

Appendix G

Geotechnical Planning Review Report

Civil Engineering and Development
Department

**Application for Permission under
Section 16 of the Town Planning
Ordinance (Cap. 131) for
Proposed Temporary Centralised
Quarters for Imported Labour in
Construction Sector for a Period of
3 Years in “Industrial” Zone and
Area Shown as ‘Road’ of Planning
Area 36 of Hung Shui Kiu/ Ha
Tsuen New Development Area**

**Geotechnical Planning Review
Report**

| Aug 2026

This report takes into account the particular
instructions and requirements of our client.

It is not intended for and should not be relied
upon by any third party and no responsibility
is undertaken to any third party.

Job number 278463

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ARUP

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1 Introduction

1.1 Background

1.1.1 Ove Arup and Partners Hong Kong Limited (Arup) was commissioned by the Civil Engineering and Development Department (CEDD) to submit a Section 16 Planning Application for Proposed Temporary Centralised Quarter for Imported Labour in Construction Sector within "Industrial" ("I") Zone and area shown as 'Road' of Planning Area 36 of the draft Hung Shui Kiu and Ha Tsuen Outline Zoning Plan ("the HSK/HT OZP") No. S/HSK/3 for a Period of 3 Years ("the proposed development").

1.1.2 The Proposed Development will have a total PR of about 0.456 with domestic GFA of about 13,414m² and non-domestic GFA of about 1,065m² respectively. The 8 nos. of two-storey residential blocks will provide about 450 residential module of Modular Integrated Construction (MiC) to provide accommodation for about 1,800 numbers of imported labour. The Proposed Development is targeted to commence operation in Q3 2027.

1.2 Site Location

1.2.1 The Application Site, with an area of about 31,787 m², is situated at the western part of HSK/HT NDA adjacent to the planned high-density development under the Second Phase Development of Hung Shui Kiu / Ha Tsuen New Development Area (HSK/HT NDA), of which the construction works have commenced since 2024. The Application Site itself is part of the Advance Works phase 3 of HSK/NT NDA for implementation of site clearance/ site formation and associated infrastructure works. The location of the Application Site is shown in **Figure 1.1**.

1.3 Purpose of the Report

1.3.1 The indicative scheme of the proposed development is shown in **Figure 1.1** respectively.

1.3.2 This geotechnical planning review report provides the following assessment to support the planning application for the proposed redevelopment works:

- Summary of the available geotechnical information for the Application Site;
- Initial review of the geotechnical issues relating to the proposed redevelopment;
- Review of the natural terrain hazards overlooking the site; and
- Proposed works and the corresponding impact on the existing slope features.

2 Site Description

2.1 Site Topography

- 2.1.1** The Application Site is situated at the western part of HSK/HT NDA, at the downslope area of the natural terrain. It is located at Site 3-44 and Site 3-47 of HSK/HT NDA Development. The western boundary of the site adjoins the natural hillside, with level varying from approx. +32mPD to +45mPD. For the eastern boundary of the site, the existing ground level varies from approx. +23mPD to +25mPD. Under HSK/NT NDA, the eastern boundary of the site will be modified to match with the proposed Road L24 under the HSK/HT NDA development with proposed road level varying from +24.2mPD at the southern part to +19.1mPD in the northern part.

3 Geotechnical Review

3.1 General

- 3.1.1** A desk study has been carried out to support geotechnical appraisal. The study comprised a review of the general site history via aerial photograph interpretation (API); review of regional geology; evaluation of the condition and engineering status of man-made features within and adjacent to the Sites; and a review of existing ground investigation (GI) records.
- 3.1.2** The Natural Terrain Hazard Study (NTHS) is discussed in **Section 4**.

3.2 Site Development History

- 3.2.1** The API report is enclosed in **Appendix A**, identifying all salient geological features, hydrology, land use changes, past instability, ground conditions, and potential landslide hazards.
- 3.2.2** The Application Site is located at Site 3-44 and Site 3-47 of HSK/HT NDA Development. It is overlooked by several well-defined natural terrain catchments. The natural terrain is characterized by distinct ridgelines, spurlines and incised drainage lines. Numerous relict and recent landslide features have been identified within the catchments. The demarcations of natural terrain catchments are shown in **Appendix A** and **Figure 4.1**.
- 3.2.3** Presence of incised natural drainage channels are noted within Catchment Nos. YTS-6, YTS-7, YTS-9 and YTS-10. Within Catchment No. YTS-10, several drainage tributaries join together to form a major channel in the middle and lower portions of the catchment.
- 3.2.4** In early 1960s, the Sites were predominantly rural in character, comprising extensive farmland with footpaths and a limited number of village houses. The surrounding natural terrain catchments appeared largely undisturbed and remained

covered by natural vegetation, with little evidence of significant human activities.

- 3.2.5** By early 1970s, portions of the farmland appeared to have been abandoned. This trend continued into early 1980s when much of the agricultural land had become overgrown, indicating a substantial decline in farming activities within the area. During the same period, additional squatters and village houses were established.
- 3.2.6** No major terrain modification, large-scale excavation or substantial urban development was evident during late 1980s to early 1990s. The adjoining natural terrain catchments also remained largely unaffected by anthropogenic activities.
- 3.2.7** By 2020s, extensive vegetation clearance had been carried out across significant portions of the Sites. A structure was also constructed within the western part of Site 3-47, and its footprint subsequently expanded. Notwithstanding these recent changes, the natural terrain catchments overlooking the Sites continued to exhibit minimal signs of anthropogenic disturbance throughout this period.

3.3 Published Geology

Superficial Geology

- 3.3.1** Based on the 1:20,000 Solid and Superficial Geological Map Sheets 6 (GEO, 2019) and HKGS 1:5,000 superficial geological map, the Sites are underlain by extensive deposits of Quaternary colluvium (Qcd) of Check Lap Kok Formation of Pleistocene age.

Solid Geology

- 3.3.2** Based on the 1:20,000 Solid Geological Map Sheet 6, the Sites are overlain on bedrock of Jurassic Tuen Mun Formation, particularly the Siu Hang Tsuen Member (Jus).

Tuen Mun Formation - Siu Hang Tsuen Member (Jus)

- 3.3.3** The Siu Hang Tsuen Member (Jus) is predominantly present at the central to eastern portion of the HSK/HT NDA, comprising dominantly polymictic (including marble clasts), tuffaceous/epiclastic conglomerate, sandstone and siltstone with minor andesite peperite.

Structural Geology

- 3.3.4** Based on the 1:20,000 Solid Geological Map Sheet 6, an east to northeast trending inferred fault intersects the southern portion of the Sites.
- 3.3.5** The Sites are located between two major faults, namely the Yuen Tau Shan Fault and East Tuen Mun Fault with distance over 400 m.

Metamorphism

3.3.6 With reference to the published geological maps, mylonite and low-grade metamorphism are documented along the abovementioned Yuen Tau Shan Fault and East Tuen Mun Fault and not evident within the Sites.

3.3.7 The 1:100,000 Geological Map, 1:20,000 Geological Map, 1:5,000 Geological Map (Solid Geology and Superficial geology) are shown in **Figure 3.1, 3.2, 3.3a and 3.3b**.

3.4 Previous Ground Investigation Records

3.4.1 A search of existing ground investigation (GI) records was conducted at the Geological Information Unit (GIU) of the Geotechnical Engineering Office (GEO). No existing GI records were identified within 25 m of the site boundary.

3.4.2 Project-specific GI works were conducted within and near the vicinity of the Site under different stages of the HSK NDA Projects including: (i) *Contract No. YL/2021/02 "Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development"* and (ii) *Contract No. YL/2023/05 "Hung Shui Kiu / Ha Tsuen New Development Area Second Phase Development – Contract 5 – Site Formation and Engineering Infrastructure Works"*. A total of 10 nos. of drillholes and 7 nos. of trial pits have been completed. Layout plan indicating the location of the project-specific GI is presented in **Figure 3.4**. A summary of the relevant GI records is presented in **Table 3.1** and the logs are in **Appendix D** for reference.

Table 3.1 – Summary on Projects-specific GI Information

Contract No.	Drillhole/ Trial pit No.	Within/O outside Site Boundary ^[1]	Ground Level (mPD)	Depth (m)	Thickness of Strata (m)			
					Fill	Colluvium	Alluvium	Saprolite
YL/2021/02	A15	Within	+26.42	11.55	-	2.00	-	9.55
YL/2021/02	A16	Within	+27.11	11.55	-	6.00	-	5.55
YL/2021/02	A17	Within	+27.46	11.55	-	6.00	-	5.55
YL/2021/02	DH2031	Outside	+23.78	24.30	2.00	2.00	4.90	5.60
YL/2021/02	TP2009	Within	+27.14	2.80	-	1.80	-	1.00
YL/2021/02	TP2010	Within	+26.84	3.00	0.70	-	-	2.30
YL/2021/02	TIP3001	Outside	+31.32	2.05	-	2.05	-	-
YL/2021/02	TIP3002	Outside	+42.28	3.00	-	3.00	-	-
YL/2021/02	TIP3006	Outside	+31.87	3.00	0.20	2.80	-	-
YL/2021/02	TIP3008	Outside	+42.95	3.00	0.35	1.95	-	0.70
YL/2021/02	TIP3009	Outside	+41.12	3.00	-	2.70	-	0.30
YL/2023/05	BHC5-044	Outside	+29.42	26.88	1.00	3.00	-	17.11
YL/2023/05	BHC5-054	Outside	+24.15	30.93	2.00	5.10	2.90	19.76
YL/2023/05	BHC5-212	Outside	+33.65	24.35	-	2.00	-	16.91
YL/2023/05	BHC5-213	Within	+26.81	25.21	1.60	6.00	-	11.49
YL/2023/05	BHC5-214	Within	+26.89	33.38	3.00	4.00	-	23.80
YL/2023/05	BHC5-215	Within	+24.13	18.76	2.50	2.20	2.00	6.63

[1] The GI located outside the site boundary is identified within 25m of the site boundary.

- 3.4.3** Based on the above GI records, the Sites comprises fill, colluvium, alluvium, and completely to slightly decomposed in-situ materials.
- 3.4.4** Fill comprising silt, sand and cobble-sized materials has been encountered, with thicknesses ranging from approximately 0.2 m to 3.0 m, forming the uppermost stratum across the Site.
- 3.4.5** Colluvium has been encountered extensively across almost the entire Site, with thicknesses ranging from approximately 1.8 m to 6.0 m. The colluvial deposits generally comprise a heterogeneous mixture of clay, silt, sand and cobble-sized materials.
- 3.4.6** Alluvial deposits comprising clay, silt, sand and cobble-sized materials have been locally encountered in DH2031, BHC5-215 and BHC5-054. These deposits are generally found beneath the colluvium layer, with thicknesses ranging from approximately 2.0 m to 4.9 m.
- 3.4.7** In-situ materials of varying lithologies have been encountered beneath the superficial deposits across the Site.
- 3.4.8** No major fault-related features have been identified from the available GI records. Nevertheless, highly fractured rock was encountered in BHC5-212, while silicified bedrock and a locally deepened rockhead profile were recorded in BHC5-214.
- 3.4.9** The aforementioned GI findings are generally consistent with the published solid and superficial geological information presented in the available geological maps and relevant publications.

3.5 Registered Man-made Features

- 3.5.1** All available information regarding existing man-made features which may affect or be affected by the proposed redevelopment have been reviewed through inspection of the records maintained in the Geotechnical Information Infrastructure (GInfo) of the Geotechnical Engineering Office (GEO) and Slope Maintenance Responsibility Information System (SMRIS) of the District Lands Department (DLO).
- 3.5.2** No registered man-made features are located within the Site. Two registered man-made features have been identified within 50m of the site boundary. Existing feature 6NW-A/C13 is located to the north, while feature 6NW-C/C30 is situated to the south. The locations of the features are shown in **Figure 3.1**. A summary of the responsible maintenance parties and slope information is shown in **Table 3.2**.

Table 3.2 – Summary on Registered Man-made Feature

Feature No.	Maintenance Party	Maintenance Agent	Max. Height (m)	Length (m)	Average Slope Angle (Degree)	Affected by proposed redevelopment? (Yes/No)
6NW-C/C30	LandsD	LandsD	6	70	45	No
6NW-A/C13	LandsD	LandsD	3	25	30	No

3.5.3 The detail description of the registered features is presented as follows:

Feature No. 6NW-C/C30

3.5.4 The feature is located at a minimum distance of 16m from the southern site boundary. It comprises a soil cut slope with maximum height of approx. 6m, an average inclination of 45. Given the large offset distance, the existing feature will not affect / be affected by the proposed development.

Feature No. 6NW-A/C13

3.5.5 The feature is located at a minimum distance of 42m from the northern site boundary. It has maximum height of approx. 3 m and an average inclination of 30°. The feature will be demolished by the proposed site formation works under separate CEDD Contract No. YL/2023/05 under the HSK/HT NDA.

4 Natural Terrain Hazard Study

4.1 Natural Terrain Catchment Area

4.1.1 The extent of the natural terrain catchments affecting the Sites has been defined in accordance with GEO Report No. 138 (Edition II) (Ho & Roberts, 2016).

4.1.2 11 natural terrain catchments, namely Catchment Nos. YTS-5, YTS-6, YTS-7, YTS-8, YTS-9, sub catchment YTS-9A, YTS-10, sub catchment YTS-10A and YTS-10B, YTS-11 and sub catchment YTS-11A, overlooking the Sites have been identified. These areas have been delineated based on the extent of hillside directly overlooking and with flow paths leading to the proposed site boundary. The layout plan of the catchment is enclosed in **Figure 4.1**.

4.2 Natural Terrain Hazard Screening

4.2.1 Natural Terrain Hazard Screening has been undertaken for the various catchments delineated to determine whether they have notable potential to contribute hazards to the Sites. The screening has been conducted in accordance with the criteria laid out in GEO Report No. 138 (Edition II), namely:

- i. Inclusion Guidelines
- ii. In-principle Objection Criteria
- iii. Alert Criteria

Inclusion Guidelines

4.2.2 According to the GEO Report No. 138 (Edition II), there are two conditions to fulfill to identify whether a site may require further study, comprising:

- (a) *The proposed development involves Group 1, 2 or 3 facilities, and*
- (b) *There is a 'hillside' sloping at more than 15° within 100 m horizontally upslope of the site boundary.*

4.2.3 The Sites are identified as a Group 1(a) facility as it comprises 'residential building'. The Sites are also within 100 m of hillsides with slope angles over 15°. Therefore, the inclusion criteria are satisfied, and further screening of the Sites is required.

In-principle Objection Criteria

4.2.4 According to GEO Report No.138 (Edition II), GEO would object in-principle to proposals for the zoning and disposal of a site that falls under the following conditions:

- (a) *A site is faced with severe natural terrain hazards. A site falls within this category if any proposed Facility Groups 1(a), 1(b) and 2(a) is either:*
 - (i) *located within an angle of reach of 35° from any natural terrain at an elevation of 50 m or more above the proposed site formation level, or*
 - (ii) *located on, or immediately below, terrain that is known to be affected by active, large-scale movement (e.g. Tuen Mun Area 19).*
- (b) *The site is proposed for small-scale New Territories Exempted House (NTEH) and is subject to potential natural terrain hazards.*

4.2.5 The maximum angle of reach for all natural terrain catchments is less than 35° (**Appendix B**). Additionally, the Sites do not fall within an area that is known to be affected by active, large-scale movement and is not proposed for NTEH type development. As such, the Sites do not satisfy the in-principle objection criteria.

Alert Criteria

4.2.6 The "Alert Criteria" is defined as follows:

- (a) *It is a new development site involving provision of Group 1 to 3 facilities, or it is a redevelopment that requires modification of the lease conditions and involves either a significant population at risk or a significant increase in population at risk.*
- (b) *Where there is natural terrain outside the site, but within the same catchment, that is at an angular elevation of 20° or more from the site and where there is ground sloping at more than 15° within 50 m horizontally upslope of the site boundary, provided that there is a credible debris flow path to the site.*

4.2.7 A detailed assessment of natural terrain hazards will be required for any catchments satisfying the Alert Criteria.

4.2.8 Cross sections showing that the maximum angular elevation for each of the natural terrain catchment affecting the Sites are shown in **Appendix B**, with a summary of

the findings provided in **Table 4.1** below. The assessment found that all catchments meet the "Alert Criteria" or having the prominent natural drainage course as additional consideration, and thus require further detailed study of natural terrain hazards.

Table 4.1 – Summary of Catchments overlooking the Site

Catchment No.	Inclusion Criteria Satisfied	Angular Elevation (°)	Result of Proximity Assessment	Other Consideration	NTHA Required ?
YTS-5	Y	27	Satisfy Alert Criteria	-	Y
YTS-6	Y	24	Satisfy Alert Criteria	-	Y
YTS-7	Y	23	Satisfy Alert Criteria	-	Y
YTS-8	Y	21	Satisfy Alert Criteria	-	Y
YTS-9 (including sub catchment YTS-9A)	Y	28	Satisfy Alert Criteria	-	Y
YTS-10 (including sub catchments YTS-10A and YTS-10B)	Y	18	Not Satisfy Alert Criteria	Presence of prominent natural drainage and past instability record	Y
YTS-11 (including sub catchment YTS-11A)	Y	20	Satisfy Alert Criteria	-	Y

4.3 Mitigation Strategies for Natural Terrain Hazard

4.3.1 With due consideration of the possible type and magnitude of the hazards as well as the site conditions present, the following are the possible hazard mitigation strategies for the Application Sites:

4.3.2 *Avoidance:* Considering the temporary nature of proposed land use, avoidance approaches such as adjustments to the facility layout and providing buffer zones, are considered realistic strategies in terms of cost effectiveness.

4.3.3 *Debris Containment / Diversion:* Depending on the magnitude of the landslide in question, debris can be prevented from impacting on facilities through provision of flexible or rigid barriers or through provision of debris diversion walls to deflect the debris away from any affected facilities.

4.3.4 Mitigation strategy for natural terrain hazards will be discussed in separate NTHS report.

5 Proposed Geotechnical Works

5.1 Proposed Site Formation Works

- 5.1.1** The Application Site composes of a platform with level varying from +27.0mPD to +28.5mPD in most part of the Site and ramping up to +32.5mPD near the northern end to match with the adjacent ground level.
- 5.1.2** To form a levelled platform for the proposed redevelopment, cut and fill slopes are proposed at the periphery of the platform to cater for the level difference with the adjacent ground. The maximum slope height is approx. 9m at the eastern part of the Site. Schematic site formation layout plan is shown in **Appendix C**.
- 5.1.3** Both cutting and filling from original ground level are proposed to form the levelled platform. Cut and fill slopes are tentatively proposed with a max. gradient of 33 degrees and 30 degrees respectively.
- 5.1.4** In detailed design stage, proposed slopes will be designed to meet the current geotechnical standards and requirements from the Geotechnical Engineering Office (GEO). For slopes with building foundation located near the crest, the vertical load and lateral load of the building foundation will be taken into account in the slope stability analysis. In addition, the surface drainage works will be designed in accordance with the requirements of the Geotechnical Manual for Slopes.

5.2 Proposed Foundation Works

- 5.2.1** In view of the relatively small loading, shallow footing / raft foundation is envisaged for the two-storey residential blocks by Modular Integrated Construction (MiC). For shallow footing / raft foundation located near the crest of slope, the bearing capacity will be estimated with due consideration of the slope profile.
- 5.2.2** Details of the proposed shallow footing / raft foundations will be presented in the foundation design submission.
- 5.2.3** Temporary excavation for the proposed foundation construction will be presented in separate design submission in the detailed design stage. The use of temporary open cut slope will be deployed as far as possible.

6 Conclusion and Recommendation

- 6.1.1** A geotechnical planning review has been conducted for the proposed Application Site that may affect, or be affected by, natural terrain, man-made slope or retaining wall features in accordance with GEO Advice Note for Planning Application under Town Planning Ordinance (Cap. 131). The indicative scheme of the Site comprises 8 nos. of two-storey residential blocks and the associated works.
- 6.1.2** The review has been carried out based on the findings of desk studies, aerial photo interpretation (API) and inspection of Site and the adjacent natural terrain catchments. The Application Site is located at the toe of few natural terrain catchments.
- 6.1.3** Initial natural terrain hazard screening indicated that the site falls into the "Alert Criteria" for the Application Sites. Further study of natural terrain hazards in accordance with GEO Report No. 138 is required. Suitable mitigation measures, including avoidance and debris containment/diversion strategies, will be developed to manage the identified natural terrain hazard risks, and will be covered under separate report.
- 6.1.4** Schematic site formation plan has been proposed. Both cutting and filling from original ground level are required to form the levelled platform. Cut and fill slopes are proposed to retain level difference between proposed platform and adjacent ground level. The two-storey residential blocks are proposed to sit on shallow footing / raft foundation.
- 6.1.5** In conclusion, the proposed redevelopment is considered to be feasible from the geotechnical perspective.

