



Our ref: EMA2602/L003  
Date: 7 May 2026

Water Supplies Department  
New Works Branch  
Consultants Management Division  
6/F, Sha Tin Government Offices,  
1 Sheung Wo Che Road, Sha Tin,  
New Territories

By email

**Attn: Mr. S K Wong**

**Provision of Independent Environmental Checker (IEC) Service for Operation of the First Stage of Desalination Plant at Tseung Kwan O (Quotation Ref. No. TKO1/IEC/004)**

**Verification of Detailed Design Plan for Slope Mitigation Works (Issue 9)**

Dear Sirs,

Referring to the Detailed Design Plan for Slope Mitigation Works (190495/29.2140 Issue 9) as submitted on 6 May 2026, we hereby verify the captioned report for further submission to the Director's Representative of the Project according to Clause 2.8 of the Environmental Permit EP-503/2015/B and Further Environmental Permit FEP-01/503/2015/B.

Should you need any further information or clarification, please feel free to contact the undersigned at 2774 7406 or email at roy.hung@sgs.com.

Yours faithfully,  
For and on behalf of **SGS Hong Kong Limited**

Roy Hung  
Independent Environmental Checker

Aurecon  
Binnies

(Attn.: Toby Wan)  
(Attn.: Calvin Leung)

By E-mail  
By E-mail

Our ref: PL-202605024

Date: 7 May 2026

Water Supplies Department  
New Works Branch  
Consultant Management Division  
6/F Sha Tin Government Offices  
1 Sheung Wo Che Road  
Sha Tin  
New Territories

Attention: Mr W. S. Wong / S. K. Wong

Dear Sirs,

**Contract No. 13/WSD/17**

**Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant**  
**Certification on Detailed Design Plan for Slope Mitigation Works**

Reference is made to the submission of the Detailed Design Plan for Slope Mitigation Works (190495/29.2140 Issue 9) by email dated 6 May 2026, we are pleased to inform you that we have no further comment and certified the Detailed Design Plan for Slope Mitigation Works in accordance with Clause 2.8 under the Environmental Permit No. EP-503/2015/B and Further Environmental Permit No. FEP-01/503/2015/B.

Yours Faithfully,

For and on behalf of

Aurecon Hong Kong Limited



Toby K. H. Wan

Environmental Team Leader

ISSUE 214-9

# DETAILED DESIGN PLAN FOR SLOPE MITIGATION WORKS

Agreement No. CE 8/2015 (WS)

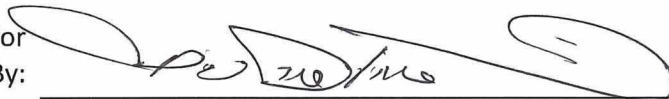
First Stage of Desalination Plant at

Tseung Kwan O

– Investigation, Design and Construction

**BINNIES PROJECT NO. 190495/29.2140**

Report Authorized For  
Issue By:



For and on Behalf of  
Binnies Hong Kong Limited

**PREPARED FOR**

**Water Supplies Department**

6 MAY 2026





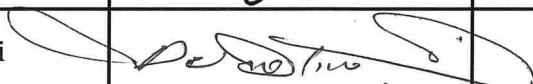


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	Name	Signature	Date
Prepared	Calvin Leung		6 May 2026
Checked	Esther Tong		6 May 2026
Reviewed	Augustine Li		6 May 2026



# 1 Introduction

## 1.1 Background and Purpose

- 1.1.1 Water Supplies Department appointed Binnies Hong Kong Limited (Binnies) (formerly Black & Veatch Hong Kong Limited (B&V)) to undertake the consultancy “Agreement No. CE 8/2015 (WS) First Stage of Desalination Plant at Tseung Kwan O – Investigation, Design, and Construction” on 16 November 2015.
- 1.1.2 The purpose of the project is to construct a sea water reverse osmosis (SWRO) desalination plant at Tseung Kwan O (TKO) Area 137, together with all ancillary facilities and the slope mitigation works in the adjoining Clear Water Bay Country Park.
- 1.1.3 The first stage of the proposed SWRO desalination plant will have a water production capacity of 135,000 cubic meters (m<sup>3</sup>) per day with provision for future expansion to the ultimate capacity up to 270,000 m<sup>3</sup> per day when necessary.
- 1.1.4 The proposed desalination plant is a key supply management initiative under the Total Water Management (TWM) strategy promulgated in 2008. As one of the key supply management initiatives, the desalination plant will help diversify the water supply resources and serve as a new water source to better prepare Hong Kong for uncertainties such as acute climate change and low rainfall. Under the TWM strategy, Hong Kong should broaden its strategic investment in advanced water treatment for desalination of seawater.

## 1.2 Project Elements

- 1.2.1 The Project comprises of the following elements:
- Formation of the reserved site of about 8 hectares in TKO Area 137 to provide sufficient space for a desalination plant with an ultimate water production output at 270,000 m<sup>3</sup> per day.
  - Design and construction of the desalination plant including:
    - Seawater treatment components using RO technology with a water production output at 135,000 m<sup>3</sup> per day with provision for future expansion of the desalination plant to an ultimate water production output at 270,000 m<sup>3</sup> per day.
    - Associated facilities including the intake pipes, outfall pipes, administration building, laboratory, maintenance workshop, chemical building, chlorine building, sludge filter press building, seawater intake pumping station, fresh water pumping station and power supply facilities, etc. with provision for future expansion of the desalination plant to cater for an ultimate water production output at 270,000 m<sup>3</sup> per day.
    - Provision of all associated civil, structural, architectural, geotechnical, landscaping, marine, electrical and mechanical works, including landscaping, permanent and temporary access, etc.
  - Operation and maintenance of the desalination plant for the initial operation period to be determined prior to tendering the works.
  - Slope mitigation works in the Country Park Area to mitigate the natural terrain hazards affecting the site.
- 1.2.2 Fresh water produced by the desalination plant will be transferred via a trunk main to the existing Tseung Kwan O Fresh Water Primary Service Reservoir (TKOFWPSR) and/or other existing fresh water service reservoirs. Detailed design of the trunk main is being carried out by WSD Design Division and the associated main laying works will be procured by WSD.

### 1.3 Site Description

- 1.3.1 The proposed site at TKO Area 137 is located on the Clearwater Bay Peninsula. The site is at the southern tip of the TKO Phase III (Area 137) reclamation. The Area 137 reclamation involves reclaiming the sea between the islands of Fat Tong Chau and Tit Cham Chau. The site covers about 10 hectares. The existing land use of the site is public fill area managed by Civil Engineering and Development Department (CEDD). Intake and outfall pipes will be extended to the east and south from the coastline of Tit Cham Chau.
- 1.3.2 The site boundary of the project is shown in **Appendix A**. Trunk main to the existing TKOFWPSR and/or other existing fresh water service reservoirs is excluded from our Project scope and will under WSD separate contract.

### 1.4 Objective of the Detailed Design Plan for Slope Mitigation Works (“this report”)

- 1.4.1 As required in the Environmental Permit (EP-503/2015/B and FEP-01/503/2015/B) for the construction and operation of the Tseung Kwan O Desalination Plant, a Detailed Design Plan for Slope Mitigation Works containing details on the design of the proposed flexible barrier, soil nailing, and rock slope mitigation works had been submitted to and subsequently approved by EPD in 2018.
- 1.4.2 On 14 June 2023, the Method Statement of Geotechnical Works to be carried out inside CWBCP (Rock Slope Mitigation and Lower Portion Boulders) was submitted to AFCD. On 19 July 2023, AFCD queried if the Detailed Design Plan for Slope Mitigation Works stated that the flexible barrier shall be relocated outside the Clearwater Bay Country Park (CWBCP). The above-ground elements of the flexible barrier are all located outside the CWBCP boundary, only a number of underground anchors of the flexible barrier unavoidably fall within the CWBCP boundary.
- 1.4.3 AFCD was informed that since anchors are installed into bedrock underground far below the slope toe, no adverse effect will be caused to the plants and trees within CWBCP. This was demonstrated by the latest Flexible Barrier Design Plan approved by GEO and a typical section showing the underground anchors, both of which have been provided to AFCD via email dated 10 August 2023.
- 1.4.4 The objective of this revised submission is to elaborate the textual description on the extent of the underground anchors of the flexible barrier which is detailed in Section 2.6 and 2.7.
- 1.4.5 This submission also includes updated tree and vegetation survey results and several changes to the design of the slope mitigation works in comparison with the previously approved DDP. The changes are detailed in Section 2.4 and 2.5. The Updated Vegetation Survey Report for Slope Mitigation Works (Issue 212-5) was approved by EPD on 9 March 2026 via letter ref. (21) in EP 2/N8/E/120 Pt.16, in accordance with Condition 2.7 of EP-503/2015/B and FEP-01/503/2015/B, which have been adopted in this submission. In compliance with Condition 2.8 of the Environmental Permit, AFCD was consulted during the preparation of this report prior to its submission to the DEP for approval. The submission was circulated to AFCD on 13 January 2026 and AFCD written reply confirmed that they have no comments on this report dated 6 February 2026.

### 1.5 Structure of this Report

- 1.5.1 The report is structured as follows:
- Section 1: Introduction, this section

- Section 2: Presents the detailed design plan for slope mitigation works as required in the Environmental Permit, the design development of the slope mitigation works and the proposed mitigation measures
- Section 3: Presents the landscape and visual mitigation measures
- Section 4: Presents the conclusions

## 2 Detailed Design Plan for Slope Mitigation Works

### 2.1 Environmental Impact Assessment (EIA) Report (Register No. AEIAR-192/2015)

2.1.1 As stated in the Environmental Impact Assessment (EIA) report carried out for “Agreement No. CE21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study”,

- Section 9.3 of the EIA report, “...At the lower portion of the natural hill of the Clear Water Bay Country Park, a flora species of conservation interest *Marsdenia lachnostoma* was recorded in the shrubland/grassland habitat along the proposed alignment of the flexible barriers within the country park area (Annex 9B)...”.
- Section 9.5.2 of the EIA report, “...no trees will be felled for the implementation of slope mitigation works. To avoid tree felling, the exact locations of the flexible barrier foundation plates, soil nails and rock dowels can be adjusted during detailed design when detailed topographic data are available. To further minimize potential impacts on trees including the root system, a setback distance (e.g. 1-1.5m from stem) from existing trees can be maintained as far as practical. For the flexible barriers which are 4-5m tall, canopies of existing trees, if any, may be in conflict with the barriers and pruning may be required. This will be minimized as far as practicable and will be undertaken properly to reduce damages to trees. To restore the naturalness of habitats within the Country Park and improve the vegetation cover in the desalination plant, landscaping works will be provided at the desalination plant and slope mitigation works area upon completion of the construction.”
- Section 9.7 of the EIA report, “...the alignment of flexible barriers shall be optimized to preserve all flora species of conservation interest and minimize potential impact to existing vegetation as far as practicable. All individuals of *Marsdenia lachnostoma* within the slope mitigation areas shall be retained in-situ, by positioning the alignment of flexible barriers at a minimum 1.5m in a radius away from these individuals. The implementation of this mitigation measures is presented in Figure 9.1 as an illustration...”. Good site practices shall also be implemented as far as practicable for the protection of flora species of conservation interest.

### 2.2 Environmental Permit No. EP-503/2015/B and FEP-01/503/2015/B (Condition 2.8)

2.2.1 Condition 2.8 Submission of Detailed Design Plan for Slope Mitigation Work Environmental Permit No. EP-503/2015/B and FEP-01/503/2015/B states:

2.2.1.1 “To reduce ecological impact on the Clear Water Bay Country Park due to the slope mitigation works of the Project as shown in [Figure 2](#), the Permit Holder shall, no later than 3 months before the commencement of site clearance works for the slope mitigation works of the Project, submit 4 hardcopies and 1 electronic copy of the Detailed Design Plan for Slope Mitigation Works to the Director of Environmental Protection for Approval. The Detailed Design Plan shall be prepared in accordance with the conceptual plan contained in Figure 9.1 of the EIA Report (Register No. AEIAR-192/2015) and with reference to the guidelines and standards adopted by the Civil Engineering and Development Department. The Plan shall include:

- (i) details on the design of the proposed flexible barriers, soil nailing and rock stabilization for slope mitigation works;
- (ii) landscape and visual mitigation measures for slope mitigation works; and
- (iii) recommended protection and mitigation measures to avoid felling of existing trees, to minimize ecological impact on plant species of conservation importance, including but not limited to *Marsdenia lachnostoma* within the country park.

2.2.1.2 Before submission to the Director of Environmental Protection, the Detailed Design Plan shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report (Register No. AEIAR-192/2015). All recommended mitigation measures as set out in the approved Detailed Design Plan shall be fully and properly implemented.

2.2.1.3 The Permit Holder shall consult the Director of Agriculture, Fisheries and Conservation in preparing the Detailed Design Plan prior to the submission to the Director of Environmental Protection for approval.”

2.2.2 Figure 9.1 of the EIA Report (Register No. AEIAR-192/2015) is appended in **Appendix B** of this report. Figure 2 of Environmental Permit No. EP-503/2015/B and FEP-01/503/2015/B is appended in **Appendix C** of this report.

## 2.3 Original Slope Mitigation Works

2.3.1 The original proposed slope mitigation works planned during the Feasibility Study stage of the Project includes:

- (a) Flexible barriers installed along the coastal slope crest within the Country Park and along the slope toe;
- (b) Rock slope stabilization works along the toe of the natural terrain within the Clearwater Bay Country Park area; and
- (c) Soil nailing above the rock face within the Country Park.

## 2.4 Changes of Slope Mitigation Works compared with the Approved Detailed Design Plan

2.4.1 Comparing the layout of the proposed slope mitigation works in Drawing No. 190495/B/DD/00-10001, 00-20001 to 00-20011 in Appendix F of the approved submission, and Drawing No. SK/190495B/C13/48-16003 to 48-16009 in Appendix F of this submission, the changes to the proposed slope mitigation works as shown in Appendix H include:

- (a) The northern portion of the flexible barrier have been deleted due to the reduction in land allocation extent;
- (b) The southern-most point of the flexible barrier was shifted upwards due to the conflict with the existing sloping seawall structure, and due to the fact that there is no desalination process facility behind;
- (c) The rock slope works located in the north have been deleted due to the reduction in land allocation extent.
- (d) The original proposed works included about 3,120 m<sup>2</sup> of wire mesh, 53 nos. of rock dowels, 5 nos. of dentitions, 4 nos. of buttresses covering an area of 183 m<sup>2</sup>, 11 nos. of boulder removals and 4 nos. of in-situ boulder breaking works. Under the revised design, the proposed slope mitigation works have been reduced to approx. 180 m<sup>2</sup> of wire mesh and 37 nos. rock dowels, with all previously proposed dentitions deleted. The revised works also include 5 nos. of buttresses covering an area of 53m<sup>2</sup>, 6 nos. of boulder

removals while 4 nos. of in-situ boulder breaking works remain unchanged. The potential consequence to life and property is assessed to be low, as access to the slope toe area is restricted by fencing, thereby limiting human exposure. In the event of a rockfall or landslide, debris would be intercepted and contained within the slope toe area by the proposed flexible barrier. In addition, the proposed open channel and its associated maintenance access have been relocated away from the soil/rock slope and are now situated behind and protected by the flexible barrier. Accordingly, the flexible barrier design has been revised to further minimise the residual risk associated with potential rockfall or landslide events.

## 2.5 Tree and Updated Vegetation Survey

### Tree Survey

- 2.5.1 Following the initial tree surveys conducted in Nov 2015 and Mar 2016, the Civil Engineering and Development Department (CEDD) carried out an extensive tree felling exercise in 2018. Upon handover of the site in Dec 2019, further tree surveys were conducted within the desalination plant site and along the temporary access for boulder removal/stabilization works in Feb and Aug of 2020 to establish a new baseline record of the existing trees following the site handover.
- 2.5.2 After the Feb and Aug 2020 tree surveys, CEDD conducted additional tree felling operations. In the period that followed, typhoons and adverse weather affected the site. Consequently, prior to the commencement of works, another series of tree surveys was carried out in Feb, May, and Jun 2022, and Feb 2023 within the desalination plant site, areas for rock slope stabilization works, area for the proposed flexible barrier and along the temporary access for boulder removal/stabilization works.
- 2.5.3 Locations of existing trees and associated tree assessment schedule from the tree surveys carried out in Feb 2020, Aug 2020, Feb, May, and Jun 2022, and Feb 2023 are appended in **Appendix D**. A total of 148 existing trees were recorded, the findings are as follows:
- 148 nos. of existing trees (i.e. trunk diameter greater than or equal to 95mm), of which 9 nos. of existing trees were destroyed due to landslide and adverse weather conditions
  - A total of 15 species identified, all of which are common and widespread in Hong Kong.
  - Height range: 3m to 12m.
  - Spread range: 1m to 12m.
  - Trunk diameter from 95mm to 500mm.
  - Health condition, structural condition and form: Average to Poor.
  - Amenity value of the overall trees in the survey: Medium to Low.
  - No rare or endangered tree species were recorded.
  - No Registered Old and Valuable Trees (OVT) or potential OVT were recorded.

### Vegetation Survey

- 2.5.4 Updated vegetation surveys were conducted between the May and December 2016 to cover the wet and dry seasons within the Works and Study Area by a Qualified Ecologist<sup>1</sup> as appointed under Condition 2.3 of EP-503/2015/B and FEP-01/503/2015/B for Updated Vegetation Survey. The Updated Vegetation Survey Report for Slope Mitigation Works (Issue 212-5) was approved by EPD on 9 March 2026 via letter ref. (21) in EP 2/N8/E/120 Pt.16, in accordance with Condition 2.7 of EP-503/2015/B and FEP-01/503/2015/B, which have been adopted in this submission.

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<sup>1</sup> Employment of Qualified Ecologist for Updated Vegetation Survey: The Permit Holder shall appoint a Qualified Ecologist who has at least 5 years of relevant experience to be responsible for carrying out the updated vegetation survey for slope mitigation works and preparing submission for the Project as required under Condition 2.7 of EP-503/2015.

- 2.5.5 It was noted that species of conservation importance were identified within or were in close proximity to the proposed flexible barriers and soil nails in the Country Park, as indicated in **Appendix E**.
- 2.5.6 A total of 139 plant species were recorded between May and December 2016. Of the 139 plant species recorded, 2 were considered as plant species of conservation importance, including Hairy-throat Condorvine *Marsdenia lachnostoma* and Balloon Flower *Platycodon grandiflorus*. Only *Marsdenia lachnostoma* was found within the Works Area and within the shrubland and hillside grassland mosaic habitat. Their representative photos and the full list of the plant species are presented in **Appendix E**.
- 2.5.7 To avoid and minimize the impact on those existing trees and plant species of conservation importance, the proposed slope mitigation measures of installing flexible barriers and soil nails within the Country Park were reviewed and the proposed works revised.
- 2.5.8 Further vegetation surveys were conducted in August 2020, September 2021 and 2023. The surveys updated the locations of the plant species of conservation importance within the proposed works area for the slope mitigation works prior to commencement of works. **Table 2-1** summarizes the species, quantities, and locations of plant species of conservation importance documented in surveys conducted between 2016 and 2023. **Appendix G** provides the corresponding location information for these species as recorded in the vegetation surveys. All identified plant species of conservation importance within the proposed works areas, but not limited to *Marsdenia lachnostoma*, will be protected.

**Table 2-1 Summary of Plant Species of Conservation Importance Identified (2016-2023)**

SPECIES	NUMBERS	LOCATIONS
Survey conducted in 2016		
<i>Marsdenia lachnostoma</i>	94	Appendix G
<i>Platycodon grandiflorus</i>	1	Appendix G
Survey conducted in 2020		
<i>Marsdenia lachnostoma</i>	218	Appendix G
<i>Habenaria linguella</i>	4	Appendix G
Survey conducted in 2021		
<i>Marsdenia lachnostoma</i>	28	Appendix G
<i>Gnetum luofuense</i>	1	Appendix G
Survey conducted in 2023		
<i>Gnetum luofuense</i>	7	Appendix G

## 2.6 Revised Slope Mitigation Works

- 2.6.1 The revised slope mitigation works includes:
- Flexible barriers are redesigned and located away from the slope toe of the Clearwater Bay Country Park area, thus no above-ground elements of the flexible barriers above ground will be located within the Clearwater Bay Country Park area. Inclined underground anchors, installed 3-4m into rock is required and may extend into Clearwater Bay Country Park boundary. The maximum length of the underground anchors shall be 15m. No ecological impact on plant species of conservation importance and trees anticipated as inclined anchors would be installed into bedrock situated 3 to 4m below the ground level.
  - Rock slope stabilization/improvement works along the toe of the natural terrain within the Clearwater Bay Country Park area (the design is similar to the Section 2.3.1 item (b) including rock dowel, buttress & wire mesh); and
  - Soil nailing works as stated in Section 2.3.1 item (c) is not required and omitted due to the relocation of flexible barriers;

- (d) Boulder removal/break-off of 10 unstable boulders, identified at the natural terrain within the Clearwater Bay Country Park area.
- 2.6.2 The design drawings for the revised slope mitigation works extracted from the submission "Deliverable 49 – Detailed Design for Slope Mitigation Works" for this project are appended in **Appendix F**. Geotechnical Engineering Office of the Civil Engineering and Development Department (CEDD/GEO) has no adverse comment on the captioned submission.
- SK/190495B/C13/48-16003 gives the layout plan of slope mitigation works
  - SK/190495B/C13/48-16004 to 16009 gives the locations of rock slope works
  - SK/190495B/C13/48-16001 to 16002 gives the notes of slope mitigation works including the recommended good site practices and mitigation measures inside Country Park
  - 190495/B/DD/00-30002 to 30003 gives the details of rock slope works
  - 190495/B/DD/00-30004 gives the reference details of flexible barrier
- 2.6.3 Access to the boulders for the boulder removal break-off works will be required, to minimize the disturbance to the existing habitat and vegetation from the works, temporary elevated accesses of 600mm width shall be provided. Three nos. of the temporary elevated accesses with a total length of approximately 400m, ranging from 40m to 290m, extending from temporary working platform for rock slope works will be provided. To facilitate the boulder removal / break-off works, temporary elevated access of 600mm width around each of the 10 nos. of boulders will be provided (total area = 0.006 ha). Temporary working platforms for rock slope works (total area = 0.017ha) will also be provided. The temporary elevated access and temporary working platform for boulder and rock slope works are indicated in Appendix G.
- 2.6.4 The revised slope mitigation design has been prepared in accordance with the conceptual plan shown in Figure 9.1 of the EIA Report. The design has been optimised to preserve all plant species of conservation interest and to minimize potential impacts on the existing trees and vegetation as far as practicable.
- 2.6.5 The alignment of the flexible barriers has been optimized through realignment, reduction, and avoidance approaches, to avoid or protect plant species of conservation interest. All individual *Marsdenia lachnostoma*, among other identified species of conservation interest within the slope mitigation area, will be retained in-situ. This will be achieved by providing protection or works-exclusion zones with a minimum radius of 1.5 m around each individual. The flexible barrier has been located outside the Clearwater Bay Country Park boundary. Further detailed details are provided in **Section 2.7**.
- 2.6.6 All proposed slope mitigation works have been prepared in accordance with the prevailing GEO/CEDD standards and technical requirements for Natural Terrain Hazard Assessment. GEO/CEDD has provided no further comments on the design of the slope mitigation works in its memo dated 4 March 2025 (Ref.: ( ) in ME-30-2025-12-226-1).

## 2.7 Recommended Protection and Mitigation Measures

### Flexible Barrier

- 2.7.1 The extent of the flexible barrier has been shortened as discussed in Sections 2.4.1(a) and 2.4.1(b), and the flexible barriers will be located outside the Clearwater Bay Country Park area as noted in Section 2.6.1(a). However, localized trimming of the ground vegetation within the works areas of the flexible barrier will be needed. The flexible barrier will be located in close proximity to mixed woodland, the footprint of vegetation clearance would therefore be localized and very limited. The ecological impact due to the construction of flexible barriers is considered insignificant. Inclined underground anchors may extend into Clearwater Bay Country Park boundary, no ecological impact on plant species of conservation importance and

trees anticipated as inclined anchors would be 3-4m below ground.

- 2.7.2 With the implementation of protection measures, including the redesign and relocation of the flexible barrier away from the slope toe of the Clearwater Bay Country Park area as mentioned in paragraph 2.6.1(a), localized trimming of ground vegetation within the works areas of the flexible barrier, and the good site practices described in paragraphs 2.7.13–2.7.19, tree felling is avoided and the ecological impact on plant species of conservation importance within the country park is considered minimal.

#### Rock Slope Stabilization/Improvement Works

- 2.7.3 Rock stabilization works shall be adjusted as discussed in Section 2.4.1(c), 2.4.1(d) and 2.6.1(c), such that no tree will be felled and no plant species of conservation importance will be affected. The anchorage for the temporary working platform and access to be erected will be designed to avoid the plant species of conservation importance.
- 2.7.4 Prior to the commencement of slope stabilization construction works, rock mapping will be carried out to verify the condition and stability of the rock slope. The rock stabilization works, including the extent and location of the buttress walls and rock dowels, will be reviewed together with the location and positions of the tree roots. Based on the rock mapping results, final positioning and extent of the buttress walls will be designed to prevent direct impact on the tree root systems.
- 2.7.5 The design primarily aims to keep the buttress walls independent of the trees by maintaining adequate spatial separation, and tree rings will not be required. Where spatial separation cannot be achieved due to site constraints, tree rings will be incorporated into the buttress wall design to accommodate the existing trees. The buttress walls with tree rings will only be implemented where necessary, based on the actual site conditions confirmed during rock mapping.
- 2.7.6 With the implementation of hydroseeding and/or planting shrub seedlings will be provided to reinstate vegetation loss and disturbance at the area of slope stabilization works due to construction works, with regular monitoring and appropriate maintenance works carried out for a 12-month establishment period. Stone facing will be applied to the buttress walls to restore the natural finishes of the slopes. Wire mesh covering the rock face will be provided with opening to existing trees to avoid the trees. The general details of stone facing and opening to trees are shown in Drawing No. 190495/B/DD/00-30002 and 30003 of **Appendix F**. Felling of trees are avoided and ecological impact to plant species of conservation importance within the country park is minimized
- 2.7.7 In summary, the proposed slope mitigation works design has incorporated the latest vegetation and tree survey findings to avoid plant species of conservation importance and existing trees as far as practicable. No unacceptable ecological impacts from the proposed rock slope mitigation works are anticipated. Tree felling has been avoided, and the ecological impact due to the rock slope stabilization/improvement works on plant species of conservation importance within the country park is considered minimal.

#### Boulder Removal/Break-off

- 2.7.8 The proposed boulder removal works will involve provision of temporary working platform and access of 600mm around the boulder. To avoid direct conflict between the boulder removal and nearby plant species of conservation importance, protection zones/works exclusion zones will be established at least 1.5m radius from the identified plant species of conservation importance to preserve them on site.
- 2.7.9 The number of boulder removal works has been reduced as discussed in Section 2.6.1(d) when compared to the original design.

- 2.7.10 The protection zones/works exclusion zones will be established prior to site clearance and throughout the construction period to separate the identified protected plant individuals from the works.
- 2.7.11 The temporary working platform and temporary access will be designed to avoid anchorage on the plant species of conservation importance.
- 2.7.12 With proper implementation of the recommended protection measures discussed in Section 2.7.8 to 2.7.11, no unacceptable impact on the existing trees and plant species of conservation importance are anticipated. The ecological impact due to boulder removal/break-off on plant species of conservation importance within the country park is considered minimal.

Recommended Good Site Practices inside Country Park Area

- 2.7.13 Prior to the commencement of construction works, the location and condition of the plant species of conservation importance along the direct footprint of the slope mitigation works shall be verified by a qualified plant ecologist appointed under Environmental Team (ET).
- 2.7.14 Protection zones/works exclusion zones will be established, prior to site clearance and throughout the construction period, at least 1.5m radius and 1.5m height to surround the plant species of conservation importance to preserve them on site. Signage to identify the protection zones/works exclusion zones shall be implemented.
- 2.7.15 Upon completion of the works, the species of conservation importance that will be potentially affected will be revisited to assess the condition.
- 2.7.16 Induction training will be provided to all site staff to ensure that every staff will fully understand the preservation method and location of the identified plant species of conservation importance.
- 2.7.17 The ET shall monitor the condition of the plant species of conservation importance within the protection zone/works exclusion zones during the construction period in accordance with EM&A Manual with representative photographic record to present the updated conditions of the plant specimens in the EM&A monitoring report.
- 2.7.18 Where vegetation clearance and/or trimming is required, a qualified ecologist/arborist will be appointed by the Contractor to provide on-site supervision and monitoring to ensure no tree canopy or tree roots will be adversely impacted.
- 2.7.19 Standard good site practice will considerably reduce any potential disturbance from slope works including:
  - (a) All construction materials shall be stockpiled offsite to minimize the disturbance to areas in particular inside the country park area;
  - (b) Construction activities will be restricted to the clearly demarcated slope mitigation works areas;
  - (c) Boulders works will be carried out by handheld tool to minimize the works area. No excavation works, tree felling and removal of vegetation should be allowed during the boulder removal/break-off works; and
  - (d) Tree Preservation and Protection Measures shall be implemented as specified in General Specification Section 26, such as provision of temporary protective fencing, armouring and mulching to the preserved trees.
- 2.7.20 With the implementation of good site practices discussed in Section 2.7.13 to 2.7.19, the ecological impact during construction phase on plant species of conservation importance within the country park is considered minimal.

### 3 Landscape and Visual Mitigation Measures

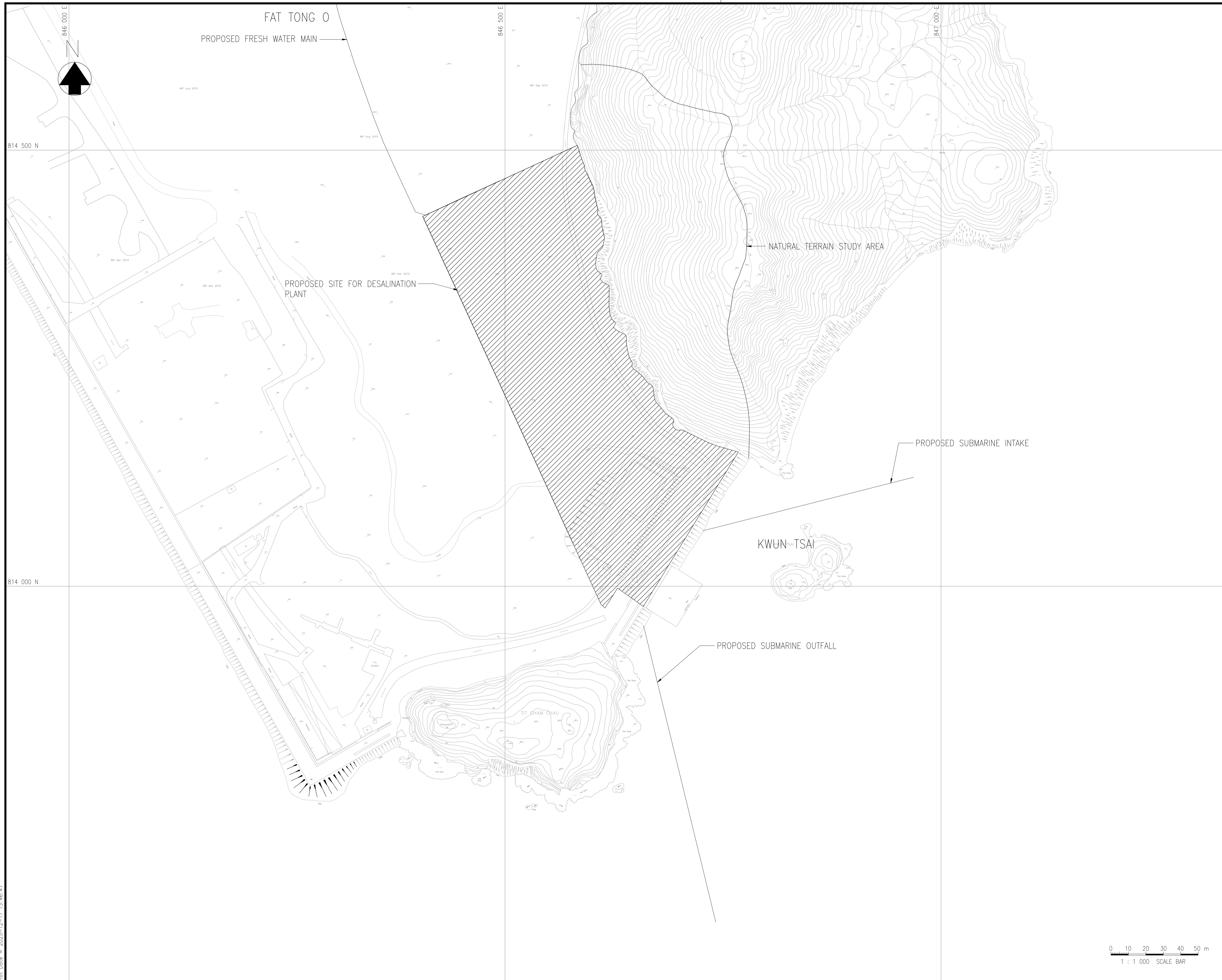
- 3.1.1 With the implementation of revised slope mitigation works as discussed in **Section 2.7** with design drawings appended in **Appendix F**, no tree will be felled and no plant of species of conservation importance will be affected.
- 3.1.2 Flexible barriers will be located away from the slope toe of the Clearwater Bay Country Park area, thus no flexible barriers will be installed within the Clearwater Bay Country Park area. Therefore, the ecological impact to the country park due to the construction of flexible barriers is considered insignificant. No landscape and visual mitigation measure for the flexible barrier is required.
- 3.1.3 Subject to the actual site conditions confirmed during rock mapping, the buttress walls will be designed to remain independent of the trees through spatial separation, and tree rings will not be required. Where spatial separation cannot be achieved, tree rings will be incorporated into the buttress wall design as a mitigation measure. Stone facing will also be applied to the buttress walls as landscaping measures to restore the natural finishes of the slopes as shown in Drawing Nos. SK/190495B/C13/48-16004 to 16008 of **Appendix F**. Wire mesh covering the rock face will be provided with opening to existing trees to avoid the trees. The general details are shown in Drawing Nos. 190495/B/DD/00-30002 and 30003 of **Appendix F**.
- 3.1.4 Unstable boulder inside the country park will be removed or broken-off and no landscape and visual mitigation measure for the boulder works is required.
- 3.1.5 No works are proposed to the soil slope portion inside the country park. However, the Contractor shall reinstate the vegetation in all temporarily disturbed areas due to construction works to its original condition (particularly the soil slope in proximity to the rock slope improvement works and boulder removal/in-situ breaking-off works). Where necessary, hydroseeding shall be applied to restore the green appearance of the site. Notes of slope mitigation works including the good site practice and mitigation measures inside country park area are stated in Drawing No. SK/190495B/C13/48-16001 to 16002 of **Appendix F**.

### 4 Conclusion

- 4.1.1 The design drawings for the revised slope mitigation works extracted from the submission "Deliverable 49 – Detailed Design for Slope Mitigation Works" for this project are appended in **Appendix F**. CEDD/GEO has no adverse comment on the captioned submission.
- 4.1.2 With revised slope mitigation works as discussed in Section 2.5 and implementation of mitigation measures as discussed in Section 2.6, no tree will be felled and no plant of species of conservation importance will be affected inside the Clear Water Bay Country Park area.
- 4.1.3 Subject to the actual site conditions confirmed during rock mapping, the buttress walls will be designed to be independent of the trees through spatial separation, and tree rings will not be required. Where spatial separation cannot be achieved, tree rings will be incorporated into the buttress wall design as a mitigation measure. Stone facing will also be applied to the buttress wall as landscaping measures to restore the natural finishes of the slopes as well as wire mesh with opening to trees will be provided at the rock face to mitigate the landscape and visual impact of the Project as discussed in Section 3.
- 4.1.4 All recommended protection/mitigation measures (Section 2.6) as set out in this report shall be fully and properly implemented on site during the construction stage of this Project. No site clearance works for slope mitigation works of this Project shall be allowed prior to the completion of such protection/mitigation works on site.

