

KJE PPP Project Phase 1 ESIA

Technical Appendix: Soils

DRAFT

SOILS

Borehole Log Results

KJE Mainline Section (Part 3: Geotechnical Report, Volume 3C: Borehole Investigations - ICS, 2015)

Project: Kampala - Jinja Express Road**Location:** 0+496**Coordinates (E/N):** 456697 36131**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-25m)**BH No.:** BH301**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-25.0m)**Date Started:** 16-Sep-14**Date Completed:** 18-Sep-2014**Total Depth:** 25**Water level (m):** 11.60**Borehole diameter (mm):** 97

















	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0								Very soft, grey CLAY with numerous rootlets (Top Soil)	0.15	
1	1.00		100			D	2,1,2,1,2,3	Firm, reddish brown, gravelly CLAY (Residual Soil)	0.95	
2	2.00		100			UD		Soft, reddish brown, CLAY (Residual Soil)		
	2.45		100			D	1,1,1,2,2,1			
3										
4	4.00		100			D*				
5	5.00		100			D	1,2,1,2,2,1		4.70	
	5.30		100			UD		Soft to firm, reddish brown, 5-10° inclined, very narrowly banded slightly Gravelly CLAY (Highly Weathered Gneiss). Gravel, extremely weak to very weak, angular to sub rounded, fine to medium gneiss		5.00
6										
7	7.00		100			D	1,2,2,2,2,2			
8	8.00		100			D	1,2,3,3,3,3			
	8.30		100			UD			8.30	
9	9.10		100			D	2,2,3,3,3,4	Firm, reddish brown, 10-30° inclined, very narrowly banded, slightly micaceous CLAY with rare weak, angular to sub rounded,		
	9.60		100							
10	10.00		100							10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Mizen Beyene**Note:** Stand pipe installed

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+496**Coordinates (E/N):** 456697 36131**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-25m)**BH No.:** BH301**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-25.0m)**Date Started:** 16-Sep-14**Date Completed:** 18-Sep-2014**Total Depth:** 25**Water level (m):** 11.60**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
10						D	2,3,3,4,4,6	fine gneiss gravels (Completely Weathered Mica Gneiss)		
			100			10.45				
11	11.10					11.10				
	11.40		100			UD				
						D	1,2,3,3,4,3	Firm, orange, 10-30° inclined, very narrowly to very thinly banded, slightly micaceous CLAY with some, extremely weak to very weak, very angular, medium quartzite gravels from 14.60-15.05m (Completely Weathered Mica Gneiss)		
12						11.85				
			100			12.45				
						D*				
						12.65		Stiff, greenish orange, 10-60° inclined, very narrowly to very thinly banded, micaceous Silty CLAY		
13	13.00					13.00				
			100			13.45				
						D	1,2,4,4,3,4			
14	14.00					14.00				
	14.60		100			UD				
15						D	2,4,4,3,3,4			
			100			15.05				
16	16.2					16.20		2,2,3,4,4,4		
						D				
						16.65				
						17.00				
17	17.6					D*				
						17.20				
						17.60				
						D				
18	18.15					UD				
			100			D	1,2,2,2,5,5			
						18.60				
19						D				
	19.6					19.60				
20						D	1,2,4,4,5,6			

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene


Note: Stand pipe installed

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 0+496**Coordinates (E/N):** 456697 36131**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-25m)**BH No.:** BH301**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-25.0m)**Date Started:** 16-Sep-14**Date Completed:** 18-Sep-2014**Total Depth:** 25**Water level (m):** 11.60**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
20	20.6		100			20.05	1,3,4,5,7,7	(Completely Weathered Mica Gneiss)		
21			100			21.50				
22	21.5					D				
						21.95				
						D*				
23	23		100			22.40	2,4,6,7,7,8			
						23.00				
						D				
						23.45				
						23.73				
24			100			SC	4,4,6,7,10,12			
						24.00				
						24.55				
25	25					D			25.00	25.00
26										
27										
28										
29										
30										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Mizen Beyene**Note:** Stand pipe installed

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample
 SC=Soil Core Sub Sample
 RC=Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+701**Coordinates (E/N):** 456841 36272**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH302**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 18-Sep-14**Date Completed:** 20-Sep-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0	0.60		100			0.60		Soft, pink brown gravelly CLAY (Made Ground)	0.25	
1	1.00		100			D*		Stiff, reddish brown, slightly gravelly CLAY (Residual Soil). Gravel, extremely weak to very weak, angular to subrounded, fine gneiss and rare quartzite		
						D	2,2,2,3,6,6			
2	2.00		100			1.45				
	2.15		100			UD	2,3,6,6,7,6			
3						2.60				
	3.50					3.50				
4	4.00		100			D	3,3,6,5,5,5			
						3.95				
5	5.00		100							5.00
	5.60		100			D	3,7,8,9,6,5			
6						5.45				
	6.50		100			D*			6.50	
7						5.80				
						6.00				
8	8.00					6.50		Firm to stiff, reddish brown, pink brown & orange brown, 10-60° inclined, very narrowly banded micaceous CLAY (Completely Weathered Mica Gneiss)		
	8.20		100			D	3,4,4,4,5,5			
9						6.95				
			100							
10	9.60					8.00				
						UD	1,2,2,3,3,4			
						8.65				
			100							
						9.60				
						D	1,2,2,3,3,5			10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Mizen Beyene

Note: Undisturbed sampling attempted at 5m but refused

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample
 SC=Soil Core Sub Sample
 RC=Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+701**Coordinates (E/N):** 456841 36272**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH302**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 18-Sep-14**Date Completed:** 20-Sep-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
10			100			10.05				
11	11.00					11.00				
	11.50		100			UD				
						D	1,2,2,3,3,5			
12			100			11.95 12.40				
						D*				
						12.60 13.00				
13	13.00					D	2,3,4,4,4,5			
			100			13.45 14.00				
14	14.00					UD				
	14.70		100			D	1,2,2,3,4,6			
15			100			15.15 16.00				15.00
16	16.00					D	2,3,3,4,5,6			
			100			16.45				
17	17		100							
	17.5		100							
18	18					UD				
						D	4,4,6,7,8,9			
						18.45				
19			100			19.55				
20	20					D	3,5,7,8,8,10			20.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

Note: Undisturbed sampling attempted at 5m but refused

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 0+941**Coordinates (E/N):** 457003 36440**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-15m)**BH No.:** BH303**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-15.0m)**Date Started:** 20-Sep-14**Date Completed:** 22-Sep-2014**Total Depth:** 15**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0			65					Very soft, pink brown CLAY with occasional, angular, medium gneiss (Imported Fill)		
1	1.00	115mm	95			D	1,1,1,1,1,1		1.80	
2	2.00		95			D	3,2,2,1,2,1	Soft, pink brown, CLAY with angular, coarse, cobble and boulder size gneiss (Made Ground)		
3	2.50								3.00	
4	3.40					D*		Stiff, reddish brown, Gravely CLAY (Residual Soil). Gravel, extremely weak to weak, very angular to sub rounded, fine to medium gneiss & quartz		
5	4.40		85							
	4.60		100			D	4,6,6,5,4,4			5.00
6	5.50		100							
7	6.10		100			UD		Firm, pink brown, 10-30° inclined, very narrowly banded slightly micaceous slightly Gravely Silty CLAY (Highly Weathered Mica Gneiss). Gravel, extremely weak to very weak, angular to sub rounded, fine gneiss with becoming fine to medium quartz from 8.60-8.95m	6.30	
	6.30		100			D	1,2,2,2,3,3			
8	7.50		100			D	2,2,3,3,4,4			
9	8.60					D*				
	9.00		100			D	2,4,4,5,6,6		9.00	
10			100					As next sheet		10.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene



Note: Undisturbed sampling attempted at 2.5, 4.60 & 9.00m but refused
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Stand pipe installed 0.0-15.0m
Slotted section 1.5-14.5m
0.0-1.0m Concrete
1.0-1.5m bentonite
1.50-14.5m Gravel pack
14.5-15.0 Gravel

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 0+941**Coordinates (E/N):** 457003 36440**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-15m)**BH No.:** BH303**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-15.0m)**Date Started:** 20-Sep-14**Date Completed:** 22-Sep-2014**Total Depth:** 15**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
10	10.60					10.60		Stiff to very stiff, pink, 20-60° inclined, very narrowly banded micaceous Clayey SILT (Completely Weathered Mica Gneiss)		
11						D 11.05	2,6,6,9,12,12			
	11.70		100							
12	12.25		100			12.25				
						D 12.70	2,5,2,9,11,13			
13	13.20		100							
	13.80		100			13.80				
14						D 14.25	3,6,9,11,11,12			
15	15.00		100						15.00	15.00
16										
17										
18										
19										
20										



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Mizen Beyene

Note: Undisturbed sampling attempted at 2.5, 4.60 & 9.00m but refused
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Stand pipe installed 0.0-15.0m
Slotted section 1.5-14.5m
0.0-1.0m Concrete
1.0-1.5m bentonite
1.50-14.5m Gravel pack
14.5-15.0 Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 1+579**Coordinates (E/N):** 457521 36883**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH304**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 23-Sep-14**Date Completed:** 24-Sep-2014**Total Depth:** 20**Water level (m):** 3.60**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0			80					Very soft, dark brown Silty CLAY with rare, extremely weak to very weak, angular, fine gneiss & numerous rootlets from 0.0-0.45m (Top Soil)		
1	1.00					D	1/15cm, 1, 1, 1, 1		1.80	
2	2.00					D*		Very soft, reddish brown, Silty CLAY with rare, extremely weak to very weak, angular to sub rounded, fine to medium gneiss (Residual Soil).		
2	2.55					UD				
3		115mm				D	1/15cm, 1, 1, 1, 1		3.75	
4	4.00					D	1, 1, 1, 1, 1, 1	Very soft, orange brown, 10-60° inclined, friable, very narrowly banded, Silty CLAY with becoming, stiff Sandy SILT from 5.40-6.45m (Completely Weathered Gneiss)		
5	5.10					D*				5.00
5	5.40					UD				
6						D	2, 3, 4, 4, 5, 5		6.45	
7	6.60							Medium dense, orange, 10-30° inclined, friable, very narrowly to narrowly banded, Silty SAND with medium dense, pink coarse Sand and gravel, cobble & boulder size quartz from 6.45-6.95m (Completely Weathered Granitic Gneiss)		
7	7.00					D	2, 3, 3, 4, 5, 5			
8						D*				
8	8.60					UD				
9						D	3, 4, 5, 5, 7, 8			
9	9.50									
10										10.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 1+579**Coordinates (E/N):** 457521 36883**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH304**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 23-Sep-14**Date Completed:** 24-Sep-2014**Total Depth:** 20**Water level (m):** 3.60**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
10	10.25					10.25				
						D	3,4,4,4,5,6			
11		100				10.70 11.10				
						D*				
	11.60					11.25 11.60		Stiff, light gray and pink, 10-30° inclined, very narrowly banded, slightly Silty CLAY (Completely Weathered Gneiss)		
12		100				D	2,3,4,5,5,5			
	12.50					12.05 12.50				
	12.85	100				UD				
13		100				D	2,3,4,4,5,5			
	13.70					13.30 13.70				
14		100				SC		Medium dense, orange, 10-60° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)		
						14.55				
15	15.00	100				D	2,3,4,6,6,7			15.00
						15.00				
16		100								
	16.55					16.55				
17		100				D	2,5,7,10,13,15	Dense to very dense, grey, 10-60° inclined, friable, narrowly banded, slightly micaceous Silty SAND (Completely Weathered Mica Gneiss)		
						17.00				
18										
	18.5					18.50				
19		100				D	5,6,8,11,15,17			
						18.95				
20	20									20.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title	Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 1 of 2

Project: Kampala - Jinja

Location: 2+448

Coordinates (E/N): 456677.762 36140.804

Ground Elevation (masl.):

Drilling Method: Dry (0.0-5.5m), Water flush (5.5-21.4)

Type of Rig: APAFOR 560

BH No.: BH305

BH Inclination: 90°

Bit type: Carbide/diamond




Borehole diameter (mm): 97

Core diameter (mm): 75

Date Started: Jan. 24, 2014 **Date Completed:** Jan. 27, 2013

Total Depth: 21.4

Water level: 1.0

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.60	100					Soft, reddish brown, CLAY with occasional angular fine gravel size brick, angular medium gravel size Quartz and a sweat wrapper (Imported fill)	0.6	
1	1.50	100			1.50	1,2,2		1.6	
2	2.60	100			1.95		Soft, light gray, CLAY with occasional rootlets, angular coarse gravel size wood, and angular coarse quartz gravel (Alluvium)	2.6	
3	3.00	100			2.6				
4	4.00	100			UD	3,5,8	Firm, light to yellowish brown, micaceous, Sandy SILT (Alluvium)		
5	4.40	100			D	7,12,17	Stiff, light gray, micaceous, Sandy SILT with extremely to very closely, extremely to very thin (10 to 25mm) sub horizontal bands of brown CLAY (Residual Soil)	6.5	
6	5.00	100			D	8,12,18			
7	5.70	100			D	4,3,3,6,6,8	Very thinly interbanded, extremely weak, yellowish brown, fine grained, foliated GNEISS and firm brown CLAY. Between 7.55-7.85 & 8.5-8.6m, very closely spaced 40-70°, planar, smooth, tight and orange stained fractures noted (Moderately weathered GNEISS)	8.6	
8	7.10				7.10	3,6,6,7,10,10			
9	8.60				7.55	2,3,10,15,15,19			
10	9.05				D				
	9.90				9.90				
	10.00				D	3,8,14,17,29,21/2.5cm			10.00
		42			10.32				

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: From 1.5 to 5.5m, SPT blows counted for 15cm. Below 5.5m SPT blows counted for 7.5cm increments

D=Disturbed Sample
UD=Undisturbed Sample
RC=Rock Core Sample
HF= Highly Fractured

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title	Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 2 of 2

Project: Kampala - Jinja

Location: 2+448

Coordinates (E/N): 456677.762 36140.804

Ground Elevation (masl.):

Drilling Method: Dry (0.0-5.5m), Water flush (5.5-21.4)

Type of Rig: APAFOR 560

BH No.: BH305

BH Inclination: 90°

Bit type: Carbide/diamond

Borehole diameter (mm): 97

Core diameter (mm): 75

Date Started: Jan. 24, 2014 **Date Completed:** Jan. 27, 2013

Total Depth: 21.4

Water level: 1.0

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
11	11.10									
	11.50					11.50				
12			Cuttings			D	2,4,14,36/4.5 cm	Interbanded, extremely weak, yellowish gray, medium grained, GNEISS and firm brown CLAY. Sub horizontal to 45° brown healed fractures. Mainly recovered as micaceous Silty Sand and occasionally as 30 to 150mm thick clay bands and as corestones (Highly and moderately weathered GNEISS)		
						11.77				
13	13.00					13.00	18,32/3.5cm			
						13.11				
14			15							
	14.75					15.00				
15	15.00		Cuttings			15.165	10,40/1.5cm	Very weak, gray and dark gray, fractured GEISS. Joints closely spaced dominantly sub horizontal, planar, rough and brown stained.	15.3	15.00
	15.75									
16			63	36						
17	17.00								17.0	
18			Cuttings					Extremely weak, gray and dark gray, GNEISS mainly recovered as micaceous Silty Sand (Highly and moderately weathered GNEISS)		
19	19					19				
	19.45		100			D	2,8,10,11,8,10		19.5	
						19.45				
20			100					Firm, yellow with orange molting, Silty CLAY with very closely to closely spaced subhorizontal thin bands of firm brown Clay		20.00
	20.30					20.3				
			Cuttings			D	2,6,8,11,12,19			
21	21.4					20.75			21.4	21.4

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse




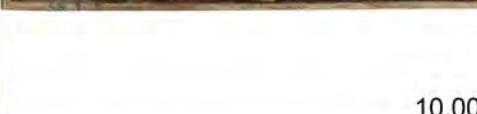

Note: From 1.5 to 5.5m, SPT blows counted for 15cm. Below 5.5m SPT blows counted for 7.5cm increments

D=Disturbed Sample
UD=Undisturbed Sample
RC=Rock Core Sample
HF= Highly Fractured

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 2+660**Coordinates (E/N):** 458406 37440**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH306**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 25-Sep-14**Date Completed:** 26-Sep-2014**Total Depth:** 20**Water level (m):** 0.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0			75					Very soft, reddish brown Clayey Sandy SILT with, extremely weak to weak, angular, fine to medium gneiss, numerous rootlets and plastics (Made Ground)		
1	1.00	115mm				D	Penetrated by hammer self weight		1.35	
			100			1.45			1.65	
2	2.00					UD		Very soft, dark grey, CLAY (Top Soil).		
	2.65		100					Very soft, grey, CLAY with becoming, stiff, Gravelly Sandy SILT from 2.65-3.50m (Residual Soil)		
3						D	1,1,3,4,6,6		3.50	
			100			3.45				
4	4.00					D	1,1,2,3,3,4	Firm, orange & grey, 10-60°, inclined, friable, very narrowly to narrowly banded, micaceous slightly Sandy Silty CLAY with becoming Stiff slightly Gravelly Sandy Silty CLAY from 6.75-8.30m (Completely Weathered Mica Gneiss)		
			100			4.45				
5	5.00					UD				
	5.25		100			D	1,3,2,3,3,4			
6										
			100			5.70				
7	6.75					D	1,2,3,4,5,6			
	7.50								8.30	
8										
			100			8.70				
9	8.70					D	3,3,4,5,6,6	Medium dense, orange, pink & grey, 10-60° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)		
						9.15				
						9.55				
10			100			D*				
						9.75				10.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

Note: Undisturbed sampling attempted at 8.70m but refused

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
SC=Soil Core Sub Sample
RC=Rock Core Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 2+660**Coordinates (E/N):** 458406 37440**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH306**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 25-Sep-14**Date Completed:** 26-Sep-2014**Total Depth:** 20**Water level (m):** 0.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
10	10.40					10.40				
						D	3,3,4,6,6,5			
11		100				10.85				
	11.75									
12	12.25	100				12.25				
						D	2,4,5,6,6,8			
						12.70				
13	13.50	100								
						14.10				
14	14.10	100				D	2,3,5,5,7,8			
						14.55				
15	15.00	100				SC		Dense, pink, orange & grey, 10-60° inclined, friable, very narrowly to narrowly banded, slightly micaceous Clayey Silty SAND (Completely Weathered Micaceous Granitic Gneiss)		15.00
	15.40	100				15.00				
16	16.00	100				16.00				
						D	4,8,8,8,9,10			
						16.45				
17		100								
18	18.00					18.00				
						D	3,4,8,8,9,9			
						18.45				
19		100								
						19.55				
20	20					D	5,5,6,8,10,12			20.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

Note: Undisturbed sampling attempted at 8.70m but refused

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample
 SC=Soil Core Sub Sample
 RC=Rock Core Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 1 of 2

Project: Kampala - Jinja Express Road

Location: 2+801

Coordinates (E/N): 458546.365 37351.894

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-10.3), Water flush (10.3-18.0), Mud flush (16-18)

BH No.: BH307

BH Inclination: 90°

Bit type: Carbide/diamond

Borehole diameter (mm): 97


Date Started: Jan. 28, 2014

Date Completed: Jan. 30, 2014

Total Depth: 18.1

Water level (m): 1.0

Core diameter (mm): 75

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.30	115mm	100			0.5		Firm, Reddish brown, slightly gravelly silty CLAY with occasional plastic bags, lids and occasional angular gravel and cobble size pieces of concrete, ceramic and stone (Made Ground)	0.5	
1	1.40		100			1.40			1.2	
2	2.00		100			1.89	2/49cm		2.6	
3	3.15		100			2.60		Soft, Reddish brown, slightly gravelly silty CLAY (Made Ground)		
4	4.20		100			3.00	1/15cm, 1/15cm, 2/15cm	Very soft, light gray, CLAY (Alluvium).	4.0	
5	5.00		100			3.80		Very soft, light gray with orange mottling, CLAY (Alluvium).	4.3	
6	6.20		100			4.65	3,5,4,3,2,2	Firm, light gray with orange mottling, angular, medium to coarse gravelly CLAY (Alluvium).	5.7	
7	6.60		100			5.65		Thinly interbanded, firm, brown CLAY AND light gray sandy CLAY with occasional thin bands of angular coarse quartz sand (Completely Weathered Gneiss)	7.3	
8	8.10		100			6.20		Interbanded, thin bands of orange brown very clayey medium and coarse SAND with very closely to closely spaced very thin bands of firm brown clay (Completely Weathered Gneiss)		
9	9.40		100			8.10	4,5,5,6,8,9			
10	10.00		100			8.55	3,4,5,6,7,11	Angular and subangular, coarse gravel size		10.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 4 & 4.2m but refused
Hand dug pit (0.0-1.0m) & Hand auger (1.0-1.4m) conducted adjacent to the borehole to supplement logging of the Made Ground

Abbreviations:

D=Disturbed Sample (Split Spoon Sample)

D*=Disturbed Sample (from core box)

DTP=Disturbed Sample from Test Pit

UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 2 of 2

Project: Kampala - Jinja Express Road

Location: 2+801

Coordinates (E/N): 458546.365 37351.894

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-10.3), Water flush (10.3-18.0), Mud flush (16-18)

BH No.: BH307

BH Inclination: 90°

Bit type: Carbide/diamond

Borehole diameter (mm): 97

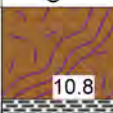

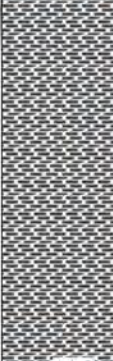

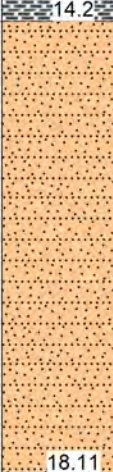

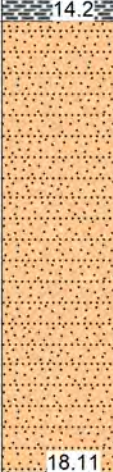

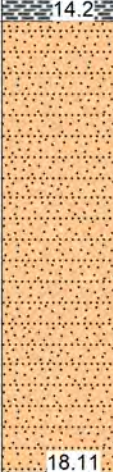

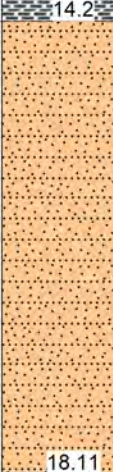

Date Started: Jan. 28, 2014

Date Completed: Jan. 30, 2014

Total Depth: 18.1

Water level (m): 1.0

Core diameter (mm): 75

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.30		100			9.85		corestones of extremely weak white with orange staining medium grained GNEISS with some matrix of brown micaceous silty CLAY (Moderately Weathered Gneiss)		
	10.80		100							
11	11.10					11.10	9,13,14,20,20,15	Very stiff, white and gray, micaceous, Silty CLAY (Residual Soil). Friable when dry		
						11.55				
12						12.50	4,6,8,10,13,21	Very dense, orange brown, fine to medium, Silty SAND with occasional coarse grained pink quartz sand (Completely weathered Gneiss)		
	12.5					12.95				
13						14.20	3,6,10,25,31,19/3cm			
	14.20					14.41				
15						16.00	5,11,21,23,30,20/1.5cm			
	16.00					16.45				
17						18.00				
	18.11					18.11	18, 32/3.5cm			
19										
20										

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 4 & 4.2m but refused
Hand dug pit (0.0-1.0m) & Hand auger (1.0-1.4m) conducted adjacent to the borehole to supplement logging of the Made Ground

Abbreviations:

D=Disturbed Sample (Split Spoon Sample)

D*=Disturbed Sample (from core box)

DTP=Disturbed Sample from Test Pit

UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title	Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 1 of 2

Project: Kampala - Jinja Express Road

Location: 3+062

Coordinates (E/N): 459162 37133

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-16.15m), Water flush by Triple core barrel (16.15-20.00m)

BH No.: BH308

BH Inclination: 90°

Bit type: Carbide

Borehole diameter (mm): 97 **Core diameter (mm):** 75

Date Started: Feb. 04, 2014 **Date Completed:** Feb. 08, 2014

Total Depth: 20

Water level (m): 0.9

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0		100					Light gray, medium to coarse grained, angular Gravelly CLAY with occasional medium and coarse gravel size angular concrete and cement (Made Ground)	0.3	
0.80									
1		100			1.4				
1.40					D	1/15cm, 1/24cm, 1/17cm			
2		100			1.96				
2.70	115mm				2.7		Very soft, light brown, CLAY with occasional medium to coarse grained, angular quartz gravel (Made Ground)		
3		50			-	Penetrated by hammer self weight			
3.35					D	1/11cm, 1/13cm, 1/10cm, 1/11cm		3.65	
4		10			3.8		Very soft, light to dark gray, CLAY with occasional, angular, fine grained, Quartz Gravel and occasional rootlets (Alluvium). Below 5.8 orange mottled		
5					5				5.00
5.45		100			D	1/9.5cm, 1/5.5cm, 2/10cm, 1/5cm, 2/7.5cm,			
6					5.45			6.00	
6.40		100			6.4				
7		100			UD				
7.45					D	2,2,3,3,4,4	Intermixed, firm, light brown, light gray & light green, CLAY AND coarse gravel size pockets of stiff, orange brown, SILT (Residual Soil)		
8		100			7.45				
8.50					8.5				
9		100			D	1,2,3,4,4,4			
8.95					8.95				
9.70		100			UD				
10					D	1,2,3,3,3,4		10.00	

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Site Photograph:

Note: Undisturbed sampling attempted between 4-5m, but no recovery

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil Core Sample



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 2 of 2

Project: Kampala - Jinja Express Road

Location: 3+062

Coordinates (E/N): 459162 37133

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-16.15m), Water flush by Triple core barrel (16.15-20.00m)

BH No.: BH308

BH Inclination: 90°

Bit type: Carbide

Borehole diameter (mm): 97 **Core diameter (mm):** 75

Date Started: Feb. 04, 2014 **Date Completed:** Feb. 08, 2014

Total Depth: 20

Water level (m): 0.9

	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)	Sampling				
10	10.70		100			SC				
11	11.00		100			UD				
						D	1,2,2,3,4,5	Firm, light green with gray and orange mottling, Silty CLAY. Below 11.6m, very closely spaced, extremely thin bands of soft, light green clay.		
12	12.40		100							
						D	2,3,4,4,6,8			
13										
						D	2,2,4,6,6,11			
14	14.20									
						D	2,5,6,8,11,13	Extremely weak, light gray and white, coarse sand size GRANITE with very closely spaced and locally extremely closely spaced, 5-25mm thick bands of soft to firm, light brown slightly sandy CLAY (Moderately Weathered Granite)		
15	15.15									
						D*	1,3,7,10,14,20			
16	16.15									
						D*	1,4,12,15,16, 16	Extremely weak, light gray and white, coarse sand size GRANITE (Slightly weathered Granite). Mainly recovered as light brown fine to medium sand with occasional very thin firm clay bands.		
17	17.00									
						D*				
18	18.35									
19	19.00									
20	20.00									

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Site Photograph:

Note: Undisturbed sampling attempted between 4-5m, but no recovery

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil Core Sample



Project: Kampala - Jinja Express Road**Location:** 3+526**Coordinates (E/N):** 459379 37204**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20m)**BH No.:** BH309**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 27-Sep-14**Date Completed:** 30-Sep-2014**Total Depth:** 20**Water level (m):** 0.60**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm)					
0			70					Very soft, reddish brown Sandy Clayey SILT with occasional, extremely weak to weak, angular, fine to medium gneiss & quartz gravels, gravel & cobble size bricks & concretes, hair (wig) and pieces of clothes (Made Ground)		
1	1.00	115mm				1.00	Penetrated by hammer self weight			
						D				
						1.45				
						1.80				
2	2.00					D*	2,2,7,7,7,8			
	2.25		100			UD				
						D				
						2.70				
3	3.10						4,5,3,4,4,4	Stiff, grey & orange, Clayey Sandy SILT with occasional angular, weak to medium strong, medium to coarse gneiss & quartz gravels (Alluvium)		
	3.50		75	0	<1					
	3.80		95	0	<1					
4	4.50		65	0	<1		1,2,2,2,2,3	Stiff, pink & light grey, Clayey medium to coarse grained, angular, strong, quartz GRAVEL (Alluvium)		
	5.00		65	0	<1					
5	5.40		100			5.50				
						D				
6	6.60		100			5.95	3,3,3,4,6,6	Firm to stiff, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY with occasional extremely weak to weak, very angular, fine to medium, quartz gravels (Completely Weathered Mica Gneiss)		
						6.60				
7	7.40		100			UD				
						D				
8			100			7.85				
						8.35				
						D*				
						8.55				
9	9.00					9.00				
						D				
						9.45				
10	10.00		100							

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Mizen Beyene

Note: Undisturbed sampling attempted at 15.50m but refused

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample
 SC=Soil Core Sub Sample
 RC=Rock Core Sample

Site Photograph:



Effective Date: 10/01/2013 Sheet: 2 of 2

ALPHA GEO ENGINEERING (U) LTD.	Title	Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 1 of 2

Project: Kampala - Jinja Express Road

Location: 3+526

Coordinates (E/N): 459162 37133

Ground Elevation (masl.):

Drilling Method: dry(0.0-18.5m), Water flush(18.5-21.0)

Type of Rig: APAFOR 560

BH No.: BH310

BH Inclination: 90°

Bit type: Carbide





Borehole diameter (mm): 97

Core diameter (mm): 75

Date Started: Jan. 31, 2014 **Date Completed:** Feb. 04, 2014

Total Depth: 21.45

Water level (m): 2.3

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0					0.50		Friable, light brown sandy, slightly gravelly CLAY (Made Ground).	0.5	
1	1.50	100			0.95	1,1,2,2,2,2	Gravels angular and fine to coarse Quartz with occasional concrete		
2	2.50	100			2.10	3/60cm	Soft, reddish brown, micaceous CLAY with some gravel size firm to stiff clay lumps,	2.5	
3	3.00	100			2.70	3/60cm	occasional angular gravel size quartz and medium gravel size sub angular cement. Below 1.5m more friable (Made Ground). Quartzite boulder/cobble (8cm long core) encountered at 2.3m and the hole was moved 80cm to get past the boulder/cobble.		
4	4.50	100			3.30				
5					4.50	3/40cm			
6	6.00	100			5.40	1,3,3 (every 15cm)	Very soft, orange brown, slightly sandy CLAY with occasional angular, fine to coarse quartz gravel (Made Ground)	5.6	
7	6.30	100			5.80			6.0	
8	7.00	100			6.30	1,4,4,2,2,2	Soft, dark gray, sandy CLAY with black plant debris between 5.6-5.7m (Top soil) (Alluvium)	7.4	
9	7.20	100			6.85				
10	7.40	100			7.85	2,11,7,6,6,8	Soft to firm, gray, CLAY with light gray, medium to coarse grained, Sand between 6.8 to 6.9m (Alluvium)	8.5	
	7.85	100			9.30				
	8.50	100			9.30				
	9.30	100			UD	1,2,3,4,4,6	Stiff, light gray, medium to coarse grained, angular, quartz gravelly		
	10.40	100			D				
	10.70	100			D*				

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 6.0, 7.2, 7.4, 11.5 & 15.35m but refused

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=soil core sample for triaxial test

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 2 of 2

Project: Kampala - Jinja Express Road

Location: 3+526

Coordinates (E/N): 459162 37133

Ground Elevation (masl.):

Drilling Method: dry(0.0-18.5m), Water flush(18.5-21.0)

Type of Rig: APAFOR 560

BH No.: BH310

BH Inclination: 90°

Bit type: Carbide




Borehole diameter (mm): 97

Core diameter (mm): 75

Date Started: Jan. 31, 2014 **Date Completed:** Feb. 04, 2014

Total Depth: 21.45

Water level (m): 2.3

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
11	11.50		100			D	1,3,3,5,5,7	to very gravelly CLAY (Residual Soil)		
12	12.35		100							
13	13.35		100			D	1,3,4,7,6,8			
14	13.80		100							
14	14.70		100			D	3,5,6,7,8,8			
15	15.35		100			SC		Interbanded, Stiff, very thin occasionally thin, bands of orange brown & light gray, micaceous, very sandy CLAY AND brown, extremely thin, occasionally very thin bands of micaceous, slightly Sandy CLAY (Completely Weathered Gneiss)		
16	16.50		100			D	1,3,4,5,6,8			
17	17.00		100							
18	18.50		100			D	1,4,6,8,10,14			
19	19.00					SC				
20	21.00					D	3,5,5,7,8,9	Pink and gray, extremely weak, extremely thin (10-20°) banded, micaceous, granitic GNEISS (Slightly Weathered Granitic Gneiss). Mainly recovered as brown silty Sand		
21	21.45									

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 6.0, 7.2, 7.4, 11.5 & 15.35m but refused

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=soil core sample for triaxial test

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 1 of 3

Project: Kampala - Jinja Express Road

Location: 3+754

Coordinates (E/N): 459441.842 37048.907

Ground Elevation (masl.):

Drilling Method: dry (0.0-3.3m), Water flush by Triple core barrel (3.3-18.65)

Type of Rig: APAFOR 560

BH No.: BH311

BH Inclination: 90°

Bit type: Carbide/Diamond

Core diameter (mm): 75 (0-3.3m), 61mm (3.3-20.0)

Total Depth: 18.65

Water level (m): 0.35

Borehole diameter (mm): 97

Date Started: Feb. 10, 2014 **Date Completed:** Feb. 14, 2014

Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)				
0						Very soft, light brown & reddish brown CLAY with some rootlets (Alluvium)	0.70	
1	1.35							
2	2.50				1.50 1.95 2.35	Firm, orange brown with light gray mottling, CLAY with occasional rootlets (Alluvium)		
3	3.00				3,11,11,9, 8/2.5cm		3.30	
4	3.50					Orange brown and light gray, clayey, medium to coarse grained, angular quartz GRAVEL (Alluvium)	3.90	
5	3.70					Firm to stiff, orange brown with occasional light gray mottling, CLAY with occasional fine to medium, subrounded gravel size corestones of Gneiss (Residual Soil)	4.50	
6	4.15				3/7cm			
7	4.50					Extremely weak, orange brown, medium grained, occasional gravel size corestones, thinly banded GNEISS with occasional closely spaced, very thin to thin, subhorizontal. bands of	6.00	
8	4.80				8,10,10,9,12, 20			
9	4.90							
10	5.70				12,19,37, 13/2.5cm			
11	6.40							
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Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse






Note:

D=Disturbed Sample (split spoon)
D*=Disturbed Sample (core box)
UD=Undisturbed Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 3+754**Coordinates (E/N):** 459441.842 37048.907**Ground Elevation (masl.):****Drilling Method:** dry (0.0-3.3m), Water flush by Triple core barrel (3.3-18.65)**Type of Rig:** APAFOR 560**BH No.:** BH311**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-3.3m), 61mm (3.3-20.0)**Total Depth:** 18.65**Water level (m):** 0.35**Borehole diameter (mm):** 97**Date Started:** Feb. 10, 2014 **Date Completed:** Feb. 14, 2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	7.50							light gray, very sandy clay (Moderately weathered GNEISS)		
	8.00		60			8.00 D	10,16,25, 25/6.5cm			
9						8.29		Extremely weak, orange brown, medium grained, 20-30° inclined, extremely thinly foliated, mica SCHIST with occasional, very closely spaced, very thin, subhorizontal, bands of brown slightly sandy clay (Moderately weathered mica Schist)		
	9.30		40							
10										10.00
	10.30		40			10.30 D	5,8,10,11,11,9			
11						10.75		Interbanded, extremely weak, fine grained, 20-30° inclined orange brown & pink, extremely thin, schistose banding, mica SCHIST AND firm, pink brown, very thin, subhorizontal bands of CLAY (Moderately weathered mica Schist). Partly recovered as brown and white fine sand size mica.		
	11.80		10			11.80 D	4,5,8,12,9,15			
12						12.25				
	12.80		77			12.80 D*				
13						13				
	13.30									
14			25							

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (split spoon)
D*=Disturbed Sample (core box)
UD=Undisturbed Sample

Site Photograph:

	ALPHA GEO ENGINEERING (U) LTD.	Title	Borehole Log Sheet	
		Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 3 of 3

Project: Kampala - Jinja Express Road

Location: 3+754

Coordinates (E/N): 459441.842 37048.907

Ground Elevation (masl.):

Drilling Method: dry (0.0-3.3m), Water flush by Triple core barrel (3.3-18.65)

Type of Rig: APAFOR 560

BH No.: BH311

BH Inclination: 90°

Bit type: Carbide/Diamond

Core diameter (mm): 75 (0-3.3m), 61mm (3.3-20.0)

Total Depth: 18.65

Water level (m): 0.35

Borehole diameter (mm): 97

Date Started: Feb. 10, 2014 **Date Completed:** Feb. 14, 2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
15	14.30	10				D 14.30	2,2,12,25, 50/11cm	Extremely weak, orange brown and white, medium grained, 30 -60° inclined, extremely thin, schistose banding, mica SCHIST with occasional very thin bands of brown slightly sandy clay (Moderately weathered mica Schist). (Mainly recovered as brown and white medium to coarse sand size mica).	14.30	15.00
16	16.30					D 16.30	3,4,7,19,20,30	Firm, white, very gravelly CLAY. Gravel composed of angular medium and coarse quartz (Moderately Weathered Quartz Vein)	15.50	
17		Cuttings				16.75		(Moderately Weathered mica Schist) as 14.30 to 15.50m interval	16.30	18.85
18						18.20	7,50/5cm	Extremely strong, white, coarse grained, fractured QUARTZITE (Recovered as gravel and cobble size fragments) (QUARTZITE)	18.40	
19	18.60	25	0			18.33			18.85	
20	18.70	90	0	1.25						
21	18.85	100	67	2						

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note:

D=Disturbed Sample (split spoon)
D*=Disturbed Sample (core box)
UD=Undisturbed Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 5+311**Coordinates (E/N):** 460690 36130**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**BH No.:** BH312**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-18.5m), 61mm (18.5-20.0)**Date Started:** Feb. 25, 2014 **Date Completed:** Feb. 28, 2014**Drilling Method:** dry (0.0-18.5.0m), Water flush by double core barrel (6.50-7.50, 11.50-12.70m) & Triple core barrel (18.5-20m)**Total Depth:** 20.45**Water level (m):** 2.8**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.70		100			0.70		Reddish brown, medium to coarse, very (quartz) gravelly CLAY (Made Ground)	0.70	
1	1.50		100			D	1/18.5cm, 1/11.5cm, 1/10cm, 1/9cm	Very soft, dark gray with orange brown mottling, CLAY with occasional rootlets (Alluvium)		
2	2.30		100			UD			2.30	
3	3.50		100			D	1/11cm, 1/4cm, 2,2,3,3			
4	4.50		100			D*	1/9cm, 1/6cm, 2,2,3,3	Extremely thinly, 30-40° inclined interbanded, firm to stiff, orange brown, light green and light gray CLAY with occasional rootlets (Residual Soil)		
5	5.20		100			UD				5.00
						D	2,4,4,5,5,5		5.70	
6	6.20		100				5.65	Stiff, light gray with light green mottling, slightly sandy CLAY with extremely closely to very closely spaced, thin, subhorizontal bands of orange brown clay and light gray slightly clayey	6.00	
	6.50		100			D	7,13,15,13,14, 15		6.50	
7			100				6.95			







Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 18.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 5+311**Coordinates (E/N):** 460690 36130**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-18.5.0m), Water flush by double core barrel (6.50-7.50, 11.50-12.70m) & Triple core barrel (18.5-20m)**BH No.:** BH312**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-18.5m), 61mm (18.5-20.0)**Date Started:** Feb. 25, 2014 **Date Completed:** Feb. 28, 2014**Total Depth:** 20.45**Water level (m):** 2.8**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	7.50	115mm				7.50	2,4,4,5,5,5	medium sand (Residual Soil)	7.50	
	8.00		100			7.65		Very dense, white and light gray, coarse SAND and fine GRAVEL size, very strong, quartzite fragments in some firm brown clay matrix (Moderately Weathered Quartzite)		
	8.40		100			8.00				
9		115mm				UD	No penetration by 10 blows			
						D		Very dense, white and pink, angular occasionally subrounded, fine to coarse GRAVEL size, very strong, quartzite fragments in some firm brown clay matrix (Moderately Weathered Quartzite)	9.80	
						8.85				
10		115mm				9.30	1,3,4,5,5,7			
						SC		Extremely thin to thinly interbanded, stiff, 20-40° inclined, orange brown, micaceous, CLAY AND stiff, light gray CLAY (Completely weathered Gneiss)	11.50	
						9.80				
11	9.80	115mm				10.25	6,6,6,7,7,9			
	10.25		100			10.7		White and pink, angular to subrounded, fine to coarse GRAVEL size and occasionally cobble size fragments of extremely strong, quartzite in some clay matrix (Moderately Weathered Quartzite)	10.25	
						D				
12		115mm				11.20				
						D*		Interbanded, stiff, extremely thin to thin, 10-20° inclined banded	11.50	
						11.35			11.65	
13		115mm				12.70				
						-				
						13.15				
14		115mm				14.00				
	14.00								14.00	

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 18.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 5+311**Coordinates (E/N):** 460690 36130**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-18.5.0m), Water flush by double core barrel (6.50-7.50, 11.50-12.70m) & Triple core barrel (18.5-20m)**BH No.:** BH312**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-18.5m), 61mm (18.5-20.0)**Date Started:** Feb. 25, 2014 **Date Completed:** Feb. 28, 2014**Total Depth:** 20.45**Water level (m):** 2.8**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) No. of Frac.					
15	14.70		60			UD(DN)	3,3,3,4,7,8	CLAY AND extremely weak, pink brown and light gray, extremely thin, 10-20° inclined foliated GNEISS (Highly weathered Gneiss)		15.00
						D				
16			63				3,3,3,4,5,6	Extremely strong, white, coarse grained, QUARTZITE (Quartz Vein). Recovered as, angular, coarse gravel and cobble size quartzite fragments (Highly weathered Gneiss) as 10.25 to 11.50m interval		
	16.50					D				
17			20				5,7,8,10,10,11	Stiff, brown and light gray, micaceous CLAY with occasional very closely spaced, extremely thin 30° inclined, orange brown clay bands (Completely Weathered Gneiss)		
	17.70					D				
18			100			SC	4,5,6,8,10,11	Extremely weak, extremely thinly banded, 10-20° inclined, white, brown and orange brown foliated, micaceous GNEISS with occasional extremely thin, light green clay and coarse gravel size pockets of white fine to medium quartz gravel (Moderately weathered Gneiss). Recovered as brown, micaceous fine sand		20.45
	18.50					D				
19			Cuttings							
20										
	20.00									
21										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 18.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample
by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 5+952**Coordinates (E/N):** 461283.828 36310.989**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-6.50, 8.85-12m), Water flush by double core barrel (6.50-8.85m) & Triple core barrel (12-20m)**BH No.:** BH313**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12m), 61mm (12-20)**Date Started:** 1-Mar-14**Date Completed:** 4-Mar-2014**Total Depth:** 20**Water level (m):** 4.6**Borehole diameter (mm):** 97

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0		100					Reddish brown, CLAY with some angular, fine to coarse quartz gravel and occasional, coarse gravel size concrete, ceramic and brick (Made ground)	0.80	
1	1.00	100			1.35		Pieces of plastic bags and clothes (20-60mm size) (Made Ground)	1.00	
	1.35	100						1.35	
2		100			UD		Firm, Reddish brown and dark brown, CLAY with some grasses, occasional angular, coarse quartz gravel and coarse gravel size bricks (Made Ground)		
	2.35					1,1,2,1,3,4		2.65	
3		100			D*				
	3.50					3,4,5,5,7,7			
4		100			D		Soft, dark gray, CLAY (Alluvium)		
	4.50						Stiff, brown and orange brown, very sandy CLAY with stiff, very closely spaced, extremely thinly to thinly, subhorizontally interbanded, light gray, slightly sandy clay (Residual Soil)		
5	5.00	100			UD			5.30	5.00
					B	4,6,6,6,7,6		6.00	
6		100					White, angular, fine to coarse, very strong quartz GRAVEL in some brown firm clay matrix (moderately Weathered Quartzite)	6.70	
	6.50				B	2,4,9,12,12,13			
7	7.00	100					Extremely thinly occasionally thinly interbanded, stiff, light gray, CLAY AND stiff, brown with orange brown mottling, CLAY (Completely Weathered Gneiss)	7.85	
	7.25	100							
8	7.85	60							
	8.50	85			8.50				
9	8.85	100			UD		Dense, white and pink brown, angular, fine to		
					D	1,2,3,3,3,4			
10		100							10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample
by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 5+952**Coordinates (E/N):** 461283.828 36310.989**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-6.50, 8.85-12m), Water flush by double core barrel (6.50-8.85m) & Triple core barrel (12-20m)**BH No.:** BH313**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12m), 61mm (12-20)**Date Started:** 1-Mar-14**Date Completed:** 4-Mar-2014**Total Depth:** 20**Water level (m):** 4.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.25					10.25		coarse GRAVEL and cobble size, extremely strong quartzite fragments in some clay matrix (Moderately Weathered Quartzite)		
						D	5,5,4,4,6,10			
11	11.00		100			11.00		Extremely thinly to very thinly, 20-30° inclined, interbanded, firm to stiff, orange brown, micaceous CLAY AND firm to stiff, dark gray, micaceous CLAY with rare extremely thin (10mm) subhorizontal bands of angular, medium quartz gravel (Completely weathered Gneiss)	11.50	
						UD(DN)				
12	12.00		65			12.00		Very thinly subhorizontally, interbanded, stiff, orange with reddish brown mottling CLAY AND stiff, light green and light gray CLAY (Completely Weathered Gneiss)		
						D	4,4,4,4,4,4			
13	13.10					13.10		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,	13.20	
						D	28,22/2.5cm			
14	13.80					13.80		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D	13,24,45,5/0.5 cm			
15	14.40					14.40		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D	19,19,21,29/1.5cm			
16	14.65					14.65		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D	50/6cm			
17	16.65					16.65		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D				
18	18.65					18.65		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D				
19	20.00					20.00		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D				
20	20.00					20.00		Extremely weak, white, dark gray, orange brown and light green, 20-30° inclined, extremely thinly foliated GNEISS with rare very weak, dark gray, angular, coarse gravel size fragments of gneiss and extremely thin angular 20° inclined, medium gravel size quartz band (Slightly Weathered Gneiss). Recovered as brown and dark gray, micaceous,		
						D				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample
by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 6+497**Coordinates (E/N):** 461802 36497**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-7.5), Water flush by double core barrel (7.50-15.70)**BH No.:** BH314**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-7.5m), 64 (7.5-15.70)**Date Started:** 7-Mar-14**Date Completed:** 9-Mar-2014**Total Depth:** 15.7**Water level (m):** 3.95**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.20		100					Soft, light brown CLAY with occasional coarse gravel size bricks and coarse gravel size concrete (Made Ground)	0.35	
			25							
1	1.00					1.00	1,15cm, 1,1,2,1			
						D				
			100			1.45		Soft to firm, dark gray with orange brown mottling CLAY with occasional, rootlets (Alluvium)		
2	2.00					2.00				
			100			UD				
	2.35					D	1,2,2,3,3,4		2.80	
3			100			2.80		Very thinly, 20-40° inclined interbanded, firm, orange brown, CLAY AND firm light gray, CLAY (Residual Soil)		
						D*				
	3.50					3.50				
						D	2,2,2,3,3,4		4.00	
4			100			3.95		Interbanded, light gray, thin banded, medium to coarse SAND AND firm, light gray, very thin banded CLAY (Residual Soil)	4.50	
	4.50					4.50				
			100			UD				
5	5.00									5.00
						D	1,2,2,4,4,4			
						5.45		(Residual Soil) Same as interval 2.80-4.00m		
			100						6.00	

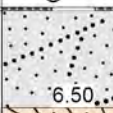



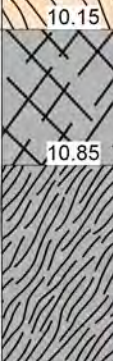

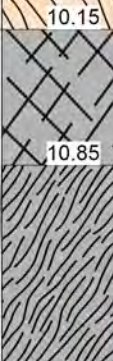

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 7.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
RC=Rock core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 6+497**Coordinates (E/N):** 461802 36497**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-7.5), Water flush by double core barrel (7.50-15.70)**BH No.:** BH314**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-7.5m), 64 (7.5-15.70)**Date Started:** 7-Mar-14**Date Completed:** 9-Mar-2014**Total Depth:** 15.7**Water level (m):** 3.95**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
6	6.50					6.50		White, angular, fine to coarse GRAVEL size, extremely strong quartz in much stiff, light gray with orange brown mottling CLAY matrix (Highly Weathered Quartzite)		
7		100				D	3,4,5,7,8,10			
	7.50					D*				
8						D	10,12,15,25,25,25	Extremely weak, medium grained, extremely thinly 20-30° inclined, foliated, orange brown and light gray, GNEISS with occasional extremely thin, light gray and brown, 30° inclined firm Clay bands (slightly Weathered Gneiss)		
		30				D				
	9.50					9.50				
9						D	15,35/4cm	Extremely weak to very weak, medium grained, light and dark gray, 40-50° inclined, extremely thinly foliated, fractured GNEISS. Joints extremely closely spaced to very closely spaced, 20-40° inclined, planar and rough (Slightly Weathered Gneiss)		
	10.15	Cuttings				9.62				
10										
	10.50		100	0	2					
	10.85		60	0	2					
11										
	11.90		100	0	5					

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse


Note: Undisturbed sampling attempted at 7.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
RC=Rock core sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 6+497**Coordinates (E/N):** 461802 36497**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-7.5), Water flush by double core barrel (7.50-15.70)**BH No.:** BH314**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-7.5m), 64 (7.5-15.70)**Date Started:** 7-Mar-14**Date Completed:** 9-Mar-2014**Total Depth:** 15.7**Water level (m):** 3.95**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
12	12.75		100	30	4	12.50 RC 12.62	20/4cm	Weak to medium strong, medium grained, light and dark gray, 40-50° inclined, extremely thinly foliated GNEISS. Joints very closely spaced to closely spaced, 20-40° inclined, planar and rough (Fresh to Slightly Weathered Gneiss)	13.13	
13	13.80		33	0	3			Extremely weak, dark gray, GNEISS (Slightly Weathered Gneiss).		
14	14.80		80	50	5	14.35 RC 14.65		Recovered as dark gray, micaceous, fine to medium Sand.		
15	15.70		100	40	5	15.45 RC		Medium strong to strong, medium grained, light and dark gray, 20-30° inclined, extremely thinly foliated GNEISS with very strong, white, 10° inclined, extremely thin (15mm) quartz vein at 14.30m . Joints closely spaced rarely very closely spaced, 10° inclined, planar, rough and light brown stained (Fresh to Slightly Weathered Gneiss)		
16										15.00
17										15.70