7 Reference

Geotechnical Control Office, (1989). 1:5,000 Geological Map Sheet 6-NW-A (Series HGP5A and HGP5B), Hong Kong Geological Survey;

Sewell et al. (2000). The Pre-Quaternary Geology of Hong Kong. Geological Map of Hong Kong. Series HGM100. Scale 1:100,000;

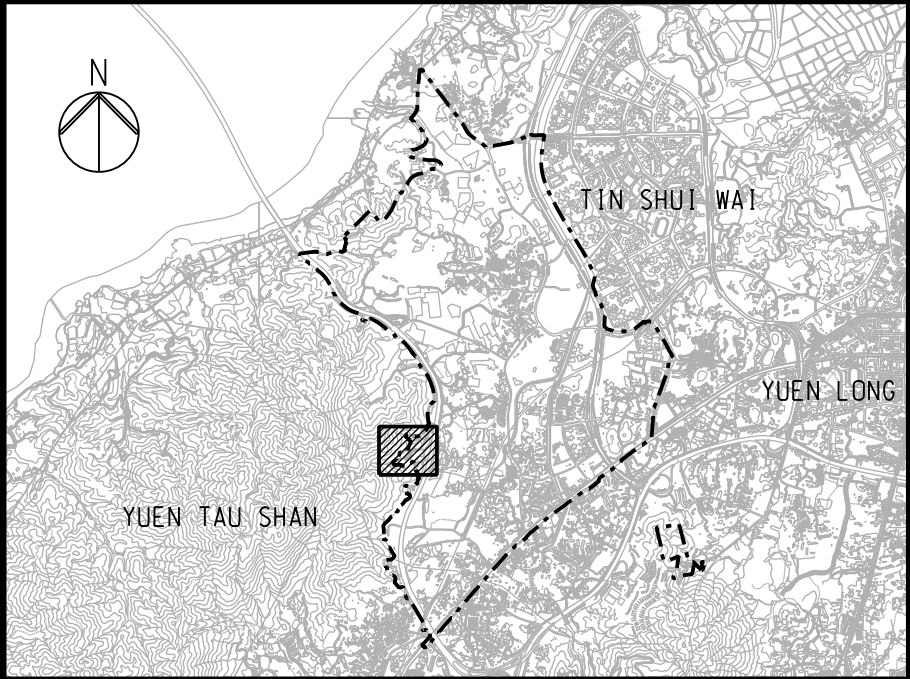
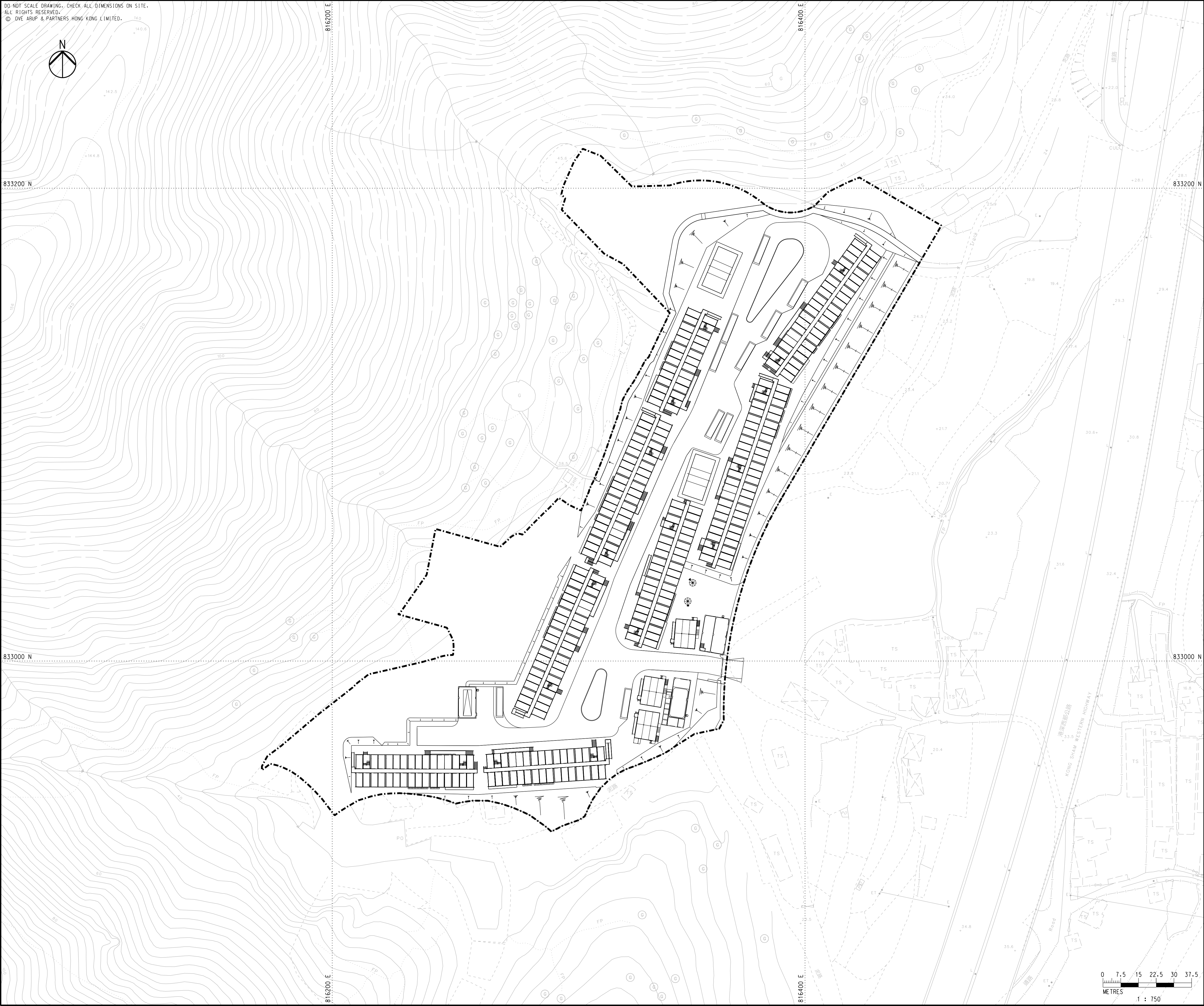
Geotechnical Engineering Office, (2016). GEO Report No. 138 (Second Edition), Hong Kong Geological Survey;

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Geotechnical Engineering Office (GEO) (2024). Geo Advice for Planning Applications under Town Planning Ordinance (Cap 131) – Requirements for a Geotechnical Planning Review report in support of planning application

Figures

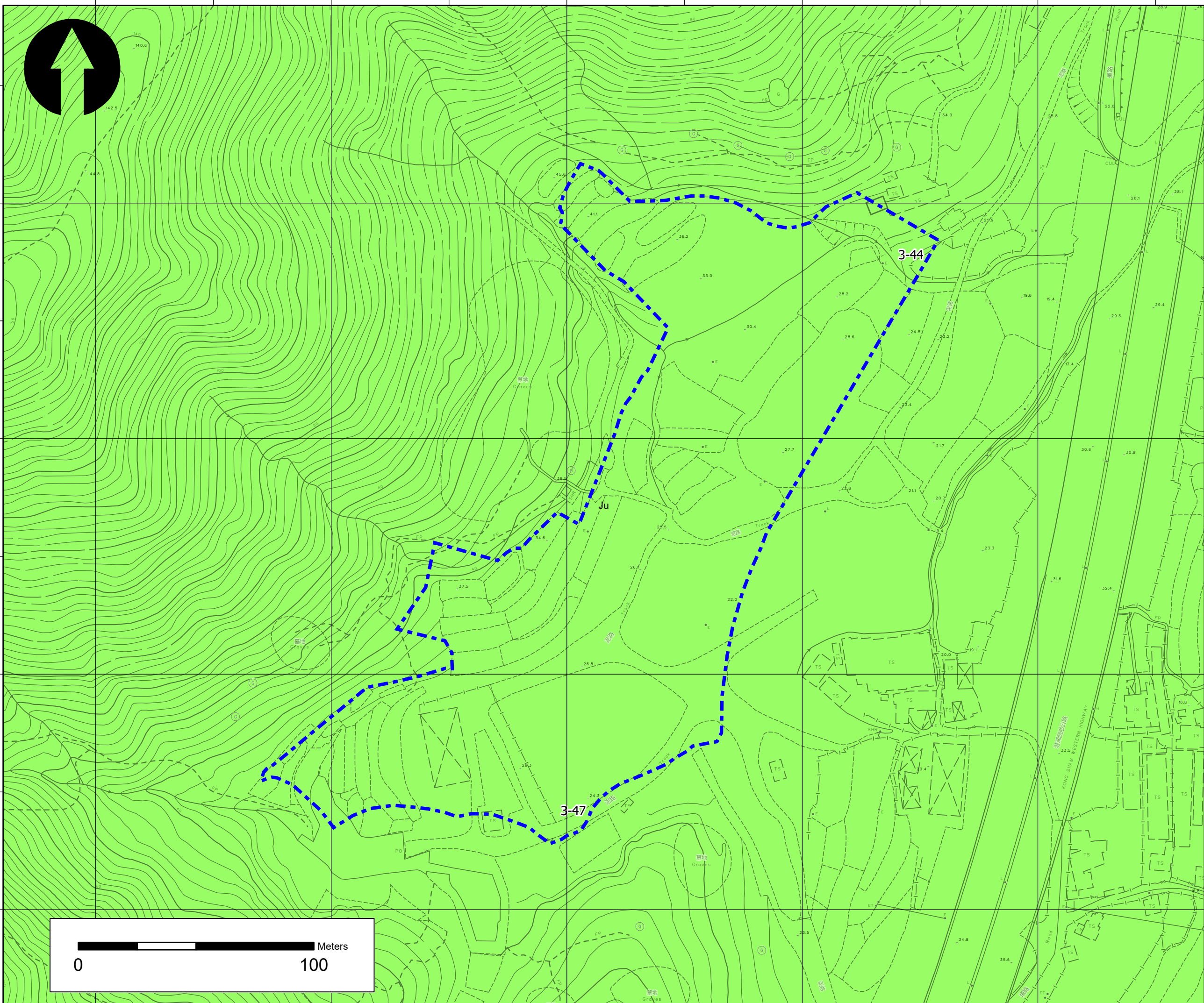
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KEY PLAN

LEGEND
[Dashed Box] APPLICATION SITE

A	FIRST ISSUE	KF	07/26
Rev	Description	By	Date
Consultant			
ARUP			
Project Title			
Agreement No. CE 1/2020 (CE) Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction			
Drawing title			
HSK / HT NDA SECOND PHASE DEVELOPMENT IMPORTED LABOUR QUARTERS GENERAL LAYOUT PLAN			
Figure 1.1			Rev. A
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Scale 1:750 @ A1		Status PRELIMINARY	
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Legend

- Site Boundary
- Tuen Mun Fm.

Contract No. and Title

ARUP

Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area
Package A Works for Second Phase
Development – Design and Construction

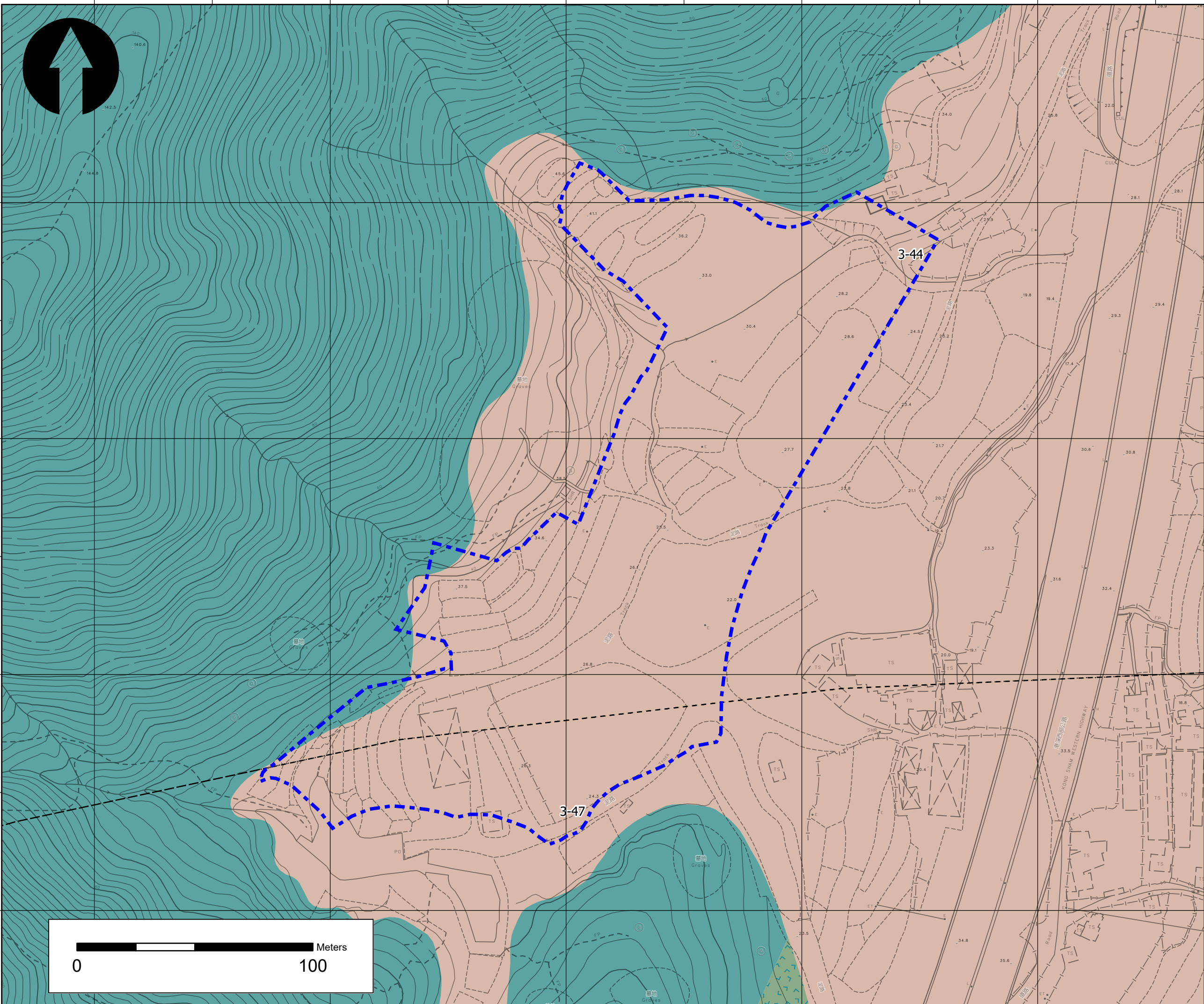
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1:100,000 Geological Map

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CEDD

土木工程拓展署
Civil Engineering and
Development Department



Legend

Site Boundary

Faults

- Approximate Fault
- Inferred Fault

Superficial Deposits

Qcd Colluvium (Chek Lap Kok Fm.)

Solid Geology

Jua Andesite lava, autobreccia, lapilli lithic-bearing coarse ash crystal tuff and tuffite (Tuen Mun Fm.)

Jus Polymictic tuffaceous conglomerate, sandstone and siltstone with minor andesitic peperite (Tuen Mun Fm.)

Contract No. and Title

Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction

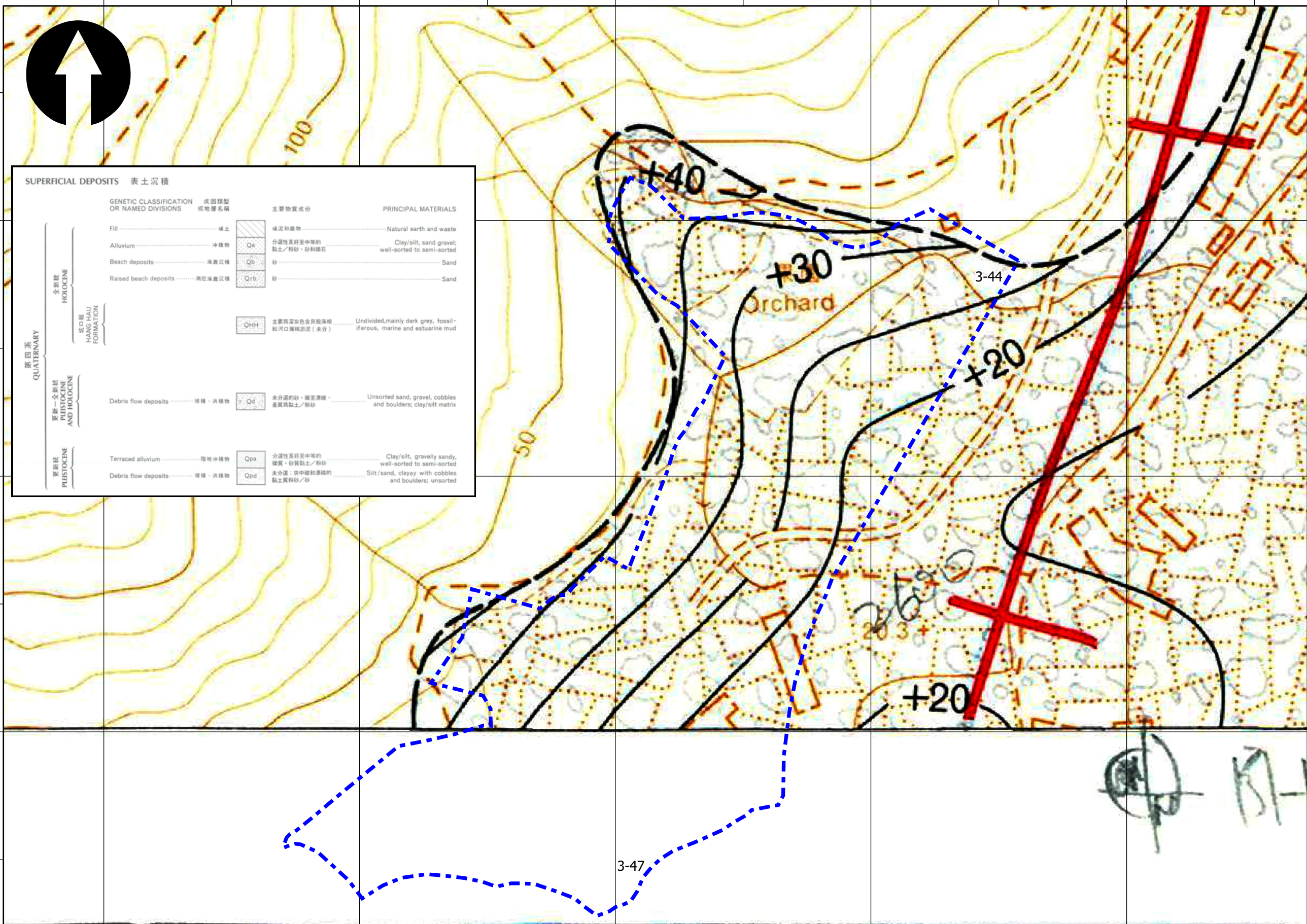
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1:20,000 Geological Map

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SUPERFICIAL DEPOSITS 表土沉積			
GENETIC CLASSIFICATION OR NAMED DIVISIONS 成因類型或地層名稱		主要物質成份	PRINCIPAL MATERIALS
全新統 HOLOCENE	Fill 填土		Natural earth and waste
	Alluvium 沖積物	Qa	Clay/silt, sand gravel; well-sorted to semi-sorted
	Beach deposits 海灘沉積	Qb	Sand
	Raised beach deposits 高位海灘沉積	Qrb	Sand
第四系 QUATERNARY	洪口組 HANG HAU FORMATION		
	QHH		主要為深灰色含頁岩海相和河口海相淤泥（未分）
更新—全新統 PLISTOCENE AND HOLOCENE	Debris flow deposits 堆積、洪積物	Qd	未分選的砂、礫至漂礫、基質為黏土/粉砂
			Unsorted sand, gravel, cobbles and boulders; clay/silt matrix
更新統 PLEISTOCENE	Terraced alluvium 階地沖積物	Qpa	分選性良好至中等的礫質、砂質黏土/粉砂
	Debris flow deposits 堆積、洪積物	Qpd	未分選：夾中礫和漂礫的黏土質粉砂/砂

Legend

Site Boundary

Consultant

ARUP

Contract No. and Title
Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction

Drawing Title

1:5,000 Geological Map (Superficial Geology)

Figure No.

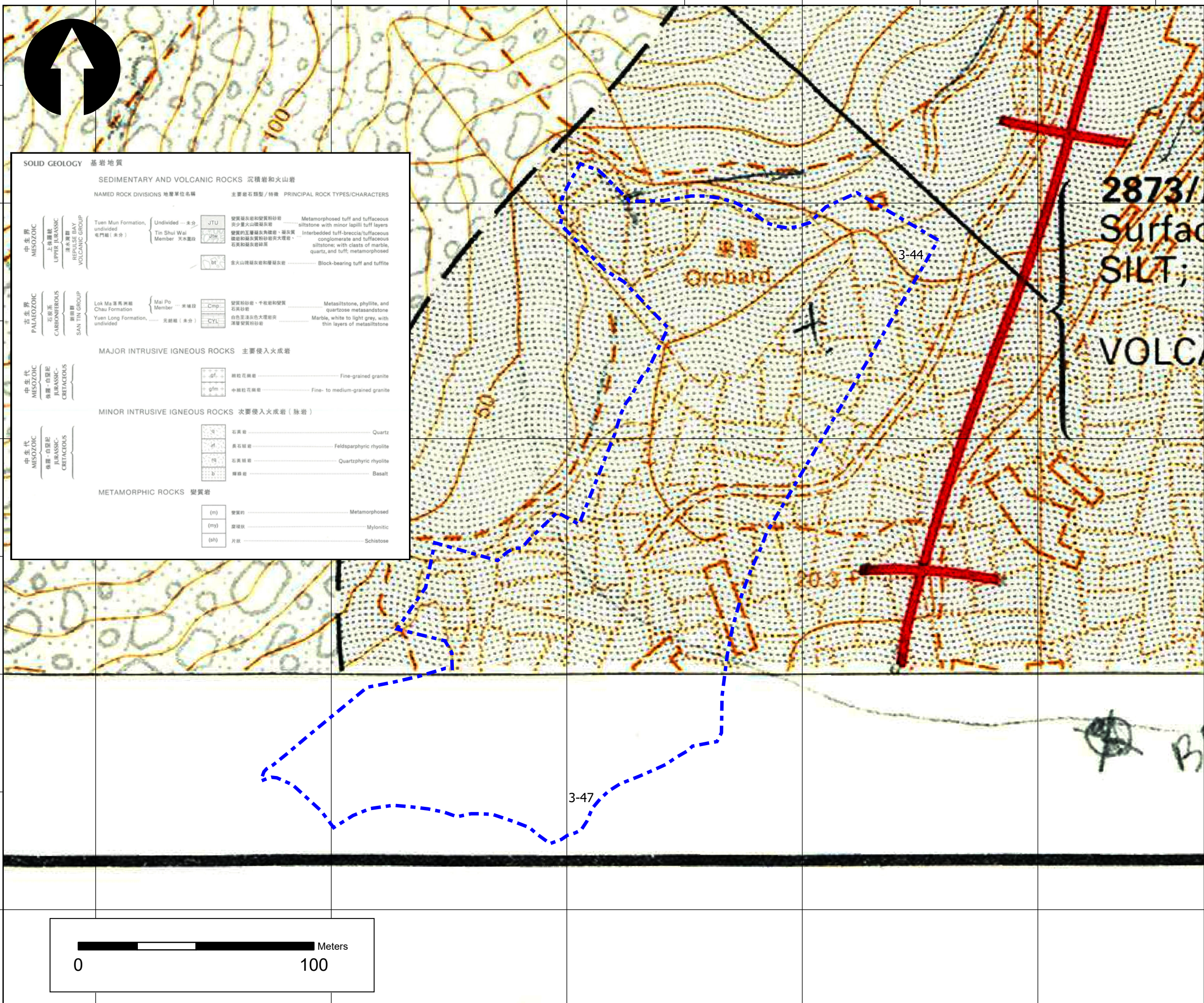
3.3a

Rev.

-

Drawn	AL	Date	07.2026	Checked	KL	Approved	KC
Scale	1:1,500			@ A3			

土木工程拓展署
Civil Engineering and Development Department



SOLID GEOLOGY 基岩地質

SEDIMENTARY AND VOLCANIC ROCKS 沉積岩和火山岩

NAMED ROCK DIVISIONS 地層單位名稱

主要岩石類型 / 特徵 PRINCIPAL ROCK TYPES/CHARACTERS

中生界
MESOZOIC

上侏羅統
UPPER JURASSIC

淡水湖層
REPLUSE BAY
VOLCANIC GROUP

Tuen Mun Formation, undivided
屯門組 (未分)

Undivided 未分
Tin Shui Wai Member 天水圍段

JTU
JTW
bt

變質凝灰岩和變質粉砂岩
夾少量火山碎屑灰岩
變質的互層凝灰岩和凝灰質
凝灰岩和凝灰質粉砂岩夾大理岩、
石英和凝灰岩碎屑
Metamorphosed tuff and tuffaceous
siltstone with minor lapilli tuff layers
Interbedded tuff-breccia/tuffaceous
conglomerate and tuffaceous
siltstone; with clasts of marble,
quartz, and tuff; metamorphosed
Block-bearing tuff and tuffite

古生界
PALAEOZOIC

石炭系
CARBONIFEROUS

新田組
SAN TIN GROUP

Lok Ma Tsuen 馬洲嶺
Chau Formation
Yuen Long Formation, undivided
元朗組 (未分)

Mai Po Member 麥埔段
CYL

Cmp
CYL

變質粉砂岩、千枚岩和變質
石英砂岩
白色至淺灰色大理岩夾
淺變質粉砂岩
Metasiltstone, phyllite, and
quartzose metasandstone
Marble, white to light grey, with
thin layers of metasiltstone

MAJOR INTRUSIVE IGNEOUS ROCKS 主要侵入火成岩

中生代
MESOZOIC

侏羅-白堊紀
JURASSIC-
CRETACEOUS

細粒花崗岩
gfl
中細粒花崗岩
gfm

細粒花崗岩
中細粒花崗岩
Fine-grained granite
Fine- to medium-grained granite

MINOR INTRUSIVE IGNEOUS ROCKS 次要侵入火成岩 (脈岩)

中生代
MESOZOIC

侏羅-白堊紀
JURASSIC-
CRETACEOUS

石英岩
q
英石斑岩
r
石英斑岩
rs
輝綠岩
b

石英岩
英石斑岩
石英斑岩
輝綠岩
Quartz
Feldsparphyric rhyolite
Quartzphyric rhyolite
Basalt

METAMORPHIC ROCKS 變質岩

(m)
(my)
(sh)

變質岩
糜礫岩
片麻岩
Metamorphosed
Mylonitic
Schistose

Legend

Site Boundary

Contract No. and Title

Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction

Drawing Title

1:5,000 Geological Map (Solid Geology)

Figure No.

