

GEO TECHNICAL INVESTIGATION REPORT

**Project:
Proposed Project of G.V.R.C. (G & G+3)
at Genome Valley, Shamirpet**

**Client:
M/s. G.V. Research Centers Pvt. Ltd.**

December-2018

Prepared by:



GEO TECHNOLOGIES

ISO 9001-2015 COMPANY

**# 5-83/ B, V.V Nagar Street No 8, Habsiguda
Hyderabad-500 007**

Tel: 42217757, Cell: 9347275255

E-mail: geotech999@gmail.com

Website: www.geotechnologie.in

GT / 1530 / 2018-19

GEO TECHNICAL INVESTIGATION REPORT

REPORT No.: **GT / 1530 / 2017-18**

PROJECT: **Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet**

CLIENT: **M/s. G.V. Research Centers Pvt. Ltd.**

W. O. No.: **GT/ Quo/Soil/2018-19/218, Dt. 28-11-2018**

DURATION: **December 2018**

GEOTECHNICAL
CONSULTANTS:



GEO TECHNOLOGIES

ISO 9001:2015 COMPANY

5-83/B, V. V. NAGAR

HABSIGUDA, STREET No. 8

HYDERABAD - 500 007

Tele/Fax: 040 – 42217757; M: 9347275255

Email: geotech999@gmail.com

Website: www.geotechnologies.in



CONTENTS

S.NO.	TITLE	PAGE
1.	INTRODUCTION	3
2.	FIELD INVESTIGATIONS	3
3.	LABORATORY TESTING	4
4.	RESULTS	4
5.	SUB SOIL PROFILE	5
6.	RECOMMENDATIONS	6
7.	TABLE-1: Summary of Drilling	8
8.	TABLE-2: Results of tests on soil samples	8
9.	TABLE-3: Results of Lab tests on Rock cores	9
10.	APPENDIX: Calculations for SBC	10
11.	FIG-1: Site plan showing Bore hole locations	
12.	FIG-2: Combined Bore Logs	
13.	Annexure-1: Field Bore Log charts	
14.	Annexure-2: BIS (IS) Codes	



1. INTRODUCTION

M/s. G.V. Research Centers Pvt. Ltd. have engaged M/s Geo Technologies as Consultant to carryout geotechnical investigation work for Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet.

The aim of investigations is to determine the depth of foundations and the Safe Bearing Capacity based on Field and Laboratory Investigations.

2. FIELD INVESTIGATIONS

DRILLING:

Fourteen (14) bore holes were drilled in the site, at the locations specified by the client as shown in Fig.1. Table-1 gives details of the bore holes drilled.

Rotary Drilling was performed as per IS: 1892. The size of the casing used was 150 / 90 mm.

The following information was collected during the drilling operations:

- Nature of strata
- Details of soil samples
- Colour of Return Water
- Rate of drilling

STANDARD PENETRATION TEST (SPT):

Standard Penetration Tests were conducted at 1.5 m depth intervals in soil, in accordance with IS: 2131-1981. Soil samples were carefully extracted from the split-spoon sampler and preserved in polythene bags.

SAMPLES:

Soil samples were collected as per IS: 2132. Rock cores were carefully extracted from the core barrel and arranged in core boxes in proper sequence. Core recovery and RQD were recorded. All the samples collected from the bore holes were properly packed, labeled and transported to Geo Technologies Soil Testing Laboratory at Hyderabad.

FIELD BORE LOGS:

All the details collected from the field operations are presented in Logs of Bore holes in Annexure-1 at the end of this Report. These logs contain depth wise strata details, depth and type of soil & rock samples collected, results of Standard Penetration Tests, Core recovery & RQD, drilling rate and color of return water etc.



3. LABORATORY TESTING:

The following tests were performed on the Soil sample:

- Specific gravity (IS: 2720: part3 – 1980)
- Grain size distribution (IS 2720 part 4 – 1985)
- Direct Shear test (IS 2720 – part 13 – 1986)

No core samples were recovered from SDR strata.

The following Tests, where relevant, were conducted on rock cores.

- Specific gravity
- Porosity
- Water Absorption
- Unconfined compressive strength

4. RESULTS

Fig. 2 gives the combined Log of bore holes.

Table 2 gives the results of lab tests of soil sample.

Table 3 gives the results of lab tests of rock cores.

Appendix gives the calculations for SBC.



**5. SUB SURFACE PROFILE**

The generalized sub soil profile in the bore holes is as follows:

Building	BH Nos.	Depth, m	Strata	N Value	RQD	Water Table, m
Pump House	BH-1	0.0 – 1.3	Silty Gravel	16 – 50	-	1.10
		1.3 – 2.3	Boulder	> 50	36	
		2.3 – 3.7	S.D.R.	>50	0	
		3.7 – 5.7	Hard Rock	Cores	51 – 91	
Building 8300 (Symbiotic Module)	BH-2	0.0 – 1.5	Silty Sand	-	-	1.60
		1.5 – 4.5	Hard Rock	Cores	57 – 93	
	BH-3	0.0 – 3.0	Hard Rock	Cores	73 – 99	0.80
	BH-4	0.0 – 0.7	Silty Sand	-	-	0.20
0.7 – 3.7		Hard Rock	Cores	54 – 93		
Building 6500 (Pioneer Module)	BH-5	0.0 – 3.0	Hard Rock	Cores	25 – 63	1.20
	BH-6	0.0 – 0.5	Silty Gravel	-	-	1.10
0.5 – 3.5		Hard Rock	Cores	52 – 89		
Building 7400 (Amplifier Module)	BH-7	0.0 – 1.5	Silty Gravel	-	-	1.60
		1.5 – 3.0	Gravel	>50	-	
		3.0 – 5.5	SDR	>50	0	
		5.5 – 8.5	Hard Rock	Cores	23 – 74	
	BH-8	0.0 – 1.5	Gravel	-	-	1.70
		1.5 – 4.5	SDR	>50	0	
		4.5 – 7.5	Hard Rock	Cores	0 – 97	
	BH-9	0.0 – 0.6	Silty Gravel	-	-	1.70
0.6 – 3.6		Hard Rock	Cores	17 – 61		
Building 9200 (Nucleus Module)	BH-10	0.0 – 3.3	Hard Rock	Cores	54 – 93	1.30
	BH-11	0.0 – 0.5	Silty Gravel	-	-	2.10
		0.5 – 1.5	Gravel	-	-	
		1.5 – 2.5	SDR	>50	0	
		2.5 – 5.5	Hard Rock	Cores	73 – 85	
Building 5600	BH-12	0.0 – 0.7	Silty Sand			0.30
		0.7 – 3.7	Hard Rock	Cores	56 – 85	
	BH-13	0.0 – 3.0	Hard Rock	Cores	25 – 42	-
	BH-14	0.0 – 3.0	Hard Rock	Cores	71 – 89	-

