ARUP

Appendix H

Geotechnical Planning Review Report

GEOTECHNICAL PLANNING REVIEW REPORT (GPRR)

FOR

APPLICATION FOR AMENDMENT OF PLAN

UNDER SECTION 12A OF THE TOWN PLANNING ORDINANCE (Cap.131)

TO REZONE THE APPLICATION SITE

FROM "GREEN BELT" AND AREA SHOWN AS "ROAD"

TO "RESIDENTIAL (GROUP C) 5"

FOR

PROPOSED RESIDENTIAL DEVELOPMENT AT

VARIOUS LOTS IN D.D. 210 AND ADJOINING GOVERNMENT LAND

PAK WAI, SAI KUNG

CONTENTS

LIST OF FIGURES

APPENDICES

1. INTRODUCTION

This report presents the geotechnical planning review for the proposed development based on the available ground information in supplementary to the master layout plans.

The development involved the construction of four blocks of 3 to 4 storey residential building with carparking podium.

The geotechnical review is prepared under the supervision of Registered Geotechnical Engineer, Wong Wai Yi 0151939, in accordance with the requirement set out in PNAP-APP25 (PNAP 78). This report contains the following as listed.

- Impact and proposed investigation to the adjoining premises
- Conclusion and recommendation

2. SITE LOCATION AND DESCRIPTION

2.1 Site Location

The captioned site locates in a valley opposing Pak Wai in Sai Kung, The total area of the site is about 12,692m^2. The elevation of the site is about +4.5 – 7.5mPD. A site location plan is attached in Figure 1.

2.2 Existing Features

According to the Slope Information System, there are two existing features (slope or retaining wall) within site boundary and four close to the site. The feature is listed as follow :

Feature No.	Type	Location	Responsibility	Height	Angle	Length
7SE-D/C 154	Slope	West	Land D	4.0 m	35	40 m
7SE-D/C 153	Slope	West	Land D	3.5 m	75	60 m
7SE-D/C 163	Slope	West	Land D	9.0 m	45	45 m
7SE-D/F 46	Slope	West	Land D	5.0 m	35	40 m
7SE-D/FR 70	Wall	West	Highway	1.0 m	58	90 m
	Slope	West	Highway	4.0 m	140	30 m
7SE-D/R 54	Wall	East	Land D	4.4 m	30	85 m

Location plan & basic information of the features are attached in Appendix A. The available information indicates that the slope shall be in good condition.

A natural terrain is located at the west of the site.

3. THE PROPOSED DEVELOPMENT

The development involved the construction of residential development of four blocks of 3 to 4 storey residential building with one-level basement carpark. The schematic master layout plan and diagramatic section of the proposed new building are given in Figure 2 and Figure 3.

4. EXISTING INFORMATION

4.1 Ground Investigation Information

Two boreholes carried out by Enpack (HK) Ltd. In 2001 BH8 and BH9 were found within the site, information is given in Appendix B.

4.2 Layout of Existing Utilities

Enquiries shall be made to various utility companies for the layout of existing utilities adjacent to the site. A waterpipe laid along the existing footpath to be diverted before the site formation work.

4.3 Layout of Existing Building Structure

There is one temporary structure of concrete building in the lot and this will be demolished during the development.

5. GROUND CONDITIONS

5.1 Topography

The elevation of site is about +4.5 – 7.5mPD. The site can be accessed via Access road from Hiram's Highway. The total area of the site is about 12,692m^2.

5.2 Geology

From the two boreholes information, the site would be covered by a layer of fill/ alluvium/ residual soil of 2m to 6m thick. Underneath the fill/ alluvium/ residual soil there would be a layer of grade V to IV TUFF. Grade III or better grade of Tuff be found at a depth of 3m to 6m below existing ground level.

Soil Properties

FILL
Fill generally consists of light brown, sandy silt.

ALLUVIUM
Alluvium generally consists of firm, greyish brown, silt or clayey sand, locally sandy or silty clay.

TUFF
Tuff was classified as weak to strong, light yellowish brown, highly to slightly decomposed, coarse ash crystal.

5.3 Groundwater Condition

Based on the available ground investigation information, highest water table may be at about 2m below existing ground level.

6. PROPOSED WORKS

6.1 Proposed Ground Investigation Works

The proposed Ground Investigation works for the site area at D.D.210, Sai Kung for the proposed development will include drilling of 7 vertical drillholes with installation of 3 standpipe / piezometer inside the site. Sampling of soil/rock material and testing will be proposed to determine the soil/rock properties.

6.2 Proposed Works on Existing Features

There are 2 existing features within the site and 4 outside site boundary but close to the site.

The stability of existing features within or close to the site (including any unregistered features) to be affected or being affected by the development during site formation works shall be assessed. Monitoring works shall be carried out during the whole construction period. Remedial or upgrading works shall be proposed and carried out if found necessary.

6.3 Proposed Works on Natural Terrain

There is one natural terrains with an angular elevation of >20 degrees overlooking the development site. The natural terrain shall be studied in the detailed design stage.

It is proposed to set back the building line of the proposed development at a distance of 10m to 15m from the site boundary, is about 15m to 20m from the toe of the natural terrains to reduce potential risk of the natural terrain.

