

**ANNEXURE - I**  
**BOREHOLE LOG SHEETS**

# Borehole Log Details

Sheet 1 of 4

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram

LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram

BOREHOLE NO: 01 (BH-01)

WATER TABLE (from GL): 8.15m

Date of start: 08/09/2017


Date of finish: 12/09/2017

Type of Boring: Rectary boring

Borehole diameter: 100mm

Total depth: 29.73m

Purpose: Three storey Biotech Lab building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values		Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion KN/m <sup>2</sup>	Dry unit weight KN/m <sup>3</sup>
				Depth, m	15cm	30cm	45cm	N Value		0	100								
0.00m																			
2.20m		SPT		1.85m	5	11	21	32	Dark brown gravelly sand with silt & some clay (coarse, medium & fine sand)	32	30			22	52	26	16.9		
3.70m		SPT		3.11m	9	16	23	39	Brownish red & light grey laterite, silty sand with gravel & clay (coarse, medium & fine sand)	39	38			25	52	23	24.9		
5.00m		SPT		4.70m	3	7	17	21	Brownish red & light grey laterite, silty sand (c. medium & fine sand)	21	20			14	55	31	24.7		
6.30m		SPT		5.25m	11	6	12	18	Brownish red & light grey laterite, silty sand with clay (medium & fine sand)	18	18			0	68	32	29.6		
8.00m		SPT		6.80m	5	7	8	15	Light brown & light grey silty sand (medium & fine sand)	15	15			0	58	42	32.0		
9.50m		SPT		8.44m	4	6	28	34	Brownish red & light grey laterite, gravelly sand with silt & clay (coarse, medium & fine sand)	34	34			0	64	36	24.9		
11.50m		SPT		10.03m	6	14	32	46	Light brown silty, fine sand (medium & fine sand)	46	46			12	64	24	24.6		
13.50m		SPT		12.34m	3	11	11	22	Light brownish yellow silty sand (coarse, medium & fine sand)	22	22			0	75	25	27.5		

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 01 (BH-01)  
 WATER TABLE (from GL): 8.15m

Date of start: 08/09/2017  
 Date of finish: 12/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 29.73m  
 Purpose: Three storey Biotech Lab building

## Borehole Log Details

Sheet 2 of 4

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values		Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion kN/m <sup>2</sup>	Dry unit weight kN/m <sup>3</sup>	
				Depth, m	15cm	30cm	45cm	N Value		0	100									
13.50m																				
14.35m		SPT		6	11	15	26	Brown silty sand (coarse, medium & fine sand)	25	50										
15.50m																				
16.54m		SPT		30	(balance=30cm)		> 50	Brown & light grey silty sand (coarse, medium & fine sand)	50	50										
17.50m																				
18.42m		SPT		20	25 & rebound (balance=22.5cm)		> 50	Brown & light grey silty fine & medium sand (coarse, medium & fine sand)	50	50										
19.00m																				
19.99m		SPT		10 & rebound (balance=41cm)			> 50	Brown weathered rock material: silty sand (medium & fine sand)	50	50										
20.50m																				
21.51m		SPT		16	10 & rebound (balance=28cm)		> 50	Dark greenish grey weathered rock material: silty sand (coarse, medium & fine sand)	50	50										
21.51m								Weathered/soft rock stratum												

# Borehole Log Details

**PROJECT:** KSIDC Non Technical Buildings, Thiruvananthapuram  
**LOCATION:** Life Science Park, Thonnakkal, Thiruvananthapuram  
**BOREHOLE NO:** 01 (BH-01)  
**WATER TABLE (from GL):** 8.15m

**Date of start:** 08/09/2017  
**Date of finish:** 12/09/2017  
**Type of Boring:** Rotary boring

**Sheet 3 of 4**  
**Borehole diameter:** 100mm  
**Total depth:** 29.73m  
**Purpose:** Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	Size of core pieces				DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
		<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size								>150mm size	TEST SECTION	By Applied Pressure Method (kg/sq.cm)	By Pressure Method (l/m)	
21.51m	Brown soft rock							NX	Other sizes		Complete						
23.21m	Brown soft rock										Partial						Core Recovery = 16/170 = 9.4% RQD = 16/170 = 9.4% Total no. of pieces = 1
25.00m	Brown soft rock										No						Core Recovery = 130/179 = 72.6% RQD = 55/179 = 30.7% Total no. of pieces = 12++
26.54m	Brown soft rock																Core Recovery = 29/154 = 18.8% RQD = 10/154 = 6.5% Total no. of pieces = 3++
28.34m	Light brownish grey jointed medium hard rock																Core Recovery = 141/180 = 78.3% RQD = 112/180 = 62.2% Total no. of pieces = 11++