Water was seen at the time of drilling at 0.2 – 2.1 m below E.G.L.

It is understood that there will be G & G + 3 upper floors buildings.



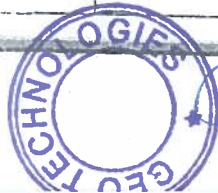
[Handwritten signature]

**6. RECOMMENDATIONS**

The following recommendations are made for Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet. These are based on fourteen (14) bore holes.

a) The generalized sub soil profile is as follows.

Building	BH Nos.	Depth, m	Strata	N Value	RQD	Water Table, m
Pump House	BH-1	0.0 – 1.3	Silty Gravel	16 – 50	-	1.10
		1.3 – 2.3	Boulder	> 50	36	
		2.3 – 3.7	S.D.R.	>50	0	
		3.7 – 5.7	Hard Rock	Cores	51 – 91	
Building 8300 (Symbiotic Module)	BH-2	0.0 – 1.5	Silty Sand	-	-	1.60
		1.5 – 4.5	Hard Rock	Cores	57 – 93	
	BH-3	0.0 – 3.0	Hard Rock	Cores	73 – 99	0.80
	BH-4	0.0 – 0.7	Silty Sand	-	-	0.20
0.7 – 3.7		Hard Rock	Cores	54 – 93		
Building 6500 (Pioneer Module)	BH-5	0.0 – 3.0	Hard Rock	Cores	25 – 63	1.20
	BH-6	0.0 – 0.5	Silty Gravel	-	-	1.10
		0.5 – 3.5	Hard Rock	Cores	52 – 89	
Building 7400 (Amplifier Module)	BH-7	0.0 – 1.5	Silty Gravel	-	-	1.60
		1.5 – 3.0	Gravel	>50	-	
		3.0 – 5.5	SDR	>50	0	
		5.5 – 8.5	Hard Rock	Cores	23 – 74	
	BH-8	0.0 – 1.5	Gravel	-	-	1.70
		1.5 – 4.5	SDR	>50	0	
		4.5 – 7.5	Hard Rock	Cores	0 – 97	
	BH-9	0.0 – 0.6	Silty Gravel	-	-	1.70
		0.6 – 3.6	Hard Rock	Cores	17 – 61	
Building 9200 (Nucleus Module)	BH-10	0.0 – 3.3	Hard Rock	Cores	54 – 93	1.30
	BH-11	0.0 – 0.5	Silty Gravel	-	-	2.10
		0.5 – 1.5	Gravel	-	-	
		1.5 – 2.5	SDR	>50	0	
		2.5 – 5.5	Hard Rock	Cores	73 – 85	
Building 5600	BH-12	0.0 – 0.7	Silty Sand			0.30
		0.7 – 3.7	Hard Rock	Cores	56 – 85	
Building 4700	BH-13	0.0 – 3.0	Hard Rock	Cores	25 – 42	-
Building 3800	BH-14	0.0 – 3.0	Hard Rock	Cores	71 – 89	-




[Handwritten signature]

- b) Water was seen at the time of drilling at 0.2 – 2.1 m below E.G.L. However, it is reported that the water is only due to seepage from adjacent sites and will be contained.
- c) It is understood that there will be G and G+3 upper floor buildings.
- d) Open foundations (Footings) are recommended to be rested in SDR / Hard Rock.
- e) SBC is recommended as follows:

Building	BH Nos.	Depth	Foundations resting in	S.B.C. t / sq. m.
Pump House	BH1	2.5 m	SDR.	55
Symbiosis Module Building 8300 (G+3)	BHs 2, 3 & 4	1.0 m in Rock	Hard Rock	70
Pioneer Module Building 6500 (G+3)	BHs 5 & 6	1.0 m in Rock	Hard Rock	70
Amplifier Module Building 7400 (G+3)	BHs 7,8 & 9	1.0 m in Rock	SDR / Hard Rock	55
Nucleus Module Building 9200 (G+3)	BHs 10 & 11	1.0 m in Rock	SDR / Hard Rock	55
Building 5600 (G)	BH12	1.0 m in Rock	Hard Rock	70
Building 4700 (G+3)	BH13	1.0 m in Rock	Hard Rock	70
Building 3800 (G+3)	BH14	1.0 m in Rock	Hard Rock	70

- f) Actual size and shape of foundations will be based on the loads from the super structure.
- g) All loose boulders and broken fragments of rock should be fully removed before placement of PCC bed.
- h) In view of heavy seepage, adequate measures should be taken to prevent flow of water into the foundations.
- i) All concreting should be done in dry conditions.

