerely,
For and on behalf of
AECOM Asia Co. Ltd.


Johnny Leung
Senior Resident Engineer
Water & Urban Development
JL/AL/RW/m

cc: AACL (Attn: Mr. Igor Hoi / Mr. C. K. Man)
REZ, ARE1, IOW1

Important Message

Rebranding as AECOM
To better serve our clients, all Mott MacDonald AECOM operations in Hong Kong have been integrated into one operating entity and rebranded as AECOM. The Mott MacDonald Consultants Asia Ltd. operation is now part of AECOM Asia Co. Ltd.

AECOM

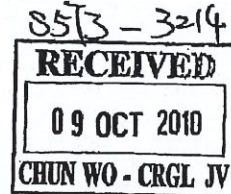
AECOM
PRE Office
9 Performing Arts Avenue
Admiralty
Hong Kong
www.aecom.com

+852 2587 1778 tel
+852 2587 1877 fax

Your Ref : CWCRLJV/573/CS/MAT/S-0088 (Rev. A)
Our Ref : WDII/(HK/2009/02)/C70/710/F01655

7 October 2010

The Agent
Chun Wo – CRGL Joint Venture
5C, Hong Kong Spinners Industrial Building, Phase I
601 – 603 Tai Nan West Street
Cheung Sha Wan
Kowloon



Dear Sir,

Contract No. HK/2009/02
Wan Chai Development Phase II –
Central – Wan Chai Bypass at Wan Chai East

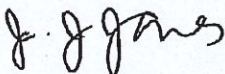
Proposed Geotextile Type A for Submarine Outfall – G and E Engineering Bontec SNW120 Non Woven

I refer to your above submission dated 17 September 2010 and have no objection in principle to your proposed use of Bontec SNW120 Non Woven Geotextile supplied by G and E Engineering as the Geotextile Type A for submarine outfall.

Please be reminded that the extent of Geotextile shall be extended by 2000mm and embedded underneath the concrete surround section.

Acceptance of your proposal does not release your duty and obligation under the Contract nor does it relax any of the Contract requirements.

Yours faithfully,



Ian J Jones
Engineer's Representative
Chief Resident Engineer
AECOM Asia Co. Ltd.

c.c. AACL - Attn: Mr. Stephen Lai

FF/JJ/AK/EN/SKL/RC/KG/II
MEN/m

AECOM

AECOM
8/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 8 樓
www.aecom.com

+852 2605 8282 tel
+852 2681 2649 fax

Your Ref. : CMS/000017/B
Our Ref. : CWB/(HY/2009/11)/M25/100/B000346

19 April 2010

Mr. Daniel Cheung
China Harbour Engineering Company Limited –
China Road and Bridge Corporation Joint Venture
19th Floor, China Harbour Building
370-374 King's Road
North Point
Hong Kong

Dear Sir,

Contract No. HY/2009/11
Central-Wan Chai Bypass – North Point Reclamation

Material Submission for Geotextile Type A

I refer to your above referenced submission dated 15 April 2010 proposing the company "G and E Company Limited" as the supplier to supply the product "Bonar SNW 120 Non Woven Geotextile" manufactured by Bonar Technical Fabrics Company using for geotextile type A of this project.

Please be advised that I have no objection to your proposal. With reference to PS Clause 7.212, please be reminded that three random samples each of 2 m² in size and two pieces of geotextile filter joined in accordance with the manufacturer's recommendations for each type of joint shall be submitted.

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.


Terry Siu
Engineer's Representative
Transportation

c.c. AECOM - Attn : Mr. Kelvin Cheng

TS/DC/E/cw



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PRE Office
9 Performing Arts Avenue
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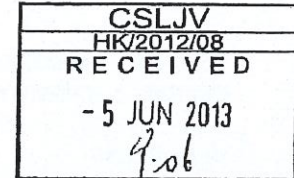
+852 2587 1778 tel
+852 2587 1877 fax

CDBI 000423

Your Ref : HK/2012/08/CDB/MA2.05/000259
Our Ref : WDII/(HK/2012/08)/C60/300/R00316

4 June 2013

The Agent
China State – Leader Joint Venture
29/F, China Overseas Building
139 Hennessy Road
Wan Chai
Hong Kong



Dear Sir,

Contract No. HK/2012/08
Wan Chai Development Phase II –
Central – Wan Chai Bypass at Wan Chai West

Material Submission – Non Woven Geotextile (Bontec SNW120)

I refer to your above-referenced submission dated 14 May 2013 proposing the use of Bontec SNW 120 Non Woven Geotextile manufactured by Bonar Technical Fabrics Company and supplied by G and E Company Limited as an alternative Type A geotextile for reclamation.

I have no objection in principle to the proposal subject to your further submission of the following being made and found satisfactory:-

1. As stipulated in GS Clause 7.204(1)(c), a certificate for the geotextile filter showing the manufacturer's name, the date and place of manufacture and test results demonstrating that the geotextile complies with the requirements stated in PS Clause 7.196(3).
2. Calculations to substantiate that the proposed geotextile can fulfil the functions stipulated in PS Clause 7.204(1)(d).
3. Information to demonstrate that the proposed geotextile is non-decayable, oil and seawater stable as required by PS Clause 7.196(3).
4. Samples of proposed geotextile joined in accordance with the manufacturer's recommendations as stipulated in PS Clause 7.212(b).

You are also reminded that the method of construction for the proposed geotextile shall be submitted to cover the particulars stated in GS Clauses 7.204(1)(f) to (j) and PS Clauses 7.220(3) and (4).

Yours faithfully,

Henry Chan
Engineer's Representative
Chief Resident Engineer
AECOM Asia Co. Ltd.

c.c. AACL – Attn: Mr. Francis Leong

FF/HC/JH/G/SWC/MF/si



G AND E COMPANY LIMITED

14/F Kiu Yin Commercial Building

361 – 363 Lockhart Road,

Wanchai, Hong Kong

Tel: 2570 0103

Fax: 2570 0089

website: www.g-and-e.com

G and E – a Perspective

G and E, founded in 1984, is a geosynthetics specialist who distributes a wide variety of geosynthetics from a list of renowned global manufacturers. The Company also manages a competent installation contracting service. To better serve our clients, design and engineering service have also been established in our portfolio. We aspire to provide our client comprehensive engineering solutions, from technical application and design, the supply of materials and their installation, to the conformance testing and project commissioning.

G and E takes a strong vision on geosynthetics application and development by working closely with international consultants, academics, professional organizations, research institutions, testing laboratories and renowned manufacturers, a mission to broaden the versatility of geosynthetics and its innovation.



Our vast product range covers:

Geotextile, geomembrane, geodrain, geocomposite, geogrid, geocell, band drain, erosion control systems, geosynthetic clay liner, rockfall barrier, gabion, geofoam, silt curtain, concrete mattress and geotextile container, extending a very wide scope of application in most civil, geotechnical and marine engineering.

We offer our clients:

- Extensive product knowledge and installation method statement
- Comprehensive services, application, design, contracting and commissioning
- Highly attentive and superior professional work
- Superb quality products at competitive price



G and E is ISO9001:2008 quality management certified, and a VSRS registered subcontractor. G and E has a remarkably successful working relationship with a long list of clients, the Government, project owners, contractors, designers, consultant engineers, overseas distributors and trading partners. The clientele extends to Macau, Southeast Asia and Southern China.

Talk to us today and see how we can work together for cost-effective and time saving solutions. We are stepping into our 32nd year in the field and have valuable experience to share with you.

ISO9001:2008



Product Endorsement



A Registered Subcontractor





G AND E COMPANY LIMITED

14/F Kiu Yin Commercial Building
 361 – 363 Lockhart Road,
 Wanchai, Hong Kong
 Tel: 2570 0103 Fax: 2570 0089 website: www.g-and-e.com

G and E is a distribution network and sourcing agent of geosynthetics, as well as a provider of professional design and installation services.



Central – Wan Chai Bypass - seawall separation using heavy non-woven geotextile Bontec SNW120

The company handles a comprehensive range of geosynthetic materials:

<u>GEOTEXTILE:</u>	PP, PET woven, non-woven, thermal bonded, needle punched, spun bond, special weave & composite
<u>GEOMEMBRANE:</u>	HDPE, LLDPE, PVC, keyed preformed, tunnel lining, concrete protection liner, gas barrier, basement waterproofing, leakage collection & effluent containment
<u>GEODRAIN:</u>	Geonet, geocomposite, band drain, sheet drain & roof drain
<u>GEOGRID:</u>	HDPE, PET, PP for reinforced slope and wall, MSEW, stabilization geogrid, special composite
<u>EROSION CONTROL:</u>	Erosion mat, concrete mat, coir mat, geocell, gabion, rockfall mesh, flexible rockfall fence
<u>MARINE ENGINEERING:</u>	Silt curtain, turbidity control, block mat, geotextile tube, trash boom, geotextile container
<u>GCL:</u>	Geosynthetic clay liner, bentonite liner and composite
<u>HDPE PIPE:</u>	Sewer pipe, dual wall pipe, submarine outfall
<u>TUNNELING:</u>	GFRP rebar for soft eye, tunnel support & invert drainage
<u>SPECIAL SERVICE:</u>	Geomembrane leak location survey, HDPE pipe welding, HDPE lining repair

Registration Certificate

This is to certify that the Management Systems of

G & E Company Limited

have been assessed by AJA Registrars and registered
against the requirements of

ISO 9001:2008

Certificate No. : **AJA14/17026** Date of Original Registration : **22/01/2014**

Expiry Date : **14/12/2016** Date of Re-Registration : **N/A**



0059

A handwritten signature in blue ink, reading 'Raymond Hinton'.

Chief Executive - AJA Registrars Ltd



This certificate is issued in respect of the locations & scope of registration detailed in the Associated Registration Schedule.
This certificate is the property of AJA Registrars Ltd Unit 6 Gordano Court Gordano Gate Business Park Serbert Close Portishead Bristol UK BS20 7FS
and must be returned on request. A member of the AJA Group of Companies



Progress through performance

June 6, 2017

CERTIFICATE OF CONFORMANCE

The undersigned supplier low & Bonar NV, hereby states under his responsibility that Bontec SNW120 geotextile complies with the declared technical properties as shown in the data sheet as follows:

Properties	Standard	Performance
Tensile strength MD-CMD	EN ISO 10319	70 kN/m – 70 kN/m
Garb elongation MD-CMD	ASTM D 4632 (M-08 2013)	80 % - 80 %
Static puncture resistance (CBR)	EN ISO 12236	11.5 kN
Permeability	BS 6906 Part 3	21 l/m2.s
Thickness under 2 kPa	ASTM D 5199-02	6.5 mm
Weight	ASTM D 5261-10	1000 g/m2

Manufacturer: Low & Bonar NV, Industriestraat 39, 9240 Zele, Belgium
Goods are of Belgium (EU) origin

Low & Bonar NV


Low & Bonar NV
Industriestraat 39
B-9240 Zele
BTW BE 0421 053 442



Geotextile Installation Recommendation

September 2017



Contents

	Page
1. Introduction	3
2. Seam Type	3
3. Number of Rows of Stitching	4
4. Seam Location	4
5. Stitch Type	4
6. Thread Type	5
7. Sewing Equipment	5

1. Introduction of hand-held sewing

Sewn seam formed with 2 edges facing each other is called Prayer seam (Figure 1),. This seam can be formed with single or double stitch line, depending on the strength required.

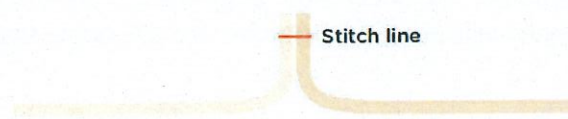


Figure 1: Prayer seam with single stitch line

Stitch lines should be parallel to the edges, with the outer line at the selvedge inside edge and the number of stitch per inch of the outer line maximized for optimum strength.

Besides the seam type and number of stitching, the following are also critical for the seam strength (assuming the tensile strength of the geotextile itself is satisfactory):

- Seam location
- Stitch type
- Thread type
- Sewing equipment

It is also recommended to use the sewn seam method over overlapping method where sand is the trafficked surface above the geotextile. Reason being is possibility for the sand to migrate through the overlapping. Make sure that the seam stand up faces down.

2. Seam Type

The most common practice is superimposed seams (SS), whereby two sections of fabric are placed together and joined with one or more rows of stitching (Figure 2). Prayer or SSa seam (Figure 2) is the easiest to form and it also requires the least manipulation of the geotextile.

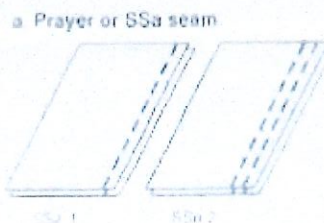


Figure 2. SS types

3. Number of rows of stitching

Hand-held sewing machines are very common for on-site sewing and it is usually sewn with one or two rows of stitching. As shown in Figure 2, the SS designation may be appended with the number of stitch rows to provide a complete description of the seam type.

The second row of stitching usually provides no strength benefit and serves only as a backup in case there are dropped/jumped stitches or other problems with the first row of stitching. It is the first row of stitching that actually provides the entire strength of the seam.

4. Seam Location

The location of the seam relative to the edge of the geotextile can also influence seam strength. It is recommended for woven fabric seams should be sewn at least 25mm to 50 mm from the edge of the fabric, whereas seams in non-woven fabrics should be sewn 25 mm to 50 mm from the edge. When woven fabric has no factory finished edge, the fabric should be folded back to create a double ply thickness. The seam should then be sewn within the double ply area with a minimum of 25 mm to 38 mm from the edge.

5. Stitch Type

Figure 6a and 6b shown the most commonly used stitch types for geotextile. The Federal Stitch Type 101 Chainstitch (Figure 3a) is formed using a single thread and take note that any broken stitch anywhere along the seam can threaten the integrity of the entire stitch line. The Federal Stitch Type 401 Chainstitch (Figure 3b) is a two-thread stitch which offers superior seam strength and take note that 401 type stitch will not unravel if the seam is cut.