# Borehole Log Details

Sheet 4 of 4

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 01 (BH-01)  
 WATER TABLE (from GL): 8.15m

Date of start: 08/09/2017  
 Date of finish: 12/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 29.73m  
 Purpose: Three storey Biotech Lab building

LOG	LITHOLOGY	Size of core pieces	Structural Conditions	DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING Other sizes	Depth of water level, m	Water Loss	TEST SECTION	PERCOLATION TEST					REMARKS
													By Applied Pressure Method	Loss (l/m)	Depth of water level	By Falling Head Method	Time Interval	
28.34m	Light brownish grey jointed medium hard rock	<10mm size			20	20	NX		20		No	Not Conducted					Core Recovery = 83/139 = 59.7% RQD = 28/139 = 20.1% Total no. of pieces = 7++	
29.73m		10 to 25mm size			40	40			40		Partial							
		25 to 75mm size			60	60			60		Complete							
		75 to 150mm size			80	80			80									
		>150mm size			100	100			100									


END OF BOREHOLE

# Borehole Log Details,

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 02 (BH-02)  
 WATER TABLE (from GL): 6.10m

Date of start: 13/09/2017  
 Date of finish: 15/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 33.90m  
 Purpose: Three storey Biotech Lab building

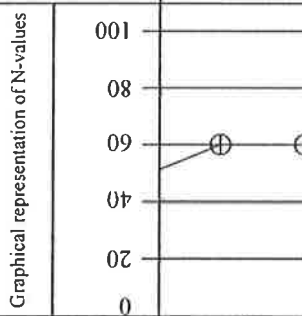
Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values		Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion KN/m <sup>2</sup>	Dry unit weight KN/m <sup>3</sup>
				Depth, m	15cm	30cm	45cm	N Value		0	100								
0.00m																			
1.48m		SPT		3	8	15	23	Brownish red laterite; sandy gravel with silt & clay (coarse, medium & fine sand)	20	23		48	29	23	17.8	-	-	-	
3.33m		SPT		5	16	21	37	Reddish brown & grey laterite; silty clay with sand (medium & fine sand)	37	21		0	38	62	24.2	-	-	-	
4.48m		SPT		6	11	14	25	Reddish brown & grey laterite; gravelly sand with silt & clay (coarse, medium & fine sand)	25	14		10	38	52	28.1	-	-	-	
6.13m		SPT		8	12	13	25	Brownish red & grey laterite; clayey silt with sand (medium & fine sand)	25	13		0	40	60	31.2	-	-	-	
8.32m		SPT		4	8	9	17	Yellow silty sand (coarse, medium & fine sand)	17	9		0	62	38	27.3	-	-	-	
10.42m		SPT		8	27	10 & rebound (balance=12.5cm)	> 50	Brown silty sand (coarse, medium & fine sand)	> 50	10 & rebound (balance=12.5cm)		0	79	21	19.2	-	-	-	
12.74m		SPT		7	19	22	41	Brown silty fine & med um sand (coarse, medium & fine sand)	41	22		0	75	25	16.9	-	-	-	
14.00m																			

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 02 (BH-02)  
 WATER TABLE (from GL): 6.10m

Date of start: 13/09/2017  
 Date of finish: 15/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 33.90m  
 Purpose: Three storey Biotech Lab building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion kN/m <sup>2</sup>	Dry unit weight kN/m <sup>3</sup>
				Depth, m	15cm	30cm	45cm	N Value									
14.00m																	
15.50m		SPT		15.07m	25 & rebound	-	-	-	> 50	Grey weathered rock material; silty sand (coarse, medium & fine sand)		0	85	15	09.5		
16.56m		SPT		16.56m	20 & rebound	-	-	-	> 50	Greenish grey weathered rock material; silty sand (coarse, medium & fine sand)		0	85	15	13.8		40
										Weathered/soft rock stratum							17.1



# Borehole Log Details

Sheet 3 of 5

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 02 (BH-02)  
 WATER TABLE (from GL): 6.10m

