

Proactive Environmental Protection Proforma

Ref: 201801

Ref ⁽¹⁾	Proposed Construction Method ⁽²⁾	Location/ Working Period	Anticipated Impacts	Recommended Mitigation Measures
EIA Ref 6.7.3 and 6.7.4	Marine Deck Support Pile (details refer to the attached document)	Open Water in Kowloon Bay for 10 months	According to EIA Section 6.7.4, minor seabed disturbance is anticipated by pipe wall installed.	<p>Good site practices such as silt curtain and regular inspections is consider adequate to minimize the water quality impact.</p> <ul style="list-style-type: none"> ▪ Following the FEP-01/457/2013/C, the Contractor will be ensure the silt curtains (at least 75% SS reduction) will be deployed to fully enclose and the pipepile / sheetpile installation / demolition point in accordance with Condition 2.13(b). ▪ The temporary reclamation will be fully enclosed by silt curtain. ▪ Daily review of the silt curtain will be carried out to ensure the implementation of the recommended mitigation measures, provide effective control of any malpractices, and provide continuous improvements to the environmental conditions.

Notes:

(1) EIA Ref/EM&A Log Ref/Design Document Ref

(2) Details of equipment, vehicles, plants, processes, technologies for the option of construction method

Reviewed by Environmental Team Leader: 

Date: 05 December 2018

Approved by Independent Checker (Environment): 

Date: 10 December 2018

Contract No. HY/2014/07

Contract Title: Central Kowloon Route – Kai Tak West

Proactive Environmental Protection Proforma for Alternative Construction Method for Temporary Reclamation

Introduction

Gammon Construction Limited (GCL) was commissioned by the Highways Department as the Civil Contractor for Works Contract HY/2014/07. AECOM Asia Company Limited (AECOM) was appointed by GCL as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) programme during construction phase of the Project.

The Environmental Impact Assessment (EIA) Report for Central Kowloon Route (CKR EIA) (Register No.: AEIAR-171/2013) was approved on 11 July 2013 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) for CKR was granted on 9 August 2013 (EP No.: EP- 457/2013) for the construction and operation. Variation of EP (VEP) was subsequently applied and the latest EP (EP No. EP-457/2013/C) was issued by the Director of Environmental Protection (DEP) on 16 January 2017. Further Environmental Permit (EP No. FEP-01/457/2013/C) for CKR – Kai Tak West was issued on 28 February 2018.

At times during the construction phase the Contractor may submit method statements for various aspects of construction. This state of affairs would only apply to those construction methods that the EIA has not imposed conditions while for construction methods that have been assessed in the EIA, the Contractor is bound to follow the requirements and recommendations in the EIA study. The Contractor's options for alternative construction methods may introduce adverse environmental impacts into the Project. According to Section 14.3 of the EM&A Manual, it is the responsibility of the Contractor and ET, in accordance with established standards, guidelines and EIA study recommendations and requirements, to review and determine the adequacy of the environmental protection and pollution control measures in the Contractor's proposal in order to ensure no unacceptable impacts would result. To achieve this end, the ET shall provide a copy of the Proactive Environmental Protection Proforma to the IEC for approval. The IEC should audit the review of the construction method and endorse the proposal on the basis of no adverse environmental impacts.

In this project, a 370 m long section of the CKR tunnel between the Kowloon City Ferry Pier to the Kai Tak Development Area will pass through the seabed of Kowloon Bay. According to Section 3.5.1 of the CKR EIA Report, due to various site constraints, this underwater tunnel will have to be constructed using the alternative temporary reclamation method. This method would require constructing pipe pile or similar wall system along either side of the underwater tunnel as temporary seawall and backfilling between them to create a dry working platform.

Original Scheme for Temporary Reclamation in the CKR EIA Report

The temporary seawall structure is envisaged to consist of double-layer pipe pile wall, or a combined wall type make up of pipe pile wall and sheetpile wall or similar to be installed to predetermined level. The double layer walls are interconnected by diaphragm pipe pile wall or tie rod. The space between the double layer walls will then be backfilled by suitable filling materials for the completion of the temporary seawall structure. Prior to the construction of the temporary seawall structure, ground treatment, such as stone columns, will be carried out at the marine deposit layer to be left in-situ in front or under the proposed temporary seawall structure to enhance the stability of the seawall structure. After the completion of the temporary seawall structure, reclamation will be carried out within the temporary seawall to +4.0mPD to form a temporary working platform. A diaphragm wall will

then be constructed within the temporary working platform and the subsequent excavation and underwater tunnel construction works will be carried out within the area enclosed by the temporary seawall by cut-and-cover method with corresponding temporary lateral support system.