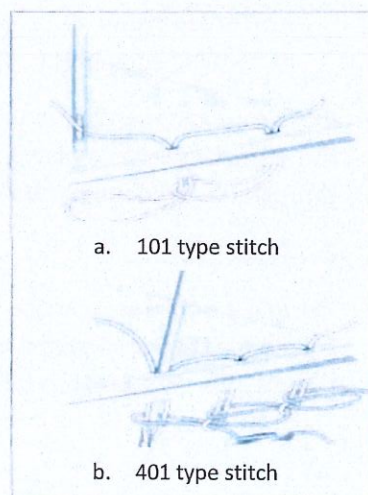


Figure 3. Common stitch types



6. Thread Type

The sewing threads must have similar or better durability as compared to the geotextile due to the fact that the threads will be exposed to the same sub-base conditions as the geotextile. Such conditions may include, but not limited to, chemical attack and UV degradation.

Aramid or polyester (PET) or PP or nylon thread can be used. Cotton thread is not acceptable. Polypropylene and polyester thread are the most common material in the geotextile industry. Take note that thread made of Kevlar which is a very strong nylon is quite abrasive and may damage the geotextile strength along the seam.

7. Sewing Equipment

Geotextile seams can be sewn on site or in plant. The number of panels that can be sewn together in a plant is limited by the logistic and handling on site. Thus sewing seams on site are more common and practical for civil engineering. On-site seaming is normally performed with hand-held sewing machines that are designed for electrical operation. The stitch count (stitches per inch) and stitch tension are normally adjustable. These settings should be checked on site and have a few trial runs in order to be sure that the stitches are uniform and tight.



Figure 4. Hand held sewing machine

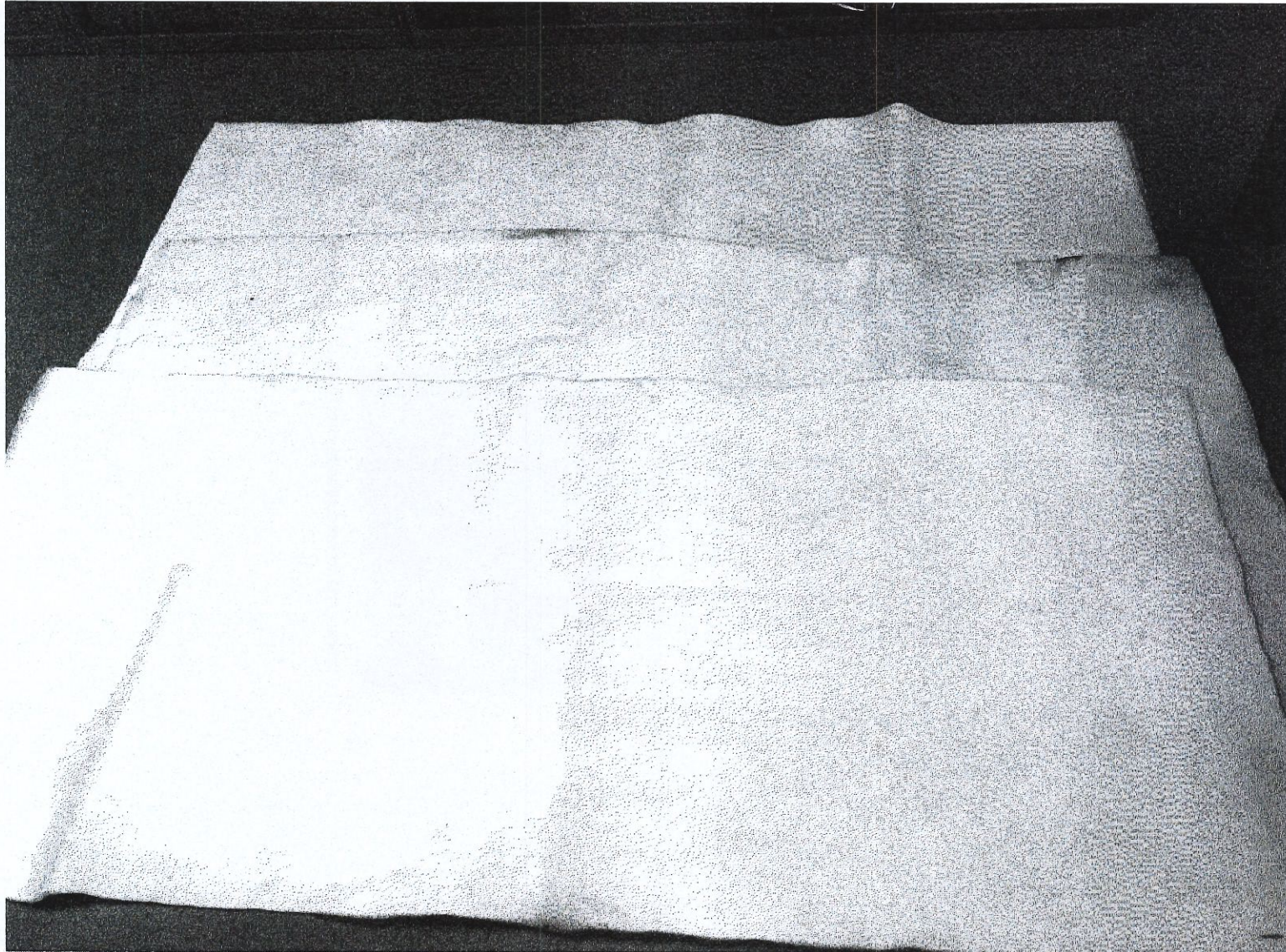


Photo1: 3 pieces of 2m² Geotextile – Bontec SNW120 Filter

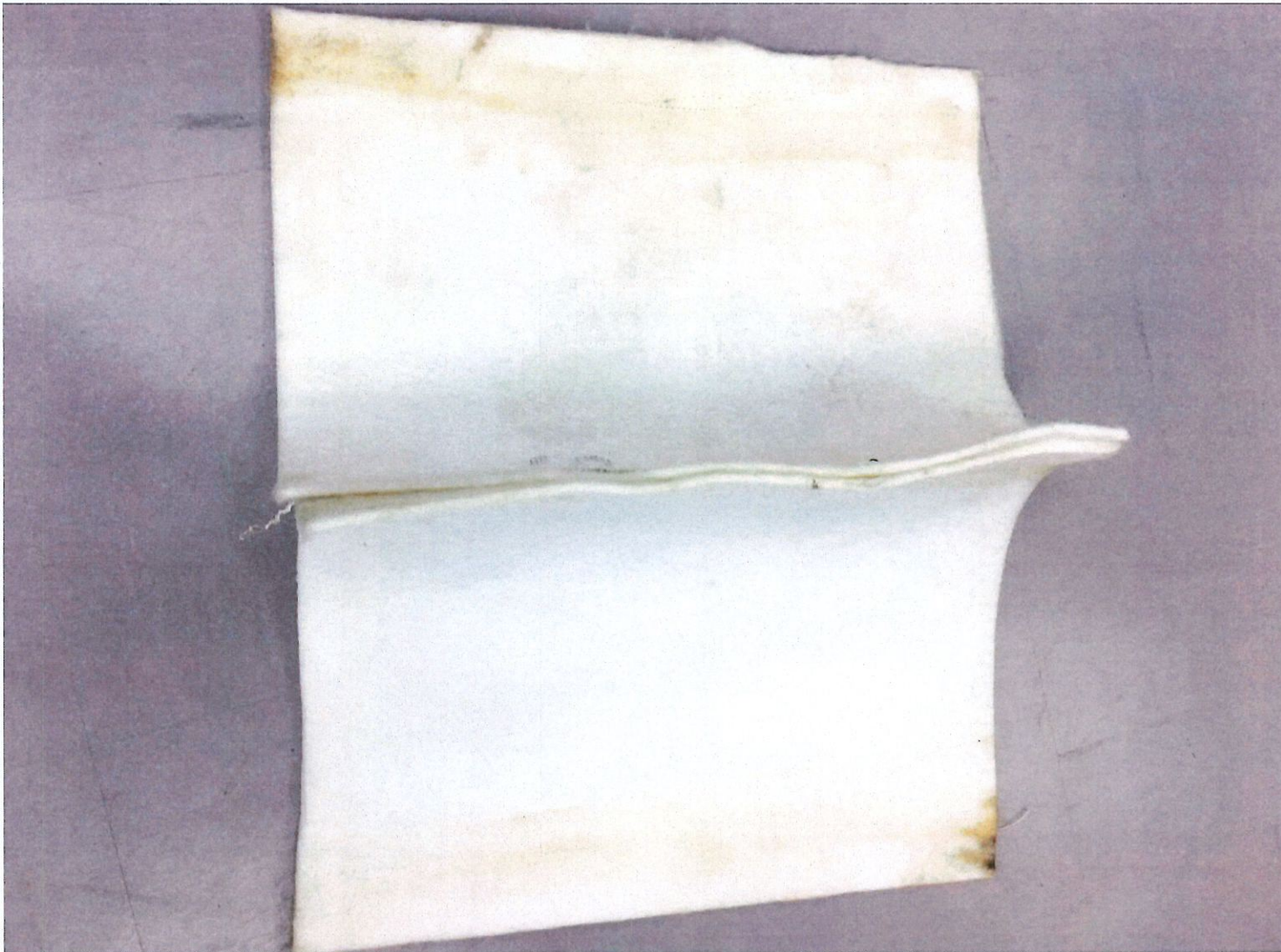
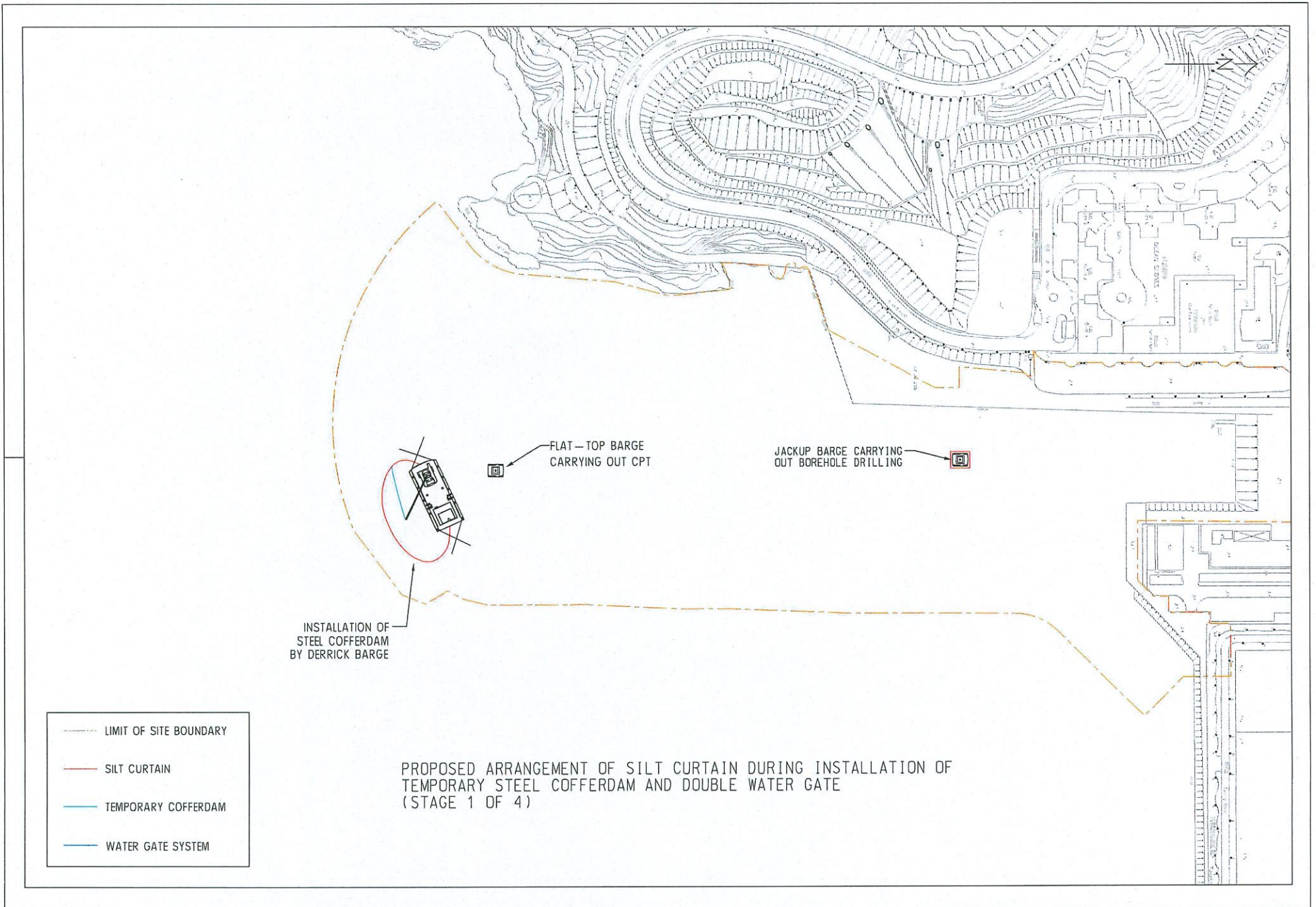


Photo2: 2 pieces of Geotextile – Bontec SNW120 Filter Joined in accordance with the Manufacture’s Recommendations