**APPENDIX A**  
**SITE BOUNDARY OF THE PROJECT**





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MAP NOS. 12SW11D, 12SW12C,  
12SW16B, 12SW16D,  
12SW17A, 12SW17C

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
B	12/25		UPDATED SITE BOUNDARY		CL
A	08/16		UPDATED SITE BOUNDARY		KHC
Initial		YLC	CKH	SZ	WLS
Date		11/15	11/15	11/15	11/15

Approved

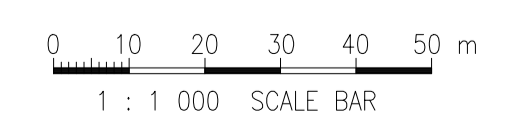
Agreement No. CE 8/2015 (WS)

Contract Title  
FIRST STAGE OF  
DESALINATION PLANT AT  
TSEUNG KWAN O -INVESTIGATION,  
DESIGN AND CONSTRUCTION

Drawing Title  
SITE BOUNDARY

Drawing No.	Revision
Appendix A	B

Scale  
A1 1 : 2000  
A3 1 : 4000



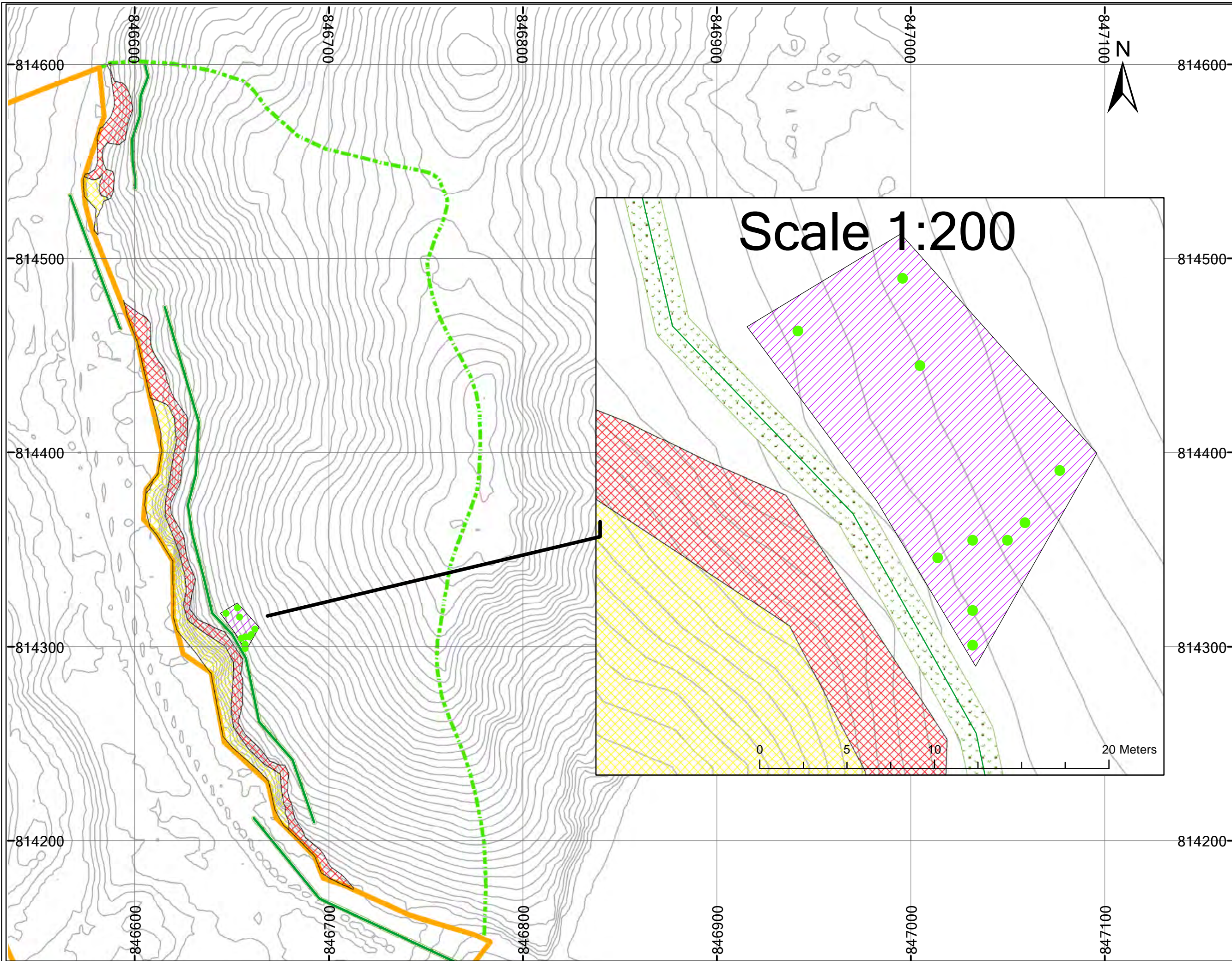
Plot Date = 2025-12-17 13:46:47



**APPENDIX B**

**LOCATION PLAN AND PROTECTION MEASURES FOR *MARSDENIA LACHNOSTOMA*  
(FIGURE 9.1 OF ENVIRONMENTAL IMPACT ASSESSMENT REPORT)**





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Initial	Designed	Reviewed	Drawn	Checked
	YLC	TT	YLC	KHL
Date	03/13	03/13	03/13	03/13
Revision	Date	Description	Initial	

**Legend**

- Marsdenia Lachnostoma
- Flexible Barrier
- Temporary Fence for Protection
- Works Area of Flexible Barrier
- Proposed Soil Slope Stabilisation Works
- Proposed Rock Slope Stabilization Works
- Proposed Fresh Water Main
- Proposed Submarine Intake and Outfall
- Proposed Desalination Plant
- Study Area for Slope Mitigation Work

Agreement No. CE21/2012 (WS)

**Project Title**  
 DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY

**Figure Title**  
 Location Plan and Protection Measures for Marsdenia Lachnostoma

<b>Drawing No.</b> Figure 9.1	<b>Scale</b> 1:1,800 @ A3
----------------------------------	------------------------------

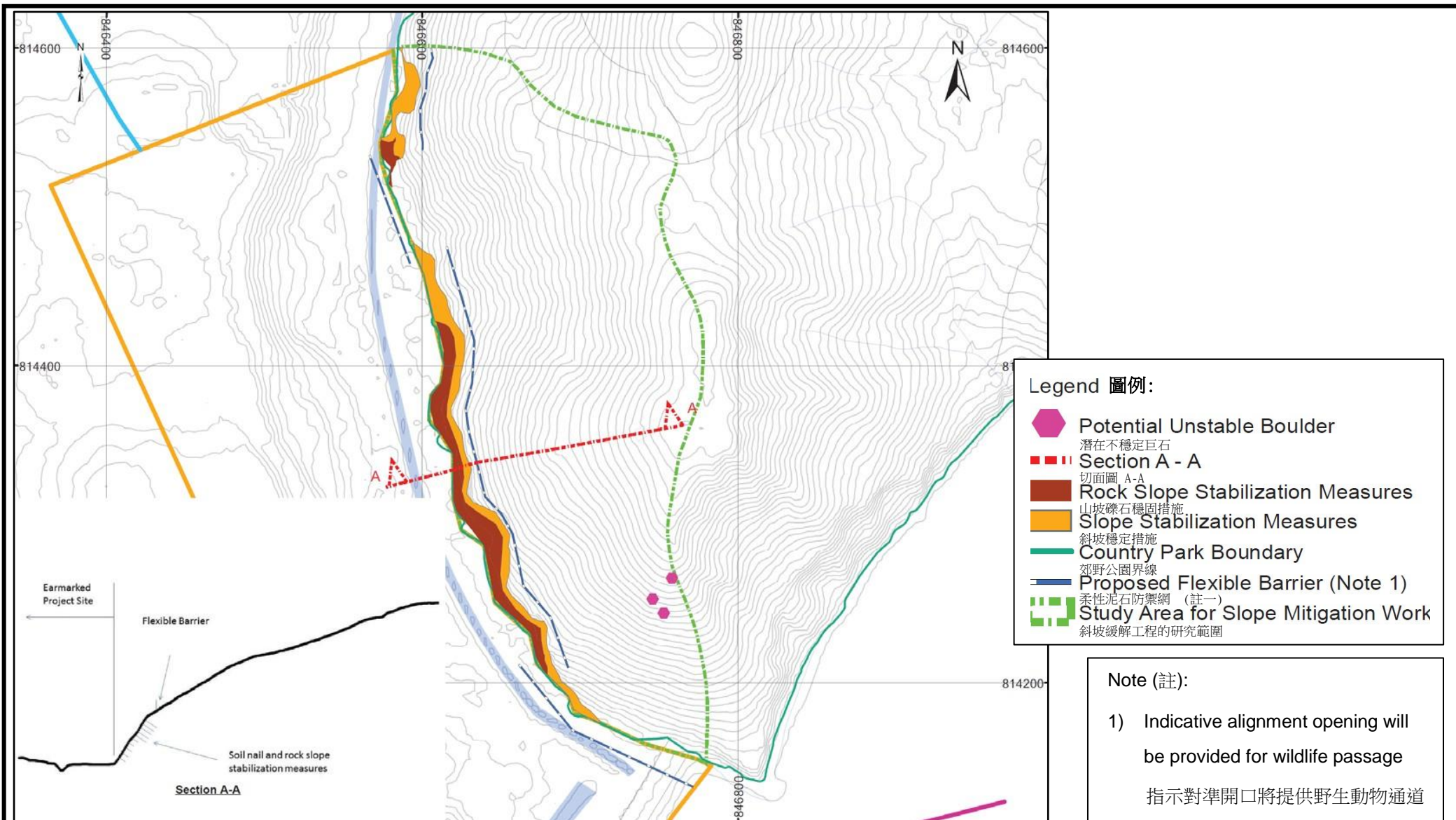
**Client**  
 水務署  
 Water Supplies Department

**Consultant**  
**BLACK & VEATCH**  
 Building a world of difference.



**APPENDIX C**  
**SLOPE MITIGATION WORKS AREA OF THE PROJECT**  
**(FIGURE 2 OF ENVIRONMENTAL PERMIT)**





Project Title: Desalination Plant at Tseung Kwan O  
 工程項目名稱: 將軍澳海水化淡廠  
 Slope Mitigation Works within the Clear Water Bay Country Park  
 位於清水灣郊野公園範圍內的斜坡緩解工程

Plan originated from the Figure 2.3d of approved EIA Report: AEIAR-192/2015  
 圖則源自已批准環評報告-AEIAR-192/2015 內的圖2.3d

Environmental Protection Department  
 環境保護署



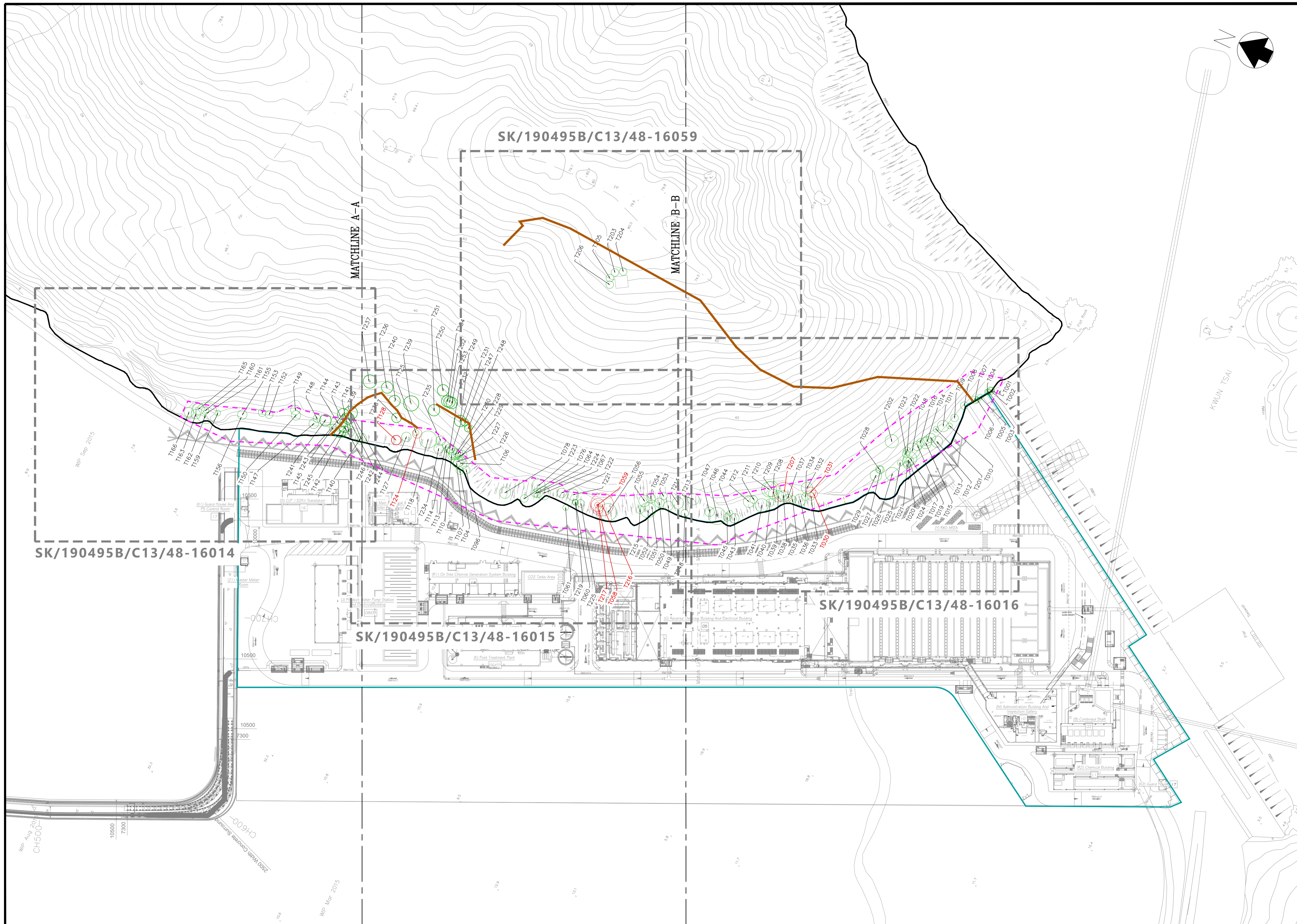
Environmental Permit No. EP-503/2015/B  
 環境許可證編號: EP-503/2015/B

Figure 2  
 圖二











**APPENDIX D**  
**LOCATION PLAN OF EXISTING TREES AND TREE ASSESSMENT SCHEDULE**





MAP NOS. T12SW

LEGEND:

-  EXISTING TREES TO BE RETAINED
-  CLEAR WATER BAY COUNTRY PARK
-  PROPOSED FLEXIBLE BARRIER
-  SITE BOUNDARY
-  OPEN CHANNEL
-  TREE DESTROYED DUE TO ADVERSE WEATHER
-  TREE SURVEY FOR ROCK SLOPE STABILISATION WORKS
-  TREE SURVEY ALONG TEMPORARY ACCESS FOR BOULDER REMOVAL/STABILISATION WORKS

N.T.S.



**BINNIES HONG KONG LIMITED**  
賓尼斯工程顧問有限公司

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

APPENDIX D –  
TREE SURVEY PLAN  
(SHEET 1 OF 5)

Date: 2026/01/07

Outgoing letter Ref. No.: BY E-MAIL

Reference Drawing:

Sketch No.: SK/190495B/C13/48-16013

Rev.: C

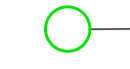







Drafted by  
CL

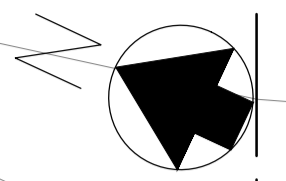
Checked by  
IY

Approved by  
MP

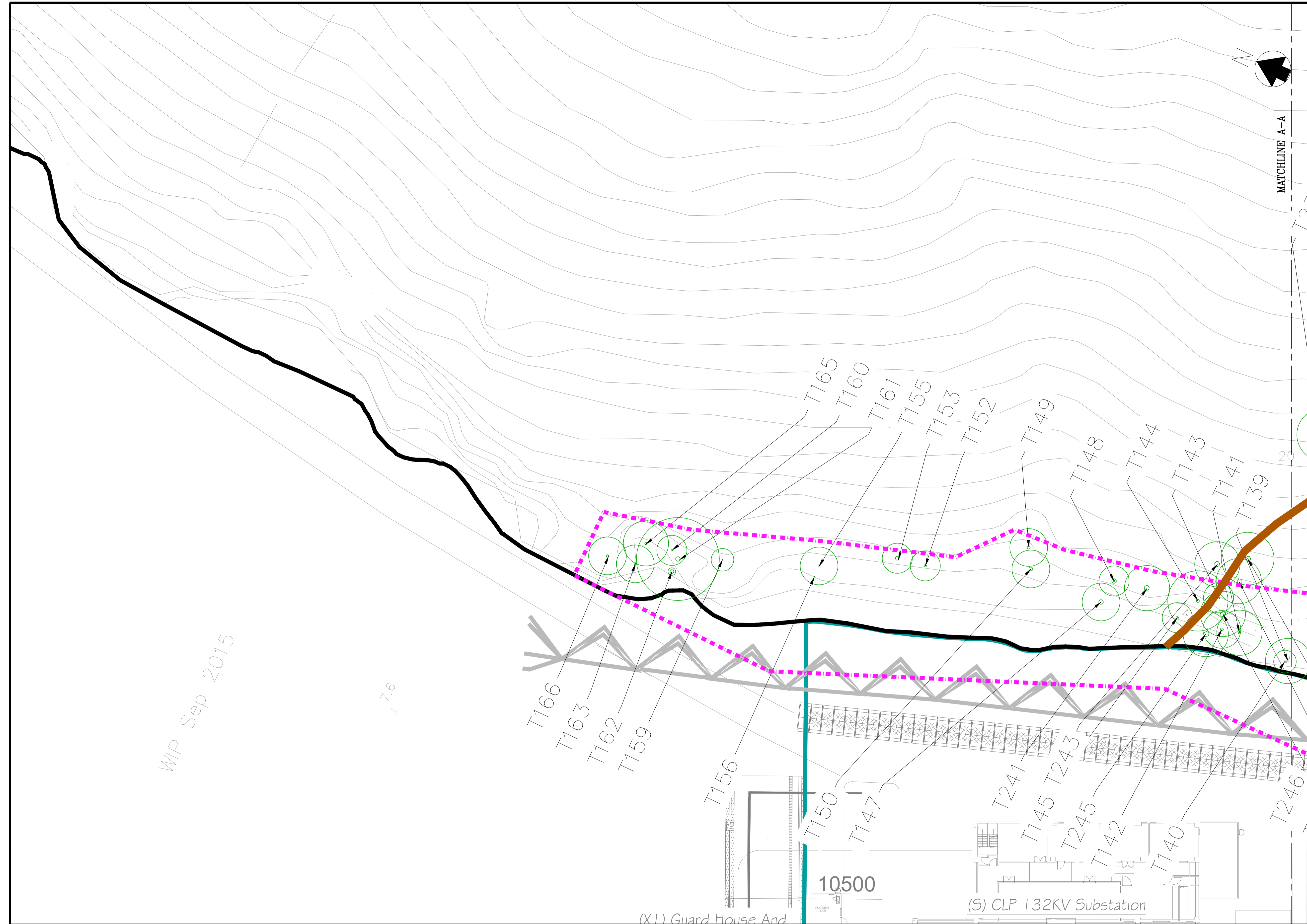
MAP NOS. T12SW

LEGEND:

-  EXISTING TREES TO BE RETAINED
-  CLEAR WATER BAY COUNTRY PARK
-  PROPOSED FLEXIBLE BARRIER
-  SITE BOUNDARY
-  OPEN CHANNEL
-  TREE DESTROYED DUE TO ADVERSE WEATHER
-  TREE SURVEY FOR ROCK SLOPE STABILISATION WORKS
-  TREE SURVEY ALONG TEMPORARY ACCESS FOR BOULDER REMOVAL/STABILISATION WORKS



MATCHLINE A-A



WIP Sep 2015

7.6

20

10500

(X1) Guard House And

(S) CLP 132KV Substation

Scale: A1 1 : 250  
A3 1 : 500



CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

APPENDIX D -  
TREE SURVEY PLAN  
(SHEET 2 OF 5)

Date: 2026/01/07

Drafted by  
CL

Outgoing letter Ref. No.: -

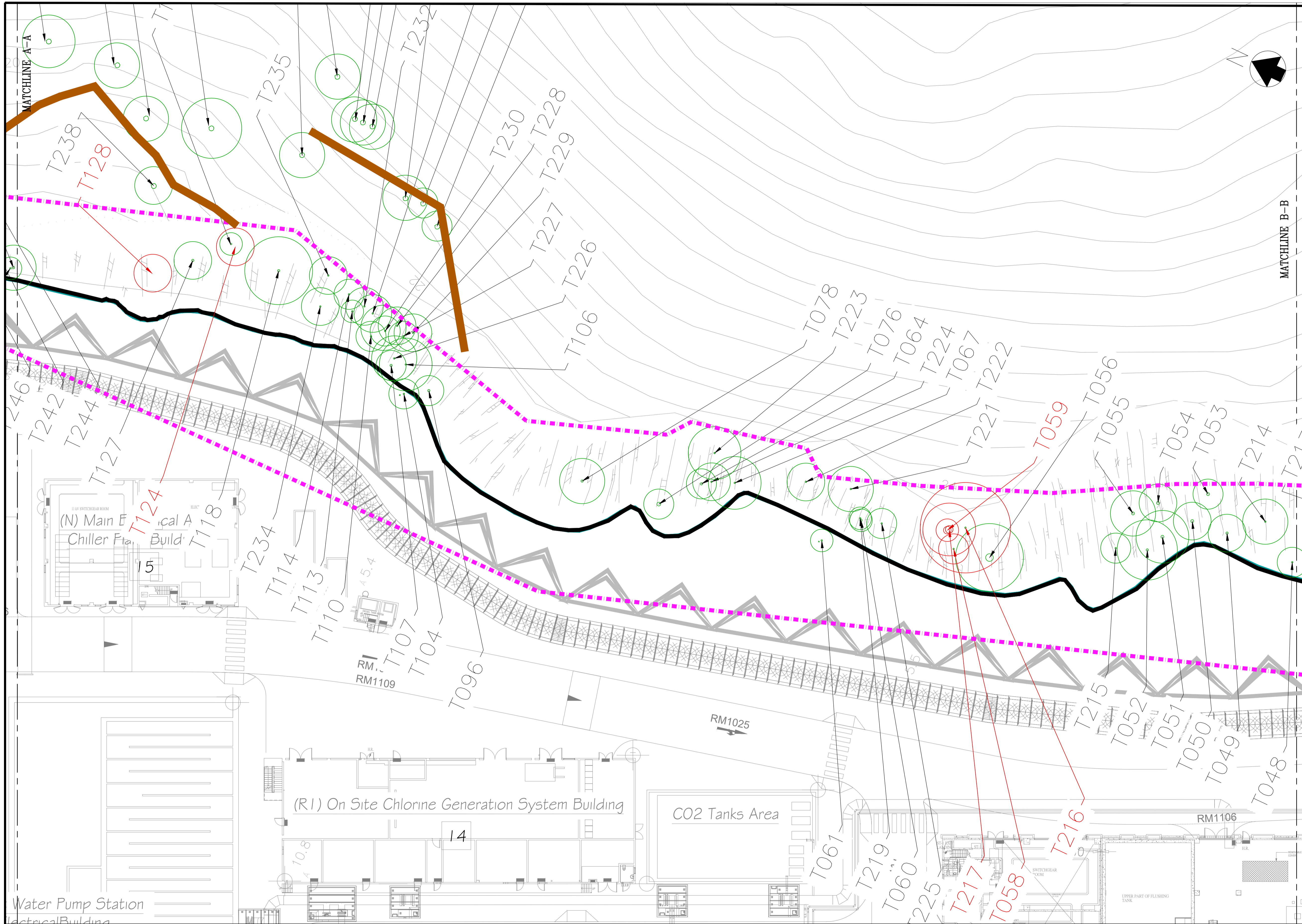
Checked by  
IY

Reference Drawing:

Approved by  
MP

Sketch No.:  
SK/190495B/C13/48-16014

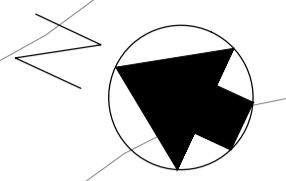
Rev.:  
C



MAP NOS. T12SW

LEGEND:

- EXISTING TREES TO BE RETAINED
- CLEAR WATER BAY COUNTRY PARK
- PROPOSED FLEXIBLE BARRIER
- SITE BOUNDARY
- OPEN CHANNEL
- TREE DESTROYED DUE TO ADVERSE WEATHER
- TREE SURVEY FOR ROCK SLOPE STABILISATION WORKS
- TREE SURVEY ALONG TEMPORARY ACCESS FOR BOULDER REMOVAL/STABILISATION WORKS



MATCHLINE B-B

MATCHLINE A-A

Water Pump Station  
Electrical Building

(N) Main Electrical A  
Chiller Plant Building  
15

(R1) On Site Chlorine Generation System Building  
14

CO2 Tanks Area

UPPER PART OF FLUSHING TANK

Scale: A1 1 : 250  
A3 1 : 500



CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

APPENDIX D -  
TREE SURVEY PLAN  
(SHEET 3 OF 5)

Date: 2026/01/07

Outgoing letter Ref. No.: -

Reference Drawing:

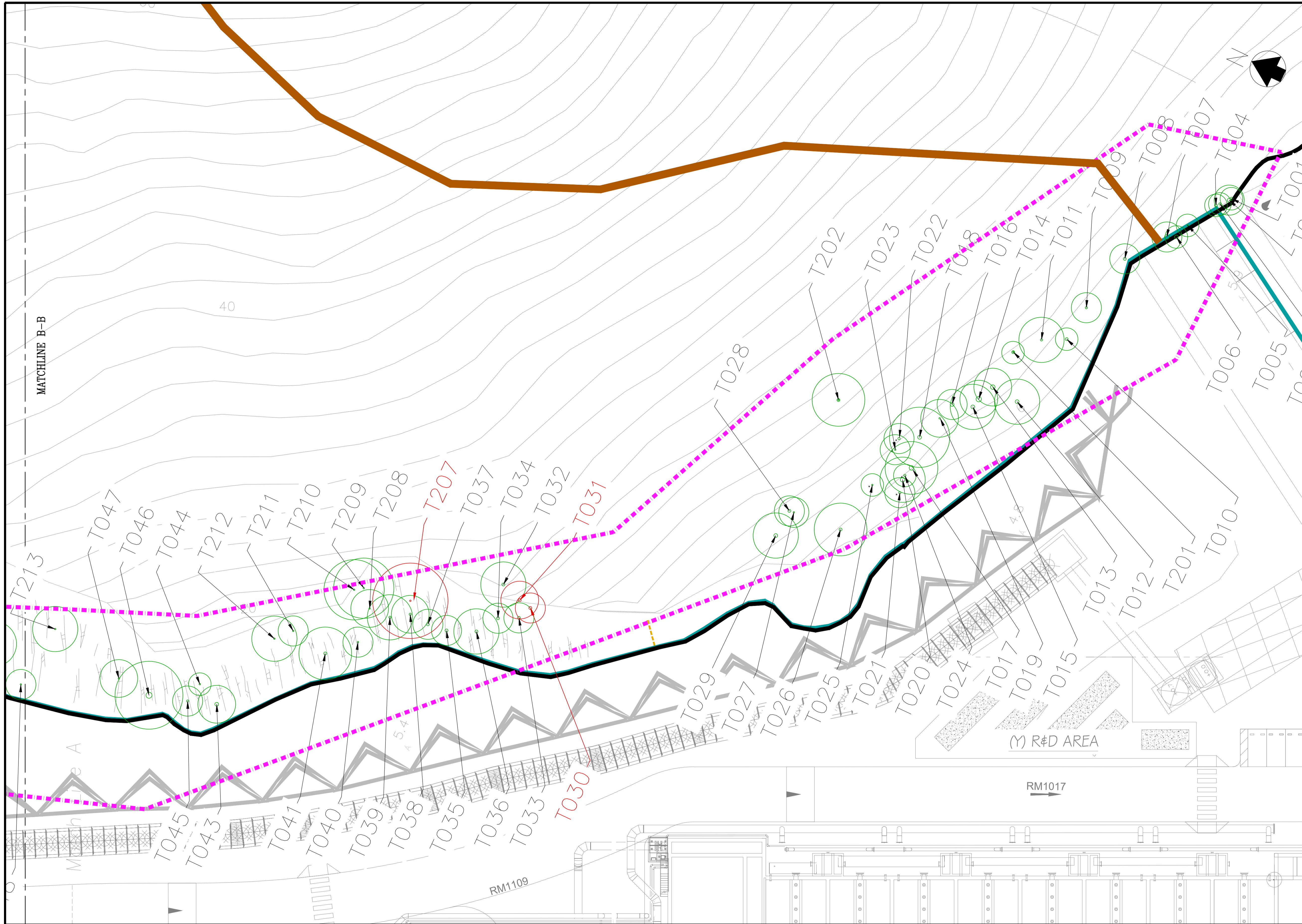
Sketch No.: SK/190495B/C13/48-16015

Drafted by CL

Checked by IY

Approved by MP

Rev.: C



- MAP NOS. T12SW
- LEGEND:
- EXISTING TREES TO BE RETAINED
  - CLEAR WATER BAY COUNTRY PARK
  - PROPOSED FLEXIBLE BARRIER
  - SITE BOUNDARY
  - OPEN CHANNEL
  - TREE DESTROYED DUE TO ADVERSE WEATHER
  - TREE SURVEY FOR ROCK SLOPE STABILISATION WORKS
  - TREE SURVEY ALONG TEMPORARY ACCESS FOR BOULDER REMOVAL/STABILISATION WORKS

Scale: A1 1 : 250  
A3 1 : 500



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賓尼斯工程顧問有限公司

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

APPENDIX D –  
TREE SURVEY PLAN  
(SHEET 4 OF 5)

Date: 2026/01/07

Drafted by  
CL

Outgoing letter Ref. No.: -

Checked by  
IY

Reference Drawing:

Approved by  
MP









Sketch No.:  
SK/190495B/C13/48-16016

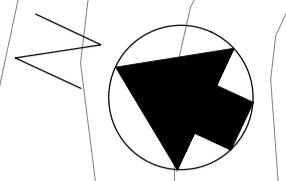
Rev.:  
C



MAP NOS. T12SW

LEGEND:

-  EXISTING TREES TO BE RETAINED
-  CLEAR WATER BAY COUNTRY PARK
-  PROPOSED FLEXIBLE BARRIER
-  SITE BOUNDARY
-  OPEN CHANNEL
-  TREE DESTROYED DUE TO ADVERSE WEATHER
-  TREE SURVEY FOR ROCK SLOPE STABILISATION WORKS
-  TREE SURVEY ALONG TEMPORARY ACCESS FOR BOULDER REMOVAL/STABILISATION WORKS



MATCHLINE B-B

Scale: A1 1 : 250  
A3 1 : 500



**BINNIES HONG KONG LIMITED**  
賓尼斯工程顧問有限公司

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

APPENDIX D –  
TREE SURVEY PLAN  
(SHEET 5 OF 5)

Date:	2026/01/07	Drafted by	CL
Outgoing letter Ref. No.:	-	Checked by	IY
Reference Drawing:		Approved by	MP
Sketch No.:	SK/190495B/C13/48-16059	Rev.:	-



**Tree Survey Schedule**

Project Title: Contract No. 13/WSD/17 Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant  
 Date of Survey: 2020/02/10, 2020/02/19, 2020/08/20, 2022/02/15, 2022/05/03, 2022/06/02

Tree No.	Species		Measurement			Amenity value (high/medium/low)	Form (good/average/poor)	Health condition	Structural condition	Suitability for transplanting		Conservation status	Recommendation (retain/transplant/fell)	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH (mm)	crowns spread					(high/medium/low)	Remarks				
T001	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	240	3	Medium	Average	Average	Average	Low	Near structure	N/A	Retain	AFCD	-
T002	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	230	4	Medium	Average	Average	Average	Low	Near structure	N/A	Retain	AFCD	-
T003	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	4	140	3	Low	Poor	Average	Average	Low	Poor form	N/A	Retain	AFCD	Bark crack
T004	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	3	165	3	Low	Poor	Average	Average	Low	Poor form	N/A	Retain	AFCD	Leaning
T005	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	3	130	3	Low	Poor	Average	Average	Low	Poor form	N/A	Retain	AFCD	Leaning
T006	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	4	140	3	Medium	Average	Average	Average	Medium	-	N/A	Retain	AFCD	-
T007	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	200	4	Medium	Average	Average	Average	Medium	-	N/A	Retain	AFCD	-
T008	<i>Celtis sinensis</i>	朴樹	7	170	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T009	<i>Sterculia lanceolata</i>	假蘋婆	5	130	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T010	<i>Phoenix hanceana</i>	刺葵	4	240	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T011	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	150	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T012	<i>Celtis sinensis</i>	朴樹	8	240	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Cross branches
T013	<i>Ficus hispida</i>	對葉榕(牛乳樹)	5	289	5	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Multiple trunks
T014	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	180	5	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T015	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	191	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T016	<i>Phoenix hanceana</i>	刺葵	4	285	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T017	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	150	5	Medium	Average	Poor	Average	Low	On slope	N/A	Retain	AFCD	-
T018	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	300	8	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Broken branch, Exposed dead wood on trunk
T019	<i>Celtis sinensis</i>	朴樹	9	297	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T020	<i>Celtis sinensis</i>	朴樹	9	250	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T021	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	140	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Broken branch
T022	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	170	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T023	<i>Litsea glutinosa</i>	潺槁樹	5	140	4	Medium	Average	Poor	Average	Low	On slope	N/A	Retain	AFCD	-
T024	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	130	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T025	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	120	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T026	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	9	240	7	Medium	Average	Poor	Poor	Low	On slope	N/A	Retain	AFCD	Codominant branches, dead tree
T027	<i>Celtis sinensis</i>	朴樹	6	140	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T028	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	180	4	Medium	Average	Poor	Average	Low	On slope	N/A	Retain	AFCD	-
T029	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	220	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T030	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	4	95	4	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T031	<i>Celtis sinensis</i>	朴樹	7	140	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T032	<i>Ficus subpisocarpa</i>	筆管榕	7	230	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T033	<i>Sterculia lanceolata</i>	假蘋婆	6	130	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T034	<i>Ficus subpisocarpa</i>	筆管榕	6	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T035	<i>Sterculia lanceolata</i>	假蘋婆	5	150	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches

**Tree Survey Schedule**

Project Title: Contract No. 13/WSD/17 Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant  
 Date of Survey: 2020/02/10, 2020/02/19, 2020/08/20, 2022/02/15, 2022/05/03, 2022/06/02

Tree No.	Species		Measurement			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation status	Recommendation	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH (mm)	crowns spread	(high/medium/low)	(good/average/poor)	(high/medium/low)	Remarks	(retain/transplant/fell)					
T036	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	180	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T037	<i>Ficus hispida</i>	對葉榕(牛乳樹)	7	140	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches
T038	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	155	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T039	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	160	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T040	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	130	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T041	<i>Acacia confusa</i>	台灣相思	10	150	7	Medium	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Root-plate movement
T043	<i>Ficus subpisocarpa</i>	筆管榕	5	200	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T044	<i>Ficus hispida</i>	對葉榕(牛乳樹)	5	163	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T045	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	150	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Leaning
T046	<i>Ficus microcarpa</i>	榕樹(細葉榕)	11	420	9	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches
T047	<i>Ficus hispida</i>	對葉榕(牛乳樹)	5	198	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T048	<i>Ficus microcarpa</i>	榕樹(細葉榕)	5	197	4	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Multiple trunks
T049	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	212	5	Medium	Average	Poor	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T050	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	180	5	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Leaning
T051	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	180	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T052	<i>Ficus subpisocarpa</i>	筆管榕	8	264	8	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T053	<i>Ficus hispida</i>	對葉榕(牛乳樹)	6	140	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T054	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	160	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches
T055	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	244	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunks
T056	<i>Ficus microcarpa</i>	榕樹(細葉榕)	10	407	9	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Multiple trunks
T058	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	196	4	Low	Poor	Poor	Average	Low	On slope	N/A	Retain	AFCD	Climber
T059	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	120	3	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T060	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	149	3	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Leaning
T061	<i>Mallotus paniculatus</i>	白楸	5	130	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	WSD	-
T064	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	135	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T067	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	185	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T076	<i>Ficus microcarpa</i>	榕樹(細葉榕)	5	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T078	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	160	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T096	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	150	4	Low	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Trunk wound
T104	<i>Sterculia lanceolata</i>	假蘋婆	6	105	4	Medium	Average	Average	Average	Medium	-	N/A	Retain	WSD	-
T106	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	259	7	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Multiple trunks
T107	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	170	4	Low	Poor	Average	Average	Low	On slope	N/A	Retain	AFCD	Leaning
T110	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	198	4	Medium	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Leaning
T113	<i>Sterculia lanceolata</i>	假蘋婆	7	100	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T114	<i>Ficus hispida</i>	對葉榕(牛乳樹)	6	160	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-

**Tree Survey Schedule**

Project Title: Contract No. 13/WSD/17 Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant  
 Date of Survey: 2020/02/10, 2020/02/19, 2020/08/20, 2022/02/15, 2022/05/03, 2022/06/02

Tree No.	Species		Measurement			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation status	Recommendation	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH (mm)	crowns spread	(high/medium/low)	(good/average/poor)	(high/medium/low)	Remarks	(retain/transplant/fell)					
T118	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	9	330	9	Medium	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Root-plate movement
T124	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	140	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T125	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	100	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T127	<i>Ficus hispida</i>	對葉榕(牛乳樹)	7	200	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Bark crack
T128	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	140	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T139	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	9	180	6	Medium	Average	Average	Average	Medium	-	N/A	Retain	AFCD	-
T140	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	100	3	Medium	Average	Average	Average	Medium	-	N/A	Retain	AFCD	-
T141	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	180	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T142	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	230	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Abnormal bark crack
T143	<i>Ficus hispida</i>	對葉榕(牛乳樹)	6	170	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T144	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	240	8	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T145	<i>Ficus hispida</i>	對葉榕(牛乳樹)	5	150	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T147	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	330	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T148	<i>Ficus hispida</i>	對葉榕(牛乳樹)	6	190	4	Low	Poor	Poor	Average	Low	On slope	N/A	Retain	AFCD	Climber, Old termite track
T149	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	260	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T150	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	360	5	Low	Poor	Poor	Poor	Low	-	N/A	Retain	AFCD	Abnormal bark crack, dead branch, exposed dead wood
T152	<i>Sterculia lanceolata</i>	假蘋婆	7	210	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T153	<i>Sterculia lanceolata</i>	假蘋婆	7	280	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Multiple trunks
T155	<i>Mallotus paniculatus</i>	白楸	7	220	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T156	<i>Celtis sinensis</i>	朴樹	4	95	3	Medium	Average	Average	Average	Medium	-	N/A	Retain	AFCD	-
T159	<i>Mallotus paniculatus</i>	白楸	5	95	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T160	<i>Celtis sinensis</i>	朴樹	4	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T161	<i>Acacia confusa</i>	台灣相思	12	500	11	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant trunk
T162	<i>Acacia confusa</i>	台灣相思	4	240	1	Low	Poor	Poor	Poor	Low	On slope	N/A	Retain	AFCD	Topped, decay
T163	<i>Acacia confusa</i>	台灣相思	10	170	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Decay
T165	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	210	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T166	<i>Celtis sinensis</i>	朴樹	8	210	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T201	<i>Acacia confusa</i>	台灣相思	4	110	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T202	<i>Peltophorum pterocarpum</i>	盾柱木(雙翼豆)	10	398	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T203	<i>Celtis sinensis</i>	朴樹	7	240	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T204	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	4	145	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T205	<i>Celtis sinensis</i>	朴樹	7	230	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Climber
T206	<i>Celtis sinensis</i>	朴樹	7	198	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Climber
T207	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	230	10	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-

**Tree Survey Schedule**

Project Title: Contract No. 13/WSD/17 Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant  
 Date of Survey: 2020/02/10, 2020/02/19, 2020/08/20, 2022/02/15, 2022/05/03, 2022/06/02

Tree No.	Species		Measurement			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation status	Recommendation	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH (mm)	crowns spread	(high/medium/low)	(good/average/poor)	(high/medium/low)	Remarks	(retain/transplant/fell)					
T208	<i>Ficus hispida</i>	對葉榕(牛乳樹)	7	190	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T209	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	7	220	8	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches
T210	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	8	225	8	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T211	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	5	110	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T212	<i>Acacia confusa</i>	台灣相思	8	260	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Codominant branches
T213	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	110	6	Low	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Leaning, exposed dead wood at trunk base
T214	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	5	160	6	Low	Poor	Average	Poor	Low	On slope	N/A	Retain	AFCD	Leaning
T215	<i>Trema tomentosa</i> (Roxb.) H.Hara	山黃麻	5	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T216	<i>Ficus subpisocarpa</i>	筆管榕	11	468	12	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Exposed root wound
T217	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	7	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Wound, dead branch
T219	<i>Ficus hispida</i>	對葉榕(牛乳樹)	5	115	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T221	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	6	232	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T222	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	220	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Leaning
T223	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	290	7	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T224	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	130	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T225	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	130	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T226	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	297	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T227	<i>Ficus variegata</i> var. <i>chlorocarpa</i>	青果榕	6	145	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	Bark crack, wound
T228	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	258	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T229	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	4	190	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T230	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	9	200	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T231	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	7	320	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T232	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	6	170	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T234	<i>Celtis sinensis</i>	朴樹	8	160	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-
T235	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	4	140	5	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD	-