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 7.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
RC=Rock core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 6+699**Coordinates (E/N):** 461987.58 36488.96**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-16.50), Water flush by Triple core barrel (16.50-20.00)**BH No.:** BH315**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-16.5m), 61 (16.5-20.0)**Date Started:** 10-Mar-14**Date Completed:** 12-Mar-2014**Total Depth:** 20**Water level (m):** 1.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			80					Very soft, light to dark brown, CLAY with occasional rootlets (Top Soil)		
1	1.00					D	1,2,3,3,3,3	Firm, orange brown with light gray mottling, CLAY (Residual Soil)	1.00	
2	2.00		100			UD			2.50	
3	3.50		100			D	2,5,7,7,6,6	Stiff, reddish brown with orange brown mottling CLAY with occasional, medium to coarse gravel size pockets of firm, light gray Clay and rare angular, medium gravel size, corestones of very weak gneiss and angular coarse gravel size quartz (Residual Soil)	5.80	
4	4.50		100			D*	2,5,5,8,7,8			
5	4.90		100			UD			5.35	
6	6.50		100			D	3,3,3,4,4,5	Stiff, orange brown, 10-20° inclined, extremely thinly banded CLAY with extremely closely spaced, 10-20° inclined, extremely thin bands of reddish brown and light gray stiff clay (Completely Weathered Gneiss)	8.00	
7	7.50		100			UD				
8	8.00		100			D	1,2,2,3,3,3	Firm, reddish to light brown, 10-20° inclined, extremely thinly banded, CLAY with very closely spaced, firm, 10-20° inclined, very thin, orange brown, bands of micaceous clay and rare angular	9.90	
9			100							
10	9.90									

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 13.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 6+699**Coordinates (E/N):** 461987.58 36488.96**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-16.50), Water flush by Triple core barrel (16.50-20.00)**BH No.:** BH315**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-16.5m), 61 (16.5-20.0)**Date Started:** 10-Mar-14**Date Completed:** 12-Mar-2014**Total Depth:** 20**Water level (m):** 1.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.40		100			UD		coarse gravel size quartz (Completely Weathered Gneiss)		
						D	1,1,3,3,3,3		10.85	
11								Firm, orange brown, pink brown and light to dark gray, 10-20° inclined, extremely thinly banded CLAY with occasional angular medium gravel size quartz (Completely Weathered Gneiss)		
			100			D*				
12	12.00					D	1,2,3,4,6,6			
								Stiff, orange brown, pink brown and light to dark gray, 10-20° inclined, extremely thinly banded CLAY with occasional angular medium gravel size quartz (Completely Weathered Gneiss)		
			100							
13	13.50					D	3,4,5,5,6,7			
								Interbanded, stiff to very stiff, light to dark gray, 10-20° inclined, very thin, micaceous CLAY AND brown, 10° inclined, extremely thin, CLAY with very closely spaced, extremely weak, orange brown, 30-40° inclined, extremely thin, bands of gneiss and angular coarse gravel size corestones of Gneiss (Highly Weathered Gneiss)		
			100						15.00	15.00
14	14.65									
						D	4,4,5,6,8,10			
15	15.35					SC				
16	16.50					D	4,7,10,15,16			
								Extremely weak, orange brown and light yellow, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Mainly Recovered as brown, fine to medium micaceous sand		
17			80				19		17.65	
18	18.00					D	7,15,22,22,28, 22/4.5cm			
19										
20	20.00								20.00	20.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 13.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013	Sheet: 1 of 2

Project: Kampala - Jinja Express Road

Location: 0+200

Coordinates (E/N): 461537 38260

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-8.4m), Water flush by Triple core barrel (8.4-20)

BH No.: BH316

BH Inclination: 90°

Bit type: Carbide/Diamond

Core diameter (mm): 75 (0-8.4m), 61mm (8.4-20.0)

Date Started: Feb. 14, 2014

Date Completed: Feb. 18, 2014

Total Depth: 20

Water level (m): 3.3

Borehole diameter (mm): 97

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.50	100					Asphalt concrete	0.03	
							Light brown and dark gray, fine to coarse	0.50	
1	1.00	100			1.00	1,1,2,3,4,3	GRAVEL AND sandy CLAY (Road Base and Subbase course)		
					1.45		Firm, reddish brown, CLAY with occasional angular to subrounded, medium quartz gravel (Embankment Fill)		
2		100			1.80				
	2.50				2.00	1,1,1,1,2,1	Soft, brown and dark brown, CLAY with some angular, fine to medium quartz gravel (Alluvium)	2.50	
					2.50				
3		100			2.95			3.00	
	3.50				3.50				
4		100			UD		Firm, reddish brown, CLAY with closely spaced, very thin subhorizontal bands of dark brown clay (Residual Soil)	4.00	
	4.50				4.50	1/15cm, 2,2,2,4		5.02	
5		100			4.95				5.00
	5.50				5.50	2,3,3,5,9,10			
6		100			6.20		Firm, dark gray with light green mottling, slightly sandy CLAY (Alluvium)		
	6.50				6.20		Interbanded, Stiff, very thin, 20-30° inclined, light gray with light green mottling CLAY AND stiff, extremely thin to very thin, 20-30° inclined, orange brown CLAY with occasional angular medium to coarse, quartz gravel (Residual Soil)	7.40	
	6.70	100			UD				
7		100			7.40				
	7.40				7.40	2,5,6,5,5,6			
8		100			7.85				
	8.40				8.40				
9		20			8.85	4,4,9,13,13,15		9.00	
	9.50						Extremely weak, medium grained, 20-30° inclined, extremely		
10	10.00				10.00				10.00

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 8.4m, but refused

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (Core Box)
UD=Undisturbed Sample

Site Photograph:



Alpha Geo Engineering (U) Ltd.	Title	Borehole Log Sheet	
	Document No.: GT-F-006	Revision No. 0	Effective Date: 10/01/2013 Sheet: 2 of 2

Project: Kampala - Jinja Express Road

Location: 0+200

Coordinates (E/N): 461537 38260

Ground Elevation (masl.):

Type of Rig: APAFOR 560

Drilling Method: dry (0.0-8.4m), Water flush by Triple core barrel (8.4-20)

BH No.: BH316

BH Inclination: 90°

Bit type: Carbide/Diamond

Core diameter (mm): 75 (0-8.4m), 61mm (8.4-20.0)

Date Started: Feb. 14, 2014

Date Completed: Feb. 18, 2014

Total Depth: 20

Water level (m): 3.3

Borehole diameter (mm): 97

Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)				
10		Cuttings			4,8,8,11,12,13	closely spaced, extremely thin, pink and orange brown foliated, GNEISS with firm, very thin, occasionally extremely thin, bands of firm clay (Moderately weathered Gneiss)		
11	11.50 11.65							
12		10			5,3,5,8,14,16	Extremely weak, pink, orange brown and dark gray, fine to medium grained, 20-30° inclined, extremely closely spaced, extremely thin banded, GNEISS (Moderately weathered Gneiss). Mainly recovered as pink & orange brown sand		
13	13.00							
14		10			3,7,8,9,8,13			
15	14.65							
16	16.25	30			4,50/5cm	Extremely weak, light and dark gray, medium grained, 20-30° inclined, extremely closely spaced, extremely thin banded, GEISS (Moderately weathered Gneiss). Mainly recovered as medium to coarse grained, pink and orange brown sand		
17	16.90							
18	18.00	Cuttings			50/4cm			
19	19.00							
20	20.00							

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 8.4m, but refused

D=Disturbed Sample (Split Spoon)
D*=Disturbed Sample (Core Box)
UD=Undisturbed Sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 0+240**Coordinates (E/N):** 4615464 38148**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-13.0m), Water flush by Triple core barrel (13-20)**BH No.:** BH317**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-13m), 61mm (8.4-20.0)**Date Started:** Feb. 21, 2014 **Date Completed:** Feb. 24, 2014**Total Depth:** 20**Water level (m):** 0.3**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.20		100					Soft, reddish brown, angular to subrounded, medium to coarse very quartz gravelly CLAY (Top Soil)		
			100					Firm, dark brown, CLAY (Alluvium)	0.70	
1	1.00					D	1,1,1,1,1,1		1.00	
			100						1.60	
2	2.00					UD		Loose, gray with occasional orange brown mottling, slightly clayey fine to medium SAND (Alluvium)		
			100							
3	2.80					D	2,3,5,3,4,5	Interbanded, 30-50° inclined, Stiff, very thin, light gray, slightly sandy CLAY AND orange brown, extremely thin to thin, CLAY with rare angular medium quartz gravel (Completely weathered Gneiss)		
			100						3.25	
4	4.00					UD			4.00	
			100			D	3,3,4,4,5,6			
5	5.40					SC			5.40	
			100			D	1,2,3,3,3,3	Extremely thinly, 20-30° inclined, interbanded, firm orange brown, CLAY AND light green CLAY with some angular to subrounded, medium gravel size corestones of gneiss (Highly Weathered Gneiss)		
6	6.50					UD			6.50	
			100			D	1,2,3,3,4,6			
7	7.10					UD		Stiff, orange brown, 30-45° inclined, extremely thinly banded, slightly sandy, micaceous CLAY with occasional firm, light gray, very closely spaced, very thin to		
			100			D	2,2,4,4,5,6		9.20	
9	9.20									
			100						10.00	
10			100							

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+240**Coordinates (E/N):** 4615464 38148**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-13.0m), Water flush by Triple core barrel (13-20)**BH No.:** BH317**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-13m), 61mm (8.4-20.0)**Date Started:** Feb. 21, 2014**Date Completed:** Feb. 24, 2014**Total Depth:** 20**Water level (m):** 0.3**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.70							thinly subhorizontally banded Clay with rare angular medium gravel size corestones of gneiss (Highly Weathered Gneiss)		
11						11.15 D 11.70	3,3,5,5,7,7	Stiff, brown, orange brown and light gray, 20-30° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely weathered Gneiss)		
12	12.20					12.00 SC 12.20				
	12.70		100			12.70				
13	13.00		100			UD D 13.45	4,6,7,8,8,10			
								Very thinly to thinly subhorizontally interbanded, extremely weak, white and orange brown, 10-20° inclined foliated, GNEISS AND firm, brown CLAY (Moderately Weathered Gneiss)		
14	14.10					14.10 D 14.16	50/5.5cm			
	14.25		100							
	14.40		100							
15			Cuttings			15.60				15.00
	15.60									
16			Cuttings			16.05	1,3,3,5,9,8	Extremely strong, white, coarse grained, fractured QUARTZITE (Recovered as gravel and cobble size fragments) (Quartz Vein)		
17	17.00		Cuttings			17.00 D 17.45	4,6,7,9,10,11			
18			Cuttings					Extremely weak, white and dark gray, fine to medium grained, 20-30° inclined foliated, GNEISS with occasional quartz (Slightly Weathered Gneiss). Recovered as Friable micaceous medium to coarse sand and angular fine to medium quartz gravel		
	18.70					18.70				
19			Cuttings			19.15	5,9,12,12,13,15			
20	20.00								20.00	20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+475**Coordinates (E/N):** 461579.419 37989.826**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-12.75m), Water flush by Triple core barrel (8.4-20)**BH No.:** BH318**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12.75m), 61mm (8.4-20.0)**Date Started:** Feb. 19, 2014 **Date Completed:** Feb. 21, 2014**Total Depth:** 20**Water level (m):** 0.35**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.20		100					Firm, reddish brown, CLAY with occasional angular, coarse quartz gravel and occasional coarse gravel size charcoal (Made Ground)		
	0.60		100						0.75	
1	1.00		100			1.00		Light gray, coarse SAND with occasional medium gravel size angular cement, occasional nails and a piece of metal (Made Ground)	1.00	
						D	3,3,3,2,2,2		1.65	
						1.45			1.75	
2	2.00					2.00		Soft, light and dark gray, CLAY with occasional coarse angular quartz gravel and occasional fine gravel size charcoal (Made Ground)		
						UD			3.00	
3	3.00					3.00	1/12.5cm, 1/7cm, 2/10.5cm, 2,2	Black, medium to coarse gravel size charcoal with a piece of plastic bag (Made ground)		
						3.45		Very soft, light brown, CLAY (Alluvium)		
4	4.50					D*		Very soft to soft, light gray, slightly sandy CLAY (Alluvium)	4.50	
						SC				
5						D	1,3,4,5,5,6	Firm to stiff, light and dark gray, slightly sandy, CLAY with occasional angular coarse quartz gravel (Alluvium)		
						4.95			5.80	
6	6.00					D*		Firm, light gray and light green, micaceous CLAY with rare rootlets (Residual Soil)		
						UD			7.00	
	6.50									
7		5mm				D	1,1,2,2,2,4			
						6.95				

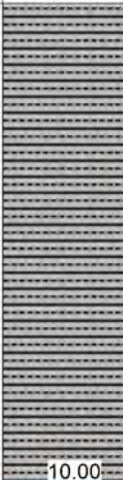




Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 4.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample
by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+475**Coordinates (E/N):** 461579.419 37989.826**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-12.75m), Water flush by Triple core barrel (8.4-20)**BH No.:** BH318**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12.75m), 61mm (8.4-20.0)**Date Started:** Feb. 19, 2014 **Date Completed:** Feb. 21, 2014**Total Depth:** 20**Water level (m):** 0.35**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs	
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)						
8	8.10	11	100			6.95	2,3,3,5,5,4	Firm to stiff, light gray, dark gray and orange brown, extremely closely spaced, extremely thin, 20-30° inclined banded, micaceous CLAY with occasional extremely weak, subrounded, coarse gravel size corestones of gneiss (Highly weathered Gneiss)			
						7.40					D*
9	9.00	11	100			7.60					
						8.10					D
						8.55					
						9.00					UD
10	9.40	11	100			UD	2,3,4,4,6,6	Extremely weak, medium grained, orange brown and light gray, 10-20° inclined extremely thinly foliated GNEISS with firm, very closely to closely spaced, extremely thin to very thin subhorizontal bands of clay (Moderately Weathered Gneiss)			
						D					
11	11.00	11	100			9.85	4,4,5,5,6,6				
						11.00					D
12	12.00	11	100			11.45					
						11.45					
13	12.75	11	100			12.00	1,2,8,19,19,19	Extremely weak, medium grained, white and dark gray, 20-30° inclined, extremely thinly foliated GNEISS with occasional firm, extremely thin bands of brown clay and occasional very weak angular coarse gravel			
						13.20					D
14											

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 4.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
UD(DN)=Undisturbed Sample by denison sampler
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 0+475**Coordinates (E/N):** 461579.419 37989.826**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry (0.0-12.75m), Water flush by Triple core barrel (8.4-20)**BH No.:** BH318**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12.75m), 61mm (8.4-20.0)**Date Started:** Feb. 19, 2014 **Date Completed:** Feb. 21, 2014**Total Depth:** 20**Water level (m):** 0.35**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
15	14.25					14.25 D	4,5,10,14,13,12	size corestones of Gneiss (Moderately Weathered Gneiss)	14.70	
16	16.00					16.00 D	4,7,9,11,15,23	Extremely weak, medium grained, light and dark gray, 5-10° inclined, extremely thinly foliated GNEISS with occasional firm, extremely thin bands of brown clay and occasional very weak angular coarse gravel size corestones of Gneiss (Moderately Weathered Gneiss)		15.00
17	17.50					17.50 -	10,14,23,27/5cm			
18						17.78				
19	19.00					19.00 -	4,13,50/7cm			
20	20.00					19.22			20.00	20.00
21										




Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 4.5m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 UD(DN)=Undisturbed Sample
 by denison sampler
 SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 1+853**Coordinates (E/N):** 461777.516 36673.619**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-12.70), Water flush by Triple core barrel (12.7-20)**BH No.:** BH319**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12.70m), 61 (12.7-20)**Date Started:** 15-Mar-14**Date Completed:** 18-Mar-2014**Total Depth:** 20**Water level (m):** 3.2**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100					Very soft, dark brown CLAY with occasional angular coarse gravel size cement and medium gravel size charcoal (Made Ground)		
1	1.00		100			D	1/27cm, 2/7.5cm, 1/10.5cm	Interbanded, Very soft, 20-40° inclined, very thin, light gray, slightly sandy CLAY AND very soft, orange brown, 20-40° inclined, extremely thin, CLAY (Residual Soil)	1.00	
2	2.00		100			UD		Interbanded, Stiff, 20-40° inclined, very thin, light gray, slightly sandy CLAY AND stiff, orange brown, 20-40° inclined, extremely thin, CLAY (Residual Soil)	2.75	
3	2.75		100			D	1,4,4,5,6,5	Interbanded, Stiff, 20-30° inclined, very thin, orange brown, CLAY AND stiff, light gray, 20° inclined, extremely thin, CLAY (Residual Soil)	3.40	
4	4.00		100			D*	2,3,4,5,6,6	Very dense, white and pink brown, angular, fine to coarse GRAVEL size, very strong quartzite fragments in some very stiff, light gray and orange brown, CLAY matrix (Moderately Weathered Quartzite)	6.30	
5	5.00		100			UD			7.90	
6	5.35		100			D	3,3,5,5,5,7			
7	6.30	115mm	100			D	6,8,10,13,15, 17			
8	7.20		100			UD				
9	7.60		100			D				
10	8.30		100			UD				
11	8.65		100			D				
12	9.10		100			D*				
13	9.70		100			D				
14	9.80		100			D				10.00













Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 11.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 1+853**Coordinates (E/N):** 461777.516 36673.619**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-12.70), Water flush by Triple core barrel (12.7-20)**BH No.:** BH319**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-12.70m), 61 (12.7-20)**Date Started:** 15-Mar-14**Date Completed:** 18-Mar-2014**Total Depth:** 20**Water level (m):** 3.2**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10						D	2,3,3,4,4,4	Extremely thinly to vey thinly, 10-20° inclined, interbanded, firm to stiff, brown, orange brown and light gray CLAY (Completely Weathered Gneiss)		
						10.60				
						SC				
11	11.50		100			10.90		Extremely thinly to vey thinly, 10-20° inclined, interbanded, extremely weak, friable, light gray, GNEISS AND firm to stiff, brown CLAY (Highly to Moderately Weathered Gneiss)		
						11.50				
						D	3,4,6,6,8,8			
12	12.40		100			11.95		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
	12.70		100			12.70				
						D	22,28/4.5cm			
13	13.00		100			12.82		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
						D	28,20,6,7,6,7			
14	14.30					14.30		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
	15.00					14.75				
						D	15,23,30,20/3.5cm			
15						16.00		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
	16.00					16.26				
						D	4,7,12,12,17,22			
16						17.50		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
	17.50					17.95				
						D	10,10,15,35/4.5cm			
17						19.40		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
	19.40					19.67				
						D	10,10,15,35/4.5cm			
18	20.00					19.67		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
						D	10,10,15,35/4.5cm			
19						19.67		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
						D	10,10,15,35/4.5cm			
20	20.00					19.67		Extremely weak, light gray and brown, fine to medium grained, 20° inclined, extremely thinly foliated, GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand and very rare angular, coarse gravel size weak fragments of Gneiss between 19.00 -19.40m (Slightly Weathered Gneiss)		
						D	10,10,15,35/4.5cm			

Client: UNRA

Approved by:

Consultant: URS

Drilling Contractor: Gondwana/Alpha

Logged by: Melaku Tadesse

Note: Undisturbed sampling attempted at 11.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:



Project: Kampala - Jinja Express Road**Location:** 2+595**Coordinates (E/N):** 461605 35978**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-20)**BH No.:** BH320**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-20m)**Date Started:** 5-Mar-14**Total Depth:** 20**Water level (m):** 0.8**Borehole diameter (mm):** 97**Date Completed:** 6-Mar-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0								Soft, reddish brown, CLAY with occasional angular, medium quartz gravel (Made Ground)	0.30	
1	1.00		100			1.00	1/11.5cm, 1/12.5cm, 1/9cm, 1/4cm, 2/11.5cm	Very soft, light and dark gray with orange brown mottling, CLAY with rare subrounded, medium gravel size corestones of gneiss (Residual Soil)	1.00	
						D	1.45		1.60	
2	2.00		100					Very soft, light and dark gray, very gravelly CLAY (Residual Soil). Gravel angular fine to coarse grained quartz	2.50	
	2.65					2.75		Very weak, brown, subrounded, fine to medium GRAVEL size, corestones of gneiss and occasional, subrounded, coarse gravel size quartz in much light gray and orange brown clay matrix (Highly Weathered Gneiss)		
3			100			D	3.20			
	3.75						3.75			
4	4.20		100			UD		Firm, orange brown and reddish brown, 20-30° inclined, extremely thinly banded CLAY with very closely spaced, firm, 20-40° inclined, extremely thin, bands of light gray CLAY (Completely Weathered Gneiss)		
						D	4.65			
5		115mm	100					Extremely strong, white and light gray, angular, medium to coarse GRAVEL size, quartz in some light gray and brown clay matrix (Moderately Weathered Quartz Vein)	5.00	
	5.60					D	5.60		5.60	
						D	6.05		5.75	
6	6.60		100							
	7.00					UD				

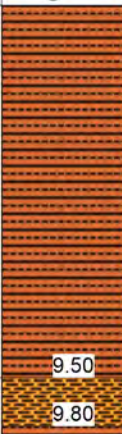

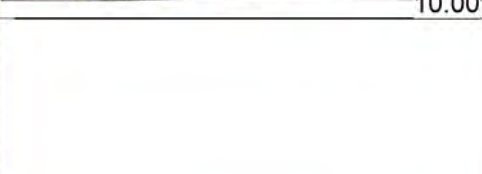

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.0, 5.5, 9.5 & 15.5m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 SC=Soil core sub sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 2+595**Coordinates (E/N):** 461605 35978**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-20)**BH No.:** BH320**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-20m)**Date Started:** 5-Mar-14**Total Depth:** 20**Water level (m):** 0.8**Borehole diameter (mm):** 97**Date Completed:** 6-Mar-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs		
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)							
8	8.50	100			D	2,3,4,5,5,6	Stiff, reddish brown, 20-30° inclined, extremely closely spaced, extremely thinly banded CLAY with extremely closely to very closely spaced, stiff, 20° inclined, extremely thin, bands of orange brown and light gray CLAY (Completely Weathered Gneiss)					
					7.45							
					8.00							
					D*							
9	9.50	100			8.15	4,5,7,7,7,8				Stiff, orange brown and light gray, 20-30° inclined, extremely thinly banded CLAY with some white and dark gray, angular, medium to coarse quartz gravel (Completely Weathered Gneiss)	9.50	
					8.50							
					D							
					9.20							
10	10.00	100			SC	3,4,4,6,6,7	(Completely Weathered Gneiss) same as interval 5.75 - 9.50m	9.80				
					9.50							
					10.00							
					UD							
11	11.50	100			D	4,5,7,8,8,8						
					10.65							
					11.50							
					D							
12	12.50	100			11.95	3,4,4,4,5,5						
					12.50							
					UD							
					12.90							
13	13.35	100			D							
14												

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.0, 5.5, 9.5 & 15.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sub sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 2+595**Coordinates (E/N):** 461605 35978**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-20)**BH No.:** BH320**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-20m)**Date Started:** 5-Mar-14**Total Depth:** 20**Water level (m):** 0.8**Borehole diameter (mm):** 97**Date Completed:** 6-Mar-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
15	14.50					14.50		Very Stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with extremely closely spaced to very closely spaced, extremely weak, medium to coarse grained, light gray and pink brown, 10-20° inclined, extremely thin to very thin bands of gneiss and occasional coarse gravel size rounded corestones of gneiss in the clay matrix (Highly weathered Gneiss)	14.50	15.00
		100				14.95	4,6,6,8,9,11			
16	15.50					15.50		Very stiff, yellowish brown, 10-20° inclined, extremely thinly banded, slightly sandy CLAY with very closely spaced, extremely thin (5mm), brown clay band and extremely closely spaced, extremely weak, medium grained, 20° inclined, extremely thin bands of gneiss (Highly Weathered Gneiss)	17.00	
		100				15.95	3,5,6,8,8,11			
17	17.00					17.00		Very stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with occasional, extremely weak, subrounded, light gray, medium gravel size corestones of gneiss in the clay matrix (Highly Weathered Gneiss)	18.65	20.00
		100				17.45	4,5,8,9,9,14			
18	18.50					17.85		Very stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with extremely closely spaced, extremely weak, medium grained, 20° inclined, extremely thin bands of gneiss (Highly Weathered Gneiss)	18.65	
		100				18.00	4,5,7,8,10,10			
19						18.50		Very stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with occasional, extremely weak, subrounded, light gray, medium gravel size corestones of gneiss in the clay matrix (Highly Weathered Gneiss)	20.00	
		100				18.95				
20	20.00					19.50		Very stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with occasional, extremely weak, subrounded, light gray, medium gravel size corestones of gneiss in the clay matrix (Highly Weathered Gneiss)	20.00	
						19.80				
21										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.0, 5.5, 9.5 & 15.5m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 SC=Soil core sub sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 7+053**Coordinates (E/N):** 462327.45 36417.32**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-10), Water flush by Triple core barrel (10-20)**BH No.:** BH321**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-10m), 61 (10-20)**Date Started:** 13-Mar-14**Date Completed:** 15-Mar-2014**Total Depth:** 20**Water level (m):** 1.50**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0								Firm, dark brown, CLAY (Top Soil)	0.10	
	0.50		100					Stiff, light to reddish brown CLAY (Residual Soil)		
1	1.00		100			1.00	2,4,4,5,7,8			
						D			1.60	
						1.45		Stiff, light to reddish brown, 20-30° inclined, extremely thinly banded, CLAY with very rare angular, coarse gravel size corestones of very weak gneiss (Highly Weathered Gneiss)		
2	2.35		100			2.35				
	2.65		100			UD				
3						D	3,4,4,5,5,4			
						3.10				
						3.80				
4	4.00					D*				
						D	2,3,4,4,5,5			
						4.45				
5	5.00					5.00		Soft to firm, reddish brown and light green, 10-20° inclined, extremely thinly banded CLAY with occasional extremely weak, angular coarse gravel size corestones of gneiss (Highly Weathered Gneiss)	5.00	5.00
						UD				
	5.80		100							
6						D	1,2,2,2,2,2			
						6.25				
						6.90				
7						D*				
						7.00				
	7.50					7.50				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 7+053**Coordinates (E/N):** 462327.45 36417.32**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-10), Water flush by Triple core barrel (10-20)**BH No.:** BH321**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-10m), 61 (10-20)**Date Started:** 13-Mar-14**Date Completed:** 15-Mar-2014**Total Depth:** 20**Water level (m):** 1.50**Borehole diameter (mm):** 97


	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	8.50		100			D	1,2,4,3,4,4			
						7.95				
9	9.15		100			UD				
						8.50				
10	10.00		100	0	<1	D	2,5,5,7,10,12	Extremely weak, white, brown and light to dark gray, 10-20° inclined, extremely thinly foliated, friable, micaceous GNEISS with closely spaced, extremely thin, brown firm clay bands (Moderately Weathered Gneiss)	9.25	10.00
	10.30		100	0	<1		9.60			
						10.30				
						10.75				
11			45	0	<1					
12	12.00					D	2,5,10,12,23			
						12.00				
						12.45				
13			30	0	<1					
14	14.00					D	4,10,12,20,20,30	Extremely weak, dark gray, medium grained, 10-20° inclined, extremely thinly foliated GNEISS (Slightly Weathered Gneiss). Recovered as dark gray,	13.70	15.00
						14.00				
						14.13				
15	15.00									

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 7+053**Coordinates (E/N):** 462327.45 36417.32**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-10), Water flush by Triple core barrel (10-20)**BH No.:** BH321**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-10m), 61 (10-20)**Date Started:** 13-Mar-14**Date Completed:** 15-Mar-2014**Total Depth:** 20**Water level (m):** 1.50**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
16	16.00		80	0	<1	15.65 15.75	10/3cm (No further penetration by 10 Consecutive blows)	fine to medium, micaceous sand and occasional extremely weak, friable, very angular coarse gravel size fragments of gneiss	15.30	
17	17.50		10	0	<1	17.50 17.53		Extremely weak, light to dark gray, medium grained, 10-20° inclined, extremely thinly foliated GNEISS (Fresh to Slightly Weathered Gneiss). Joints extremely closely spaced, 10°		
18	18.30		25	0	<1			inclined, planar, rough and brown mica stained. Recovered as angular medium to coarse, friable gravel size and cobble size fragments of gneiss and dark gray, fine to medium, micaceous sand.		
19	19.30		25	0	<1			Very weak to weak, light to dark gray, medium grained, 10-20°	19.45	
20	20.00		79	0	5	19.88 19.96		inclined, extremely thinly foliated GNEISS (Fresh to Slightly Weathered Gneiss). Joints extremely closely to very closely spaced, 10° inclined, planar, rough and brown mica stained.	20.00	20.00
21										
22										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+288**Coordinates (E/N):** 463543 36153**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-13.9, 14.1-20.0), Water flush by double core barrel (13.9-14.1)**BH No.:** BH322**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-13.9, 14.1-20.0m), 64 (13.9-14.10)**Date Started:** 19-Mar-14**Date Completed:** 21-Mar-2014**Total Depth:** 20**Water level (m):** 0.65**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.50		100					Soft, dark brown, slightly sandy CLAY (Top Soil)	0.35 0.50	
1	1.20		100			1.20		Light gray, slightly clayey SAND (Alluvium)		
	1.70		100			UD		Extremely thin to very thin, 20-30° inclined, interbanded, stiff, orange brown and light gray CLAY (Residual Soil)	2.15	
2						D	1,3,4,4,5,6			
	3.00		100			2.15 2.70 D*		Very stiff, light to reddish brown, CLAY with stiff, 30-40° inclined, very closely spaced, extremely thin, bands of light gray, clay (Residual Soil)	3.00	
3	3.70		100			D	3,5,5,6,12,14			
4	4.80					3.70 D	8,10,12,13,10,8			
	5.30		100			4.15		Very stiff, light to reddish brown, CLAY with some extremely weak to weak, subrounded, fine to medium gravel size fragments of gneiss (Highly Weathered Gneiss)	4.50	
5	5.75		100			5.30				5.00
						UD				
6						D	2,2,3,3,3,3			
	7.50	115mm	70			6.20		Firm, light to reddish brown, CLAY with very closely spaced, extremely thin bands of firm, light gray, 30-40° inclined, clay (Completely Weathered Gneiss)	7.50	
7	8.50		100			7.50 D	1,2,2,2,2,3			
8	9.50		100			7.95 8.50				
9						UD		Firm, white, light yellow and light green 20-40° inclined, extremely thinly banded, micaceous CLAY (Completely	9.50	
10						D	2,2,3,4,5,5			10.00
						9.95				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 3.7, 16.3m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+288**Coordinates (E/N):** 463543 36153**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0-13.9, 14.1-20.0), Water flush by double core barrel (13.9-14.1)**BH No.:** BH322**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0-13.9, 14.1-20.0m), 64 (13.9-14.10)**Date Started:** 19-Mar-14**Date Completed:** 21-Mar-2014**Total Depth:** 20**Water level (m):** 0.65**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10			100			9.95 10.45 D*		Weathered Gneiss)		
11	11.00					10.60 11.00 D	2,3,4,4,6,6			
12			80			11.45		Stiff, white, light yellow and light green, 20-40° inclined, extremely thinly banded, micaceous CLAY with rare angular coarse quartz gravel (Completely Weathered Gneiss)		
	12.50					12.50				
	12.80		100			UD				
13						D	3,5,5,7,10,8			
			100			13.25				
	13.90					13.90				
14	14.10		100	0	<1	-	No penetration by 10 blows	Extremely strong, subvertically fractured, white QUARTZITE. Recovered as angular coarse gravel and cobble size quartzite fragments (Completely Weathered Gneiss) same as interval 9.50-13.90m	13.90 14.10	
			75							
15	15.00					15.00 D*	3,5,8,7,6,8			15.00
						15.60				
			100			SC				
16	16.30					16.00 D	4,8,11,15,17			
						16.75				
17			65			17.55 SC				
	18.00					17.85 D	3,5,9,11,13,19	Extremely thinly to very thinly, 20-30° inclined interbanded, stiff, light green CLAY AND extremely weak, friable, white with light green mottling GNEISS (Highly to Moderately Weathered Gneiss)		
						18.45				
19			30			19.50 D	6,8,13,18,24,35			
	19.50					19.95				
20	20.00		100						20.00	20.00

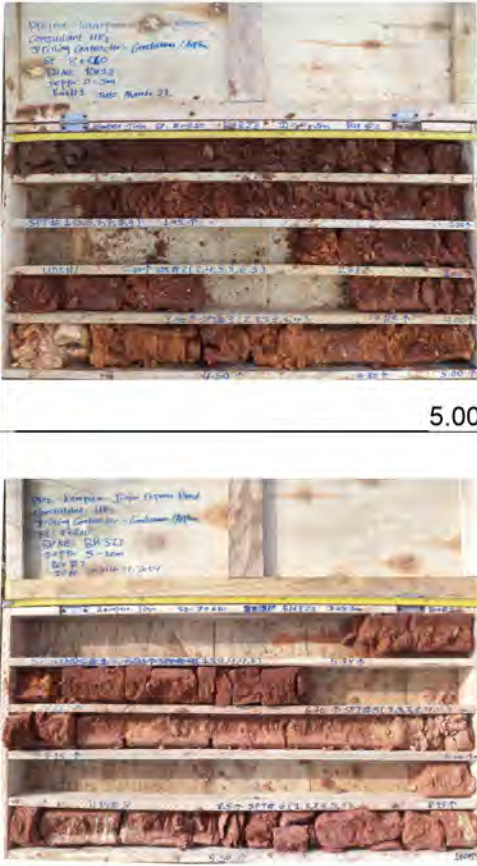
Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 3.7, 16.3m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+610**Coordinates (E/N):** 463855 36238**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-21.15)**BH No.:** BH323**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-21.15m)**Date Started:** 21-Mar-14**Date Completed:** 25-Mar-2014**Total Depth:** 21.15**Water level (m):** 14.55**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.70	115mm	100					Firm, dark brown, CLAY (Top Soil)	0.4	
1	1.00		100			1.00	3,5,7,7,8,8	Stiff, reddish brown, angular, fine to medium (quartz) gravelly CLAY (Residual Soil)		
	1.40		100			D				
2	2.00		100			1.45				
	2.30		100			2.00	2,4,5,5,6,5			
						UD				
						D				
3	3.00		100			2.75				
	3.40		100			3.40	2,3,5,6,4			
						D				
4	4.00		100			3.85		Extremely to very thinly subhorizontally interbanded, stiff, orange brown, gravelly CLAY AND stiff, reddish brown, gravelly CLAY (Residual Soil). Gravel angular, fine to medium quartz.	4.00	
	4.50		100			4.30				
	4.80		100			4.40				
5	5.00		100			5.00	1,3,4,4,4,6		5.00	
	5.30		100			UD				
						D				
6			100			5.75		Firm, reddish brown, angular, slightly, gravelly CLAY (Residual Soil). Gravel angular, fine quartz.		
	6.70					6.70	2,3,3,3,4,4		6.70	
7			100			7.15		Firm, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, fissured, micaceous CLAY with rare 20° inclined, extremely thin bands of firm, light gray clay (Completely Weathered Mica Schist). Fissures extremely closely spaced, 10-20° inclined, planar, tight and smooth.		
8	8.00		100			8.00				
	8.50		100			UD	1,3,3,3,5,5			
						D				
9			100			8.95				
	9.50					9.50				
						D*				
						9.60				
10	10.00		100			10.00	1,2,3,4,4,4			
						D				
						10.45				
11	11.00		100			11.00			11.00	
	11.30		100			UD				
	11.70		100			D	2,3,4,5,5,5			
12			100			11.75		iff, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, fissured.		

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+610**Coordinates (E/N):** 463855 36238**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-21.15)**BH No.:** BH323**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-21.15m)**Date Started:** 21-Mar-14**Date Completed:** 25-Mar-2014**Total Depth:** 21.15**Water level (m):** 14.55**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
	12.30							micaceous CLAY (Completely Weathered Mica Schist). Fissures extremely closely spaced, 10-20° inclined, planar, tight and smooth.	12.30	
13	13.00	100				D	1,1,2,2,2,3			
		100								
14	14.00					UD		Soft, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, fissured, micaceous CLAY	14.00	
	14.55	100						(Completely Weathered Mica Schist). Fissures extremely closely spaced, 10-20° inclined, planar, tight and smooth.		
15		100				D	1,2,2,2,3,4			
	15.70								15.70	
16		100				D	2,3,3,5,5,6			
	16.80							Firm, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, fissured, micaceous CLAY	16.70	
17	17.00	100				UD		(Completely Weathered Mica Schist). Fissures extremely closely spaced, 10-20° inclined, planar, tight and smooth.		
						D	2,2,4,4,6,6			
18		100								
	18.50					D	4,4,6,7,7,8			
19		100								
	19.70					D	4,4,8,9,12, 10			
20		100						Stiff, pink brown and light gray, 20-30° inclined, extremely thin banded, fissured, micaceous CLAY		
	20.70							(Completely Weathered Mica Schist). Fissures extremely closely spaced, 10-20° inclined, planar, tight and smooth.		
21	21.15	100				D	6,8,12,13,15, 16		21.15	
22								Very thin to thin occasionally extremely thin, 20-30° inclined, interbanded, very stiff, brown, white, light gray and light yellow, micaceous CLAY (Completely Weathered Gneiss)		
23										
24										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+836**Coordinates (E/N):** 464022 36254**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-21.00)**BH No.:** BH324**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-21.0m)**Date Started:** 25-Mar-14**Date Completed:** 27-Mar-2014**Total Depth:** 21**Water level (m):** 16.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0								Soft, dark brown CLAY (Top Soil)	0.25	
			100					Soft to firm, reddish brown CLAY (Residual Soil)		
1	1.00					1.00				
	1.40		100			UD				
						D	1,2,2,2,2,3			
2			100			1.85				
	3.00	115mm				3.00				
			100			D	1,2,2,2,2,2			
						3.45				
4	4.00					4.00				
	4.5		100			UD				
						D	1,2,1,2,2,2			
5			100			4.95				
	5.70					5.70			5.50	
6						6.15	1,2,2,3,3,2	Firm, reddish brown CLAY with very closely spaced, extremely thin subhorizontal bands of firm, orange brown CLAY and rare angular medium to coarse quartz gravel (Residual Soil)		
	7.00		80			7.00				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Stand pipe installed: 0.0-20.0m

Slotted Section: 1.5 - 19.5m

0.0 - 1.0m: Concrete

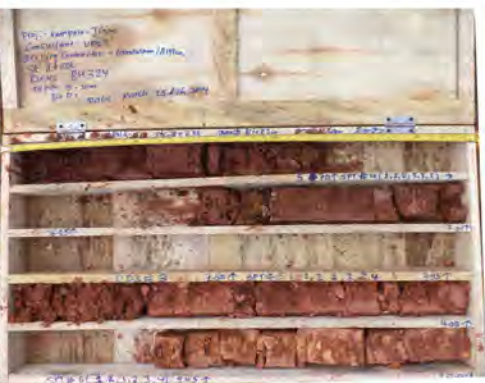

1.0 - 1.5m: Bentonite

1.5 - 20m: Gravel pack

20 - 21m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+836**Coordinates (E/N):** 464022 36254**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-21.00)**BH No.:** BH324**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-21.0m)**Date Started:** 25-Mar-14**Date Completed:** 27-Mar-2014**Total Depth:** 21**Water level (m):** 16.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	7.50		100			UD				
						D	1,2,2,2,3,4	Firm, pink brown with orange brown mottling, 30-40° inclined extremely thinly banded, fissured, micaceous CLAY (Completely Weathered Mica Schist). Fissures, extremely closely spaced, 10-20° inclined, planar, tight and smooth.	7.55	
							7.95			
9	9.00		100			UD				
						D	1,2,3,2,3,4			
							9.45			
10	10.00		100			UD				
	10.30		100			D	1,2,4,3,4,5			
							10.75			
11	11.20		100			UD				
						D	1,2,2,3,4,4			
							12.00			
12	12.00		100			UD				
						D	2,3,3,4,5,6			
							12.45			
13	13.00		100			UD		Stiff, pink brown with orange brown mottling, 30-40° inclined extremely thinly banded, fissured, micaceous CLAY (Completely Weathered Mica Schist).	13.00	
	13.35		100			D				
14			100				13.80			

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Stand pipe installed: 0.0-20.0m

Slotted Section: 1.5 - 19.5m

0.0 - 1.0m: Concrete

1.0 - 1.5m: Bentonite

1.5 - 20m: Gravel pack

20 - 21m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 8+836**Coordinates (E/N):** 464022 36254**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-21.00)**BH No.:** BH324**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-21.0m)**Date Started:** 25-Mar-14**Date Completed:** 27-Mar-2014**Total Depth:** 21**Water level (m):** 16.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)	Sampling				
15	14.50							Fissures, extremely closely spaced, 10-20° inclined, planar, tight and smooth.	14.50	
	15.15	100				15.15	1,2,2,3,3,5	Firm, light to dark gray and pink brown, 40-60° inclined, extremely thinly banded, fissured, very micaceous CLAY (Completely Weathered Mica Schist). Fissures, extremely closely spaced, 10-20° inclined, planar, tight and smooth. Easily breaks along smooth fissure surfaces.		15.00
16	16.00	100				D				
	16.35	100				UD	2,2,2,2,3,3			
17	16.80	100				D		Stiff, white, orange brown and light green, 30-40° inclined, extremely thinly banded, micaceous CLAY with closely spaced, very thin bands of white and light gray, very sandy clay and very rare, angular, medium gravel size, extremely weak, friable, Gneiss (Highly Weathered Gneiss)	16.85	
	17.50	100								
18	18.00					18.00	4,5,6,7,7,9			
	18.45	100				D		Extremely weak, white, light green and dark gray, 30-50° inclined banded, friable GNEISS with very closely to closely spaced, extremely thin to very thin, 10-20° inclined, bands of stiff, light green and brown clay (Moderately Weathered Gneiss)	19.00	
19	19.50					19.50	6,6,8,9,10,12			
	19.95	100				D				20.00
20	20.50					20.50				
	20.95	100				D	6,7,9,11,11,12			
21	21.00					20.95			21.00	

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

UD=Undisturbed Sample

Stand pipe installed: 0.0-20.0m

Slotted Section: 1.5 - 19.5m

0.0 - 1.0m: Concrete

1.0 - 1.5m: Bentonite

1.5 - 20m: Gravel pack

20 - 21m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 9+005**Coordinates (E/N):** 464231 36303**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-18.50), water flush and dry (18.50-20.00)**BH No.:** BH325**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 27-Mar-14**Date Completed:** 29-Mar-2014**Total Depth:** 20**Water level (m):** 8.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100					Soft, dark brown, CLAY (Top Soil)	0.30	
	0.60		100					Stiff, reddish brown, slightly sandy CLAY (Residual Soil)		
	0.80		100						0.90	
1	1.00		100			1.00				
						D	4,5,5,5,5,6	Stiff, reddish brown and orange brown, angular, medium to coarse very (quartz) gravelly CLAY (Residual Soil)		
	1.80		100			1.45				
2										
	2.50		100			2.50				
						D	2,4,8,7,4,4			
3										
	3.65		100			2.95				
						3.50				
						D*			3.65	
4						3.65		Firm, reddish brown with orange brown mottling, CLAY with occasional angular, fine quartz gravel (Residual Soil)		
	4.50		100			4.50				
						UD				
5	5.00		100							
						D	1,3,3,3,3,4			
			100			5.45				
6	6.00		100			6.00				
	6.35		100			UD				
						D	1,2,2,3,3,4			
7			100			6.80				



5.00



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.5m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 9+005**Coordinates (E/N):** 464231 36303**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-18.50), water flush and dry (18.50-20.00)**BH No.:** BH325**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 27-Mar-14**Date Completed:** 29-Mar-2014**Total Depth:** 20**Water level (m):** 8.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	8.00					8.00		Extremely thinly occasionally very thinly, 10-20° inclined, interbanded, firm, reddish brown and orange brown, micaceous CLAY (Completely Weathered Gneiss)	7.85	
						D	1,2,2,2,2,3			
		100				8.45				
9	9.00					9.00				
						UD		Stiff, light gray, coarse sandy and angular fine to medium (quartz) gravelly CLAY (Highly Weathered Quartzite)	10.85	
		100				10.05	1,2,2,3,3,3			
10	9.60								11.00	
11	11.00					11.00		Stiff, orange brown, light gray and dark gray, 10-20° inclined, extremely thinly banded, micaceous CLAY. Between 13.85-13.95, very thin to thin, slightly clayey, medium to coarse (quartz) sand band (Completely Weathered Gneiss)		
						D	2,2,3,4,4,6			
		100				11.45				
12	12.00					12.00				
						UD				
	12.40						3,4,4,5,6,6			
13						12.85				
	13.50					13.50				
						D*				
						13.65				
14	14.00					14.00				
						D	2,3,4,4,5,6			
						14.45				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.5m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 9+005**Coordinates (E/N):** 464231 36303**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-18.50), water flush and dry (18.50-20.00)**BH No.:** BH325**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 27-Mar-14**Date Completed:** 29-Mar-2014**Total Depth:** 20**Water level (m):** 8.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)	Sampling				
15	15.50		100			15.00 SC 15.30	4,5,6,7,7,8	Extremely thinly to very thinly, 10-20° inclined, interbanded, stiff, light green and brown, micaceous CLAY AND light gray, dark gray and orange brown, extremely weak, friable, GNEISS with very thin (40-50mm), white, coarse sandy, angular, medium to coarse (quartz) gravel bands at 16.95, 17.85 and 17.95m (Highly to Moderately Weathered GNEISS)	15.30	15.00
16	16.50		100			15.95 D				
17	17.00		100			17.00 D 17.45	5,6,7,7,8,10			
18	18.00		100			18.50 D 18.95	8,10,10,11,12, 12	Dense, white, sandy GRAVEL with very closely spaced, extremely thin, dark gray and white, stiff, micaceous Clay bands (Moderately Weathered Quartzite). Gravel angular, medium to coarse quartz.	18.25 18.95	
19	18.50									
20	20.00							Extremely thinly to very thinly, 10-20° inclined, interbanded, stiff, light green and brown, micaceous CLAY AND light gray, dark gray and orange brown, extremely weak, friable, GNEISS (Highly to Moderately Weathered GNEISS)	20.00	20.00
21										

**Client:** UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 2.5m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 SC=Soil core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 9+145**Coordinates (E/N):****Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-20.0)**BH No.:** BH326**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 29-Mar-14**Total Depth:** 20**Water level (m):** 0.8**Borehole diameter (mm):** 97**Date Completed:** 1-Apr-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100			WS		Very soft, orange brown and reddish brown CLAY with some angular medium to coarse gravel size quartz and coarse gravel size bricks (Made Ground)	0.85	
1	1.00					D	1/22.5cm, 1,1,1		1.00	
2	2.00		100							
3	2.90		100			UD		Light gray, slightly medium to coarse gravelly SAND (Alluvium). Gravel coarse and angular quartz.		
4	4.00		100			D*	1/15cm, 1,1,2,2	Extremely thin, 20-30° inclined interbanded, very soft to soft, light gray, orange brown and reddish brown, micaceous CLAY (Completely Weathered Gneiss)	4.20	
5	5.00		100			UD				5.00
6	6.50		100			D	1,2,2,2,3,3	Firm, 10-30° inclined, orange brown, pink brown and light gray, extremely thin banded, micaceous CLAY with at 7.43m very thin (25mm), white, angular, medium to coarse quartz gravel band (Completely Weathered Gneiss)		
7	7.50		100			D	1,2,3,3,4,4		7.50	
8	7.90		100			UD		Stiff, 10-30° inclined, orange brown, pink brown and light gray, extremely thin banded, micaceous CLAY (Completely Weathered Gneiss)	8.85	
9	9.00		85							
10	10.00									10.00



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 11m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample
WS=Ground water sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 9+145**Coordinates (E/N):****Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry by single core barrel (0.00-20.0)**BH No.:** BH326**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 29-Mar-14**Date Completed:** 1-Apr-2014**Total Depth:** 20**Water level (m):** 0.8**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10						D	2,3,5,5,5,6			
			100			10.45				
11	11.00					D	3,4,5,5,5,7	Interbanded, stiff, 20-30° inclined, extremely thin occasionally very thin banded, micaceous, brown and orange brown, CLAY AND extremely weak, 20-30° inclined, extremely thin banded, pink and light gray, micaceous GNEISS (Highly Weathered Gneiss)		
						11.45				
12	12.50					D	4,5,7,7,7,9			
						12.50				
13						D	12.95			
						13.40				
	13.80					SC	13.70			
14						D	3,4,5,6,7,8			
						14.25				
15	15.00									15.00
	15.50					D	3,4,6,6,8,8	Extremely thin to very thin, 10-20° inclined, interbanded, stiff, brown micaceous CLAY AND extremely weak, friable, orange brown, light and dark gray, micaceous GNEISS (Highly to Moderately Weathered Gneiss)		
16						D	15.95			
						16.30				
17	17.00					SC	16.55			
						17.00				
						D	5,7,8,8,10,12			
						17.45				
18	18.00									
	18.50					D	6,8,10,10,12, 13			
						18.50				
19						D	18.95			
						18.95				
20	20.00								20.00	20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 11m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample
WS=Ground water sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 14+435**Coordinates (E/N):** 468950 35695**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry and water flush by single core barrel (0.00-20)**BH No.:** BH329**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 11-Apr-14**Date Completed:** 15-Apr-2014**Total Depth:** 22**Water level (m):** 14.0**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100					Soft, dark brown, CLAY with occasional rootlets (Top soil)	0.50	
1	1.00	115mm				D	2,4,6,7,7,3	Stiff, reddish brown, gravelly CLAY (Residual Soil). Gravel angular to subrounded, fine to coarse quartz.	1.40	
2	2.00					UD		Soft to firm, reddish brown, gravelly CLAY (Residual Soil). Gravel angular to subrounded, fine to coarse quartz and pink brown gneiss.		
	2.40		50			D	1,2,1,1,1,3			
3	3.00		100							
	3.50		100						3.50	
4	4.00		100			D	7,13,13,13,16,20	Very stiff, orange brown, slightly sandy CLAY and occasional angular, medium gravel size pockets of very stiff, reddish brown clay with extremely weak, orange and pink brown, friable, angular to subrounded, fine to coarse gravel size fragments of gneiss and occasional medium gravel size strong quartz. At 13.2m white and pink brown, strong, angular, cobble size (90mm) quartzite fragment (Highly Weathered Gneiss)		
			100							
5	5.00									5.00
	5.40		40							
						D	11,15,19,25,			
6	6.00		100							
	6.20		100							
	6.40		100							
	6.60		100							
7	7.00		100			D	7,14,15,30,30,20/3.5cm			
			100							
8	7.90									



