

GEO TECHNICAL INVESTIGATION REPORT

Name of the Work

" Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24."

Report No

MAARK/2023-24/120/001

Dated: January-2024.

1 Introduction

M/s Maark Civil Engineering Services Private Limited, to carry out Geo-Technical Investigation works for " Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24. " This report deals with the analysis of field and laboratory test results, type and depth of foundation and recommendations regarding the safe bearing capacity.

This report includes the details of methodology of investigation, collections of samples, field test results, and laboratory test results including their interpretation/ analysis, recommendations for the properties essential to the design of foundations and recommendations.

This report contains the following information:

- Introduction
- Geotechnical Investigation and Planning & Programme
- Methodology of investigation
- Recommendations on Foundation

2 Geotechnical Investigation and Planning & Programme

Based on nature of the project, it was decided to carry out soil exploration in order to: Obtain soil samples, both disturbed and undisturbed (Wherever necessary and possible) classification tests and other laboratory tests for determining Engineering properties;

2.1 Scope of the Work

The scope of work for the project was limited to the following:

- Mobilization and demobilization of equipment and personnel to the project site and setting up the equipment and carrying out the field investigation.
- Drilling of 12 nos. of boreholes of 100mm in all types of soil/rock up to various depths, by using shell/auger/ rotary drilling at specified location mentioned as per the work order.
- Conducting standard penetration test at regular depth intervals of 1.50m or at the change of strata whichever is occurs at earlier and collect each SPT samples and UDS/DS samples for further testing.

2.2 Location/Site for GT Work

The site for the Geotechnical work is in Holenarasipura to investigate the subsurface condition nominated locations drilling 12 bore holes were carried out.

Table 1: Details of Boreholes at approaches

S.No	No of Bore Hole	Structure/ Location	Reduced Level	Ground Water Level, m	Depth of the Borehole, m
1	BH-1	Hirebelagulli	100.0	-	10.0
2	BH-2		100.0	-	10.0
3	BH-3	Dakshinanala	100.0	-	10.0
4	BH-4	Chikkabyagathavalli	100.0	-	10.0
5	BH-5	Dakshinanala	100.0	-	10.0
6	BH-6	Huchanakoppalu	100.0	-	10.0
7	BH-7	Krishnapura	100.0	-	10.0
8	BH-8	Ichanahalli	100.0	-	10.0
9	BH-9	Ichanahalli	100.0	-	10.0
10	BH-10	Chikkchagahalli	100.0	-	10.0
11	BH-11	Chikkchagahalli	100.0	-	10.0
12	BH-12	Chikkchaganahalli	100.0	-	10.0

2.3 Field Tests

Field in-situ tests, like Standard Penetration Tests during boring operation.

2.4 Sample

Collecting disturbed sample /undisturbed soil samples and water sample from the bore hole.

2.5 Laboratory Tests

Laboratory tests were conducted on selected soil samples, groundwater samples to determine its index and engineering properties. The testing procedures were in accordance with current applicable IS specifications. The following tests were conducted on selected samples recovered from the boreholes:

Table 2: Laboratory Tests List

S.No	Test Name	Ref. I.S Code
1	Grain size analysis	IS: 2720 (Part-4)

2	Consistency Limits.	IS: 2720 (Part -5)
3	Determination of Natural Moisture Content (Water content).	IS: 2720 (Part-2)
4	Determination of Specific Gravity.	IS: 2720 (Part-3)
5	Determination of Bulk & Dry Unit Weight.	IS: 2720 (Part-8)
6	Triaxial Test	IS: 2720 (Part-12)
7	Direct Shear Test	IS: 2720 (Part-13)

3 Methodology of Investigation

The investigation is planned to obtain the subsurface stratification in the proposed project site and collect soil samples for laboratory testing to determine the engineering properties such as shear strength along with basic engineering classification of the subsurface stratum to arrive at the foundation design parameters.

3.1 Soil Boring

The Boreholes in soil are progressed by shell & auger boring method as per IS: 1892 – 1979 and approved methodology. Boring is advanced at selected / specified borehole locations. The following steps are adopted during boring operations.

- 1) Boring rig with power winch is assembled at site and was shifted and erected at the borehole location.
- 2) Taken out the top soil up to approximately 500 mm.
- 3) The auger is joined at the end of hollow drill rod, which is rotated manually.
- 4) After reaching the drill rod attached with the auger attained its full depth another piece (extension rod) was attached and the process is continued the drilling up to the level of water table.
- 5) Below the water table shell is used instead of auger and the casing pipe is lowered as per requirement.
- 6) Casing is used as per the prevailing soil conditions, to stabilize the borehole.
- 7) Required field tests i.e., Standard Penetration Tests are conducted and collection of undisturbed /disturbed samples are collected as per requirements at specified depths.
- 8) This process is continued till the achievement of full depth of bore hole as per requirement.

3.2 Standard Penetration Tests

Standard Penetration Tests (SPT) are conducted in the borehole at 1.5 m intervals, by connecting a split spoon sampler to 'A' rods and driving it by 45 cm using a 63.5 kg hammer falling freely from a height of 75 cm. The tests are conducted in accordance with IS: 2131- 1981.

The number of blows for each 15 cm of penetration is recorded. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm. sampling interval is termed the SPT value or the 'N' value. The 'N' values are presented on the profiles for each borehole. Refusal to further boring penetration was considered when the 'N' values exceed 100 blows for 30 cm penetration or when practical refusal to further penetration by shell and auger is encountered.

Disturbed samples are collected from the split spoon after conducting SPT. The samples are preserved in transparent polythene bags. Undisturbed samples are collected by attaching a 75 mm diameter thin-walled 'Shelby' tubes and driving the sampler using a 63.5 kg hammer in accordance with IS:2132-1986. The tubes are sealed with wax at both ends. All samples are transported to our laboratory for further examination and testing

3.3 Disturbed Sample

Disturbed soil samples are also collected from the bore holes at suitable depths/intervals to supplement the boring records. These samples are collected in polythene bags of suitable size. These samples are properly sealed, labelled, recorded & carefully transported to the laboratory for testing.

3.4 Ground Water

The depth at which groundwater is struck during boring is carefully noted and the depth of water table was ascertained subsequently in the completed borehole by one of the following methods. The water table in the borehole was allowed to stabilize after depressing the water level adequately by bailing. Stability of the borehole sides and bottom is be ensured at all times.

The bore hole was filled with water and then bailed out to various depths. Observations were made at each depth to see if the water level is rising or falling. The depth at which neither a fall nor rise is observed, was considered as the water table depth.

4 Design methodology for SBC

4.1 Soil

In shear, a foundation can fail in any of the three different ways viz.

- I. Local shear failure
- II. General shear failure
- III. In between the above two

The local Shear Failure is assumed to occur for ϕ less than 30° & general shear failure for $\phi > 36^\circ$ & between these limiting values of ϕ , interpolated values for local & general shear failure can be determined. Taking the various depths below O.G.L. and determining the bearing capacity as per IS:6403-1981 for required size of footing.

$$Q_{U \text{ General}} = C N_c S_c d_c i_c + q (N_q - 1) S_q d_q i_q + 0.5 B_\gamma N_\gamma S_\gamma d_\gamma i_\gamma W'$$

$$Q_{U \text{ Local}} = \frac{2}{3} C N'_c S_c d_c i_c + q (N'_q - 1) S_q d_q i_q + 0.5 B_\gamma N'_\gamma S_\gamma d_\gamma i_\gamma W'$$

$$Q_s = \frac{Q_U}{F}$$

Where,

$Q_{U \text{ General}}$ = Allowable Bearing Capacity based on General Shear Failure.

$Q_{U \text{ Local}}$ = Allowable Bearing Capacity based on Local Shear Failure.

Q_s = Safe Bearing Capacity

F = Factor of Safety taken as 2.5

C = Cohesion

q = Overburden Pressure

B = Width of Footing

γ = Density

N_c, N_q, N_γ = Bearing Capacity Factors

N'_c, N'_q, N'_γ = Modified Bearing Capacity Factors

S_c, S_q, S_γ = Shape Factors

d_c, d_q, d_γ = Depth Factors

4.2 Rock

Safe bearing capacity of rock can be determined with UCS value of rock, UCS value of rock is obtained by following methods.

1. The Core Strength
2. Point Load Strength

4.2.1 The Core Strength

Proper estimation of the in-situ intact rock strength as well as an estimation of the in-situ stresses forms the basis for most geomechanically designs of under-ground openings. Borehole failure constitutes a well-accepted stress orientation indicator, but its use for stress magnitude estimation is controversial. Indeed, in order to obtain a proper estimate of stress magnitude from borehole breakouts, an accurate and independent estimation of the in-situ strength of the borehole walls is required. The UCS obtained from core samples provides an acceptable estimate of borehole wall strength.

The safe bearing pressure should be estimated from the equation.

$$q_s = (q_c \times N_j) \frac{1}{f}$$

Where,

q_s = safe bearing pressure (gross),

q_c = average uniaxial compressive strength of rock cores,

N_j = empirical coefficient.

F = Factor of safety taken as 6.

4.2.2 Point Load Strength

A test sample is defined as a set of rock specimens of similar strength for which a single point load strength value is to be determined. The cores or lumps shall be selected so as to represent a true average of the rock type under consideration.

4.2.2.1 Calculation of Point Load Strength Index of Cores

The point load strength index I_h shall be calculated from the following formula

$$I_s = \frac{p}{D^{1.5} \sqrt{D_{50}}}$$

Where,

I_s = point load strength index in MPa (for the standard core size),

P = failure load in N,

D = core diameter in mm

D_{50} = standard core diameter (50 mm).

The uniaxial compressive strength of rock may be predicted from the following correlation:

$$q_c = 22 I_s(50)$$

Where,

q_c = uniaxial compressive strength in MN/m² (kgf/cm²),

$I_s(50)$ = corrected point load strength.

4.2.2.2 Point Load Lump Strength Index Test

This test shall be conducted on lump pieces of rock material. Point load lump strength index (I_L) is Calculated by the formula

$$I_L = \frac{p}{(DW)^{0.75} \sqrt{D_{50}}}$$

P = peak load in N at failure,

(DW) = the minimum cross-sectional area passing through point loads in mm²

I_L = point load lump strength index in MPa,

D_{50} = standard size of lump (50 mm),

D = distance between point loads in mm,

W = average width of minimum cross-sectional area in mm.

Uniaxial compressive strength q_c is related to point load lump strength index by:

$$q_c = 15 I_L(50)$$

Where, q_c = uniaxial compressive strength in MN/m² (kgf/cm²),

$I_L(50)$ = corrected point load lump strength.

5 Recommendations and Considerations on Foundation

Table 3: SBC Values

Borehole No.	Structure / Location	Strata Classification	Depth	Size of footing	SBC Value
-	-	-	m	m	t/m ²
BH-1	Hirebelagulli	Morrum	0.50	6 x 6	4.32
		SDR (Soft Disintegrated Rock)	2.00	6 x 6	20.69
			3.00	6 x 6	34.37

			4.50	6 x 6	54.59
			6.00	6 x 6	79.01
			7.50	6 x 6	109.24
			9.00	6 x 6	158.05
BH-2	Hirebelagulli	Morrum	1.00	6 x 6	6.04
			1.50	6 x 6	7.46
			3.00	6 x 6	11.82
			4.50	6 x 6	17.26
			6.00	6 x 6	22.71
		SDR (Soft Disintegrated Rock)	7.00	6 x 6	48.06
			8.50	6 x 6	91.29
BH-3	Dakshinanala	Silty Clay	2.00	6 x 6	7.22
			3.00	6 x 6	7.65
			4.50	6 x 6	10.60
		Clay	6.00	6 x 6	13.04
			7.50	6 x 6	15.20
			9.00	6 x 6	18.30
BH-4	Chikkabyagathavalli	Clay	1.00	6 x 6	6.50
			1.50	6 x 6	7.46
			3.00	6 x 6	9.32
		Sandy soil mixed with Gravel	4.00	6 x 6	17.54
			4.50	6 x 6	20.32
			6.00	6 x 6	27.92
			7.50	6 x 6	35.32
			9.00	6 x 6	45.45
BH-5	Dakshinanala	Clay	1.50	6 x 6	6.06
			3.00	6 x 6	8.22
			4.50	6 x 6	9.95

		Sandy soil mixed with Gravel	6.00	6 x 6	24.42
			7.50	6 x 6	32.34
			9.00	6 x 6	42.27
BH-6	Huchanakoppalu	BC Soil	1.50	6 x 6	7.55
		Clay	3.00	6 x 6	8.48
			4.50	6 x 6	9.43
		Sandy soil mixed with Gravel	6.00	6 x 6	24.97
			7.50	6 x 6	32.55
		SDR (Soft Disintegrated Rock)	8.00	6 x 6	56.19
			9.00	6 x 6	90.20
BH-7	Krishnapura	SDR (Soft Disintegrated Rock)	1.50	6 x 6	12.64
			3.00	6 x 6	26.59
			4.50	6 x 6	46.12
			6.00	6 x 6	66.49
			7.50	6 x 6	100.85
			8.00	6 x 6	122.14
			9.00	6 x 6	160.96
BH-8	Ichanahalli	Morrum	1.50	6 x 6	10.73
		SDR (Soft Disintegrated Rock)	3.00	6 x 6	18.12
			4.50	6 x 6	40.11
			6.00	6 x 6	64.26
			7.50	6 x 6	90.71
			8.00	6 x 6	112.51
			9.00	6 x 6	152.22
BH-9	Ichanahalli	Sandy soil mixed with Gravel	1.50	6 x 6	11.08
			3.00	6 x 6	17.61
			4.50	6 x 6	24.96
			6.00	6 x 6	41.15

		SDR (Soft Disintegrated Rock)	7.50	6 x 6	74.25
			8.00	6 x 6	99.95
			9.00	6 x 6	136.84
BH-10	Chikkchagahalli	Red Soil	1.50	6 x 6	6.88
		Morrum	3.00	6 x 6	14.02
			4.50	6 x 6	18.94
			6.00	6 x 6	24.17
		SDR (Soft Disintegrated Rock)	7.50	6 x 6	41.39
			8.00	6 x 6	64.67
			9.00	6 x 6	85.07
BH-11	Chikkchagahalli	Silty sand	1.50	6 x 6	5.65
		Sandy soil mixed with Gravel	3.00	6 x 6	12.88
		Morrum	4.50	6 x 6	18.24
		SDR (Soft Disintegrated Rock)	6.00	6 x 6	43.76
			7.50	6 x 6	74.61
			8.00	6 x 6	95.17
			9.00	6 x 6	136.82
BH-12	Chikkchagahalli	Silty sand	1.50	6 x 6	6.00
			3.00	6 x 6	9.06
		Silty clay	4.50	6 x 6	10.51
			6.00	6 x 6	12.49
		SDR (Soft Disintegrated Rock)	7.50	6 x 6	47.42
			8.00	6 x 6	68.03
			9.00	6 x 6	99.07

The following points are highlighted with reference to the above-recommended safe net bearing pressures:

1. The above values include a bearing capacity safety factor of 2.5.

2. Safe bearing pressures for foundations at intermediate depths may be interpolated linearly between the values given above.
3. The soils at foundation level should be compacted thoroughly prior to construction to ensure that there are no loose soil pockets below the foundation.
4. Foundation depth and shape of the foundation as per the design loads.
5. Size of the footing based on the Structure. (For Calculation purpose we considered footing width & Length is 6 m x 6 m open Isolated.

6 Limitations.

Recommendations contained in this report are based on our field observations, subsurface exploration, laboratory tests. It is often possible that soil strata observed from bore log profiles to that of actual field strata could vary due to limitations in exploration of boreholes. If soil conditions encountered during construction differs from those described herein, concerned person at construction is requested to notify the same immediately, in order that a review may be made and any supplementary recommendations be provided. It is recommended that the suggested bearing capacity/pile capacity values to be ascertained during construction phase through field testing methods.

Table 4: Strata of Boreholes

Borehole No.	Structure / Location	Strata Description	Depth from	Depth to	Remark
-	-	-	m	m	-
BH-1	Hirebelaguli	Filling Soil	0.00	0.50	-
		Morrum	0.50	2.00	-
		SDR (Soft Disintegrated Rock)	2.00	10.00	-
BH-2	Hirebelaguli	Soil	0.00	0.10	-
		Morrum	0.10	1.50	-
		SDR (Soft Disintegrated Rock)	1.50	10.00	-
BH-3	Dakshinanala	Filling Soil	0.00	2.00	-
		Silty clay	2.00	6.00	-
		Clay	6.00	10.00	-

BH-4	Chikkabyagathavalli	BC Soil	0.00	0.10	-
		Clay	0.10	4.00	-
		Sandy soil mixed with Gravel	4.00	10.00	-
BH-5	Dakshinanala	Clay	0.00	6.00	-
		Sandy soil mixed with Gravel	6.00	10.00	-
BH-6	Huchanakoppalu	BC Soil	0.00	3.00	-
		Clay	3.00	6.00	-
		Sandy soil mixed with gravel	6.00	8.00	-
		SDR (Soft Disintegrated Rock)	8.00	10.00	-
BH-7	Krishnapura	Morrum	0.00	1.50	-
		SDR (Soft Disintegrated Rock)	1.50	10.00	-
BH-8	Ichanahalli	Filling Soil	0.00	1.50	-
		Morrum	1.50	3.00	-
		SDR (Soft Disintegrated Rock)	3.00	10.00	-
BH-9	Ichanahalli	Filling Soil	0.00	1.50	-
		Morrum	1.50	6.00	-
		SDR (Soft Disintegrated Rock)	6.00	10.00	-
BH-10	Chikkchagahalli	Red Soil	0.00	3.00	-
		Morrum	3.00	7.50	-
		SDR (Soft Disintegrated Rock)	7.50	10.00	-
BH-11	Chikkchagahalli	Silty sand	0.00	3.00	-
		Sandy soil mixed with gravel	3.00	4.50	-
		Morrum	4.50	6.00	-
		SDR (Soft Disintegrated Rock)	6.00	10.00	-
BH-12	Chikkchagahalli	Silty sand	0.00	4.50	-
		Silty clay	4.50	7.50	-
		SDR (Soft Disintegrated Rock)	7.50	10.00	-



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 1
Location : Hirebelaguli
Chainage : 1+100
Drilling Master : -
Ground Elevation : 100.000

Job No. : MAARK/2023-24/120
Date of Commenced : 06-01-2024
Date of Completed : 06-01-2024
Ground Water Level : -
Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms				SPT 'N' Value	Standard penetration test Number of blows	Remarks
06-Jan-24	100.000	0.0			Filling Soil	SPT	DS							
	99.500	0.5												
	99.000	1.0												
	98.500	1.5						11	14	18	32			
	98.000	2.0												
	97.500	2.5												
	97.000	3.0						Refused N>100						
	96.500	3.5												
	96.000	4.0												
	95.500	4.5						Refused N>100						
	95.000	5.0												
	94.500	5.5												
	94.000	6.0						Refused N>100						
	93.500	6.5												
	93.000	7.0												
	92.500	7.5						Refused N>100						
	92.000	8.0												
	91.500	8.5												
	91.000	9.0						Refused N>100						
	90.500	9.5												
	90.000	10.0												

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 1

Location: Hirebelaguli

Chainage:1+100

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

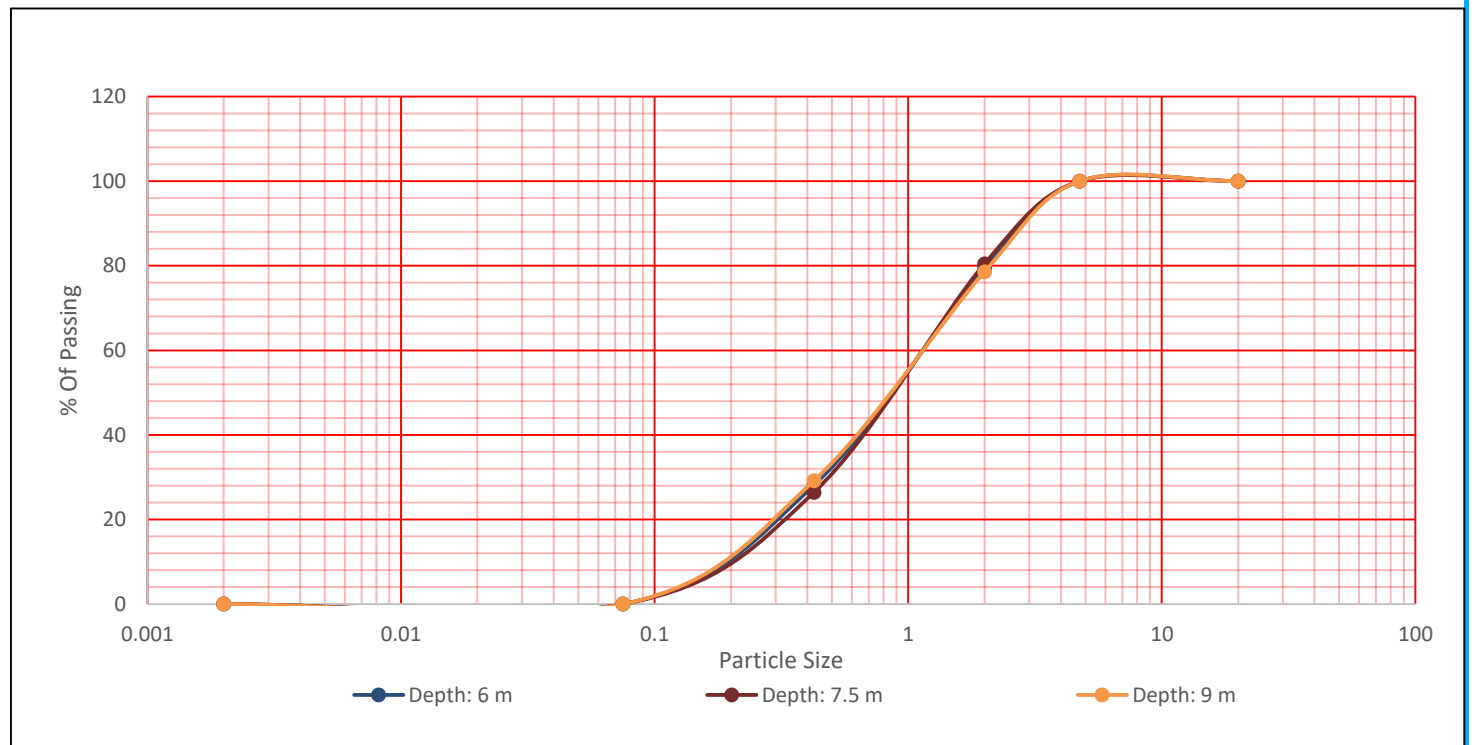
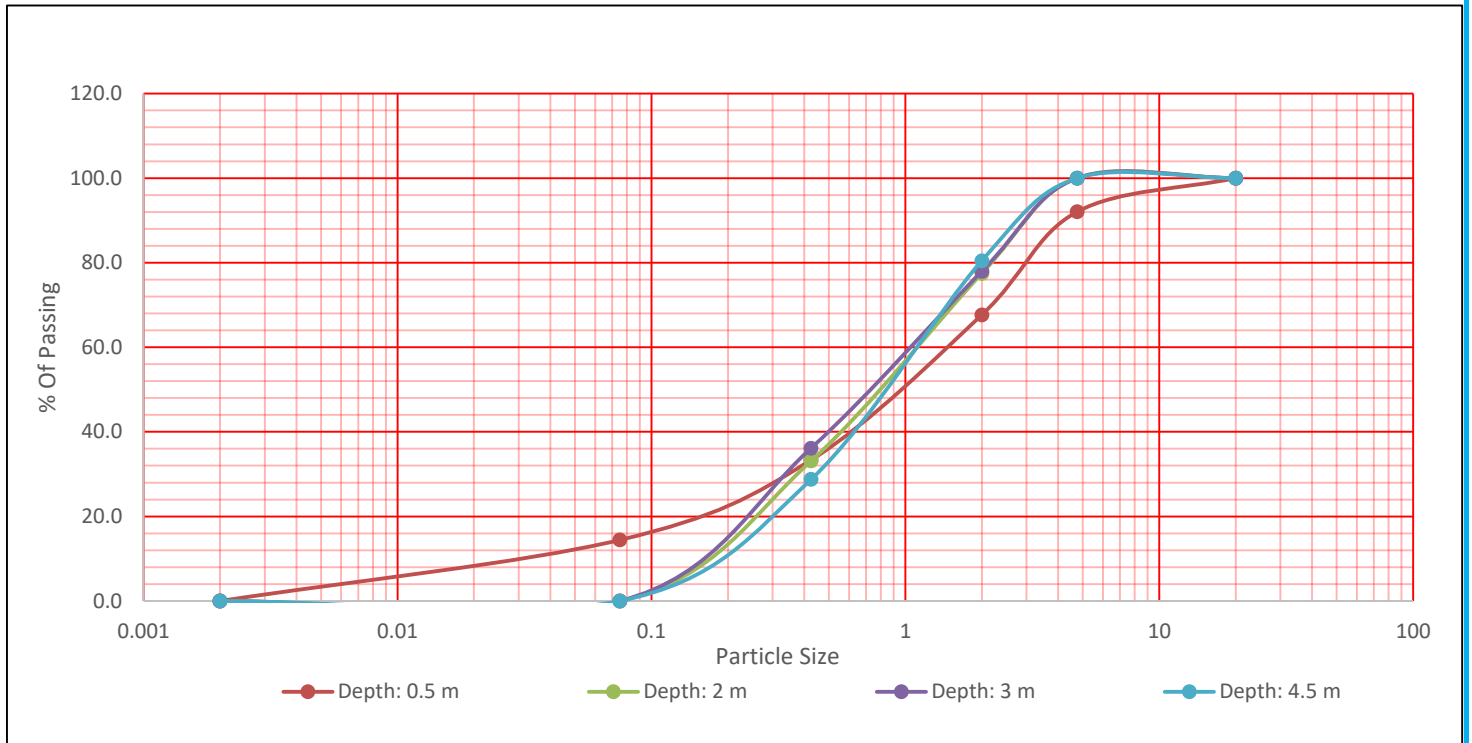
[illegible]



