Appendix 4

Geotechnical Planning Review Report

Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.
Section 16 Planning Application

GEOTECHNICAL PLANNING REVIEW REPORT

Fugro reference: 090691.04

Rev	Date	Purpose of Issue	Prepared	Checked
---	Jul-25	Original Issue	MYL	TW
A				
B				
C				

In the event of there being any questions or comments on the contents of this report, please contact Mr. Timothy Wong, telephone 2577 9023.

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PLATES

FIGURES

APPENDICES

1. INTRODUCTION

1.1 The Project

The application site is located near San Shek Wan Road to the south of Tuen Mun Golf Centre, Tuen Mun, N.T. as shown on the Location Plan of **Figure 1**. The site is approximately in trapezoidal shape on plan, which includes Tuen Mun Town Lot No. 550. The site has a total area of approximately 1,852m^2, which was shown in the Approved Tuen Mun Outline Zoning Plan No. S/TM/41 gazetted on 13 June 2025.

The proposed development on the site comprises a two-storey house with gardens and guard room. In connection with the development, an access road with 4.5m clear width and 1.6m footpath is also proposed linking San Shek Wan Road to the development as shown on **Figure 2**.

A Geotechnical Planning Review Report was included as part of the Section 16 Planning Application for Proposed Holiday Camp at Lot 33RP in DD300, Area 45 in February 2015. The S16 Application was subsequently approved in May 2015. Following the land exchange of the application site, which was completed in February 2021, the concerned development site was renamed as TMTL 550. With the proposed change in the land use, a Section 16 Application for house development at TMTL 550 is proposed herein.

1.2 The Report

In view of the existing site conditions that the site of proposed development is located adjacent to a natural terrain, this Geotechnical Planning Review Report (GPRR) is prepared to assess whether a Natural Terrain Hazard Study is required based on the latest available geotechnical guidelines, aerial photographs and site inspection. In addition, this report also summarises the results of the stability analysis of the existing slope, Feature 5SE-D/C76 and an unregistered slope, which are located within the Green Hatched Black Area that may affect and be affected by the development and associated road access.

1.3 Client

King Brave Limited

1.4 Architect

Design Consultants Limited

1.5 Town Planner

Lawson David & Sung Surveyors Ltd.

1.6 Geotechnical Engineer

Fugro (Hong Kong) Limited

2. SITE CONDITIONS

2.1 The Site

The site is located near San Shek Wan Road bounded by a natural hillside terrain to the north and the east, a private land Lot no. 34 in DD300 to the south and a government land to the west. Tuen Mun Public Golf Centre and Tuen Mun Public Riding School are located at the north and the south of the site respectively. An existing horse riding trail is located outside the western site boundary. The existing site condition of the Application Site and surrounding land uses are shown on **Figure 3** with photographs.

The site area is predominantly characterized by rural landscape and environments, which consists of vacant agricultural land and covers with wild vegetation. There is a nullah running southbound outside the south-western site boundary. An abandonded culvert is situated within the site.

2.2 The Proposed Development

The proposed development comprises of a 2-storey house with private gardens and a guard room, as well as an access road linking between the Application Site and San Shek Wan Road. The indicative alignment of the proposed access road and the master layout plan of the development are shown on **Figures 4** and **5**.

3. DESK STUDY

3.1 Topography

The 1:5000 and 1:500 topographical survey maps of the Site and the area of the adjacent natural terrains obtained from the Lands Department are used as the base map for this review. Based on the topography of the adjoining natural terrain, the proposed study area is shown on **Figure 7**.

3.2 Geology

Sheet 5 of the Hong Kong Geology Survey 1:20,000 scale map series HGM20 (Ref. 1) (Geological Map is shown on **Figure 8**) indicates that the solid geology of the Site is underlain by Tuen Mun Formation, undivided (Andesite with tuff and tuffie), which is metamorphosed.

3.3 Hydrology

Based on the topographical survey map and site observation, a valley/ ephemeral drainage line is located to the north of the site. There are only two minor catchment areas on the natural hilly terrain to the north and east of the site uphill. Thus, the amount of surface run-off discharged into the site is minimal. The catchment areas are shown on the site plan of **Figure 9.**

3.4 Man-made Features (Feature No. 5SE-D/C76 & Unregistered Feature)

There are two man-made features affecting/ being affected by the proposed development – Feature No. 5SE-D/C76 abutting the proposed access road alignment (See **Plate 3**), and an unregistered feature partly within the western site boundary/ unallocated government land (See **Plate 4**). The locations of these features are shown on Site Plan of **Figure 9**.

Based on topographical survey plan as shown on **Figure 9**, Feature No. 5SE-D/C76 is an approx.. 7.36m high, maximum 30° soil cut slope covered with moderate vegetation, which is maintained by the Lands Department. Whereas, the unregistered feature (See **Plate 4**) has only a maximum height of 1m with the maximum slope gradient of 14°, which appears to be almost flush with the adjacent ground and is covered with heavy vegetation.

A copy of the SIMAR Slope Report, the Feature Registration Form and Stage 1 Study Report, and the SIRST Report for Feature No. 5SE-D/C76 are presented in **Appendix B**.

3.5 Enhanced Natural Terrain Landslide Inventory (ENTLI)

The ENTLI (Ref. 2) is a territory-wide catalogue of features considered to be natural terrain landslides as identified from aerial photographs. No relict / recent landslide was reported within and in the vicinity of the site. The ENTLI is reproduced on **Figure 10**.

3.6 Boulder Field Inventory

The site falls mainly within Polygon No. S5_720 of the Boulder Field Inventory (See **Figure 11**). However, the Attribute 1 of the Inventory was obscured by vegetation. Site inspection also revealed that no obvious boulders were identified on the natural terrain located to the east of the site.

3.7 Ground Investigation

A plan showing the locations of previous ground investigation works carried out in the vicinity of the site is presented on **Figure 9**. The drillhole logs indicated that the superficial geology is Alluvium overlying decomposed Porphyry and completely decomposed to slightly decomposed Andesite. The drillhole logs are presented in **Appendix C** for reference and shown in the sections in **Appendix A**. The geological information obtained from the drillhole logs is consistent with that inferred in the Geological Map.

3.8 Recorded Landslide Incident

No landslide incident within the vicinity of the site could be located at the GEO.

3.9 Historical Landslide Catchment (HLC)

No HLC falls within the site's catchment area. The extent of the nearby HLCs is shown in **Appendix E**.

3.10 Geotechnical Area Study (GAS)

The Physical Constraints Map (**Figure 12**) in GAS report (Ref. 5) for the West New Territories indicates that the study area is classified as the following zones:-

- The area is classified as the area as "instability on disturbed terrain".

The Geotechnical Land Use Map (**Figure 13**) in the GAS report indicates that Engineering cost for development of the Site is normal.

4. GEOTECHNICAL ASSESSMENT

4.1 Site Formation Works

The land formation strategy of the proposed development is formulated based on three design considerations, namely, land, drainage and minimization of earthwork. Basically, the land formation should adopt simple earth retaining structures, small-scale slope formation works and provision of drainage system, etc.

The proposed site formation works might include cutting and filling for platform formation, slope and retaining wall construction, slope stabilization and natural terrain hazard mitigation works, if necessary, above the existing ground levels to form the required platform levels (see **Figure 7**).

For the existing slopes and retaining walls affecting/ being affected by the proposed development, stability of the slopes and retaining walls will be assessed to cater for the change of ground profiles and any service loading. Stabilization measures to the slopes and retaining walls will be provided, if necessary.

Feature No. 5SE-D/C76 have been included as Green Hatched Black Areas in the lease plan in February 2021. The stability of the man-made slope shall be assessed and upgraded as required subject to the approval of BD and GEO.

For instance, the building platform within the lot will be formed to +29.5mPD to +30.1mPD in general. This will result in the provision of a 1.5m approx. high retaining wall at the front arm of of the proposed access road from the junction with San Shek Wan Road (see **Figure 4**).

Due to the uneven topography of the site area, minor retaining walls/ fence walls are expected at various locations of the site periphery to address the level difference between the +29.50mPD to +30.1mPD building platform and surrounding grounds (see **Figure 6**). It is anticipated that 1.5m approx.. buffer would be required locally for the construction of the retaining wall in

conjunction with the fence wall and peripherical drains to confine the retaining wall/fence wall alignments constructed within the site boundary.

4.2 Natural Terrain Hazards

Based on guideline given in Figure 2.5 of GEO Report No. 138 (Ref. 4), part of the proposed development meets the alert criteria for carrying out a natural terrain hazard study (NTHS). Critical cross-sections of the site to assess if the alert criteria are met as presented in **Appendix A**.

The study area marked as Green speckle blue in the lease plan (~8,500m^2) of the NTHS is shown on **Figure 7**. The toe and crest level of the study area are at about +31mPD and +44.5mPD respectively. General views of the study area are shown in **Plates 1** to **2**. Based on the observation during the field inspections since December 2022, the study area is composed of four hillside catchments (see **Figure 14**):

a) OH1 – An area of west to southwest facing, densely vegetated open hillslope.
b) OH2 – An area of northwest facing, densely vegetated open hillslope.
c) TD1 – An area between OH1 and OH2, where would allow landslide debris that originated from the upper slopes to converge and travel to a likely discharge point given sufficient mobility. According to GEO TGN 36 (Ref. 7), this catchment is considered a topographic depression catchment.
d) TD2 – An area of northwest facing, moderate concave terrain. A well-defined drainage line is not indicated in the 1:1000-scale topographic map nor observed during the field inspection. However, a relatively linear topographic depression is apparent and thus, this terrain is considered a topographic depression catchment.

Based on the findings of the desk study and field inspection, the study area is prone to the following natural terrain hazards:-

- Open Hillslope Failures (OHF) – Slope failures where the landslide debris remains wholly on the open hillside and is not channelized along a stream course; and
- Topographic Depression Failures (TDF) – Potential hazards focused across a topographic depression and/or an area of natural drainage, due to the potential to confine debris and concentrate surface flows.

In view of this, a natural terrain hazard assessment study is recommended to be carried out to assess the potential hazards in detail.

4.3 Preliminary Stability Assessment of Existing Feature No. 5SE-D/C76

Preliminary stability assessment has been carried out for the existing Feature No. 5SE-D/C76, which is considered as a Category 2A feature affecting the proposed widened double track road leading to the development site. The minimum requirement of Factor of Safety (FOS) is 1.4, as stipulated in Table 1 of Works Bureau Technical Circular No. 13/99 (Ref. 8). The slope-forming material of the feature is assumed to be completely decomposed Andesite according to the nearby drillhole logs. For the purpose of stability analysis, the design soil shear strength parameters of c' = 5kPa, ϕ' = 35°and γ = 19kN/m^3 were adopted and the design groundwater level was modelled at one-third of the slope height.

A critical section C-C of the Feature has been analyzed using Morgenstern-Price Method in a computer program "SLOPE/W" and the results are summarised in the following table. The relevant computer outputs are presented in **Appendix F**.

Table 1 – Section C-C (Refer to Appendix F1 – F2)

Slip No.	Calculated Factors of Safety (F.O.S)
1	2.047
2	1.787
3	1.780 (Min)
4	1.794
5	1.906

Based on the preliminary stability analysis results, the calculated minimum FOS is 1.780, which is greater than the required FOS of 1.4. Thus, the stability of Feature can meet the current safety standards, and it is unlikely to cause potential hazards to affect the proposed access road. This is further confirmed by the site inspections carried out since December 2022 where the slope was in satisfactory condition and no signs of seepage or distresses were observed.

However, ground investigation works are recommended to be carried out to reveal the actual site geology and refine the soil shear strength parameters for detailed slope stability assessment of the feature as part of the development. Stabilization measures will also be recommended to upgrade the Feature, if necessary.

5. CONCLUSIONS AND RECOMMENDATIONS

(1) The site meets the alert criteria for carrying out a NTHS.

(2) The following potential natural terrain hazard is likely to occur within the study area:-

a. Open Hillslope Failures (OHF); and

b. Topographic Depression Failures (TDF).

In view of this, a NTHS is recommended to be undertaken and necessary mitigation measures are recommended as part of the proposed development.

(3) The existing features within the Site will be upgraded as part of the site formation works to the current safety standards, based on the requirement of the Master Layout Plan.

(4) With the implementation of the appropriate mitigation measures for natural terrain hazards if necessary, and proposed site formation works based on detailed ground investigations and stability assessment to be carried out, the proposed development is considered geotechnically feasible.

Based on a review of the latest geotechnical guidelines, safety standards, coupled with an interpretation of the aerial photographs and site inspection, the recommendation and findings of the GPRR is confirmed to be valid.

6. REFERENCES

1. Geotechnical Control Office (1988). "Solid and Superficial Geology. Hong Kong Geological Survey HGM20, Edition 1, Sheet No. 5, 1:20,000 scale". Government Press, Hong Kong.

2. Maunsell Fugro Scott Wilson (2005). "Enhanced Natural Terrain Landslide Inventory". Geotechnical Engineering Office, Hong Kong.

3 Maunsell Geotechnical Services Ltd (1998). "Boulder Study of Hong Kong Final Report. Boulder Field Inventory Map Sheet No. 5". Geotechnical Engineering Office, Hong Kong.

4. Geotechnical Engineering Office (2016). "GEO Report No. 138 Guildlines for Natural Terrain Hazard Studies". Geotechnical Engineering Office, Hong Kong.

5. Geotechnical Control Office (1987). "Geotechnical Area Study for West New Territories. GASP Report III". Geotechnical Engineering Office, Hong Kong.

6. Geotechnical Engineering Office (2014). "GEO Technical Guidance Note No. 34 Guidelines on Assessment of Debris Mobility for Open Hillslope Failures". Geotechnical Engineering Office, Hong Kong.

7. Works Bureau (1999b). Geotechnical Manual for Slopes - Guidance on Interpretation and Updating (Works Bureau Technical Circular No. 13/99). Works Bureau, Government Secretariat, Hong Kong, 12 p.

8. Fugro (Hong Kong) Limited (2010). Geotechnical Planning Review Report for Proposed Houses at Lot No. 33 R.P. in DD300, Area 45, Tuen Mun, New Territories – Section 16 Application.

9. Fugro (Hong Kong) Limited (2014). Geotechnical Planning Review Report for Proposed Holiday Camp and the associated Vehicular Access in "Recreation" and "Other Specified Uses" annotated "Public Recreation and Sports Centre"

Zones at Lot 33RP and Adjoining Government Land in DD300, Area 45, Tuen Mun, New Territories – Section 16 Application.

10. Fugro (Hong Kong) Limited (2023). Geotechnical Planning Review Report for Proposed Section 12A Rezoning Application – TMTL 550 at Tuen Mun, New Territories

Plates

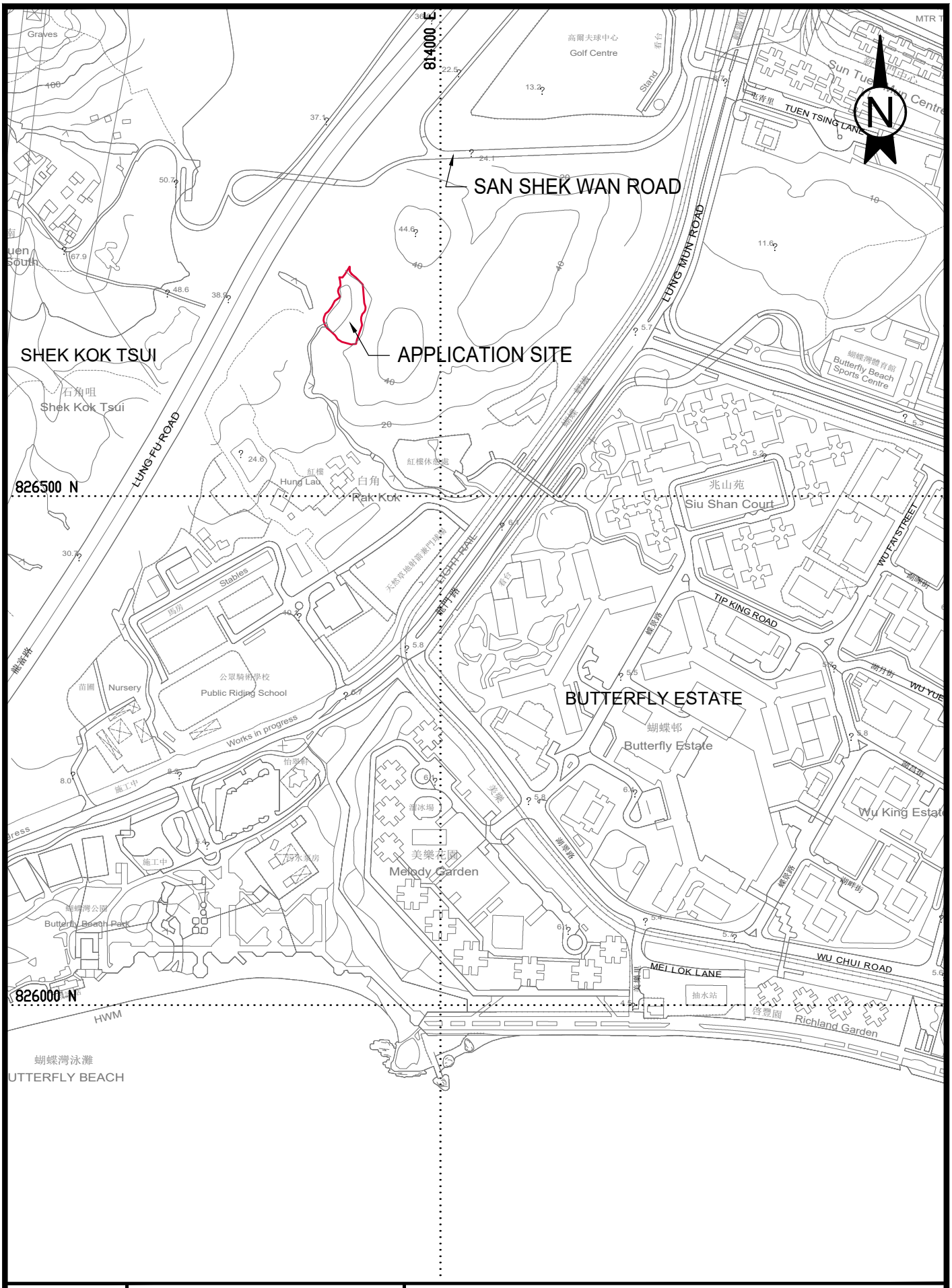
Description:	**General View of the Site (Looking South)**	Scale:	-
FUGRO	**Project Title:** **Proposed House Development of Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	Project No.:	090691
		Date:	29-Dec-22
		PLATE	**1**

Description:	**General View of the Natural Terrain (To the North and East of the Site)**	Scale:	-
FUGRO	**Project Title:** **Proposed House Development of Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T. Section 16 Planning Application**	Project No.:	090691
		Date:	29-Dec-22
		PLATE	**2**

Description:	**General View of the Existing Feature No. 5SE-D/C76 (To the North of the Site)**	Scale:	-
FUGRO	**Project Title:** **Proposed House Development of Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	Project No.:	090691
		Date:	29-Dec-22
		PLATE	**3**

Description:	**General View of the Unregistered Slope (within the Green Hatched Black Area along North-western Site Boundary)**	Scale:	-
FUGRO	**Project Title:** **Proposed House Development of Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	Project No.:	090691
		Date:	29-Dec-22
		PLATE	**4**

Figures



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FUGRO

Project
PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title
LOCATION PLAN

Job No.	Figure No.	Scale	Date
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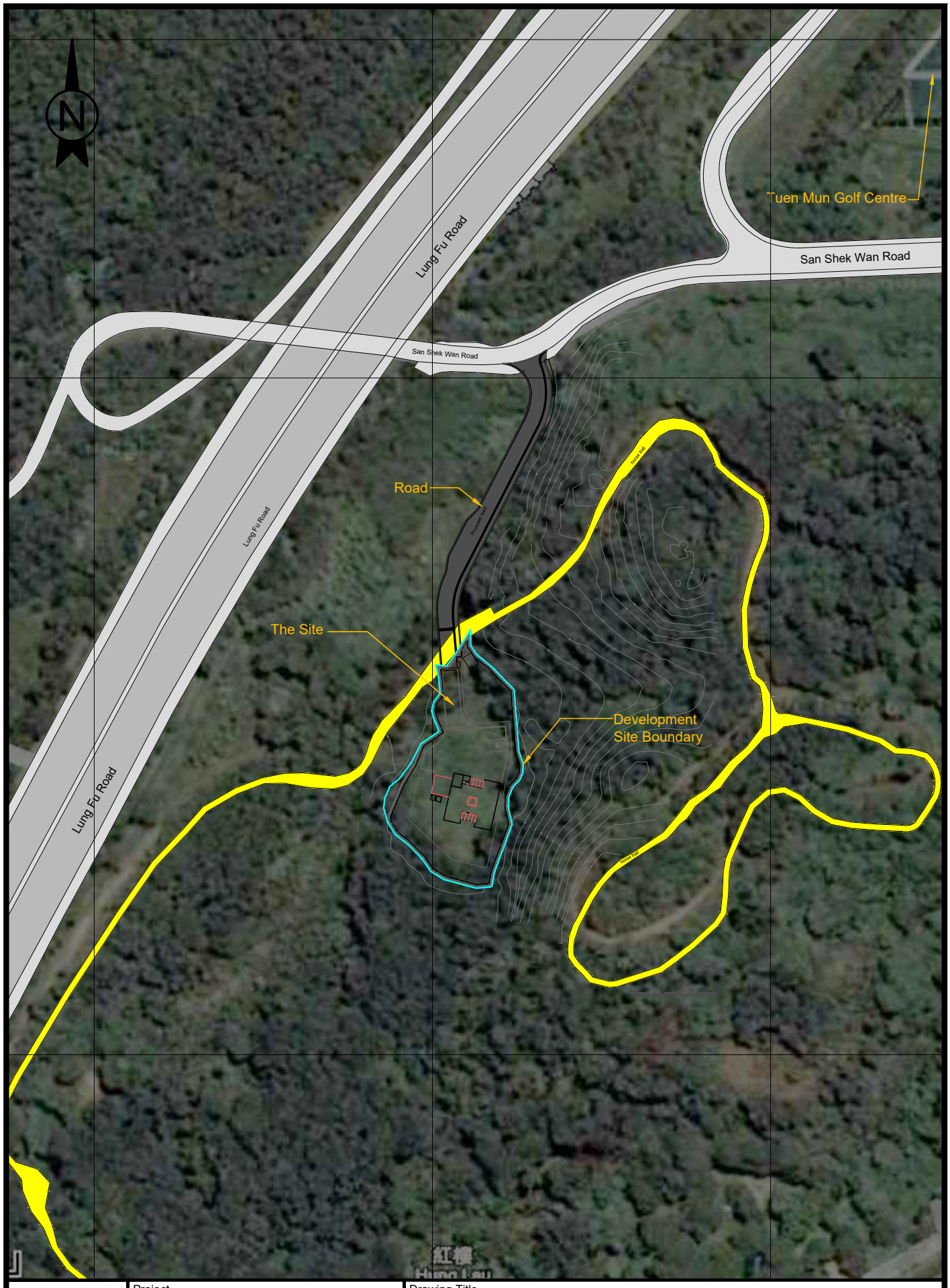