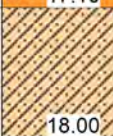





Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 14+435**Coordinates (E/N):** 468950 35695**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry and water flush by single core barrel (0.00-20)**BH No.:** BH329**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 11-Apr-14**Date Completed:** 15-Apr-2014**Total Depth:** 22**Water level (m):** 14.0**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)	Sampling				
8	8.30		100							
	8.60		100			8.60				
						D	6,15,28, 22/3cm			
9			77			8.86				
	9.50									
			80							
10	10.00					10.00				10.00
						D	6,15,20, 30/5.5cm			
			60			10.28				
11	11.00									
	11.40		50			11.40				
						D	5,15,20,21,25, 25/5cm			
12			65			11.83				
	12.30									
	12.70		90							
13	13.00		100							
	13.30		85			13.30				
						D	4,10,18,24,30, 20/4.5cm			
14	14.00		90			13.72				
			85							
15	15.00									15.00
	15.50		87			15.50				
						D	4,6,8,12,10,8			
16						15.95		Very stiff, orange brown, fissured, slightly sandy CLAY with occasional		

**Client:** UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 14+435**Coordinates (E/N):** 468950 35695**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry and water flush by single core barrel (0.00-20)**BH No.:** BH329**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 11-Apr-14**Date Completed:** 15-Apr-2014**Total Depth:** 22**Water level (m):** 14.0**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)	Sampling				
17	16.75		90			15.95	3,3,7,8,9,11	angular gravel size pockets of stiff, reddish brown clay (Completely Weathered Gneiss).		
	17.10		100			17.10				
18	18.00		83			17.55	7,16,40, 10/6.5cm	Very stiff, orange brown, fissured, slightly sandy CLAY with some subrounded, fine to medium gravel size fragments of extremely weak, orange and pink brown, friable, gneiss. (Highly Weathered Gneiss). Fissures 10-15° inclined, extremely closely spaced, tight, planar and smooth.		
	18.40		80							
19	19.10		60			19.10	30,20/6.5cm	Very dense, angular, medium to coarse GRAVEL size, very strong to strong quartz fragments and occasional very weak, angular, medium to coarse gravel size gneiss fragments in some very stiff, orange brown clay matrix (Moderately Weathered Quartzite).		
			20			19.44				
20	20.50					20.50				
						20.64				
21			22							
22	22									
23										
24										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 14+705**Coordinates (E/N):** 46925 35632**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry and water flush by single core barrel (0-6m), dry (6-20m)**BH No.:** BH330**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 16-Apr-14**Date Completed:** 18-Apr-2014**Total Depth:** 20**Water level (m):** 8.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.40		100					Soft, dark brown, CLAY with some rootlets (Top Soil)	0.10	
	0.80		100							
1	1.00		100			1.00	5,8,10,12,12,12	Very stiff, orange brown, fissured, slightly sandy CLAY with some		
			85			1.45		extremely weak to very weak, pink brown and orange brown, angular to subrounded, fine to coarse, gravel size fragments of gneiss and occasional, angular, fine to medium gravel size, quartz fragments (Highly Weathered Gneiss). Fissures, extremely closely spaced, 10-15° inclined, planar, tight and smooth.		
2	2.00									
	2.60		100			2.60	5,8,12,14,14,14			
3			70			3.05				
	3.40		60							
4	4.00					4.00	4,8,11,17,20,26			
			78			4.45				
5	4.90		75							
	5.30		57			6.00		Very stiff, light yellow, CLAY with some extremely strong, white, angular, fine to coarse gravel size fragments of quartzite (Highly Weathered Quartzite)	5.30	
6	6.00					6.45	3,5,7,9,12,13	Stiff to very stiff, pink brown and orange brown, 20-30° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	6.00	
			84							
7	7.10		30							
			100			8.00	2,4,6,10,11,10			
	8.55		100			8.45				
9	9.10		100					Very stiff, orange brown and pink brown, 10-15° inclined, extremely thinly banded, gravely CLAY	8.55	
	9.60		100			9.60			9.10	
10	10.00		100			D	1,3,6,6,8,8			

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 8.0, 9.6 and 12.5m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed SampleStand pipe installed: 0.0-19.0m
Slotted Section: 1.5 - 18.50m
0.0 - 1.0m: Concrete
1.0 - 1.5m: Bentonite
1.5 - 19.0m: Gravel pack
19.0 - 20.0m: Gravel**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 14+705**Coordinates (E/N):** 46925 35632**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry and water flush by single core barrel (0-6m), dry (6-20m)**BH No.:** BH330**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-20.0m)**Date Started:** 16-Apr-14**Date Completed:** 18-Apr-2014**Total Depth:** 20**Water level (m):** 8.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10						10.05		(Completely Weathered Gneiss). Gravel angular, fine to medium quartz		
11	11.00		100			11.00	2,4,6,7,7,8			
						D				
			100			11.45				
12	12.00									
	12.50		100			12.50				
						D	3,6,6,7,6,7			
13						12.95				
			100							
14	14.00					14.00	4,4,7,7,8,9	Stiff to very stiff, pink brown and orange brown, 10-20° inclined, extremely thinly banded, fissured, micaceous slightly sandy CLAY (Completely Weathered Gneiss). Fissures, extremely closely spaced, 10-20° inclined, tight, planar, smooth and rough.		
			100			14.45				
15	15.20									15.00
			100							
16	16.00					16.00	3,3,6,8,8,8			
			100			16.45				
17	16.85									
	17.50		100			17.50			17.30 17.43	
						D	3,3,7,8,9,9	Strong, angular, fine to medium GRAVEL size quartz in much very stiff, white and gray CLAY matrix (Highly Weathered Quartzite)		
18	18.50		100			17.95				
19			100							
	19.50					19.50		(Highly Weathered Gneiss) same as interval 9.10-17.30m.		
						D	4,5,7,8,8,10		20.00	20.00
20	20.00		100			19.95				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 8.0, 9.6 and 12.5m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample

Stand pipe installed: 0.0-19.0m

Slotted Section: 1.5 - 18.50m

0.0 - 1.0m: Concrete


1.0 - 1.5m: Bentonite

1.5 - 19.0m: Gravel pack

19.0 - 20.0m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 16+910**Coordinates (E/N):** 471213 35332**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-12.6m), Water flush by double core barrel (12.6-18.80m)**BH No.:** BH331**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-12.6m), 64mm (12.6-18.80)**Date Started:** 19-Apr-14**Date Completed:** 22-Apr-2014**Total Depth:** 18.8**Water level (m):** 8.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0								Soft, dark brown CLAY (Top Soil)	0.20	
			100					Stiff, reddish brown, slightly fine (quartz) gravelly CLAY (Residual Soil)	1.10	
1	1.00		100			1.20		Stiff, reddish brown, gravelly CLAY (Residual Soil). Gravel angular, fine to medium quartz and occasional very weak, subrounded medium gravel size gneiss.	1.75	
	1.20		100			D	3,5,7,7,8,7			
			100			1.65				
2	1.75		100			2.50		Firm, reddish brown, slightly gravelly CLAY (Residual Soil). Gravel angular, fine to medium and occasional coarse quartz.	4.05	
	2.50		100			D	1,2,3,4,4,4			
3	3.50		100			2.95				
			100			3.50				
4	4.00		100			UD		Firm, reddish brown, orange brown and light gray, fissured, micaceous, slightly gravelly CLAY (Residual Soil). Gravel angular, fine to medium quartz. Fissures 10-15° inclined, extremely closely spaced, tight, planar and smooth.	6.35	
			100			D	1,2,3,4,4,5			
			100			4.45				5.00
5			100			4.85				
			100			D*				
			100			5.00				
	5.50		100			5.50				
6			100			D	1,2,2,3,4,5			
			100			5.95				
			100			6.50		Firm, brown, orange brown and light gray,		
	6.50		100			UD				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 1m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
RC= Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 16+910**Coordinates (E/N):** 471213 35332**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-12.6m), Water flush by double core barrel (12.6-18.80m)**BH No.:** BH331**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-12.6m), 64mm (12.6-18.80)**Date Started:** 19-Apr-14**Date Completed:** 22-Apr-2014**Total Depth:** 18.8**Water level (m):** 8.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
7	6.90					D	1,2,3,4,4,5	fissured, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss). Fissures, 10-15° inclined, extremely closely spaced, tight, planar and smooth		
			100			7.35				
8	8.00					D	1,2,2,4,4,4			
			100			8.45				
9								Extremely thin to thin, 10-15° inclined interbanded, firm to stiff, brown CLAY AND extremely weak, friable, GNEISS (Highly to Moderately Weathered Gneiss)	9.00	
	9.50					9.50				
	9.80		100			UD				
10						D	2,3,3,3,4,4			10.00
			100			10.35				
11	11.00									
			100							
	11.60					11.85				
12						D*				
			100			12.00				
	12.60					12.60				
13			Cuttings			D	2,5,5,7,50/7cm	Extremely weak, dark gray GNEISS (Slightly Weathered Gneiss).	12.90	
						12.97				
	13.50								13.50	

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 1m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 RC= Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 16+910**Coordinates (E/N):** 471213 35332**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-12.6m), Water flush by double core barrel (12.6-18.80m)**BH No.:** BH331**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.00-12.6m), 64mm (12.6-18.80)**Date Started:** 19-Apr-14**Date Completed:** 22-Apr-2014**Total Depth:** 18.8**Water level (m):** 8.20**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
14						13.60 RC 14.00		Recovered as light to dark gray, medium sand and extremely weak, light and dark gray, coarse gravel size fragments of gneiss.		
15	15.00		100	75	53			Medium strong to strong, white and dark gray, medium to coarse grained, 70-80° inclined foliated, GNEISS (Fresh to Slightly Weathered Gneiss). Joints closely to medium spaced, 70-80° inclined, undulating, rough and stained by mica.	15.00	15.00
16			84	13	<1 cm			Very Weak to weak, white and dark gray, medium to coarse grained, 70-80° inclined foliated, GNEISS (Slightly Weathered Gneiss). Joints extremely closely to very closely spaced, 60-70° inclined, undulating, rough and stained by mica.	16.70	
17	16.70					16.70 RC 17.00		Very strong, white and dark gray, medium to coarse grained, 70-80° inclined foliated, GNEISS (Fresh Gneiss). Joints widely spaced, 80° inclined, undulating, rough and stained by mica.	18.80	18.80
18			100	86	105					
19										
20	18.80									


**Client:** UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 1m but refused

D=Disturbed Sample (Split spoon)
 D*=Disturbed Sample (from core box)
 UD=Undisturbed Sample
 RC= Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 17+160**Coordinates (E/N):** 471451 35368**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-1.90m), Water flush by double core barrel (1.9-25.3m)**BH No.:** BH332**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Total Depth:** 25.3**Water level (m):** 8.20**Borehole diameter (mm):** 97**Core diameter (mm):** 75 (0.00-1.90m), 64mm (1.9-11.0), 47mm (11.0-25.3)**Date Started:** 23-Apr-14**Date Completed:** 28-Apr-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.50	115mm	100					Dark brown, CLAY with rootlets (Top Soil)	0.05	
1	1.00		100			1.00	6,10,12, 6/15cm	Very dense, light brown and pink brown, gravelly fine to coarse SAND with occasional angular, coarse gravel size, brown clay lumps and occasional angular cobble size quartz (Residual Soil). Gravel angular, fine to coarse quartz	1.24	
	1.24		100			D				
2	1.90		100	0	<1					
	2.40		100	0	<1					
3	3.00		85	0	<1			Strong to very strong, white and brown, medium to coarse grained, fractured QUARTZITE (Fresh to slightly Weathered Quartzite). Joints extremely closely spaced, subhorizontal and very closely spaced, 70-80° inclined. Fractures planar, rough and brown stained	3.00	
	3.40		100	20	10					
	3.85		100	62	14				3.85	
4	4.45		40	0	<1					
	4.80		57	0	<1	RC		Extremely strong, white, medium to coarse grained, fractured QUARTZITE (Fresh QUARTZITE). Joints very closely to closely spaced, 10° inclined & medium spaced 80° inclined. Fractures, planar, rough and brown stained.	5.45	
	5.40		100	15	<1	RC				
5	5.80		100	68	8	RC				
	6.35		64	0	<1					
	6.55		100	0	5					
6	6.55		100	0	5					
	7.10		100	22	3			Medium strong to strong, white, medium to		
7	7.10									5.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
RC=Rock Core Sample
NA=Note Applicable

Stand pipe installed: 0.0-24.80m
Slotted Section: 1.5 - 24.30m
0.0 - 1.0m: Concrete
1.0 - 1.5m: Bentonite
1.5 - 24.80m: Gravel pack
24.80 - 25.30m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 17+160**Coordinates (E/N):** 471451 35368**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-1.90m), Water flush by double core barrel (1.9-25.3m)**BH No.:** BH332**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Total Depth:** 25.3**Water level (m):** 8.20**Borehole diameter (mm):** 97**Core diameter (mm):** 75 (0.00-1.90m), 64mm (1.9-11.0), 47mm (11.0-25.3)**Date Started:** 23-Apr-14**Date Completed:** 28-Apr-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
8	7.80		100	64	12			coarse grained, fractured, QUARTZITE (Slightly Weathered QUARTZITE). Joints extremely closely spaced, 20° inclined & extremely closely spaced, 80° inclined. Fractures planar, rough and brown stained. Strong to extremely strong, medium to coarse grained, 60-70° inclined, white and pink brown, fractured, extremely thin banded GNEISS (Fresh to Slightly Weathered Gneiss). Joints extremely closely to closely spaced, 10° inclined & closely spaced to medium spaced, 70° inclined. Fractures planar, rough and brown stained. Extremely strong, white, medium to coarse grained, fractured QUARTZITE (Fresh to Slightly Weathered QUARTZITE). Joints closely to medium spaced occasionally very closely spaced, 20° inclined & medium spaced, 70° inclined. Fractures, planar, rough and brown stained.		
			56	11	3					
9	8.70								9.50	
	9.20		100	56	8					
10	9.70		75	23	5					10.00
			100	77	15					
11	10.30		100	64	13					
	10.55		100	76	23	10.75				
12	11.00					RC				
			82	65	21	11.20				
13	11.85								13.00	
			100	98	43					
14	13.00								13.60	
			67	13	9	13.4				
	13.90					13.5				
			N/A	N/A						

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
RC=Rock Core Sample
NA=Note Applicable

Stand pipe installed: 0.0-24.80m
Slotted Section: 1.5 - 24.30m
0.0 - 1.0m: Concrete
1.0 - 1.5m: Bentonite
1.5 - 24.80m: Gravel pack
24.80 - 25.30m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 17+160**Coordinates (E/N):** 471451 35368**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-1.90m), Water flush by double core barrel (1.9-25.3m)**BH No.:** BH332**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Total Depth:** 25.3**Water level (m):** 8.20**Borehole diameter (mm):** 97**Core diameter (mm):** 75 (0.00-1.90m), 64mm (1.9-11.0), 47mm (11.0-25.3)**Date Started:** 23-Apr-14**Date Completed:** 28-Apr-2014

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
15	14.70		44	49	12			Medium strong to strong, white, medium to coarse grained, fractured QUARTZITE (Slightly Weathered QUARTZITE). Joints closely spaced, 20° inclined & very closely spaced, 80° inclined. Fractures, undulating, rough and filled by 3-10mm thick, firm, white and orange brown clay.	14.35	15.00
	15.40		100	58	30					
16	15.80		100	63	13	15.80	16,34/2.5cm	Very stiff, white with orange brown mottling, gravelly CLAY (Highly Weathered Quartzite). Gravel angular, fine to medium quartz.	15.80	20.00
				N/A	N/A	18.9				
	16.70		56	0	6					
17								Extremely strong, white and dark gray, medium to coarse grained, fractured QUARTZITE (Fresh QUARTZITE). Joints closely to medium spaced, 10-20° inclined & medium spaced, 70° inclined. Fractures undulating, rough, brown and white stained.	16.15	20.00
	17.50		85	35	9					
18	18.00		100	54	25			Very stiff, white, slightly gravelly CLAY (Highly Weathered Quartzite). Gravel angular, fine to medium quartz.	17.20	20.00
	18.40		100	75	-					
19	19.30		77	55	45			Strong, white, medium to coarse grained, fractured QUARTZITE	20.00	20.00
	19.70		100	35	13					
20						20.33		Very stiff, white, slightly gravelly CLAY (Highly Weathered Quartzite). Gravel angular, fine to medium quartz.	20.00	20.00
	20.55		100	35	12	RC				
						RC				
21			100	30	9	20.72				



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
RC=Rock Core Sample
NA=Note Applicable

Stand pipe installed: 0.0-24.80m
Slotted Section: 1.5 - 24.30m
0.0 - 1.0m: Concrete
1.0 - 1.5m: Bentonite
1.5 - 24.80m: Gravel pack
24.80 - 25.30m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**BH No.:** BH332**Total Depth:** 25.3**Location:** 17+160**BH Inclination:** 90°**Water level (m):** 8.20**Coordinates (E/N):** 471451 35368**Bit type:** Carbide/Diamond**Borehole diameter (mm):** 97**Ground Elevation (masl.):****Core diameter (mm):** 75 (0.00-1.90m), 64mm (1.9-11.0), 47mm (11.0-25.3)**Type of Rig:** APAFOR 560**Date Started:** 23-Apr-14**Date Completed:** 28-Apr-2014**Drilling Method:** dry boring by single core barrel (0-1.90m), Water flush by double core barrel (1.9-25.3m)

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
22	21.55							(Slightly Weathered Quartzite). Joints very closely to closely spaced, 70-80° inclined, undulating, rough and filled by 3-10mm thick, firm, white clay		
	22.40		100	65	17					
22.80	100		0	9						
23	23.50		100	97	23					
	23.90		100	25	10					
24	24.25		100	96	12					
	24.60		100	98	35					
25	25.30		100	75	60					
									25.00	
26									25.30	
27										
28										



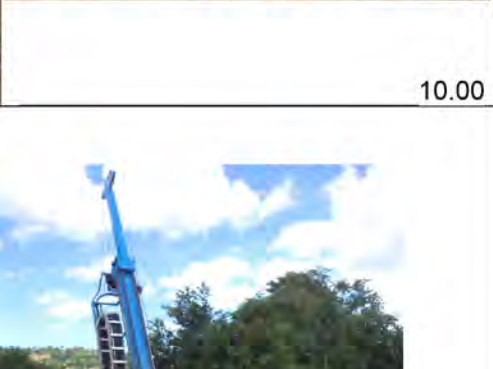

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
RC=Rock Core Sample
NA=Note Applicable

Stand pipe installed: 0.0-24.80m
Slotted Section: 1.5 - 24.30m
0.0 - 1.0m: Concrete
1.0 - 1.5m: Bentonite
1.5 - 24.80m: Gravel pack
24.80 - 25.30m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 19+153**Coordinates (E/N):** 473327 35710**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**BH No.:** BH333**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-8.6m & 16.10-20.25), 64mm (8.6-9.0)**Total Depth:** 20**Water level (m):** 2.55**Borehole diameter (mm):** 97**Date Started:** 29-Apr-14**Date Completed:** 1-May-2014**Drilling Method:** dry by single core barrel (0-8.60 & 16.10-20.25), Water flush, double & triple core barrel (8.60-16.10m)

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			75					Very soft, light brown CLAY (Top Soil)	0.10 0.50	
1	1.00					1.00	1/20, 1/10, 1/11, 1/6 cm	Light brown, SAND with occasional medium gravel size angular bricks (Made Ground)	1.50	
2	2.00		100			1.47		Very soft, black and light brown CLAY with occasional rootlets (Alluvium)	2.00	
2	2.35		100			2.35	2,1,2,1,2,1	Light gray, slightly clayey SAND (Alluvium)	2.35 2.45	
3	3.20		100			2.80		Soft, dark gray CLAY (Alluvium)	3.20	
3	3.50		100			UD		Light gray, clayey GRAVEL (Alluvium). Gravel angular, fine to coarse quartz.	4.40	
4		115mm	100			3.95	2,3,3,4,6,6	Soft, light green, 10-20° inclined, extremely thin banded CLAY (Residual Soil)	4.65	
5	5.00		100			4.50		Stiff, orange brown and light green, 10-20° inclined, extremely thin banded, micaceous, sandy CLAY (Completely Weathered Gneiss)	5.20	
5	5.20		100			5.20	3,6,7,10,11,14	Extremely weak, orange brown and light gray, friable GNEISS with very closely spaced, 10-20° inclined, extremely thin (5-15mm), stiff, light green clay bands (Moderately Weathered Gneiss)	8.55	
6	6.00		90			5.65	5,8,10,14,14, 18		9.00	
6	6.50		100			6.50				
7	7.50		80			6.95				
8	8.00		85			8.00	5,10,10,11,11, 20			
8	8.60		100	22	6	8.45				
9	9.00									
10	10.10					10.10				10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 19+153**Coordinates (E/N):** 473327 35710**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**BH No.:** BH333**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-8.6m & 16.10-20.25), 64mm (8.6-9.0m)**Total Depth:** 20**Water level (m):** 2.55**Borehole diameter (mm):** 97**Date Started:** 29-Apr-14**Date Completed:** 1-May-2014**Drilling Method:** dry by single core barrel (0-8.60 & 16.10-20.25), Water flush, double & triple core barrel (8.60-16.10m)

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.10	cuttings			D 10.55	6,10,12,16,20,30	Strong, light gray, medium to coarse grained, 50° inclined banded, granitic GNEISS (Fresh granitic Gneiss). Joints 20° and 50° inclined, very closely to closely spaced, planar, rough and orange brown stained. Extremely weak, orange brown and light gray, friable, granitic GNEISS (Slightly Weathered Gneiss). Recovered as brown and light gray, fine to coarse sand.		
11									
12	12.10				D 12.10	6,8,10,13,13,17			
13					12.55				
14	14.10				D 14.10	4,6,8,8,9,11	Extremely weak, brown and light green, friable, granitic GNEISS with very closely spaced, light green and brown, 10-20° inclined, extremely thin (5-15mm), firm to stiff, brown, clay bands (Moderately Weathered Gneiss)		
15					14.55				
16	16.10				D 16.10	4,5,6,7,8,9			
17					16.85				
18	17.70	65	0		D* 17.00				
19					17.70				
20	19.50	78			D 18.15	5,5,6,7,7,9			
20	20.25	90			D 19.80	3,4,8,9,11,13			

15.00

20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 19+851**Coordinates (E/N):** 473557 36278**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20.0)**BH No.:** BH334**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 1-May-14**Date Completed:** 3-May-2014**Total Depth:** 20**Water level (m):** 8.5**Borehole diameter (mm):** 97


	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.15		100					Light brown, gravelly CLAY (Road sub base)	0.15	
	0.30		100							
1			71			1.00		Soft to firm, reddish brown CLAY (Residual Soil)		
	1.00		66			UD	1,2,2,1,1,2			
2			35			1.75				
	2.50					2.50	1,1,2,2,2,3			
3			73			2.95				
	3.50					3.50				
4			77			UD				
	3.85					D	1,1,2,2,2,2			
			43			4.50				
5						5.40				5.00
	4.85		55			D	1,2,2,2,2,2		5.90	
	5.40		100			5.85		Stiff, orange brown and reddish brown, 10-20° inclined extremely thinly banded, CLAY with occasional angular medium gravel size quartz (Completely Weathered Gneiss)		
6			100			7.00				
	6.10		100			7.45	7,7,9,8,8,8	Firm, 20-30° inclined, extremely thinly interbanded, orange brown and reddish brown, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	7.60	
7			100			8.60				
	6.50		100			9.05				
8			100			9.50	1,3,3,4,3,4			
	6.90		100			9.80				
9			100			UD				
	7.00					D				
10										

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 7m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample
SC=Soil core sample**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 19+851**Coordinates (E/N):** 473557 36278**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20.0)**BH No.:** BH334**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 1-May-14**Date Completed:** 3-May-2014**Total Depth:** 20**Water level (m):** 8.5**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10			100			D	1,2,2,2,2,3			
11	11.00					D	2,2,3,4,4,4			
12	12.30 12.55		100			UD D	2,2,3,4,5,6	Extremely thin to very thin, 10-20° inclined interbanded, extremely weak, light gray and pink brown GNEISS AND firm to stiff, brown, slightly sandy CLAY (Highly to Moderately Weathered Gneiss)	12.15	
13	13.50		100			D	1,3,3,4,6,6			
14	14.00		100			D				
15	15.00					SC	2,4,6,6,9,10			
16	16.00		100			D				
17	17.00		100							
18	18.00		100			D	4,6,8,8,9,9			
19	19.00 19.50		100							
20	20.00		100			D	4,8,7,8,10,13		20.00	

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 7m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample
SC=Soil core sample**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 20+070**Coordinates (E/N):** 473930 36414**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20)**BH No.:** BH335**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20m)**Date Started:** 5-May-14**Date Completed:** 7-May-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0								Soft, dark brown CLAY with some rootlets (Top Soil)	0.20	
1	1.00		50			1.00				
	1.55		89			UD				
2	2.40		88			D	1,1,1,2,1,1	Soft, reddish brown CLAY (Residual Soil)		
3	3.00		67			3.00				
	3.85		100			D	1/15cm, 1, 1/15cm, 1	Very Soft, reddish brown, slightly gravelly CLAY (Residual Soil). Gravel angular to subrounded fine to medium quartz.	3.60	
4	4.30		100			4.30				
	5.00		100			D				
5	5.40		100			4.75				
	5.80		100			5.80				
6	6.50		100			D	3,9,13,16,18	Stiff to very stiff, orange brown and reddish brown, CLAY with some extremely weak, angular to subrounded, medium gravel size gneiss fragments and occasional strong angular medium to coarse gravel size quartz (Highly Weathered Gneiss)	8.10	
7	7.00		100			6.25	19			
	7.30		100			7.30				
8	8.50		100			7.75	5,10,9,7,6,5	Stiff, 10-20° inclined, extremely thin interbanded, orange brown, pink brown and reddish brown CLAY (Completely Weathered Gneiss)	8.75	
9	9.00		100			9.00				
	9.25		100			UD				
						D	3,3,4,5,6,6			
10			100			9.70				10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 3.85m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed SampleStand pipe installed: 0.0-19m
Slotted Section: 1.5 - 18.50m
0.0 - 1.0m: Concrete
1.0 - 1.3m: Bentonite
1.3 - 19m: Gravel pack
19 - 20m: Gravel**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 20+070**Coordinates (E/N):** 473930 36414**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-20)**BH No.:** BH335**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20m)**Date Started:** 5-May-14**Date Completed:** 7-May-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.50									
11	11.00	100				D	1,2,2,3,3,4			
		100								
12	12.00					UD				
	12.30	100				D	2,3,5,5,5,6	Stiff becoming between 10.5-12.0 firm, pink brown, fissured, 50-70° inclined banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss). Fissures, 5-10° inclined, extremely closely spaced, tight, planar and smooth.		
		100								
13	13.30									
		100								
14	14.00					D	2,3,4,5,5,6			
		100								
15	15.20									15.00
		100								
16	16.00					D	4,5,6,8,8,9			
		100								
17	17.50					D	4,5,7,7,8,9	Stiff, orange brown, pink brown & reddish brown, fissured 70-80° inclined banded, , slightly sandy CLAY with below 19m some angular, fine to medium quartz gravel (Completely Weathered Gneiss). Fissures extremely closely spaced, 10-20° inclined, tight, planar and smooth.		
		100								
19	19.00					D	3,3,6,7,8,11			
		100								
20	20.00									20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 3.85m but refused

D=Disturbed Sample (Split spoon)
UD=Undisturbed SampleStand pipe installed: 0.0-19m
Slotted Section: 1.5 - 18.50m
0.0 - 1.0m: Concrete
1.0 - 1.3m: Bentonite
1.3 - 19m: Gravel pack
19 - 20m: Gravel**Site Photograph:**

Project: Kampala - Jinja Express Road**Location:** 22+392**Coordinates (E/N):** 475475 38089**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-4.5m), water flush by double core barrel (4.5-9.3m)**BH No.:** BH337**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-4.5m), 64 (4.5-9.3m)**Date Started:** 15-May-14**Date Completed:** 16-May-2014**Total Depth:** 9.3**Water level (m):** 2.8**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			80					Soft, dark to reddish brown CLAY (Top Soil)		
1	1.00								1.20	
	1.45		100			1.45		Orange brown and light gray, slightly clayey SAND (Residual Soil)	1.45	
2		115mm				D	1/18.5cm, 1/13.5cm, 1/9cm, 1/8cm	Very soft, orange brown and light gray, CLAY (Residual Soil)		
	2.50		100			1.94				
	2		100			2.50				
	2.75		100			UD			2.75	
3						D	1,2,3,4,7,8	Extremely weak, light green and brown, 60° inclined banded, friable, AMPHIBOLITE with 10-15° inclined, very closely spaced, extremely thin to very thin, light green, slightly sandy, firm CLAY bands		
	3.65		100			3.2				
4	4.00		100			4.00	7,9,6,44/4cm	Very strong, dark gray, medium grained, fractured, AMPHIBOLITE (Fresh Amphibolite). Joints extremely closely spaced, 40-80° inclined, planar, rough and brown stained.		
	4.45		100			4.27			4.45	
	4.80		100	0	<1 cm	5			4.80	
5						RC				5.00
	5.80		100	92	20	5.26				
6	6.35		100	65	11					
	6.85		100	68	17	6.61				
7						RC				
	7.75		100	76	13	6.85		Very strong, dark gray, medium grained, AMPHIBOLITE (Fresh Amphibolite). Joints closely to medium spaced occasionally very closely spaced, 20° inclined and medium spaced 85° inclined.		
8	8.30		100	45	9					
9			100	95	50				9.30	10.00
10								Fractures, planar, rough and brown stained.		

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

RC= Rock Core Sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 23+867**Coordinates (E/N):** 476952 38363**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-16.50m), water flush by triple core barrel (16.50-20.00)**BH No.:** BH338**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-16.50m), 64 (16.50-20.00m)**Date Started:** 19-May-14**Date Completed:** 21-May-2014**Total Depth:** 20**Water level (m):** 16.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100					Firm, reddish brown CLAY (Residual Soil)		
1	1.00					D	1,1,2,1,2,4		1.45	
			100							
2	2.00					UD				
	2.30		100			D	1/11, 1/9, 1/6, 1/5.5, 1/6cm, 2	Soft to firm, reddish brown, slightly gravelly, CLAY. Gravel angular to subrounded, fine to medium occasionally coarse quartz (Residual Soil)		
3			100							
	3.50									
4	4.00					D	1,2,1,1,2,1		4.60	
			100							
										5.00
5	5.00					UD				
	5.30		100			D	1,1,1,2,2,2	Soft to firm, 10-20° inclined, extremely thinly interbanded, fissured, orange brown, reddish brown and pink brown, micaceous sandy CLAY (Completely Weathered Gneiss). Fissures 10° inclined, extremely closely spaced, planar, smooth and tight		
6			100							
						D				
7	7.00					D	1,2,2,2,2,2			
			100							
8	8.00					UD				
	8.20		100			D	2,2,2,3,3,3		8.80	
			100							
9	9.00							Firm, brown and orange brown, 10-20° inclined, extremely thinly banded, micaceous sandy CLAY		
	9.50		100							
10			100			D	2,2,2,3,3,2		10.00	

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 11m but refused

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

Stand pipe installed: 0.0-19m
 Slotted Section: 1.5 - 18.50m
 0.0 - 0.7m: Concrete
 0.7 - 1.2m: Bentonite
 1.2 - 19m: Gravel pack
 19 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 23+867**Coordinates (E/N):** 476952 38363**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-16.50m), water flush by triple core barrel (16.50-20.00)**BH No.:** BH338**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-16.50m), 64 (16.50-20.00m)**Date Started:** 19-May-14**Date Completed:** 21-May-2014**Total Depth:** 20**Water level (m):** 16.6**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.50					9.95		with some medium gravel size pockets and occasional extremely thin (2-5mm) bands of extremely weak, granitic gneiss (Highly Weathered Granitic Gneiss)		
11	11.00	100				11.00	2,3,4,4,4,5			
						11.45				
12	12.20	100				12.75		Stiff to very stiff, brown and orange brown, 10-20° inclined, extremely thinly banded, micaceous sandy CLAY with some medium gravel size pockets and occasional extremely thin (2-5mm) bands of extremely weak, granitic gneiss (Highly Weathered Granitic Gneiss)		15.00
13	12.75	100				13.2	4,4,6,6,6,9			
						13.60				
14	13.50	80				13.75		Extremely weak, 40-50° inclined, orange brown and pink, extremely thinly banded, friable, granitic GNEISS (Slightly Weathered Granitic Gneiss). Recovered as brown fine to medium sand.		20.00
						14.45	4,5,6,8,9,11			
15	14.00	100				15.50				
16	15.00	100				15.95	5,5,8,10,10,13			
						17.20				
17	15.50	100				17.65	4,4,8,10,12,20			
18	16.50					19.20				
19	17.20					19.34	30,20/6.5cm			
20	19.20									
20	20.00									

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 11m but refused

D=Disturbed Sample (Split spoon)

D*=Disturbed Sample (from core box)

Stand pipe installed: 0.0-19m
 Slotted Section: 1.5 - 18.50m
 0.0 - 0.7m: Concrete
 0.7 - 1.2m: Bentonite
 1.2 - 19m: Gravel pack
 19 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 25+070**Coordinates (E/N):** 478135 38312**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-17.50m), water flush by single core barrel (17.50-20.00)**BH No.:** BH339**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 22-May-14**Date Completed:** 24-May-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs		
			TCR (%)	RQD (%)	AFS (cm) (No of Frac.)							
0	0.50		100					Soft, dark brown, CLAY with occasional rootlets (Top Soil)	0.20			
1	1.00		100			1.00	2,2,3,4,4,5	Firm, reddish brown, fissured, CLAY with occasional angular to subrounded, fine to medium quartz gravel (Residual Soil). Fissures 10-15° inclined, very closely spaced, planar, tight and smooth.				
	1.15		100			UD						
2	2.00		100			1.60						
	2.40		100			2.40						
3	3.20		100			2.85	2,2,3,4,5,4					
			100			4.00						
4	4.00		100			UD	1,2,3,2,3,3					
	4.20					D						
5	5.50		100			4.65					1,2,3,3,3,4	
	6.00		100			6.00						
6			100			6.45	2,2,2,3,3,3					
	7.00		100			7.00						
7	7.30		100			UD				1,1,3,2,3,3		
						D						
8			100			7.75						
						9.00						
9	9.00					D	1,1,3,2,3,3					
						9.45						
10			100			10.00				10.00		

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Stand pipe installed: 0.0-19.5m

Slotted Section: 1.5 - 19.0m

0.0 - 0.8m: Concrete

0.8 - 1.0m: Bentonite

1.0 - 19.5m: Gravel pack

19.5 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 25+070**Coordinates (E/N):** 478135 38312**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-17.50m), water flush by single core barrel (17.50-20.00)**BH No.:** BH339**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 22-May-14**Date Completed:** 24-May-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.40					UD		As previous sheet		
						D	1,1,2,3,3,3			
11		100				10.85				
	11.50					11.40				
						D*				
						11.50				
12	12.00	100				12.00				
						D	1,2,2,3,3,4			
						12.45				
13		100								
	13.50					13.50				
14		100				D	2,3,4,5,6,8	Stiff, orange brown, 30-40° inclined, extremely thinly banded, fissured, slightly sandy CLAY (Completely Weathered Gneiss). Fissures 10-15° inclined, very closely spaced, planar, tight and smooth.		
						13.95				
						14.30				
						SC				
						14.60				
15	15.00					15.00				15.00
						D	2,2,4,5,5,9			
						15.45				
16		100								
	16.50					16.50		Extremely weak, orange brown and dark gray, 30-40° inclined, extremely thinly banded, friable, GNEISS with very closely spaced, firm, brown, extremely thin (5-7mm) clay bands (Moderately Weathered Gneiss)		
17		100	0			D	4,5,7,7,8,8			
	17.50					16.95				
18	18.00					18.00				
						D	4,6,8,10,15, 35/5.5cm	Extremely weak, dark gray and light gray, 30-40° inclined, extremely thinly banded, friable, GNEISS (Slightly Weathered Gneiss). Recovered as dark gray and brown, fine to medium sand.		
						18.43				
19										
	19.50					19.50				
20	20.00					19.64	15,35/6cm			20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse**Note:**

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample

Stand pipe installed: 0.0-19.5m

Slotted Section: 1.5 - 19.0m

0.0 - 0.8m: Concrete

0.8 - 1.0m: Bentonite

1.0 - 19.5m: Gravel pack

19.5 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 25+681**Coordinates (E/N):** 478689 38568**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-13.3m), water flush by double core barrel (13.3-19.0)**BH No.:** BH340**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-13.5m), 64 (13.5-19.0)**Date Started:** 24-May-14**Date Completed:** 28-May-2014**Total Depth:** 19**Water level (m):** 10.45**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0			100					Soft, dark brown CLAY with occasional rootlets (Top Soil)	0.25	
1	1.00					D	1,1,2,2,1,2			
			100							
2	2.00					UD				
	2.50		100					Soft, reddish brown, CLAY (Residual Soil)		
3						D	1/9cm, 1/8.5cm, 1/6cm, 1,1,2			
	3.50		100							
4	4.00					D				
			100				2,4,4,5,5,6	Stiff, reddish brown, CLAY (Residual Soil)	3.80	
	4.80									
5	5.20		100						5.00	
	5.50		100					Very stiff, reddish brown, gravelly CLAY (Residual Soil). Gravel angular, medium to coarse quartz	5.50	
6						D	3,5,6,6,7,7			
			100							
7	7.00	90mm				UD				
	7.20		100			D		Stiff, reddish brown and orange brown, 20-30° inclined, extremely thinly banded, CLAY (Completely Weathered Gneiss)		
							1,3,3,5,5,6			
8			100							
	8.50					D*				
9	9.00		100						9.00	
						D				
			100				1,1,3,3,3,4			
								As next sheet		
10	10.00									10.00







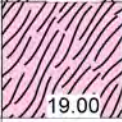

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 4.8 & 13.3m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample
RC=Rock core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 25+681**Coordinates (E/N):** 478689 38568**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring by single core barrel (0-13.3m), water flush by double core barrel (13.3-19.0)**BH No.:** BH340**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-13.5m), 64 (13.5-19.0)**Date Started:** 24-May-14**Date Completed:** 28-May-2014**Total Depth:** 19**Water level (m):** 10.45**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs	
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)						
10	10.25		100			UD	1,2,3,3,4,5	Firm, reddish brown, orange brown and pink brown, 20-30° inclined, extremely thinly banded, CLAY (Completely Weathered Gneiss)			
			100			D					
11	11.25			100							
				100							
12	12.00					D	1,1,2,2,3,4	Strong, dark gray, fine to medium grained, fractured, AMPHIBOLITE (Slightly Weathered Amphibolite). Recovered as angular, medium to coarse gravel size and cobble size fragments.			
			100			SC					
13	13.30										D
			40	0	<1	13.57					
14	13.80		70	0	<1		5,8,15, 35/5.5cm	Very strong, dark gray, fine to medium grained, fractured Amphibolite (Fresh Amphibolite). Joints, closely to medium spaced and occasionally very closely spaced, 40-70° inclined, planar, rough, brown and gray stained.			
			30		<1						
15	15.00			0	5						
			100	58	11	15.55					
16	15.55					RC	16.65	Extremely strong, pink with dark gray mottling, medium grained, fractured, Gneiss (Fresh Gneiss). Joints closely to medium spaced, 30-70° inclined, planar, rough and gray stained			
			100	90	28	15.75					
17	16.65										RC
			100	95	50	16.91					
18	17.70						18.00				
			100	64	12	18.00					
19	18.20										RC
			100	63	11	18.14					
19	19.00										
20											



Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 4.8 & 13.3m but refused

D=Disturbed Sample (Split spoon)
D*=Disturbed Sample (from core box)
UD=Undisturbed Sample
SC=Soil core sample
RC=Rock core sample

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 26+086**Coordinates (E/N):** 479019 38798**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring and water flush by single core barrel (0-8.2m), dry boring by single core barrel (8.2-20)**BH No.:** BH341**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 29-May-14**Date Completed:** 31-May-2014**Total Depth:** 20m**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs		
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)							
0			100					Soft, dark brown, gravelly CLAY (Top Soil). Gravel weak, subrounded, fine to medium gneiss.	0.30			
1	0.80											
	1.00	100			1.00	8,18,19,22,26, 24/4.5cm						
	1.50	100			1.42							
2	1.70	100						Very dense, reddish brown and orange brown, angular to subrounded, medium to coarse, GRAVEL size fragments of weak to medium strong gneiss in much reddish brown and orange brown, stiff CLAY matrix (Highly Weathered Gneiss)		5.00		
	2.10	100			2.50	8,26,33, 17/2.5cm						
3	2.50	100			D 2.75							
	3.00	100										
	3.40	90										
4	3.80	75										
	4.00	100			4.00	10,28,50/6cm						
					D 4.21							
5		75										
	5.00											
	5.50	70			5.50	15,25, 50/2.5cm						
6	5.90	85			D 5.68							
	6.30	90										
		65										
7	7.00						As next sheet			8.00		
	7.50	87			7.50	10,22,32, 18/2.7						
8		100			D 7.75							
	8.20											
		100										
9	9.00				9.00	3,4,5,6,6,10						
					D 9.55							
10		100			SC 9.80							10.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 10.5m but refused

D=Disturbed Sample (Split spoon)

Stand pipe installed: 0.0-19m
 Slotted Section: 1.5 - 18.5m
 0.0 - 0.7m: Concrete
 0.7 - 1.0m: Bentonite
 1.0 - 19m: Gravel pack
 19 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 26+086**Coordinates (E/N):** 479019 38798**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring and water flush by single core barrel (0-8.2m), dry boring by single core barrel (8.2-20)**BH No.:** BH341**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-20.0m)**Date Started:** 29-May-14**Date Completed:** 31-May-2014**Total Depth:** 20m**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.50					9.80				
						10.50				
11	11.30	100				D	2,3,5,6,6,7			
						10.95				
12	12.00	100				12.00				
						12.45	2,3,4,4,5,5			
13	13.00	100				13.50				
						13.50				
14	14.30	100				D	3,3,5,6,6,7			
						13.95				
15	15.50	100				15.50				
						15.95	2,3,6,6,6,8			
16	17.00	100				17.00				
						17.45	3,4,6,6,8,10			
18	18.00	100				18.50				
						18.50				
19	19.40	100				D	5,5,6,8,8,9			
						18.95				
20	20.00	100								

Stiff, orange brown and pink brown, fissured, 20-40° inclined, extremely thin banded, slightly micaceous CLAY (Completely Weathered Gneiss). Fissures closely spaced, 10-15° inclined, planar, tight and smooth.