Date of start: 13/09/2017  
 Date of finish: 15/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 33.90m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY		Size of core pieces				DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING Other sizes mm, NX, EX, AX	Depth of water level, m	Water Loss No Partial Complete	PERCOLATION TEST				REMARKS
	LOG	DESCRIPTION	<10mm size	10 to 25mm size	25 to 75mm size	>75mm size									TEST SECTION	Pressure (kg/sq.cm)	Loss (l/m)	Depth of water level	
16.56m																			
17.97m		Dark brownish grey soft rock					60	20											Core Recovery = 98/141 = 69.5% RQD = 24/141 = 17.0% Total no. of pieces = 12++
19.37m		Dark brownish grey soft rock					40	20	NX										Core Recovery = 38/140 = 27.1% RQD = 0/140 = zero Total no. of pieces = 5++
20.77m		Light greyish brown soft rock					40	20											Core Recovery = 52/140 = 37.1% RQD = 45/140 = 32.1% Total no. of pieces = 5
22.56m		Light greyish brown soft rock & some jointed medium hard rock					10	20											Core Recovery = 20/179 = 11.2% RQD = 0/179 = zero Total no. of pieces = ++ (all small)



# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 02 (BH-02)  
 WATER TABLE (from GL): 6.10m

Date of start: 13/09/2017  
 Date of finish: 15/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 33.90m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	Size of core pieces					PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
		<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size	>150mm size							TEST SECTION	Pressure (kg/sq.cm)	Loss (l/m)	Depth of water level	
-22.56m																	
24.23m	Light greyish brown soft rock						40	40	NX								Core Recovery = 58/167 = 34.7% RQD = 0/167 = zero Total no. of pieces = 6++
25.86m	Light greyish brown soft rock						60	60									Core Recovery = 130/163 = 79.8% RQD = 113/163 = 69.3% Total no. of pieces = 7
27.56m	Light yellowish brown soft rock						40	40									Core Recovery = 77/170 = 45.3% RQD = 52/170 = 30.6% Total no. of pieces = 7
29.30m	Light yellowish brown soft rock						20	20									Core Recovery = 34/174 = 19.5% RQD = 10/174 = 5.7% Total no. of pieces = 4++

# Borehole Log Details

Sheet 5 of 5

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 02 (BH-02)  
 WATER TABLE (from GL): 6.10m

Date of start: 13/09/2017  
 Date of finish: 15/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 33.90m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	Size of core pieces	Structural Conditions	DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
											TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	Depth of water level	
29.30m		<10mm size								No					
30.55m	Light yellowish brown soft rock	10 to 25mm size			45	25		mm NX, BX, AX		Partial					Core Recovery = 66/125 = 52.8% RQD = 41/125 = 32.8% Total no. of pieces = 6
31.75m	Light brownish grey soft rock	25 to 75mm size			55	35				Partial					Core Recovery = 95/154 = 61.7% RQD = 52/154 = 33.8% Total no. of pieces = 8++
32.09m	Light brownish grey medium hard rock	75 to 150mm size			85	45				Partial					Core Recovery = 160/181 = 88.4% RQD = 83/181 = 45.9% Total no. of pieces = 16++
33.90m	Brown highly jointed hard rock	>150mm size			85	45				Complete					
Not Conducted Not Conducted Not Conducted															


END OF BOREHOLE

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 03 (BH-03)  
 WATER TABLE (from GL): 7.15m

Date of start: 18/09/2017  
 Date of finish: 19/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 28.81m  
 Purpose: Three storey Biotech Lab building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of Water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values	Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion $kN/m^2$	$\phi$	Dry unit weight $kN/m^3$
				Depth, m	15cm	30cm	45cm	N Value											
0.00m																			
1.58m		SPT		7	17	32	49	Reddish brown laterite; silty sand (coarse, medium & fine sand)	50			0	74	26	14.7				
3.24m		SPT		5	6	11	17	Light grey & brown laterite; silty clay with fine sand (medium & fine sand)	20			0	22	78	20.4				
4.69m		SPT		3	8	9	17	Grey & some brown silty clay with fine sand (medium & fine sand)	20			0	20	80	23.5				
6.66m		SPT		5	11	24	35	Brownish red & light grey laterite; silty sand with some clay (coarse, medium & fine sand)	35			0	70	30	16.9				
8.74m		SPT		7	13	16	29	Dark reddish brown & white laterite silty sand with some clay (coarse, medium & fine sand)	30			0	69	31	23.3				
10.98m		SPT		4	10	35	45	Brownish red silty sand (coarse, medium & fine sand)	45			0	73	27	25.7				
13.30m		SPT		9	27	25 & rebound (balance=8.5cm)	> 50	Brown silty sand (medium & fine sand)	50			0	70	30	14.7				
14.00m																			