Particle size Distribution Curves

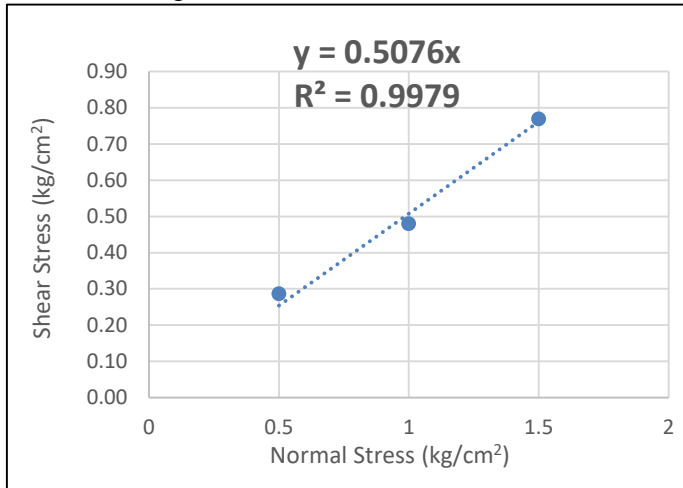
BH- 1, Hirebelaguli

Chainage:1+250



Graphical Representation of Direct Shear Test Results

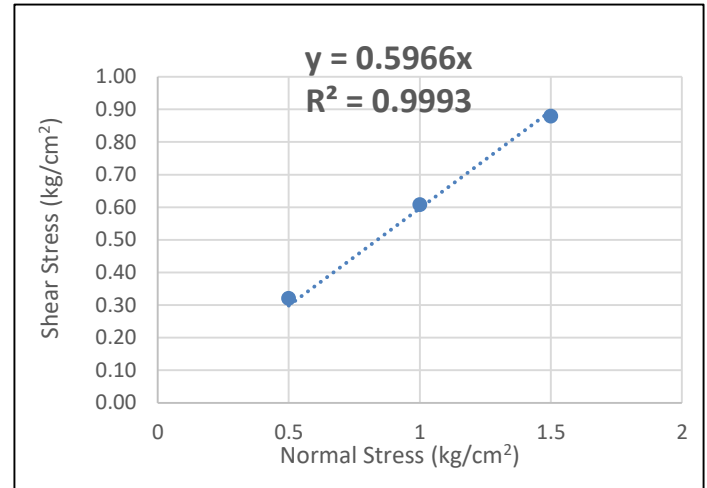
BH- 1, Hirebelaguli



Depth: 0.5 m

$C = 0.00$

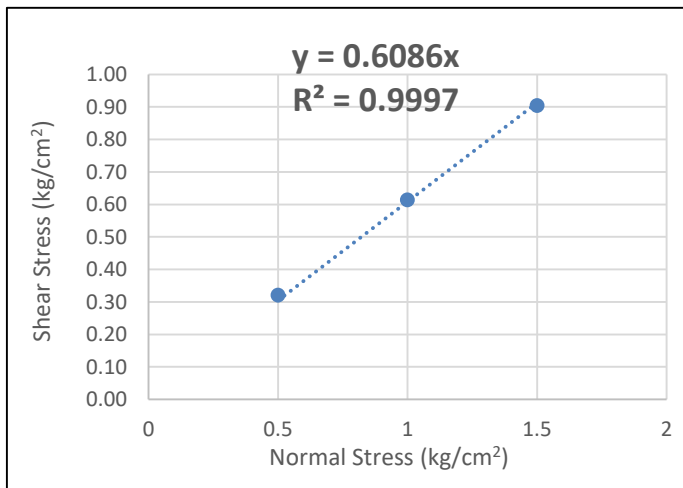
$\phi = 26.91$



Depth: 2 m

$C = 0.00$

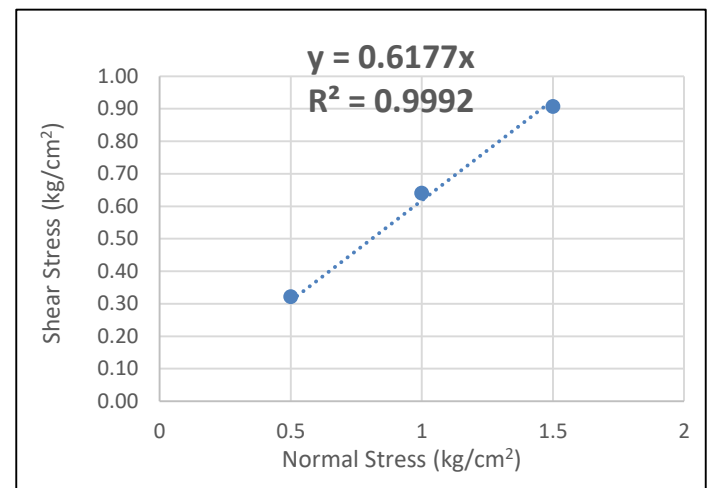
$\phi = 30.82$



Depth: 3 m

$C = 0.00$

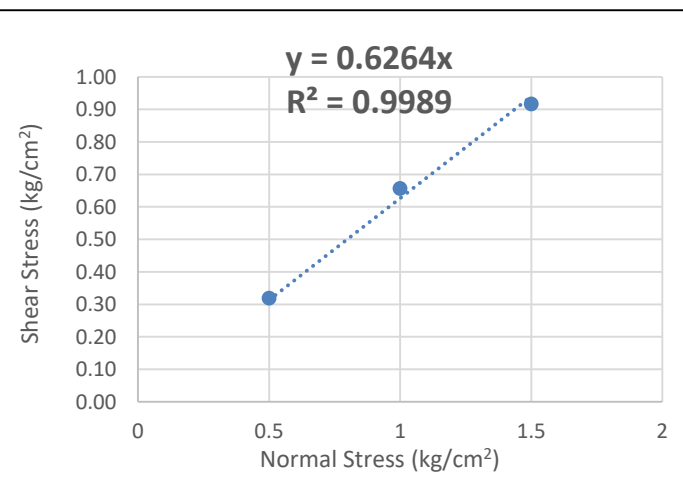
$\phi = 31.32$



Depth: 4.5 m

$C = 0.00$

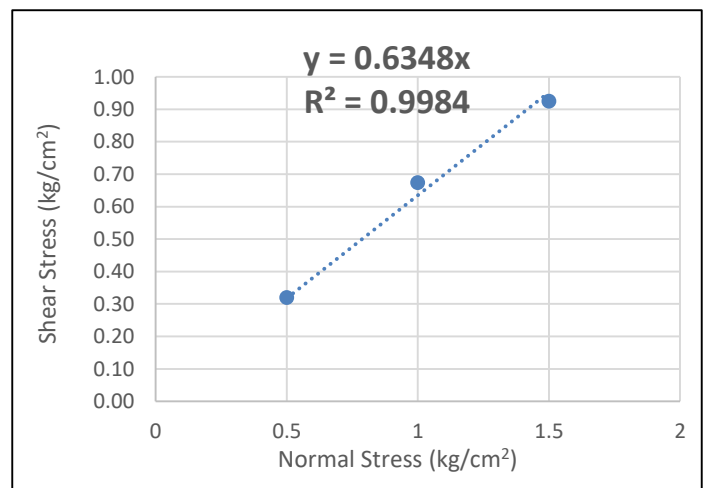
$\phi = 31.70$



Depth: 6 m

$C = 0.000$

$\phi = 32.06$

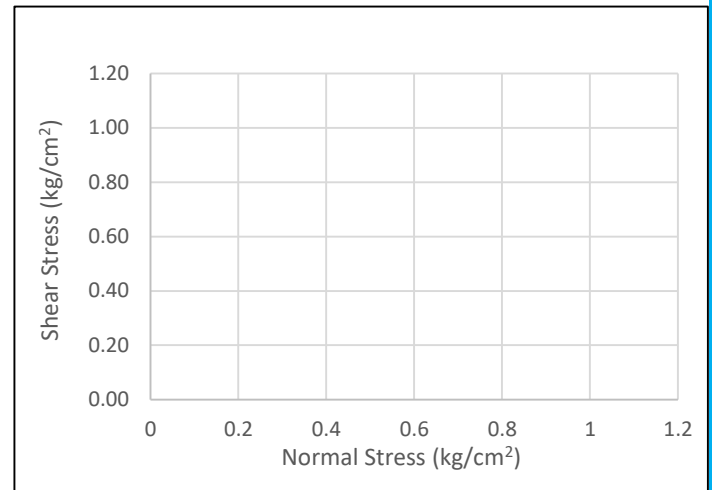
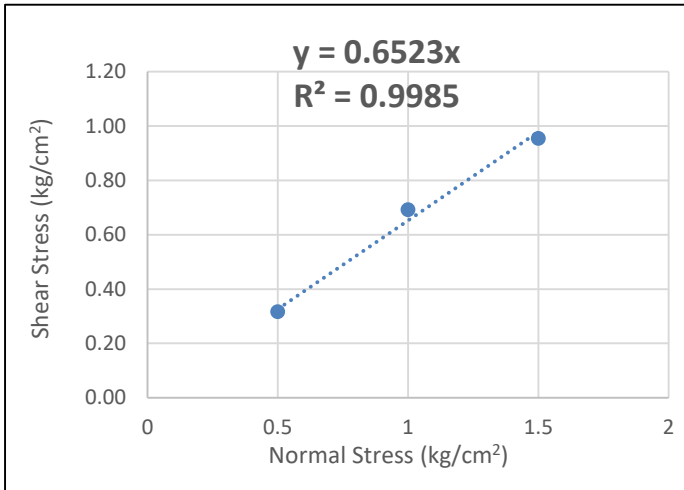


Depth: 7.5 m

$C = 0.000$

$\phi = 32.41$

Graphical Representation of Direct Shear Test Results



Depth: 9 m

C = 0.000

ϕ = 33.12

-

C = -

ϕ = -

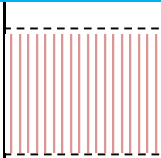
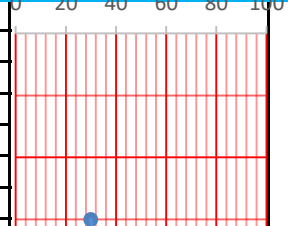


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Bore Hole Number : BH- 2 Job No. : MAARK/2023-24/120
Location : Hirebelaguli Date of Commenced : 06-01-2024
Chainage : 1+250 Date of Completed : 06-01-2024
Drilling Master : - Ground Water Level : -
Ground Elevation : 100.000 Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
06-Jan-24	100.000	0.0	 Water Table occurs at ground surface		Soil	SPT	DS	7 13 17 30	30		
	99.500	0.5									
	99.000	1.0									
	98.500	1.5									
	98.000	2.0									
	97.500	2.5									
	97.000	3.0									
	96.500	3.5									
	96.000	4.0									
	95.500	4.5									
	95.000	5.0									
	94.500	5.5									
	94.000	6.0									
	93.500	6.5									
	93.000	7.0									
	92.500	7.5									
	92.000	8.0									
	91.500	8.5									
	91.000	9.0									
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 2

Location: Hirebelaguli

Chainage:1+250

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

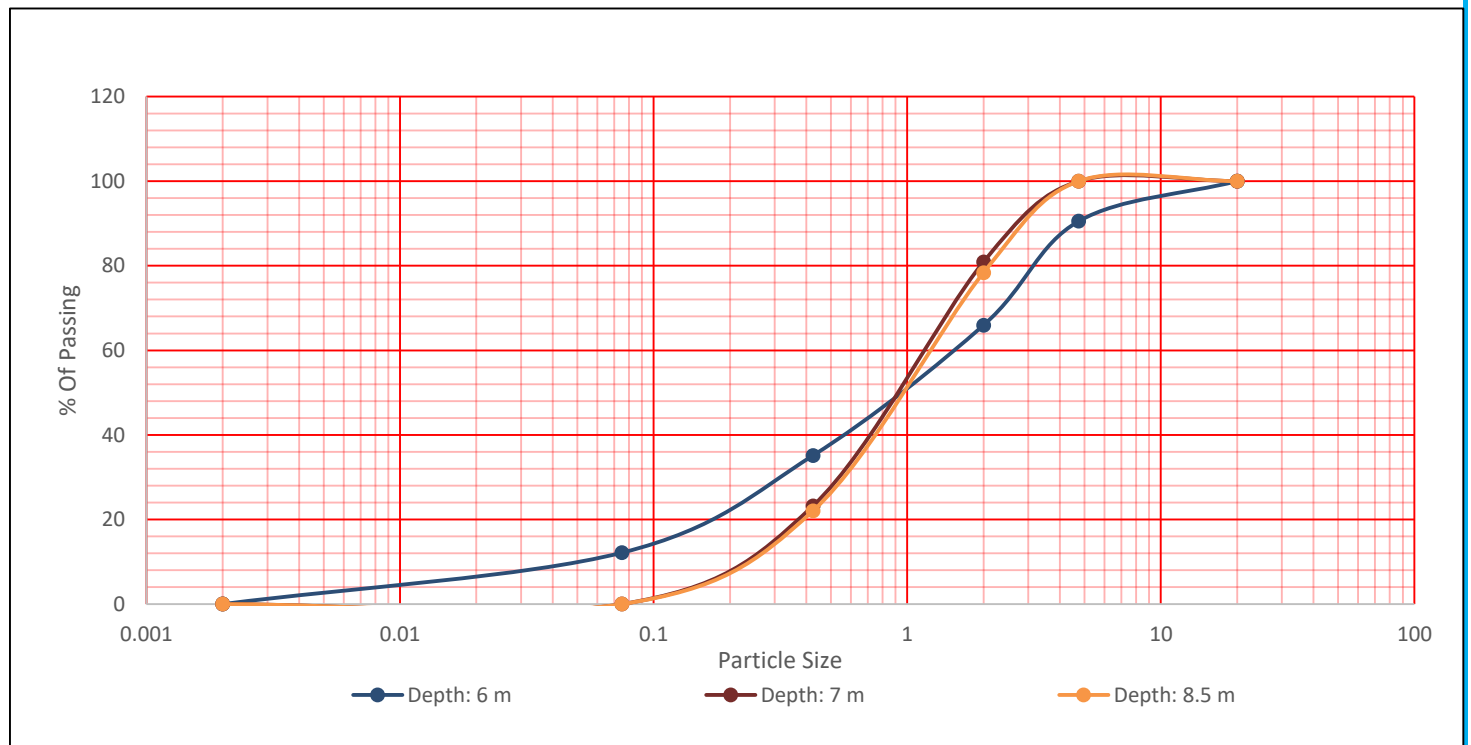
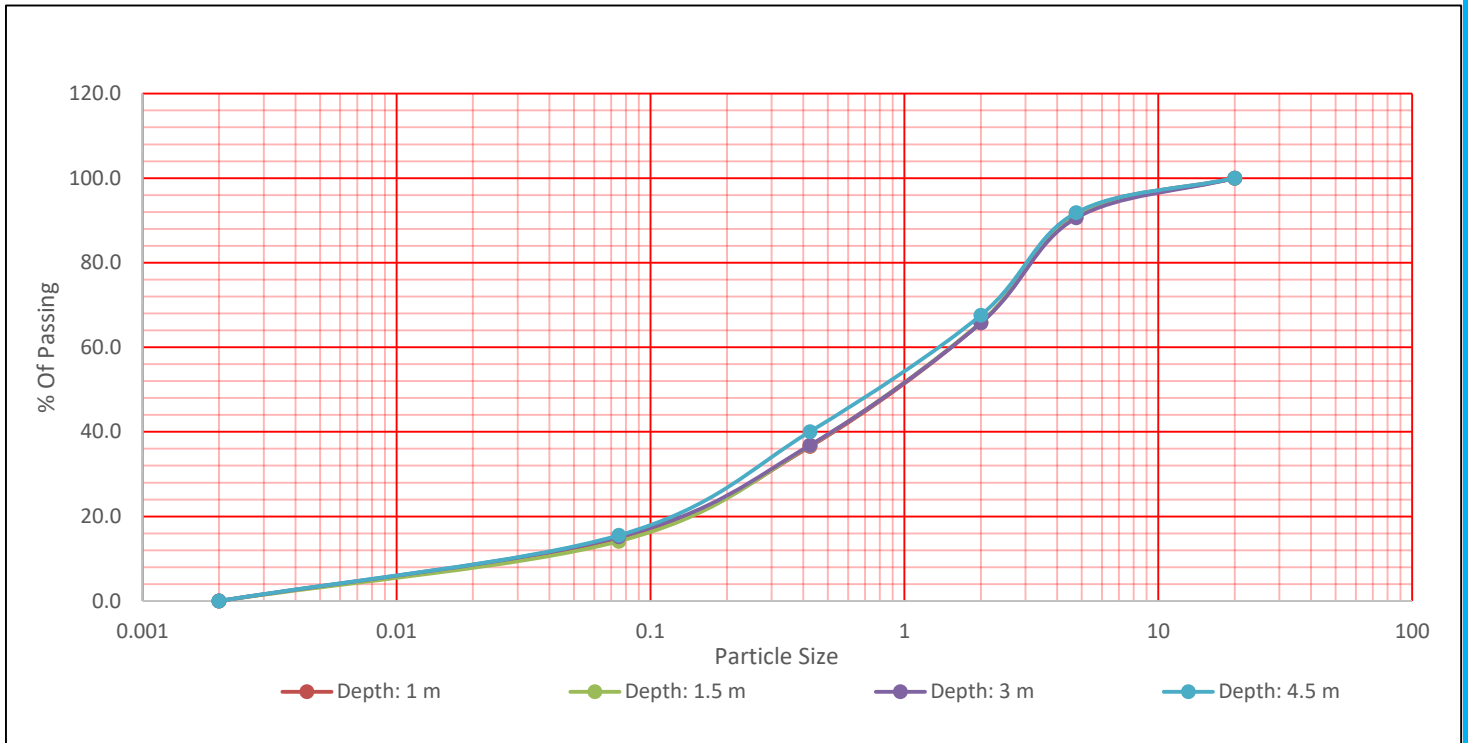
[illegible]



Particle size Distribution Curves

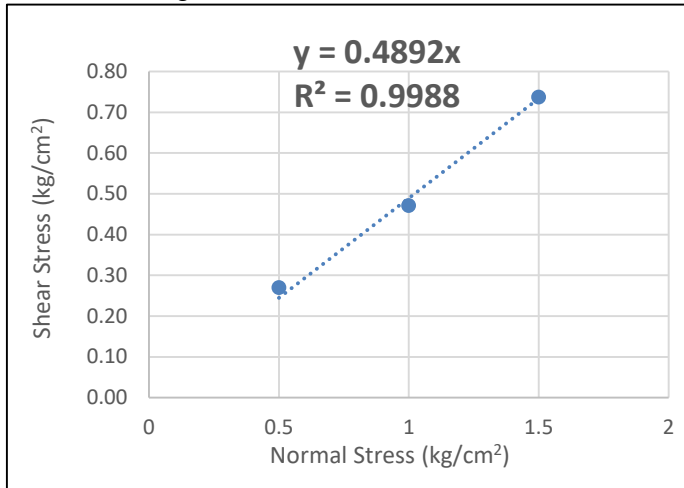
BH- 2, Hirebelaguli

Chainage:1+250



Graphical Representation of Direct Shear Test Results

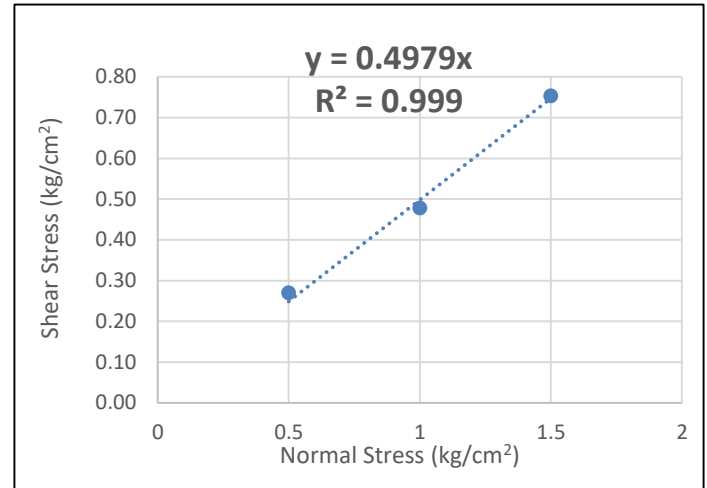
BH- 2, Hirebelaguli



Depth: 1 m

$C = 0.00$

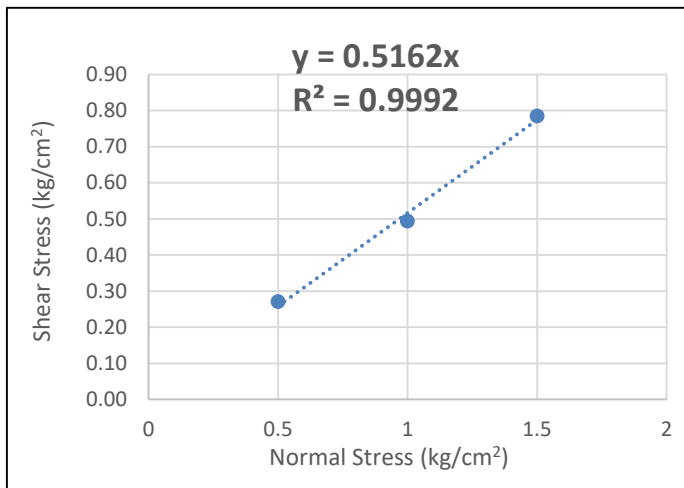
$\phi = 26.07$



Depth: 1.5 m

$C = 0.00$

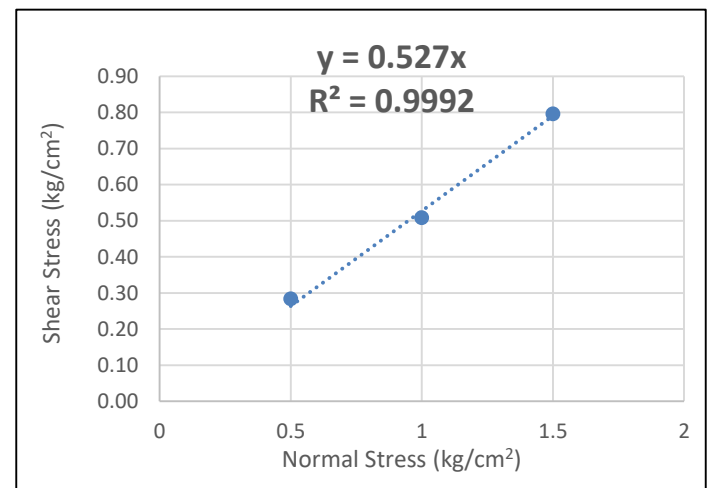
$\phi = 26.47$



Depth: 3 m

$C = 0.00$

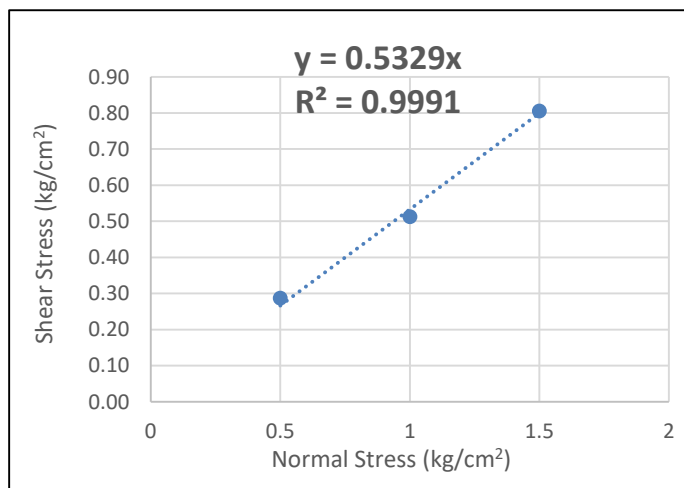
$\phi = 27.30$



Depth: 4.5 m

$C = 0.00$

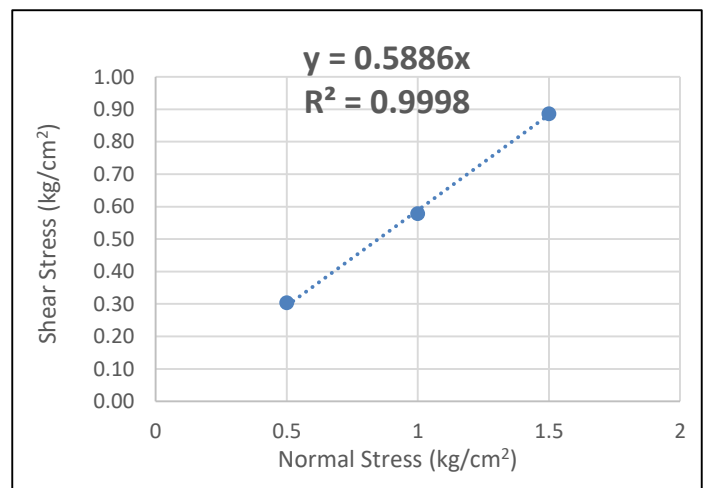
$\phi = 27.79$



Depth: 6 m

$C = 0.000$

$\phi = 28.05$

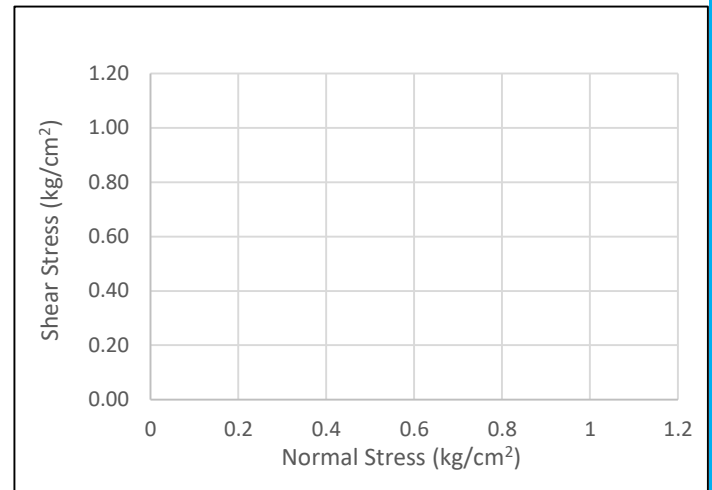
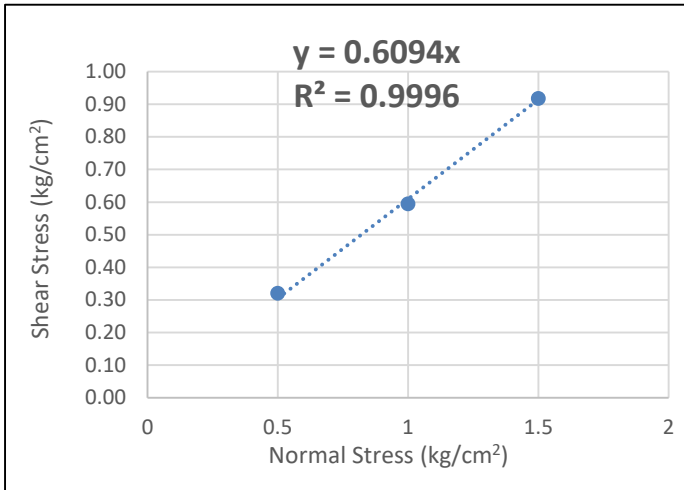