A typical section of the original temporary reclamation for construction of underwater tunnel is shown in **Figure 1**.

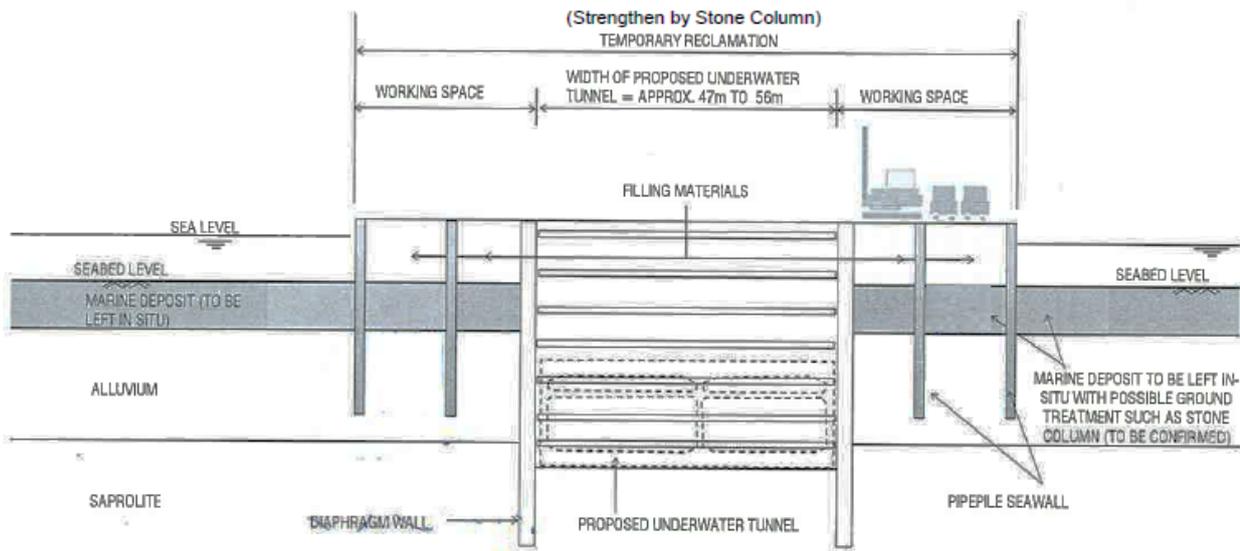


Figure 1 – Original Scheme for Temporary Reclamation stated in the CKR EIA Report