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Project

PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title

AERIAL PHOTO OF THE SITE AND PROPOSED ACCESS ROAD

Job No.	Figure No.	Scale	Date
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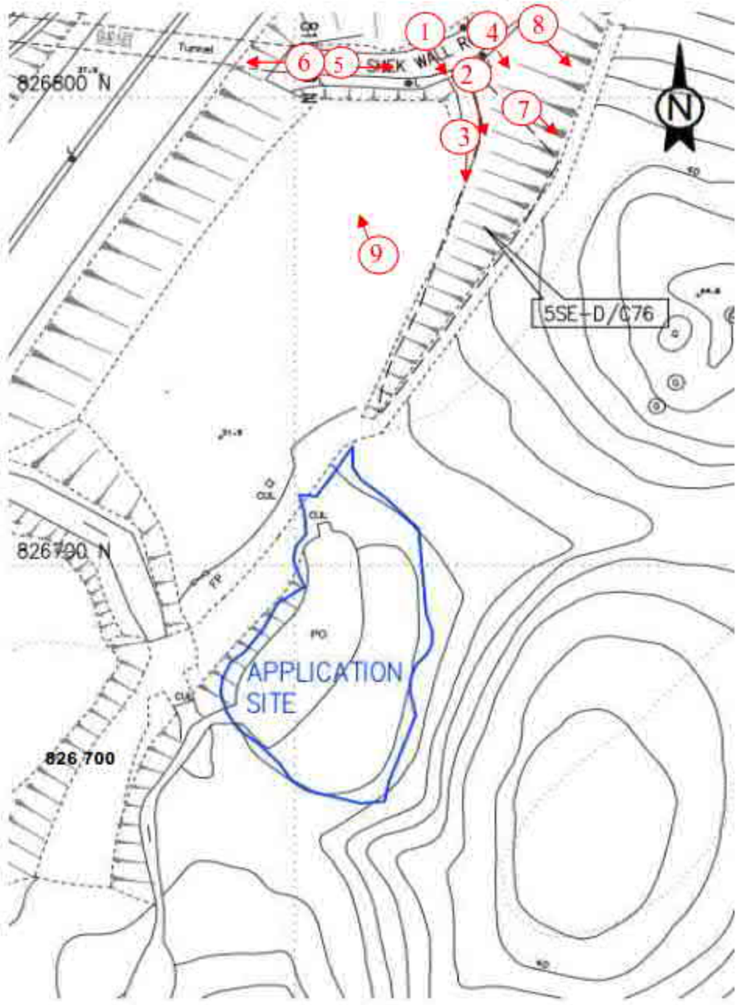
CAD Reference : X:\WORKING\090691\GENERAL\090691-FIG02_P10-G.DWG Date & Time : 29-07-25 (4:29:21PM) Plotted By : HK.COMMUSER3

V1 - Existing Site Entrance At San Shek Wan Road

V5 - San Shek Wan Road Near Site Entrance (Looking East)

V6 - San Shek Wan Road Near Site Entrance (Looking West)

V2 - Existing Footpath Leading to Fenced-off Government Land



V7 - Upper Portion of Feature No. 5SE-D/C76

V3 - Steel Gate to Government Land

V8 - Natural Hillside Terrain Above Feature No. 5SE-D/C76

V4 - General View of Feature No. 5SE-D/C76
(Abutting Proposed Access Road Alignment)

Legend:

Direction and Location of Plate No. 1

V9 - General View of Government Land (Looking North-West)

Title **Existing Conditions of the Site & Its Vicinity - Index Plan (Part 1)**	**Figure** 3a **(Sheet 1 of 3)**
Project Title **Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	**Scale** **1 : 1500**

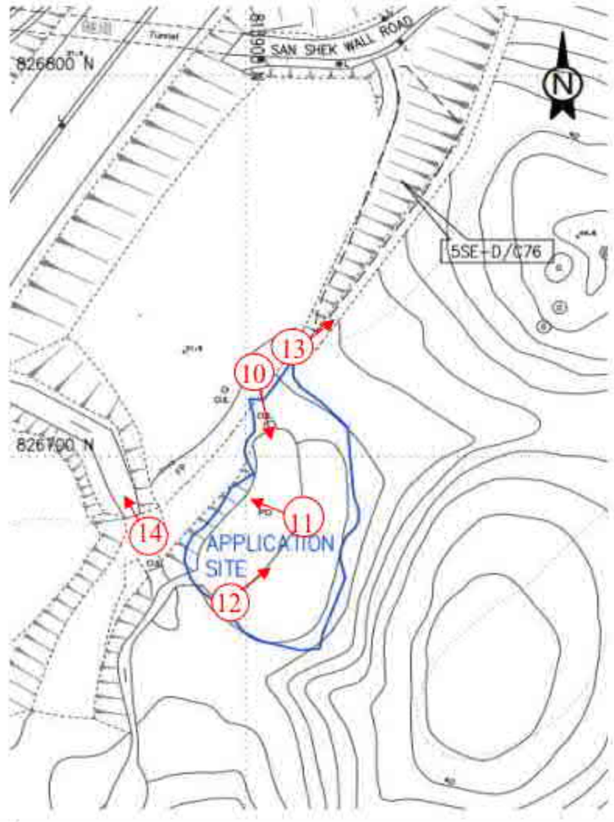
V10 - General View of the Natural Terrain (Looking South-East)

V11 - General View of the Unregistered Slope (Along North-western site boundary)

V12 - General View of the Natural Terrain (Looking North-East)

V13 - General View of the Existing Horse Riding Track

V14 - General View of the Nullah (Near South-western boundary)



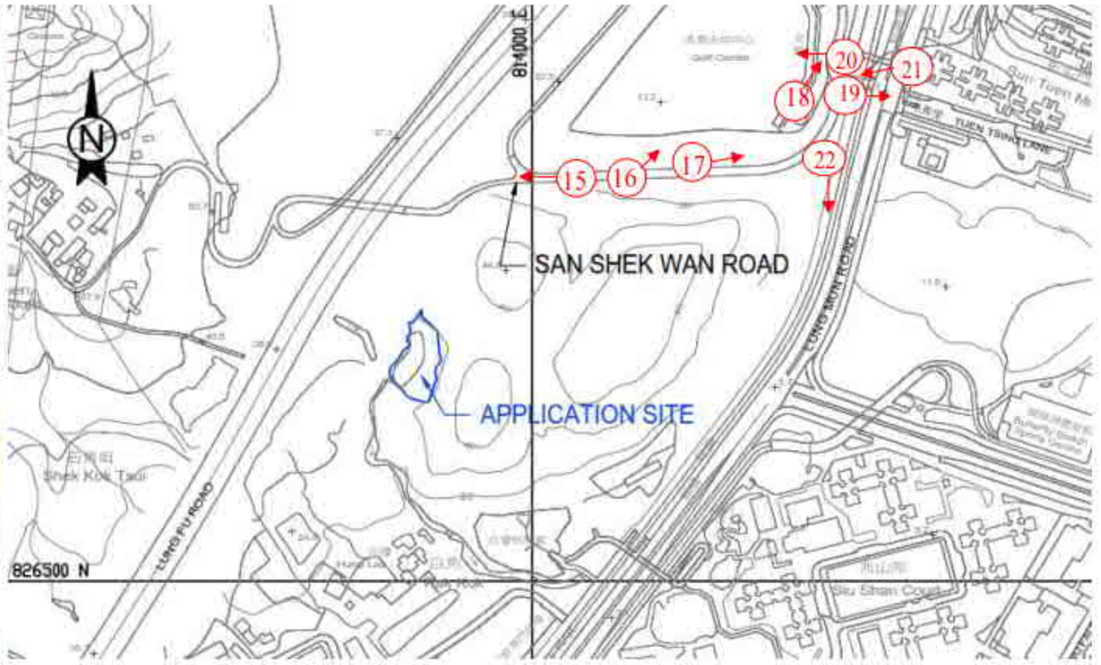
Title **Existing Conditions of the Site & Its Vicinity - Index Plan (Part 1)**	**Figure** 3b **(Sheet 2 of 3)**
Project Title **Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	**Scale** **1 : 1500**

V15 - San Shek Wan Road Leading to the Site Uphill

V16 - Tuen Mun Golf Centre

V17 - San Shek Wan Road Heading Tuen Mun New Tuen Mun Centre

V18 - Light Railway Station (LRT Depot)



Legend:

19 Direction and Location of Plate No. 19

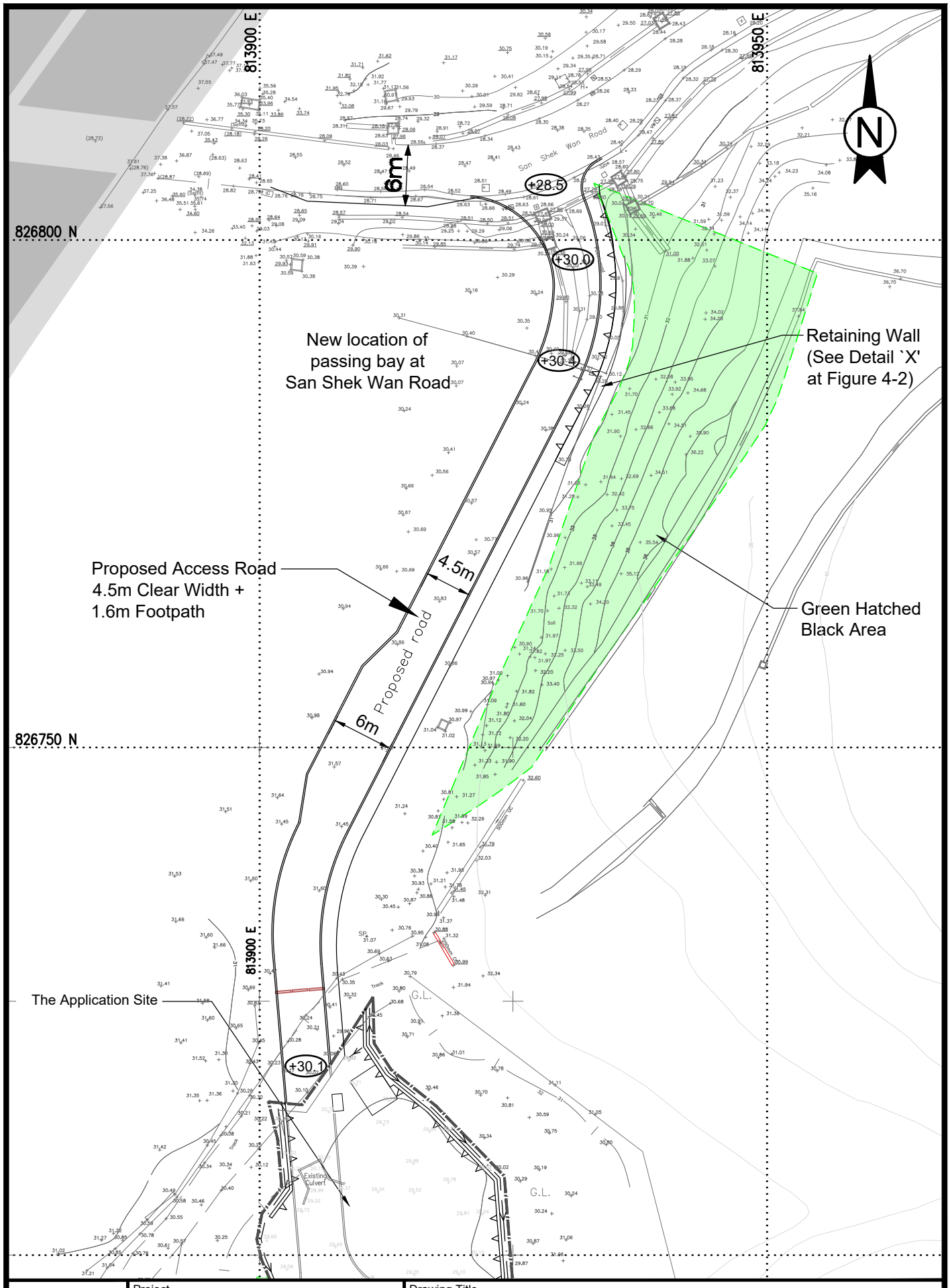
V19 - Lung Mun Road Near Sun Tuen Mun Centre

V20 - Entrance of Tuen Mun Golf Centre

V21 - San Shek Wan Road

V22 - Railway Next to Lung Mun Road

Title **Existing Conditions of the Site & Its Vicinity - Index Plan (Part 1)**	**Figure** 3c **(Sheet 3 of 3)**
Project Title **Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T.** **Section 16 Planning Application**	**Scale** **1 : 5000**



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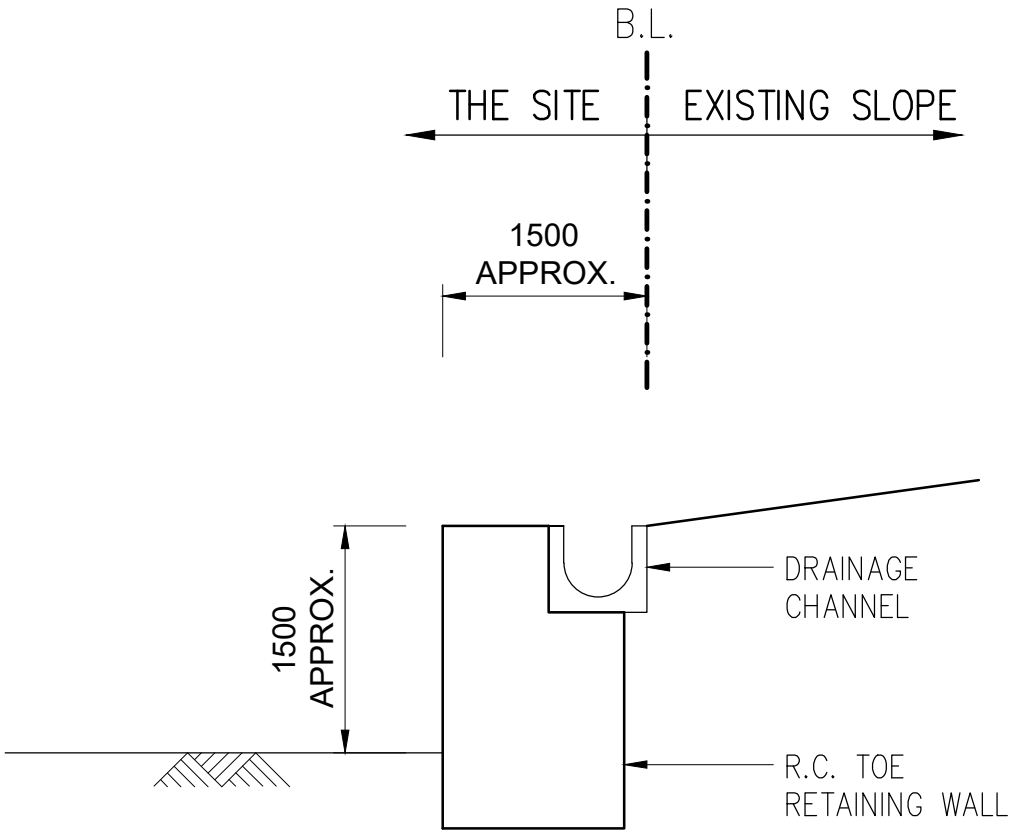

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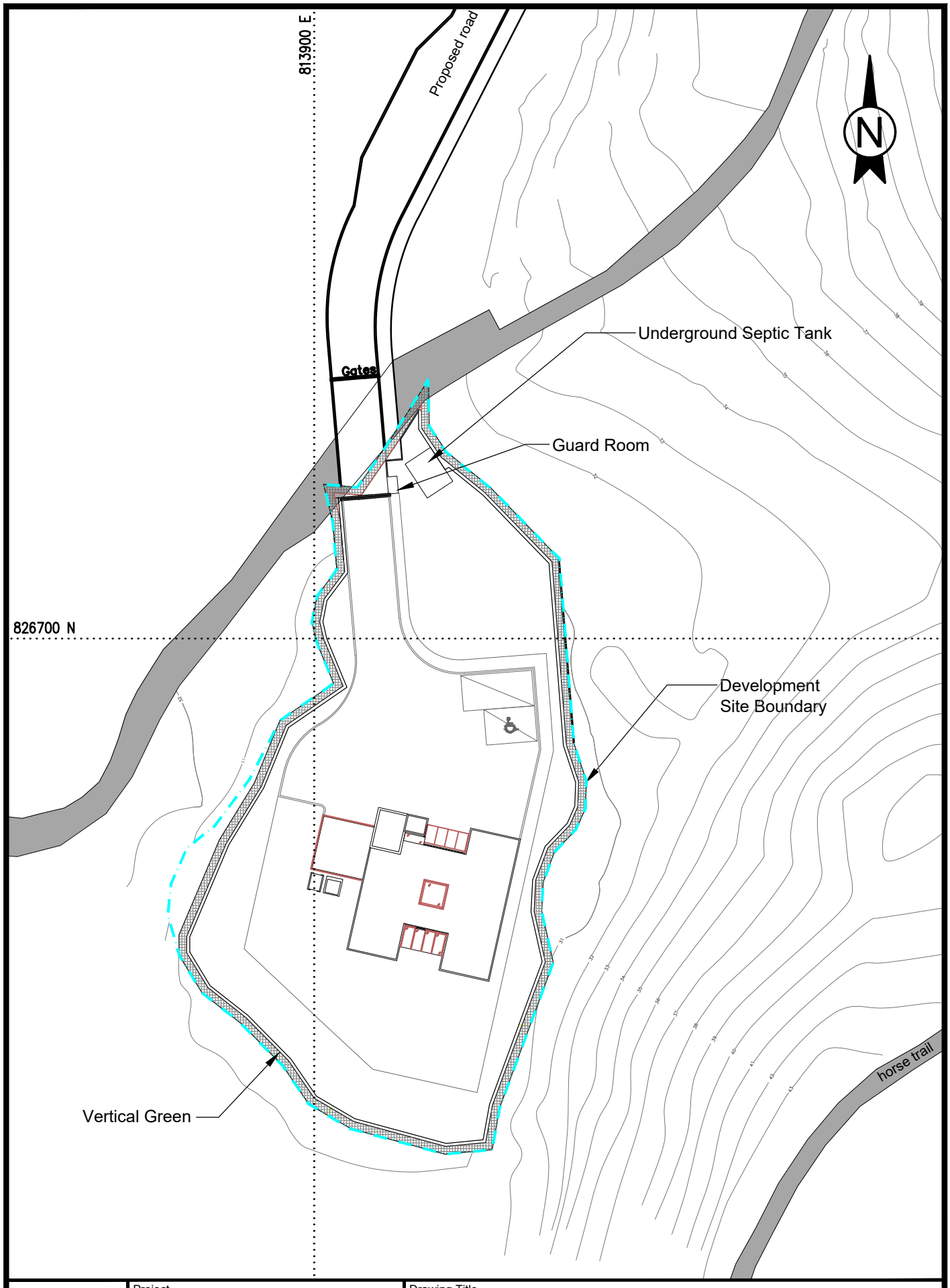

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Project

PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title

INDICATIVE MASTER LAYOUT PLAN

Job No.	Figure No.	Scale	Date
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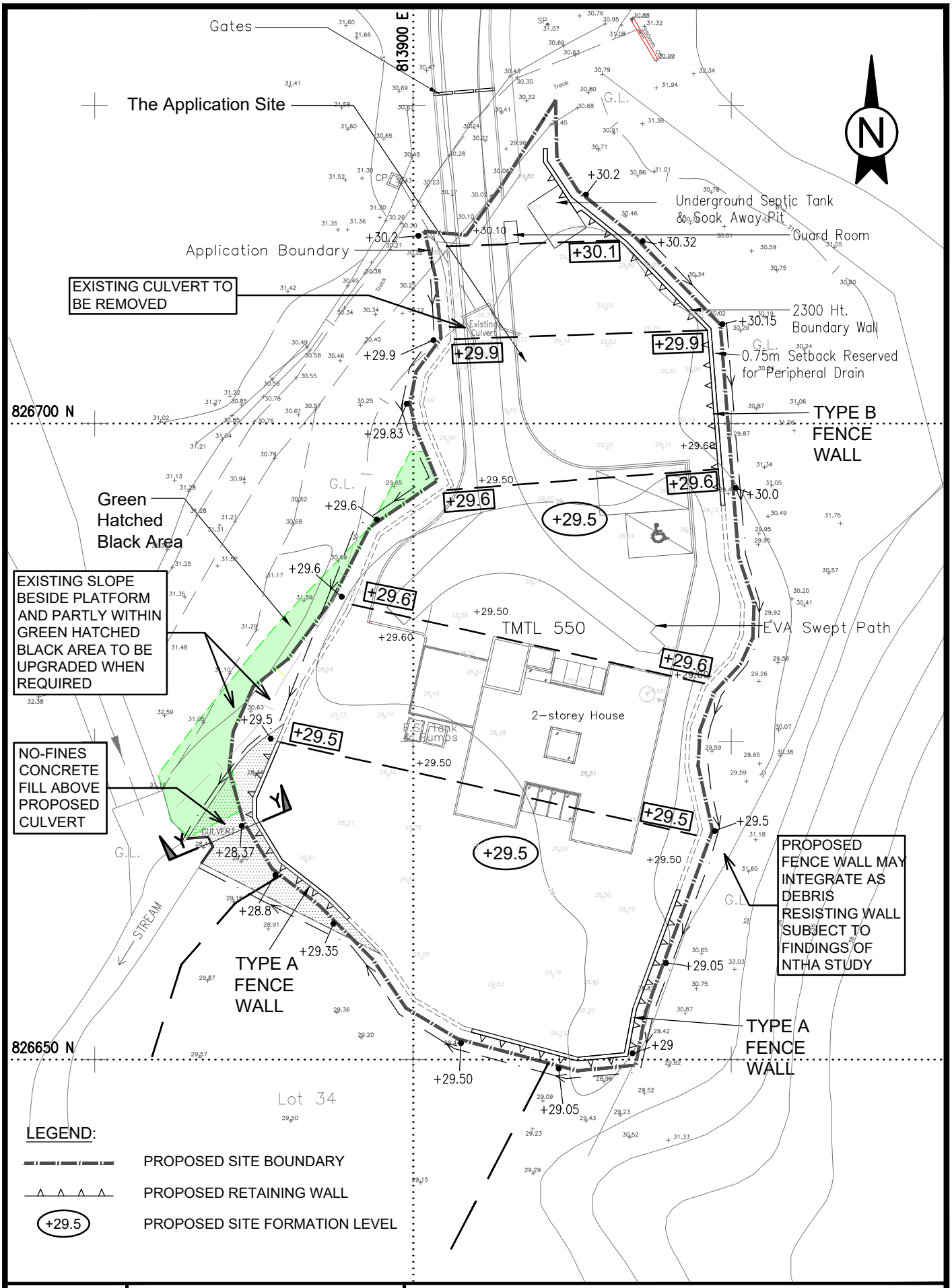

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Project
PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title
PROPOSED SITE FORMATION PLAN