**Tree Survey Schedule**

Project Title:

Contract No. 13/WSD/17 Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant

Date of Survey: 1 February 2023

Tree No.	Species		Measurement			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation status	Recommendation	Department to provide expert	2m Within Construction area	Additional Remarks
T236	<i>Sterculia lanceolata</i>	假蒴婆	6	100	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T237	<i>Mallotus paniculatus</i>	白楸	7	210	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Codominant branches, climber
T238	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	5	130	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Branch crossed with a undersized tree
T239	<i>Mallotus paniculatus</i>	白楸	8	210	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Climber
T240	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	6	130	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Climber
T241	<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	8	240	6	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Bark crack
T242	<i>Mallotus paniculatus</i>	白楸	6	110	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T243	<i>Sterculia lanceolata</i>	假蒴婆	6	115	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T244	<i>Mallotus paniculatus</i>	白楸	7	120	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T245	<i>Mallotus paniculatus</i>	白楸	6	120	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Codominant branches, climber
T246	<i>Leucaena leucocephala</i>	銀合歡	6	120	2	Low	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Invasive species
T247	<i>Mallotus paniculatus</i>	白楸	4	95	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T248	<i>Schefflera heptaphylla</i>	鵝掌柴(鴨腳木)	3	145	3	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T249	<i>Mallotus paniculatus</i>	白楸	6	125	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Codominant branches
T250	<i>Mallotus paniculatus</i>	白楸	6	110	4	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T251	<i>Mallotus paniculatus</i>	白楸	6	105	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T252	<i>Mallotus paniculatus</i>	白楸	6	95	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		-
T253	<i>Mallotus paniculatus</i>	白楸	6	100	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Climber
T254	<i>Mallotus paniculatus</i>	白楸	6	115	2	Medium	Average	Average	Average	Low	On slope	N/A	Retain	AFCD		Climber



**APPENDIX E**  
**SPECIES OF CONSERVATION IMPORTANCE**  
**IN ORIGINAL SCHEME OF SLOPE MITIGATION WORKS**



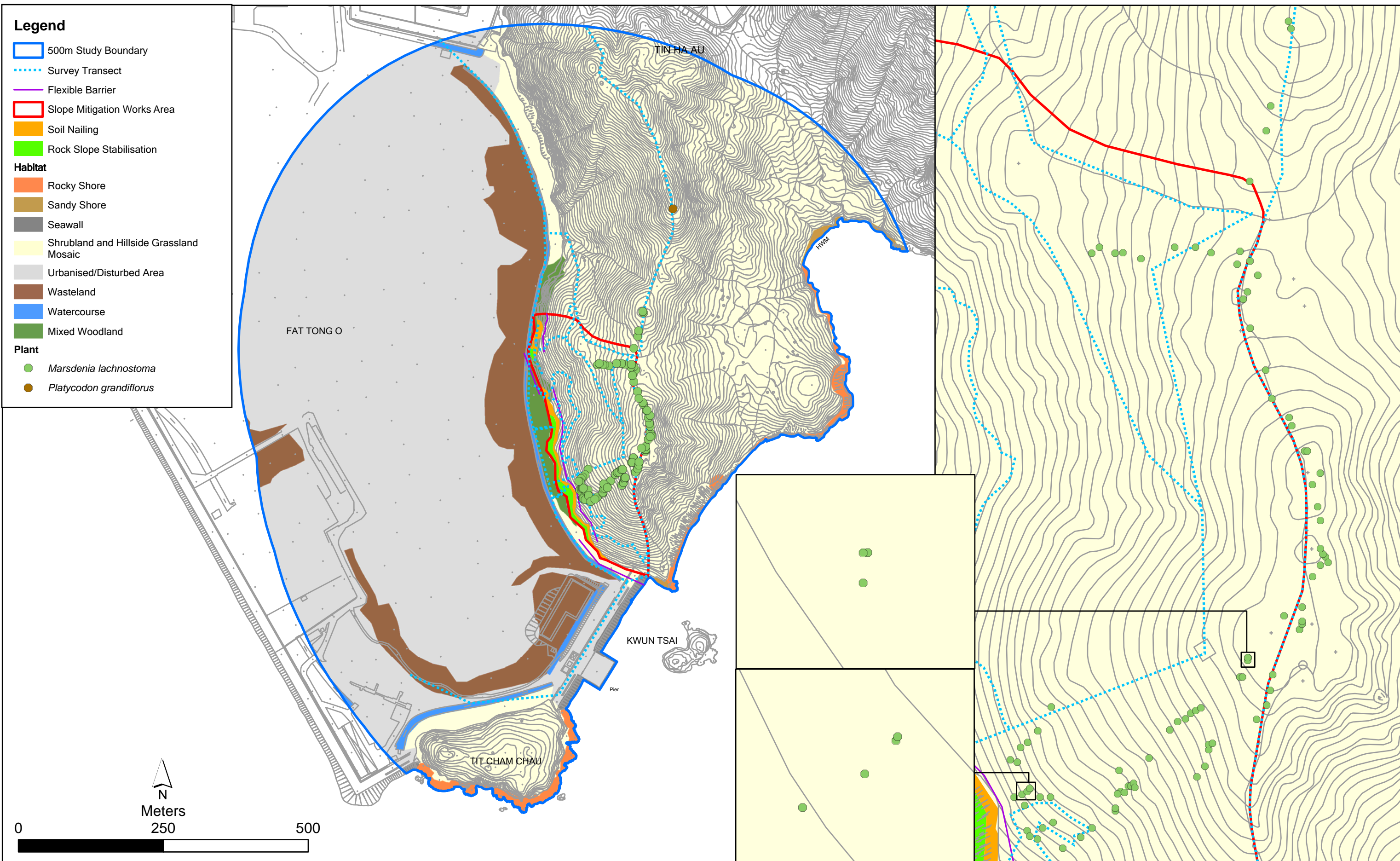


Figure 3.2  
 Study Area for Updated Vegetation Survey - Species of Conservation Importance (Original Slope Mitigation Works)



*Marsdenia lachnostoma*



*Platycodon grandiflorus*

**Annex A1 Relative Abundance of Plant Species Recorded Within the Study Area**

**Note:**

(1) Commonness as per Xing *et al.* Gymnosperms and angiosperms of Hong Kong. Memoirs of the Hong Kong Natural History Society (2000)

C = Common; VC = Very Common; P = Planted, VR = Very Rare, RA = Rare, RE = Restricted, NA = Not Applicable

(2) AFCD (2003) Rare and Precious Plants of Hong Kong

Listed in China Red Plant Databook (1992): LC = Least Concern; CR = Critically Endangered;

Cap. 96 = Listed in the Forests and Countryside Ordinance.

(3) Habitats: WL = Mixed Woodland, SG = Shrubland and Hillside Grassland Mosaic, UA = Urbanised/ Disturbed Area, WA = Wasteland and WC = Watercourse

(4) Relative abundance: 1 = scarce, 2 = common, 3 = abundant

Species Name	Chinese Name	Origin	Growth Form	Commonness <sup>(1)</sup>	Conservation Status <sup>(2)</sup>	Habitat <sup>(3) (4)</sup>					Slope Mitigation Works Area
						WL	SG	UA	WA	WC	
<i>Acacia auriculiformis</i>	耳果相思	Exotic	Tree	C, P		2			1		2
<i>Acacia confusa</i>	台灣相思	Exotic	Tree	C, P		1			1		1
<i>Acronychia pedunculata</i>	山油柑	Native	Tree	VC			1				1
<i>Adiantum flabellulatum</i>	扇葉鐵線蕨	Native	Herb	VC		1					1
<i>Adina pilulifera</i>	水團花	Native	Tree	VC		1					1
<i>Aeginetia indica</i>	野菰	Native	Herb	C		1					1
<i>Alangium chinense</i>	八角楓	Native	Tree	C		1					1
<i>Alocasia macrorrhizos</i>	海芋	Native	Herb	C		2			2		2
<i>Alpinia officinarum</i>	高良薑	Native	Herb	RE			3				3
<i>Alpinia zerumbet</i>	艷山薑	Native	Herb	VC		3					3
<i>Alternanthera paronychioides</i>	星星蝦鉗菜	Exotic	Herb	NA					3		3
<i>Alyxia sinensis</i>	鏈珠藤	Native	Climber	C		1					1
<i>Ampelopsis heterophylla</i>	牯嶺蛇葡萄	Native	Climber	C		2					2
<i>Aporosa dioica</i>	銀柴	Native	Tree	VC		2					2
<i>Archidendron clypearia</i>	猴耳環	Native	Tree	C		1					1
<i>Asparagus densiflorus</i>	非洲天門冬	Exotic	Climber	C		2	1				2
<i>Atalantia buxifolia</i>	酒餅筍	Native	Shrub	C		1					1
<i>Baeckea frutescens</i>	崗松	Native	Shrub	VC		1	2				1
<i>Bidens alba</i>	白花鬼針草	Exotic	Herb	VC		1	2	2	2		2
<i>Blechnum orientale</i>	烏毛蕨	Native	Herb	VC		1	1				1
<i>Boehmeria nivea</i>	苧麻	Exotic	Shrub	C				1	2		
<i>Breynia fruticosa</i>	黑面神	Native	Shrub	VC			1				1
<i>Bridelia insulana (Bridelia balansae)</i>	禾串樹	Native	Tree	C		1					
<i>Bridelia tomentosa</i>	土蜜樹	Native	Shrub	VC		1	1				1
<i>Cajanus scarabaeoides</i>	蔓草蟲豆	Native	Climber	C			1				1
<i>Casuarina equisetifolia</i>	木麻黃	Exotic	Tree	C				1	1		
<i>Cayratia corniculata</i>	角花烏蘘莓	Native	Climber	VC		1					1
<i>Celtis sinensis</i>	朴樹	Native	Tree	C, P		2	1				2

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Species Name	Chinese Name	Origin	Growth Form	Commonness <sup>(1)</sup>	Conservation Status <sup>(2)</sup>	Habitat <sup>(3) (4)</sup>					Slope Mitigation Works Area
						WL	SG	UA	WA	WC	
<i>Cerbera manghas</i>	海杧果	Native	Tree	C					1		1
<i>Chloris barbata</i>	孟仁草	Native	Herb	VC				1	1		
<i>Choerospondias axillaris</i>	南酸棗	Native	Tree	C		1					1
<i>Cinnamomum camphora</i>	樟	Native	Tree	C, P		1					1
<i>Cleistocalyx nervosum</i>	水翁	Native	Tree	VC		1					1
<i>Cratogeomys cochinchinense</i>	黃牛木	Native	Tree	VC		1	1				1
<i>Cyclosorus acuminatus</i>	漸尖毛蕨	Native	Herb	VC		1	1		1		1
<i>Cyrtococcum patens</i>	弓果黍	Native	Herb	VC		2		1	1		2
<i>Dalbergia benthamii</i>	兩廣黃檀	Native	Climber	C		1	2				1
<i>Dalbergia hancei</i>	藤黃檀	Native	Climber	C		1	1				1
<i>Daphniphyllum calycinum</i>	牛耳楓	Native	Tree	C			1				1
<i>Desmos chinensis</i>	假鷹爪	Native	Shrub	C		1					1
<i>Dianella ensifolia</i>	山菅蘭	Native	Herb	VC			1				1
<i>Dicranopteris pedata</i>	芒萁	Native	Herb	C			3				3
<i>Elaeocarpus chinensis</i>	中華杜英	Native	Tree	C		1					1
<i>Elaeagnus loureirii</i>	羅氏胡頹子	Native	Climber/ Shrub	C			1				
<i>Embelia laeta</i>	酸藤子	Native	Climber	VC			3				3
<i>Emilia sonchifolia</i>	一點紅	Native	Herb	VC				1	1		
<i>Eriosema chinense</i>	雞頭薯	Native	Herb	C			2				2
<i>Eucalyptus citriodora</i>	檸檬桉	Exotic	Tree	C				1	1		
<i>Eucalyptus robusta</i>	大葉桉	Exotic	Tree	C				1	1		
<i>Eurya nitida</i>	細齒葉柃	Native	Shrub	VC		1	1				1
<i>Ficus hirta</i>	粗葉榕	Native	Shrub	C		2					2
<i>Ficus hispida</i>	對葉榕	Native	Tree	VC		3	1				3
<i>Ficus microcarpa</i>	細葉榕	Native	Tree	C		1			1		1
<i>Ficus subpisocarpa</i>	筆管榕	Native	Tree	C		1					1
<i>Ficus variegata</i>	青果榕	Native	Tree	C		1					1
<i>Ficus variolosa</i>	變葉榕	Native	Tree	VC		1					1
<i>Gahnia tristis</i>	黑莎草	Native	Herb	VC			1				1

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						WL	SG	UA	WA	WC	
<i>Garcinia oblongifolia</i>	嶺南山竹子	Native	Tree	VC		1					1
<i>Gardenia jasminoides</i>	梔子	Native	Shrub	VC		1	1				1
<i>Glochidion eriocarpum</i>	毛果算盤子	Native	Shrub	C			1				1
<i>Glochidion lanceolarium</i>	艾膠算盤子	Native	Tree	C			1				1
<i>Glochidion puberum</i>	算盤子	Native	Shrub	RE			1				1
<i>Gnetum luofuense</i>	羅浮買麻藤	Native	Climber	VC		1	2				2
<i>Gymnanthera oblonga</i>	海島藤	Native	Climber	C				1	1		1
<i>Helicteres angustifolia</i>	山芝麻	Native	Herb	VC			2				2
<i>Homalium cochinchinense</i>	天料木	Native	Tree	C		1	1				1
<i>Ilex asprella</i>	梅葉冬青	Native	Shrub	VC		1	1				1
<i>Ilex pubescens</i>	毛冬青	Native	Shrub	VC		1	1				1
<i>Imperata cylindrica</i>	大白茅	Native	Herb	C				3	3		3
<i>Ipomoea cairica</i>	五爪金龍	Exotic	Climber	VC				1	1		1
<i>Ipomoea nil</i>	牽牛	Exotic	Climber	C			1		3		3
<i>Itea chinensis</i>	鼠刺	Native	Shrub	VC		1					1
<i>Lantana camara</i>	馬纓丹	Exotic	Shrub	VC		1	1		1		1
<i>Leucaena leucocephala</i>	銀合歡	Exotic	Tree	C		3		1	3		3
<i>Ligustrum sinense</i>	山指甲	Native	Tree	C		1			1		1
<i>Liquidambar formosana</i>	楓香	Native	Tree	C		1					1
<i>Liriope spicata</i>	山麥冬	Native	Herb	VC		1	1				1
<i>Litsea glutinosa</i>	潺槁樹	Native	Tree	C		3	2				3
<i>Litsea rotundifolia</i>	豺皮樟	Native	Shrub	VC		1	1				1
<i>Lophatherum gracile</i>	淡竹葉	Native	Herb	VC		2			2		2
<i>Lygodium japonicum</i>	海金沙	Native	Herb	VC		1	2				2
<i>Macaranga tanarius</i>	血桐	Native	Tree	C		3		2	2		3
<i>Machilus velutina</i>	絨毛潤楠	Native	Tree	C		1					1
<i>Maesa perlaris</i>	鯽魚膽	Native	Shrub	C		1					1
<i>Mallotus paniculatus</i>	白楸	Native	Tree	C		3	2				3
<i>Marsdenia lachnostoma</i>	毛喉牛奶菜	Native	Climber	VR	CR		3				3

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Species Name	Chinese Name	Origin	Growth Form	Commonness <sup>(1)</sup>	Conservation Status <sup>(2)</sup>	Habitat <sup>(3) (4)</sup>					Slope Mitigation Works Area
						WL	SG	UA	WA	WC	
<i>Melastoma sanguineum</i>	毛荳	Native	Shrub	C		1	1				1
<i>Melicope pteleifolia</i>	密茱萸	Native	Shrub	C		1					1
<i>Melodinus suaveolens</i>	山橙	Native	Climber	C		1					1
<i>Mikania micrantha</i>	薇甘菊	Exotic	Climber	C		2	2	1	2		3
<i>Millettia nitida</i>	亮葉崖豆藤	Native	Climber	VC		1	1				1
<i>Millettia speciosa</i>	美麗崖豆藤	Native	Climber	C		1	1				1
<i>Miscanthus floridulus</i>	五節芒	Native	Herb	C		2	3	1	3		3
<i>Morinda parvifolia</i>	雞眼藤	Native	Climber	VC			2				1
<i>Mussaenda pubescens</i>	玉葉金花	Native	Climber	VC		2	2				2
<i>Neyraudia reynaudiana</i>	類蘆	Native	Herb	C				2	3		3
<i>Oxalis corniculata</i>	酢漿草	Native	Herb	VC				1	1		1
<i>Oxalis corymbosa</i>	紅花酢漿草	Exotic	Herb	C				1	1		1
<i>Osbeckia chinensis</i>	金錦香	Native	Herb	C			1				1
<i>Paederia scandens</i>	雞矢藤	Native	Climber	VC		1	2		1		1
<i>Palhinhaea cernua</i>	鋪地蜈蚣	Native	Herb	VC			1				1
<i>Pandanus tectorius</i>	露兜樹	Native	Shrub	VC		1	1				1
<i>Panicum maximum</i>	大黍	Exotic	Herb	C			1	1	1		1
<i>Parthenocissus dalzielii</i>	爬牆虎	Exotic	Climber	P		1					1
<i>Passiflora foetida</i>	龍珠果	Exotic	Climber	C			1				1
<i>Phoenix hanceana</i>	刺葵	Native	Tree	C		2	1				2
<i>Phyllanthus cochinchinensis</i>	越南葉下珠	Native	Shrub	C		1	1				1
<i>Phyllanthus emblica</i>	餘甘子	Native	Tree	VC			2				2
<i>Platycodon grandiflorus</i>	桔梗	Native	Herb	RE	Cap.96; LC		1				
<i>Psychotria asiatica</i>	九節	Native	Tree	C		2	1				2
<i>Psychotria serpens</i>	蔓九節	Native	Climber	VC			2				2
<i>Pteris semipinnata</i>	半邊旗	Native	Herb	VC		3	1				3
<i>Pueraria phaseoloides</i>	三裂葉野葛	Native	Climber	VC		2	1				2
<i>Rhaphiolepis indica</i>	石斑木	Native	Shrub	VC			1				1
<i>Rhodomyrtus tomentosa</i>	桃金娘	Native	Shrub	VC		2	3				3

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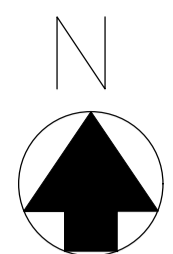
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						WL	SG	UA	WA	WC	
<i>Rhus hypoleuca</i>	白背漆	Native	Shrub	C		2	2				2
<i>Rhus succedanea</i>	野漆	Native	Shrub	C		2	2				2
<i>Rubus reflexus</i>	鑷毛莓	Native	Climber	VC		1	1		1		1
<i>Sapium discolor</i>	山烏柏	Native	Tree	VC		1	1				1
<i>Sapium sebiferum</i>	烏柏	Native	Tree	C		2	1				2
<i>Schefflera heptaphylla</i>	鵝掌柴	Native	Tree	C		2	2				2
<i>Schima superba</i>	木荷	Native	Tree	C		1					1
<i>Smilax china</i>	菝葜	Native	Climber	VC		1	2				2
<i>Smilax glabra</i>	土茯苓	Native	Climber	VC		1	1				1
<i>Solena amplexicaulis</i>	茅瓜	Native	Climber	VC			2				1
<i>Sterculia lanceolata</i>	假蘋婆	Native	Tree	C		3	1				3
<i>Strophanthus divaricatus</i>	羊角拗	Native	Climber	C			1				1
<i>Syzygium jambos</i>	蒲桃	Exotic	Tree	C		1					1
<i>Syzygium levinei</i>	山蒲桃	Native	Tree	C		1					1
<i>Tadehagi triquetrum</i>	葫蘆茶	Native	Shrub	VC			1				1
<i>Tetracera asiatica</i>	錫葉藤	Native	Climber	VC		1					1
<i>Tylophora ovata</i>	娃兒藤	Native	Climber	C		1					1
<i>Viburnum odoratissimum</i>	珊瑚樹	Native	Shrub	VC		1					1
<i>Vitis balanseana</i>	小果葡萄	Native	Climber	RE			2				2
<i>Vitis bryoniiifolia</i>	襲菓	Native	Climber	RA			1				2
<i>Vitis rotundifolia</i>	綿毛葡萄	Native	Climber	C		1	1				1
<i>Wikstroemia indica</i>	了哥王	Native	Shrub	C			1				1
<i>Zanthoxylum avicennae</i>	筲欖花椒	Native	Tree	C		1					1
<i>Zanthoxylum nitidum</i>	兩面針	Native	Climber	VC		1	1				1
<b>Total Number of Species:</b>		<b>139</b>				<b>93</b>	<b>80</b>	<b>19</b>	<b>32</b>	<b>0</b>	<b>130</b>



**APPENDIX F**  
**DESIGN DRAWINGS FOR THE REVISED SLOPE MITIGATION WORK**





846 400 E

846 500 E

WP Sep 2015

846 600 E

846 700 E

846 800 E

814 500 N

814 400 N

814 300 N

814 200 N

814 100 N

**NOTES:**

- EXTENTS OF WORKS AS SHOWN ARE TENTATIVE ONLY.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. SK/190495B/C13/48-16004 TO 16008 AND 16009
- SETTING OUT COORDINATES ARE BASED ON HK GRID REFERENCE.
- SETTING-OUT POINTS OF FLEXIBLE BARRIER ARE TENTATIVE. DIMENSIONS OF LENGTH, SEPARATION AND OVERLAP OF THE FLEXIBLE BARRIER SECTIONS SHALL BE SUBJECT TO THE MANUFACTURER'S RECOMMENDATION.

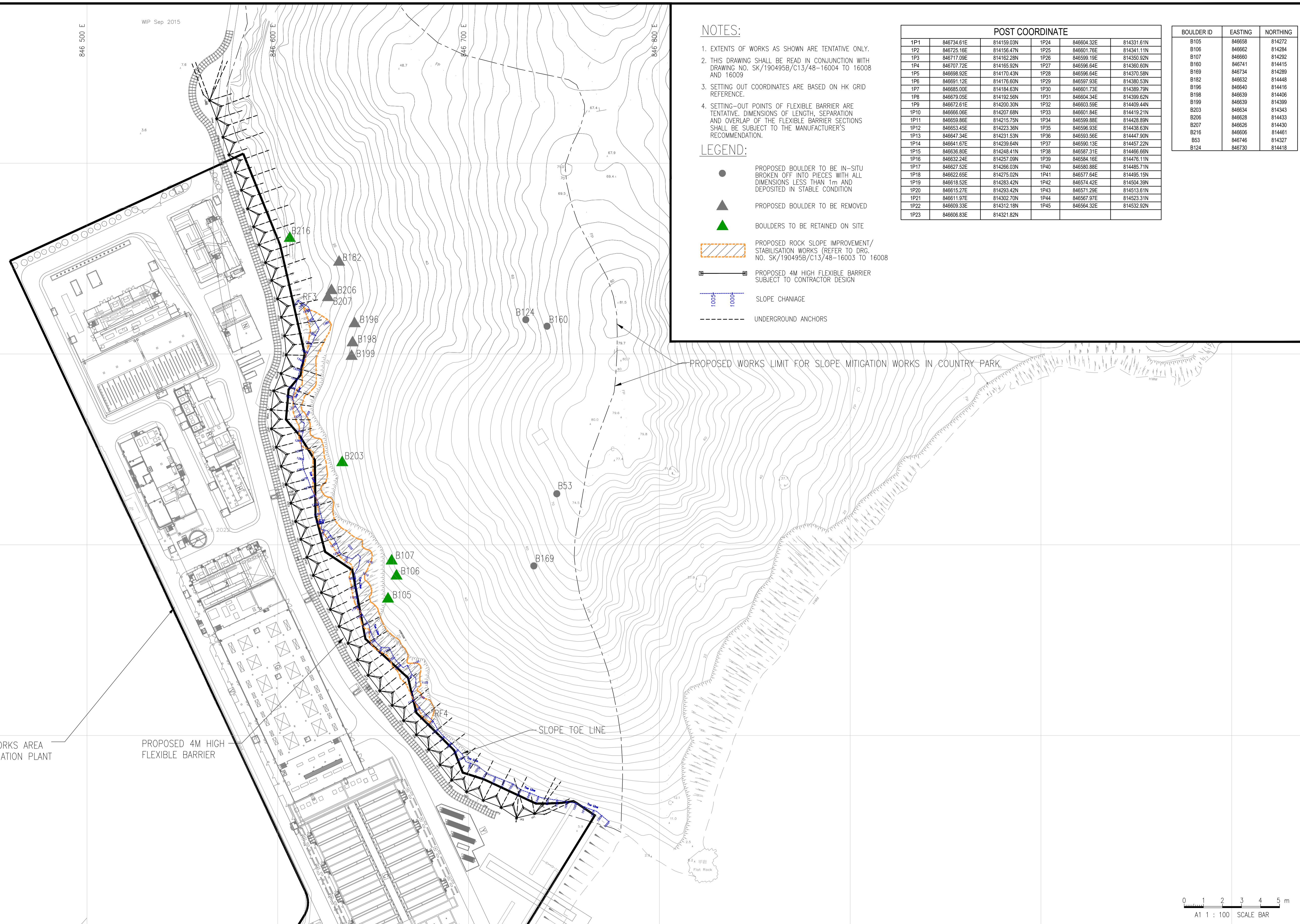
**LEGEND:**

- PROPOSED BOULDER TO BE IN-SITU BROKEN OFF INTO PIECES WITH ALL DIMENSIONS LESS THAN 1m AND DEPOSITED IN STABLE CONDITION
- PROPOSED BOULDER TO BE REMOVED
- BOULDERS TO BE RETAINED ON SITE
- PROPOSED ROCK SLOPE IMPROVEMENT/STABILISATION WORKS (REFER TO DRG. NO. SK/190495B/C13/48-16003 TO 16008)
- PROPOSED 4M HIGH FLEXIBLE BARRIER SUBJECT TO CONTRACTOR DESIGN
- SLOPE CHANGIAGE
- UNDERGROUND ANCHORS

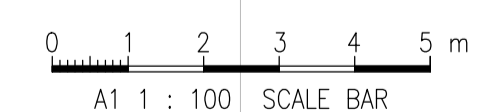
**POST COORDINATE**

1P1	846734.61E	814159.03N	1P24	846604.32E	814331.61N
1P2	846725.16E	814156.47N	1P25	846601.76E	814341.11N
1P3	846717.09E	814162.28N	1P26	846599.19E	814350.92N
1P4	846707.72E	814165.92N	1P27	846596.64E	814360.60N
1P5	846698.92E	814170.43N	1P28	846596.64E	814370.58N
1P6	846691.12E	814176.90N	1P29	846597.93E	814380.53N
1P7	846685.00E	814184.63N	1P30	846601.73E	814389.78N
1P8	846679.05E	814192.56N	1P31	846604.34E	814399.62N
1P9	846672.61E	814200.30N	1P32	846603.59E	814409.44N
1P10	846666.06E	814207.68N	1P33	846601.84E	814419.21N
1P11	846659.86E	814215.75N	1P34	846599.88E	814428.89N
1P12	846653.45E	814223.36N	1P35	846596.93E	814438.63N
1P13	846647.34E	814231.53N	1P36	846593.56E	814447.90N
1P14	846641.67E	814239.64N	1P37	846590.13E	814457.22N
1P15	846636.80E	814248.41N	1P38	846587.31E	814466.66N
1P16	846632.24E	814257.09N	1P39	846584.16E	814476.11N
1P17	846627.52E	814266.03N	1P40	846580.86E	814485.71N
1P18	846622.85E	814275.02N	1P41	846577.64E	814495.15N
1P19	846618.52E	814283.42N	1P42	846574.42E	814504.39N
1P20	846615.27E	814293.42N	1P43	846571.29E	814513.61N
1P21	846611.97E	814302.70N	1P44	846567.97E	814523.31N
1P22	846609.33E	814312.18N	1P45	846564.32E	814532.92N
1P23	846606.83E	814321.82N			

BOULDER ID	EASTING	NORTHING
B105	846658	814272
B106	846662	814284
B107	846660	814292
B109	846741	814415
B169	846734	814289
B182	846632	814446
B196	846640	814416
B198	846639	814406
B199	846639	814399
B203	846634	814343
B206	846628	814433
B207	846626	814420
B216	846636	814461
B53	846746	814327
B124	846730	814418



SCALE A1 : 1:1000  
 A3 : 1:2000

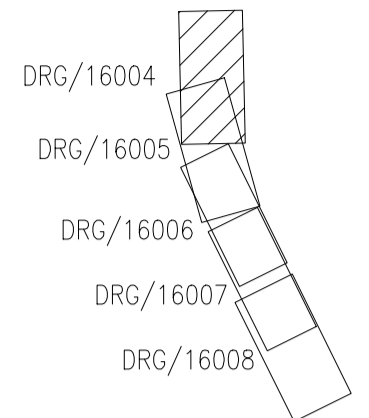
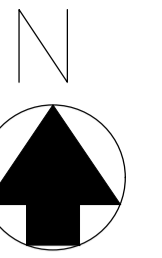


CONTRACT NO. 13/WSD/17  
 DESIGN, BUILD AND OPERATE  
 FIRST STAGE OF TSEUNG KWAN O  
 DESALINATION PLANT

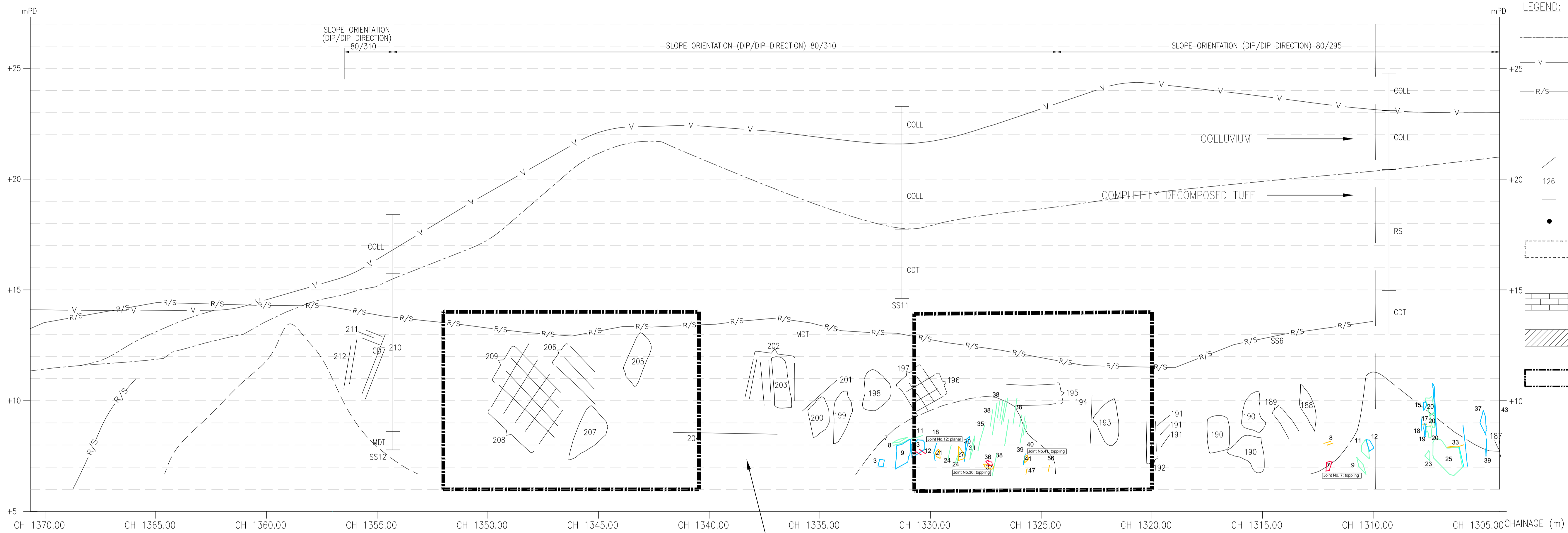
Title:  
 PROPOSED SLOPE  
 MITIGATION WORKS

Date: 23/09/2025  
 Outgoing letter Ref. No.:  
 Reference Drawing: 190495/K/TEND/80/1001  
 Sketch No.: SK/190495B/C13/48-16003  
 Rev.: I

Drafted by JL  
 Checked by IY  
 Approved by MP

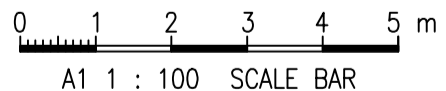


KEY PLAN  
N.T.S.