Depth: 7 m

$C = 0.000$

$\phi = 30.48$

Graphical Representation of Direct Shear Test Results



Depth: 8.5 m

$C = 0.000$

$\phi = 31.36$

-

$C = -$

$\phi = -$



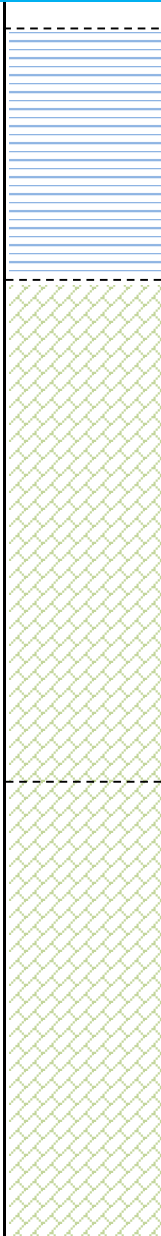
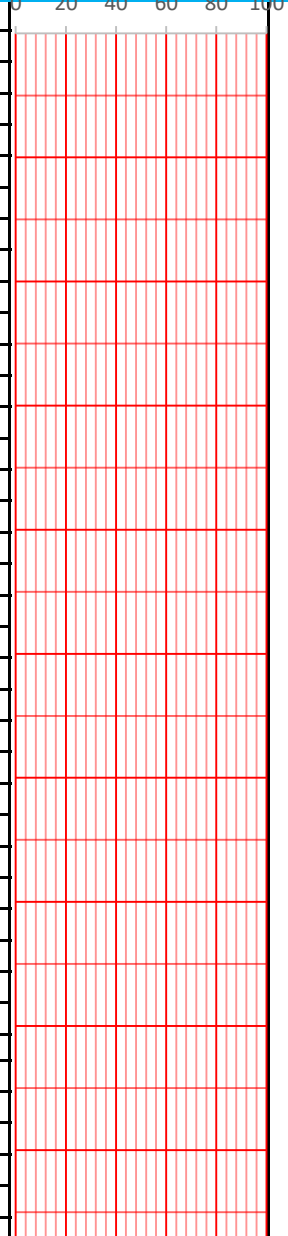
BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 3
Location : Dakshinanala
Chainage : 1+500
Drilling Master : -
Ground Elevation : 100.000

Job No. : MAARK/2023-24/120
Date of Commenced : 07-01-2024
Date of Completed : 07-01-2024
Ground Water Level : -
Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms				SPT 'N' Value	Standard penetration test Number of blows	Remarks
07-Jan-24	100.000	0.0			Filling Soil									
	99.500	0.5												
	99.000	1.0												
	98.500	1.5					DS							
	98.000	2.0					DS							
	97.500	2.5			Silty Clay									
	97.000	3.0				SPT		3	10	11	21			
	96.500	3.5					DS							
	96.000	4.0												
	95.500	4.5				SPT		5	9	10	19			
	95.000	5.0					DS							
	94.500	5.5												
	94.000	6.0				SPT		7	11	13	24			
	93.500	6.5			Clay		DS							
	93.000	7.0												
	92.500	7.5				SPT		9	11	15	26			
	92.000	8.0					DS							
	91.500	8.5												
	91.000	9.0				SPT		9	12	16	28			
	90.500	9.5					DS							
	90.000	10.0												

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 3

Location: Dakshinanala

Chainage:1+500

[illegible]

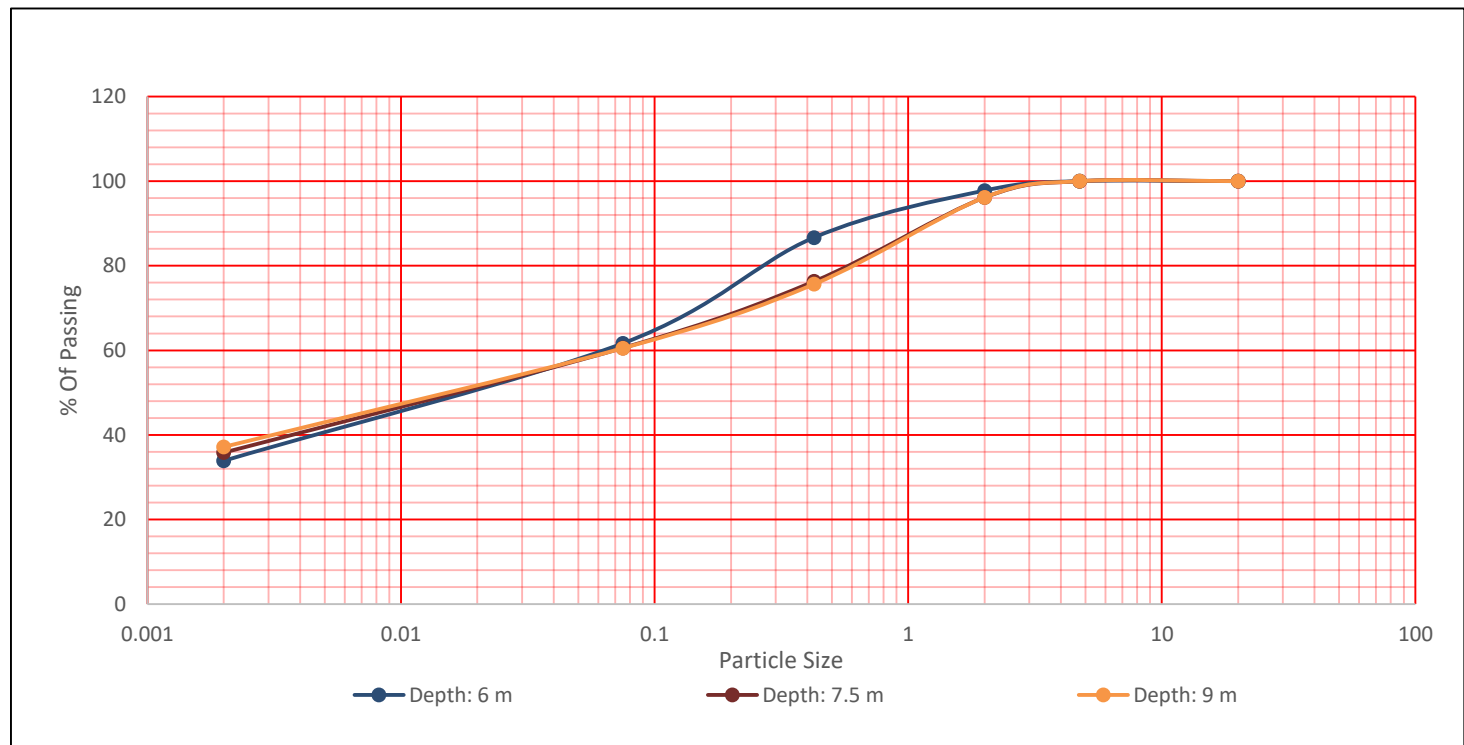
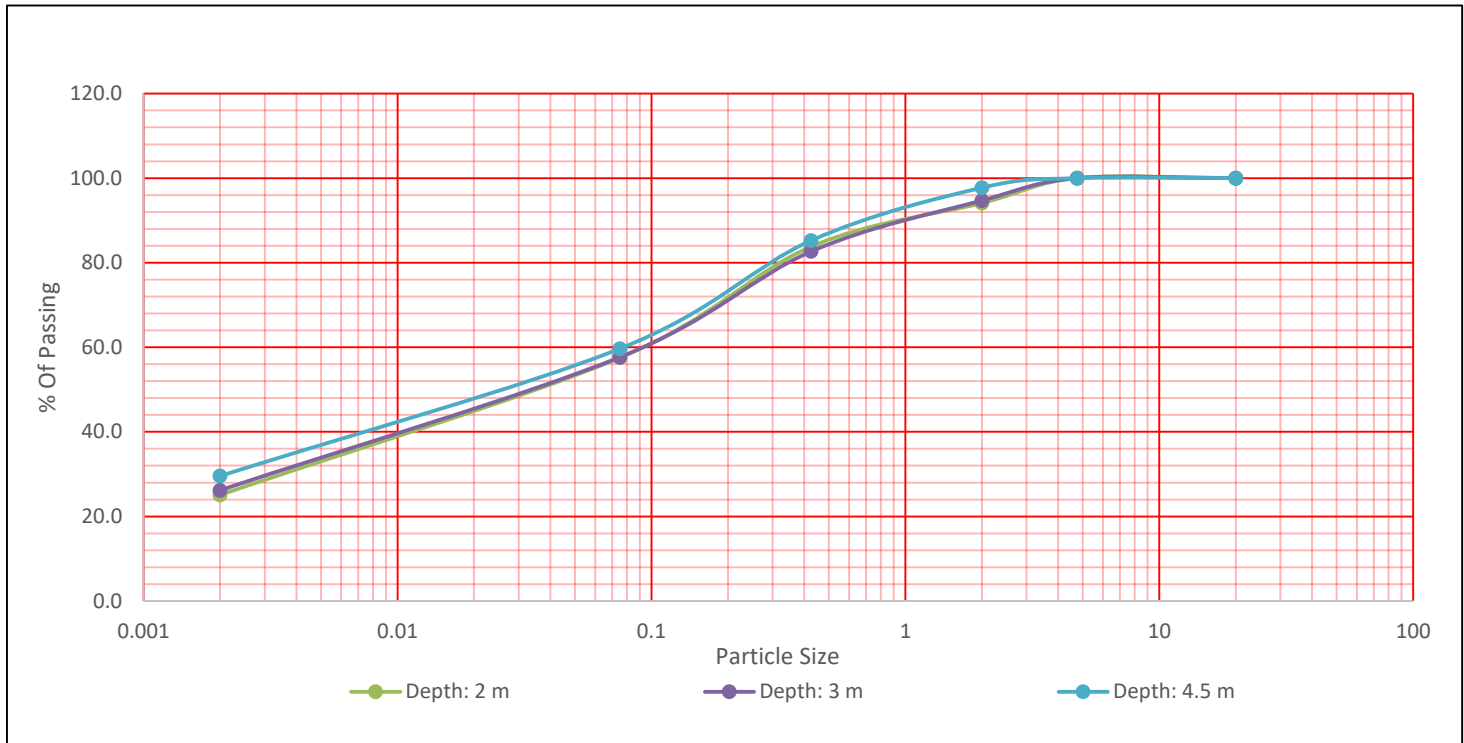
[illegible]



Particle size Distribution Curves

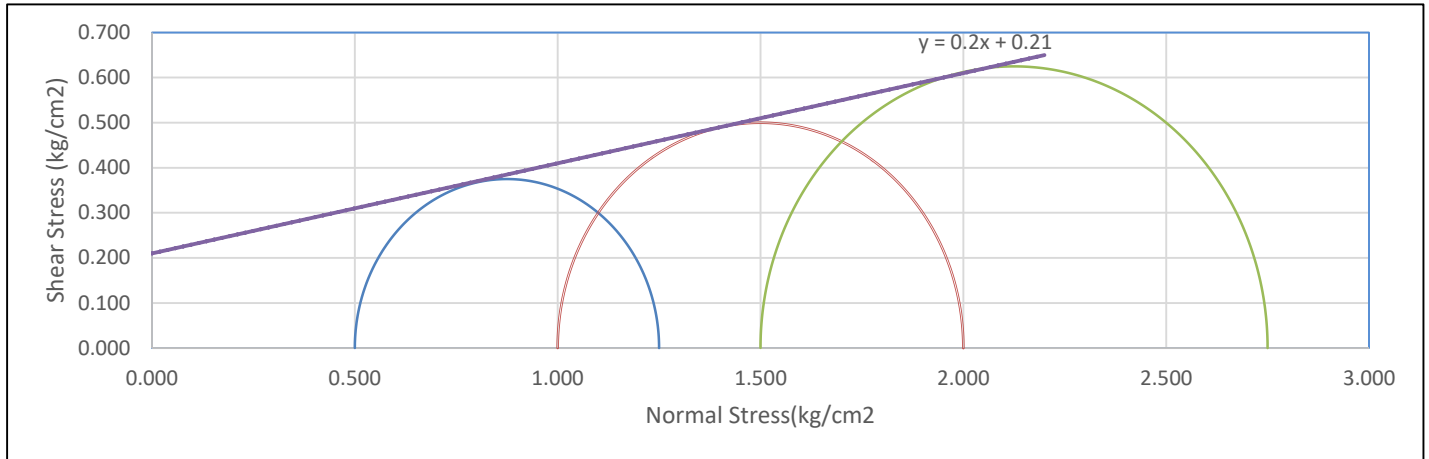
Bore Hole Number: BH- 3

Chainage: 1+500



Graphical Representation of Triaxial Shear Results:

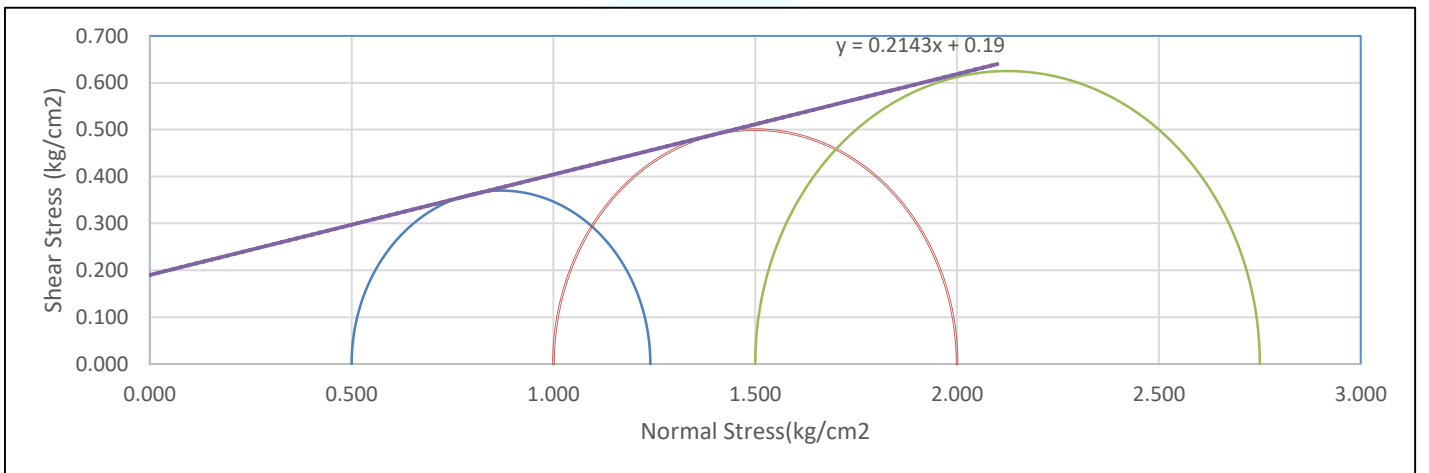
Bore Hole Number: BH- 3



Depth: 2 m

$C = 0.210$

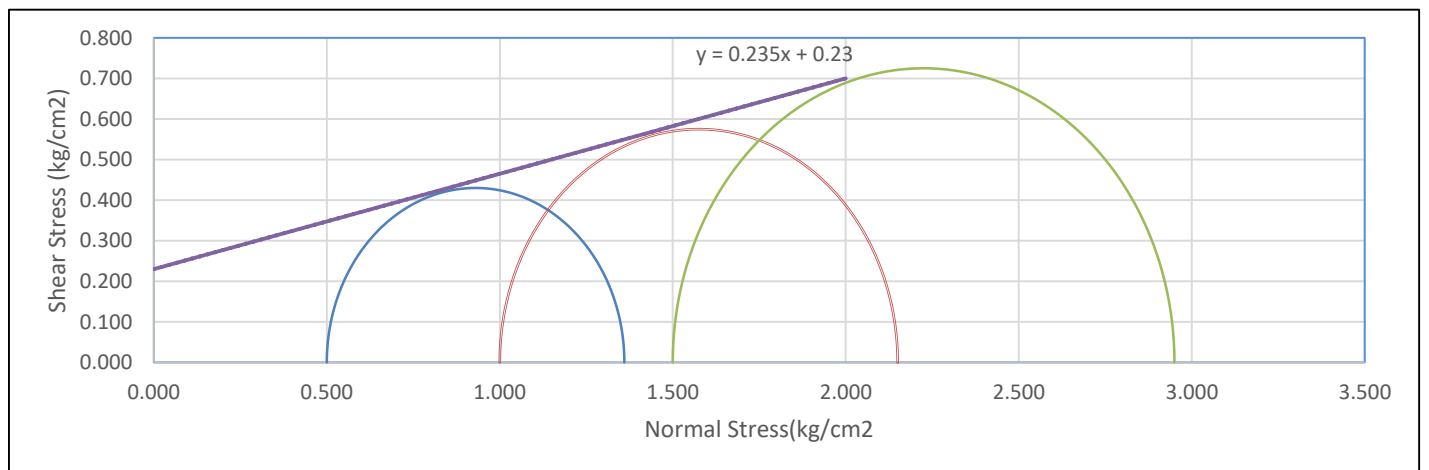
$\phi = 11.32$



Depth: 3 m

$C = 0.190$

$\phi = 12.10$



Depth: 4.5 m

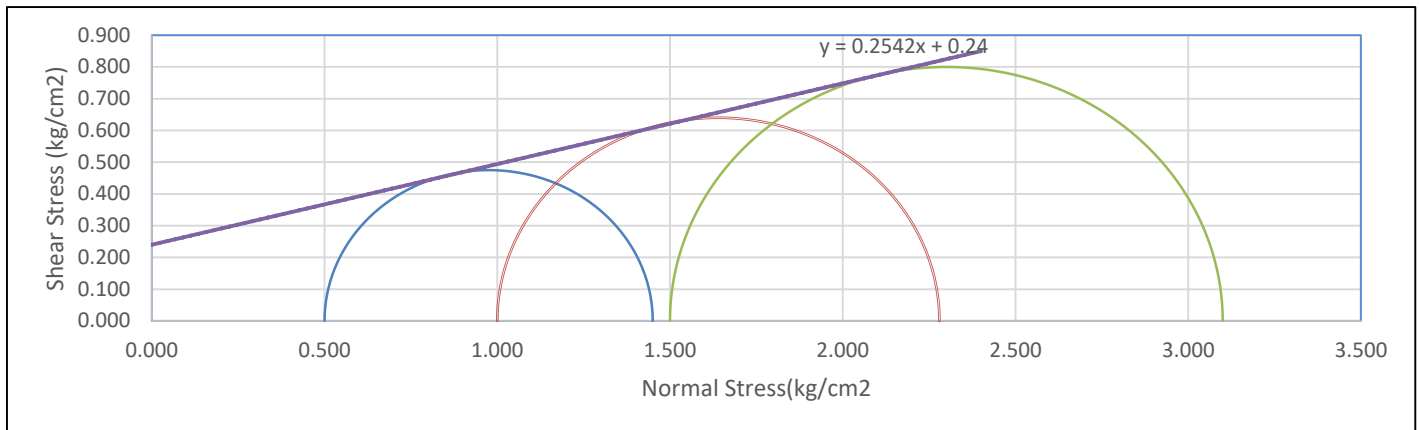
$C = 0.230$

$\phi = 13.23$



Graphical Representation of Triaxial Shear Results:

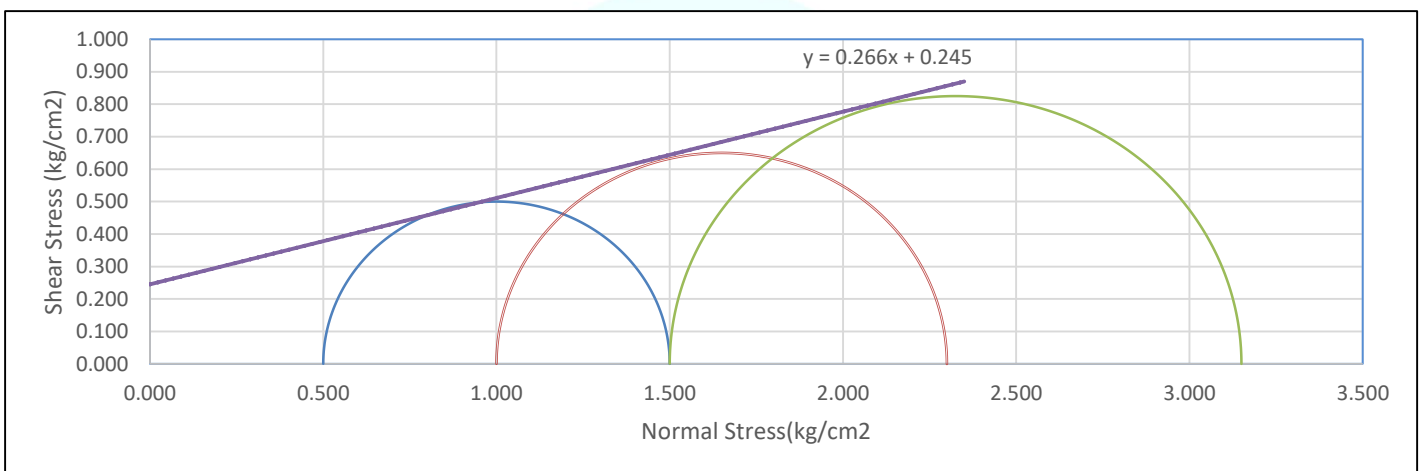
Bore Hole Number: BH- 3



Depth: 6 m

$C = 0.240$

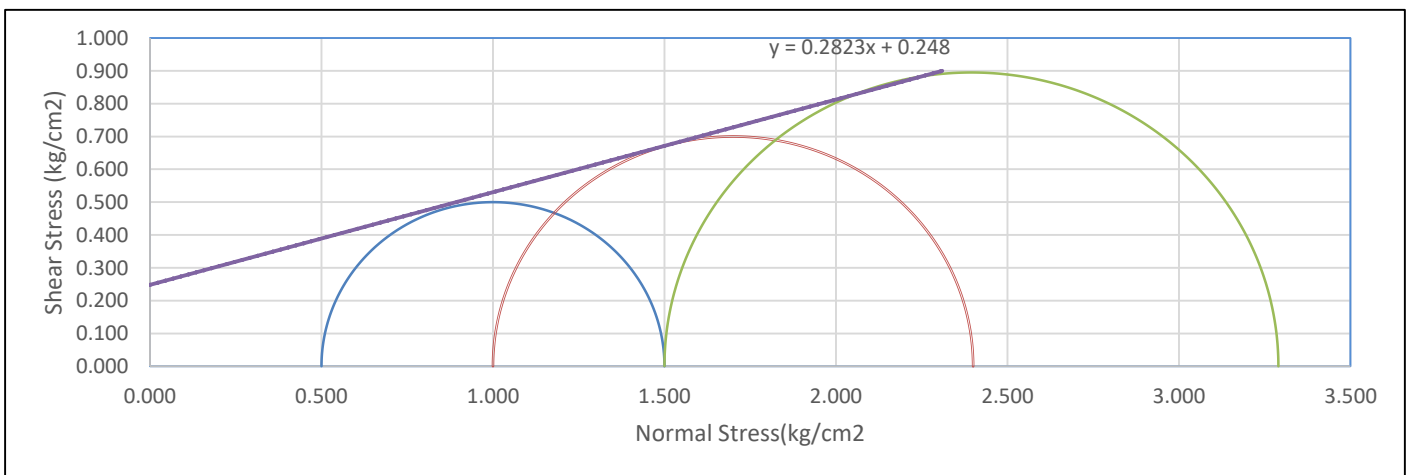
$\phi = 14.27$



Depth: 7.5 m

$C = 0.245$

$\phi = 14.90$



Depth: 9 m

$C = 0.248$

$\phi = 15.76$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 4 **Job No.** : MAARK/2023-24/120

Location : Chikkabyagathavalli **Date of Commenced** : 07-01-2024

Chainage : 2+250 **Date of Completed** : 07-01-2024

Drilling Master : - **Ground Water Level** : -

Ground Elevation : 100.000 **Total Depth** : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms				SPT 'N' Value	Standard penetration test Number of blows	Remarks
07-Jan-24	100.000	0.0			BC Soil								0 20 40 60 80 100	
	99.500	0.5												
	99.000	1.0												
							DS							
	98.500	1.5				SPT		6	9	11	20			
							DS							
	98.000	2.0												
	97.500	2.5												
	97.000	3.0				SPT		5	10	12	22			
							DS							
	96.500	3.5												
	96.000	4.0					DS							
	95.500	4.5				SPT		12	16	22	38			
							DS							
	95.000	5.0												
	94.500	5.5												
	94.000	6.0				SPT		17	20	24	44			
							DS							
	93.500	6.5												
	93.000	7.0												
	92.500	7.5				SPT		Refused N>100						
							DS							
	92.000	8.0												
	91.500	8.5												
	91.000	9.0				SPT		Refused N>100						
							DS							
	90.500	9.5												
	90.000	10.0												

