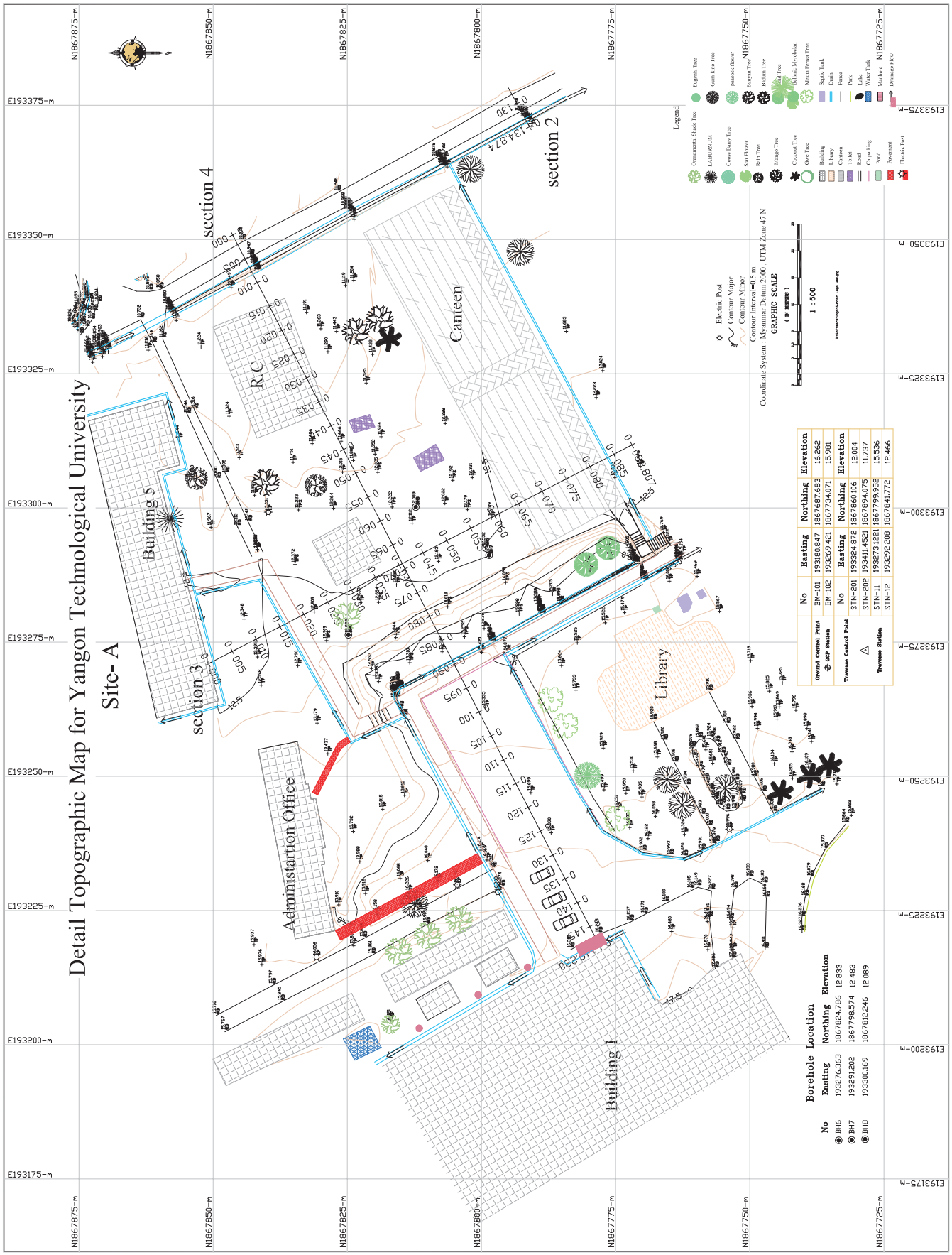
資料５．参考資料/入手資料リスト

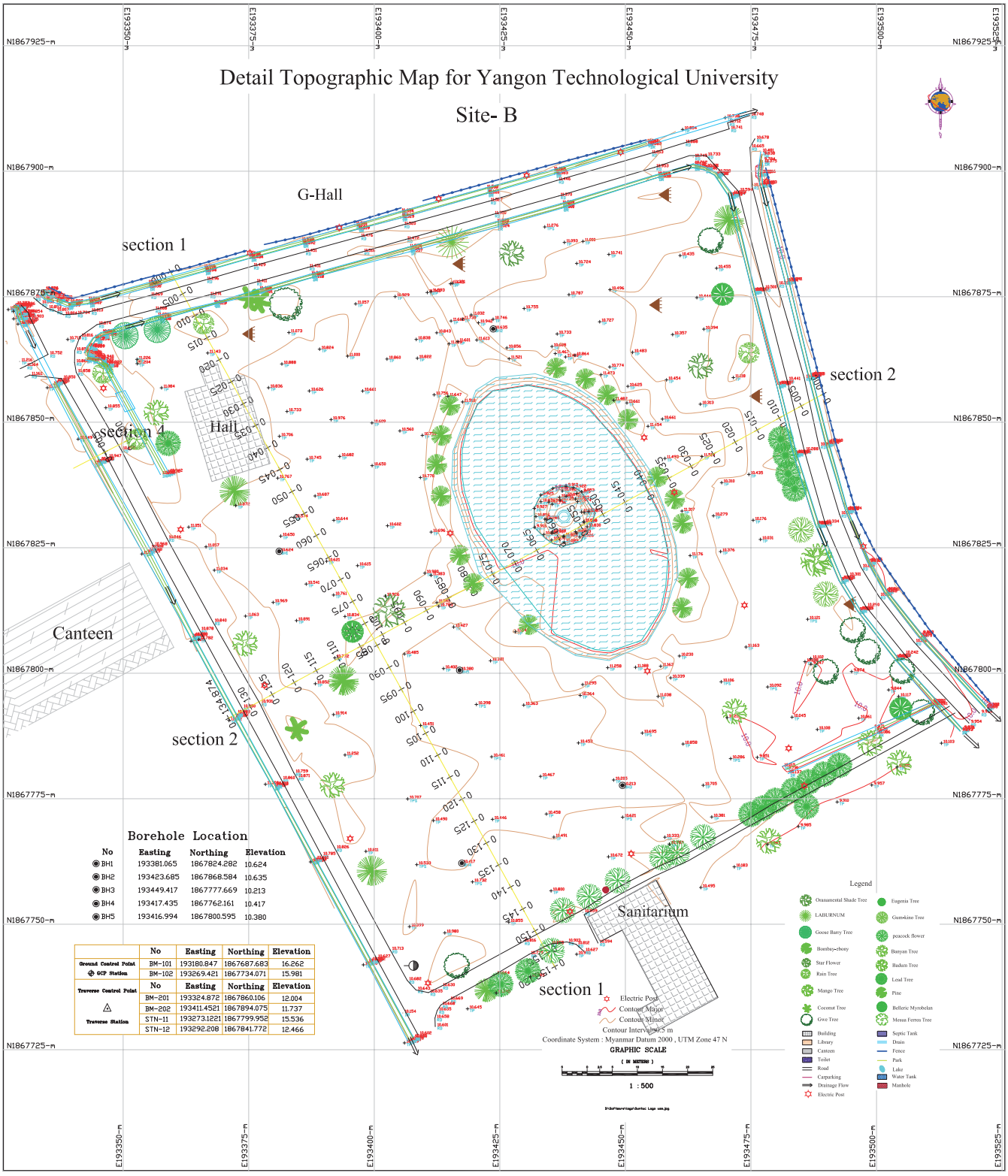
番号	名称	形態 図書・ビデオ・地図・写真等	ｵﾘｼﾞﾅﾙ・ｺﾋﾟｰ	発行機関	発行年
1	科学技術省組織図	図書	コピー	科学技術省	-
2	National Comprehensive Development Plan Plans of Development Sector of Human Resource (2011-2012 to 2030-2031)	図書	コピー	科学技術省	2012
3	科学技術省、科学技術省先端科学技術局、ヤンゴン工科大学、マンダレー工科大学年間予算 (2011/12, 2012/13, 2013/14)	図書	コピー	科学技術省	-
4	Myanmar Scientific and Technological Research Department 概要	図書	コピー	科学技術省	2013
5	Technical and Vocational Education in Myanmar	プレゼンテーション資料	コピー	科学技術省	2013
6	No. of Universities under 12 Ministries in Myanmar	図書	コピー	教育省	2013
7	List of 168 Universities, Degree Colleges and Colleges under 12 Ministries in Myanmar	図書	コピー	教育省	2013
8	Implementation of Pragmatic Education Reform in the Higher Education Sector	プレゼンテーション資料	コピー	教育省	2013
9	ヤンゴン工科大学概要	プレゼンテーション資料	コピー	ヤンゴン工科大学	2013
10	マンダレー工科大学概要	プレゼンテーション資料	コピー	マンダレー工科大学	2013
11	The National Comprehensive Development Plan (NCDP)　骨子案	プレゼンテーション資料	コピー	国家計画経済開発省	2014
12	YTU 既存図面	PDF データ	コピー	-	-

6. その他の資料・情報

6-1. 自然条件調査　測量図（1）



6-1. 自然条件調査　測量図（2）



6-2. 自然条件調査　ボーリング調査

調査孔位置図

Soil Investigation work for Research Center Construction Project
YTU Campus, Insein Township, Yangon Region.

2.3 Location of Boring Points

The locations, levels and coordinates of investigation points of boring points were designated by the client. The locations of boreholes are presented in Figure - 2.3.

Figure - 2.3 : Plan Map of Investigation Boring Points

Table - 2.2 : Coordinates of Borehole Points

BH No.	N	E	Elevation