- LEGEND:
- GEOLOGICAL PROFILE (ESTIMATED)
  - v- BREAK SLOPE FACE (ESTIMATED)
  - R/S- ROCK/SOIL INTERFACE (ESTIMATED)
  - ..... LANDSLIDE DEBRIS TO BE CLEARED AND FOLLOWING BY ROCK SLOPE MAPPING (INDICATIVE)
  - 126 MEASURED ROCK JOINT AND ROCK JOINT NUMBER
  - PROPOSED ROCK DOWEL
  - ..... POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)
  - ..... PROPOSED DENTITION (WITH STONE FACING)
  - ..... PROPOSED BUTTRISS (WITH STONE FACING)
  - ..... PROPOSED WIRE MESH COVER AFTER GENERAL SCALING (WITH OPENING TO TREES TO BE RETAINED) (INDICATIVE)

ELEVATION  
SCALE A1 1:100  
A3 1:200



SCALE A1 : 1:100  
A3 : 1:200



BINNIES HONG KONG LIMITED  
賓尼斯工程顧問有限公司

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

ROCK SLOPE ELEVATION  
(CH1365 - CH1305)

Date: 25/09/2025

Outgoing letter Ref. No.:  
190495/(13/WSD/17)/C10/300/M201848

Reference Drawing:  
190495/B/DD/00-20005

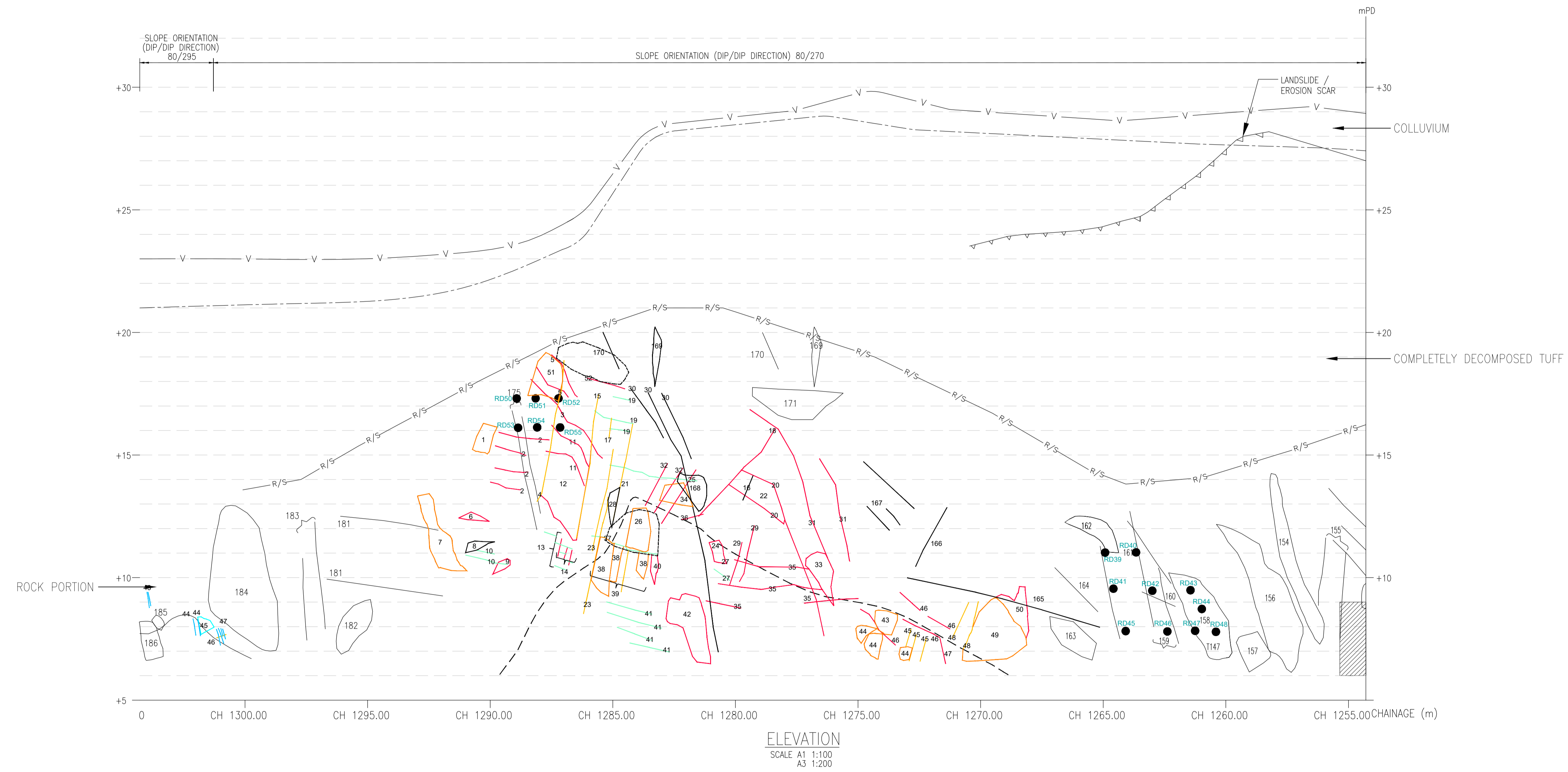
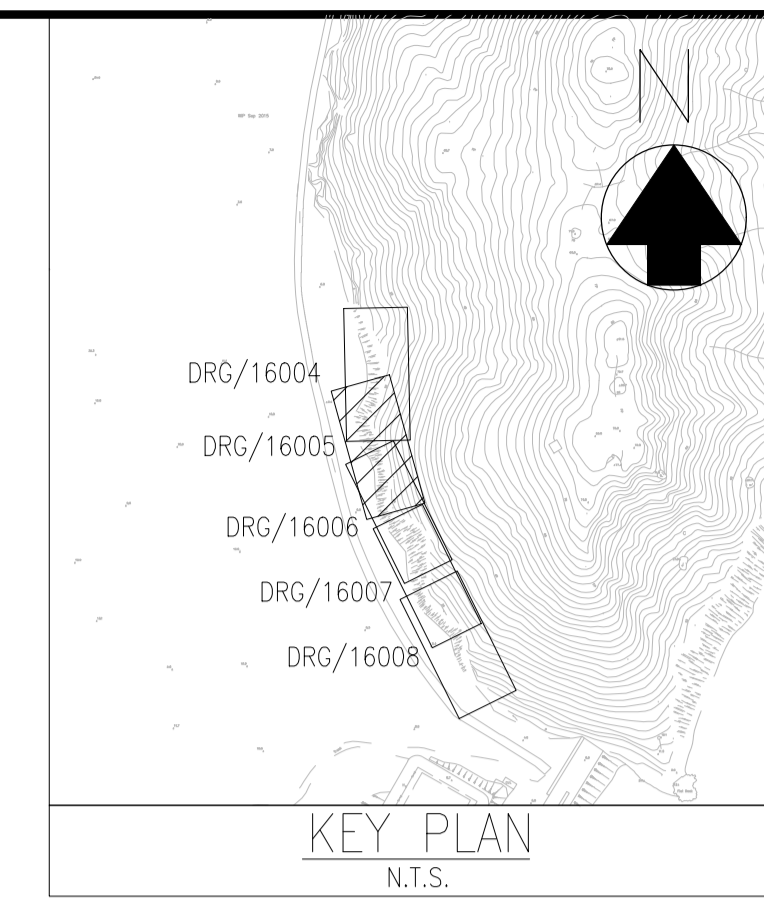
Sketch No.:  
SK/190495B/C13/48-16004

Rev.:  
I

Drafted by  
JL

Checked by  
IY

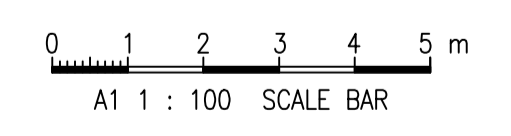
Approved by  
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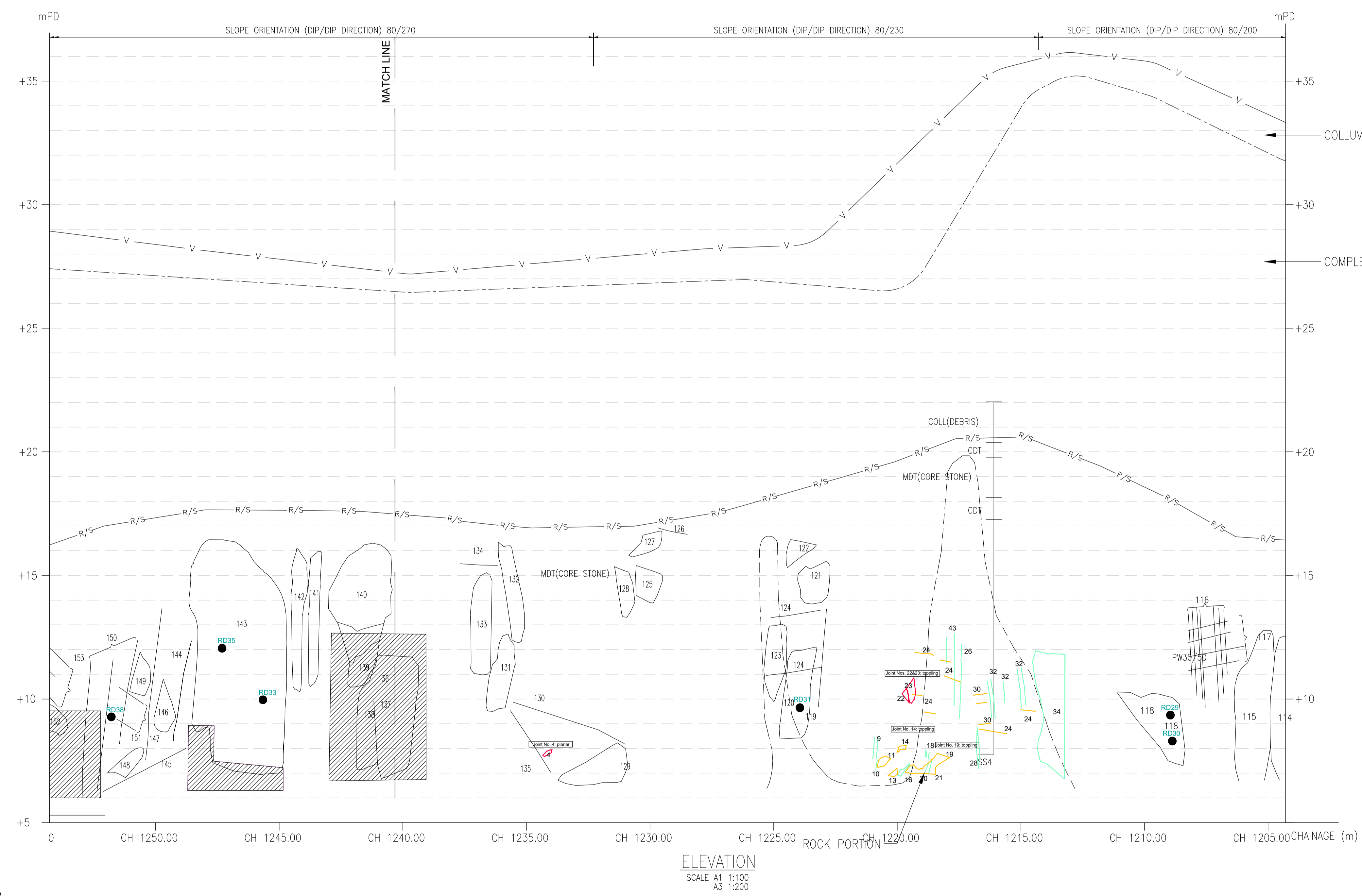
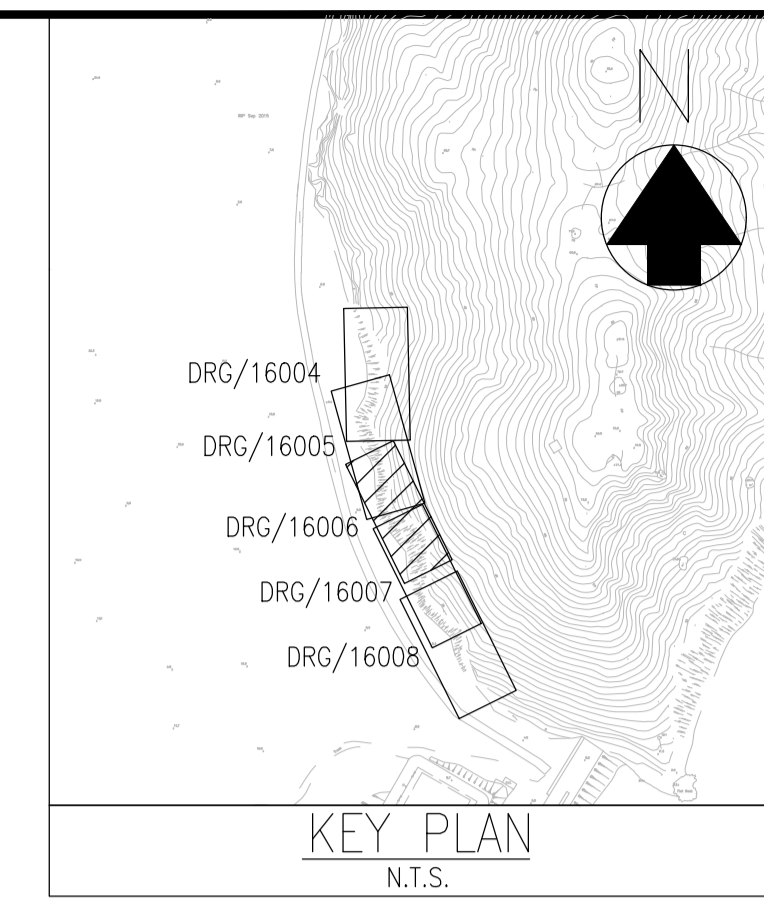
NOTE:  
1. ALL LEGEND AND NOTES REFER TO DRAWING NO. SK/190495B/C13/48-16004.

- LEGEND:
- GEOLOGICAL PROFILE (ESTIMATED)
  - v- BREAK SLOPE FACE (ESTIMATED)
  - R/S- ROCK/SOIL INTERFACE (ESTIMATED)
  - LANDSLIDE DEBRIS TO BE CLEARED AND FOLLOWING BY ROCK SLOPE MAPPING (INDICATIVE)
  - 126 MEASURED ROCK JOINT AND ROCK JOINT NUMBER
  - PROPOSED ROCK DOWEL
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)
  - PROPOSED DENTITION (WITH STONE FACING)
  - PROPOSED BUTTRESS (WITH STONE FACING)
  - PROPOSED WIRE MESH COVER AFTER GENERAL SCALING (WITH OPENING TO TREES TO BE RETAINED) (INDICATIVE)

SCALE A1 : 1:100  
A3 : 1:200



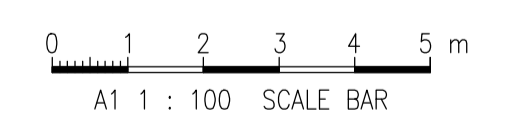
 <b>BINNIES HONG KONG LIMITED</b> 賓尼斯工程顧問有限公司	CONTRACT NO. 13/WSD/17 DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Title:  ROCK SLOPE ELEVATION (CH1305 - CH1255)	Date: 25/09/2025	Drafted by JL
			Outgoing letter Ref. No.:	Checked by IY
			Reference Drawing: 190495/B/DD/00-20006	Approved by MP
			Sketch No.: SK/190495B/C13/48-16005	Rev.: J



- LEGEND:**
- GEOLOGICAL PROFILE (ESTIMATED)
  - v - BREAK SLOPE FACE (ESTIMATED)
  - R/S - ROCK/SOIL INTERFACE (ESTIMATED)
  - LANDSLIDE DEBRIS TO BE CLEARED AND FOLLOWING BY ROCK SLOPE MAPPING (INDICATIVE)
  - 126 MEASURED ROCK JOINT AND ROCK JOINT NUMBER
  - PROPOSED ROCK DOWEL
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)
  - PROPOSED DENTITION (WITH STONE FACING)
  - PROPOSED BUTTRISS (WITH STONE FACING)
  - PROPOSED WIRE MESH COVER AFTER GENERAL SCALING (WITH OPENING TO TREES TO BE RETAINED) (INDICATIVE)
  - ROCK DEBRIS TO BE REMAINED

SCALE A1 : 1:100  
A3 : 1:200

ELEVATION  
SCALE A1 1:100  
A3 1:200

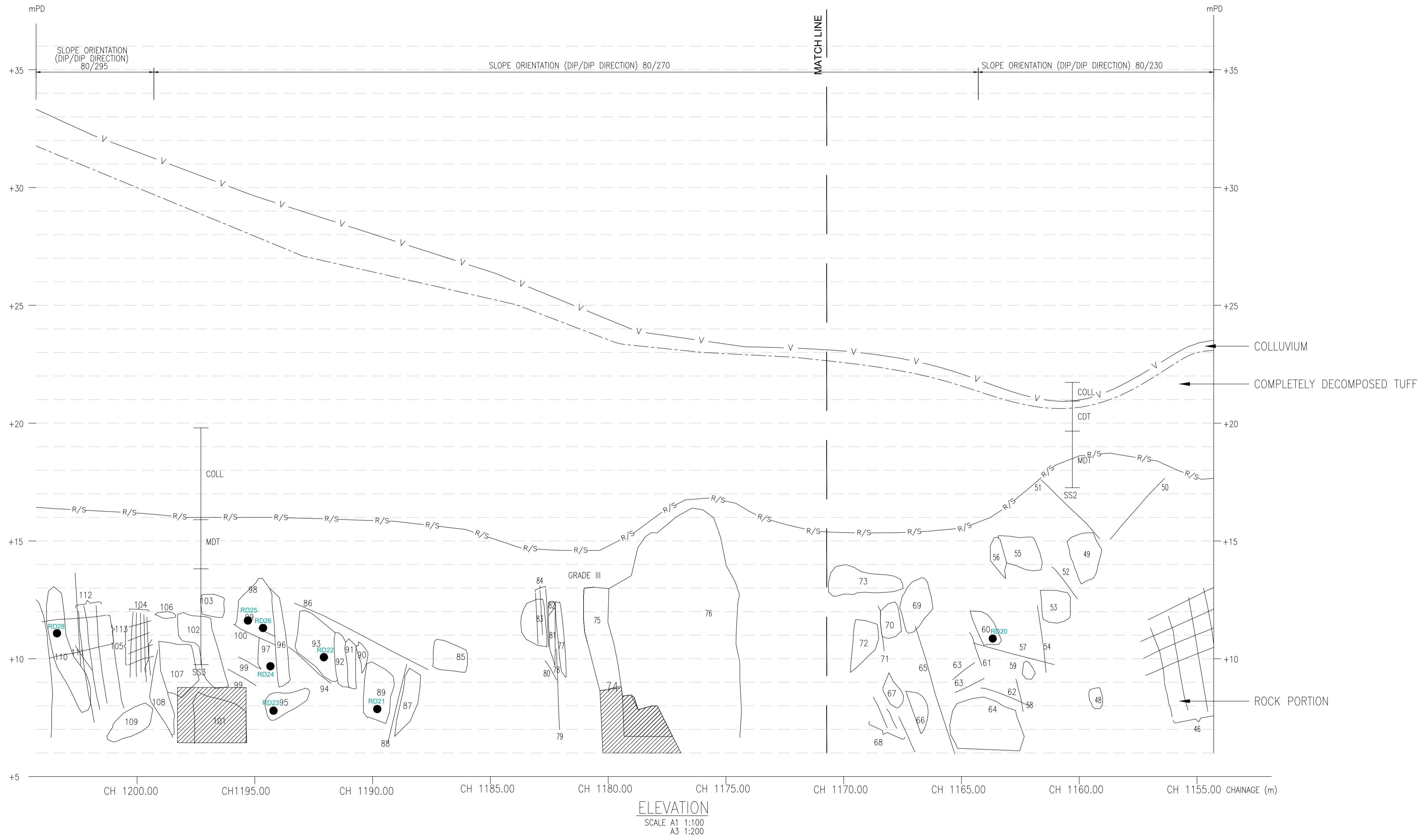
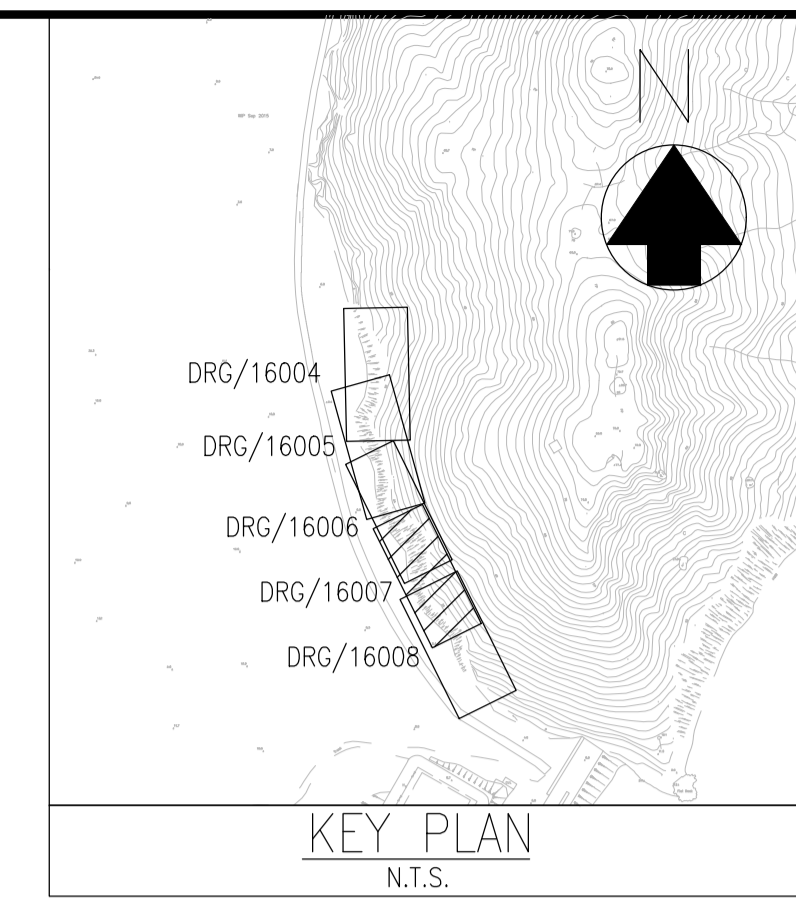


CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

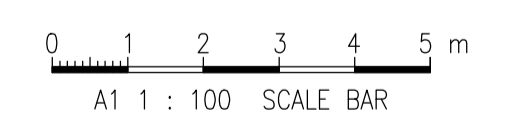
ROCK SLOPE ELEVATION  
(CH1255 - CH1205)

Date:	25/09/2025	Drafted by	JL
Outgoing letter Ref. No.:		Checked by	IY
Reference Drawing:	190495/B/DD/00-20007	Approved by	MP
Sketch No.:	SK/190495B/C13/48-16006	Rev.:	J



- LEGEND:**
- GEOLOGICAL PROFILE (ESTIMATED)
  - v — BREAK SLOPE FACE (ESTIMATED)
  - R/S — ROCK/SOIL INTERFACE (ESTIMATED)
  - LANDSLIDE DEBRIS TO BE CLEARED AND FOLLOWING BY ROCK SLOPE MAPPING (INDICATIVE)
  - 126 MEASURED ROCK JOINT AND ROCK JOINT NUMBER
  - PROPOSED ROCK DOWEL
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)
  - PROPOSED DENTITION (WITH STONE FACING)
  - PROPOSED BUTTRESS (WITH STONE FACING)
  - PROPOSED WIRE MESH COVER AFTER GENERAL SCALING (WITH OPENING TO TREES TO BE RETAINED) (INDICATIVE)

SCALE A1 : 1:100  
A3 : 1:200



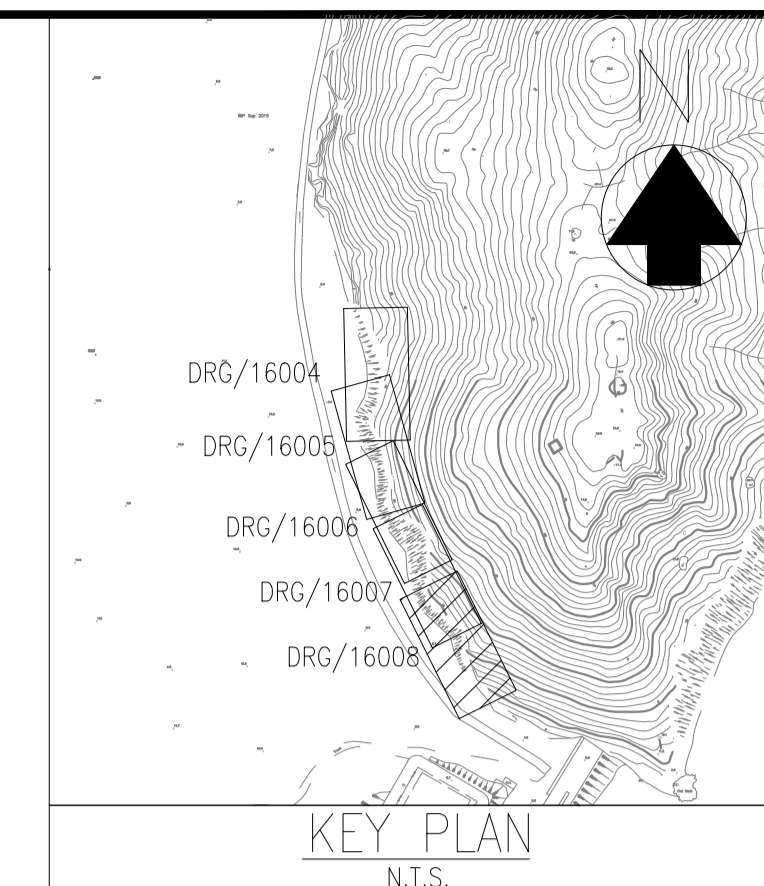
ELEVATION  
SCALE A1 1:100  
A3 1:200

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:  
  
ROCK SLOPE ELEVATION  
(CH1205 - CH1160)

Date:	25/09/2025
Outgoing letter Ref. No.:	
Reference Drawing:	190495/B/DD/00-20008
Sketch No.:	SK/190495B/C13/48-16007
Rev.:	H

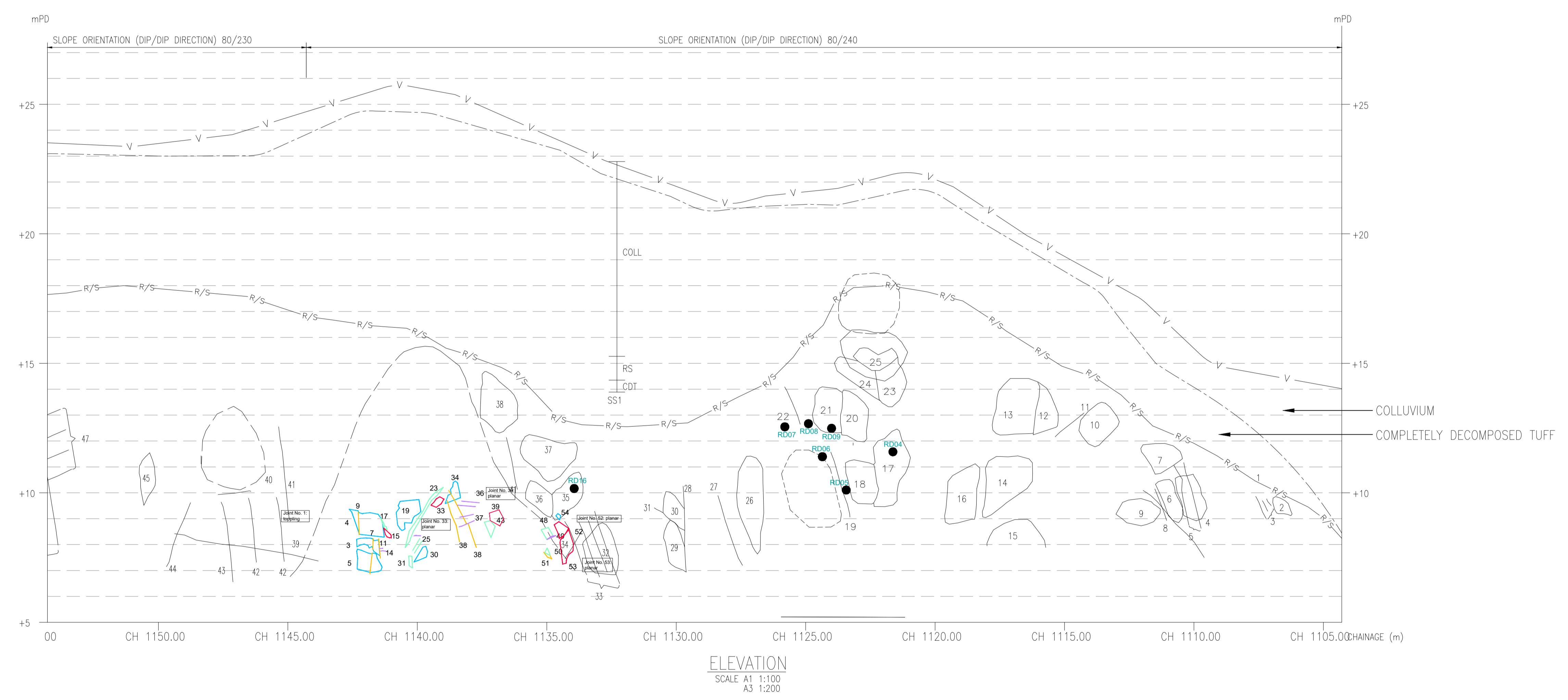
Drafted by	JL
Checked by	IY
Approved by	MP



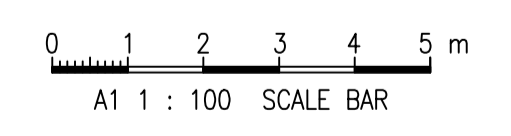
NOTE:  
1. ALL LEGEND AND NOTES REFER TO DRAWING NO. SK/190495B/C13/48-16004.


LEGEND:

- GEOLOGICAL PROFILE (ESTIMATED)
- v - BREAK SLOPE FACE (ESTIMATED)
- R/S - ROCK/SOIL INTERFACE (ESTIMATED)
- LANDSLIDE DEBRIS TO BE CLEARED AND FOLLOWING BY ROCK SLOPE MAPPING (INDICATIVE)
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SCALE A1 : 1:100  
A3 : 1:200



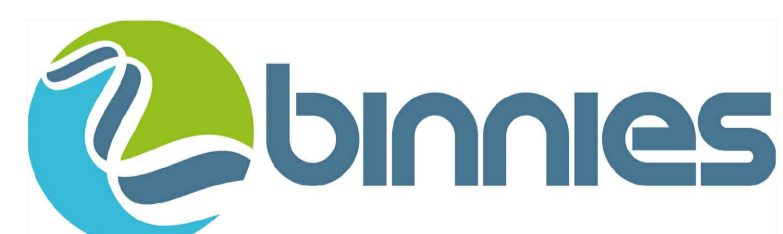
 <b>BINNIES HONG KONG LIMITED</b> <b>賓尼斯工程顧問有限公司</b>	CONTRACT NO. 13/WSD/17 DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Title:  ROCK SLOPE ELEVATION (CH1155 - CH1105)	Date: 23/09/2025	Drafted by JL
			Outgoing letter Ref. No.:	Checked by IY
			Reference Drawing: 190495/B/DD/00-20009	Approved by MP
			Sketch No.: SK/190495B/C13/48-16008	Rev.: K

# ROCK DOWEL SCHEDULE

NOTES:

- NOTES REFER TO DRAWING NO. SK/190495B/C13/48-16001 to 16002
- EXACT LOCATIONS, INCLINATIONS, ORIENTATIONS AND LENGTHS OF ROCK DOWELS SHALL BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.
- ROCK DOWEL SHALL BE WITH EMBEDMENT INTO STABLE ROCK AS DETERMINED ON SITE BY THE SUPERVISING OFFICER.

REFERENCE CHAINAGE	ROCK DOWEL NO.	REFERENCE DISCONTINUITY NO.	INCLINATION TO HORIZONTAL (DEG)	REINFORCEMENT SIZE	MIN. LENGTH (M)	MIN. EMBEDMENT INTO STABLE ROCK (M)	ACTUAL LENGTH (M)	REMARKS
	RD01	-	-	-	-	-	-	cancelled
	RD02	-	-	-	-	-	-	cancelled
	RD03	-	-	-	-	-	-	cancelled
1122	RD04	17	15	T32	3	1	3	
1123	RD05	18	15	T32	3	1	3	
1124	RD06	19	15	T32	3	1	3	
1126	RD07	22	30	T32	3	1	3	
1126	RD08	22	30	T32	3	1	3	
1126	RD09	22	30	T32	3	1	3	
	RD10	-	-	-	-	-	-	cancelled
	RD11	-	-	-	-	-	-	cancelled
	RD12	-	-	-	-	-	-	cancelled
	RD13	-	-	-	-	-	-	cancelled
	RD14	-	-	-	-	-	-	cancelled
	RD15	-	-	-	-	-	-	cancelled
1134	RD16	35	11	T32	3	1	3	
	RD17	-	-	-	-	-	-	cancelled
	RD18	-	-	-	-	-	-	cancelled
	RD19	-	-	-	-	-	-	cancelled
1164	RD20	60	25	T32	3	1	3	
1190	RD21	89	12°	T40	4	2	4	
1192	RD22	93	15°	T40	4	2	4	
1194	RD23	95	36°	T32	3	1	3	
1195	RD24	97	13°	T32	3	1	3	
1195	RD25	98	15°	T32	4	1	4	
1195	RD26	98	15°	T32	4	1	4	
	RD27	-	-	-	-	-	-	cancelled
1203	RD28	110	45°	T32	4	1	4	
1209	RD29	118	15°	T40	6	2	6	
1209	RD30	118	15°	T40	6	2	6	
1224	RD31	120	10°	T32	3	1	3	
	RD32	-	-	-	-	-	-	cancelled
1246	RD33	143	30	T40	7	2	7	
	RD34	-	-	-	-	-	-	cancelled
1246	RD35	143	30	T40	7	2	7	
	RD36	-	-	-	-	-	-	cancelled
	RD37	-	-	-	-	-	-	cancelled
1252	RD38	150	15	T32	4	1	4	
1261	RD39	158	35	T32	3	1	3	
1261	RD40	158	35	T32	3	1	3	
1261	RD41	158	35	T32	3	1	3	
1261	RD42	158	35	T32	3	1	3	
1261	RD43	158	35	T32	3	1	3	
1261	RD44	158	35	T32	3	1	3	
1261	RD45	158	35	T32	3	1	3	
1261	RD46	158	35	T32	3	1	3	
1261	RD47	158	35	T32	3	1	3	
1261	RD48	158	35	T32	3	1	3	
	RD49	-	-	-	-	-	-	cancelled
1287	RD50	175	46	T32	4	1	4	
1287	RD51	175	46	T32	4	1	4	
1287	RD52	175	46	T32	4	1	4	
1287	RD53	175	46	T32	4	1	4	
1287	RD54	175	46	T32	4	1	4	
1287	RD55	175	46	T32	4	1	4	



**BINNIES HONG KONG LIMITED**  
**賓尼斯工程顧問有限公司**

CONTRACT NO. 13/WSD/17  
 DESIGN, BUILD AND OPERATE  
 FIRST STAGE OF TSEUNG KWAN O  
 DESALINATION PLANT

Title:

ROCK DOWEL SCHEDULE

Date: 25/09/2025

Drafted by  
JL

Outgoing letter Ref. No.:

Checked by  
IY

Reference Drawing:  
190495/K/TEND/80/2011

Approved by  
MP

Sketch No.:  
SK/190495B/C13/48-16009

Rev.:  
I

I. GENERAL:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, STANDARD DRAWINGS, SKETCHES, SPECIFICATIONS AND INSTRUCTIONS ISSUED BY THE SUPERVISING OFFICER.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
- ALL LEVELS ARE IN METRES ABOVE P.D..
- THE EXACT BOUNDARY OF THE WORKS SITE AND THE WORKS AREA AND THE EXACT ALIGNMENT OF HOARDING AND SAFETY FENCE SHALL BE CONFIRMED BY THE SUPERVISING OFFICER ON SITE.
- LOCATION OF INGRESS/EGRESS POINT FOR ACCESS TO SITE SHALL BE AGREED BY THE SUPERVISING OFFICER ON SITE.
- THE NOTES ON THIS DRAWING ARE THE GENERAL REQUIREMENTS UNLESS OTHERWISE SPECIFIED OR INSTRUCTED BY THE SUPERVISING OFFICER.
- THE CONTRACTOR SHALL STRICTLY COMPLY WITH ENVIRONMENTAL PERMIT NO. EP-503/2015 AND AMENDED ENVIRONMENTAL PERMIT NO. EP-503/2015/A ALL CONDITIONS AND RESTRICTIONS IMPOSED BY COUNTRY AND MARINE PARKS AUTHORITY (CMPA), AGRICULTURE, FISHERIES AND CONSERVATION DEPARTMENT (AFCD) AND ENVIRONMENTAL PROTECTION DEPARTMENT (EPD) OR OTHER AUTHORITIES FOR WORKS.

II. UTILITIES:

- THE CONTRACTOR SHALL OBTAIN THE INFORMATION OF UTILITIES FROM UTILITY/SERVICE PROVIDERS. NEITHER THE EMPLOYER NOR HIS AGENTS OR REPRESENTATIVES ACCEPT ANY RESPONSIBILITY WHATSOEVER FOR THE ACCURACY OR SUFFICIENCY OF THE INFORMATION. THE CONTRACTOR SHALL MAKE SUCH INQUIRIES AND INVESTIGATIONS AS ARE REQUIRED FOR HIS OWN INFORMATION.
- PRIOR TO COMMENCEMENT OF THE WORKS, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATIONS OF THE EXISTING UTILITIES AFFECTING OR BEING AFFECTED BY THE WORKS USING INSPECTION PITS OR OTHER MEANS AS RECOMMENDED BY THE RELEVANT UTILITY/SERVICE PROVIDERS OR GOVERNMENT DEPARTMENTS.
- THE CONTRACTOR SHALL EXERCISE EXTREME CARE NOT TO DAMAGE ANY EXISTING UTILITIES OR SERVICES WITHIN OR IN THE VICINITY OF THE WORKS SITE AND WORKS AREA AND SHALL PROVIDE NECESSARY PROTECTION AND SUPPORT TO THE EXISTING UTILITIES OR SERVICES IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT UTILITY/SERVICE PROVIDERS OR GOVERNMENT DEPARTMENTS DURING THE EXECUTION OF THE WORKS. SHOULD ANY DAMAGE OCCUR TO THE UTILITIES/SERVICES DUE TO THE CONTRACTOR'S WORKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY INCURRED COST RESULTING FROM THE DAMAGE.

III. INSPECTION OF SLOPE SURFACE:

- EXISTING HARD SURFACING AND UNPLANNED VEGETATION ON THE SLOPE SHALL NOT BE REMOVED UNLESS AGREED OR DIRECTED BY THE SUPERVISING OFFICER.
- WHEN DIRECTED BY THE SUPERVISING OFFICER, REMOVAL OF EXISTING HARD SURFACING AND UNPLANNED VEGETATION IN THE SPECIFIED SLOPE AREAS SHALL BE CARRIED OUT FOR INSPECTION OF THE SLOPE BY THE SUPERVISING OFFICER PRIOR TO COMMENCEMENT OF ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS. AFTER INSPECTION, THE EXPOSED SLOPE SURFACE SHALL BE PROPERLY REINSTATED AS DIRECTED BY THE SUPERVISING OFFICER.
- SAFE ACCESS SHALL BE PROVIDED AND INSPECTION SCAFFOLDING WITH TOE BOARD SHALL BE ERECTED AS DIRECTED BY THE SUPERVISING OFFICER ON SITE FOR INSPECTION OF THE SPECIFIED SLOPE AREAS.
- THE CONTRACTOR SHALL ALLOW IN THE WORKS PROGRAMME SUFFICIENT TIME FOR THE REQUIRED INSPECTION OF THE SLOPE BY THE SUPERVISING OFFICER.

- THE CONTRACTOR SHALL CLEAR THE LANDSLIDE DEBRIS AND CARRY OUT ROCK SLOPE MAPPING FOR THE FOLLOWING ROCK SLOPES AS SHOWN IN DRAWING NO. SK/190495B/C13/48-16004 TO 16008 IN ACCORDANCE WITH CONTRACT SPECIFICATIONS.  
REFERENCE CHAINAGE 1355 to 1305  
REFERENCE CHAINAGE 1305 to 1255  
REFERENCE CHAINAGE 1255 to 1205  
REFERENCE CHAINAGE 1205 to 1155  
REFERENCE CHAINAGE 1155 to 1105
- ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS SHALL BE CARRIED OUT AT THE EXPOSED ROCK FACE AS DIRECTED BY THE SUPERVISING OFFICER.

IV. ROCK SLOPE IMPROVEMENT /STABILISATION WORKS:

- ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS INCLUDING SCALING OF ROCK BLOCKS, INSTALLATION OF ROCK DOWELS AND CONSTRUCTION OF BUTTRESS AND DENTITION AND WIRE MESH PROTECTION SHALL BE CARRIED OUT AS DIRECTED BY THE SUPERVISING OFFICER ON SITE AND IN ACCORDANCE WITH DRAWINGS.
- BEFORE CONSTRUCTION, THE POSITIONS OF ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS SHALL BE MARKED ON THE SLOPE SURFACE FOR THE SUPERVISING OFFICER'S VERIFICATION AND CONFIRMATION.
- EXTENTS OF ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS AS SHOWN IN DRAWING NO. SK/190495B/C13/48-16004 TO 16008 ARE INDICATIVE ONLY AND TO BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.
- DETAILS OF ROCK SLOPE IMPROVEMENT/STABILIZATION WORKS SHALL BE IN ACCORDANCE WITH DRAWING NO. SK/190495B/C13/48-16009 AND 16012

V. PROTECTION AND PRESERVATION OF EXISTING VEGETATION/LANDSCAPE WORKS:

- WHERE EXISTING SPRAYED CONCRETE IS TO BE REMOVED, CARE SHALL BE TAKEN NOT TO DISTURB TREE ROOTS IMMEDIATELY UNDERLYING THE SLOPE SURFACE.
- AS AGREED OR DIRECTED BY THE SUPERVISING OFFICER, ALIGNMENT OF HOARDING, FENCING, NEW CHANNELS AND MAINTENANCE STAIRWAY WALKWAY SHALL BE ADJUSTED ON SITE TO AVOID DAMAGE TO EXISTING TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE.
- ADEQUATE TEMPORARY WORKS AS ACCEPTED BY THE SUPERVISING OFFICER SHALL BE PROVIDED TO SUPPORT AND PROTECT TREE AND PLANT SPECIES OF CONSERVATION IMPORTANCE FROM DAMAGE IN ACCORDANCE WITH THE CONTRACT SPECIFICATION.
- THE CONTRACTOR SHALL CONFIRM THE LOCATIONS OF THE EXISTING TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE WITHIN THE WORKS SITE AND WORKS AREA. THE CONTRACTOR SHALL CHECK, RECORD AND TAKE PHOTOS OF THE CONDITION OF THE EXISTING TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE WITHIN THE WORKS SITE AND WORKS AREA AND LABEL THE TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE CLEARLY AND VISIBLY ON SITE. A REPORT OF THE CONDITIONS OF THE EXISTING TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE, INCLUDING COLOUR PHOTOS, PLAN OF LOCATIONS AND BRIEF DESCRIPTIONS OF ANY DEFECTS OR DAMAGE OF TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE OBSERVED, SHALL BE SUBMITTED TO THE SUPERVISING OFFICER FOR RECORD AT LEAST 2 WEEKS PRIOR TO COMMENCEMENT OF THE WORKS.
- THE EXTENT AND CONSTRUCTION METHODS OF THE PROPOSED WORKS WITHIN THE COUNTRY PARK AREA SHALL BE SUBJECT TO THE ACTUAL SITE CONDITIONS AND THE AGREEMENT OF AFCD. PRIOR WRITTEN CONSENT OF COUNTRY AND MARINE PARKS AUTHORITY (CMPA) SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF THE WORKS. THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED WORKS INCLUDING NOT BE LIMITED TO THE SCOPE OF THE WORKS, METHODOLOGY AND USE OF MATERIALS, WORKS SCHEDULE, POTENTIAL IMPACTS AND MITIGATION MEASURES TO COUNTRY PARKS FOR CMPA'S CONSIDERATION. THE CONTRACTOR SHALL DEPLOY HANDHELD MACHINERY AND MANUAL HANDLING INSIDE COUNTRY PARK AS FAR AS POSSIBLE.
- CONSTRUCTION METHOD SUBMITTED BY THE CONTRACTOR SHALL COMPLY WITH CONDITIONS OF THE ENVIRONMENTAL PERMIT NO. EP-503/2015 AND AMENDED ENVIRONMENTAL PERMIT NO. EP-503/2015/A.
- UNLESS OTHERWISE APPROVED BY THE SUPERVISING OFFICER, NO WORKS WITHIN THE COUNTRY PARK AREA SHALL BE CARRIED OUT.