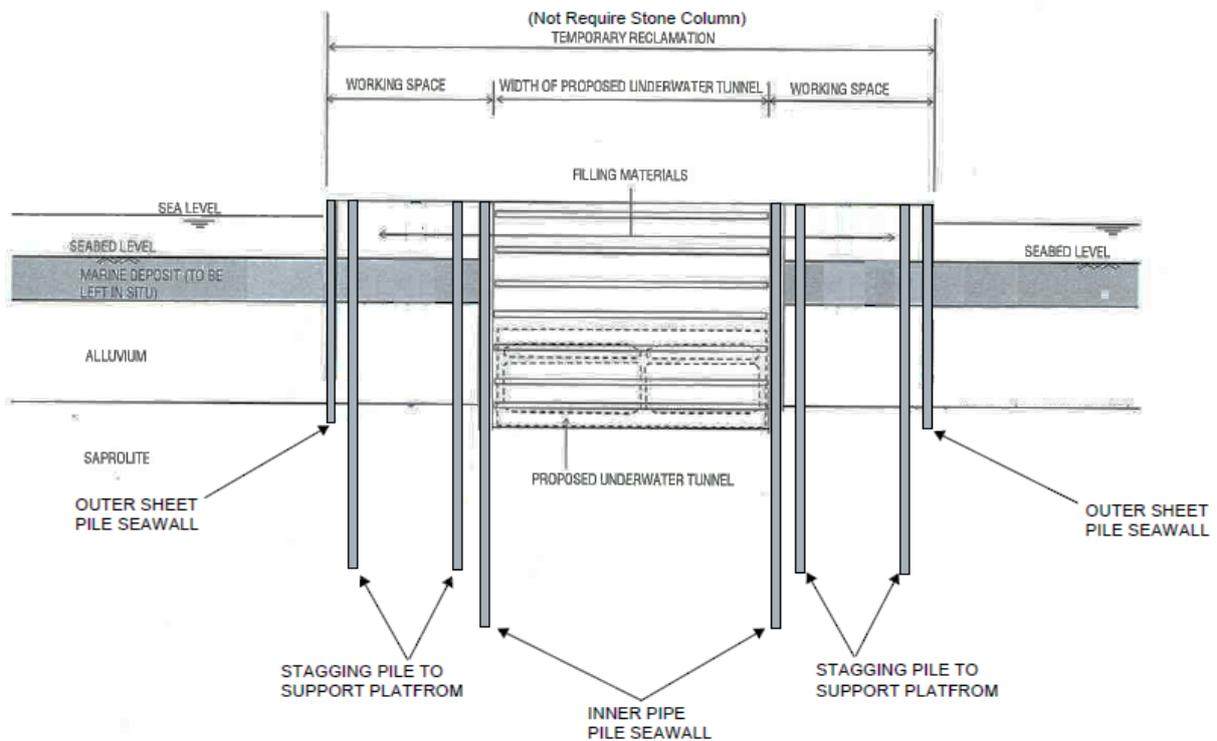


Figure 2 – Proposed Scheme for Temporary Reclamation

Proposed Scheme for Temporary Reclamation

GCL proposes alternative construction method for the temporary reclamation. Instead of adopting ground treatment using the stone column, GCL proposes to erect prefabricated temporary steel deckings above seawater level in order to provide a dry working platform for constructional plants to be operated for forthcoming tunnel construction works. These temporary steel deckings will be mainly supported by staggings piles. Furthermore, the inner wall will be constructed using clutched pipe piles and no additional diaphragm wall is required in the proposed scheme.

A typical section for the proposed temporary reclamation for construction of underwater tunnel is shown in **Figure 2**.

Anticipated Environmental Impacts and Recommended Mitigation Measures of Proposed Scheme

In the proposed scheme, the construction does not involve ground treatment works, i.e. stone column installation is omitted. Instead of the ground treatment method, the staggings piles will be installed to support the steel deckings and will be constructed disturbing the seabed. A comparison on the volume of temporary seabed disturbance involved was made between the two schemes was estimated as attached in **Annex A**. Based on the estimation, minimal temporary seabed disturbance was anticipated in the proposed scheme. Similar to the original scheme, excavation of marine deposit under the temporary wall structure is not required.

According to Section 6.7.3 and 6.7.4 of the CKR EIA Report, a direct comparison can be made as a reference for the anticipated environmental impacts between stone column installation and pipepile wall installation. For ease of reference, those sections in the CKR EIA Report were enclosed in **Annex B**.

Mitigation measures required for the stone column installation in the CKR EIA Report are listed below:

1. Geotextile layers are required will be installed to cover the sea bed to prevent re-suspension and seabed disturbance;
2. A silt curtain will be deployed to the stone column working vessels during installation; and
3. In order to ensure the acceptance of water quality during stone column installation, performance review for stone column installation is proposed.

For the pipepile wall installation as stated in the CKR EIA Report, silt curtain is only required prior to the installation works. Minimal seabed disturbance is anticipated and the water quality impact could be mitigated by good site practices such as perimeter silt curtain. Following to the FEP-01/457/2013/C, GCL should ensure the silt curtains (at least 75% SS reduction) will be deployed to fully enclose and the pipepile / sheetpile installation / demolition point in accordance with Condition 2.13(b). Daily review of the silt curtain will be carried out to ensure the implementation of the recommended mitigation measures, provide effective control of any malpractices, and provide continuous improvements to the environmental conditions.

Based on the extent of the mitigation measures required, a conclusion can be made that minimal water quality impacts are anticipated when comparing the proposed scheme with the original scheme in the CKR EIA Report.

During the construction of the temporary reclamation, silt curtain will be deployed to fully enclose the staggings pile construction.