Appendix D – General Arrangement of Silt Curtain



INSTALLATION OF
STEEL COFFERDAM
BY DERRICK BARGE

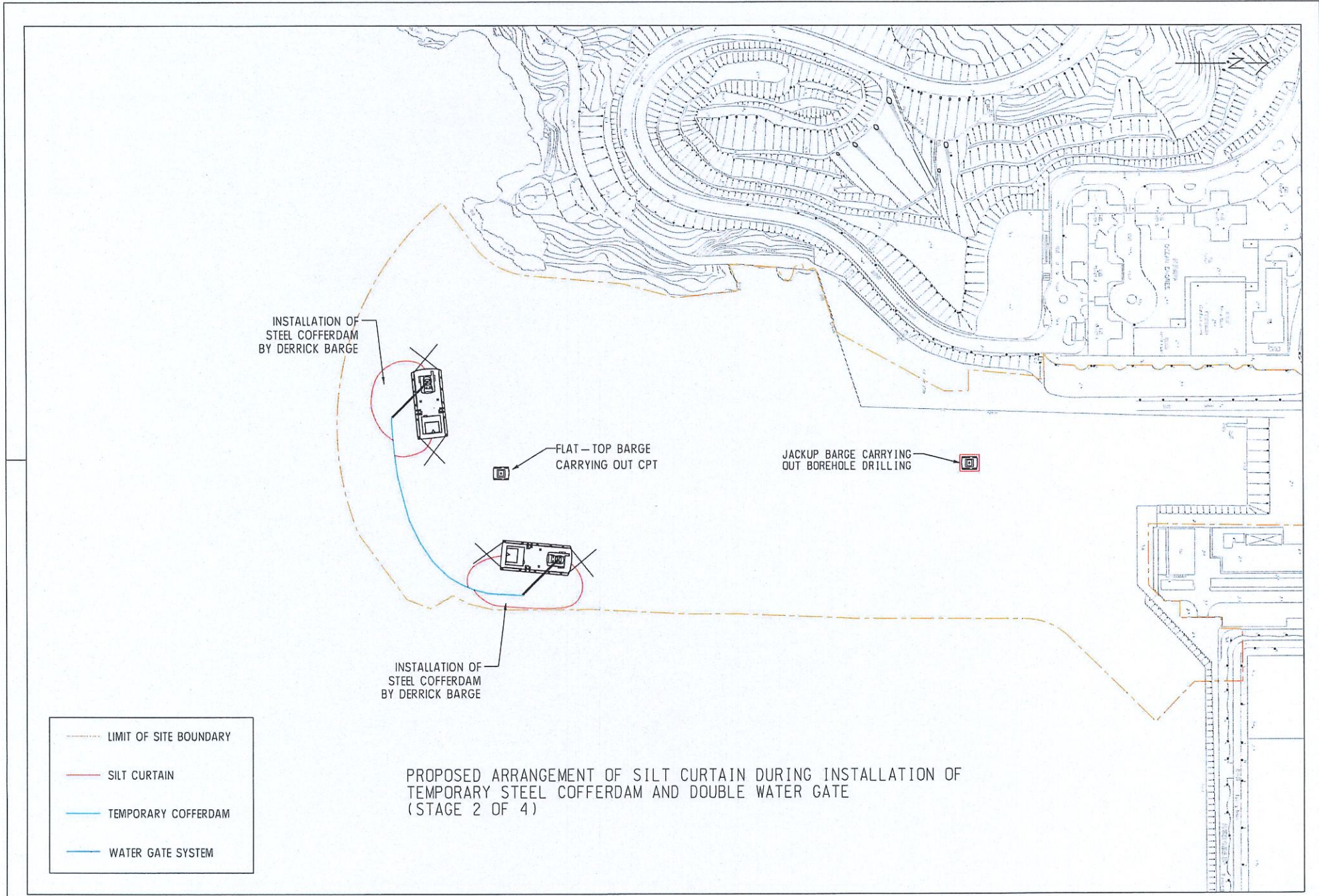
FLAT-TOP BARGE
CARRYING OUT CPT

JACKUP BARGE CARRYING
OUT BOREHOLE DRILLING

INSTALLATION OF
STEEL COFFERDAM
BY DERRICK BARGE

- LIMIT OF SITE BOUNDARY
- SILT CURTAIN
- TEMPORARY COFFERDAM
- WATER GATE SYSTEM

PROPOSED ARRANGEMENT OF SILT CURTAIN DURING INSTALLATION OF
TEMPORARY STEEL COFFERDAM AND DOUBLE WATER GATE
(STAGE 2 OF 4)



INSTALLATION OF
STEEL COFFERDAM
BY DERRICK BARGE

FLAT-TOP BARGE
CARRYING OUT CPT

JACKUP BARGE CARRYING
OUT BOREHOLE DRILLING

INSTALLATION OF
STEEL COFFERDAM
BY DERRICK BARGE

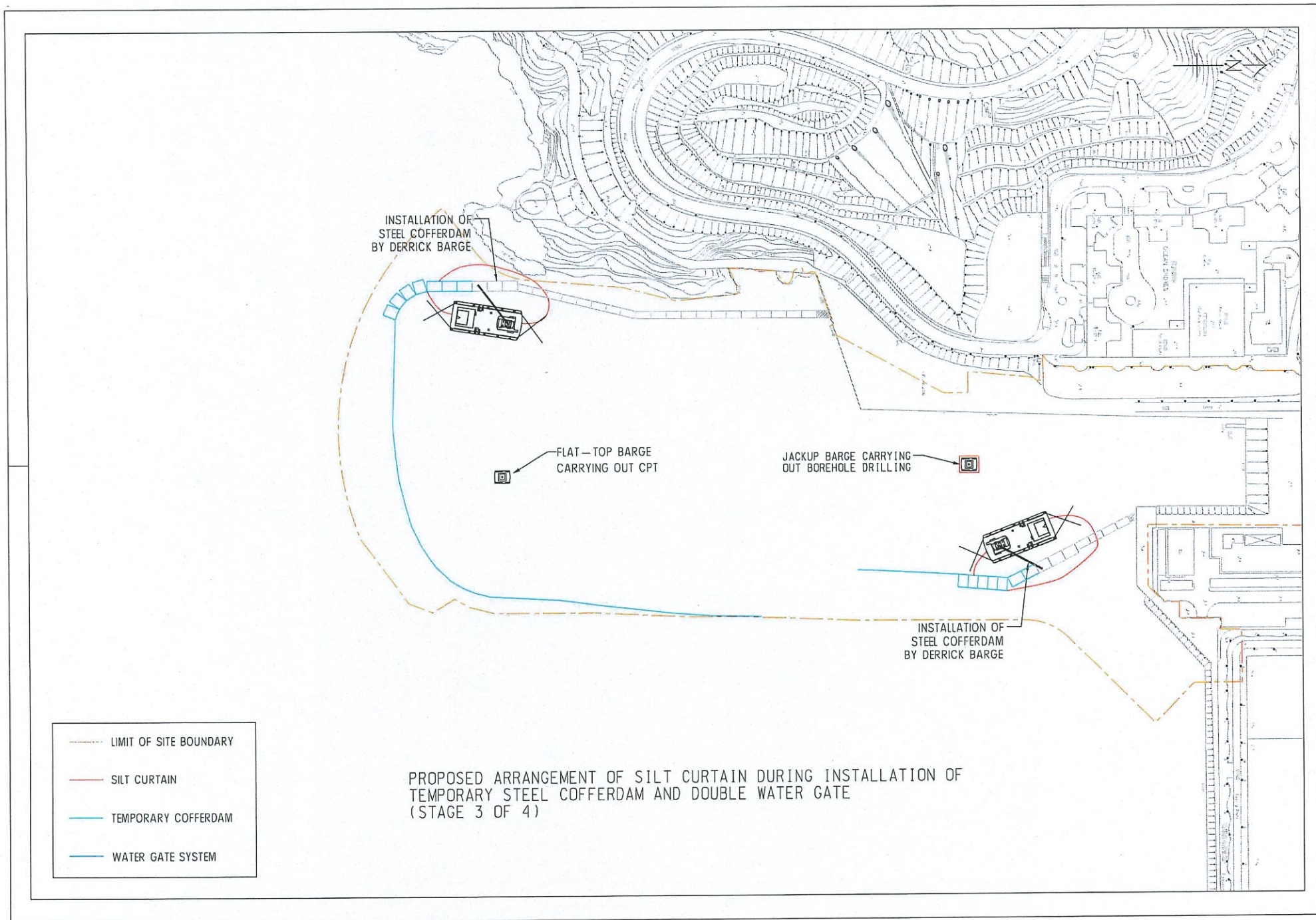
--- LIMIT OF SITE BOUNDARY

--- SILT CURTAIN

--- TEMPORARY COFFERDAM

--- WATER GATE SYSTEM

PROPOSED ARRANGEMENT OF SILT CURTAIN DURING INSTALLATION OF
TEMPORARY STEEL COFFERDAM AND DOUBLE WATER GATE
(STAGE 3 OF 4)

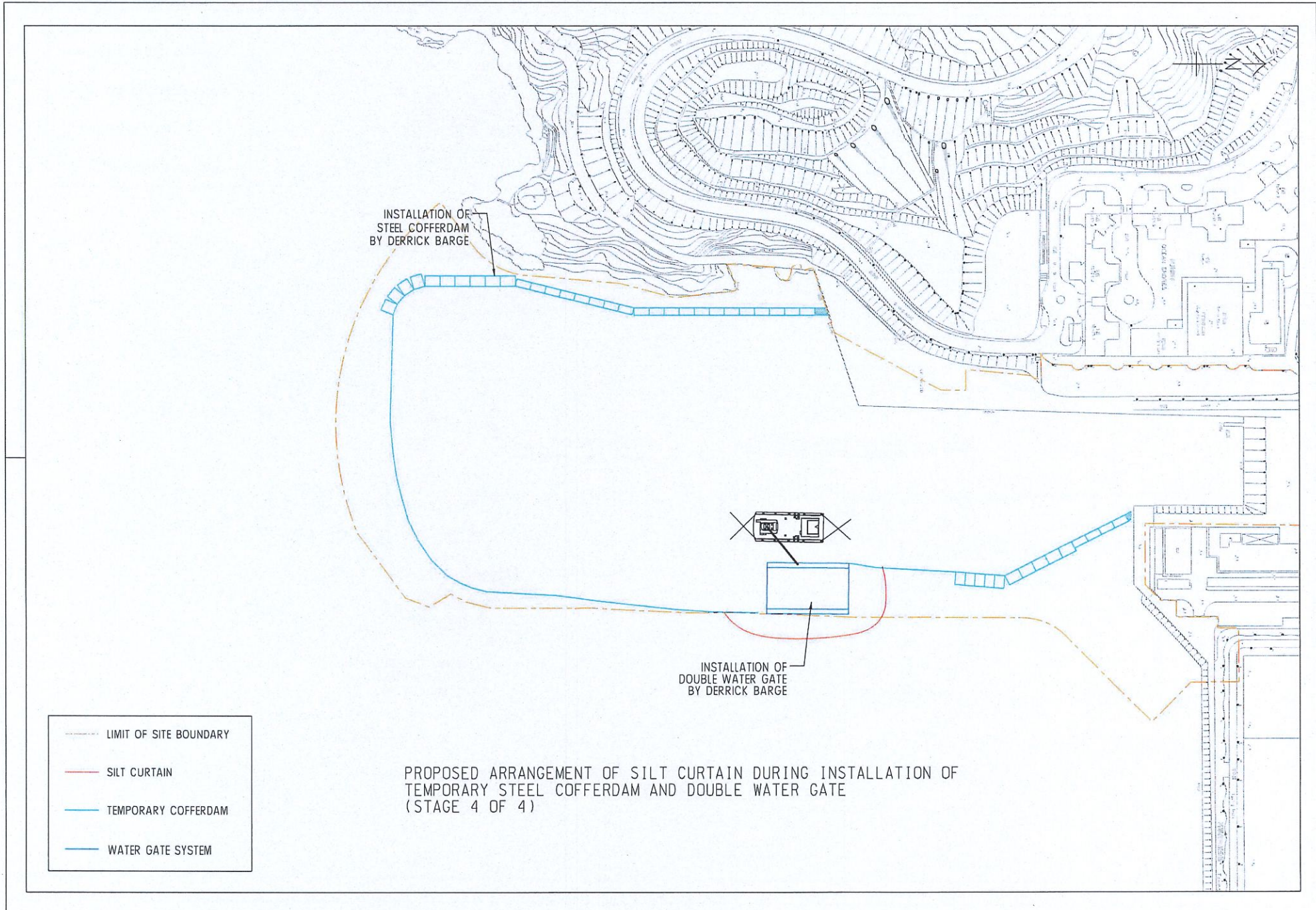


INSTALLATION OF
STEEL COFFERDAM
BY DERRICK BARGE

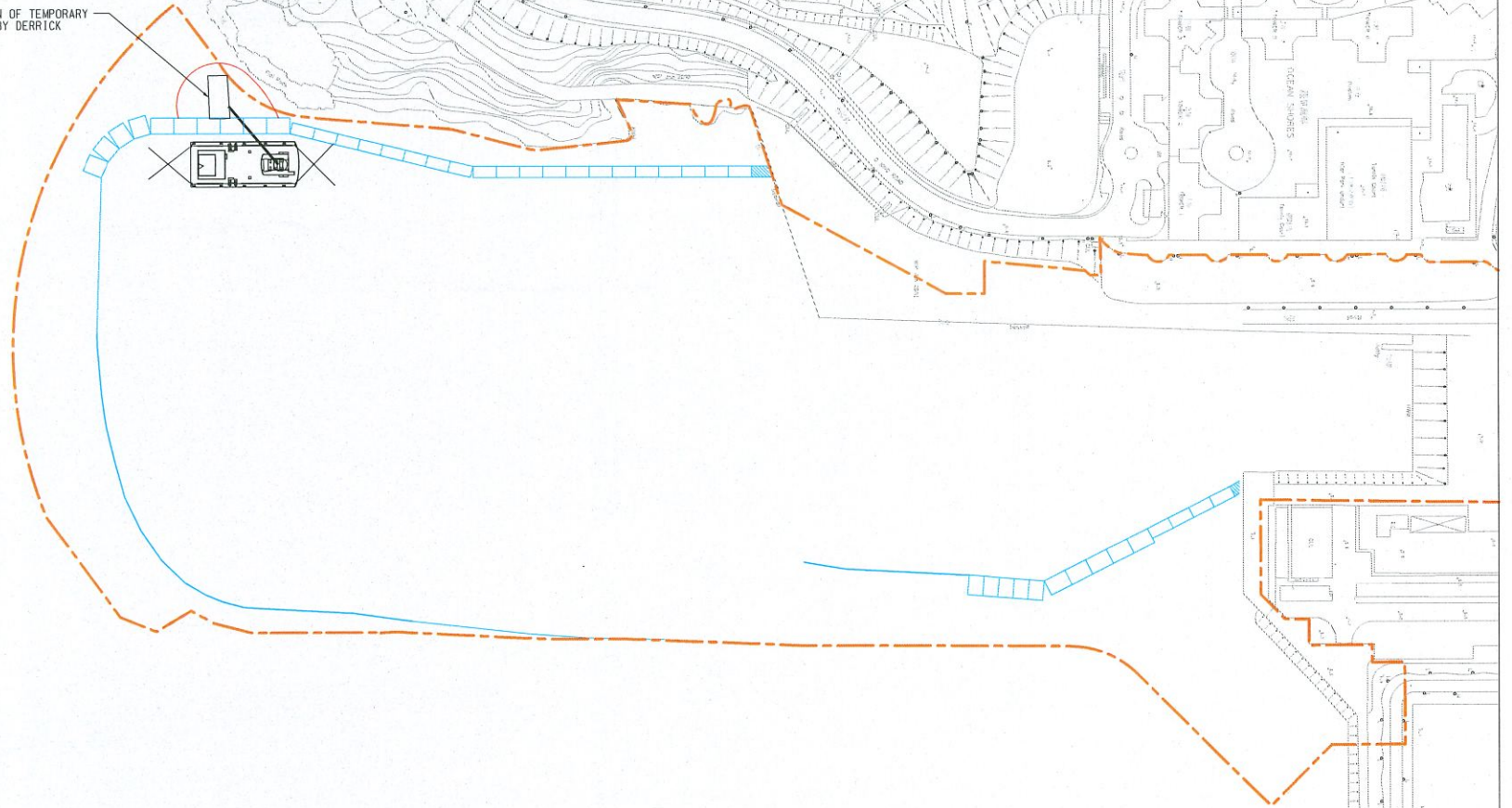
INSTALLATION OF
DOUBLE WATER GATE
BY DERRICK BARGE

- LIMIT OF SITE BOUNDARY
- SILT CURTAIN
- TEMPORARY COFFERDAM
- WATER GATE SYSTEM

PROPOSED ARRANGEMENT OF SILT CURTAIN DURING INSTALLATION OF
TEMPORARY STEEL COFFERDAM AND DOUBLE WATER GATE
(STAGE 4 OF 4)