For **GEO TECHNOLOGIES**


(Dr. D. BABU RAO)
 M.E., Ph.D. (USA), MIGS
 Former Professor & Head of Civil Engineering
 Principal Geotechnical Consultant




(Dr. N. VENKAT RAO)
 M.Sc. Tech., Ph.D. FAEG, MIGS
 Former Professor & Head of Geophysics
 Geological Consultant & Proprietor

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet.

TABLE – 1: SUMMARY OF DRILLING

S No.	BH No.	Location / Building	Depth drilled, m	Remarks
1	BH-1	Pump House	5.7	Hard rock from 3.7 m
2	BH-2	Symbiosis Module Building 8300 (G+3)	4.5	Hard rock from 1.5 m
3	BH-3		3.0	Hard rock from 0.0 m
4	BH-4		3.7	Hard rock from 0.7 m
5	BH-5	Pioneer Module Building 6500 (G+3)	3.0	Hard rock from 0.0 m
6	BH-6		3.5	Hard rock from 0.5 m
7	BH-7	Amplifier Module Building 7400 (G+3)	8.5	Hard rock from 5.5 m
8	BH-8		7.5	Hard rock from 4.5 m
9	BH-9		3.6	Hard rock from 0.6 m
10	BH-10	Nucleus Module Building 9200 (G+3)	3.3	Hard rock from 1.3 m
11	BH-11		5.5	Hard rock from 2.5 m
12	BH-12	Building 5600 (G)	3.7	Hard rock from 0.7 m
13	BH-13	Building 4700 (G+3)	3.0	Hard rock from 0.0 m
14	BH-14	Building 3800 (G+3)	3.0	Hard rock from 0.0 m

TABLE-2: Results of Lab testing of Soil samples

BH No.	Depth, m	Soil	Sp. Gr.	Grain size, Percentage			γ KN/Cum	Direct Shear Test	
				Gr >4.75mm	Sa 4.75 to 0.075 mm	Fines (Si+Cl) <0.075 mm		C	φ
BH-7	1.5	Gravel	2.66	42	46	12	18.4	10	34



Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet.

TABLE-3: RESULTS OF TESTS ON ROCK CORES

Rock: Granite							
BH No.	DEPTH OF SAMPLE (m)	CR%	RQD%	Sp. Gr.	POROSITY (%)	WATER ABSORPTION (%)	UCS kg/sqcm
BH-1	3.7 - 4.7	58	51	2.71	1.15	0.90	730
	4.7 - 5.7	91	91	2.71	1.10	0.85	1050
BH-2	1.5 - 2.5	93	57	2.73	1.05	0.90	680
	3.5 - 4.5	93	93	2.72	1.00	0.85	1010
BH-3	0.0 - 1.0	87	73	2.71	0.97	0.80	880
	2.0 - 3.0	90	90	2.72	0.95	0.78	1030
BH-4	0.7 - 1.7	77	54	2.73	1.03	0.82	760
	2.7 - 3.7	93	93	2.72	1.15	0.90	1010
BH-5	0.0 - 1.0	77	32	2.71	1.10	0.88	550
	2.0 - 3.0	83	63	2.72	1.01	0.83	740
BH-6	0.5 - 1.5	81	76	2.72	1.10	0.90	830
	2.5 - 3.5	89	89	2.71	1.15	0.92	850
BH-7	5.5 - 6.5	71	23	2.73	0.99	0.80	530
	7.5 - 8.5	82	74	2.72	1.10	0.87	850
BH-8	4.5 - 5.5	75	0	2.71	1.06	0.92	510
	6.5 - 7.5	97	97	2.71	1.05	0.92	1100
BH-9	0.6 - 1.6	78	36	2.72	0.97	0.81	630
	2.6 - 3.6	85	61	2.71	0.99	0.82	770
BH-10	0.0 - 1.0	71	55	2.73	1.01	0.86	630
	2.3 - 3.3	78	78	2.72	1.10	0.95	810
BH-11	2.5 - 3.5	73	73	2.72	1.03	0.84	750
	4.5 - 5.5	87	78	2.71	1.10	0.92	830
BH-12	0.7 - 1.7	85	56	2.72	1.12	0.85	680
	2.7 - 3.7	89	85	2.72	1.05	0.90	910
BH-13	0.0 - 1.0	70	26	2.72	1.10	0.96	570
	2.0 - 3.0	86	42	2.71	1.15	0.97	580
BH-14	0.0 - 1.0	80	71	2.73	0.99	0.80	870
	2.0 - 3.0	96	89	2.73	1.00	0.83	910
						Average	787



Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet

Appendix: Calculation of SBC for Open foundations

I. Foundations in S.D.R. strata:

A. Based on 'N' Values:

a) Shear criterion:

Assumed width of Footings $B = 2$ m; $N = 50$

Assumed depth of foundations $D = 1.0$ m (Inside SDR / Rock)

Allowable bearing pressure is: (with F.S. = 3.0)

$$q \text{ (Allowable)} = 1/18 [2 \times N \times N B R_w + 6 (100 + N \times N) D R_q] = 719 \text{ kN/sq m}$$

b) Settlement Criterion:

For a settlement of 40 mm ($N = 50$, $B = 2$ m),

$$\text{Allowable bearing capacity} = 12.25 N [(B + 0.3) / B] = 704 \text{ KN/sq m}$$

B. Based on IS: 12070:

According to IS: 12070 (Table-3), recommended SBC for 'Very poor' (Classification No. V) is 40 – 45 – 55 t / sq m.

SBC for foundations at 1.0 m depth, resting in SDR is recommended as 55 tonnes per sq m.

II. Foundations in hard rock:

(As per IS : 12070 (Code of Practice for Design & Construction of Shallow Foundations on Rocks)

As per Clause 6.2 of IS: 12070, the safe bearing pressure of rock is estimated from the equation: $q_s = q_c * N_f$

where q_s = safe bearing pressure, q_c = average uniaxial compressive strength of rock cores, N_f = empirical coefficient depending on spacing of discontinuities.