Annex A – Comparison on volume of seabed disturbance for two schemes
Annex B – Abstract of Section 6.7.3 and 6.7.4 of the EIA Report

Annex A - Comparison of volume between marine deck support pile and stone column

30 Oct 2018

Stone Column (Stage 1)

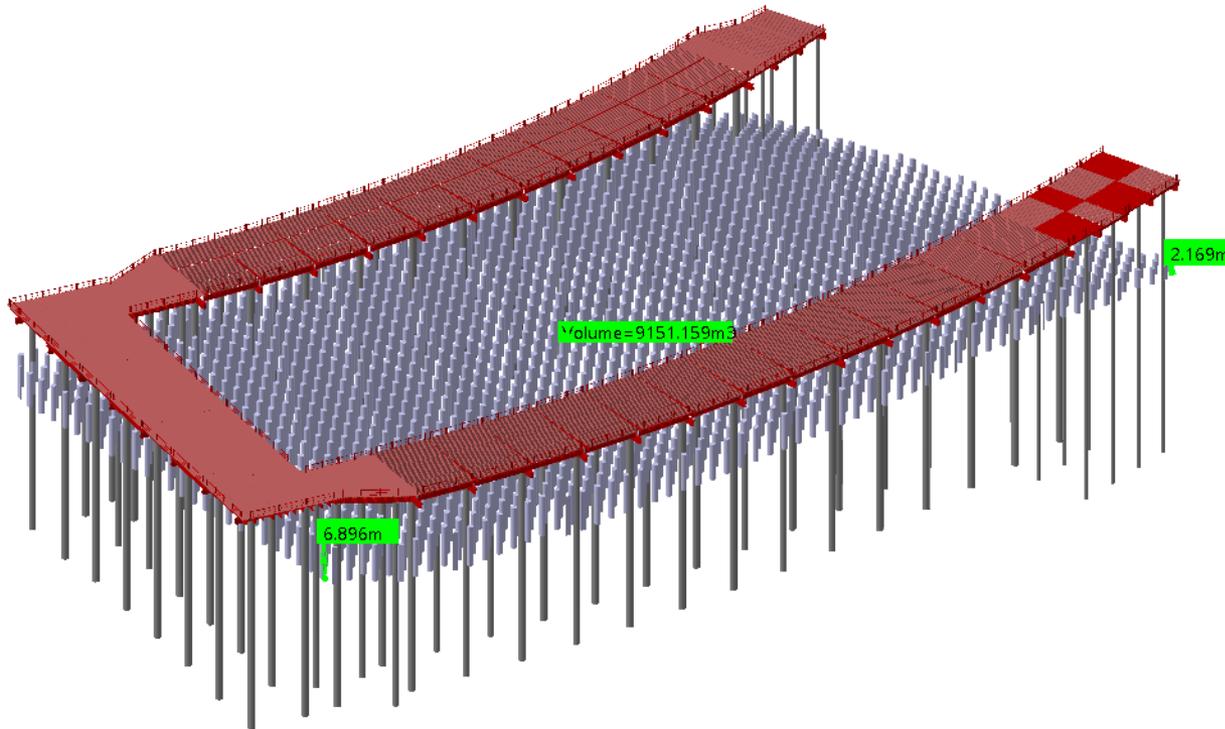
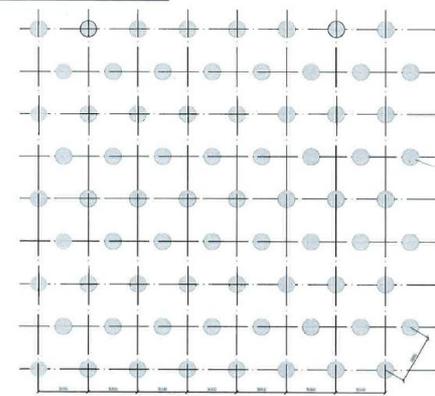
试验桩布置

碎石桩设计桩径
1.0m

间距按正三角形
3.0m布置

共布置碎石桩72
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- Volume (from MD to Alluvium): $\sim 9151.159\text{m}^3$

Stone Column (Stage 2)