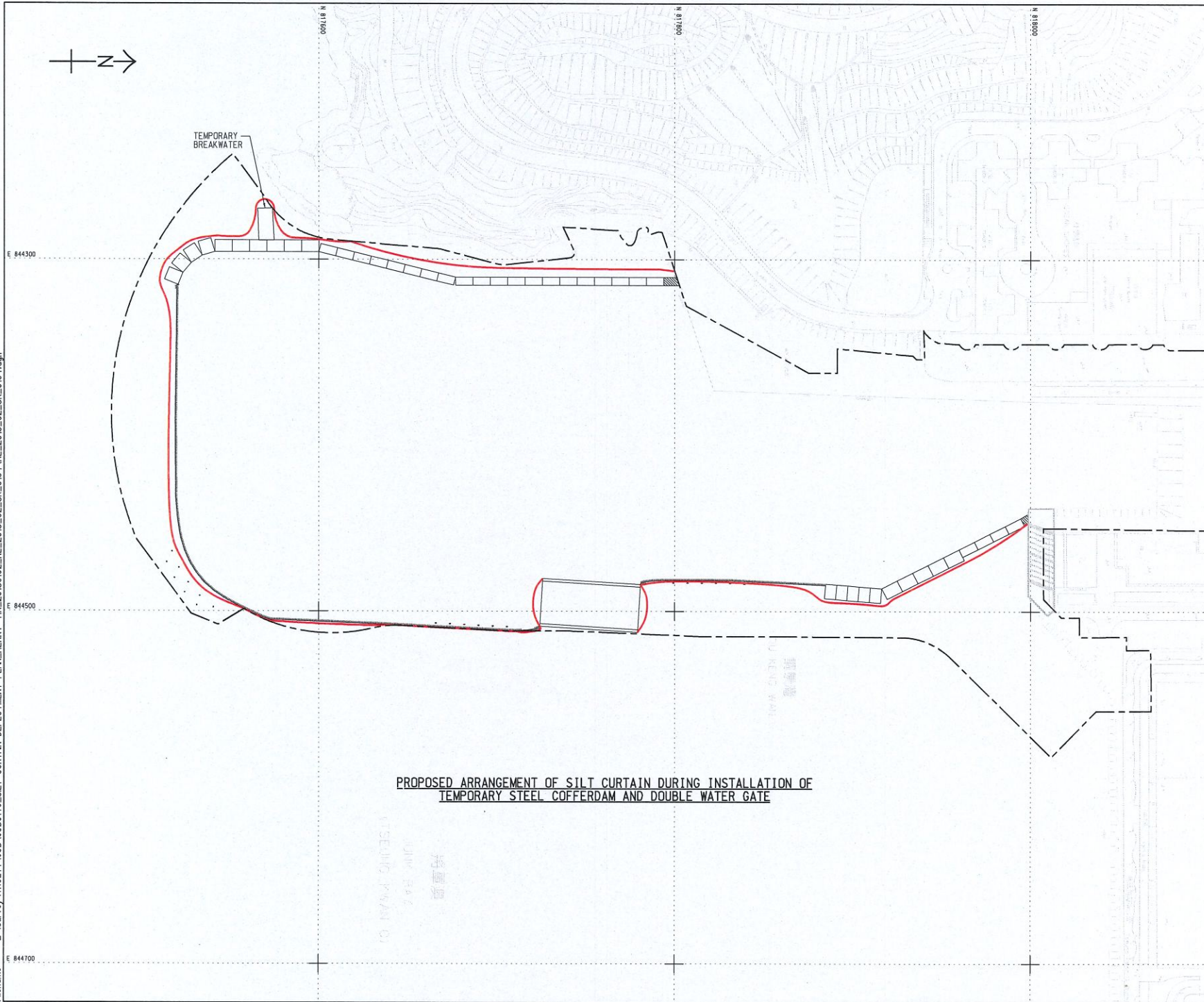
INSTALLATION OF TEMPORARY
BREAKWATER BY DERRICK
BARGE



- LIMIT OF SITE BOUNDARY
- SILT CURTAIN
- TEMPORARY COFFERDAM
- WATER GATE SYSTEM

PROPOSED ARRANGEMENT OF SILT CURTAIN DURING INSTALLATION OF
TEMPORARY BREAKWATER

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LEGEND:
 - - - - - LIMIT OF SITE BOUNDARY
 ——— SILT CURTAIN

Rev. No.	Description	By	Date

 土木工程拓展署
 Civil Engineering and Development Department

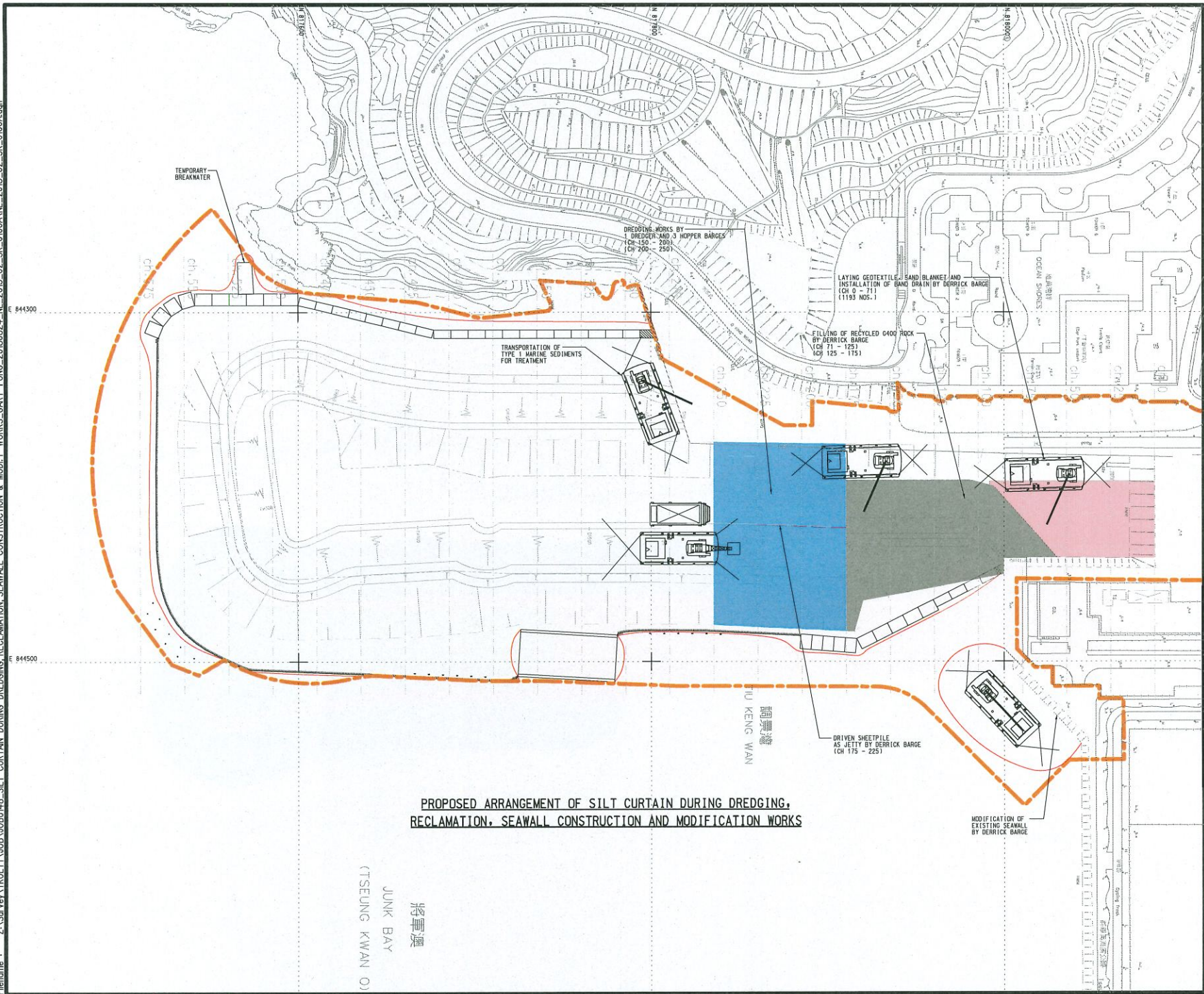
Supervisor
 AECOM Asia Co. Ltd.

Contractor
 
 CRBC-Build King Joint Venture

Project Title
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

Drawing Title
 SILT CURTAIN DEPLOYMENT PLAN

Drawing no. 圖號	NE/2015/02/SK/0104	Rev. 版次	-
Drawn By 繪圖	AL	Checked By 校核	Approved By 批准人
Scale 比例	1:1000 @ A1	Status 圖則	



PROPOSED ARRANGEMENT OF SILT CURTAIN DURING DREDGING, RECLAMATION, SEAWALL CONSTRUCTION AND MODIFICATION WORKS

LEGEND:
 - - - - - LIMIT OF SITE BOUNDARY
 ——— SILT CURTAIN

Rev. No.	Description	By	Date

PM
 土木工程拓展署
 Civil Engineering and Development Department

Supervisor
 AECOM Asia Co. Ltd.

