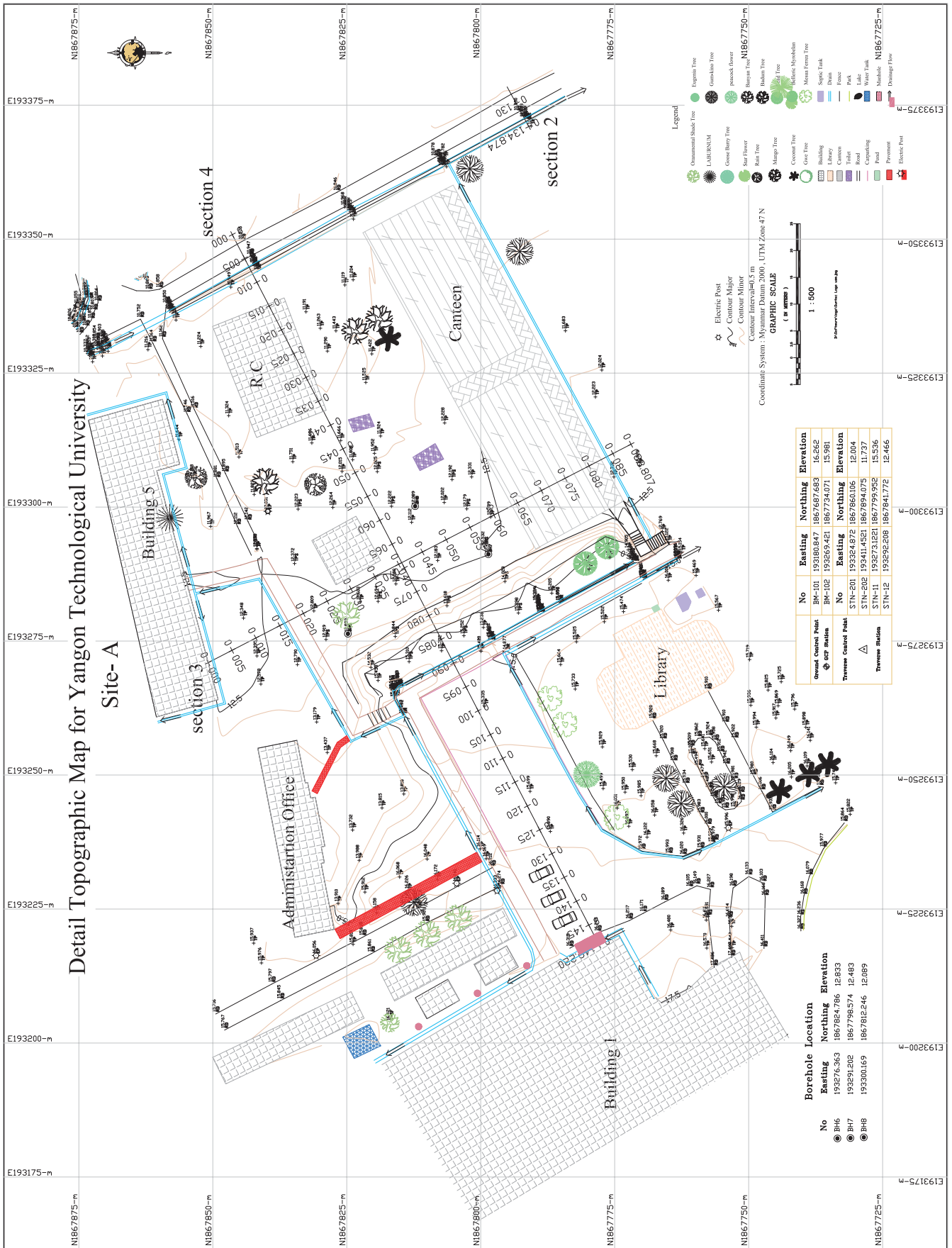


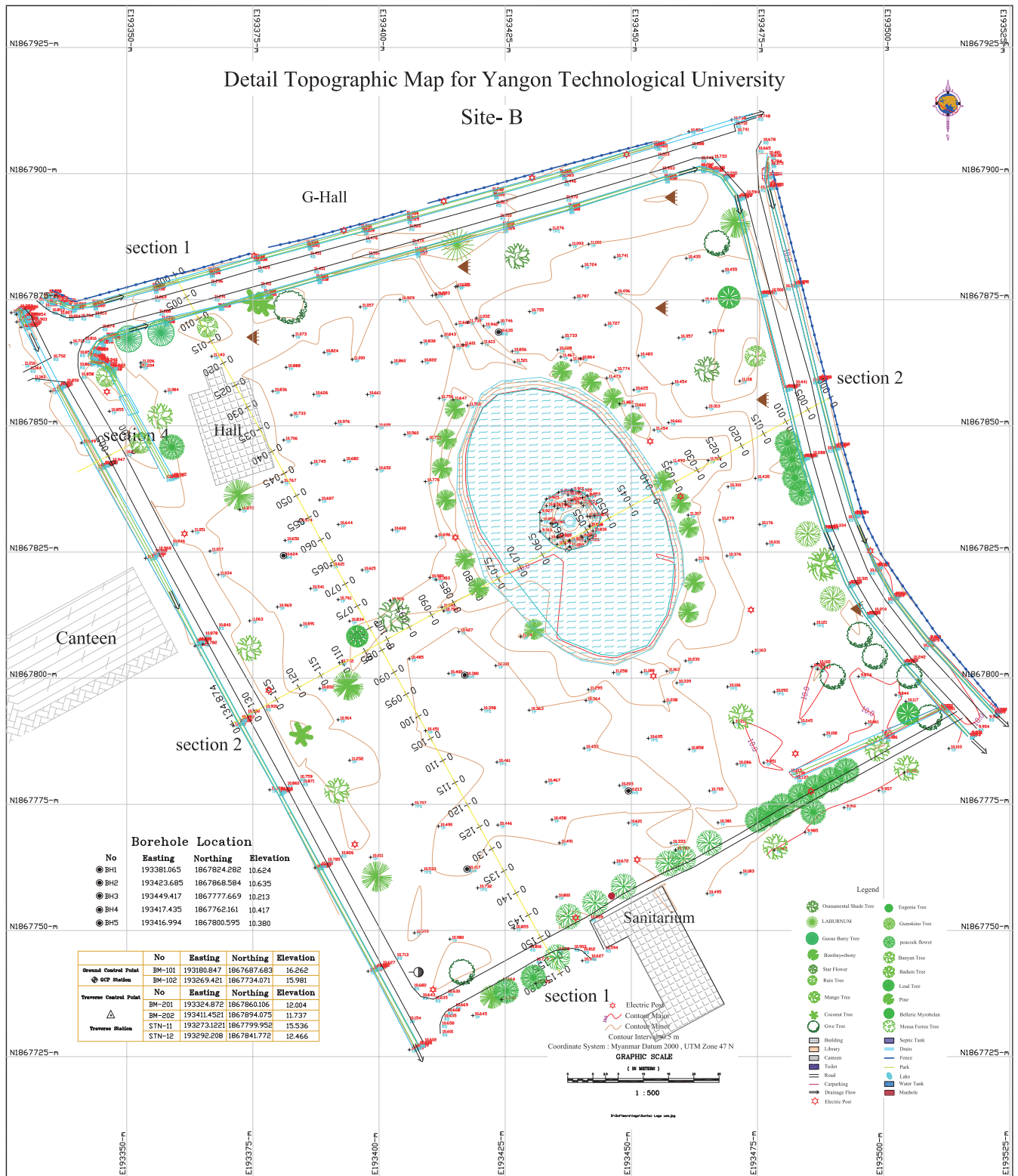
Appendix 5. Other Relevant Data

No.	Name of Document	Type	Original Copy	Issued by	Date
1	Organization chart of MOST	Book	Copy	MOST	
2	National Comprehensive Development Plan Plans of Development Sector of Human Resource (2011-2012 to 2030-2031)	Book	Copy	MOST	2012
3	Annual budget plan of MOST, DUST, YTU, MTU (2011/12, 2012/13, 2013/14)	Book	Copy	MOST	
4	Outline of Myanmar Scientific and Technological Research Department	Book	Copy	MOST	2013
5	Technical and Vocational Education in Myanmar	Presentation	Copy	MOST	2013
6	No. of Universities under 12 Ministries in Myanmar	Book	Copy	MoE	2013
7	List of 168 Universities, Degree Colleges and Colleges under 12 Ministries in Myanmar	Book	Copy	MoE	2013
8	Implementation of Pragmatic Education Reform in the Higher Education Sector	Presentation	Copy	MoE	2013
9	Outline of Yangon Technological University	Presentation	Copy	YTU	2013
10	Outline of Mandalay Technological University	Presentation	Copy	MTU	2013
11	The National Comprehensive Development Plan (NCDP) draft preliminary plan	Presentation	Copy	Ministry of National Planning and Economic Development	2014

Appendix 6. Reference
6-1. Topographic Map of the Site (1)



6-1. Topographic Map of the Site (2)



6-2. Boring Data of the Site

Location of Bore Hole (BH)