3.3b

Rev.

-

Drawn

AL

Date

07.2026

Checked

KL

Approved

KC

Scale

1:1,500 @ A3

CEDD

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Development Department

© Arup



11

816400 E

816400 E



816400 E

~~CULT~~

A graphical scale bar for the map. It is marked in metres with values 0, 7.5, 15, 22.5, 30, and 37.5. The scale is 1 : 750.



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Drawing title

HSK / HT NDA SECOND PHASE
DEVELOPMENT IMPORTED LABOUR
QUARTERS EXISTING GROUND
INVESTIGATION AND REGISTERED
FEATURES LAYOUT PLAN

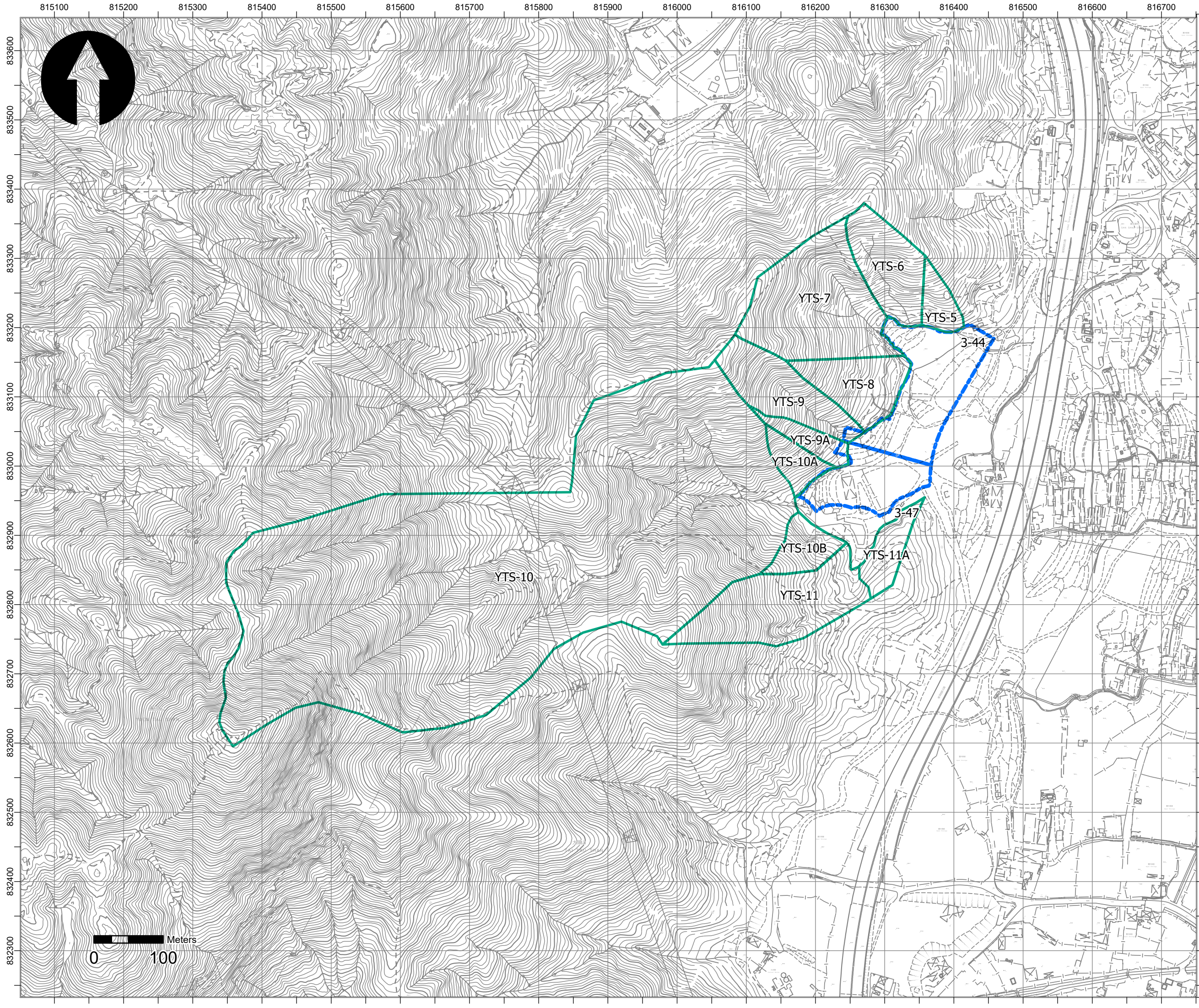
Rev. A

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Legend

- Site Boundary
- Natural Terrain Catchments

Consultant

ARUP

Contract No. and Title

Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction

Drawing Title

Natural Terrain Catchment Layout Plan

Figure No.

4.1

Rev.

-

Drawn

AL

Date

07.2026

Checked

KL

Approved

KC

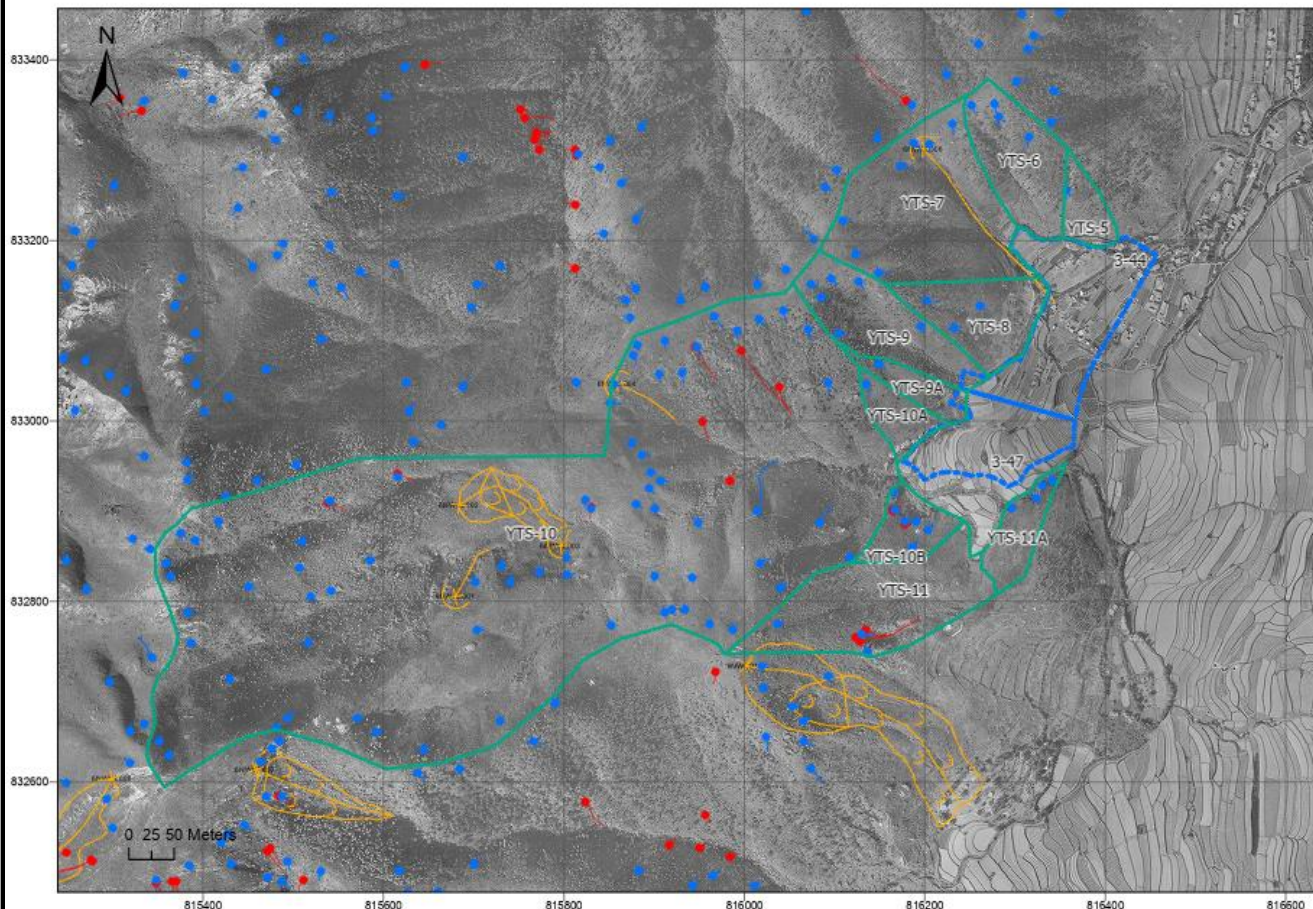
Scale

1:5,000 @ A3

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Civil Engineering and Development Department

Appendix A

Aerial Photograph Interpretation Report



Year 1963

Sites 3-44 & 3-47

- The Sites were largely covered by farmland with multiple footpaths and village houses.
- Well-defined drainage basins that include incised drainage channels were noted within Catchment Nos. YTS-6, YTS-7, YTS-9, YTS-10. In Catchment No. YTS-10, several streams join to form a single channel in the middle and lower parts of the catchment.
- Multiple relict ENT LI records have been recorded within the natural terrain catchments overlooking the Sites. Along with four (4) large landslide in Catchment No. YTS-10 and one (1) in Catchment No. YTS-7.
- No significant signs of anthropogenic disturbance were observed in the NTHS Catchments. Minor disturbances include scattered graves at the middle to lower portion of Catchment No. YTS-10.

Legend

- Site Boundary
- Catchment Boundary
- Recent ENT LI Source
- Relict ENT LI Source
- Large Landslide Dataset

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

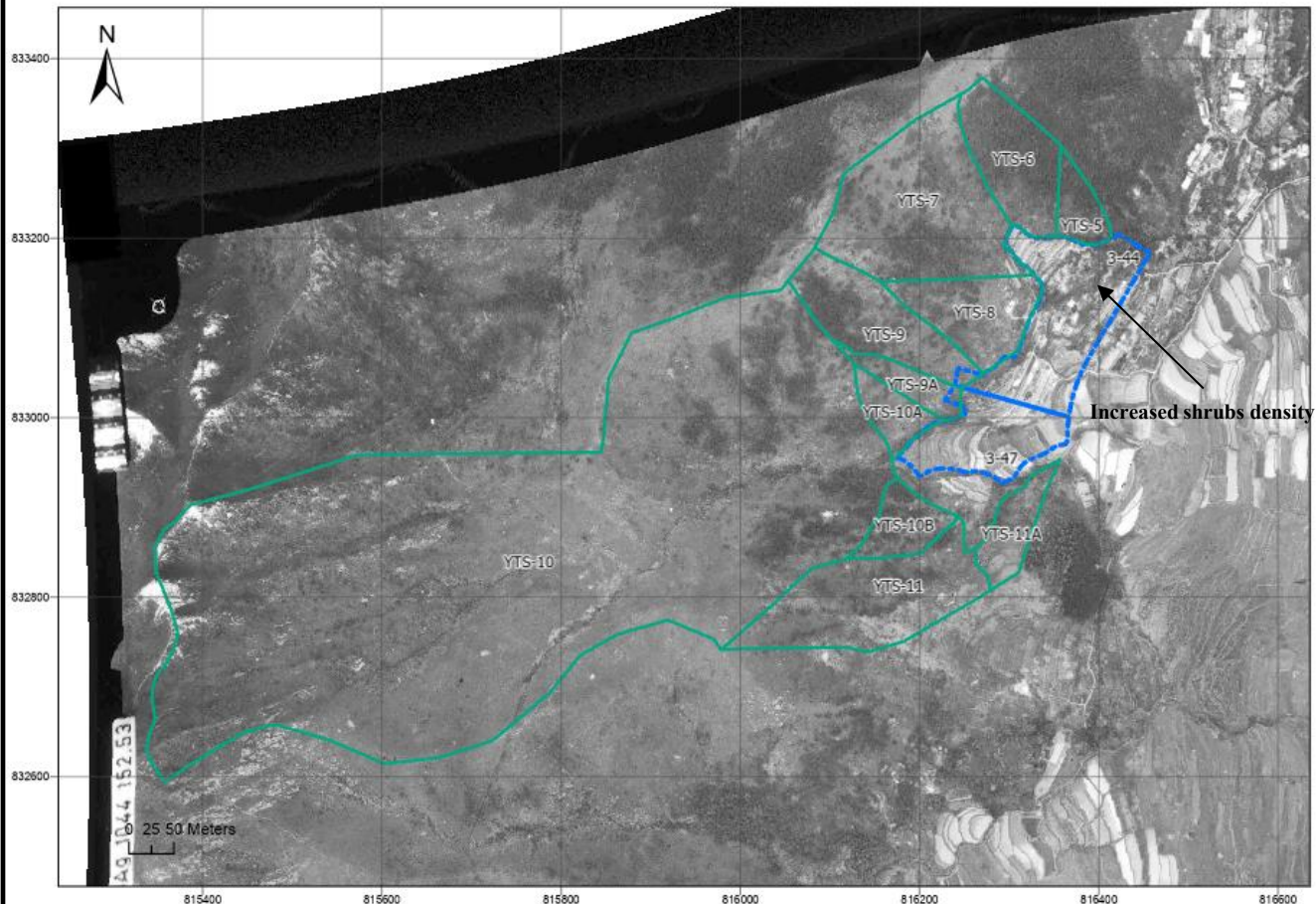
ARUP

Scale N.T.S.

Drn. AL Date Jul 2026 Chd. HC Passed JL

Job No. 278463

Figure No. A1



Year 1973

Sites 3-44 & 3-47

- Farmland at the northern portion of Site 3-44 seemingly being abandoned as reflected by increased density of shrubs
- No significant changes noted within the natural terrain catchments.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

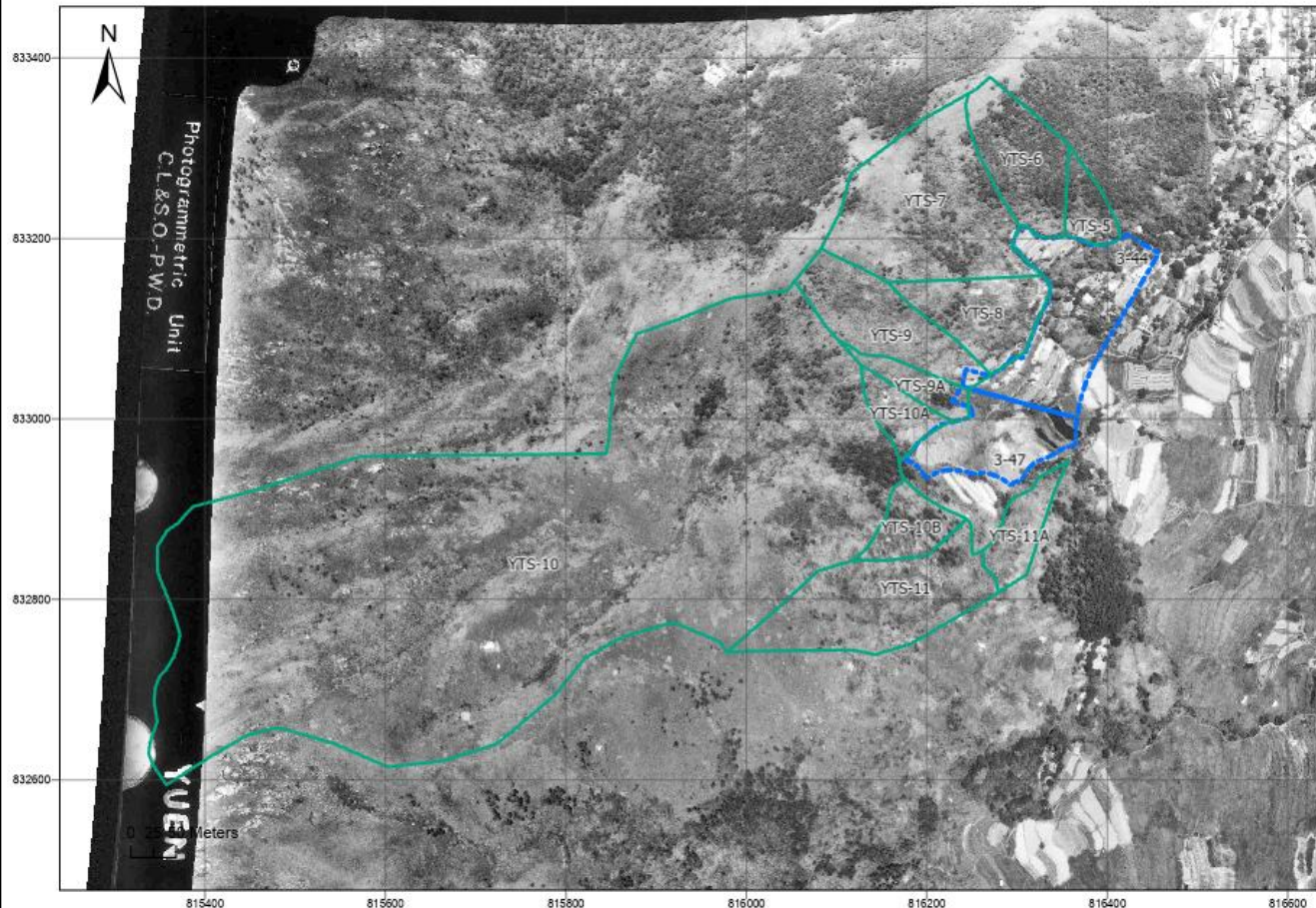
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A2



Year 1979

Sites 3-44 & 3-47

- No significant changes were noted within the Sites and natural terrain catchments.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

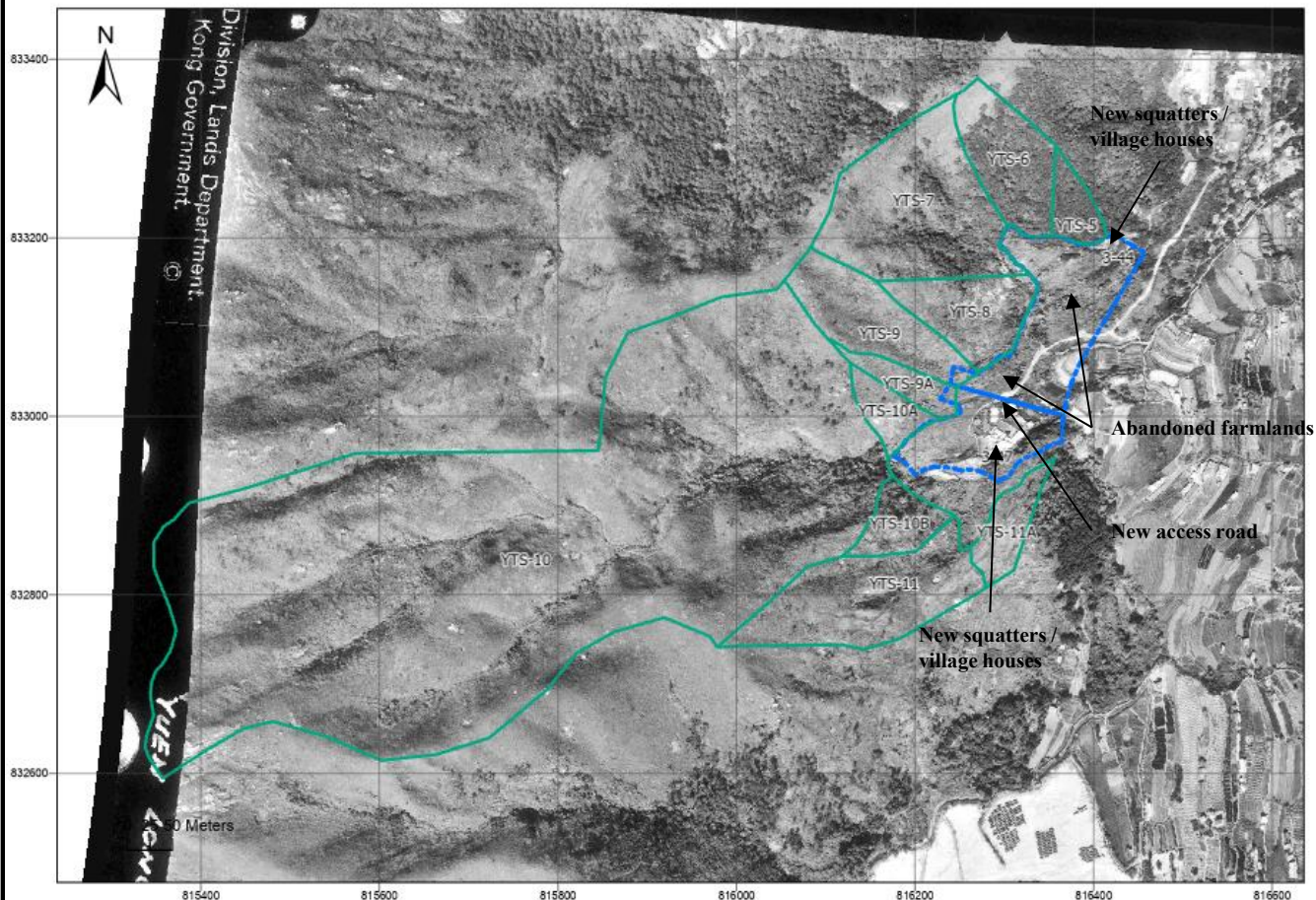
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A3



Year 1982

Sites 3-44 & 3-47

- Much of the farmland were covered by vegetation, suggesting most of them were abandoned.
- A new access road was formed traversing the Sites.
- Multiple squatters / village houses were formed at the northern portion of Site 3-44 and southern portion of Site 3-47.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

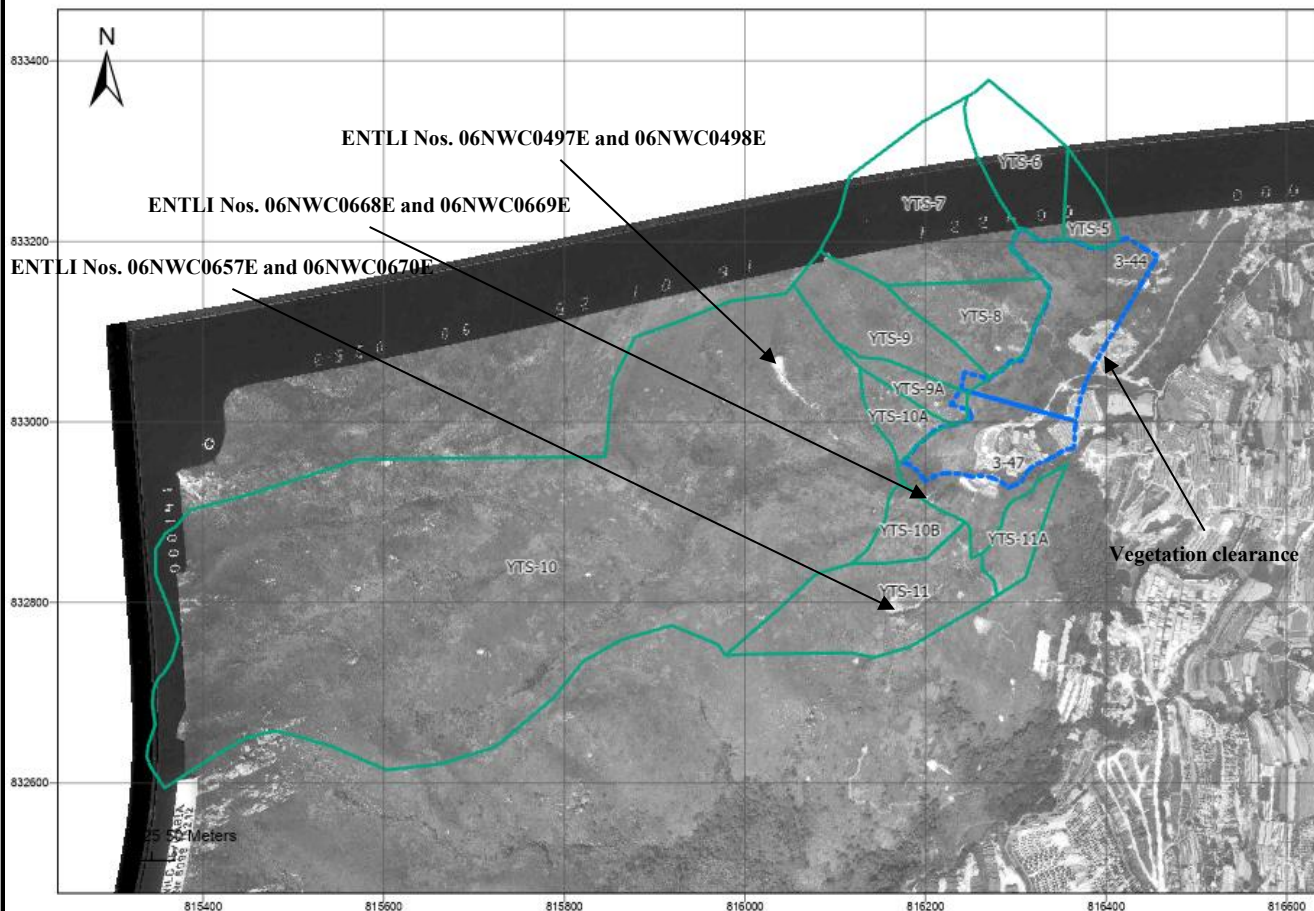
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A4