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram

LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram

BOREHOLE NO: 03 (BH-03)

WATER TABLE (from GL): 7.15m

Date of start: 18/09/2017

Date of finish: 19/09/2017

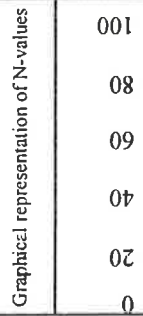
Type of Boring: Rotary boring

Borehole diameter: 100mm

Total depth: 28.81m

Purpose: Three storey Biotech Lab building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion kN/m <sup>2</sup>	φ	Dry unit weight kN/m <sup>3</sup>
				Depth, m	15cm	30cm	45cm	N Value										
14.00m																		
16.00m		SPT		15.28m	10	32	20 & rebound (balance=10cm)	> 50	Reddish brown silty sand (coarse, medium & fine sand)			0	78	22	12.2			
17.50m		SPT		17.06m	15 & rebound (balance=35cm)	-	-	> 50	Grey weathered rock material; silty sand (coarse, medium & fine sand)			0	82	18	15.1			
18.66m		SPT		18.66m	15 & rebound (balance=36cm)	-	-	> 50	Brown weathered rock material; silty medium sand (coarse, medium & fine sand)			0	80	20	16.9	0	40	17.1
									Weathered/soft rock stratum									



# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 03 (BH-03)  
 WATER TABLE (from GL): 7.15m

Date of start: 18/09/2017  
 Date of finish: 19/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 28.81m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY DESCRIPTION	Size of core pieces					PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING Other sizes mm NX BX AX	Depth of water level, m	Water Loss No Partial Complete	PERCOLATION TEST				REMARKS	
		<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size	>150mm size							TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	Depth of water level		By Falling Head Method
-18.66m	Brown soft rock						20											
20.24m	Grey soft rock (grain size: silty medium sand)						20											Core Recovery = 37/158 = 23.4% RQD = 35/158 = 22.2% Total no. of pieces = 2+
22.02m	Brown & grey soft rock						20											Core Recovery = 0/178 = zero RQD = 0/178 = zero Total no. of pieces = ++ (all small) (SPT at 21.87m; N=30 & rebound, -, - > 50; water content = 10.2%)
23.80m	Grey soft rock						20											Core Recovery = 24/178 = 13.5% RQD = 15/178 = 8.4% Total no. of pieces = 2++
25.36m																		Core Recovery = 49/156 = 31.4% RQD = 22/156 = 14.1% Total no. of pieces = 7

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvaranthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 03 (BH-03)  
 WATER TABLE (from GL): 7.15m

Date of start: 18/09/2017  
 Date of finish: 19/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 28.81m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	DESCRIPTION	Size of core pieces				PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
			<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size								>150mm size	TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	
25.36m																		
26.20m	Grey soft rock					40	20											Core Recovery = 80/158 = 50.6% RQD = 18/158 = 11.4% Total no. of pieces = 9
26.94m	Grey jointed medium hard rock					45	20											Core Recovery = 77/187 = 41.2% RQD = 24/187 = 12.8% Total no. of pieces = 10
28.81m	Light greyish brown jointed hard rock							NX										Not Conducted

END OF BOREHOLE


PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 04 (BH-04)  
 WATER TABLE (from GL): 4.60m

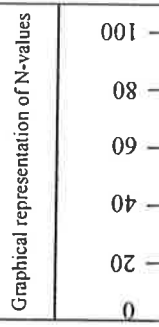
Date of start: 21/09/2017  
 Date of finish: 22/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 29.06m  
 Purpose: Three storey Biotech Lab building