15.00

20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 10.5m but refused

D=Disturbed Sample (Split spoon)

Stand pipe installed: 0.0-19m
 Slotted Section: 1.5 - 18.5m
 0.0 - 0.7m: Concrete
 0.7 - 1.0m: Bentonite
 1.0 - 19m: Gravel pack
 19 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 27+470**Coordinates (E/N):** 480084 39676**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring (0-11m), water flush by double core barrel (11-20)**BH No.:** BH342**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-11.0m), 64 (11-20)**Date Started:** 2-Jun-14**Date Completed:** 4-Jun-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
0	0.50		100					Soft, dark brown, CLAY with occasional angular, medium quartz gravel (Top Soil)	0.25	
1	1.10		100					Strong, white, angular, coarse GRAVEL with medium cobble content fragments of quartzite with some firm, reddish brown, clay (Moderately Weathered Quartzite)	1.10	
	1.70		100			1.70				
2	2.50		100			D	1,2,3,5,5,5			
	2.70					2.15				
	2.70					2.50				
3	3.00		100			UD		Stiff, reddish brown, CLAY with occasional, angular, medium quartz gravel (Residual Soil)	3.00	
	3.45		100			D	1,1,2,2,2,2			
4	4.00							Firm, pink brown and reddish brown, 20-30° inclined, extremely thin banded, fissured, micaceous, slightly sandy CLAY		
	4.50	80				4.50	2,2,2,3,3,4			
5	5.50		100			4.95		(Completely Weathered Gneiss). Fissures, extremely closely spaced, 10-15° inclined, planar, tight and smooth.		
	5.70		100			5.50				
6	6.50		100			D	1,2,2,2,2,2		6.40	
7	7.50		100			7.50		Extremely thin to very thin, 10-20° inclined, interbanded, stiff brown CLAY AND extremely weak, friable, pink brown GNEISS (Highly to moderately Weathered Gneiss)		
8	8.50		100			7.95	2,3,4,4,5,6			
9	9.15		100			9.15				
			100			D	2,4,4,4,5,6			
10	10.00					9.60				

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 8.5m but refused

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

RC=Rock Core Sample

Stand pipe installed: 0.0-19.5m

Slotted Section: 1.5 - 19m

0.0 - 0.6m: Concrete



0.6 - 1.0m: Bentonite

1.0 - 19.5m: Gravel pack

19.5 - 20m: Gravel

Site Photograph:

Project: Kampala - Jinja Express Road**Location:** 27+470**Coordinates (E/N):** 480084 39676**Ground Elevation (masl.):****Type of Rig:** APAFOR 560**Drilling Method:** dry boring (0-11m), water flush by double core barrel (11-20)**BH No.:** BH342**BH Inclination:** 90°**Bit type:** Carbide/Diamond**Core diameter (mm):** 75 (0.0-11.0m), 64 (11-20)**Date Started:** 2-Jun-14**Date Completed:** 4-Jun-2014**Total Depth:** 20**Water level (m):** Nil**Borehole diameter (mm):** 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)					
10	10.60		100							
11	11.00		100			11.00			11.00	
						D	6,9,12,17,20	Extremely weak, friable, light gray and brown, 10-20° inclined, extremely thin banded, GNEISS (Slightly Weathered Gneiss). Recovered as brown, micaceous, fine to medium Sand.		
12						11.45	23			
13	13.00					13.00	6,18,35,			
						D	15/1.5cm			
						13.24				
14								Extremely weak to weak, pink and dark gray, 20-30° inclined, extremely thin banded, medium to coarse grained, fractured, granitic GNEISS (Slightly Weathered Gneiss). Joints extremely closely spaced to very closely spaced, 30-40° and closely to medium spaced subvertical to vertical. Fractures planar, rough and orange brown stained.		
15	15.00					15.00	50/5cm			
						15.05				
16	16.30									
17	17.00					17.00	50/4cm			
						17.04				
	17.65								17.65	
18			95	0	<1 cm	18.56				
						18.64				
19	19.20					19.20				
						RC				
						RC				
						19.28				
20	20.00		100	0	3				20.0	20.00

Client: UNRA**Approved by:****Consultant:** URS**Drilling Contractor:** Gondwana/Alpha**Logged by:** Melaku Tadesse

Note: Undisturbed sampling attempted at 8.5m but refused

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

RC=Rock Core Sample

Stand pipe installed: 0.0-19.5m

Slotted Section: 1.5 - 19m

0.0 - 0.6m: Concrete




0.6 - 1.0m: Bentonite

1.0 - 19.5m: Gravel pack

19.5 - 20m: Gravel

Site Photograph:

KSB Section (Part 3: Geotechnical Report, Volume 3A: Factual Ground Investigations - ICS, 2016)

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2			
Project: <u>Kampala Southern Bypass</u> Location: <u>2+850</u> Coordinates (E/N): <u>459900 35897</u> Ground Elevation (masl.): <u>1151</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH1</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>15-Dec-14</u>		Total Depth: <u>19.64</u> Water level (m): <u>3.25</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>17-Dec-2014</u>			
<div> <div>0</div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> </div>	<div>Core run (m)</div> <div>1.10</div> <div>2.00</div> <div>2.70</div> <div>4.00</div> <div>5.20</div> <div>5.70</div> <div>7.20</div> <div>8.70</div> <div>9.80</div>	<div>Casing depth (m)</div> <div>45</div> <div>100</div> <div>65</div> <div>100</div> <div>100</div> <div>100</div> <div>100</div> <div>100</div> <div>100</div>	<div>Core Recovery</div> <div> <div>TCR (%)</div> <div>ROD (%)</div> <div>AFS (cm) No of Frac.)</div> </div> <div> <div>1.10</div> <div>D</div> <div>1.55</div> <div>2.00</div> <div>UD</div> <div>D</div> <div>4.00</div> <div>D</div> <div>4.45</div> <div>5.20</div> <div>UD</div> <div>D</div> <div>6.15</div> <div>D</div> <div>7.20</div> <div>D</div> <div>7.65</div> <div>D</div> <div>8.37</div> <div>D</div> <div>8.70</div> <div>D</div> <div>9.15</div> <div>D</div> <div>9.80</div> <div>D</div> </div>	<div>SPT (No of blows)</div> <div>1/15cm, 1/15cm, 1/15cm</div> <div>1,1,1,1,2,2</div> <div>1,1,2,2,3,3</div> <div>1,2,2,3,3,4</div> <div>2,6,6,6,9,9</div> <div>2,3,5,6,9,10</div>	<div>Field Description of Soil/Rock</div> <div> <p>Very soft, dark brown friable CLAY with occasional rootlets. (Top soil)</p> <p>Soft to firm, reddish brown slightly sandy CLAY. (Residual soil)</p> <p>Firm to stiff, light grey and orange brown, 10-30° inclined very narrowly banded gravelly CLAY. (Highly Weathered Gneiss). Gravel angular, fine to medium weak gneiss and occasional coarse quartz.</p> </div>	<div>Graphic Log</div> <div> <div>0.40</div> <div>5.20</div> </div>	<div>Core photographs</div> <div>   </div>
				5.00			
				10.00			
Client: <u>UNRA</u> Approved by: _____ Consultant: <u>ICS</u> Drilling Contractor: <u>Gondwana/Alpha</u> Logged by: <u>Dickens Ahimbisibwe</u> Note: D=Disturbed Sample (Split spoon) D*=Core box sample UD=Undisturbed Sample		Site Photograph: 					

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2			
Project: <u>Kampala Southern Bypass</u> Location: <u>2+850</u> Coordinates (E/N): <u>459900 35897</u> Ground Elevation (masl.): <u>1151</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH1</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>15-Dec-14</u>		Total Depth: <u>19.64</u> Water level (m): <u>3.25</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>17-Dec-2014</u>			
	Core run (m)	Casing depth (m)	Core Recovery TCR (%) ROD (%) AFS (cm) No of Frac.)	Sampling SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
10				6,9,10,8,8,8		10.50	
11	11.30	100		10,17,17,10,11,12	Dense, orange brown, very gravelly, slightly micaceous SAND with thin grey clay bands. (Highly Weathered Gneiss)	10.50	
12	12.30	100					
13	12.90	75		2,8,12,12,12,13			
14	14.00	40					
15	15.00	50		2,7,9,10,13,8	Stiff yellowish brown interbanded micaceous silty CLAY. (Completely Weathered Gneiss)	15.50	
16	16.00	80					
17	17.50	80		3,4,6,7,11,11			
18	18.50	80					
19	19.64	90		40,10/1cm	Very dense, yellowish and greyish brown gravelly SAND with thin Clay bands. Gravel angular fine to medium gneiss. (Highly Weathered Gneiss)	19.64	
20							

Client: UNRA
 Approved by: _____
 Consultant: ICS
 Drilling Contractor: Gondwana/Alpha
 Logged by: Dickens Ahimbisibwe

Note:
 D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample

Site Photograph:

		ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
				Document No.:	Revision No.	Effective Date:			
				GT-F-006	0	10/01/2013 Sheet: 1 of 2			
Project: <u>Kampala Southern Bypass</u> Location: <u>3+750</u> Coordinates (E/N): <u>459514 35138</u> Ground Elevation (masl.): <u>1163</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>				BH No.: <u>BH2</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>17-Dec-14</u>		Total Depth: <u>17</u> Water level (m): <u>NIL</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>18-Dec-2014</u>			
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RCD (%)	AFS (cm) (No of Frac.)	Sampling			
0			70				Firm, dark brown CLAY with some rootlets. (Top Soil)	0.80	
1	1.00					1.00			
						D	1,2,2,3,2,3		
						1.45			
2	2.00		100			2.00			
						UD			
						2.50			
			100				1,2,2,2,1,2		
3	2.50					2.95			
						D			
						4.00			
4	4.00		100			4.45	1,2,2,2,2,2		
						5.50			
5	5.00		100			5.50			
						UD			
						6.25			
6	5.50		100			7.00	1,4,4,5,5,5		
						7.45			
7	5.80					D	2,2,2,2,3,4		
						8.50			
8	7.00		100			9.35	2,3,5,6,9,10		
						UD			
						10.00			
9	8.50		62.5				Firm, pinkish whitish and reddish brown gravelly CLAY. Gravel angular, fine to coarse quartz. (Highly Weathered Gneiss)	8.40	
						D			
						9.35			
10	8.90		100						
						10.00			
	10.00								10.00

Client: UNRA

Approved by: _____

Consultant: ICS

Drilling Contractor: Gondwana/Alpha Geo


Logged by: Dickens Ahimbisibwe

Note:

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2					
Project: <u>Kampala Southern Bypass</u>		BH No.: <u>BH2</u>		Total Depth: <u>17</u>					
Location: <u>3+750</u>		BH Inclination: <u>90°</u>		Water level (m): <u>NIL</u>					
Coordinates (E/N): <u>459514 35138</u>		Bit type: <u>Carbide/Diamond</u>		Borehole diameter (mm): <u>97</u>					
Ground Elevation (masl.): <u>1163</u>		Core diameter (mm): <u>75</u>		Date Started: <u>17-Dec-14</u>					
Type of Rig: <u>APAFOR 560</u>		Date Completed: <u>18-Dec-2014</u>							
Drilling Method: <u>Dry boring by single core barrel</u>									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	ROD (%)	AFS (cm) No of Frac.				
10									
11	11.10		100			10.45	1,2,2,3,5,7		
						11.30			
	11.80		60			11.80			
12	12.00		100			11.80	2,2,4,5,6,7		
						12.45			
13	13.50		100			13.50	3,3,4,4,6,7		
14						13.95			
15	15.10		100			15.10	2,2,4,4,5,5		
16						15.55			
17	17.00		100						
18									
19									
20									

Client: UNRA

Approved by: _____

Consultant: ICS

Drilling Contractor: Gondwana/Alpha Geo

Logged by: Dickens Ahimbisibwe

Note:

D=Disturbed Sample (Split spoon)

UD=Undisturbed Sample

Site Photograph:

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2					
Project: Kampala Southern Bypass		BH No.: BH3		Total Depth: 20					
Location: 4+270		BH Inclination: 90°		Water level (m): 1.50					
Coordinates (E/N): 459016 35047		Bit type: Carbide/Diamond		Borehole diameter (mm): 97					
Ground Elevation (masl.): 1101		Core diameter (mm): 75							
Type of Rig: APAFOR 560		Date Started: 19-Dec-14		Date Completed: 20-Dec-2014					
Drilling Method: Dry boring by single core barrel									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No of Frac.)					Sampling
0							Soft, reddish brown gravelly CLAY with polythene bags and pieces of cloth. Gravel angular, medium to coarse size quartz. (Made ground)		
1	1.00	100				1.00	1,1/10.5cm, 1/12cm, 1/15cm		
						D		1.45	
2	2.00					2.00	Very soft, dark brown, slightly gravelly CLAY with pieces of cloth and polythene bags. (Swamp Top soil)		
	2.65	40				UD			
3		100				3.10	hammer self weight/15cm, 1/45cm		
						D		4.15	
4	4.15					4.60	1,1,1,2,2,2		
5		100				5.60	Soft to firm light grey and orange brown 10-30° inclined extremely thinly banded sandy CLAY. (Completely Weathered Gneiss)		
	5.60					D		6.05	
6	6.55	100				7.20	2,2,3,3,4,5		
	7.20					D		7.65	
8	8.00	100				8.40			
						D*		8.70	
9	9.00					9.00	3,7,9,10,10,16		
						D		9.45	
10		100					(same as next sheet)		

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: Undisturbed sampling attempted between 5.5 and 5.6m but no sample was recovered and at 8.0m but refused.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.:	Revision No.	Effective Date:	Sheet: 2 of 2				
		GT-F-006	0	10/01/2013					
Project: Kampala Southern Bypass		BH No.: BH3		Total Depth: 20					
Location: 4+270		BH Inclination: 90°		Water level (m): 1.50					
Coordinates (E/N): 459016 35047		Bit type: Carbide/Diamond		Borehole diameter (mm): 97					
Ground Elevation (masl.): 1101		Core diameter (mm): 75							
Type of Rig: APAFOR 560		Date Started: 19-Dec-14		Date Completed: 20-Dec-2014					
Drilling Method: Dry boring by single core barrel									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)				
10	10.70					10.70			
11						D	2,3,5,6,6,7		
		100				11.15			
12	12.20					12.20	2,4,6,6,11,13		
						D			
13						12.65			
		100				13.00			
						D*			
						13.30			
14	13.85					13.85	4,4,5,7,7,7		
						D			
		100				14.30			
15						15.50			
	15.50					D	3,5,6,6,7,7		
16						15.95			
		100							
17	17.00					17.00	3,4,5,6,7,8		
						D			
		100				17.45			
18						18.50			
	18.50					D	3,5,7,7,7,8		
19						18.95			
		100							
20	20.00								

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha





Logged by: Dickens Ahimbisibwe

Note: Undisturbed sampling attempted between 5.5 and 5.6m but no sample was recovered and at 8.0m but refused.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:




		Title		Borehole Log Sheet					
ALPHA GEO ENGINEERING (U) LTD.		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2					
Project: <u>Kampala Southern Bypass</u> Location: <u>4+725</u> Coordinates (E/N): <u>458751 34687</u> Ground Elevation (masl.): Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH4</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>22-Dec-14</u>		Total Depth: <u>16.45</u> Water level (m): <u>0.80</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>23-Dec-2014</u>					
	Core run (m)	Casing depth (m)	Core Recovery		SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs	
			TCR (%)	RGD (%)	AFS (cm) (No of Frac.)	Sampling			
0									
1	1.00		100			1.00	1/37.5cm, 1/15cm	Firm, reddish brown very micaceous gravelly CLAY. Gravel angular medium to coarse weak Gneiss. (Made ground/Fill)	
2	2.50		100			1.525			
3	3.60		100			2.50	1,1,2,2,2,2		
4	4.20		100			2.95			
5	5.70		100			3.60			
6	6.70		100			4.20	UD		
7	7.00		100			4.65	D	Soft to firm light grey and orange brown CLAY. (Residual Soil)	
8	8.50		100			5.70			
9	8.95		100			6.15	1,1,1,1,2,2		
10	10.00		100			6.70			
						6.70	UD		
						7.45	D	Firm light grey and yellowish brown banded sandy CLAY. (Completely Weathered Gneiss)	
						8.50			
						8.95	2,2,3,3,4,4		
								(same as next sheet)	

Client: UNRA
Approved by:
Consultant: ICS
Drilling Contractor: Gondwana/Alpha
Logged by: Dickens Ahimbisibwe

Note: UD refusal at 10m
D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet	
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2	
Project: <u>Kampala Southern Bypass</u> Location: <u>4+725</u> Coordinates (E/N): <u>458751 34687</u> Ground Elevation (masl.): Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH4</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>22-Dec-14</u>		Total Depth: <u>16.45</u> Water level (m): <u>0.80</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>23-Dec-2014</u>	
<div> <div>10</div> <div>11</div> <div>12</div> <div>13</div> <div>14</div> <div>15</div> <div>16</div> <div>17</div> <div>18</div> <div>19</div> <div>20</div> </div>	<div>Core run (m)</div> <div>12.00</div> <div>14.00</div> <div>16.00</div> <div>16.45</div>				

ALPHA GEO ENGINEERING (U) LTD.

Title

Revision No

Borehole Log Sheet

Document No :
GEE/005

Revision No
0

Effective Date:
16/01/2015 Sheet: 1 of 2

Project: Kampala Southern Bypass

Location: 5+480

Coordinates (E/N): 458982 34088

Ground Elevation (masl): 1138

Type of Rig: APAFOR 560

Drilling Method: Dry boring by single core barrel

BH No.: BH5

BH Inclination: 90°

Bit type: Carbide

Core diameter (mm): 75



Date Started: 28-Jan-2015

Date Completed: 29-Jan-2015

Total Depth: 16.45

Water level (m): 0.60m

Borehole diameter (mm): 97

	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Grain size	Core photographs	
			TCR (%)	ROD (%)	AFS (m) (No of Pass)						
0											
1	1.20	115mm	100			1.00	1/550mm (N=0)	Firm, reddish brown silty gravelly CLAY with medium to coarse gravel size concrete particles and bricks.	0.90		
2	2.15		100			1.75		Very soft, dark brown CLAY with decomposing matter and numerous rootlets. (Top soil)	1.75		
3	2.60		89			2.50	1/15cm, 1, 1, 1, 2 (N=5)				
4	4.00		100			3.05		Soft to firm, dark grey CLAY. (Alluvium)			
5	5.00					4.00	1, 1, 2, 2, 2, 3 (N=9)				
6	5.70		71			4.45					
7						5.00					
8	7.50					5.70	1, 2, 2, 3, 3, 5 (N=13)	Firm, light grey and orange brown, CLAY. (Residual soil)	5.50		
9	8.50		100			6.15		Medium dense to dense, orange brown, pinkish and whitish clayey gravelly SAND. (Completely Weathered Granite). Gravel angular fine to medium quartz.	7.80		
	8.70		100			7.50	1, 2, 3, 3, 5, 6 (N=17)				
		100			7.95						
					8.50						
					8.90						
					9.15						

Client: UNRA

Approved by:

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note:

D=Disturbed Sample (Split spoon)


N=Core box sample

UD=Undisturbed Sample

Ground Water table strike

Date	Time	Water level (mBGL)	Remarks
28-Jan-2015	08:40AM	0.64	Water was at ground level on 28th Jan 2015 at 7:45Am
-	08:45AM	0.64	
-	08:50AM	0.60	
-	08:55AM	0.60	
-	09:00AM	0.60	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2					
Project: Kampala Southern Bypass		BH No.: BH5		Total Depth: 16.45					
Location: 5+480		BH Inclination: 90°		Water level (m): 0.60m					
Coordinates (E/N): 458982 34088		Bit type: Carbide		Borehole diameter (mm): 97					
Ground Elevation (masl.): 1138		Core diameter (mm): 75							
Type of Rig: APAFOR 560		Date Started: 28-Jan-2015		Date Completed: 29-Jan-2015					
Drilling Method: Dry boring by single core barrel									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) No. of Frac.					Sampling
10	10.00					10.00			
					D	3,6,6,7,10,12 (N=35)			
11		50				10.45	(Same as previous sheet)		
12	12.00				D	4,8,6,5,3,4 (N=18)			
						12.45		12.50	
13		100					Stiff, greyish, yellowish and orangish multi coloured sandy silty CLAY with some pinkish and whitish weak angular fine to medium quartz gravel. (Highly Weathered Granite)		
14	14.00				D	3,5,5,5,5,7 (N=22)			
						14.45			
15		100							15.00
16	16.00				D	3,6,10,14,16 (N=60)	Very stiff, yellowish, greyish clayey sandy SILT with some pinkish fine to medium angular, quartz gravel. (Highly Weathered Granite)	15.80	
	16.45	100						16.45	16.45
17									
18									
19									

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note:
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Ground Water table strike			
Date:	Time	Water level (mBGL)	Remarks
28-Jan-2015	08:40AM	0.64	
"	08:45AM	0.64	
"	08:50AM	0.60	Water was at ground level on 29th Jan 2015 at 7.45am
"	08:55AM	0.60	
"	09:00AM	0.60	

Site Photograph:

ALPHA GEO ENGINEERING (U) LTD.				Title Document No.: GT-F-006		Borehole Log Sheet Revision No.: 0		Effective Date: 10/01/2013		Sheet: 1 of 2					
Project:Kampala Southern Bypass Location: 6+590 Coordinates (E/N): 459206 32875 Ground Elevation (masl.): 1138 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel						BH No.: BH6 BH Inclination: 90° Bit type: Carbide Core diameter (mm): 75 Date Started: 31-Jan-2015			Total Depth: 20 Water level (m): 0.80 Borehole diameter (mm):97 Date Completed: 2-Feb-2015						
		Core Recovery													
Core run (m)		Casing depth (m)		TCR (%)		RQD (%)		AFS (cm) (No. of Frac.)		Sampling					
										SPT (No of blows)					
										Field Description of Soil/Rock					
										Graphic Log					
										Core photographs					
0				100						Stiff, reddish brown, micaceous silty CLAY with some fine to medium gravel and rootlets. (Made ground)		1.00			
1		1.00		100				D		1/30cm, 1/15cm (N=1)		2.40		5.00	
2		2.00		100				D		1,2,3,2,3,4 (N=12)		3.40			
3		2.50		100				D		Medium dense, light grey and blackish SAND. (Alluvium)		5.90			
4		3.40		100				UD		Soft to firm, dark grey and light grey sandy silty CLAY. (Alluvium)					
5		4.50		100				D		1,1,1,2,2,2 (N=7)					
6		5.50		100				UD		2,2,4,4,6,8 (N=22)					
7		5.90		100				D		Stiff, light grey, yellowish and greenish sandy silty CLAY with some fine to medium angular quartz gravel. (Alluvium)					
8		7.00		100				D		2,3,4,5,5,5 (N=19)					
9		7.80		100				UD		1,3,4,5,5,6 (N=20)					
10		9.00		100				D							
		9.25		100				UD							
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ALPHA GEOTECHNICAL ENGINEERING (P) LTD.

Document No.: GEP-0000

Revision No.: 01

Borehole Log Sheet

Effective Date: 11/11/2013

Sheet: 2 of 2

Project: Kameela Southern Bypass

Location: 6+590

Coordinates (E/N): 459206 32875

Ground Elevation (masl.): 1138

Type of Rig: APAFOR 560

Drilling Method: Dry boring by single core barrel

BH No.: BH6

BH Inclination: 90°

Bit type: Carbide

Core diameter (mm): 75

Date Started: 31-Jan-2015

Total Depth: 20

Water level (m): 0.80

Borehole diameter (mm): 97

Date Completed: 2-Feb-2015

Depth (m)	Core Recovery (%)	SPT (No. of blows)	Field Description of Soil/rock	Graphic Log	Core photographs
10	100				
11	100	1,3,4,4,4,4 (N=16)			
12	100	3,5,5,10,16,17 (N=48)			
13	100				
14	100	4,4,4,7,8,8 (N=27)			
15	100	8,20,12,14,16,16 (N=58)	Medium dense to dense greyish, light bluish, whitish silty gravelly SAND with some mica at 15m. Gravel angular to subrounded fine to medium white quartz. (Highly Weathered SANDSTONE)		
16	80	3,4,8,8,8,8 (N=32)			
17	50	1,3,5,5,5,6 (N=21)			
18	50				
19	50				
20					

Client: UNRA

Approved by:

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Notes:

- ☐ Disturbed Sample (Split spoon)
- ☐ Undisturbed Sample

Ground Water table strike

Date	Time	Water level (mBGL)	Remarks
31-Jan-2015	00:50PM	0.75	
-	04:03PM	0.65	Ground water sample was taken at 0.80m for pH and Sulphate tests.
-	04:05PM	0.35	
-	04:13PM	0.25	
-	04:16PM	0.20	

Site Photograph:

ALPHA GEOTECHNICAL ENGINEERING (P) LTD.

Title

Document No.: GEP-0000

Revision No.: 01

Borehole Log Sheet

Effective Date: 11/11/2013

Sheet 2 of 2

Project: Kameela Southern Bypass

Location: 6+590

Coordinates (E/N): 459206 32875

Ground Elevation (masl.): 1138

Type of Rig: APAFOR 560

Drilling Method: Dry boring by single core barrel

BH No.: BH6

BH Inclination: 90°

Bit type: Carbide

Core diameter (mm): 75

Date Started: 31-Jan-2015

Total Depth: 20

Water level (m): 0.80

Borehole diameter (mm): 97

Date Completed: 2-Feb-2015

Core Depth (m)	Core Recovery (%)	TRP (%)	ROD (s)	W.S. (m)	Sampling	SPT (No. of blows)	Field Description of Struck Rock	Graphic Log	Core photographs
10		100							
11	11.00				D	1,3,4,4,4,4 (N=16)			
		100							
12	12.00				UD				
	12.30	100			D	3,5,5,10,16,17 (N=48)		12.40	
13									
		100							
14	14.00				D	4,4,4,7,8,8 (N=27)			
		100							
15	15.50				D	8,20,12,14,16,16 (N=58)	Medium dense to dense greyish, light bluish, whitish silty gravelly SAND with some mica at 15m. Gravel angular to subrounded fine to medium white quartz. (Highly Weathered SANDSTONE)		15.00
16		80							
17	17.00				D	3,4,8,8,8,8 (N=32)			
18									
	18.50								
19		50			D	1,3,5,5,5,6 (N=21)			
20	20.00							20.00	20.00

Client: UNRA

Approved by:

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note:

- D = Disturbed Sample (Split spoon)
- UD = Undisturbed Sample

Ground Water table strike

Date	Time	Water level (mBGL)	Remarks
31-Jan-2015	03:58PM	0.75	
-	04:03PM	0.65	Ground water sample was taken at 0.65m for pH and Sulphate tests.
-	04:05PM	0.35	
-	04:13PM	0.25	
-	04:16PM	0.20	

Site Photograph:

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet	
		Document No.:	Revision No.	Effective Date:	
		GT-F-006	0	10/01/2013 Sheet: 1 of 2	
Project: Kampala Southern Bypass		BH No.: BH7		Total Depth: 17	
Location: 6+810		BH Inclination: 90°		Water level (m): 1.00	
Coordinates (E/N): 459184 33008		Bit type: Carbide/Diamond		Borehole diameter (mm): 97/76	
Ground Elevation (masl.): 1138		Core diameter (mm): 75/64/47			
Type of Rig: APAFOR 560		Date Started: 30-Jan-2015		Date Completed: 31-Jan-2015	
Drilling Method: Dry boring by single core barrel (0.00-14.00m), water flush by double core barrel (14.00-17.00m)					

Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RCD (%)	AFS (cm) No of Frac.					
0		100					Firm, reddish brown silty gravelly CLAY with numerous rootlets. (Made Ground)	0.60	
1	1.00	100			1.00	1/30cm, 1/22cm (N=1)			
2	2.00	43			1.52		Soft, reddish brown silty gravelly CLAY. (made ground)		
3	2.70	100			2.00	1/22.5cm, 1/15cm, 1/15cm (N=2)			
4	4.00	100			3.225		Very soft, black clayey SILT with decomposed organic matter. (Organic SILTS)	3.70	
5	5.00	80			4.00	1/45cm (N=1)		4.35	
6	5.75	100			4.45		Very soft, dark grey and black spongy clayey SILT. (Alluvium)		
7	7.00	100			5.00	1/52cm (N=0)			
8	8.00	66			5.75		Loose, dark grey and light grey, clayey silty SAND. (Alluvium)	6.90	
9	8.35	100			7.00	1.2, 2.3, 2.3 (N=10)		7.16	
					7.45		Firm, whitish and greyish sandy silty CLAY. (Alluvium)		
					8.00	2, 2, 2, 2, 3 (N=9)			
					8.35				
					8.80			9.30	

Client: UNRA

Approved by: _____

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note:

D=Disturbed Sample (Split spoon)

D=Cone box sample


UD=Undisturbed Sample

R=Rock core sample

Ground Water table strike

Date	Time	Water level (mBGL)	Remarks
30-Jan-2015	09:10AM	1.05	
"	09:15AM	1.00	Ground water sample was taken at 1.00m for pH and Sulphate tests.
"	09:20AM	0.97	
"	09:25AM	0.95	
"	09:30AM	0.95	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.	Title		Borehole Log Sheet	
	Document No.:	Revision No.	Effective Date:	Sheet: 2 of 2
	GT-F-006	0	10/01/2013	

Project: Kampala Southern Bypass
Location: 6+810
Coordinates (E/N): 459184 33008
Ground Elevation (masl.): 1138
Type of Rig: APAFOR 560
Drilling Method: Dry boring by single core barrel (0.00-14.00m), water flush by double core barrel (14.00-17.00m)

BH No.: BH7
BH Inclination: 90°
Bit type: Carbide/Diamond
Core diameter (mm): 75/64/47
Date Started: 30-Jan-2015 **Date Completed:** 31-Jan-2015

Total Depth: 17
Water level (m): 1.00
Borehole diameter (mm): 97/76

Core run (m)	Core Recovery				Field Description of Soil/Rock	Graphic Log	Core photographs
	Casing depth (m)	TCR (%)	RQD (%)	AFS (cm) (No of Free.)			
10	10.00			10.00	Firm to stiff, greenish, greyish and orangish sandy silty CLAY. (Alluvium)	10.80	
				10.45			
11	11.00	100		11.00	Firm, greenish, dark greyish and orange brown, silty CLAY. (Residual soil)	13.00	
	11.50			11.85			
12	12.00	100		11.95	Firm, light grey and yellowish brown, sandy silty CLAY. (Residual soil)	14.00	
	12.50			13.50			
13	13.00	100		13.50	Extremely weak to very weak, pinkish and brownish, porphyritic, medium grained Micro-Granite. (Recovered as pinkish, brownish fine to medium SAND). (Slightly weathered Granite)	15.15	
	13.50			13.95			
14	14.00	cuttings			strong to very strong, pinkish, greyish and whitish, crystalline coarse grained Granite. (Fresh Granite)	17.00	
15	15.15						
16		76.5	32.5	15.70			
				16.00			
17		94	44	16.50			
18							
19							

Client: UNRA

Approved by:

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note:

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample
 R=Rock core sample
 Ground Water table strike

Date	Time	Water level, (mBCL)	Remarks
30 Jan 2015	09:10AM	1.05	
"	09:15AM	1.00	Ground water sample was taken at 1.00m for pH and Sulphate tests.
"	09:20AM	0.97	
"	09:25AM	0.95	
"	09:30AM	0.95	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2					
Project: <u>Kampala Southern Bypass</u> BH No.: <u>BH8</u> Total Depth: <u>20</u> Location: <u>7+320</u> BH Inclination: <u>90°</u> Water level (m): <u>12.40</u> Coordinates (E/N): <u>458802 32327</u> Bit type: <u>Carbide</u> Borehole diameter (mm): <u>97</u> Ground Elevation (masl.): <u>1151</u> Core diameter (mm): <u>75</u> Type of Rig: <u>APAFOR 560</u> Date Started: <u>26-Jan-2015</u> Date Completed: <u>27-Jan-2015</u> Drilling Method: <u>Dry boring by single core barrel</u>									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RCD (%)	AFS (cm) No of Frac.				
0			100				Stiff, dark brown, silty CLAY with some rootlets. (Top soil)	0.50	
1	1.00				1.00	2,3,4,4,6,6 (N=20)			
			100		1.45				
2	2.00				2.50	2,5,4,6,6,5 (N=21)	Stiff, reddish brown sandy gravelly CLAY. Gravel angular to subrounded fine to medium quartz, occasionally coarse. (Residual soil)		
	2.50		100		2.95				
3					4.00	2,4,4,6,6,8 (N=24)		4.00	
4	4.00		100		4.45		Stiff, light grey, orangish and reddish brown interbanded, clayey sandy gravelly SILT. (Gravel angular to subrounded fine to medium quartz. (Completely Weathered Gneiss)		
5	5.00				5.50	2,3,3,3,5,5 (N=16)		5.50	
	5.50		100		5.95				
6					7.10	2,4,4,3,3,4 (N=14)			
7	7.10		100		7.55		Firm, reddish brown, orangish and dark greyish slightly micaceous sandy silty CLAY. (Completely Weathered gneiss)		
8	8.10				8.10	1,2,3,4,4,4 (N=15)			
	8.40		100		8.40				
9					8.85				
10	10.00		100		10.00			10.00	

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe





Note: UD sampling attempted with Shelby sampler at 2.00, 5.00 and 14.50 but refused
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Ground Water table strike			
Date	Time	Water level (mBGL)	Remarks
26-Jan-2015	09:00AM	9.65	
"	09:05AM	9.50	Ground water sample was taken at 12.40m for lab testing.
"	09:10AM	9.40	
"	09:15AM	9.40	
"	09:20AM	9.40	

Site Photograph:



26/01/2015 12:07

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2					
Project: <u>Kampala Southern Bypass</u>		BH No.: <u>BH8</u>		Total Depth: <u>20</u>					
Location: <u>7+320</u>		BH Inclination: <u>90°</u>		Water level (m): <u>12.40</u>					
Coordinates (E/N): <u>458802 32327</u>		Bit type: <u>Carbide</u>		Borehole diameter (mm): <u>97</u>					
Ground Elevation (masl.): <u>1151</u>		Core diameter (mm): <u>75</u>							
Type of Rig: <u>APAFOR 560</u>		Date Started: <u>26-Jan-2015</u>		Date Completed: <u>27-Jan-2015</u>					
Drilling Method: <u>Dry boring by single core barrel</u>									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RGD (%)	AFS (cm) No of Frac.	Sampling			
10			100			D 10.45	1,1,2,1,2,1 (N=6)	Soft, yellowish and reddish brown silty CLAY. (Completely Weathered Gneiss)	
11	11.00		100			UD 11.60	1,1,2,1,2,2 (N=7)		
12	11.60		100			D 12.05		Medium dense, greyish, orangish and yellowish micaceous silty SAND. (Highly Weathered Gneiss)	
13	13.00		100			D 13.45	1,2,3,4,4,4 (N=15)		
14	14.50		100			D 14.95	2,3,4,5,5,6 (N=20)	Stiff, yellowish, orangish and light greenish multi coloured silty CLAY. (Highly Weathered Gneiss)	
15	16.00		100			D 16.75	1,3,3,5,6,7 (N=21)		
16	17.7		100			D* 17.00	2,2,4,5,7,8 (N=24)	Very stiff, orange brown, greenish, dark grey and yellowish multi-coloured silty CLAY with extremely weak black highly weathered Gneiss. (Highly Weathered Gneiss)	
17	17.75		100			D 18.20			
18	19.55		100			D 19.55	2,7,7,10,11,16 (N=44)		
19	20.00		100			D			
20									

Client: UNRA

Approved by: _____

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: UD sampling attempted with Shelby sampler at 2.00, 5.00 and 14.50 but refused


D=Disturbed Sample (Split spoon)

D*=Core box sample


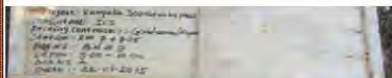

UD=Undisturbed Sample


Ground Water table strike			
Date	Time	Water level (mBGL)	Remarks
26-Jan-2015	09:00AM	9.65	
"	09:05AM	9.50	Ground water sample was taken at 12.40m for lab testing.
"	09:10AM	9.40	
"	09:15AM	9.40	
"	09:20AM	9.40	

Site Photograph:



26/01/2015 12:07

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet						
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013	Sheet: 1 of 4					
Project: Kampala Southern Bypass		BH No.: BH9		Total Depth: 33						
Location: 7+705		BH Inclination: 90°		Water level (m): NIL						
Coordinates (E/N): 458614 32017		Bit type: Carbide		Borehole diameter (mm): 97/7						
Ground Elevation (masl.): 1171		Core diameter (mm): 75 (0.00-27.5m), 46 (27.5-33.00m)								
Type of Rig: APAFOR 560		Date Started: 21-Jan-2015		Date Completed: 24-Jan-2015						
Drilling Method: Dry boring by single core barrel (0.00-27.50m), water flush by single core barrel (27.50-33.00m)										
	Core run (m)	Casing depth (m)	Core Recovery							
			TCR (%)	ROD (%)	AFS (cm) No of Frac.					
					Sampling					
					SPT (No of blows)					
					Field Description of Soil/Rock					
					Graphic Log					
					Core photographs					
0										
1	1.00		100			1.00	2,3,2,3,3,4 (N=12)	Firm, dark brown, silty CLAY with some rootlets and some medium to coarse angular quartz gravel. (Top soil)	0.60	
2	2.00		100			1.45				
3	3.00		100			3.00	3,5,7,10,11,11 (N=39)	Firm, becoming very stiff between 1.8 and 4.0m, reddish brown silty gravelly CLAY. (Residual soil). Gravel angular fine to medium quartz occasionally coarse.		
4	4.50		100			3.45			4.00	
5			100			4.50	3,5,6,6,7,7 (N=26)			
6	6.00		100			4.95		Firm, yellowish, whitish, orangish silty CLAY with some fine quartz gravel. (Completely Weathered Granite)		5.00
7			100			6.00	2,4,4,5,5,5 (N=19)			
8	7.50 7.70		100			6.45			7.00	
9	9.00		100			7.50	1,2,3,4,4,4 (N=15)			
10			100			7.70		(Same as next sheet)		
						8.15				
						9.00	2,3,3,5,5,5 (N=18)			
						9.45				10.00
Client: UNRA						Site Photograph: 				
Approved by:										
Consultant: ICS										
Drilling Contractor: Gondwana/Alpha										
Logged by: Dickens Ahimbisibwe										
Note: UD sampling with Shelby sampler refused at 2.00m and 19.50m.										
D=Disturbed Sample (Split spoon)										
D*=Core box sample										
UD=Undisturbed Sample										

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet				
Document No.: GT-F-006		Revision No. 0		Effective Date: 10/01/2013 Sheet: 2 of 4				
Project: Kampala Southern Bypass Location: 7+705 Coordinates (E/N): 458614 32017 Ground Elevation (masl.): 1171 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel (0.00-27.50m), water flush by single core barrel (27.50-33.00m)			BH No.: BH9 BH Inclination: 90° Bit type: Carbide Core diameter (mm): 75 (0.00-27.5m), 46 (27.5-33.00m) Date Started: 21-Jan-2015 Date Completed: 24-Jan-2015					
			Total Depth: 33 Water level (m): NIL Borehole diameter (mm): 97/7					
10	10.50 10.70	98mm	100	10.50 10.70	2,3,3,4,4,5 (N=16)	Firm, yellowish, whitish, orangish clayey SILT with some fine quartz gravel. (Completely Weathered Granite)	12.00	
11	100		11.15					
12	100		12.00	2,3,4,4,4,5 (N=17)				
13	100		12.45					
14	100		13.50	2,3,5,6,7,7 (N=25)				
15	100		13.70					
16	100		14.15					
17	100		15.00	2,2,3,4,5,6 (N=18)				
18	100		15.45					
19	100		16.50	2,3,4,5,5,5 (N=19)	Stiff, yellowish, orangish, clayey, sandy, gravelly SILT. (Completely Weathered Granite). Gravel angular, fine to medium pinkish quartz.				15.00
20	100	16.70						
21	100	17.15						
22	100	18.00	2,3,4,6,8,9 (N=27)					
23	100	18.45						
24	100	19.50						
25	100	19.95			3,5,8,14,15,15 (N=52)			
26	100							
27	100							
28	100							
29	100							
30	100							
31	100							
32	100							
33	100							

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha


Logged by: Dickens Ahimbisibwe




Note: UD sampling with shelby sampler refused at 2.00m and 19.50m.

D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.:	Revision No.	Effective Date:					
		GT-F-006	0	10/01/2013 Sheet: 3 of 4					
Project: Kampala Southern Bypass Location: 7+705 Coordinates (E/N): 458614 32017 Ground Elevation (masl.): 1171 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel (0.00-27.50m), water flush by single core barrel (27.50-33.00m)		BH No.: BH9 BH Inclination: 90° Bit type: Carbide Core diameter (mm): 75 (0.00-27.5m), 46 (27.5-33.00m) Date Started: 21-Jan-2015 Date Completed: 24-Jan-2015		Total Depth: 33 Water level (m): NIL Borehole diameter (mm): 97/7					
	Core run (m)	Casing depth (m)	Core Recovery						
			TCR (%)	RQD (%)	AFS (cm) (No of Pies.)				
					Sampling				
					SPT (No of blows)				
					Field Description of Soil/Rock				
					Graphic Log				
					Core photographs				
20			100		19.95				
21	21.50				21.50	10,12,14,14,16,16 (N=60)			
22			100		21.95				
23	23.15				23.15	4,5,7,14,14,20 (N=55)	Stiff, pinkish, yellowish and orangish clayey sandy gravelly SILT. (Completely Weathered Granite)		
24	24.50		100		23.95				
25	25.50		100		25.50	3,6,11,11,11			
26	26.80		100		25.95	15 (N=48)			
27					27.50	6,10,15,21,30,20/1.5cm (N=108)			
28	28.30				27.89		(Same as next sheet)		
29	29.50		100		29.50	4,8,10,15,17,20 (N=62)			
30					29.95				
Client: UNRA Approved by: _____ Consultant: ICS Drilling Contractor: Gondwana/Alpha Logged by: Dickens Ahimbisibwe Note: UD sampling with shelby sampler refused at 2.00m and 19.50m. D=Disturbed Sample (Split spoon) D*=Core box sample UD=Undisturbed Sample						Site Photograph: 			

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 4 of 4					
Project: Kampala Southern Bypass		BH No.: BH9		Total Depth: 33					
Location: 7+705		BH Inclination: 90°		Water level (m): NIL					
Coordinates (E/N): 458614 32017		Bit type: Carbide		Borehole diameter (mm): 97/7					
Ground Elevation (masl.): 1171		Core diameter (mm): 75 (0.00-27.5m), 46 (27.5-33.00m)							
Type of Rig: APAFOR 560		Date Started: 21-Jan-2015		Date Completed: 24-Jan-2015					
Drilling Method: Dry boring by single core barrel (0.00-27.50m), water flush by single core barrel (27.50-33.00m)									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RCD (%)	AFS (cm) No of Frac.					Sampling
31	31.60	50			29.95	4, 10, 25, 25/2.5 cm (N=150)	Hard, pinkish and yellowish clayey, sandy, gravelly SILT. (Completely Weathered Granite). Gravel angular, fine to medium, whitish and pinkish quartz.		
32		100			31.50 D 31.75				
33	33.00								
34									
35									
36									
37									
38									
39									
40									
Client: UNRA Approved by: _____ Consultant: ICS Drilling Contractor: Gondwana/Alpha Logged by: Dickens Ahimbisibwe Note: UD sampling with shelby sampler refused at 2.00m and 19.50m. D=Disturbed Sample (Split spoon) D*=Core box sample UD=Undisturbed Sample							Site Photograph: 		

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet						
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2						
Project: <u>Kampala Southern Bypass</u>		BH No.: <u>BH10</u>		Total Depth: <u>18</u>						
Location: <u>8+100</u>		BH Inclination: <u>90°</u>		Water level (m): <u>14.75</u>						
Coordinates (E/N): <u>458594 31624</u>		Bit type: <u>Carbide</u>		Borehole diameter (mm): <u>97</u>						
Ground Elevation (masl.): <u>1157</u>		Core diameter (mm): <u>75</u>								
Type of Rig: <u>APAFOR 560</u>		Date Started: <u>20-Jan-2015</u>		Date Completed: <u>21-Jan-2015</u>						
Drilling Method: <u>Dry boring by single core barrel</u>										
	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	ROD (%)	AFS (cm) No of Frac.					
0			95					Soft, dark brown, sandy silty CLAY. (Top soil)	0.70	
1	1.00		95			1.00 D	2,2,1,2,2,1 (N=6)	Soft to firm, reddish brown silty gravelly CLAY. (Residual Soil). Gravel, fine to medium angular white quartz.		
2	2.00					1.45 UD				
	2.55		98			2.00 D	1,2,2,2,2,1 (N=7)			
3						2.55 D				
	3.80		100			3.00 D	1,2,2,3,2,3 (N=10)			
4						3.80 D		Stiff, reddish brown and black sandy gravelly CLAY. (Completely Weathered Gneiss) Gravel angular fine to medium quartz.		
	5.20		100			4.25 UD	1,2,3,2,4,3 (N=12)			
5						5.20 D				
	7.00		100			5.75 D	1,2,2,3,3,4 (N=12)			
6						7.00 D				
7						7.45 UD	2,3,3,3,5,4 (N=15)			
8	8.00		100			8.00 D			8.00	
	8.25					8.25 D				
9			100			8.70				

Client: UNRA
 Approved by: _____
 Consultant: ICS
 Drilling Contractor: Gondwana/Alpha
 Logged by: Dickens Ahimbisibwe

Note: UD refusal at 14.00m
 D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample

Date	Time	Water level. (mBGL)	Remarks
21-Jan-2015	09:25AM	10.90	
"	09:30AM	10.93	
"	09:35AM	10.95	
"	09:40AM	10.95	
"	09:45AM	10.95	

Site Photograph:


ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet				
		Document No.:	Revision No.	Effective Date:				
		GT-F-006	0	10/01/2013 Sheet: 1 of 2				
Project: Kampala Southern Bypass Location: 9+980 Coordinates (E/N): 457061 30874 Ground Elevation (masl.): 1141 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel		BH No.: BH11 BH Inclination: 90° Bit type: Carbide/Diamond Core diameter (mm): 75 Date Started: 24-Dec-14		Total Depth: 20 Water level (m BGL): 1.55 Borehole diameter (mm): 97 Date Completed: 29-Dec-2014				
	Core run (m)	Casing depth (m)	Core Recovery		SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) No. of Frac.	Sampling		
0			100					
1	1.00		100			1.00 D	1/15cm, 1, 1, 1/1 5cm (N=3)	Firm, reddish brown gravelly CLAY. (Made ground)
2	2.00		100			1.45 2.00		
3	2.70		87			UD	1, 1, 1, 1, 1, 1 (N=4)	Soft to firm, dark grey CLAY. (Residual soil)
4	4.00		100			3.15 D	1, 1, 1, 2, 2, 2 (N=7)	
5	5.00		100			4.00 D	1, 2, 2, 3, 3, 4 (N=12)	Firm, dark grey and yellowish brown banded sandy CLAY. (Completely weathered Gneiss)
6	5.50		100			4.45 5.00		
7	7.00		100			UD	1, 1, 2, 2, 2, 2 (N=8)	Stiff, yellowish and greenish extremely thinly banded sandy CLAY with some medium to coarse quartz gravel. (highly Weathered Gneiss)
8	8.00		100			8.00 UD	1, 3, 5, 7, 9, 11 (N=32)	
9	8.25		100			D		
10	10.00		100			8.70		

Client: UNRA
Approved by:
Consultant: ICS
Drilling Contractor: Gondwana/Alpha
Logged by: Dickens Ahimbisibwe

Note: UD refusal at 11m.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet						
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013	Sheet: 2 of 2					
Project: <u>Kampala Southern Bypass</u>		BH No.: <u>BH11</u>		Total Depth: <u>20</u>						
Location: <u>9+980</u>		BH Inclination: <u>90°</u>		Water level (m BGL): <u>1.55</u>						
Coordinates (E/N): <u>457061 30874</u>		Bit type: <u>Carbide/Diamond</u>		Borehole diameter (mm): <u>97</u>						
Ground Elevation (masl.): <u>1141</u>		Core diameter (mm): <u>75</u>								
Type of Rig: <u>APAFOR 560</u>		Date Started: <u>24-Dec-14</u>		Date Completed: <u>29-Dec-2014</u>						
Drilling Method: <u>Dry boring by single core barrel</u>										
	Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No of Frac.)	Sampling				
10						D	3,4,6,7,6,6 (N=25)			
11	11.00		100							
12	12.00		100			D	3,6,7,12,13,16 (N=48)	Very stiff, greyish, greenish and yellowish micaceous sandy silty CLAY (Highly Weathered Gneiss)		
13	13.00		100							
14	14.00		100			D	6,6,10,20,15,15 (N=60)			
15	15.00		100							
16	16.00		100			D	3,4,5,5,6,8 (N=24)	Dense to very dense greyish and yellowish interbanded micaceous clayey silty SAND with a gravel pack between 14.00 to 14.80. Gravel angular, medium to coarse quartz. (Highly Weathered Gneiss)		
17			100							
18	18.00					D	12,24,40,10/1.5cm (N=167)			
19			100							
20	20.00									

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: UD refusal at 11m.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet	
		Document No.:	Revision No.	Effective Date:	
		GT-F-006	0	10/01/2013 Sheet: 1 of 2	
Project: Kampala Southern Bypass		BH No.: BH12		Total Depth: 20	
Location: 11+030		BH Inclination: 90°		Water level (mBGL): NIL	
Coordinates (E/N): 456117 30426		Bit type: Carbide/Diamond		Borehole diameter (mm): 97	
Ground Elevation (masl.): 1167		Core diameter (mm): 75		Date Started: 30-Dec-14	
Type of Rig: APAFOR 560		Date Completed: 31-Dec-2014			
Drilling Method: Dry boring by single core barrel					

Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm)	No of Frac.				
0							Firm, dark brown silty CLAY with some rootlets. (Top soil)	0.15	
1	1.00	100			1.00	1,2,2,4,3,3 (N=12)			
					1.45				
2	2.00	100			2.00	2,3,2,3,2,2 (N=9)			
	2.15				2.60		Firm, reddish brown silty CLAY. (Residual soil)		
3		100			3.80	3,3,3,3,4,4 (N=14)			
4	3.80				4.25				
		100			5.20	2,4,4,5,5,3 (N=17)		5.00	5.00
5	5.20	100			5.85				
	5.40				7.00	3,4,5,6,6,7 (N=22)	Stiff, reddish brown silty CLAY. (Residual soil)		
6		100			7.45				
	6.70				9.00	3,5,7,8,9,9 (N=33)			
7	7.00	100			9.45			9.00	
		100							
8	8.00								
		100							
9	9.00								
		100							
10	10.00								10.00

Client: UNRA

Approved by: _____

Consultant: ICS

Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe


Note:

D=Disturbed Sample (Split spoon)

D*=Core box sample

UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.:	Revision No.	Effective Date:					
		GT-F-006	0	10/01/2013 Sheet: 2 of 2					
Project: <u>Kampala Southern Bypass</u>		BH No.: <u>BH12</u>		Total Depth: <u>20</u>					
Location: <u>11+030</u>		BH Inclination: <u>90°</u>		Water level (mBGL): <u>NIL</u>					
Coordinates (E/N): <u>456117 30426</u>		Bit type: <u>Carbide/Diamond</u>		Borehole diameter (mm): <u>97</u>					
Ground Elevation (masl.): <u>1167</u>		Core diameter (mm): <u>75</u>							
Type of Rig: <u>APAFOR 560</u>		Date Started: <u>30-Dec-14</u>		Date Completed: <u>31-Dec-2014</u>					
Drilling Method: <u>Dry boring by single core barrel</u>									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) (No of Frac.)				
10	10.50	100				10.50			
11		100				10.95			
12	12.00					11.60			
						12.00			
12						12.45	3,3,5,5,8,7 (N=25)		
13		100							
14	14.00					14.00			
		100				14.45	2,4,6,6,8,10 (N=30)		
15	15.00								
		100							
16	16.00					16.00			
						16.45	3,6,9,10,10,10 (N=39)		
17		100							
						17.55			
18	18.00					18.00			
						17.80	3,4,7,7,7,7 (N=28)		
						18.45			
19		100							
20	20.00								
Stiff, yellowish and reddish brown extremely thinly bedded silty gravelly CLAY. Gravel angular to subrounded fine to medium quartz. (Completely Weathered Gneiss)									
Stiff, light yellowish and orange brown interbanded micaceous silty gravelly CLAY. (Highly weathered Gneiss)									
									15.00
									20.00

Client: UNRA

Approved by: _____

Consultant: ICS


Drilling Contractor: Gondwana/Alpha



Logged by: Dickens Ahimbisibwe




Note:

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:

		ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
				Document No.:	Revision No.	Effective Date:	Sheet: 1 of 2		
				GT-F-006		10/01/2013			
Project: Kampala Southern Bypass Location: 11+510 Coordinates (E/N): 455798 30089 Ground Elevation (masl.): 1194 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel (0.0-9.6m) and water flush by double core barrel (9.6-15.5m)				BH No.: BH13 BH Inclination: 90° Bit type: Carbide/Diamond Core diameter (mm): 75 (0.0-9.6m) and 64 (9.6-15.5m) Date Started: 5-Jan-2015 Date Completed: 6-Jan-2015				Total Depth: 15.5m Water level (mBGL): NIL Borehole diameter (mm): 97	
	Core run (m)	Casing depth (m)	Core Recovery		SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs	
			TCR (%)	RQD (%)	AFS (cm) (No of Frac.)	Sampling			
0							0.50		
1	1.00		100			2,2,3,3,5,7 (N=18)			
2	2.00		100			4,4,8,10,11,11 (N=40)			
3	3.30		100			4,8,9,13,13,13 (N=48)			
4	4.10	75				3,7,11,13,16,1 8 (N=58)			
5	5.50	100				3,5,7,7,9,9 (N=32)			
6	6.15	100				2,4,5,7,6,8 (N=28)			
7	7.00	100							
8	8.60	100							
9	9.60	100							
10	10.00	100							
Client: UNRA Approved by: Consultant: ICS Drilling Contractor: Gondwana/Alpha Logged by: Dickens Ahimbisibwe Note: Undisturbed sampling attempted at 2.00m but refused. D=Disturbed Sample (Split spoon) D*=Core box sample UD=Undisturbed Sample						Site Photograph: 			

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet				
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2				
Project: Kampala Southern Bypass Location: 11+510 Coordinates (E/N): 455798 30089 Ground Elevation (masl.): 1194 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel (0.0-9.6m) and water flush by double core barrel (9.6-15.5m)		BH No.: BH13 BH Inclination: 90° Bit type: Carbide/Diamond Date Started: 5-Jan-2015		Total Depth: 15.5m Water level (mBGL): NIL Borehole diameter (mm): 97 Core diameter (mm): 75 (0.0-9.6m) and 64 (9.6-15.5m) Date Completed: 6-Jan-2015				
	Core run (m)	Casing depth (m)	Core Recovery		SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)					AFS (cm) (No. of Frac.)	Sampling
10								
11	11.50		75	0	<1cm	D	3,6,6,10,13,30 (N=59)	
12			Cuttings					
13	13.00							
14	14.00		20	0	<1cm			
15	15.00		5	0	<1cm			
15						D	25,25/3.5cm (N=205)	15.00
15						D	15.45	15.50
16								
17								
18								
19								
20								
Client: UNRA Approved by: Consultant: ICS Drilling Contractor: Gondwana/Alpha Logged by: Dickens Ahimbisibwe Note: Undisturbed sampling attempted at 2.00m but refused. D= Disturbed Sample (Split spoon) D*= Core box sample UD= Undisturbed Sample						Site Photograph: 		

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet						
		Document No.:	Revision No.	Effective Date:						
		GT-F-006	0	10/01/2013 Sheet: 2 of 2						
Project: <u>Kampala Southern Bypass</u> Location: <u>11+730</u> Coordinates (E/N): <u>455626 29967</u> Ground Elevation (masl.): <u>1209</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel (0.0-4.0m) and water flush by double core barrel (4.0-20.0m)</u>		BH No.: <u>BH14</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75 (0.0-4.0m) and 64 (4.0-20.0m)</u> Date Started: <u>2-Jan-2015</u> Date Completed: <u>5-Jan-2015</u>		Total Depth: <u>20</u> Water level (mBGL): <u>NIL</u> Borehole diameter (mm): <u>97</u>						
	Core run (m)	Casing depth (m)	Core Recovery			Sampling	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	ROD (%)	AFS (cm) (No of Frac.)					
10			100	49	16			Weak to strong, thinly laminated, dark grey and whitish medium grained Gneiss. (Slightly Weathered Gneiss)		
11	11.25									
12	12.50		100	0	12.5					
13	13.50		100	43	20					
14			100	31	15					
15	15.00									
16	16.75		100	27	12					
17	17.35		100	75	30	17.00 RC				
18										
19	19.45									
20	20.00		100	0	8					