Year 1989

Sites 3-44 & 3-47

- Vegetation clearance noted at the eastern boundary of Site 3-44.
- ENTLI No. 06NWC0497E and 06NWC0498E occurred at the upper northern portion of Catchment No. YTS-10. ENTLI No. 06NWC0497E exhibited clear landslide scarp and debris travel path. The depression of ENTLI No. 06NWC0498E was not obvious, possibly eroded by the debris produced by ENTLI No. 06NWC0497E.
- ENTLI No. 06NWC0668E and 06NWC0669E were noted at the toe of Catchment No. YTS-10B. Slightly degraded depressions were observed for both landslides.
- ENTLI No. 06NWC0657E and 06NWC0670E occurred at the upper portion of NTHS Catchment No. YTS-11. The two landslides were of close proximity and displayed clear landslide scarp and debris travel path.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

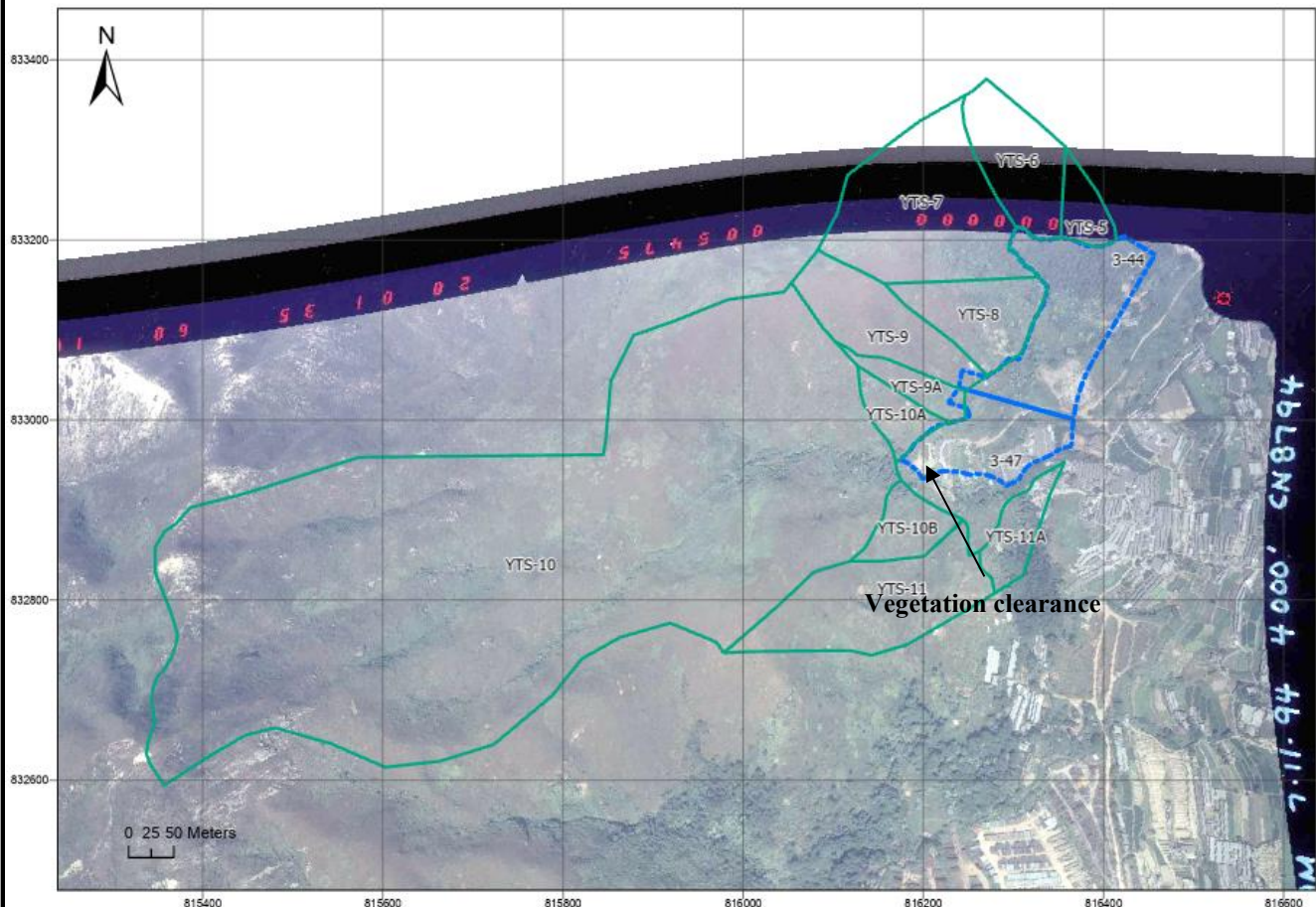
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A5



Year 1994

Sites 3-44 & 3-47

- Vegetation clearance noted at western portion of Site 3-47.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

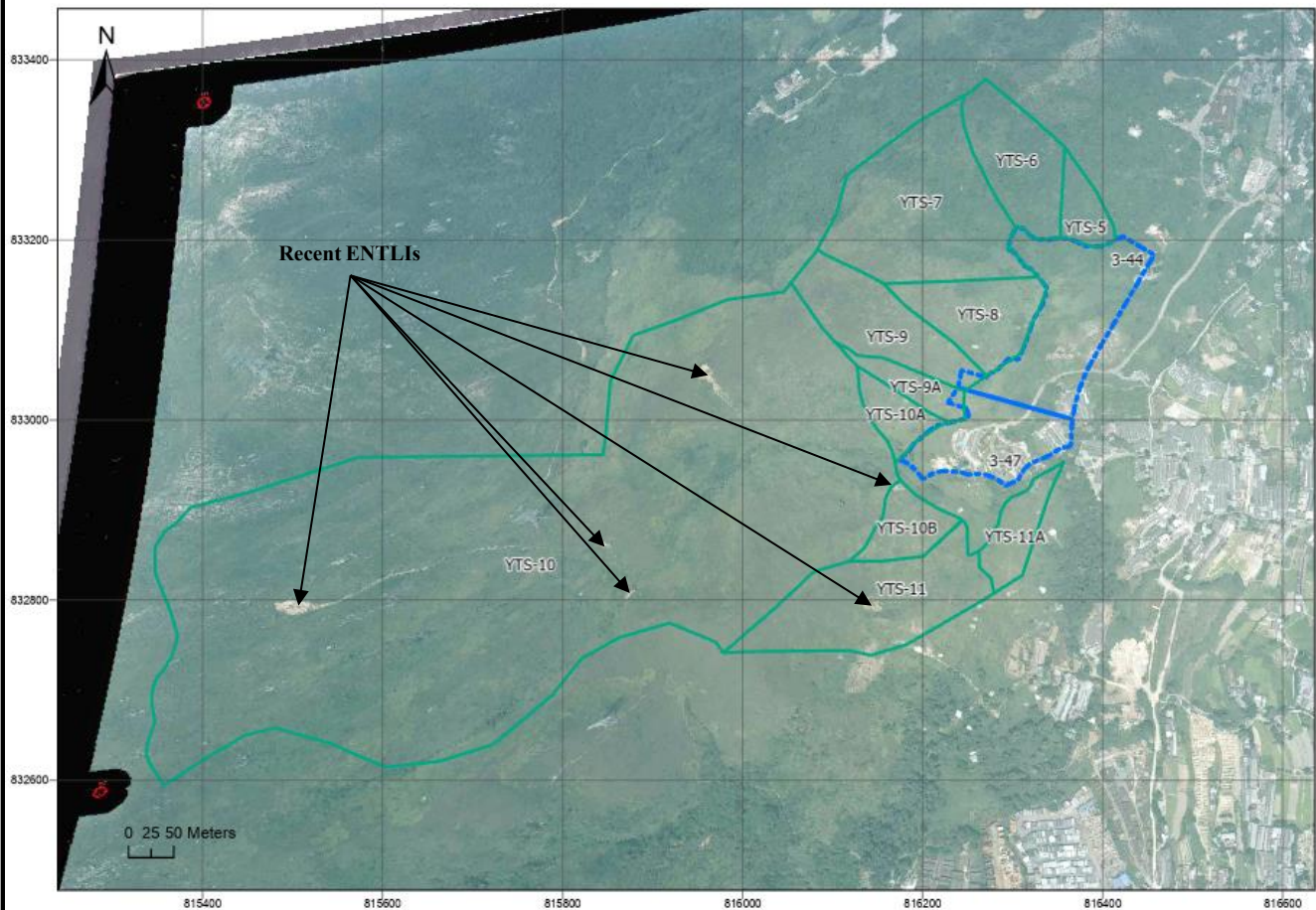
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A6



Year 2000

Sites 3-44 & 3-47

- No significant changes were noted within the Sites.
- ENTLI Nos. 06NWA0541E, 06NWC0752E, 06NWC0753E, 06NWC0784E, 06NWC0785E in Catchment Nos. YTS-10 and YTS-10B, 06NWC0754E in Catchment No. YTS-11.
- ENTLI Nos. 06NWC0541E and 06NWC0752E showed clear scarp and flow trails. Meanwhile, ENTLI Nos. 06NWC0753E, 06NWC0785E and 06NWC0784E showed depression features with bare vegetation cover, no obvious flow trail and displaced materials could be identified.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

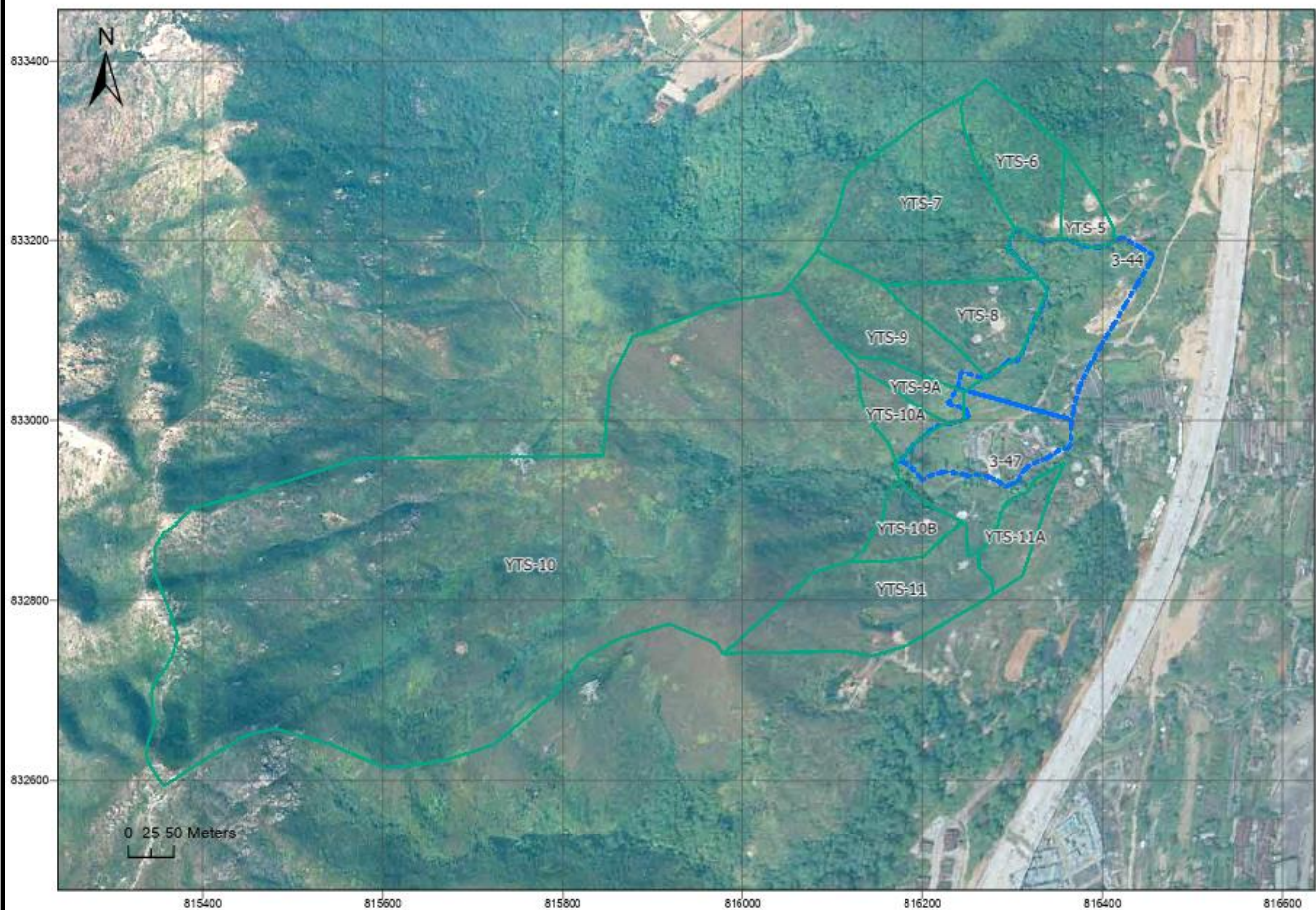
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A7



Year 2005

Sites 3-44 & 3-47

- No significant changes were noted within the Sites and natural terrain catchments.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

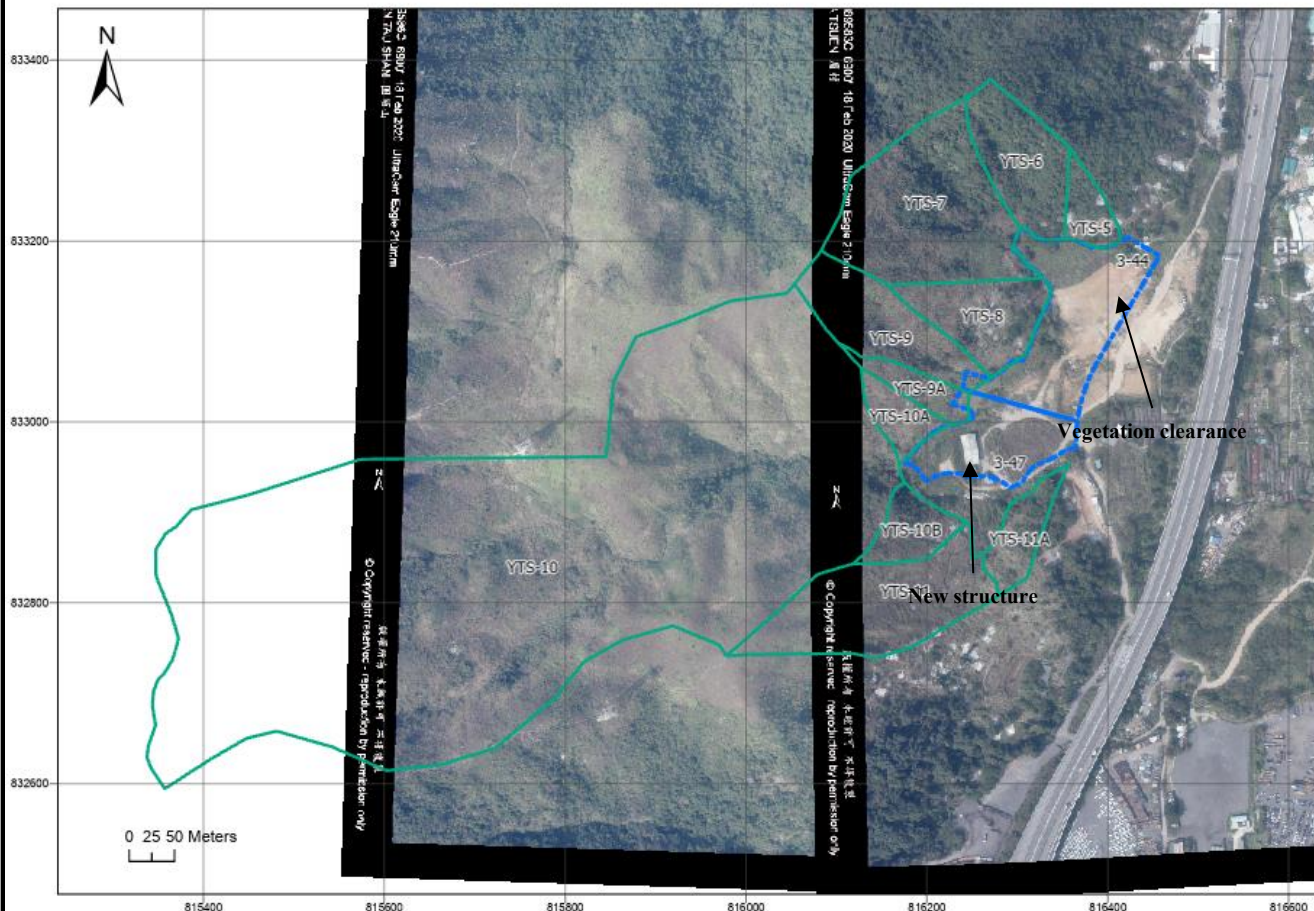
ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A8



Year 2020

Sites 3-44 & 3-47

- Large scale vegetation clearance was noted across the Sites.
- A structure formed at the western part of Site 3-47.
- No significant changes within the natural terrain catchments are noted.

Legend

- Site Boundary
- Catchment Boundary

Job Title

Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
- Design and Construction

Figure Title

Aerial Photograph Interpretation

ARUP

Scale N.T.S.

Drn. AS Date Apr 2024 Chd. HC Passed JL

Job No. 278463

Figure No. A9



Year 2025

Sites 3-44 & 3-47

- Extent of structure at Site 3-47 increased.
- No significant changes within the natural terrain catchments are noted.

Legend

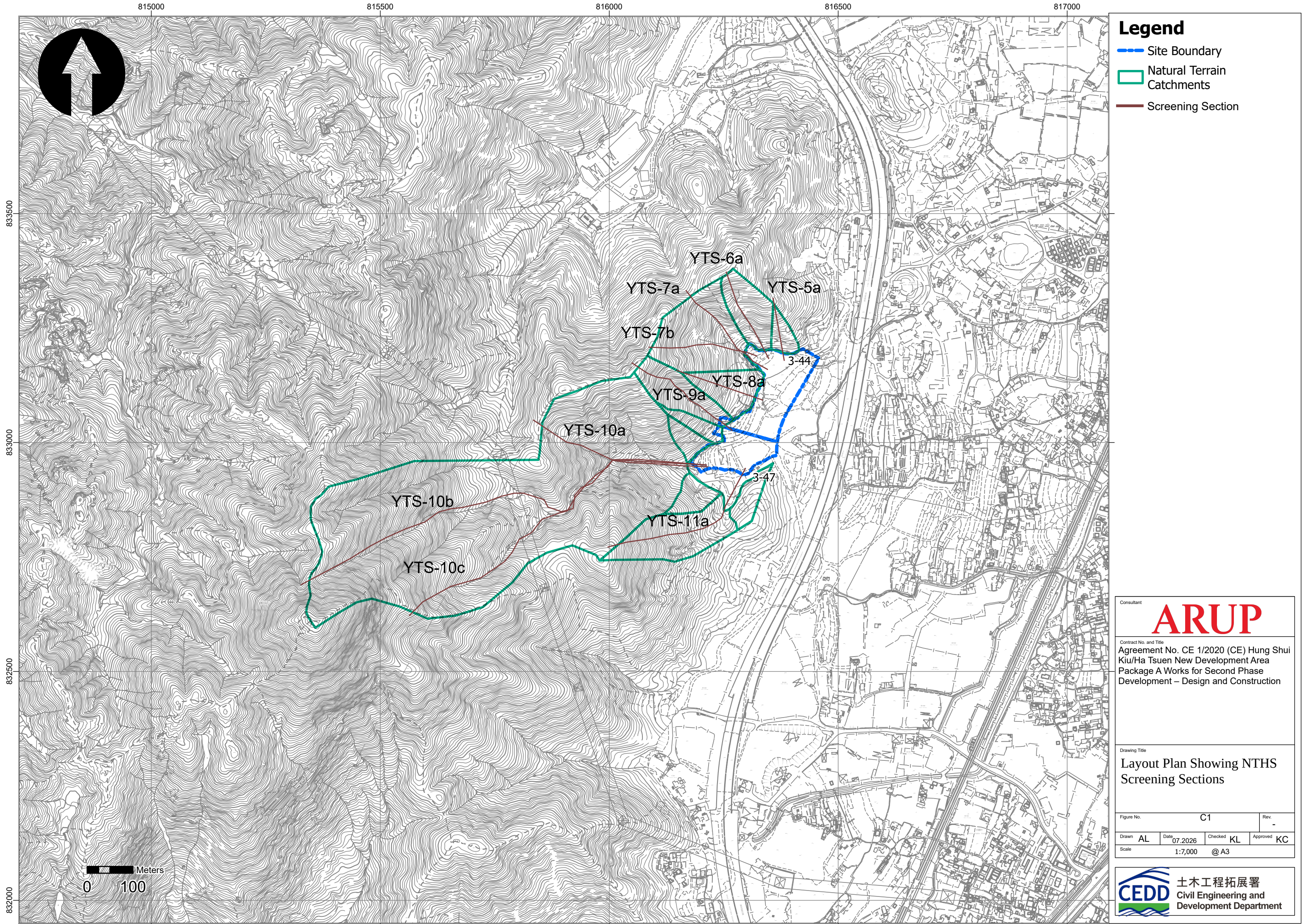
Site Boundary

Catchment Boundary

Job Title Agreement No. CE 1/2020 (CE) Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development - Design and Construction	Figure Title Aerial Photograph Interpretation	ARUP			
		Scale N.T.S.			
		Drn. AS	Date Apr 2024	Chd. HC	Passed JL
		Job No. 278463		Figure No. A10	