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 4

Location:Chikkabyagathavalli

Chainage:2+250

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

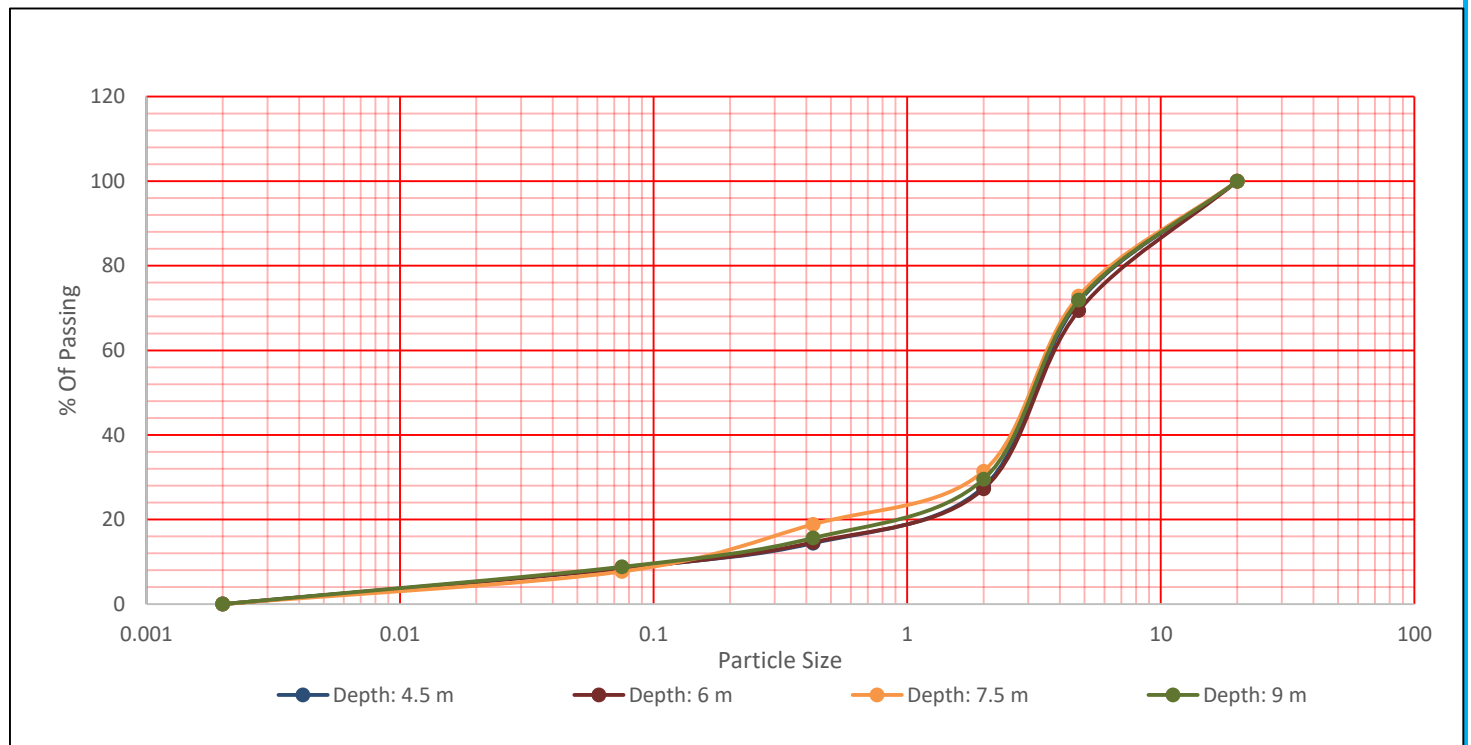
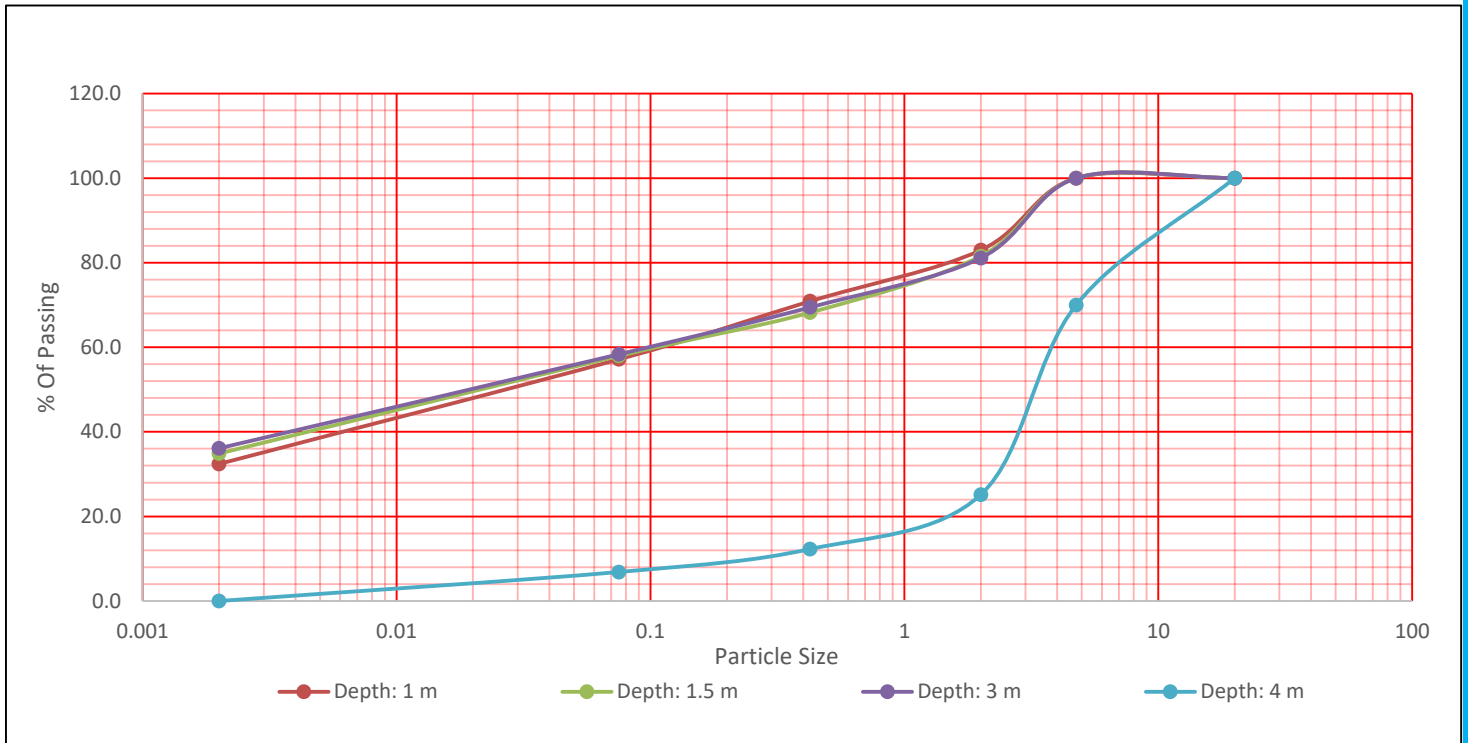
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 4

Chainage: 2+250

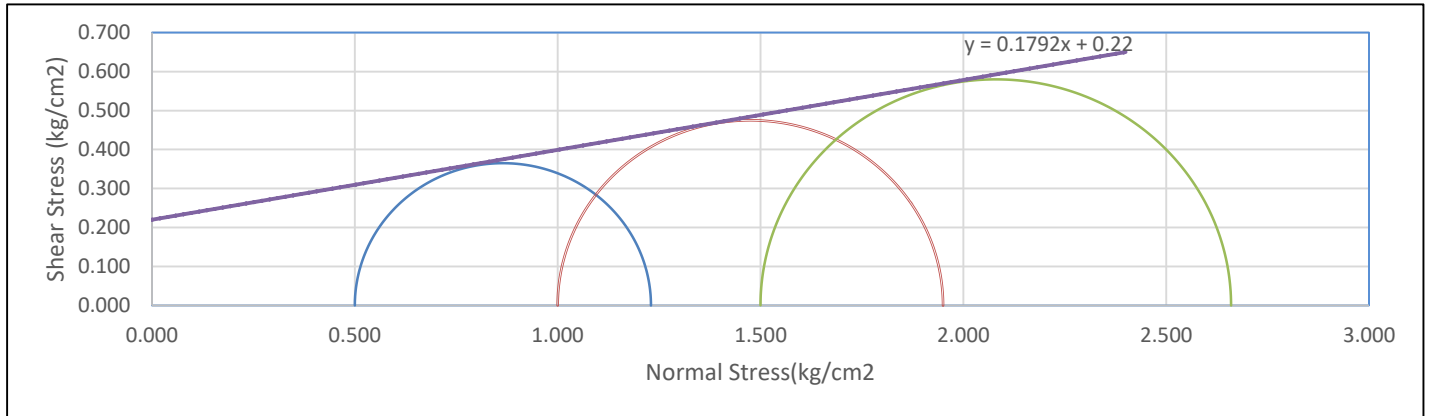




Graphical Representation of Triaxial Shear Results:

Bore Hole Number: BH- 4

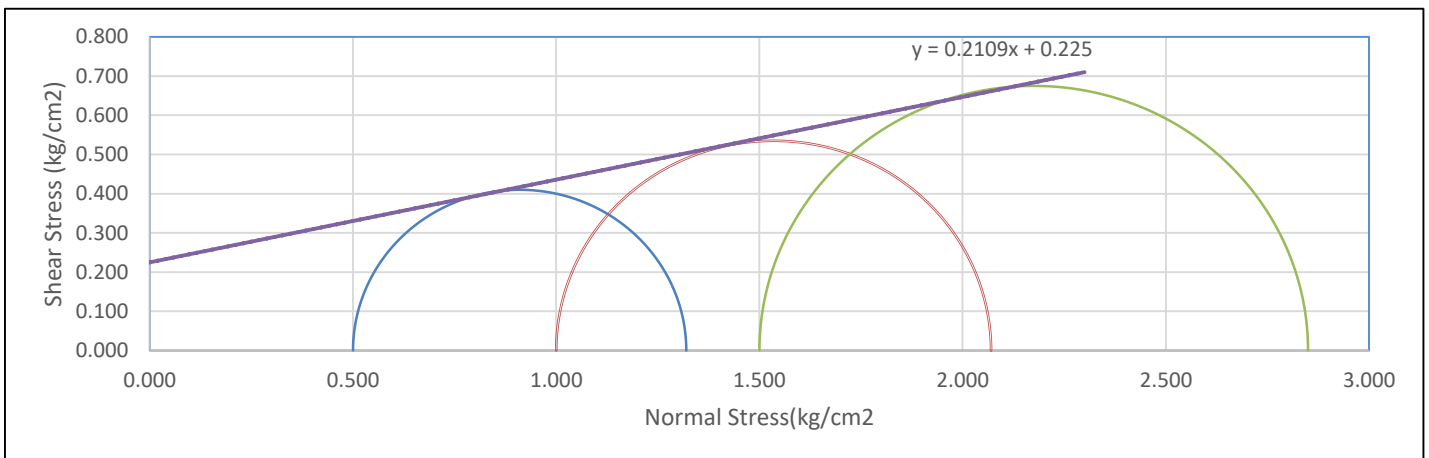
Chainage: 2+250



Depth: 1 m

$C = 0.220$

$\phi = 10.15$

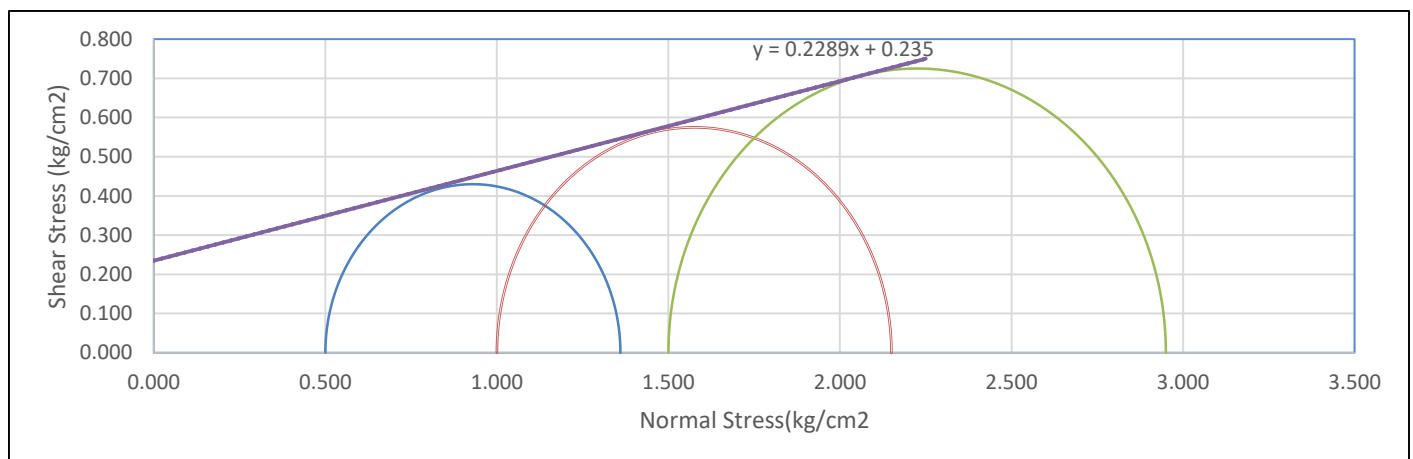


Depth: 1.5 m

Trust is our solid reputation.
Maark Civil Engineering Services PVT. LTD.

$C = 0.225$

$\phi = 11.67$



Depth: 3 m

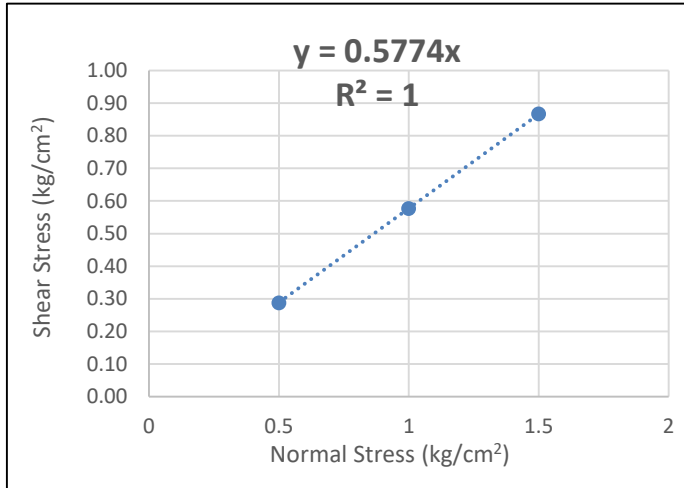
$C = 0.235$

$\phi = 12.90$

Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 4

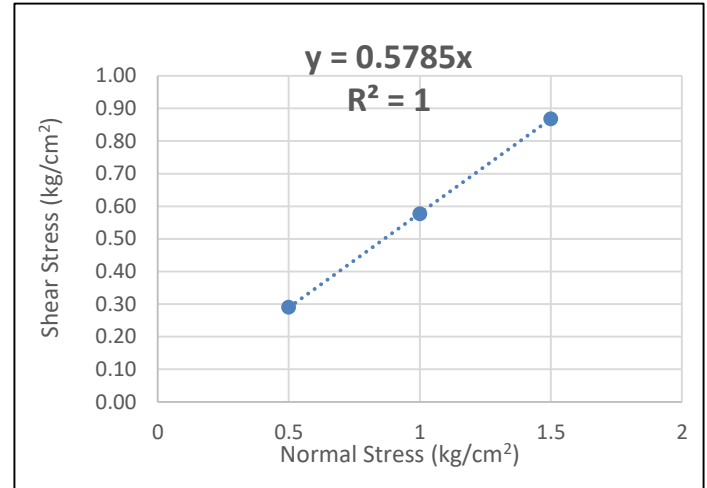
Chainage: 2+250



Depth: 4 m

C = 0.00

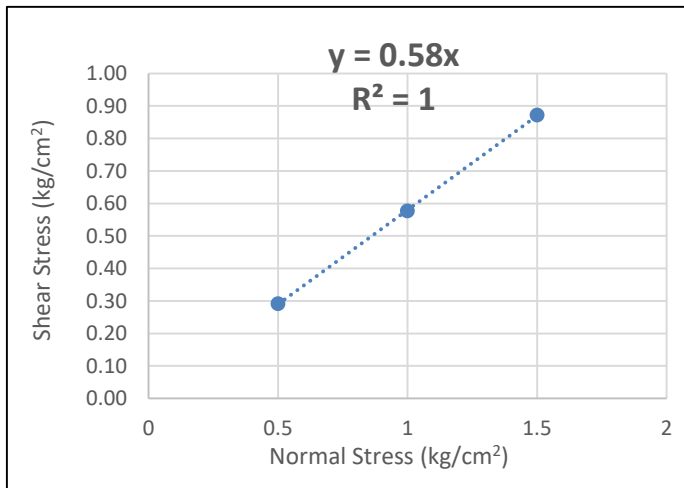
$\phi = 30.00$



Depth: 4.5 m

C = 0.00

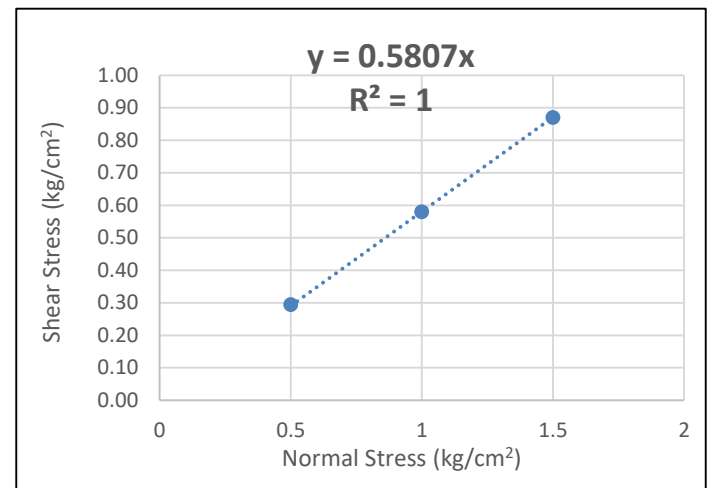
$\phi = 30.05$



Depth: 6 m

C = 0.00

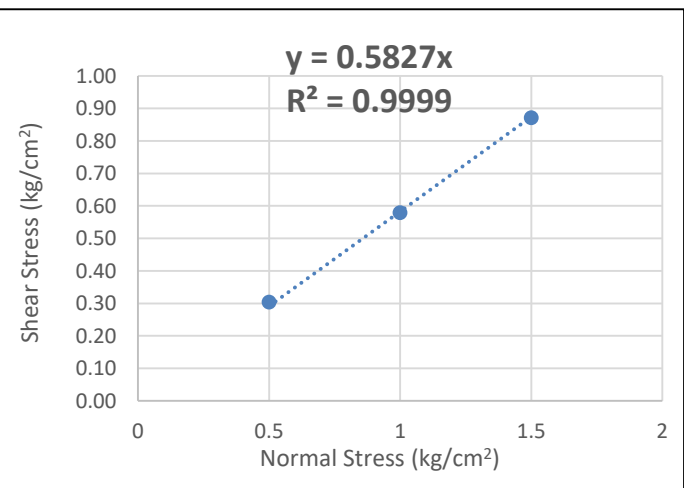
$\phi = 30.11$



Depth: 7.5 m

C = 0.00

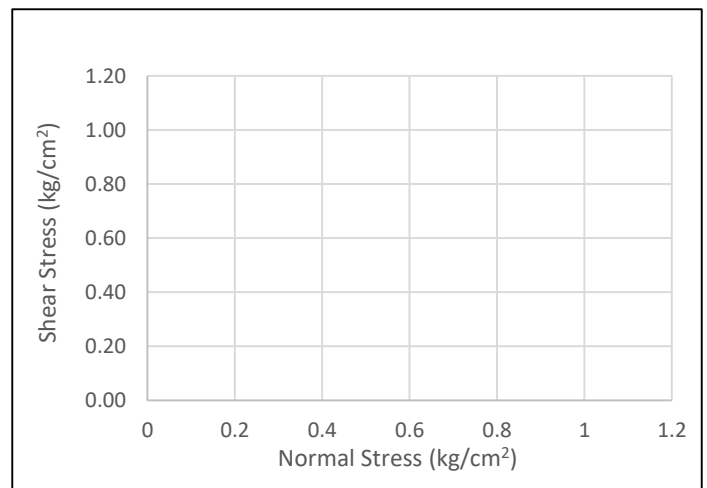
$\phi = 30.14$



Depth: 9 m

C = 0.000

$\phi = 30.23$



Depth: - m

C = -

$\phi = -$



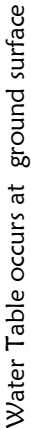
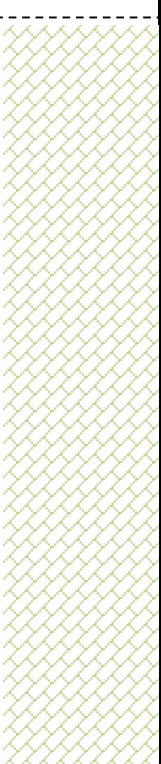
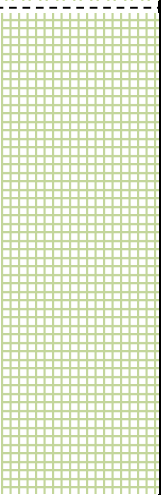
BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 5
Location : Dakshinanala
Chainage : 2+100
Drilling Master : -
Ground Elevation : 100.000

Job No. : MAARK/2023-24/120
Date of Commenced : 08-01-2024
Date of Completed : 08-01-2024
Ground Water Level : -
Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
08-Jan-24	100.000	0.0			Clay	SPT	DS	2 8 9 17	17	20	
	99.500	0.5									
	99.000	1.0									
	98.500	1.5									
	98.000	2.0									
	97.500	2.5									
	97.000	3.0									
	96.500	3.5									
	96.000	4.0									
	95.500	4.5									
	95.000	5.0									
	94.500	5.5									
	94.000	6.0									
	93.500	6.5			Sandy soil mixed with Gravel	SPT	DS	7 11 13 24	24	40	
	93.000	7.0									
	92.500	7.5									
	92.000	8.0									
	91.500	8.5									
	91.000	9.0									
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 5

Location: Dakshinanala

Chainage:2+100

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

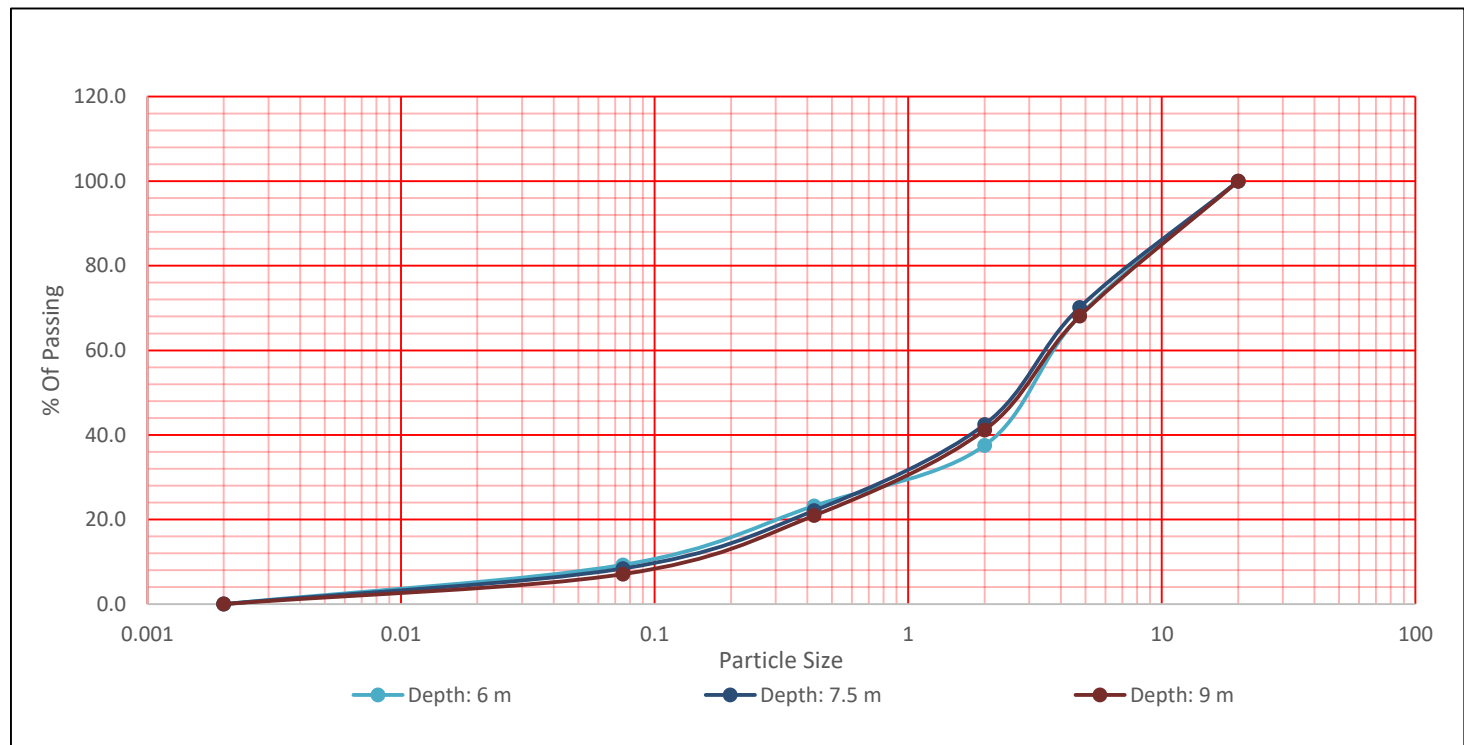
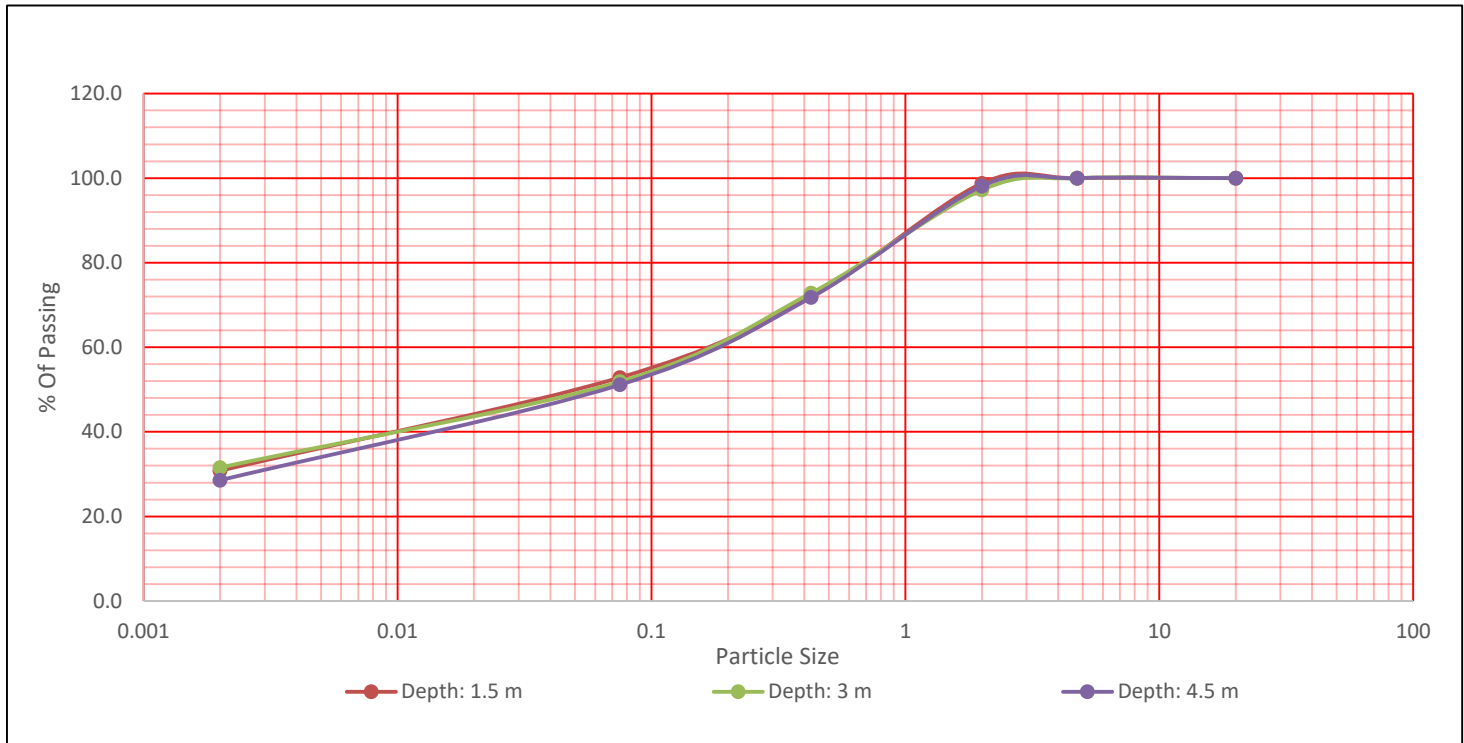
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 5