6.4 Proposed Foundation Works

The proposed development comprises four blocks of 3 to 4 storey residential building with one level of basement carpark. The available ground investigation information indicates that the rockhead level, defined as weathering grade III or better rock with total core recovery greater than 85%, or a firm stratum such as grade IV rock, may be encountered on average at a level about 3m to 6m below the existing ground. As the loading from the building is comparatively general, mini pile or pre-boring socket H-piles are considered to be feasible foundation options for the proposed building. In case the rock head level is shallow or the bearing capacity is checked to the adequate, footing foundation shall be an alternative. The proposed foundation scheme of the development shall have minimal effect or impact to the stability of all slopes (man-made & natural terrains), retaining walls and existing building or structures within or in vicinity to the lot. Detailed foundation design will be submitted separately when the proposed ground investigation works are completed. Stability of all existing slopes (man-made & natural terrains) and retaining wall (including unregistered features) within or in vicinity to the lot affecting or being affected by the development during demolition & construction shall be assessed & remedial works shall be carried out if found necessary.

6.5 Proposed Site Formation, Excavation and Lateral Support Works

Since the proposed building platform is similar to existing ground level of the site, site formation works are considered to be minimal. For the construction of footing / pile cap, open excavation, sheet pile / pipe pile / soldier pile wall with walings and struts are considered to be feasible scheme to retain excavation depth. The choice of scheme of temporary support shall be subject to detail assessment. Stability of all existing slopes (man-made & natural terrains) and retaining walls (including unregistered features) within or in vicinity to the lot affecting or being affected by the development during demolition & construction shall be assessed & remedial works shall be carried out if found necessary. The detailed design of the works will be submitted separately.

6.6 Construction Method & Sequence

Monitoring points shall be installed & initial reading shall be recorded prior commencement of any works. Remedial works on existing slopes & retaining walls being affected shall be carried out prior commencement of site formation, ELS, foundation & superstructure. Pre-boring shall be carried out prior H-pile installation.

Obstruction during pipe pile installation for temporary ELS shall be overcome by pre-boring. Strut of the ELS shall not be dismantled until completion of the permanent screen wall support the level difference. All temporary cut slope and back filling shall be backfilled by proper material with proper compaction. Groundwater shall be controlled during the excavation. Excessive groundwater drawdown at the adjacent ground shall not be allowed.

7. IMPACTS ON ADJACENT PREMISES/GEOTECHNICAL FEATURES

As the existing registered retaining walls & slope is in close proximity to the captioned site, consideration shall be taken in the design of the proposed works. Also, vibration caused by the installation of the pipe piles / socket H-pile and the ground settlement caused by the wall deflection and dewatering in the excavated areas may cause adverse effects to the adjacent utilities and structures. Therefore, it is necessary to limit the amount of vibration and ground settlement by adoption suitable lateral support works design and construction method. Pre-boring shall be carried out prior installation of piling for foundation and ELS. In all case, stability of existing geotechnical features within or in vicinity to the lot affecting or being affected by the development shall be assessed & remedial works shall be carried out if found necessary.

Groundwater control during the excavation is also critical for the design. Excessive groundwater drawdown at the adjacent ground is not allowed because ground settlement will be induced and damage will be caused to the adjacent structures and utilities. Detail assessment and design will be included in the foundation, site formation and ELS submission.