Appendix B

Extract of Previous NTHS Report for HSK/HT NDA Area



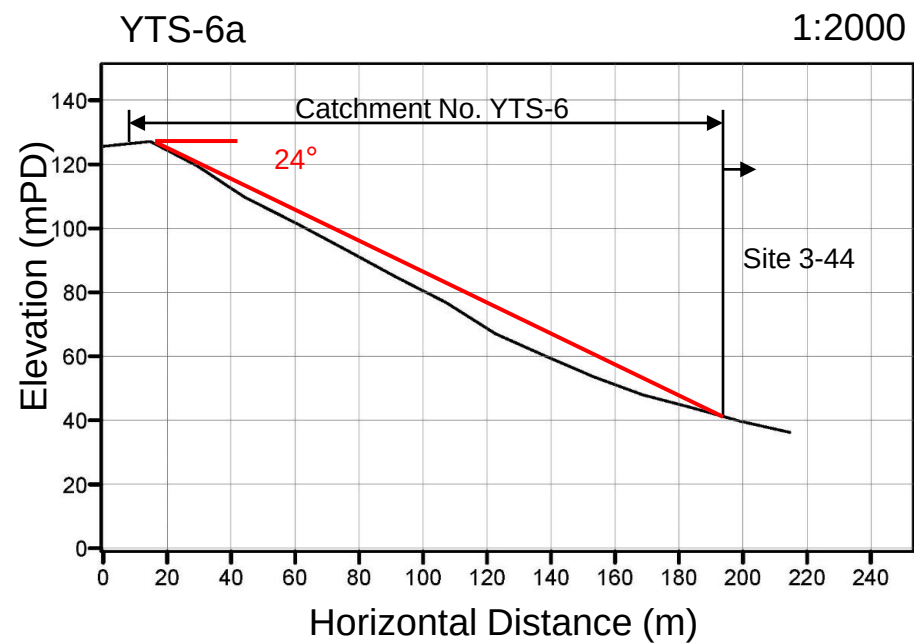
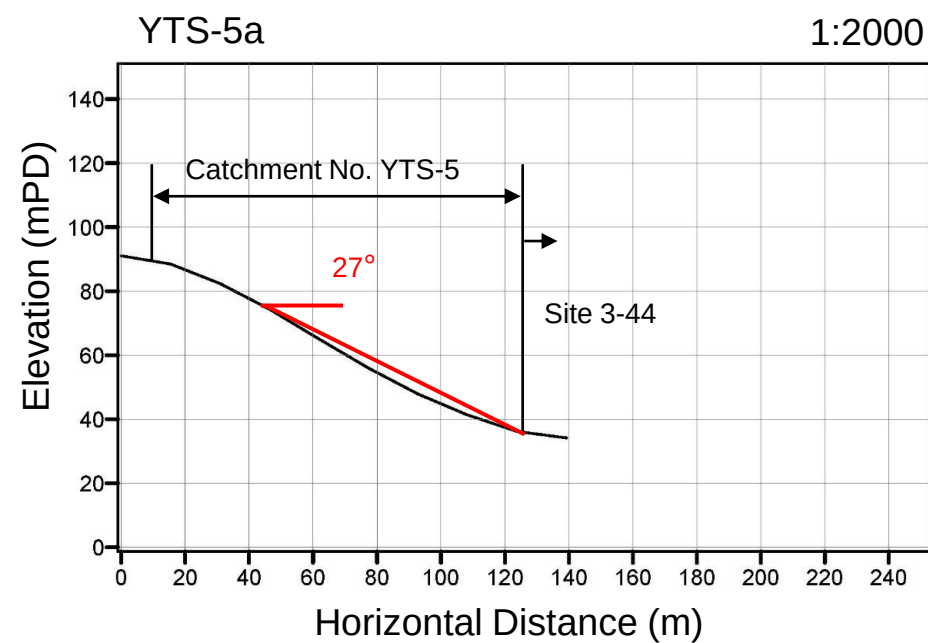
 Site Boundary
 Natural Terrain
Catchments
 Screening Section

Consultant ARUP Contract No. and Title Agreement No. CE 1/2020 (CE) Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction			
Drawing Title Layout Plan Showing NTHS Screening Sections			
Figure No. C1			Rev. -
Drawn AL	Date 07.2026	Checked KL	Approved KC
Scale 1:7,000 @ A3			

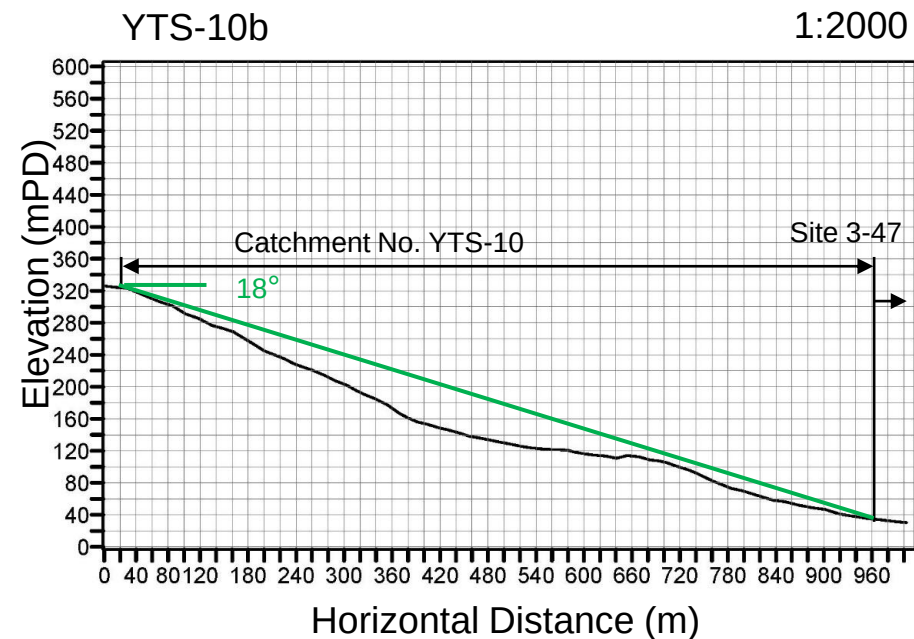
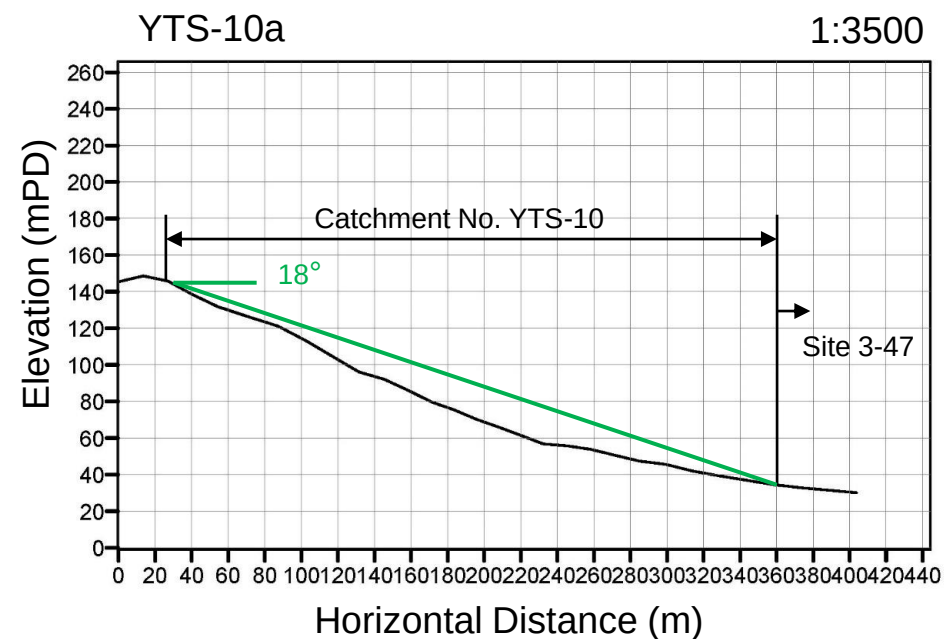
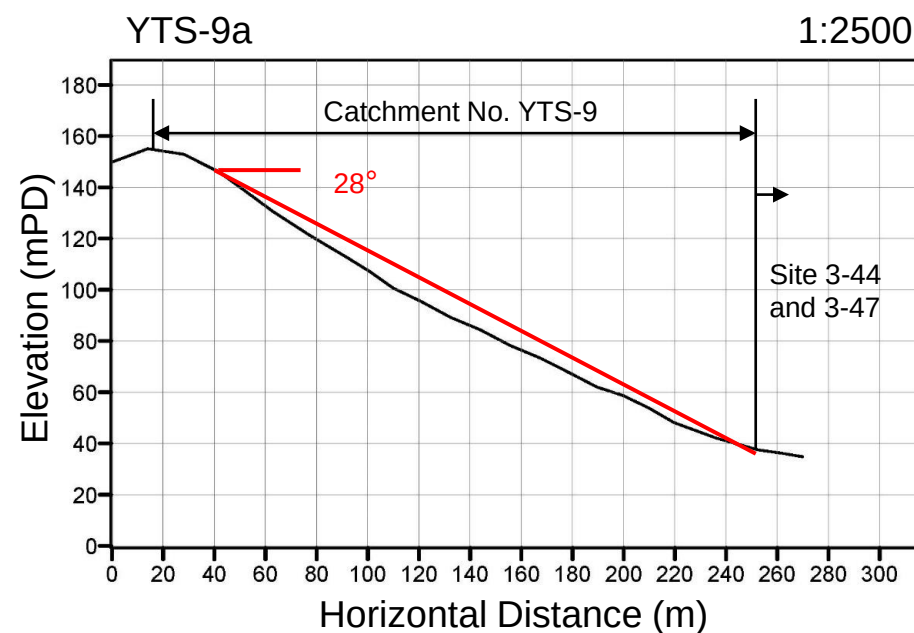
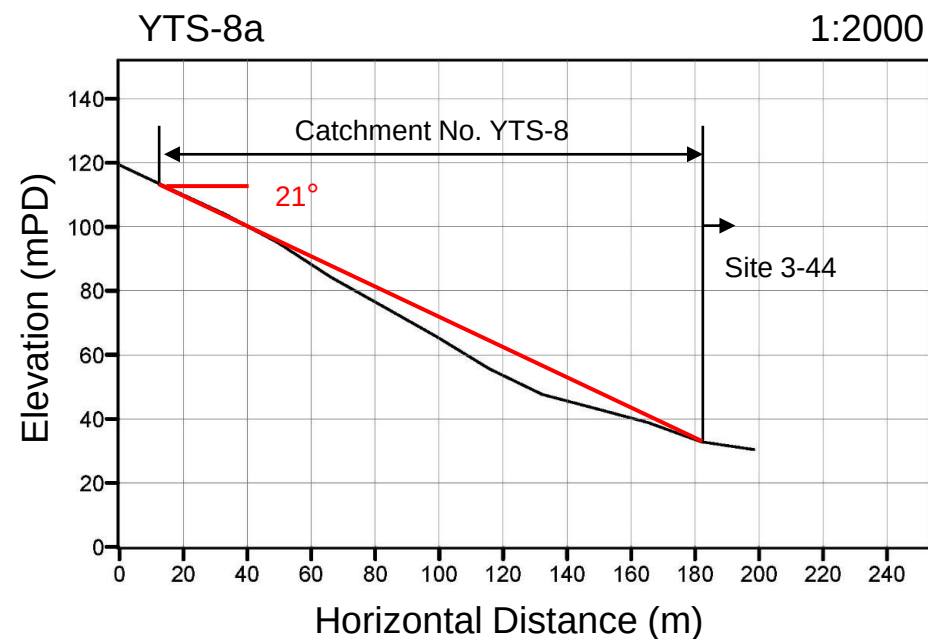
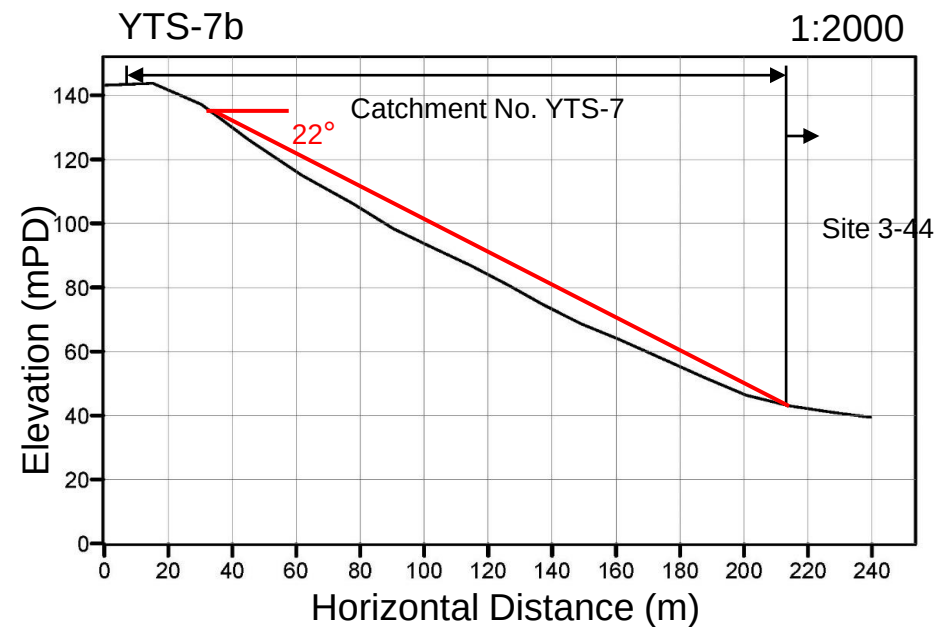
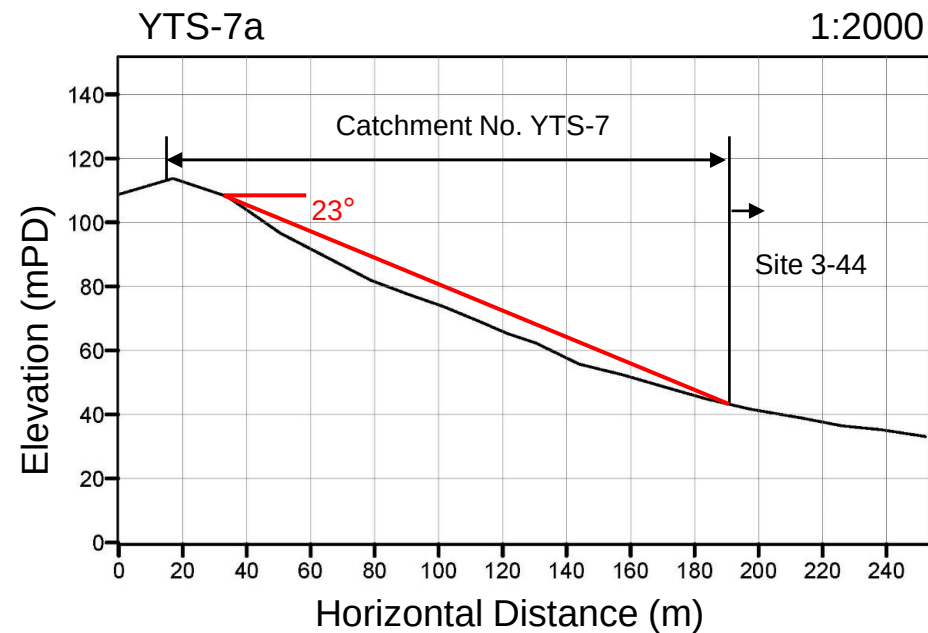


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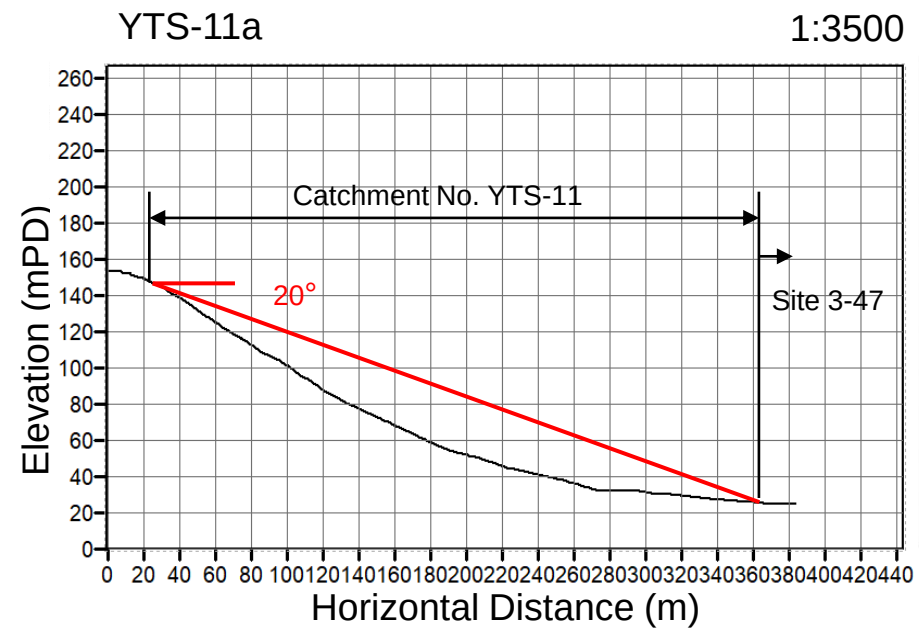
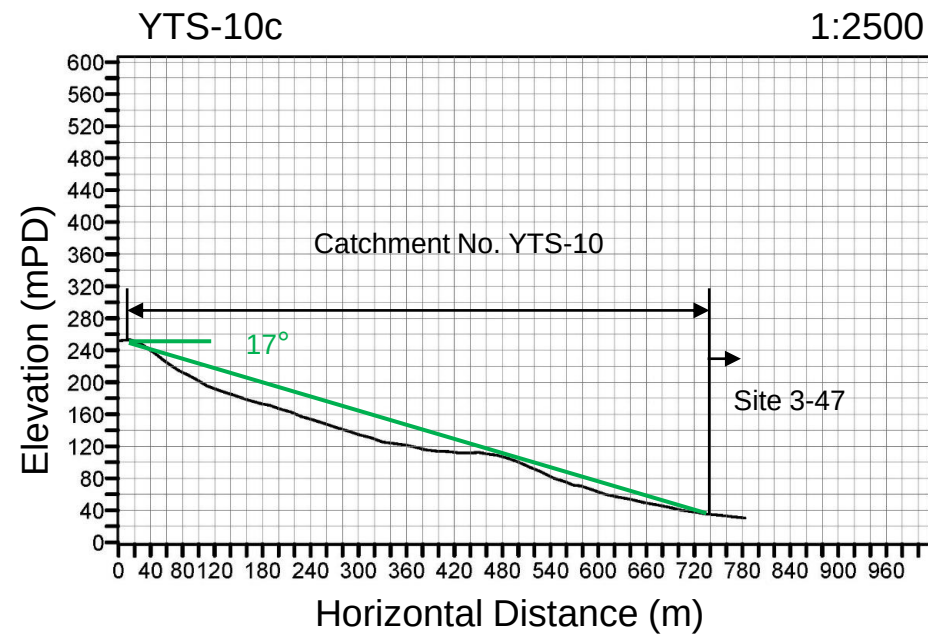
Civil Engineering and
Development Department



Consultant				
ARUP				
Contract No. and Title				
Agreement No. CE 1/2020 (CE) Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction				
Drawing Title				
Southern Package Screening Sections (1 of 5)				
Figure No.				Rev.
Figure 3.2.1				P0
Drawn	AKL	Date	2022-12-11	Checked
		AKL	Approved	AKL
Scale				
1:0 @ A3				
CEDD 土木工程拓展署 Civil Engineering and Development Department				



Consultant	
ARUP	
Contract No. and Title Agreement No. CE 1/2020 (CE) Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction	
Drawing Title Southern Package Screening Sections (2 of 5)	
Figure No.	Rev.
Figure 3.2.1	P0
Drawn	Checked
AKL	AKL
Date	Approved
2022-12-11	AKL
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CEDD 土木工程拓展署 Civil Engineering and Development Department	



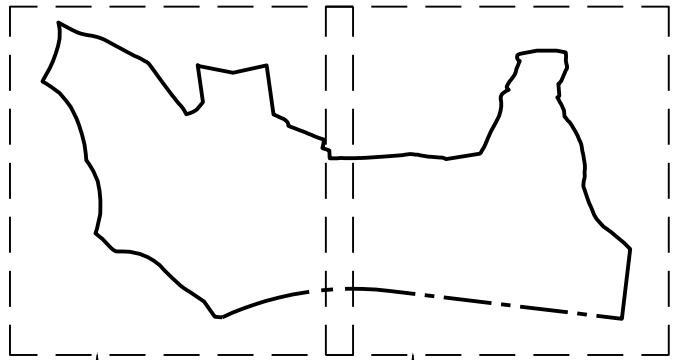
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Figure No. Figure 3.2.1	Rev. P0
Drawn AKL	Disc 2022-12-11
Checked AKL	Approved AKL
Scale 1:0 @ A3	
 土木工程拓展署 Civil Engineering and Development Department	

Appendix C

Proposed Site Formation Plan

SCHEMATIC LAYOUT PLAN
FOR INFORMATION ONLY

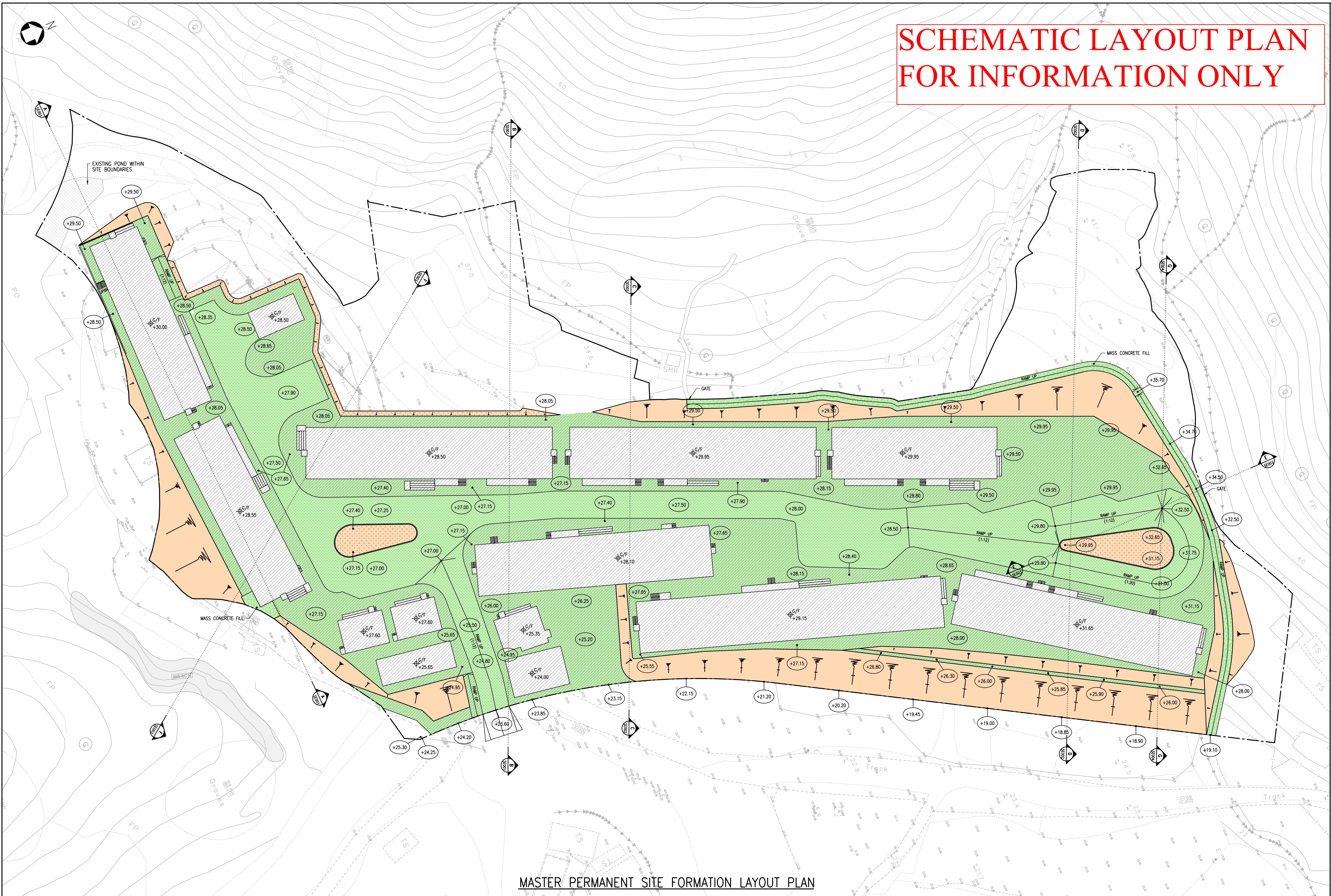
EXTRACTED FROM DRAWING:



REFER TO
DRAWING NUMBER
F/SF001/FP102

REFER TO
DRAWING NUMBER
F/SF001/FP103

KEY PLAN



MASTER PERMANENT SITE FORMATION LAYOUT PLAN

LEGEND

- — — SITE BOUNDARY LINE
- (+27.00) PROPOSED FORMATION LEVEL (mPD)
- PROPOSED CONCERTE PAVEMENT
(FOR DRIVEWAY)
- PROPOSED FOOTPATH PAVING
(FOR PEDESTRIAN/ MAINTENANCE ACCESS)
- PROPOSED MASS CONCRETE FILL

- PROPOSED SOIL SLOPE (COVERED BY HYDROSEEDING) AS BELOW:
- PROPOSED MAXIMUM 30° SOIL CUT SLOPE
- PROPOSED TRANSITION ZONE (FROM 30° TO 33°) SOIL CUT SLOPE
- PROPOSED MAXIMUM 33° SOIL CUT SLOPE
- PROPOSED MAXIMUM 30° SOIL FILL SLOPE
- PROPOSED BUILDING STRUCTURE
UNDER SEPARATE SUBMISSION

23.73 EXISTING GROUND LEVEL (mPD)

AMENDED DRAWING

0 5 10 15 20 25 m
1 : 500 SCALE BAR

Drawing Title

SITE FORMATION WORKS –
MASTER PERMANENT SITE FORMATION
LAYOUT PLAN

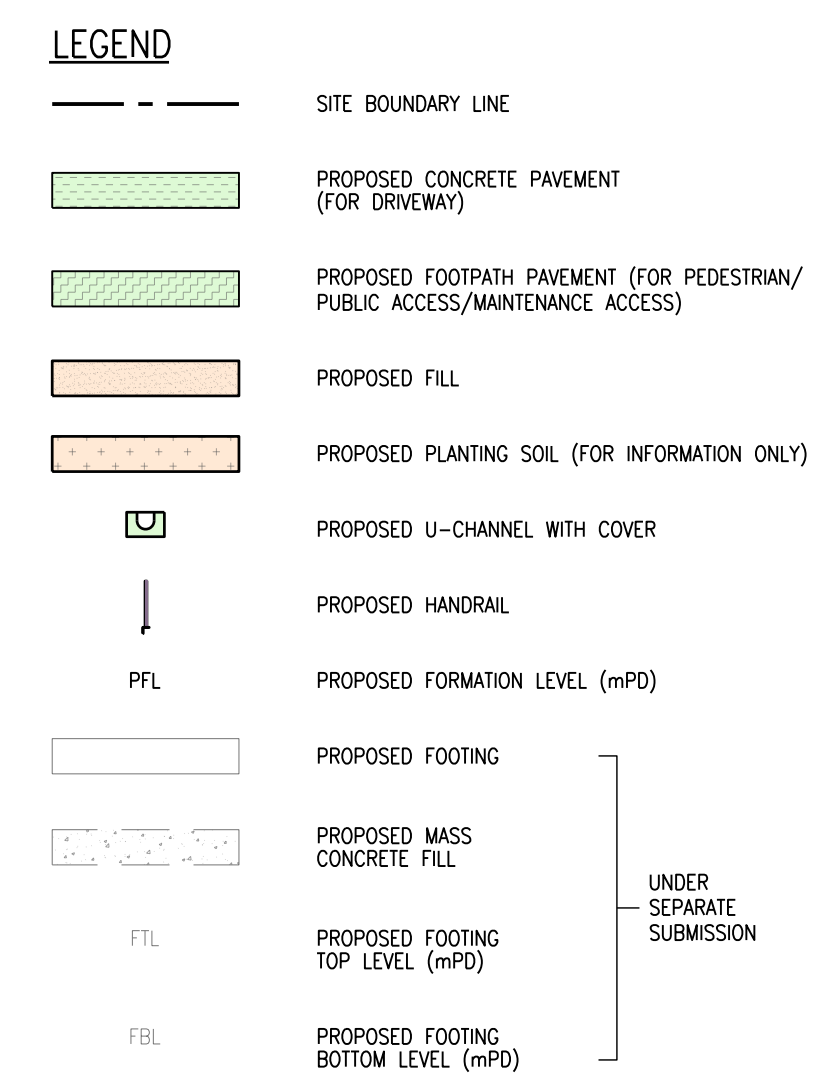
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Drawn WT	Checked KC	Approved WC
Scale 1:500 (A1)	CAD File No. –	Date JUNE 2026
First Issued	Drawing No.	Rev.

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F/SF001/FP101

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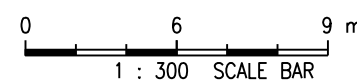


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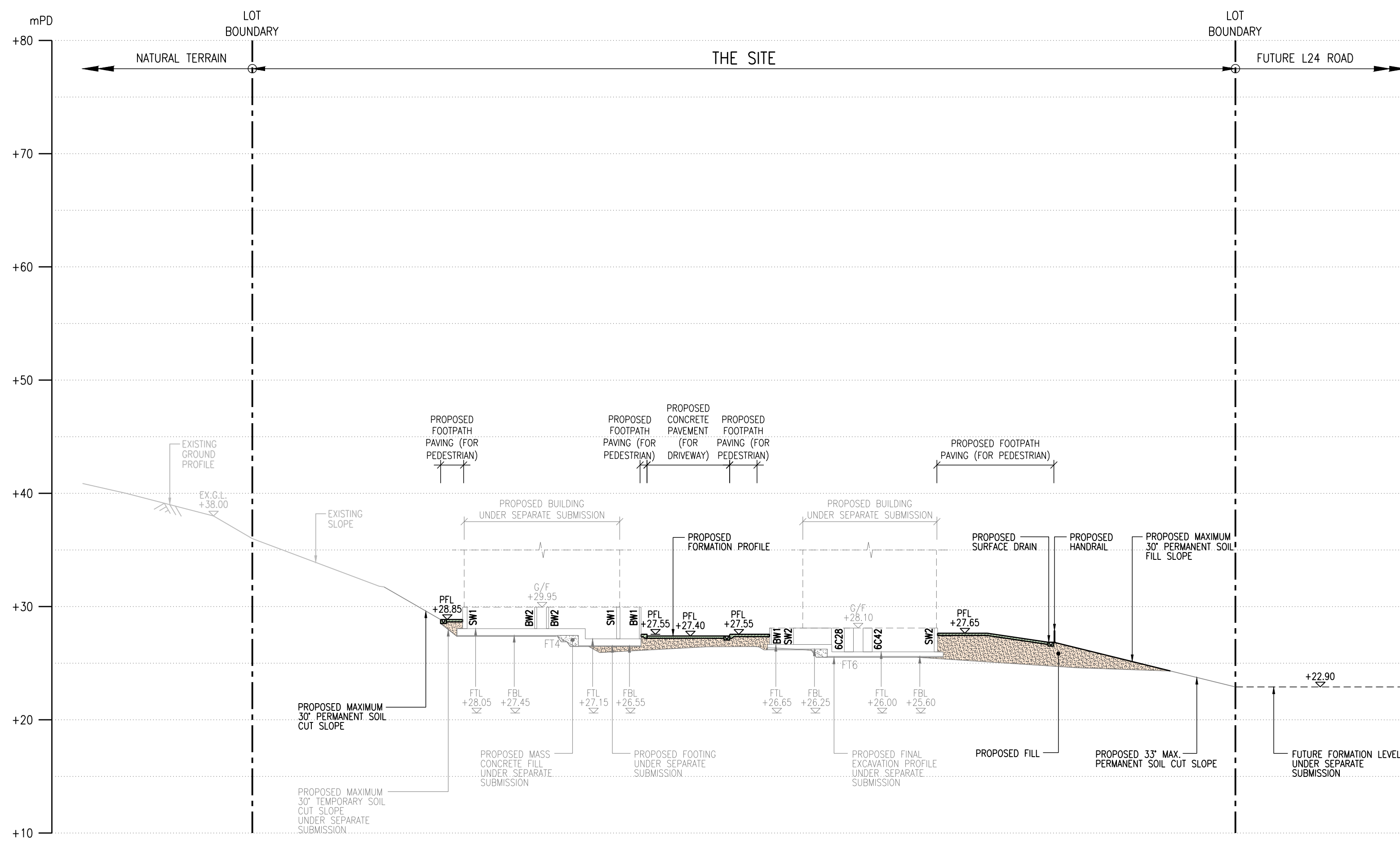
SITE FORMATION WORKS -
SECTIONS A-A AND B-B

Status	SUBMISSION
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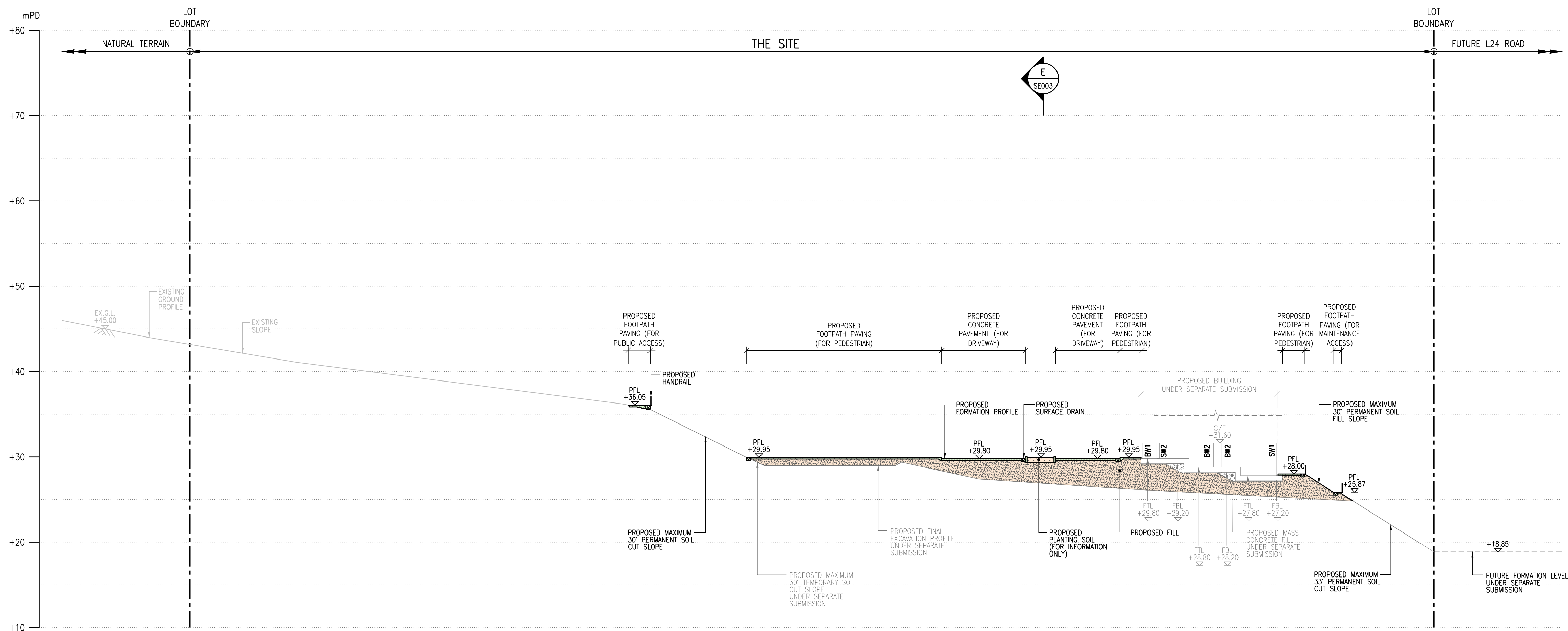
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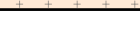
SECTION B-B



SECTION C-C



SECTION D-D

LEGEND	
	SITE BOUNDARY LINE
	PROPOSED CONCRETE PAVEMENT (FOR DRIVEWAY)
	PROPOSED FOOTPATH PAVEMENT (FOR PEDESTRIAN/ PUBLIC ACCESS/MAINTENANCE ACCESS)
	PROPOSED FILL
	PROPOSED PLANTING SOIL (FOR INFORMATION ONLY)
	PROPOSED U-CHANNEL WITH COVER
	PROPOSED HANDRAIL
PFL	PROPOSED FORMATION LEVEL (mPD)
	PROPOSED FOOTING
	PROPOSED MASS CONCRETE FILL
FTL	PROPOSED FOOTING TOP LEVEL (mPD)
FBL	PROPOSED FOOTING BOTTOM LEVEL (mPD)
UNDER SEPARATE SUBMISSION	

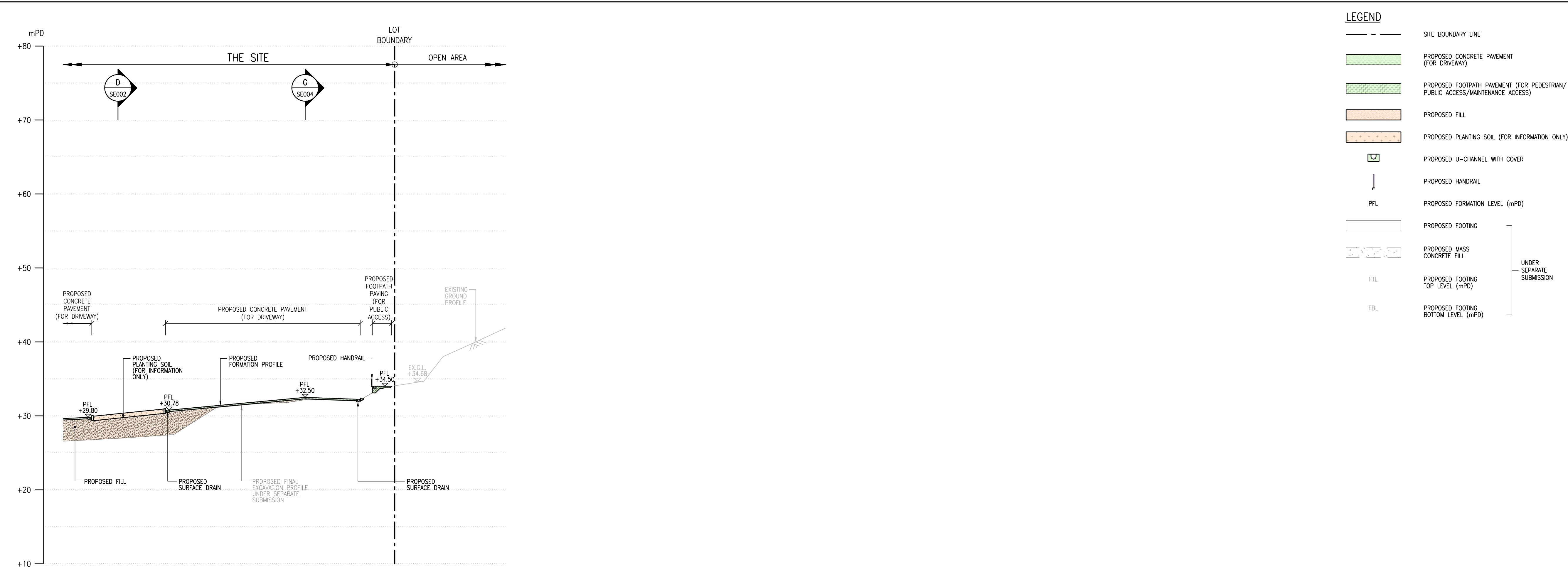
EXTRACTED FROM DRAWING:

Drawing Title

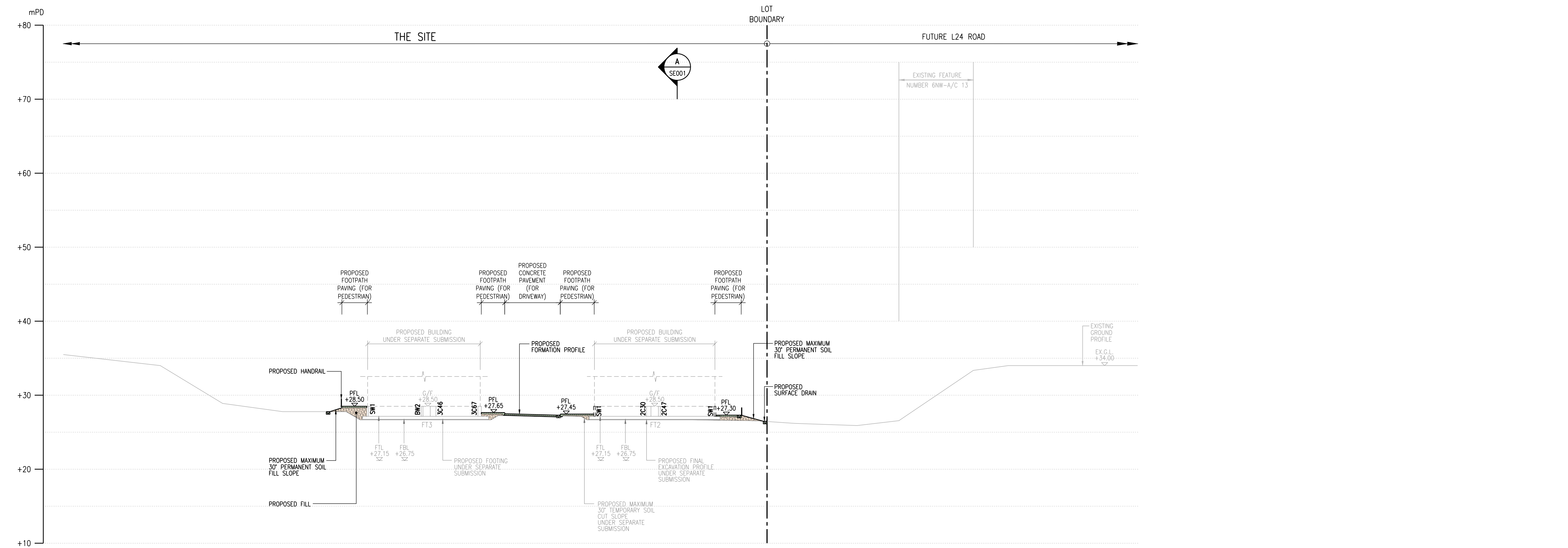
SITE FORMATION WORKS -
SECTIONS C-C AND D-D

Status	SUBMISSION
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Drawn WT	Checked KC	Approved WC	
Scale 1:300 (A1)	CAD File No. -	Date JUNE 2026	
First Issued	Drawing No.		Rev.
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SECTION E-E



SECTION F-F

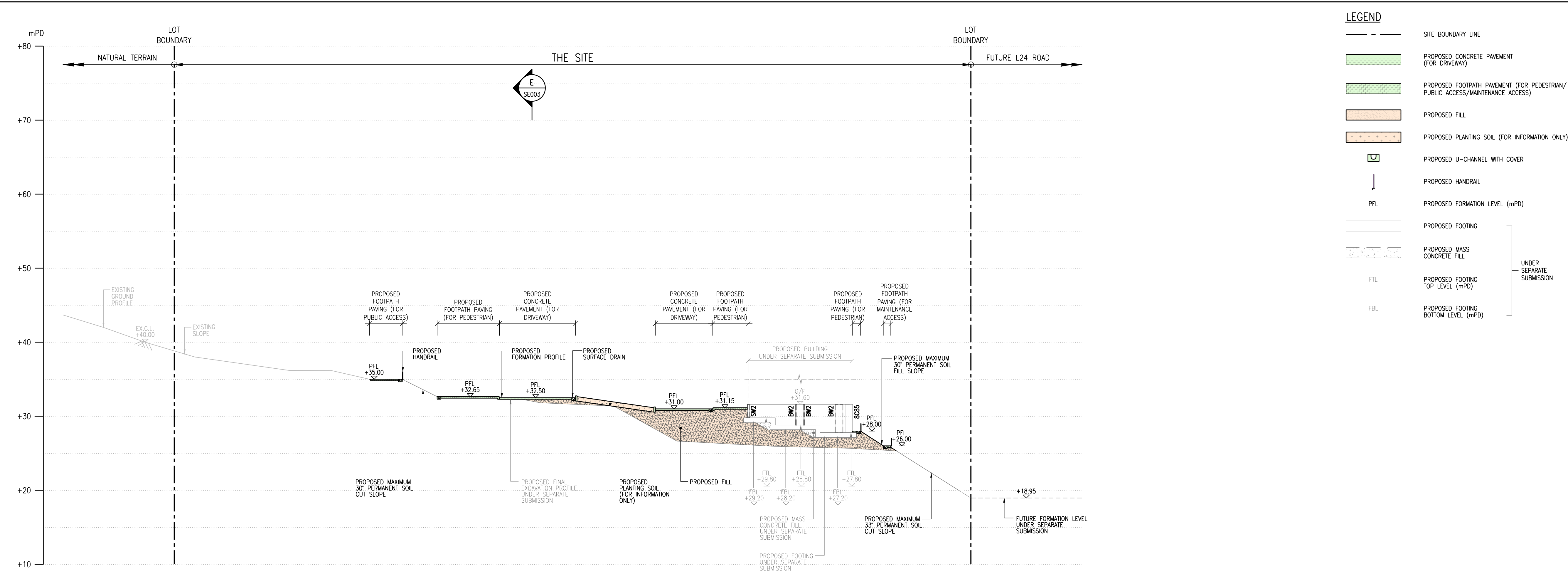
LEGEND

- SITE BOUNDARY LINE
- PROPOSED CONCRETE PAVEMENT (FOR DRIVEWAY)
- PROPOSED FOOTPATH PAVEMENT (FOR PEDESTRIAN/PUBLIC ACCESS/MAINTENANCE ACCESS)
- PROPOSED FILL
- PROPOSED PLANTING SOIL (FOR INFORMATION ONLY)
- PROPOSED U-CHANNEL WITH COVER
- PROPOSED HANDRAIL
- PROPOSED FORMATION LEVEL (mPD)
- PROPOSED FOOTING
- PROPOSED MASS CONCRETE FILL
- PROPOSED FOOTING TOP LEVEL (mPD)
- PROPOSED FOOTING BOTTOM LEVEL (mPD)

EXTRACTED FROM DRAWING:

Drawing Title
SITE FORMATION WORKS –
SECTIONS E-E AND F-F

tutus		SUBMISSION			
Drawn WT		Checked KC		Approved WC	
Scale 1:300 (A1)		CAD File No. -		Date JUNE 2026	
First Issued		Drawing No.			Rev.
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SECTION G-G

- LEGEND**
- SITE BOUNDARY LINE
 - PROPOSED CONCRETE PAVEMENT (FOR DRIVEWAY)
 - PROPOSED FOOTPATH PAVEMENT (FOR PEDESTRIAN/PUBLIC ACCESS/MAINTENANCE ACCESS)
 - PROPOSED FILL
 - PROPOSED PLANTING SOIL (FOR INFORMATION ONLY)
 - PROPOSED U-CHANNEL WITH COVER
 - PROPOSED HANDRAIL
 - PROPOSED FORMATION LEVEL (mPD)
 - PROPOSED FOOTING
 - PROPOSED MASS CONCRETE FILL
 - PROPOSED FOOTING TOP LEVEL (mPD)
 - PROPOSED FOOTING BOTTOM LEVEL (mPD)

EXTRACTED FROM DRAWING:

Drawing Title			
SITE FORMATION WORKS – SECTION G-G			
Status SUBMISSION			
Drawn WT	Checked KC	Approved WC	
Scale 1:300 (A1)	CAD File No. –	Date JUNE 2026	Rev.
First Issued	Drawing No. F/SF001/SE004		–
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NEW DRAWING

0 6 9 m

1 : 300 SCALE BAR

Appendix D

Existing Ground Investigation Logs

DRILLHOLE RECORD-NEW PROJECT-2

		DRILLHOLE RECORD		HOLE No. A16	
		CONTRACT No.: YL/2021/02		SHEET: 2 of 2	
PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development					
METHOD: Rotary Drilling			CO-ORDINATES:		WORKS ORDER No.: -
MACHINE & No.: SF-02			E 816393.92 N 833162.94		DATE from: 24/04/2023 to 06/05/2023
FLUSHING MEDIUM: Water			ORIENTATION: Vertical		GROUND LEVEL: + 27.11 mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type					
11	PW 11.55m		90	100				k=2.91E-7m/s 3, 2, 4, 4, 3, 5 N=16	21  22  23  24 	10.00 11.00 11.10 11.20 11.50 11.55	+17.11 +15.56	10.00 11.55	V	Extremely weak, light grey (10R/7/1), spotted white, completely decomposed coarse ash crystal TUFF. (Clayey SILT) End of investigation hole at 11.55m.	
12															
13															
14															
15															
16															
17															
18															
19															
20															

 Small Disturbed Sample  Piston sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Mazier Sample  76mm Vibrocore Sample  100mm Vibrocore Sample  Vibrocore Sub-sample SPT Liner Sample  Standard Penetration Test  In-situ Vane Shear Test  Permeability Test  Pressuremeter Test  Televiwer Survey  Packer Test  Impression Packer Test  Water Sample Standpipe Piezometer Tip	LOGGED <u>K.H. Lai</u> DATE <u>10/05/2023</u> CHECKED <u>A.B.Hollinshead</u> DATE <u>15/05/2023</u>	REMARKS
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DRILLHOLE RECORD

HOLE No.