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

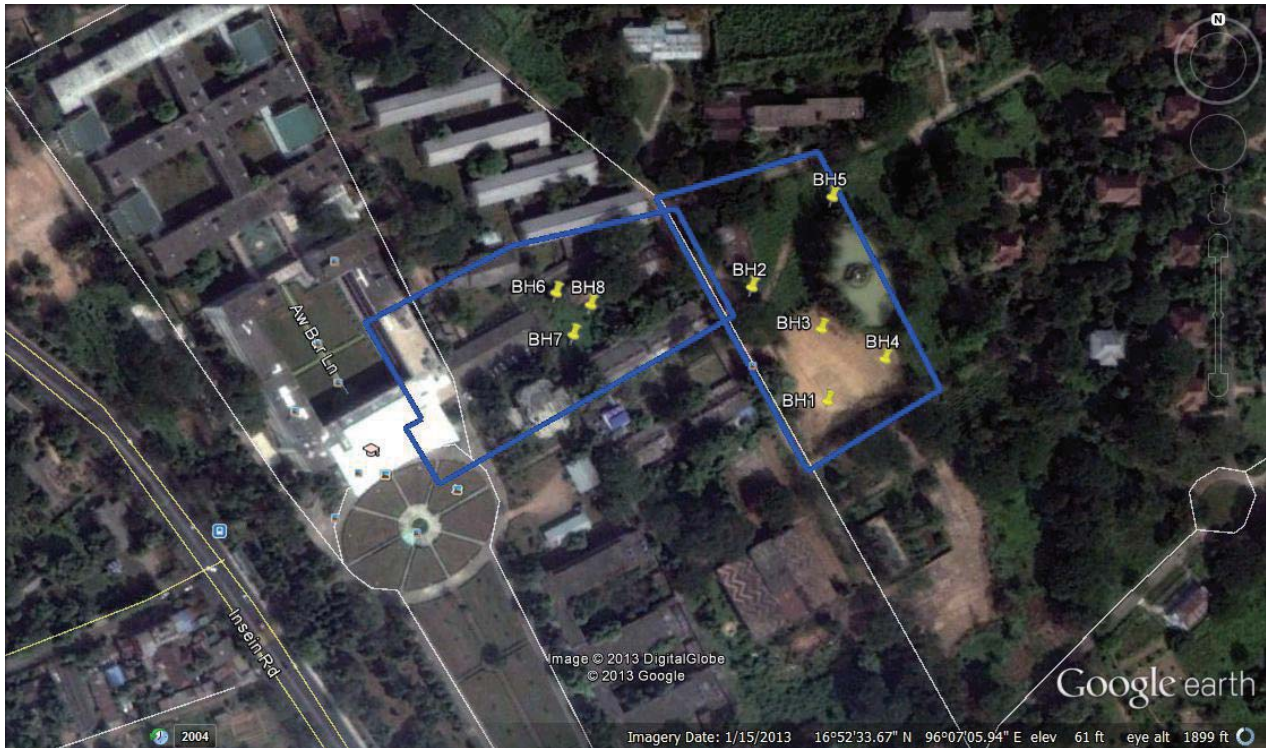


Table - 2.2 : Coordinates of Borehole Points

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. Boring Data of the Site

(1) Soil Profile of BH-1

BORE HOLE No. BH - 1		BORING LOG (FOR DESIGN PARAMETERS CONSIDERATION)						Sheet No. 1 OF 1													
PROJECT NAME : Soil Investigation Works for YTU Research Centre			BORING EQUIPMENT : TOHO-D2			DATE : 22/12/13 ~ 24/12/13															
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' 33.1", E:96° 07' 09.2"			DEPTH : 20.45 m			GROUND WATER LEVEL : 1.26 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)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)				SAMPLING					
												DEPTH GL - (m)	N-Value (Blows / 30cm)	N-Value (Blows / 30cm)	CURVE OF BLOW	SAMPLE (TYPE & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)	SCALE (m)
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, reddish brown color, CLAY.				1.0	8/30		SPT-1	0.45					
2					Yellowish brown and Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, yellowish brown mottled gray color, high plasticity, Fat CLAY-I.			1.26	2.0	12/30		SPT-2	1.45					
3										3.0		3.0	10/30		SPT-3	2.45					
4	-4.00	4.00	3.00							φ110		4.0	55/55		SPT-4	3.45					
5					Yellowish brown and Gray							5.45	8/30		SPT-5	4.45					
6											22/12/13	6.0	6/30		SPT-6	5.45					
7												7.0	5/30		SPT-7	6.45					
8												8.0	5/30		SPT-8	7.45					
9						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).				9.0	6/30		SPT-9	8.45					
10												10.0	7/30		SPT-10	9.45					
11					Gray							11.0	8/30		SPT-11	10.45					
12												12.0	7/30		SPT-12	11.45					
13												13.0	7/30		SPT-13	12.45					
14												14.0	10/30		SPT-14	13.45					
15	-15.00	15.00	11.00								23/12/13	15.0	19/30		SPT-15	14.45					
16					Greenish gray	Very stiff to hard	Fat CLAY-II	Very stiff to hard, greenish gray spotted brown color, Low plasticity, Fat CLAY-II.				16.0	25/30		SPT-16	15.45					
17												17.0	51/30		SPT-17	16.45					
18	-18.00	18.00	3.00									18.0	70/26		SPT-18	17.45					
19					Brownish gray	Hard	SILT	Hard, Brownish gray color, low to high plasticity, SILT.				19.0	70/18		SPT-19	18.45					
20	-20.45	20.45	2.45									20.0	60/10		SPT-20	19.45					
21												21.0			SPT-21	20.45					
22												22.0			SPT-22	21.45					
23												23.0			SPT-23	22.45					
24												24.0			SPT-24	23.45					
25												25.0			SPT-25	24.45					
26												26.0			SPT-26	25.45					
27												27.0			SPT-27	26.45					
28												28.0			SPT-28	27.45					
29												29.0			SPT-29	28.45					
30												30.0			SPT-30	29.45					
															SPT-31	30.45					