Sheet 1 of 4

## Borehole Log Details

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Liquid limit %	Plastic limit %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion $\frac{KN}{m^2}$	Dry unit weight $\frac{KN}{m^3}$
				Depth, m	15cm	30cm	45cm	N Value									
0.00m																	
2.50m		SPT		1.47m	10	14	14	28	Brown laterite; silty sand (coarse, medium & fine sand)			0	72	28	20.5		
4.00m		SPT		3.04m	5	25	10 & rebound (balance=13.5cm)	> 50	Brownish red laterite; silty sand (coarse, medium & fine sand)			0	78	22	21.6		
6.00m		SPT		4.62m	7	13	31	44	Light reddish brown laterite; silty sand (coarse, medium & fine sand)			0	72	28	19.9		
8.00m		SPT		6.58m	6	12	27	39	Reddish brown laterite; silty sand (coarse, medium & fine sand)			0	74	26	23.5		
10.00m		SPT		8.86m	10	24	26 & rebound (balance=8.5cm)	> 50	Brown laterite; silty medium sand (coarse, medium & fine sand)			0	77	23	24.2		
12.00m		SPT		10.91m	21	10 & rebound (balance=29cm)	-	> 50	Light yellowish grey silty medium sand (coarse, medium & fine sand)			0	79	21	20.1		
12.99m		SPT		12.99m	5 & rebound (balance=4.5cm)	-	-	> 50	Yellowish brown silty medium sand (medium & fine sand)			0	82	18	19.6		
									Weathered/soft rock stratum								17.1



# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 04 (BH-04)  
 WATER TABLE (from GL): 4.60m

Date of start: 21/09/2017  
 Date of finish: 22/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 29.06m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	Size of core pieces	DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS		
											TEST SECTION	By Applied Pressure Method (kg/sq.cm)	Loss (l/m)	By Falling Head Method		Time Interval	
-12.99m																	
14.63m	Brown soft rock	<10mm size		40	40					Partial							Core Recovery = 84/164 = 51.2% RQP = 77/164 = 47% Total no. of pieces = 6
16.32m	Light brown soft rock	10 to 25mm size		10	10					No							Core Recovery = 24/169 = 14.2% RQD = 0/169 = zero Total no. of pieces = 4
18.18m	Light greyish brown soft rock (grain size: silty medium sand)	25 to 75mm size		20	20					Partial							Core Recovery = 0/186 = zero RQD = 0/186 = zero Total no. of pieces = ++ (all small) (SPT at 18.155m; N=10 & rebound, -, - > 50; water content = 8.4%)
19.70m	Light yellowish grey soft rock	75 to 150mm size		20	20					Partial							Core Recovery = 40/152 = 26.3% RQD = 22/152 = 14.5% Total no. of pieces = 7++



# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 04 (BH-04)  
 WATER TABLE (from GL): 4.60m

Date of start: 21/09/2017  
 Date of finish: 22/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 29.06m  
 Purpose: Three storey Biotech Lab building

Depth from GL, m	LITHOLOGY	LOG	Size of core pieces				PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
			Structural Conditions	DESCRIPTION	TEST SECTION	Pressure (kg/sq.cm)								Loss (l/m)	Depth of water level	By Applied Pressure Method	By Falling Head Method	
19.70m			< 10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size	> 150mm size											
21.36m	Light yellowish grey soft rock																	Core Recovery = 42/166 = 25.3% RQD = 27/166 = 16.3% Total no. of pieces = 4
22.92m	Light yellowish grey soft rock							NX										Core Recovery = 8/156 = 5.1% RQD = 0/156 = zero Total no. of pieces = 1+
24.34m	Light yellowish grey soft rock																	Core Recovery = 72/142 = 50.7% RQD = 11/142 = 7.7% Total no. of pieces = 10
25.93m	Light brownish yellow & grey soft rock																	Core Recovery = 58/159 = 36.5% RQD = 12/159 = 7.5% Total no. of pieces = 8

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 04 (BH-04)  
 WATER TABLE (from GL): 4.60m

Date of start: 21/09/2017  
 Date of finish: 22/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 29.06m  
 Purpose: Three storey Biotech Lab building

LOG	LITHOLOGY	Size of core pieces				DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING	Depth of water level, B	Water Loss	PERCOLATION TEST				REMARKS
		<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size									>150mm size	TEST SECTION	Pressure (kg/sq.cm)	Loss (l/m)	
25.93m																		
27.52m	Light brownish yellow & grey soft rock					20	100	100				Partial						Core Recovery = 23/159 = 14.5% RQD = 0/159 = zero Total no. of pieces = 3++
29.06m	Light brownish yellow & grey soft rock					30	100	100				Partial						Core Recovery = 44/154 = 28.6% RQD = 15/154 = 9.7% Total no. of pieces = 2++


END OF BOREHOLE

# Borehole Log Details

Sheet 1 of 4

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 05 (BH-05)  
 WATER TABLE (from GL): 4.60m