A15

CONTRACT No.: YL/2021/02

SHEET:

1

of

2

PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development

METHOD: Rotary Drilling

CO-ORDINATES:

WORKS ORDER No.:

-

MACHINE & No.: SF-02

E 816423.21
N 833183.02

DATE from: 06/05/2023 to 11/05/2023

FLUSHING MEDIUM: Water

ORIENTATION: Vertical

GROUND LEVEL: +26.42 mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type					
09/05/2023	PW										+26.42	0.00			
1									1	↓	0.50				Firm, brown (7.5YR/5/4) to reddish brown (5YR/4/3), slightly sandy clayey SILT with occasional angular to subangular fine to medium gravel of weak siltstone and tuff. (COLLUVIUM)
									2	↓	1.00				
									3	↓	1.50				
2	PW 2.00m HW			100					4	↓	2.00	+24.42	2.00		Extremely weak, purplish brown (7.5R/3/3), locally pink (10R/8/3) and dark brown (7.5YR/3/4), completely decomposed tuffaceous METASILTSTONE. (Clayey SILT)
			90						5	↓					
3								2, 2, 1, 3, 3, 2 N=9	6	↓	3.00				
									7	↓	3.10				
									8	↓	3.20				
									9	↓	3.50				
4				100					10	↓	5.00				Extremely weak, light yellowish grey (2.5Y/7/2) to light grey (10R/7/1), locally striped brown, spotted grey, completely decomposed coarse ash crystal TUFF. (Clayey SILT)
			90						11	↓	5.10				
5								2, 2, 3, 3, 3, 4 N=13	12	↓	5.20				
									13	↓	5.50				
6				100					14	↓	6.00	+20.42	6.00		
			90						15	↓	7.00				
7								k=2.83E-7m/s	16	↓	7.10				
									17	↓	7.20				
8				100				2, 3, 3, 4, 5, 5 N=17	18	↓	8.00				
			90						19	↓	9.00				
9									20	↓	9.10				
10								2, 3, 3, 2, 4, 4 N=13		↓	9.20				
										↓	9.50				
										↓	10.00	+16.42	10.00		

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample

- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED K.H. Lai

DATE 10/05/2023

CHECKED A.B.Hollinshead

DATE 15/05/2023

REMARKS

1. An inspection pit was excavated to a depth of 2.00m.
 2. Constant head permeability tests were performed from 6.05m to 7.55m and 10.05m to 11.55m below existing ground level on 09/05/2023.
 3. A standpipe was installed at 8.00m below existing ground level on 11/05/2023.
 4. A piezometer was installed at 11.00m below existing ground level on 11/05/2023.
- (to next page)

		DRILLHOLE RECORD		HOLE No. A15	
		CONTRACT No.: YL/2021/02		SHEET: 2 of 2	
PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development					
METHOD: Rotary Drilling			CO-ORDINATES:		WORKS ORDER No.: -
MACHINE & No.: SF-02			E 816423.21 N 833183.02		DATE from: 06/05/2023 to 11/05/2023
FLUSHING MEDIUM: Water			ORIENTATION: Vertical		GROUND LEVEL: + 26.42 mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type					
				100					21		+16.42	10.00		V	As sheet 1 of 2.
11	HW 11.55m	1.80m at 18:00	90					k=1.59E-7m/s 2, 3, 3, 3, 4, 5 N=15	22			11.00			
									23			11.10			
									24		+14.87	11.55			End of investigation hole at 11.55m.
12															
13															
14															
15															
16															
17															
18															
19															
20												20.00			

 Small Disturbed Sample  Piston sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Mazier Sample  76mm Vibrocore Sample  100mm Vibrocore Sample  Vibrocore Sub-sample SPT Liner Sample  Standard Penetration Test  In-situ Vane Shear Test  Permeability Test  Pressuremeter Test  Televiwer Survey  Packer Test  Impression Packer Test  Water Sample Standpipe Piezometer Tip	LOGGED <u>K.H. Lai</u> DATE <u>10/05/2023</u> CHECKED <u>A.B.Hollinshead</u> DATE <u>15/05/2023</u>	REMARKS (Continued from previous page) 5. Automatic groundwater monitoring devices (AGMD) were installed in standpipe and piezometer on 04/10/2023.
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DRILLHOLE RECORD

HOLE No.

A17

CONTRACT No.: YL/2021/02

SHEET:

1

of

2

PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development

METHOD: Rotary Drilling

CO-ORDINATES:

WORKS ORDER No.:

-

MACHINE & No.: KK-6

E 816355.03

N 833137.01

DATE from: 08/05/2023 to 11/05/2023

FLUSHING MEDIUM: Water

ORIENTATION: Vertical

GROUND LEVEL: +27.46 mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type	Depth				
08/05/2023	SW										+27.46	0.00			Firm to stiff, brown (7.5YR/5/4) to brownish grey (10YR/5/1), spotted yellowish brown and white, slightly sandy silty CLAY with some angular fine to medium gravel of weak to moderately weak siltstone. (COLLUVIUM)
1									1	↓	0.50				
									2	↓	1.00				
									3	↓	1.50				
08/05/2023		Dry at 18:00		100					4	↓	2.00				Very stiff, greyish brown (10YR/5/2), mottled reddish brown, sandy silty CLAY with occasional to some angular fine gravel of moderately weak siltstone. (COLLUVIUM)
10/05/2023		Dry at 08:00	80					2, 3, 4, 4, 5, 8 N=21	5	↓	3.00				
3	SW 3.10m PW								6	↓	3.10				
									7	↓	3.20				
									8	↓	3.50				Extremely weak, light grey (10R/7/1), completely decomposed tuffaceous METASILTSTONE. (Clayey SILT)
4				100				3, 5, 5, 7, 7, 9 N=28	9	↓	4.00	+23.46	4.00		
5									10	↓	5.00				
									11	↓	5.10				
6	PW 6.00m HW			100				3, 4, 5, 5, 5, 6 N=21	12	↓	5.50				REMARKS 1. An inspection pit was excavated to a depth of 2.00m. 2. Constant head permeability tests were performed from 6.05m to 7.55m and 10.05m to 11.55m below existing ground level on 10/05/2023 and 11/05/2023 respectively.
									13	↓	6.00	+21.46	6.00	V	
7								k=3.36E-6m/s	14	↓	7.00				
									15	↓	7.10				
8				100					16	↓	7.50				
									17	↓	8.00				
9									18	↓	9.00				
									19	↓	9.10				
10								3, 4, 4, 5, 5, 6 N=20	20	↓	9.50	+17.46	10.00		



Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiometer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED K.H. Lai

DATE 15/05/2023

CHECKED A.B. Hollinshead

DATE 16/05/2023

REMARKS

1. An inspection pit was excavated to a depth of 2.00m.
2. Constant head permeability tests were performed from 6.05m to 7.55m and 10.05m to 11.55m below existing ground level on 10/05/2023 and 11/05/2023 respectively.



DRILLHOLE RECORD

HOLE No. **DH2031**

CONTRACT No.: **YL/2021/02**

SHEET: **1** of **3**

PROJECT: **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No.: **-**

MACHINE & No.: **KK-25**

E **816396.13**
N **833053.04**

DATE from: **01/12/2022** to **07/12/2022**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL: **+23.78** mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	F I	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
									No. Type Depth					
01/12/2022 01/12/2022 02/12/2022	SW								1 INSPECTION PIT 0.50	+23.78	0.00			Firm to stiff, brown (7.5YR/5/4), sandy clayey SILT with some angular fine to medium gravel of moderately strong granite and occasional asphalt fragments. (FILL)
									2 1.00					
									3 1.50					
02/12/2022 03/12/2022				100					4 2.00	+21.78	2.00			Stiff, brown (7.5YR/5/4), slightly sandy silty CLAY. (COLLUVIUM)
			70						5 2.50					
	SW 3.10m PW							5.5, 6.4, 3.3 N=16	6 3.00					
									7 3.20					
									8 3.50					
									9 4.00	+19.78	4.00			Firm to stiff, greyish brown (10YR/5/2), spotted brown, slightly sandy silty CLAY. (ALLUVIUM)
				100					10 5.00					
			70					4.4, 4.3, 4.4 N=15	11 5.10					
									12 5.50					
									13 6.00	+17.78	6.00			Firm, dark grey (5Y/4/1), slightly sandy silty CLAY with occasional black decayed organic matter. (ALLUVIUM)
				100					14 7.00					
			70					k=6.77E-6m/s	15 7.10					
									16 7.20					
03/12/2022 05/12/2022	1.20m at 17:00 3.40m at 09:00							1.2, 2.1, 2.2 N=7	17 8.00	+15.78	8.00			Grey (7.5YR/6/1), slightly clayey silty fine to coarse SAND with much angular fine to coarse gravel and cobbles of quartz vein. (ALLUVIUM)
				54					18 8.55	+15.13	8.65			
									19 8.90	+14.88	8.90			Grey (7.5YR/6/1), angular COBBLES with some coarse gravel of quartz. (ALLUVIUM)
				80					20 9.90	+13.78	10.00			Extremely weak, greyish brown (10YR/5/2), completely decomposed tuffaceous METASILTSTONE. (Slightly sandy SILT with some angular fine to coarse gravel)
			70	42										

Small Disturbed Sample	Standard Penetration Test
Piston sample	In-situ Vane Shear Test
U76 Undisturbed Sample	Permeability Test
U100 Undisturbed Sample	Pressuremeter Test
Mazier Sample	Televiwer Survey
76mm Vibrocore Sample	Packer Test
100mm Vibrocore Sample	Impression Packer Test
Vibrocore Sub-sample	Water Sample
SPT Liner Sample	Standpipe
	Piezometer Tip

LOGGED **K.H. Lai**
DATE **08/12/2022**
CHECKED **A.B. Hollinshead**
DATE **19/12/2022**

REMARKS

1. An inspection pit was excavated to a depth of 2.00m.
2. Constant head permeability tests were performed from 6.05m to 7.55m and 12.50m to 14.00m below existing ground level on 03/12/2022 and 06/12/2022 respectively.



DRILLHOLE RECORD

HOLE No. **DH2031**

CONTRACT No.: **YL/2021/02**

SHEET: **2** of **3**

PROJECT: **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No.: **-**

MACHINE & No.: **KK-25**

E **816396.13**
N **833053.04**

DATE from: **01/12/2022** to **07/12/2022**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL: **+ 23.78** mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	F I	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
									No. Type Depth					
								7, 7, 14, 10, 9, 15 N=48	21 10.00 22 10.48	+13.78	10.00		V	As sheet 1 of 3.
11				85					23 10.90	+12.88	10.90		V	Extremely weak, dark yellowish brown (10YR/4/6), completely decomposed tuffaceous METASILTSTONE. (Sandy SILT with some angular fine to medium gravel)
12	PW 12.00m HW							8, 8, 12, 12, 15, 15 N=54	24 11.90 25 12.00 26 12.48					
13				82					27 12.90	+10.88	12.90		V	Extremely weak, grey (7.5YR/6/1), completely decomposed tuffaceous METASILTSTONE. (Slightly sandy SILT with some angular fine to medium gravel)
14								k=1.26E-5m/s	28 13.90 29 14.00 30 14.48					
15	0.60m at 17:00 14.50m at 09:00							9, 9, 10, 11, 12, 15 N=48		+9.28	14.50		III	Strong, grey to dark grey, striped white, slightly decomposed tuffaceous METASILTSTONE.
16				100	80	53	6.7		T2101 15.25	+8.53	15.25		II	Joints are closely to medium spaced, locally widely spaced, rough planar and rough stepped, very narrow to extremely narrow, iron oxide stained, dipping at 0°-10°, 20°-30°, 45°-55° and 70°-80°.
17				100	100	100			T2101 15.98					14.50 - 15.25m : Moderately strong, grey, moderately decomposed.
18				100	51	46	3.4		T2101 16.76					
19				100	84	73			T2101 17.75					
20				100	100	100	2.6		T2101 18.68					
				100	100	100	1.3		T2101	+3.78	20.00			

DRILLHOLE RECORD-NEW PROJECT-2

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED **K.H. Lai**
DATE **08/12/2022**
CHECKED **A.B.Hollinshead**
DATE **19/12/2022**

REMARKS



DRILLHOLE RECORD

HOLE No. **DH2031**

CONTRACT No.: **YL/2021/02**

SHEET: **3** of **3**

PROJECT: **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No.: **-**

MACHINE & No.: **KK-25**

E **816396.13**
N **833053.04**

DATE from: **01/12/2022** to **07/12/2022**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL: **+ 23.78** mPD

Drilling Progress	Casing size /depth	Water Level at Shift Start/End	Water Return %	TCR %	SCR %	RQD %	F I	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
									No. Type Depth	+3.78	20.00			
21		0.80m at 17:00	70	100	100	100			T2101 20.15				II	As sheet 2 of 3.
22		2.35m at 09:00	70	100	100	100	1.3		T2101 21.68					
23			70	100	100	90			T2101 22.70					
24			70	100	100	100			T2101 23.86					
			70	100	100	100			T2101 24.30	-0.52	24.30			End of investigation hole at 24.30m.
25														
26														
27														
28														
29														
30														



Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

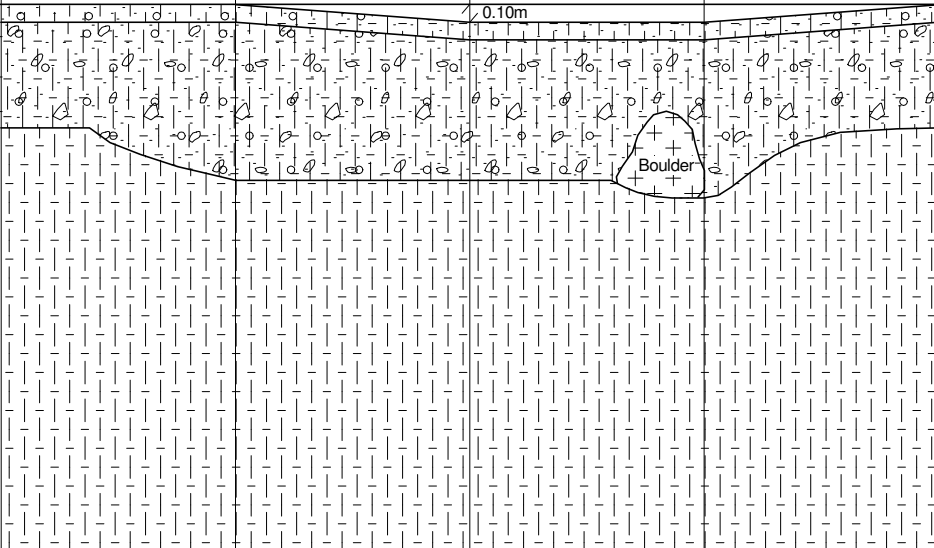
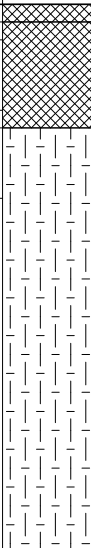
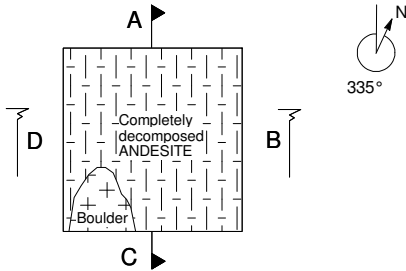
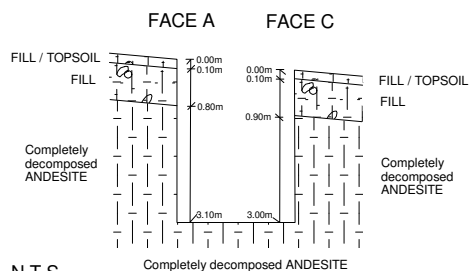
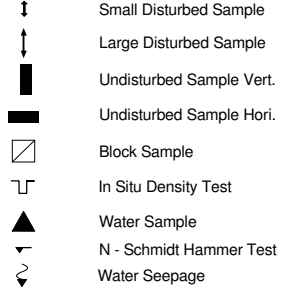
Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiwer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED **K.H. Lai**
DATE **08/12/2022**
CHECKED **A.B.Hollinshead**
DATE **19/12/2022**

REMARKS

FUGRO		Project : Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development			Logged by : K.H. Lai Date logged : 28/11/2022 Checked by : A.B-Hollinshead Date checked : 29/11/2022		Co-ordinates : E 816366.22 m N 833133.26 m Ground Level : +27.14 mPD		Excavation Dates: 19/11/2022 to 24/11/2022 Backfill Date: 30/11/2022		Trial Pit No.: TP2009	
Contract No.: YL/2021/02												
Sample & Tests	Depth (m)	Sketch				Depth (m)	Legend	Grade	Description			
		Face A 1.50 m	Face B 1.50 m	Face C 1.50 m	Face D 1.50 m							
2 3 5 6 8 9	0.50					1.70	V	Firm, moist, brown (7.5YR/5/4) to yellowish brown (10YR/5/6), spotted black and yellowish white, slightly sandy clayey SILT with occasional to some angular fine to coarse gravel of weak to moderately weak granite and quartz. (COLLUVIUM)				
	1.00					1.80						
	1.50					2.00		Extremely weak, brownish grey (10YR/5/1), mottled yellowish brown, occasionally spotted yellowish white and streaked black, completely decomposed tuffaceous METASILTSTONE. (Firm, clayey SILT) Relict joint is rough planar, extremely narrow, iron oxide stained, manganese oxide infilled (<2mm), dipping at J1. 243°/74°.				
	1.80					2.00						
	2.00					2.80		End of trial pit at average depth of 2.80m.				
	2.50					2.80						
	2.80											
	3.00											
	3.50											
	4.00											
4.50												
PLAN		SECTION				SYMBOL			REMARKS			
						↑ ↑ ■ ■ □ ┌ ▲ ▼ ⤵ Small Disturbed Sample Large Disturbed Sample Undisturbed Sample Vert. Undisturbed Sample Hori. Block Sample In Situ Density Test Water Sample N - Schmidt Hammer Test Water Seepage			Shoring: Yes Water Seepage: 2.60m Stability: Stable Maximum Depth: 2.80m Average Depth: 2.80m 1. Termination upon encountering groundwater. 2. All sample depths are relative to centre of trial pit. 3. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 2.80m below existing ground level. 4. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level.			

TRIAL PIT RECORD

		Project : Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development		Logged by : K.H. Lai Date logged : 22/11/2022 Checked by : A.B-Hollinshead Date checked : 28/11/2022		Co-ordinates : E 816415.91 m N 833182.73 m Ground Level : +26.84 mPD		Excavation Dates: 19/11/2022 to 22/11/2022 Backfill Date: 29/11/2022		Trial Pit No.: TP2010	
Contract No.: YL/2021/02											
Sample & Tests	Depth (m)	Sketch				Depth (m)	Legend	Grade	Description		
		Face A 1.50 m	Face B 1.50 m	Face C 1.50 m	Face D 1.50 m						
2 5 8	0.10					0.10		V	Soft, moist, brown (7.5YR/5/4) to greyish brown (10YR/5/2), slightly sandy clayey SILT with occasional subangular fine to coarse gravel of weak siltstone fragments, and with some roots. (FILL / TOPSOIL)		
	0.20										
	0.60										
	0.70										
	1.10										
	1.50										
	2.00										
	2.50										
	3.00										
	3.10										
End of trial pit at average depth of 3.00m.											
PLAN		SECTION		SYMBOL		REMARKS					
						Shoring: Yes Water Seepage: Nil Stability: Stable Maximum Depth: 3.10m Average Depth: 3.00m 1. All sample depths are relative to centre of trial pit. 2. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level. 3. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level.					

TRIAL PIT RECORD



Project : **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen
New Development Area Package A Works for Second
Phase Development**

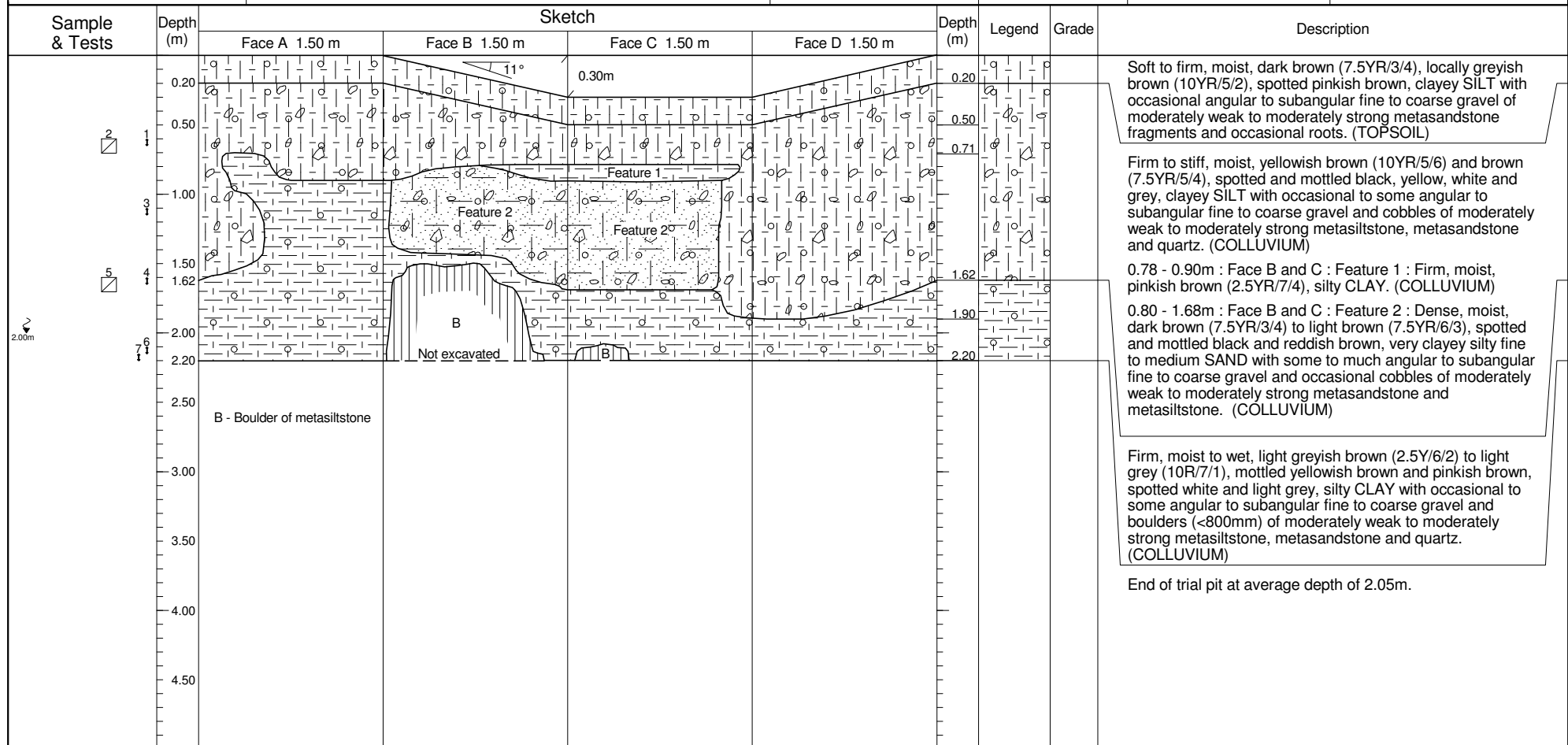
Logged by : K.H. Lai
Date logged : 21/11/2023
Checked by : A.B.Hollinshead
Date checked : 23/11/2023

Co-ordinates :
E 816175.35 m
N 832929.88 m
Ground Level :
+31.32 mPD

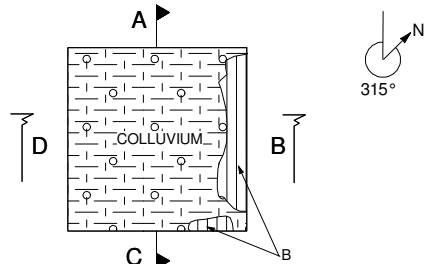
Excavation Dates:
14/11/2023 to 17/11/2023
Backfill Date:
06/12/2023

Trial Pit No.:
TIP3001

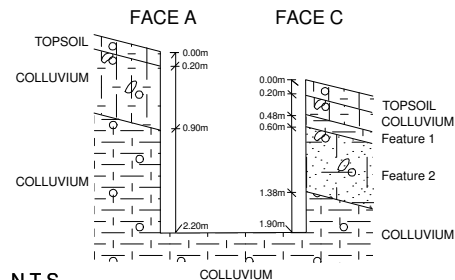
Contract No.: YL/2021/02



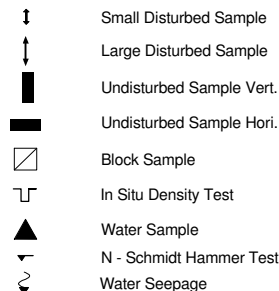
PLAN



SECTION



SYMBOL



REMARKS

Shoring: Yes Water Seepage: 2.00m
Stability: Stable
Maximum Depth: 2.20m Average Depth: 2.05m
1. Termination upon encountering groundwater.
2. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m and 2.05m below existing ground level.
3. Block samples were taken at 0.50m and 1.50m below existing ground level.