Job No.	Figure No.	Scale	Date
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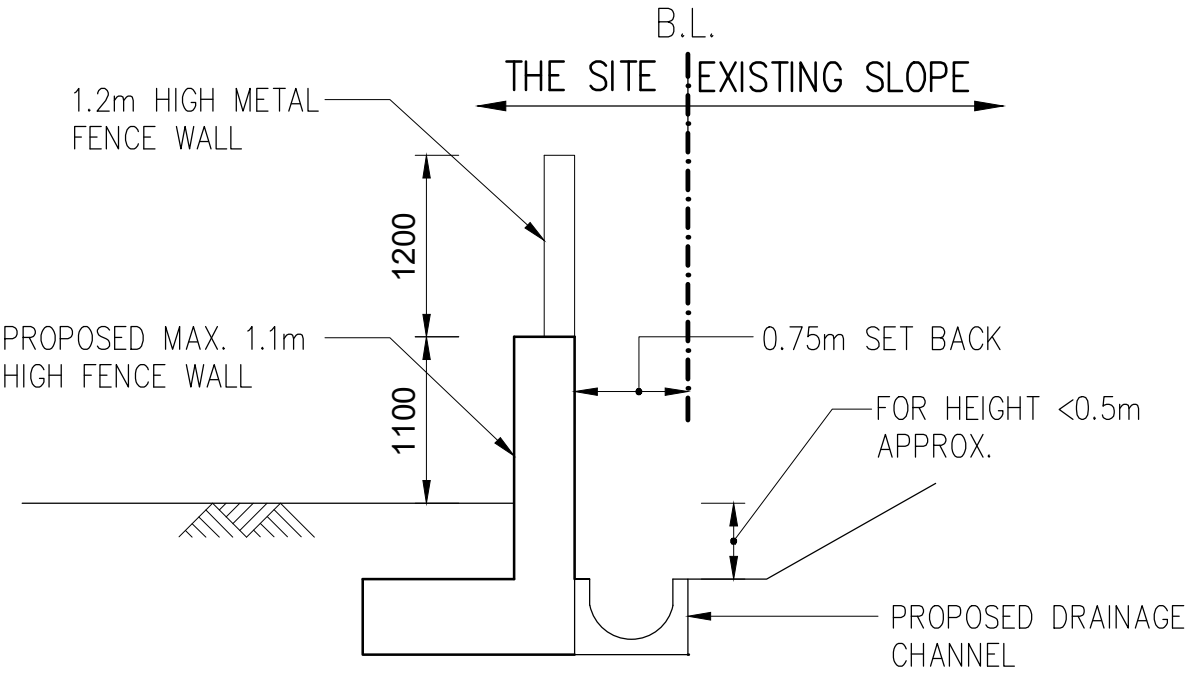

FENCE WALL FOOTING TYPE A

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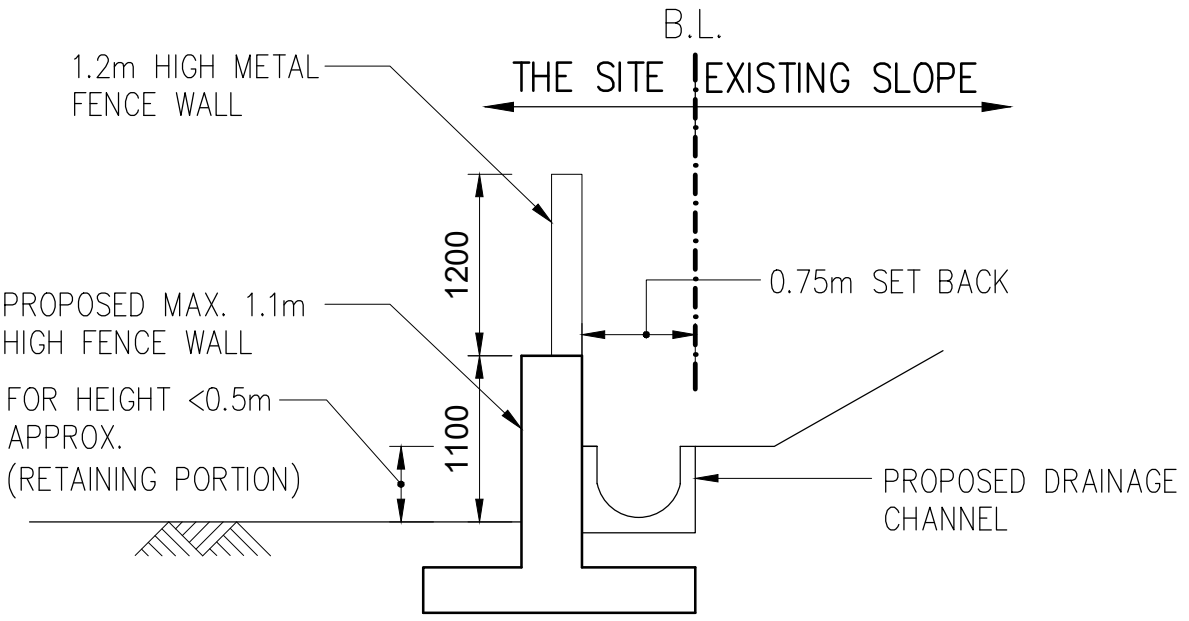

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Project
PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title
PROPOSED FENCE WALL TYPE A AND B

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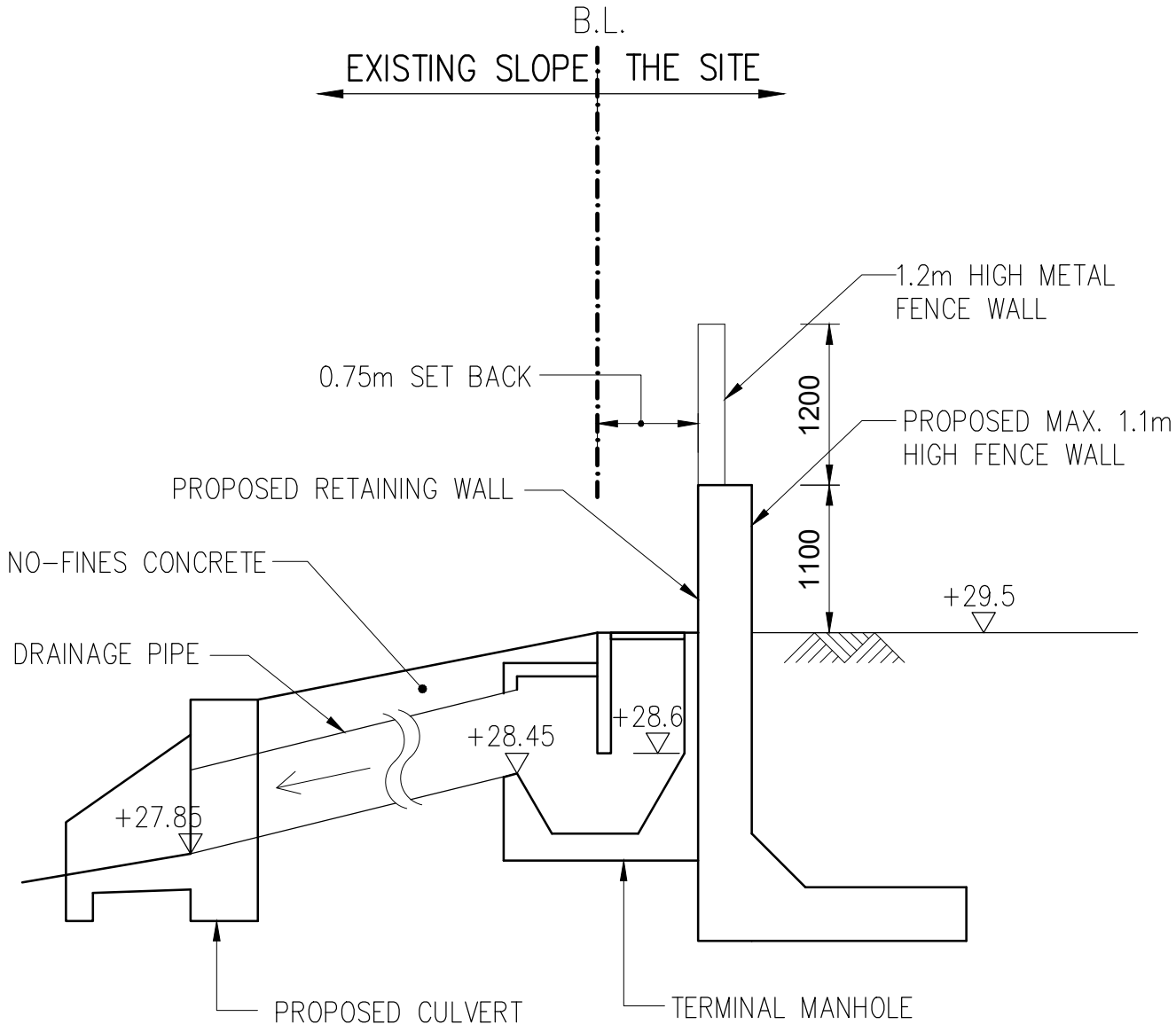

SECTION Y-Y

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Project
PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title
SECTION Y-Y

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826800 N

826700 N

813900 E

NATURAL TERRAIN HAZARD
STUDY (NTHS) AREA

PROPOSED
DEVELOPMENT
OF THE SITE

PROPOSED
ACCESS ROAD

Proposed road

LEGEND :

DEVELOPMENT SITE BOUNDARY

NATURAL TERRAIN HAZARD
STUDY (NTHS) BOUNDARY

PLAN

SCALE 1 : 500

FUGRO (HONG KONG) LIMITED

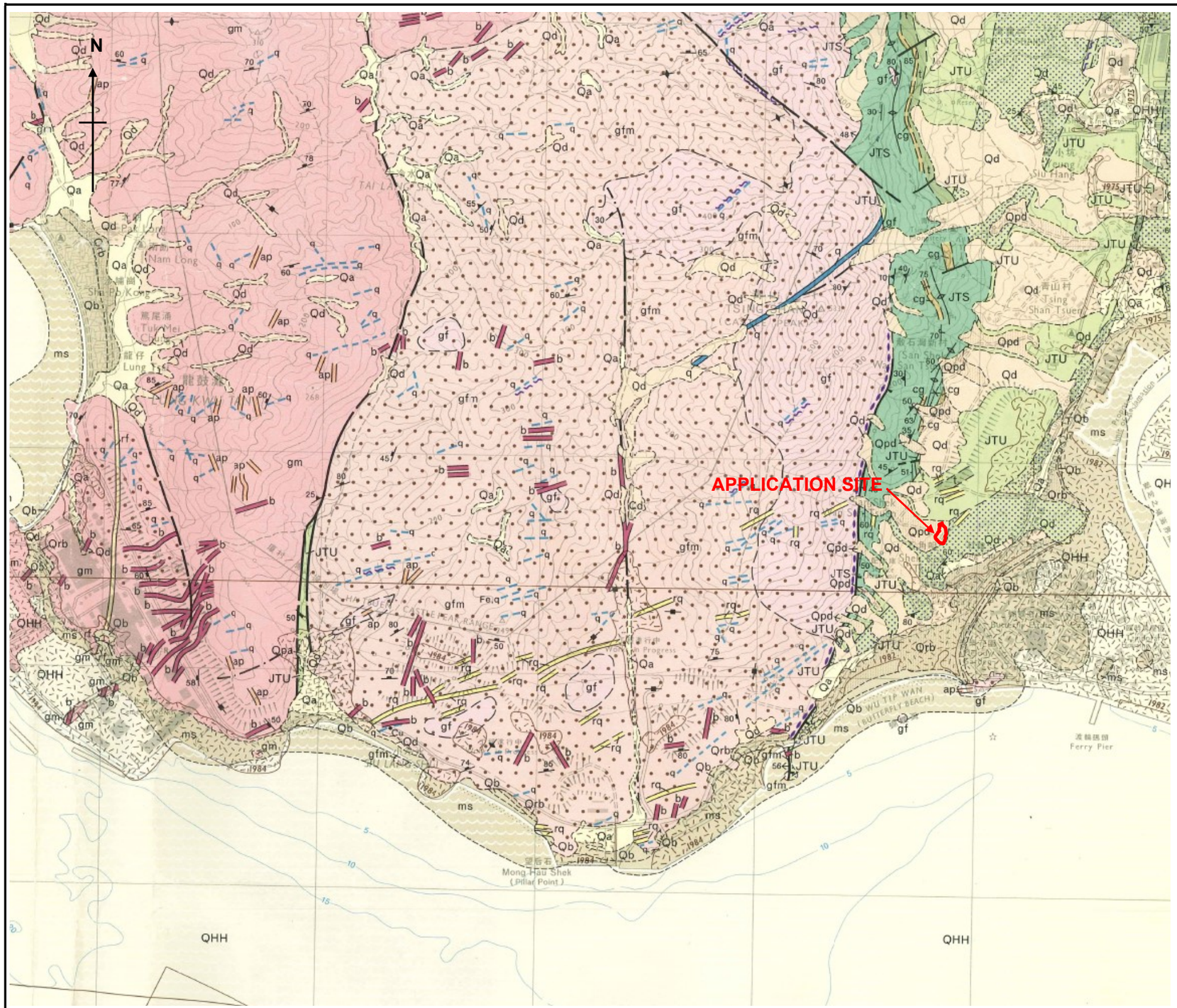
[redacted]

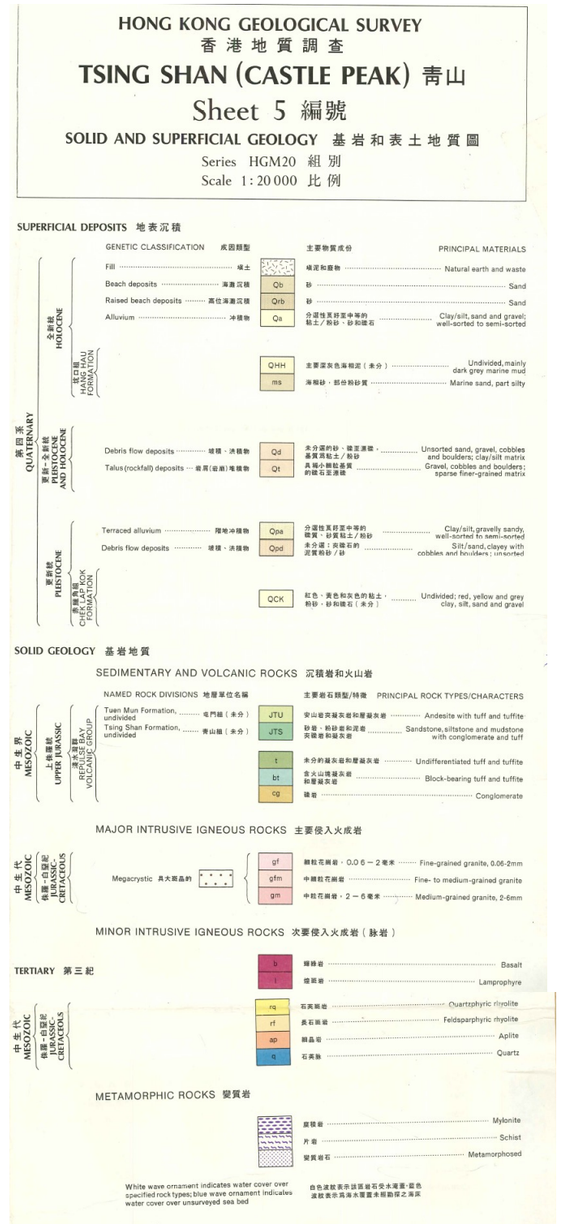
Project
PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title
SITE PLAN

Job No.	Figure
090691	7
Scale	Date
1:500	JUL-2025

CAD Reference : X:\WORKING\090691\GENERAL\090691-FIG07&09_P10-G.DWG Date & Time : 16-07-25 (1:30:12PM) Plotted By : HK.COMMUSER3





Description: **GEOLOGICAL MAP**

Scale: **1:20 000**

FUGRO

Project Title:

Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T. – Section 16 Planning Application

Project No.:	090691
Date:	Jul-25

FIGURE 8

826800 N

826700 N

5SE-D/C76

NATURAL TERRAIN HAZARD STUDY (NTHS) AREA

PROPOSED DEVELOPMENT OF THE SITE

PROPOSED ACCESS ROAD

Proposed road

TP14,15,16

813900 E

UNREGISTERED FEATURE

A

B

C

N

PLAN

LEGEND :

- DEVELOPMENT SITE BOUNDARY
- NATURAL TERRAIN HAZARD STUDY (NTHS) BOUNDARY
- FEATURE BOUNDARY (UNDER STUDY)
- CROSS-SECTION
- TP14,15,16 EXISTING TRIAL PIT

Checked by :

Drawn by :

Compiled by :

FUGRO (HONG KONG) LIMITED

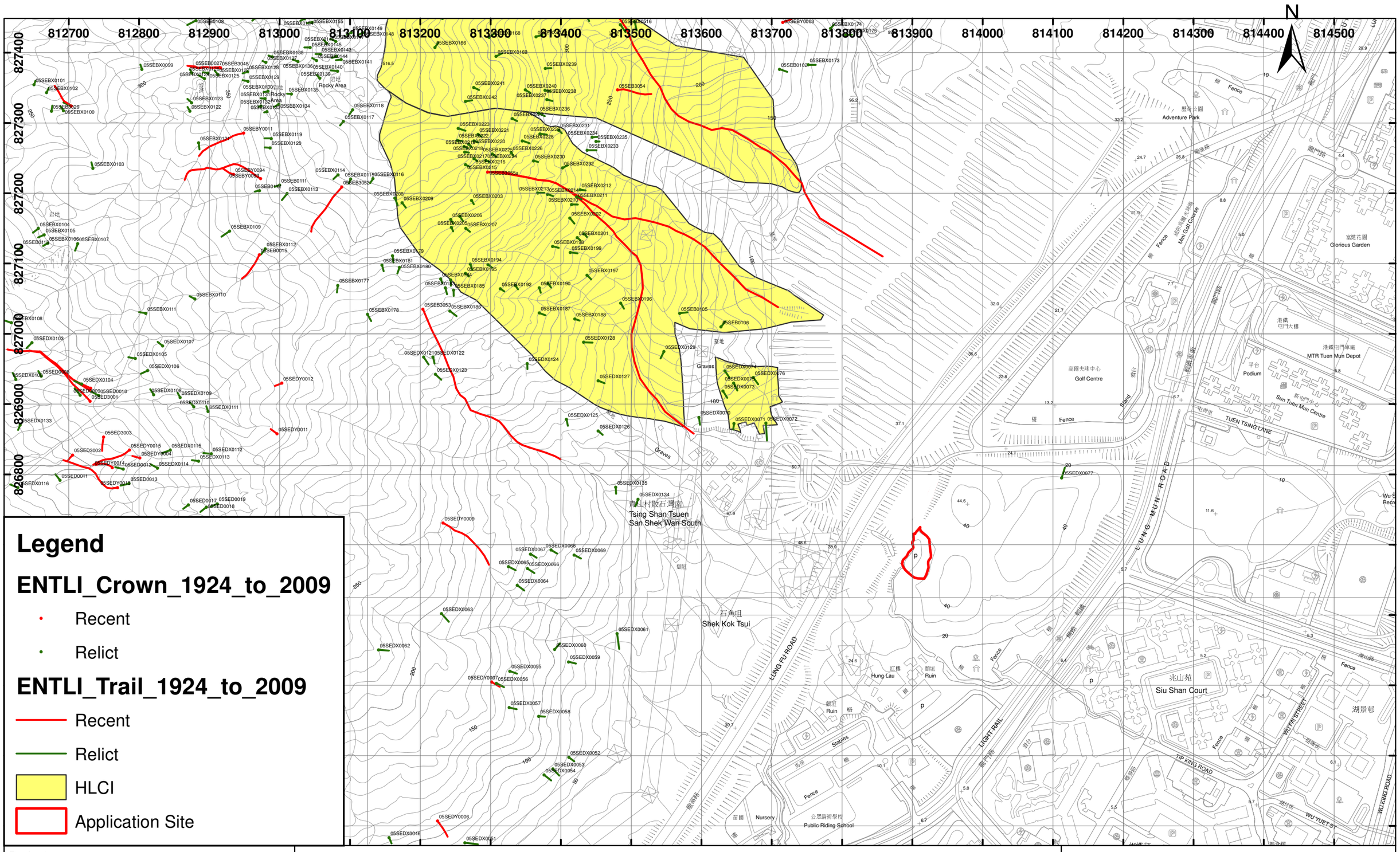
[redacted]

Project: PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION

Drawing Title: SITE PLAN (SHOWING FEATURES)

Job No.	Figure
090691	9
Scale	Date
1:500	JUL-2025

CAD Reference : X:\WORKING\090691\GENERAL\090691-FIG07&09_P10-G.DWG Date & Time : 18-07-25 (10:22:37AM) Plotted By : HK.COMMUSER3



Legend

ENTLI_Crown_1924_to_2009

- Recent
- Relict

ENTLI_Trail_1924_to_2009

- Recent
- Relict
- HLCI
- Application Site

Project

Proposed House Development at
Tuen Mun Town Lot No. 550 (TMTL 550),
Tuen Mun, N.T.
Section 16 Planning Application

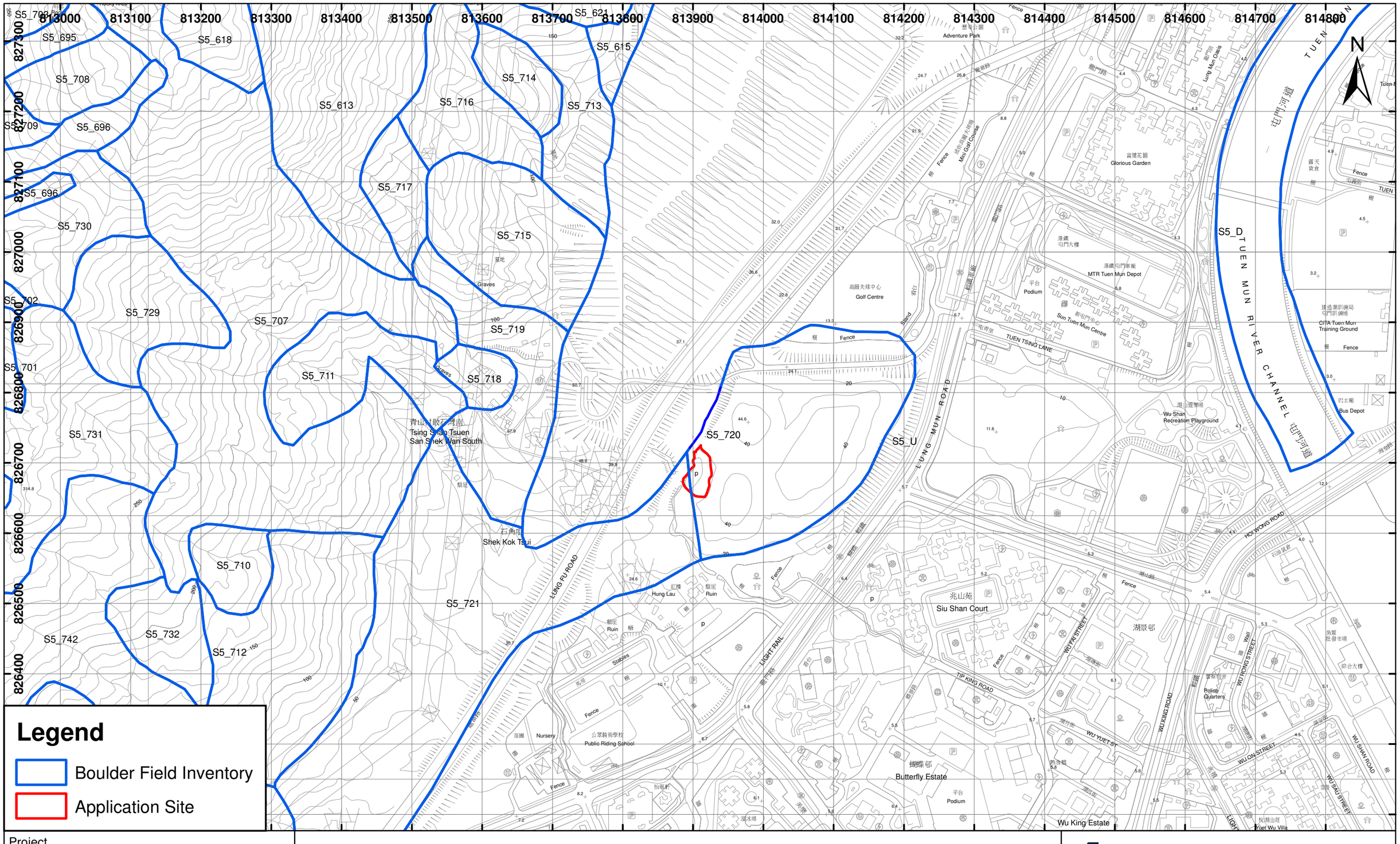
Enhanced Natural Terrain Landslide Inventory Map
Historical Landslide Catchment Inventory Map