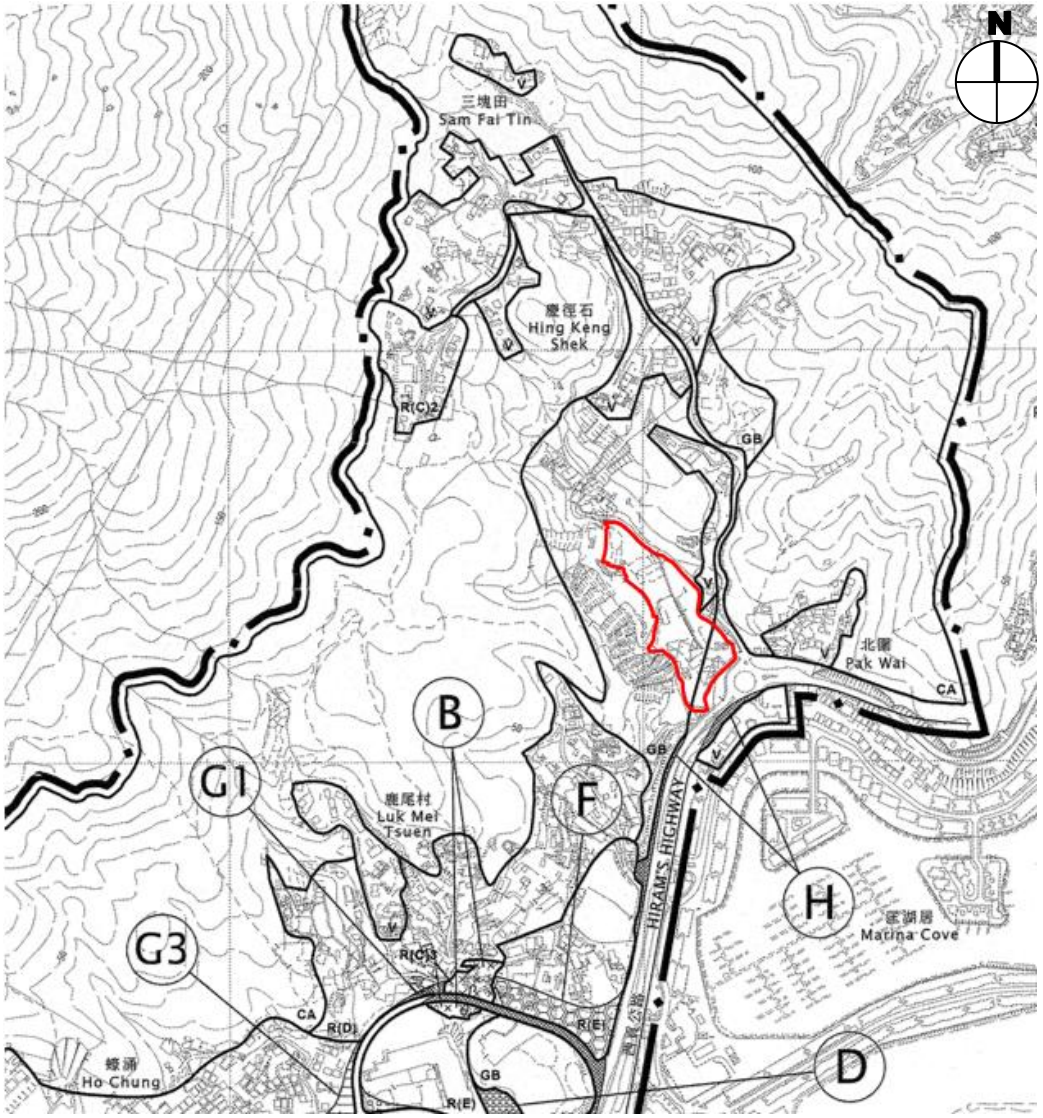
In addition, in order to ensure the adjacent premises will not be damaged by the proposed works, settlement monitoring stations, titling check points and building settlement pins will be proposed to be installed around the site. The movement of the adjacent premises will be monitored at these stations continuously throughout the work period. The noise from proposed works shall be kept within acceptable limit to minimize the disturbance to the environment. The detailed assessment and discussion on these aspects will be presented in the separate submission for ELS works.

8. CONCLUSION

On the basis of the available geotechnical information, the following conclusions and recommendation are drawn:

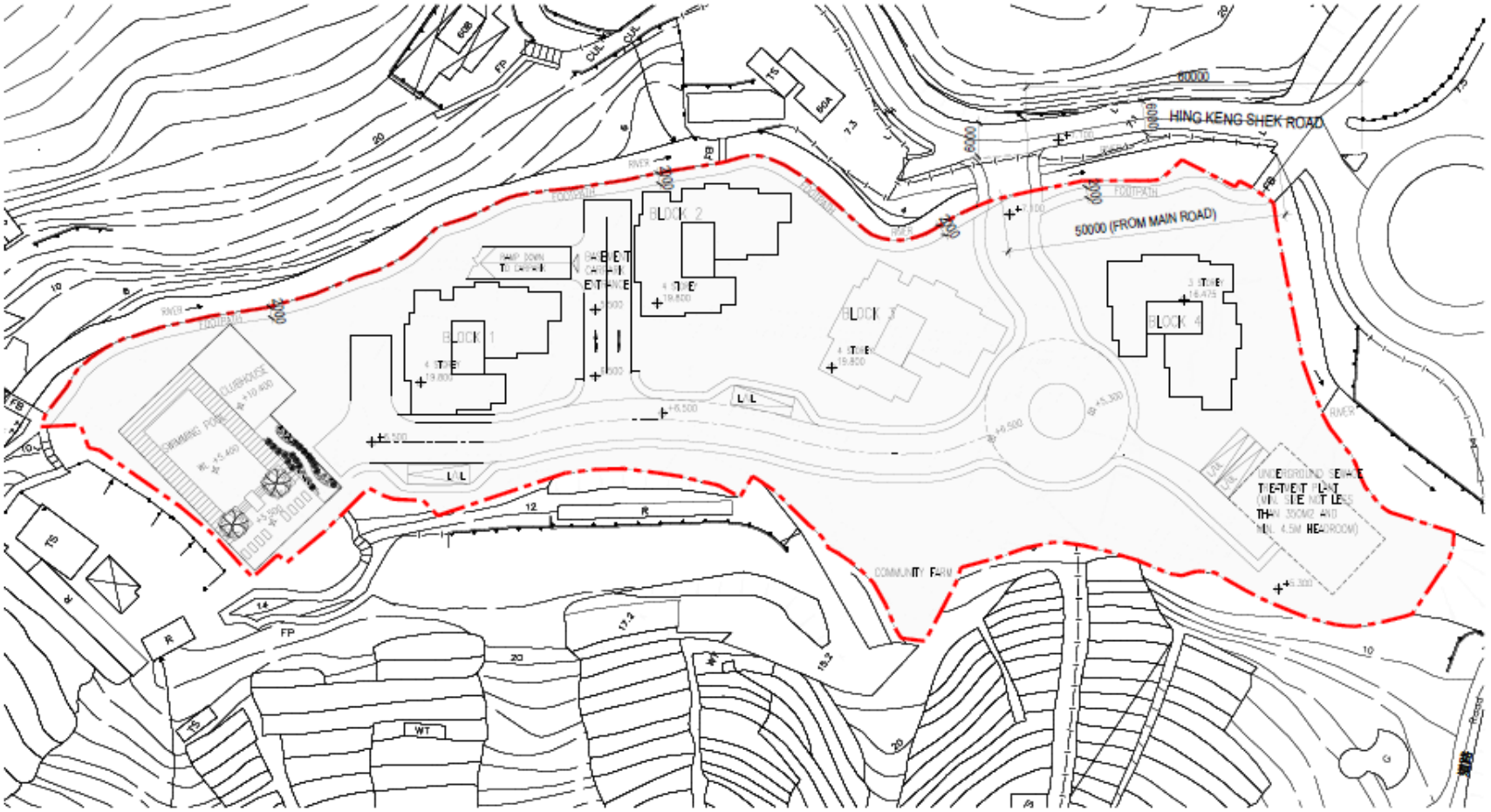
- The proposed development as presented in the Master Layout Plan is considered as a geotechnical feasible scheme.
- Ground investigation works will be carried out within the proposed development site.
- Mini pile or socket H pile with pre-boring is considered to be feasible foundation options for the proposed development. Footing may be an alternative if the soil stratum at shallow level provides adequate bearing capacity.
- The site formation works for the proposed development shall be minimal.
- Suitable groundwater control scheme shall be considered in design to avoid excessive groundwater drawdown at the adjacent area.
- Proper excavation and lateral support works design and construction method have to be adopted to minimize the adverse effect on the existing utilities and structures. The detailed discussion will be presented the separate submission for excavation and lateral support works.
- Stability of all slopes (man-made & natural terrains) and retaining walls (including unregistered features) within or in vicinity to the lot affecting or being affected by the development during demolition & construction works shall be assessed & remedial works shall be carried out if found necessary.
- Stability of the natural terrain affecting or being affected by the development permanently or temporarily during demolition & construction works shall be assessed & monitored. Mitigation works shall be proposed and carried out as necessary.