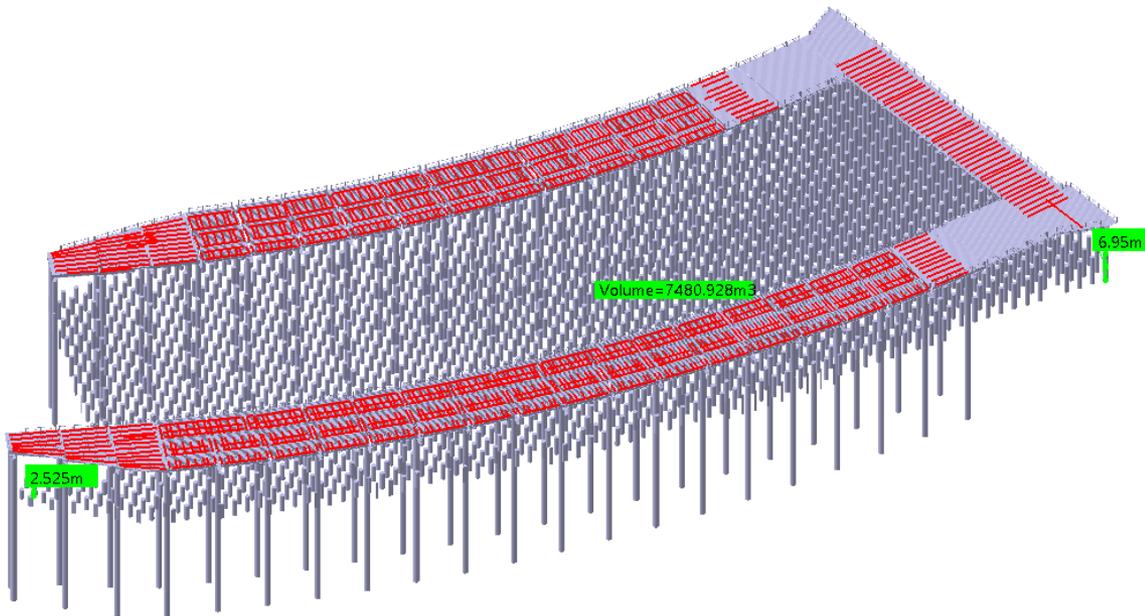
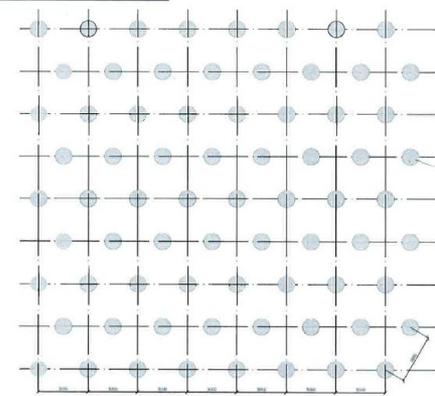
试验桩布置

碎石桩设计桩径
1.0m

间距按正三角形
3.0m布置

共布置碎石桩72
根

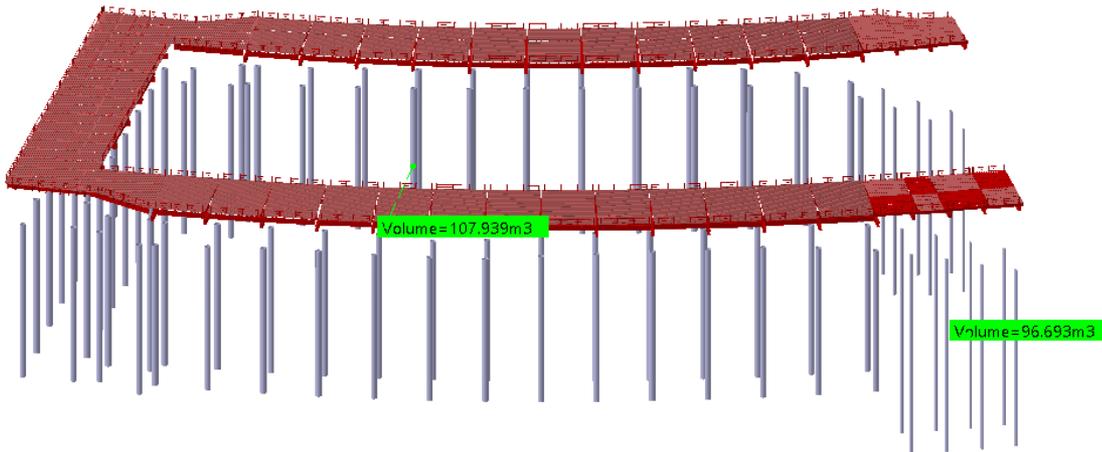
分为9排, 每排8
根



- Volume (from MD to Alluvium): $\sim 7480.928\text{m}^3$

Pile Column (Stage 1)

- Volume of Pile in Type A Platform (thickness + inside – from MD to foundation level): $\sim 96.693\text{m}^3$
- Volume of others Pipe pile (thickness – from MD to foundation level): $\sim 107.939\text{m}^3$