BH-1	16°52' 33.1"	96° 07' 09.2"	natural GL
BH-2	16°52' 35.0"	96° 07' 07.9"	natural GL
BH-3	16°52' 34.3"	96° 07' 09.1"	natural GL
BH-4	16°52' 33.8"	96° 07' 10.2"	natural GL
BH-5	16°52' 36.5"	96° 07' 09.3"	natural GL
BH-6	16°52' 34.9"	96° 07' 04.5"	natural GL
BH-7	16°52' 34.2"	96° 07' 04.8"	natural GL
BH-8	16°52' 34.7"	96° 07' 05.1"	natural GL

6-2. 自然条件調査　ボーリング調査

（1）土質柱状図　BH-1

BORE HOLE No. **BH - 1**

B O R I N G　L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
LOCATION : YTU Campus, Insein Township, Yangon
GROUND LEVEL : Existing ground level
COORDINATE : N:16°52' 33.1", E: 96° 07' 09.2"　DEPTH : 20.45 m

BORING EQUIPMENT : TOHO-D2　DATE : 22/12/13 ~ 24/12/13
BORING METHOD : Rotary Drilling Method　LOGGED BY : Zin Lin Cho
ORIENTATION : Vertical
GROUND WATER LEVEL : 1.26 m from GL

CLIENT: Intem Consulting Inc

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, reddish brown color, CLAY.
2 ~ 4	-4.00	4.00	3.00		Yellowish brown and Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, yellowish brown mottled gray color, high plasticity, Fat CLAY-I.
5 ~ 15	-15.00	15.00	11.00		Yellowish brown and Gray / Gray	Firm to stiff	Lean CLAY	Firm to stiff, yellowish brown mottled gray color, low plasticity, Lean CLAY (with a trace of fine sand, peat and mica).
16 ~ 18	-18.00	18.00	3.00		Greenish gray	Very stiff to hard	Fat CLAY-II	Very stiff to hard, greenish gray spotted brown color, Low plasticity, Fat CLAY-II.
19 ~ 20	-20.45	20.45	2.45		Brownish gray	Hard	SILT	Hard, Brownish gray color, low to high plasticity, SILT.

DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
5.45 — 22/12/13	3.0 — ϕ110	1.26
14.45 — 23/12/13		
20.45 — 24/12/13		

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	8/30
2.0	12/30
3.0	10/30
4.0	55/55
5.0	8/30
6.0	6/30
7.0	5/30
8.0	5/30
9.0	6/30
10.0	7/30
11.0	8/30
12.0	7/30
13.0	7/30
14.0	10/30
15.0	19/30
16.0	25/30
17.0	51/30
18.0	70/26
19.0	70/18
20.0	60/10

CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)
SPT-1	1.0
SPT-2	2.0
SPT-3	3.0
UD-1	4.0
SPT-4	5.0
SPT-5	6.0
SPT-6	7.0
SPT-7	8.0
SPT-8	9.0
SPT-9	10.0
SPT-10	11.0
SPT-11	12.0
SPT-12	13.0
SPT-13	14.0
SPT-14	15.0
SPT-15	16.0
SPT-16	17.0
SPT-17	18.0
SPT-18	19.0
SPT-19	20.0

TCR (%) | SCR (%) | RQD (%)

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-1 Disturbed sample (SPT sample)
- T-1 Undisturbed Sample (Piston sampler)
- D-1 Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-1 Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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Revision No. Rev-0
Revision Date 06/01/14
Site Geogolist : Zin Lin Cho
Operator : Ko Kyaw Thi Ha
Checked by : May Thu

6-2. 自然条件調査　ボーリング調査

（2）土質柱状図　BH-2

BORE HOLE No. **BH - 2**

B O R I N G　L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
LOCATION : YTU Campus, Insein Township, Yangon
GROUND LEVEL : Existing ground level
COORDINATE : N:16°52' 35.0", E: 96° 07' 07.9" DEPTH : 20.45 m

BORING EQUIPMENT : TOHO-D5
BORING METHOD : Rotary Drilling Method
ORIENTATION : Vertical
GROUND WATER LEVEL : 2.03 m from GL

DATE : 22/12/13 ~ 23/12/13
LOGGED BY : Nyi Nyi Zaw

CLIENT
Intem Consulting Inc

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, yellowish brown color, CLAY.
2 - 5	-5.00	5.00	4.00		Yellowish brown and Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, yellowish brown mottled gray color, high plasticity, Fat CLAY-I.
6 - 10	-10.00	10.00	5.00		Gray	Firm to stiff	Lean CLAY	Firm to stiff, gray, low plasticity, Lean CLAY.
11	-11.00	11.00	1.00		Dark gray	Dense	Silty SAND	Dense, dark gray color, fine to coarse grained sand, Silty SAND.
12 - 17	-17.00	17.00	6.00		Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, gray color, high plasticity, Fat CLAY-I.
18 - 19	-19.00	19.00	2.00		Gray	Medium dense	Silty SAND	Medium dense, gray color, fine to coarse grained sand, Silty SAND.
20	-20.45	20.45	1.45		Gray mottled brown	Hard	Fat CLAY-II	Hard, gray mottled brown color, high plasticity, Fat CLAY-II.
21 - 30								

DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
	3.0 φ110	2.03
8.45 22/12/13		
20.45 23/12/13		

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	6/30
2.0	10/30
3.0	70/90
4.0	9/30
5.0	6/30
6.0	11/30
7.0	7/30
8.0	10/30
9.0	12/30
10.0	31/30
11.0	8/30
12.0	9/30
13.0	7/30
14.0	8/30
15.0	9/30
16.0	15/30
17.0	26/30
18.0	25/30
19.0	55/30
20.0	47/30

CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
UD-1	3.0			
	3.45			
SPT-3	4.0			
	4.45			
SPT-4	5.0			
	5.45			
SPT-5	6.0			
	6.45			
SPT-6	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-I: Disturbed sample (SPT sample)
- T-I: Undisturbed Sample (Piston sampler)
- D-I: Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-I: Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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service@geo-friends.com

Revision No.	Rev-0
Revision Date	06/01/14
Site Geogolist :	Nyi Nyi Zaw
Operator :	Hla Min Htut
Checked by :	May Thu

6-2. 自然条件調査　ボーリング調査

（3）土質柱状図　BH-3

BORE HOLE No. **BH - 3**

B O R I N G　L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
LOCATION : YTU Campus, Insein Township, Yangon
GROUND LEVEL : Existing ground level
COORDINATE : N:16°52' 34.3", E: 96° 07' 09.1" DEPTH : 20.45 m

BORING EQUIPMENT : TOHO-D2
BORING METHOD : Rotary Drilling Method
ORIENTATION : Vertical
GROUND WATER LEVEL : 2.85 m from GL

DATE : 27/12/13 ~ 28/12/13
LOGGED BY : Zaw Myo Win

CLIENT
Intem Consulting Inc

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, Reddish brown color, CLAY (lateritic soil)			
2					Reddish & Yellowish brown and Gray	Soft to firm	Lean CLAY	Soft to firm, reddish brown and yellowish brown mottled gray color, low plasticity, Lean CLAY (with a trace of laterite fragments).		3.0 ϕ110	▽ 2.85
5	-5.00	5.00	4.00								
6					Yellowish brown and Gray	Stiff to very stiff	Fat CLAY-I	Stiff to very stiff, yellowish brown mottled gray color, high plasticity, Fat CLAY-I.			
8	-8.00	8.00	3.00								
9					Gray	Firm	Lean CLAY	Firm, gray color, low plasticity, Lean CLAY.	10.45 27/12/13		
12	-12.00	12.00	4.00								
13	-13.00	13.00	1.00		Gray	Medium dense	Silty SAND	Medium dense, grey color, fine to coarse grained sand, Silty SAND.			
14					Dark gray	Firm to stiff	Lean CLAY	Firm to stiff, dark to bluish gray color, low plasticity, Lean CLAY.			
19					Bluish gray						
20	-20.45	20.45	7.45						20.45 28/12/13		