It is noteworthy to note that the works / proposal mentioned in this report are preliminary only at the planning stage and will be subjected to detailed study in the detail design stage under separate cover. Based on the current assessment, the proposed development is considered geotechnical feasible.



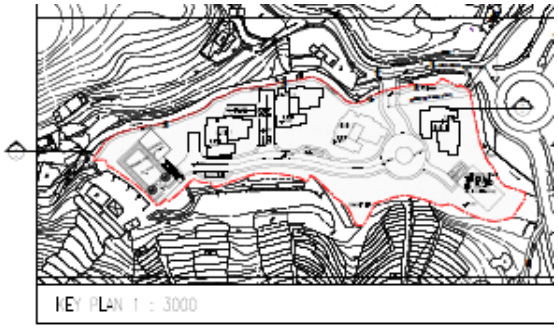
Site Location Plan
(Extracted from Draft Ho Chung Outline Zoning Plan No. S/SK-HC/12)

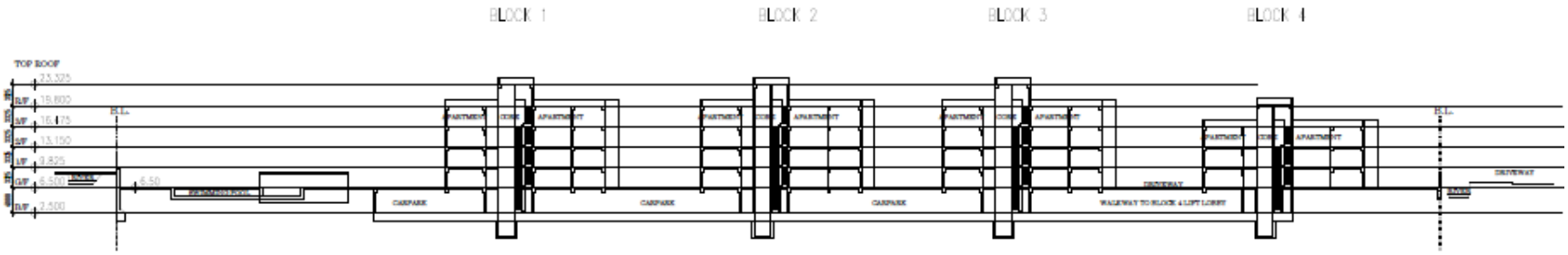
Figure 1



Master Layout Plan

Figure 2





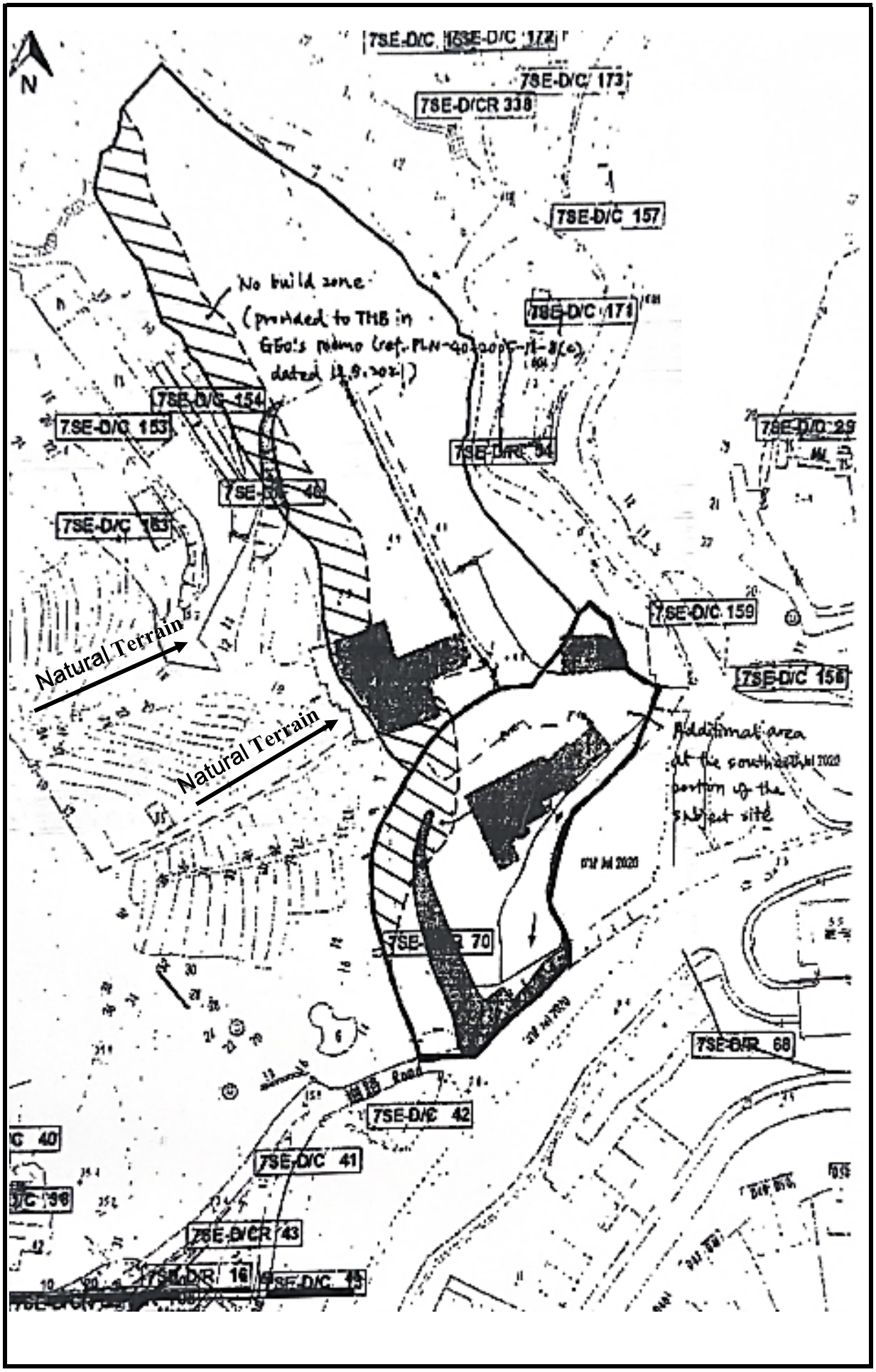
DIAGRAMATIC SECTION

Diagramatic Section

Figure 3

Appendix A

Information of Existing Slopes/ Retaining Walls


N
7SE-D/C 172
7SE-D/C 173
7SE-D/CR 338
7SE-D/C 157
No build zone
(provided to THB in
GBO's memo (ref. PLN-40-200PC-11-3(c)
dated 13.9.2021)
7SE-D/C 171
7SE-D/C 154
7SE-D/C 153
7SE-D/C 94
7SE-D/C 29
7SE-D/C 40
7SE-D/C 163
7SE-D/C 159
7SE-D/C 158
Natural Terrain
Natural Terrain
Additional area
at the southeastern
portion of the
subject site
7SE-D/C 70
7SE-D/R 68
7SE-D/C 42
7SE-D/C 41
7SE-D/CR 43
7SE-D/R 16
7SE-D/C 45

BASIC INFORMATION

Location: Southern part of Hing Keng Shek Village, Sai Kung

Date of Formation: pre-1977

Date of Construction/ Modification:

Approximate Coordinates: Easting : 844005 Northing : 824697

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Remote area or abandoned facilities

Distance of Facility from Crest (m): 0

Facility at Toe: Remote area or abandoned facilities

Distance of Facility from Toe (m): 0

Consequence-to-life Category: 3

Remarks: N/A

SLOPE PART

(1) Max. Height (m): 4 Length (m): 35 Average Angle (deg): 40

WALL PART

N/A

BASIC INFORMATION

Location: Southern part of Hing Keng Shek Village, Pak Sha Wan

Date of Formation: pre-1977

Date of Construction/ Modification:

Approximate Coordinates: Easting : 843982 Northing : 824693

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Remote area or abandoned facilities

Distance of Facility from Crest (m): 0

Facility at Toe: Remote area or abandoned facilities

Distance of Facility from Toe (m): 0

Consequence-to-life Category: 3

Remarks: N/A

SLOPE PART

(1) Max. Height (m): 3.5 Length (m): 75 Average Angle (deg): 60

WALL PART

N/A

BASIC INFORMATION

Location: Southern part of Hing Keng Shek Village

Date of Formation: pre-1977

Date of Construction/ Modification:

Approximate Coordinates: Easting : 843985 Northing : 824668

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Undeveloped green belt

Distance of Facility from Crest (m): 0

Facility at Toe: Lightly-used playground

Distance of Facility from Toe (m): 1

Consequence-to-life Category: 3

Remarks: TGN 15 case - provided by SP Division (31 MAR 2004)

SLOPE PART

(1) Max. Height (m): 9 Length (m): 45 Average Angle (deg): 45

WALL PART

N/A

BASIC INFORMATION

Location: SOUTHERN PART OF HING KENG SHEK VILLAGE

Date of Formation: pre-1977

Date of Construction/ Modification:

Approximate Coordinates: Easting : 844019 Northing : 824678

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with very low traffic density

Distance of Facility from Crest (m): 0

Facility at Toe: Remote area or abandoned facilities

Distance of Facility from Toe (m): 0

Consequence-to-life Category: 3

Remarks: N/A

SLOPE PART

(1) Max. Height (m): 5 Length (m): 35 Average Angle (deg): 40

WALL PART

N/A

BASIC INFORMATION

Location: Hiram's Highway

Date of Formation: post-1977

Date of Construction/ Modification:

Approximate Coordinates: Easting : 844090 Northing : 824574

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with heavy traffic density

Distance of Facility from Crest (m): 0

Facility at Toe: Horticulture garden

Distance of Facility from Toe (m): 0

Consequence-to-life Category: 2

Remarks: N/A

SLOPE PART

(1) Max. Height (m): 4 Length (m): 140 Average Angle (deg): 30

WALL PART

(1) Max. Height (m): 2 Length (m): 58 Face Angle (deg): 90

BASIC INFORMATION

Location: Hing Keng Shek Road, Sai Kung

Date of Formation: pre-1977

Date of Construction/ Modification: 17-03-2010

Approximate Coordinates: Easting : 844072 Northing : 824698

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Cottage, licensed and squatter area