Contractor

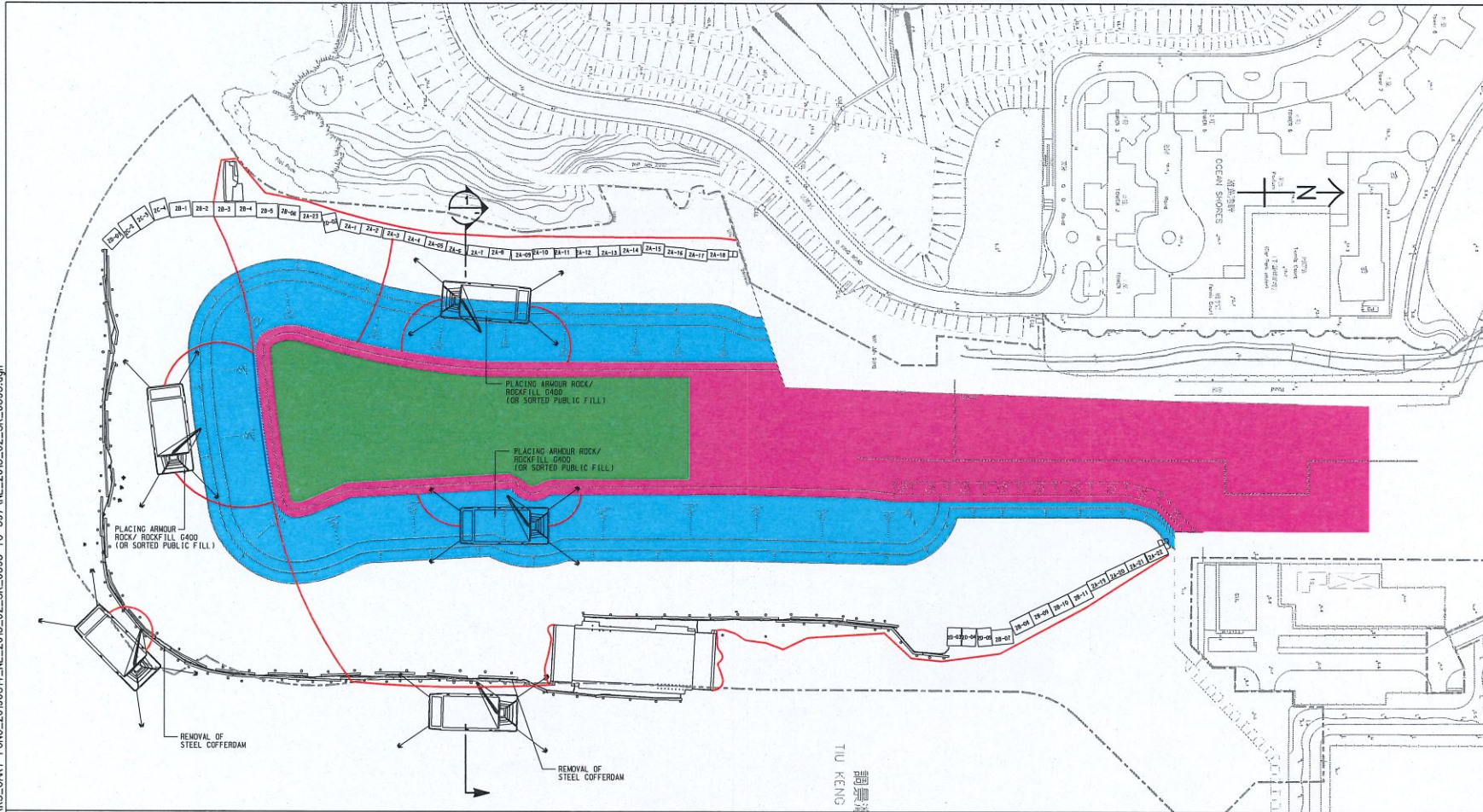
 CRBC-Build King Joint Venture

Project Title
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

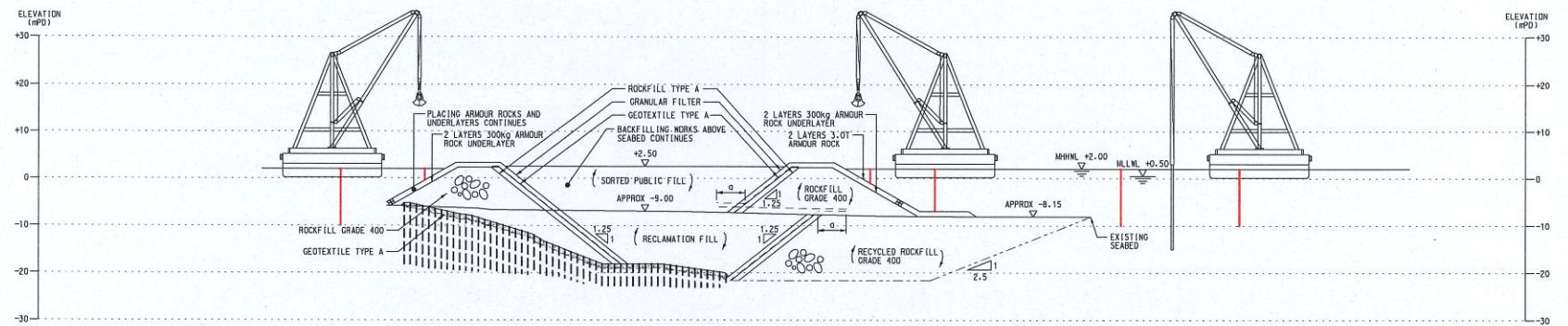
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Drawing no. 圖號	NE/2015/02/SK/0106	Rev. (次)	-
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Scale 比例	1:1000 @ A1	Status 狀態	

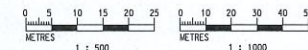
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- LEGEND**
- SILT CURTAIN INSTALLATION
 - GEOTEXTILE
 - ARMOUR ROCK PLACING ZONE
 - RECLAIMED AREA
 - RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400



TYPICAL SECTION "1-1"



Rev. No.	Description	By	Date

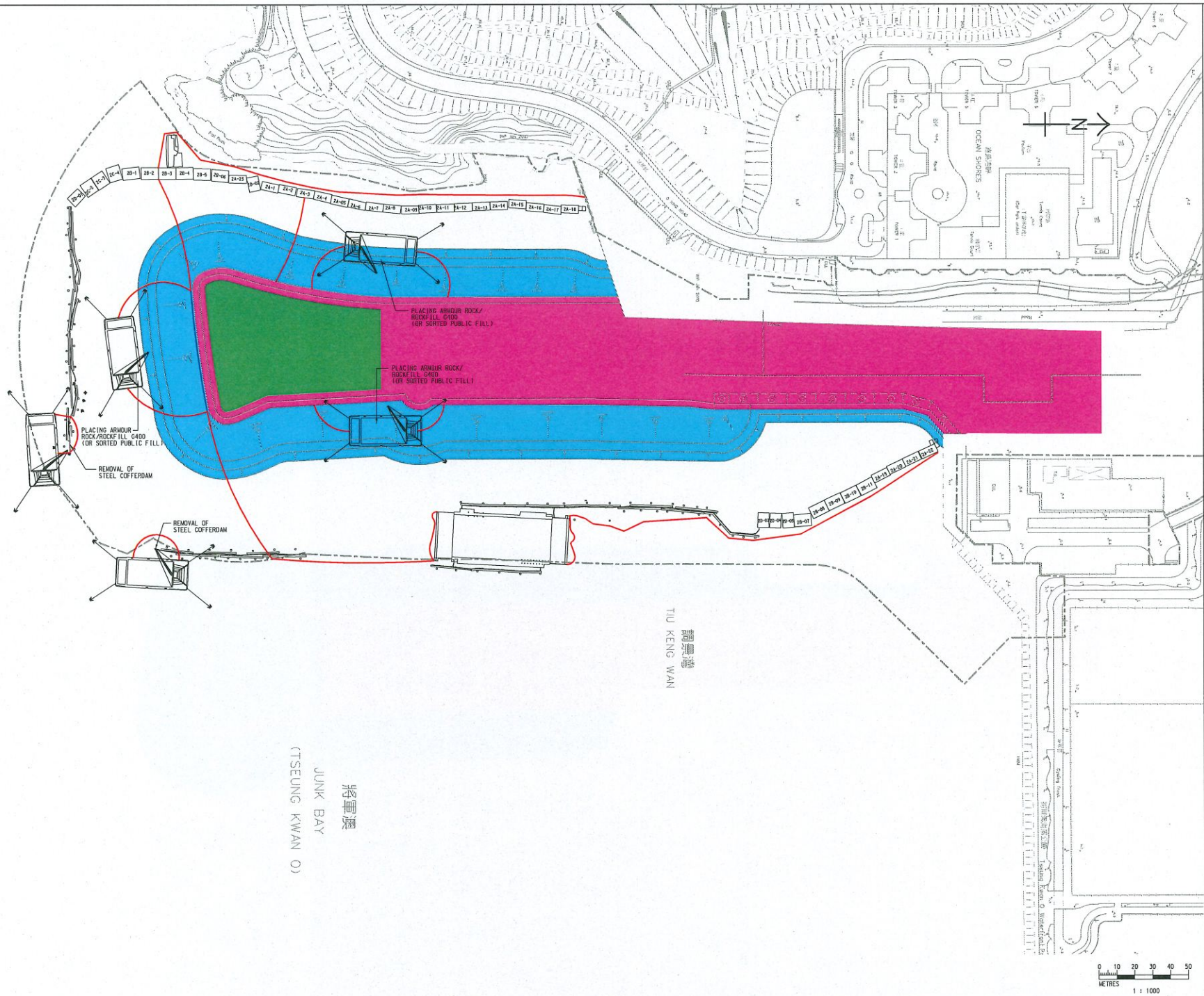
Supervisor: **CEED** 土木工程拓展署
 Civil Engineering and Development Department

Contractor: **AECOM** AECOM Asia Co. Ltd.
CRBC-Build King Joint Venture

Project Title: 土庫工程
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

Drawing Title: 土庫工程
 SILT CURTAIN DEPLOYMENT PLAN - DURING RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400, PLACING OF ARMOUR ROCK AND REMOVED OF STEEL COFFERDAM (STAGE 1)

Drawing no. NE/2015/02/SK/0393
 Drawn By: AL, Checked By: AL, Approved By: [Signature]
 Scale: AS SHOWN @ A1, Status: [Signature]



LEGEND

- SILT CURTAIN INSTALLATION
- GEOTEXTILE
- ARMOUR ROCK PLACING ZONE
- RECLAIMED AREA
- RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400

Rev. No.	Description	By	Date

Client:
 土木工程拓展署
 Civil Engineering and Development Department

Supervisor:
 AECOM Asia Co. Ltd.

Contractor:

 CRBC-Build King Joint Venture

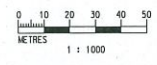
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 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

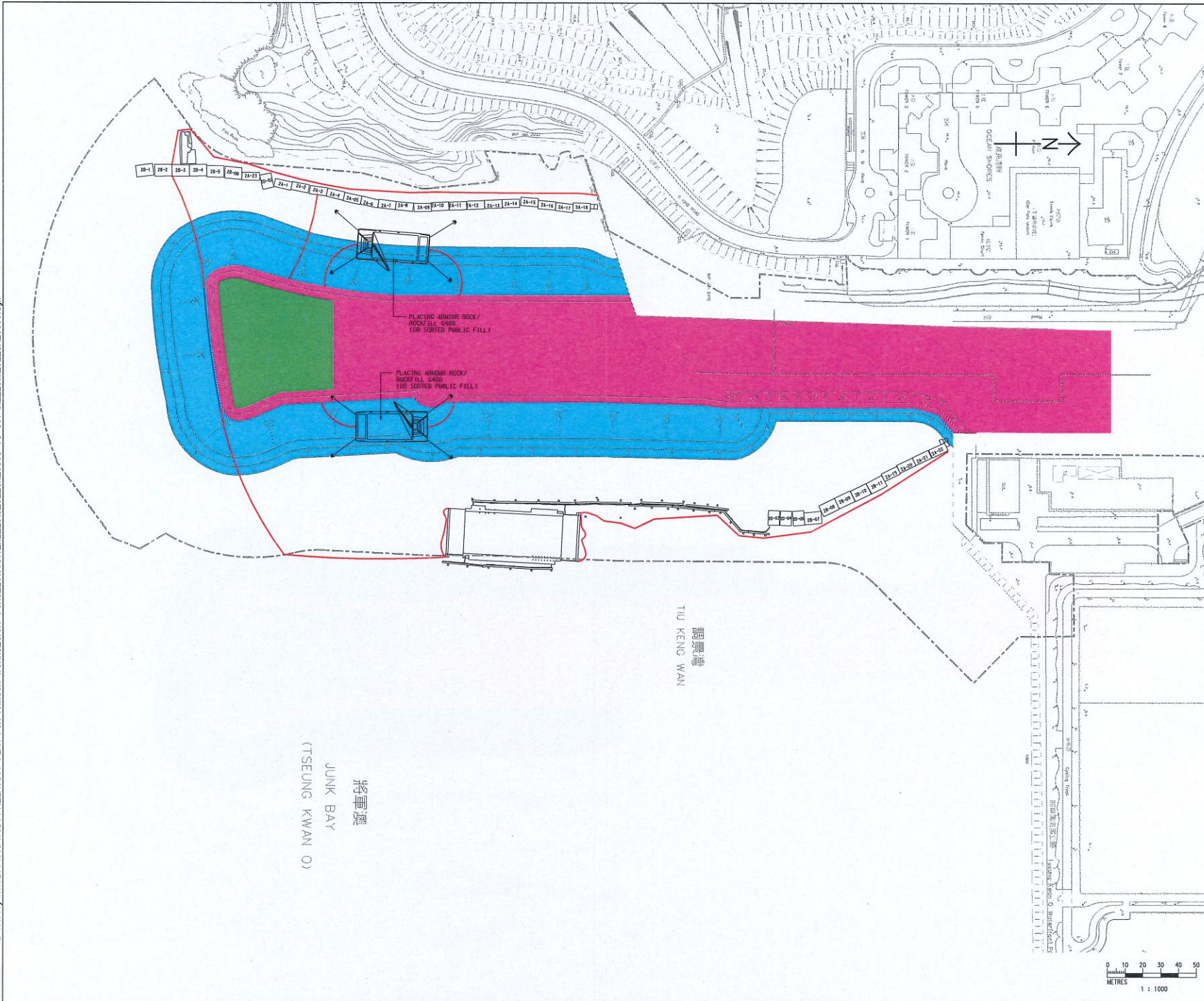
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 -DURING RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400,
 PLACING OF ARMOUR ROCK AND REMOVED OF STEEL COFFERDAM (STAGE 2)

Drawing no.: NE/2015/02/SK/0394 **Rev. No.:** -

Drawn By: AL **Checked By:** [Signature] **Approved By:** [Signature]

Scale: 1:1000 # A1 **Status:** []





LEGEND

- SILT CURTAIN INSTALLATION
- GEOTEXTILE
- ARMOUR ROCK PLACING ZONE
- RECLAIMED AREA
- RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400

Rev. No.	Description	By	Date

土木工程拓展署
 Civil Engineering and Development Department

Supervisor
AECOM AECOM Asia Co. Ltd.

Contractor

 CRBC-Build King Joint Venture

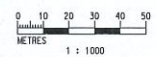
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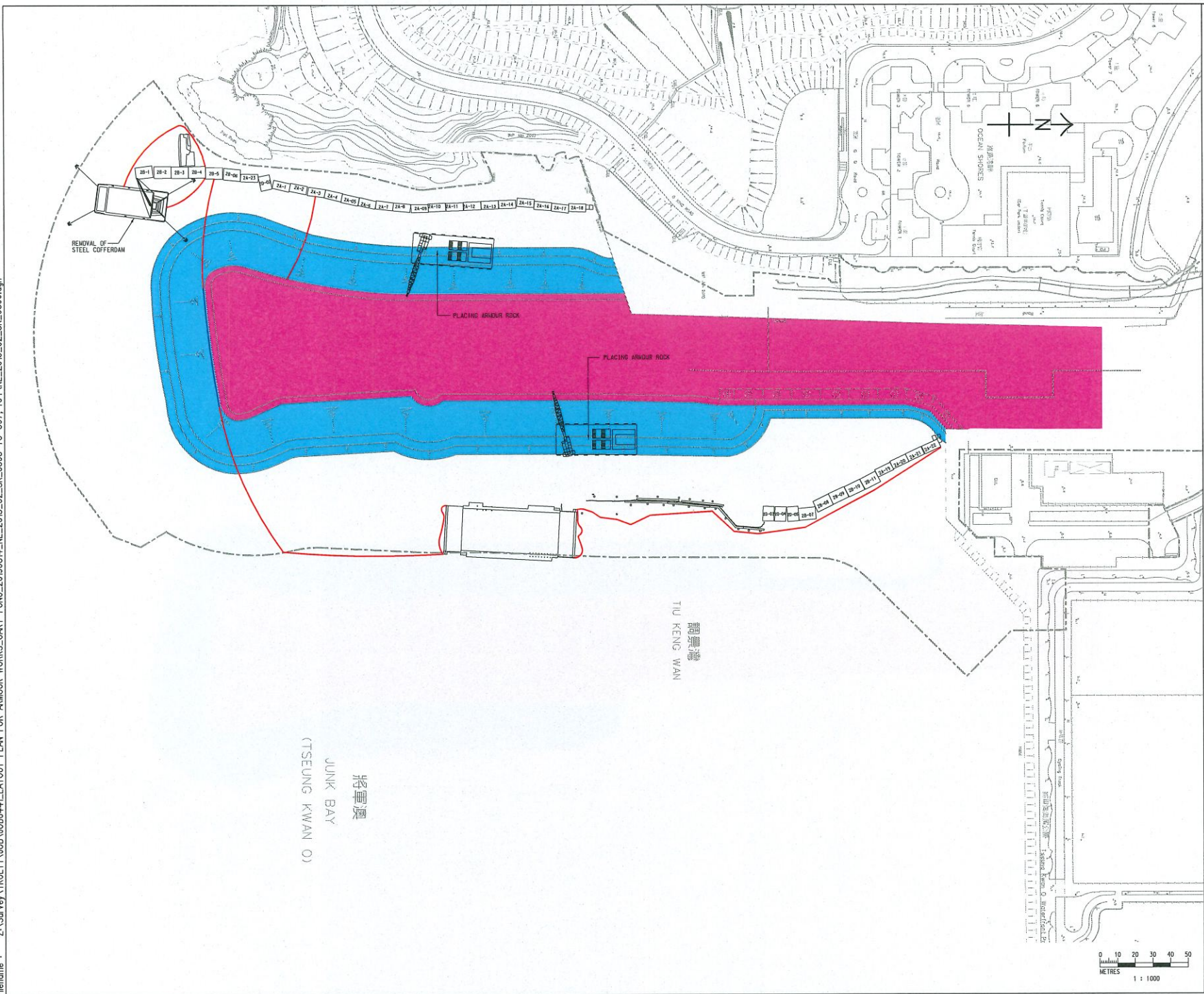
Drawing Title
 SILT CURTAIN DEPLOYMENT PLAN - DURING RECLAMATION WORK AFTER COMPLETION OF ROCKFILL G400 AND PLACING OF ARMOUR ROCK (STAGE 3)