Average UCS of rock is taken as 750 kg / sq cm.

From Table 4 of the Code, N_f is taken as 0.010.

$$q_s = 0.010 \times 750 = 7.5 \text{ kg / sq cm}$$

$$\text{SBC} = 7.5 \text{ kg /sq cm} = 75 \text{ t / sq m}$$

In view of heterogeneity of rock and submerged conditions, Recommended SBC for foundations in hard rock is 70 t / sq m.

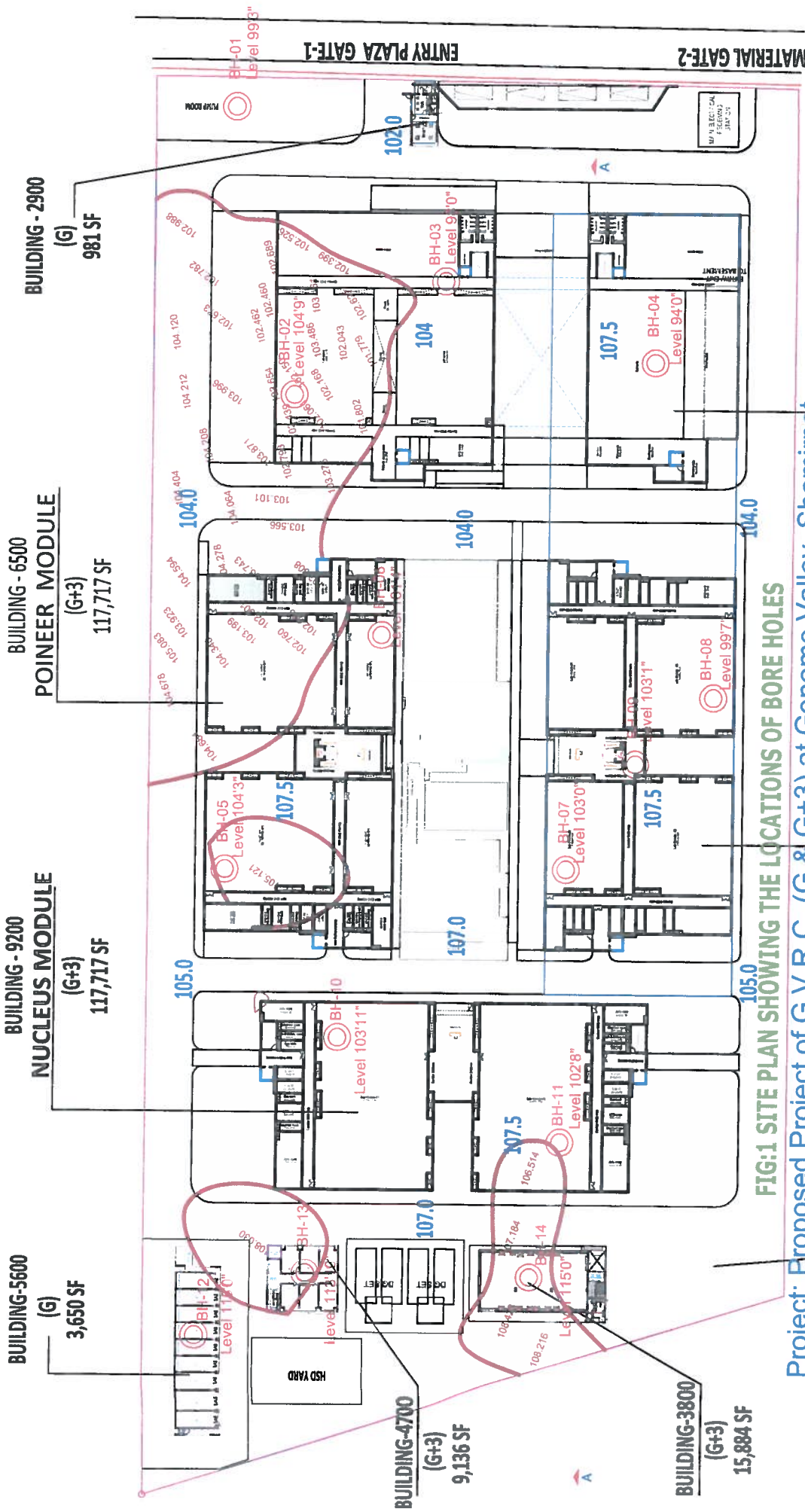


FIG:1 SITE PLAN SHOWING THE LOCATIONS OF BORE HOLES
Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet



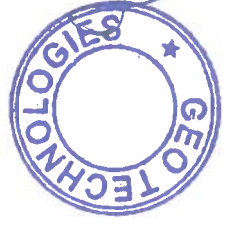
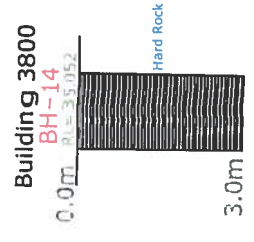
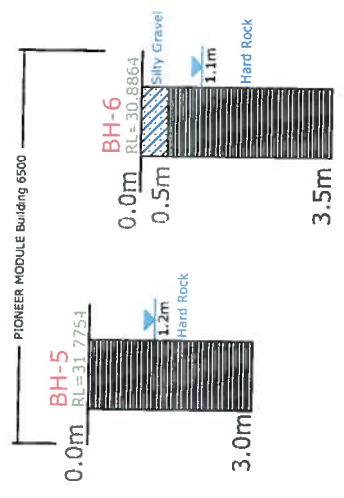
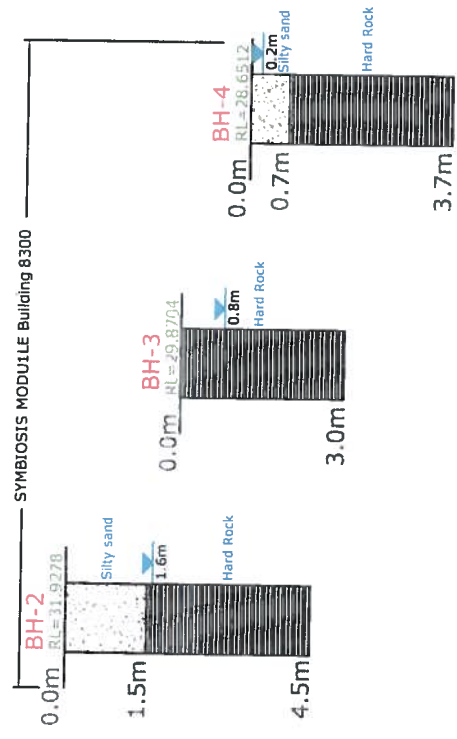
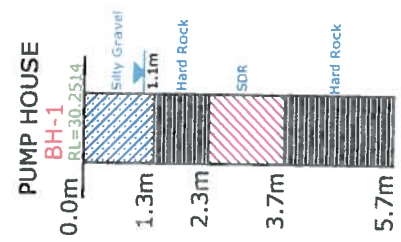
[Handwritten signature]

OPTION-3

FIG:2 LOG OF BORE HOLES
 Project: Proposed Project of G.V.R.C. (G & G+3)
 at Genome Valley, Shamirpet

NOT TO SCALE

Water Table



[Handwritten signature]

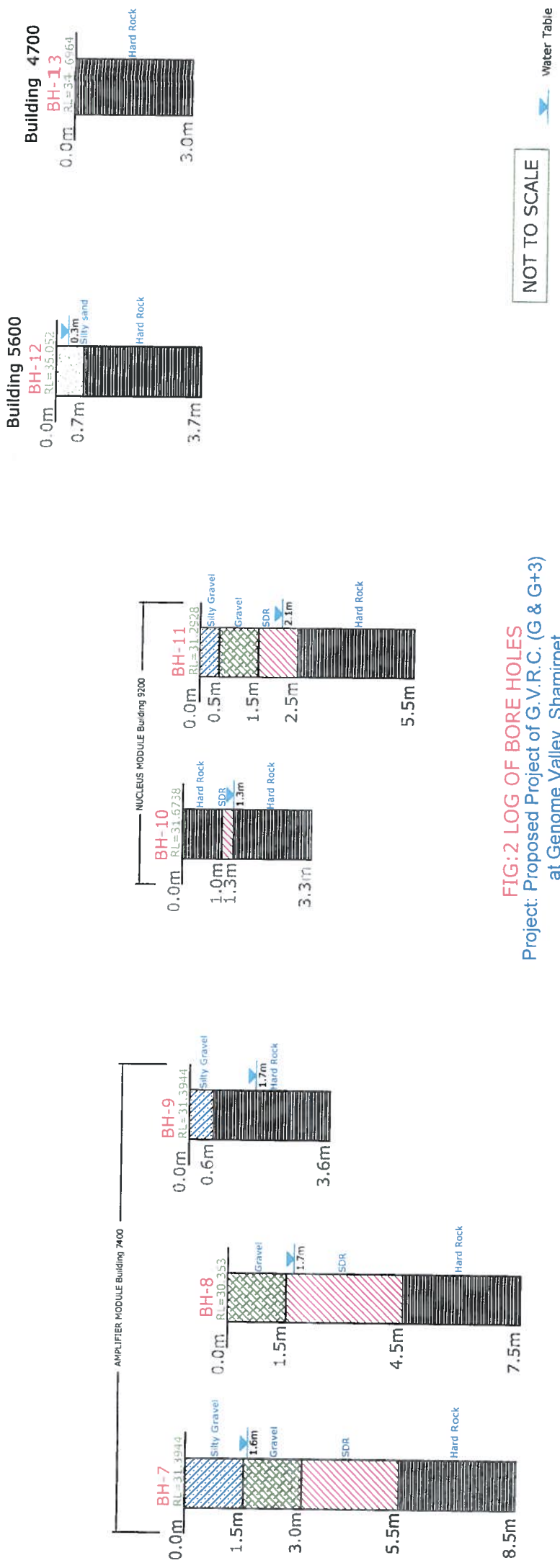


FIG:2 LOG OF BORE HOLES
 Project: Proposed Project of G.V.R.C. (G & G+3)
 at Genome Valley, Shamirpet



Annexure-1

FIELD BORE CHARTS





FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet

Date : 09-12-2018

Ground Level:
Dia. Of Casing: 150mm/NX
Water Table: 1.10m

BORE HOLE
NO. 1

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	Details of Rock core			Rate of Drill Min/m						
From	To				Depth (m)	Type			>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces		% of core Recovery	RQD Value %	Avg. RQD %	Water colour		
0.0	1.3	1.3	Silty Gravel		1.00 1.30	D/S SPT	5cm/50blows	>50										
1.3	2.3	1.0	Hard Rock				Core Sample		19+17=36	76	2no+7 sp	76%	36%		Muddy			
2.3	3.0	0.7	SDR		3.00	SPT	27cm/50blows	>50										
3.0	3.7	0.7			3.50	D/S												
3.7	4.7	1.0	Hard Rock				Core Sample		12+16+23=51	58	3no+1 sp	58%	51%		Milky			
4.7	5.7	1.0							Core Sample	28+13+34+16=91	91	4no only	91%	91%		Milky		

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces



Handwritten signature in blue ink.

FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet

Date : 03-12-2018 to 04-12-2018

Ground Level:
Dia. Of Casing: 150mm/NX
Water Table: 1.60m

BORE HOLE
NO. 2

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	Details of Rock core			Rate of Drill Min/m			
				Depth (m)	Type			>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces		% of core Recovery	RQD Value %	Avg. RQD %
0.0	1.5	Filling		1.50	SPT	4cm/50blows	>50							
1.5	2.5			Core Sample			10+23+24=57	93	3no+6 sp	93%	57%		Milky	
2.5	3.5	Hard Rock		Core Sample			22+28+25+11=86	86	4no only	86%	86%		Milky	
3.5	4.5			Core Sample			26+37+30=93	93	3no only	93%	93%		Milky	

SDR=Soft Disintegrated Rock

cm/50= no.of blows

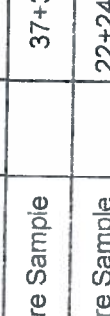
sp=Small pieces vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 03-12-2018

BORE HOLE NO. 3
 Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table: 0.80m

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	Details of Rock core			Avg. RQD %	Water colour	Rate of Drill Min/m		
				Depth (m)	Type			>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces				% of core Recovery	RQD Value %
0.0	1.0					Core Sample		37+36=73	87	2no+3 sp	87%	73%	Milky		
1.0	2.0	Hard Rock					Core Sample		22+24+53=99	99	3no only	99%	99%	Milky	
2.0	3.0						Core Sample		28+62=90	90	2no only	90%	90%	Milky	

SDR=Soft Disintegrated Rock

cm/50= no of blows

sp=Small pieces vsp=Very Small Pieces



[Handwritten Signature]

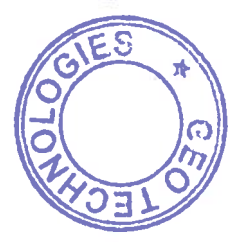
FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet		Ground Level:												
Date : 04-12-2018		Dia. Of Casing: 150mm/NX												
Water Table: 0.00m		Water Table: 0.00m												
BORE HOLE NO. 4		Details of Rock core												
Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling	SPT	N	> 10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
From To														
0.0	0.7	0.7	0.7	0.50	D/S									
0.7	1.7	1.0	1.0		Core Sample		30+24=54	77	2no+3 sp	77%	54%		Milky	
1.7	2.7	1.0	1.0		Core Sample		15+12+28+25=80	91	4no+sp	91%	80%		Milky	
2.7	3.7	1.0	1.0		Core Sample		19+37+37=93	93	3no only	93%	93%		Milky	

SDR=Soft Disintegrated Rock

cm/50= no of blows

sp=Small pieces vsp=Very Small Pieces



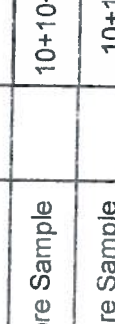
[Handwritten Signature]

FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 06-12-2018

Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table: 1.20m

BORE HOLE
 NO. 5

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	Details of Rock core			Rate of Drill Min/m			
				Depth (m)	Type			>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces		% of core Recovery	RQD Value %	Avg. RQD %
0.0	1.0							10+10+12=32	77	3no+7 sp	77%	32%		
1.0	1.0	Hard Rock						10+15=25	82	2no+10 sp	82%	25%		Milky
2.0	1.0							10+13+22+18=63	83	4no+3 sp	83%	63%		Milky

SDR=Soft Disintegrated Rock

cm/50= no of blows

sp=Small pieces vsp=Very Small Pieces



[Handwritten Signature]

FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet		Ground Level:		BORE HOLE NO. 6		Dia. Of Casing: 150mm/NX		Water Table: 1.10m		Rate of Drill Min/m	
Date : 06-12-2018		SPT		N		Total Length (cm)		% of core Recovery		Avg. RQD %	
Depth (m)		Log of Bore		No. blows for Penetration of (15-30-45)cm		cm/50= no.of blows		No. of Pieces		RQD Value %	
From	To	Description		Type		>10cm core Pieces(cm)		Total Length (cm)		Water colour	
0.0	0.5	Silty Gravel		0.40 D/S		26+20+30=76		81		Muddy	
0.5	1.5	Hard Rock		Core Sample		27+25=52		76		Milky	
1.5	2.5	Hard Rock		Core Sample		46+43=89		89		Milky	
2.5	3.5	Hard Rock		Core Sample		46+43=89		89		Milky	

SDR=Soft Disintegrated Rock

sp=Small pieces vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet





Date : 05-12-2018

BORE HOLE NO. 7

Ground Level:

Dia. Of Casing: 150mm/NX

Water Table: 1.60m

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m	
From	To				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm
0.0	1.5	1.5	Silty Gravel		1.00 D/S	28cm/50blows	>50								Muddy		
1.5	3.0	1.5	Gravel		1.50 SPT	17cm/50blows	>50								Brownish		
3.0	4.5	1.5	SDR		3.00 SPT	10cm/50blows	>50								Milky		
4.5	5.5	1.0			4.00 D/S											Milky	
5.5	6.5	1.0	Hard Rock		4.50 SPT	Core sample		23	71	1no+9 sp	71%		23%		Milky		
6.5	7.5	1.0			5.00 D/S	Core sample	11+20+23=54			62	3no+1 sp	62%		54%		Milky	
7.5	8.5	1.0			Core sample	16+15+29+14=74				82	4no+1 sp	82%		74%		Milky	