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: SPT refusal at 8.5m.
Coordinates are WGS 84


D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample
RC=Rock core Sample

Site Photograph:










ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet	
		Document No.:	Revision No.	Effective Date:	
		GT-F-006	0	10/01/2013 Sheet: 1 of 2	
Project: <u>Kampala Southern Bypass</u> Location: <u>12+095</u> Coordinates (E/N): <u>455423 29661</u> Ground Elevation (masl.): <u>1197</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH15</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>8-Jan-2015</u>		Total Depth: <u>18</u> Water level (m): <u>NIL</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>9-Jan-2015</u>	
0					
1	1.00	100		1.00	1,2,2,2,3,3 (N=10)
2	2.00	100		1.45	
3	2.40	100		2.00	2,2,2,1,2,2 (N=7)
4	3.90	100		2.85	
5	5.00	100		3.90	1,2,3,3,3,4 (N=13)
6	5.35	86		4.35	
7	7.00	100		5.00	1,2,3,3,4,4 (N=14)
8	8.00	100		5.80	
9	8.50	100		7.00	3,4,6,8,11,12 (N=37)
10	10.00	100		7.45	
				8.00	3,7,7,7,8,8 (N=30)
				8.17	
				8.50	
				8.95	
				10.10	

Core run (m)	Casing depth (m)	Core Recovery	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	ROD (%)	AFS (cm) No. of Frac.		
0		100			0.25	
1	1.00	100				
2	2.00	100				
3	2.40	100				
4	3.90	100				
5	5.00	86				
6	5.35	100				
7	7.00	100			6.50	
8	8.00	100				
9	8.50	100				
10	10.00	100				

Client: <u>UNRA</u> Approved by: Consultant: <u>ICS</u> Drilling Contractor: <u>Gondwana/Alpha</u> Logged by: <u>Dickens Ahimbisibwe</u> Note: Undisturbed sampling attempted at 8.5m but refused D= Disturbed Sample (Split spoon) D*= Core box sample UD= Undisturbed Sample	Site Photograph: 
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ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
		Document No.:	Revision No.	Effective Date:			
		GT-F-006	0	10/01/2013 Sheet: 2 of 2			
Project: <u>Kampala Southern Bypass</u> Location: <u>12+095</u> Coordinates (E/N): <u>455423 29661</u> Ground Elevation (masl.): <u>1197</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u>		BH No.: <u>BH15</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>8-Jan-2015</u>		Total Depth: <u>18</u> Water level (m): <u>NIL</u> Borehole diameter (mm): <u>97</u> Date Completed: <u>9-Jan-2015</u>			
Core run (m)	Casing depth (m)	Core Recovery		SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No. of Frac.)			
10	10.75	100		D	3,5,8,10,12,13 (N=43)		
11	11.60	100		D*			
12		100		D	3,6,7,11,11,11 (N=40)		
13	13.10	100		D	3,4,7,8,8,8 (N=31)		
14	14.60	100		D	4,5,7,8,10,10 (N=35)		
15	16.10	100		D	3,5,7,8,9,9 (N=33)		
16		100		D			
17	18.00	100		D			
18							
19							
20							
Client: <u>UNRA</u> Approved by: _____ Consultant: <u>ICS</u> Drilling Contractor: <u>Gondwana/Alpha</u> Logged by: <u>Dickens Ahimbisibwe</u> Note: Undisturbed sampling attempted at 8.5m but refused D=Disturbed Sample (Split spoon) D*=Core box sample UD=Undisturbed Sample						Site Photograph: 	

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2					
Project: Kampala Southern Bypass		BH No.: BH16		Total Depth: 16					
Location: 12+580		BH Inclination: 90°		Water level (m): 1.00m					
Coordinates (E/N): 455212 29207		Bit type: Carbide/Diamond		Borehole diameter (mm): 97					
Ground Elevation (masl.): 1158		Core diameter (mm): 75							
Type of Rig: APAFOR 560		Date Started: 10-Jan-2015		Date Completed: 12-Jan-2015					
Drilling Method: Dry boring by single core barrel									
Core run (m)	Casing depth (m)	Core Recovery				SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TOR (%)	ROD (%)	AFS (cm) (No of Frac.)	Sampling				
0		90					Soft, reddish brown sandy silty CLAY with some rootlets. (Residual soil)	1.00	
1	1.00	100			1.00	1/15cm, 1,2,1,2 (N=6)			
2	2.00				1.45		Firm to stiff, orange brown, light grey and pinkish very gravelly CLAY. (Completely Weathered Granite)		
2	2.50	74			2.00	1,2,3,4,8,5 (N=20)	Gravel subrounded fine to medium quartz.		
3					2.30				
3		100			2.95				
4	4.00				4.00	1,2,3,4,4,5 (N=16)	Firm, light green, whitish and greyish brown sandy gravelly CLAY. (Completely Weathered Granite). Gravel angular fine to medium quartz.	4.00	
5	5.00	100			4.45				
5	5.45	100			5.00	1,2,3,4,4,4 (N=15)			
6					5.45				
6		100			5.90				
7	7.00				7.00	2,3,4,4,6,7 (N=21)	Stiff, pinkish, greenish whitish and greyish multi coloured sandy gravelly CLAY. (Highly weathered Granite). Gravel angular fine to medium quartz.	6.50	
8	8.00	100			7.45				
8	8.20	100			8.00	2,2,4,5,5,6 (N=20)			
9					8.20				
9		100			8.65				
10	10.00				10.00				10.00

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha


Logged by: Dickens Ahimbisibwe

Note: UD refusal at 12.65m
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Ground Water strike.			
Date	Time	Water level. (mBGL)	Remarks
10-Jan-2015	11:28AM	1.00	
"	11:33AM	0.90	
"	11:38AM	0.85	
"	11:43AM	0.85	
"	11:49AM	0.80	

Site Photograph:




ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet			
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Project: <u>Kampala Southern Bypass</u> Location: <u>12+580</u> Coordinates (E/N): <u>455212 29207</u> Ground Elevation (masl.): <u>1158</u> Type of Rig: <u>APAFOR 560</u> Drilling Method: <u>Dry boring by single core barrel</u> </div> <div style="width: 45%;"> BH No.: <u>BH16</u> BH Inclination: <u>90°</u> Bit type: <u>Carbide/Diamond</u> Core diameter (mm): <u>75</u> Date Started: <u>10-Jan-2015</u> Date Completed: <u>12-Jan-2015</u> </div> <div style="width: 45%;"> Total Depth: <u>16</u> Water level (m): <u>1.00m</u> Borehole diameter (mm): <u>97</u> </div> </div>							
10	Core run (m)	Casing depth (m)	Core Recovery	SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
11	11.50	100	D	3,5,5,6,6,7 (N=24)	Dense, light green, pinkish, yellowish and light grey multi coloured clayey silty gravelly SAND. (Highly Weathered Granite) Gravel angular fine to medium quartz.	10.70	
12	12.65	100	D	3,5,7,7,8,11 (N=33)		11.95	
13	13.00	100	D*	3,5,7,8,11,11 (N=37)		12.65	
14	14.50	100	D	4,8,8,9,9,12 (N=38)		13.00	
15	15.55	100	D	13.50		13.95	
16	16.00	100	D	15.55	16.00	16.00	16.00
17							
18							
19							
20							



Client: UNRA
Approved by: _____
Consultant: ICS
Drilling Contractor: Gondwana/Alpha
Logged by: Dickens Ahimbisibwe

Note: UD refusal at 12.65m
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Ground Water strike.			
Date	Time	Water level. (mBGL)	Remarks
10-Jan-2015	11:28AM	1.00	
"	11:33AM	0.90	
"	11:38AM	0.85	
"	11:43AM	0.85	
"	11:49AM	0.80	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet				
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 1 of 2				
Project: Kampala Southern Bypass		BH No.: BH17		Total Depth: 11				
Location: 14+665		BH Inclination: 90°		Water level (mBGL): 1.00				
Coordinates (E/N): 456075 27485		Bit type: Carbide/Diamond		Borehole diameter (mm): 97				
Ground Elevation (masl.): 1141		Core diameter (mm): 75 (0.0-7.45), 64 (7.45-10.00) and 47 (10.00-11.00)						
Type of Rig: APAFOR 560		Date Started: 13-Jan-2015		Date Completed: 14-Jan-2015				
Drilling Method: Dry boring by single core barrel (0.00-7.45m) and Water flush by double core barrel (7.45-11.00m)								
Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) No of Frac.					Sampling
0		100				Firm, reddish brown silty CLAY with medium to coarse gravel size concrete particles. (Made ground)	0.45 0.70	
1	1.00	100			1, 1, 1, 2, 2, 2 (N=7)	Very soft, dark brown CLAY with numerous rootlets. (Top soil)		
2	2.00							
3	2.70	90			Hammer self weight/15cm, 1/15cm, 1, 1 (N=3)	Soft to firm, light grey and yellowish brown sandy CLAY. (Residual soil)	4.00	
4	4.20	100			1, 2, 2, 2, 2, 2 (N=8)			
5	5.15	37			1, 2, 3, 3, 3, 4 (N=13)	Firm, orange brown, dark grey and pinkish multi coloured sandy gravelly CLAY. (Completely Weathered Granite)		
6	5.50							
7	7.00	100			2, 4, 8, 10, 14, 16 (N=48)	Extremely weak, yellowish brown, crystalline Granite. (Highly Weathered Granite). Recovered as dark grey and brown sandy SILT.	7.00 8.30	
8	8.65	30				(See next sheet)		
9								

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha




Logged by: Dickens Ahimbisibwe

Note:




D=Disturbed Sample (Split spoon)
UD=Undisturbed Sample
RC=Rock Core Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet						
		Document No.:	Revision No.	Effective Date:						
		GT-F-006	0	10/01/2013 Sheet: 2 of 2						
Project: Kampala Southern Bypass		BH No.: BH17		Total Depth: 11						
Location: 14+665		BH Inclination: 90°		Water level (mBGL): 1.00						
Coordinates (E/N): 456075 27485		Bit type: Carbide/Diamond		Borehole diameter (mm): 97						
Ground Elevation (masl.): 1141		Core diameter (mm): 75 (0.0-7.45), 64 (7.45-10.00) and 47 (10.00)								
Type of Rig: APAFOR 560		Date Started: 13-Jan-2015		Date Completed: 14-Jan-2015						
Drilling Method: Dry boring by single core barrel (0.00-7.45m) and Water flush by double core barrel (7.45-11.00m)										
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs	
			TCR (%)	RCD (%)	AFS (cm) No. of Frac.					Sampling
9			100	91	24	9.60	Strong to very strong, pink, whitish and dark greyish crystalline, coarse grained Granite. (Fresh Granite)			
10	10.00					10.00				10.00
11	11.00		100	67	12					11.00	11.00
12										
13										
14										
15										
16										
17										
18										
Client: UNRA Approved by: Consultant: ICS Drilling Contractor: Gondwana/Alpha Logged by: Dickens Ahimbisibwe Note: D=Disturbed Sample (Split spoon) UD=Undisturbed Sample RC=Rock Core Sample							Site Photograph: 			

ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet	
		Document No.:	Revision No.	Effective Date:	
		GT-F-006	0	10/01/2013 Sheet: 1 of 2	
Project: Kampala Southern Bypass		BH No.: BH18		Total Depth: 17	
Location: 14+995		BH Inclination: 90°		Water level (m): 0.90	
Coordinates (E/N): 456204 27177		Bit type: Carbide/Diamond		Borehole diameter (mm): 97	
Ground Elevation (masl.): 1143		Core diameter (mm): 75		Date Started: 15-Jan-2015	
Type of Rig: APAFOR 560		Date Completed: 16-Jan-2015			
Drilling Method: Dry boring by single core barrel					

Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No of Frac.)				
0								
1	1.10	75		1.10	Hammer self weight/15cm, 1/30cm N=1	Very soft, dark brown and reddish brown silty CLAY with pieces of polythene bags and medium gravel size charcoal particles. (Made ground)		
2	2.00	100		1.55				
2	2.45	89		2.45	2,3,3,7,5,5 (N=20)	Stiff, light grey sandy gravelly CLAY. Gravel fine to medium quartz. (Alluvium)		
3		100		2.90				
4	4.00			4.00	2,3,7,7,8,9 (N=31)	Firm, orange brown and light grey sandy gravelly CLAY. (Residual soil)		
5	5.00			4.45				
5	5.50	100		5.50	2,2,3,5,5,6 (N=19)			
6		100		5.95				
7	7.00			7.00	1,2,2,3,4,4 (N=13)			
8	8.00			7.45				
8	8.60			8.60	2,2,3,3,4,4 (N=14)			
9		100		9.05				
10	10.00			10.00				

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: UD refusal at 5.00m
D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Ground Water test			
Date	Time	Water level. (mBGL)	Remarks
15-Jan-2015	09:55AM	0.90	
"	10:00AM	0.70	
"	10:05AM	0.70	
"	10:10AM	0.70	
"	10:15AM	0.65	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet		
		Document No.:	Revision No.	Effective Date:		
		GT-F-006	0	10/01/2013 Sheet: 2 of 2		
Project: Kampala Southern Bypass Location: 14+995 Coordinates (E/N): 456204 27177 Ground Elevation (masl.): 1143 Type of Rig: APAFOR 560 Drilling Method: Dry boring by single core barrel		BH No.: BH18 BH Inclination: 90° Bit type: Carbide/Diamond Core diameter (mm): 75 Date Started: 15-Jan-2015		Total Depth: 17 Water level (m): 0.90 Borehole diameter (mm): 97 Date Completed: 16-Jan-2015		
Core run (m)	Casing depth (m)	Core Recovery	SPT (No of blows)	Field Description of Soil/Rock	Core photographs	
		TCR (%)	RQD (%)	AFS (cm) (No of Frac.)	Sampling	
10		100			D	1,2,3,3,4,4 (N=14)
					10.45	
11	11.00	100			UD	4,4,4,5,6,6 (N=21)
	11.50				11.50	
12		100			D	2,4,6,7,9,9 (N=31)
	13.00				13.00	
13		100			D	9,14,9,8,6,9 (N=32)
	14.55				14.55	
14		100			D*	3,4,6,7,10,10 (N=33)
	16.55				16.55	
15		100			D	
	17.00				17.00	
16						
17						
18						
19						
20						

Stiff, orange brown, whitish and greyish sandy gravelly CLAY. Gravel angular, fine to medium quartz. (Highly weathered Gneiss)

10.40

15.00


17.00


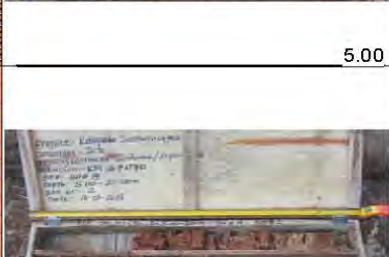




Client: UNRA
 Approved by:
 Consultant: ICS
 Drilling Contractor: Gondwana/Alpha
 Logged by: Dickens Ahimbisibwe

Note: UD refusal at 5.00m
 D=Disturbed Sample (Split spoon)
 D*=Core box sample
 UD=Undisturbed Sample

Ground Water test			
Date	Time	Water level. (mBGL)	Remarks
15-Jan-2015	09:55AM	0.90	
"	10:00AM	0.70	
"	10:05AM	0.70	
"	10:10AM	0.70	
"	10:15AM	0.65	

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet				
		Document No.:	Revision No.	Effective Date:				
		GT-F-006	0	10/01/2013 Sheet: 1 of 2				
Project: Kampala Southern Bypass		BH No.: BH19		Total Depth: 20.2				
Location: 16+070		BH Inclination: 90°		Water level (m): NIL				
Coordinates (E/N): 456411 26121		Bit type: Carbide		Borehole diameter (mm): 97				
Ground Elevation (masl.): 1155		Core diameter (mm): 75						
Type of Rig: APAFOR 560		Date Started: 16-Jan-2015		Date Completed: 18-Jan-2015				
Drilling Method: Dry boring by single core barrel								
Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
		TCR (%)	RQD (%)	AFS (cm) (No of Frac.)					Sampling
0						Soft, dark brown silty CLAY with medium to coarse gravel size brick fragments. (Topsoil)	0.40	
1	1.00	80			1.00	1,3,2,3,2,3 (N=10)		
					D			
2	2.00	85			1.45	1,1,2,3,2,3 (N=10)		
					UD			
3	2.40	88			2.00	2,2,3,3,4,4 (N=14)		
					D			
4	3.80	100			2.85	2,3,3,4,5,5 (N=17)		
					D			
5	5.00	100			3.80	1,2,3,3,4,5 (N=15)		
					UD			
6	6.50	100			4.25	2,2,3,5,5,5 (N=18)		
					D			
7	6.80	100			5.00	1,2,3,4,4,5 (N=15)		
					UD			
8	8.50	100			5.45			
					D			
9	9.50	100			6.50			
					UD			
10	9.95	100			6.80			
					D			
					9.90			

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha



Logged by: Dickens Ahimbisibwe

Note: UD sampling attempted but refused at 15.75m.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample

Site Photograph:



ALPHA GEO ENGINEERING (U) LTD.		Title		Borehole Log Sheet					
		Document No.: GT-F-006	Revision No.: 0	Effective Date: 10/01/2013 Sheet: 2 of 2					
Project: Kampala Southern Bypass		BH No.: BH19		Total Depth: 20.2					
Location: 16+070		BH Inclination: 90°		Water level (m): NIL					
Coordinates (E/N): 456411 26121		Bit type: Carbide		Borehole diameter (mm): 97					
Ground Elevation (masl.): 1155		Core diameter (mm): 75							
Type of Rig: APAFOR 560		Date Started: 16-Jan-2015		Date Completed: 18-Jan-2015					
Drilling Method: Dry boring by single core barrel									
	Core run (m)	Casing depth (m)	Core Recovery			SPT (No of blows)	Field Description of Soil/Rock	Graphic Log	Core photographs
			TCR (%)	RQD (%)	AFS (cm) No of Frac.					Sampling
11	11.50		100			10.35	(Same as previous sheet)	12.50	
12	12.50 12.70		100			11.50 11.95 12.50 12.70			
13	13.75		100			13.75	Stiff, greyish thickly laminated very micaceous silty CLAY. (Completely Weathered Gneiss)	15.00	
14	15.00		100			14.20			
15	15.75		100			15.75			
16	17.00		100			16.20			
17	18.75		100			17.75		20.20	
18	19.75		100			18.20			
19	20.20		100			19.75			
20									

Client: UNRA

Approved by:

Consultant: ICS


Drilling Contractor: Gondwana/Alpha

Logged by: Dickens Ahimbisibwe

Note: UD sampling attempted but refused at 15.75m.

D=Disturbed Sample (Split spoon)
D*=Core box sample
UD=Undisturbed Sample




Site Photograph:






Soil Auger and Test Pit Results

KJE Mainline Section (Part 3: Geotechnical Report, Volume 3A: Field Investigations - ICS, 2015)




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 110	4+140	459868	10		Light brown GRAVELS, contaminated				
		36658	20					Sampling Depth	
			30					CM	
			40		Light brown Gravely Sandy Clayey SILT	% Pass	40-140		
			50			2mm	66		
			60			0.425mm	49		
			70			0.075mm	26		
			80			LL%	26		
			90			PI%	7		
			100			Soil Class	A-2-4(0)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
						SP. gravity	2.8		
						USCS	SC		
						NMC%	49		
SDCP 112	4+340	460018	10		Light brown Gravely Sandy Silty CLAY (topsoil)				
		36526	20					Sampling Depth	
			30					CM	
			40		Dark to dark gray Sandy Silty CLAY. Ground water at a depth of 120cm.	% Pass	30-120		
			50			2mm	97		
			60			0.425mm	91		
			70			0.075mm	70		
			80			LL%	52		
			90			PI%	26		
			100			Soil Class	A-7-6(16)		
			110			OMC%	-		
			120			MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.6		
						USCS	CH		
						NMC%	31		
SDCP 113	4+440	460093	10		Dark to dark brown Silty CLAY (topsoil)				
		36460	20					Sampling Depth	
			30					CM	
			40		Dark to dark gray Sandy Silty CLAY. Ground water at a depth of 140cm.	% Pass	20-140		
			50			2mm	100		
			60			0.425mm	96		
			70			0.075mm	75		
			80			LL%	54		
			90			PI%	27		
			100			Soil Class	A-7-6(18)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
						SP. gravity	2.610		
						USCS	CH		
						NMC%	52		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 114	4+540	460168	10		Light brown Gravely Sandy Silty CLAY Dark to dark gray Silty CLAY. Ground water at a depth of 120cm.				
		36394	20					Sampling Depth	
			30					CM	
			40			% Pass	20-120		
			50			2mm	100		
			60			0.425mm	94		
			70			0.075mm	79		
			80			LL%	51		
			90			PI%	27		
			100			Soil Class	A-7-6(17)		
			110			OMC%	-		
			120			MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.6		
						USCS	CH		
						NMC%	43		
SDCP 115	4+640	460243	10		Light brown to brown Silty CLAY Dark gray Silty CLAY. Ground water at a depth of 140cm				
		36328	20					Sampling Depth	
			30					CM	
			40			% Pass	0- 40	40-140	
			50			2mm	91	98	
			60			0.425mm	67	87	
			70			0.075mm	28	58	
			80			LL%	47	41	
			90			PI%	16	20	
			100			Soil Class	A-2-7(1)	A-7-6(9)	
			110			OMC%	-	-	
			120			MDD g/cm3	-	-	
			130			CBR (95%)	-	-	
			140			Swell%	-	-	
						SP. gravity	2.660	2.623	
						USCS	SC	CL	
						NMC%	29	37	
SDCP 116	4+740	460321	10		Brownish Gravely Silty SAND Dark gray Silty CLAY. Ground water at a depth of 100cm.				
		36265	20					Sampling Depth	
			30					CM	
			40			% Pass	20-100		
			50			2mm	98		
			60			0.425mm	92		
			70			0.075mm	75		
			80			LL%	52		
			90			PI%	28		
			100			Soil Class	A-7-6(12)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.599		
						USCS	CH		
						NMC%	45		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 117	4+840	460405	10		Dark Silty CLAY				
		36210	20					Sampling Depth	
			30					CM	
			40			% Pass	0-100		
			50			2mm	100		
			60			0.425mm	90		
			70			0.075mm	49		
			80			LL%	44		
			90			PI%	21		
			100			Soil Class	A-7-6(7)		
			>100		Dark gray Silty CLAY and Ground water	OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
SDCP 118	4+940	460494	10		Reddish aggregate chips, from remains of brick making				
		36166	20					Sampling Depth	
			30					CM	
			40		Dark gray Silty CLAY	% Pass	40-140		
			50			2mm	100		
			60			0.425mm	95		
			70			0.075mm	78		
			80			LL%	64		
			90			PI%	40		
			100			Soil Class	A-7-6(20)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
						SP. gravity	2.634		
SDCP 119	5+040	460588	10		Light brown Clayey Silty SAND				
		36131	20					Sampling Depth	
			30					CM	
			40		Brownish Clayey Silty SAND. Ground water at a depth of 120cm.	% Pass	0-100		
			50			2mm	90		
			60			0.425mm	66		
			70			0.075mm	36		
			80			LL%	34		
			90			PI%	13		
			100			Soil Class	A-6(1)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.725		
			160			USCS	SC		
						NMC%	33		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 120	5+140	460685	10		Brownish Clayey Silty SAND				
		36108	20					Sampling Depth	
			30					CM	
			40		Dark to yellowish gray Sandy Silty CLAY	% Pass	30-130		
			50			2mm	99		
			60			0.425mm	84		
			70			0.075mm	55		
			80			LL%	43		
			90			PI%	23		
			100			Soil Class	A-7-6(10)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.673		
						USCS	CL		
						NMC%	27		
SDCP 121	5+240	460785	10		Brownish Clayey Silty SAND				
		36097	20					Sampling Depth	
			30					CM	
			40		Dark gray Silty Clayey with bands of yellowish Sandy Silty CLAY	% Pass	20-130		
			50			2mm	100		
			60			0.425mm	95		
			70			0.075mm	72		
			80			LL%	41		
			90			PI%	22		
			100			Soil Class	A-7-6(12)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.589		
						USCS	CL		
						NMC%	31		
SDCP 122	5+450	460998	10		Dark gray Silty CLAY. Ground water at a depth of 80cm.				
		36105	20					Sampling Depth	
			30					CM	
			40			% Pass	0-120		
			50			2mm			
			60			0.425mm			
			70			0.075mm			
			80			LL%			
			90			PI%			
			100			Soil Class			
			110			OMC%			
			120			MDD g/cm3			
						CBR (95%)			
						Swell%			
						SP. gravity			
						USCS			
						NMC%			



Kampala - Jinja Express Road Graphic Test-pit Log




TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 123	5+840	461317	10		Brownish Sandy Silty CLAY (topsoil)				
		36237	20					Sampling Depth	
			30					CM	
			40		Dark gray Silty Clayey with bands of yellowish Sandy Silty CLAY. Ground water at a depth of 100cm.	% Pass	20-100		
			50			2mm	99		
			60			0.425mm	64		
			70			0.075mm	44		
			80			LL%	40		
			90			PI%	20		
			100			Soil Class	A-6(5)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.617		
						USCS	SC		
						NMC%	28		
SDCP 124	6+040	461550	10		Brownish Sandy Silty CLAY (topsoil)				
		36305	20					Sampling Depth	
			40					CM	
			60		Dark gray Silty CCLAY with bands of yellowish Sandy Silty CLAY. Ground water at a depth of 160cm.	% Pass	20-160		
			80			2mm	90		
			100			0.425mm	93		
			120			0.075mm	76		
			140			LL%	46		
			160			PI%	24		
						Soil Class	A-7-6(15)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.548		
						USCS	CL		
						NMC%	45		
SDCP 125	6+240	461736	10		Dark brown Silty CLAY (topsoil)				
		36376	20					Sampling Depth	
			30					CM	
			40		Dark gray Silty CLAY	% Pass	30-150		
			50			2mm	100		
			60			0.425mm	93		
			70			0.075mm	86		
			80			LL%	48		
			90			PI%	24		
			100			Soil Class	A-7-6(15)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.6		
						USCS	CL		
						NMC%	28.0		

Kampala - Jinja Express Road Graphic Test-pit Log




TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 126	6+340	461830	10		Brownish Sandy Silty CLAY (topsoil)				
		36410	20					Sampling Depth	
			30		Dark gray Silty CLAY			CM	
			40			% Pass	20-100		
			50			2mm	100		
			60			0.425mm	95		
			70			0.075mm	77		
			80			LL%	42		
			90			PI%	21		
			100			Soil Class	A-7-6(13)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.649		
						USCS	CL		
						NMC%	39		
SDCP 127	6+440	461927	20		Light gray Silty CLAY (topsoil)				
		36436	30					Sampling Depth	
			40		Dark and yellowish brown Silty CLAY. Ground water at a depth of 240cm.			CM	
			60			% Pass	30-240		
			80			2mm	100		
			100			0.425mm	95		
			120			0.075mm	77		
			140			LL%	42		
			160			PI%	21		
			180			Soil Class	A-7-6(13)		
			200			OMC%	-		
			220			MDD g/cm3	-		
			240			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.7		
						USCS	CL		
						NMC%	39.0		
SDCP 127A	7+140	462612	20		Dark gray Silty Clayey with bands of yellowish Sandy Silty CLAY				
		36355	40					Sampling Depth	
			60					CM	
			80			% Pass	0-120		
			100			2mm	99		
			120			0.425mm	90		
			140			0.075mm	64		
			160			LL%	37		
						PI%	18		
						Soil Class	A-7-6(9)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.630		
						USCS	CL		
						NMC%	30		


Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 128	7+440	462900	10		Dark gray Silty CLAY (topsoil)				
		36272	20					Sampling Depth	
			20		Light brown Gravely SAND			CM	
			30			% Pass	20-100		
			40			2mm	93		
			50			0.425mm	61		
			60			0.075mm	33		
			70			LL%	22		
			80			PI%	6		
			90			Soil Class	A-2-4(0)		
			100			OMC%	-		
			>100		Hardned rewrked quartzite and sand ground	MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.7		
						USCS	SM-SC		
						NMC%	17		
SDCP 129	8+940	464368	10		Dark gray Silty CLAY (topsoil)				
		36286	20					Sampling Depth	
			20		Dark gray Gravely Sandy Silty CLAY			CM	
			30			% Pass	20-130		
			40			2mm	61		
			50			0.425mm	46		
			60			0.075mm	24		
			70			LL%	40		
			80			PI%	17		
			90			Soil Class	A-2-6(1)		
			100			OMC%	-		
			110			MDD g/cm3	-		
			120			CBR (95%)	-		
			130			Swell%	-		
						SP. gravity	2.717		
						USCS	SC		
						NMC%	25		

Kampala - Jinja Express Road Graphic Test-pit Log									
TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 151	13+100	468118	10		Dark Silty CLAY (topsoil)				
		35406	20				Sampling Depth		
			40		Dark gray Silty CLAY. Ground water at a depth of 120cm.		CM		
			50			% Pass	20- 120		
			60			2mm	100		
			70			0.425mm	88		
			80			0.075mm	71		
			90			LL%	33		
			100			PI %	13		
			110			Soil Class	A-6(8)		
			120			OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.593		
						USCS	CL		
						NMC%	39		
SDCP 152	13+200	468209	10		Dark Silty CLAY (topsoil)				
		35448	20				Sampling Depth		
			30		Light gray Silty SAND. Ground water at a depth of 120cm.		CM		
			40			% Pass	30- 120		
			50			2mm	98		
			60			0.425mm	77		
			70			0.075mm	33		
			80			LL%	19		
			90			PI %	4		
			100			Soil Class	A-2-4(0)		
			110			OMC%	-		
			120			MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.653		
						USCS	SM		
						NMC%	22		
SDCP 153	13+300	468299	10		Dark Silty CLAY (topsoil)				
		35491	20				Sampling Depth		
			30		Light gray Sandy SILT. Ground water at a depth of 120cm.		CM		
			40			% Pass	20- 120		
			50			2mm	99		
			60			0.425mm	90		
			70			0.075mm	67		
			80			LL%	19		
			90			PI %	4		
			100			Soil Class	A-4(6)		
			110			OMC%	-		
			120			MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.695		
						USCS	ML		
						NMC%	35		

Kampala - Jinja Express Road Graphic Test-pit Log




TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary		Photograph
SDCP 154	17+400	472108	10		Dark brown Sandy Silty CLAY (topsoil)			
		35357	20				Sampling Depth	
			30		Light gray Silty SAND		CM	
			40			% Pass	20- 150	
			50			2mm	46	
			60			0.425mm	36	
			70			0.075mm	26	
			80			LL%	0	
			90			PI %	0	
			100			Soil Class	A-4(1)	
			110			OMC%	-	
			120			MDD g/cm3	-	
			130			CBR (95%)	-	
			140			Swell%	-	
			150			SP. gravity	2.667	
						USCS	SM	
						NMC%	20	
SDCP 155	17+500	472208	10		Dark Silty CLAY (topsoil)			
		35359	20				Sampling Depth	
			30		Dark gray Sandy Silty CLAY. Ground water at a depth of 120cm.		CM	
			40			% Pass	20- 120	
			50			2mm	100	
			60			0.425mm	79	
			70			0.075mm	41	
			80			LL%	30	
			90			PI %	16	
			100			Soil Class	A-6(3)	
			110			OMC%	-	
			120			MDD g/cm3	-	
						CBR (95%)	-	
						Swell%	-	
						SP. gravity	2.679	
						USCS	SC	
						NMC%	22	
SDCP 156	17+600	472108	10		Dark Silty CLAY (topsoil)			
		35357	25				Sampling Depth	
			30		Dark gray Silty CLAY. Ground water at a depth of 160cm.		CM	
			40			% Pass	25- 160	
			50			2mm	100	
			60			0.425mm	94	
			70			0.075mm	80	
			80			LL%	49	
			90			PI %	26	
			100			Soil Class	A-7-6(16)	
			110			OMC%	-	
			120			MDD g/cm3	-	
			130			CBR (95%)	-	
			140			Swell%	-	
			150			SP. gravity	2.670	
			160			USCS	CL	
						NMC%	53	




Kampala - Jinja Express Road Graphic Test-pit Log									
TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
SDCP 156	17+800	472507	10		Dark Silty CLAY (topsoil)				
		35375	25				Sampling Depth		
			30		Pinkish yellow Sandy Silty CLAY		CM		
			40			% Pass	25- 150		
			50			2mm	100		
			60			0.425mm	90		
			70			0.075mm	66		
			80			LL%	40		
			90			PI %	22		
			100			Soil Class	A-6(11)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.623		
						USCS	CL		
						NMC%	26		

Kampala - Jinja Express Road Graphic Test-pit Log




TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP101	0+100	456502	10		Dark brown to brown Silty CLAY (topsoil)				
		36095	25					Sampling Depth	
			20		Brownish to reddish brown lateritic Silty CLAY			CM	
			30			% Pass	25- 100		
			40			2mm	85		
			50			0.425mm	76		
			60			0.075mm	58		
			70			LL%	38		
			80			PI %	19		
			90			Soil Class	A-6(8)		
			100			OMC%	-		
					MDD g/cm3	-			
					CBR (95%)	-			
					Swell%	-			
					SP. gravity	2.774			
					USCS	CL			
					NMC%	20			
TP102	0+900	457104	20		Brown to dark brown Silty CLAY				
		36590	30					Sampling Depth	
			40		Brownish Silty CLAY			CM	
			60			% Pass	60-150		
			70			2mm	100		
			80			0.425mm	89		
			90			0.075mm	66		
			100			LL%	49		
			110			PI%	21		
			120			Soil Class	A-7-6(12)		
			130			OMC%	23		
			140		MDD g/cm3	1.705			
			150		CBR (95%)	18			
					Swell%	0.32			
					SP. gravity	2.9			
					USCS	ML			
					NMC%	29			
TP103	1+100	457255	10		Brownish Silty CLAY (topsoil)				
		36722	20					Sampling Depth	
			30		Brownish Gravelly Silty CLAY, embeded by oversized quartzite stone			CM	
			40			% Pass	20- 100		
			50			2mm	32		
			60			0.425mm	24		
			70			0.075mm	10		
			80			LL%	45		
			90			PI %	17		
			100			Soil Class	A-2-7(0)		
			>100			Widely fractured quartzite rock	OMC%	10.0	
						MDD g/cm3	2.052		
						CBR (95%)	36		
						Swell%	0.15		
						SP. gravity	2.825		
						USCS	GC		
						NMC%	11		


Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP104	1+400	457380	20		Brownish Sandy Silty CLAY				
		37000	30			Sampling Depth			
			40			CM			
			60			% Pass	60-120		
			70		2mm	72			
			80		0.425mm	58			
			90		0.075mm	32			
			100		LL%	34			
			110		PI%	15			
			120		Soil Class	A-6(1)			
					OMC%	13.0			
					MDD g/cm3	2.020			
					CBR (95%)	31.00			
					Swell%	0.21			
					SP. gravity	2.8			
					USCS	SC			
			NMC%	18					
TP105	1+500	457575	10		Light to reddish brown laterite. Ground water at a depth of 60cm				
		36963	20			Sampling Depth			
			30			CM			
			40			% Pass	0-120		
			50			2mm			
			60			0.425mm			
			70			0.075mm			
			80			LL%			
			90			PI%			
			100			Soil Class			
			110			OMC%			
			120			MDD g/cm3			
						CBR (95%)			
						Swell%			
						SP. gravity			
						USCS			
TP106	1+750	457880	20		Reddish brown laterite, contaminated with gravely materials				
		37000	30			Sampling Depth			
			40			CM			
			60			% Pass	60-120		
			70		2mm				
			80		0.425mm				
			90		0.075mm				
			100		LL%				
			110		PI%				
			120		Soil Class				
					OMC%				
					MDD g/cm3				
					CBR (95%)				
					Swell%				
					SP. gravity				
					USCS				




Kampala - Jinja Express Road Graphic Test-pit Log												
TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph			
TP107	1+850	457872	20		Light brown Gravels							
		37156	30		Reddish brown laterite		Sampling Depth					
			40			CM						
			60	% Pass		20- 60	60-120					
					70	Light to dark brown Clayey Silty SAND	2mm					
					80		0.425mm					
					90		0.075mm					
					100		LL%					
					110		PI%					
					120		Soil Class					
							OMC%					
							MDD g/cm3					
						CBR (95%)						
						Swell%						
						SP. gravity						
						USCS						
		TP108	2+540	458572	10		Dark to dark brown Silty CLAY (topsoil)			Sampling Depth		
37511	20			CM								
	30			% Pass	40-120							
					40	Dark gray Sandy Silty CLAY. Ground water at a depth of 90cm	2mm					
					60		0.425mm					
					70		0.075mm					
					80		LL%					
					90		PI%					
					100		Soil Class					
					110		OMC%					
					120		MDD g/cm3					
						CBR (95%)						
						Swell%						
						SP. gravity						
						USCS						
TP 109	6+300			461730	10		Brownish Silty CLAY (topsoil)		Sampling Depth			
				37480			CM					
			20	% Pass	10-100							
					30	Dark gray Sandy Silty CLAY. Ground water at a depth of 60cm.	2mm		100			
					40		0.425mm		93			
					50		0.075mm		67			
					60		LL%	38				
					70		PI%	22				
					80		Soil Class	A-6(11)				
					90		OMC%	-				
					100		MDD g/cm3	-				
						CBR (95%)	-					
						Swell%	-					
						SP. gravity	2.6					
						USCS	CL					
						NMC%	42					

Kampala - Jinja Express Road Graphic Test-pit Log




TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP 110	6+300	461780	10		Dark Sandy Silty CLAY (topsoil)				
		36950	20					Sampling Depth	
			30					CM	
			40		Yellowish gray Silty SAND. Ground water at a depth of 110cm.	% Pass	40-120		
			50			2mm	98		
			60			0.425mm	71		
			70			0.075mm	28		
			80			LL%	0		
			90			PI%	0		
			100			Soil Class	A-2-4(0)		
			120			OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.7		
						USCS	SM		
						NMC%	15		
TP 111	6+300	461980	10		Dark Sandy Silty CLAY (topsoil)				
		35880	20					Sampling Depth	
			20					CM	
			30		Dark to dark gray Sandy Silty CLAY. Ground water at a depth of 80cm.	% Pass	20-120		
			40			2mm	100		
			50			0.425mm	94		
			60			0.075mm	86		
			70			LL%	63		
			80			PI%	28		
			90			Soil Class	A-7-6(20)		
			100			OMC%	-		
			110			MDD g/cm3	-		
			120			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.674		
						USCS	CH		
						NMC%	34		
TP 112	6+750	462236	10		Brownish Silty CLAY (topsoil)				
		36452	20					Sampling Depth	
			20					CM	
			30		Reddish brown Silty CLAY	% Pass	20-130		
			40			2mm	86		
			50			0.425mm	80		
			60			0.075mm	58		
			70			LL%	54		
			80			PI%	23		
			90			Soil Class	A-7-5(11)		
			100			OMC%	18		
			110			MDD g/cm3	1.805		
			120			CBR (95%)	12.0		
			130			Swell%	1.970		
						SP. gravity	2.915		
						USCS	MH		
						NMC%	21		

Kampala - Jinja Express Road Graphic Test-pit Log									
TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP 113	7+980	463423	10		Dark Silty CLAY (topsoil)		Sampling Depth		
		36151	20						
			30				CM		
			40			% Pass	40-160		
			60			2mm	100		
			80		Light gray Silty SAND. Ground water at a depth of 120cm.	0.425mm	79		
			100			0.075mm	22		
			120			LL%	0		
			140			PI%	0		
			160			Soil Class	A-2-4(0)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.7		
						USCS	SM		
						NMC%	14.0		



Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP118	13+040	468064	20		Dark Silty CLAY (topsoil)				
		35380	30				Sampling Depth		
			40		Yellowish gray Clayey Silty SAND. Ground water at a depth of 120cm.		CM		
			50			% Pass	30- 130		
			60			2mm	100		
			70			0.425mm	89		
			80			0.075mm	34		
			90			LL%	0		
			100			PI %	0		
			110			Soil Class	A-2-4(0)		
			120			OMC%	-		
			130			MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.654		
						USCS	SM		
						NMC%	20		
TP119	13+511	468490	10		Dark to dark gray Silty CLAY (topsoil)				
		35581	20				Sampling Depth		
			30		Light gray to light brown fine SAND. Ground water at a depth of 140cm.		CM		
			40			% Pass	40-150		
			50			2mm	100		
			60			0.425mm	63		
			70			0.075mm	15		
			80			LL%	0		
			90			PI%	0		
			100			Soil Class	A-4(6)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.641		
						USCS	SM		
						NMC%	35.0		
TP120	13+900	468859	10		Yellowish brown laterite				
		35697	20				Sampling Depth		
			30				CM		
			40			% Pass	0- 90		
			50			2mm	51		
			60			0.425mm	31		
			70			0.075mm	16		
			80			LL%	34		
			90			PI %	8		
					Reworked hard laterite ground/duricrust	Soil Class	A-2-4(0)		
						OMC%	11		
						MDD g/cm3	2.092		
						CBR (95%)	120		
						Swell%	0.09		
						SP. gravity	2.832		
						USCS	SC		
						NMC%	10		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP121	14+600	469508	10		Brownish Silty CLAY (topsoil)				
		35490	20					Sampling Depth	
			30					CM	
			40		Yellowish brown Silty CLAY	% Pass	40-150		
			50			2mm	91		
			60			0.425mm	79		
			70			0.075mm	51		
			80			LL%	39		
			90			PI%	20		
			100			Soil Class	A-6(7)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.728		
						USCS	CL		
						NMC%	20		
TP122	15+080	469867	10		Dark to dark gray Silty CLAY (topsoil)				
		35173	20					Sampling Depth	
			30					CM	
			40		Light brown to light gray Sandy Silty CLAY	% Pass	30- 100	100- 130	
			50			2mm	86	98	
			60			0.425mm	52	90	
			70			0.075mm	36	83	
			80			LL%	23	48	
			90			PI%	9	27	
			100		Dark Silty CLAY. Ground water at a depth of 110cm.	Soil Class	A-4(0)	A-7-6(26)	
			110			OMC%	-	-	
			120			MDD g/cm3	-	-	
			130			CBR (95%)	-	-	
						Swell%	-	-	
						SP. gravity	2.620	2.570	
						USCS	SC	CL	
						NMC%	38	18	
TP123	15+640	470402	10		Brown to light brown Silty CLAY (topsoil)				
		35042	20					Sampling Depth	
			30					CM	
			40		Reddish brown Silty CLAY	% Pass	40-150		
			50			2mm	99		
			60			0.425mm	84		
			70			0.075mm	29		
			80			LL%	51		
			90			PI%	19		
			100			Soil Class	A-7-5(7)		
			110			OMC%	21		
			120			MDD g/cm3	1.690		
			130			CBR (95%)	29.0		
			140			Swell%	0.64		
			150			SP. gravity	2.804		
						USCS	SC		
						NMC%	26.0		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP124	16+140	470873	10		Dark Silty CLAY (topsoil)				
		35200	20				Sampling Depth		
			30				CM		
			40		Light brown to light gray Clayey SILT. Ground water at a depth of 70cm.	% Pass	30- 100		
			50			2mm	100		
			60			0.425mm	94		
			70			0.075mm	58		
			80			LL%	21		
			90			PI %	7		
			100			Soil Class	A-4(5)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.698		
						USCS	CL-ML		
						NMC%	22		
TP125	17+200	471908	10		Brown to light brown Silty CLAY (topsoil)				
		35353	20				Sampling Depth		
			30				CM		
			40		Light to reddish brown laterite, with quartz vein gravels	% Pass	30- 150		
			50			2mm	42		
			60			0.425mm	366		
			70			0.075mm	26		
			80			LL%	51		
			90			PI %	28		
			100			Soil Class	A-2-7(1)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.709		
						USCS	GC		
						NMC%	14		
TP126	17+700	472408	10		Dark Silty CLAY (topsoil)				
		35365	20				Sampling Depth		
			30				CM		
			40		Dark brown Sandy Silty CLAY	% Pass	30- 140		
			50			2mm	100		
			60			0.425mm	95		
			70			0.075mm	81		
			80			LL%	49		
			90			PI %	28		
			100			Soil Class	A-7-6(17)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
						SP. gravity	2.639		
						USCS	CL		
						NMC%	26		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP127	18+300	472987	10	Dark Silty CLAY (topsoil)					
		35511	20				Sampling Depth		
			30	Yellowish brown Silty CLAY			CM		
			40			% Pass	40- 150		
			50	Light gray Sandy Silty CLAY		2mm	100		
			60			0.425mm	96		
			70			0.075mm	72		
			80			LL%	37		
			90			PI %	22		
			100			Soil Class	A-6(12)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.639		
						USCS	SL		
						NMC%	35		
TP128	18+800	473403	10	Dark Silty CLAY (topsoil)					
		35784	20				Sampling Depth		
			30				CM		
			40			% Pass	30- 100		
			50	Light to dark gray Silty CLAY. Ground water at a depth of 60cm.		2mm	100		
			60			0.425mm	87		
			70			0.075mm	55		
			80			LL%	29		
			90			PI %	15		
			100			Soil Class	A-6(6)		
						OMC%	-		
						MDD g/cm3	-		
						CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.626		
						USCS	CL		
						NMC%	35		
TP129	20+000	473580	10	Brown to light brown Silty CLAY (topsoil)					
		37300	20				Sampling Depth		
			30				CM		
			40			% Pass	30- 150		
			50	Reddish brown Silty CLAY		2mm	100		
			60			0.425mm	91		
			70			0.075mm	62		
			80			LL%	56		
			90			PI %	27		
			100			Soil Class	A-7-6(14)		
			110			OMC%	21		
			120			MDD g/cm3	1.687		
			130			CBR (95%)	14		
			140			Swell%	0.87		
			150			SP. gravity	2.787		
						USCS	CH		
						NMC%	28		




Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP129A	20+400	474383	10	Dark Silty CLAY (topsoil)					
		37046	20				Sampling Depth		
			30				CM		
			40	Yellowish brown Sandy Silty CLAY. Ground water at a depth of 100cm.		% Pass	40-130		
			50			2mm	94		
			60			0.425mm	82		
			70			0.075mm	59		
			80			LL%	40		
			90			PI%	23		
			100			Soil Class	A-6(10)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.686		
						USCS	CL		
						NMC%	13.0		
TP130	20+819	474658	10	Dark brown to dark gray Silty CLAY (topsoil)					
		37361	20				Sampling Depth		
			30				CM		
			40	Reddish brown Silty CLAY		% Pass	30-120		
			50			2mm	100		
			60			0.425mm	89		
			70			0.075mm	59		
			80			LL%	48		
			90			PI%	20		
			100			Soil Class	A-7-6(10)		
			110			OMC%	19		
			120			MDD g/cm3	1.775		
			130			CBR (95%)	15		
			140			Swell%	1.280		
			150			SP. gravity	2.724		
						USCS	ML		
						NMC%	29		
TP131	21+350	475048	10	Dark Silty CLAY (topsoil)					
		37722	20				Sampling Depth		
			30				CM		
			40	Light gray Sandy Silty CLAY		% Pass	30-130		
			50			2mm	99		
			60			0.425mm	90		
			70			0.075mm	61		
			80			LL%	43		
			90			PI%	27		
			100			Soil Class	A-7-6(12)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.725		
						USCS	CL		
						NMC%	29		

Kampala - Jinja Express Road Graphic Test-pit Log

TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP132	22+400	475926	10	Dark Silty CLAY (topsoil)					
		38276	15				Sampling Depth		
			20	Light gray Sandy Silty CLAY			CM		
			30			% Pass	15-150		
			50			2mm	100		
			60			0.425mm	83		
			70			0.075mm	43		
			80			LL%	24		
			90			PI%	11		
			100			Soil Class	A-6(2)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
			150			SP. gravity	2.684		
						USCS	SC		
						NMC%	12		
						NMC%	21		
TP133	22+997	476520	10	Dark Silty CLAY (topsoil)					
		38326	20				Sampling Depth		
			30	Light gray Silty SAND. Ground water at a depth of 120cm.			CM		
			40			% Pass	30-130		
			50			2mm	99		
			60			0.425mm	73		
			70			0.075mm	29		
			80			LL%	0		
			90			PI%	0		
			100			Soil Class	A-2-4(0)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
						Swell%	-		
						SP. gravity	2.731		
						USCS	SM		
						NMC%	17		
TP134	24+000	477521	10	Brown to light brown Silty CLAY (topsoil)					
		38354	20				Sampling Depth		
			25	Reddish Silty CLAY			CM		
			30			% Pass	25-145		
			40			2mm	100		
			50			0.425mm	89		
			60			0.075mm	57		
			70			LL%	48		
			80			PI%	21		
			90			Soil Class	A-7-6(10)		
			100			OMC%	-		
			110			MDD g/cm3	-		
			120			CBR (95%)	-		
			130			Swell%	-		
			140			SP. gravity	2.81		
			145			USCS	CL		
						NMC%	25		


Kampala - Jinja Express Road Graphic Test-pit Log


TP Type.	Sta. (km)	GPS (East, North)	Depth (cm)	TP Log	Field Material Description	Lab Summary			Photograph
TP135	24+885	478382	10	Dark brown Silty CLAY (topsoil)					
		38405	20					Sampling Depth	
			30					CM	
			40	Reddish brown Silty CLAY	% Pass	30-140			
			50			2mm	100		
			60			0.425mm	91		
			70			0.075mm	64		
			80			LL%	50		
			90			PI%	25		
			100			Soil Class	A-7-6(13)		
			110			OMC%	-		
			120			MDD g/cm3	-		
			130			CBR (95%)	-		
			140			Swell%	-		
					SP. gravity	2.792			
					USCS	CL-CH			
					NMC%	22			
TP136	25+233	478690	10	Dark brown to brown Silty CLAY (topsoil)					
		38567	20					Sampling Depth	
			30					CM	
			40	Reddish brown Silty CLAY	% Pass	50-130			
			50			2mm	98		
			60			0.425mm	83		
			70			0.075mm	62		
			80			LL%	58		
			90			PI%	22		
			100			Soil Class	A-7-5(12)		
			110			OMC%	22		
			120			MDD g/cm3	1.691		
			130			CBR (95%)	29		
					Swell%	0.25			
					SP. gravity	2.801			
					USCS	MH			
					NMC%	26			
TP139	26+888	479970	10	Brownish to light brown Silty CLAY					
		39598	20					Sampling Depth	
			30					CM	
			40	Reddish brown laterite Gravely Silty CLAY with little over size stone	% Pass	60-130			
			50			2mm	83		
			60			0.425mm	72		
			70			0.075mm	55		
			80			LL%	52		
			90			PI%	24		
			100			Soil Class	A-7-6(11)		
			110			OMC%	17		
			120			MDD g/cm3	1.825		
			130			CBR (95%)	35		
					Swell%	0.68			
					SP. gravity	2.806			
					USCS	CH			
					NMC%	18			