NOTES				Sample key		Planner structure		Discontinuities	
Relative density description	Consistency description		● _{u-1}	Rock core sample (Core lost)	Term	Spacing (mm)	Term	Spacing (mm)	
Relative density	SPT N-Value (max)	Consistency	○ _{u-1}	Water sample	Very thick	> 2000	Very widely spaced	> 2000	
Very loose	0 - 3	Very soft	□ _{u-1}		Thick	600 - 2000	Widely spaced	600 - 2000	
Loose	4 - 10	Soft	□ _{u-2}		Medium	200 - 600	Medium spaced	200 - 600	
Medium dense	11 - 30	Firm	□ _{u-3}		Thin	60 - 200	Closely spaced	60 - 200	
Dense	31 - 50	Stiff	□ _{u-4}		Very thin	20 - 60	Very closely spaced	20 - 60	
Very dense	over 50	Very stiff	□ _{u-5}		Thickly laminated	6 - 20	Extremely closely spaced	< 20	
		Hard	□ _{u-6}		Thinly laminated	< 6			
			□ _{u-7}				Remarks		
			□ _{u-8}						
			□ _{u-9}						
			□ _{u-10}						

Relative density	SPT N-Value (max)	Consistency	SPT N-Value (max)
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

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

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

6-2. Boring Data of the Site
 (2) Soil Profile of BH-2

BORE HOLE No. BH - 2		BORING LOG (FOR DESIGN PARAMETERS CONSIDERATION)						Sheet No. 1 OF 1													
PROJECT NAME : Soil Investigation Works for YTU Research Centre				BORING EQUIPMENT : TOHO-D5		DATE : 22/12/13 ~ 23/12/13															
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' 35.0", E: 96° 07' 07.9" DEPTH : 20.45 m				GROUND WATER LEVEL : 2.03 m from GL																	
SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (g) CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING DEPTH (m) & DIAMETER (mm)	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)				SAMPLING					
												DEPTH GL - (m)	N-Value (Blows / 30cm)	N-Value (Blows / 30cm)	CURVE OF BLOW ●	SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)	SCALE (m)
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, yellowish brown color, CLAY.				1.0	6/30		SPT-1	0.45					1
2					Yellowish brown and Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, yellowish brown mottled gray color, high plasticity, Fat CLAY-I.	3.0	φ110	2.03	2.0	10/30		SPT-2	1.45					2
3												3.0	70/90		UD-1	2.45					3
4												4.0	9/30		SPT-3	3.45					4
5	-5.00	5.00	4.00									5.0	6/30		SPT-4	4.45					5
6					Gray	Firm to stiff	Lean CLAY	Firm to stiff, gray, low plasticity, Lean CLAY.				6.0	11/30		SPT-5	5.45					6
7												7.0	7/30		SPT-6	6.45					7
8									8.45			8.0	10/30		SPT-7	7.45					8
9									22/12/13			9.0	12/30		SPT-8	8.45					9
10	-10.00	10.00	5.00		Dark gray	Dense	Silty SAND	Dense, dark gray color, fine to coarse grained sand, Silty SAND.				10.0	31/30		SPT-9	9.45					10
11	-11.00	11.00	1.00									11.0	8/30		SPT-10	10.45					11
12												12.0	9/30		SPT-11	11.45					12
13												13.0	7/30		SPT-12	12.45					13
14					Gray	Firm to stiff	Fat CLAY-I	Firm to stiff, gray color, high plasticity, Fat CLAY-I.				14.0	8/30		SPT-13	13.45					14
15												15.0	9/30		SPT-14	14.45					15
16												16.0	15/30		SPT-15	15.45					16
17	-17.00	17.00	6.00									17.0	26/30		SPT-16	16.45					17
18					Gray	Medium dense	Silty SAND	Medium dense, gray color, fine to coarse grained sand, Silty SAND.				18.0	25/30		SPT-17	17.45					18
19	-19.00	19.00	2.00									19.0	55/30		SPT-18	18.45					19
20	-20.45	20.45	1.45		Gray mottled brown	Hard	Fat CLAY-II	Hard, gray mottled brown color, high plasticity, Fat CLAY-II.	20.45			20.0	47/30		SPT-19	19.45					20
21									23/12/13			21.0				20.45					21
22												22.0				21.45					22
23												23.0				22.0					23
24												24.0				22.45					24
25												25.0				23.0					25
26												26.0				23.45					26
27												27.0				24.0					27
28												28.0				24.45					28
29												29.0				25.0					29
30												30.0				25.45					30
																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 (max)	Consistency	SPT N-Value (max)
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

●	Disturbed sample (SPT sample)	□	Rock core sample (Core lost)
○	Undisturbed Sample (Piston sampler)	○	Water sample
○	Undisturbed Sample (Denison sampler)		
○	Rock core sample (Single core tube)		
○	Rock core sample (Double core tube)		

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-01
 Revision Date : 06/01/14
 Site Geologist : Nyi Nyi Zaw
 Operator : Hla Min Htat
 Checked by : May Thu