Distance of Facility from Crest (m): 3

Facility at Toe: Catchwater w/consequence on Group 5 facilities

Distance of Facility from Toe (m): 0

Consequence-to-life Category: 1

Remarks: N/A

SLOPE PART

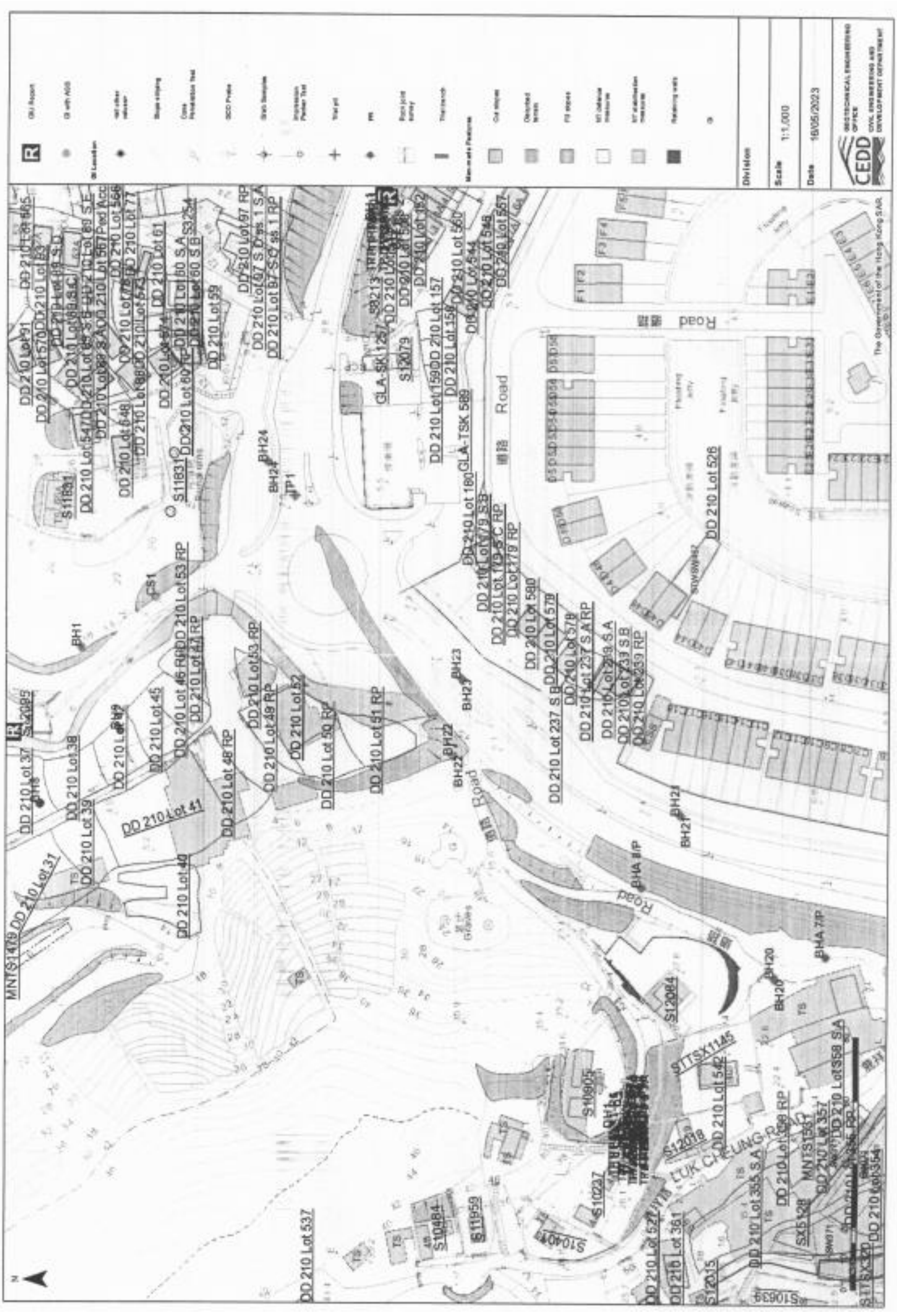
N/A

WALL PART

(1) Max. Height (m): 4.4 Length (m): 30 Face Angle (deg): 85

Appendix B

Existing Boreholes Information



Division
Scale 1:1,000
Date 16/05/2023
CEDD
The Government of the Hong Kong SAR
LUK CHEUNG ROAD
Road
DD 210 Lot 537
DD 210 Lot 526
DD 210 Lot 37
DD 210 Lot 38
DD 210 Lot 39
DD 210 Lot 40
DD 210 Lot 41
DD 210 Lot 45
DD 210 Lot 48 RP
DD 210 Lot 50 RP
DD 210 Lot 51 RP
DD 210 Lot 52
GLA-TSK 589
S12079
S12084
S10905
S11959
S10484
STTSX1145
BH1
BH20
BH21
BH22
BH23
BH24
BHA 7/P
BHA 8/P

ENPACK (H.K.) LIMITED Civil Engineers & Contractors Astoria Building, 6th floor, 34 Ashley Road Kowloon, Hong Kong Tel : 23762121 Fax : 23760252 ISO 9002 : 1994 Certificate No. FQ00021	**DRILLHOLE RECORD**	HOLE NO. **BH 8**
	CONTRACT NO. **GE/99/06**	SHEET **1** of **2**

PROJECT **PWP Item 4273DS-Port Shelter Sewerage Stage 3 Phase 3, Ho Chung and Pik Shui Sun Tsuen Sewerage, Ground Investigation**

METHOD **W+RC**	CO-ORDINATES **E 844,049.46** **N 824,688.94**	W.O. No **GE/99/06.59**
MACHINE & No. **DR 77**		DATE: **17/11/2001** to **19/11/2001**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+4.15** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
17.11.01	PX							1 I.P. 0.50 2 1.00 3 1.50 4 1.90 2.05	+2.10	2.05			Loose, light yellowish brown (10YR 6/4), silty fine to medium SAND with some angular to subangular fine to medium gravel sized rock fragments. (ALLUVIUM)
			32					T2-101 3.00 T2-101					Light grey (10R 7/1), angular to subangular fine to coarse GRAVEL sized moderately strong tuff fragments. (ALLUVIUM)
			51										
			100				38blows	5 3.50 6 3.95 4.10	+0.65 +0.05	3.50 4.10			Dark grey (5R 4/1), subangular fine to medium GRAVEL sized tuff fragments with a matrix of silty sand. (ALLUVIUM)
	PX HX												
			41					T2-101 4.85					Light grey, angular to subangular medium to coarse GRAVEL with much cobble and occasional boulder sized moderately strong to strong tuff fragments. (ALLUVIUM)
	HX					NA			-1.00	5.15			
			98	21	13	>20		T2-101 6.05				III	Moderately strong, light grey to light yellowish brown, moderately decomposed coarse ash crystal TUFF. Joints are extremely closely occasionally very closely to closely spaced, rough, undulating and planar, extremely to very narrow, iron and manganese stained and clay infilled (<2-3mm), dipping at 60°-70° and subvertical.
		1.20m at 18:00							-2.35	6.50			
17.11.01 19.11.01		1.10m at 08:00											
			98	32	10	10.0 >20		T2-101 7.35				III/II	Moderately strong to strong, grey, moderately to slightly decomposed coarse ash crystal TUFF. Joints are closely, locally extremely to very closely spaced, rough, undulating and planar, extremely narrow, iron and manganese stained, kaolin infilled (<2mm), dipping at 60°-70° and subvertical.
			100	80	47	5.0		T2-101 8.10					
			100	67	44	NI		T2-101 9.45	-5.30	9.45			From 8.90-9.45m : Non intact.
						7.7		T2-101				II	Strong, grey to dark grey, slightly decomposed coarse ash crystal TUFF.

Small 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
Standpipe Tip

LOGGED **P. Barry**
DATE **20/11/2001**
CHECKED **J. Morrison**
DATE **22/11/2001**

REMARKS
1. Prior to drilling an inspection pit was excavated by hand to 1.50m depth.