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	3/30
2.0	5/30
3.0	5/30
4.0	50/50
5.0	18/30
6.0	13/30
7.0	11/30
8.0	5/30
9.0	6/30
10.0	7/30
11.0	7/30
12.0	25/30
13.0	9/30
14.0	8/30
15.0	7/30
16.0	5/30
17.0	12/30
18.0	8/30
19.0	15/30
20.0	10/30

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)
CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
SPT-3	3.0			
	3.45			
UD-1	4.0			
	4.45			
SPT-4	5.0			
	5.45			
SPT-5	6.0			
	6.45			
SPT-6	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (nos)	Consistency	SPT N-Value (nos)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key
- P-I Disturbed sample (SPT sample)
- T-I Undisturbed Sample (Piston sampler)
- D-I Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-I Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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Revision No. Rev-0
Revision Date 06/01/14
Site Geogolist : Zaw Myo Win
Operator : Ko Kyaw Thi Ha
Checked by : May Thu

6-2. 自然条件調査　ボーリング調査

（4）土質柱状図　BH-4

BORE HOLE No. **BH - 4**

B O R I N G L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
BORING EQUIPMENT : TOHO-D2
DATE : 25/12/13 ~ 26/12/13
LOCATION : YTU Campus, Insein Township, Yangon
BORING METHOD : Rotary Drilling Method
LOGGED BY : Zin Lin Cho
GROUND LEVEL : Existing ground level
ORIENTATION : Vertical
CLIENT : Intem Consulting Inc
COORDINATE : N:16°52' 33.8", E: 96° 07' 10.2"
DEPTH : 20.45 m
GROUND WATER LEVEL : 1.98 m from GL

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, Reddish brown color, CLAY			
2					Yellowish brown and Gray	Firm to stiff	Lean CLAY	Firm to stiff, yellowish brown mottled gray color, low plasticity, Lean CLAY with a trace of laterite gravels.			1.98
3										3.0 ϕ110	
4	-4.00	4.00	3.00								
5					Yellowish brown and Brownish gray	Stiff	Fat CLAY-I	Stiff, Brownish gray mottled light bluish gray color, high plasticity, Fat CLAY-I with a trace of laterite gravels.			
6											
7	-7.00	7.00	3.00								
8					Gray	Firm to stiff	Lean CLAY	Firm to stiff, gray color, low plasticity, Lean CLAY.			
9											
10									5.45 25/12/13		
11											
12											
13											
14											
15											
16											
17	-17.00	17.00	10.00								
18					Dark bluish gray	Dense to very dense	Silty SAND	Dense to very dense, dark bluish gray color, fine to coarse grained sand, Silty SAND.			
19											
20	-20.45	20.45	3.45						20.45 26/12/13		
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	5/30
2.0	7/30
3.0	9/30
4.0	14/30
5.0	15/30
6.0	9/30
7.0	80/90
8.0	8/30
9.0	8/30
10.0	7/30
11.0	9/30
12.0	10/30
13.0	11/30
14.0	12/30
15.0	11/30
16.0	15/30
17.0	33/30
18.0	44/30
19.0	46/30
20.0	52/30

CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
SPT-3	3.0			
	3.45			
SPT-4	4.0			
	4.45			
SPT-5	5.0			
	5.45			
SPT-6	6.0			
	6.45			
UD-1	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-i: Disturbed sample (SPT sample)
- T-i: Undisturbed Sample (Piston sampler)
- D-i: Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-i: Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

Geo-friends Engineering & construction Co.,Ltd.
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Revision No. Rev-0
Revision Date 06/01/14
Site Geogolist : Zin Lin Cho
Operator : Ko Kyaw Thi Ha & Kyaw Swar
Checked by : May Thu

6-2. 自然条件調査　ボーリング調査

（5）土質柱状図　BH-5

BORE HOLE No. **BH - 5**

B O R I N G L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
LOCATION : YTU Campus, Insein Township, Yangon
GROUND LEVEL : Existing ground level
COORDINATE : N:16°52' 36.5", E: 96° 07' 09.3" DEPTH : 20.45 m

BORING EQUIPMENT : TOHO-D2
BORING METHOD : Rotary Drilling Method
ORIENTATION : Vertical
GROUND WATER LEVEL : 1.30 m from GL

DATE : 25/12/13 ~ 26/12/13
LOGGED BY : Nyi Nyi Zaw

CLIENT
Intem Consulting Inc

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION
1	-1.00	1.00	1.00		Yellowish brown		Sandy CLAY	Top soil layer, Yellowish brown color, Sandy CLAY
2					Yellowish brown and Gray	Firm to stiff	Lean CLAY	Firm to stiff, yellowish brown mottled gray color, low plasticity, Lean CLAY with a trace of laterite gravels.
3								
4	-4.00	4.00	3.00					
5					Gray mottled brown			
6								
7								
8					Gray	Firm to very stiff	Fat CLAY-I	Firm to very stiff, gray mottled brown color, high plasticity, Fat CLAY-I with trace of peat at GL-7.0 ~ 10.0 m.
9								
10								
11								
12	-12.00	12.00	8.00					
13					Yellowish brown and Gray	Firm to stiff	Lean CLAY	Firm to stiff, yellowish brown mottled gray color, low plasticity, Lean CLAY with a trace of laterite gravels.
14								
15								
16								
17	-17.00	17.00	5.00					
18	-18.00	18.00	1.00		Gray	Medium dense	Clayey SAND	Medium dense, gray color, fine to coarse grained sand, Clayey SAND.
19					Gray	Stiff	Lean CLAY	Stiff, gray color, low plasticity, Lean CLAY.
20								
	-20.45	20.45	2.45					
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
		1.30
	3.0 φ110	
7.45 25/12/13		
20.45 26/12/13		