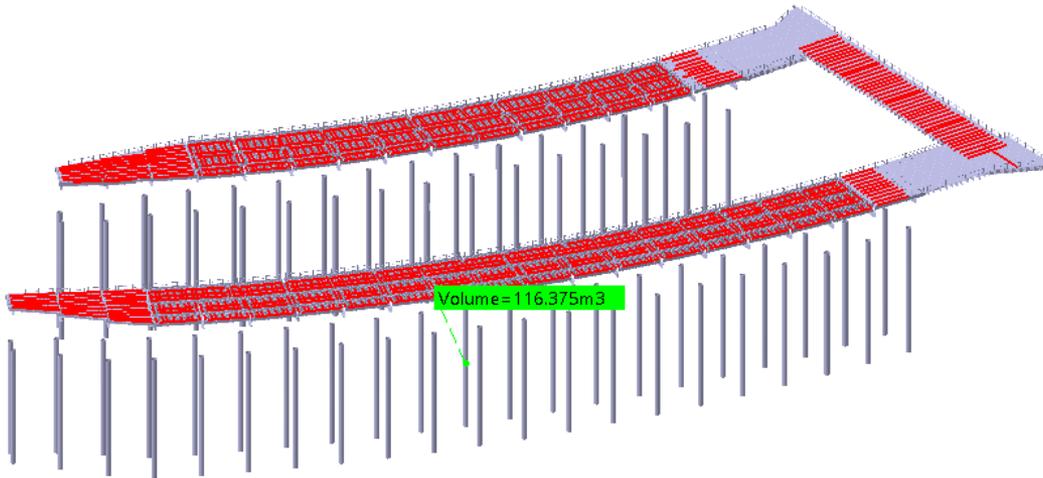


Volume of pile in type A (inside + thickness)

Volume of pile (thickness)

Pile Column (Stage 2)

- Volume of Pipe pile (thickness – from MD to foundation level):
~116.375m³



Volume of pile
(thickness)

6.7.3 Stone Column Installation

Stone columns will be installed prior to pipepile seawall erection. Stone columns will be installed to accelerate the settlement and improve the strength of marine deposits and foundation of temporary reclamation, as shown in **Figure 6.4**. The stone columns will be installed under seabed levels both inside and outside pipepile walls and a geotextile layers will be installed to cover the seabed to prevent re-suspension and seabed disturbance. A silt curtain will be deployed to the stone column working vessels during penetrations. In addition to the perimeter silt curtain to the entire marine works area, minor disturbance to water column is anticipated during installation/removal of jet. In order to ensure the acceptance of water quality during stone column installation, performance review for stone column installation is proposed and the details are provided in the EM&A manual.

6.7.4 Installation/Demolition Temporary Reclamation

Temporary reclamation will be installed by pipepile wall method. A perimeter silt curtain will be deployed prior to pipepile wall installation and no dredging work is required (**Figure 6.5**). Minor seabed disturbance is anticipated and the water quality impact could be mitigated by good site practices such as perimeter silt curtain.

During demolition of temporary reclamation, the perimeter silt curtain will be deployed. Demolition of temporary reclamation will involve excavation of bulk fill. The proposed construction method adopts an approach where the double-layer seawall would not be removed until completion of all excavation works within the temporary reclamation area enclosed by the double-layer seawall. The double-layer seawall will then be demolished by first removing the soil infill within the double-layer steel pipepile/sheetpiles, followed by the removal of the steel pipepile/sheetpiles. Thus, excavation of bulk fill will be carried out within the area enclosed by the double-layer seawall and the sediment plume can be effectively contained within the works area. Hence, all these works will have no contact with water body and adverse water quality impact is not anticipated. The last stage of demolition of double-layer seawall will involve removal of pipe piles/sheet piles only, which will be trimmed on the seabed and involve minor seabed disturbance. No additional dredging is required during pile trimming. The water quality impact could be mitigated by good site practice such as the deployment of perimeter silt curtain and no significant SS impact would be anticipated. Fines content in the filling materials in the seawall would be negligible and loss of fill material during temporary reclamation demolition is not expected. No stone column will be demolished and the perimeter silt curtain will not be removed during the whole demolition process.

The construction details for installation/demolition of temporary reclamation are given in **Section 3.5.1**.

6.7.5 Dumping of Marine Sediment

The total quantity of marine sediment generated (including both from land-based excavations and marine dredging) is 218.894 m³. 500m³ of Category L land-based sediment will be reused on site, 71,159m³ of which requires Type 1 – Open Sea Disposal, 4,070 m³ requires Type 1 – Open Sea (Dedicated Sites) Disposal,