FUGRO (HONG KONG) LTD

Figure 10

Scale: 1:5,000

PROJECT No. 090691



Legend

- Boulder Field Inventory
- Application Site

Project

Proposed House Development at
Tuen Mun Town Lot No. 550 (TMTL 550),
Tuen Mun, N.T.
Section 16 Planning Application

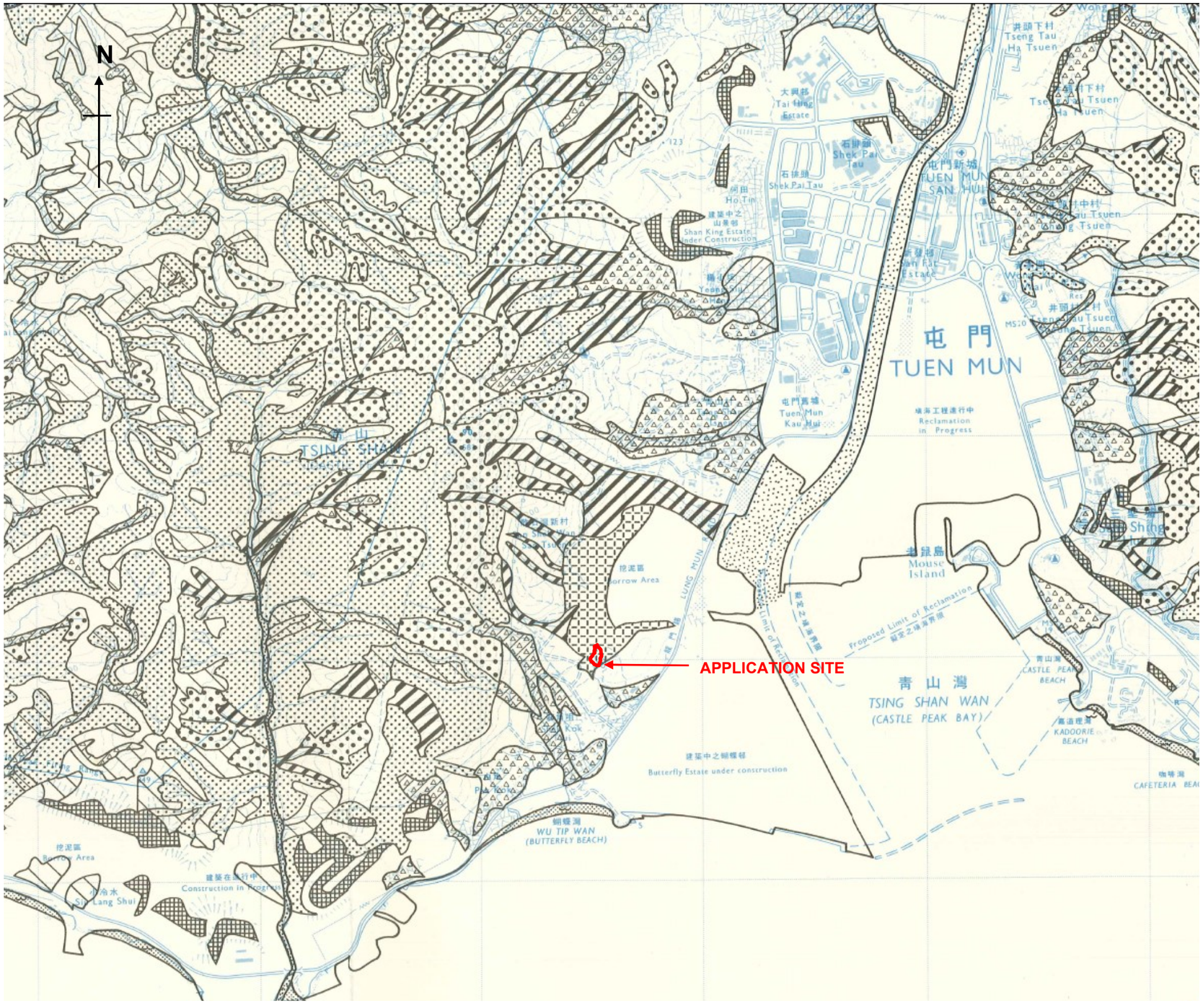
Boulder Field Inventory Map

FUGRO (HONG KONG) LTD

Figure 11

Scale: 1:5,000

PROJECT No. 090691



LEGEND

- Colluvium
- Zones of colluvium which are subject to overland flow and periodic inundation. Evidence of unusual groundwater regime (delineated as drainage plain on Landform
- Floodplain - subject to overland flow and regular inundation. Evidence of unusual groundwater regime (delineated as floodplain on Landform Map)
- Zones of general instability associated with predominantly colluvial terrain
- Zones of general instability associated with predominantly insitu terrain
- Slopes on insitu terrain which are generally steeper than 30 degrees (other than those delineated as colluvial or unstable)
- Disturbed terrain - extensive cut and fill batters which generally exceed 30 degrees
- Instability on disturbed terrain
- Waterbodies (streams, man-made channels, storage dams)
- Ponds
- Moderate or severe gully erosion (may be superimposed upon other constraints)
- Littoral zone (generally subject to tidal action)

Description: **PHYSICAL CONSTRAINTS MAP**

Scale: **1:20 000**

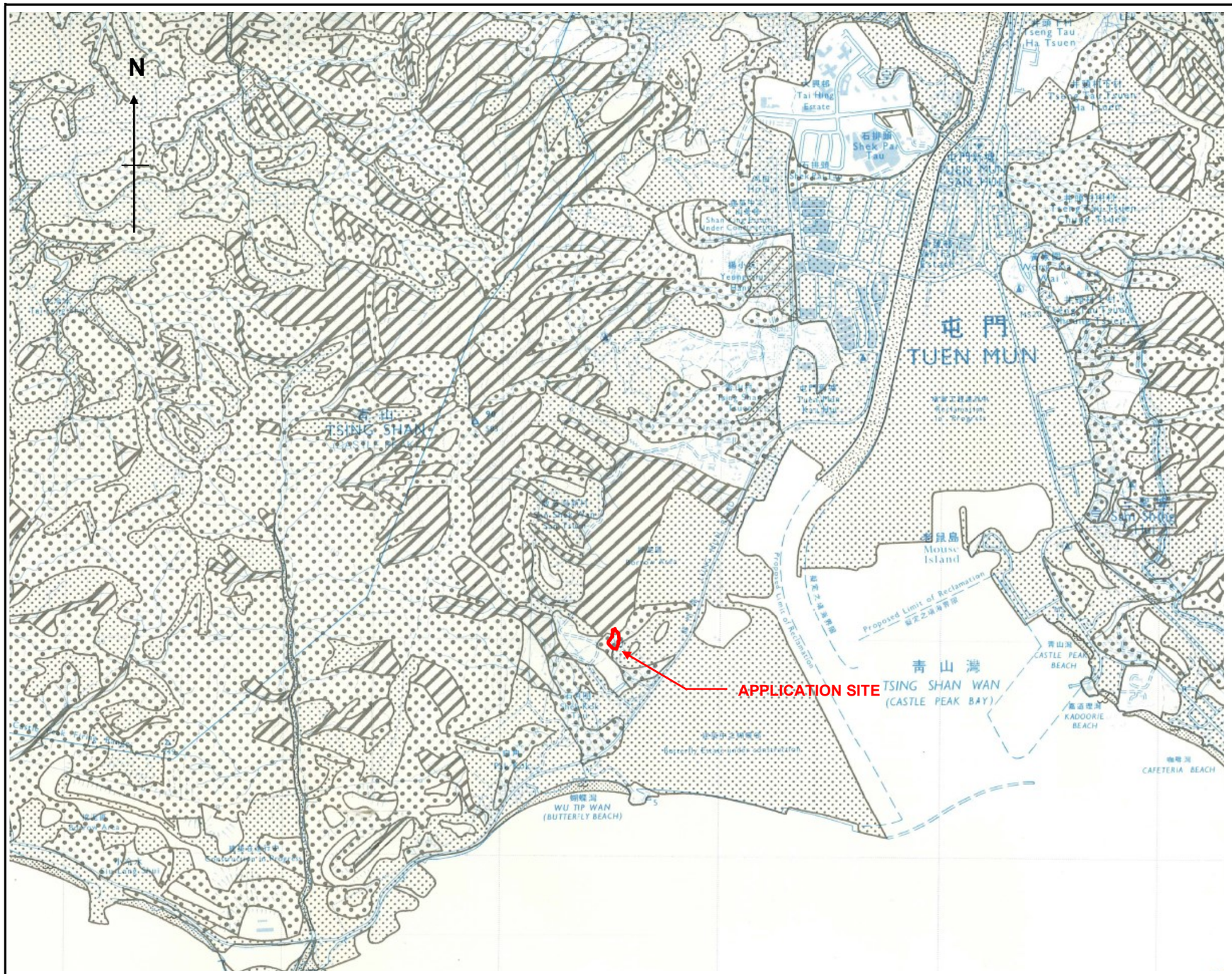
FUGRO

Project Title:

Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T. – Section 16 Planning Application

Project No.:	090691
Date:	Jul-25

FIGURE 12



LEGEND

CLASS	CODE	GEOTECHNICAL LIMITATIONS	SUITABILITY FOR DEVELOPMENT	ENGINEERING COST FOR DEVELOPMENT	INTENSITY OF SITE INVESTIGATION REQUIRED
I		Low	High	Low	Normal
II		Moderate	Moderate	Normal	Normal
IIs		Moderate	Moderate - Low	Normal - High	Normal
III		High	Low	High	Intensive
IV		Extreme	Probably Unsuitable	Very High	Very Intensive

General Features - terrain which is not classified within GLUM system

- Waterbodies (streams, man-made channels, storage dams)
- Ponds
- Littoral zone (generally subject to tidal action)

Description: **LAND USE MAP**

Scale: **1:20 000**

FUGRO

Project Title:

Proposed House Development at Tuen Mun Town Lot No. 550 (TMTL 550), Tuen Mun, N.T. – Section 16 Planning Application

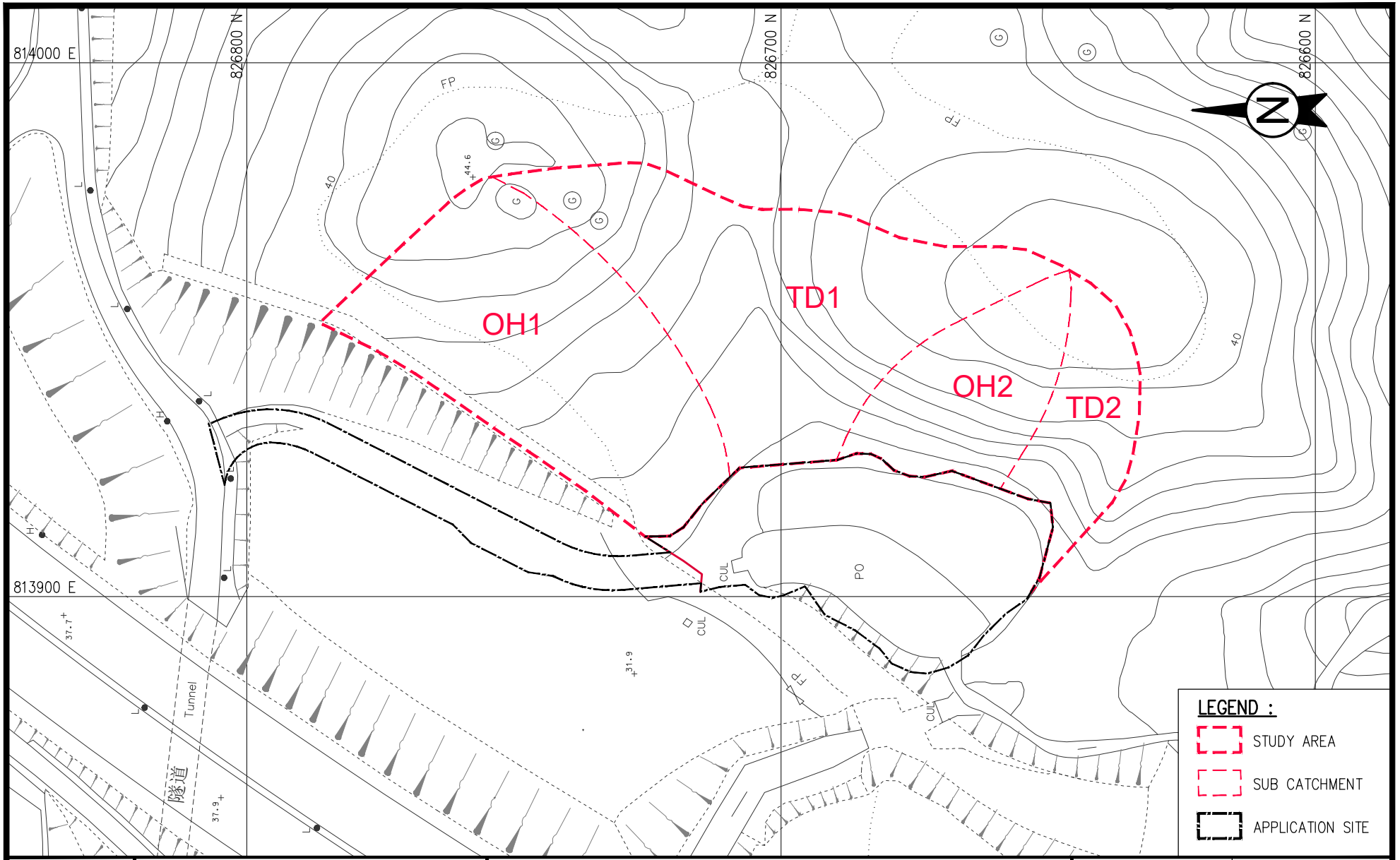
Project No.:	090691
Date:	Jul-25

FIGURE 13

Compiled by :

Drawn by :

Checked by :



FUGRO	Project PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION	Drawing Title CATCHMENT CLASSIFICATION MAP	Job No. 090691 Scale 1:1000	Figure No. 14 Date JUL-2025

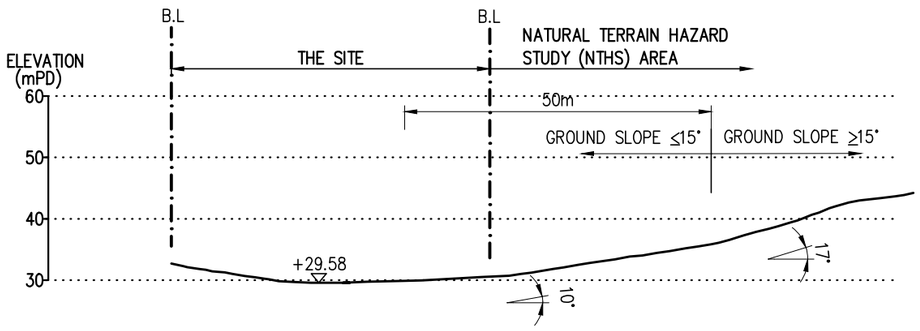
CAD Reference : X:\WORKING\090691\GENERAL\090691-FIG14_P02-G.DWG Date & Time : 16-07-25 (11:58:52AM) Plotted By : HK.COMMUSER3

Appendix A

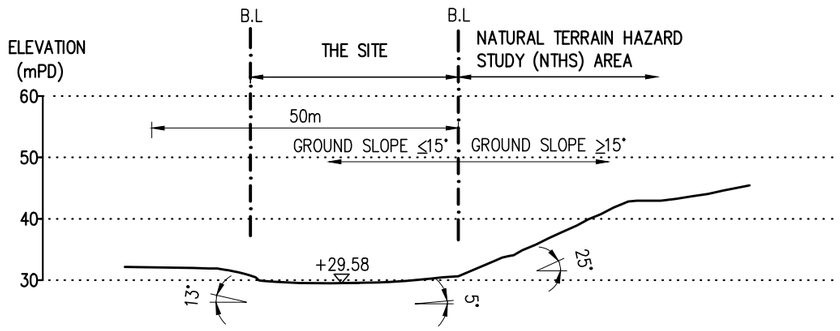
Sections of the Study Area and the Site

LEGEND :

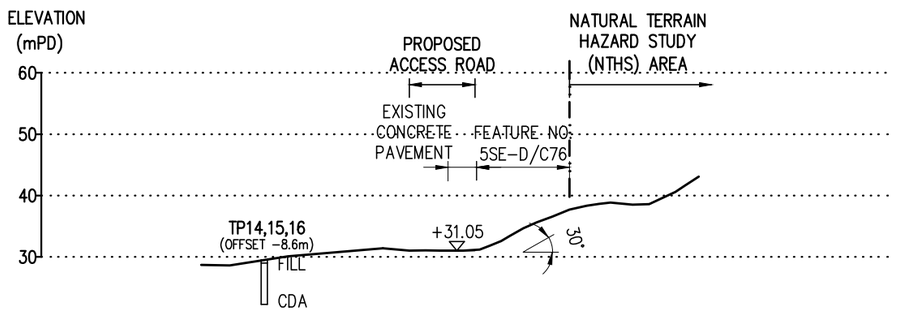
- SITE BOUNDARY
- NATURAL TERRAIN HAZARD STUDY (NTHS) BOUNDARY
- FILL — FILL
- CDA — COMPLETELY DECOMPOSED ANDESITE



SECTION A – A



SECTION B – B



SECTION C – C

Checked by :

Drawn by :

Compiled by :

FUGRO (HONG KONG) LIMITED [redacted]	Project: PROPOSED HOUSE DEVELOPMENT AT TUEN MUN TOWN LOT NO. (TMTL 550), TUEN MUN, N.T. - SECTION 16 PLANNING APPLICATION	Drawing Title: SECTIONS OF THE STUDY AREA	Job No.: 090691	Figure: A1
			Scale: 1:1000	Date: JUL-2025

CAD Reference : X:\WORKING\090691\GENERAL\090691-FIG_A1_P05-G.DWG Date & Time : 18-07-25 (9:39:13AM) Plotted By : HK.COMMUSER3

are used by the GEO to help decide whether a site falls under this category:

(a) It is a new development site involving provision of Group 1 to 3 facilities (Table 2.2), 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.

Site	Angular elevation of natural terrain ≥20°	Within 50m of ground sloping at >15°	Alert Criteria met?
A	Yes	Yes	Yes
B	Yes	No	No

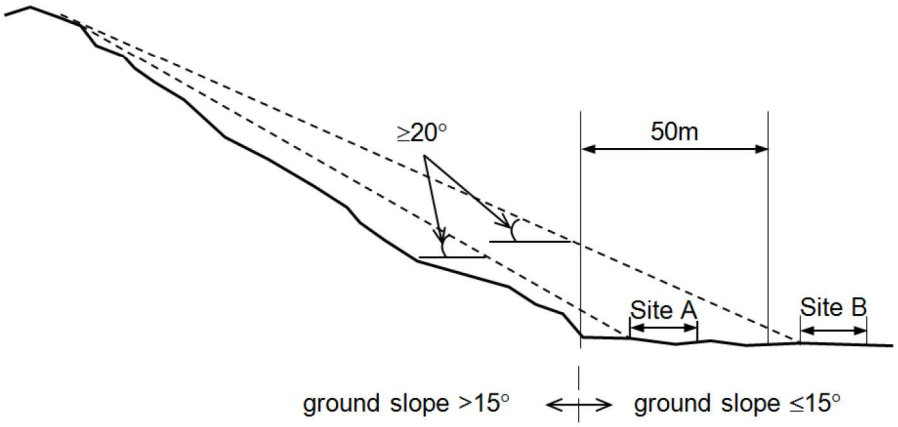


Figure 2.5 Application of Alert Criteria

An NTHS may be required for sites that lie beyond the area delineated by the above criteria, as for example for sites where there are historical landslides with long debris runout extending beyond these limits, and for sites that are either intersected by, or adjacent to, a natural drainage course.

A "credible debris flow path" is generally a downhill path followed by surface water. However, flow paths that debris could follow, but are deemed unlikely to do so would not be regarded as "credible". For example, a debris flow path down a ridge line, rather than descending into the catchment on either side of the ridge line, would not be "credible". Another example would be a site that is shielded from debris by a substantial structure such as a large building.