Chainage: 2+100

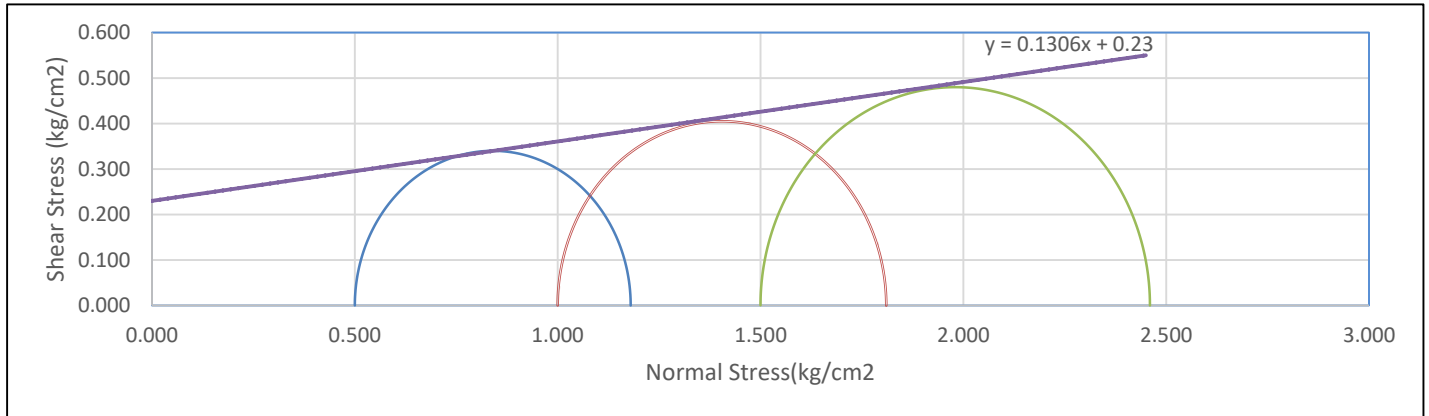




Graphical Representation of Triaxial Shear Results:

Bore Hole Number: BH- 5

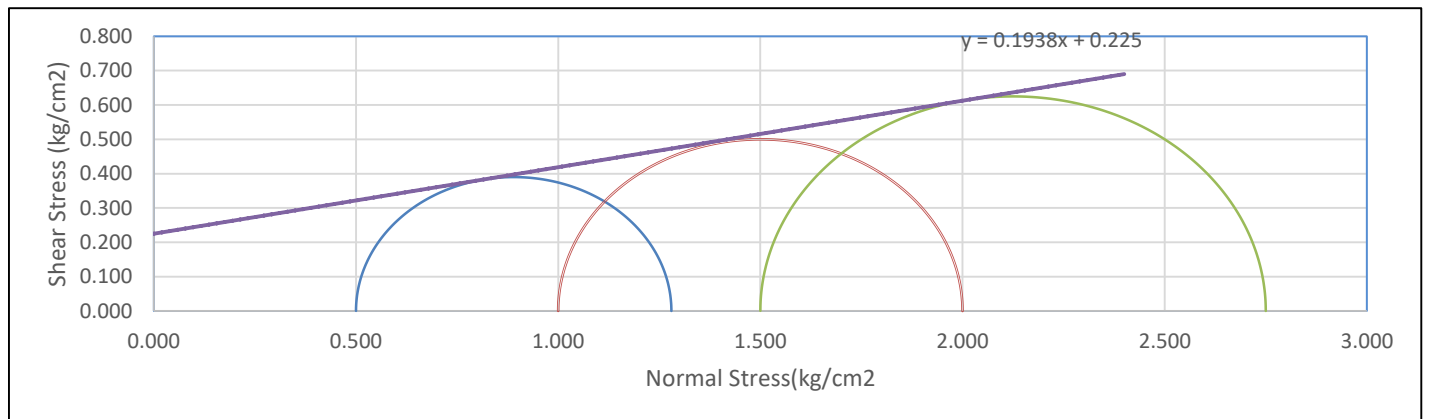
Chainage: 2+100



Depth: 1.5 m

$C = 0.230$

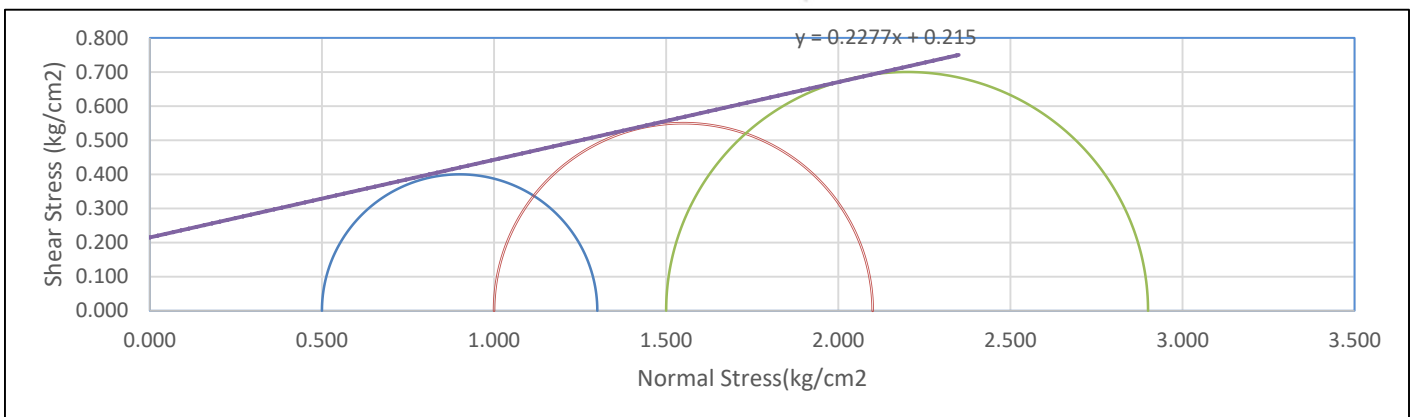
$\phi = 7.44$



Depth: 3 m

$C = 0.225$

$\phi = 11.08$



Depth: 4.5 m

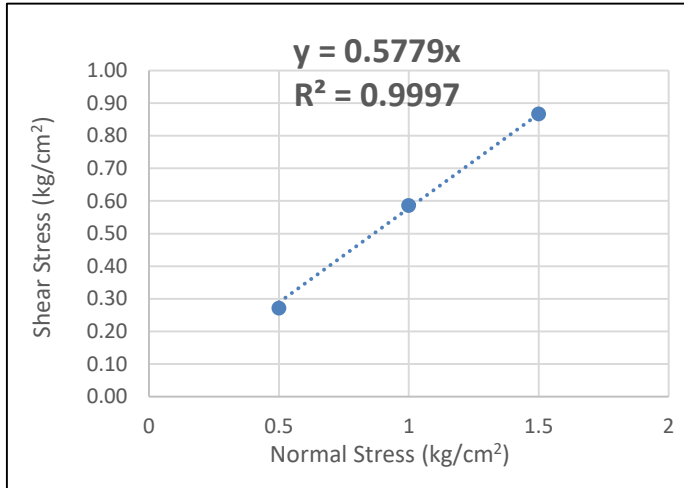
$C = 0.215$

$\phi = 12.83$

Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 5

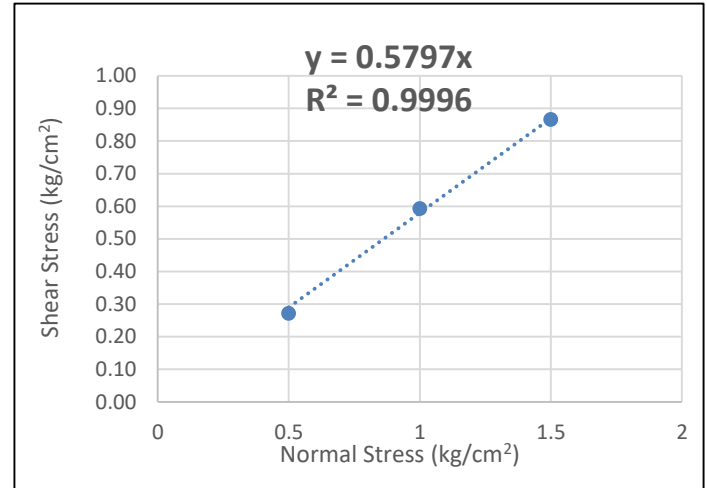
Chainage: 2+100



Depth: 6 m

$C = 0.00$

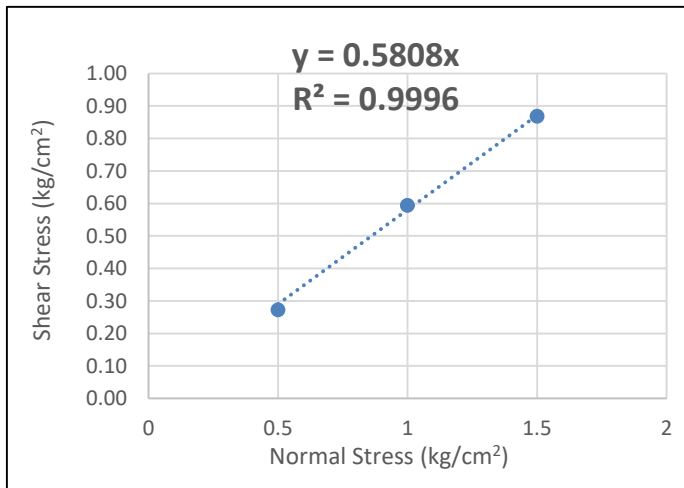
$\phi = 30.02$



Depth: 7.5 m

$C = 0.00$

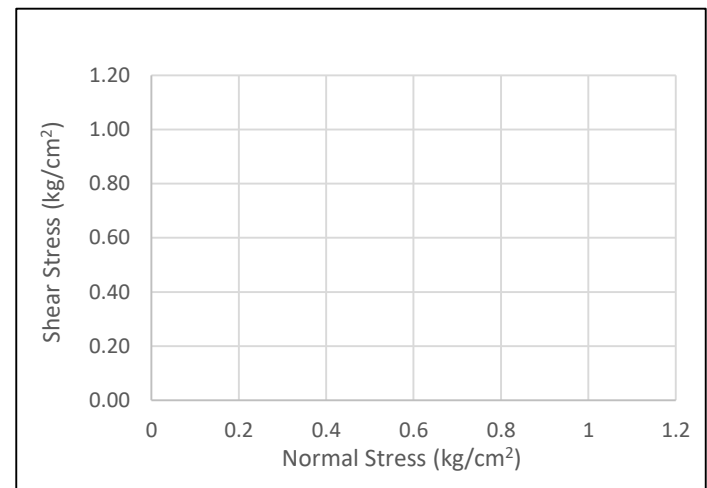
$\phi = 30.10$



Depth: 9 m

$C = 0.00$

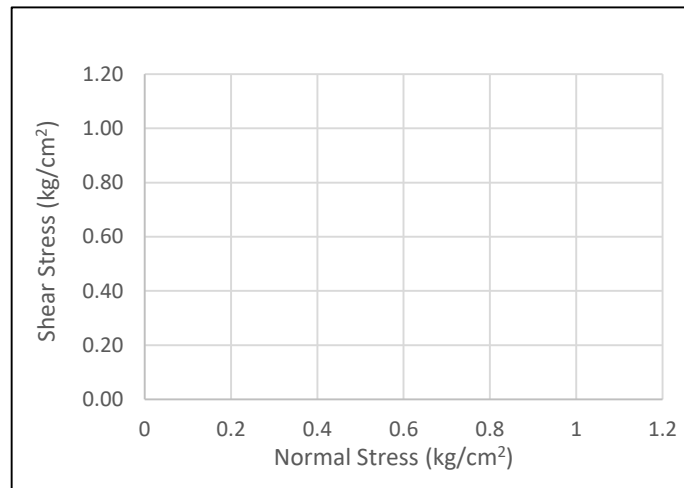
$\phi = 30.15$



Depth: - m

$C = -$

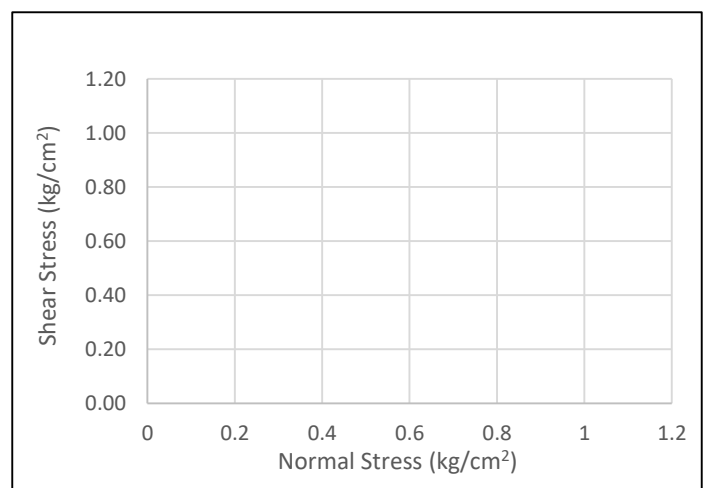
$\phi = -$



Depth: - m

$C = -$

$\phi = -$



Depth: - m

$C = -$

$\phi = -$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 6 **Job No.** : MAARK/2023-24/120

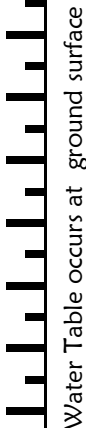
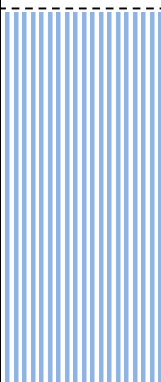
Location : Huchanakoppalu **Date of Commenced** : 08-01-2024

Chainage : 5+250 **Date of Completed** : 08-01-2024

Drilling Master : - **Ground Water Level** : -

Ground Elevation : 100.000 **Total Depth** : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of sample	SPT Blows 15-30-45cms				SPT 'N' Value	Standard penetration test Number of blows					Remarks
08-Jan-24	100.000	0.0			BC Soil													
	99.500	0.5																
	99.000	1.0					DS											
	98.500	1.5				SPT		6	9	11	20							
	98.000	2.0					DS											
	97.500	2.5																
	97.000	3.0				SPT		5	10	12	22							
	96.500	3.5					DS											
	96.000	4.0																
	95.500	4.5			DS													
	95.000	5.0		SPT		12	16	22	38									
	94.500	5.5			DS													
	94.000	6.0		SPT		17	20	24	44									
	93.500	6.5			DS													
	93.000	7.0																
	92.500	7.5		SPT		Refused N>100												
	92.000	8.0			DS													
	91.500	8.5																
	91.000	9.0		SPT		Refused N>100												
	90.500	9.5			DS													
	90.000	10.0																

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 6

Location:Huchanakoppalu

Chainage:5+250

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

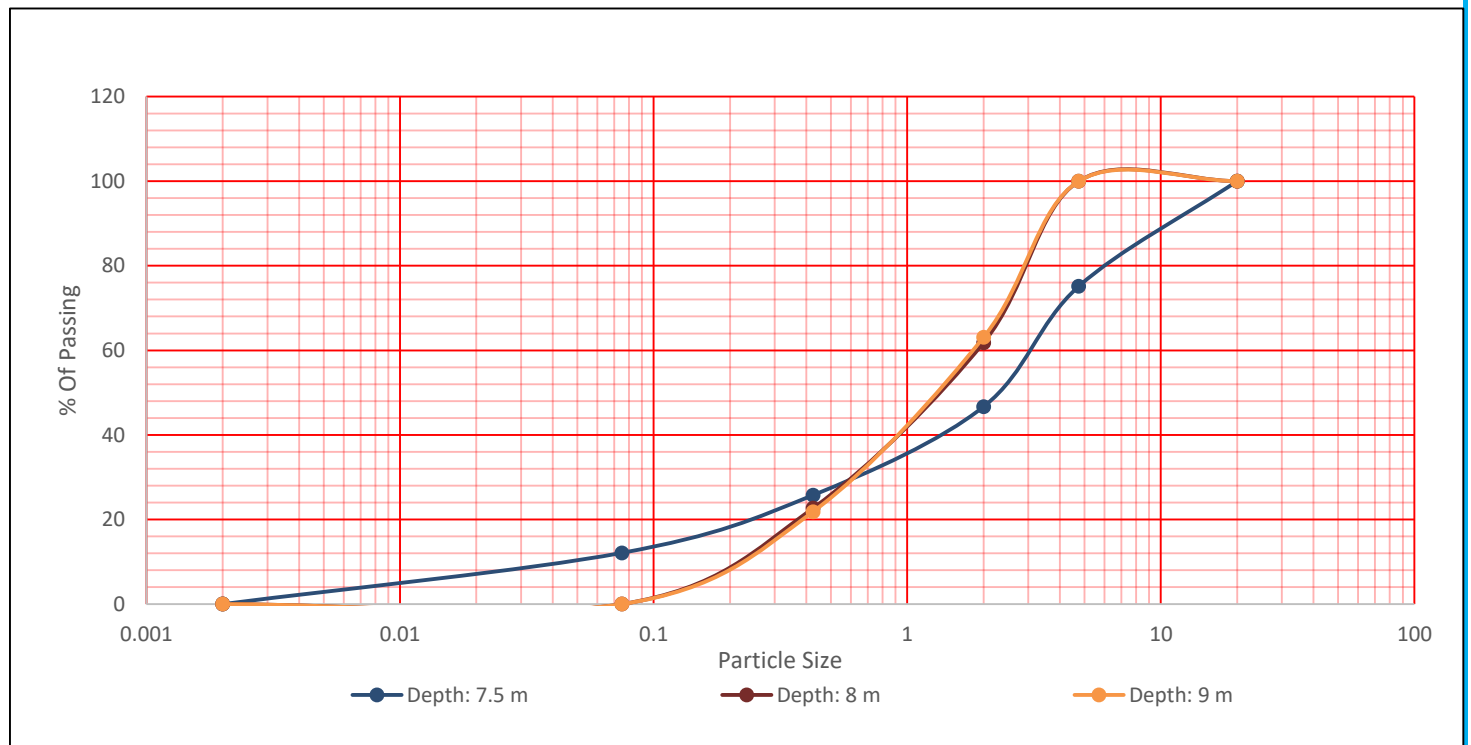
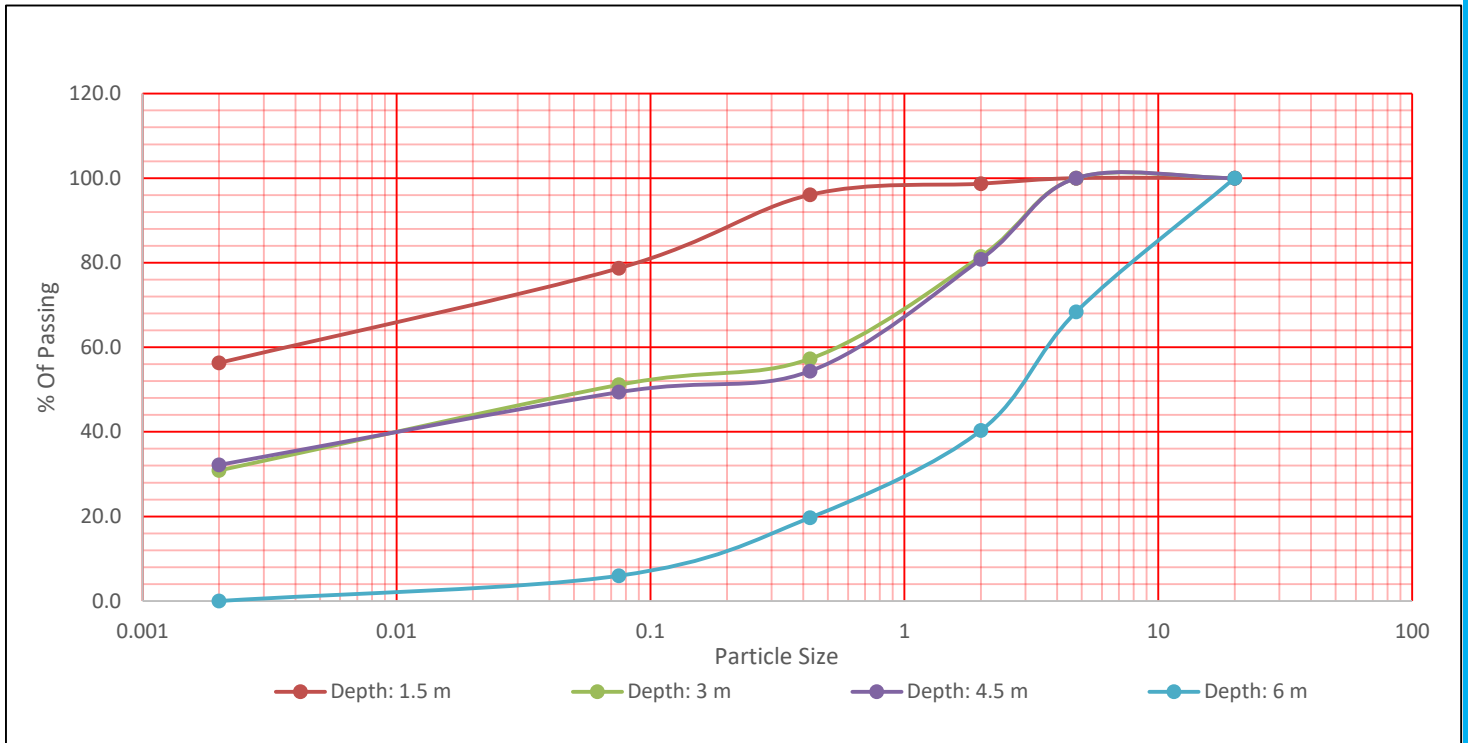
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 6

Chainage: 5+250

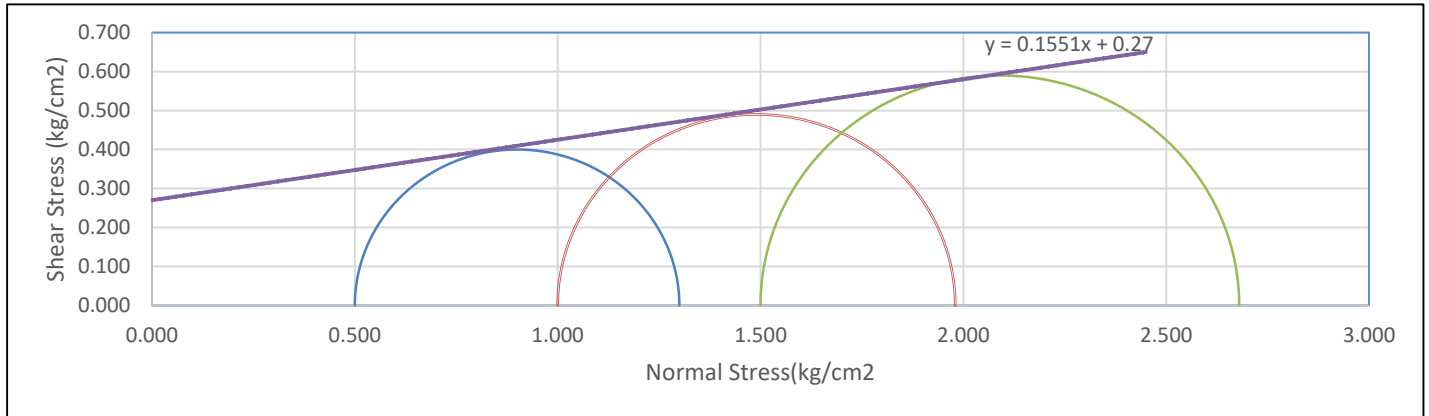




Graphical Representation of Triaxial Shear Results:

Bore Hole Number: BH- 6

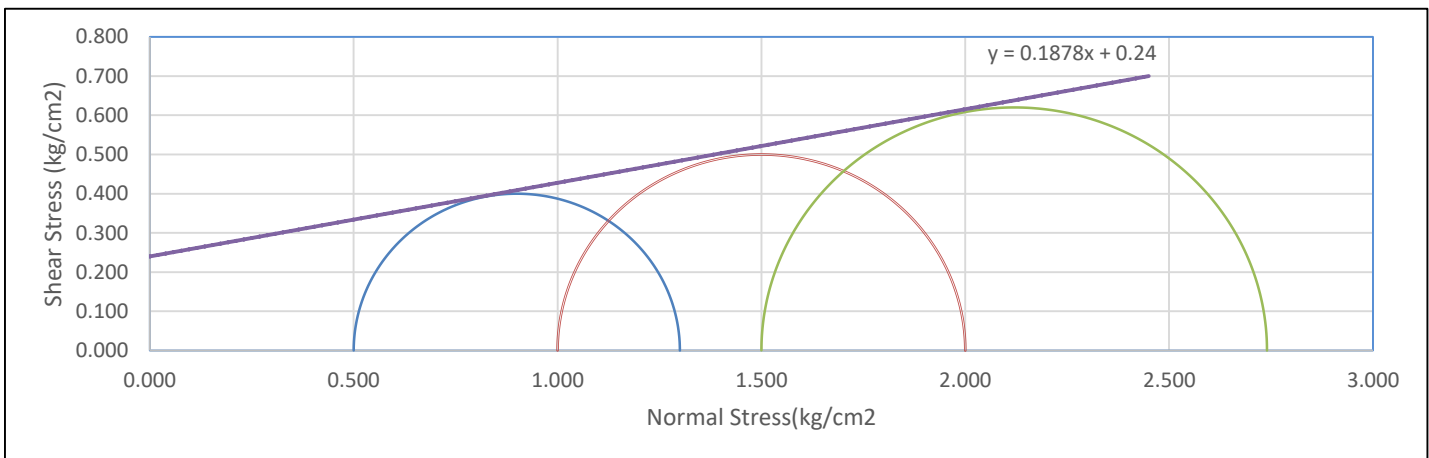
Chainage: 5+250



Depth: 1.5 m

$C = 0.270$

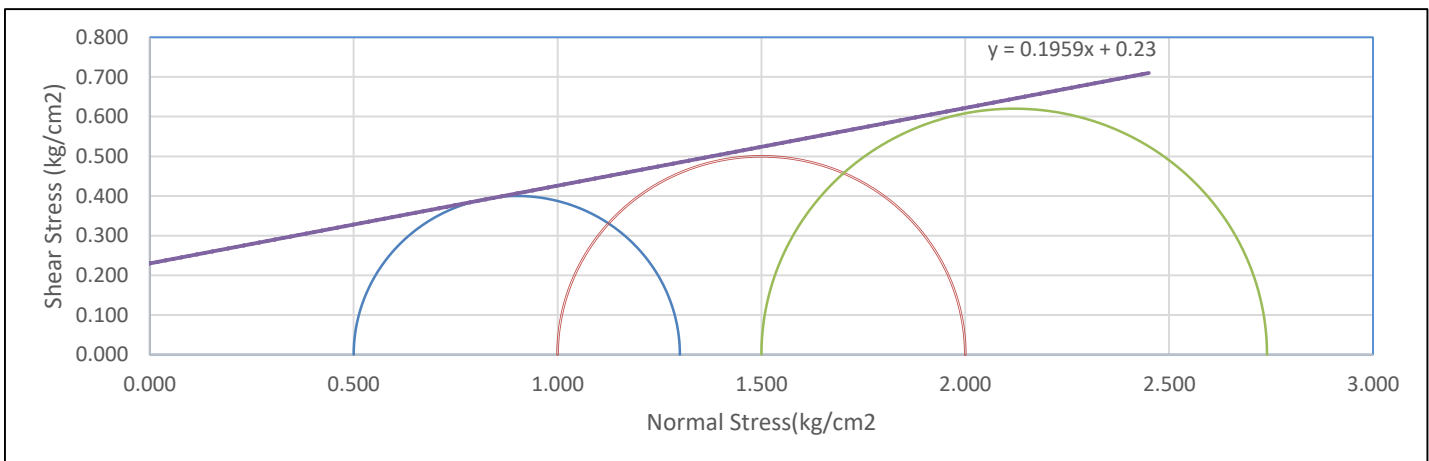
$\phi = 8.82$



Depth: 3 m

$C = 0.240$

$\phi = 10.64$



Depth: 4.5 m

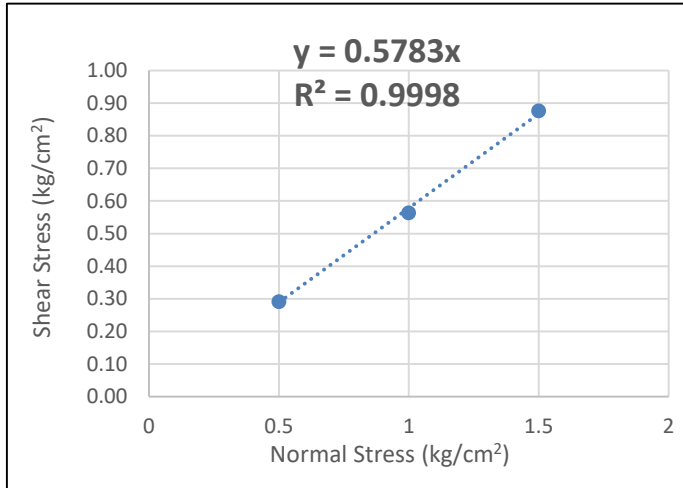
$C = 0.230$

$\phi = 11.09$

Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 6

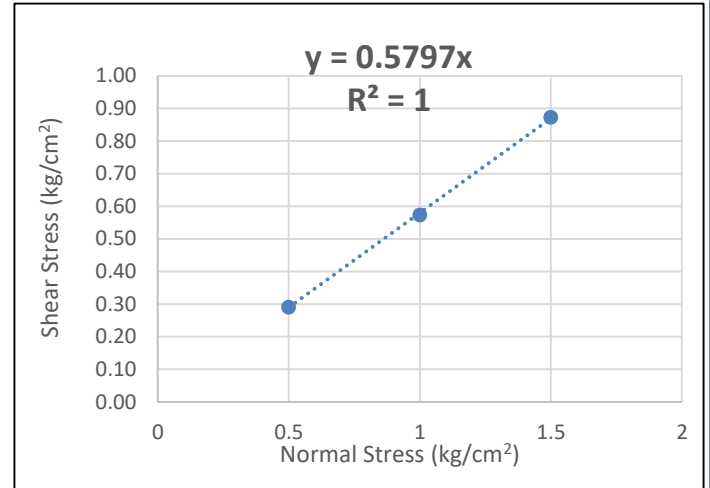
Chainage: 5+250



Depth: 6 m

$C = 0.00$

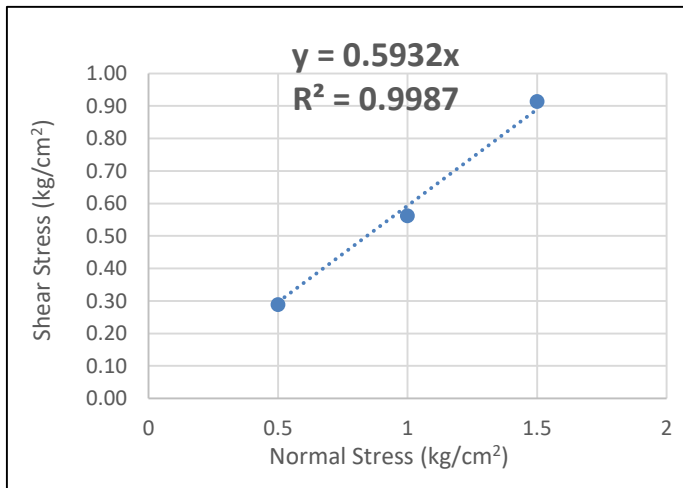
$\phi = 30.04$



Depth: 7.5 m

$C = 0.00$

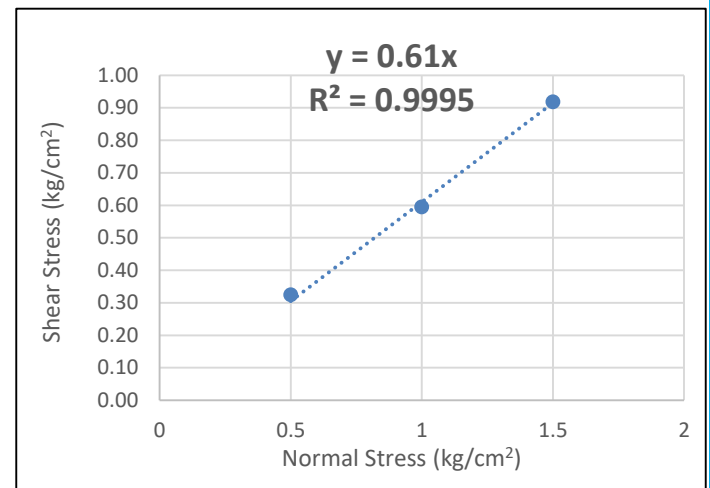
$\phi = 30.10$



Depth: 8 m

$C = 0.00$

$\phi = 30.68$



Depth: 9 m

$C = 0.00$

$\phi = 31.38$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 7
Location : Krishnapura
Chainage : 6+130
Drilling Master : -
Ground Elevation : 100.000

Job No. : MAARK/2023-24/120
Date of Commenced : 09-01-2024
Date of Completed : 09-01-2024
Ground Water Level : -
Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
09-Jan-24	100.000	0.0			Morrum	SPT	DS	11 14 21 35	35		
	99.500	0.5									
	99.000	1.0									
	98.500	1.5									
	98.000	2.0									
	97.500	2.5									
	97.000	3.0									
	96.500	3.5									
	96.000	4.0									
	95.500	4.5									
	95.000	5.0									
	94.500	5.5									
	94.000	6.0									
	93.500	6.5									
	93.000	7.0									
	92.500	7.5									
	92.000	8.0									
	91.500	8.5									
	91.000	9.0									
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 7

Location: Krishnapura

Chainage:6+130

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

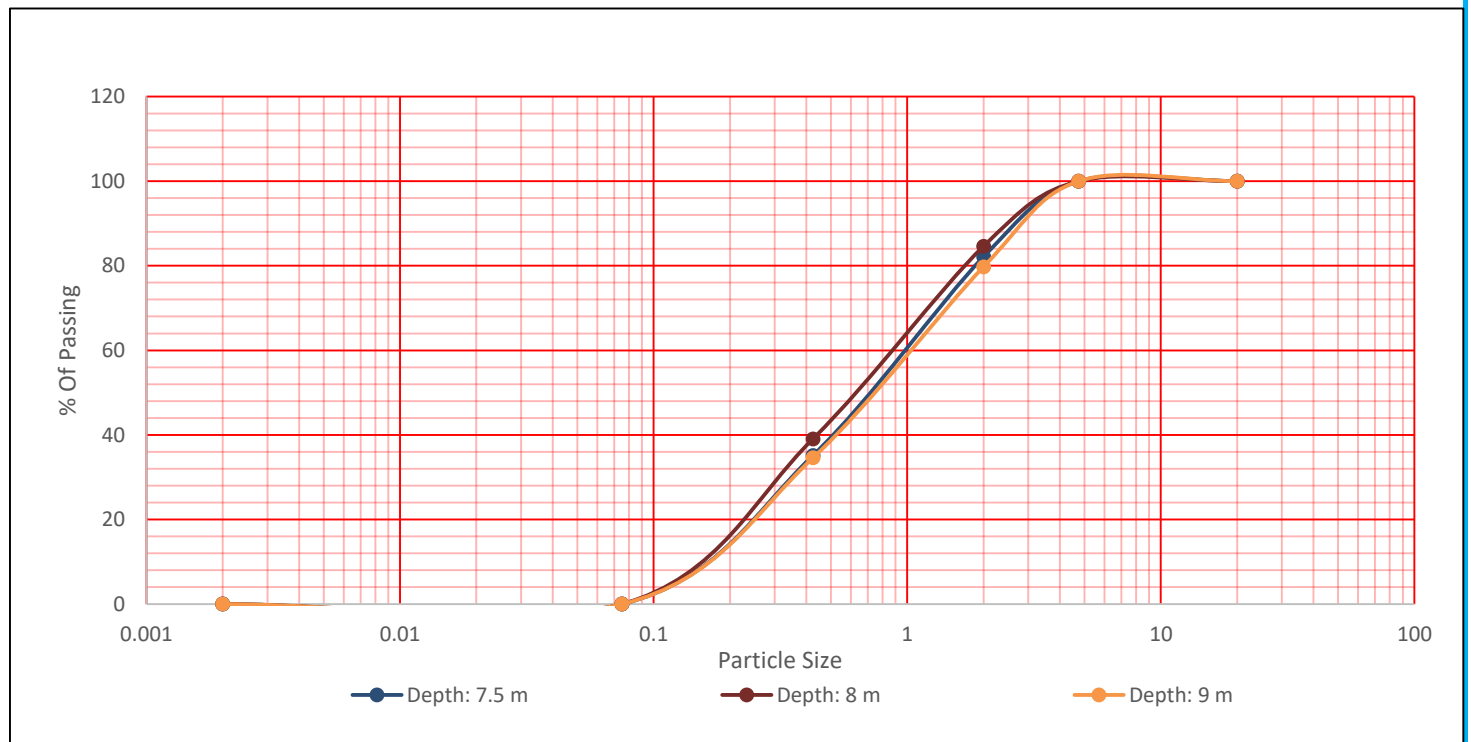
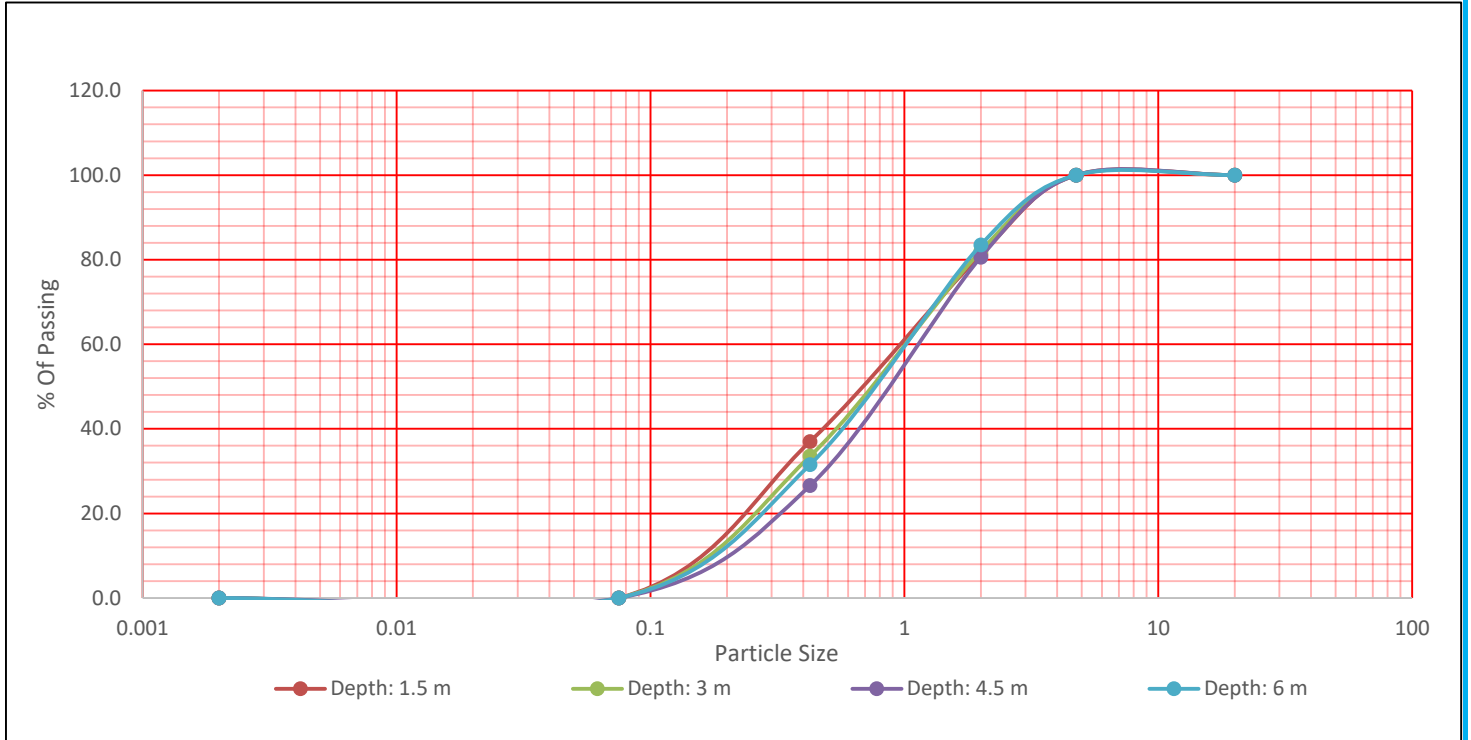
[illegible]



Particle size Distribution Curves

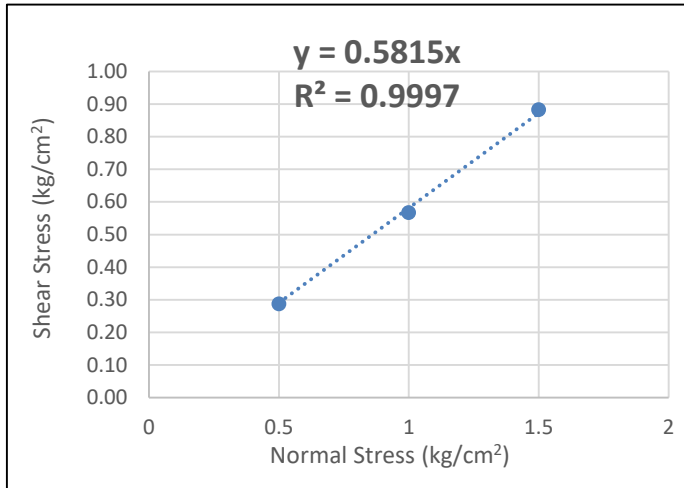
Bore Hole Number: BH- 7

Chainage: 6+130



Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 7

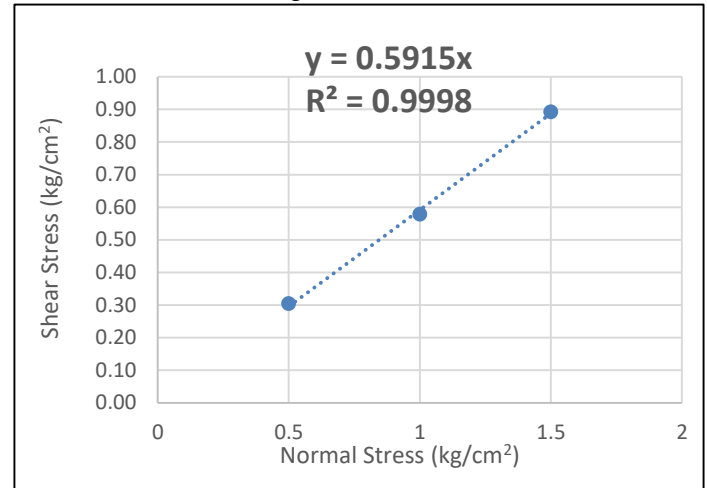


Depth: 1.5 m

C = 0.00

$\phi = 30.18$

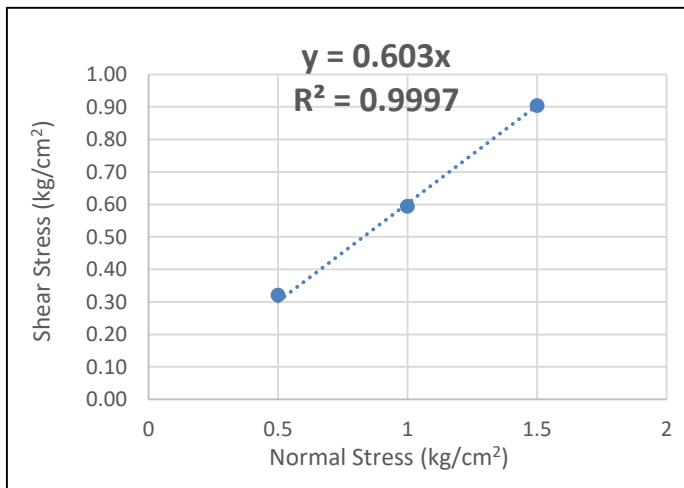
Chainage: 6+130



Depth: 3 m

C = 0.00

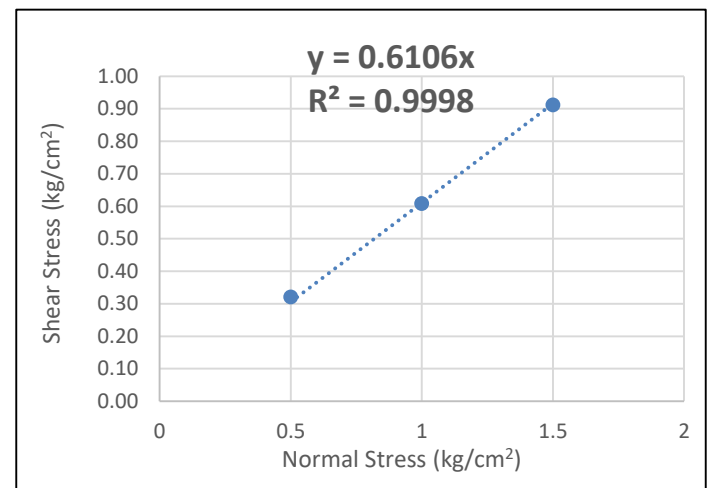
$\phi = 30.60$



Depth: 4.5 m

C = 0.00

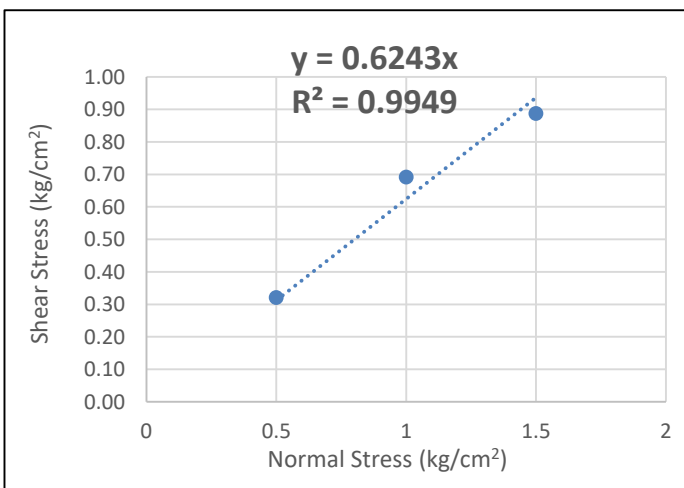
$\phi = 31.09$



Depth: 6 m

C = 0.00

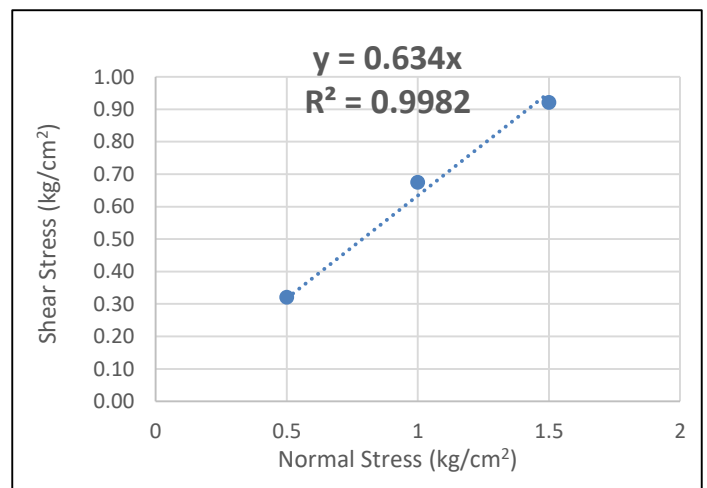
$\phi = 31.41$



Depth: 7.5 m

C = 0.000

$\phi = 31.98$

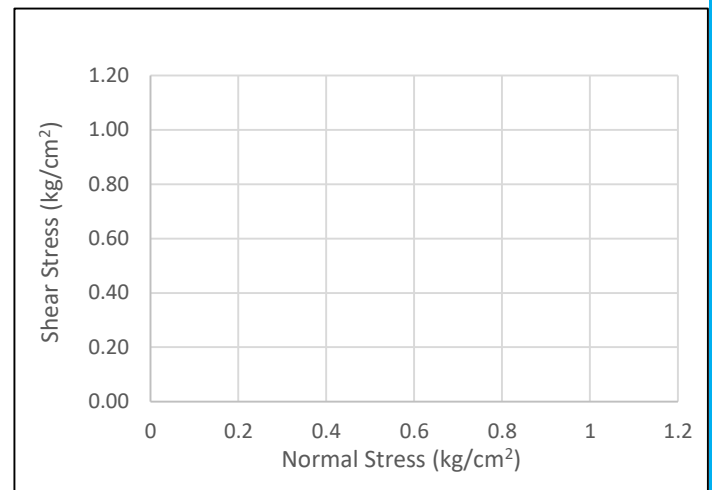
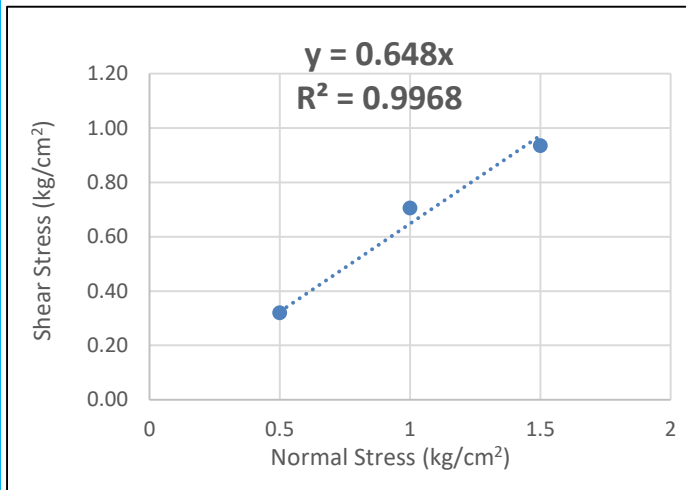