Date of start: 25/09/2017  
 Date of finish: 28/09/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 35.59m  
 Purpose: Two storey Office Building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values							Dry unit weight KN/m <sup>3</sup>	
				Depth, m	15cm	30cm	45cm	N Value		Liquid limit %	Plastic limit %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion KN/m <sup>2</sup>		$\phi$
0.00m																		
2.00m		SPT		1.57m	4	9	12	21	Brown & light grey laterite; silty sand with clay (coarse, medium & fine sand)	20			0	72	28	18.2		
3.50m		SPT		3.00m	7	20	29	49	Reddish pink laterite; silty clay	50			0	0	100	32.3		
5.50m		SPT		4.50m	6	15	25	40	Light reddish pink laterite; silty sand with clay (medium & fine sand)	40			0	72	28	27.7		
7.50m		SPT		6.15m	8	20	10 & rebound (balance=5cm)	> 50	Brown silty sand (medium & fine sand)	50			0	78	22	28.2		
9.50m		SPT		8.26m	6	13	17	30	Red & light grey laterite; silty sand with two cobble sized stones (coarse, medium & fine sand)	30			0	75	25	14.9		
11.50m		SPT		10.37m	11	17	24	41	Dark brown laterite; sandy grave; with silt & clay (coarse, medium & fine sand)	40				47	25	12.3		
13.00m		SPT		12.52m	10	21	25 & rebound (balance=5cm)	> 50	Light pinkish brown silty fine & medium sand (coarse, medium & fine sand)	50			0	79	21	27.8		
14.50m		SPT		13.99m	3	6	19	25	Brown & light grey laterite; silty sand (coarse, medium & fine sand)	25			0	73	27	25.0		

# Borehole Log Details

Sheet 2 of 4

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 05 (BH-05)  
 WATER TABLE (from GL): 4.60m

Date of start: 25/09/2017  
 Date of finish: 28/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 35.59m  
 Purpose: Two storey Office Building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values	Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion $kN/m^2$	$\phi$	Dry unit weight $kN/m^3$
				Depth, m	15cm	30cm	45cm	N Value											
14.50m																			
16.63m		SPT		8	19	26	45	Grey silty sand with some clay (medium & fine sand)	45			0	78	22	17.8				
19.02m		SPT		12	15 & rebound (balance=26cm)	-	> 50	White weathered rock material; silty sand (medium & fine sand)	> 50			0	87	13	14.8	0	40	17.0	
21.00m		SPT		31 & rebound (balance=30cm)	-	-	> 50	Light grey weathered rock material; silty sand (medium & fine sand)	> 50						13.6				
22.69m		SPT		20 & rebound (balance=30cm)	-	-	> 50		> 50			0	88	12	13.2				
24.34m		SPT		4	30 & rebound (balance=15cm)	-	> 50	Weathered/soft rock stratum	> 50			0	90	10	10.1	0	40	17.1	

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 05 (BH-05)  
 WATER TABLE (from GL): 4.60m

Date of start: 25/09/2017  
 Date of finish: 28/09/2017  
 Type of Boring: Rotary boring  
 Purpose: Two storey Office Building

Borehole diameter: 100mm  
 Total depth: 35.59m

Depth from GL, m	LOG	LITHOLOGY	Size of core pieces				DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS
			<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size								>150mm size	TEST SECTION	By Applied Pressure Method	By Falling Head Method	
24.34m																		
25.95m		Grey soft rock					50	40	NX									Core Recovery = 82/161 = 50.9% RQD = 62/161 = 38.5% Total no. of pieces = 6
27.60m		Grey soft rock					20	20										Core Recovery = 32/165 = 19.4% RQD = 17/165 = 10.3% Total no. of pieces = 3
29.28m		Grey soft rock					35	25										Core Recovery = 53/168 = 31.5% RQD = 45/168 = 26.8% Total no. of pieces = 5
30.83m		Grey soft rock					0	0										Core Recovery = 0/155 = nil RQD = 0/155 = zero Total no. of pieces = ++ (all small)

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 05 (BH-05)  
 WATER TABLE (from GL): 4.60m

Date of start: 25/09/2017  
 Date of finish: 28/09/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 35.59m  
 Purpose: Two storey Office Building