TRIAL PIT RECORD

		Project : Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development		Logged by : K.H. Lai Date logged : 28/11/2023 Checked by : A.B-Hollinshead Date checked : 06/12/2023		Co-ordinates : E 816252.42 m N 833054.62 m Ground Level : +42.28 mPD		Excavation Dates: 18/11/2023 to 24/11/2023 Backfill Date: 09/12/2023		Trial Pit No.: TIP3002	
Contract No.: YL/2021/02											
Sample & Tests	Depth (m)	Sketch				Depth (m)	Legend	Grade	Description		
		Face A 1.50 m	Face B 1.50 m	Face C 1.50 m	Face D 1.50 m						
2 1 3 5 4 6 7 8 9	0.20					0.20			Loose, dry, dark brown (7.5YR/3/4), spotted reddish brown, pinkish brown, dark grey, black and pale yellowish brown, silty fine to coarse SAND with much angular to subangular fine to coarse gravel of moderately weak to moderately strong metasandstone, metasiltstone, tuff and quartz fragments with occasional roots. (TOPSOIL) Firm, moist, reddish brown (5YR/4/3), spotted and mottled black, white, pinkish brown, reddish brown, yellow, pink, purple and dark grey, slightly sandy clayey SILT with some to much angular to subangular fine to coarse gravel and occasional cobbles of weak to moderately strong metasiltstone, metasandstone, tuff and quartz, and with occasional roots. (COLLUVIUM)		
	0.50										
	1.00										
	1.50										
	2.00								End of trial pit at average depth of 3.00m.		
	2.50										
	3.00					3.07					
	3.50										
	4.00										
	4.50										
PLAN		SECTION				SYMBOL			REMARKS		
						↑ Small Disturbed Sample ↑ Large Disturbed Sample ▬ Undisturbed Sample Vert. ▬ Undisturbed Sample Hori. Block Sample In Situ Density Test Water Sample N - Schmidt Hammer Test Water Seepage			Shoring: Yes Water Seepage: Nil Stability: Stable Maximum Depth: 3.07m Average Depth: 3.00m 1. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level. 2. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level. 3. An inspection pit TIP3002(IP) was excavated at bottom of trial pit.		
N.T.S.		N.T.S.									

TRIAL PIT RECORD



Project : **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen
New Development Area Package A Works for Second
Phase Development**

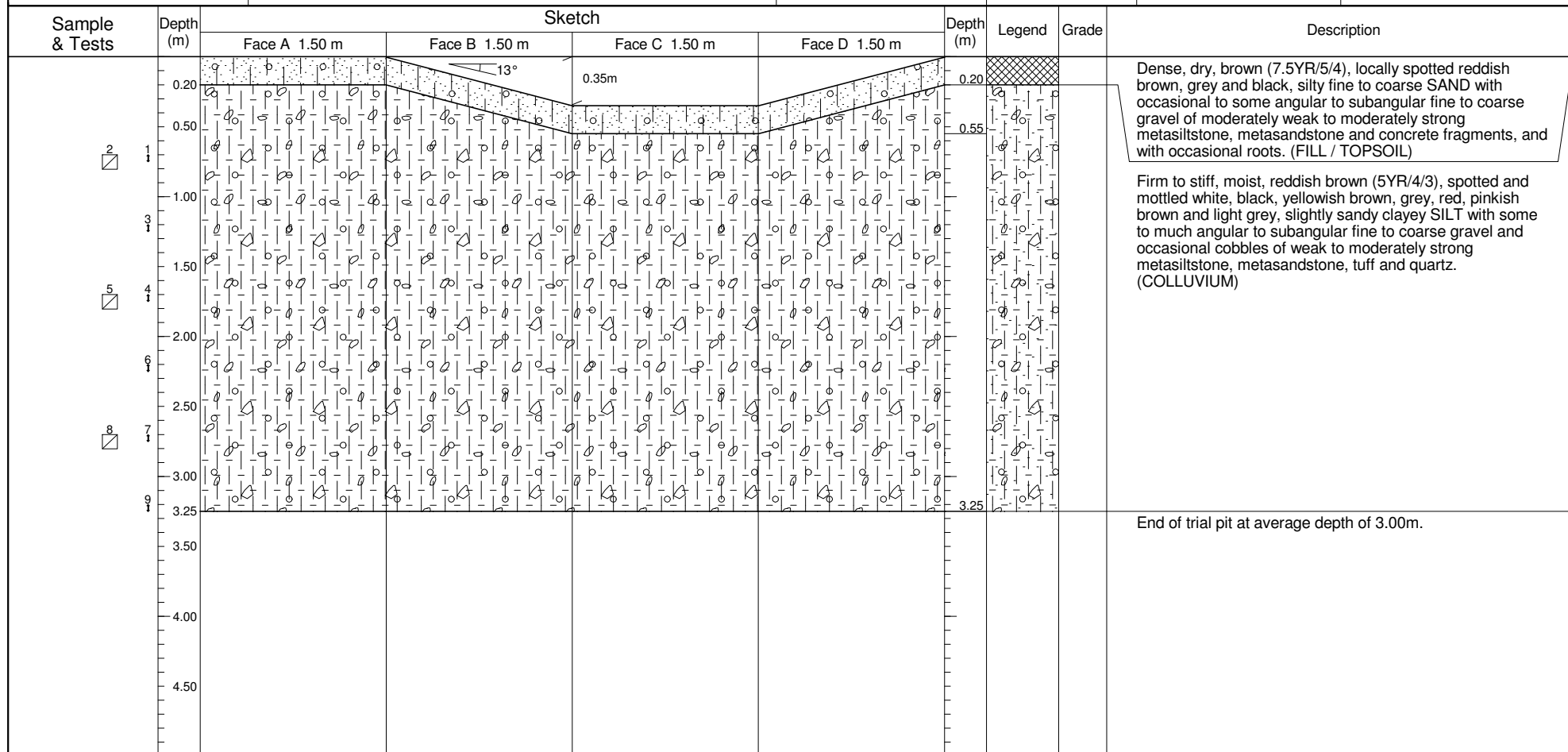
Logged by : K.H. Lai
Date logged : 04/12/2023
Checked by : A.B.Hollinshead
Date checked : 07/12/2023

Co-ordinates :
E 816314.92 m
N 833093.08 m
Ground Level :
+31.87 mPD

Excavation Dates:
21/11/2023 to 04/12/2023
Backfill Date:
11/12/2023

Trial Pit No.:
TIP3006

Contract No.: YL/2021/02



TRIAL PIT RECORD

PLAN	SECTION	SYMBOL	REMARKS
		↑ ↓ ■ ■ □ └┐ ▲ ▼ ~ Small Disturbed Sample Large Disturbed Sample Undisturbed Sample Vert. Undisturbed Sample Hori. Block Sample In Situ Density Test Water Sample N - Schmidt Hammer Test Water Seepage	Shoring: Yes Water Seepage: Nil Stability: Stable Maximum Depth: 3.25m Average Depth: 3.00m 1. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level. 2. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level. 3. An inspection pit TIP3006(IP) was excavated at bottom of trial pit.

TRIAL PIT RECORD 2

N.T.S.

N.T.S.

		Project : Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development				Logged by : K.H. Lai Date logged : 28/11/2023 Checked by : A.B-Hollinshead Date checked : 08/12/2023		Co-ordinates : E 816292.95 m N 833171.02 m Ground Level : +42.95 mPD		Excavation Dates: 18/11/2023 to 27/11/2023 Backfill Date: 09/12/2023		Trial Pit No.: TIP3008	
Contract No.: YL/2021/02													
Sample & Tests	Depth (m)	Sketch				Depth (m)	Legend	Grade	Description				
		Face A 1.50 m	Face B 1.50 m	Face C 1.50 m	Face D 1.50 m								
	1					0.35			Dense, dry, dark brown (7.5YR/3/4) to brown (7.5YR/5/4), spotted reddish brown, pinkish brown and light grey, silty fine to coarse SAND with some to much angular to subangular fine to coarse gravel of moderately weak to moderately strong metasandstone, metasiltstone and tuff fragments, and with occasional roots. (TOPSOIL / SLOPE WASHED)				
	3												
	4								Firm to stiff, moist, reddish brown (5YR/4/3), spotted and mottled pink, black, white, pinkish brown, purple, yellowish brown, grey and brown, slightly sandy clayey SILT with some angular to subangular fine to coarse gravel and occasional cobbles of weak to moderately weak metasiltstone, conglomerate, tuff and quartz. (COLLUVIUM)				
	6												
	7							V	Extremely weak to very weak, locally weak, light greyish brown (2.5Y/6/2), mottled white, yellowish brown and light grey, completely decomposed tuffaceous METACONGLOMERATE. (Slightly sandy clayey SILT with some to much angular to subrounded coarse gravel and cobbles)				
	9												
	3.00	CDCO - Completely decomposed tuffaceous METACONGLOMERATE							End of trial pit at average depth of 3.00m.				
	3.50												
	4.00												
	4.50												
PLAN		SECTION				SYMBOL				REMARKS			
						 				Shoring: Yes Water Seepage: Nil Stability: Stable Maximum Depth: 3.00m Average Depth: 3.00m 1. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level. 2. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level. 3. An inspection pit TIP3008(IP) was excavated at bottom of trial pit.			
N.T.S.		N.T.S.											

TRIAL PIT RECORD



Project : **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen
New Development Area Package A Works for Second
Phase Development**

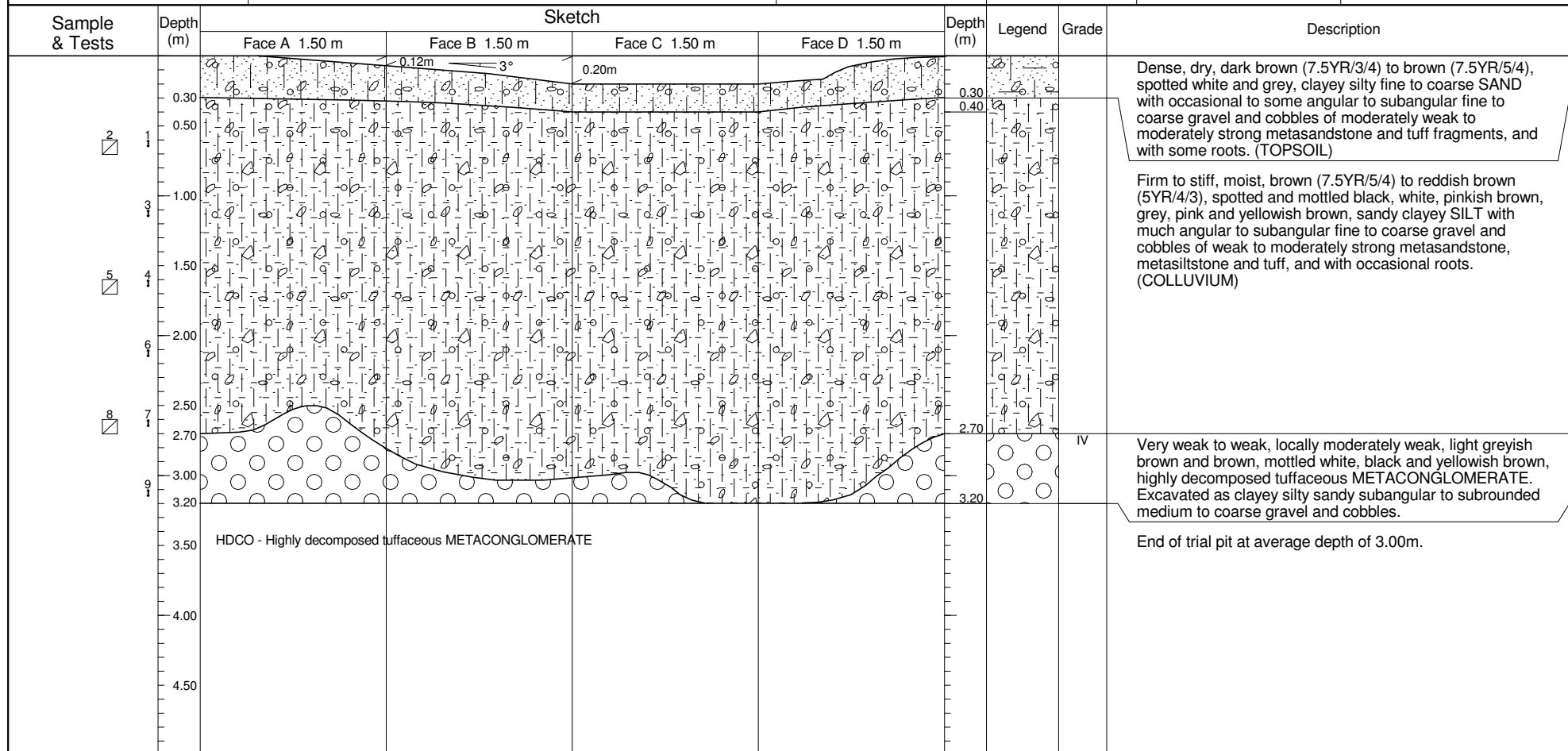
Logged by : K.H. Lai
Date logged : 05/12/2023
Checked by : A.B.Hollinshead
Date checked : 08/12/2023

Co-ordinates :
E 816332.46 m
N 833207.36 m
Ground Level :
+41.12 mPD

Excavation Dates:
21/11/2023 to 04/12/2023
Backfill Date:
11/12/2023

Trial Pit No.:
TIP3009

Contract No.: YL/2021/02

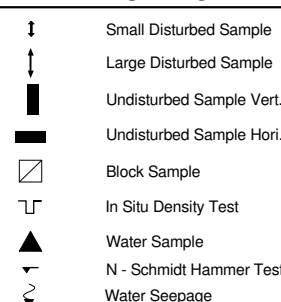
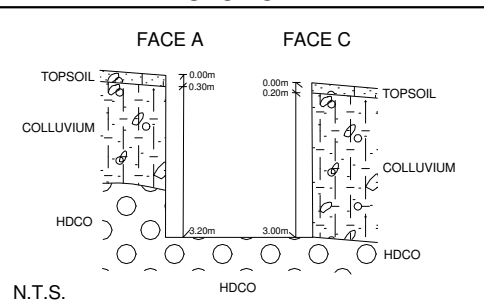
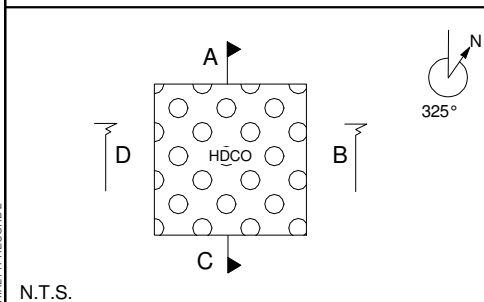


PLAN

SECTION

SYMBOL

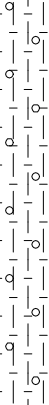
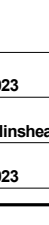
REMARKS



Shoring: Yes Water Seepage: Nil
Stability: Stable
Maximum Depth: 3.20m Average Depth: 3.00m
1. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level.
2. Block samples were taken at 0.50m, 1.50m and 2.50m below existing ground level.
3. An inspection pit TIP3098(IP) was excavated at bottom of trial pit.

TRIAL PIT RECORD

		INSPECTION PIT RECORD		INSPECTION PIT No. TIP3002(IP)					
		CONTRACT No.: YL/2021/02		SHEET: 1 of 1					
PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development									
WORKS ORDER No. -			CO-ORDINATES:		GROUND LEVEL + 39.35 mPD				
DATE from: 01/12/2023 to 02/12/2023			E 816252.68 N 833055.28						
Progress	Water Level (m) Shift start/end	Samples			Reduced Level	Depth (m)	Legend	Grade	Description
		No.	Type	Depth					
1	01/12/2023	1	↓	0.50	+39.35	0.00		VI	Firm to stiff, moist, red (10R/5/8) to reddish brown (5YR/4/3), occasionally mottled black, white and pale yellowish brown, clayey SILT with occasional angular coarse gravel and cobbles of weak to moderately weak metasandstone and tuff. (RESIDUAL SOIL)
		2	↓	1.00					
		3	↓	1.50					
2	01/12/2023 02/12/2023	4	↓	2.00	+37.35	2.00		V	Extremely weak to very weak, light greyish brown (10YR/5/2) to brown (7.5YR/5/4), spotted and mottled grey and white, completely decomposed tuffaceous METASILTSTONE. (Clayey SILT with some angular medium to coarse gravel of vein quartz)
		5	↓	2.50					
3	02/12/2023	6	↓	3.00	+36.35	3.00			End of inspection pit at 3.00m.
↓ Small Disturbed Sample ↓ Large Disturbed Sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Water Sample		LOGGED <u>K.H. Lai</u> DATE <u>07/12/2023</u> CHECKED <u>A.B-Hollinshead</u> DATE <u>28/12/2023</u>			REMARKS 1. TIP3002(IP) was excavated at the bottom of Trial Pit TIP3002. 2. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level.				

		INSPECTION PIT RECORD		INSPECTION PIT No. TIP3006(IP)				
		CONTRACT No.: YL/2021/02		SHEET: 1 of 1				
PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development								
WORKS ORDER No. -				CO-ORDINATES:		GROUND LEVEL + 28.82 mPD		
DATE from: 06/12/2023 to 08/12/2023				E 816314.65 N 833093.82				
Progress	Water Level (m) Shift start/end	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
		No.	Type Depth					
06/12/2023		1	↓ 0.50	+28.82	0.00			Firm to stiff, moist, yellowish brown (10YR/5/6) to brown (7.5YR/5/4), spotted and mottled black, light grey and reddish brown, clayey SILT with some angular to subangular fine to coarse gravel of weak to moderately strong metasandstone and metasiltstone. (COLLUVIUM)
06/12/2023 07/12/2023		2	↓ 1.00	+27.82	1.00		VI	Soft to firm, moist, red (10R/5/8) to reddish brown (5YR/4/3), occasionally spotted and mottled yellowish brown, black and light grey, clayey SILT. (RESIDUAL SOIL)
		3	↓ 1.50					
		4	↓ 2.00					
07/12/2023 08/12/2023		5	↓ 2.50					
		6	↓ 3.00	+25.82	3.00			End of inspection pit at 3.00m.
INSPECTION PIT RECORD - NEW PROJECT ↓ Small Disturbed Sample ↓ Large Disturbed Sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Water Sample				LOGGED K.H. Lai DATE 08/12/2023 CHECKED A.B-Hollinshead DATE 28/12/2023		REMARKS 1. TIP3006(IP) was excavated at the bottom of Trial Pit TIP3006. 2. Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m below existing ground level.		

		INSPECTION PIT RECORD				INSPECTION PIT No. TIP3008(IP)		
		CONTRACT No.: YL/2021/02		SHEET: 1 of 1				
PROJECT: Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development								
WORKS ORDER No. -				CO-ORDINATES:		GROUND LEVEL + 40.08 mPD		
DATE from: 01/12/2023 to 02/12/2023				E 816292.99 N 833172.38				
Progress	Water Level (m) Shift start/end	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
		No.	Type Depth					
01/12/2023 01/12/2023 02/12/2023 02/12/2023		1	↓ 0.17	+40.08 +39.91	0.00 0.17		IV	Weak to moderately weak, yellowish brown and reddish brown, mottled and spotted black, white and light grey, highly decomposed tuffaceous METACONGLOMERATE. Excavated as clayey silty angular fine to coarse gravel and cobbles.
End of inspection pit at 0.17m.								
1 2 3								
↓ Small Disturbed Sample ↑ Large Disturbed Sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Water Sample				LOGGED K.H. Lai DATE 04/12/2023 CHECKED A.B-Hollinshead DATE 28/12/2023		REMARKS 1. TIP3008(IP) was excavated at the bottom of Trial Pit TIP3008. 2. Small disturbed sample was taken at 0.17m below existing ground level.		



INSPECTION PIT RECORD

INSPECTION PIT No. **TIP3009(IP)**CONTRACT No.: **YL/2021/02**SHEET: **1** of **1**PROJECT: **Ground Investigation Works for Hung Shui Kiu / Ha Tsuen New Development Area Package A Works for Second Phase Development**WORKS ORDER No. **-**

CO-ORDINATES:

DATE from: **05/12/2023** to **06/12/2023**E **816331.90**
N **833206.91**GROUND LEVEL **+ 38.28** mPD

Progress	Water Level (m) Shift start/end	Samples			Reduced Level	Depth (m)	Legend	Grade	Description
		No.	Type	Depth					
05/12/2023					+38.28	0.00		IV	Very weak to weak, locally moderately weak, light greyish brown and brown, mottled white, black and yellowish brown, highly decomposed tuffaceous METACONGLOMERATE. Excavated as clayey silty sandy subangular to subrounded medium to coarse gravel and cobbles.
05/12/2023 06/12/2023		1	↓	0.50					
06/12/2023		2	↓	0.70	+37.58	0.70			
1									End of inspection pit at 0.70m.
2									
3						3.00			
INSPECTION PIT RECORD - NEW PROJECT ↓ Small Disturbed Sample ↓ Large Disturbed Sample  U76 Undisturbed Sample  U100 Undisturbed Sample  Water Sample					LOGGED <u>K.H. Lai</u> DATE <u>08/12/2023</u> CHECKED <u>A.B-Hollinshead</u> DATE <u>28/12/2023</u>			REMARKS 1. TIP3009(IP) was excavated at the bottom of Trial Pit TIP3009. 2. Small disturbed samples were taken at 0.50m and 0.70m below existing ground level.	