ENPACK (H.K.) LIMITED
Civil Engineers & Contractors
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ISO 9002 : 1994
Certificate No. PQ00021

DRILLHOLE RECORD

HOLE NO. **BH 8**

CONTRACT NO. **GE/99/06**

SHEET **2** of **2**

PROJECT **PWP Item 4273DS-Port Shelter Sewerage Stage 3 Phase 3, Ho Chung and Pik Shui Sun Tsuen Sewerage, Ground Investigation**

METHOD **W+RC**	CO-ORDINATES **E 844,049.46 N 824,688.94**	W.O. No **GE/99/06.59**
MACHINE & No. **DR 77**		DATE: **17/11/2001** to **19/11/2001**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+4.15** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
10			100	100	77	NI 2.1		T2-101 10.95					Joints are closely becoming medium spaced, planar, extremely narrow, kaolin coated and occasionally kaolin infilled (<2mm), dipping at 45°-55°, 60°-70° and subvertical. From 10.15-10.50m : Non intact.
11													
12			100	90	73			T2-101 12.45					
13			100	100	76			T2-101 13.90					
14		1.15m at 18:00	100	100	89			T2-101 14.80	-10.65	14.80			
19.11.01													
15													End of Investigation hole at 14.80m.
16													
17													
18													
19													
20													

- Small 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
- Standpipe Tip

LOGGED **P. Barry**

DATE **20/11/2001**

CHECKED **J. Morrison**

DATE **22/11/2001**

REMARKS

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DRILLHOLE RECORD

HOLE NO. **BH 9**

CONTRACT NO. **GE/99/06**

SHEET **1** of **2**

PROJECT **PWP Item 4273DS-Port Shelter Sewerage Stage 3 Phase 3, Ho Chung and Pik Shui Sun Tsuen Sewerage, Ground Investigation**

METHOD **W+RC**	CO-ORDINATES **E 844,072.77 N 824,663.34**	W.O. No **GE/99/06.59**
MACHINE & No. **DR 77**		DATE: **21/11/2001** to **22/11/2001**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+4.06** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
21.11.01	PX							1 0.50 I.P. 2 1.00 3 1.50					Soft to firm, yellowish brown (10YR 5/6) and light grey (10R 7/1), sandy SILT with some angular fine to coarse gravel sized weak to moderately strong tuff fragments. (FILL)
			0				20blows	4 1.90 2.00					
			100				21blows	5 2.45 6 2.50 7 2.95	+1.06	3.00			
							(1, 2, 3, 4, 4, 4) N = 15	8 3.10 9 3.40				V	Extremely weak, red (10R 5/8) mottled yellowish brown, completely decomposed coarse ash crystal TUFF. (Firm to stiff, slightly sandy clayey SILT with occasional angular fine to medium gravel sized rock fragments)
			100					10 4.00 11 5.00					
							(2, 2, 3, 5, 5, 6) N = 19	12 5.65 13 5.95 14 6.00	-1.94	6.00		V/IV	Extremely weak to weak, light yellowish brown (2.5Y 6/4), completely to highly decomposed coarse ash crystal TUFF. (Sandy angular fine to coarse GRAVEL sized weak rock fragments)
			100					15 6.90					
	PX							7.00	-2.94	7.00		III	Moderately strong, light yellowish brown, moderately decomposed highly micro fractured coarse ash crystal TUFF. Joints are extremely very closely spaced, rough, planar, extremely narrow, iron and manganese stained, dipping at 35°-45°, 60°-70° and subvertical.
			95	30	0	>20		T2-101 7.50					
			100	100	50			T2-101 7.80					
			100	85	38	8.8		T2-101 8.80	-3.94	8.00		III/II	Moderately strong to strong, grey, moderately to slightly decomposed coarse ash crystal TUFF. Joints are very closely to closely spaced, rough, undulating and planar, extremely to very narrow, iron and manganese stained, kaolin infilled (<2-3mm), dipping at 35°-45°, 60°-70° and subvertical. From 8.80-9.10m : Extremely closely spaced joints.
						>20							
			95	73	37	6.7		T2-101					

Small 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
Standpipe Tip

LOGGED **P. Barry**
DATE **23/11/2001**
CHECKED **J. Morrison**
DATE **01/12/2001**

REMARKS
1. Prior to drilling an inspection pit was excavated by hand to 1.50m depth.

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DRILLHOLE RECORD

HOLE NO. **BH 9**

CONTRACT NO. **GE/99/06**

SHEET **2** of **2**

PROJECT **PWP Item 4273DS-Port Shelter Sewerage Stage 3 Phase 3, Ho Chung and Pik Shui Sun Tsuen Sewerage, Ground Investigation**

METHOD **W+RC**	CO-ORDINATES **E 844,072.77 N 824,663.34**	W.O. No **GE/99/06.59**
MACHINE & No. **DR 77**		DATE: **21/11/2001** to **22/11/2001**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+4.06** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	T.C.R.(%)	S.C.R.(%)	R.Q.D.(%)	F.I.	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
10								T2-101 10.30					As sheet 1 of 2. From 10.30-10.40m : Non intact.
11		0.30m at 18:00	100	91	53	NI 1.7		T2-101 11.45	-6.94	11.00		II	Strong, grey to dark grey, slightly decomposed coarse ash crystal TUFF. Joints are closely to medium spaced, rough, planar, extremely narrow, chlorite coated, dipping at 35°-45°, 60°-70° and subvertical.
21.11.01 22.11.01 12		1.25m at 08:00	100	100	100			T2-101 12.85					
13			100	100	70			T2-101 14.35					
14						5.5							
15			100	100	59			T2-101 15.80					
16													
17 22.11.01		1.23m at 18:00	100	92	54			T2-101 17.10	-13.04	17.10			End of Investigation hole at 17.10m.
18													
19													
20													

Small 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
Standpipe Tip

LOGGED **P. Barry**
DATE **23/11/2001**
CHECKED **J. Morrison**
DATE **01/12/2001**

REMARKS