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	3/30
2.0	7/30
3.0	8/30
4.0	45/45
5.0	17/30
6.0	11/30
7.0	5/30
8.0	6/30
9.0	6/30
10.0	6/30
11.0	7/30
12.0	9/30
13.0	9/30
14.0	9/30
15.0	6/30
16.0	9/30
17.0	21/30
18.0	12/30
19.0	13/30
20.0	14/30

CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
SPT-3	3.0			
	3.45			
UD-1	4.0			
	4.45			
SPT-4	5.0			
	5.45			
SPT-5	6.0			
	6.45			
SPT-6	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (nos)	Consistency	SPT N-Value (nos)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-I: Disturbed sample (SPT sample)
- T-I: Undisturbed Sample (Piston sampler)
- D-I: Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-I: Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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Revision No.	Rev-0
Revision Date	06/01/14
Site Geogolist :	Nyi Nyi Zaw
Operator :	Hla Min Htut
Checked by :	May Thu

6-2. 自然条件調査　ボーリング調査

（6）土質柱状図　BH-6

BORE HOLE No. **BH -6**

B O R I N G　L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
BORING EQUIPMENT : TOHO-D5
DATE : 27/12/13 ~ 29/12/13
LOCATION : YTU Campus, Insein Township, Yangon
BORING METHOD : Rotary Drilling Method
LOGGED BY : Nyi Nyi Zaw
GROUND LEVEL : Existing ground level
ORIENTATION : Vertical
CLIENT : Intem Consulting Inc
COORDINATE : N:16°52' 34.9", E: 96° 07' 04.5"
DEPTH : 20.45 m
GROUND WATER LEVEL : 3.48 m from GL

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, Reddish brown color, CLAY (lateritic soil)
2 ~ 4	-4.00	4.00	3.00		Reddish brown mottled gray / Brown & gray	Firm to stiff	Fat CLAY-I	Firm to stiff, light gray mottled brown color, high plasticity, Fat CLAY-I.
5 ~ 13	-13.00	13.00	9.00		Brown & gray / Gray	Firm to stiff	Lean CLAY	Firm to stiff, gray mottled with brown and gray color, Low plasticity, Lean CLAY.
14 ~ 17	-17.00	17.00	4.00		Gray	Very stiff	Sandy Lean CLAY	Very stiff, gray color, fine to coarse grained sand, Sandy Lean CLAY.
18 ~ 20	-20.45	20.45	2.45		Gray	Stiff to very stiff	Lean CLAY	Stiff to very stiff, gray color, low plasticity, Lean CLAY with trace of peat.
21 ~ 30								

DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
2.45 / 27/12/13	3.0 / ϕ110	▽ 3.48
17.45 / 28/12/13		
20.45 / 29/12/13		

STANDARD PENETRATION TEST TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	6/30
2.0	13/30
3.0	12/30
4.0	8/30
5.0	90/90
6.0	7/30
7.0	9/30
8.0	11/30
9.0	10/30
10.0	8/30
11.0	10/30
12.0	10/30
13.0	19/30
14.0	24/30
15.0	23/30
16.0	22/30
17.0	9/30
18.0	11/30
19.0	9/30
20.0	16/30

CURVE OF BLOW ● — N-Value (Blows / 30cm) 0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)
SPT-1	0.45 / 1.0 / 1.45
SPT-2	2.0 / 2.45
SPT-3	3.0 / 3.45
SPT-4	4.0 / 4.45
UD-1	5.0 / 5.45
SPT-5	6.0 / 6.45
SPT-6	7.0 / 7.45
SPT-7	8.0 / 8.45
SPT-8	9.0 / 9.45
SPT-9	10.0 / 10.45
SPT-10	11.0 / 11.45
SPT-11	12.0 / 12.45
SPT-12	13.0 / 13.45
SPT-13	14.0 / 14.45
SPT-14	15.0 / 15.45
SPT-15	16.0 / 16.45
SPT-16	17.0 / 17.45
SPT-17	18.0 / 18.45
SPT-18	19.0 / 19.45
SPT-19	20.0 / 20.45
	21.0 / 21.45
	22.0 / 22.45
	23.0 / 23.45
	24.0 / 24.45
	25.0 / 25.45
	26.0 / 26.45
	27.0 / 27.45
	28.0 / 28.45
	29.0 / 29.45
	30.0 / 30.45

TCR (%) | SCR (%) | RQD (%)

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-I: Disturbed sample (SPT sample)
- T-I: Undisturbed Sample (Piston sampler)
- D-I: Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-I: Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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Revision No. Rev-0
Revision Date 06/1/14
Site Geogolist : Nyi Nyi Zaw
Operator : Hla Min Htut
Checked by : May Thu

6-2. 自然条件調査　ボーリング調査

（7）土質柱状図　BH-7

BORE HOLE No. **BH - 7**

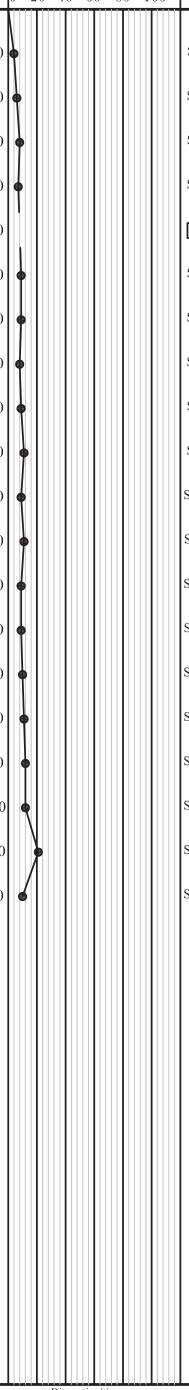
B O R I N G　L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
BORING EQUIPMENT : TOHO-D5
DATE : 29/12/13 ~ 31/12/13
LOCATION : YTU Campus, Insein Township, Yangon
BORING METHOD : Rotary Drilling Method
LOGGED BY : Nyi Nyi Zaw
GROUND LEVEL : Existing ground level
ORIENTATION : Vertical
CLIENT : Intem Consulting Inc
COORDINATE : N:16°52' 34.2", E: 96° 07' 04.8"
DEPTH : 20.45 m
GROUND WATER LEVEL : 2.80 m from GL