VI. BOULDER REMOVAL/IN-SITU BREAK-OFF WORKS

- BEFORE THE WORKS, DETAILED METHOD STATEMENT OF BOULDER REMOVAL/IN-SITU BREAK-OFF WORKS (INCLUDING THE DETAILS OF TEMPORARY ACCESS TO THE SUBJECT BOULDERS AND PROTECTION/MITIGATION MEASURES TO THE PLANT SPECIES OF CONSERVATION IMPORTANCE AND EXISTING TREES) SHALL BE SUBMITTED TO THE SUPERVISING OFFICER, AFCD, CMPA AND RELEVANT PARTIES FOR ACCEPTANCE.
- THE TRANSECT OF THE TEMPORARY ACCESS SHALL BE DESIGNED TO AVOID AFFECTING THE RARE FLORA/PLANT SPECIES AND EXISTING TREES ON SITE.
- BOULDERS SHALL BE REMOVED OR IN-SITU BROKEN-OFF IN ACCORDANCE WITH DRAWING NO. SK/190495B/C13/48-16003
- THE WORKS TO BE CARRIED OUT FOR REMOVAL OF BOULDERS SHALL COMPRISE SPLITTING OF BOULDERS INTO PIECES, REMOVAL OF BOULDER PIECES OR DIRECT REMOVAL OF BOULDERS FROM THE SITE.
- THE WORKS TO BE CARRIED OUT FOR IN-SITU BREAKING-OFF OF BOULDERS SHALL COMPRISE THE BREAKING-OFF OF BOULDERS INTO PIECES WITH ALL DIMENSIONS LESS THAN 1 M AND TO BE DEPOSITED ON SITE IN STABLE CONDITIONS AS DETERMINED BY THE CONTRACTOR'S EXPERIENCED AND QUALIFIED GEOLOGIST OR GEOTECHNICAL ENGINEER. THE DETAILS AND LOCATIONS OF BROKEN-OFF BOULDER PIECES TO BE DEPOSITED ON SITE SHALL BE AGREED BY THE SUPERVISING OFFICER.

VII. MISCELLANEOUS:

- ANY SOFT SPOTS SHALL BE REMOVED AND ANY VOIDS SHALL BE BACKFILLED WITH SUITABLE MATERIALS AS DIRECTED BY THE SUPERVISING OFFICER.
- WHERE REQUIRED, THE CONTRACTOR SHALL SUBMIT THE DETAILS OF CONSTRUCTION METHOD, SEQUENCE AND THE PROPOSED PRECAUTIONARY MEASURES AGAINST DUST, SILTATION, NOISE NUISANCE, HEAVY RAINFALL, PEDESTRIAN DIVERSION AND TEMPORARY TRAFFIC MEASURES (TTM) PROPOSAL TO THE SUPERVISING OFFICER AND THE GOVERNMENT DEPARTMENTS CONCERNED FOR COMMENT PRIOR TO IMPLEMENTATION OF THE WORKS.
- THE CONTRACTOR SHALL SUBMIT DETAILED METHOD STATEMENTS FOR CARRYING OUT THE WORKS. NO WORKS SHALL BE COMMENCED PRIOR TO ACCEPTANCE OF THE METHOD STATEMENTS BY THE SUPERVISING OFFICER.
- WHERE REQUIRED, PROPOSAL OF SITE CLEARANCE PROCEDURES AND TEMPORARY SURFACE PROTECTION MEASURES SHALL BE SUBMITTED TO THE SUPERVISING OFFICER FOR APPROVAL PRIOR TO COMMENCEMENT OF THE WORKS.
- WHEN THE SLOPE WORKS IS COMPLETED, THE CONTRACTOR SHALL ERECT SLOPE REGISTRATION NUMBER PLATES/WALL REGISTRATION PLATES IN ACCORDANCE WITH CEDD DRAWING NO. C2505/1C, C2505/2C, AND WBTC NO. 10/2000.

VIII. PRECAUTIONARY MEASURES AGAINST HEAVY RAINFALL:

- AS FAR AS PRACTICABLE, THE WORKS INCLUDING MATERIALS FOR USE IN THE WORKS SHALL BE KEPT FREE OF WATER AND PROTECTED FROM DAMAGE DUE TO WATER. TEMPORARY DRAINAGE, PUMPING SYSTEMS OR OTHER EFFECTIVE MEASURES SHALL BE PROVIDED BY THE CONTRACTOR AND APPROVED BY THE SUPERVISING OFFICER. SILT AND DEBRIS SHALL BE INTERCEPTED WITH TRAPS BEFORE WATER IS DISCHARGED FROM THE SITE. THE DISCHARGE POINTS OF THE TEMPORARY DRAINAGE AND PUMPING SYSTEMS SHALL BE APPROVED BY THE SUPERVISING OFFICER.
- THE CONTRACTOR SHALL ADOPT A METHOD OF WORKING IN WHICH THE MINIMUM OF BARE SOIL IS EXPOSED AT ANY TIME.
- THE CONTRACTOR SHALL PROTECT THE TEMPORARY BARE SLOPE FROM HEAVY RAINFALL WITH IMPERMEABLE SHEETING WELL-SECURED AGAINST THE WIND AND, IF NECESSARY, PROVISION OF TEMPORARY DRAIN.

IX. FLEXIBLE BARRIER

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED DESIGN OF THE PROPOSED FLEXIBLE BARRIER. DIMENSIONS OF LENGTH, SEPARATION AND OVERLAP OF THE FLEXIBLE BARRIER SECTIONS SHALL BE MADE TO SUIT THE SITE CONDITIONS AND MANUFACTURER'S RECOMMENDATION.
- THE FLEXIBLE BARRIER SHALL BE A PROPRIETARY PRODUCT CAPABLE TO RETAIN THE LANDSLIDE DEBRIS AND BOULDERS, AND SUBJECT TO THE SUPERVISING OFFICER'S APPROVAL PRIOR TO THE COMMENCEMENT OF WORKS.
- THE SEQUENCE OF INSTALLATION AND THE CONNECTION DETAILS OF BARRIER COMPONENTS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND THE METHOD STATEMENT APPROVED BY THE SUPERVISING OFFICER.
- THE CONTRACTOR SHALL PROVIDE AND INSTALL THE FLEXIBLE BARRIER SYSTEMS AT LOCATIONS INDICATED ON THE DRAWING NO. SK/190495B/C13/48-16002. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL MARK THE ALIGNMENT OF THE BARRIERS AND THE POSITIONS OF THE STEEL POSTS AND THE ANCHORAGE POINTS FOR WIRE ROPES ON SITE FOR THE SUPERVISING OFFICER'S VERIFICATION, THE BARRIER LOCATION AND THE ANCHORAGE POINTS FOR WIRE ROPES SHALL NOT BE ADJUSTED WITHOUT THE SUPERVISING OFFICER'S APPROVAL.
- TESTS SHALL BE CARRIED OUT TO DEMONSTRATE COMPLIANCE OF THE MAIN COMPONENTS OF THE FLEXIBLE BARRIER SYSTEM WITH THE MATERIAL REQUIREMENT SPECIFIED:



**BINNIES HONG KONG LIMITED**  
**賓尼斯工程顧問有限公司**

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

NOTES ON  
GEOTECHNICAL WORKS  
SHEET 1 OF 2

Date: 2022-08-03

Outgoing letter Ref. No.: 190495/(13/WSD/17)/C10/100/L104038

Reference Drawing: 190495/K/TEND/80/0001

Sketch No.: SK/190495B/C13/48-16001

Rev.: 0

Drafted by DC

Checked by LL

Approved by RW

ELEMENTS	MANUFACTURER CERTIFICATE	TYPE OF TESTS <sup>(1)</sup>	RATE OF TESTS		NATIONAL/ INTERNATIONAL STANDARDS OR EQUIVALENT HONG KONG STANDARDS <sup>(2)</sup>
			SIZE OF BATCH	MINIMUM NO. OF TESTS	
(A) PRINCIPAL NETS	THE CERTIFICATE SHALL INCLUDE THE FOLLOWING:	TENSILE TEST (TO DETERMINE THE BREAK LOAD)	0-30 TONNES	3	BS 5896 :1980 OR BS 302 - 1:1987 OR BS EN 10002 - 1:2001 OR EQUIVALENT AS APPROPRIATE
(B) WIRE ROPES OR WIRE ROPE ANCHORS	(a) MANUFACTURER CERTIFICATE REFERENCE NO. (b) MANUFACTURER'S NAME AND ADDRESS (c) MANUFACTURER'S ISO 9001:2008 CERTIFICATION NO. AND THE APPROVAL REFERENCE NO. ISSUED BY THE CERTIFYING AUTHORITY	COATING THICKNESS	EACH ADDITIONAL 30 TONNES OR PART THEREOF	1	BS EN ISO 1461 :2009 OR BS EN 10244 - 2:2009
(C) SHACKLES, WIRE ROPE CLIPS (INCLUDING COMPONENTS OF THE ASSEMBLY E.G. MAIN BODY, PIN, U - BOLT AND FASTENER), BOLTS AND NUTS	(d) STEEL GRADE AND COMPLIANCE STANDARD IN MANUFACTURING (e) MANUFACTURER'S TEST RECORDS (GEOMETRICAL PROPERTIES, TENSILE STRENGTH, ELONGATION AT MAXIMUM LOAD, LOAD - EXTENSION DIAGRAM, WHERE APPLICABLE ETC.)		FOR EACH COMPONENT, ≤ 500 NOS. 501 -1200 NOS. 1201 - 3200 NOS.	6 10 16	
(D) STEEL POST AND GROUND PLATES	(f) CORROSION PROTECTION (E.G. COATING THICKNESS OF GALVANIZATION AND METHOD OF APPLICATION OF GALVANIZATION, AND COMPLIANCE STANDARD)	COATING THICKNESS	0-30 TONNES	3	BS EN ISO 1461 :2009
(E) BAR ANCHORS AND CONNECTORS	(g) CUSTOMER'S ORDER NO. OR OTHER REFERENCE BATCH NO. OR LOT NO. (h) PRODUCT DESCRIPTION AND QUANTITY SUPPLIED	STRENGTH TEST FOR STEEL BARS	CLAUSE 15.32 AND TABLE 15.2 OF GS: 2006		CS2:2012 - SECTION 5
(F) OTHER ABOVE - GROUND COMPONENTS IF APPLICABLE (E.G. SECONDARY MESH, RUNNING WHEELS, THIMBLES ETC.)	(i) DATE OF DISPATCH	TENSILE TEST FOR CONNECTORS	TABLE 1 OF BS EN ISO 1461 :2009		CLAUSE 15.35 OF GS:2006
		COATING THICKNESS	0-30 TONNES	3	BS EN ISO 1461 :2009
			EACH ADDITIONAL 30 TONNES OR PART THEREOF	1	

(1) THESE TESTS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT STANDARDS AND THE TEST RESULTS ISSUED ON HOKLAS ENDORSED TEST CERTIFICATES WHERE AVAILABLE.

(2) BS 302-1:1987 - STRANDED STEEL WIRE ROPES. PART 1: SPECIFICATION FOR GENERAL REQUIREMENTS  
BS 5896:1980 - SPECIFICATION FOR HIGH TENSILE STEEL WIRE AND STRAND FOR THE PRESTRESSING OF CONCRETE  
BS EN 10002-1:2001 - METALLIC MATERIALS - TENSILE TESTING. PART 1: METHOD OF TEST AT AMBIENT TEMPERATURE  
BS EN 10244-2:2009 - STEEL WIRE AND WIRE PRODUCTS - NON-FERROUS METALLIC COATINGS ON STEEL WIRE (PART 1 & 2)  
BS EN ISO 1461:2009 - HOT DIP GALVANIZED COATINGS ON FABRICATED IRON AND STEEL ARTICLES  
CS2:2012 - CONSTRUCTION STANDARD 2 - STEEL REINFORCING BARS FOR THE REINFORCEMENT OF CONCRETE  
ETAG 27 - GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL OF FALLING ROCK PROTECTION KITS  
GS:2006 - GENERAL SPECIFICATION FOR CIVIL ENGINEERING WORKS (2006 EDITION)  
TESTS ON OTHER ELEMENTS TO BE SPECIFIED BY THE DESIGNER AND AGREED BY THE SUPERVISING OFFICER AS NECESSARY.

6. TESTS FOR TENSION ANCHORS SHALL BE CARRIED OUT:

- A) PULL-OUT TESTS USING THE SAME SET-UP AND LOADING APPARATUS AS FOR SOIL NAILS (CLAUSE 7.138 OF THE GENERAL SPECIFICATION FOR CIVIL ENGINEERING WORKS (2006 EDITION)) SHALL BE PERFORMED TO VALIDATE THE BOND STRENGTH OF THE TENSION ANCHORS. THE TESTING PROCEDURES SHALL FOLLOW THE DETAILS GIVEN IN FIGURE 6.3 OF GEOGUIDE 7 WITH THE MAXIMUM TEST LOAD APPLIED TO BE TD2 (I.E. THE ALLOWABLE PULL-OUT RESISTANCE TIMES THE FACTOR OF SAFETY AGAINST PULLOUT FAILURE AT SOIL-GROUT INTERFACE). THE OBJECTIVE OF THE PULL-OUT TESTS IS TO VALIDATE THE DESIGN ASSUMPTION (E.G. THERE IS A MINIMUM FACTOR OF SAFETY OF 1.5 OR 2 FOR THE BOND STRENGTH AT SOIL-GROUT INTERFACE), AND HENCE TESTING THE ANCHOR TO TD2 IS REQUIRED. THE ANCHORS TESTED SHALL NOT BE USED AS WORKING ANCHORS.
- B) THE GROUTED SECTION OF A TENSION ANCHOR PREPARED FOR THE PULL-OUT TEST SHALL BE AT LEAST 2M. THE MATERIAL AND SIZE OF REINFORCEMENT, HOLE DIAMETER AND INCLINATION, AND THE TYPE OF GROUT OF THE TEST ANCHOR SHALL BE THE SAME AS THAT OF THE WORKING ANCHOR. THE TOP OF THE GROUTED SECTION SHALL BE AT LEAST 5M INTO THE GROUND ALONG THE DIRECTION OF THE DRILLED HOLE. THIS AVOIDS TESTING THE TOP FEW METRES OF A GROUTED ANCHOR SECTION WHICH WILL BE SUBJECT TO THE INFLUENCE OF THE COMPRESSIVE STRESSES FROM THE PULL-OUT TEST SET-UP ON THE GROUND. THE TEST SECTION CHOSEN SHALL BE REPRESENTATIVE OF THE AVERAGE GROUND CONDITIONS.
- C) THE NUMBER OF PULL-OUT TESTS TO BE CARRIED OUT SHOULD BE 5% OF THE NUMBER OF WORKING TENSION ANCHORS BUT NOT LESS THAN 2 FOR EACH ENTIRE CONTINUOUS STRETCH OF BARRIER. THE TESTS SHALL BE CARRIED OUT AT LOCATIONS REPRESENTATIVE OF THE GROUND CONDITIONS OF THE STRETCH OF BARRIER.

7. TESTS FOR POST ANCHORS TAKING COMPRESSIVE LOAD SHALL BE CARRIED OUT:

- A) PULL-OUT TESTS SHALL BE DONE AT REPRESENTATIVE LOCATIONS FOLLOWING THE SAME REQUIREMENTS FOR TENSION ANCHORS.
8. ZINC-RICH PRIMING PAINT SHALL BE APPLIED TO ALL PARTS OF SHACKLES, WIRE ROPE CLIPS, BOLTS AND NUTS AFTER THEIR ASSEMBLY, AS WELL AS TO ANY REPAIRS TO GALVANIZATION COATING FOR OTHER PARTS OF THE FLEXIBLE BARRIERS. THE ZINC-RICH PRIMING PAINT SHALL COMPLY WITH BS 4652:1995 AS APPROVED BY THE SUPERVISING OFFICER. DETAILS OF PAINT APPLICATION METHODS SHALL BE SUBMITTED TO THE SUPERVISING OFFICER FOR APPROVAL.
9. NON-DESTRUCTIVE TESTS IN THE FORM OF TIME DOMAIN REFLECTOMETRY (TDR) TESTS SHALL BE CARRIED OUT ON ALL WORKING ANCHORS, INCLUDING ANCHORS TAKING COMPRESSIVE LOAD, FOR CHECKING THE INTEGRITY OF THE ANCHORS AND CONSTRUCTION QUALITY CONTROL.

#### X. GOOD SITE PRACTICES/MITIGATION MEASURES INSIDE COUNTRY PARK

- THE CONTRACTOR SHALL SET OUT FLEXIBLE BARRIER, ROCK SLOPE IMPROVEMENT/STABILISATION WORKS AND OTHER WORKS TO AVOID EXISTING TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE. THE CONTRACTOR SHALL MARK THE SETTING-OUT POINTS ON SITE FOR THE SUPERVISING OFFICER'S CONFIRMATION.
- THE CONTRACTOR SHALL DEPLOY HANDHELD MACHINERY AND MANUAL HANDLING INSIDE COUNTRY PARK AS FAR AS POSSIBLE.
- THE ANCHORAGES FOR THE TEMPORARY WORKING PLATFORM AND TEMPORARY ELEVATED ACCESS FOR CONSTRUCTION OF ROCK SLOPE IMPROVEMENT/STABILISATION WORKS AND BOULDER REMOVAL/IN-SITU BREAKING-OFF WORKS SHALL BE ERECTED TO AVOID TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE. DETAILS SHALL BE SUBMITTED TO CMPA FOR CONSIDERATION.
- THE CONTRACTOR SHALL APPOINT A QUALIFIED PLANT ECOLOGIST TO SET OUT THE LOCATIONS OF PLANT SPECIES OF CONSERVATION IMPORTANCE ALONG THE DIRECT FOOTPRINT OF THE SLOPE MITIGATION WORKS ON SITE AND TO RECORD THEIR CURRENT CONDITIONS BEFORE COMMENCING SITE CLEARANCE AND ANY WORKS INSIDE CLEARWATER BAY COUNTRY PARK. THE CONTRACTOR SHALL RECORD THE EXTENTS AND CONDITIONS OF THE PLANT SPECIES OF CONSERVATION IMPORTANCE ON DRAWINGS PROVEN BY RECORD PHOTOGRAPHS FOR SUBMISSION TO THE SUPERVISING OFFICER FOR AGREEMENT.
- TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE SHALL BE CLEARLY AND VISIBLY LABELLED ON SITE.
- THE CONTRACTOR SHALL ESTABLISH THE PROTECTION ZONES AT LEAST 1M RADIUS FROM THE IDENTIFIED PLANT SPECIES OF CONSERVATION IMPORTANCE TO SEPARATE THEM FROM THE WORKS PRIOR TO SITE CLEARANCE AND THROUGHOUT THE CONSTRUCTION. THE CONTRACTOR SHALL ESTABLISH THE PROTECTION FENCES OF AT LEAST 1M HEIGHT TO SURROUND THE PROTECTION ZONES AND LABEL THE FENCES FOR CLEAR IDENTIFICATION OF THE PROTECTION ZONES.

- THE CONTRACTOR SHALL PROVIDE INDUCTION TRAINING TO ALL SITE STAFF ON THE PROTECTION AND MITIGATION MEASURES FOR TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE AND THE LOCATIONS OF TREES TO BE RETAINED AND THE PLANT SPECIES OF CONSERVATION IMPORTANCE.
- WHERE VEGETATION CLEARANCE AND/OR TRIMMING IS REQUIRED, THE CONTRACTOR SHALL APPOINT A QUALIFIED ECOLOGIST/ARBORIST TO PROVIDE ON-SITE SUPERVISION AND MONITORING TO ENSURE NO TREE CANOPY OR TREE ROOTS TO BE ADVERSELY IMPACTED.
- THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING STANDARD GOOD SITE PRACTICES INSIDE COUNTRY PARK AS FAR AS POSSIBLE TO MINIMISE THE POTENTIAL DISTURBANCE TO THE COUNTRY PARK :  
(A) ALL CONSTRUCTION MATERIALS SHALL BE STOCKPILED OFFSITE;  
(B) CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE CLEARLY DEMARCATED WORKS AREAS;  
(C) BOULDERS REMOVAL/IN-SITU BREAKING-OFF WORKS SHALL BE CARRIED OUT BY HANDHELD TOOL TO MINIMISE THE WORKS AREA. NO EXCAVATION WORKS, TREE FELLING AND REMOVAL OF VEGETATION SHALL BE ALLOWED DURING THE BOULDER REMOVAL/IN-SITU BREAK-OFF WORKS;  
(D) TREE PRESERVATION AND PROTECTION MEASURES SHALL BE IMPLEMENTED AS SPECIFIED IN G.S. SECTION 26 AND THE SPECIFICATION SUCH AS PROVISION OF TEMPORARY PROTECTIVE FENCING AND ARMOURING AND MULCHING TO PRESERVED TREES.
- ENVIRONMENTAL TEAM SHALL MONITOR THE CONDITION OF TREES AND PLANT SPECIES OF CONSERVATION IMPORTANCE WITHIN THE PROTECTION ZONES DURING THE CONSTRUCTION PERIOD ON A WEEKLY BASIS AND PRESENT THE REPRESENTATIVE PHOTOGRAPHIC RECORDS IN THE MONTHLY MONITORING REPORT OF ENVIRONMENTAL MONITORING & AUDIT (EM&A).
- THE CONTRACTOR SHALL BE RESPONSIBLE TO REINSTATE THE VEGETATION IN ALL TEMPORARILY DISTURBED AREAS DUE TO CONSTRUCTION WORKS TO ITS ORIGINAL CONDITION. WHERE NECESSARY, HYDROSEEDING SHALL BE APPLIED WITH REGULAR MONITORING AND APPROPRIATE MAINTENANCE WORKS FOR A 12-MONTH ESTABLISHMENT PERIOD TO RESTORE THE GREEN APPEARANCE OF THE SITE.

#### XI SITE SAFETY MEASURES

- THE CONTRACTOR SHALL SUBMIT THE JOB METHOD STATEMENT, SAFETY RISK ASSESSMENT, JOB HAZARDS ASSESSMENT FOR THE CONSTRUCTION OF SLOPE MITIGATION WORKS TO THE SUPERVISING OFFICE FOR APPROVAL BEFORE COMMENCEMENT OF THE WORKS.
- THE CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION MEASURES, SUCH AS SAFE AND RIGID WORKING SHELTER OR BARRIER, TO SAFEGUARD AND SHIELD THE PERSONNEL WORKING INSIDE THE SLOPE MITIGATION WORKS ZONE FROM THE POSSIBLE LANDSLIDE HAZARDS. THE TEMPORARY WORKS SHALL BE CERTIFIED BY AN INDEPENDENT CHECKING ENGINEER WHO SHALL BE A CORPORATE MEMBER OF THE HKIE IN THE GEOTECHNICAL OR CIVIL DISCIPLINE, OR EQUIVALENT, AS APPROVED BY THE SUPERVISING OFFICER.
- THE CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION MEASURES, SUCH AS TEMPORARY SAFETY BARRIER AND SETBACK ZONE SEPARATING THE SLOPE MITIGATION WORKS ZONE AND THE MAIN SITE OF DESALINATION PLANT, TO SAFEGUARD AND SHIELD THE PERSONNEL WORKING OUTSIDE THE SLOPE MITIGATION WORKS ZONE FROM THE POSSIBLE LANDSLIDE HAZARDS. THE TEMPORARY WORKS SHALL BE CERTIFIED BY AN INDEPENDENT CHECKING ENGINEER WHO SHALL BE A CORPORATE MEMBER OF THE HKIE IN THE GEOTECHNICAL OR CIVIL DISCIPLINE, OR EQUIVALENT, AS APPROVED BY THE SUPERVISING OFFICER.



CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title:

NOTES ON  
GEOTECHNICAL WORKS  
SHEET 2 OF 2

Date: 2022-08-03

Drafted by  
DC

Outgoing letter Ref. No.:  
190495/(13/WSD/17)/C10/100/L104038

Checked by  
LL

Reference Drawing:  
190495/K/TEND/80/0001

Approved by  
RW

Sketch No.:  
SK/190495B/C13/48-16002

Rev.:  
0

**NOTES ON ROCK SLOPE IMPROVEMENT /STABILISATION WORKS**

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. CEMENT GROUT SHALL HAVE 28 DAYS STRENGTH OF 30MPa UNLESS OTHERWISE STATED. WATER CEMENT RATIO SHALL NOT EXCEED 0.45.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. 190495/B/DD/00-10001, 20001 TO 20011 AND 30001 AND 30003.

**NOTES FOR DENTITION:**

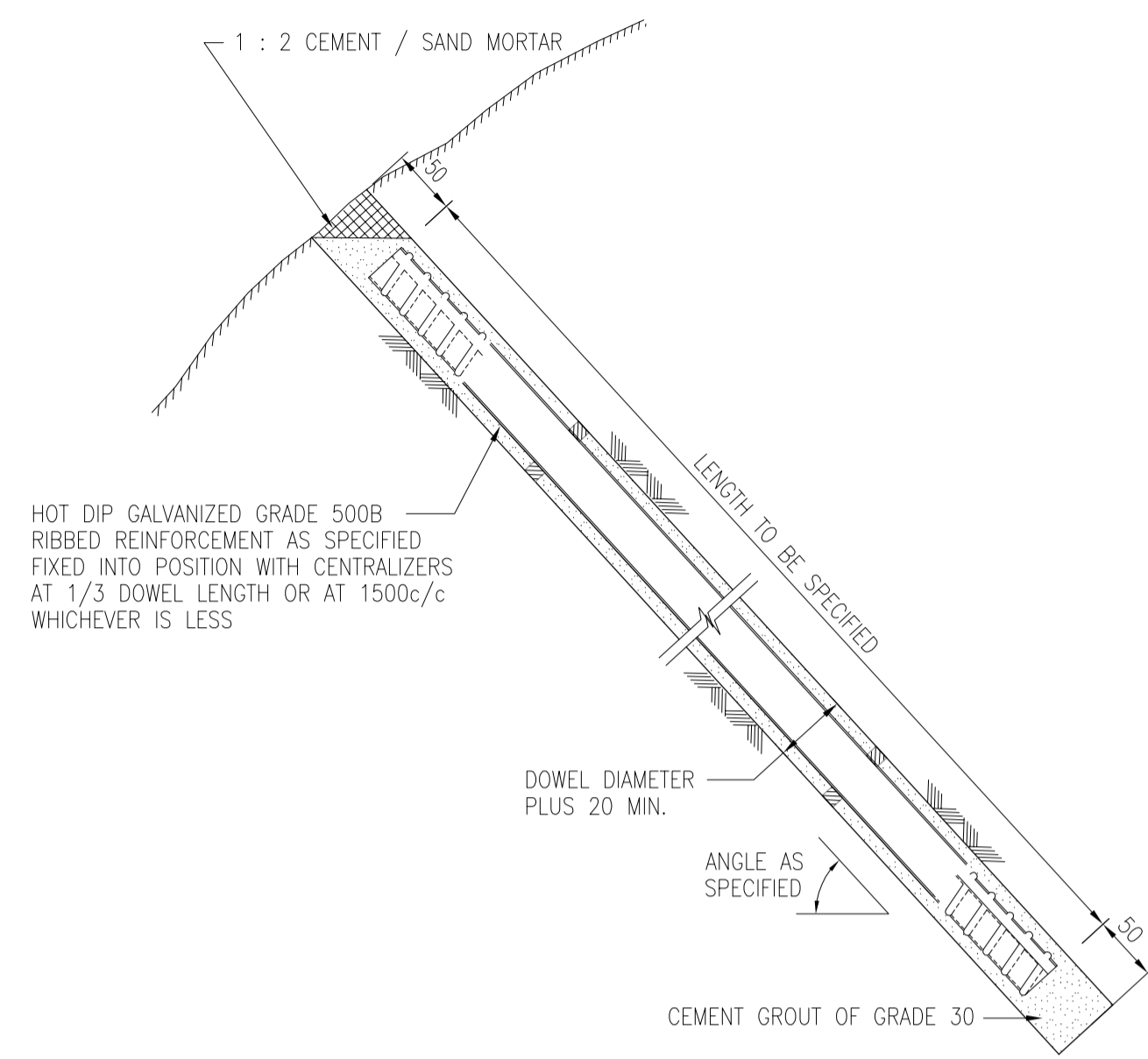
1. EXACT LOCATION, DIMENSIONS, DEPTH AND EXTENT OF DENTITION, DOWEL REQUIREMENT, RELIEF DRAIN REQUIREMENT AND REINFORCEMENT REQUIREMENT SHALL BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.
2. MINIMISE PROTRUDING SURFACES, SO THAT CONCRETE SURFACE OF DENTITION IS AS FLUSH WITH SURROUNDING ROCK FACES AS POSSIBLE.
3. FOR SPECIFICATION OF FITTER FABRIC, SEE G.S. CLAUSE 7.198(7).

**NOTES FOR WIRE MESH:**

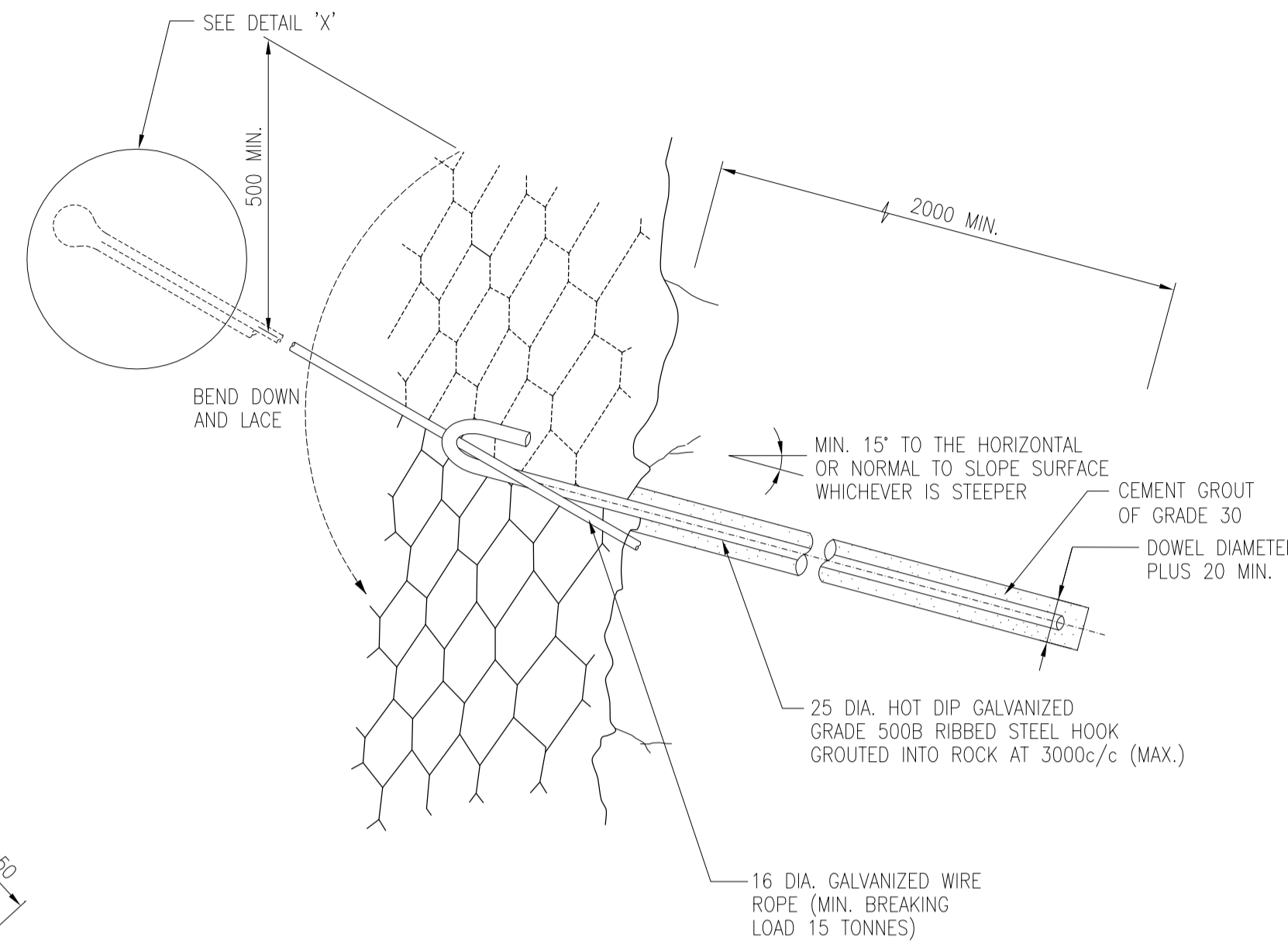
1. PVC THICKNESS OF WIRE MESH SHALL BE 0.4MM MINIMUM.
2. COLOUR OF PVC COATING OF WIRE MESH SHALL BE SPECIFIED BY THE SUPERVISING OFFICER TO MATCH WITH COLOUR OF ROCK FACE WHERE POSSIBLE.
3. SPACING OF THE STEEL HOOKS OR EQUIVALENT ANCHOR BOLTS FOR WIRE MESH SHALL BE REDUCED WHERE APPROPRIATE TO ENSURE THAT THE WIRE MESH CLOSELY FOLLOWS THE ROCK SLOPE PROFILE PARTICULARLY ON RUGGED ROCK SURFACE.
4. STEEL WIRE TENSILE STRENGTH OF THE MESH SHALL BE AT LEAST 1770 N/mm<sup>2</sup> AND THE MESH SHALL HAVE PUNCTURING RESISTANCE NOT LESS THAN 10 KN IN ACCORDANCE WITH ASTM A975 SECTION 13.1.4 OR SIMILAR APPROVED TEST.

**NOTES FOR ROCK DOWEL:**

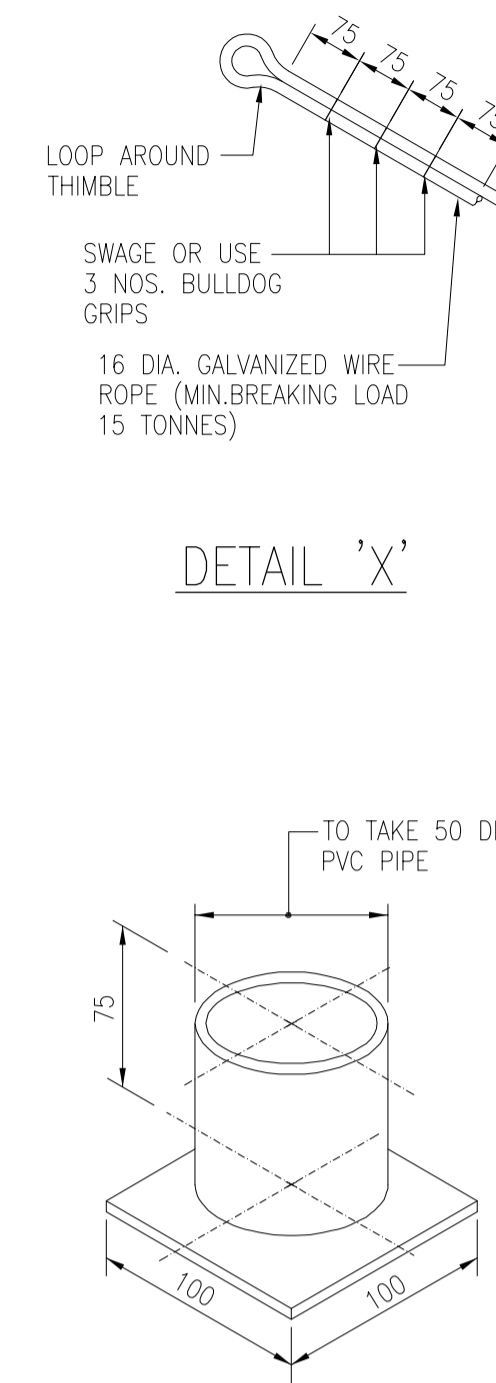
1. EXACT LOCATIONS, ANGLES AND LENGTHS OF ROCK DOWELS SHALL BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.