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Graphic Test-pit and Auger-hole Log


GI Type.	Sta. (km)	GPS (East, North)	Depth (cm)	Log ID	Field Material Description	Lab Summary			Photograph
Op. 1, TP1+DCP1	0+920	461584	20		Dark organic Silty CLAY (topsoil)				
		36164	40			Sampling Depth			
			60	CM					
			80	Light brown Silty CLAY	% Pass	40-90	90-210		
			90		2mm	100	100		
			100	Dark gray Silty Sandy CLAY	0.425mm	97	99		
			120		0.075mm	91	96		
			140		LL%	51	62		
			160		PI%	32	41		
			180		Soil Class	A-7-6(18)	A-7-6(20)		
			200		OMC%	-	-		
			210		MDD g/cm3	-	-		
					CBR (95%)	-	-		
				Swell%	-	-			
				SP. gravity	2.520	2.593			
		USCS	CH	CH					
		NMC%	24	15					
Op. 1, Tp2+DCP2	1+300	461227	10		Dark brown Silty CLAY (topsoil)				
		36043	20			Sampling Depth			
			30	CM					
			40	Dark gray Sandy Silty CLAY, Groundwater at 80cm	% Pass	40-120			
			50		2mm	100			
			60		0.425mm	88			
			70		0.075mm	67			
			80		LL%	41			
			90		PI %	24			
			100		Soil Class	A-7-6(12)			
			110		OMC%	-			
			120	MDD g/cm3	-				
				CBR (95%)	-				
				Swell%	-				
				SP. gravity	2.608				
		USCS	CL						
		NMC%	37						
Op. 1, SDCP2	2+650	459960	10		Dark brown Silty CLAY (topsoil)				
		36084	20			Sampling Depth			
			40	CM					
			60	Brownish Sandy Silty CLAY, Groundwater at 80cm	% Pass	20-140			
			70		2mm	97			
			80		0.425mm	82			
			90		0.075mm	45			
			100		LL%	28			
			110		PI%	10			
			120		Soil Class	A-4(2)			
			130		OMC%	-			
			140	MDD g/cm3	-				
				CBR (95%)	-				
				Swell%	-				
				SP. gravity	2.8				
		USCS	SC						
		NMC%	68						










Op.1, TP3+ DCP3	3+000	459887	10	Construction remains of light brown Gravely SAND				
		35749	20				Sampling Depth	
			30				CM	
				40	Reddish brown Silty CLAY	% Pass	30- 140	
				50		2mm	99	
				60		0.425mm	87	
				70		0.075mm	56	
				80		LL%	34	
				90		PI %	15	
				100		Soil Class	A-5(6)	
				110		OMC%	17.0	
				120		MDD g/cm3	1.8	
				130		CBR (95%)	19.0	
				140	Swell%	0.15		
					SP. gravity	2.810		
				USCS	CL			
				NMC%	20			
Op.1, TP4+ DCP4	3+660	459646	10	Construction remains of light brown Gravely SAND				
		35220	20				Sampling Depth	
			30				CM	
				40	Reddish brown Silty CLAY	% Pass	30- 240	
				60		2mm	100	
				80		0.425mm	87	
				100		0.075mm	63	
				120		LL%	45	
				140		PI %	18	
				160		Soil Class	A-7-6(10)	
				180		OMC%	23.0	
				200		MDD g/cm3	1.68	
				220		CBR (95%)	16.0	
				240	Swell%	0.09		
					SP. gravity	2.835		
				USCS	CL			
				NMC%	28			
Op.1, TP5+ DCP5	4+265	459017	10	Light brown Gravely Sandy Silty CLAY				
		35144	20				Sampling Depth	
			30				CM	
				40	Brownish Silty CLAY, Groundwater at 80cm.	% Pass	30-150	
				50		2mm	99	
				60		0.425mm	85	
				70		0.075mm	45	
				80		LL%	26	
				90		PI%	11	
				100		Soil Class	A-6(2)	
				110		OMC%	-	
				120		MDD g/cm3	-	
				130		CBR (95%)	-	
				140	Swell%	-		
					SP. gravity	2.8		
				USCS	SC			
				NMC%	29			









Op. 1, TP6+ DCP6	4+730	458752	10	Light brown Sandy Silty CLAY					
		34684	20					Sampling Depth	
			30					CM	
			40				% Pass	0-80	80- 160
			50				2mm	82	100
			60				0.425mm	68	96
			70				0.075mm	48	85
			80				LL%	42	57
			90				PI%	17	26
			100				Soil Class	A-7-6(5)	A-7-5(18)
			110				OMC%	-	-
			120				MDD g/cm3	-	-
			130				CBR (95%)	-	-
	140			Swell%	-	-			
	150			SP. gravity	2.806	2.683			
	160			USCS	SC	MH			
					NMC%	17.0	66		
Op. 2, Tunneled SDCP201	6+500	459004	10	Dark Organic Silty CLAY, Groundwater at 80cm					
		33184	20					Sampling Depth	
			30					CM	
			40				% Pass	0- 160	
			50				2mm		90
			60				0.425mm		47
			70				0.075mm		23
			80				LL%		67
			90				PI%		12
			100				Soil Class	A-7-7(0)	
			110				OMC%		-
			120				MDD g/cm3		-
			130				CBR (95%)		-
	140			Swell%		-			
	150			SP. gravity		2.486			
	160			USCS		SC			
					NMC%		76		
Op. 1, SDCP5	6+100	458512	10	Brownish Silty CLAY, alluvial flood plain deposit					
		33485	20					Sampling Depth	
			30					CM	
			40				% Pass	30-140	
			50				2mm	86	
			60				0.425mm	75	
			70				0.075mm	60	
			80				LL%	48	
			90				PI%	14	
			100				Soil Class	A-7-5(14)	
			110				OMC%	-	
			120				MDD g/cm3	-	
			130				CBR (95%)	-	
				Swell%	-				
				SP. gravity	2.474				
				USCS		MH			
					NMC%		182		







Op.1, SDCP6	6+350	458444	10		Brownish Silty CLAY, alluvial flood plain deposit			
		33247	20				Sampling Depth	
			30				CM	
			40		Dark brown Silty CLAY, Groundwater at 100cm	% Pass	30-140	
			50			2mm	98	
			60			0.425mm	96	
			70			0.075mm	86	
			80			LL%	70	
			90			PI%	31	
			100			Soil Class	A-7-5(20)	
			110			OMC%	-	
			120			MDD g/cm3	-	
			130			CBR (95%)	-	
			140			Swell%	-	
						SP. gravity	2.634	
						USCS	MH	
						NMC%	36	
Op.1, SDCP7	6+600	458506	10		Brownish organic Silty CLAY, alluvial flood plain deposit			
		33008	20				Sampling Depth	
			30				CM	
			40		Dark Organic Silty CLAY, Groundwater at 130cm	% Pass	30-140	
			50			2mm	92	
			60			0.425mm	81	
			70			0.075mm	66	
			80			LL%	77	
			90			PI%	30	
			100			Soil Class	A-7-5(17)	
			110			OMC%	-	
			120			MDD g/cm3	-	
			130			CBR (95%)	-	
			140			Swell%	-	
						SP. gravity	2.442	
						USCS	MH	
						NMC%	182	
Op.1, SDCP9	7+800	459348	10		Light brown Gravely Silty SAND			
		32155	20				Sampling Depth	
			30				CM	
			40			% Pass	0-80	
			50			2mm	94	
			60			0.425mm	58	
			70			0.075mm	17	
			80			LL%	0	
					Hardned reworked gravely material	PI%	0	
			>80			Soil Class	A-2-4(0)	
						OMC%	-	
						MDD g/cm3	-	
						CBR (95%)	-	
						Swell%	-	
						SP. gravity	2.727	
						USCS	SM	
						NMC%	11	



Op.1, TP9+ DCP9	11+42 0	456987 30853	20	Dark Silty CLAY (topsoil)		Sampling Depth	
			30			CM	
			40		% Pass	20-180	
			50		2mm	97	
			60		0.425mm	90	
			70		0.075mm	79	
			80		LL%	48	
			90		PI%	25	
			100	Brown to dark brown Silty CLAY.	Soil Class	A-7-6(18)	
			110	Ground water at a depth of 90cm	OMC%	-	
			120		MDD g/cm3	-	
			130		CBR (95%)	-	
			140		Swell%	-	
			150		SP. gravity	2.520	
			160		USCS	CL	
			170		NMC%	25	
			180				
Op.1,TP10+ DCP10	11+80 0	456631 30738	20	Brownish Silty CLAY		Sampling Depth	
			30			CM	
			40		% Pass	20-130	
			50		2mm	100	
			60		0.425mm	92	
			70		0.075mm	74	
			80	Dark to dark gray Silty CLAY. Ground water at a depth of 30cm.	LL%	51	
			90		PI%	28	
			100		Soil Class	A-7-6(17)	
			110		OMC%	-	
			120		MDD g/cm3	-	
			130		CBR (95%)	-	
					Swell%	-	
					SP. gravity	2.685	
					USCS	CH	
					NMC%	52	
Op.1, SDCP16	11+95 0	456483 30717	20	Reddish brown Silty CLAY (alluvial floodplain deposit, topsoil)		Sampling Depth	
			30			CM	
			40		% Pass	30-180	
			50		2mm	98	
			60		0.425mm	84	
			70		0.075mm	65	
			80		LL%	47	
			90		PI%	23	
			100	Dark gray Silty CLAY.	Soil Class	A-7-6(12)	
			110	Ground water at a depth of 100cm.	OMC%	-	
			120		MDD g/cm3	-	
			130		CBR (95%)	-	
			140		Swell%	-	
			150		SP. gravity	2.628	
			160		USCS	CL	
			180		NMC%	65	

Op.1, SDCP17	12+10 0	456345	10	Reddish brown Silty CLAY.						
		30659	20							
			30							
			40							
			50		% Pass	0-160				
			60		2mm	99				
			70		0.425mm	87				
			80		0.075mm	54				
			90		LL%	33				
			100		PI%	15				
			110		Soil Class	A-6(6)				
			120		OMC%	-				
			130		MDD g/cm3	-				
			140		CBR (95%)	-				
			150		Swell%	-				
			160		SP. gravity	2.679				
					USCS	CL				
					NMC%	23				
Op.1A, (C2(t)), TP11+ DCP11	11+66 0	456779	10	Dark organic Silty CLAY (topsoil)						
		30756	20							
			30							
			40							
			50		% Pass	30-160				
			60		2mm	100				
			70		0.425mm	92				
			80		0.075mm	78				
			90		LL%	42				
			100		PI%	27				
			110		Soil Class	A-7-6(15)				
			120		OMC%	-				
			130		MDD g/cm3	-				
			140		CBR (95%)	-				
			150		Swell%	-				
			160		SP. gravity	2.520				
					USCS	CL				
					NMC%	26				
Op.1A, (C2(t)), TP12+ DCP12	12+65 0	455953	10	Reddish brown Silty LAY						
		30276	20							
			30							
			40							
			50		% Pass	0- 210				
			60		2mm	100				
			70		0.425mm	84				
			80		0.075mm	55				
			90		LL%	48				
			100		PI%	24				
			110		Soil Class	A-7-6(10)				
			120		OMC%	23.0				
			130		MDD g/cm3	1.6				
			140		CBR (95%)	18.0				
			150		Swell%	0.5				
			160		SP. gravity	2.758				
			170		USCS	CL				
			180		NMC%	26				
			190							
			200							
			210							



Op.1, Open, TP13+ DCP13	14+03 0	455229	10	Reddish brown laterite (reclaimed land).			
		29137	20			Sampling Depth	
			30			CM	
			40		% Pass	30-140	
			50		2mm	97	
			60	Dark brown Silty LAY. Ground water found at a depth of 40cm, but later on test pit filled with water from damaged pipeline, due pit excavation .	0.425mm	79	
			70		0.075mm	52	
			80		LL%	38	
			90		PI%	9	
			100		Soil Class	A-6(8)	
			110		OMC%	-	
			120		MDD g/cm3	-	
			130		CBR (95%)	-	
			140		Swell%	-	
					SP. gravity	2.724	
					USCS	CL	
					NMC%	36	



Op.1, Open,TP14 + DCP14	14+65 0	455498	10	Light brown Clayey Gravely SAND			
		28616	20			Sampling Depth	
			30			CM	
			40		% Pass	30-140	
			50		2mm	98	
			60	Dark Sandy Silty LAY. Groundwater at 110cm.	0.425mm	70	
			70		0.075mm	48	
			80		LL%	27	
			90		PI%	11	
			100		Soil Class	A-6(3)	
			110		OMC%	-	
			120		MDD g/cm3	-	
			130		CBR (95%)	-	
			140		Swell%	-	
					SP. gravity	2.574	
					USCS	CL	
					NMC%	36	



Op.1, Open, TP17+ DCP17	17+40 0	456394	10	Brownish Silty CLAY (Topsoil)			
		26084	20			Sampling Depth	
			35			CM	
			40				
			50	Reddish brown lateritic Silty CLAY with oversized stones	% Pass	35-140	
			60		2mm	87	
			70		0.425mm	77	
			80		0.075mm	56	
			90		LL%	25	
			100		PI%	23	
			110		Soil Class	A-7-6(11)	
			120		OMC%	-	
			130		MDD g/cm3	-	
			140		CBR (95%)	-	
					Swell%	-	
					SP. gravity	2.843	
					USCS	CL	
					NMC%	21	








Op.1, Open, SDCP19	16+94 0	456444	10	Dark Organic Silty CLAY			
		26542	20			Sampling Depth	
			25			CM	
			40				
			50	Dark gray Gravely Sandy Silty CLAY. Augering stopped on gravely weathered rock at 160cm	% Pass	25-160	
			60		2mm	82	
			70		0.425mm	52	
			80		0.075mm	32	
			90		LL%	29	
			100		PI%	13	
			110		Soil Class	A-2-6(1)	
			120		OMC%	-	
			130		MDD g/cm3	-	
			140		CBR (95%)	-	
			150		Swell%	-	
			160		SP. gravity	2.689	
					USCS	CL	
			>160	Weathered rock	NMC%	18	






Potential Sources of Construction Material Results





KJE Mainline Section (Part 3: Geotechnical Report, Volume 3A: Field Investigations - ICS, 2015)

Source No.	QR-01	
Station Location and Direction	6+300, RHS .6km, Muyenga/ Tank Hill	
Easting	457884	
Northing	32030	
Possible Application	Asphalt, Base Course, Concrete Aggregates and Hard Core Fill	
Material Type	ridge forming, widely jointed foliated biotite Granite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	400,000	
Laboratory Tests		
Test Typs	Result	
Specific Gravity (Dry)	2.576	
Degradation LA wear (%)	18.2	
Soundness (%)	1.9	
Flakiness Index (%)	25	
Water absorption (%)	0.7	
ACV %	26.9	
10% Fine (KN)	140	
Asphalt Coating	>95	
Remark: -	Laboratory test results of the aggregate have been refrenced from Preliminary GI of Option 1, 6+25 RHS 9km	
Source No.	QR-02	
Station Location and Direction	21+700, RHS, 2.7km, Seeta Nakoosi private Quarry Site	
Easting	479511	
Northing	36057	
Possible Application	Asphalt, Base Course, Concrete Aggregates and Hard Core Fill	
Material Type	Widely jointed to massive medium grained pinkish granite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	420,000	
Laboratory Tests		
Test Typs	Result	
Specific Gravity (Dry)	2.576	
Degradation LA wear (%)	18.2	
Soundness (%)	1.9	
Flakiness Index (%)	25	
Water absorption (%)	0.7	
ACV (Aggregate Crushing Value)	26.9	
10% Fine (KN)	140	
Asphalt Coating	>95	
Remark: -	Laboratory test results of the aggregate have been refrenced from Preliminary GI of Option1, 19+300, RHS, 6.5km	


Source No.	QR-03	
Station Location and Direction	28+660, RHS 775m, Mbalala Stiring Private Quarry Site	
Easting	481058	
Northing	39321	
Possible Application	Asphalt, Base Course, Concrete Aggregates and Hard Core Fill	
Material Type	Ridge forming, widely jointed augened biotite granodiorite gneiss	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	720,000	
Laboratory Tests		
Test Typs	Result	
Specific Gravity (Dry)	2.669	
Degradation LA wear (%)	21.5	
Soundness (%)	0.6	
Flakiness Index (%)	20	
Water absorption (%)	0.4	
ACV (Aggregate Crushing Value)	19.7	
10% Fine (KN)	200	
Asphalt Coating	>95	
Remark: -	Laboratory test results of the aggregate have been refrenced from Prlimiary GI of Option1, 25+100 RHS 2.5km	

Possible Sources of Rock Fill
Kampala - Jinja Expressway

Source No.	CR-01	
Station Location and Dir	6.3, LHS 600m	
Easting	451198	
Northing	37191	
Possible Application	Hard Core fill	
Material Type	Ridge forming, medium to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>600,000	
Remark	The Quartzite ridge extends north, exploitation along strike will enhance the quantity	
Source No.	CR-02	
Station Location and Dir	15.64, RHS 900m	
Easting	470438	
Northing	34127	
Possible Application	Hard Core Fill	
Material Type	North south elongated ridge forming, medium to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>800,000	
Remark	Manually exploited for hard core and crushing, Budo ridge	
Source No.	CR-03	
Station Location and Dir	16.14, RHS 400m	
Easting	471293	
Northing	35214	
Possible Application	Hard Core Fill	
Material Type	North south elongated ridge forming, widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	400,000	
Remark	Manually exploited for hard core and crushing, South Nsube ridge	

Source No.	CR-04	
Station Location and Dir	17.0, LHS 600m	
Easting	472032	
Northing	35913	
Possible Application	Hard Core Fill	
Material Type	Medium to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	400,000	
Remark	Manually exploited for hard core and crushing, Nsube ridge	
Source No.	CR-05	
Station Location and Dir	17.5, LHS 700m	
Easting	472156	
Northing	36057	
Possible Application	Hard Core Fill	
Material Type	Medium to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	760,000	
Remark	Manually exploited for hard core and crushing, North Nsube ridge	
Source No.	CR-06	
Station Location and Dir	27.17 LHS 270m	
Easting	479723	
Northing	39740	
Possible Application	Hard Core Fill	
Material Type	Massive to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>600,000	
Remark	Manually exploited for hard core and crushing, Kasenge ridge	
Source No.	CR-07	
Station Location and Dir	36+900, LHS, 2km, Nakaseta area	
Easting	485655	
Northing	44977	
Possible Application	Hard Core Fill	
Material Type	Massive to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>300,000	
Remark	Manually exploited for hard core and crushing, Nakaseta area	


Proposed Natural Granular Sources					
Source No.		NG-1			
Km Station and Direction		3+340, LHS, 600m			
Geographic Coordinates					
Easting		459955			
Northing		37171			
Possible Application		Subbase			
Material Type		Ridge forming, light to reddish brown laterite GRAVELS			
Over-burden (m)		Nil			
Vegetation Cover		Nil			
Estimated Quantity (M3)		>300,000			
Laboratory Tests					
Test Types	Sample ID and Result				
	A1	A2	B1	B2	
Liquid Limit (LL) %: -	42	29	43	39	
Plasticity Index (PI) %: -	14	7	13	10	
Optimum Moisture content (OMC)%: -	13.0	-	13.0	-	
Maximum dry density (MDD)%: -	2.075	-	2.070	-	
CBR soaked at T-180: - 97%	80	-	96	-	
Linear Shrinkage (%)	7	5	7	6	
Swell (%): -	0.09	-	0.17	-	
ASHTO Soil class: -	A-2-7(0)	A-2-4(0)	A-2-7(0)	A-2-4(0)	



Source No.		NG-2			
Km Station and Direction		9+840, LHS, 1.2km			
Geographic Coordinates					
Easting		464297			
Northing		34851			
Possible Application		Subbase			
Material Type		Ridge forming, yellowish brown laterite GRAVELS, with duricrust stones			
Over-burden (m)		Nil			
Vegetation Cover		Nil			
Estimated Quantity (M3)		420,000			
Laboratory Tests					
Test Types	Sample ID and Result				
	A1	A2	B1	B2	
Liquid Limit (LL) %: -	42	47	46	46	
Plasticity Index (PI) %: -	15	17	17	16	
Optimum Moisture content (OMC)%: -	13	-	15.0	-	
Maximum dry density (MDD)%: -	2.035	-	1.920	-	
CBR soaked at T-180: - 97%	65	-	108	-	
Linear Shrinkage (%)	8	10	9	8	
Swell (%): -	0.07	-	0.12	-	
ASHTO Soil class: -	A-2-7(0)	A-2-7(0)	A-2-7(0)	A-2-7(0)	



Source No.		NG-3			
Km Station and Direction		17+500, LHS, 700m			
Geographic Coordinates					
Easting		472156			
Northing		36057			
Possible Application		Subbase			
Material Type		Ridge forming, reddish brown laterite			
Over-burden (m)		Nil			
Vegetation Cover		Nil			
Estimated Quantity (M3)		360,000			
Laboratory Tests					
Test Types	Sample ID and Result				
	A1	A2	B1	B2	
Liquid Limit (LL) %: -	41	27	39	40	
Plasticity Index (PI) %: -	16	8	15	15	
Optimum Moisture content (OMC)%: -	8	-	7	-	
Maximum dry density (MDD)%: -	2.090	-	2.125	-	
CBR soaked at T-180: - 97%	96	-	90	-	
Linear Shrinkage (%)	9	5	8	9	
Swell (%): -	0.05	-	0.04	-	
ASHTO Soil class: -	A-2-7(0)	A-2-4(0)	A-2-6(0)	A-2-6(0)	







Source No.	NG-4					
Km Station and Direction	27+170, LHS, 270m					
Geographic Coordinates						
Easting	479723					
Northing	39740					
Possible Application	Subbase					
Material Type	Ridge forming, reddish brown laterite GRAVELS					
Over-burden (m)	Nil					
Vegetation Cover	Nil					
Estimated Quantity (M3)	320,000					
Laboratory Tests						
Test Types	Sample ID and Result					
	A1	A2	B1	B2		
Liquid Limit (LL) %: -	54	50	42	43		
Plasticity Index (PI) %: -	21	16	13	15		
Optimum Moisture content (OMC)%: -	12	-	10	-		
Maximum dry density (MDD)%: -	2.180	-	2.200	-		
CBR soaked at T-180: - 97%	83	-	44	-		
Linear Shrinkage (%)	10	10	10	10		
Swell (%): -	0.13	-	0.08	-		
ASHTO Soil class: -	A-2-7(1)	A-2-7(0)	A-2-7(0)	A-2-7(0)		
Source No.	NG-5					
Km Station and Direction	36+900, LHS, 2km, Nakaseta area					
Geographic Coordinates						
Easting	485660					
Northing	44874					
Possible Application	Subbase					
Material Type	Ridge forming reddish brown laterite GRAVEL					
Over-burden (m)	Nil					
Vegetation Cover	Few					
Estimated Quantity (M3)	100,000					
Remark						
Laboratory Tests						
Test Types	Sample ID and Result					
	A1	A2	B1	B2		
Liquid Limit (LL) %: -	46	44	53	47		
Plasticity Index (PI) %: -	16	16	17	18		
Optimum Moisture content (OMC)%: -	11	-	12	-		
Maximum dry density (MDD)%: -	2.225	-	2.163	-		
CBR soaked at T-180: - 97%	44	-	44	-		
Linear Shrinkage (%)	9	9	11	10		
Swell (%): -	0.7	-	0.25	-		
ASHTO Soil class: -	A-2-7(0)	A-2-7(0)	A-2-7(0)	A-2-7(0)		
Source No.	NG-6					
Km Station and Direction	40+500, RHS, 800m					
Geographic Coordinates						
Easting	492707					
Northing	43204					
Possible Application	Subbase					
Material Type	Ridge forming reddish brown lateritic GRAVEL					
Over-burden (m)	Nil					
Vegetation Cover	Few					
Estimated Quantity (M3)	220,000					
Laboratory Tests						
Test Types	Sample ID and Result					
	A1					
Liquid Limit (LL) %: -	49					
Plasticity Index (PI) %: -	14					
Optimum Moisture content (OMC)%: -	9.4					
Maximum dry density (MDD)%: -	2.340					
CBR soaked at T-180: - 97%	75					
Linear Shrinkage (%)	9					
Swell (%): -	0.21					
ASHTO Soil class: -	A-2-7(0)					


Source No.	NG-7			
Km Station and Direction	42+800, LHS, 550m			
Easting	492661			
Northing	44650			
Possible Application	Subbase			
Material Type	Smooth topped ridge forming, light brown LATERITE			
Over-burden (m)	Nil			
Vegetation Cover	Nil			
Estimated Quantity (M3)	120,000			
Remark				
Laboratory Tests				
Test Types	Sample ID and Result			
	A1	A2	B1	B2
Liquid Limit (LL) %: -	44	41	42	40
Plasticity Index (PI) %: -	12	12	15	11
Optimum Moisture content (OMC)%: -	12	-	9	-
Maximum dry density (MDD)%: -	2.185	-	2.230	-
CBR soaked at T-180: - 97%	90	-	112	-
Linear Shrinkage (%)	7	7	7	6
Swell (%): -	0.04	-	0.09	-
ASHTO Soil class: -	A-2-7(0)	A-2-7(0)	A-2-7(0)	A-2-7(0)



Summary of Proposed Borrow Material Sources, Kampala - Jinja Expressway


Source No.	B-1	
Km Station Location and Direction	13+900, LHS and RHS	
Easting	468859	
Northing	35697	
Possible Application	Borrow Fill	
Material Type	Smooth topped ridge forming, yellowish brown laterite	
Over-burden (m)	Nil	
Vegetation Cover	Few	
Estimated Quantity (M3)	75,000	
Hauling Distance (Km)	2	
Laboratory Test Result		
Test Types	Result	
Soil classifications	A-2-4(0)	
Atterberg Limits (LL, PI)	(34,8)	
CBR at AASHTO T-180: - 95%	120	
OMC %	11	
Swell (%)	0.09	
Source No.	B-2	
Km Station Location and Direction	20+000, LHS and RHS	
Easting	473580	
Northing	37300	
Possible Application	Borrow Fill	
Material Type	Smooth topped ridge forming reddish brown Silty CLAY	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>80,000	
Hauling Distance, Km (Km)	3.1	
Laboratory Test Result		
Test Types	Result	
Soil classifications	A-7-6(14)	
Atterberg Limits (LL, PI)	(56,27)	
CBR soaked at T-180: - 95%	14	
OMC %	21	
Swell (%)	0.87	
Source No.	B-3	
Km Station Location and Direction	26+048, LHS and RHS	
Easting	479293	
Northing	39104	
Possible Application	Borrow Fill	
Material Type	Reddish brown Silty CLAY	
Over-burden (m)	0.0-0.3	
Vegetation Cover	Nil	
Estimated Quantity (M3)	60,000	
Hauling Distance (Km)	3	
Laboratory Test Result		
Test Types	Result	
Soil classifications	A-7-5(14)	
Atterberg Limits (LL, PI)	(51,11)	
CBR soaked at T-180: - 95%	30	
OMC %	20	
Swell (%)	0.3	


Source No.	B-4	
Km Station Location and Direction	29+837, LHS and RHS	
Easting	481935	
Northing	41483	
Possible Application	Borrow Fill	
Material Type	Reddish brown Silty CLAY	
Over-burden (m)	0.0-0.3	
Vegetation Cover	Nil	
Estimated Quantity (M3)	45,000	
Hauling Distance (Km)	3	
Laboratory Test Result		
Test Types	Result	
Soil classifications	A-7-5(14)	
Atterberg Limits (LL, PI)	(50,19)	
CBR soaked at T-180: - 95%	19	
OMC %	22	
Swell (%)	0.64	

Possible Sources of Sand		
Source No.	SA-1	
Station Location and Direction	10+100, LHS, Bukassa Kisigni area	
Easting	465635	
Northing	35961	
Possible Application	Concrete, and Mortar	
Material Type	Light gray to Sugary medium grained SAND	
Estimated Quantity (M3)	adequate	
Laboratory Test Result		
Test Typs	Sample ID and Result	
	SA-1a	SA-1b
Soundness: - %	0.5	
Organic color plate No.	1	
Sand Equivalent (%):-	87.9	
Clay/Silt Content (%)	1.4	
Source No.	SA-2	
Station Location and Direction	19+300, RHS, 26.6km,Northern shore of Lake Victoria at Katosi area	
Easting	478588	
Northing	17803	
Possible Application	Concrete and Mortar	
Material Type	Pinkish brown Gravely SAND	
Estimated Quantity (M3)	Adequate	
Laboratory Tests		
Test Typs	Sample ID and Result	
	SA-2a	SA-2b
Soundness: - %	2.1	
Organic color plate No.	3	
Sand Equivalent (%):-	79.5	
Clay/Silt Content (%)	6.2	



KSB Section (Part 3: Geotechnical Report, Volume 3A: Factual Ground Investigations - ICS, 2016)

Possible Sources of Hard Rock for Aggregate Crushing and Hard Core Fill Kampala Southern Bypass Road Project		
Source No.	QR-01	
Station Location and Direction	Option 1, 8+000, RHS 600m. Muyenga/ Tank Hill	
Easting	457884	
Northing	32030	
Possible Application	Asphalt, Base Course, Concrete Aggregates and Hard Core Fill	
Material Type	Ridge forming, widely jointed foliated biotite Granite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	360,000	
Laboratory Tests		
Test Types	Result	
Specific Gravity (Dry)	2.576	
Degradation LA wear (%)	18.2	
Soundness (%)	1.9	
Flakiness Index (%)	25	
Water absorption (%)	0.7	
ACV (Aggregate Crushing Value)	26.9	
10% Fine (KN)	140	
Asphalt Coating	>95	
Remark: -	Laboratory test results of the aggregate have been referenced from Kampala - Jinja Expressway, Option 1, 6+25, RHS 9km, of the preliminaray GI	
Source No.	QR-02	
Station Location and Dir	0+900, RHS 1.5km	
Easting	451198	
Northing	37191	
Possible Application	Hard Core fill	
Material Type	Ridge forming, medium to widely jointed Quartzite	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	>600,000	
Remark	As the Quartzite ridge extends north, exploitation along strike will inhance the quantity	







Possible Sources of Hard Rock for Aggregate Crushing and Hard Core Fill Kampala Southern Bypass Road Project		
Source No.	QR-03	
Station Location and Dir	17+500, RHS 350m	
Easting	456055	
Northing	26206	
Possible Application	Hard Core Fill	
Material Type	East West elongated ridge forming, medium to widely jointed Quartzite	
Over-burden (m)	NII	
Vegetation Cover	NII	
Estimated Quantity (M3)	>320,000	
Remark	Manually exploited for hard core and crushing, exploitation along strike will enhance the quantity	
Source No.	QR-04	
Station Location and Dir	15+500, RHS 3.8km	
Easting	446640	
Northing	23877	
Possible Application	Hard Core Fill	
Material Type	Massive to widely jointed Quartzite	
Over-burden (m)	NII	
Vegetation Cover	NII	
Estimated Quantity (M3)	250,000	
Remark	Existing Site	

Proposed Natural Granular Sources for Subbase and Borrow Fill Kampala Southern Bypass Road Project		
Source No.	NG-1	
Km Station and Direction	0+000, LHS 2km	
Geographic Coordinates		
Easting	464297	
Northing	34851	
Possible Application	Subbase, Borrow Fill	
Material Type	Ridge forming, yellowish brown laterite GRAVELS, with duricrust stones	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	420,000	
Laboratory Tests		
Test Types	Result	
Liquid Limit (LL) %:-	46	
Plasticity Index (PI) %:-	17	
Optimum Moisture content (OMC)%:-	15	
Maximum dry density (MDD)%:-	1.920	
CBR soaked at T-180:- 97%	108	
Linear Shrinkage (%)	9	
Swell (%):-	0.12	
ASHTO Soil class:-	A-2-7(0)	
Remark:-	Laboratory test results of the granular materials have been referenced from Kampala - Jinja Expressway, station 9+840, LHS, 1.2km.	
Source No.	NG-2	
Km Station and Direction	1+000, RHS 1.45km	
Geographic Coordinates		
Easting	459955	
Northing	37171	
Possible Application	Subbase, Borrow Fill	
Material Type	Ridge forming, light to reddish brown laterite GRAVELS	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	300,000	
Laboratory Tests		
Test Types	Result	
Liquid Limit (LL) %:-	42	
Plasticity Index (PI) %:-	14	
Optimum Moisture content (OMC)%:-	13	
Maximum dry density (MDD)%:-	2.075	
CBR soaked at T-180:- 97%	80	
Linear Shrinkage (%)	7	
Swell (%):-	0.09	
ASHTO Soil class:-	A-2-7(0)	
Remark:-	Laboratory test results of the granular materials have been referenced from Kampala - Jinja Expressway, station 3+340, LHS, 600m.	
Source No.	NG-3	
Km Station and Direction	Option 2, 6+500, LHS 500m	
Geographic Coordinates		
Easting	459185	
Northing	33126	
Possible Application	Subbase, Borrow Fill	
Material Type	Smooth topped ridge forming, Gravely Silty CLAY	
Over-burden (m)	Nil	
Vegetation Cover	Nil	
Estimated Quantity (M3)	400,000	
Laboratory Tests		
Test Types	Result	
Liquid Limit (LL) %:-	25	
Plasticity Index (PI) %:-	3	
Optimum Moisture content (OMC)%:-	11	
Maximum dry density (MDD)%:-	1.965	
CBR soaked at T-180:- 97%	62	
Linear Shrinkage (%)	3	
Swell (%):-	0.12	
ASHTO Soil class:-	A-2-4(0)	
Remark:-	Existing site	







Proposed Natural Granular Sources for Subbase and Borrow Fill
Kampala Southern Bypass Road Project

Source No.	NG-4
Km Station and Direction	Option 2, 6+500, LHS 300m
Geographic Coordinates	
Easting	459264
Northing	33322
Possible Application	Subbase, Borrow Fill
Material Type	Smooth topped ridge forming, reddish brown Laterite with quartz vein gravels
Over-burden (m)	Nil
Vegetation Cover	Nil
Estimated Quantity (M3)	600,000

Laboratory Tests

Test Types	Result
Liquid Limit (LL) %:-	20
Plasticity Index (PI) %:-	8
Optimum Moisture content (OMC)%:-	7
Maximum dry density (MDD)%:-	2.220
CBR soaked at T-180:- 97%	80
Linear Shrinkage (%)	4
Swell (%):-	0.09
ASHTO Soil class:-	A-2-4(0)
Remark:-	Existing site





Source No.	NG-5
Km Station and Direction	17+500, RHS 350m
Geographic Coordinates	
Easting	456055
Northing	26208
Possible Application	Subbase, Borrow Fill
Material Type	Smooth topped ridge forming, reddish brown Laterite with quartz vein gravels
Over-burden (m)	Nil
Vegetation Cover	Nil
Estimated Quantity (M3)	320,000

Laboratory Tests

Test Types	Result
Liquid Limit (LL) %:-	41
Plasticity Index (PI) %:-	19
Optimum Moisture content (OMC)%:-	12
Maximum dry density (MDD)%:-	2.015
CBR soaked at T-180:- 97%	44
Linear Shrinkage (%)	9
Swell (%):-	0.15
ASHTO Soil class:-	A-2-7(1)
Remark:-	Existing site



Possible Sources of Sand		
Kampala Southern Bypass Road Project		
Source No.	SA-1	
Station Location and Direction	0+000, LHS, ~46km, Northern shore of Lake Victoria at Katosi area	
Easting	478588	
Northing	17803	
Possible Application	Concrete and Mortar	
Material Type	Pinkish brown Gravelly SAND	
Estimated Quantity (M3)	Adequate	
Laboratory Tests		
Test Typs	Sample ID and Result	
	SA-1	
Soundness - %	2.1	
Organic color plate No.	3	
Sand Equivalent (%):-	79.5	
Clay/Silt Content (%)	6.2	
Remark: -	Laboratory test results of the Sand source have been refrenced from Kampala - Jinja Expressway, Station 19+600, RHS 26.6km, Northern shore of Lake Victoria at Katosi area	
Source No.	SA-1	
Station Location and Direction	1+000, LHS 5.2km, Bukassa Kisignii area	
Easting	465635	
Northing	35961	
Possible Application	Concrete, and Mortar	
Material Type	Light gray to Sugary medium grained SAND	
Estimated Quantity (M3)	adequate	
Laboratory Test Result		
Test Typs	Sample ID and Result	
	SA-1	
Soundness - %	0.5	
Organic color plate No.	1	
Sand Equivalent (%):-	87.9	
Clay/Silt Content (%)	1.4	
Remark: -	Laboratory test results of the Sand source have been refrenced from Kampala - Jinja Expressway, Station 10+100, LHS, Bukassa Kisignii area	

Hydrometer Results

KJE Mainline Section (Part 3: Geotechnical Report, Volume 3C: Borehole Investigations - ICS, 2015)

Date 1-Nov-14

[illegible]

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
	Firm, orange, 10-30° inclined, very narrowly to very thinly banded, slightly micaceous CLAY (Completely Weathered Mica Gneiss)	Split spoon	16.2 - 16.65		85	81		58	44	14	22	24	36	19	A-7-5 (10)	MH	2.759	27	
	Firm, orange, 10-30° inclined, very narrowly to very thinly banded, slightly micaceous CLAY (Completely Weathered Mica Gneiss)	Undisturbed	17.6 - 18.2	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.771	41	
	Stiff, greenish orange, 10-60° inclined, very narrowly to very thinly banded, micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	19.6 - 20.1	100	100	97	67	57	42	15	0	48	39	12	A-7-5 (11)	MH	2.812	46	
		Split spoon	21.5 - 22.0	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—		
	Stiff, greenish orange, 10-60° inclined, very narrowly to very thinly banded, micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	23.0 - 23.5	100	100	100	65	55	39	16	1	43	42	13	A-7-5 (11)	MH	2.806	41	
	Stiff, greenish orange, 10-60° inclined, very narrowly to very thinly banded, micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Soil core	23.73 - 240	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.780	35	
BH 302 KM 0+701	Stiff, reddish brown, CLAY with rare fine gneiss gravels (Residual Soil).	Split spoon	1.0 - 1.45	99	98	94	77	60	34	26	—	—	—	—	A-7-5 (18)	MH	—	23.0	
		Undisturbed	2.0 - 2.15	—	—	—	—				—	—	—	—	— — — —	—	2.780		
	Stiff, reddish brown, CLAY with rare fine gneiss gravels (Residual Soil).	Split spoon	2.15 - 2.6	100	100	96	78	65	34	31	—	—	—	—	A-7-5 (20)	MH	—	23.0	
	Stiff, reddish brown, CLAY with rare fine gneiss gravels (Residual Soil).	Split spoon	3.5 - 3.95	99	97	92	70	62	34	28	—	—	—	—	A-7-5 (18)	MH	—	22.0	
	Stiff, reddish brown, slightly gravelly CLAY (Residual Soil).	Split spoon	5.0 - 5.45	72	49	37	26	42	27	15	—	—	—	—	A-2-7 (1)	SC	—	11.0	
	Stiff, reddish brown, 30° inclined, very narrowly banded slightly micaceous CLAY (Completely Weathered Gneiss).	Split spoon	6.5 - 6.95	98	97	95	85	55	33	22	5	17	29	49	A-7-5 (16)	MH	2.857	27.0	
	Stiff, reddish brown, 30° inclined, very narrowly banded slightly micaceous CLAY (Completely Weathered Gneiss).	Undisturbed	8.0 - 8.2	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.912	25.2	
	Firm, pink brown, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Split spoon	9.6 - 10.05	100	100	99	85	59	40	19	0	27	32	41	A-7-5 (15)	MH	2.838	36.0	
	Firm, pink brown, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Undisturbed	11.0 - 11.5	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.856	33.8	
	stiff, pink brown, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Split spoon	13.0 - 13.45	100	100	98	82	65	42	23	2	36	32	31	A-7-5 (17)	MH	2.851	34.0	
	stiff, pink brown, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Undisturbed	14.0 - 14.7	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.830	30.5	
	Firm, pink brown, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Split spoon	14.7 - 15.15	100	100	99	80	58	38	20	0	35	35	30	A-7-5 (16)	MH	2.906	37.0	
	stiff, pink brown & brown orange, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Undisturbed	17.5 - 18.0	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	2.810	33.3	
	stiff, pink brown & brown orange, 10-30° inclined, very narrowly banded, micaceous CLAY (Completely Weathered Mica Gneiss)	Split spoon	19.55-2.0	100	100	99	64	57	39	18	0	49	33	18	A-7-5 (11)	MH	2.867	26.0	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 303 KM 0+941	Very soft, pink brown CLAY with occasional, angular, medium gneiss (Imported Fill)	Split spoon	1.0 - 1.45	49	38	28	16	—	—	—	—	—	—	—	—	—	—	8	
	Soft, pink brown, CLAY with angular, coarse, cobble and boulder size gneiss (Made Ground)	Split spoon	2.5 - 2.95	81	75	66	48	—	—	—	—	—	—	—	—	—	—	10	
	Stiff, reddish brown, Gravely CLAY (Residual Soil). Gravel, extremely weak to weak, very angular to subrounded, fine to medium gneiss & quartz	Split spoon	4.6 - 5.05	51	38	26	18	35	20	15	—	—	—	—	A-2-6 (0)	SC	—	13	
	Stiff, reddish brown, Gravely CLAY (Residual Soil). Gravel, extremely weak to weak, very angular to subrounded, fine to medium gneiss & quartz	Undisturbed	6.1 - 6.3	—	—	—	—	—	—	—	—	—	—	—	—	—	2.752	22	
	Firm, pink brown, 10-30° inclined, very narrowly banded slightly micaceous slightly Gravely Silty CLAY (Highly Weathered Mica Gneiss).	Split spoon	6.30 - 6.75	100	98	93	68	36	25	11	—	—	—	—	A-6 (7)	ML	—	21	
		Split spoon	7.50 - 7.95								—	—	—	—	A-6 (7)		—		
	Stiff, pink, 20-60° inclined, very narrowly banded micaceous Clayey SILT (Completely Weathered Mica Gneiss)	Split spoon	9.0 - 9.45	95	94	80	58	43	28	15	4	43	24	28	A-7-6 (7)	ML	2.724	19	
	Very stiff, pink, 20-60° inclined, very narrowly banded micaceous Clayey SILT (Completely Weathered Mica Gneiss)	Split spoon	12.25 - 12.7	100	100	96	64	35	24	11	0	47	34	19	A-6 (6)	ML - CL	2.728	18	
KM 1+579	Very soft, dark brown Silty CLAY with rare, extremely weak to very weak, angular, fine gneiss & numerous rootlets from 0.0-0.45m (Top Soil)	Split spoon	1.0 - 1.45	95	90	76	44	39	22	17	—	—	—	—	A-6 (4)	SC	—	23	
	Very soft, reddish brown, Silty CLAY with rare, extremely weak to very weak, angular to sub rounded, fine to medium gneiss (Residual Soil).	Undisturbed	2.0 - 2.55	100	99	88	56	43	25	18	—	—	—	—	A-7-6 (8)	CL	2.861	22	
		Split spoon	2.55 - 3.0								—	—	—	—	A-7-6 (8)		—		
	Soft, orange & pink, 10-60° inclined,very narrowly banded, friable,Sandy Silty CLAY (Completely Weathered Gneiss).	Split spoon	4.0 - 4.45	100	99	84	52	40	24	16	—	—	—	—	A-6 (6)	CL	—	25	
	Soft, orange & pink, 10-60° inclined,very narrowly banded, friable,Sandy Silty CLAY (Completely Weathered Gneiss).	Undisturbed	5.10 - 5.40	—	—	—	—	—	—	—	—	—	—	—	—	—	2.711	17	
	Stiff, orange & pink, 10-60° inclined,very narrowly banded, friable,Sandy Silty CLAY (Completely Weathered Gneiss).	Split spoon	5.40 - 5.85	100	100	80	50	41	22	19	—	—	—	—	A-7-6 (6)	CL	—	19	
	Medium dense, orange, 10-30° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)	Split spoon	7.0 - 7.45	99	98	78	58	—	—	—	—	—	—	—	—	—	—	23	
	Medium dense, orange, 10-30° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)	Undisturbed	8.60 - 8.75	—	—	—	—	—	—	—	—	—	—	—	—	—	2.727	19	
	Medium dense, orange, 10-30° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)	Split spoon	8.75 - 9.20	100	99	74	38	29	25	4	—	—	—	—	A-4 (1)	SC - SM	—	22	
		Split spoon	10.25 - 10.7					—	—	—	—	—	—	—					

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 304	Stiff, light gray and pink, 10-30° inclined, very narrowly banded, slightly Sandy Silty CLAY (Completely Weathered Gneiss)	Split spoon	11.6 - 12.05	100	99	89	71	46	24	22	—	—	—	—	A-7-6 (13)	CL	—	24	
	Stiff, light gray and pink, 10-30° inclined, very narrowly banded, slightly Sandy Silty CLAY (Completely Weathered Gneiss)	Undisturbed	12.5 - 12.85	—	—	—	—	—	—	—	—	—	—	—	— - - -	—	2.588	24	
	Stiff, light gray and pink, 10-30° inclined, very narrowly banded, slightly Sandy Silty CLAY (Completely Weathered Gneiss)	Split spoon	12.85 - 13.3	100	99	87	68	45	23	22	—	—	—	—	A-7-6 (12)	CL	—	23	
	Stiff, light gray and pink, 10-30° inclined, very narrowly banded, slightly Sandy Silty CLAY (Completely Weathered Gneiss)	Soil core	13.7 - 13.9	—	—	—	—	—	—	—	—	—	—	—	— - - -	—	2.622	22	
	Medium dense, orange, 10-60° inclined, friable, very narrowly to narrowly banded, Silty SAND (Completely Weathered Granitic Gneiss)	Split spoon	14.55 - 15.0	100	98	73	53	33	24	9	3	49	29	19	A-4 (4)	CL - ML	2.653	19	
	Dense, grey, 10-60° inclined, friable, narrowly banded, slightly micaceous Silty SAND (Completely Weathered Mica Gneiss)	Split spoon	16.55 - 17												A-4 (4)				
	Very dense, grey, 10-60° inclined, friable, narrowly banded,slightly micaceous Silty SAND (Completely Weathered Mica Gneiss)	Split spoon	18.5 18.95												A-4 (4)				
BH 305	Soft, light gray, CLAY	core box	0.60 - 1.40	85	84	73	56	50	24	26	10	32	24	34	A-7-6 (12)	CL - CH	2.619	10	
	Firm, light brown, Sandy SILT	Split spoon	3.0- 3.45	100	98	68	35	38	24	14	1.96	67.3	14	17	A-2-6 (1)	SC	2.72	22	
	Firm, light brown, Sandy SILT	core box	3.7 - 3.85					—	—	—					— - - -			—	
	Stiff, light brown, Sandy SILT	Split spoon	4.4 - 4.85					—	—	—					— - - -			—	
	Stiff, light brown, Sandy SILT	Split spoon	5.0 - 5.45					—	—	—					— - - -			—	
	Medium dense, yellowish gray, Silty SAND (very weak rock)	Split spoon	7.1 - 7.55					97	93	74					37			33	23	10	1	62	17	20	A-4 ( 0 )	SC	2.663	18
	Dense, yellowish gray, Silty SAND (very weak rock)	Split spoon	8.6 - 9.05	100	98	80	41	36	25	12	1	57	21	22	A-6 (2)	SC	2.828	20	
	Very dense, yellowish gray, Silty SAND (moderately weathered very weak Gneiss)	Split spoon	10.0 - 10.32					—	—	—					— - - -	—			
	Very dense, yellowish gray, Silty SAND (moderately weathered very weak Gneiss)	Split spoon	11.5 - 11.77					99	89	44					16	33		31	2
	Very dense, yellow & orange, Sandy SILT (moderately weathered very weak Gneiss)	core box	19.6 - 19.75	—	—	—	—	—	—	—	0	64	16	20	— - - -	SC	2.743	—	
	Very dense, yellow & orange, Sandy SILT (moderately weathered very weak Gneiss)	Split spoon	20.3 - 20.8	100	100	85	48	42	29	13					A-7-6 (4)			—	
	Very soft, reddish brown slightly Gravelly CLAY (Made Ground)	Split spoon	1.0 - 1.45	54	40	31	17	—	—	—	—	—	—	—	— - - -	—	—	29.0	
	Very soft, reddish brown slightly Gravelly CLAY (Made Ground)	Undisturbed	2.0 - 2.65	—	—	—	—	—	—	—	—	—	—	—	— - - -	—	2.618	23.4	

[illegible]