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, Yellowish brown color, CLAY			
2					Brownish gray	Firm to stiff	Fat CLAY-I	Firm to stiff, Brownish gray color, high plasticity, Fat CLAY-I.	2.45 / 29/12/13	3.0 / ϕ110	2.80
3											
4	-4.00	4.00	3.00		Brownish gray						
5											
6											
7											
8											
9											
10											
11											
12					Gray	Firm to very stiff	Lean CLAY	Firm to very stiff, brownish gray and gray color, low plasticity, Lean CLAY.			
13											
14											
15											
16											
17											
18									17.45 / 30/12/13		
19											
20	-20.45	20.45	16.45						20.45 / 31/12/13		
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)



SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
SPT-3	3.0			
	3.45			
SPT-4	4.0			
	4.45			
UD-1	5.0			
	5.45			
SPT-5	6.0			
	6.45			
SPT-6	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-I: Disturbed sample (SPT sample)
- T-I: Undisturbed Sample (Piston sampler)
- D-I: Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-I: Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

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Revision No.	Rev-0
Revision Date	06/01/14
Site Geogolist :	Nyi Nyi Zaw
Operator :	Hla Min Htut
Checked by :	May Thu

6-2. 自然条件調査　ボーリング調査

（8）土質柱状図　BH-8

BORE HOLE No. **BH - 8**

B O R I N G L O G (FOR DESIGN PARAMETERS CONSIDERATION)

Sheet No. 1 OF 1

PROJECT NAME : Soil Investigation Works for YTU Research Centre
LOCATION : YTU Campus, Insein Township, Yangon
GROUND LEVEL : Existing ground level
COORDINATE : N:16°52' 34.7", E: 96° 07' 05.1" DEPTH : 20.45 m

BORING EQUIPMENT : TOHO-D2 DATE : 30/12/13 ~ 31/12/13
BORING METHOD : Rotary Drilling Method LOGGED BY : Zin Lin Cho
ORIENTATION : Vertical
GROUND WATER LEVEL : 4.00 m from GL

CLIENT
Intem Consulting Inc

SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (or) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, Yellowish brown color, CLAY			
2											
3					Yellowish brown and gray	Firm to stiff	Fat CLAY-I	Firm to stiff, Yellowish brown and gray color, high plasticity, Fat CLAY-I.		3.0 φ110	
4											▽ 4.00
5	-5.00	5.00	4.00								
6											
7											
8											
9											
10					Gray	Firm to very stiff	Lean CLAY	Firm to very stiff, gray color, low plasticity, Lean CLAY.			
11											
12											
13									12.45 30/12/13		
14	-14.00	14.00	9.00								
15					Gray	Very stiff	Sandy Lean CLAY	Very stiff, gray color, fine to coarse grained sand, Sandy Lean CLAY.			
16	-16.00	16.00	2.00								
17	-17.00	17.00	1.00		Gray	Medium dense	Silty SAND	Medium dense, gray color, fine to coarse grained sand, Silty SAND.			
18											
19					Gray	Stiff	Lean CLAY	Stiff, gray color, low plasticity, Lean CLAY.			
20	-20.45	20.45	3.45						20.45 31/12/13		
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

STANDARD PENETRATION TEST
TEST METHOD (BS 5930)

DEPTH GL - (m)	N-Value (Blows / 30cm)
1.0	10/30
2.0	11/30
3.0	14/30
4.0	7/30
5.0	70/90
6.0	8/30
7.0	9/30
8.0	11/30
9.0	9/30
10.0	12/30
11.0	10/30
12.0	13/30
13.0	21/30
14.0	20/30
15.0	22/30
16.0	30/30
17.0	10/30
18.0	11/30
19.0	9/30
20.0	9/30

CURVE OF BLOW ●
N-Value (Blows / 30cm)
0 20 40 60 80 100

SAMPLING

SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
	0.45			
SPT-1	1.0			
	1.45			
SPT-2	2.0			
	2.45			
SPT-3	3.0			
	3.45			
SPT-4	4.0			
	4.45			
UD-1	5.0			
	5.45			
SPT-5	6.0			
	6.45			
SPT-6	7.0			
	7.45			
SPT-7	8.0			
	8.45			
SPT-8	9.0			
	9.45			
SPT-9	10.0			
	10.45			
SPT-10	11.0			
	11.45			
SPT-11	12.0			
	12.45			
SPT-12	13.0			
	13.45			
SPT-13	14.0			
	14.45			
SPT-14	15.0			
	15.45			
SPT-15	16.0			
	16.45			
SPT-16	17.0			
	17.45			
SPT-17	18.0			
	18.45			
SPT-18	19.0			
	19.45			
SPT-19	20.0			
	20.45			
	21.0			
	21.45			
	22.0			
	22.45			
	23.0			
	23.45			
	24.0			
	24.45			
	25.0			
	25.45			
	26.0			
	26.45			
	27.0			
	27.45			
	28.0			
	28.45			
	29.0			
	29.45			
	30.0			
	30.45			