Drawing No. NE/2015/02/SK/0395

Drawn By	Checked By	Approved By
AL		

Scale 1:1000 @ A1





LEGEND

	SILT CURTAIN INSTALLATION
	ARMOUR ROCK PLACING ZONE
	RECLAIMED AREA

Rev. (No.)	Description (修改)	By	Date (日期)


土木工程拓展署
 Civil Engineering and Development Department

Supervisor

 AECOM Asia Co. Ltd.

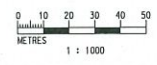
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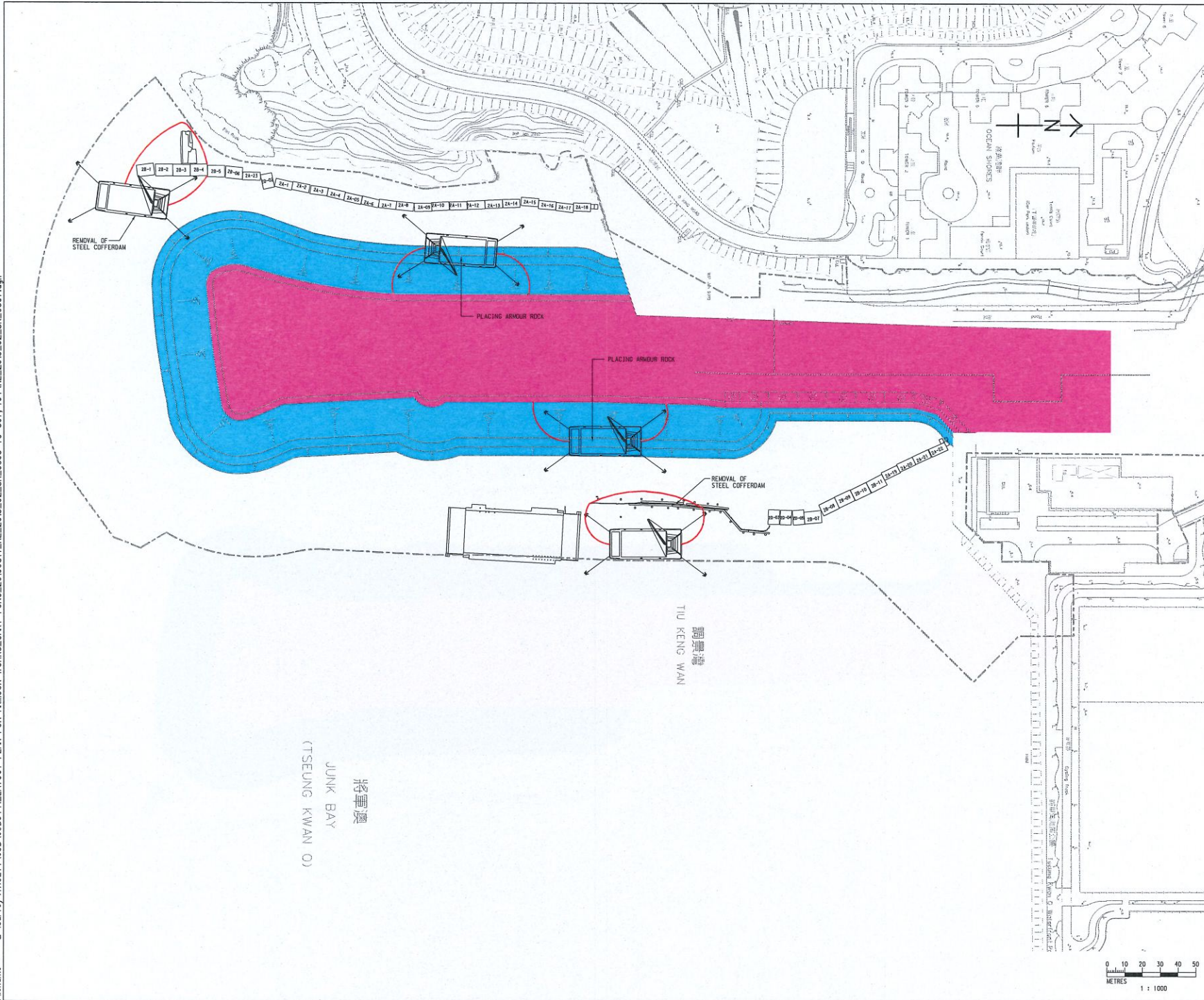

 CRBC-Build King Joint Venture

Project Title
 工程名稱
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

Drawing Title
 圖名
 SILT CURTAIN DEPLOYMENT PLAN
 -DURING PLACING OF ARMOUR ROCK AND REMOVAL OF STEEL COFFERDAM (STAGE 4A)

Drawing no. (圖號)	NE/2015/02/SK/0396	Rev. (No.)	-
Drawn By (繪圖)	AL	Checked By (校核)	
Scale (比例)	1:1000 @ A1	Approved By (核准)	
		Status (狀態)	





LEGEND

	SILT CURTAIN INSTALLATION
	ARMOUR ROCK PLACING ZONE
	RECLAIMED AREA

Rev. No.	Description	By	Date

土木工程拓展署
 Civil Engineering and Development Department

Supervisor
AECOM AECOM Asia Co. Ltd.

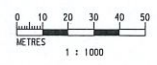
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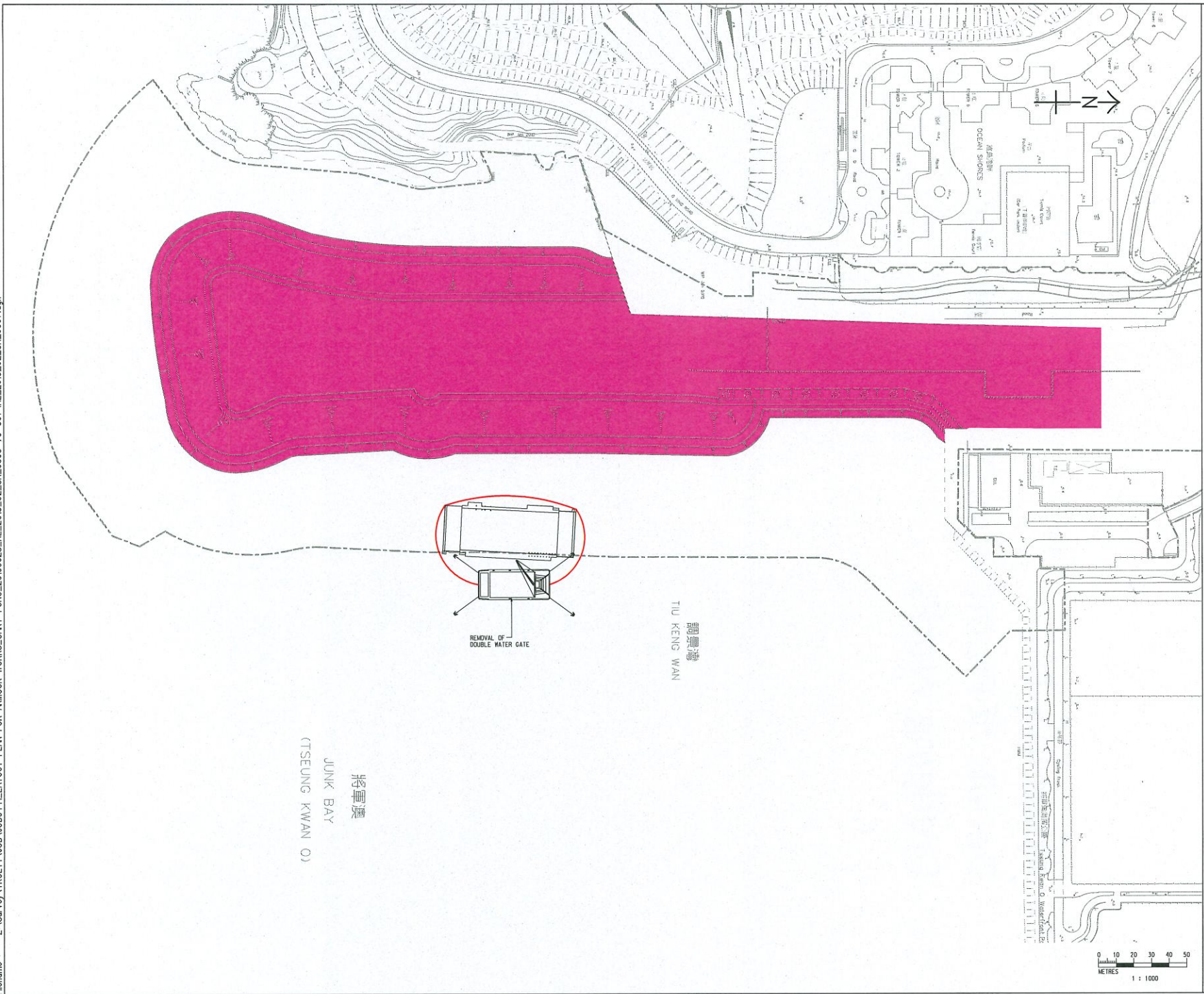
 CRBC-Build King Joint Venture

Project Title
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

Drawing title
 SILT CURTAIN DEPLOYMENT PLAN
 -DURING PLACING OF ARMOUR ROCK
 AND REMOVAL OF STEEL COFFERDAM
 (STAGE 4B)

Drawing no. NE/2015/02/SK/0397	Rev. -
Drawn By AL	Checked By MRE
Scale 1:1000 @ A1	Approved By RJC/A





LEGEND

- SILT CURTAIN INSTALLATION
- RECLAIMED AREA

Rev. (R/C)	Description (中文說明)	By (S/C)	Date (D/M)

PH
CEDD 土木工程拓展署
 Civil Engineering and Development Department

Supervisor
AECOM AECOM Asia Co. Ltd.

Contractor
CRBC 中國路橋 **Build King**
 CRBC-Build King Joint Venture

Project title
 工程名稱
 Contract No. NE/2015/02
 Tseung Kwan O - Lam Tin Tunnel Road P2 and Associated Works

Drawing title
 圖名
SILT CURTAIN DEPLOYMENT PLAN - DURING REMOVAL OF DOUBLE WATER GATE (STAGE 5)

Drawing no.
 圖號
 NE/2015/02/SK/0397

Drawn By
 繪圖
 AL

Checked By
 校核
 [Signature]

Approved By
 批准
 [Signature]