6-2. Boring Data of the Site
 (3) Soil Profile of BH-3

BORE HOLE No. BH - 3		BORING LOG (FOR DESIGN PARAMETERS CONSIDERATION)						Sheet No. 1 OF 1																	
PROJECT NAME : Soil Investigation Works for YTU Research Centre				BORING EQUIPMENT : TOHO-D2		DATE : 27/12/13 - 28/12/13																			
LOCATION : YTU Campus, Insein Township, Yangon				BORING METHOD : Rotary Drilling Method		LOGGED BY : Zaw Myo Win																			
GROUND LEVEL : Existing ground level				ORIENTATION : Vertical		CLIENT : Intem Consulting Inc																			
COORDINATE : N:16°52' 34.3", E: 96° 07' 09.1" DEPTH : 20.45 m				GROUND WATER LEVEL : 2.85 m from GL																					
SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (opt/CONSISTENCY)	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)					SAMPLING								
												DEPTH GL - (m)	N-Value (Blows / 30cm)	CURVE OF BLOW ●			SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)	SCALE (m)			
												0	20	40	60	80	100								
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, Reddish brown color, CLAY (lateritic soil)				1.0	3/30					SPT-1	0.45					1	
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).				2.0	5/30					SPT-2	2.0					2	
3										3.0	2.85	3.0	5/30					SPT-3	3.0					3	
4										4.0		4.0	50/50					UD-1	4.45					4	
5	-5.00	5.00	4.00		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.				5.0	18/30					SPT-4	5.0					5	
6										6.0		6.0	13/30					SPT-5	6.0					6	
7										7.0		7.0	11/30					SPT-6	7.0					7	
8	-8.00	8.00	3.00		Gray	Firm	Lean CLAY	Firm, gray color, low plasticity, Lean CLAY.				8.0	5/30					SPT-7	8.0					8	
9										9.0		9.0	6/30					SPT-8	9.0					9	
10										10.0		10.0	7/30					SPT-9	10.0					10	
11									10.45	27/12/13		11.0	7/30					SPT-10	11.0					11	
12	-12.00	12.00	4.00		Gray	Medium dense	Silty SAND	Medium dense, grey color, fine to coarse grained sand, Silty SAND.				12.0	25/30					SPT-11	12.0					12	
13	-13.00	13.00	1.00									13.0	9/30					SPT-12	13.0					13	
14												14.0	8/30					SPT-13	14.0					14	
15												15.0	7/30					SPT-14	15.0					15	
16												16.0	5/30					SPT-15	16.0					16	
17												17.0	12/30					SPT-16	17.0					17	
18												18.0	8/30					SPT-17	18.0					18	
19												19.0	15/30					SPT-18	19.0					19	
20	-20.45	20.45	7.45						20.45	28/12/13		20.0	10/30					SPT-19	20.0					20	
21												21.0							21.0					21	
22												22.0							22.0					22	
23												23.0							23.0					23	
24												24.0							24.0					24	
25												25.0							25.0					25	
26												26.0							26.0					26	
27												27.0							27.0					27	
28												28.0							28.0					28	
29												29.0							29.0					29	
30												30.0							30.0					30	

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (max)	Consistency	SPT N-Value (max)
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

● (s)	Disturbed sample (SPT sample)	□	Rock core sample (Core lost)
□ (s)	Undisturbed Sample (Piston sampler)	□	Water sample
□ (s)	Undisturbed Sample (Denison sampler)	□	RQD (%) Term
□ (s)	Rock core sample (Single core tube)	0 - 25	Very poor
□ (s)	Rock core sample (Double core tube)	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

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

6-2. Boring Data of the Site
(4) Soil Profile of BH-4

BORE HOLE No. BH - 4		BORING LOG (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)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)					SAMPLING							
												DEPTH (m)	N-Value (Blows / 30cm)	CURVE OF BLOW				N-Value (Blows / 30cm)	SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	ROD (%)	SCALE (m)
												0	20	40	60	80	100							
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														
4	-4.00	4.00	3.00		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.			φ110													
5																								
6																								
7	-7.00	7.00	3.00																					
8																								
9																								
10										5.45														
11										25/12/13														
12					Gray	Firm to stiff	Lean CLAY	Firm to stiff, gray color, low plasticity, Lean CLAY.																
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														
21										26/12/13														
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (60cm)	Consistency	SPT N-Value (30cm)
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)	□	Rock core sample (Core lost)
□	Undisturbed Sample (Piston sampler)	□	Water sample
□	Undisturbed Sample (Denison sampler)	□	Rock core sample (Single core tube)
□	Rock core sample (Double core tube)		

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 Geologist : Zin Lin Cho
Operator : Ko Kyaw Thi Ha & Kyaw Suar
Checked by : May Thu