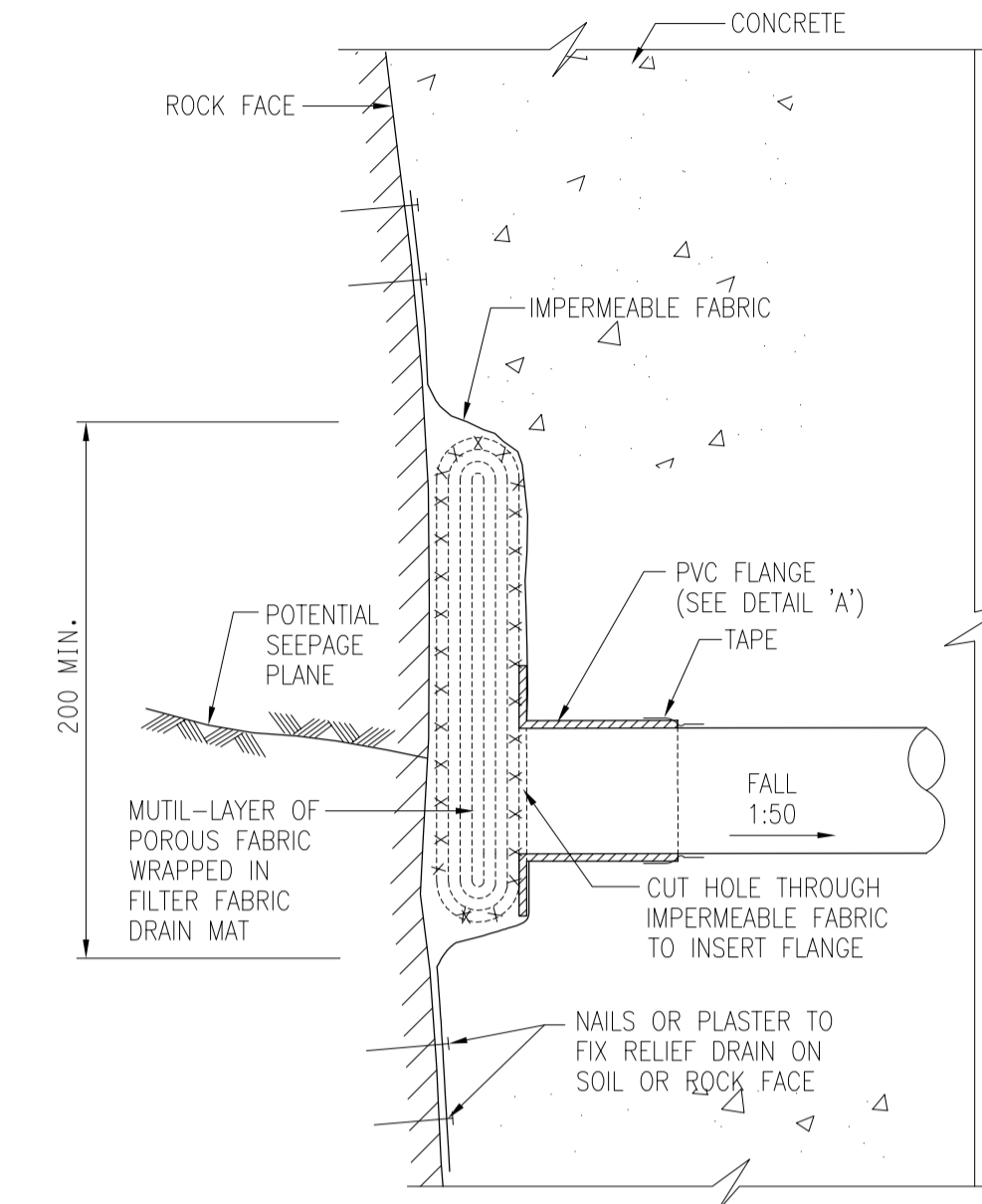
TYPICAL ARRANGEMENT OF ROCK DOWEL



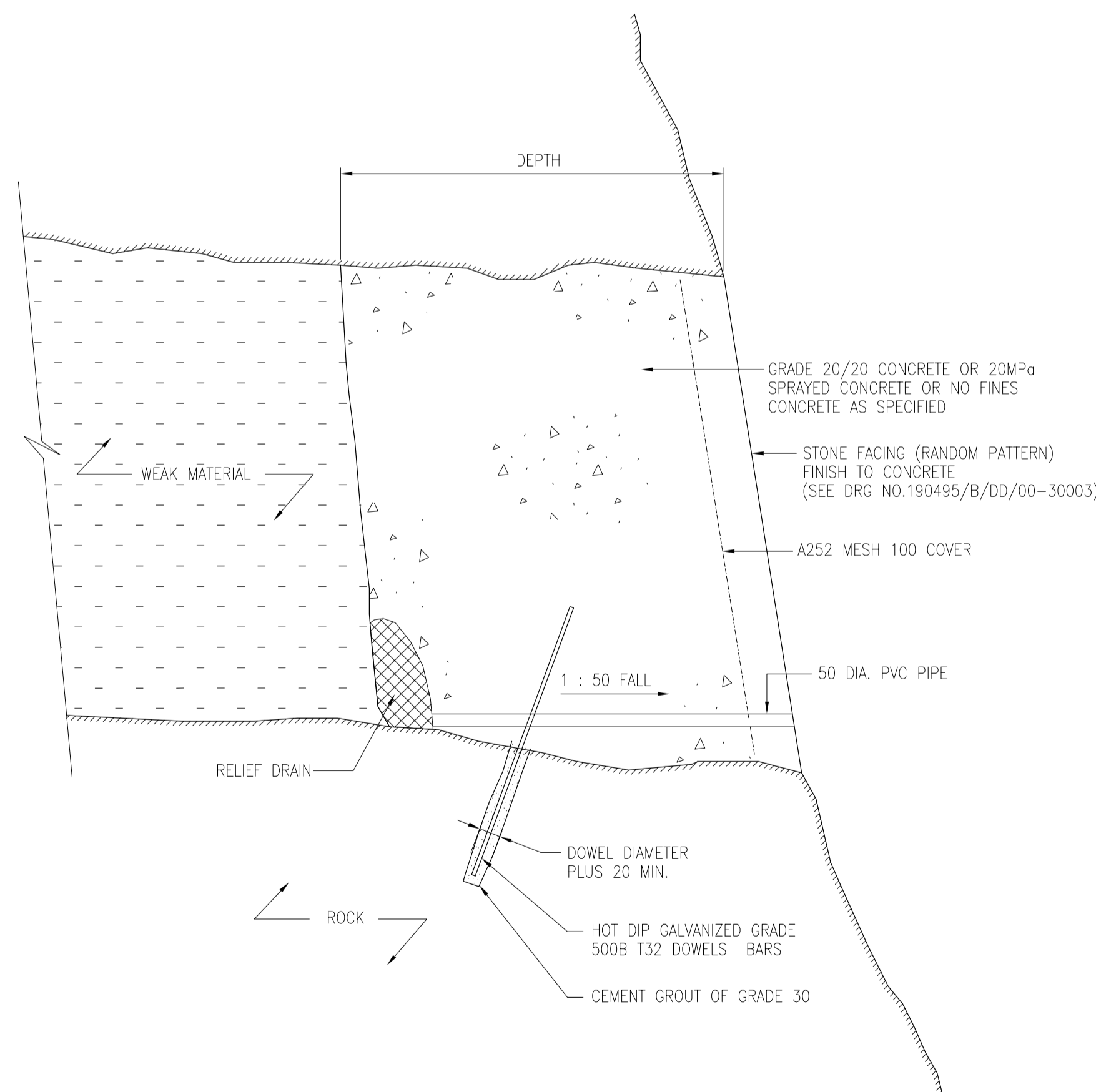
FIXING WIRE MESH AT TOP OF ROCK FACE



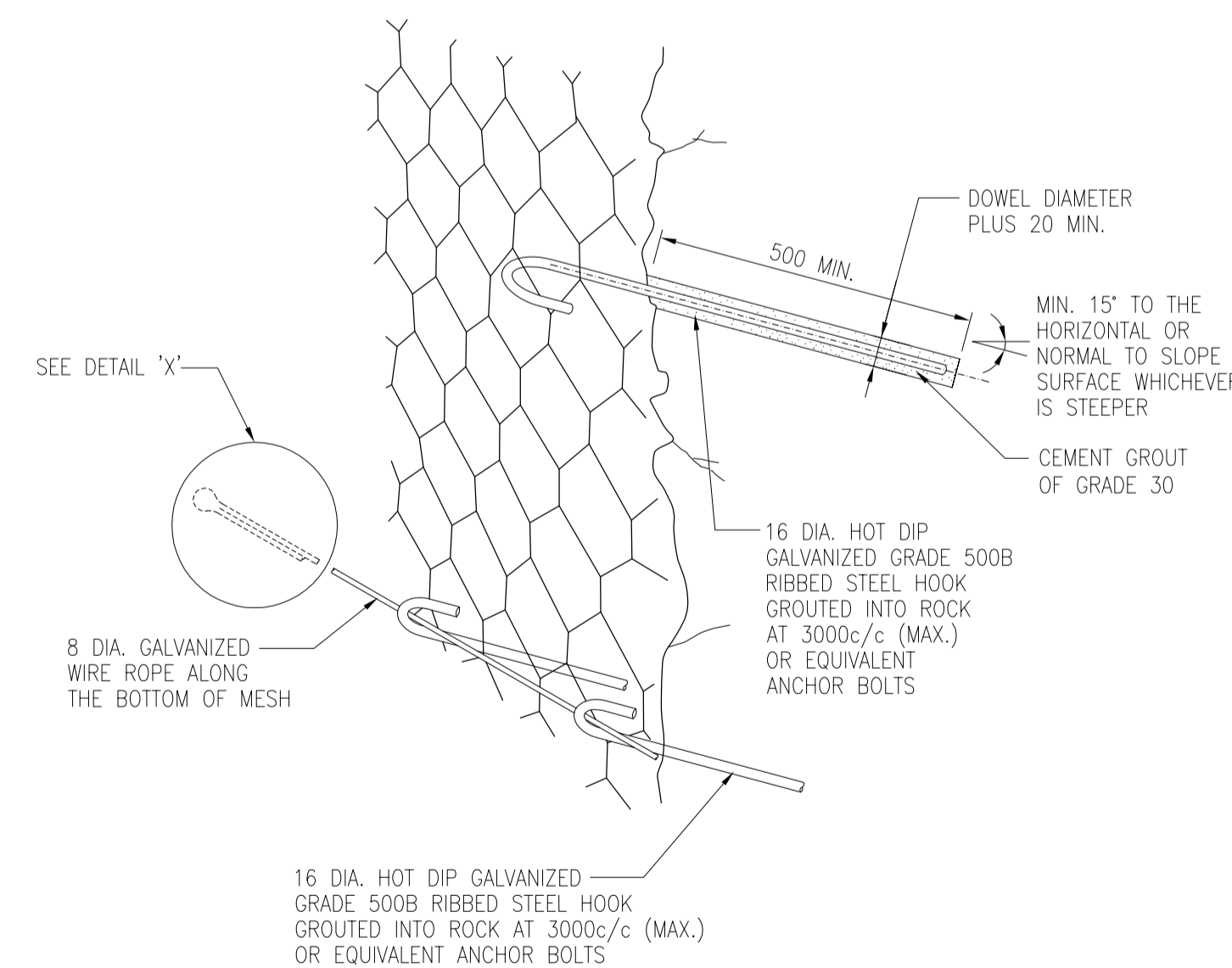
DETAIL 'A'



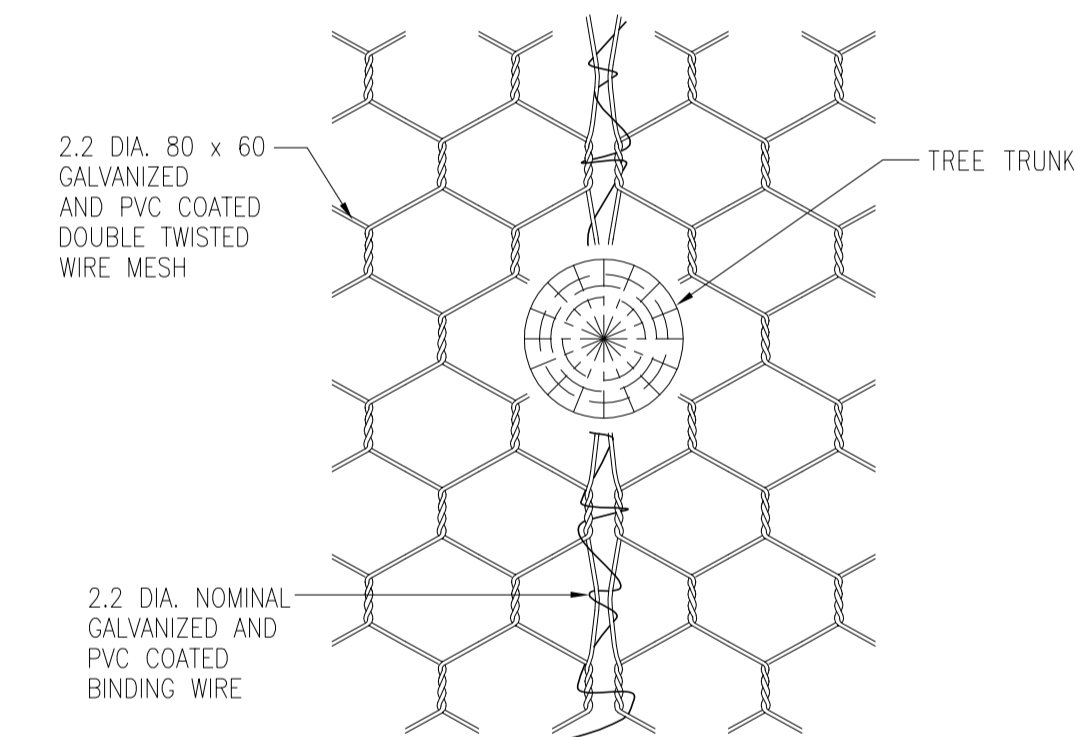
RELIEF DRAIN DETAIL



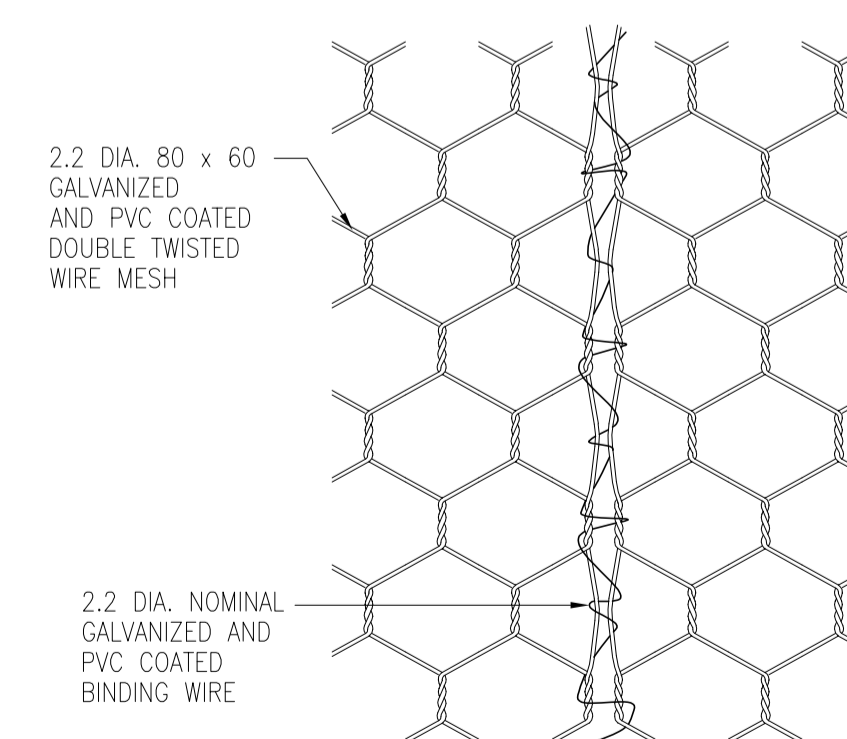
TYPICAL ROCK FACE DENTITION



FIXING WIRE MESH TO ROCK FACE AND AT BOTTOM OF ROCK FACE



LACING OF ADJACENT WIRE MESH SHEETS (WITH OPENING TO TREE)



LACING OF ADJACENT WIRE MESH SHEETS

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
		KK	CKH	SZ	WLS
Date	04/17	04/17	04/17	04/17	04/17

Approved				
Agreement No. CE 8/2015 (WS)				

Contract Title				
FIRST STAGE OF DESALINATION PLANT AT TSEUNG KWAN O - INVESTIGATION, DESIGN AND CONSTRUCTION				

Drawing Title				
DETAILS OF GEOTECHNICAL WORKS (ROCK SLOPE IMPROVEMENT/STABILISATION WORKS)				
Drawing No. 190495/B/DD/00/30002				Revision
				-

Scale	N.T.S.
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**NOTES:**

1. THIS DRAWING SHOULD READ IN CONJUNCTION WITH DRAWING NOS 190495/B/DD/00-10001 20001 TO 20011 AND 30001 AND 30002.
2. ALL DIMENSIONS ARE IN MILLIMETRES.

**NOTES FOR BUTTRESS:**

1. BUTTRESS TO SUPPORT ROCK OR ROCK FACE SHALL BE CONSTRUCTED AT THE LOCATIONS AND TO THE DIMENSIONS DIRECTED BY THE SUPERVISING OFFICER ON SITE.
2. DIMENSIONS, SURFACE INCLINATION OR OUTLINE OF BUTTRESS ON ROCK FACE SHALL BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.
3. CEMENT GROUT SHALL HAVE 28 DAYS STRENGTH OF 30MPa UNLESS OTHERWISE STATED. WATER CEMENT RATIO SHALL NOT EXCEED 0.45.
4. AT EACH BUTTRESS LOCATIONS, THE CONTRACTOR SHALL SCALE OFF LOOSE BLOCKS AND TRIM THE SLOPE TO LINES AND LEVELS DIRECTED BY THE SUPERVISING OFFICER ON SITE.
5. FOUNDATION OF THE BUTTRESS SHALL BE CLEARED OF LOOSE SOIL AND ROCK AND SHALL BE COMPACTED BEFORE CAST OF CONCRETE.
6. EXTENT OF RELIEF DRAINS AND WEEPHOLES SHALL BE DETERMINED ON SITE BY THE SUPERVISING OFFICER.
7. FOR SMOOTH SURFACE FINISH, A GROOVE SHALL BE FORMED FROM THE RELIEF DRAIN PIPE TO LEAD THE WATER DOWN TO THE BOTTOM OF THE BUTTRESS. GROOVE TO BE CO-ORDINATED WITH ANY SURFACE PATTERN.
8. MINIMISE PROTRUDING SURFACES, SO THAT SURFACE OF BUTTRESS IS AS FLUSH WITH SURROUNDING ROCK FACES AS POSSIBLE.
9. BUTTRESS SHALL BE FOUNDED ON GRADE III OR BETTER ROCK, OTHERWISE SUPERVISING OFFICER SHALL MAKE ANY NECESSARY CHANGES TO SUIT SITE CONDITIONS.
10. GENERAL DETAILS OF DOWEL ARE SHOWN ON THIS DRAWING. SUPERVISING OFFICER SHALL MAKE ANY NECESSARY CHANGES TO SUIT SITE CONDITIONS.

**NOTES FOR STONE FACING:**

1. A TRIAL PANEL OF SIZE 1m X 1m SHALL BE PREPARED FOR THE SUPERVISING OFFICER'S APPROVAL.
2. WEEPHOLES SHALL BE PROVIDED AS APPROPRIATE.

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		KK	CKH	SZ	WLS
Date	04/17	04/17	04/17	04/17	04/17

Approved

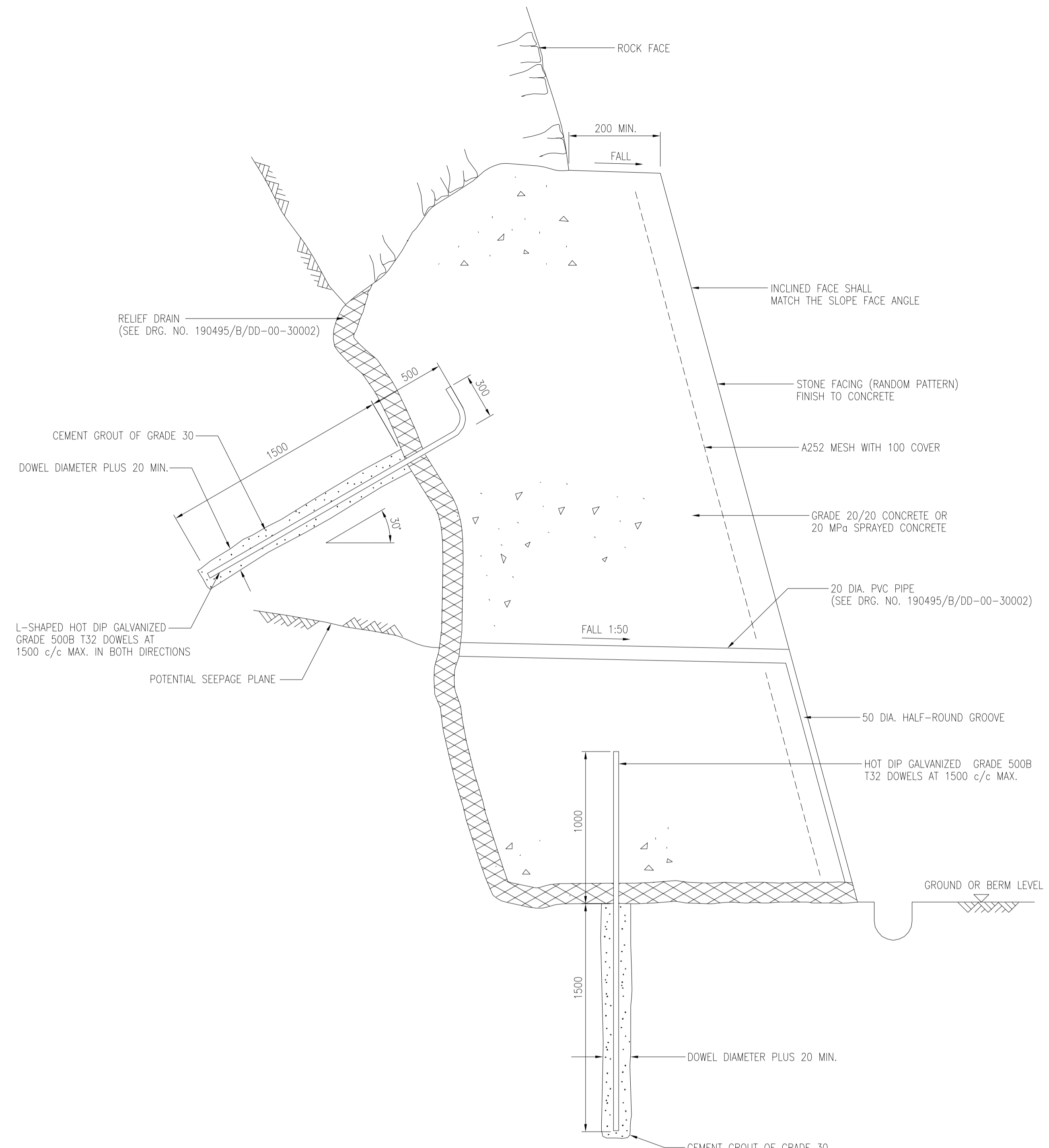
Agreement No. CE 8/2015 (WS)

Contract Title  
FIRST STAGE OF DESALINATION PLANT AT TSEUNG KWAN O - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
DETAILS OF GEOTECHNICAL WORKS (ROCK SLOPE IMPROVEMENT/STABILISATION WORKS)

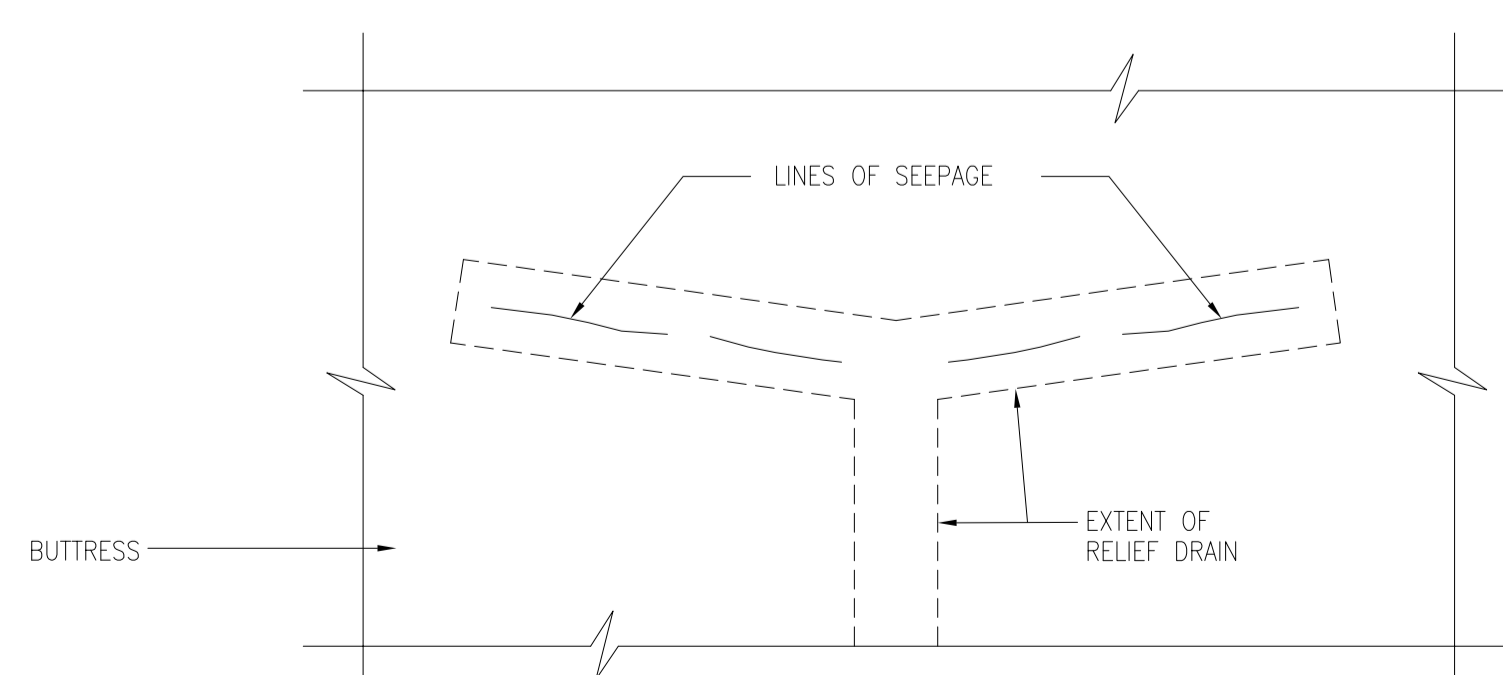
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Scale AS SHOWN



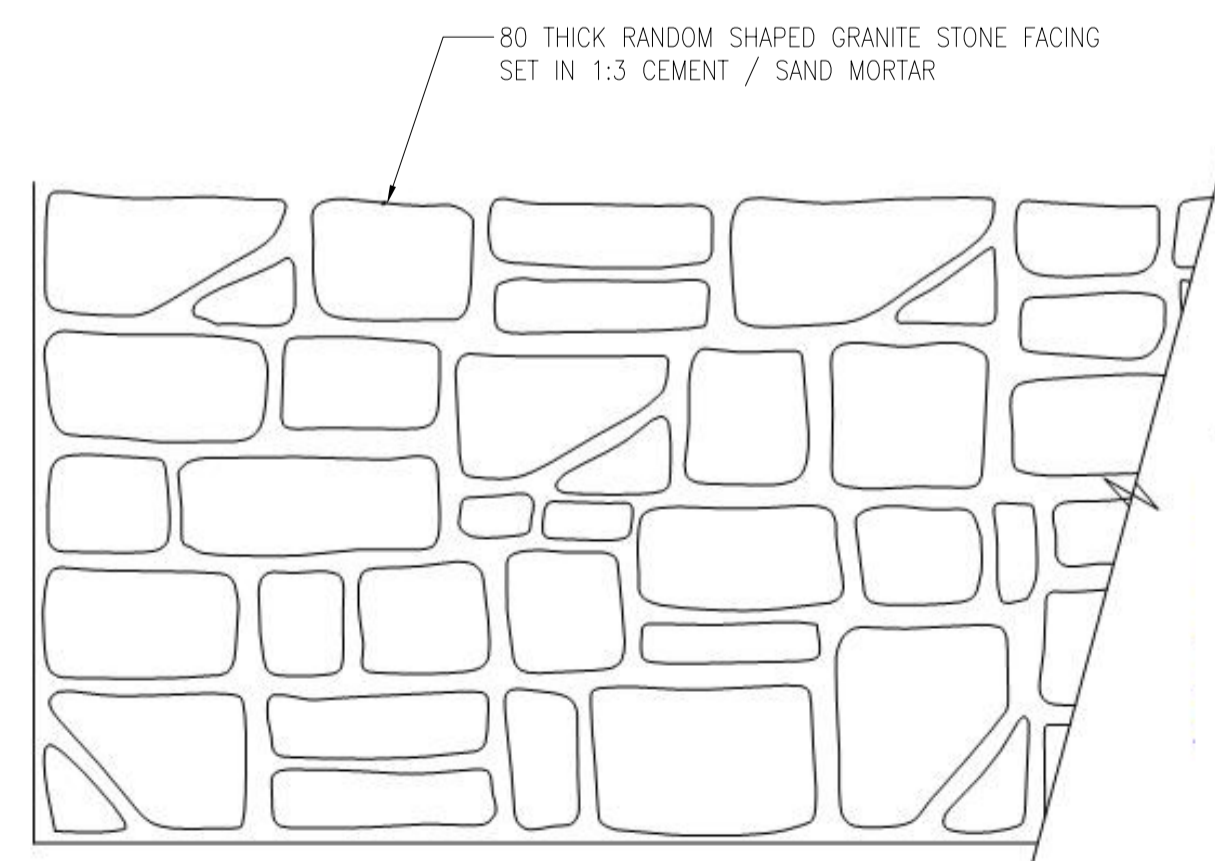
TYPICAL DETAILS OF CONCRETE BUTTRESS

SCALE A1 1 : 20  
A3 1 : 40



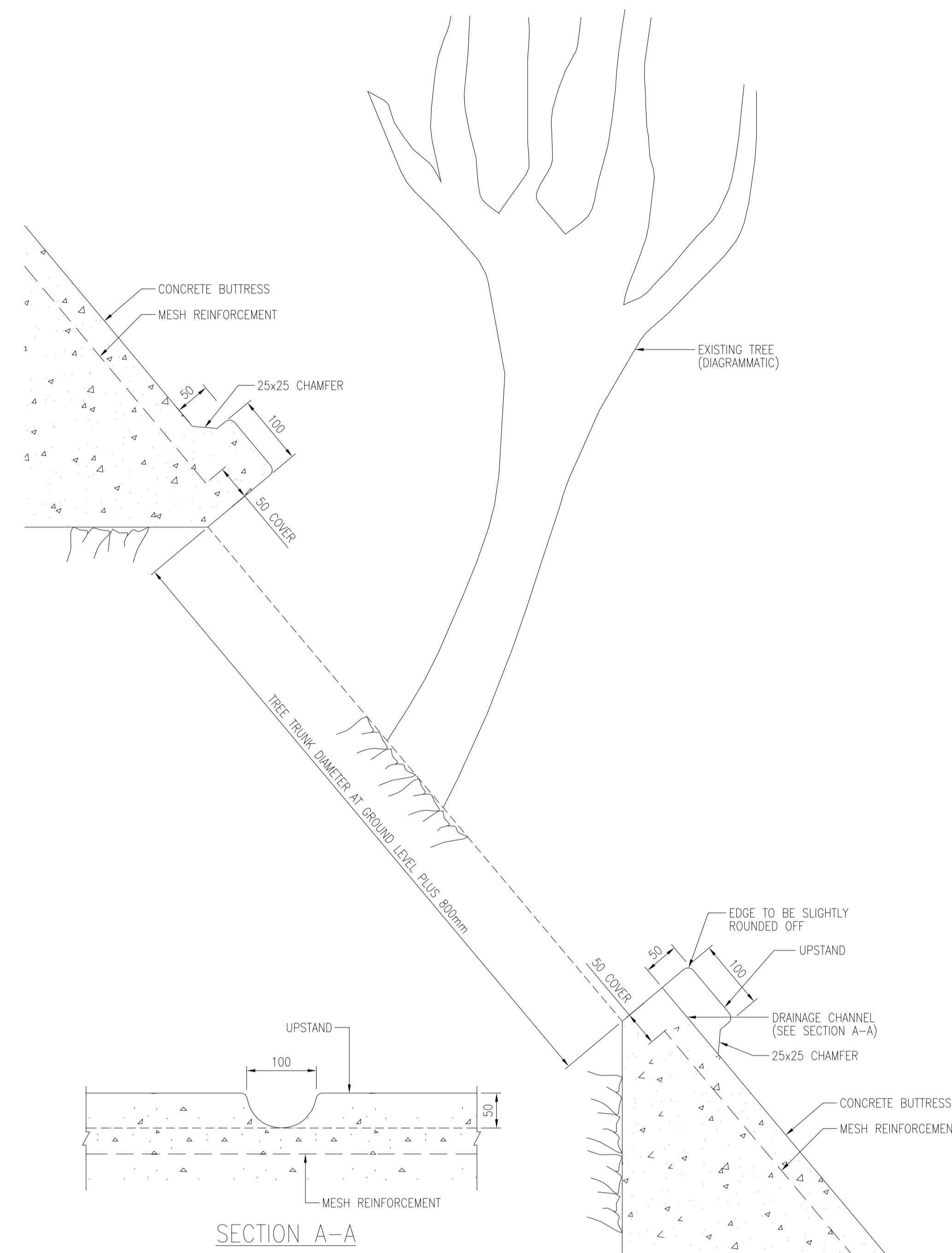
TYPICAL ELEVATION OF RELIEF DRAIN

SCALE A1 1 : 20  
A3 1 : 40



ELEVATION OF STONE FACING (RANDOM PATTERN)