Scale
 比例
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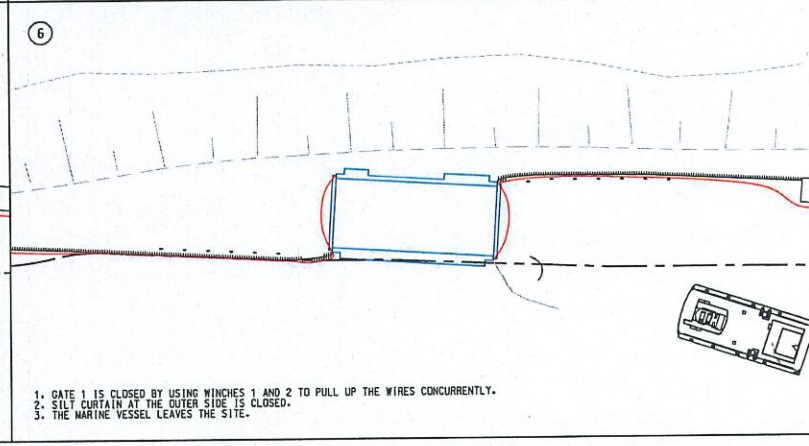
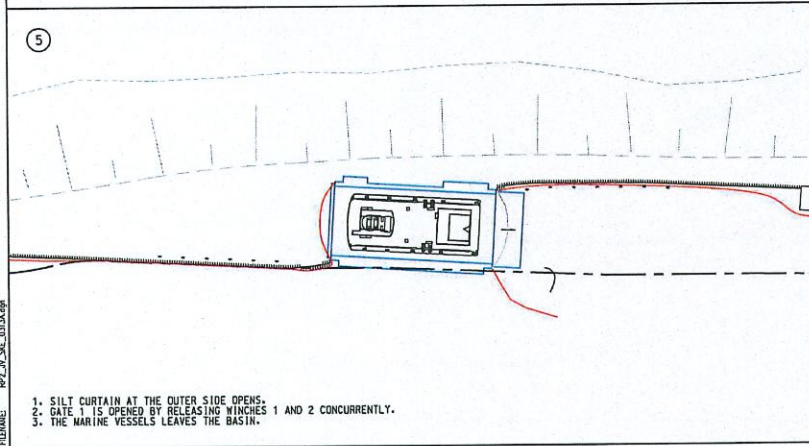
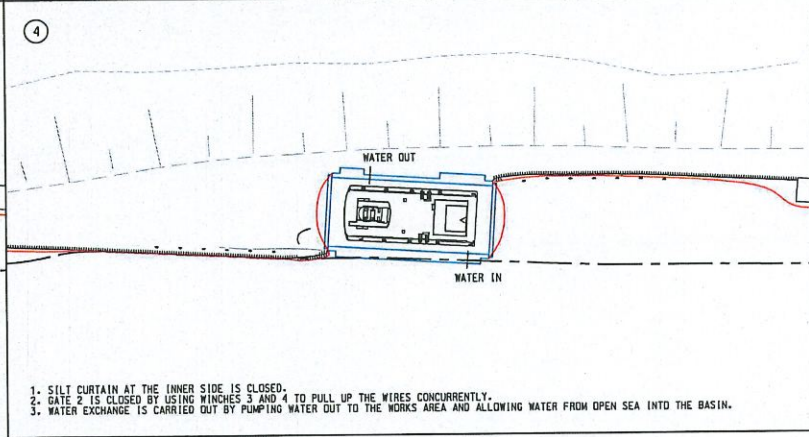
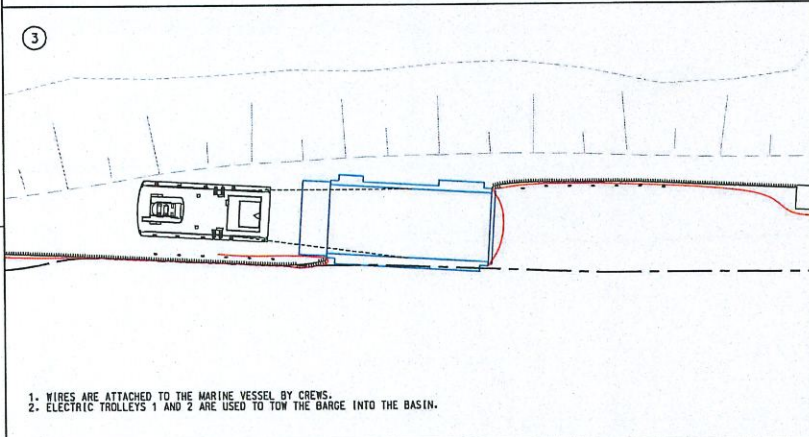
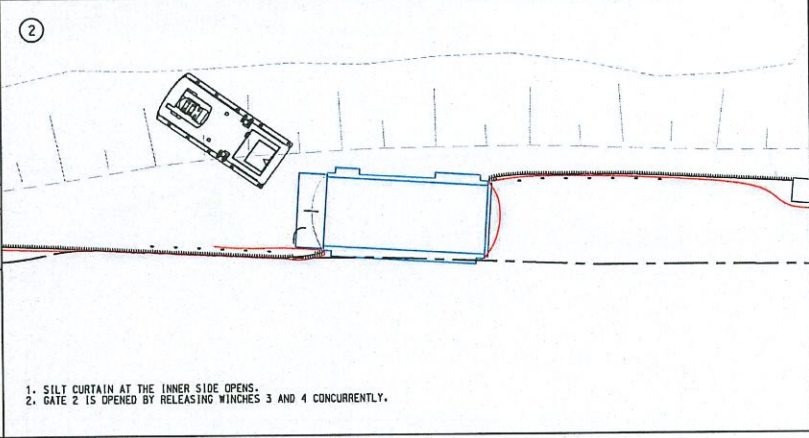
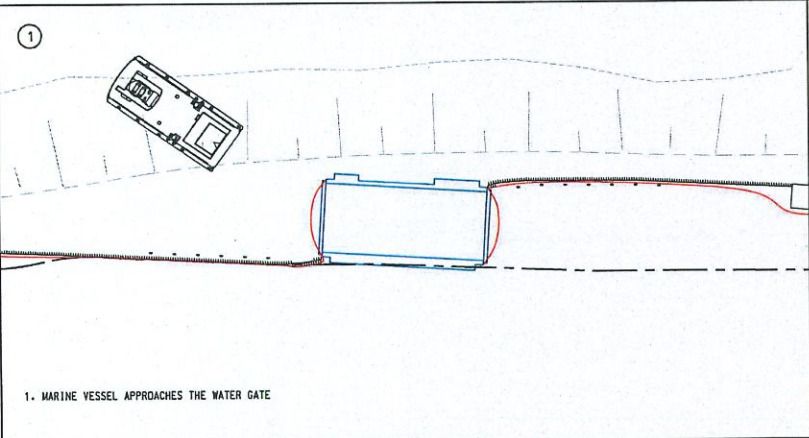
Status
 狀態
 [Signature]

Appendix E – Details of Frame-Type Silt Curtain for Dredging Works


Appendix F – Arrangement of Silt Curtain During Operation of Double Water Gate System

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


-  LIMIT OF SITE BOUNDARY
-  DREDGE SLOPE
-  SILT CURTAIN

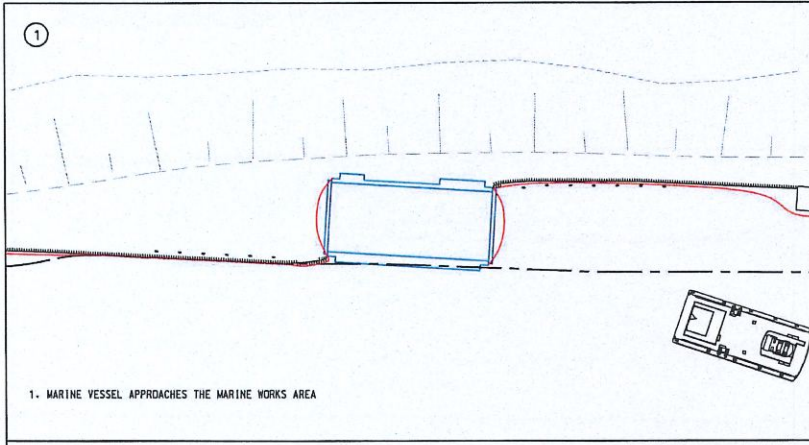


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 DRAWN BY: J.L.
 CHECKED BY: S.K.E.
 PROJECT NO.: RP2/JV/SKE/0313A

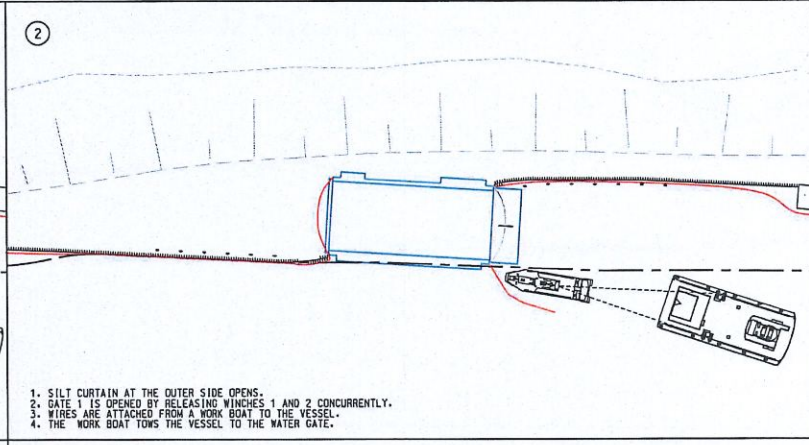
NO.	REVISION	DATE	BY
 CRBC - Build King Joint Venture			
TIANJIN BEIHAI 0 - LAN THU TUNNEL ROAD P2 AND ASSOCIATED WORKS GENERAL ARRANGEMENTS FOR VESSEL LEAVING WORKS AREA			
DRAWING NO.		RP2/JV/SKE/0313A	
DESIGNED BY	DESIGN NO.	DATE	APPROVED
S.K.E.	HL/2007/02	06/2007/02	
DRAWN BY	SCALE	CONSTRUCTION STAGE	
J.L.	1:500 # A1		
COPYRIGHT RESERVED 版權 所 有			

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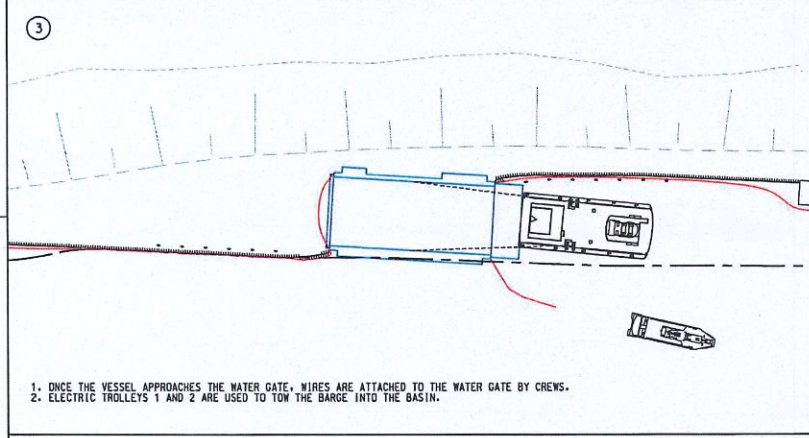
-  LIMIT OF SITE BOUNDARY
-  DREDGE SLOPE
-  SILT CURTAIN



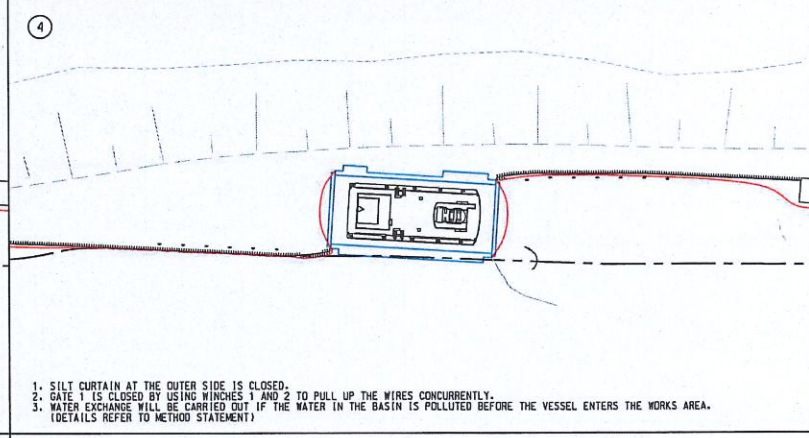
1. MARINE VESSEL APPROACHES THE MARINE WORKS AREA



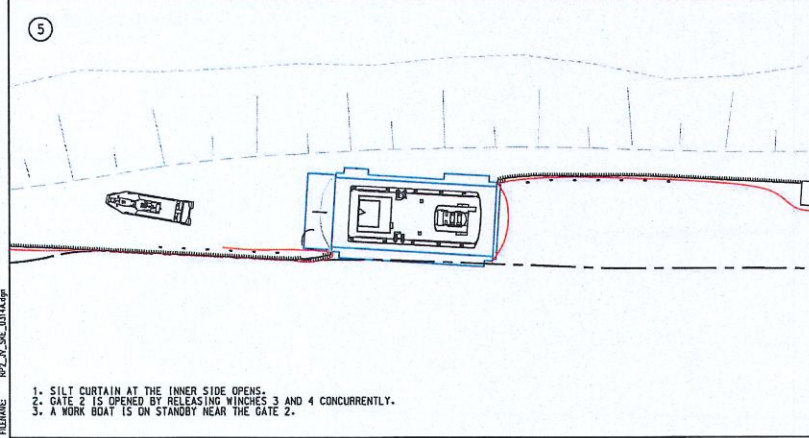
1. SILT CURTAIN AT THE OUTER SIDE OPENS.
 2. GATE 1 IS OPENED BY RELEASING WINCHES 1 AND 2 CONCURRENTLY.
 3. WIRES ARE ATTACHED FROM A WORK BOAT TO THE VESSEL.
 4. THE WORK BOAT TOWS THE VESSEL TO THE WATER GATE.



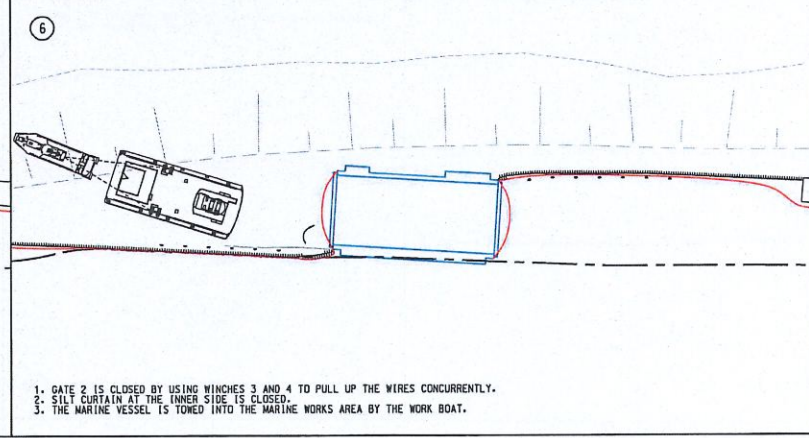
1. ONCE THE VESSEL APPROACHES THE WATER GATE, WIRES ARE ATTACHED TO THE WATER GATE BY CREWS.
 2. ELECTRIC TROLLEYS 1 AND 2 ARE USED TO TOW THE BARGE INTO THE BASIN.



1. SILT CURTAIN AT THE OUTER SIDE IS CLOSED.
 2. GATE 1 IS CLOSED BY USING WINCHES 1 AND 2 TO PULL UP THE WIRES CONCURRENTLY.
 3. WATER EXCHANGE WILL BE CARRIED OUT IF THE WATER IN THE BASIN IS POLLUTED BEFORE THE VESSEL ENTERS THE WORKS AREA. (DETAILS REFER TO METHOD STATEMENT)




1. SILT CURTAIN AT THE INNER SIDE OPENS.
 2. GATE 2 IS OPENED BY RELEASING WINCHES 3 AND 4 CONCURRENTLY.
 3. A WORK BOAT IS ON STANDBY NEAR THE GATE 2.