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces

vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 04-12-2018

Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table: 1.70m

BORE HOLE
 NO. 8

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	AVG. RQD %	Water colour	Rate of Drill Min/m
From	To				Depth (m)	Type										
0.0	1.5	1.5	Gravel	1.00 D/S 1.50 SPT		18cm/50blows	>50								Muddy	
1.5	3.0	1.5	SDR	2.50 D/S 3.00 SPT		12cm/50blows	>50								Brownish	
3.0	4.5	1.5		4.00 D/S 4.50 SPT		6cm/50blows	>50								Brownish	
4.5	5.5	1.0	Hard Rock			Core Sample			75	Total sp	75%				Milky	
5.5	6.5	1.0					Core Sample		12+13+21=46	74	3no+4 sp	74%	46%		Milky	
6.5	7.5	1.0					Core Sample		22+27+25+23=97	97	4no only	97%	97%		Milky	

SDR=Soft Disintegrated Rock

cm/50= no. of blows

sp=Small pieces vsp=Very Small Pieces






FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 05-12-2018

Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table: 1.70m

BORE HOLE
 NO. 9

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	Details of Rock core			RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
From	To				Depth (m)	Type			No. blows for Penetration of (15-30-45)cm	>10cm core Pieces(cm)	Total Length (cm)				
0.0	0.6	0.6	Silty Gravel		0.50	D/S									
0.6	1.6	1.0					Core Sample	10+12+14=36	78	3no+5 sp	78%	36%		Muddy	
1.6	2.6	1.0	Hard Rock				Core Sample	17	76	1no+10 sp	76%	17%		Milky	
2.6	3.6	1.0					Core Sample	21+12+28=61	85	3no+2 sp	85%	61%		Milky	

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces






FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet

Date : 06-12-2018 to 07-12-2018

Ground Level:
Dia. Of Casing: 150mm/NX
Water Table: 1.30m

BORE HOLE
NO. 10

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m
				Depth (m)	Type										
0.0	1.0	Hard Rock			Core Sample			-	70	13no sp	70%	-		Milky	
1.0	1.3	SDR		1.20	D/S				71	2no+2 sp	71%	55%		Milky	
1.3	2.3	Hard Rock			Core Sample			43+12=55	78	3no only	78%	78%		Milky	
2.3	3.3				Core Sample			20+15+43=78						Milky	

SDR=Soft Disintegrated Rock

cm/50= no. of blows

sp=Small pieces vsp=Very Small Pieces



[Handwritten Signature]

FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 08-12-2018

Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table: 2.10m

BORE HOLE
 NO. 11

Depth (m)		Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces(cm)	Total Length (cm)	No. of Pieces	% of core Recovery	RQD Value %	Avg. RQD %	Water colour	Rate of Drill Min/m		
From	To				Depth (m)	Type											No. blows for Penetration of (15-30-45)cm	
0.0	0.5	0.5	Silty Gravel															
0.5	1.5	1.0	Gravel		1.00 D/S	21cm/50blows	>50											
1.5	2.5	1.0	SDR		1.50 SPT													
2.5	3.5	1.0			2.00 D/S													
3.5	4.5	1.0	Hard Rock			Core Sample		25+21+27=73	73	3no only	73%	73%						
4.5	5.5	1.0				Core Sample		15+24+46=85	85	3no only	85%	85%						
4.5	5.5	1.0				Core Sample		51+12+15=78	87	3no+1 sp	87%	78%						

SDR=Soft Disintegrated Rock

cm/50= no. of blows

sp=Small pieces vsp=Very Small Pieces



FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet		Ground Level:	
Date : 07-12-2018 to 08-12-2018		Dia. Of Casing: 150mm/NX	
Water Table: 0.30m		Water Table: 0.30m	
BORE HOLE NO. 12		BORE HOLE NO. 12	
SPT		Details of Rock core	
Sampling		cm/50= no.of blows	
No. of blows for Penetration of (15-30-45)cm		vsp=Very Small Pieces	
N Value		sp=Small pieces	
Log of Bore		vsp=Very Small Pieces	
Description		vsp=Very Small Pieces	
Length of Run (m)		vsp=Very Small Pieces	
Depth (m)		vsp=Very Small Pieces	
From To		vsp=Very Small Pieces	
0.0 0.7		vsp=Very Small Pieces	
0.7 1.7		vsp=Very Small Pieces	
1.7 2.7		vsp=Very Small Pieces	
2.7 3.7		vsp=Very Small Pieces	
Depth (m)		vsp=Very Small Pieces	
From To		vsp=Very Small Pieces	
0.0 0.7		vsp=Very Small Pieces	
0.7 1.7		vsp=Very Small Pieces	
1.7 2.7		vsp=Very Small Pieces	
2.7 3.7		vsp=Very Small Pieces	
Length of Run (m)		vsp=Very Small Pieces	
0.0 0.7		vsp=Very Small Pieces	
0.7 1.7		vsp=Very Small Pieces	
1.7 2.7		vsp=Very Small Pieces	
2.7 3.7		vsp=Very Small Pieces	
Description		vsp=Very Small Pieces	
Silty sand		vsp=Very Small Pieces	
Hard Rock		vsp=Very Small Pieces	
Log of Bore		vsp=Very Small Pieces	
Depth (m)		vsp=Very Small Pieces	
0.50		vsp=Very Small Pieces	
Type		vsp=Very Small Pieces	
D/S		vsp=Very Small Pieces	
No. of blows for Penetration of (15-30-45)cm		vsp=Very Small Pieces	
Core Sample		vsp=Very Small Pieces	
Core Sample		vsp=Very Small Pieces	
Core Sample		vsp=Very Small Pieces	
N Value		vsp=Very Small Pieces	
16+13+27=56		vsp=Very Small Pieces	
14+42+25=81		vsp=Very Small Pieces	
30+26+29=85		vsp=Very Small Pieces	
>10cm core Pieces(cm)		vsp=Very Small Pieces	
Total Length (cm)		vsp=Very Small Pieces	
85		vsp=Very Small Pieces	
86		vsp=Very Small Pieces	
89		vsp=Very Small Pieces	
No. of Pieces		vsp=Very Small Pieces	
3no+3 sp		vsp=Very Small Pieces	
3no+2 sp		vsp=Very Small Pieces	
3no+1 sp		vsp=Very Small Pieces	
% of core Recovery		vsp=Very Small Pieces	
85%		vsp=Very Small Pieces	
86%		vsp=Very Small Pieces	
89%		vsp=Very Small Pieces	
RQD Value %		vsp=Very Small Pieces	
56%		vsp=Very Small Pieces	
81%		vsp=Very Small Pieces	
85%		vsp=Very Small Pieces	
Avg. RQD %		vsp=Very Small Pieces	
Muddy		vsp=Very Small Pieces	
Milky		vsp=Very Small Pieces	
Milky		vsp=Very Small Pieces	
Milky		vsp=Very Small Pieces	
Rate of Drill Min/m		vsp=Very Small Pieces	