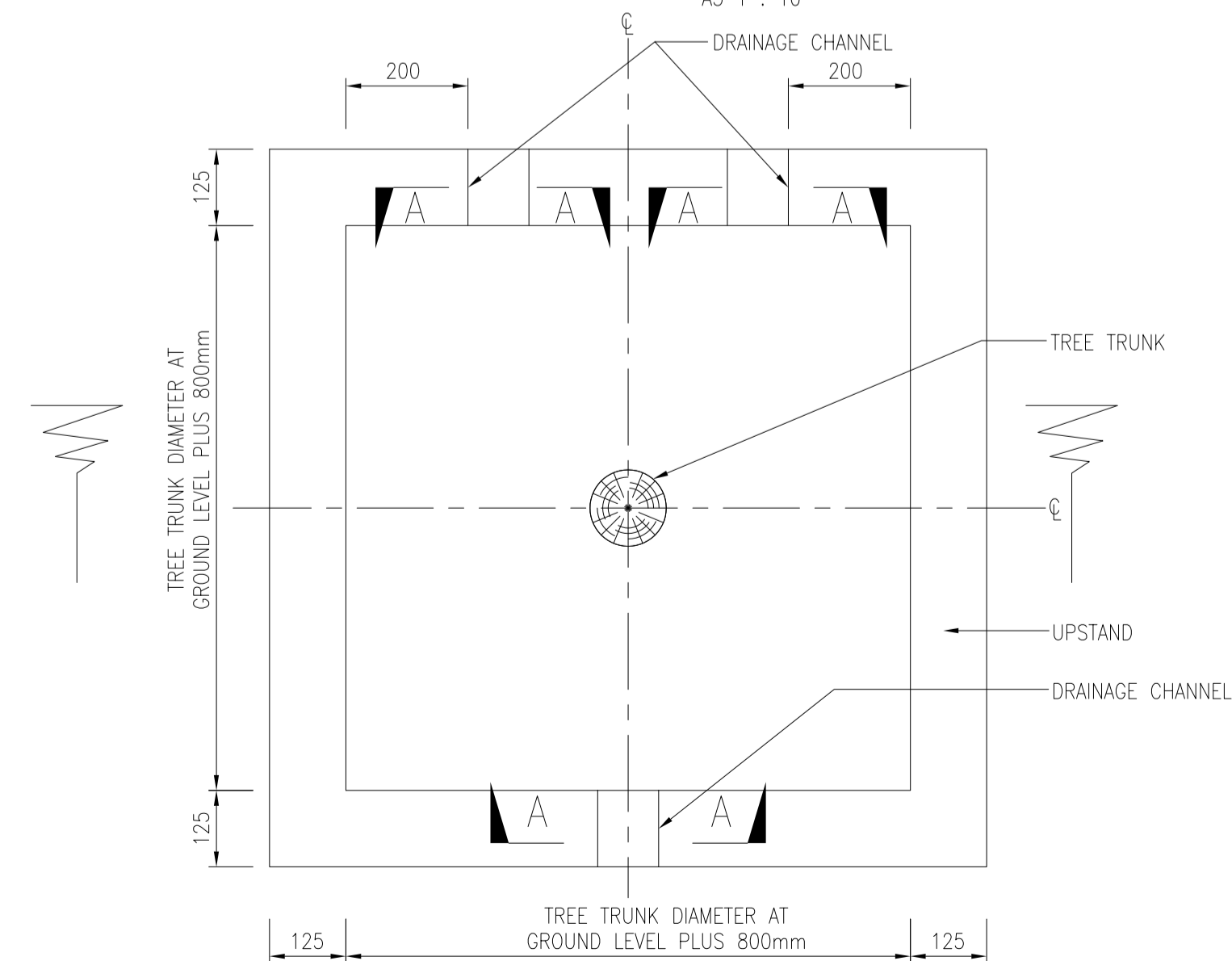
SCALE A1 1 : 20  
A3 1 : 40



SECTION A-A

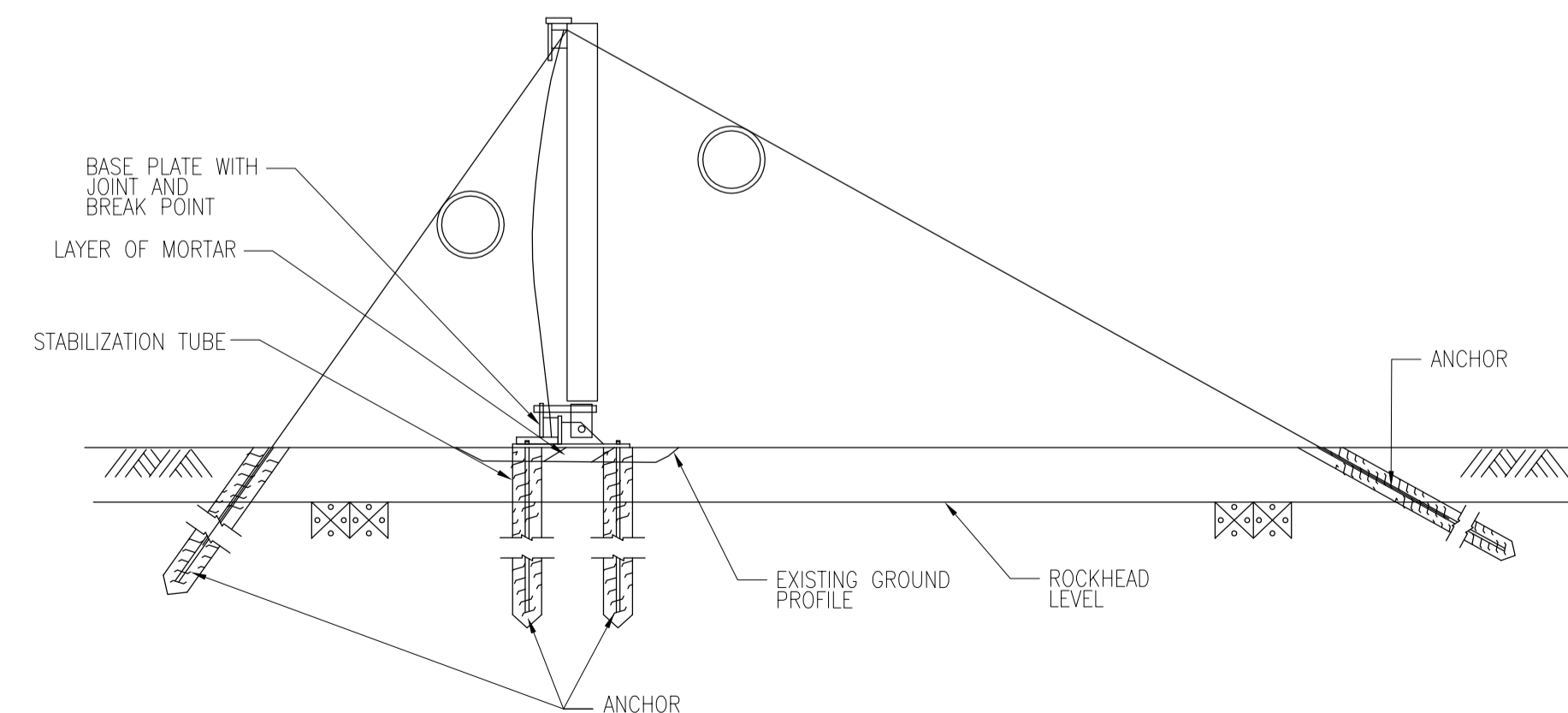
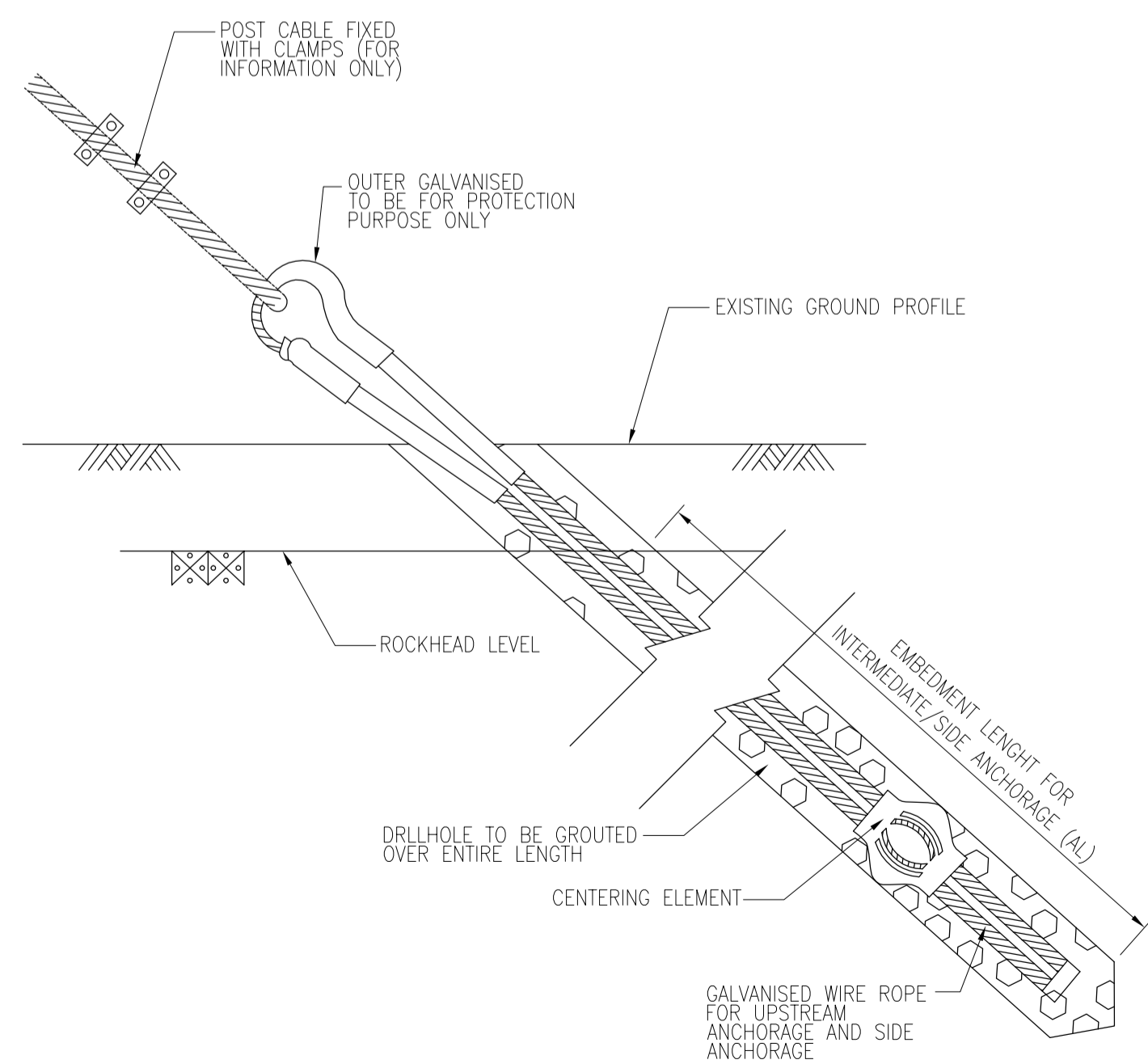
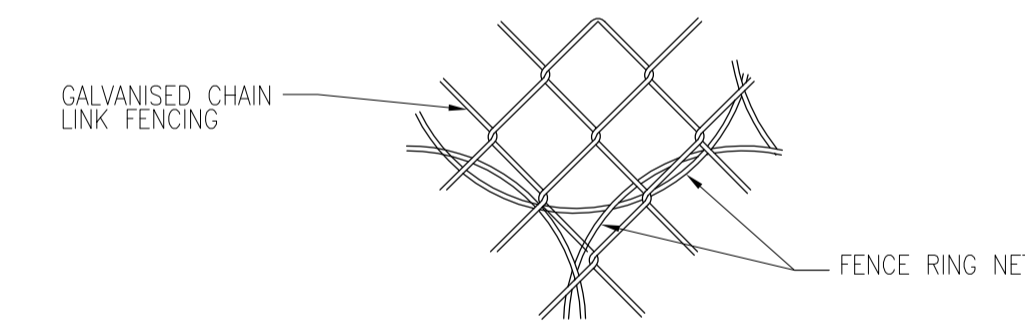
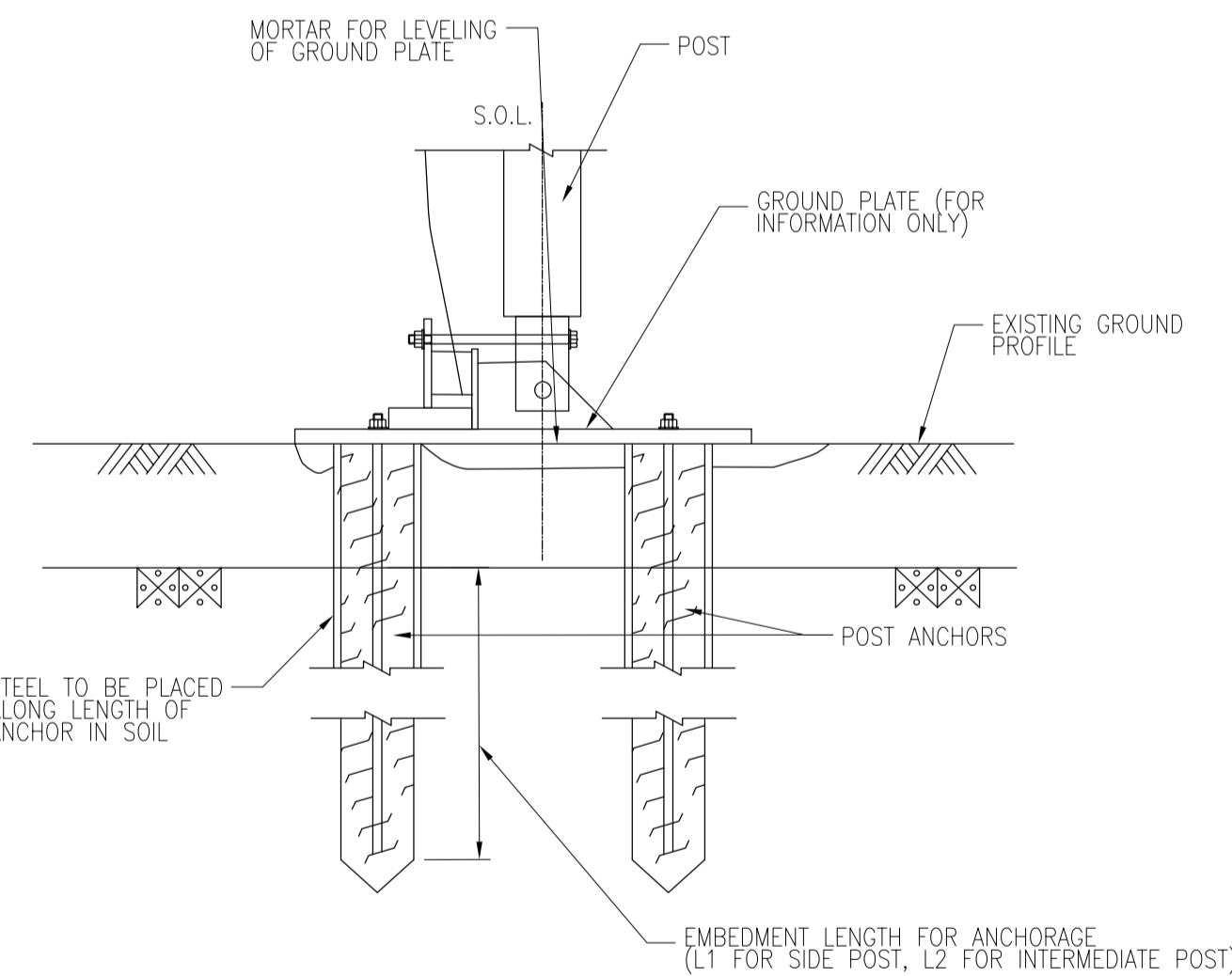
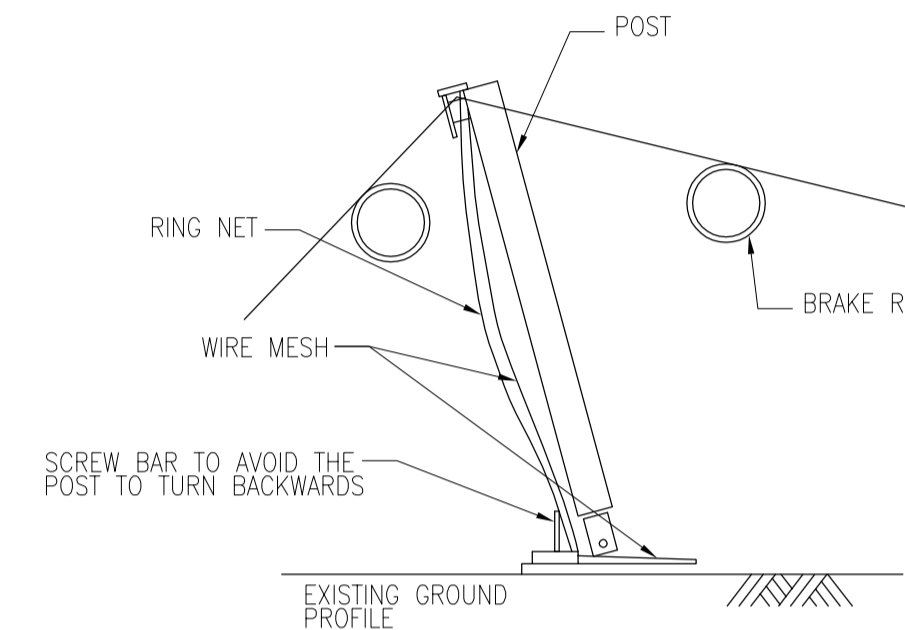
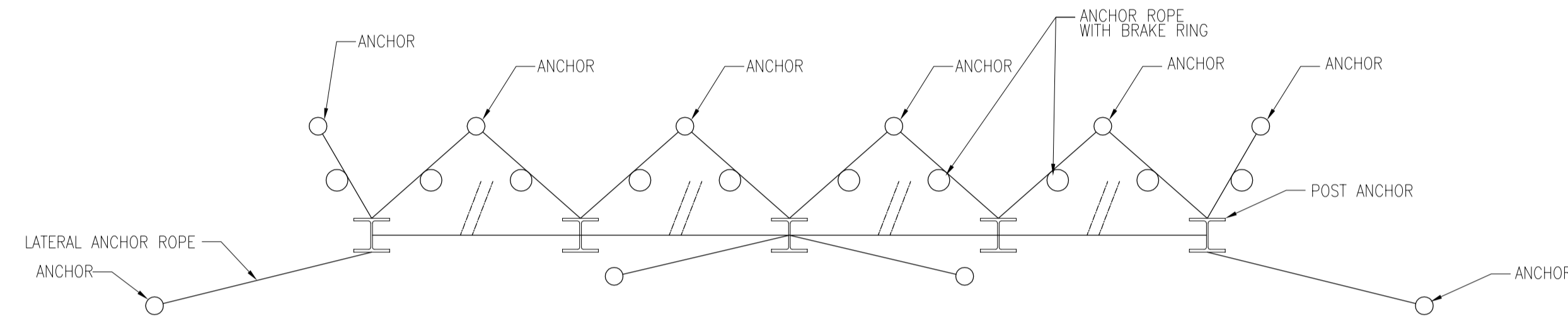
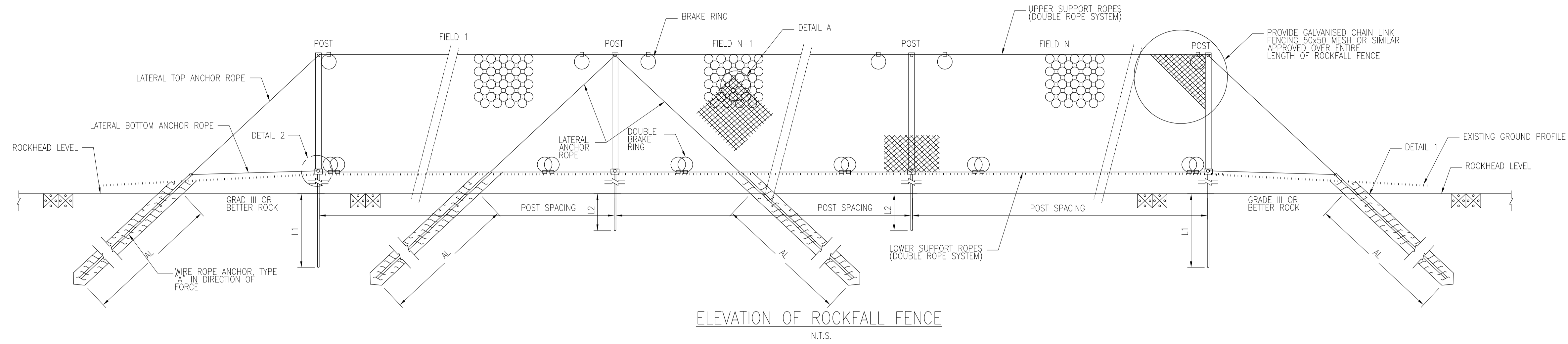
SECTION OF TREE RING

SCALE A1 1 : 5  
A3 1 : 10



PLAN OF TREE RING

SCALE A1 1 : 10  
A3 1 : 20



**NOTES:**

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED DESIGN OF THE PROPOSED FLEXIBLE BARRIER. THE FLEXIBLE BARRIER SHALL ALLOW DEFORMATION DURING IMPACT. THE MINIMUM DESIGN CRITERIA FOR THE FLEXIBLE BARRIER SHALL BE CAPABLE FOR MIN. 3000KJ OR MIN. 5000KJ KINETIC ENERGY OF IMPACT WITH MIN. HEIGHT OF 4m AS SPECIFIED AND TO RETAIN THE LANDSLIDE DEBRIS AND BOULDERS.
2. THE PROPOSED FLEXIBLE BARRIER DETAILS SHOWN IN THE DRAWING IS FOR CONTRACTOR'S REFERENCE ONLY. THE EXACT TYPE AND INSTALLATION DETAILS OF THE FLEXIBLE BARRIER SHALL BE PROPOSED AND DESIGNED BY THE CONTRACTOR. THE FLEXIBLE BARRIER SHALL BE A PROPRIETARY PRODUCT AND SUBJECT TO THE SUPERVISING OFFICER'S APPROVAL PRIOR TO THE COMMENCEMENT OF WORKS.
3. DIMENSIONS OF LENGTH, SEPARATION AND OVERLAP OF THE FLEXIBLE BARRIER SECTIONS SHALL BE MADE TO SUIT THE SITE CONDITIONS AND MANUFACTURER'S RECOMMENDATIONS.
4. THE ROPE ANCHORAGE LENGTH (AL), POST FOUNDATION (L1 & L2), POST SIZE AND POST SPACING, ETC. AS SHOWN IN DRAWING SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE ADOPTED FLEXIBLE BARRIER TYPE.
5. GROUND INVESTIGATION WORKS SUCH AS VERTICAL DRILLHOLES AND TRIALPIITS SHALL BE CARRIED OUT BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE TO VERIFY THE GEOLOGICAL PROFILE FOR CARRYING OUT DETAILED DESIGN OF FOUNDATION AND ANCHORAGE.

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		KK	CKH	SZ	WLS
Date	02/17	02/17	02/17	02/17	02/17

Approved

Agreement No. CE 8/2015 (WS)

Contract Title  
FIRST STAGE OF DESALINATION PLANT AT TSEUNG KWAN O - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
FLEXIBLE BARRIER GENERAL ARRANGEMENT (NOT FOR CONSTRUCTION)

Drawing No. 190495/B/DD/00-30004  
Revision -

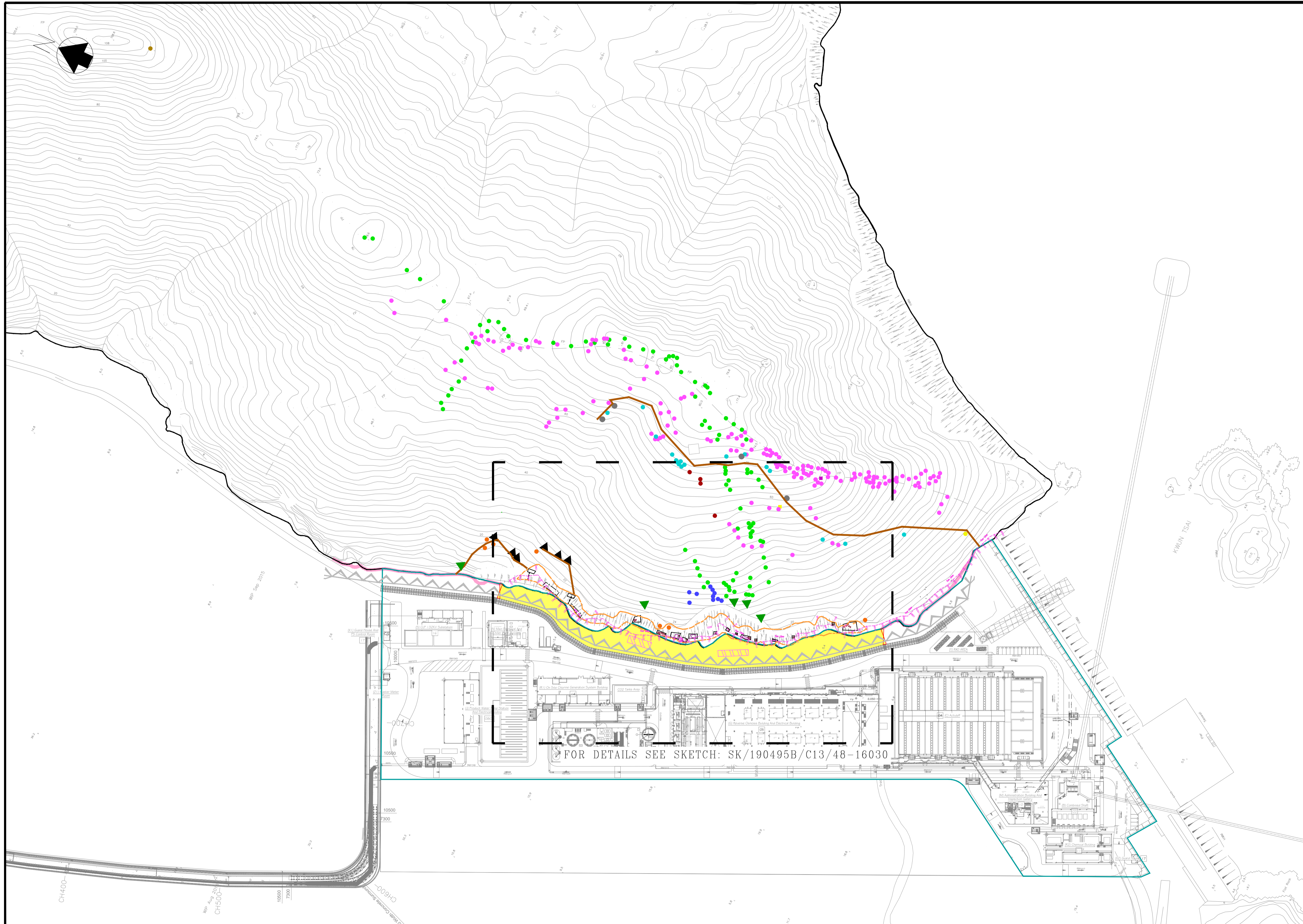
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A3 1 : 400



**APPENDIX G**

**SPECIES OF CONSERVATION IMPORTANCE  
IN THE REVISED SCHEME OF SLOPE MITIGATION WORKS  
AND RECOMMENDED TEMPORARY ACCESS AND WORKING PLATFORM**





MAP NOS. T12SW

NOTES:  
 ONLY WORKERS WITH HAND HELD TOOLS ARE ALLOWED TO ENTER THE RESTRICTED ACCESS ZONE TO CARRY OUT THE ROCK SLOPE MITIGATION WORKS.

- LEGEND:
- PROPOSED ROCK DOWELS
  - ▭ PROPOSED BUTTRESS
  - ▭ PROPOSED WIRE MESH
  - ▭ PROPOSED DENITION
  - CLEAR WATER BAY COUNTRY PARK
  - ▲▲▲ PROPOSED FLEXIBLE BARRIER
  - SITE BOUNDARY
  - ▨ OPEN CHANNEL
  - ▭ BARRIERS
  - ▭ RESTRICTED ACCESS ZONE
  - ▭ STOCKPILING AREA
  - ▭ GATE
  - ▭ TEMPORARY WORKING PLATFORMS AND VEGETATION CLEARANCE
  - MARSDENIA LACHNOSTOMA (SURVEYED IN 2015)
  - MARSDENIA LACHNOSTOMA (SURVEYED IN 2016)
  - PLATYCODON GRANDIFLORUS (SURVEYED IN 2016)
  - HABENARIA LINGUELLA (SURVEYED IN 2020)
  - MARSDENIA LACHNOSTOMA (SURVEYED IN 2020)
  - MARSDENIA LACHNOSTOMA (SURVEYED IN 2021)
  - GNETUM LUOFUENSE (SURVEYED IN 2021)
  - GNETUM LUOFUENSE (SURVEYED IN 2023)
  - ▲ BOULDER REMOVAL
  - ▲ BOULDERS TO BE RETAINED ON SITE
  - TEMPORARY ACCESS
  - EXTENT OF WORK PLATFORM IN DETAILED DESIGN PLAN APPROVED BY EPD IN 2018
  - Proposed Garbage Chute Location
  - ▭ Lilium brownii found in 2014
  - ▭ Pachystoma pubescens found in 2014
  - PROPOSED BOULDER TO BE IN-SITU BROKEN OFF INTO PIECES WITH ALL DIMENSIONS LESS THAN 1m AND DEPOSITED IN STABLE CONDITION

N.T.S.



CONTRACT NO. 13/WSD/17  
 DESIGN, BUILD AND OPERATE  
 FIRST STAGE OF TSEUNG KWAN O  
 DESALINATION PLANT

Title:  
 LAYOUT OF GEOTECHNICAL WORKS TO BE CARRIED OUT  
 INSIDE THE CLEARWATER BAY COUNTRY PARK (STAGE 2)

Date: 2025/12/01  
 Outgoing letter Ref. No.:  
 Reference Drawing:  
 Sketch No.: SK/190495B/C13/48-16029  
 Rev.: D

Drafted by CL  
 Checked by IY  
 Approved by MP

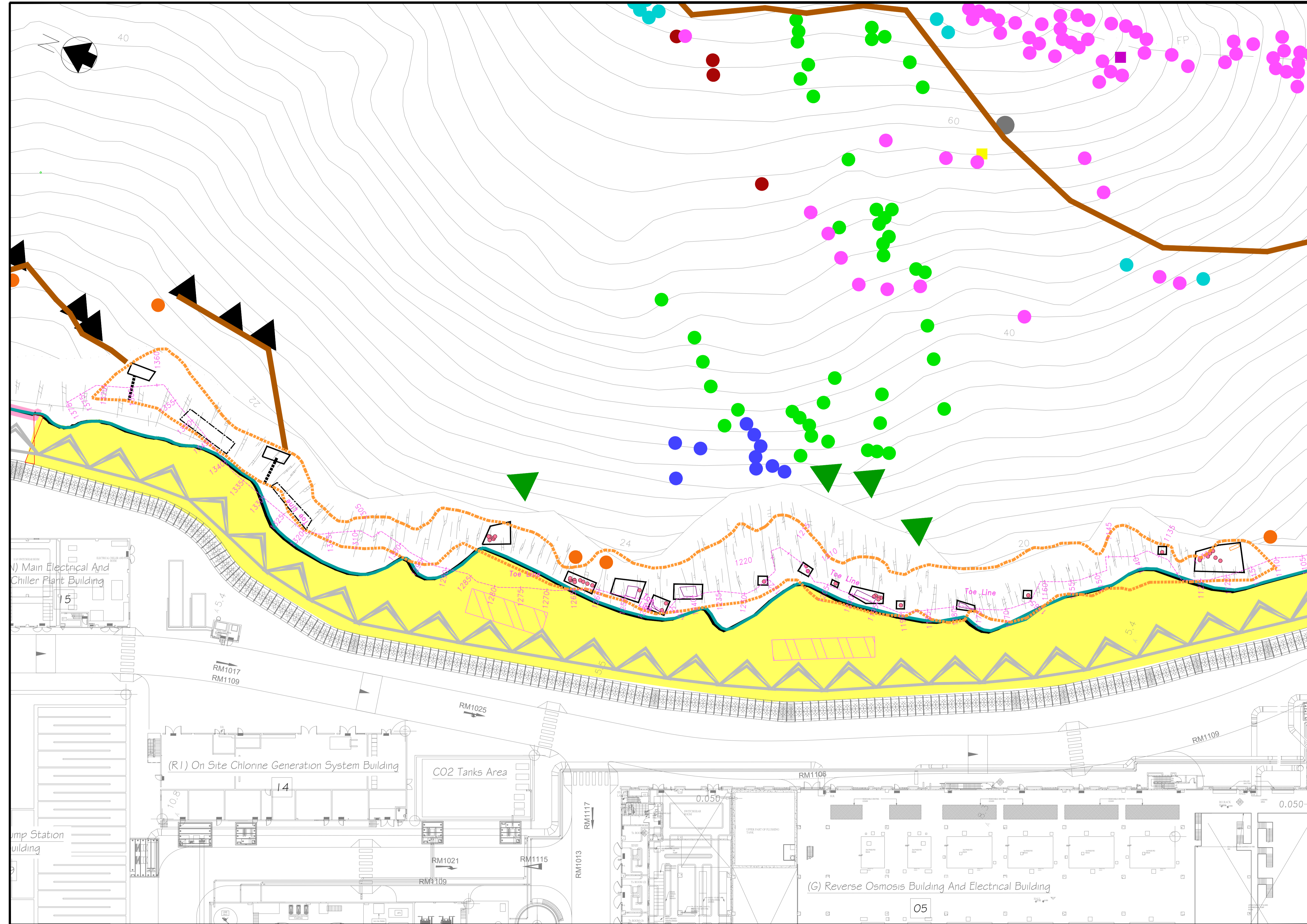
(SHEET 1 OF 2)

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MAP NOS. T12SW

NOTES:  
 ONLY WORKERS WITH HAND HELD TOOLS ARE ALLOWED TO ENTER THE RESTRICTED ACCESS ZONE TO CARRY OUT THE ROCK SLOPE MITIGATION WORKS.

- PROPOSED ROCK DOWELS
- PROPOSED BUTTRESS
- PROPOSED WIRE MESH
- PROPOSED DENTITION
- CLEAR WATER BAY COUNTRY PARK
- PROPOSED FLEXIBLE BARRIER
- SITE BOUNDARY
- OPEN CHANNEL
- BARRIERS
- RESTRICTED ACCESS ZONE
- STOCKPILING AREA
- GATE
- TEMPORARY WORKING PLATFORMS AND VEGETATION CLEARANCE
- MARSDENIA LACHNOSTOMA (SURVEYED IN 2015)
- MARSDENIA LACHNOSTOMA (SURVEYED IN 2016)
- PLATYCODON GRANDIFLORUS (SURVEYED IN 2016)
- HABENARIA LINGUELLA (SURVEYED IN 2020)
- MARSDENIA LACHNOSTOMA (SURVEYED IN 2020)
- MARSDENIA LACHNOSTOMA (SURVEYED IN 2021)
- GNETUM LUOFUENSE (SURVEYED IN 2021)
- GNETUM LUOFUENSE (SURVEYED IN 2023)
- ▲ BOULDER REMOVAL
- ▲ BOULDERS TO BE RETAINED ON SITE
- TEMPORARY ACCESS
- EXTENT OF WORK PLATFORM IN DETAILED DESIGN PLAN APPROVED BY EPD IN 2018
- Proposed Garbage Chute Location
- Liliun brownii found in 2014
- Pachystoma pubescens found in 2014
- PROPOSED BOULDER TO BE IN-SITU BROKEN OFF INTO PIECES WITH ALL DIMENSIONS LESS THAN 1m AND DEPOSITED IN STABLE CONDITION



N.T.S.



CONTRACT NO. 13/WSD/17  
 DESIGN, BUILD AND OPERATE  
 FIRST STAGE OF TSEUNG KWAN O  
 DESALINATION PLANT

Title:  
 LAYOUT OF GEOTECHNICAL WORKS TO BE CARRIED OUT  
 INSIDE THE CLEARWATER BAY COUNTRY PARK (STAGE 2)

Date: 2025/12/01		Drafted by CL	
Outgoing letter Ref. No.:		Checked by IY	
Reference Drawing:		Approved by MP	
Sketch No.: SK/190495B/C13/48-16030	Rev.: D		

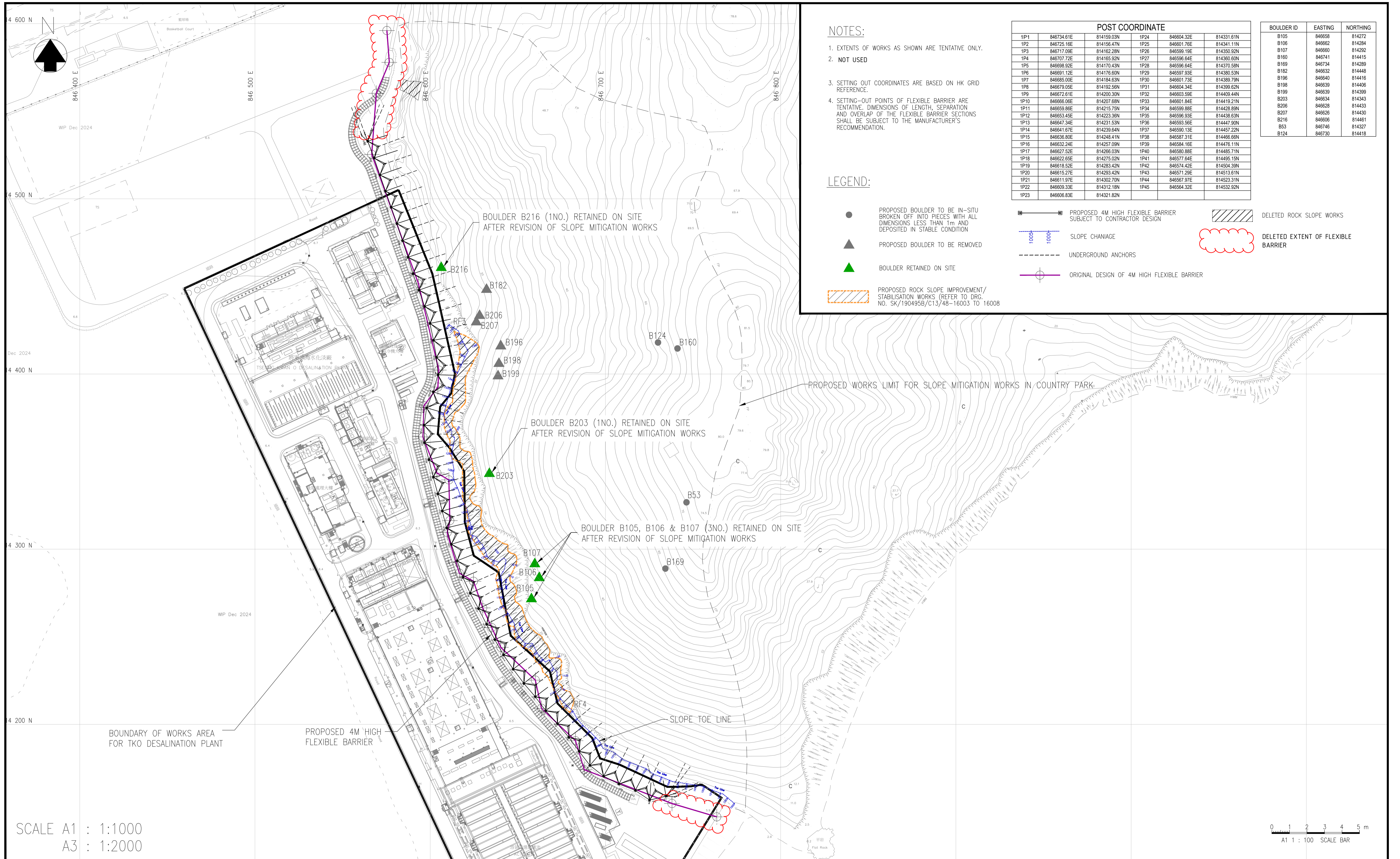
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**APPENDIX H**

**DRAWINGS SHOWING DESIGN CHANGES FROM THE APPROVED DETAILED DESIGN  
PLAN FOR SLOPE MITIGATION WORKS**





**NOTES:**

1. EXTENTS OF WORKS AS SHOWN ARE TENTATIVE ONLY.
2. NOT USED
3. SETTING-OUT COORDINATES ARE BASED ON HK GRID REFERENCE.
4. SETTING-OUT POINTS OF FLEXIBLE BARRIER ARE TENTATIVE. DIMENSIONS OF LENGTH, SEPARATION AND OVERLAP OF THE FLEXIBLE BARRIER SECTIONS SHALL BE SUBJECT TO THE MANUFACTURER'S RECOMMENDATION.