6-2. Boring Data of the Site
(5) Soil Profile of BH-5

BORE HOLE No. BH - 5		BORING LOG (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 : Nyi Nyi Zaw																		
GROUND LEVEL : Existing ground level			ORIENTATION : Vertical			CLIENT																		
COORDINATE : N:16°52' 36.5", E: 96° 07' 09.3" DEPTH : 20.45 m			GROUND WATER LEVEL : 1.30 m from GL			Intem Consulting Inc																		
SCALE (m)	ELEVATION (m)	DEPTH GL - (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (G/CONSISTENCY)	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)					SAMPLING							
												DEPTH GL - (m)	N-Value (Blows / 30cm)	0	20	40	60	80	100	SAMPLE (Type & No.)	DEPTH GL - (m)	TCR (%)	SCR (%)	RQD (%)
1	-1.00	1.00	1.00		Yellowish brown		Sandy CLAY	Top soil layer, Yellowish brown color, Sandy CLAY				1.0	3/30					SPT-1	0.45				1	
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.		1.30		2.0	7/30					SPT-2	1.45				2	
3										3.0		3.0	8/30					SPT-3	2.45				3	
4	-4.00	4.00	3.00							4.10		4.0	45/45					UD-1	3.45				4	
5					Gray mottled brown							4.45	17/30					SPT-4	4.45				5	
6						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.		7.45		5.0	11/30					SPT-5	5.45				6	
7										25/12/13		6.0	5/30					SPT-6	6.45				7	
8					Gray							7.0	6/30					SPT-7	7.45				8	
9												8.0	6/30					SPT-8	8.45				9	
10												9.0	6/30					SPT-9	9.45				10	
11												10.0	6/30					SPT-10	10.45				11	
12	-12.00	12.00	8.00									11.0	7/30					SPT-11	11.45				12	
13												12.0	9/30					SPT-12	12.45				13	
14					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.				13.0	9/30					SPT-13	13.45				14	
15												14.0	9/30					SPT-14	14.45				15	
16												15.0	6/30					SPT-15	15.45				16	
17	-17.00	17.00	5.00									16.0	9/30					SPT-16	16.45				17	
18	-18.00	18.00	1.00		Gray	Medium dense	Clayey SAND	Medium dense, gray color, fine to coarse grained sand, Clayey SAND.				17.0	21/30					SPT-17	17.45				18	
19												18.0	12/30					SPT-18	18.45				19	
20					Gray	Stiff	Lean CLAY	Stiff, gray color, low plasticity, Lean CLAY.				19.0	13/30					SPT-19	19.45				20	
21	-20.45	20.45	2.45							20.45		20.0	14/30					SPT-19	20.45				21	
22										26/12/13		21.0								21.0				22
23												22.0								22.0				23
24												23.0								23.0				24
25												24.0								24.0				25
26												25.0								25.0				26
27												26.0								26.0				27
28												27.0								27.0				28
29												28.0								28.0				29
30												29.0								29.0				30
												30.0								30.0				31
												30.45								30.45				32

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (max)	Consistency	SPT N-Value (max)
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)	□	Rock core sample (Core lost)
□	Undisturbed Sample (Piston sampler)	□	Water sample
□	Undisturbed Sample (Denison sampler)	□	
□	Rock core sample (Single core tube)	□	
□	Rock core sample (Double core tube)	□	

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-Brands Engineering & Construction Co., Ltd.
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Revision No. : Rev-0
Revision Date : 06/01/14
Site Geologist : Nyi Nyi Zaw
Operator : Hlu Min Hnat
Checked by : May Thu

6-2. Boring Data of the Site
(6) Soil Profile of BH-6

BORE HOLE No. BH-6		BORING LOG (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 (%) / CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)					SAMPLING								
												DEPTH GL - (m)	N-Value (Blows / 30cm)	DEPTH GL - (m)	TCR (%)	SCR (%)	ROD (%)	SCALE (m)							
												0	20	40	60	80	100								
1	-1.00	1.00	1.00		Reddish brown		CLAY	Top soil layer, Reddish brown color, CLAY (lateritic soil)					6/30					SPT-1	0.45					1	
2					Reddish brown mottled gray	Firm to stiff	Fat CLAY-I	Firm to stiff, light gray mottled brown color, high plasticity, Fat CLAY-I.	2.45				13/30					SPT-2	1.0	1.45				2	
3					Brown & gray				27/12/13	φ110	3.0		12/30					SPT-3	2.0	2.45				3	
4	-4.00	4.00	3.00		Brown & gray						3.48		8/30					SPT-4	3.0	3.45				4	
5					Brown & gray								90/90					UID-1	4.0	4.45				5	
6													7/30					SPT-5	5.0	5.45				6	
7													9/30					SPT-6	6.0	6.45				7	
8													11/30					SPT-7	7.0	7.45				8	
9													10/30					SPT-8	8.0	8.45				9	
10													10/30					SPT-9	9.0	9.45				10	
11													8/30					SPT-10	10.0	10.45				11	
12													10/30					SPT-11	11.0	11.45				12	
13	-13.00	13.00	9.00										10/30					SPT-12	12.0	12.45				13	
14													19/30					SPT-13	13.0	13.45				14	
15													24/30					SPT-14	14.0	14.45				15	
16													23/30					SPT-15	15.0	15.45				16	
17	-17.00	17.00	4.00										22/30					SPT-16	16.0	16.45				17	
18									17.45				9/30					SPT-17	17.0	17.45				18	
19									28/12/13				11/30					SPT-18	18.0	18.45				19	
20													9/30					SPT-19	19.0	19.45				20	
21	-20.45	20.45	2.45						20.45				16/30					SPT-20	20.0	20.45				21	
22									29/12/13											21.0	21.45			22	
23																				22.0	22.45			23	
24																				23.0	23.45			24	
25																				24.0	24.45			25	
26																				25.0	25.45			26	
27																				26.0	26.45			27	
28																				27.0	27.45			28	
29																				28.0	28.45			29	
30																				29.0	29.45			30	
																				30.0	30.45				

NOTES

Relative density description		Consistency description	
Relative density	SPT N-Value (cores)	Consistency	SPT N-Value (cores)
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)	□	Rock core sample (Core lost)
○ P-1	Undisturbed Sample (Piston sampler)	□	Water sample
○ P-2	Undisturbed Sample (Denison sampler)	□	Rock core sample (Single core tube)
□	Rock core sample (Double core tube)		

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


ROD (%) Term

0 - 25	Very poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

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Revision No. :
Revision Date : 06/1/14
Site Geologist : Nyi Nyi Zaw
Operator : Hla Min Htat
Checked by : May Thu