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH-308 km 3+060	Very soft, light to dark gray, CLAY with occasional angular to subrounded, coarse Gravel (ALLUVIUM)	Split Spoon	5.00 - 5.45	88	83	62	51	52	22	30	—	—	—	—	A-2-7 (12)	CH	—	—	
	Intermixed, light brown, light gray & light green, firm, CLAY and coarse gravel size pockets of stiff, orange brown, SILT (Residual Soil)	Undisturbed	9.20 - 9.70	100	98	96	62	55	31	24	1	40	27	33	A-7-5 (13)	MH	2.795	—	
	Firm, light green with gray and orange mottling, Silty CLAY	Undisturbed	10.70 - 11.00	100	99	97	69	67	43	24	—	—	—	—	A-2-7 (16)	MH	—	—	
	Firm, light green with gray and orange mottling, Silty CLAY	Split Spoon	11.00 - 11.45	100	100	98	72	60	38	22	0	40	24	36	A-7-5 (16)	MH	2.700	47	
		Split Spoon	12.40 - 12.85	100	100	98	72								A-2-7 (7)	—		—	
BH 309 KM 3+526	Very soft, reddish brown Sandy Clayey SILT with occasional gneiss & quartz gravels (Made Ground)	Split spoon	1.0 - 1.45	93	90	70	36	—	—	—	—	—	—	—	—	—	—	25	
	Stiff, grey & orange, Clayey Sandy SILT with occasional angular, weak, medium to coarse quartz gravels (Alluvium)	Undisturbed	2.0 - 2.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17	
	Firm, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	5.5 - 5.95	97	90	69	49	46	24	22	13	38	23	26	A-7-6 (7)	SC	2.716	22	
	Firm, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Undisturbed	6.60 - 7.40	—	—	—	—	—	—	—	—	—	—	—	—	—	2.746	45	
	Firm, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	7.40 - 7.85	100	99	95	78	73	41	32	1	31	45	24	A-7-5 (20)	MH	2.640	46	
	Stiff, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	9.0 - 9.45	98	95	87	65	73	36	37	—	—	—	—	A-7-5 (17)	MH	—	36	
	Stiff, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Undisturbed	10.5 - 11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	2.684	44	
	Stiff, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	11.0 - 11.45	91	86	73	45	59	33	26	13	46	26	15	A-7-5 (8)	SC	2.737	30	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %				
	Stiff, pink & light grey, 10-30°, inclined, very narrowly to narrowly banded, slightly micaceous Silty CLAY (Completely Weathered Mica Gneiss)	Split spoon	14.0 - 14.45	100	99	95	68	61	36	25	3	43	35	18	A-7-5 (16)	MH	2.659	44
		Split spoon	15.5 - 15.95												A-7-5 (16)			
	Very stiff, greenish grey, 5-10° inclined, extremely narrowly to very narrowly banded, micaceous Clayey SILT (Completely Weathered Mica Gneiss)	Split spoon	17.5 - 17.95	100	98	81	40	51	34	17	2	62	26	10	A-7-5 (3)	SC	2.812	30
	Very stiff, greenish grey, 5-10° inclined, extremely narrowly to very narrowly banded, micaceous Clayey SILT (Completely Weathered Mica Gneiss)	Split spoon	19.55 - 19.7	98	93	83	49	62	36	26	7	47	32	14	A-7-5 (10)	SC	2.784	15
BH 310 KM 3+526	Soft, reddish brown, micaceous CLAY (made ground)	Split Spoon	1.5 - 2.10	95	87	71	55	42	28	14	—	—	—	—	A-7-6 (6)	ML	—	15
	Very soft, orange brown, slightly Sandy CLAY with occasional angular Quartz Gravel (made Ground)	Split Spoon	2.7 - 3.3	93	83	68	55	44	31	14	—	—	—	—	A-7-5 (6)	ML	—	30
	Very soft, orange brown, slightly Sandy CLAY with occasional very thin light yellow bands (Made Ground)	Split Spoon	4.5 - 4.9	88	80	75	64	53	28	25	—	—	—	—	A-7-6 (14)	CH	—	26
	Very soft, orange brown, slightly Sandy CLAY with occasional very thin light yellow bands (Made Ground)	Split Spoon	4.9 - 5.5												A-7-6 (14)	CH	—	
	Firm, dark gray, CLAY with very thin to thin bands of medium grained, light gray, slightly silty sand (Alluvium)	Split Spoon	6.3 - 6.85	98	97	80	48	36	19	17	3	55	24	18	A-6 (5)	SC	2.604	19
	Firm, dark gray, CLAY with very thin to thin bands of medium grained, light gray, slightly silty sand (Alluvium)	Core box	7.0 - 7.25					—	—	—					— - - -	—		—
	Interbanded, Stiff, very thin occasionally thin, very closely spaced bands of orange brown & light gray, micaceous, very Sandy CLAY AND brown, extremely thin, micaceous, slightly Sandy CLAY (Residual Soil)	Undisturbed	9.3 - 9.6	100	99	68	40	39	28	11	—	—	—	—	A-6 (1)	SC	—	—
	Interbanded, Stiff, very thin occasionally thin, very closely spaced bands of orange brown & light gray, micaceous, very Sandy CLAY AND brown, extremely thin, micaceous, slightly Sandy CLAY (Residual Soil)	Split Spoon	12.35 - 12.8	100	99	70	41	—	—	—	1	59	27	12	— - - -	—	2.635	—
		Split Spoon	13.8 - 14.25					—	—	—					— - - -	—		—
		Soil core	14.4 - 14.65					33	28	5					A-4 (1)	SM - SC		—
		Split Spoon	15.35 - 15.8					—	—	—					— - - -	—		—
		Split Spoon	17.0 - 17.45					—	—	—					— - - -	—		—
	Interbanded, Stiff, very thin occasionally thin, very closely spaced bands of orange brown & light gray, micaceous, very Sandy CLAY AND brown, extremely thin, micaceous, slightly Sandy CLAY (Residual Soil)	Soil core	18.07 - 18.35	100	98	66	39	33	24	9	—	—	—	—	A-4 (1)	SC	—	—
	Very soft, light gray with orange brown mottling, silty CLAY	Split spoon	1.5 - 1.95	100	99	91	68	—	—	—	1	48	21	30	— - - -	—	2.688	24
	Firm, orange brown with light gray mottling, CLAY (Alluvium)	Core box	2.5 - 3.0	100	100	89	65	41	21	20	—	—	—	—	A-7-6 (10)	CL	—	20
	Firm to stiff, orange brown with occasional light gray mottling, CLAY with occasional fine to medium grained, subrounded gravel (Residual Soil)	Core box	4.1 - 4.5	98	94	79	63	40	23	17	—	—	—	—	A-6 (8)	CL	—	14

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 311 KM 3+754	Very dense, orange brown, slightly silty fine to medium SAND with closely spaced very thin to thin subhorizontal bands of light gray very sandy CLAY (Moderately weathered Gneiss)	Split spoon	4.9 - 5.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15
	Vey dense, orange brown, fine to medium SAND (Moderately weathered mica Schist)	Split spoon	6.4 - 6.65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
	Interbanded, extremely weak, fine grained, 20-30° inclined orange brown & pink schistose banding, mica SCHIST AND firm, very closely to closely spaced, very thin, subhorizontal bands of pink brown CLAY (Moderately weathered mica Schist). Partly recovered as brown and white fine sand size mica.	Core box	12.8 - 13.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23
BH 312 KM 5+311	Very soft, dark gray with orange brown mottling, CLAY with occasional rootlets (Alluvium)	Undisturbed	1.5 - 2.3	100	100	95	77	64	19	45	0	34	20	46	A-7-6 (20)	CH	2.674	33	
	Extremely thinly, 30-40° inclined interbanded, stiff, orange brown, light green and light gray CLAY with occasional rootlets (Residual Soil)	Undisturbed	4.5 - 5.2	100	99	91	62	41	23	18	1	42	25	31	A-7-6 (9)	CH	2.905	25	
	Extremely thin to thinly interbanded, stiff, 20-40° inclined, orange brown, micaceous, CLAY AND stiff, light gray CLAY (Completely weathered Gneiss)	Undisturbed	8.0 - 8.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29	
	Extremely thin to thinly interbanded, stiff, 20-40° inclined, orange brown, micaceous, CLAY AND stiff, light gray CLAY (Completely weathered Gneiss)	Soil Core sub Sample	9.3 - 9.6	100	97	73	54	45	32	13	3	49	25	24	A-7-5 (5)	ML	2.694	23	
	Stiff, light gray and pink brown, 10-30° inclined, extremely thinly banded, micaceous slightly sandy CLAY (Completeley Weathered Gneiss)	Split spoon	10.25 - 10.7	100	98	65	41	37	28	9	—	—	—	—	A-4 (1)	SC	—	23	
	Stiff, brown and light gray, micaceous CLAY with occasional extremely thin 30° inclined, orange brown clay band (Completely Weathered Gneiss)	Undisturbed (Denison)	14.0 - 14.7	100	99	76	43	39	30	9	0	67	25	7	A-4 (2)	SC	2.726	20	
	Stiff, brown and light gray, micaceous CLAY with occasional extremely thin 30° inclined, orange brown clay band (Completely Weathered Gneiss)	Soil Core sub Sample	18.1 - 18.33	100	97	70	41	38	29	9	—	—	—	—	A-4 (1)	SC	—	16	
	Soft, dark gray, CLAY (Alluvium)	Undisturbed	1.35 - 2.35	100	100	74	52	50	20	30	—	—	—	—	A-7-6 (12)	CL - SC	—	20	
	Stiff, dark gray with orange brown mottling CLAY (Residual Soil)	Split spoon	3.5 - 3.95	100	100	74	35	—	—	—	1	71	13	14	—	—	—	2.734	—
	Stiff, brown and orange brown, very sandy CLAY with stiff, very closely spaced, extremely thinly to thinly, subhorizontally banded, light gray, slightly sandy clay (Residual Soil)	Undisturbed	4.5 - 5.0	96	93	53	30	31	15	16	—	—	—	—	A-2-6 (1)	SC	—	11	
	Stiff, light gray and brown CLAY (Completely weathered Gneiss)	Split spoon	6.5 - 6.7	100	99	83	61	48	20	28	—	—	—	—	A-7-6 (13)	CL	—	22	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 313 KM 5+952	White, coarse sand and fine to coarse angular quartz gravel in some light gray clay matrix (Moderately weathered Quartzite)	Split spoon	6.7 - 6.95	54	44	29	19	—	—	—	66	22	11	1	— — — —	—	2.707	—	
	Extremely thinly to very thinly, 20-30° inclined, interbanded, firm to stiff, orange brown, micaceous CLAY AND firm to stiff, dark gray, micaceous CLAY with rare extremely thin (10mm) subhorizontal bands of angular, medium to coarse quartz gravel (Completely weathered Gneiss)	Undisturbed	8.5 - 8.85	87	84	61	37	39	30	9	10	54	22	13	A-4 (0)	SC	2.721	21	
	Very thinly subhorizontally, interbanded, stiff, orange with reddish brown mottling CLAY AND stiff, light green and light gray CLAY (Completely Weathered Gneiss)	Undisturbed (Denison)	11.0 - 12.0	100	98	82	46	51	32	19	3	56	17	22	A-7-5 (6)	SC	2.809	23	
	Extremely thinly to very thinly subhorizontally interbanded, stiff, dark gray, micaceous CLAY AND white, angular, fine to medium quartz gravel (Completely weathered Gneiss with quartz vein)	Split spoon	12.0 - 12.45	94	87	70	39	36	30	6	12	53	27	8	A-4 (1)	SM - SC	2.732	44	
13.1 - 13.2	—		—					—	— — — —	—					—				
BH 314 KM 6+497	soft, dark gray with orange brown mottling CLAY (Alluvium)	Split Spoon	1.0 - 1.45	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	27	
	Soft to firm, dark gray with orange brown mottling CLAY with occasional, rootlets (Alluvium)	Undisturbed	2.0 - 2.35	100	100	97	86	58	21	37	0	18	24	58	A-7-6 (20)	CH	2.726	29	
	Very thinly 40-50° inclind, interbanded, firm orange brown CLAY AND light gray, CLAY (Residual soil)	Split Spoon	3.5 - 3.95	100	99	89	68	52	20	32	0	37	24	39	A-7-6 (17)	CH	2.637	23	
	Very thinly, 20-40° inclined interbanded, firm, orange brown, CLAY AND firm light gray, CLAY (Residual Soil)	Undisturbed	4.5 - 5.0	98	97	69	39	34	15	19	1	62	11	26	A-6 (3)	SC	2.806	17	
	Extremely weak, medium grained, extremely thinly 20-30° inclined, foliated, orange brown and light gray, GNEISS with rare angular, coarse gravel size, very weak, corestones of Gneiss and occasional extremely thin, light gray, and brown, 30° inclined Clay bands (Moderately Weathered Gneiss)	Core box	7.1 - 7.25	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	12	
	Firm, orange brown with light gray mottling, CLAY (Residual Soil)	Undisturbed	2.0 - 2.5	100	99	93	73	49	26	23	—	—	—	—	A-7-6 (15)	CL	—	29	
	Stiff, reddish brown with light gray and orange brown mottling CLAY with occasional coarse angular quartz gravel and medium gravel size, rounded, very weak, gneiss corestone (Residual Soil)	Split spoon	2.5 - 2.95	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	17	
	Stiff, reddish brown with orange brown mottling CLAY with occasional, medium to coarse gravel size, pockets of firm, light gray Clay and rare angular, medium gravel size, corestones of very weak gneiss and angular coarse gravel size quartz (Residual Soil)	Undisturbed	4.5 - 4.9	100	97	90	73	41	24	17	3	39	25	34	A-7-6 (11)	CL	2.855	24	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 315 KM 6+699	Stiff, orange brown, 10-20° inclined, extremely thinly banded CLAY with occasional, 10-20° inclined, extreme thin bands of reddish brown and light gray clay (Completely Weathered Gneiss)	Split spoon	6.5 - 6.95	—	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	28
	Stiff, orange brown, 10-20° inclined, extremely thinly banded CLAY with occasional, 10-20° inclined, extreme thin bands of reddish brown and light gray clay (Completely Weathered Gneiss)	Undisturbed	7.5 - 8	100	100	91	60	51	38	13	—	—	—	—	A-7-5 (8)	MH	—	28	
	Firm, reddish to light brown, 10-20° inclined, extremely thinly banded CLAY with rare, 10-20° inclined, extremely thin bands of light gray clay (Completely Weathered Gneiss)	Split spoon	8.0 - 8.45	100	98	87	63	40	24	16	—	—	—	—	A-6 (8)	CL	—	25	
	Firm to stiff, orange brown, pink brown and light to dark gray, 10-20 inclined, extremely thinly banded CLAY with occasional angular medium gravel size quartz (Completely Weathered Gneiss)	Undisturbed	9.9 - 10.4	92	88	71	52	40	27	13	—	—	—	—	A-6 (5)	ML	—	20	
	Stiff, orange brown, light yellow and pink brown, 10-20° inclined, extremely thinly banded, CLAY (Compleley Weathered Gneiss)	Split spoon	12.0 - 12.45	100	99	90	51	44	35	9	2	53	25	20	A-5 (4)	ML	2.669	29	
	Stiff, orange brown and light gray, 10-20° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered GneiSS)	Split spoon	13.5 - 13.95					—	—	—					— — — —	—		—	
	Stiff, light to dark gray, white and orange brown, 10-20° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered GneiSS)	Split spoon	15.35 - 15.8	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	26		
	Interbanded, stiff to very stiff, light to dark gray, 10-20° inclined, very thin, micaceous CLAY AND brown, 10° inclined, extremly thin, CLAY with occasional, extremely weak, orange brown, 30-40° inclined, extremely thin, bands and angular coarse gravel size corestones of Gneiss (Highly Weathered Gneiss)	Undisturbed	16.0 - 16.3	99	97	72	50	43	34	9	—	—	—	—	A-5 (3)	ML	—	23	
BH 316 KM 0+200	Firm, reddish brown with black mottling, CLAY with occasional medium grained, angular to subrounded, quartz gravel (Embankment	Split Spoon	1.0 - 1.45	91	89	75	56	42	23	19	—	—	—	—	A-7-6 (8)	CL	—	20	
	Soft, brown and dark brown, CLAY with some fine to medium grained, angular quartz gravel (Alluvium)	Split Spoon	2.5 - 2.95	93	88	71	49	41	22	19	—	—	—	—	A-7-6 (6)	SC	—	18	
	Firm, reddish brown, CLAY & dark gray with light green mottling, slightly sandy CLAY (Alluvium)	Undisturbed	3.5 - 4.5	100	100	83	45	22	16	6	—	—	—	—	A-4 (2)	SM - SC	—	—	
	Stiff, orange brown with light gray and light green mottling, CLAY with occasional coarse, angular quartz gravel (Residual Soil)	Split Spoon	5.5 - 5.95	80	74	52	35	35	19	16	—	—	—	—	A-2-6 (1)	SC	—	18	
	Interbanded, Stiff, light gray with light green mottling CLAY AND orange brown CLAY with occasional medium to coarse grained, angular quartz gravel (Residual Soil)	Core box	6.2 - 6.4	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	10	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
	Extremely weak, orange brown and pink banded, GNEISS (Moderately Weathered Gneiss). Friable to medium to coarse sand.	Split Spoon	7.4 - 7.85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15
BH 317 KM 0+240	Loose, gray, fine to medium, SAND with occasional rootlets (Alluvium)	Split spoon	1.0 - 1.45	100	100	71	30	—	—	—	—	—	—	—	—	—	—	—	15
	Interbanded, 30-50° inclined, Stiff, very thin, light gray, slightly sandy CLAY AND orange brown, extremely thin to thin, CLAY (Completely weathered Gneiss)	Undisturbed	2.0 - 2.8	98	90	61	36	30	15	15	9	57	15	19	A-6 (1)	SC	2.696	—	
	Interbanded, 30-50° inclined, Stiff, very thin, light gray, slightly sandy CLAY AND orange brown, extremely thin to thin, CLAY (Completely weathered Gneiss)	Undisturbed	4.0 - 4.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	
	Interbanded, 30-50° inclined, Stiff, very thin, light gray, slightly sandy CLAY AND orange brown, extremely thin to thin, CLAY (Completely weathered Gneiss)	Soil core	5.0 - 5.3	100	98	88	69	44	23	21	—	—	—	—	A-7-6 (12)	CL	—	—	
	Stiff, orange brown, 30-45° inclined, extremely closely spaced, extremely thinly banded, slightly sandy, micaceous CLAY with occasional firm, light gray, very thin to thinly subhorizontally banded CLAY with rare angular medium gravel size corestones of gneiss (Highly Weathered Gneiss)	Undisturbed	6.5 - 7.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Stiff, orange brown, 30-45° inclined, extremely closely spaced, extremely thinly banded, slightly sandy, micaceous CLAY with occasional firm, light gray, very thin to thinly subhorizontally banded CLAY with rare angular medium gravel size corestones of gneiss (Highly Weathered Gneiss)	Undisturbed	8.5 - 9.2	100	100	79	43	39	32	7	0	65	30	5	A-4 (2)	SM - SC	2.693	25	
	Stiff,orange brown, dark and light gray, 20-30° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely weathered Gneiss)	Split spoon	9.2 - 9.65	100	99	73	43	39	31	8	—	—	—	—	A-4 (2)	SC	—	27	
	Very thinly to thinly subhorizontally interbanded, extremely weak, white and orange brown, 10-20° inclined foliated, GNEISS AND firm, brown CLAY (Moderately Weathered Gneiss)	Soil core	12.0 - 12.2	100	100	74	37	43	37	6	—	—	—	—	A-5 (0)	SM- SC	—	—	
8 KM 0+475	Soft, light and dark gray, CLAY with apiece of plastic bag (Alluvium)	Split spoon	1.0 - 1.45	99	93	72	37	23	17	6	—	—	—	—	A-4 (0)	SM - SC	—	12	
	Very soft, light brown, CLAY (Alluvium)	Undisturbed	2.0 - 3	100	94	69	63	51	29	22	—	—	—	—	A-7-6 (12)	MH	—	—	
	Very soft, light and dark gray, CLAY (Alluvium)	Split spoon	3.0 - 3.45	100	100	93	62	32	21	11	—	—	—	—	A-6 (6)	CL	—	25	
	Stiff, light and dark gray, slightly quartz gravely slightly sandy CLAY (Alluvium)	Split spoon	4.5 - 4.95	90	81	48	26	36	15	21	—	—	—	—	A-2-6 (1)	SC	—	12	
	Firm, light gray and light green, micaceous CLAY with rare rootlets (Residual Soil)	Undisturbed	6.0 - 6.5	99	96	82	47	52	34	18	4	54	20	22	A-7-5 (6)	SC	2.743	—	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 31	Firm to stiff, light gray, dark gray and orange brown, extremely closely spaced, extremely thin, 20-30° inclined banded, micaceous CLAY (Highly weathered Gneiss)	Undisturbed	9.0 - 9.4	100	97	73	29	35	30	5	—	—	—	—	A-2-4 (0)	SM- SC	—	—	
	Extremely weak, medium grained, white and dark gray, 20-30° inclined, extremely thinly foliated GNEISS with occasional firm, extremely thin bands of brown clay and occasional angular coarse gravel size corestones (Moderately Weathered Gneiss)	Undisturbed, Denison	12 - 12.8	100	93	56	21	34	31	4	—	—	—	—	A-2-4 (0)	SM	—	19	
BH 319 KM 1+853	Interbanded, Very soft, 20-40° inclined, very thin, light gray, slightly sandy CLAY AND very soft, orange brown, 20-40° inclined, extremely thin, CLAY (Residual Soil)	Split Spoon	1.0 - 1.45	100	100	86	48	—	—	—	0	60	18	22	— — — —	—	2.634	—	
	Interbanded, Very soft, 20-40° inclined, very thin, light gray, slightly sandy CLAY AND very soft, orange brown, 20-40° inclined, extremely thin, CLAY (Residual Soil)	Undisturbed	2.0 - 2.75					26	16	10					A-4 (3)	SC			12
	Interbanded, Stiff, 20-40° inclined, very thin, light gray, slightly sandy CLAY AND stiff, orange brown, 20-40° inclined, extremely thin, CLAY (Residual Soil)	Split Spoon	2.7 - 3.2	100	100	82	43	28	14	14	—	—	—	—	A-6 (3)	SC	—	14	
	Interbanded, Stiff, 20-30° inclined, very thin, orang brown, CLAY AND stiff, light gray, 20-30° inclined, extremely thin, CLAY (Residual Soil)	Split Spoon	4.0 - 4.45	100	99	87	58	—	—	—	0	50	21	29	— — — —	—	2.603	—	
	Interbanded, Stiff, 20-30° inclined, very thin, orang brown, CLAY AND stiff, light gray, 20° inclined, extremely thin, CLAY (Residual Soil)	Undisturbed	5.0 - 5.35					40	19	21					A-6 (9)	CL			18
	Extremely thinly to vey thinly, 10-20° inclined, interbanded, brown, orange brown and light gray CLAY (Completely Weathered Gneiss)	Undisturbed	8.3 - 8.65	97	90	74	47	34	25	9	—	—	—	—	A-4 (2)	SC	—	23	
	Extremely thinly to thinly, 10-20° inclined, interbanded, firm, brown, orange brown and light gray CLAY (Completely Weathered Gneiss)	Split Spoon	10.0 - 10.45	100	100	84	49	—	—	—	2	53	20	25	— — — —	—	2.639	33	
	Extremely thinly to vey thinly, 10-20° inclined, interbanded, brown, orange brown and light gray CLAY (Completely Weathered Gneiss)	oil core sub sample	10.6 - 10.9	98	96	87	52	40	24	16	—	—	—	—	A-6 (6)	CL	—	30	
	Very soft, light and dark gray, very quartz gravely CLAY (Residual Soil). Gravel angular fine to coarse grained	split spoon	1.0 - 1.45	58	50	37	27	40	21	19	61	20	13	6	A-2-6 (1)	SC	2.802	20	
		split spoon	1.6 - 2.5	54	38	31	24	—	—	—	64	19	14	3	— — — —	—	2.804	—	
	Firm, orange brown and reddish brown CLAY with occasional, firm, 40° inclined, very closely spaced, extremely thin, light gray, CLAY (Completely Weathered Gneiss)	split spoon	2.75 - 3.2	100	97	92	74	51	30	21	—	—	—	—	A-7-5 (14)	MH	—	34	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 320 KM 2+595	Firm, orange brown and reddish brown, 20-30° inclined, extremely closely spaced, extremely thinly banded CLAY with occasional, firm, 20-40° inclined, very closely spaced, extremely thin, bands of light gray CLAY (Completely Weathered Gneiss)	undisturbed	3.75 - 4.2	100	99	95	79	46	28	18	3	40	26	31	A-7-6 (12)	ML	2.837	31	
	Stiff, reddish brown, 20-30° inclined, extremely closely spaced, extremely thinly banded CLAY with occasional, stiff, 20 inclined, extremely closely to very closely spaced, extremely thin, bands of orange brown and light gray CLAY (Completely Weathered Gneiss)	undisturbed	10.0 - 10.2	100	93	74	49	42	29	13	28	39	13	19	A-7-6 (4)	SC	2.808	20	
	Stiff, reddish brown, 20-30° inclined, extremely closely spaced, extremely thinly banded CLAY with occasional, stiff, 20 inclined, extremely closely to very closely spaced, extremely thin, bands of orange brown and light gray CLAY (Completely Weathered Gneiss)	split spoon	10.2 - 10.65	100	98	89	65	46	34	12	1	41	27	31	A-7-5 (8)	ML	2.714	30	
	Very Stiff, reddish brown, 20-30° inclined, extremely closely spaced, extremely thinly, banded CLAY with 30° inclined, extremely thin, light gray and orange brown, bands of clay and orange brown stained vertical tight joint (Completely Weathered Gneiss)	split spoon	11.5 - 11.95					—	—	—					— — — —	—		—	
	Very Stiff, reddish brown, orange brown and dark gray, 30° inclined, extremely closely spaced, extremely thinly, banded CLAY with 10° inclined, extremely thin (20mm), white, fine to coarse sand size quartz band (Completely Weathered Gneiss)	split spoon	14.5 - 14.95	100	98	80	56	51	35	16	1	51	22	26	A-7-5 (8)	MH	2.749	25	
			15.5 - 15.95												A-7-5 (8)	MH			
	Very stiff, yellowish brown, 10-20° inclined, extremely thinly banded, slightly sandy CLAY (Completely Weathered Gneiss)	split spoon	17 - 17.45	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	17	
	Very stiff, reddish brown and light brown, 10-20° inclined, extremely thinly banded CLAY with occasional, extremely weak, subrounded, light gray, medium gravel size corestones of gneiss in the clay matrix (Highly Weathered Gneiss)	Soil Core	19.5 - 19.8	100	100	85	63	51	33	18	—	—	—	—	A-7-5 (10)	MH	—		
11 KM 7+053	Stiff, light to reddish brown CLAY (Residual Soil)	Split spoon	1.0 - 1.45	99	95	89	72	63	31	32	9	19	30	42	A-7-5 (19)	CH	2.926	21	
	Stiff, light to reddish brown, 20-30° inclined, extremely thinly banded, CLAY with very rare angular, coarse gravel size corestones of very weak gneiss (Highly Weathered Gneiss)	Undisturbed	2.35 - 2.65	98	89	79	63	42	27	15	—	—	—	—	A-7-6 (8)	ML	—	27	
	Soft to firm, reddish brown and light green, 10-20° inclined, extremely thinly banded CLAY with occasional extremely weak, angular coarse gravel size corestones of gneiss (Highly Weathered Gneiss)	Undisturbed	5.0 - 5.8	100	98	91	58	30	22	8	4	50	29	17	A-4 (5)	CL	2.982	17	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %				
BH 32	Soft to firm, reddish brown and light green, 10-20° inclined, extremely thinly banded CLAY with occasional extremely weak, angular coarse gravel size corestones of gneiss (Highly Weathered Gneiss)	Undisturbed	8.5 - 9.15	100	99	83	41	38	27	11	1	57	29	13	A-6 (1)	sc	2.876	15
	Extremely weak, light to dark gray, 10-20° inclined, extremely thinly foliated, GNEISS (Moderately weathered Gneiss)	Split spoon	12.0- 12.45	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	8
BH 322 KM 8+288	Extremely thinly to very thinly, 20-30° inclined, interbanded, stiff, orange brown and light gray CLAY (Residual Soil)	Undisturbed	1.2 - 1.7	99	98	91	70	55	25	30	—	—	—	—	A-7-6 (18)	CH	—	29
	Very stiff, light to reddish brown CLAY with occasional 30-40° inclined, extremely thin light gray CLAY with very rare subrounded, medium gravel size weak fragments of gneiss (Highly weathered Gneiss)	Split spoon	3.0 - 3.45	84	71	61	45	34	21	13	38	27	13	23	A-6 (3)	SC	2.756	22
	Extremely weak to weak, brown and dark gray, subrounded, fine to medium gravel size gneiss fragments in much brown clay matrix with rare medium to coarse angular quartz gravel (Highly Weathered gneiss)	Split spoon	3.7 - 4.15					—	—	—					— — — —	—		—
	Firm, light to reddish brown, CLAY with firm, light gray, 30-40° inclined, very closely spaced, extremely thin bands of clay (Completely Weathered Gneiss)	Undisturbed	5.3 - 5.75	100	100	97	83	56	25	31	0	24	33	42	A-7-6 (19)	CH	2.804	30
	Firm, white, light yellow and light green 20-40° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	Undisturbed	8.5 - 9.5	100	100	76	46	47	38	9	—	—	—	—	A-5 (3)	SC	—	29
	Stiff, white, light yellow and light green 20-40° inclined, extremely thinly banded, micaceous CLAY with rare angular coarse quartz gravel (Completely Weathered Gneiss)	Split spoon	11.0 - 11.45	90	89	71	45	44	32	12	22	43	20	16	A-7-5 (3)	SC	2.679	30
	Stiff, white, light yellow and light green 20-40° inclined, extremely thinly banded, micaceous CLAY with rare angular coarse quartz gravel (Completely Weathered Gneiss)	Undisturbed	12.5 - 12.8	100	99	76	41	49	35	14	2	56	25	17	A-7-5 (3)	SC	2.697	37
	Stiff, white, light yellow and light green 20-40° inclined, extremely thinly banded, micaceous CLAY with rare angular coarse quartz gravel (Completely Weathered Gneiss)	core box	15.0 - 15.45	100	98	76	45	41	28	13	—	—	—	—	A-7-6 (3)	SC	—	29
	Extremely thinly to very thinly, 20-30 inclined interbanded, stiff, light green CLAY AND extremely weak, friable, white with light green mottling GNEISS (Highly to Moderately Weathered Gneiss)	soil core	17.6 - 17.9	100	95	60	36	40	30	10	—	—	—	—	A-4 (0)	SC	—	20
	Stiff, reddish brown, angular, medium (quartz) gravelly CLAY	Split Spoon	2.3 - 2.75	98	81	61	44	44	24	20	25	50	11	14	A-7-6 (5)	SC	2.726	22
	Stiff, reddish brown, (quartz) gravelly CLAY (Residual Soil). Gravel angular, fine to medium	Split Spoon	3.4 - 3.85					—	—	—					— — — —	—		—
	Firm, reddish brown, angular, slightly fine (quartz) gravelly CLAY (Residual Soil)	Undisturbed	5.0 - 5.3	91	72	57	44	47	24	23	33	29	14	24	A-7-6 (6)	SC	2.707	14

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 323 KM 8+610	Firm, pink brown, 20-30° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Mica Schist)	Split Spoon	6.7 - 7.15					—	—	—					—	—	—	—	24
	Firm, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded micaceous CLAY with rare 20° inclined, extremely thin bands of light gray firm clay (Completely Weathered Mica Schist)	Undisturbed	8.0 - 8.5	100	99	84	58	53	36	17	2	42	26	30	A-7-5 (9)	MH	2.808	21	
	Stiff, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded micaceous CLAY (Completely Weathered Mica Schist)	Undisturbed	11.0 - 11.3	100	99	84	59	48	37	11	0	47	39	15	A-7-5 (6)	ML	2.773	22	
	Soft, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, micaceous CLAY (Completely Weathered Mica Schist)	Split Spoon	13.0 - 13.45	100	99	89	56	50	35	15	—	—	—	—	A-7-5 (7)	ML - MH	—	28	
	Firm, pink brown with orange brown mottling, 20-30° inclined, extremely thin banded, micaceous CLAY (Completely Weathered Mica Schist)	Undisturbed	14.0 - 14.55	100	99	86	58	49	34	15	0	46	30	24	A-7-5 (8)	ML	2.777	31	
	Stiff, light yellow & light gray, 20° inclined, extremely thin banded, micaceous CLAY (Completely Weathered Gneiss)	Undisturbed	16.8 - 17.0	100	99	75	41	45	36	9	—	—	—	—	A-5 (1)	SC	—	19	
BH 324 KM 8+836	Soft to firm, reddish brown CLAY (Residual Soil)	Undisturbed	1.0 - 1.4	100	100	93	71	59	28	31	—	—	—	—	A-7-6 (19)	CH	—	28	
	Firm, reddish brown CLAY (Residual Soil)	Split spoon	1.4 - 1.85	100	100	93	73	—	—	—	1	44	24	32	—	—	—	—	
	Soft, reddish brown CLAY (Residual Soil)	Split spoon	3.0 - 3.45					50	27	23					A-7-6 (15)	CL - CH	2.836	31	
	Soft, reddish brown CLAY (Residual Soil)	Undisturbed	4.0 - 4.5	100	99	94	75	56	27	29	—	—	—	—	A-7-6 (19)	CH	—	24	
	Firm, reddish brown CLAY with very closely spaced, extremely thin subhorizontal bands of orange brown CLAY and rare angular medium to coarse quartz gravel (Residual Soil)	Split spoon	5.7 - 6.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29	
	Firm, reddish brown CLAY with very closely spaced, extremely thin subhorizontal bands of orange brown CLAY (Residual Soil)	Undisturbed	7.0 - 7.5	98	92	76	58	60	39	21	8	36	21	35	A-7-5 (11)	ML - MH	2.892	25	
	Firm, pink brown, 30-40° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Mica Schist)	Split spoon	9.0 - 9.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	
	Firm, pink brown with orange brown mottling, 30-40° inclined extremely thinly banded, 10-20° inclined, extremely closely spaced fissured, micaceous CLAY (Completely Weathered Mica Schist)	Undisturbed	10.0 - 10.3	100	99	84	67	68	47	21	1	41	25	34	A-7-5 (14)	MH	2.844	35	
	Stiff, pink brown with orange brown mottling, 30-40° inclined extremely thinly banded, 10-20° inclined, extremely closely spaced fissured, micaceous CLAY (Completely Weathered Mica Schist)	Undisturbed	13.0 - 13.35	100	100	72	46	58	43	15	0	55	20	25	A-7-5 (5)	SC	2.817	26	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
	Firm, light to dark gray and pink brown, 30-40° inclined, extremely thinly banded, micaceous slightly sandy micaceous CLAY (Completely Weathered Mica Schist)	Split spoon	15.15 - 15.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32
	Firm, light to dark gray and pink brown, 40-60° inclined, extremely thinly banded, 10-20° inclined, extremely closely spaced fissured, very micaceous CLAY (Completely Weathered Mica Schist).	Undisturbed	16.0 - 16.35	100	100	86	62	53	38	15	—	—	—	—	A-7-5 (9)	MH	—	23	
	Stiff, white, orange brown and light green, 30-40° inclined, extremely thinly banded micaceous CLAY with occasional medium gravel size extremely weak, friable, Gneiss (Highly Weathered Gneiss)	Split spoon	18.0 - 18.45	100	99	92	57	40	33	7	—	—	—	—	A-4 (4)	ML	—	38	
BH 325 KM 9+005	Stiff, light and orange brown, angular, medium to coarse, very (quartz) gravely CLAY	Split spoon	1.0 - 1.45	82	68	55	40	42	22	20	34	39	8	18	A-7-6 (4)	SC	2.892	16	
		Split spoon	2.5 - 2.95					—	—	—					—			—	—
	Firm, reddish brown with orange brown mottling, CLAY with occasional angular, fine quartz gravel (Residual Soil)	Undisturbed	6.0 - 6.35	100	99	91	75	61	32	29	2	30	22	46	A-7-5 (20)	MH - CH	2.905	25	
	Firm, 10-20° inclined, extremely thinly interbanded, orange brown and reddish brown, micaceous CLAY (Completely Weathered Gneiss)	Split spoon	8.0 - 8.45	100	99	96	70	—	—	—	1	36	27	37	—	—	2.833	35	
		Undisturbed	9.0 - 9.6					55	32	23					A-7-5 (15)			MH	34
	Stiff, orange brown, light gray and dark gray, 10-20° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	Undisturbed	12.0 - 12.4	100	100	90	50	43	33	10	0	56	25	19	A-5 (3)	ML	2.778	24	
	Stiff, orange brown, light to dark gray, 10-20° inclined, extremely thinly banded, micaceous CLAY with 20° inclined, 10mm white clay band (Completely Weathered Gneiss)	Split spoon	14.0 - 14.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26	
	Stiff, orange brown, light gray and dark gray, 10-20° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	soil core	15.0 - 15.3	100	99	86	57	44	29	15	—	—	—	—	A-7-6 (7)	ML	—	23	
6 KM 9+145	Extremely thinly, 20-30° inclined interbanded, very soft to soft, light gray, orange brown and reddish brown, micaceous CLAY (Completely Weathered Gneiss)	Undisturbed	2.0 - 2.9	100	99	95	62	64	45	19	1	43	29	26	A-7-5 (12)	MH	2.745	39	
	Firm, 10-30° inclined, orange brown, pink brown and light gray, extremely thin banded, micaceous CLAY with very thin (25mm), white, angular, medium to coarse quartz gravel band at 7.43m (Completely Weathered Gneiss)	Undisturbed	4.5 - 5.0	100	99	69	49	49	35	14	—	—	—	—	A-7-5 (5)	SC	—	29	
	Firm, 10-30° inclined, extremely thinly, orange brown, light gray and pink brown banded, micaceous CLAY (Completely Weathered Gneiss)	Split Spoon	5.0 - 5.45	100	100	91	51	—	—	—	0	54	26	20	—	—	2.749	42	
			6.5 - 6.95					—	—	—					—			—	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 32 BH 329 KM 14+306	Stiff, 10-30° inclined, orange brown, pink brown and light gray, extremely thin banded, micaceous CLAY (Completely Weathered Gneiss)	Undisturbed	7.5 - 7.9	100	99	60	34	48	39	9	0	73	17	10	A-2-5 (0)	SC	2.737	29	
	Interbanded, stiff, 20-30° inclined, extremely thin occasionally very thin banded, micaceous, brown and orange brown, CLAY AND extremely weak, 20-30° inclined, extremely thin banded, pink and light gray, micaceous gneiss (Highly Weathered Gneiss)	soil core	13.4 - 13.7	100	100	87	55	39	33	6	—	—	—	—	A-4 (4)	ML	—	28	
	Stiff, reddish brown, gravley CLAY (Residual Soil). Gravel angular to subrounded, fine to coarse quartz	Split spoon	1.0 - 1.45	74	55	40	27	39	28	14	—	—			A-2-6 (0)	SC	—	12	
	Firm, reddish brown, gravely CLAY (Residual Soil). Gravel angular to subrounded, fine to coarse quartz and pink brown gneiss.	Undisturbed	2.0 - 2.4	93	81	62	38	37	21	16	—	—			A-6 (2)	—	—	15	
	Soft, reddish brown, gravley CLAY (Residual Soil). Gravel angular to subrounded, fine to coarse quartz	Split spoon	2.4 - 2.85					—	—	—	—	—			— — — —	—	—	—	
	Very stiff, orange brown CLAY with occasional angular, medium gravel size pockets of very stiff, reddish brown clay with extremly weak, angular to subrounded, fine to medium gravel size fragments of gneiss and occasional medium gravel size strong quartz in the clay matrix (Highly Weathered Gneiss)	Split spoon	4.0 - 4.45	93	85	72	53	37	27	10					A-4 (4)	ML		18	
	very stiff orange brown CLAY with occasional angular, medium gravel size pockets of very stiff, reddish brown clay with extremly weak, angular to subrounded, fine to medium gravel size fragments of	Split spoon	5.4 - 5.85					—	—	—	17	36	22	24	— — — —	—			

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
	gneiss and occasional medium gravel size strong quartz in the clay matrix (Highly Weathered Gneiss)	Split spoon	7.0 - 7.41					—	—	—					— — — —	—		—	
	Very stiff, orange brown CLAY (Completlely Weathered Gneiss)	Split spoon	15.5 - 15.95	100	100	91	69	46	37	9	—	—	—	—	A-5 (8)	ML	—	27	
BH 330 KM 14+765	Very stiff, orange brown, slight sandy CLAY with extremely weak, pink brown and orange brown, angular to subrounded, fine to medium, gravel size fragments of gneiss and occasional, angular, fine to medium gravel size, quartz fragments (Highly Weathered Gneiss)	Split spoon	1.0 - 1.45					41	28	13					A-7-6 (3)	SC		12	
	Very stiff, orange brown and pink brown, slight sandy CLAY with extremely weak to very weak, pink brown and orange brown, angular to subrounded, fine to coarse, gravel size fragments of gneiss and occasional, angular, fine to medium gravel size quartz fragments (Highly Weathered Gneiss)	Split spoon	2.6 - 3.05	84	75	62	47				38	26	16	20			2.905		
	Stiff, pink brown, orange brown, 40-50° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	Split spoon	6.0 - 6.45					—	—	—	0	42	37	21	— — — —	—	2.798	25	
	Stiff, pink brown, orange brown and white, 20° inclined, extremely thinly banded, micaceous CLAY (Completely Weathered Gneiss)	Split spoon	8.0 - 8.45					—	—	—	—	—	—	—	— — — —	—	—	—	
	Stiff, pink brown and orange brown, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	9.6 - 10.05					50	37	13	0	48	30	22	A-7-5 (8)	ML - MH	2.776	29	
		Split spoon	11.0 - 11.45	100	99	95	61	—	—	—					— — — —	—		—	
		Split spoon	12.5 - 12.95					—	—	—					— — — —	—		—	
	Stiff, pink brown and orange brown, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	14.0 - 14.45					41	33	8	0	49	35	16	A-5 (7)	ML	2.699	20	
		Split spoon	16.0 - 16.45	100	100	97	70	—	—	—					— — — —	—		—	
		Split spoon	17.5 - 17.95					—	—	—					— — — —	—		—	
BH 331 KM 16+910	Stiff, reddish brown, gravelly CLAY (Residual Soil). Gravel angular, fine to medium quartz and occasional subrounded medium gravel size gneiss.	Split spoon	1.2 - 1.65	80	64	51	38	43	21	22	—	—	—	—	A-7-6 (3)	SC	—	12	
	Firm, reddish brown, slightly gravelly CLAY (Residual Soil). Gravel angular, fine to medium quartz.	Split spoon	2.5 - 2.95	97	92	83	70	—	—	—	10	26	20	44	— — — —	—	2.825	—	
	Firm, reddish brown, slightly gravelly CLAY (Residual Soil)	Undisturbed	3.5 - 4.0					58	39	19					A-7-5 (14)	MH			25
	Firm, reddish brown, orange brown and light gray, micaceous, slightly sandy CLAY (Residual Soil)	Split spoon	4.0 - 4.45	100	100	79	45	57	48	9	—	—	—	—	A-5 (3)	SC	—	26	
	Firm, brown, orange brown and light gray, fissured, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss).	Undisturbed	6.5 - 6.9					51	44	7					A-2-5 (0)	SC		28	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test					AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %					
BH 332 KM 17+161	Firm, orange brown and light gray, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	6.9 - 7.35	100	99	77	35	—	—	—	0	66	21	13	— — — —	—	2.712	—	
	Firm, orange brown and light gray, 10-20° inclined, extremely thinly banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	8.0 - 8.5					—	—	—					— — — —	—		—	
BH 332 KM 17+161	Very dense, white and pink brown, gravely fine to coarse SAND (Residual Soil). Gravel angular to coarse quartz	split spoon	1.0 - 1.24	69	59	39	16	0	0	0	—	—	—	—	A-1b (0)	SM	—	9	
	Very stiff, white, slightly gravely CLAY (Highly Weathered Quartzite). Gravel angular fine to medium quartz.	split spoon	15.8 - 1.5.9	97	88	76	65	38	30	8	—	—	—	—	A-4 (6)	SC	—	20	
BH 333 KM 19+153	Very soft, dark and light gray, very sandy CLAY (Alluvium)	Split spoon	1.0 - 1.47	99	98	87	51	27	18	9	—	—	—	—	A-4 (3)	CL	—	25	
	Soft, light green, 10-20° inclined banded CLAY (Residual Soil)	Split spoon	2.45 - 2.8	95	91	70	45	55	20	35	—	—	—	—	A-7-6 (9)	SC	—	26	
	Stiff, orange brown and light green, 10-20° inclined banded, micaceous, sandy CLAY (Completely Weathered Gneiss)	Undisturbed	3.2 - 3.5	100	90	63	33	54	34	20	10	52	22	16	A-2-7 (2)	SC	2.668	24	
		Split spoon	3.5 - 3.95	—	—	—	—	—	—	—					— — — —	—		—	
	Extremely weak, light gray and dark gray, 70-80° banded, friable GNEISS (Moderately Weathered Gneiss)	Split spoon	5.2 - 5.65	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	14	
		Extremely weak, light gray and brown, 50° inclined banded, friable GNEISS (Moderately Weathered Gneiss)	Split spoon	16.1 - 16.55	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	18	
BH 334 KM 19+581	Soft to firm, reddish brown CLAY (Residual Soil)	Undisturbed	1.0 - 1.3	100	100	93	63	47	32	15	—	—	—	—	A-7-5 (9)	ML	2.791	21	
	Soft to firm, reddish brown CLAY (Residual Soil)	Undisturbed	3.5 - 3.85	96	96	87	60	53	30	23	1	38	15	47	A-7-5 (12)	MH	2.788	21	
	Soft, reddish brown CLAY (Residual Soil)	Split spoon	3.85 - 4.5	—	—	—	—	—	—	—					— — — —	—		—	
		Split spoon	5.4 - 5.85	—	—	—	—	—	—	—					— — — —	—		—	
	Stiff, orange brown and reddish brown, 10-20° inclined, extremely thinly banded, CLAY with occasional angular medium gravel size quartz (Completely Weathered Gneiss)	Split spoon	7.0 - 7.45	96	94	79	57	40	26	14	—	—	—	—	A-6 (6)	ML	—	21	
	Stiff, orange brown and light green, 10-20° inclined banded, micaceous, sandy CLAY (Completely Weathered Gneiss)	Undisturbed	9.5 - 9.8	100	100	83	54	48	34	14	0	42	27	30	A-7-5 (6)	ML	2.726	25	
		Split spoon	9.8 - 10.25	—	—	—	—	—	—	—					— — — —	—	—	—	
		Split spoon	11.0 - 11.45	—	—	—	—	—	—	—					— — — —	—	—	—	
	Extremely thin to very thin, 10-20° inclined interbanded, extremely weak, light gray and pink brown GNEISS AND firm to stiff, brown, slightly sandy CLAY (Highly to Moderately Weathered Gneiss)	Undisturbed	12.3 - 12.55	100	100	82	54	54	46	8	—	—	—	—	A-5 (5)	MH	2.686	24	
	Extremely thin to very thin, 10-20° inclined interbanded, extremely weak, light gray and pink brown GNEISS AND firm to stiff, brown, slightly sandy CLAY (Highly to Moderately Weathered Gneiss)	Soil core	15.6 - 15.85	100	100	83	54	56	44	12	—	—	—	—	A-7-5 (6)	MH	2.637	28	
	Soft, reddish brown CLAY (Residual Soil)	Undisturbed	1.0 - 1.55	100	100	93	67	51	34	17	1	41	14	43	A-7-5 (11)	MH	2.824	29	
		Split spoon	1.55 - 2.0	—	—	—	—	—	—	—					— — — —	—	—	—	

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l %	Sand %	Silt %	Clay %				
BH 335	Very stiff, orange brown and reddish brown CLAY with occasional subrounded, medium gravel size gneiss (Residual Soil)	Split spoon	4.3 - 4.75					42	29	13					A-7-6 (3)	SC	2.822	18
	Very stiff, orange brown and reddish brown CLAY with some angular to subrounded, medium gravel size gneiss fragments and quartz (Residual Soil)	Split spoon	5.8 - 6.25	90	83	67	44	—	—	—	15	42	21	23	— — — —	—	—	—
	Stiff, orange brown and reddish brown CLAY with some angular to subrounded, medium gravel size gneiss fragments and quartz (Residual Soil)	Split spoon	7.3 - 7.75					—	—	—					— — — —	—	—	—
	Stiff, pink brown, micaceous, slightly sandy CLAY (Completely Weathered Gneiss).	Undisturbed	9.0 - 9.25	100	100	86	65	50	35	15	—	—	—	—	A-7-5 (10)	ML - MH	2.774	21
	Firm, pink brown, fissured, CLAY (Completely Weathered Gneiss)	Split spoon	11.0 - 11.45	99	98	82	28	—	—	—	—	—	—	—	— — — —	—	—	—
		Undisturbed	12.0 - 12.3					50	37	13	—	—	—	—	A-2-7 (0)	SC	2.751	20
	Stiff, pink brown, fissured, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	16.0 - 16.45	100	97	76	57	50	36	14	2	45	23	30	A-7-5 (7)	ML - MH	2.696	25
		Split spoon	17.5 - 17.95	—	—	—	—	—	—	—					— — — —	—	—	—
BH 337	Very soft, orange brown and light gray, CLAY	Spilt Spoon	1.45 - 1.94	99	97	92	70	74	31	43	—	—	—	—	A-7-5 (19)	CH		37
	Very soft, orange brown and light gray, CLAY (Residual Soil)	Undisturbed	2.5 - 2.75	100	100	91	75	42	27	15	4	50	23	23	A-7-6 (10)	ML	2.899	24
BH 338	Soft to firm, reddish brown, slightly gravelly, CLAY. Gravel angular to subrounded, fine to medium occasionally coarse quartz (Residual Soil)	Undisturbed	2.0 - 2.3	100	93	88	66	51	32	19	4	36	20	40	A-7-5 (12)	MH	2.715	23
	Soft, reddish brown, CLAY (Residual Soil)	Split Spoon	2.3 - 2.75					—	—	—					— — — —	—	—	—
	Soft to firm, 10-20° inclined, extremely thinly interbanded, fissured, orange brown, reddish brown and pink brown, micaceous sandy CLAY (Completely Weathered Gneiss)	Undisturbed	5.0 - 5.3	100	99	82	54	40	29	11	0	44	26	30	A-6 (4)	ML	2.637	20
	Soft to firm, 10-20° inclined, extremely thinly interbanded, fissured, orange brown, reddish brown and pink brown, micaceous sandy CLAY (Completely Weathered Gneiss)	Undisturbed	8.0 - 8.2	100	98	78	47	42	29	13	—	—	—	—	A-7-6 (3)	SC	2.691	27
BH 339	Firm, reddish brown, fissured, CLAY (Residual Soil)	Undisturbed	1.0 - 1.15	97	92	83	61	58	36	22	11	30	9	50	A-7-5 (12)	MH	2.839	22
	Firm, reddish brown, CLAY with occasional angular to subrounded, fine to medium quartz gravel (Residual Soil)	Split Spoon	1.15 - 1.6	—	—	—	—	—	—	—					— — — —	—		—
	Firm, reddish brown, fissured, CLAY (Residual Soil)	Undisturbed	4.0 - 4.2	100	99	94	76	61	36	25	—	—	—	—	A-7-5 (18)	MH	2.903	27
	Firm, reddish brown, CLAY with occasional angular to subrounded, fine to medium quartz gravel (Residual Soil)	Split Spoon	6.0 - 6.45	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	31
	Firm, orange brown and reddish brown, fissured, CLAY (Residual Soil)	Undisturbed	7.0 - 7.3	100	100	97	83	54	36	18	0	22	37	41	A-7-5 (14)	MH	2.877	31
	Split Spoon	7.3 - 7.75	—	—	—	—	—	—	—	—					— — — —	—		—
	Split Spoon	9.0 - 9.45	—	—	—	—	—	—	—	—					— — — —	—		—