Depth: 8 m

C = 0.000

$\phi = 32.37$

Graphical Representation of Direct Shear Test Results



Depth: 9 m

$C = 0.000$

$\phi = 32.94$

-

$C = -$

$\phi = -$



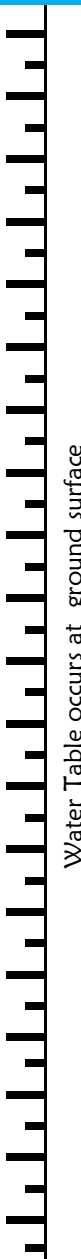
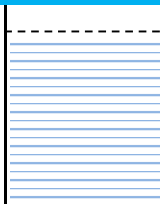
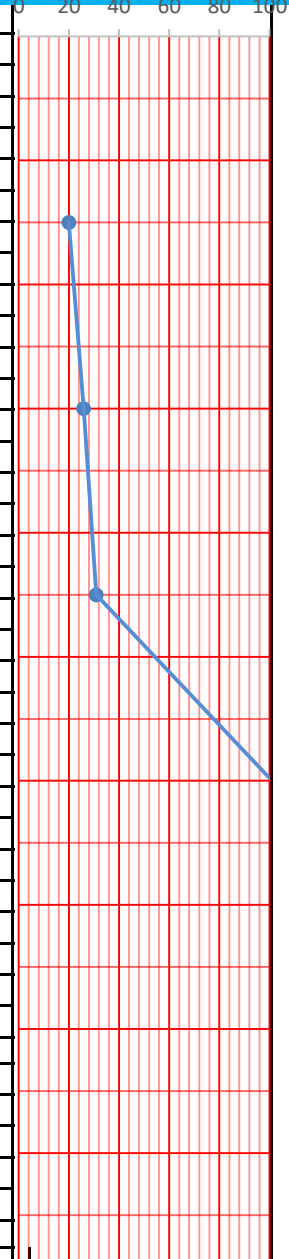
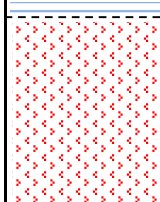
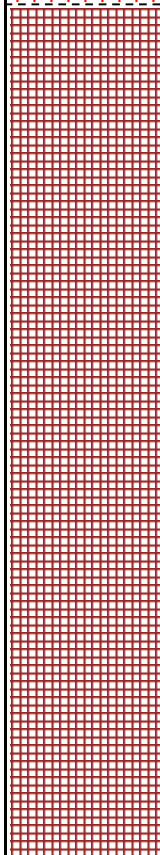
BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 8
Location : Ichanahalli
Chainage : 7+900
Drilling Master : -
Ground Elevation : 100.000

Job No. : MAARK/2023-24/120
Date of Commenced : 09-01-2024
Date of Completed : 09-01-2024
Ground Water Level : -
Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of sample	SPT Blows 15-30-45cms			SPT 'N' Value	Standard penetration test Number of blows	Remarks
09-Jan-24	100.000	0.0			Filling Soil	SPT	DS						
	99.500	0.5											
	99.000	1.0											
	98.500	1.5						7	9	11	20		
	98.000	2.0			Morrum	SPT	DS						
	97.500	2.5											
	97.000	3.0						9	12	14	26		
	96.500	3.5											
	96.000	4.0			SDR (Soft Disintegrated Rock)	SPT	DS						
	95.500	4.5						11	14	17	31		
	95.000	5.0											
	94.500	5.5											
	94.000	6.0						Refused N>100					
	93.500	6.5											
	93.000	7.0											
	92.500	7.5						Refused N>100					
	92.000	8.0											
	91.500	8.5											
	91.000	9.0						Refused N>100					
	90.500	9.5											
	90.000	10.0											

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 8

Location: Ichanahalli

Chainage:7+900

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

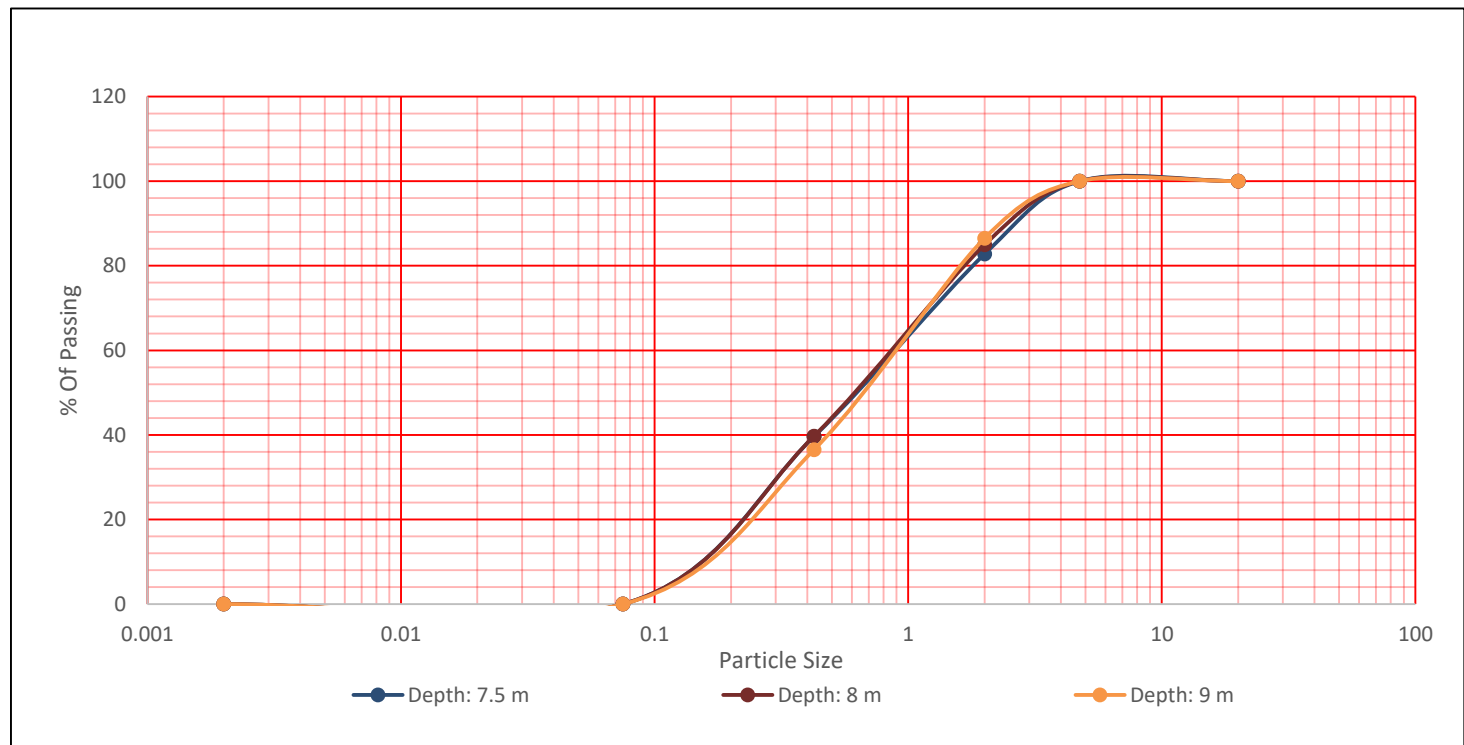
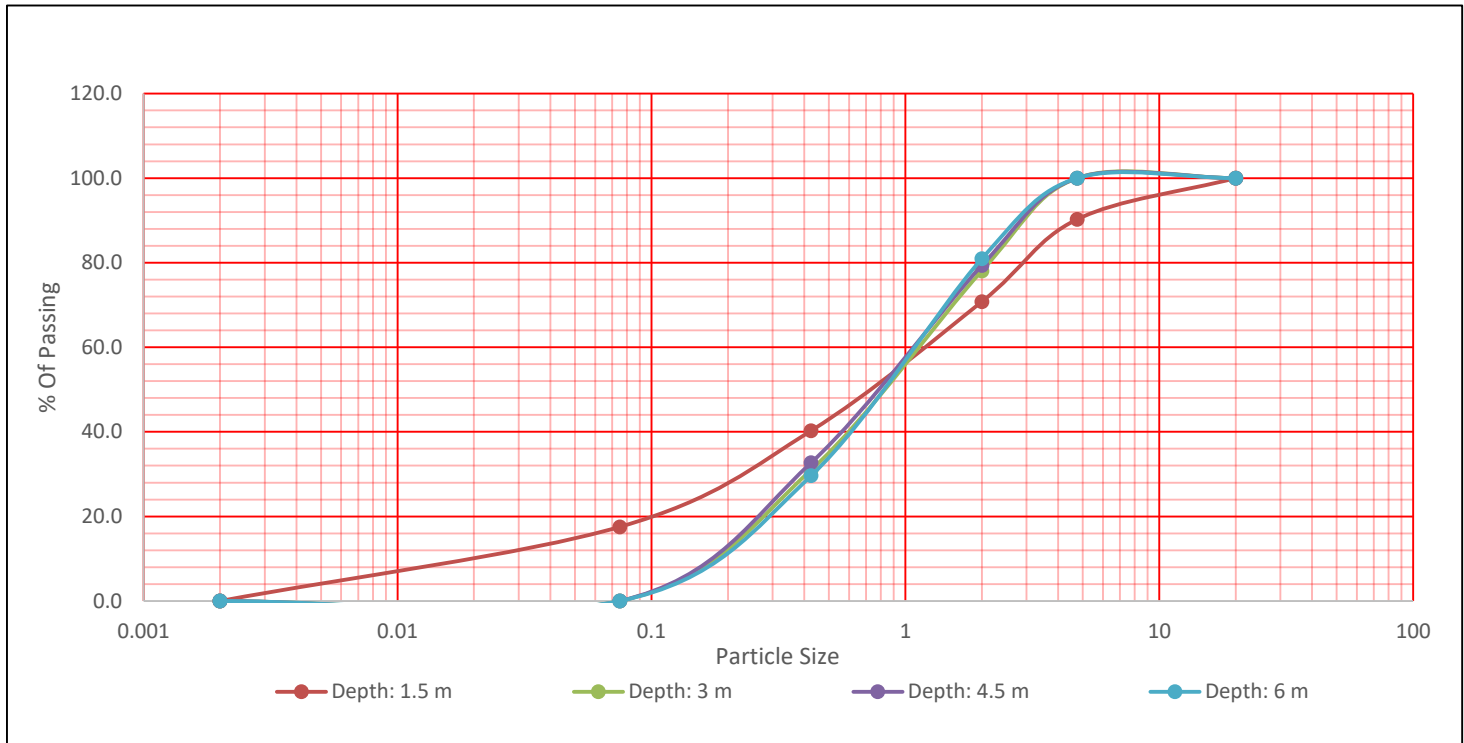
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 8

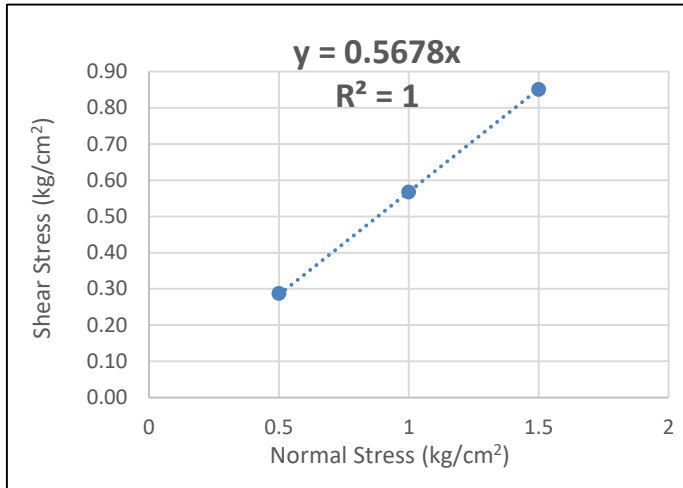
Chainage: 7+900



Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 8

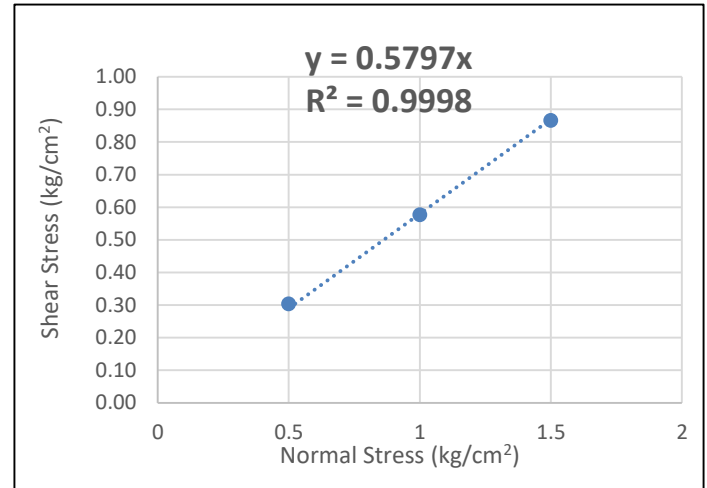
Chainage: 7+900



Depth: 1.5 m

$C = 0.00$

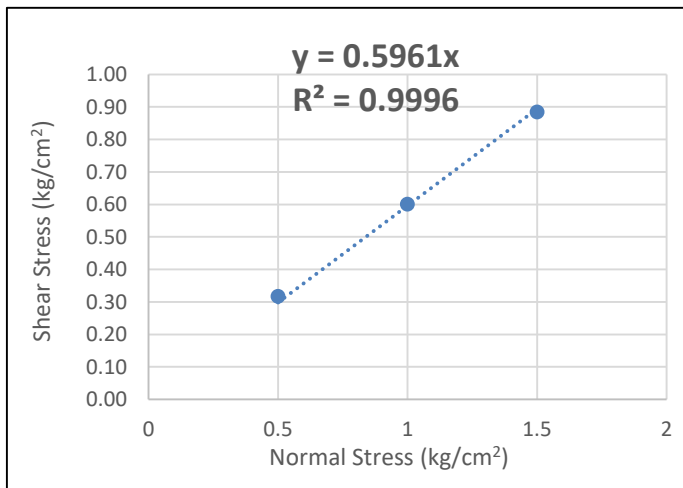
$\phi = 29.59$



Depth: 3 m

$C = 0.00$

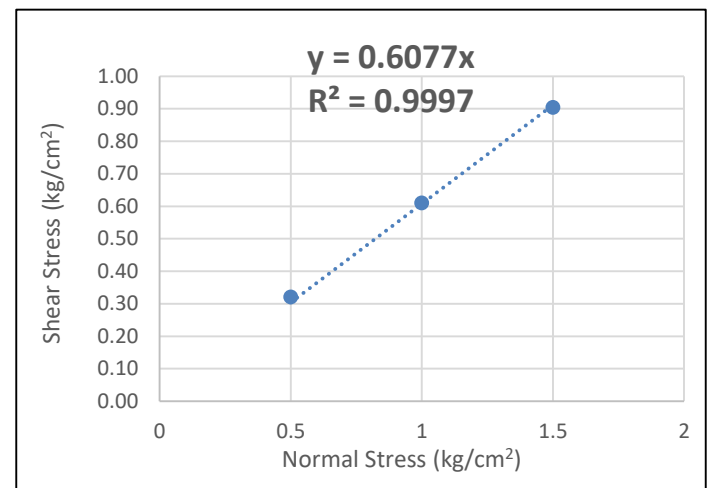
$\phi = 30.10$



Depth: 4.5 m

$C = 0.00$

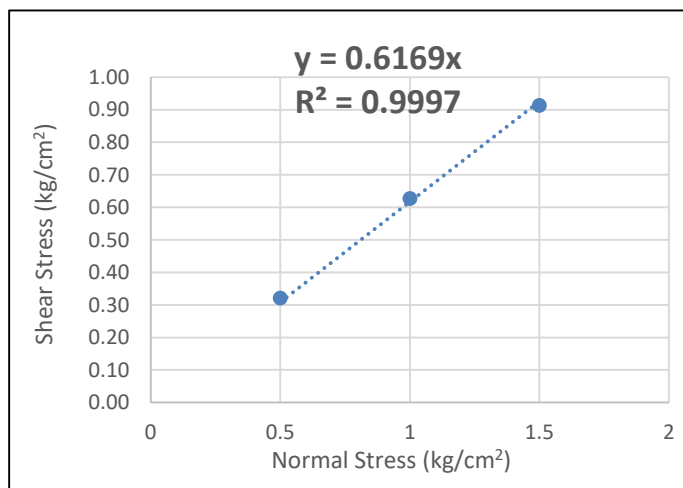
$\phi = 30.80$



Depth: 6 m

$C = 0.00$

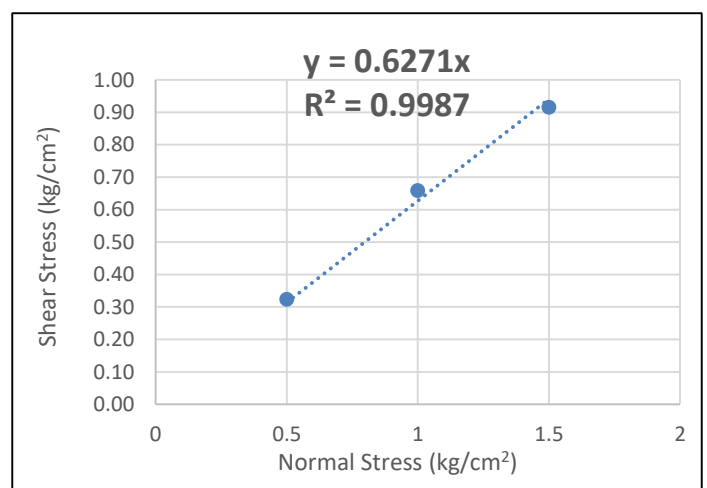
$\phi = 31.29$



Depth: 7.5 m

$C = 0.000$

$\phi = 31.67$

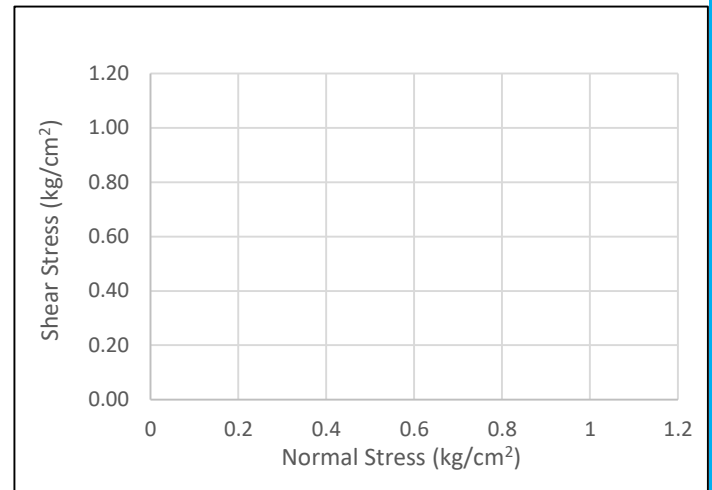
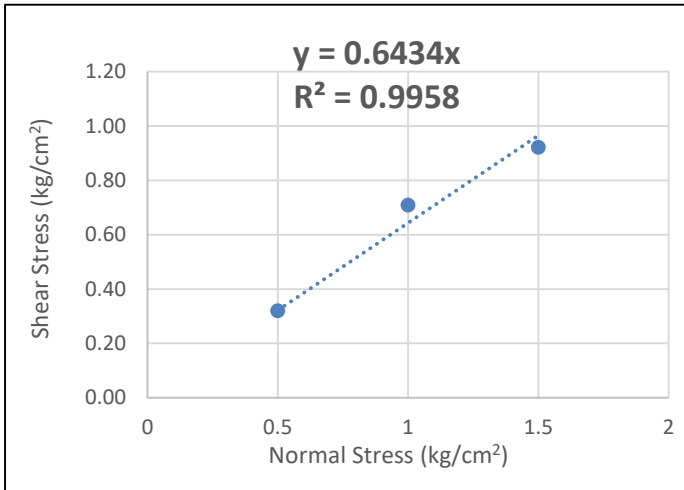


Depth: 8 m

$C = 0.000$

$\phi = 32.09$

Graphical Representation of Direct Shear Test Results



Depth: 9 m

C = 0.000

$\phi = 32.76$

-

C = -

$\phi = -$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 9 **Job No.** : MAARK/2023-24/120

Location : Ichanahalli **Date of Commenced** : 10-01-2024

Chainage : 8+600 **Date of Completed** : 10-01-2024

Drilling Master : - **Ground Water Level** : -

Ground Elevation : 100.000 **Total Depth** : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
10-Jan-24	100.000	0.0			BC Soil	SPT	DS				
	99.500	0.5									
	99.000	1.0									
	98.500	1.5						8	11	14	25
	98.000	2.0									
	97.500	2.5									
	97.000	3.0						10	12	16	28
	96.500	3.5									
	96.000	4.0									
	95.500	4.5						12	17	20	37
	95.000	5.0									
	94.500	5.5									
	94.000	6.0						15	18	21	39
	93.500	6.5									
	93.000	7.0									
	92.500	7.5						Refused N>100			
	92.000	8.0									
	91.500	8.5									
	91.000	9.0						Refused N>100			
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 9

Location: Ichanahalli

Chainage: 8+600

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

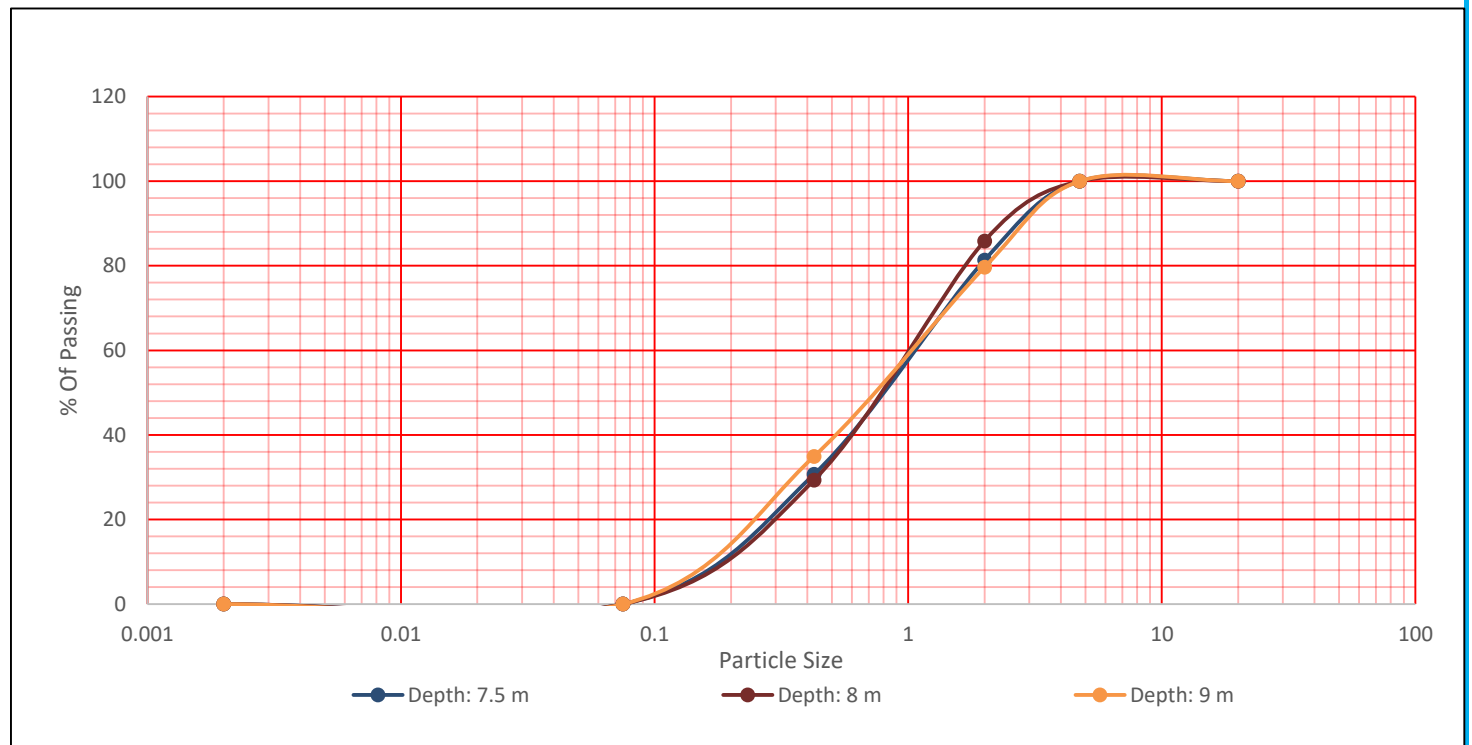
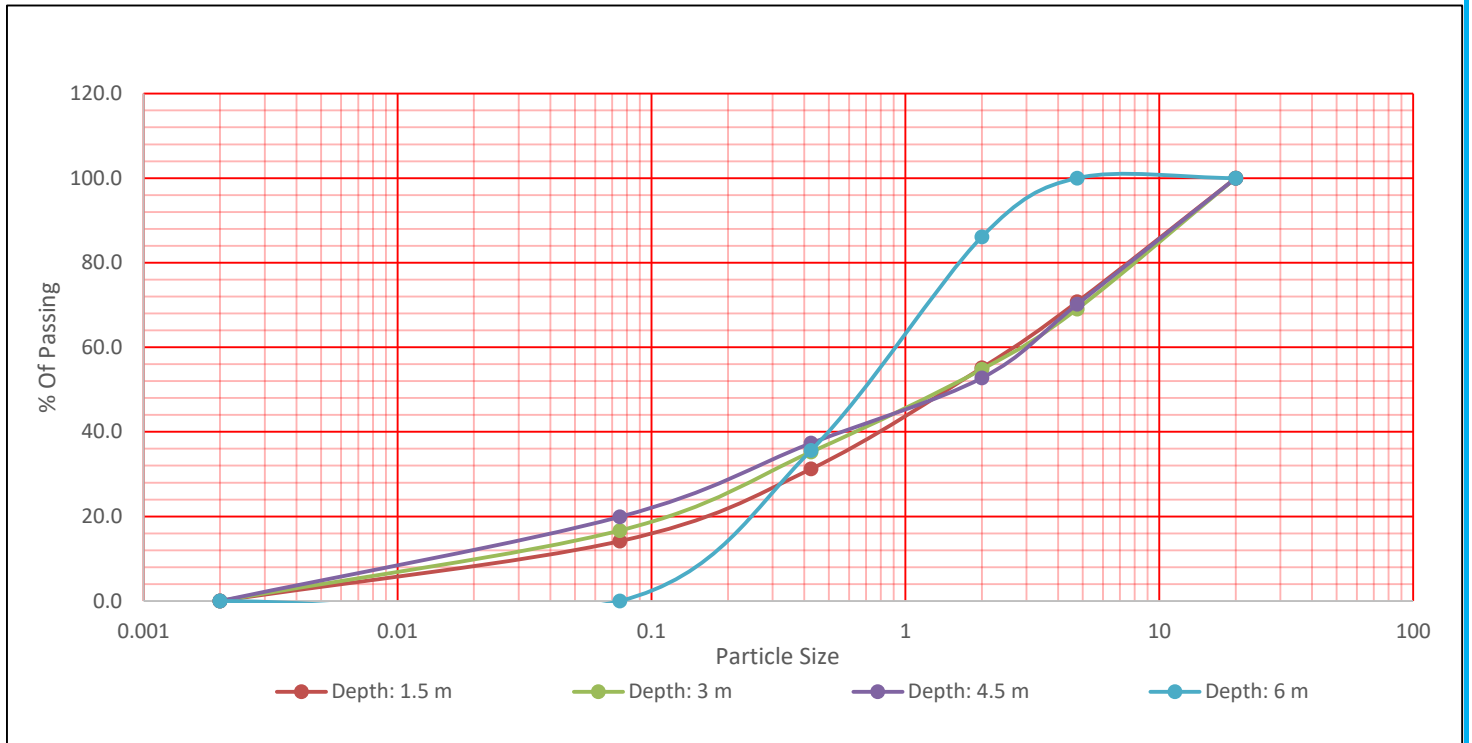
[illegible]