Appendix B

SIMAR Slope Report, Feature Registration Form, Stage 1 Study Report and SIRST Report for Feature No. 5SE-D/C76

BASIC INFORMATION

Location:	150m SE of Lamppost No.FA30226, San Wan , Tuen Mun
Registration Date:	25-02-1998
Ranking Score (NPRS):	0 (EI)
Date of Formation:	pre-1977
Date of Construction/ Modification:	
Data Source:	EI
Approximate Coordinates:	Easting : 813943 Northing : 826779

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest:	Undeveloped green belt
Distance of Facility from Crest (m):	0
Facility at Toe:	Road/footpath with low traffic density
Distance of Facility from Toe (m):	5
Consequence-to-life Category:	3
Remarks:	N/A

SLOPE PART

(1) Max. Height (m): 5 Length (m): 110 Average Angle (deg): 42

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Government Feature Party: Lands D Agent: Lands D Land Cat.: 5b(vi) Reason Code: 62 MR Endorsement Date: 05-06-2002

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection:	08-04-2002
Data Source:	EI
Slope Part Drainage:	N/A
Wall Part Drainage:	N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 0 Vegetated: 100 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: Decomposed granite
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): 40 Spacing (m): 1.2

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	5SE15C5
Map Sheet Reference (1:1000):	5SE-15C
Aerial Photos:	20700-1 (1978),
Nearest Rainguage Station (Station Number):	Tuen Mun Technical Institute, Tsing Wun Road(N07)
Data Collected On:	08-04-2002
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1978 After: 1976
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMd2/B5/10, GCMd3/2/88, GCMd2/B5/14 File/Report: Development Ref. No.: GCMd2/B5/10, GCMd3/2/88, GCMd2/B5/14 File/Report: LA Ref. No.: GCMd5/3/5 Pt11 f56(2),64,65,72,76 File/Report: LA Ref. No.: GCMd5/3/5 Pt11 f56(2),64,65,72,76 File/Report: LA Ref. No.: GCMd5/3/5 Pt19 f17,31,54, 6/5/5 Pt5 f18,19,12,14 File/Report: LA Ref. No.: GCMd5/3/5 Pt19 f17,31,54, 6/5/5 Pt5 f18,19,12,14 File/Report: LA Ref. No.: GCMd5/6/5 Pt10 f4,23,30,34, Pt13 f2,3 File/Report: LA Ref. No.: GCMd5/6/5 Pt10 f4,23,30,34, Pt13 f2,3 File/Report: LA Ref. No.: GCMd5/6/5 Pt7 f120, 126, 160 File/Report: LA Ref. No.: GCMd5/6/5 Pt7 f120, 126, 160 File/Report: LA Ref. No.: GCMd5/6/5 Pt7 f73,79,80,81,85,97,103,104,116,118 File/Report: LA Ref. No.: GCMd5/6/5 Pt7 f73,79,80,81,85,97,103,104,116,118 File/Report: LA Ref. No.: GCMd5/6/5 Pt8 f32,34,36,39,59,67, Pt9 f115,129 File/Report: LA Ref. No.: GCMd5/6/5 Pt8 f32,34,36,39,59,67, Pt9 f115,129 File/Report: LA Ref. No.: GCMd5/6/5 Pt9 f83(2),90,105 File/Report: LA Ref. No.: GCMd5/6/5 Pt9 f83(2),90,105
Remarks:	N/A
Follow Up Actions:	N/A

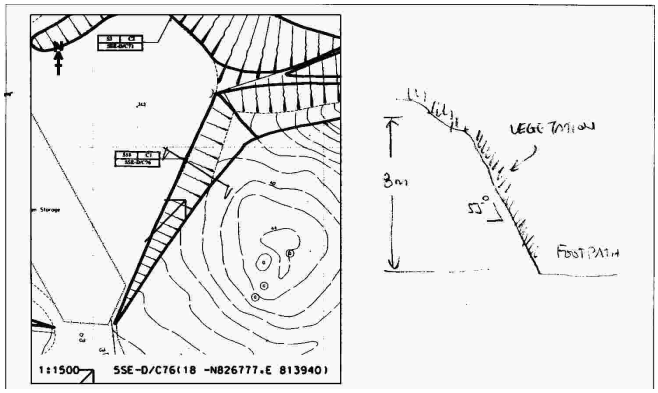
DH-Order (To Be Confirmed with Buildings Department):	None
Advisory Letter (To Be Confirmed with Buildings Department):	None
LPMIS:	None

ENHANCED MAINTENANCE INFORMATION

From Maintenance Department: (Last Updated Date: 26/06/2025)

STAGE 1 STUDY REPORT

Inspected On:	25-09-1997
Weather:	Mainly Fine
District:	MW



Section No:	1-1
Height(m):	H1 : 8 , H2 : 0
Type of Toe Facility:	Road/footpath with low traffic density
Distance from Toe(m):	5
Type of Crest Facility:	Undeveloped green belt
Distance from Crest(m):	0
Consequence Category:	3
Engineering Judgement:	P
Section No:	2-2
Type of Toe Facility:	N/A
Distance from Toe(m):	0
Type of Crest Facility:	N/A
Distance from Crest(m):	0
Consequence Category:	3
Engineering Judgement:	P
Sign of Seepage:	Slope : No signs of seepage Wall : N/A
Criterion A satisfied:	N
Sign of Distress:	Slope : Reasonable (near crest, mid-portion, at toe) Wall : N/A

Criterion D satisfied:	N
Non-routine maintenance required:	N
Note:	N/A
Masonry wall/Masonry facing:	N
Note:	N/A
Consequence category (for critical section):	3
Observations:	N/A
Emergency Action Required:	N
Action By:	N/A

ACTION TO INITIATE PREVENTIVE WORKS

Criterion A/Criterion D:	N/A
Action By:	N/A
Further Study:	Y
Action By:	Mixed

OTHER EXTERNAL ACTION

Check / repair Services:	N
Action By:	N/A
Non-routine Maintenance:	N
Action By:	N/A

PHOTO


5SE-D/F 71
5SE-D/F 68
5SE-D/F 76
5SE-D/F 73
5SE-D/C 167
5SE-D/F 67
5SE-D/C 75
5SE-D/C 76
5SE-D/F 66
5SE-D/F 75
5SE-D/F 72
5SE-D/C 166
5SE-D/F 69
SAN SHEK W
20
40
40
40
20
紅樓休憩處
紅樓
Hung Lau

49783

SIRST - FIELD SHEET(FIELD OBSERVATION)

GENERAL

Sift No C: 5SE - 15C / S 18

Examples
15NE- 4C/S123
7SW-12A/S 6

Feature No C: 5SE - D / C - 76

11SW-A/C -1013
7NE-B/FR- 5

Slope/Wall Location C: 150m S.E. of Lamp Post No. FA 30226, San Shek Wan, Tuen Mun

Toe Elevation C: 51.2

Examples
Date: 30/ 1/97
8/12/96

Inspected/Checked date C	Inspected by (TO) C	Checked by C	Consequence Category C1	Weather (past 48 hours to now) C1
25 / 9 / 97	SKH	ASL	○ 1-H ○ 2-L ● 3-N	● Mainly Fine ○ Some Rain ○ Heavy Rain

GENERAL **Complete this GENERAL section for ALL features**

Nearest structure on critical consequence section 1

TOE Structure type C	TOE distance (m) C	TOE Struct Elevation (for Fill feature only)	CREST Structure type C	CREST distance (m) C
4R	0.0		5B	0.0

Road / FootPath Name (no. of lanes, AADT) DC: FOOTPATH

Road / FootPath Name (no. of lanes, AADT) DC:

Service Conduit	water main	sewer drain	gas main	telecom cable	electricity	Other duct
Crest Size (mm)						
On Slope (mm)						

○ Reinforcement/supports (e.g. soil nail, buttress, propping, rock bolts/dowels)

Observation

Found to be
○ NE ○ WIP
○ NR ○ bdy amend
○ AP ○ type amend
○ U

Follow up notes DC

Follow Up C1
○ Yes ● No

Reviewed & checked items in accordance with SIRST Procedural Manual (Mar 96)

SIRST - FIELD SHEET(FIELD OBSERVATION)

41370

SLOPE

C Feature No: 55E - D / C - 76

SLOPE **This SLOPE section should be completed if the feature has a significant slope portion**

C1: (●) soil ( ) rock ( ) soil & rock

Cut Slope Soil Type DC1: ( ) colluvium (●) d.volcanic ( ) d.granite ( ) other geology

Covering type and extent (% age)	Sealed C	Vegetated C	Bare soil/rock C	Seal Type DC2	Condition
Slope Face		100	0	( ) chunam ( ) shotcrete	C1 ( ) poor (●) fair ( ) good
Beyond Crest	C 0				C1 ( ) poor (●) fair ( ) good

Maximum Height(m) C	Length(m) C	Angle(deg) C	Berms No.	Min width (m)
8.0	110.0	55	0	.

C1	Spacing(m)	Size(mm)	Condition	Flow
( ) WeepHole	( ) Occasional ( ) 1.4-1.8	( ) < 30 ( ) 51-80	( ) Blocked	( ) None ( ) Major
( ) Horiz. Drains	( ) Random ( ) <1.4	( ) 31-50 ( ) > 80	( ) Partially Blocked	( ) Minor ( ) With soil/muddy
(●) None	( ) 1.9-2.5		( ) Clear	

Uchannel Type	Size (mm) C1 for each group: <100	101-150	151-200	201-250	251-300	>300	None	CND	condition: severe cracks	crack	blocked	partially blocked	clear	flow: dry	small	high	ponding
stepped	( )	( )	( )	( )	( )	( )	(●)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
crest	( )	( )	( )	( )	( )	( )	(●)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
berm	( )	( )	( )	( )	( )	( )	(●)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
slope	( )	( )	( )	( )	( )	( )	(●)	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
toe	( )	( )	( )	( )	( )	(●)	( )	( )	( )	( )	( )	(●)	( )	(●)	( )	( )	( )

DC1 DC1

Seepage

C1
- ( ) Heavy seepage at or above mid-ht or from several rock jt at one location
- ( ) slight/mod. seepage at or above mid-height or from several rock jt at one location
- ( ) heavy below mid-height or from isolated rock joints
- ( ) slight/mod. below mid-height or from isolated rock joints
- ( ) signs at slope or crest wall
- (●) no sign

Water-carrying Services

C1
- ( ) potential leaky services and leakage signs
- ( ) potential leaky services but no leakage sign
- (●) no potential leaky service

Leakage Notes DC

Inferred Past Instability

C1 ( ) Major ( ) Minor ( ) Multiple minor (●) None

Sign of Distress

C1 ( ) Severe ( ) Minor (●) Reasonable ( ) None

Distress Location DCM

(●) near crest (●) midportion (●) toe

Distress Notes DC

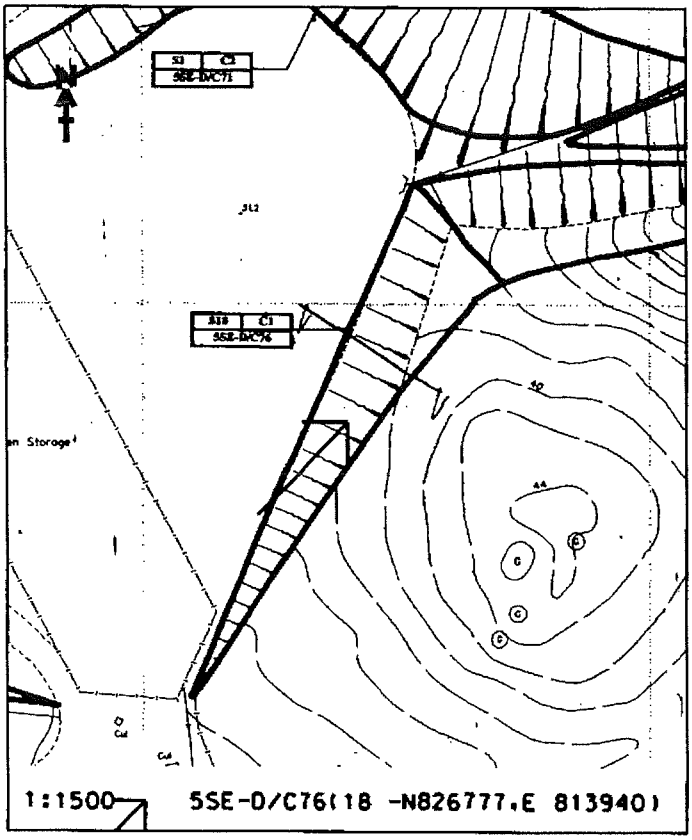
STAGE1 CUT, and RETAINING WALL

Feature No C: 5SE - D/C76 - 75

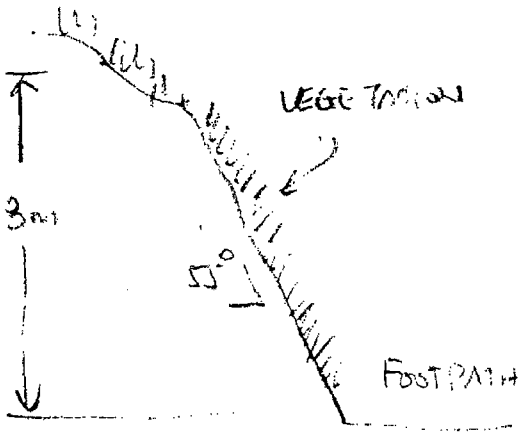
Date Inspected C: 25/9/97

Inspected by (GB) C: ASL

Sketch Plan :



Section: Critical consequence 1 (2)



Critical Consequence Section	Consequence Category C1	Engineering Judgement C1	Overall Fail Possible (for Toe Wall only)	Weather (past 48 hours to now) C1
	○ 1-H ○ 2-L ● 3-N	○ HP ● P ○ U	○ Y ○ N	● Mainly Fine ○ Some Rain ○ Heavy Rain

Masonry Wall/ Masonry Facing C1	Masonry Notes	Non routine Maintenance Required C1	NRM Notes DC
○ Y ● N		○ Y ● N	

Emergency action Required C1: ○ Y ● N

Action agency (NRM or Emergency) DCM: ○ Private(BD) ○ HyD ○ ASD ○ DLO ○ WSD ○ HD ○ Other

Action to initiate preventive works/study	Criterion A C1	Criterion D C1	Further Study	Other External Action	Check / Repair Service	Action By	Inspection Agency
	○ Y ● N	○ Y ● N	●		○	Repair Services Agency DC1: ○ BD ○ WSD ○ DSD	B C L C
	Action By DC1: ○ BD(private) ○ Govt						

Recommendation Agreed by : C. L. LAM Post: LGE/ES(BCL) Date : 28 OCT 1997

37479

CUT SLOPE (NPCS)

Feature No C: 5SE - D / C - 76

Date Inspected C: 25 / 9 / 97

Inspected by (GE) C: ASL

NEW PRIORITY CLASSIFICATION SYSTEM FOR SOIL AND ROCK CUT SLOPES (Note : For ROCK NPCS, complete P.7 also)

GEOMETRY

	Critical 1 *all C*	Critical 2	Max. Ht. (if ΔH > 25%)
H_s (Soil part)	8.0 m	m	m
H_r (Rock part)	0.0 m	m	m
H_{cw} (Crest wall)	0.0 m	m	m
H_r (Toe wall)	0.0 m	m	m
β (Upslope)	35°	°	°
θ (Slope part)	55°	°	
α (Downslope)	0°	°	°
Toe of realistic slip surface within Hs	● YES ○ NO	○ YES ○ NO	
Surcharge	0 kPa	kPa	

Weather (past 48 hours to now) *C1*
- ● Mainly Fine
- ○ Some Rain
- ○ Heavy Rain

POTENTIAL FOR WATER INGRESS

Drainage Provisions *C1*
- ○ Few / no channel + potential for convergent surface water flow above crest
- ● Few / no channels
- ○ Some channels but insufficient size or number
- ○ Adequate channels

Lithology *C1*
- ● Typical Granite or Volcanics
- ○ Atypical Granite or Volcanics
- ○ Others

This box is for Soil Cut only

NATURE OF SLOPE-FORMING MATERIAL

Adverse Geological Features *DC1*
- ○ AO relict jt., intensely weather/alter seams, dykes
- ○ Present which may weaken mass strength
- ● None

Weighting Factor, W *all C*

Good | Uncertain A

Moderate: 100 | Uncertain B

Poor

CONSEQUENCE FACTOR *CM*

- ○ Large failure Volume (> 500 cubic metre) expected
- ○ buildings may collapse / covered in landslip, or mass transportation seriously affected
- ● None of the above or Conseq. Cat. 3

Soil Slope Failure Mode *C1*
- ● Full-scale
- ○ Partial
- ○ Minor

Nearest structure on critical consequence section 2	TOE Structure type	TOE distance (m)	TOE Struct Elevation (for Fill feature only)	CREST Structure type	CREST distance (m)

SIRST

(PREVIOUS HISTORY /DOCUMENTATION -BACKGROUND INFORMATION)

GE Area: MW	SIFT No.: 5SE-15C/S18	SIFT Class.: C1	78 Catalog: N	Reference No.: 5SE-D/C76			
Coordinates: N 826777	E 813940	Nearest Rain. Stn.: N07		Previous Feature No.			
Date of Construction & Subsequent Modification / Demolition	Original Constr'n Date: / / 1976-78	Subsequent Modifications / Demolition: / /		Aerial Photo (No. / year): 20700-1, 1978			
Reference (File No., Folio No., Paper No., etc)	Previous Instability	Date of Incident:	Incident No.	Ground Anchors			
Confirmed Past Instability: ○ Major ○ Full-ht fail; ○ Multi Minor ○ Multi part-ht or struc fail; ○ Minor ○ Part-ht fail ○ struct fail only; ○ None ○ None	DB or DH			LRDC			
	PWDC			GCC			
	L&WC			DLC / BC			
	CLC			Disused Tunnels	Network Ref:	Location:	
	LA	GCMd 5/3/5 pt(11) f(56(2), 64, 65, 72, 76) ; 5/6/5 pt(1) f(73, 79, 80, 81, 85, 97, 103, 104, 116, 118, 120, 126, 160)		Piezometer data available ?			
				Within MTR Protection Zone	○ N ○ Y		
				Ground Investigation - GIU Call Ref.:	5SE15C5		
Public / Private Developments File Reference	File Ref: GCMd 2/B5/10 , GCMd 3/2/88, GCMd 2/B5/4						
Binnie & Partners reports	Mid Levels Study Report / B&P's Landslide Study Phase IIA / IIB / IIC :						
GEO Reports							
LPM Works							
Other Reports	(None) Pre-SIRST Field Sheet / North Point Study / within Victoria Barrack Geotechnical Study area / Others (specify):						

D-Notice? *

(N) Y → File Ref (DH/DB File): | Date Recommended: / / | Date served (BD issue date): / / | Order No.

Recommendation

Defaulted (eg. beyond 4 month done by Dept) N / Y → Year Discharged: (when the works become satisfactory, order compiled):

Advisory Letter? *

(N) Y → File Ref (DH/DB File): | Date Recommended: / / | Date served (BD issue date): / /

Recommendation

Works Complete: N / Y → Year of Completion:

Information from Design Div's Database: Status as at(/ /)

Maintenance responsibility:

Private (Government) / Mixed — Confirmed by DLO: Y / (N)

Dept Responsible: HyD / HD / DSD / WSD / TDD / Arch SD / AFD / USD / (DLO) / RSD / CED — Confirmed by DLO: Y / (N)

Remarks: L.A. GCMd 5/6/5 pt(8) f(32,34,36,39,59,67)
" " pt(9) f(115, 129)
" " pt(10) f(4, 23, 30, 34)
" " pt(13) f(2, 3)
" 5/3/5 pt(9) f(17, 31, 54)
" 5/5/5 pt(5) f(8, 9, 12, 14)
" 5/6/5 pt(9) f(83(2), 90, 105)

By: SSK Date: 19.8.97 | Checked: Date: / /

Feature requires Stage 1 and NPCS ? (Y) / N →

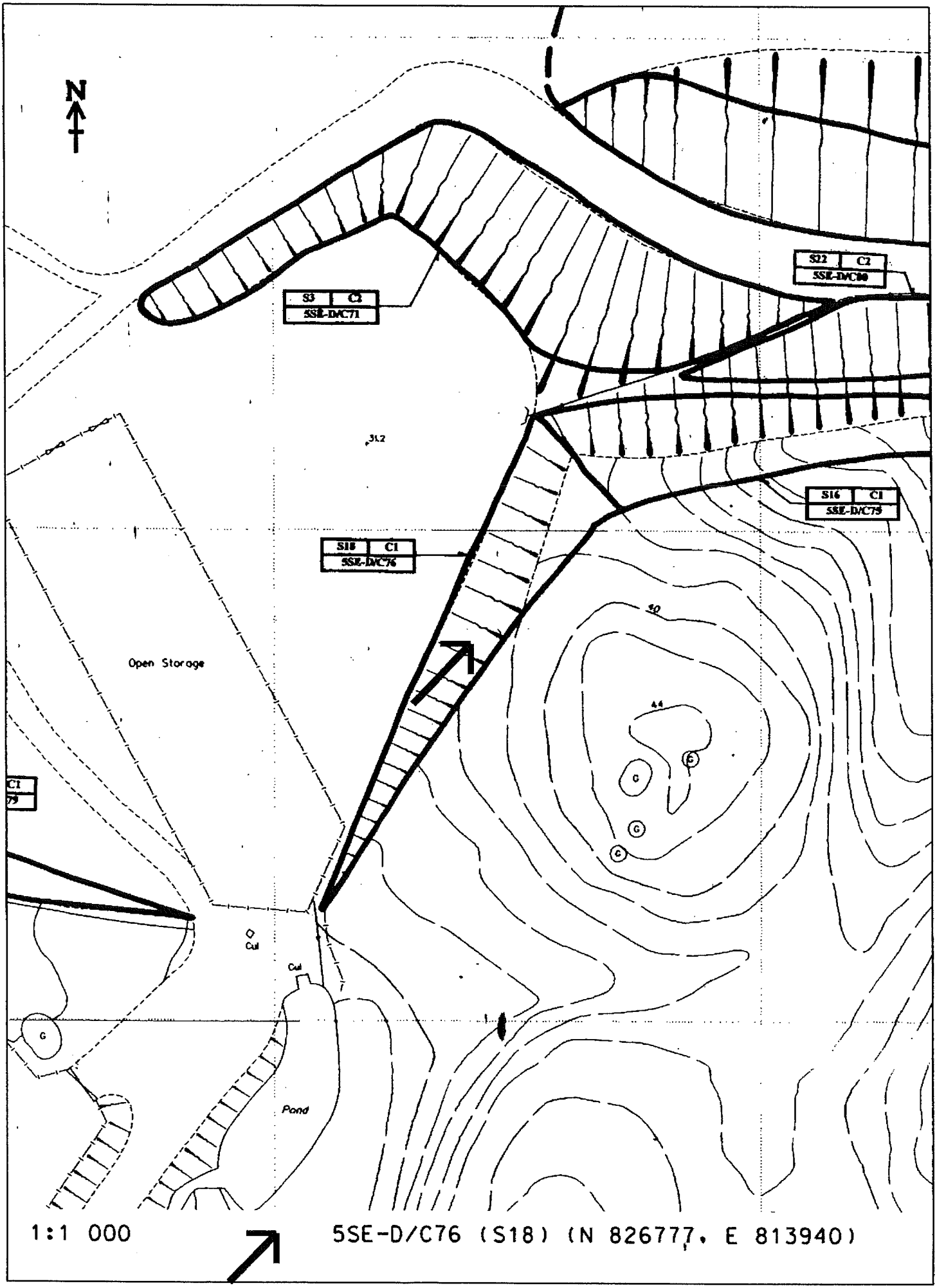
If N, due to:
- Formed or modified post mid 78 (after 30/6/78) Confirmed
- Feature removed
- Stabilised under LPM
- Checked by GEO/GCB
- Studied- report equiv to GEO Stage 1 → if only these, Just NPCS
- Fill / Undergone LPM Selection (88-91) → if only these, Just NPCS
- Studied or pending study equiv or above GEO Stage 2
- Being studied under LPM Programme
- D Notice recommended for overall stability study/investigation