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %				
	Firm, orange brown and reddish brown, fissured, CLAY (Residual Soil)	Undisturbed	10.0 - 10.4	100	100	97	84	64	40	24	—	—	—	—	A-7-5 (18)	MH	2.784	41
	Stiff, orange brown, 20-30° inclined, extremely banded, fissured, CLAY (Completely Weathered Gneiss)	Split Spoon	13.5 - 13.95	—	—	—	—	—	—	—	0	48	26	24	— — — —	—	2.905	—
	Stiff, orange brown, 30-40° inclined, extremely thinly banded, fissured, slightly sandy CLAY (Completely Weathered Gneiss).	Soil core	14.3 - 14.6	100	99	86	55	51	38	13					A-7-5 (6)	MH		43
		Split Spoon	15.0 - 15.45	—	—	—	—	—	—	—					— — — —	—		—
BH 340	Soft, reddish brown, CLAY (Residual Soil)	Split spoon	1.0 - 1.45	—	—	—	—	—	—	—	2	41	21	36	— — — —	—	2.781	—
	Soft, reddish brown, CLAY (Residual Soil)	Undisturbed	2.0 - 2.5	100	98	86	58	52	34	18					A-7-5 (9)	MH		29
		Split spoon	2.5 - 2.95	—	—	—	—	—	—	—					— — — —	—		—
	Stiff, reddish brown, CLAY (Residual Soil)	Split spoon	4.0 - 4.45	100	100	91	71	55	36	19	—	—	—	—	A-7-5 (14)	MH	—	26
	Stiff, reddish brown and orange brown, 20-30° inclined, extremely thin banded, CLAY (Completely Weathered Gneiss)	Undisturbed	7.0 - 7.2	100	100	98	85	60	43	17	—	—	—	—	A-7-5 (15)	MH	2.839	40
	Firm, reddish brown, orange brown and pink brown, 20-30° inclined, extremely thinly banded, CLAY (Completely Weathered Gneiss)	Undisturbed	10.0 - 10.3	100	100	97	83	63	46	17	0	15	37	48	A-7-5 (15)	MH	2.897	46
		Split spoon	10.3 - 10.7	—	—	—	—	—	—	—					— — — —	—	—	—
	Firm, orange brown and pink brown, 20-30° inclined, extremely thinly banded, CLAY (Completely Weathered Gneiss)	Split spoon	12.0 - 12.5	—	—	—	—	—	—	—					— — — —	—	—	—
	Firm, reddish brown, orange brown and pink brown, 20-30° inclined, extremely thinly banded, CLAY (Completely Weathered Gneiss)	Soil Core	12.7 - 13.0	100	100	99	85	59	41	18	—	—	—	—	A-7-5 (15)	MH	2.880	46
BH 341	Very stiff, reddish brown and orange brown, CLAY with some weak to medium strong, angular to subrounded, medium gravel size fragments of gneiss (Highly Weathered Gneiss)	Split spoon	1.0 - 1.42	86	65	48	33	38	24	14	—	—	—	—	A-2-6 (1)	SC	—	10
	Stiff, orange brown an pink brown, 20-30° inclined, extremely thinly banded, CLAY (completely Weathered Gneiss)	Split spoon	9.0 - 9.45	100	100	92	75	57	36	21	—	—	—	—	A-7-5 (16)	MH	2.809	28
	Stiff, orange brown and reddish brown, 30-40° inclined, extremely thin banded, slightly micaceous CLAY (Completely Weathered Gneiss)	soil core	9.55 - 9.8	100	100	94	70	59	38	21	—	—	—	—	A-7-5 (15)	MH	2.784	25
	Stiff, orange brown an pink brown, 30-40° inclined, extremely thinly banded, CLAY (completely Weathered Gneiss)	Split spoon	10.5 - 10.95	100	100	91	69	53	40	13	0	36	29	35	A-7-5 (10)	MH	—	28
		Split spoon	12 - 12.5	—	—	—	—	—	—	—					— — — —	—	—	—
		Split spoon	13.5 - 13.95	—	—	—	—	—	—	—					— — — —	—	—	—
		Split spoon	15.5 - 16	—	—	—	—	—	—	—					— — — —	—	—	—
7+470	Stiff, reddish brown, CLAY (Residual Soil)	Split spoon	1.7 - 2.15	100	99	93	77	66	39	27	—	—	—	—	A-7-5 (19)	MH	—	25
	Stiff, reddish brown, CLAY (Residual Soil)	Undisturbed	2.5 - 2.7	100	100	96	75	57	37	20	—	—	—	—	A-7-5 (15)	MH	2.758	24
	Stiff, reddish brown, CLAY (Residual Soil)	Split spoon	3.0 - 3.45	—	—	—	—	—	—	—	—	—	—	—	— — — —	—	—	20

BH No	Field Material Description	Sample Type	Depth (M)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Soil Class	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Grave l%	Sand %	Silt %	Clay %				
BH 342 KM 2	Firm, pink brown and orange brown, 20-30° inclined, extremely thin banded, micaceous, slightly sandy CLAY (Completely Weathered Gneiss)	Split spoon	4.5 - 4.95	—	—	—	—	—	—	—	1	46	28	24	—	—	2.715	—
	Firm, pink brown and reddish brown, 20-30° inclined, extremely thin banded, fissured, micaceous, slightly sandy CLAY (Completely Weathered Gneiss).	Undisturbed	5.5 - 5.7	100	100	89	60	40	33	7					A-4 (5)	ML		16

KSB Section (Part 3: Geotechnical Report, Volume 3A: Factual Ground Investigations - ICS, 2016)

Borehole Soil Samples Classification Summaries																						
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)						PL %	PI %	Hydrometer test				AASHTO Class			Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075	LL %	Gravel (%)			Sand (%)	Silt (%)	Clay (%)								
BH # 1 KM 2+850	Very soft, reddish brown slightly sandy CLAY with occasional rootlets. (residual soil)	Split spoon	1.10- - 1.55	100	100	89	58	37	23	14	—	—	—	—	A-6	(	6	)	CL	—	19
	Firm, reddish brown slightly sandy CLAY. (Residual soil)	Undisturbed	2.00 - 2.70	100	99	89	61	36	21	15	0	47	14	38	A-6	(	7	)	CL	2.716	25
	Soft reddish brown CLAY. (Residual soil)	Split spoon	2.70 - 3.15	100	99	91	70	45	27	18	—	—	—	—	A-7-6	(	11	)	CL - ML	—	27
	Firm, reddish brown occasionally light grey slightly sandy CLAY. (Residual soil)	Split spoon	4.00 - 4.45	100	100	86	59	47	28	19	—	—	—	—	A-7-6	(	9	)	CL - ML	—	28
	Firm to stiff grey and orange brown, 10-30 ⁰ inclined very narrowly banded gravelly CLAY. (Completely Weathered Gneiss)	Undisturbed	5.20 - 5.70	100	98	82	53	34	22	12	3	48	17	32	A-6	(	4	)	CL	2.697	26
	Firm, light grey and brown very sandy CLAY. (Completely Weathered Gneiss)	Split spoon	5.70 - 6.15	100	100	81	52	31	19	12	—	—	—	—	A-6	(	4	)	CL	—	20
	Stiff, brown silty CLAY with pockets of light grey clay. (Completely Weathered Gneiss)	Split spoon	7.20 - 7.65	98	93	76	61	39	23	16	—	—	—	—	A-6	(	8	)	CL	—	17
	Firm to stiff grey and orange brown, 10-30 ⁰ inclined very narrowly banded gravelly CLAY. (Completely Weathered Gneiss)	Soil core sub sample	8.27 - 8.42	100	96	78	59	37	20	17	—	—	—	—	A-6	(	8	)	CL	2.643	19
	Stiff, light grey and brown gravelly CLAY. Gravel angular, fine to medium occasionally coarse quartz. (Completely Weathered Gneiss)	Split spoon	8.70 - 9.15	94	9	83	70	43	21	22	8	29	15	48	A-7-6	(	12	)	CL	2.630	23
	Stiff, orange brown and light grey very gravelly CLAY. Gravel angular, medium to coarse quartz. (Completely Weathered Gneiss)	Split spoon	9.80 - 10.25	92	86	70	51	50	25	25	—	—	—	—	A-7-6	(	9	)	CL - CH	—	21

Borehole Soil Samples Classification Summaries																						
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)								
	Dense, orange brown and light grey gravelly micaceous clayey SAND. Gravel angular, fine to coarse weak quartz.	Split spoon	11.3 - 11.75	91	85	58	34	26	16	10	15	55	14	16	A-2-4	(	0	)		SC	2.606	14
	Dense, dark grey and brown clayey gravelly SAND. Gravel angular fine quartz. (Highly Weathered Gneiss)	Split spoon	12.9 - 13.35	100	91	46	23	28	26	2	—	—	—	—	A-1b	(	0	)		SM	—	14
	Dense, dark grey and brown interbedded slightly clayey SAND. (Highly Weathered Gneiss)	Split spoon	15.0 - 15.45	99	92	42	19	0	0	0	—	—	—	—	A-1b	(	0	)		SM	—	12
	Stiff yellowish brown interbedded micaceous silty CLAY. (Completely Weathered Gneiss)	Soil core sub sample	17.2 - 17.5	97	94	84	50	47	38	9	—	—	—	—	A-5	(	4	)		SC	2.719	33
	Stiff yellowish brown and dark grey 10-30 ⁰ inclined extremely thinly banded micaceous CLAY. (Completely Weathered Gneiss)	Split spoon	17.5 - 17.95	100	99	79	39	49	42	7	—	—	—	—	A-5	(	1	)		SC - SM	—	31
	Very dense yellowish, greyish gravelly SAND. Gravel angular fine to medium gneiss. (Highly Weathered Gneiss)	Split spoon	19.55-19.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
BH # 2 km 3+750	Firm, reddish brown CLAY. (Residual soil)	Split spoon	1.00 - 1.45	100	100	91	70	52	29	23	—	—	—	—	A-7-6	(	14	)		CH - MH	—	25
	Firm, reddish brown gravelly CLAY. Gravel angular to sub rounded fine to coarse quartz. (residual soil)	Undisturbed	2.00 - 2.50	100	99	87	60	47	29	18	4	37	20	39	A-7-6	(	9	)		ML	2.724	25
	Firm, reddish brown CLAY. (Residual soil)	Split spoon	2.50 - 2.95	100	99	87	59	51	28	23	—	—	—	—	A-7-6	(	11	)		CH	—	23
	Firm, reddish brown very gravelly CLAY. Gravel angular to sub rounded fine to medium quartz. (Residual soil)	Split spoon	4.00 - 4.45	96	87	77	59	47	28	19	—	—	—	—	A-7-6	(	9	)		ML	—	22
	Stiff reddish brown gravelly CLAY. Gravel angular to sub rounded fine to coarse quartz. (residual soil)	Undisturbed	5.50 - 5.80	87	71	52	34	45	27	18	—	—	—	—	A-2-7	(	2	)		SC	2.699	16

Borehole Soil Samples Classification Summaries																						
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)								
BH # 3 km 4+270	Stiff, reddish brown, very gravelly CLAY. Gravel angular to sub rounded fine to medium quartz. (Residual soil)	Split spoon	5.80 - 6.25	85	69	54	36	47	27	20	—	—	—	—	A-7-6	(	2	)		SC	—	14
	Firm, reddish brown very gravelly CLAY. Gravel angular to sub rounded fine to medium occasionally coarse quartz. (Residual soil)	Split spoon	7.00 - 7.45	100	96	82	65	52	31	21	—	—	—	—	A-7-5	(	12	)		MH	—	22
	Firm, pinkish whitish and reddish brown gravelly CLAY. Gravel angular, fine to coarse quartz. (Highly Weathered Gneiss)	Undisturbed	8.50 - 8.90	97	91	79	64	47	35	12	9	31	25	34	A-7-5	(	8	)		ML	2.717	8
	Stiff, light grey and brown gravelly CLAY. Gravel angular, fine to medium occasionally coarse quartz. (Highly Weathered Gneiss)	Split spoon	8.90 - 9.35	96	85	61	45	42	34	8	—	—	—	—	A-5	(	2	)		SC	—	22
	Stiff, yellowish and pinkish brown gravelly CLAY. Gravel angular, fine to coarse quartz. (Highly Weathered Gneiss)	Undisturbed	11.8 - 12.0	100	98	83	59	45	38	7	—	—	—	—	A-5	(	5	)		ML	2.654	22
	Stiff, yellowish and pinkish brown gravelly CLAY. Gravel angular fine to medium quartz. (Highly Weathered Gneiss)	Split spoon	12.0 - 12.45	97	91	71	50	50	41	9	10	45	33	12	A-5	(	4	)		ML - MH	2.662	20
	Stiff, yellowish and pinkish brown gravelly CLAY. Gravel angular fine to medium quartz. (Highly Weathered Gneiss)	Split spoon	13.5 - 13.95	99	94	72	51	45	36	9	—	—	—	—	A-5	(	4	)		ML	—	22
	Stiff, yellowish brown CLAY with a 60mm thick layer of medium sized quartz gravel. (Highly weathered gneiss)	Split spoon	15.1 - 15.55	97	94	79	49	47	39	8	—	—	—	—	A-5	(	3	)		SC	—	24
	Soft, dark brown gravelly CLAY. Gravel angular medium to coarse quartz. (Made ground)	Split spoon	1.00 - 1.45	79	69	54	34	38	24	15	—	—	—	—	A-2-6	(	1	)		SC	—	23
	Very soft, dark brown slightly gravelly CLAY. (Swamp Top soil)	Undisturbed	2.00 - 2.65	88	61	45	28	40	25	15	41	32	12	16	A-2-6	(	1	)		SC	2.747	26
	Soft, light grey CLAY with extremely thin orange brown clay bands inclined at 10-300. (Completely Weathered Gneiss)	Split spoon	4.15 - 4.60	96	90	65	43	36	17	19	10	49	11	32	A-6	(	4	)		SC	2.650	27

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class Soil USCS				Sp. Gravity	NMC %	
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
BH # 4 km 4+725	Firm, orange brown and light grey sandy CLAY with some medium size quartz gravel. (Highly Weathered Gneiss)	Split spoon	7.20 - 7.65	98	92	75	55	39	21	18	—	—	—	—	A-6	(	7	)	CL	—	23
	Stiff, orange brown, light grey and greenish 10-300 inclined very narrowly banded gravelly CLAY. Gravel angular fine to coarse quartz. (Highly Weathered Gneiss)	Soil core sub sample	8.40 - 8.70	74	62	46	37	48	21	27	—	—	—	—	A-7-6	(	4	)	SC	2.626	16
	Stiff, Orange brown and light grey, 10-300 inclined extremely thinly banded sandy CLAY. (Highly Weathered Gneiss)	Split spoon	10.7 - 11.15	100	97	77	58	37	28	9	—	—	—	—	A-4	(	5	)	ML	—	23
	Stiff, orange brown, light grey and greenish 10-300 inclined very narrowly banded gravelly CLAY. Gravel angular fine to coarse quartz. (Highly Weathered Gneiss)	Soil core sub sample	13.0 - 13.3	100	99	89	63	40	28	12	0	40	32	28	A-6	(	6	)	ML	2.649	26
	Stiff, orange brown slightly sandy, gravelly CLAY. Gravel angular to sub rounded fine to medium gravel. (Highly Weathered Gneiss)	Split spoon	13.85-14.30	96	92	75	54	39	23	16	—	—	—	—	A-6	(	6	)	CL	—	21
	Stiff, greenish, whitish and orange brown silty CLAY.	Split spoon	17.0-17.45	100	97	86	62	43	29	14	—	—	—	—	A-7-6	(	7	)	ML	—	29
	Firm, light grey CLAY. (Residual soil)	Split spoon	2.50 - 2.95	100	100	98	92	56	24	32	—	—	—	—	A-7-6	(	19	)	CH	—	37
	Soft to firm light grey and orange brown CLAY. (Residual Soil)	Undisturbed	3.60 - 4.20	100	100	97	82	56	26	30	0	27	23	50	A-7-6	(	19	)	CH	2.599	31
	Firm, light grey sandy CLAY. (Completely Weathered Gneiss)	Split spoon	5.70 - 6.15	100	100	86	73	53	20	33	—	—	—	—	A-7-6	(	18	)	CH	—	26
	Firm light grey and yellowish brown banded sandy CLAY. (Completely Weathered Gneiss)	Undisturbed	6.70 - 7.00	97	85	62	53	47	22	25	15	37	9	39	A-7-6	(	10	)	CL	2.655	18
Firm, light grey sandy CLAY. (Completely Weathered Gneiss)	Split spoon	8.50 - 8.95	99	95	58	34	33	25	8	—	—	—	—	A-2-4	(	0	)	SC	—	21	
Stiff, light grey and yellowish brown sandy CLAY. (Highly Weathered Gneiss)	Split spoon	12.0-12.45	100	96	77	53	48	32	16	—	—	—	—	A-7-5	(	7	)	ML	—	27	

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class			Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
	Stiff, yellowish, greenish and greyish sandy CLAY with occasional coarse quartz gravel. (Highly Weathered Gneiss)	Split spoon	16.0-16.45	100	91	54	31	41	29	12	—	—	—	—	A-2-7	(	0	)	SC	—	23
BH # 5 km 5+480	Very soft, dark brown, sandy CLAY with numerous rootlets. (Alluvium)	Split spoon	1.20 - 1.75	73	66	48	34	77	54	23	—	—	—	—	A-2-7	(	2	)	SC	—	96
	Soft to firm, dark grey CLAY. (Alluvium)	Undisturbed	2.15 - 2.60	100	100	97	68	66	29	37	0	12	17	72	A-7-6	(	18	)	CH	2.527	39
	Soft, dark grey CLAY. (Alluvium)	Split spoon	2.60 - 3.05	96	93	84	65	58	27	31	—	—	—	—	A-7-6	(	17	)	CH	—	39
	Firm, dark grey and orange brown mottled CLAY. (Residual soil)	Split spoon	4.00 - 4.45	100	100	95	77	51	30	21	—	—	—	—	A-7-5	(	15	)	MH	—	32
	Soft to firm, dark grey CLAY. (Alluvium)	Undisturbed	5.00 - 5.70	100	99	90	70	56	22	34	0	19	17	63	A-7-6	(	18	)	CH	2.634	25
	Firm, orange brown and light grey sandy CLAY. (Residual soil)	Split spoon	7.50 - 7.95	100	96	72	43	48	20	28	—	—	—	—	A-7-6	(	7	)	SC	—	20
	Medium dense to dense, orange brown, pinkish and whitish clayey gravelly SAND. (Completely Weathered Granite). Gravel angular fine to medium quartz.	Undisturbed	8.50 - 8.70	100	99	51	28	39	17	22	—	—	—	—	A-2-6	(	2	)	SC	2.592	17
	Dense, orange brown and pinkish clayey gravelly SAND. Gravel angular fine to medium quartz. (Highly weathered Granite)	Split spoon	10.0 - 10.45	83	68	39	24	—	—	—	—	—	—	—	—	—	—	—	—	—	17
	Medium dense, pinkish, whitish and orange brown clayey gravelly SAND. (Highly weathered Granite)	Split spoon	12.0 - 12.45	94	80	44	26	—	—	—	—	—	—	—	—	—	—	—	—	—	13
	Stiff, yellowish, greyish sandy silty CLAY. (Highly weathered Granite)	Split spoon	14.0 - 14.45	81	77	62	38	45	29	16	—	—	—	—	A-7-6	(	2	)	SC	—	31
BH # 6 km 6+110	Very soft, dark grey, silty CLAY with decomposed organic matter. (Organic silty CLAYS)	Split spoon	1.00 - 1.45	96	88	77	56	61	38	23	—	—	—	—	A-7-5	(	12	)	MH	—	55
	Medium dense, greyish and brownish SAND. (Alluvium)	Split spoon	2.50 - 2.95	99	93	43	9	0	0	0	—	—	—	—	A-1b	(	0	)	SM	—	15
	Firm, light grey and dark grey gravelly sandy	Split spoon	4.50 - 4.95	94	83	58	22	41	24	17	—	—	—	—	A-2-7	(	0	)	SC	—	32

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
BH # 7 km 6+810	CLAY. (Alluvium)																				
	Stiff, light grey clayey sandy SILT. (Alluvium)	Undisturbed	5.50 - 5.90	100	99	90	68	48	25	23	0	34	38	28	A-7-6	(	13	)	CL	2.601	25
	Stiff, greyish sandy silty CLAY. (Alluvium)	Split spoon	7.80 - 8.25	100	99	75	43	32	16	16	—	—	—	—	A-6	(	3	)	SC	—	17
	Stiff, light grey, yellowish and greenish sandy silty CLAY. (Alluvium)	Undisturbed	9.00 - 9.25	100	100	70	32	38	17	21	1	61	25	12	A-2-6	(	2	)	SC	2.649	16
	Stiff, greenish, greyish sandy silty CLAY. (Alluvium)	Split spoon	9.25 - 9.70	99	94	68	33	37	18	19	—	—	—	—	A-2-6	(	2	)	SC	—	17
	Firm, greyish sandy silty CLAY. (Alluvium)	Undisturbed	12.0 - 12.3	92	90	75	41	35	18	17	12	42	9	36	A-6	(	3	)	SC	2.633	17
	Medium dense light grey and bluish silty SAND. (Weathered SANDSTONE)	Split spoon	14.0 - 14.45	100	98	47	28	26	21	5	—	—	—	—	A-2-4	(	0	)	SM - SC	—	17
	Dense, light grey silty SAND. (Weathered SANDSTONE)	Split spoon	17.0 - 17.45	100	95	49	28	22	14	8	—	—	—	—	A-2-4	(	0	)	SC	—	16
	Very soft, reddish brown, gravelly, silty CLAY. (Made ground)	Split spoon	1.00 - 1.52	93	89	77	53	52	29	23	—	—	—	—	A-7-6	(	10	)	CH - MH	—	29
	Very soft, reddish brown, gravelly, silty CLAY. (Made ground)	Undisturbed	2.00 - 2.70	93	85	70	40	56	28	28	—	—	—	—	A-7-6	(	6	)	SC	2.617	50
	Very soft, black clayey SILT with decomposed organic matter (4.00 to 4.35m). (Organic SILTS). Loose dark grey silty SAND. (4.35 to 4.45m) (Alluvium)	Split spoon	4.00 - 4.45	99	96	91	73	57	34	23	—	—	—	—	A-7-5	(	16	)	MH	—	76
	Very soft, dark grey and black spongy clayey SILT. (Alluvium)	Undisturbed	5.00 - 5.75	100	89	78	49	60	44	16	—	—	—	—	A-7-5	(	6	)	SC	2.559	76
	Very soft, dark grey and black spongy clayey SILT. (Alluvium)	Split spoon	5.75 - 6.27	89	80	68	42	63	45	18	—	—	—	—	A-7-5	(	4	)	SC	—	96
	Firm, whitish and greyish sandy silty CLAY. (Alluvium)	Undisturbed	8.00 - 8.35	100	100	92	73	49	25	24	0	35	14	51	A-7-6	(	15	)	CL	2.595	46
	Stiff, light grey and yellowish sandy silty CLAY. (Alluvium)	Split spoon	10.0 - 10.45	100	99	68	33	68	15	53	—	—	—	—	A-2-7	(	4	)	SC	—	20

Borehole Soil Samples Classification Summaries																								
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class Soil USCS				Sp. Gravity	NMC %				
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)										
	Firm, greenish, dark greyish and orange brown, Clayey SILT.	Soil core subsample	11.0 - 11.25	100	100	96	79	31	29	2	—	—	—	—	A-4	(	8	)	ML	2.649	32	
	Stiff, orangish, greenish and dark greyish sandy silty CLAY. (Residual soil)	Split spoon	11.5 - 11.95					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30
	Stiff, dark grey sandy silty CLAY. (residual soil)	Split spoon	13.5 - 13.95					100	100	86	46	39	22	17	0	58	30	12	A-6	(4)	SC	2.633	20
BH # 8 km 7+320	Stiff, reddish brown, gravelly silty CLAY. (Residual soil)	Split spoon	1.00 - 1.45	95	91	77	52	47	24	23	—	—	—	—	A-7-6	(	9	)	CL	—	13	
	Stiff, reddish brown gravelly silty CLAY. (Residual soil) Gravel rounded fine to medium quartz.	Split spoon	2.50 - 2.95	89	73	61	50	59	28	31	—	—	—	—	A-7-6	(	11	)	CH	—	21	
	Stiff, reddish brown clayey SILT. (Completely Weathered Gneiss)	Split spoon	4.00 - 4.45	100	97	87	65	45	26	19	—	—	—	—	A-7-6	(	10	)	CL	—	18	
	Firm, orangish and reddish brown, slightly micaceous sandy silty CLAY. (Completely Weathered Gneiss)	Split spoon	5.50 - 5.95	100	100	72	30	35	30	5	—	—	—	—	A-2-4	(	0	)	SM - SC	—	16	
	Firm, orangish and reddish brown, slightly micaceous sandy silty CLAY. (Completely Weathered Gneiss)	Undisturbed	8.10 - 8.40	100	100	68	32	33	29	4	0	72	19	9	A-2-4	(	0	)	SM - SC	2.630	16	
	Soft, reddish brown and yellowish silty CLAY. (Completely Weathered Gneiss)	Split spoon	10.0 - 10.45	100	98	80	57	39	23	16	—	—	—	—	A-6	(	7	)	CL	—	29	
	Soft, reddish brown and yellowish silty CLAY. (Completely Weathered Gneiss)	Undisturbed	11.0 - 11.6	100	99	71	43	38	29	9	0	58	25	19	A-4	(	2	)	SC	2.647	26	
	Medium dense, greyish and yellowish mottled silty SAND. (Completely Weathered gneiss)	Split spoon	13.0 - 13.45	100	100	71	39	—	—	—	—	—	—	—	—	—	—	—	—	—	27			
	Medium dense, greyish, and yellowish mottled silty SAND with a yellowish and reddish brown clay layer from 14.31 to 14.45m. (Highly Weathered gneiss)	Split spoon	14.5 - 14.95					36	29	7	—	—	—	—	A-4	(	1	)	SM - SC	—	28	
		Stiff, yellowish and brownish silty CLAY.	Split spoon	16.0 - 16.45	100	100	95	58	49	38	11	—	—	—	—	A-7-5	(6)	ML	—	51		

Borehole Soil Samples Classification Summaries																						
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)								
BH # 9 km 7+705	(Completely Weathered Gneiss)																					
	Stiff, yellowish, orangish and light greenish multi colored silty CLAY. (Highly Weathered Gneiss)	Soil core sample	16.75 - 17.0	100	100	92	59	47	38	9	0	53	39	8	A-5	(	6	)	ML	2.725	44
	Very stiff, dark grey, yellowish, light greenish and orangish multi colored silty CLAY with extremely weak black highly weathered gneiss. (Highly Weathered Gneiss)	Split spoon	19.55 - 20.0	100	98	82	46	43	34	9	—	—	—	—	A-5	(	2	)	SC	—	32
	Firm, reddish brown silty CLAY.	Split spoon	1.00 - 1.45	100	99	87	57	—	—	—	—	—	—	—	—	—	—	—	—	—	26	
	Stiff, reddish brown silty CLAY.	Split spoon	3.00 - 3.45					53	27	26	—	—	—	—	A-7-6	(	12	)	CH	—	25
	Stiff, reddish brown silty gravelly CLAY. Gravel angular and fine.	Split spoon	4.50 - 4.95	99	95	83	58	48	25	23	—	—	—	—	A-7-6	(	11	)	CL	—	23
	Stiff, light yellowish and reddish sandy silty CLAY.	Split spoon	6.00 - 6.45	99	96	72	39	37	26	11	—	—	—	—	A-6	(	1	)	SC	—	20
	Firm, light yellowish, reddish brown sandy silty CLAY.	Undisturbed	7.50 - 7.70	100	100	90	61	44	34	10	0	45	36	20	A-5	(	6	)	ML	2.728	21
	Firm, light yellowish, reddish brown sandy silty CLAY.	Split spoon	7.70 - 8.15	100	99	84	58	41	29	12	—	—	—	—	A-7-6	(	6	)		—	20
	Stiff, light yellowish and reddish sandy clayey SILT.	Split spoon	9.00 - 9.45								—	—	—	—	A-7-6	(	6	)	ML	—	19
	Firm, yellowish orangish clayey sandy SILT.	Undisturbed	10.5 - 10.7	100	99	77	44	46	35	11	—	—	—	—	A-7-5	(	2	)	SC	2.676	19
	Stiff, yellowish orangish clayey sandy SILT.	Split spoon	12.0 - 12.45	99	94	72	48	47	30	17	—	—	—	—	A-7-5	(	5	)	SC	—	21
	Stiff, yellowish orangish clayey sandy SILT.	Undisturbed	13.5 - 13.7	100	95	68	38	44	28	16	5	60	28	8	A-7-6	(	2	)	SC	2.650	17
	Stiff, pinkish, orangish and yellowish clayey sandy SILT	Split spoon	15.0 - 15.45	100	98	85	59	49	35	14	—	—	—	—	A-7-5	(	7	)	ML	—	27
	Stiff, yellowish orangish clayey sandy SILT.	Undisturbed	16.5 - 16.7	99	90	58	32	41	32	9	—	—	—	—	A-2-5	(	0	)	SC	2.641	16
	Very stiff, orangish, yellowish clayey sandy SILT.	Split spoon	19.5 - 19.95	100	97	82	46	37	25	12	2	57	27	15	A-6	(	3	)	SC	2.624	19

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
BH # 10 km 8+100	Very stiff, yellowish, orangish clayey sandy SILT.	Soil core sample	23.15-23.35	100	98	81	38	35	27	8					A-4	(	1	)	SC		17
	Very stiff, light grey, orangish, clayey sandy SILT.	Split spoon	25.5 - 25.95	100	99	86	39	35	30	5					A-4	(	1	)	SM - SC		22
	Very stiff, orangish, yellowish clayey sandy SILT.	Split spoon	29.5 - 29.95	100	99	89	38	41	36	5	—	—	—	—	A-5	(	1	)	SM - SC	—	26
	Soft, reddish brown silty CLAY. (Residual soil)	Split spoon	1.00 - 1.45	100	99	79	36	35	18	17	6	50	11	33	A-6	(	2	)	SC	2.673	14
	Firm, reddish silty CLAY. (Residual soil)	Undisturbed	2.00 - 2.55	99	95	74	36	41	21	20					A-7-6	(	2	)	SC		19
	Firm, reddish brown, gravelly CLAY. (Residual soil). Gravel angular medium to coarse quartz.	Split spoon	2.55 - 3.00	96	89	71	41	—	—	—					—	—	—	—	—		16
	Firm, reddish brown silty CLAY. (Residual soil)	Split spoon	3.80 - 4.25	100	97	82	52	40	23	17	—	—	—	—	A-6	(	6	)	CL	—	24
	Firm, reddish brown silty CLAY. (Residual soil)	Undisturbed	5.20 - 5.70	100	99	87	59	39	22	17	0	43	23	34	A-6	(	8	)	CL	2.693	22
	Firm, reddish brown and light grey silty CLAY. (Residual soil)	Split spoon	7.00 - 7.45	100	99	87	64	45	24	21	—	—	—	—	A-7-6	(	11	)	CL	—	23
	Firm, reddish brown and black sandy gravelly CLAY. (Completely Weathered Gneiss)	Undisturbed	8.00 - 8.25	100	99	83	54	40	24	16	—	—	—	—	A-6	(	6	)	CL	2.714	21
	Stiff, reddish brown silty gravelly CLAY. (Completely weathered Gneiss). Gravel angular fine to medium quartz.	Split spoon	9.75 - 10.20	100	99	83	63	41	24	17	—	—	—	—	A-7-6	(	9	)	CL	—	21
	Stiff, reddish brown and black sandy gravelly CLAY. (Completely Weathered Gneiss) Gravel angular fine to medium quartz.	Undisturbed	11.0 - 11.2	100	95	84	67	42	26	16	5	37	17	41	A-7-6	(	9	)	CL - ML	2.683	22
	Stiff, reddish brown and black sandy gravelly CLAY. (Completely Weathered Gneiss). Gravel angular fine quartz.	Split spoon	11.2 - 11.65	—	—	—	—	—	—	—					—	—	—	—	21		
	Stiff, reddish brown and black sandy CLAY. (Completely Weathered Gneiss)	Split spoon	12.5 - 12.95	100	98	79	58	41	21	20	—	—	—	—	A-7-6	(	9	)	CL	—	24
	Stiff, reddish brown, black and dark grey silty	Split spoon	14.0 - 14.45	100	99	82	60	42	23	19	—	—	—	—	A-7-6	(	9	)	CL	—	22

Borehole Soil Samples Classification Summaries																				
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class	Soil	USCS	Sp. Gravity	NMC %	
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)						
BH # 11 km 9+980	CLAY. (Highly Weathered Gneiss)																			
	Very stiff, orangish and greyish mottled sandy silty CLAY. (Highly Weathered Gneiss)	Split spoon	15.55-16.0	100	99	88	63	36	19	17	—	—	—	—	A-6	(8)	CL	—	26	
	Soft, dark grey CLAY. (Residual soil)	Undisturbed	2.00 - 2.70	100	100	98	91	54	22	32	3	23	33	41	A-7-6	(19)	CH	2.545	33	
	Soft, dark grey CLAY. (Residual soil)	Split spoon	2.70 - 3.15	100	100	98	93	52	24	28	—	—	—	—	A-7-6	(18)	CH	—	34	
	Firm, dark grey CLAY. (Residual soil)	Undisturbed	5.00 - 5.50	100	100	96	74	55	27	28	0	32	24	43	A-7-6	(18)	CH	2.583	28	
	Firm, dark grey and orange brown CLAY.	Split spoon	7.00 - 7.45	100	99	82	67	45	19	26	—	—	—	—	A-7-6	(14)	CL	—	31	
	Stiff, yellowish and greenish extremely thinly banded sandy CLAY with some medium to coarse quartz gravel. (highly Weathered Gneiss)	Undisturbed	8.00 - 8.25	100	99	91	65	58	23	35	0	29	21	50	A-7-6	(17)	CH	2.629	26	
	Stiff, yellowish grey, sandy silty CLAY.	Split spoon	10.0-10.45	97	94	69	43	42	29	13	—	—	—	—	A-7-6	(3)	SC	—	27	
	Very stiff, light yellowish micaceous silty CLAY.	Split spoon	12.0-12.45	98	93	59	25	30	27	3	9	70	17	4	A-2-4	(0)	SM	2.727	18	
	Medium dense, light grey medium grained gravelly sand.	Split spoon	16.0-16.45	95	83	35	76	0	0	0	—	—	—	—	A-4	(8)	SM	—	21	
BH # 12 km 11+030	Firm, reddish brown silty CLAY. (Residual soil)	Undisturbed	2.00 - 2.15	100	100	81	58	51	31	20	—	—	—	—	A-7-5	(10)	MH	2.619	21	
	Firm, reddish brown silty CLAY. (Residual soil)	Split spoon	2.15 - 2.60	—	—	—	—	—	—	—	2	37	13	48	—	—	—	—	2.793	19
			3.80 - 4.25	100	99	90	68	51	29	22					A-7-6	(13)	MH	2.781		21
	Stiff, reddish brown silty CLAY. (Residual soil)	Undisturbed	5.20 - 5.40	100	99	91	70	49	30	19	—	—	—	—	A-7-5	(12)	ML	2.781	21	
	Stiff, reddish brown silty CLAY. (Residual soil)	Split spoon	5.40 - 5.85	—	—	—	—	—	—	—	0	33	18	48	—	—	—	—	2.764	24
			7.00 - 7.45	100	99	91	74	54	29	25					A-7-6	(17)	CH	2.847		27
	Stiff, reddish brown silty CLAY. (Residual soil)	Split spoon	10.5-10.95	100	100	91	75	53	31	22	0	29	18	53	A-7-5	(15)	MH	2.847	27	
Stiff, reddish brown silty CLAY. (Residual soil)	soil core sub sample	11.6-11.75	100	99	87	73	56	33	23	—	—	—	—	A-7-5	(16)	MH	2.750	25		

Borehole Soil Samples Classification Summaries																						
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil	USCS	Sp. Gravity	NMC %
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)								
	Stiff, yellowish and reddish brown silty gravelly CLAY with extremely weak black weathered Gneiss. (Completely Weathered Gneiss)	Split spoon	14.0-14.45	100	99	90	73	51	26	25	—	—	—	—	A-7-6	(	16	)	CH	—	25
	Stiff, yellowish and reddish brown extremely thinly bedded silty gravelly CLAY. Gravel angular to sub rounded fine to medium quartz. (Completely Weathered Gneiss)	soil core sub sample	17.55-17.8	98	95	81	60	50	21	29	3	38	40	19	A-7-6	(	14	)	CL - CH	2.648	20
	Stiff, reddish brown, slightly gravelly CLAY. Gravel fine quartz.	Split spoon	1.00 - 1.45	100	97	89	70	56	30	26	—	—	—	—	A-7-5	(	16	)	CH - MH	—	23
BH # 13 km 11+510	Very stiff, reddish brown CLAY with some fine quartz gravel.	Split spoon	2.40 - 2.85	99	95	86	70	—	—	—	5	27	15	53	—	—	—	—	—	2.690	26	
			4.10 - 4.55	99	95	86	70	—	—	—	—	—	—	—	—	—	—	—	—	—	23	
			5.50 - 5.95	99	95	86	70	58	28	30	—	—	—	—	A-7-6	(	18	)	CH	—	24
	Stiff, reddish brown CLAY with some fine quartz gravel and medium gravel size black extremely weak weathered gneiss.	Split spoon	7.00 - 7.45	99	95	86	76	62	27	35	5	26	16	53	A-7-6	(	20	)	CH	2.684	27
			8.60 - 9.05	—	—	—	—	—	—	—					—	—	—	—	—		—	—
	Stiff, reddish brown CLAY with some fine quartz gravel and medium gravel size black extremely weak weathered gneiss. (Completely Weathered Gneiss.)	Soil core sub sample	7.55 - 7.75	100	96	87	75	65	29	36	—	—	—	—	A-7-6	(	20	)	CH	2.692	22
	Very stiff, dark grey and orange brown micaceous sandy SILT with some medium gravel size very weak weathered gneiss.	Split spoon	10.0-10.45	100	95	60	27	0	0	0	—	—	—	—	A-2-4	(	0	)	SM	—	17
	Hard orange brown and grey gravelly SAND. (Weathered gneiss)	Split spoon	15.0-15.45	98	91	54	17	0	0	0	—	—	—	—	A-2-4	(	0	)	SM	—	13
BH # 14 km 11+730	Firm, yellowish brown silty CLAY with medium to coarse gravel size weathered rock. (Highly Weathered Gneiss)	Split spoon	1.00 - 1.45	81	77	69	49	47	22	25	—	—	—	—	A-7-6	(	8	)	SC	—	23
	Firm, yellowish, whitish and greyish micaceous silty SAND. (Highly Weathered Gneiss)	Split spoon	2.50 - 2.95	99	95	81	48	41	23	18	6	50	20	25	A-7-6	(	5	)	SC	2.736	22

Borehole Soil Samples Classification Summaries																								
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil USCS	Sp. Gravity	NMC %			
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)										
16 km ↑ BH # 15 km 12+095	Very dense, greyish and whitish, fine to medium grained SAND. (Moderately weathered Gneiss)	Split spoon	4.00 - 4.45	100	85	57	19	0	0	0	15	68	13	4	A-2-4	(	0	)	SM	2.777	14	
	Extremely weak, thinly laminated dark grey and black crystalline and micaceous medium grained Gneiss.		5.50 - 5.63	—	—	—	—	—	—	—					—	—	—	—	—		—	—	—	11
			7.00 - 7.14	—	—	—	—	—	—	—					—	—	—	—	—		—	—	11	
	Firm, reddish brown silty CLAY. (Residual soil)	Split spoon	1.00 - 1.45	100	99	90	63	52	30	22	—	—	—	—	A-7-5	(	12	)	MH	—	25	
	Firm, reddish brown, silty CLAY. (Residual soil)	Undisturbed	2.00 - 2.40	98	96	83	50	51	32	19	—	—	—	—	A-7-5	(	7	)	MH	2.722	25	
	Soft, reddish brown silty CLAY. (Residual soil)	Split spoon	2.40 - 2.85	98	96	85	60	—	—	—	4	39	22	34	—	—	—	—	—	2.752	24			
	Firm, reddish brown silty CLAY. (Residual soil)	Split spoon	3.90 - 4.35	—	—	—	—	—	—	—					—	—	—	—	—		—	—	—	25
		Undisturbed	5.00 - 5.35	100	99	87	56	50	30	20					A-7-5	(	9	)	ML - MH		22	
		Split spoon	5.35 - 5.80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26						
	Stiff, reddish brown silty CLAY with some fine angular quartz gravel. (Completely Weathered Granite)	Split spoon	7.00 - 7.45	100	98	86	61	52	28	24	—	—	—	—	A-7-6	(	12	)	CH	—	21	
	Stiff, reddish brown silty CLAY with some fine angular quartz gravel. (Completely weathered Granite)	soil core	8.00 - 8.17	100	100	80	69	54	27	27	0	38	16	46	A-7-6	(	16	)	CH	2.723	20	
		Split spoon	8.50 - 8.95	100	100	80	69	—	—	—					—	—	—	—	—		—	—	27	
		Split spoon	10.1 - 10.55	100	100	80	69	—	—	—					—	—	—	—	—		—	—	—	24
	Stiff, reddish brown silty CLAY with some fine angular quartz gravel. (Completely weathered Granite)	soil core	11.3 - 11.6	100	97	87	58	52	29	23	—	—	—	—	A-7-6	(	11	)	CH - MH	2.739	23	
	Stiff, reddish brown and blackish silty CLAY with some fine angular quartz gravel. (Completely Weathered Granite)	Split spoon	13.1 - 13.55	89	83	70	51	45	25	20	—	—	—	—	A-7-6	(	7	)	CL	—	20	
	16 km ↑	Soft, yellowish and light grey silty CLAY. (completely Weathered Granite)	Split spoon	1.00 - 1.45	—	—	—	—	—	—	—	4	36	12	48	—	—	—	—	—	2.665	18		

Borehole Soil Samples Classification Summaries

[illegible]

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class Soil USCS				Sp. Gravity	NMC %	
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
	Dense, light green, yellowish and light grey clayey silty gravelly SAND. (Highly Weathered Granite) Gravel angular fine to medium quartz.	Split spoon	15.55-16.0					–	–	–	–	–	–	–	–	–	–	–	–	27	
BH # 17 km 14+665	Soft, dark grey silty CLAY. (Residual soil)	Split spoon	1.00 - 1.45	100	100	97	86	50	25	25	–	–	–	–	A-7-6	(	16	)	CL - CH	–	30
	Soft to firm, light grey and yellowish brown sandy CLAY. (Residual soil)	Undisturbed	2.00 - 2.70	100	100	95	81	66	30	36	0	17	24	60	A-7-5	(	20	)	CH	2.490	37
	Very soft, dark grey silty CLAY. (Residual soil)	Split spoon	2.70 - 3.15	100	100	95	81	–	–	–					–	–	–	–	–		–
	Firm, yellowish grey silty CLAY. (Completely Weathered Granite)	Split spoon	4.20 - 4.65	100	100	96	77	58	30	28	–	–	–	–	A-7-5	(	19	)	CH	–	40
	Firm, orange brown, dark grey and pinkish multi colored sandy gravelly CLAY. (Completely Weathered Granite)	Undisturbed	5.15 - 5.50	100	100	95	73	61	27	34	0	11	25	64	A-7-6	(	19	)	CH	2.543	28
	Very stiff, yellowish silty gravelly CLAY. (Highly Weathered Granite). Gravel angular medium quartz.	Split spoon	7.00 - 7.45	90	73	54	39	40	20	20	–	–	–	–	A-6	(	3	)	SC	–	21
	Very soft, greyish silty CLAY with decomposing grasses and rootlets. (Alluvium)	Split spoon	1.10 - 1.55	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	35
BH # 18 km 14+995	Stiff, light grey sandy gravelly CLAY. Gravel fine to medium quartz. (Alluvium)	Undisturbed	2.00 - 2.45	100	98	77	55	46	20	26	1	40	11	48	A-7-6	(	11	)	CL	2.564	13
	Medium dense, light grey clayey silty SAND. (Alluvium)	Split spoon	2.45 - 2.90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	18
	Stiff, dark grey sandy silty CLAY. (Alluvium)	Split spoon	4.00 - 4.45	–	–	–	–	–	–	–	0	53	12	35	–	–	–	–	–	2.596	13
	Stiff, dark grey silty CLAY. (Alluvium)	Split spoon	5.50 - 5.95	100	98	75	48	32	16	16					A-6	(	5	)	SC		19
	Firm, yellowish brown silty CLAY. (Residual soil)	Split spoon	7.00 - 7.95	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		25
	Firm, orange brown and light grey sandy gravelly CLAY. (Residual soil)	Undisturbed	8.00 - 8.60	100	98	75	41	34	20	14	–	–	–	–	A-6	(	2	)	SC	2.666	19
	Stiff, orange brown, whitish and greyish sandy gravelly CLAY. Gravel angular, fine to medium quartz. (Highly weathered Gneiss)	Undisturbed	11.0-11.5	100	99	73	42	31	15	16	–	–	–	–	A-6	(	3	)	SC	2.643	15

Borehole Soil Samples Classification Summaries																										
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class				Soil	USCS	Sp. Gravity	NMC %				
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)												
	Stiff, light grey and brown sandy silty CLAY. (Highly Weathered Gneiss)	Split spoon	11.5-11.95	100	100	78	44	30	17	13	—	—	—	—	A-6	(	3	)	SC	—	17			
	Stiff, orange brown, whitish and greyish sandy gravelly CLAY. Gravel angular, fine to medium quartz. (Highly weathered Gneiss)	Soil core sample	14.1-14.4	85	78	64	31	37	18	19	—	—	—	—	A-2-6	(	1	)	SC	2.652	15			
BH # 19 km 16+070	Firm, reddish brown silty CLAY. (Residual soil)	Split spoon	1.00 - 1.45	100	95	88	73	61	31	30	0	41	24	36	A-7-5	(	19	)	CH -MH	2.714	27			
	Firm, reddish brown micaceous silty CLAY. (Residual soil)	Undisturbed	2.00 - 2.40	100	100	93	65	54	42	12					A-7-5	(	9	)	CH		27			
	Firm, reddish brown micaceous silty CLAY. (Residual soil)	Split spoon	2.40 - 2.85	—	—	—	—	—	—	—	0	56	30	13	—	—	—	—	—	2.692	26					
	Firm, reddish brown micaceous silty CLAY. (Residual soil)	Split spoon	3.80 - 4.25	100	100	91	65	56	42	14					—	—	—	—	A-7-5		(10)	MH	—	24
	Firm, yellowish and pinkish brown mottled micaceous silty CLAY. (Completely Weathered Gneiss)	Split spoon	5.0 - 5.45	100	100	96	53	—	—	—					0	56	30	13	—		—	—	—	—	2.692	20
		Undisturbed	6.5 - 6.8	100	100	96	53	47	39	8	A-5	(	4	)					ML		17			
		Split spoon	6.8 - 7.25	100	100	96	53	—	—	—	—	—	—	—					—		—	—	—	21		
	Firm, yellowish brown micaceous silty CLAY. (Completely Weathered Gneiss)	Split spoon	8.5 - 8.95	100	100	96	53	—	—	—	—	—	—	—	—	—	—	—	—	2.719	19					
	Firm, pinkish brown, greyish and whitish very micaceous silty CLAY. (Completely Weathered Gneiss)	Undisturbed	9.50 - 9.90	100	100	97	55	40	37	3					—	—	—	—	A-4		(4)	ML	19	
	Firm, pinkish and yellowish brown micaceous silty CLAY. (Completely Weathered Gneiss)	Split spoon	9.90-10.35	100	100	96	51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22				
	Firm, greyish, yellowish and pinkish brown micaceous silty CLAY. (Completely Weathered Gneiss)	Split spoon	11.5-11.95	100	100	95	59	0	0	0	—	—	—	—	A-4	(	5	)		—	24			
	Stiff, greyish thickly laminated very micaceous silty CLAY. (Completely Weathered Gneiss)	Undisturbed	12.5-12.7	100	100	95	41	0	0	0	—	—	—	—	A-4	(	1	)	SM	2.700	18			
	Stiff, greyish and yellowish, thickly laminated	Split spoon	13.75-14.2	100	100	96	52	0	0	0	0	52	33	15	A-4	(	3	)	ML	2.694	24			

Borehole Soil Samples Classification Summaries																					
BH No	Field Material Description	Sample Type	Depth (m)	% pass (mm)				LL %	PL %	PI %	Hydrometer test				AASHTO Class Soil USCS				Sp. Gravity	NMC %	
				4.750	2.000	0.425	0.075				Gravel (%)	Sand (%)	Silt (%)	Clay (%)							
	very micaceous silty CLAY. (Completely weathered Gneiss)	Split spoon	15.75-16.2	100	100	95	54	—	—	—					—	—	—	—	—		24
		Split spoon	17.75-18.2	—	—	—	—	—	—	—					—	—	—	—	—		21
	Stiff, greyish and yellowish, thickly laminated very micaceous silty CLAY. (Completely weathered Gneiss)	Split spoon	19.75-20.2	100	100	97	53	0	0	0	—	—	—	—	A-4	(	4	)	ML	—	23