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (mean)	Consistency	SPT N-Value (mean)
Very loose	0 - 3	Very soft	under 2
Loose	4 - 10	Soft	2 - 4
Medium dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very dense	over 50	Very stiff	16 - 30
		Hard	over 30

Sample key

- P-1 Disturbed sample (SPT sample)
- T-1 Undisturbed Sample (Piston sampler)
- D-1 Undisturbed Sample (Denison sampler)
- Rock core sample (Single core tube)
- Rock core sample (Double core tube)
- Rock core sample (Core lost)
- W-1 Water sample

RQD (%)	Term
0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Planner structure

Term	Spacing (mm)
Very thick	> 2000
Thick	600 - 2000
Medium	200 - 600
Thin	60 - 200
Very thin	20 - 60
Thickly laminated	6 - 20
Thinly laminated	< 6

Discontinuities

Term	Spacing (mm)
Very widely spaced	> 2000
Widely spaced	600 - 2000
Medium spaced	200 - 600
Closely spaced	60 - 200
Very closely spaced	20 - 60
Extremely closely spaced	< 20

Remarks

Geo-friends Engineering & construction Co.,Ltd.
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Revision No.	Rev-0
Revision Date	06/1/14
Site Geogolist :	Zin Lin Cho
Operator :	Ko Kyaw Thiha & Kyaw Swar
Checked by :	May Thu

YANGON TECHNOLOGICAL UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING LABORATORY

Sender: YTU Campus

Nature of Water: BPI Tube well (No. 1)

Location:

Date and Time of collection: ၂၀-၁၂-၂၀၁၃

Date and Time of arrival at Laboratory: ၂၀-၁၂-၂၀၁၃

Date and Time of Commencing examination: ၂၀-၁၂-၂၀၁၃

Report on Water Analysis

		WHO Guideline	Result
pH	–	6.5~8.5	6.27
Colour (True)	TCU	15 TCU	Nil
Turbidity	FTU	5 FTU	Nil
Conductivity	micromho/cm		
Iron	mg/1	0.3mg/l	0.12
Total Hardness	mg/1 as $CaCO_3$	500mg/1 as $CaCO^3$	51.8
Total Alkalinity	mg/1 as $CaCO_3$		68
Phenolphthalein Alkalinity	mg/1 as $CaCO_3$		Nil
Calcium Hardness	mg/1 as $CaCO_3$		27.8
Magnesium Hardness	mg/1 as $CaCO_3$		24.0
Carbonate $(CO_3^=)$	mg/1 as $CaCO_3$		Nil
Chloride(as Cl^-)	mg/1	250 mg/1	18.5
Sodium Chloride (as NaCl)	mg/1		30.5
Bicarbonate $(HCO_3^=)$	mg/1 as $CaCO_3$		68
Sulphate *as* $(SO_4^=)$	mg/1	200 mg/1	5
Total Solids	mg/1	1500 mg/1	112
Suspended Solids	mg/1		Nil
Dissolved Solids	mg/1	1000 mg/1	112

Lab: Technician　　Lab: Incharge　　Head of the Department

YANGON TECHNOLOGICAL UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING LABORATORY

Sender: YTU Campus

Nature of Water: YTU Campus (No. 2)

Location:

Date and Time of collection: ၂၀-၁၂-၂၀၁၃

Date and Time of arrival at Laboratory: ၂၀-၁၂-၂၀၁၃

Date and Time of Commencing examination: ၂၀-၁၂-၂၀၁၃

Report on Water Analysis

		WHO Guideline	Result
pH	–	6.5~8.5	6.76
Colour (True)	TCU	15 TCU	Nil
Turbidity	FTU	5 FTU	5
Conductivity	micromho/cm		
Iron	mg/1	0.3mg/l	0.55
Total Hardness	mg/1 as $CaCO_3$	500mg/1 as $CaCO^3$	46.2
Total Alkalinity	mg/1 as $CaCO_3$		74
Phenolphthalein Alkalinity	mg/1 as $CaCO_3$		Nil
Calcium Hardness	mg/1 as $CaCO_3$		33.0
Magnesium Hardness	mg/1 as $CaCO_3$		13.2
Carbonate $\left(CO_3^{=}\right)$	mg/1 as $CaCO_3$		Nil
Chloride(as Cl^-)	mg/1	250 mg/1	20.5
Sodium Chloride (as NaCl)	mg/1		33.8
Bicarbonate $\left(HCO_3^{=}\right)$	mg/1 as $CaCO_3$		74
Sulphate *as* $\left(SO_4^{=}\right)$	mg/1	200 mg/1	5
Total Solids	mg/1	1500 mg/1	133
Suspended Solids	mg/1		2
Dissolved Solids	mg/1	1000 mg/1	131