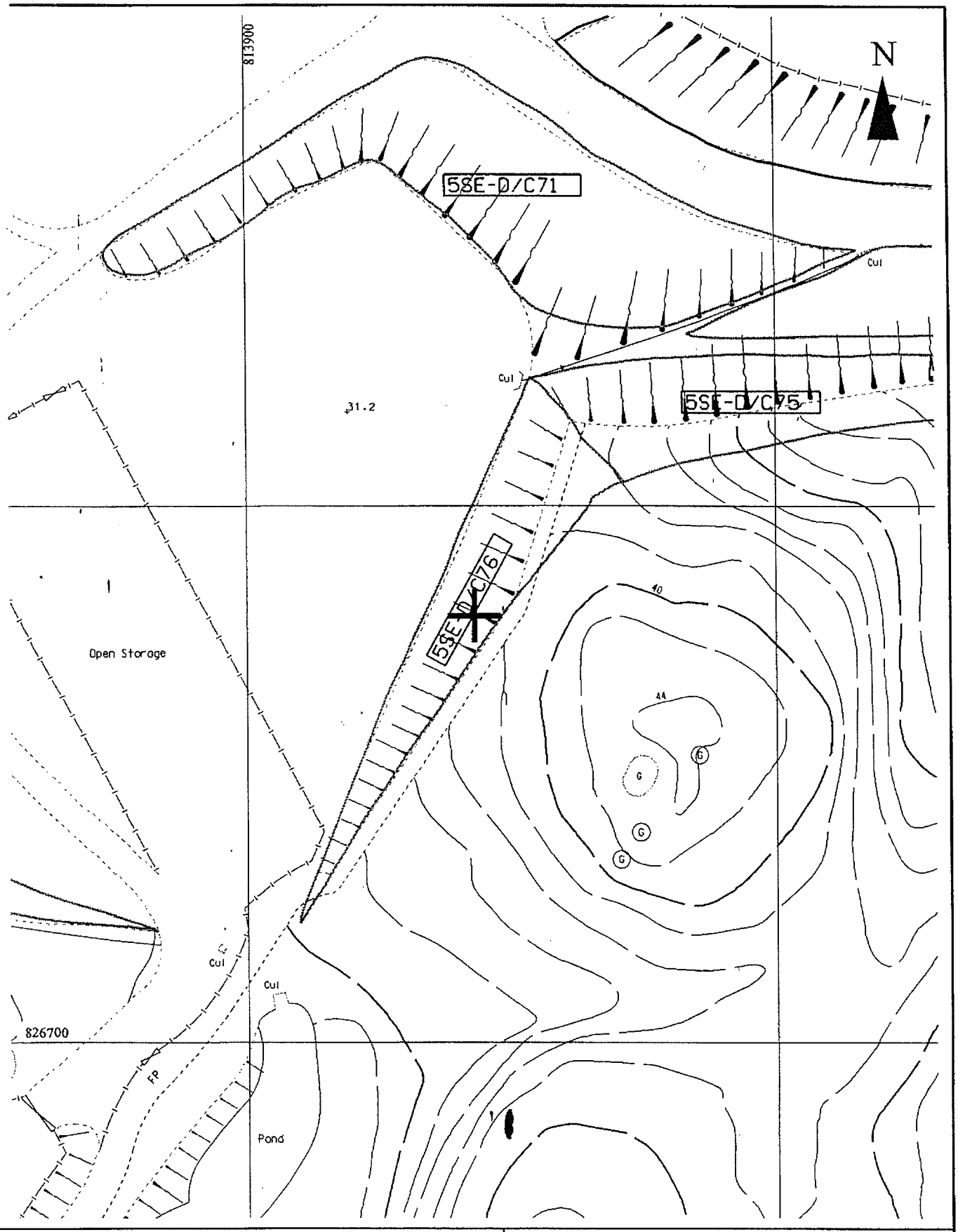
NOTES:

1. Confirmed Past Instability refers to past instability with confirmed documentary evidence of its occurrence - Read a) Landslip Incident Reports & Landslip Cards (If Landslip Card exists —> Major; Report/summary identified "Major" for slopes —> Major. Drg. A1 show locations of fill failure. For other cases and for all wall failures, study report and sketch to determine; eg. multi-minor, full-ht fail, etc.
   b) B&P Fieldsheets
   c) 1:2500 GAS Reports

SLOPE	WALL
Major - failure volume >= 50 cu m (unbulked), or >= 25 cu m & involving major portion of upslope area	Full-ht failure - those involving overall wall ht (>= 75% wall ht) & retained material
Minor - not major	Part-ht (< 75% wall ht) failure - those not involving full wall ht
(upslope area refers to that within a horiz dist = half of the max. possible failure ht)	Structural failure - those of wall fabric only without movement of the retained material

2. More D-Notice / Advisory Letter information may exist on additional page.
3. If feature requires SIRST Stage 1 Study, a NPCS would also be required to be performed at the same time.
4. If a SIRST Stage 1 is not required ONLY because of a previous Stage 1 or LPM selec (88-91), ie. no Stage 2 or higher level study nor any of the other criteria for no Stage 1 is satisfied, then a NPCS is still needed. Circle the "Just NPCS" selection to indicate this.


N
S3 C1
5SE-D/C71
S22 C2
5SE-D/C80
S16 C1
5SE-D/C75
S18 C1
5SE-D/C76
Open Storage
Cul
Cul
Pond
1:1 000
5SE-D/C76 (S18) (N 826777, E 813940)

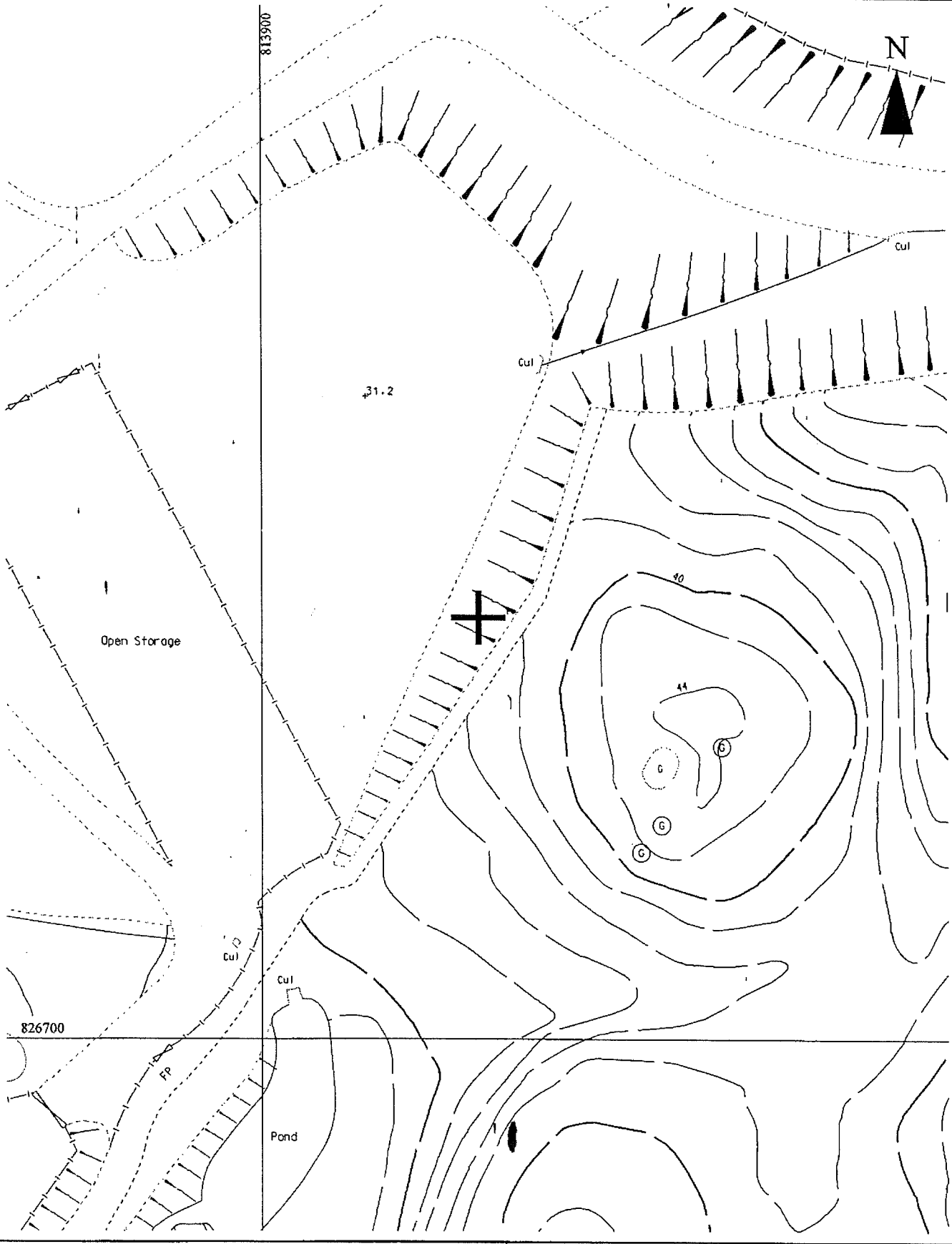


Geotechnical Engineering Office | Slope Location Plan

Slope No.: 5SE-D/C 76 Easting : 813942.791 Northing : 826779.43

Sift Ref. No.: 5SE-15C/S 18 Easting : 813940 Northing : 826777

Scale 1:1000 Date Print : 27- 4-1998 Map Modification Date : 23- 4- 1998 Page 1 of 2



Geotechnical Engineering Office

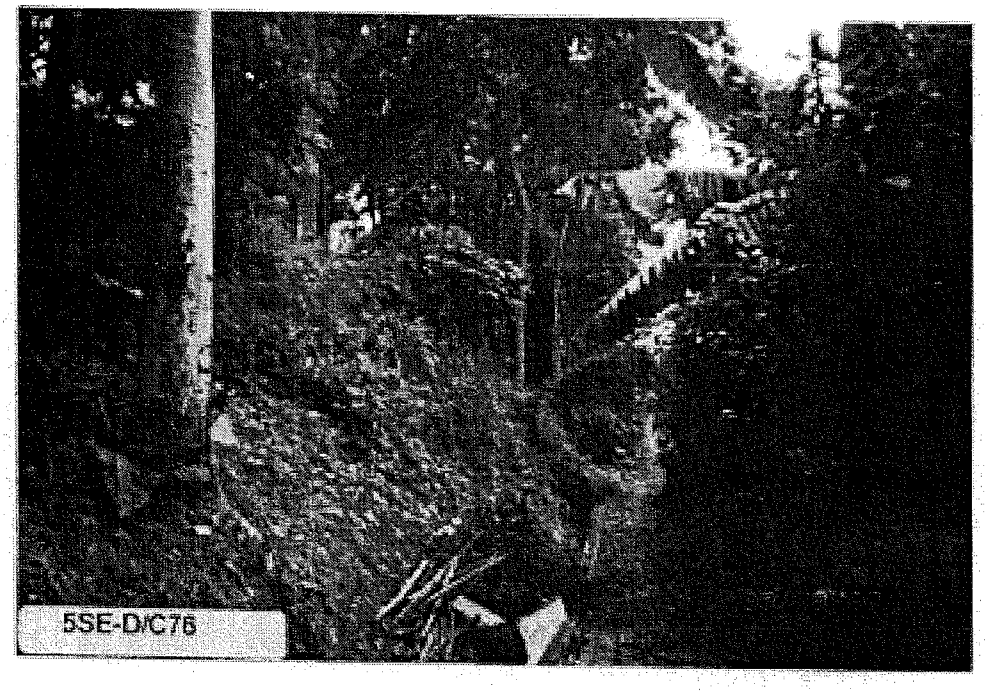
Slope Location Plan (Old Plan)

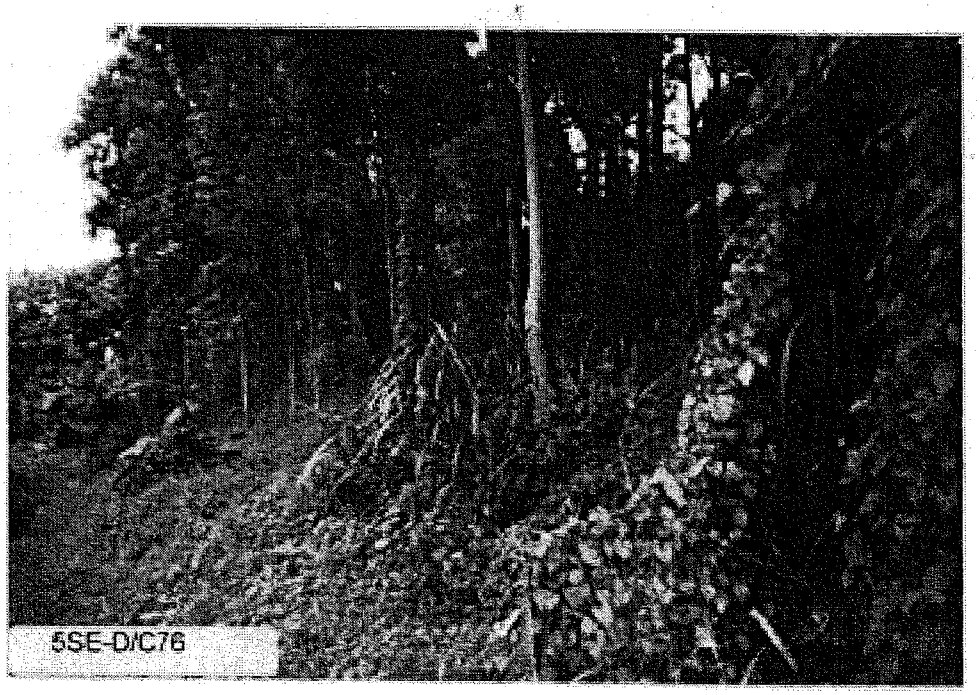
5SE-D/C 76 not exist on this survey plan.

Sift Ref. No.: 5SE-15C/S 18 Easting : 813940 Northing : 826777

Scale 1:1000 Date Print : 27- 4-1998 Map Modification Date : 11- 3- 1998 Page 2 of 2

Negative No. 5997/C79/28 Taken on 25 - 9 - 97 Slope/Wall Ref. No. 5SE-D/C76





INVESTIGATION ON SLOPES AND RETAINING WALLS

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING DEPARTMENT

Negative No. 5/97/479/22 Taken on 25-9-97 Slope/Wall Ref. No. 5SE-D/C76

Appendix C

Existing Ground Investigation Records

LAM GEOTECHNICS LIMITED

CED Contract No. GE/95/12
Ground Investigation New Territories West
Term Contract

W.O. No. GE/95/12:50
Agreement No. CE 44/95
Foothills Bypass, Tnen Mun Road/Wong Chn Road Interehange and Other Road Junction Improvement Works Additional GI - Phase I, Area 19

FIELDWORK REPORT

See also 27072

CONTRACTOR

[redacted]

Date: 7th April 1997

CLIENT

GOVERNMENT OF HONG KONG
Civil Engineering Department
Geotechnical Engineering Office
Civil Engineering Building
101 Princess Margaret Road
Homantin
Kowloon

DRILLHOLE RECORD

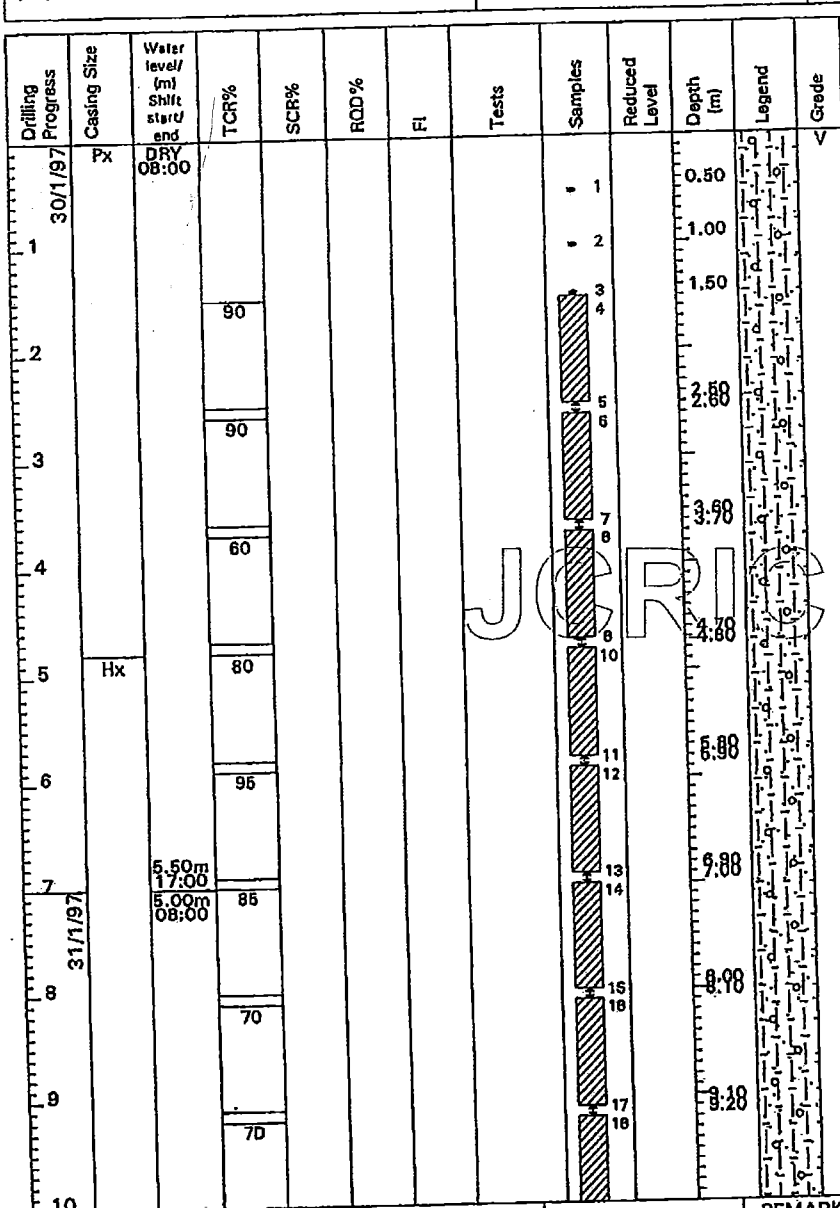
HOLE NO. D-3

SHEET 1 OF 2

CONTRACT NO. GE/95/12 LG21726/37

PROJECT Foothills Bypass, Tuen Mun Road/Wong Chu Road Interchange and Other Road Junction Improvement Works

METHOD Rotary	CO-ORDINATES E 513938.98 N 826829.97	W.O. NO. GE/95/12.50
MACHINE & NO. Longyear D65		DATE : 30/01/97 To 31/01/97
FLUSHING MEDIUM Water	ORIENTATION Vertical	GROUND LEVEL 31.02 mPD



Description

Extremely weak, light greenish brown, completely decomposed ANDESITE? (Stiff to very stiff, clayey sandy SILT with occasional light greenish grey subrounded medium to coarse gravel sized quartzitic clasts and occasional limonite stained relict joints)

Disturbed Sample
Piston Sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
SPT Liner Sample
Water Sample
Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Impression Packer Test
Packer Test
Piezometer Tip
Observation Well Tip

LOGGED S.P.Su

DATE 11/02/97

CHECKED M.D.

DATE 13/02/97

REMARKS

1. Piezometer installed at 16.47m depth.
2. Core loss in core run from 11.57m-11.97m assumed to be grade V andasite?

Lam Geotechnics Limited

Office: 23/F World Trade Centre, 280 Gloucester Rd., Causeway Bay, Hong Kong.
Laboratory: 26/F., Unit 3, Honour Ind. Centre, No. 6, Sun Yip St., Chaiwan, Hong Kong.
Tel: 2882 - 3939 Fax: 2882 - 3331

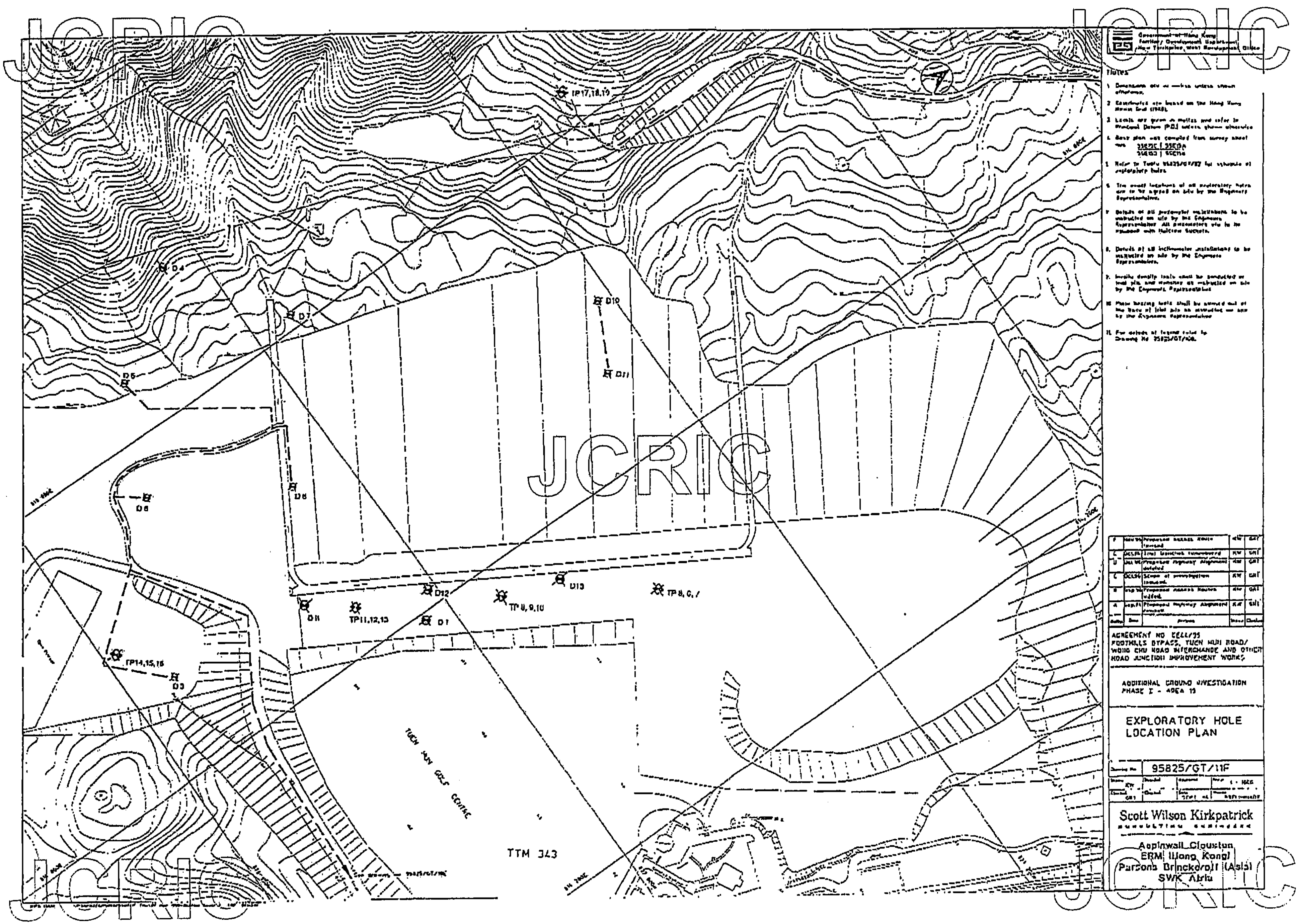
C2

Works Order No. GE/95/12.50
Foothills Bypass, Tuen Mun Road/Wong Chu Road Interchange and Other Road Junction Improvement Works