6-2. Boring Data of the Site
 (7) Soil Profile of BH-7

BORE HOLE No. BH - 7		BORING LOG (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 (g _r) / CONSISTENCY	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING DEPTH (m) & DIAMETER (mm)	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)					SCALE (m)																																																																												
												DEPTH GL - (m)	N-Value (Blows / 30cm)	SAMPLE (TYPE & No.)	DEPTH GL - (m)	TCC (%)		SCL (%)	RQD (%)																																																																										
												CURVE OF BLOW ●																																																																																	
												N-Value (Blows / 30cm)																																																																																	
												0 20 40 60 80 100																																																																																	
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, Yellowish brown color, CLAY				1.0	4/30	SPT-1	0.45																																																																														
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		2.80	2.0	6/30	SPT-2	1.0																																																																														
3												3.0	8/30	SPT-3	1.45																																																																														
4	-4.00	4.00	3.00		Brownish gray							4.0	7/30	SPT-4	2.0																																																																														
5												5.0	70/90	UD-1	2.45																																																																														
6												6.0	9/30	SPT-5	3.0																																																																														
7												7.0	9/30	SPT-6	3.45																																																																														
8												8.0	8/30	SPT-7	4.0																																																																														
9												9.0	9/30	SPT-8	4.45																																																																														
10												10.0	11/30	SPT-9	5.0																																																																														
11												11.0	9/30	SPT-10	5.45																																																																														
12					Gray	Firm to very stiff	Lean CLAY	Firm to very stiff, brownish gray and gray color, low plasticity, Lean CLAY.				12.0	11/30	SPT-11	6.0																																																																														
13												13.0	9/30	SPT-12	6.45																																																																														
14												14.0	9/30	SPT-13	7.0																																																																														
15												15.0	10/30	SPT-14	7.45																																																																														
16												16.0	11/30	SPT-15	8.0																																																																														
17												17.0	12/30	SPT-16	8.45																																																																														
18									17.45 30/12/13			18.0	12/30	SPT-17	9.0																																																																														
19												19.0	21/30	SPT-18	9.45																																																																														
20	-20.45	20.45	16.45						20.45 31/12/13			20.0	10/30	SPT-19	10.0																																																																														
21												21.0			10.45																																																																														
22												22.0			11.0																																																																														
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Relative density description: Very loose, Loose, Medium dense, Dense, Very dense Consistency description: Very soft, Soft, Firm, Stiff, Very stiff, Hard SPT N-Value (blows): 0-3, 4-10, 11-30, 31-50, over 50 SPT N-Value (blows): under 2, 2-4, 5-8, 9-15, 16-30, over 30												Rock core sample (Core lost) Water sample		Term: Very thick, Thick, Medium, Thin, Very thin, Thickly laminated, Thinly laminated Spacing (mm): > 2000, 600 - 2000, 200 - 600, 60 - 200, 20 - 60, 6 - 20, < 6		Discontinuities: Very widely spaced, Widely spaced, Medium spaced, Closely spaced, Very closely spaced, Extremely closely spaced Spacing (mm): > 2000, 600 - 2000, 200 - 600, 60 - 200, 20 - 60, < 20		Revision No. : Revision Date : Site Geologist : Operator : Checked by :																																																																											