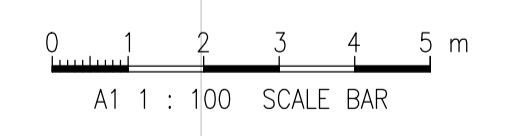
**LEGEND:**

- PROPOSED BOULDER TO BE IN-SITU BROKEN OFF INTO PIECES WITH ALL DIMENSIONS LESS THAN 1m AND DEPOSITED IN STABLE CONDITION
- ▲ PROPOSED BOULDER TO BE REMOVED
- ▲ PROPOSED BOULDER TO BE RETAINED ON SITE
- ▨ PROPOSED ROCK SLOPE IMPROVEMENT/STABILISATION WORKS (REFER TO DRG. NO. SK/190495B/C13/48-16003 TO 16008)
- ▭ PROPOSED 4M HIGH FLEXIBLE BARRIER SUBJECT TO CONTRACTOR DESIGN
- SLOPE CHANGE
- - - UNDERGROUND ANCHORS
- ORIGINAL DESIGN OF 4M HIGH FLEXIBLE BARRIER
- ▨ DELETED ROCK SLOPE WORKS
- DELETED EXTENT OF FLEXIBLE BARRIER

POST COORDINATE					
1P1	846734.61E	814159.03N	1P24	846604.32E	814331.61N
1P2	846725.18E	814156.47N	1P25	846601.76E	814341.11N
1P3	846717.09E	814162.28N	1P26	846599.19E	814350.92N
1P4	846707.72E	814165.92N	1P27	846596.64E	814360.62N
1P5	846698.92E	814170.43N	1P28	846596.64E	814370.58N
1P6	846691.12E	814176.60N	1P29	846597.93E	814380.53N
1P7	846685.00E	814184.63N	1P30	846601.73E	814389.79N
1P8	846679.05E	814192.56N	1P31	846604.34E	814399.62N
1P9	846672.61E	814200.30N	1P32	846603.59E	814409.44N
1P10	846666.06E	814207.68N	1P33	846601.84E	814419.21N
1P11	846659.88E	814215.75N	1P34	846599.88E	814428.89N
1P12	846653.45E	814223.36N	1P35	846596.93E	814438.63N
1P13	846647.34E	814231.53N	1P36	846593.56E	814447.90N
1P14	846641.97E	814239.94N	1P37	846590.13E	814457.22N
1P15	846636.80E	814248.41N	1P38	846587.31E	814466.66N
1P16	846632.24E	814257.09N	1P39	846584.16E	814476.11N
1P17	846627.52E	814266.03N	1P40	846580.88E	814485.71N
1P18	846622.65E	814275.02N	1P41	846577.64E	814495.15N
1P19	846618.52E	814283.42N	1P42	846574.42E	814504.39N
1P20	846615.27E	814292.42N	1P43	846571.29E	814513.61N
1P21	846611.97E	814302.70N	1P44	846567.97E	814523.31N
1P22	846609.33E	814312.18N	1P45	846564.32E	814532.92N
1P23	846606.83E	814321.82N			

BOULDER ID	EASTING	NORTHING
B105	846658	814272
B106	846662	814284
B107	846660	814292
B160	846741	814415
B169	846734	814289
B182	846632	814448
B196	846640	814416
B198	846639	814406
B199	846639	814399
B203	846634	814343
B206	846638	814433
B207	846626	814430
B216	846606	814461
B53	846746	814327
B124	846730	814418

SCALE A1 : 1:1000  
A3 : 1:2000



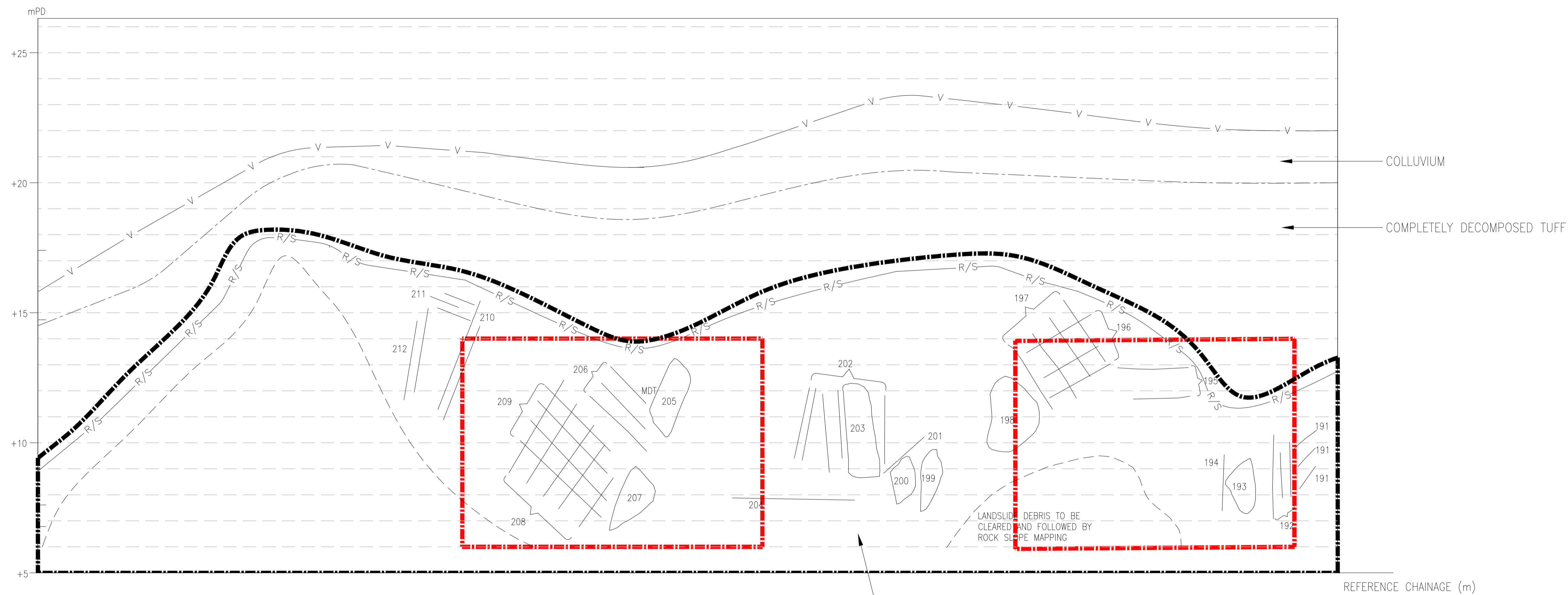
**BINNIES HONG KONG LIMITED**  
賓尼斯工程顧問有限公司

CONTRACT NO. 13/WSD/17  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Title: DESIGN CHANGES FROM APPROVED  
DETAILED DESIGN PLAN FOR SLOPE MITIGATION WORKS

Date: 25/02/2026  
Outgoing letter Ref. No.:  
Reference Drawing: 190495/K/TEND/80/1001  
Sketch No.: SK/190495B/C13/48-16003 (DRAFT)  
Rev.: H4

Drafted by CL  
Checked by IY  
Approved by MP



ELEVATION  
SCALE A1 1:100  
A3 1:200

- LEGEND:
- REVISED WIRE MESH LOCATION
  - REVISED ROCK DOWEL LOCATION
  - REVISED BUTTRESS LOCATION
  - ORIGINAL WIRE MESH LOCATION
  - ORIGINAL ROCK DOWEL LOCATION
  - ORIGINAL BUTTRESS LOCATION
  - ORIGINAL DENTITION LOCATION
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE (INDICATIVE)
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	02/18	YLC	CKH	SZ	WLS

Approved

Agreement No. CE 8/2015 (WS)

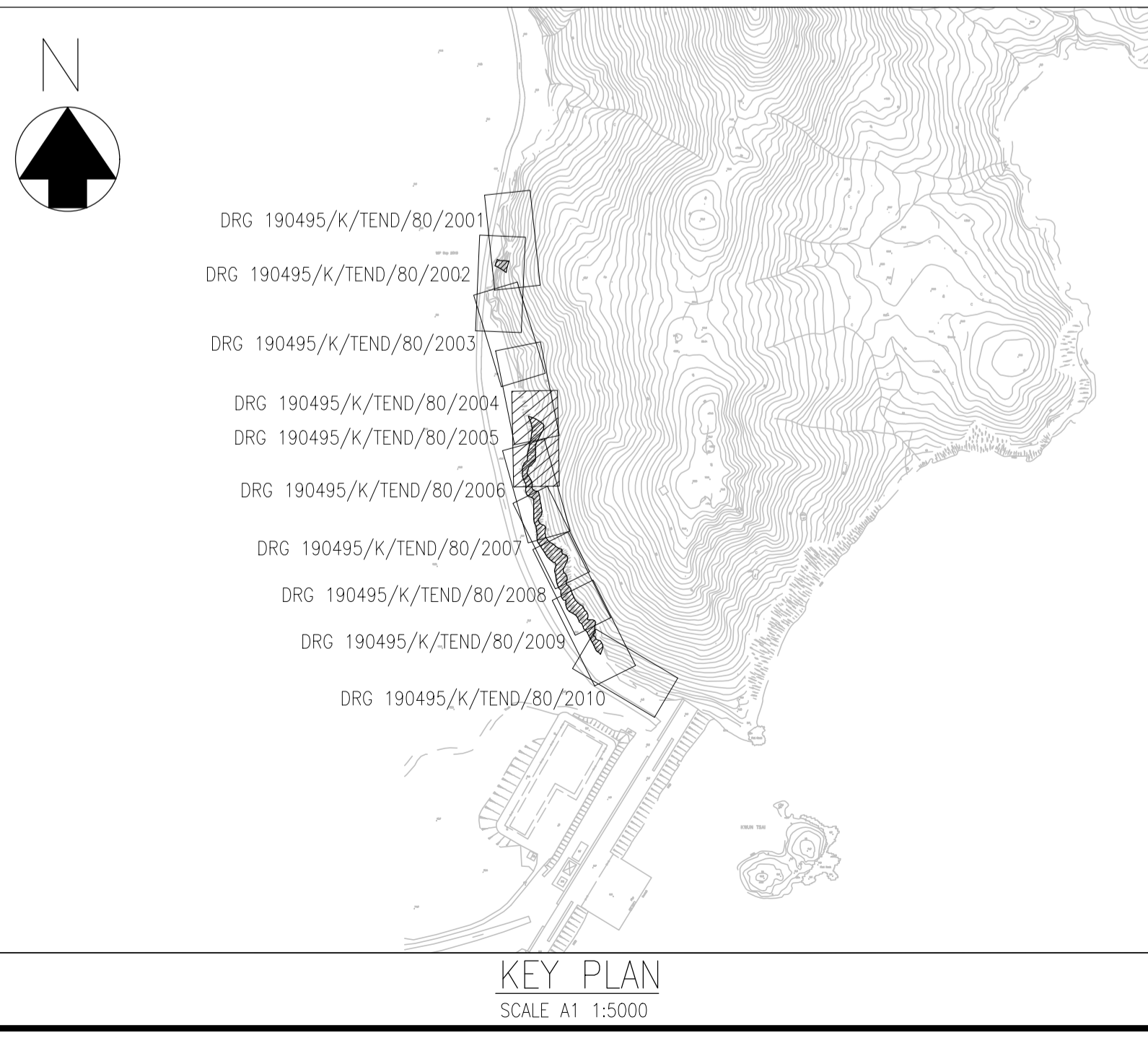
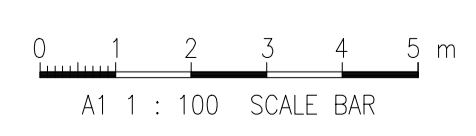
Contract No. 13/WSD/17

Contract Title  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Drawing Title  
  
ROCK SLOPE ELEVATION  
(CH1250 - CH1200)

Drawing No. 190495/K/TEND/80/2005	Revision -
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Scale AS SHOWN



Plot Date = 2025-12-15 13:37:02



ELEVATION  
SCALE A1 1:100  
A3 1:200

- LEGEND:
- REVISED WIRE MESH LOCATION
  - REVISED ROCK DOWEL LOCATION
  - REVISED BUTTRESS LOCATION
  - ORIGINAL WIRE MESH LOCATION
  - ORIGINAL ROCK DOWEL LOCATION
  - ORIGINAL BUTTRESS LOCATION
  - ORIGINAL DENTITION LOCATION
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE (INDICATIVE)
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	02/18	YLC	CKH	SZ	WLS

Approved

Agreement No. CE 8/2015 (WS)

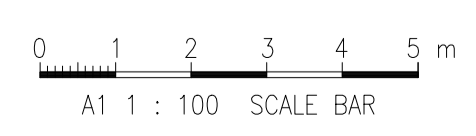
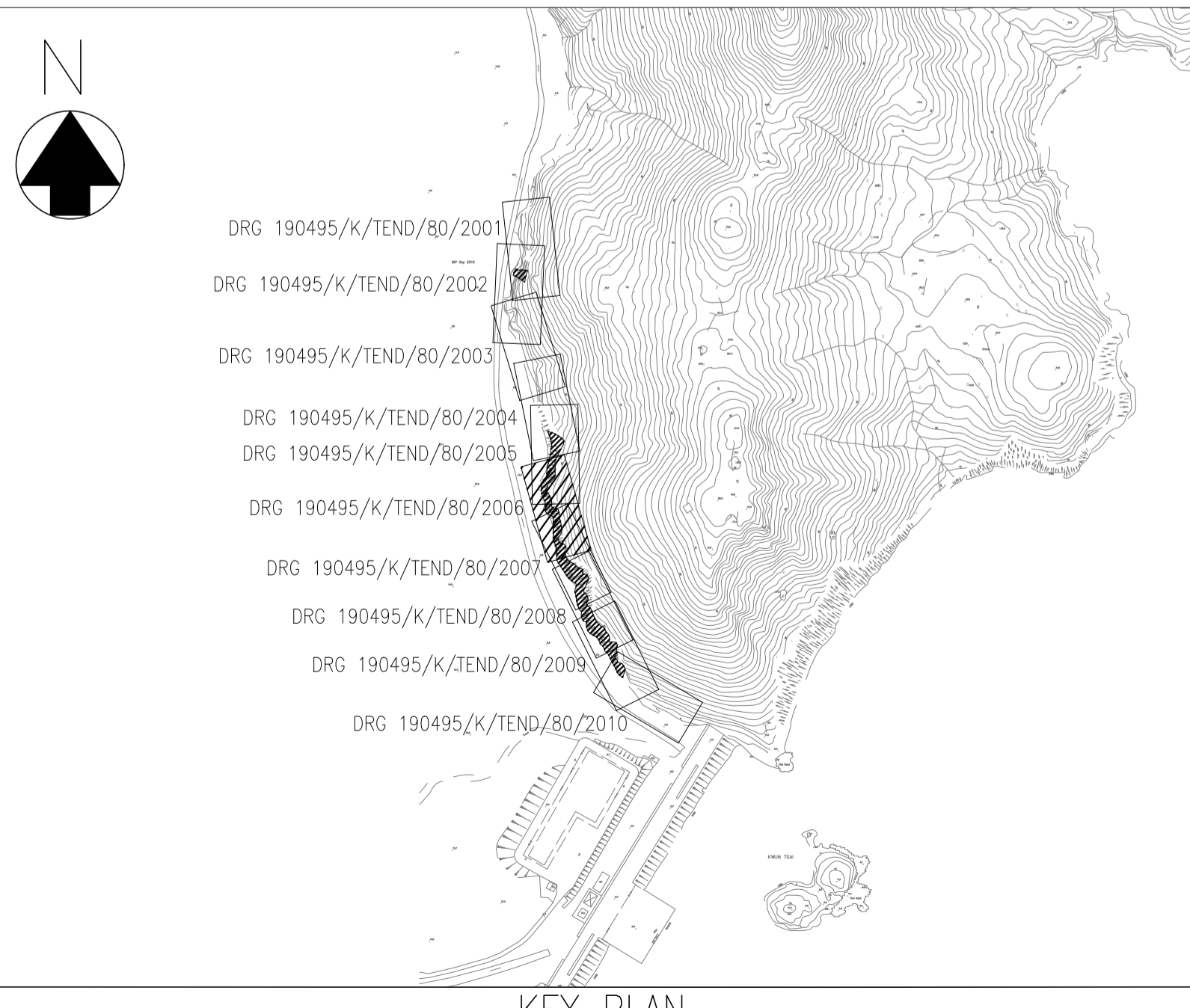
Contract No. 13/WSD/17

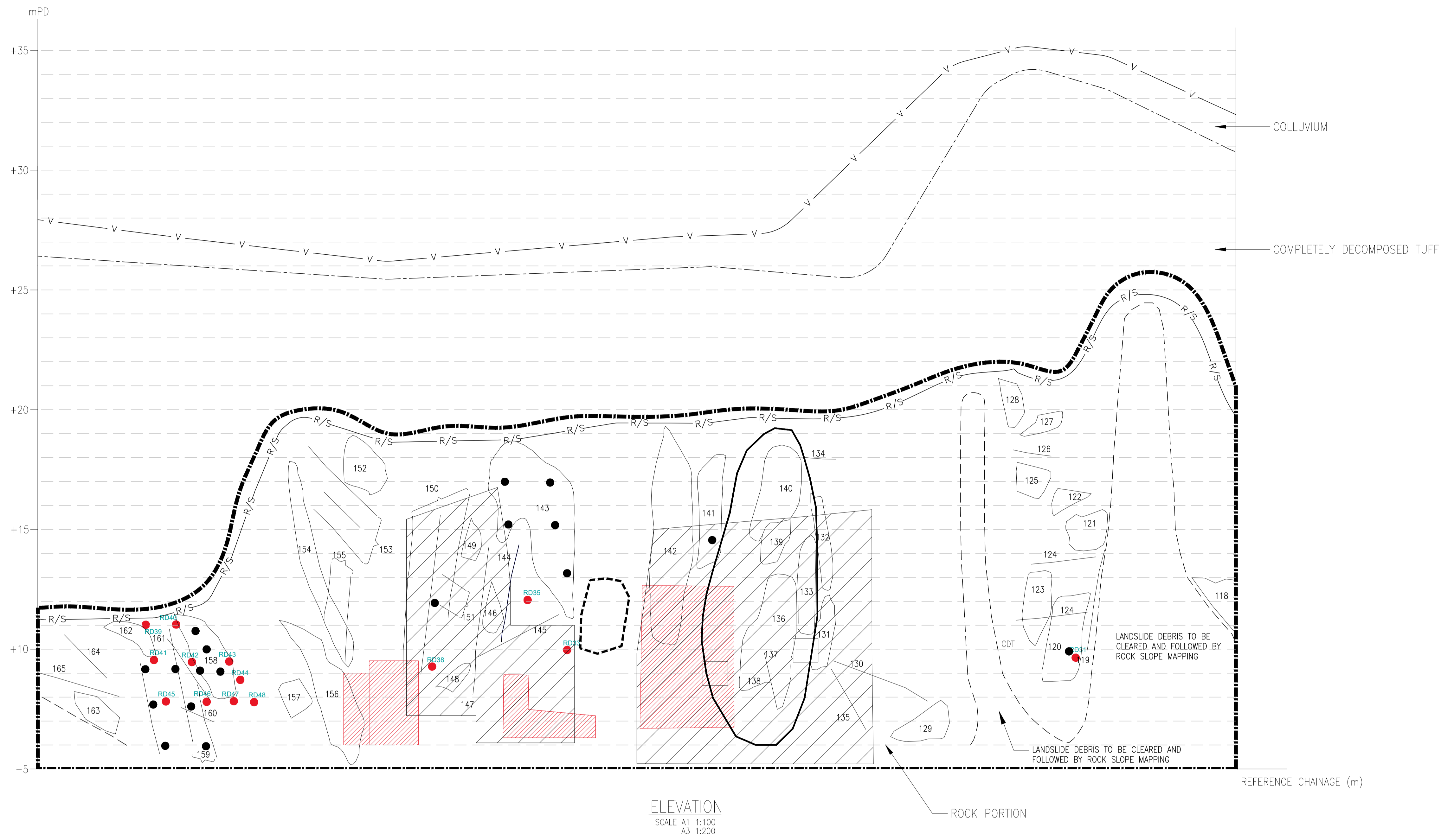
Contract Title  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Drawing Title  
**ROCK SLOPE ELEVATION  
(CH1200 - CH1150)**

Drawing No. 190495/K/TEND/80/2006	Revision -
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Scale AS SHOWN





- LEGEND:**
- REVISED WIRE MESH LOCATION
  - REVISED ROCK DOWEL LOCATION
  - REVISED BUTTRESS LOCATION
  - ORIGINAL WIRE MESH LOCATION
  - ORIGINAL ROCK DOWEL LOCATION
  - ORIGINAL BUTTRESS LOCATION
  - ORIGINAL DENTITION LOCATION
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE (INDICATIVE)
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	YLC	CKH	SZ	WLS	
Date	02/18	02/18	02/18	02/18	02/18

Approved

Agreement No. CE 8/2015 (WS)

Contract No. 13/WSD/17

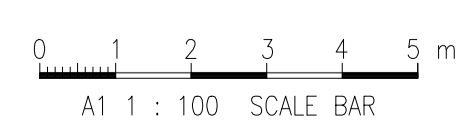
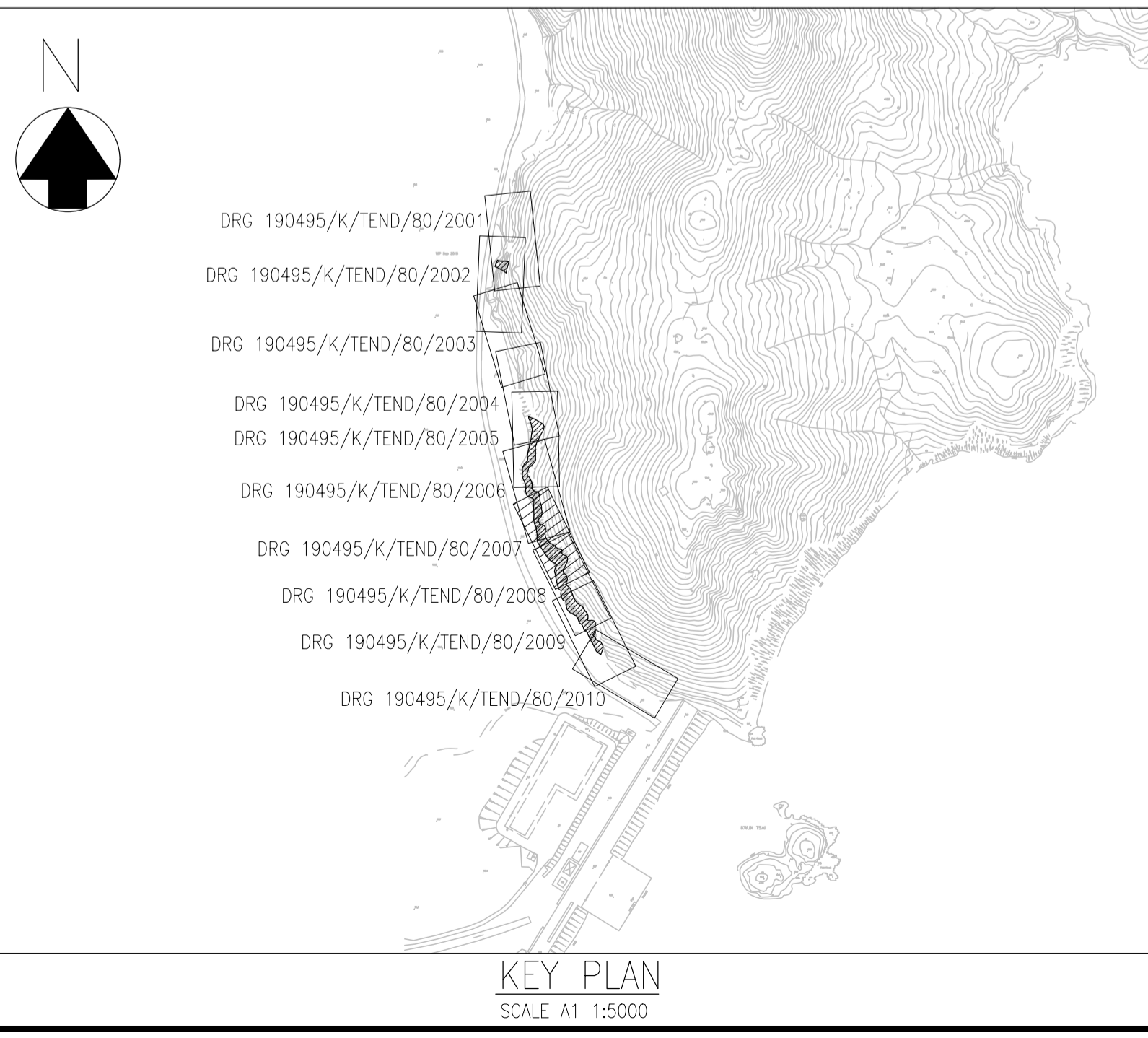
Contract Title  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Drawing Title

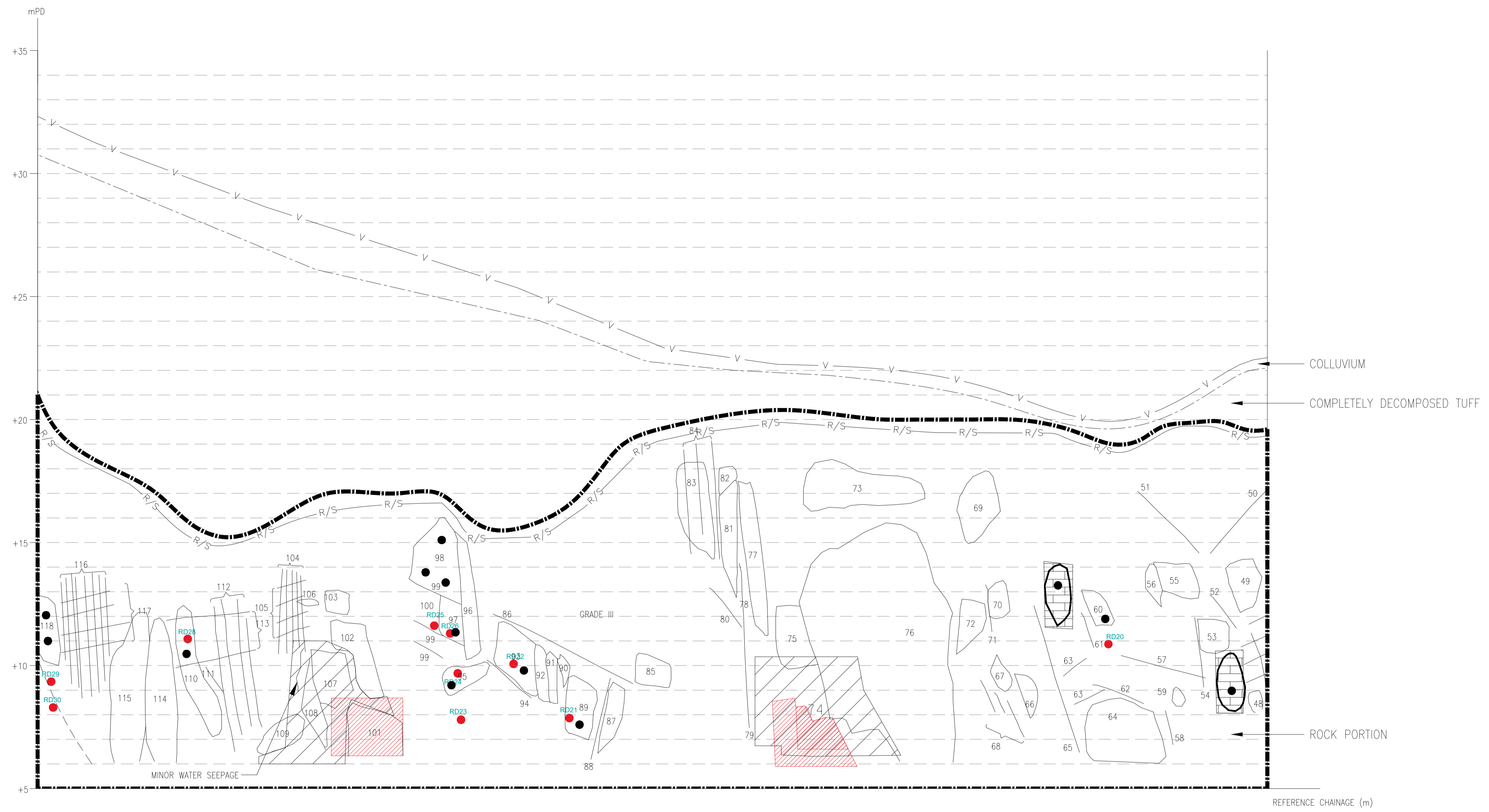
ROCK SLOPE ELEVATION  
(CH1150 - CH1100)

Drawing No.	Revision
190495/K/TEND/80/2007	-

Scale AS SHOWN



Plot Date = 2025-12-15 13:47:23



ELEVATION  
SCALE A1 1:100  
A3 1:200

- LEGEND:
- REVISED WIRE MESH LOCATION
  - REVISED ROCK DOWEL LOCATION
  - REVISED BUTTRESS LOCATION
  - ORIGINAL WIRE MESH LOCATION
  - ORIGINAL ROCK DOWEL LOCATION
  - ORIGINAL BUTTRESS LOCATION
  - ORIGINAL IDENTIFICATION LOCATION
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE (INDICATIVE)
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		YLC	CKH	SZ	WLS
Date	02/18	02/18	02/18	02/18	02/18

Approved

Agreement No. CE 8/2015 (WS)

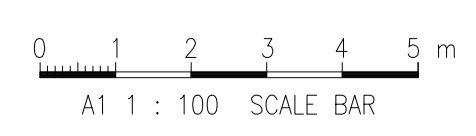
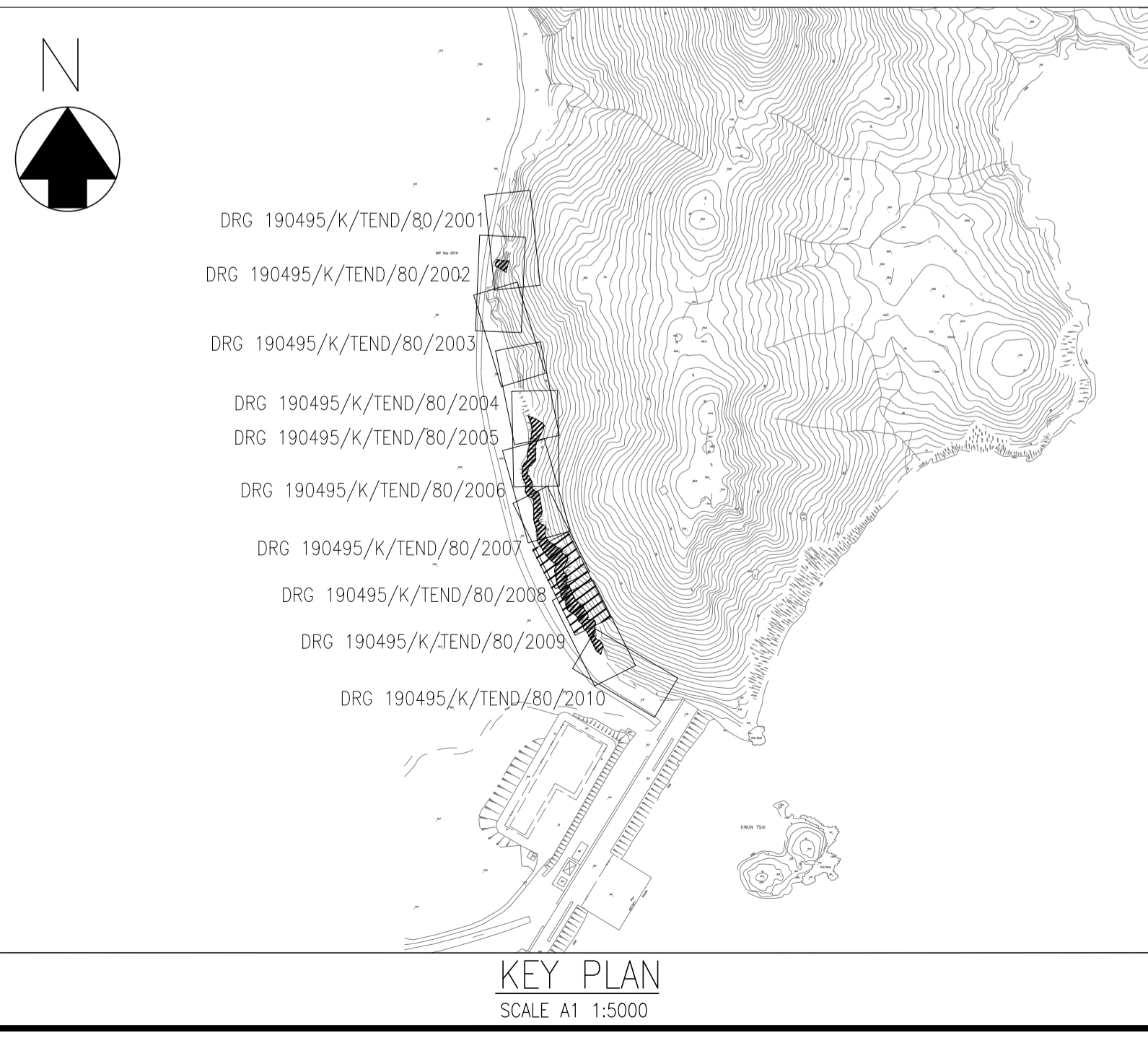
Contract No. 13/WSD/17

Contract Title  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

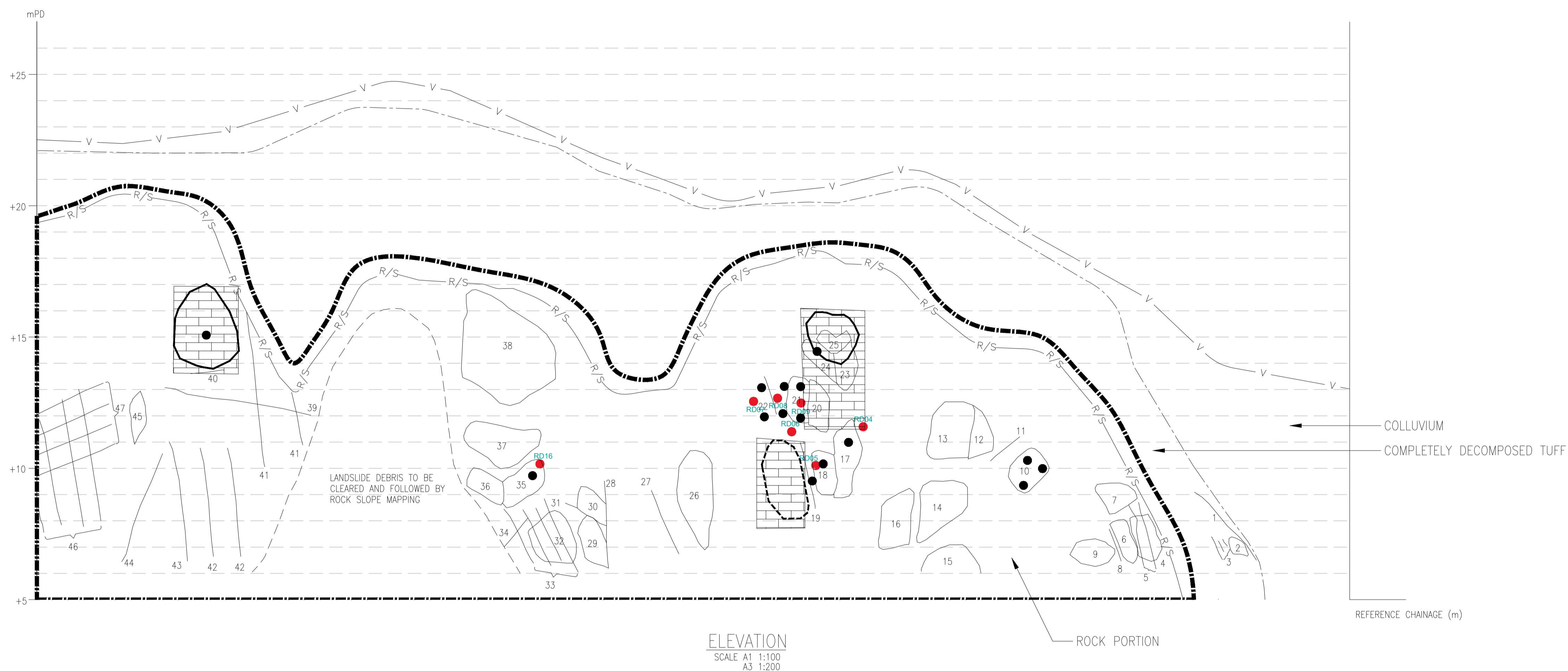
Drawing Title  
ROCK SLOPE ELEVATION  
(CH1100 - CH1050)

Drawing No.	Revision
190495/K/TEND/80/2008	-

Scale AS SHOWN



Plot Date = 2025-12-15 13:49:18



ELEVATION  
SCALE A1 1:100  
A3 1:200

- LEGEND:
- REVISED WIRE MESH LOCATION
  - REVISED ROCK DOWEL LOCATION
  - REVISED BUTTRESS LOCATION
  - ORIGINAL WIRE MESH LOCATION
  - ORIGINAL ROCK DOWEL LOCATION
  - ORIGINAL BUTTRESS LOCATION
  - ORIGINAL DENTITION LOCATION
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE (INDICATIVE)
  - POTENTIAL UNSTABLE ROCK BLOCK AS OBSERVED ON SITE WITH PROPOSED SCALING (INDICATIVE)

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	02/18	YLC	CKH	SZ	WLS

Approved

Agreement No. CE 8/2015 (WS)

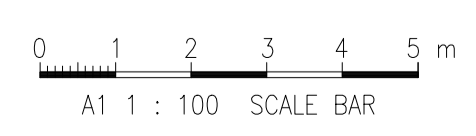
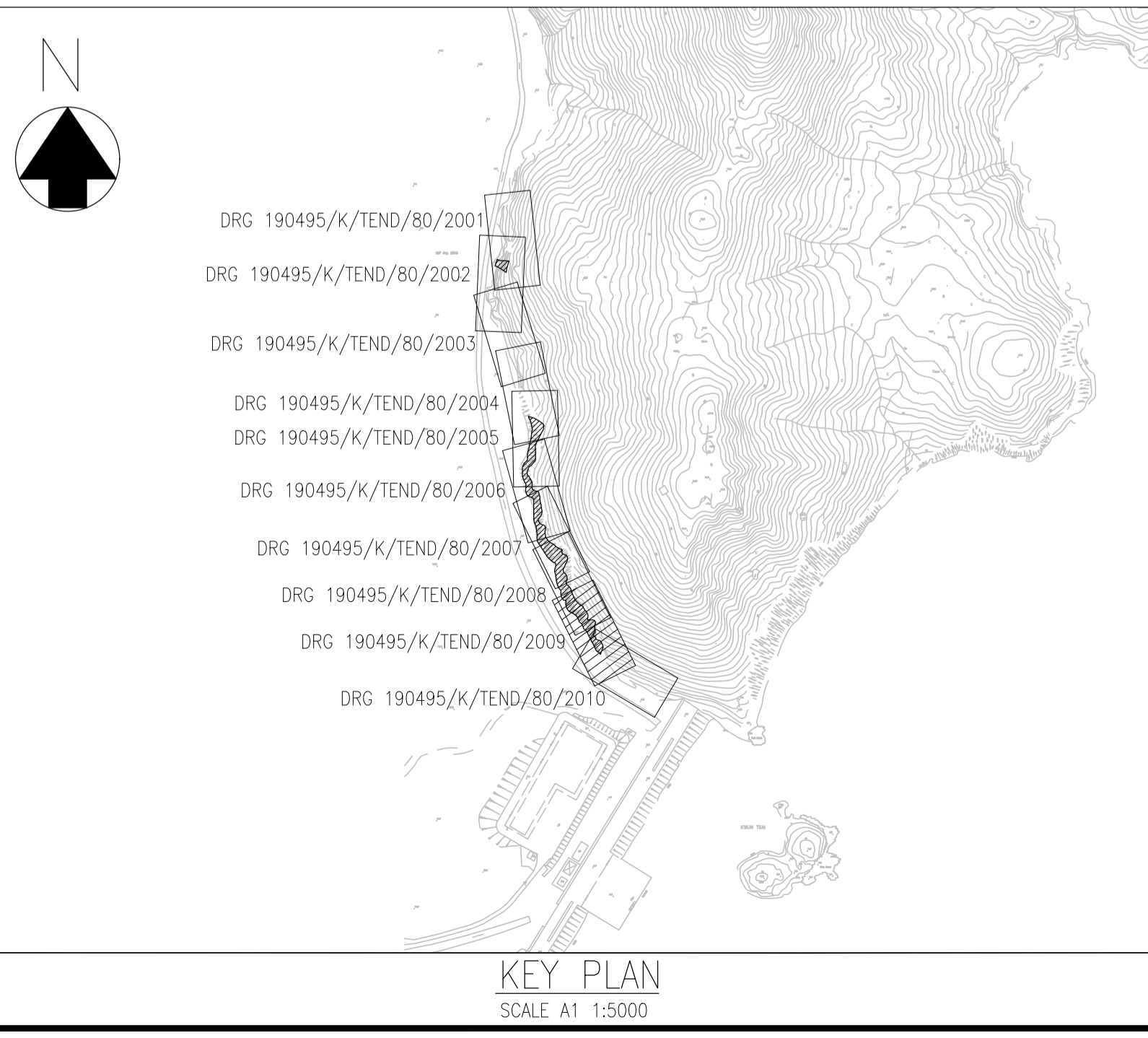
Contract No. 13/WSD/17

Contract Title  
DESIGN, BUILD AND OPERATE  
FIRST STAGE OF TSEUNG KWAN O  
DESALINATION PLANT

Drawing Title  
ROCK SLOPE ELEVATION  
(CH1050 - CH1000)

Drawing No. 190495/K/TEND/80/2009	Revision -
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Scale AS SHOWN



Plot Date = 2025-12-15 13:51:29