Water Level Readings

DRILLHOLE No.	Ground Level (m.P.D.)	Co-ordinates		Date Installed	Installed Depth (m)	Date & Water Level (m) (depth measured below ground level)						
		Easting	Northing									
D 3 (P)	31.02	813938.98	826829.97	31/01/97	16.47	12/02/97 8.05	13/02/97 7.93	14/02/97 8.12	15/02/97 7.73	17/02/97 7.80	18/02/97 7.83	19/02/97 7.78
D 4 (P)	79.32	813719.27	826975.81	07/03/97	20.00	10/03/97 14.56	11/03/97 14.58	12/03/97 14.63	13/03/97 14.75	14/03/97 14.83	15/03/97 14.98	17/03/97 15.32
D 6 (P)	38.61	813834.99	826883.01	03/02/97	10.00	14/02/97 3.69	15/02/97 3.76	17/02/97 3.85	18/02/97 3.97	19/02/97 4.13	20/02/97 4.32	21/02/97 4.46
D 7 (P)	62.43	813787.83	827021.85	27/02/97	21.00	06/03/97 7.52	07/03/97 7.84	08/03/97 7.96	10/03/97 8.03	11/03/97 8.05	12/03/97 8.08	13/03/97 8.10
D 9 (P)	22.30	813949.98	826924.99	29/01/97	13.12	12/02/97 4.73	13/02/97 4.65	14/02/97 4.78	15/02/97 4.61	17/02/97 4.66	18/02/97 4.63	19/02/97 4.62
D10 (P)	61.67	813898.21	827191.46	20/02/97	4.00	24/02/97 2.44	25/02/97 2.53	26/02/97 2.45	27/02/97 2.80	28/02/97 2.58	01/03/97 2.59	03/03/97 2.61
D10 (P)	61.67	813898.21	827191.45	20/02/97	29.00	24/02/97 7.99	25/02/97 8.03	26/02/97 8.05	27/02/97 8.20	28/02/97 8.23	01/03/97 8.27	03/03/97 8.30
D13 (P)	21.55	814031.59	827068.14	25/02/97	16.00	01/03/97 1.58	03/03/97 1.59	04/03/97 1.60	05/03/97 1.61	06/03/97 1.62	07/03/97 1.60	08/03/97 1.60

(S)-Standpipe (P)-Piezometer


JCRIC
TP17,18,19
D4
D7
D5
D10
D11
D8
D6
D12
D13
TP8,6,7
TP9,9,10
D11
TP11,12,13
D1
TP14,15,16
D3
TTM 343
Notes
AGREEMENT NO CE44/95
FOOTHILLS BYPASS, TUEN MUN ROAD/
WONG CHU ROAD INTERCHANGE AND OTHER
ROAD JUNCTION IMPROVEMENT WORKS
ADDITIONAL GROUND INVESTIGATION
PHASE I - AREA 13
EXPLORATORY HOLE
LOCATION PLAN
95825/GT/11F
Scott Wilson Kirkpatrick
Aspinwall Clouston
ERM (Hong Kong)
Parsons Brinckerhoff (Asia)
SWK Asia

TUEN MUN NEW TOWN

AREA 19

FINAL REPORT ON GEOTECHNICAL STUDY WITH PARTICULAR REFERENCE TO SLOPE STABILITY

JULY 1979

VOLUME II

1-SE10C,D
X SE1F

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor 12 Harcourt Road HONG KONG.
Tel 5 265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. 73206/HOOD Sheet 2 of 2

Client/Consultant UNIVERSAL DOCKYARD LTD
Job No./Tender No. 756
Location TUEN MUN NEW TOWN GROUND INVESTIGATION
Ex. Ground Level/Sea Bed Level +39.95 m.P.D
Coordinates N 26135.3 E 13957.2
Orientation VERTICAL
Method ROTARY
Machine D29
Core Barrel TNW
Date From 6-2-77 To 7-2-77

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Rec'y (%)	Core Rec'y (%)	Depth (m)	Description of Strata	Depth (Metre) Casing Size	Symbolic Log
7-2-77					100	100	20.9	DARK GREY FRACTURED PORPHYRY		
						100	22			
						100	22.23			
						100	23.80			
						100	24			
							24.38	OPERATION STOPPED AT 24.38 m. AS INSTRUCTED		
							26			
							28			
							30			
							32			
							34			
							36			
							38			
							40			

S : S.P.T.
D : Disturbed Sample
U : Undisturbed Sample
W : Water Sample
▽ : G.W.L.
( ) : N Value/305 mm.
— : Hole Depth in metre
Ws : Washed Sample

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. 73866/400 D Sheet 1 of 2

Client/Consultant: UNIVERSAL DOCKYARD LTD
Job No./Tender No.: 758
Location: TUEN MUN NEW TOWN GROUND INVESTIGATION
Ex. Ground Level/Sea Bed Level: + 39.95 m.P.D
Coordinates N: 26835.3 E: 13957.2

Orientation: VERTICAL
Method: ROTARY
Machine: D29
Core Barrel: TH N
Date From: 6-2-77 To: 7-2-77

Progress	Sample: Depth (m)	No.	Blows/305 mm	Type	Water Rec'y (%)	Core Rec'y (%)	Depth (m)	Description of Strata	Depth (Metre) Casing Size	Symbolic Log
6-2-77	2.00	091	(11)	SD	100		2	YELLOW & LIGHT GREY SANDY CLAY (ALLUVIUM)	NX	
	4.00	092	(12)	SD	4.32		4			
	6.00	093	(14)	SD			6			
	8.00	094	(15)	SD			6.15 8	GREY & YELLOW SLIGHTLY CLAYEY SILT WITH A TRACE OF FINE SAND (DECOMPOSED PORPHYRY)		
	10.00	095	(33)	SD			10			
	12.00	096	(69)	SD			12			
	14.00	097	(56)	SD			13.26 14	GREY & LIGHT GREEN SLIGHTLY CLAYEY SILT WITH A TRACE OF FINE SAND & GRAVELS. (DECOMPOSED PORPHYRY)		
7-2-77	16.00	098	(40)	SD			16			
	18.00	099	(107)	SD		100	18			
							19.38 20	DARK GREY FRACTURED PORPHYRY	19.38	

S : S.P.T.
D : Disturbed Sample
U : Undisturbed Sample
W : Water Sample
▽ : G.W.L.
( ) : N Value/305 mm.
— : Hole Depth in metre
Ws : Washed Sample

Remarks : -
WATER IS REQUIRED TO BE TRANSPORTED TO SITE FOR DRILLING THIS HOLE
G.W.L. + 25.63 m.P.D. AT 6:30 p.m. ON 7-2-77

GOVERNMENT OF HONG KONG

TUEN MUN NEW TOWN

FINAL REPORT

ON

GROUND INVESTIGATION AREA 19

PWD CONTRACT 615/80

MARCH 1981

VOLUME I

FIELDWORK (AREA 19)

[redacted]

[redacted]

GROUND INVESTIGATION LOG

PROJECT/CONTRACT NO. 615/80 | HOLE NO. 953D | Sheet 1 of 3

Type of drilling: ROTARY
rig: D2
bit: TNW

Coordinates: E 14000
N 36800
Angle from vertical 0°
Bearing: N ____ E ____

Location: TUEN MUN NEW TOWN AREA 19
Type of hole: ____
Ground/Seabed Level +32.40 M.P.D.

Drilling progress	Casing depth/size	Water level	Notes e.g. Water return, sampling, instrumentation	Drill Depth & Size	Reduced level m.P.D.	Core recovery %	R.Q.D.	Fracture Index	Legend	Description	Grade
30-7-1980	NX	NIL AT 8:00	90%	metres 0.00	+32.40					Reddish brown very stiff silty clay with boulder	
				0.68	31.72	95%	0	8			
				0.83	31.57						
				1.00							
			L N=19	2.00							
		NIL AT 18:45									
31-7-1980		NIL AT 8:10		3.00							
			L 2 N=23	4.00	28.40				4.00m		
										Brownish grey medium dense to dense clayey silt	
				5.00							
	6.0m		L 3 N=31	6.00	26.40				6.00m		

Legend:
- I Small disturbed sample
- Large disturbed sample
- L Undisturbed sample (LINER)
- N Standard penetration test
- Piezometer tip
- M Mazier sample
- Permeability test

Remarks:

Scale: 1:40

Contractor: GAMMON (HK) LTD
Date started 30-7-1980
Date finished 1-8-1980
Logged by
Checked by

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS

GROUND INVESTIGATION LOG

PROJECT/CONTRACT NO. 615/80 | HOLE NO. 953 D | Sheet 3 of 3

Type of drilling: ROTARY | Coordinates: E 14000 | Location: TUEN MUN NEW TOWN AREA 19
rig: 02 | N 26800 | Type of hole:
bit: TNW | Angle from vertical 0° | Ground/Seabed Level +32.40 M.P.D.
Bearing: N E

Drilling progress	Casing depth/size	Water level	Notes e.g. Water return, sampling, instrumentation	Drill Depth & Size	Reduced level m.P.D.	Core recovery %	R.Q.D.	Fracture Index	Legend	Description	Grade
1-8-1980	NX	NIL AT 8:05	95%	metres +20.60							
				12.00	20.36						
				12.04		99	43	10		Brownish grey & light green, very dense clayey SILT with cobbles & gravels	IV/III
				12.34	20.06						
						30	0	3.7			
				13.00							
				13.16	19.24						
	13.41m					0	0	∞	13.41m		
				13.41	18.99					Greenish grey fine grained, highly fractured VOLCANIC strong, moderately to highly weathered	III/II
				14.00		95	48	6.5			
				14.94	17.46						
		13.7m AT 18:45		15.00		100	89	4.9		Grey & light green fine grained, fractured VOLCANIC, strong moderately to slightly weathered	
				15.55	16.85				15.55m	operation stopped at 15.55 m	

Legend:
- I Small disturbed sample
- Large disturbed sample
- Undisturbed sample
- N Standard penetration test
- Piezometer tip
- M Mazier sample
- Permeability test

Remarks: Reamed the hole from NW to NX from 12.04m to 13.41m

Scale: 1:40

Contractor: GAMMON (H.K.) LTD
Date started: 30-7-1980
Date finished: 1-8-1980
Logged by
Checked by

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
SOIL MECHANICS & FOUNDATIONS CONSULTANT ENGINEERS

C

GROUND WATER LEVEL RECORD

PROJECT / CONTRACT NO. 615/80 | HOLE NO. 953D | Sheet 1 of 2

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS

Coordinates: E 14000 N 26800 | Location: TUEN MUN NEW TOWN AREA 19

PIEZOMETER TIP LEVEL: +22.35 (M.P.D.) 10.05 M (BELOW G.L.) | Ground Level +32.40 m.P.D.

DATE	BELOW G.L. (METER)	M.P.D.	DATE	BELOW G.L. (METER)	M.P.D.	REMARK
5-8-80	NIL		4-9-80	NIL		(—): SUNDAY
6-8-80	NIL		5-9-80	NIL		
7-8-80	NIL		6-9-80	NIL		(☆): PUBLIC
8-8-80	NIL		7-9-80	—		HOLIDAY
9-8-80	NIL		8-9-80	NIL		
10-8-80	—		9-9-80	NIL		
11-8-80	NIL		10-9-80	NIL		
12-8-80	NIL		11-9-80	NIL		
13-8-80	NIL		12-9-80	NIL		
14-8-80	NIL		13-9-80	NIL		
15-8-80	NIL		14-9-80	—		
16-8-80	NIL		15-9-80	NIL		
17-8-80	—		16-9-80	NIL		
18-8-80	NIL		17-9-80	NIL		
19-8-80	NIL		18-9-80	NIL		
20-8-80	NIL		19-9-80	NIL		
21-8-80	NIL		20-9-80	NIL		
22-8-80	NIL		21-9-80	—		
23-8-80	NIL		22-9-80	NIL		
24-8-80	—		23-9-80	NIL		
25-8-80	☆		24-9-80	☆		
26-8-80	NIL		25-9-80	NIL		
27-8-80	NIL		26-9-80	NIL		
28-8-80	NIL		27-9-80	NIL		
29-8-80	NIL		28-9-80	—		
30-8-80	NIL		29-9-80	NIL		
31-8-80	—		30-9-80	NIL		
1-9-80	NIL		1-10-80	NIL		
2-9-80	NIL		2-10-80	NIL		
3-9-80	NIL		3-10-80	NIL		

LAM GEOTECHNICS LIMITED

CED Contract No. GE/95/12
Ground Investigation New Territories West
Term Contract

W.O. No. GE/95/12:50
Agreement No. CE 44/95
Foothills Bypass, Tuen Mun Road/Wong Chu Road Interchauge and Other Road Junction Improvement Works Additional GI - Phase I, Area 19

FIELDWORK REPORT

See also 27072

CONTRACTOR

[redacted]

Date: 7th April 1997

CLIENT

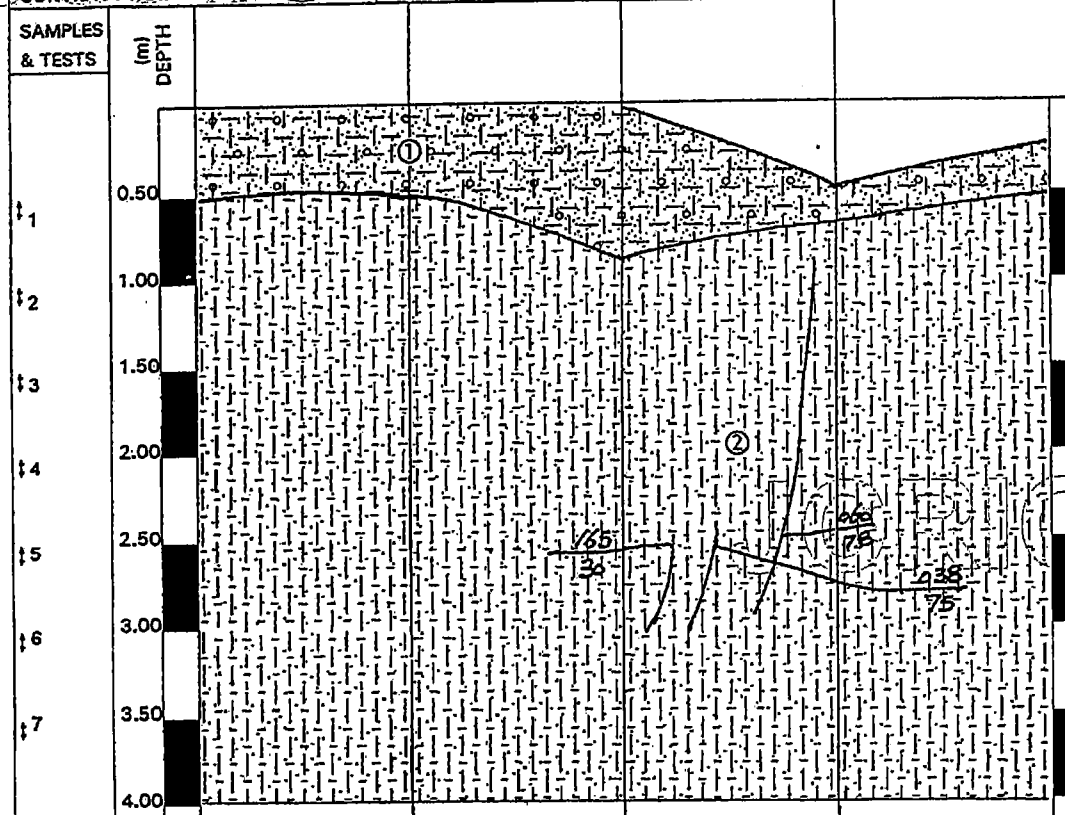
GOVERNMENT OF HONG KONG
Civil Engineering Department
Geotechnical Engineering Office
Civil Engineering Building
101 Princess Margaret Road
Homantin
Kowloon

CONTRACTOR: Lam Geotechnics Ltd. | LOGGED RY: S.P.Su | DATE: 11/03/97 | CO-ORDINATES: E 813905.63 N 826808.29

CONTRACT NO.: GE/95/12 | CHECKED BY: M.D. | DATE: 14/03/97 | GROUND LEVEL: 31.16 m.P.D.

PROJECT: Foothills Bypass, Tuen Mun Road/Wong Chu Road Interchange and Other Road Junction Improvement Works

WORKS ORDER NO.: GE/95/12.50



LEGEND (FACE C) | GRADE | DESCRIPTION

0.50

① Light brown, clayey/silty fine to medium, occasionally coarse SAND with some angular and subangular fine to coarse gravel, cobble and boulder sized moderately strong to strong rock , brick and concrete fragments and some roots and waste (FILL)

② Extremely weak, dark greenish grey spotted white discoloured and stained light brown, completely decomposed fine grained ANDESITE (Soft to firm, slightly sandy clayey SILT with many limonite and manganese oxide stained smooth and slickensided, undulating and planar, relict joints dipping at 60°-70° and 70°-80° and occasional light green dyke rock (<50mm) and occasional thin quartz veins (<50mm)

3 main joints sets identified dipping NE, SW to NW and SE. Joints normally <1.0m and upto 2.5m in length

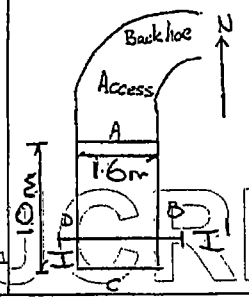
Remarks:
1. Depth of the trial trench 6.7m.
2. Water level 4.7m b.g.l.
3. Shoring from 3.0m depth to bottom of the trench.

continued on page 2

SYMBOL

- Disturbed sample
- Undist.sample, Hori. ( )
- Undist.sample, Vert. ( )
- Block sample
- Insitu density test
- Water sample
- Seepage

PLAN (not to scale)



FACE A: N | FACE B: E | FACE C: S | FACE D: W

EXCAVATION DATES: 03/03/97 to17/03/97

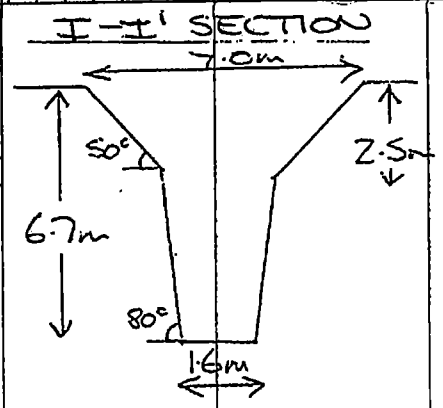
SHEET 1 OF 2

TRIAL PIT NO. 14,15,16

CONTRACTOR: Lam Geotechnics Ltd. | LOGGED BY: S.P.Su | DATE: 11/03/97 | CO-ORDINATES: E 813905.68 N 826808.29 | PROJECT: Foothills Bypass, Tuen Mun Road/Wong Chu Road Interchenge and Other Road Junction Improvement Works

CONTRACT NO.: GE/95/12 | CHECKED BY: M.D. | DATE: 14/03/97 | GRDUND LEVEL: 31.16 m.P.D. | WORKS ORDER NO.: GE/95/T2.50

SAMPLES & TESTS	(m) DEPTH	LEGEND (FACE C)	GRADE	DESCRIPTION
8				
9	4.60			
10	5.00			
11	5.60			
12	6.00			
13	6.60		6.70	
	7.00			
	7.50			
	8.00			



SYMROL

- Disturbed sample
- Undist.sample, Hori. ( )
- Undist.sample, Vert. ( )
- Block sample
- Insitu density test
- Water sample
- Seepage

PLAN (not to scale)

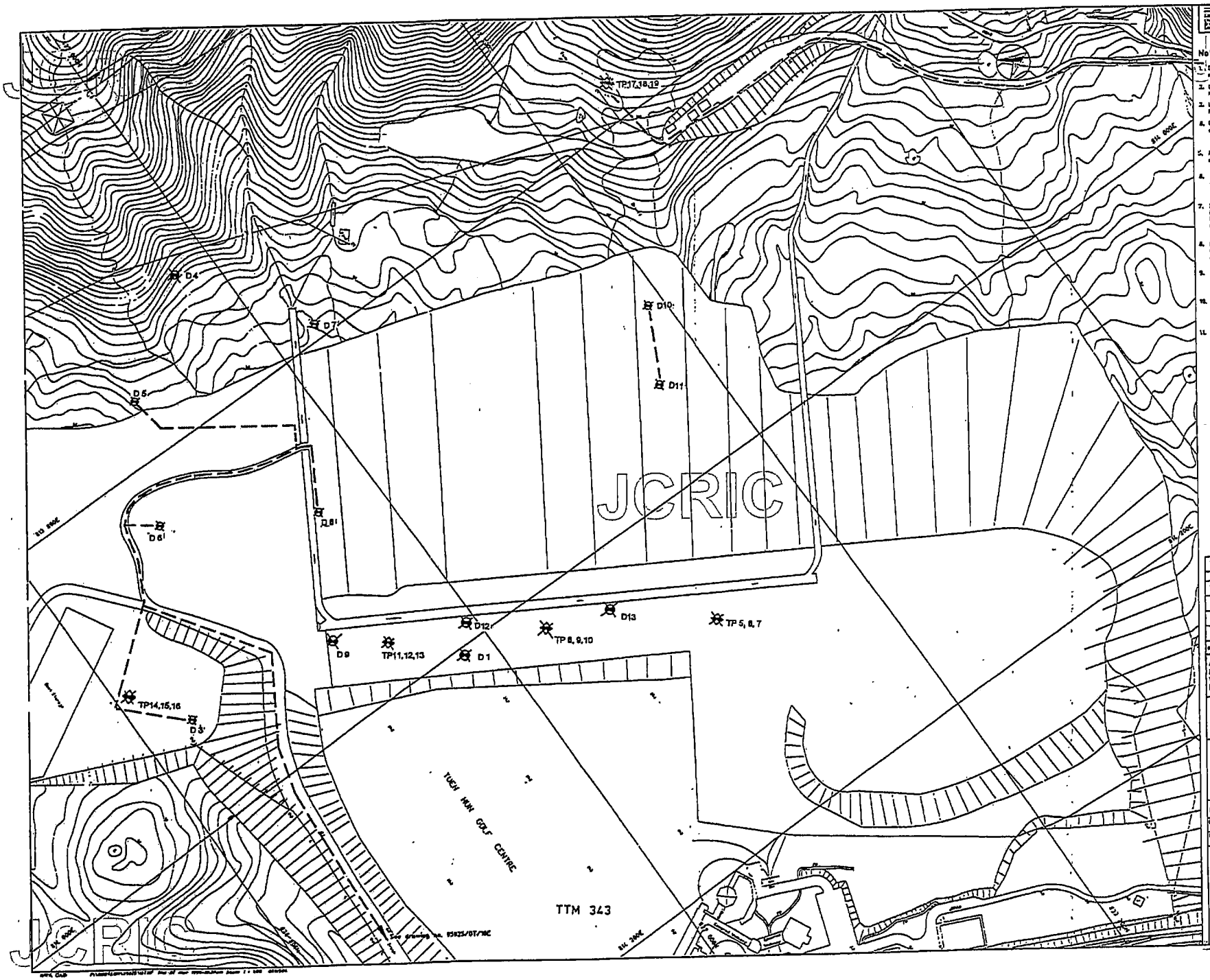
FACE A: N | FACE B: E | FACE C: S | FACE D: W

EXCAVATION DATES: 03/03/97 to17/03/97

SHEET 2 OF 2

TRIAL PIT NO. 14,15,16

C17



Government of Hong Kong
Territory Development Department
New Territories West Development Office

Notes:

1. Dimensions are in metres unless shown otherwise.
2. Coordinates are based on the Hong Kong Metric Grid (1980).
3. Levels are given in metres and refer to Principal Datum (P.D.) unless shown otherwise.
4. Base plan was compiled from survey sheet nos.