6-2. Boring Data of the Site

(8) Soil Profile of BH-8

BORE HOLE No. BH - 8										BORING LOG (FOR DESIGN PARAMETERS CONSIDERATION)										Sheet No. 1 OF 1								
PROJECT NAME : <u>Soil Investigation Works for YTU Research Centre</u>					BORING EQUIPMENT : <u>TOHO-D2</u>					DATE : <u>30/12/13 ~ 31/12/13</u>																		
LOCATION : <u>YTU Campus, Insein Township, Yangon</u>					BORING METHOD : <u>Rotary Drilling Method</u>					LOGGED BY : <u>Zin Lin Cho</u>																		
GROUND LEVEL : <u>Existing ground level</u>					ORIENTATION : <u>Vertical</u>					<u>CLIENT</u>																		
COORDINATE : <u>N:16°52'34.7", E: 96°07'05.1"</u>					DEPTH : <u>20.45 m</u>					GROUND WATER LEVEL : <u>4.00 m from GL</u>					Intem Consulting Inc													
SCALE (m)	ELEVATION (m)	DEPTH GL. (m)	THICKNESS (m)	DIAGRAM	COLOUR	RELATIVE DENSITY (%)	SOIL NAME	SOIL DESCRIPTION	DATE & DEPTH (m)	CASING (DEPTH (m) & DIAMETER (mm))	WATER DEPTH (m)	STANDARD PENETRATION TEST TEST METHOD (BS 5930)						SAMPLING				SCALE (m)						
												DEPTH GL. (m)	N-Value (Blows / 30cm)	CURVE OF BLOW	SAMPLE (Type & No.)	DEPTH GL. (m)	TCR (%)	SCR (%)	ROD (%)									
1	-1.00	1.00	1.00		Yellowish brown		CLAY	Top soil layer, Yellowish brown color, CLAY				1.0	10/30		SPT-1	0.45	1.0	1.45						1				
2					Yellowish brown and gray	Firm to stiff	Fat CLAY-I	Firm to stiff, Yellowish brown and gray color, high plasticity, Fat CLAY-I.				2.0	11/30		SPT-2	2.0	2.45							2				
3															3.0	14/30		SPT-3	3.0	3.45						3		
4															4.0	7/30		SPT-4	4.0	4.45							4	
5	-5.00	5.00	4.00												4.00													
6					Gray	Firm to very stiff	Lean CLAY	Firm to very stiff, gray color, low plasticity, Lean CLAY.				5.0	70/90		UD-1	5.0	5.45								5			
7															6.0	8/30		SPT-5	6.0	6.45							6	
8															7.0	9/30		SPT-6	7.0	7.45							7	
9															8.0	11/30		SPT-7	8.0	8.45							8	
10															9.0	9/30		SPT-8	9.0	9.45							9	
11															10.0	12/30		SPT-9	10.0	10.45								10
12															11.0	10/30		SPT-10	11.0	11.45								11
13													12.45			12.0	13/30		SPT-11	12.0	12.45							12
14	-14.00	14.00	9.00										30/12/13			13.0	21/30		SPT-12	13.0	13.45							13
15									Gray	Very stiff	Sandy Lean CLAY	Very stiff, gray color, fine to coarse grained sand, Sandy Lean CLAY.				14.0	20/30		SPT-13	14.0	14.45							14
16	-16.00	16.00	2.00												15.0	22/30		SPT-14	15.0	15.45							15	
17	-17.00	17.00	1.00		Gray	Medium dense	Silty SAND	Medium dense, gray color, fine to coarse grained sand, Silty SAND.				16.0	30/30		SPT-15	16.0	16.45							16				
18															17.0	10/30		SPT-16	17.0	17.45							17	
19					Gray	Stiff	Lean CLAY	Stiff, gray color, low plasticity, Lean CLAY.				18.0	11/30		SPT-17	18.0	18.45								18			
20															19.0	9/30		SPT-18	19.0	19.45							19	
21															20.0	9/30		SPT-19	20.0	20.45								20
22	-20.45	20.45	3.45										20.45			21.0				21.0	21.45							21
23												22.0				22.0	22.45							22				
24												23.0				23.0	23.45							23				
25												24.0				24.0	24.45							24				
26												25.0				25.0	25.45							25				
27												26.0				26.0	26.45							26				
28												27.0				27.0	27.45							27				
29												28.0				28.0	28.45							28				
30												29.0				29.0	29.45							29				
												30.0				30.0	30.45							30				

NOTES				Sample key		Planner structure		Discontinuities			
Relative density description	Consistency description			Disturbed sample (SPT sample)	Rock core sample (Core lost)	Term	Spacing (mm)	Term	Spacing (mm)	Geo-Trade Engineering & Construction Co., Ltd.	
Relative density	SPT N-Value (cores)	Consistency	SPT N-Value (cores)	Undisturbed Sample (Piston sampler)	Water sample	Very thick	> 2000	Very widely spaced	> 2000	Tel: 951-56431, 959-42018757	
Very loose	0 - 3	Very soft	under 2	Undisturbed Sample (Denison sampler)	ROD (%)	Thick	600 - 2000	Widely spaced	600 - 2000	www.geotrade.com	
Loose	4 - 10	Soft	2 - 4	Rock core sample (Single core tube)	Term	Medium	200 - 600	Medium spaced	200 - 600	www.geotrade.com	
Medium dense	11 - 30	Firm	5 - 8	Rock core sample (Double core tube)	Term	Thin	60 - 200	Closely spaced	60 - 200	Revision No.	
Dense	31 - 50	Stiff	9 - 15		Term	Very thin	20 - 60	Very closely spaced	20 - 60	Rev-0	
Very dense	over 50	Very stiff	16 - 30		Term	Thickly laminated	6 - 20	Extremely closely spaced	< 20	Revision Date	
					Term	Thinly laminated	< 6			Site Geologist : Zin Lin Cho	
					Term					Operator : Ko Kyaw Htho & Kyaw Swar	
					Term					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/1	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

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 Lab: Technician

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 Lab: Incharge

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 Head of the Department
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 ရန်ကင်းတက္ကသိုလ်

**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/l	0.3mg/l	0.55
Total Hardness	mg/l as CaCO ₃	500mg/l as CaCO ₃	46.2
Total Alkalinity	mg/l as CaCO ₃		74
Phenolphthalein Alkalinity	mg/l as CaCO ₃		Nil
Calcium Hardness	mg/l as CaCO ₃		33.0
Magnesium Hardness	mg/l as CaCO ₃		13.2
Carbonate (CO ₃ ⁼)	mg/l as CaCO ₃		Nil
Chloride(as Cl ⁻)	mg/l	250 mg/l	20.5
Sodium Chloride (as NaCl)	mg/l		33.8
Bicarbonate (HCO ₃ ⁼)	mg/l as CaCO ₃		74
Sulphate as (SO ₄ ⁼)	mg/l	200 mg/l	5
Total Solids	mg/l	1500 mg/l	133
Suspended Solids	mg/l		2
Dissolved Solids	mg/l	1000 mg/l	131

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Lab: Technician

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Lab: Incharge

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Head of the Department
မြို့ပြအင်ဂျင်နီယာဌာန
ရန်ကင်းနည်းပညာတက္ကသိုလ်