1. GATE 2 IS CLOSED BY USING WINCHES 3 AND 4 TO PULL UP THE WIRES CONCURRENTLY.
 2. SILT CURTAIN AT THE INNER SIDE IS CLOSED.
 3. THE MARINE VESSEL IS TOWED INTO THE MARINE WORKS AREA BY THE WORK BOAT.

PLOT DATE: 1/17/2007 10:33:37 PM
 PRINTED BY: J.
 FILE NAME: RP2_JV_SKE_0314A.dwg

NO.	REVISION	DATE	BY	CHK
 CNRC - Build King Joint Venture				
TONGJI KIAN O - LAI TH TUNNEL ROAD P2 AND ASSOCIATED WORKS GENERAL ARRANGEMENTS FOR VESSEL ENTERING WORKS AREA				
SHEET NO. RP2/JV/SKE/0314A				
DESIGNED BY	DRAWN BY	CHECKED BY	DATE	APPROVED
JL	HE/2005/02			
SCALE	SHEET NO.	CONSTRUCTION STAGE		
1:800 @ A1		© COPYRIGHT RESERVED 建 設 局		

Appendix G – Silt Curtain Inspection Checklist

隔泥幕檢查表
Silt Curtain Inspection Checklist

隔泥幕名稱：

地點：

檢查日期及時間：

項目	描述	情況		需要立即採取行動?*		預計修補日期	備註
		是	否	要	不要		
1.	No any floating debris / refuse within silt curtain? 隔泥幕內沒有任何垃圾?						
2.	Buoys in good condition? 浮泡情況良好?						
3.	Tying rope in good condition? 繫上的繩索情況良好?						
4.	Geotextile intact and in good condition? 土工布完整無缺?						
5.	Sinkers in good condition? 下墜物情況良好?						
6.	No any obstruction to water flow between geotextile? 土工布之間沒有任何阻礙水的流動?						
7.	Silt curtain frame in good condition? 隔泥幕鐵架狀況良好?						

檢查人：

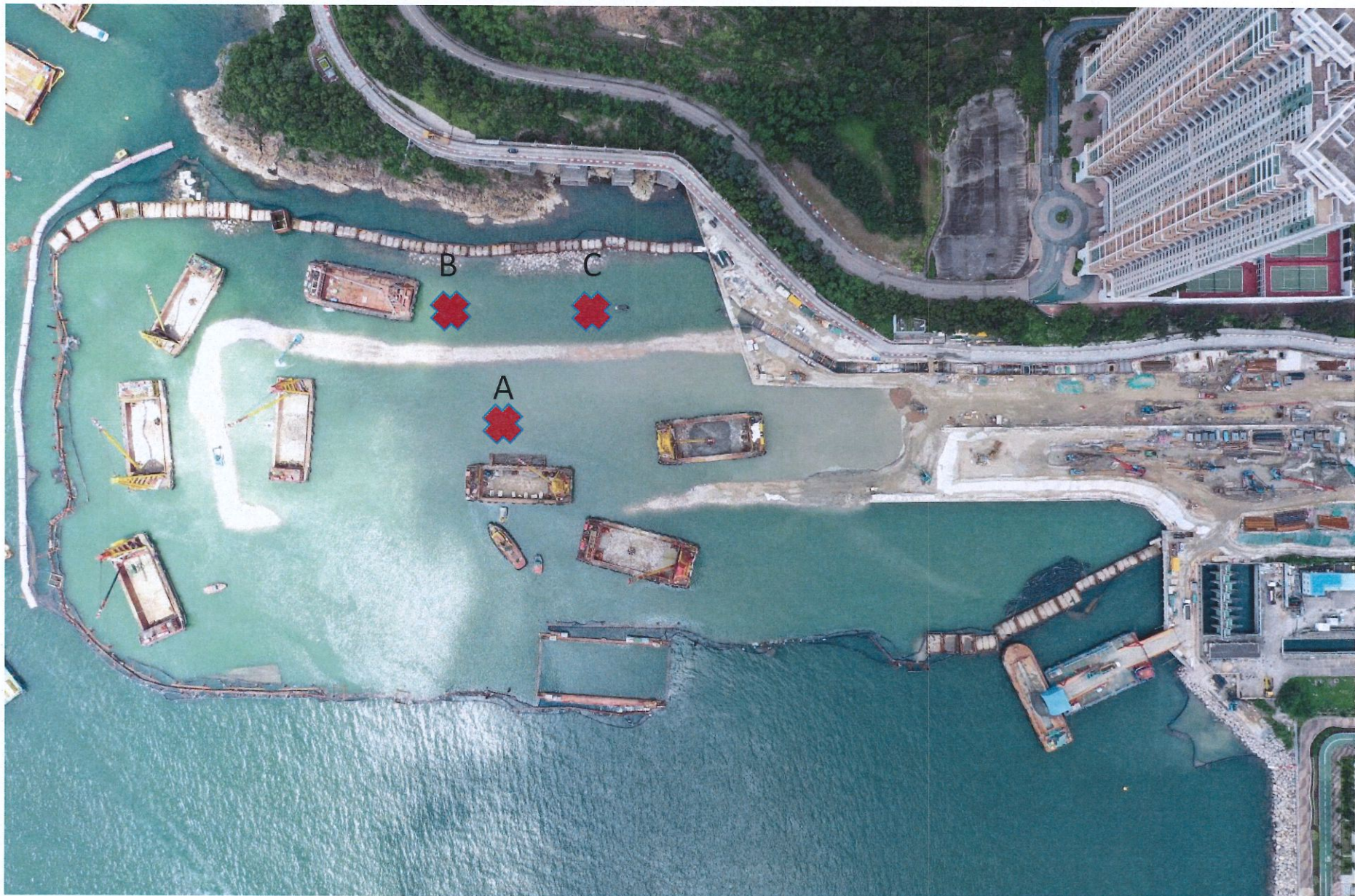
CRBC - Build King Joint Venture

*Note: For silt curtain with defects which need to be rectified immediately, related marine work has to be stopped until rectification work completed to the satisfaction of the Engineer.

* 指引：對於已損壞的隔泥幕，需要立刻給予修補，而相關的海事工作必須停止，直到工程師認可修補工作完成。

Appendix H – Water Quality Monitoring Result on 19 June & 16 August 2019

Water Quality Monitoring Result on 19 June 2019



Monitoring Result for Suspended Solid (mg/L) on 19 June 2019



Monitoring Result for Turbidity (NTU) on 19 June 2019



Water Quality Monitoring Result

Sampling Date: 19-Jun-19

Date / Time	Location	Sampling Depth	Temp	DO Conc	DO Saturation	Turbidity	Salinity	pH	SS
		m	°C	mg/L	%	NTU	ppt	unit	mg/L
13:07	TKO(A)	1.14	26.9	5.75	86.1	5.92	31.95	8.5	7
			26.8	5.65	84.5	5.86	31.98	8.49	7
		7.08	26.4	5.18	77.1	7.09	32.23	8.46	8
			26.3	5.12	76.2	7.76	32.26	8.44	8
		11.55	25.4	3.15	46.3	8.81	33.15	8.4	19
			25.5	3.19	47	8.54	33.12	8.41	20
13:20	TKO(B)	1.15	26.9	5.65	84.7	2.98	31.73	8.35	7
			26.8	5.65	84.5	2.99	31.8	8.35	6
		3.22	26.6	5.14	76.6	4.99	32.05	8.35	5
			26.5	5.13	76.4	5.72	32.09	8.34	6
		5.45	26.3	4.56	67.7	5.33	32.19	8.34	6
			26.2	4.52	67	4.88	32.24	8.33	6
13:25	TKO(C)	1.16	27.2	5.45	82	5.38	31.56	8.35	5
			26.8	5.45	81.5	4.84	31.89	8.35	5
		3.27	26.6	4.98	74.3	6.55	32.01	8.34	6
			26.5	4.96	73.9	7.07	32.05	8.34	5
		5.26	26.2	4.28	63.5	4.49	32.2	8.32	4
			26.2	4.22	62.6	4.65	32.21	8.32	6

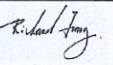


CERTIFICATE OF ANALYSIS

Client	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR BEN TAM	Contact	: Richard Fung	Work Order	: HK1926446
Address	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Bentam@fordbusiness.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2959 6059	Telephone	: +852 2610 1044	Date received	: 19-Jun-2019
Facsimile	: +852 2959 6079	Facsimile	: +852 2610 2021	Date of issue	: 24-Jun-2019
Project	: TCS01016			No. of samples	- Received : 18
Order number	:	Quote number	: HKE/3386/2018		- Analysed : 18
C-O-C number	: —				
Site	: —				

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This document has been signed by those names that appear on this report and are the authorised signatories.

<i>Signatory</i>	<i>Position</i>	<i>Authorised results for:</i>
 Fung Lim Chee, Richard	General Manager	Inorganics



Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1926446 supersedes any previous reports with this reference. Testing period is from 19-Jun-2019 to 24-Jun-2019. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific Comments for Work Order HK1926446 :

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.



Analytical Results

Sub-Matrix: WATER

			Compound	EA025: Suspended Solids (SS)	---	---	---	---
			LOR Unit	2 mg/L	---	---	---	---
Client sample ID	Client sampling date / time	Laboratory sample ID	EA/ED: Physical and Aggregate Properties	---	---	---	---	---
TKO A/S/	[19-Jun-2019]	HK1926446-001	7	---	---	---	---	---
TKO A/S/ - duplicate	[19-Jun-2019]	HK1926446-002	7	---	---	---	---	---
TKO A/M/	[19-Jun-2019]	HK1926446-003	8	---	---	---	---	---
TKO A/M/ - duplicate	[19-Jun-2019]	HK1926446-004	8	---	---	---	---	---
TKO A/B/	[19-Jun-2019]	HK1926446-005	19	---	---	---	---	---
TKO A/B/ - duplicate	[19-Jun-2019]	HK1926446-006	20	---	---	---	---	---
TKO B/S/	[19-Jun-2019]	HK1926446-007	7	---	---	---	---	---
TKO B/S/ - duplicate	[19-Jun-2019]	HK1926446-008	6	---	---	---	---	---
TKO B/M/	[19-Jun-2019]	HK1926446-009	5	---	---	---	---	---
TKO B/M/ - duplicate	[19-Jun-2019]	HK1926446-010	6	---	---	---	---	---
TKO B/B/	[19-Jun-2019]	HK1926446-011	6	---	---	---	---	---
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TKO C/S/	[19-Jun-2019]	HK1926446-013	5	---	---	---	---	---
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TKO C/M/	[19-Jun-2019]	HK1926446-015	6	---	---	---	---	---
TKO C/M/ - duplicate	[19-Jun-2019]	HK1926446-016	5	---	---	---	---	---
TKO C/B/	[19-Jun-2019]	HK1926446-017	4	---	---	---	---	---
TKO C/B/ - duplicate	[19-Jun-2019]	HK1926446-018	6	---	---	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2419973)								
HK1926446-001	TKO A/SI	EA025: Suspended Solids (SS)	----	2	mg/L	7	8	0.00
HK1926446-011	TKO B/BI	EA025: Suspended Solids (SS)	----	2	mg/L	6	6	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER				Method Blank (MB) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
						LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QCLot: 2419973)											
EA025: Suspended Solids (SS)	----	2	mg/L	<2	10 mg/L	96.5	----	81	120	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

- No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.

Water Quality Monitoring Result on 16 August 2019



Monitoring Result for Turbidity (NTU) on 16 August 2019



Appendix I – Implementation Schedule of Enhanced Silt Curtain for Marine Works

Implementation Schedule

Reference Section	Implementation Schedule of Enhanced Silt Curtain for Marine Filling Works Conditions	Implemented by	Monitored by
Section 6 & Appendix D	<u>At the commencement of marine filling activities</u> <ul style="list-style-type: none"> • The indicative enhanced silt curtain arrangement for the installation of temporary steel cofferdam and double water gate presented in Appendix D of Silt Curtain Deployment Plan (SCDP) shall be followed; 	Contractor	ET & IEC
Section 6 & Appendix D	<u>Throughout the construction period of marine filling activities</u> <ul style="list-style-type: none"> • If there are any changes on the arrangement of enhanced silt curtain system as shown in Appendix D , the Contractor is required to submit updated silt curtain plans for agreement with ET & IEC 	Contractor	ET & IEC
Section 7 & Appendix D	<u>Maintenance of enhanced silt curtain</u> <ul style="list-style-type: none"> • The Contractor shall carry out weekly diving inspection to enhance silt curtains regularly and necessary maintenance taking into account the site conditions, with details to be agreed with RSS • Daily joint inspection with RSS before commencement of marine construction works 	Contractor	RSS

Implementation Schedule

Reference Section	Arrangements of the Enhanced Silt Curtain during Dredging and Reclamation Works				
	Case		Arrangement	Implemented by	Monitored by
Section 6 & Appendix D	A	Portion IX	Enhanced silt curtain will be deployed and surrounded of the dredging and reclamation site area	Contractor	RSS & ET & IEC

Reference Section	Arrangements of the Enhanced Silt Curtain after Completion of Rockfill 400, Placing of Armour Rock and Removal of Steel Cofferdam				
	Case		Arrangement	Implemented by	Monitored by
Section 6 & Appendix D	B	Eastern side of the Portion IX	<ul style="list-style-type: none"> Enhanced silt curtain will be deployed and surrounded of the site area in the stage 1-4A. The localize silt curtain will be deployed and surrounded the derrick barge for the placing of armour rock at stage 4B. The localize silt curtain will be deployed for the removal of double water gate at stage 5. 	Contractor	RSS & ET & IEC
Section 6 & Appendix D	C	Southern side of the Portion IX	<ul style="list-style-type: none"> Enhanced silt curtain will be deployed and surrounded of the site area in the stage 1-4A. The localize silt curtain will be deployed and surrounded the derrick barge for the placing of armour rock at stage 4B. 	Contractor	RSS & ET & IEC
Section 6 & Appendix D	D	Western side of the Portion IX	<ul style="list-style-type: none"> Enhanced silt curtain will be deployed and surrounded of the site area in the stage 1-4A. The localize silt curtain will be deployed and surrounded the derrick barge for the placing of armour rock at stage 4B. 	Contractor	RSS & ET & IEC