Depth from GL, m	LITHOLOGY	DESCRIPTION	Size of core pieces					PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING Other sizes mm NX BX AX	Depth of water level, m	Water Loss No Partial Complete	PERCOLATION TEST				REMARKS
			<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size	>150mm size								TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	Depth of water level	
30.83m																			
32.27m	Brown soft rock																	Core Recovery = 0/144 = zero RQD = 0/144 = zero Total no. of pieces = ++ (all small)	
33.92m	Brown soft rock								NX									Core Recovery = 9/165 = 5.5% RQD = 0/165 = zero Total no. of pieces = 1++	
35.59m	Yellowish brown & light grey soft rock																	Core Recovery = 55/167 = 32.9% RQD = 49/167 = 29.3% Total no. of pieces = 3++	
END OF BOREHOLE																			

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 06 (BH-06)  
 WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017  
 Date of finish: 02/10/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 37.10m  
 Purpose: Two storey Office Building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Graphical representation of N-values		Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion kN/m <sup>2</sup>	Dry unit weight kN/m <sup>3</sup>
				Depth, m	15cm	30cm	45cm	N Value		0	100								
0.00m																			
1.43m		SPT		5	8	8	8	16	Reddish brown & light grey laterite; gravelly sand with silt & clay (coarse, medium & fine sand)	15	15			18	55	27	17.1		
3.11m		SPT		4	8	8	11	19	White & light grey silty medium sand (medium & fine sand)	15	15			0	68	32	19.1		
4.54m		SPT		9	17	17	30	47	Light brownish pink silty fine & medium sand with clay (coarse, medium & fine sand)	45	45			0	77	23	21.0		
6.18m		SPT		6	18	18	33	51	Light brownish yellow silty fine & medium sand with clay (medium & fine sand)	50	50			0	75	25	27.2		
8.18m		SPT		6	20	20	20 & rebound (balance=8.5m)	> 50	Light brown silty sand (medium & fine sand)	50	50			0	79	21	21.6		
10.28m		SPT		10	22	37	59	59			50	50			0	76	24	22.8	
12.00m		SPT		3	10	16	26	26	Dark brown & dark grey silty sand with clay (coarse, medium & fine sand)	25	25			0	73	27	24.6		
13.50m										60	60								

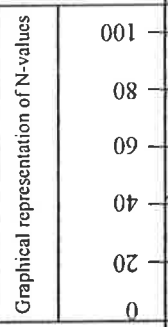
# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 06 (BH-06)  
 WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017  
 Date of finish: 02/10/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 37.10m  
 Purpose: Two storey Office Building

Depth from existing GL, m	Soil Profile	Nature of sampling	Level of water table	SPT - FIELD TEST					Description of the soil	Liquid limit %	Plastic limit, %	Gravel, %	Sand, %	Silt & clay, %	moisture content, %	cohesion $\text{KN/m}^2$	Dry unit weight $\text{KN/m}^3$
				Depth, m	15cm	30cm	45cm	N Value									
13.50m																	
15.00m		SPT		14.61m	15 & rebound	(balance=38.5cm)		> 50	Light reddish brown silty sand (medium & fine sand)			0	78	22	15.5	0	17.1
15.62m		SPT		15.62m	10 & rebound	(balance=41cm)		> 50	Light brown & light gray silty fine sand (medium & fine sand)			0	82	18	19.0	0	17.1
									Weathered/soft rock stratum								





# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 06 (BH-06)  
 WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017  
 Date of finish: 02/10/2017  
 Type of Boring: Rotary boring

Borehole diameter: 100mm  
 Total depth: 37.10m  
 Purpose: Two storey Office Building

Depth from GL, m	LITHOLOGY	Size of core pieces				DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING Other sizes mm NX BX AX	Depth of water level, m	Water Loss No Partial Complete	PERCOLATION TEST				REMARKS
		<10mm size	10 to 25mm size	25 to 75mm size	75 to 150mm size									Pressure (kg/sq cm)	By Applied Pressure Method	Loss (/m)	Depth of Water Level	
-15.62m	Light grey soft rock							NX										
17.41m	Light grey soft rock																	Core Recovery = 28/179 = 15.6% RQD = 12/179 = 6.7% Total no. of pieces = 3++
18.99m	Grey soft rock																	Core Recovery = 78/158 = 49.4% RQD = 57/158 = 36.1% Total no. of pieces = 6
20.81m	Grey soft rock																	Core Recovery = 125/182 = 68.7% RQD = 99/182 = 54.4% Total no. of pieces = 9
22.40m	Grey soft rock																	Core Recovery = 35/159 = 22.0% RQD = 28/159 = 17.6% Total no. of pieces = 3

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram.

LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram.

BOREHOLE NO: 06 (BH-06)

WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017

Date of finish: 02/10/2017

Type of Boring: Rotary boring

Borehole diameter: 100mm

Total depth: 37.10m

Purpose: Two storey Office Building

Depth from GL, m	LITHOLOGY		Size of core pieces Singular Conditions	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	CASING Other sizes	Depth of water level, m	Water Loss No Partial Complete	PERCOLLATION TEST				REMARKS	
	LOG	DESCRIPTION								TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	Depth of water level		By Applied Pressure Method
22.40m			<10mm size												
23.95m		Brown & light grey soft rock	10 to 25mm size 25 to 75mm size 75 to 150mm size >150mm size	50	50									Core Recovery = 83/155 = 53.5% RQD = 79/155 = 51% Total no. of pieces = 7	
25.75m		Grey soft rock		60	60	NX								Core Recovery = 11/180 = 6.1% RQD = 0/180 = zero Total no. of pieces = 2	
27.52m		Grey & light grey soft rock		60	60									Core Recovery = 110/177 = 62.1% RQD = 110/177 = 62.1% Total no. of pieces = 6	
29.09m		Light grey soft rock		0	0									Core Recovery = 0/157 = zero RQD = 0/157 = zero Total no. of pieces = ++ (all small) (SPT at 29.05m; N=10 & rebound, -, - = > 50)	
										Not Conducted				Permeability	Not Conducted

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram  
 LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram  
 BOREHOLE NO: 06 (BH-06)  
 WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017  
 Date of finish: 02/10/2017  
 Type of Boring: Rotary boring  
 Borehole diameter: 100mm  
 Total depth: 37.10m  
 Purpose: Two storey Office Building

Depth from GL, m	LOG	LITHOLOGY		DESCRIPTION	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING	Depth of water level, m	Water Loss	PERCOLATION TEST				REMARKS			
		DESCRIPTION	STRUCTURAL CONDITIONS									TEST SECTION	Pressure (kg/sq cm)	Loss (l/m)	Depth of water level		By Applied Pressure Method	By Falling Head Method	Time Interval
29.09m																			
30.52m				Brown soft rock													Core Recovery = 0/143 = zero RQD = 0/143 = zero Total no. of pieces = ++ (all small) (SPT at 30.508m; N=5 & rebound, -, - > 50; water content = 5.1%)		
32.22m				Dark greenish grey soft rock													Core Recovery = 0/170 = zero RQD = 0/170 = zero Total no. of pieces = ++ (all small) (SPT at 32.058m; N=23, 10 & rebound, - => 50; water content=18.6%)		
33.90m				Light grey soft rock													Core Recovery = 0/168 = zero RQD = 0/168 = zero Total no. of pieces = ++ (all small) (SPT at 33.885m; N=5 & rebound, -, - > 50; water content = 8.7%)		
35.20m				Grey soft rock													Core Recovery = 31/169 = 18.3% RQD = 0/169 = zero Total no. of pieces = 5		
35.59m				Grey highly jointed hard rock															
												Not Conducted				Permeability		Not Conducted	

# Borehole Log Details

PROJECT: KSIDC Non Technical Buildings, Thiruvananthapuram

LOCATION: Life Science Park, Thonnakkal, Thiruvananthapuram

BOREHOLE NO: 06 (BH-06)

WATER TABLE (from GL): 5.00m

Date of start: 29/09/2017

Date of finish: 02/10/2017

Type of Boring: Rotary boring

Borehole diameter: 100mm

Total depth: 37.10m

Purpose: Two storey Office Building

Depth from GL, m	LITHOLOGY		Structural Conditions	PERCENT CORE RECOVERY	RQD	SIZE OF HOLE	GROUT	CASING Other sizes mm NX BX AX	Depth of water level, m	Water Loss No Partial Complete	TEST SECTION	PERCOLATION TEST				REMARKS
	LOG	DESCRIPTION										Size of core pieces	By Applied Pressure Method Pressure (kg/sq cm)	Loss (l/m)	Depth of water level	
35.59m											Not Conducted					
37.10m		Grey highly jointed hard rock	<10mm size 10 to 25mm size 25 to 75mm size 75 to 150mm size >150mm size			NX					Not Conducted					Core Recovery = 28/151 = 18.5% RQD = 0/151 = zero Total no. of pieces = 4++

END OF BOREHOLE