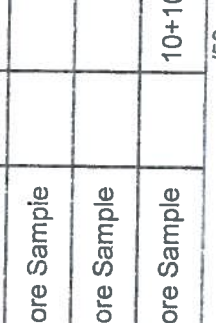
SDR=Soft Disintegrated Rock



FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet
 Date : 07-12-2018

BORE HOLE NO. 13
 Ground Level:
 Dia. Of Casing: 150mm/NX
 Water Table:

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	Details of Rock core				Rate of Drill Min/m			
				Depth (m)	Type		No. blows for Penetration of (15-30-45)cm	N Value	>10cm core Pieces(cm)	Total Length (cm)		No. of Pieces	% of core Recovery	RQD Value %
0.0	1.0					Core Sample		26	70	1no+8 sp	70%	26%		Milky
1.0	1.0	Hard Rock				Core Sample		25	74	1no+12 sp	74%	25%		Milky
2.0	1.0					Core Sample		10+10+22=42	86	3no+9 sp	86%	42%		Milky

SDR=Soft Disintegrated Rock

cm/50= no of blows

sp=Small pieces vsp=Very Small Pieces



[Handwritten Signature]


FIELD BORE LOG CHART

Project: Proposed Project of G.V.R.C. (G & G+3) at Genome Valley, Shamirpet

Date : 08-12-2018 to 09-12-2018

BORE HOLE NO. 14

Ground Level:
Dia. Of Casing: 150mm/NX
Water Table:

Depth (m)	Length of Run (m)	Description	Log of Bore	Sampling		SPT	N Value	>10cm core Pieces (cm)	Details of Rock core			Rate of Drill Min/m	
				Depth (m)	Type				No. blows for Penetration of (15-30-45)cm	Total Length (cm)	No. of Pieces		% of core Recovery
0.0	1.0					Core Sample		35+20+16=71	3no+2 sp	80%	71%		Milky
1.0	1.0	Hard Rock					Core Sample	12+11+13+28+22=86	5no+1 sp	93%	86%		Milky
2.0	1.0						Core Sample	37+15+12+25=89	4no+1 sp	96%	89%		Milky

SDR=Soft Disintegrated Rock

cm/50= no.of blows

sp=Small pieces vsp=Very Small Pieces



[Handwritten Signature]

ANNEXURE – 2: IS CODES

1. IS: 1892 – 1962: Code of Practice for Site Investigations for Foundations.
2. IS: 2131 – 1981: Method of Standard Penetration Test for Soils.
3. IS: 2132 – 1986: Code of Practice for thin walled tube sampling of Soils.
4. IS: 4464 – 1985: Code of Practice for presentation of drilling information and core description in foundation investigations.
5. IS: 3043 – 1987: Code of Practice for Earthing – Clause 37: Measurement of Soil Resistivity.
6. IS: 2720 Part 4 – 1985: Methods of Test for Soils – Part 4: Grain size analysis.
7. IS: 1498 – 1970: Classification and Identification of Soils for General Engineering Purpose.
8. IS: 2720 Part 29 – 1975: Methods of Test for Soils – Part 29: Determination of dry density of soils by core-cutter method.
9. IS: 2720 Part 2 – 1973: Methods of Test for Soils – Part 2: Determination of water content.
10. IS: 2720 Part 13 – 1986: Methods of Test for Soils – Part 13: Direct shear test.
11. IS: 2720 Part 2 – 1985: Methods of Test for Soils – Part 2: Determination of water content.
12. IS: 2720 Part 3 / section 2 – 1980: Methods of Test for Soils – Part 3: Determination of Specific gravity; Section 2: Fine, Medium and Coarse Grained Soils.
13. IS: 2720 Part 7 – 1980: Methods of Test for Soils – Part 7: Determination of water content – Dry density relation using light compaction .
14. IS: 2720 Part 16 – 1979: Methods of Test for Soils – Part 16: Laboratory Determination of CBR.
15. IS: 9143 – 1979: Method for determination of unconfined compressive strength of rock materials.
16. IS: 10785 – 1983: Method for determination of Compressive and Tensile Strengths of from Point Load Test of rock lump.
17. IS: 11315 (Part 2) – 1987: Method for Quantitative Description of Discontinuities in Rock Mass – Part 2: Spacing.
18. IS: 11315 (Part 11) – 1985: Method for Quantitative Descriptions of Discontinuities in Rock Masses – Part 11: Core Recovery and Rock Quality Designation.
19. IS: 11315 (Part 12) – 1992: Quantitative Description of Discontinuities in Rock Mass – Methods – Part 12: Drill Core study.
20. IS: 12070 – 1987: Code of Practice for Design and Construction of Shallow Foundations on Rocks.
21. IS: 6403 – 1981: Code of Practice for determination of Bearing Capacity of Shallow Foundations.
22. IS: 8009 – 1976 (Part I): Code of Practice for calculation of settlements of Foundations.



A handwritten signature in blue ink, appearing to be "H. S.", written over a horizontal line.