35SE6C	35SE5A
35SD9D	35SD5D

5. Refer to Table 95825/GT/02 for schedule of exploratory holes.
6. The exact locations of all exploratory holes are to be agreed on site by the Engineers Representative.
7. Details of all piezometer installations to be instructed on site by the Engineers Representative. All piezometers are to be equipped with Heiterau Buckets.
8. Details of all inclinometer installations to be instructed on site by the Engineers Representative.
9. In-situ density tests shall be connected in trial pits and trenches as instructed on site by the Engineers Representative.
10. Plate bearing tests shall be carried out at the base of trial pits as instructed on site by the Engineers Representative.
11. For details of legend refer to Drawing No. 95825/GT/100.

F	Nov.96	Proposed Access Route revised.	KW	GR1
E	Oct.96	Trial trenches renumbered.	KW	GR1
D	Oct.96	Proposed Highway Alignment deleted.	KW	GR1
C	Oct.96	Scope of investigation revised.	KW	GR1
B	Sep.96	Proposed Access Routes added.	KW	GR1
A	Aug.96	Proposed Highway Alignment revised.	KW	GR1
Issue	Date	Revision	Drawn	Checked

AGREEMENT NO. CE11/95
FOOTHILLS BYPASS, TUEN MUN ROAD/ WONG CHU ROAD INTERCHANGE AND OTHER ROAD JUNCTION IMPROVEMENT WORKS

ADDITIONAL GROUND INVESTIGATION
PHASE I - AREA 19

EXPLORATORY HOLE LOCATION PLAN

Drawing No.	95825/GT/11F		
Drawn KW	Detailed	Approved	Scale 1 : 1000
Designed GR1	Checked	Date SEPT. 96	Status PRELIMINARY

Scott Wilson Kirkpatrick
CONSULTING ENGINEERS

Aspinwall Clouston
ERM (Hong Kong)
Parsons Brinckerhoff (Asia)
SWK Atria

Appendix D

Boulder Field Inventory Data

Table 2 - Boulder Inventory Data

Polygon Number	Attribute 1	Attribute 2	Attribute 3				Attribute 4
			% Size 1	% Size 2	% Size 3	% Size 4	
S5_U	-	-	-	-	-	-	-
S5_618	3	1	70	10	10	10	2
S5_613	5	3	10	0	0	90	2
S5_707	5	3	10	10	10	70	2
S5_D	-	-	-	-	-	-	-
S5_621	N	-	-	-	-	-	-
S5_615	3	2	60	20	10	10	2
S5_703	1	1	90	10	0	0	2
S5_713	5	2	40	30	20	10	2
S5_716	5	1	20	20	10	50	2
S5_695	5	2	40	30	10	20	2
S5_714	N	-	-	-	-	-	-
S5_708	4	3	10	20	20	50	2
S5_696	5	2	10	20	20	50	2
S5_709	3	1	70	10	10	10	2
S5_717	4	2	20	30	20	30	2
S5_C	-	-	-	-	-	-	-
S5_730	1	1	50	10	20	20	2
S5_715	N	-	-	-	-	-	-
S5_729	3	1	10	20	40	30	2
S5_719	3	2	60	20	10	10	2
S5_702	1	1	20	20	20	40	2
S5_701	3	1	10	20	20	50	2
S5_731	1	1	90	10	0	0	2
S5_711	2	1	90	10	0	0	2
S5_720	V	-	-	-	-	-	-
S5_718	5	2	30	20	20	30	2
S5_721	1	2	90	10	0	0	2
S5_742	4	1	30	10	10	50	2
S5_710	1	1	90	10	0	0	2
S5_712	5	3	10	0	0	90	1
S5_732	3	2	50	10	10	30	2
S5_734	5	3	10	10	10	70	2
S5_740	2	1	90	10	0	0	2
S5_739	1	1	90	10	0	0	2
S5_737	5	1	30	20	20	30	2
S5_738	5	1	10	20	20	50	2

Key:

D : Drain, river or nullah
U : Urban Development

Attribute 1: Percentage Area Covered

- Class 1: less than 10% of the surfaee area of the map unit covered by boulders
- Class 2: 10-20% of the surface area of the map unit eovered by boulders
- Class 3: 20-50% of the surface area of the map unit covered by boulders
- Class 4: 50-75% of the surface area of the map unit covered by boulders
- Class 5: more than 75% of the surface area of the map unit covered by boulders
- N: no boulders observed on the ground surface
- V: land surface obscured by vegetation

Attribute 2: Boulder Type

- Class 1: corestone or tor
- Class 2: colluvial boulder field
- Class 3: cliff or rock outcrop
- Class 4: scree or talus deposit

Attribute 3: Boulder Size, giving the percentage occurrence of each class size, to total 100%

- Class 1: boulders less than 1m in size
- Class 2: boulders 1-2m in size
- Class 3: boulders 2-5m in size
- Class 4: boulders greater than 5m in size

Attribute 4: Boulder Shape

- Class 1: rounded in shape
- Class 2: angular in shape

Appendix E

Extent of Historical Landslide Catchments

Table 1 – Summary of ENTLI Features

ENTLI Feature No.	Easting	Northing	Recent / Relict Landslide	Slide Type	Class	Year 1	Year 2	M_Width	S_length	Slope	Cover	Head Elevation (mPD)	Tail Elevation (mPD)	Gully	Run Out	Area	Travelling Angle
05SEB1020E	812971	827113	Recent	O	-	1982	1981	9	10	41	A	335	311	N	43	90	29
05SEB1131Ea	813296	827230	Recent	C	-	2000	1999	11	19	55	A	368	76	N	545	209	28
05SEB1131Eb	813296	827230	Recent	C	-	2000	1999	11	19	55	A	368	77	N	470	209	32
05SEB1042E	813364	827546	Recent	C	-	1990	1989	15	24	45	A	407	9999	N	688	360	0
05SEB1129E	813204	827035	Recent	C	-	2000	1999	22	20	49	A	314	119	N	310	440	32
05SEB0059E	812971	827204	Relict	R	C1	1963	-	9	7	30	C	372	366	N	7	63	40
05SEB0058E	813000	827211	Relict	R	C1	1963	-	9	8	33	C	392	385	N	8	68	42
05SEB0055E	813628	827010	Relict	R	B1	1963	-	11	10	30	C	124	118	N	10	105	31
05SEB0054E	813569	827029	Relict	R	C1	1963	-	13	11	29	C	148	141	N	11	138	32
05SEB1023E	812949	827286	Recent	C	-	1982	1981	11	9	31	A	361	323	N	73	99	28
05SEB1028E	812973	827221	Recent	C	-	1982	1981	14	14	43	A	374	309	N	124	189	28
05SEB1029E	812935	827227	Recent	O	-	1982	1981	9	8	47	A	345	334	N	18	72	32
05SEB0233E	812929	827146	Relict	R	A1	1963	-	8	6	44	C	335	327	N	14	44	29
05SEB0236E	812980	827121	Relict	R	C1	1963	-	11	10	30	C	343	338	N	10	105	27
05SEB0237E	813011	827200	Relict	R	C1	1963	-	13	12	29	C	391	383	N	12	150	34
05SEB0238E	813083	827227	Relict	R	B2	1963	-	10	9	36	C	429	422	N	9	90	37
05SEB0239E	813101	827220	Relict	R	B2	1963	-	8	7	35	C	433	428	N	7	56	35
05SEB0240E	813133	827221	Relict	R	B2	1963	-	8	8	36	C	444	438	N	8	60	38
05SEB0241E	813091	827302	Relict	R	C1	1963	-	9	8	42	C	458	453	N	8	68	34
05SEB0242E	813104	827319	Relict	R	B2	1963	-	9	8	36	C	476	470	N	8	68	36
05SEB0243E	812988	827278	Relict	R	B2	1963	-	9	10	38	C	389	380	N	10	90	43
05SEB0244E	812986	827265	Relict	R	B2	1963	-	9	8	54	C	387	379	N	8	68	46
05SEB0256E	812974	827324	Relict	R	B2	1963	-	8	4	57	C	383	378	N	4	30	51
05SEB0257E	812982	827316	Relict	R	B2	1963	-	8	4	51	C	388	384	N	4	30	44
05SEB0258E	812999	827327	Relict	R	B2	1963	-	11	8	42	C	407	400	N	7	79	44
05SEB0301E	813083	827069	Relict	R	C1	1963	-	10	11	38	C	355	346	N	10	100	41
05SEB0302E	813125	827028	Relict	R	B2	1963	-	12	11	39	C	324	317	N	11	121	34
05SEB0303E	813161	827111	Relict	R	B2	1963	-	11	10	40	C	375	365	N	10	110	45
05SEB0304E	813171	827095	Relict	R	C2	1963	-	11	10	47	C	361	353	N	10	100	40
05SEB0305E	813145	827098	Relict	R	C2	1963	-	11	9	43	C	365	357	N	9	95	41
05SEB0306E	813243	827077	Relict	R	B2	1963	-	9	9	40	C	332	322	N	9	77	49
05SEB0307E	813236	827065	Relict	R	B2	1963	-	7	10	51	C	323	313	N	9	67	47
05SEB0308E	813229	827078	Relict	R	B2	1963	-	8	7	45	C	337	330	N	7	56	46
05SEB0309E	813247	827062	Relict	R	B2	1963	-	7	8	46	C	319	311	N	8	52	45
05SEB0310E	813242	827033	Relict	R	B2	1963	-	11	12	52	C	295	285	N	12	132	40
05SEB0311E	813369	827030	Relict	R	B2	1963	-	10	10	44	D	220	211	N	9	95	44
05SEB0312E	813420	827021	Relict	R	B2	1963	-	9	8	33	D	180	174	N	7	64	39
05SEB0313E	813362	827072	Relict	R	B2	1963	-	9	7	49	C	229	221	N	7	63	48
05SEB0314E	813369	827065	Relict	R	B2	1963	-	10	7	48	C	232	222	N	7	67	54
05SEB0315E	813335	827069	Relict	R	B2	1963	-	9	7	47	C	256	249	N	6	59	47
05SEB0316E	813314	827064	Relict	R	B2	1963	-	10	7	45	C	269	262	N	7	62	46
05SEB0317E	813297	827099	Relict	R	B2	1963	-	10	7	47	C	303	293	N	7	70	54

Table 1 – Summary of ENTLI Features

ENTLI Feature No.	Easting	Northing	Recent / Relict Landslide	Slide Type	Class	Year 1	Year 2	M_Width	S_length	Slope	Cover	Head Elevation (mPD)	Tail Elevation (mPD)	Gully	Run Out	Area	Travelling Angle
05SEB0318E	813271	827099	Relict	R	B2	1963	-	9	9	43	C	322	315	N	9	72	39
05SEB0319E	813264	827086	Relict	R	B2	1963	-	9	7	58	C	323	312	N	7	59	59
05SEB0320E	813485	827044	Relict	R	B1	1963	-	11	10	48	C	155	148	N	9	100	37
05SEB0321E	813437	627084	Relict	R	B2	1963	-	13	9	52	C	199	189	N	8	111	50
05SEB0322E	813388	827125	Relict	R	B2	1963	-	9	9	45	C	244	237	N	9	81	38
05SEB0323E	813413	827116	Relict	R	B2	1963	-	8	11	36	D	222	214	N	10	79	38
05SEB0324E	813433	827142	Relict	R	B2	1963	-	7	6	49	C	226	221	N	6	42	40
05SEB0325E	813424	827137	Relict	R	B2	1963	-	7	6	49	C	228	222	N	6	42	45
05SEB0326E	813413	827165	Relict	R	B2	1963	-	10	10	57	C	250	240	N	10	95	45
05SEB0327E	813273	827190	Relict	R	B2	1963	-	8	7	47	C	384	373	N	6	52	60
05SEB0328E	813256	827168	Relict	R	B2	1963	-	9	9	57	D	373	362	N	8	72	53
05SEB0329E	813244	827152	Relict	R	B2	1963	-	8	7	53	C	369	362	N	6	49	48
05SEB0330E	813244	827163	Relict	R	B2	1963	-	8	7	51	C	378	372	N	6	52	43
05SEB0331E	813265	827150	Relict	R	B2	1963	-	8	7	36	D	353	346	N	7	56	44
05SEB0332E	813164	827193	Relict	R	B2	1963	-	7	11	45	C	432	419	N	11	77	50
05SEB0333E	813174	827186	Relict	R	C1	1963	-	9	9	52	C	418	411	N	9	77	39
05SEB0334E	813415	827184	Relict	R	B2	1963	-	9	9	49	C	255	246	N	9	77	46
05SEB0335E	813422	827195	Relict	R	B2	1963	-	8	8	49	C	257	247	N	8	64	52
05SEB0336E	813427	827205	Relict	R	B2	1963	-	9	8	44	C	256	249	N	8	64	42
05SEB0337E	813367	827201	Relict	R	B2	1963	-	9	10	46	D	305	295	N	9	86	47
05SEB0338E	813381	827199	Relict	R	B2	1963	-	7	8	46	C	287	281	N	8	52	36
05SEB0339E	813264	827241	Relict	R	B2	1963	-	7	6	60	C	413	404	N	6	39	57
05SEB0340E	813277	827250	Relict	R	B2	1963	-	7	6	50	C	408	399	N	6	36	58
05SEB0341E	813263	827259	Relict	R	B2	1963	-	6	6	59	C	428	418	N	6	36	58
05SEB0342E	813269	827270	Relict	R	B2	1963	-	6	6	46	C	428	420	N	6	36	53
05SEB0343E	813262	827266	Relict	R	B2	1963	-	6	6	59	C	435	424	N	6	36	62
05SEB0344E	813276	827275	Relict	R	B2	1963	-	6	7	56	C	420	412	N	6	39	52
05SEB0345E	813282	827284	Relict	R	B2	1963	-	7	6	58	C	421	411	N	6	42	59
05SEB0346E	813253	827275	Relict	R	B2	1963	-	8	7	54	C	448	438	N	7	52	56
05SEB0347E	813254	827292	Relict	R	B2	1963	-	20	11	54	C	448	437	N	11	210	46
05SEB0348E	813293	827247	Relict	R	B2	1963	-	8	7	52	C	384	375	N	7	49	53
05SEB0349E	813303	827256	Relict	R	B2	1963	-	7	7	57	C	383	373	N	7	46	56
05SEB0350E	813330	827258	Relict	R	B2	1963	-	8	6	45	C	359	352	N	6	41	51
05SEB0351E	813331	827306	Relict	R	B2	1963	-	9	8	42	C	378	368	N	8	68	52
05SEB0352E	813345	827275	Relict	R	B2	1963	-	11	11	47	C	355	343	N	11	116	48
05SEB0353E	813370	827285	Relict	R	B2	1963	-	9	10	50	C	330	316	N	10	90	55
05SEB0354E	813361	827246	Relict	R	B2	1963	-	9	7	61	C	321	310	N	7	55	59
05SEB0355E	813397	827290	Relict	R	B2	1963	-	8	7	41	C	303	297	N	6	52	43
05SEB0356E	813403	827236	Relict	R	B2	1963	-	10	8	59	C	284	273	N	8	80	53
05SEB0357E	813438	827261	Relict	R	B2	1963	-	10	13	31	D	257	249	N	13	130	32
05SEB0358E	813445	827280	Relict	R	B2	1963	-	7	7	59	D	260	250	N	7	49	54
05SEB0359E	813450	827274	Relict	R	B2	1963	-	7	5	39	D	253	249	N	5	35	40

Table 1 – Summary of ENTLI Features

ENTLI Feature No.	Easting	Northing	Recent / Relict Landslide	Slide Type	Class	Year 1	Year 2	M_Width	S_length	Slope	Cover	Head Elevation (mPD)	Tail Elevation (mPD)	Gully	Run Out	Area	Travelling Angle
05SEB0360E	813368	827314	Relict	R	B2	1963	-	10	10	55	C	342	327	N	10	100	56
05SEB1128E	813088	827209	Recent	O	-	2000	1999	9	8	36	A	420	377	N	78	68	29
05SED0017E	812911	826758	Relict	R	B1	1963	-	10	11	41	C	292	283	N	11	110	39
05SED0159E	813225	826307	Recent	O	-	1973	1964	12	11	33	A	112	95	Y	26	132	33
05SED0160E	813302	826504	Recent	O	-	1977	1976	7	8	45	A	149	141	N	13	52	32
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05SED0060E	812959	826370	Relict	R	B2	1963	-	14	12	29	C	207	198	N	12	168	37
05SED0061E	812981	826480	Relict	R	B2	1963	-	9	7	40	C	247	240	N	7	59	47
05SED0062E	813001	826487	Relict	R	C1	1963	-	10	11	40	C	243	237	N	11	110	29
05SED0063E	813020	826469	Relict	R	C1	1963	-	11	9	37	C	227	220	N	9	95	38
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05SED0090E	813692	826673	Relict	R	A1	1983	-	28	12	29	C	66	9999	N	25	336	0

Table 1 – Summary of ENTLI Features

ENTLI Feature No.	Easting	Northing	Reeent / Relict Landslidc	Slide Type	Class	Year 1	Year 2	M_Width	S_leugth	Slope	Cover	Head Elevation (mPD)	Tail Elevation (mPD)	Gully	Ruu Out	Area	Travelling Angle
05SED0091E	813631	826919	Relict	R	B2	1963	-	9	12	30	C	107	98	N	11	104	39
05SED0092E	813633	826947	Relict	R	B1	1963	-	14	12	36	C	118	111	N	12	161	31
05SED0093E	813646	826930	Relict	R	C2	1963	-	14	12	27	C	105	97	N	12	162	34
05SED0094E	813674	826938	Relict	R	C1	1963	-	14	12	41	C	100	92	N	12	161	34
05SED0095E	814113	826795	Relict	R	C2	1963	-	18	15	45	D	28	21	N	15	270	25
05SED0129E	812898	826889	Relict	R	C1	1963	-	10	9	34	C	291	285	N	8	85	36
05SED0130E	812903	826829	Relict	R	A2	1963	-	11	12	49	C	297	289	N	11	127	35
05SED0139E	813205	826967	Relict	R	B2	1963	-	12	13	43	C	263	251	N	13	150	44
05SED0140E	813218	826967	Relict	R	B2	1963	-	9	10	33	C	258	251	N	10	86	36
05SED0141E	813222	826942	Relict	R	B2	1963	-	13	12	46	C	236	229	N	11	150	32
05SED0142E	813352	826958	Relict	R	B1	1963	-	11	8	41	C	202	193	N	8	88	49
05SED0143E	813408	826878	Relict	R	C1	1963	-	10	9	40	C	141	134	N	9	86	37
05SED0144E	813453	826862	Relict	R	C1	1963	-	9	9	45	C	122	116	N	9	72	35
05SED0145E	813453	826933	Relict	R	C1	1963	-	11	10	40	C	145	138	N	10	100	36
05SED0146E	813432	826988	Relict	R	C1	1983	-	12	13	46	C	161	152	N	13	144	35
05SED0147E	813547	826975	Relict	R	C1	1963	-	15	11	36	C	136	129	N	11	165	32
05SED0152E	813510	828765	Relict	R	C2	1963	-	28	11	36	C	84	77	N	11	308	33
05SED0153E	813478	826782	Relict	R	C2	1963	-	14	9	52	C	95	85	N	9	122	47

Appendix F

Stability Assessment of Existing Feature No. 5SE-D/C76

Project No.: B090691
Project Title:: Tuen Mun OPR Report
Name: SECTION C-C (amend).gsz
Date: 01/06/2012
Time: 14:50:08
Method: Morgenstern-Price

Section C-C

Scale 1:300

Name: CD Andesite
Unit Weight: 19
Cohesion: 5
Phi: 35
Phi-B: 0
Piezometric Line: 1

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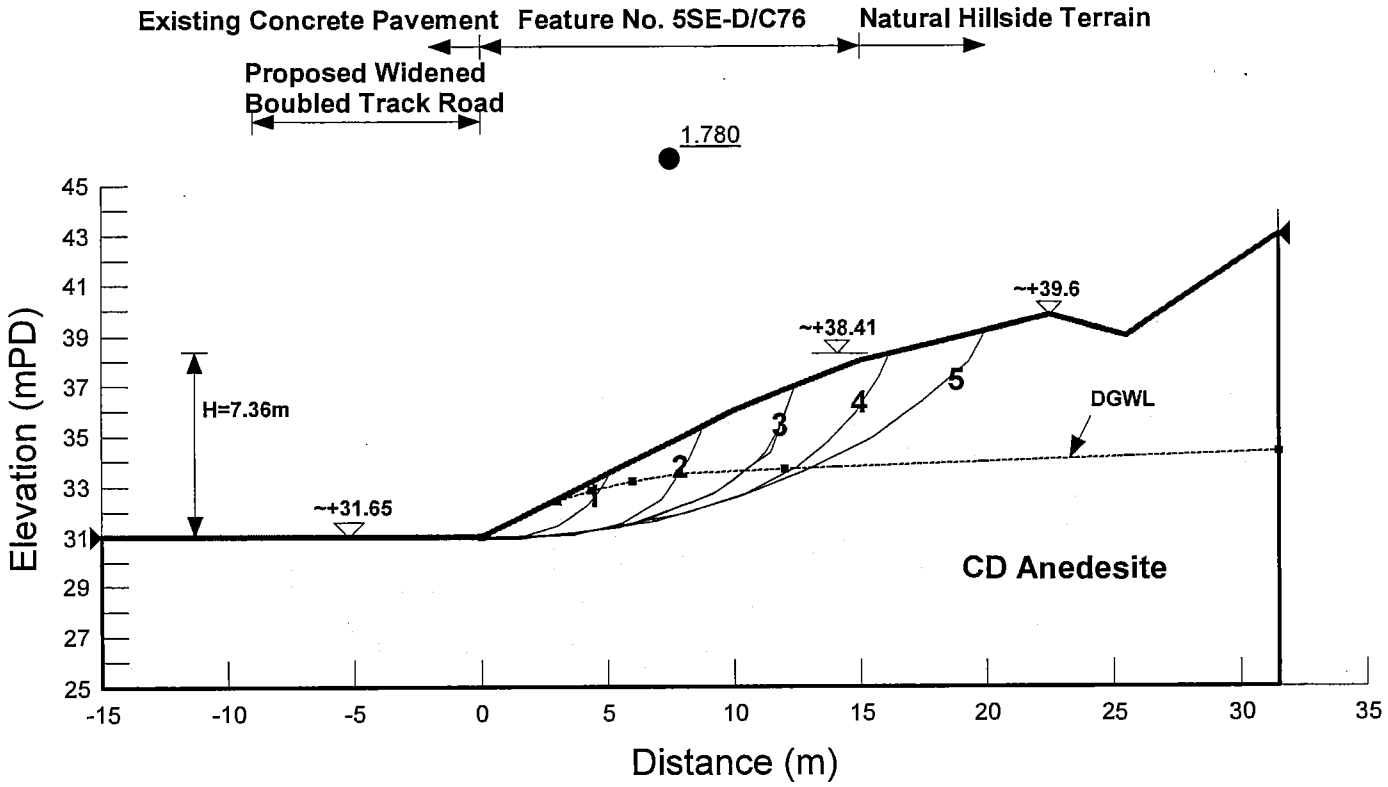
2	1.767
3	1.780 (min)
4	1.794
5	1.908



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