Lab: Technician　　Lab: Incharge　　Head of the Department

6-4. 日系企業ヒアリングリスト

日系企業ヒアリングリスト

事業分野	主なコメント 上段が工科系大卒人材への要望や課題。 下段が新設棟に入る機材を活用して提供されるサービスに対するニーズについて
土木設計	・YTUの土木、機械、建築学科の博士課程学生2人、修士課程学生5人をインターンとして受け入れたが、これからはYTU/MTUの卒業生を積極的に採用していきたいので、YTU/MTUとの関係性を構築したい。（本インタビュー後にはYTU/MTUに講師を派遣し模擬授業を実施した） ・強度試験、疲労試験のサービスは利用する可能性がある。
総合建設業	・今はまだ会社規模が小さいので経験者採用のみだが、ホテル・サービスアパートメントの新設需要も増加しており、さらにティラワが動き出し、工場建設の需要も増えたら、会社の規模拡大に伴い、土木学科出身の新卒を積極的に採用したい。 ・路床土支持力を測定するためのCBR試験、圧縮試験、万能試験、疲労試験サービスは活用したい。現在でも民間企業でこれらサービスを提供するための機材を保持している会社はあるが、日本仕様に耐えられる測定ができるレベルのものはない。
送電線工事 電気工事 空調工事	・現在一番欲しい人材はAGTI卒(高校卒業後3年課程)レベル。そこで、科学技術省Myanmar A.G.T.I.Societyと、テクニシャンレベルの電気工事技術コースを教える教員養成を開始した。テクニシャンを束ねる大卒も数は少ないが欲しい。優秀な新卒者獲得のため奨学金支給も検討している。 ・YTUのサービスニーズがあるかどうかはまだ分からない。ティラワが動き出し、日本レベルの高品質な工事が求められるようになって来たら見えてくるであろう。
建機販売・保守	・理論偏重ではなく、課題解決／実務能力を有し、且つ即戦力となる人材を求めている。重機のメンテナンス人材には、機械の基本動作原理を理解した上で、現場、現場によって状況が変る中、事故、故障原因を、あらゆる角度から分析して、その原因を突き止めて解決してゆく応用力が必要である。また、勘でやるのではなく、英語のマニュアルや、回路図を自分で読んで理解する能力も必要である。 ・YTUの機材を使ったサービスを使うかどうかは現段階では分からない。
プラントエンジニアリング(設計から施工まで)	・現在ミャンマーにいるエンジニアは15人だが、2014年度中には30-40人まで増員する予定である。22歳から30歳前後の若手を多く採用している。1988年以降の大学封鎖の影響か、35歳以上は若手に比べて質が低いという経験値がある。社員の学歴は学卒、修士卒半々程度。 ・強度試験（コンクリートの強度試験機はあるが、鉄骨の伸びや強度を計るもの）や、疲労試験用の機材、水質試験用の成分分析装置等がYTUにあれば試験サービスを受けたい。
農業トラクター・建設機械販売（製造を計画中） 水処理関連事業	・今はまだ支店しかないので、新卒を取る余裕がないが、1,2年以内に工場が操業したら、新卒を採用して、1から育てて行く予定であり、それが日系企業の良さだと考える。工場に欲しい人材層は1)YTU,MTU,YU,MU卒のマネージャーレベルの人、2)AGTIないしは普通のTU卒のようなワーカーを取りまとめる立場の人、3)ワーカー(1日3ドル程度の労賃)の3層とも採用したい。 ・工場稼働の第一段階では、日本やタイなどで作って品質検査を終わらせた部品をミャンマーで組み立てるだけなため、YTUのサービスは使わないと考える。しかし次の段階に進み、部品の品質検査等もミャンマーでやるようになったら、検査サービスのニーズは出てくるかも知れない。高電圧実験装置がYTUにあるなら使いたい。
インフラ・製造業全般	・複数の工場を立ち上げることを計画している。最初はフェライトコア、金属製品、電池、電圧トランスフォーマー等の製造になると思われる。 ・質を伴った人材はどの分野でも、どの層でも不足しており、長期的視点を持って育成が必要である。弊社は長期的視点でこの国での工場稼働を考えている。 ・今すぐではないが、3-5年後を見据えた場合、弊社は事業幅が広いので、土木学科以外の新建屋に入る機材は、何かしらのサービス提供を受ける可能性はある。
ICTソリューション提供、携帯電話事業	・自社で従業員はOJTするので、新卒を採用している。履歴書が100人分、そのうち面接に進むのが20人、採用は2人位の割合であるが、採用される人の質が高いとは言えない。従業員の平均年齢は28歳位。せっかく自社でOJTで育成しても、プロジェクト管理や工程管理が分かるレベルに達すると、給料が良い会社に転職してしまうのが悩み。これから新規事業に参入するので、テクニシャンレベル、エンジニアレベルの人材がますます必要になる。 ・YTUに入る機材のうち、高機種のシグナルアナライザー、ネットワークアナライザーは自社にはないので、それら機材を使ったサービスを受ける可能性はある。

事業分野	主なコメント 上段が工科系大卒人材への要望や課題。 下段が新設棟に入る機材を活用して提供されるサービスに対するニーズについて
電気製品、サッシ類の 販売代理店	・電化製品販売・サービス部門は約100人いるが、販売に重点があるので工学系人材よりマーケティング人材を採用している。サッシ類の部署は、2年前に新設され、組み立てから据え付けまでやり、図面作成もするので、工学系知識がある人材を採用している。現在土木と機械学科出身の学士2人、修士2人がいる。 ・YTUに入れる機材は現在の弊社業務では、まだ必要がない。今後もっと高度技術が必要なレベルになれば、サービスニーズが出てくると思われるが、それがいつになるのかは、この国のインフラ整備と人材養成の速度による。

海外投資	・ティラワに登録した会社は約40社。うち日系企業はその約半分。国内消費型、輸出加工型で半々。 ・繊維・縫製分野の製造業は、労賃に敏感で比較的短期間に労賃が安い国に移ってしまう可能性はある。しかし、それ以外の分野の製造業で工場進出を考えている日系企業は、一度工場をこの国で稼働させると、20-30年の長さで根を下ろす覚悟でいるので、現在進出のタイミングを見計らっている。それら企業が決断すると、製造業に関連する人材のニーズは高まるであろう。
文化・経済交流	・ミャンマーに進出している企業は1) 大企業と2)中小企業に分かれ、1)は拠点作り、合弁相手探しをしていて、まだじっくり検討している段階である。2015年の選挙後に本格的に決断しようと様子見である。2)は、中国での労賃高騰から待ったなしで拠点移動をしてきている。
国際会計コンサルティング	・本事務所は、日系企業のミャンマー進出のコンサルティングを提供していているため、幅広い業種の日系企業を把握しているので、インフラ開発・製造業に関係の深い会社を紹介してもらうため訪問。 ・ゼネコン大手は既に30社ほど進出してきており、製造業の工場建設、ODA案件を見据えている。


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