Particle size Distribution Curves

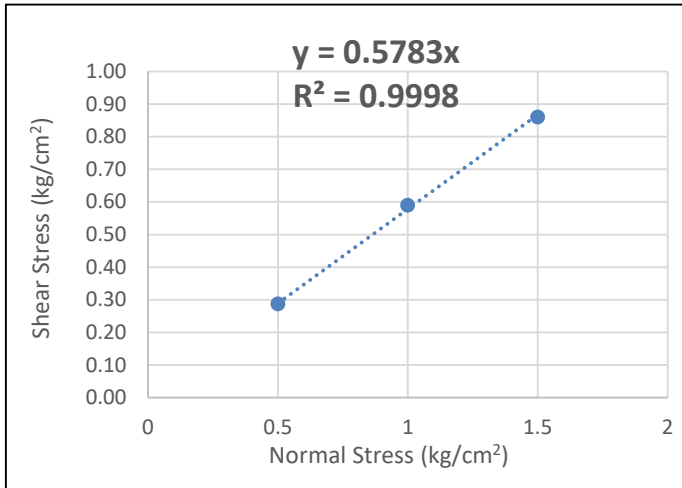
Bore Hole Number: BH- 9

Chainage: 8+600

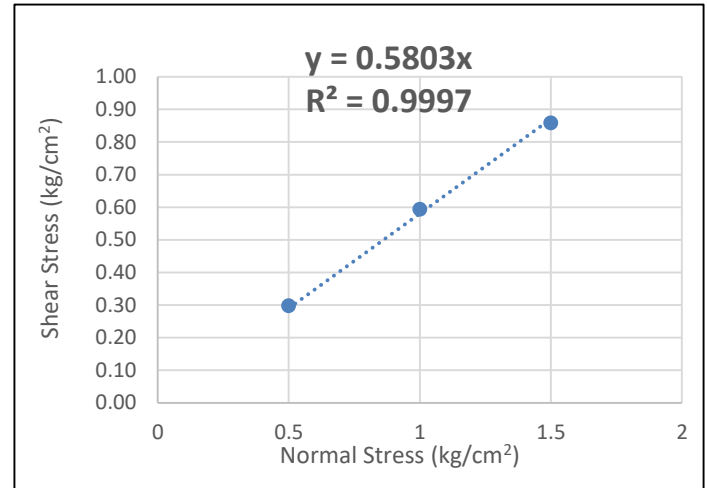


Graphical Representation of Direct Shear Test Results

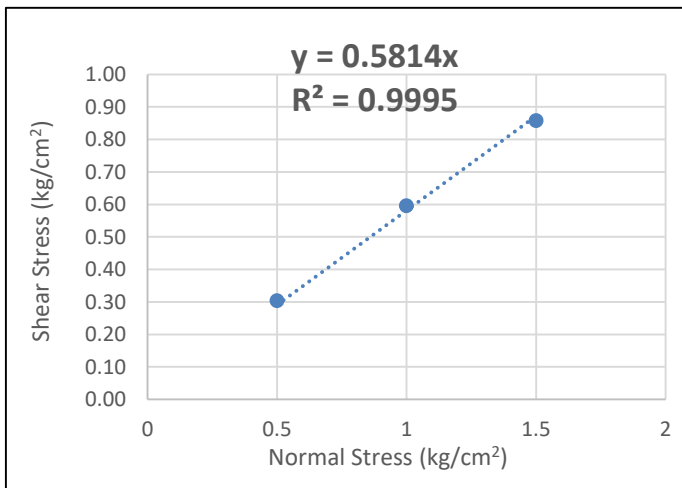
Bore Hole Number: BH- 9



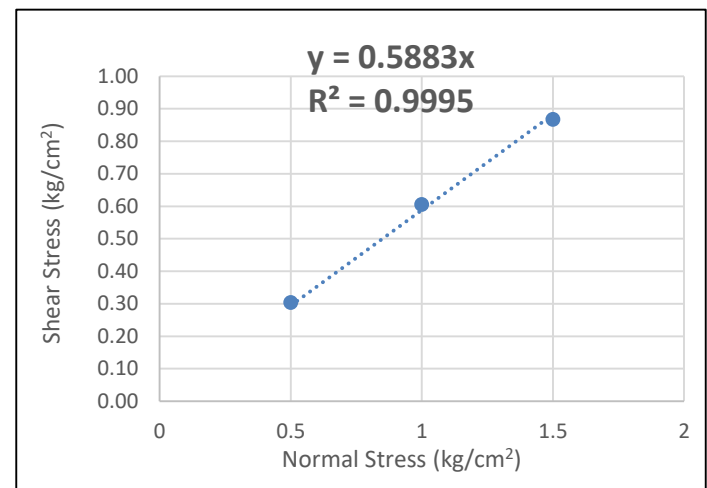
Depth: 1.5 m $C = 0.00$ $\phi = 30.04$



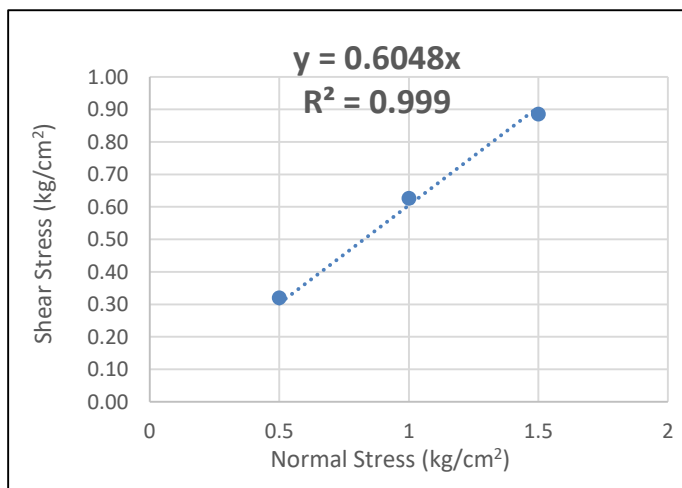
Depth: 3 m $C = 0.00$ $\phi = 30.13$



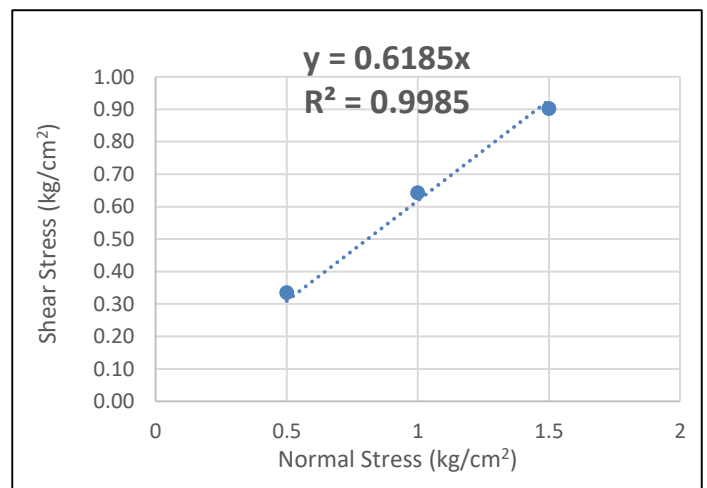
Depth: 4.5 m $C = 0.00$ $\phi = 30.17$



Depth: 6 m $C = 0.00$ $\phi = 30.47$

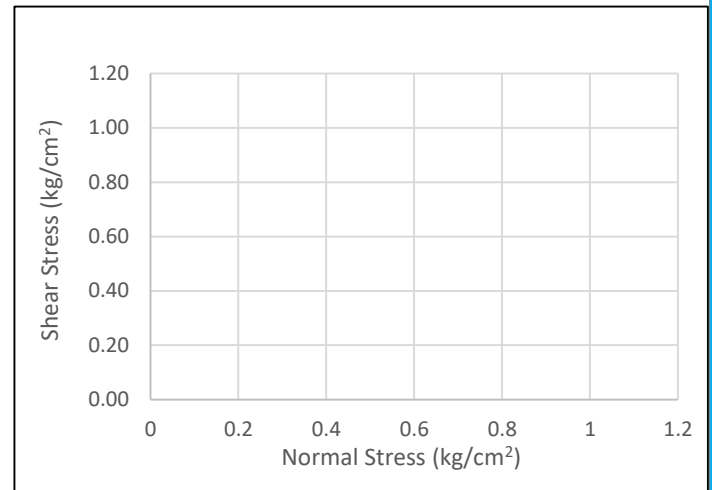
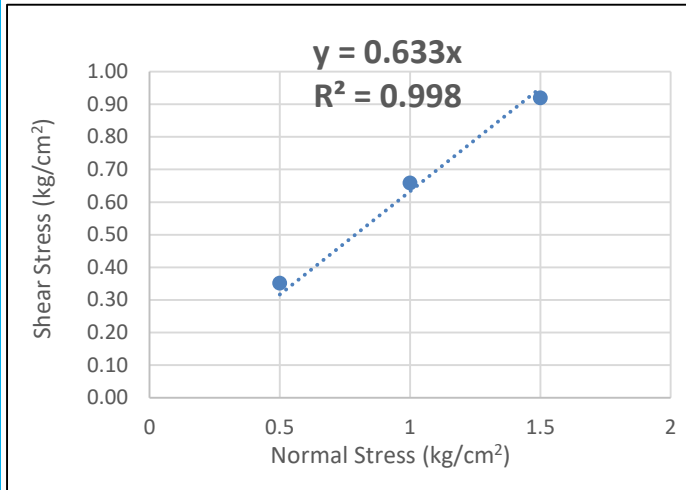


Depth: 7.5 m $C = 0.000$ $\phi = 31.17$



Depth: 8 m $C = 0.000$ $\phi = 31.74$

Graphical Representation of Direct Shear Test Results



Depth: 9 m

$C = 0.000$

$\phi = 32.33$

#REF!

$C = -$

$\phi = -$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 10 **Job No.** : MAARK/2023-24/120

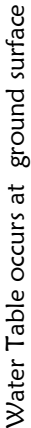
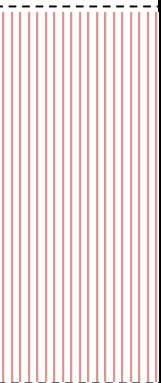
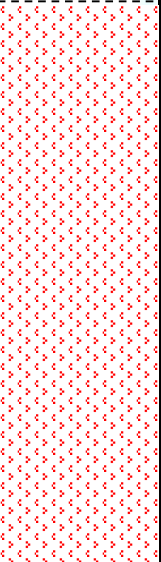
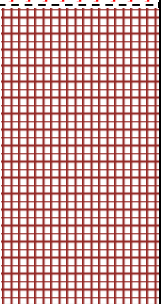
Location : Chikkchagahalli **Date of Commenced** : 10-01-2024

Chainage : 11+400 **Date of Completed** : 10-01-2024

Drilling Master : - **Ground Water Level** : -

Ground Elevation : 100.000 **Total Depth** : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
10-Jan-24	100.000	0.0			Red Soil	SPT	DS				
	99.500	0.5									
	99.000	1.0									
	98.500	1.5						9	12	14	26
	98.000	2.0									
	97.500	2.5			Morrum	SPT	DS				
	97.000	3.0						11	14	17	31
	96.500	3.5									
	96.000	4.0									
	95.500	4.5						14	18	21	39
	95.000	5.0									
	94.500	5.5									
	94.000	6.0						16	18	24	42
	93.500	6.5									
	93.000	7.0									
	92.500	7.5						16	20	29	49
	92.000	8.0			SDR (Soft Disintegrated Rock)	SPT	DS				
	91.500	8.5									
	91.000	9.0						Refused N>100			
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number:BH- 10

Location:Chikkchagahalli

Chainage:11+400

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

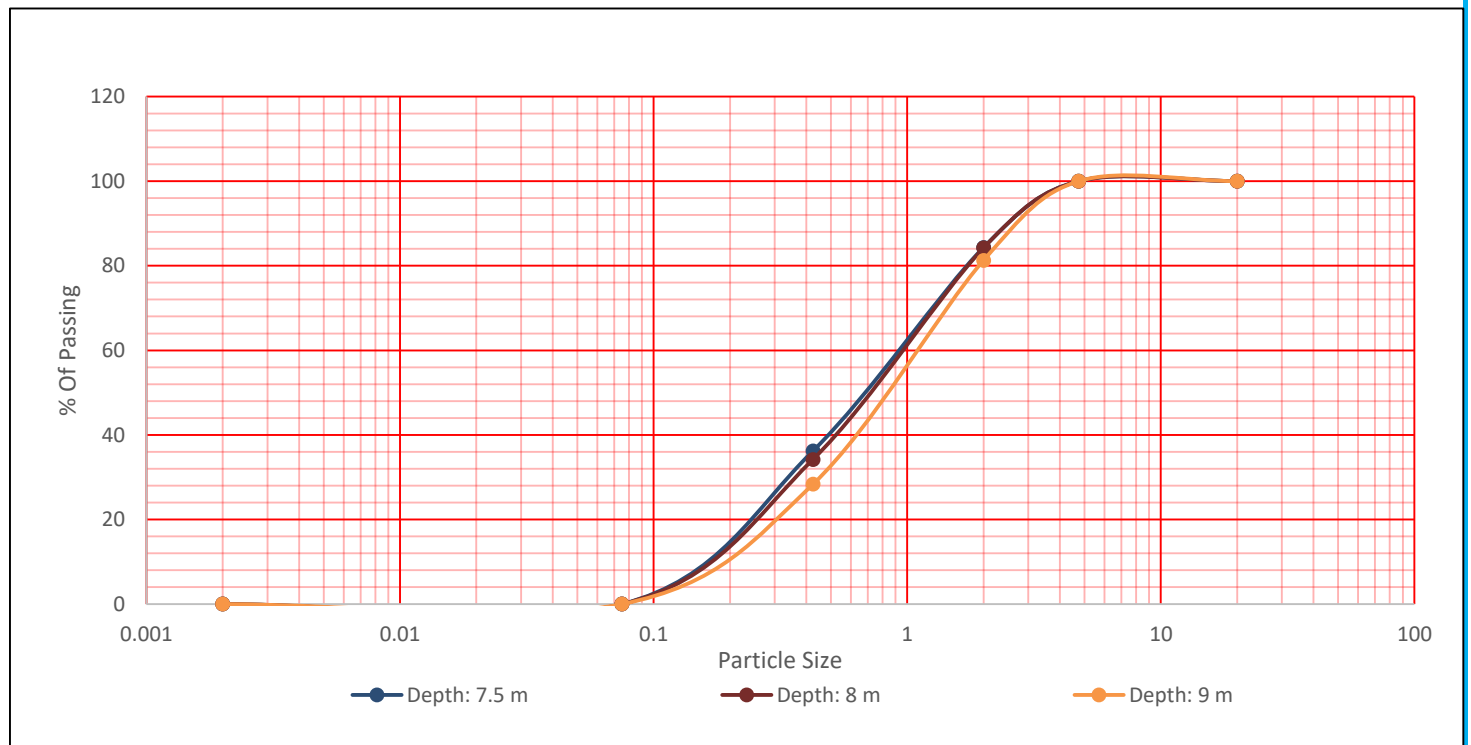
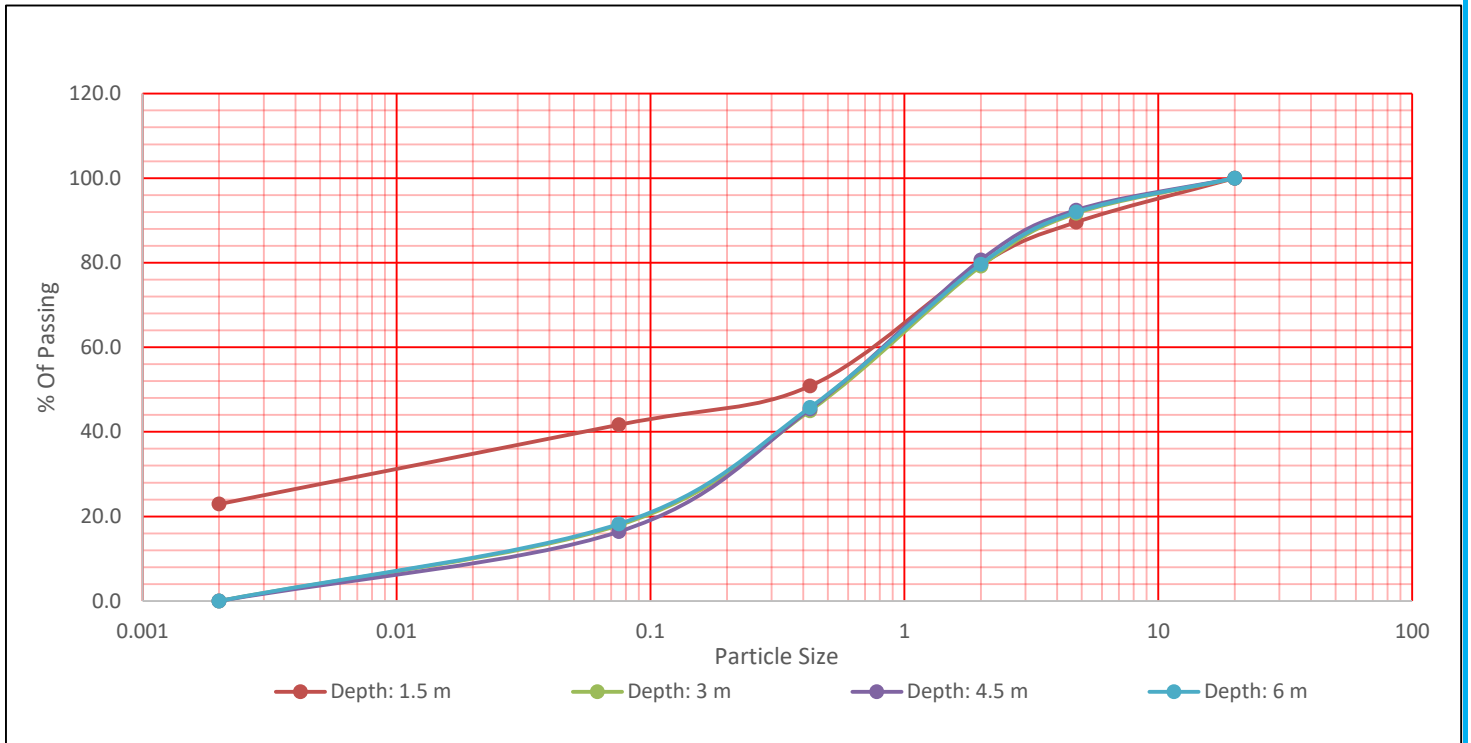
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 10

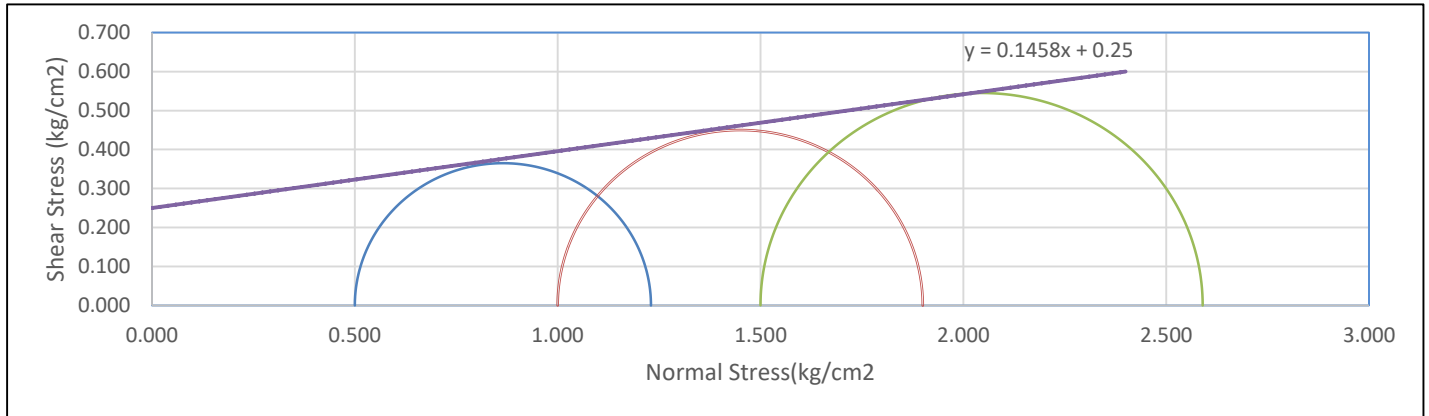
Chainage: 11+400



Graphical Representation of Triaxial Shear Results

Bore Hole Number: BH- 10

Chainage: 11+400



Depth: 1.5 m

$C = 0.250$

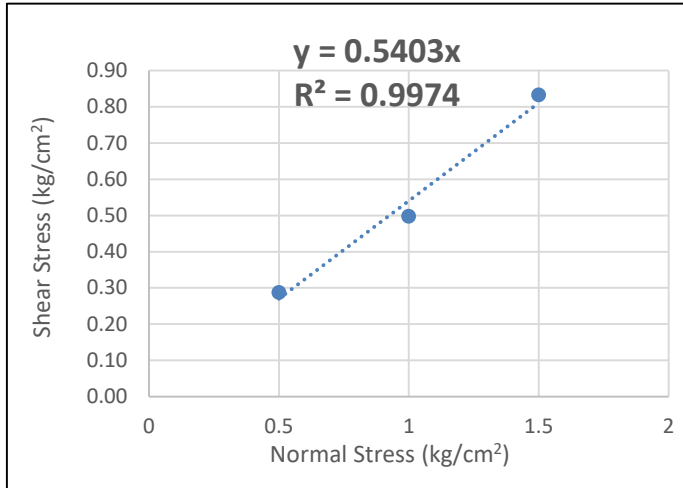
$\phi = 8.30$



Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 10

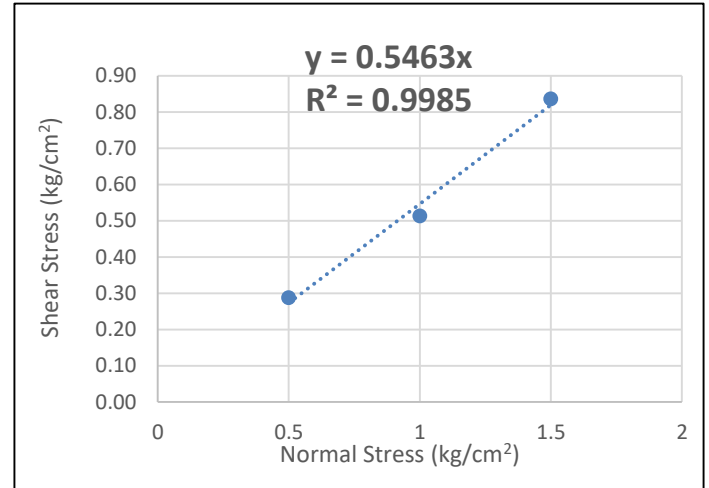
Chainage: 11+400



Depth: 3 m

$C = 0.00$

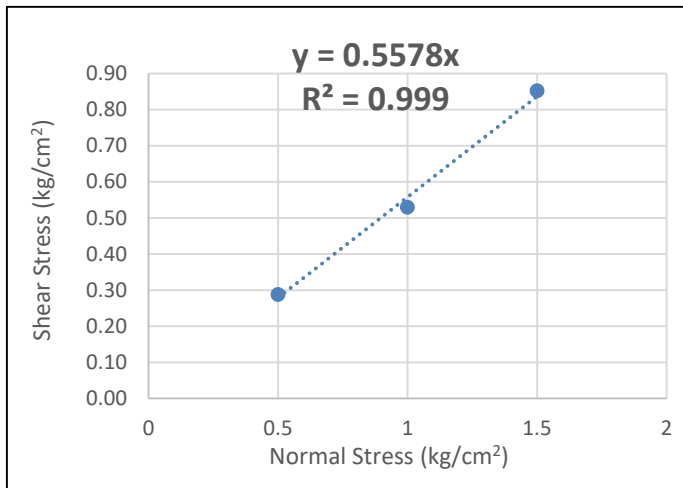
$\phi = 28.38$



Depth: 4.5 m

$C = 0.00$

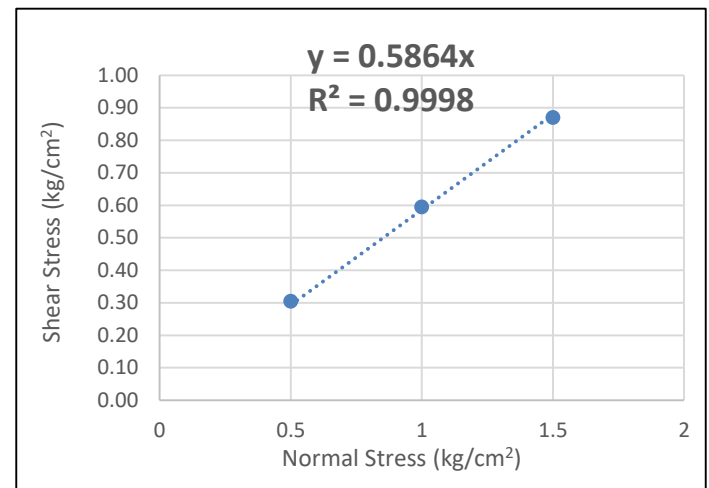
$\phi = 28.65$



Depth: 6 m

$C = 0.00$

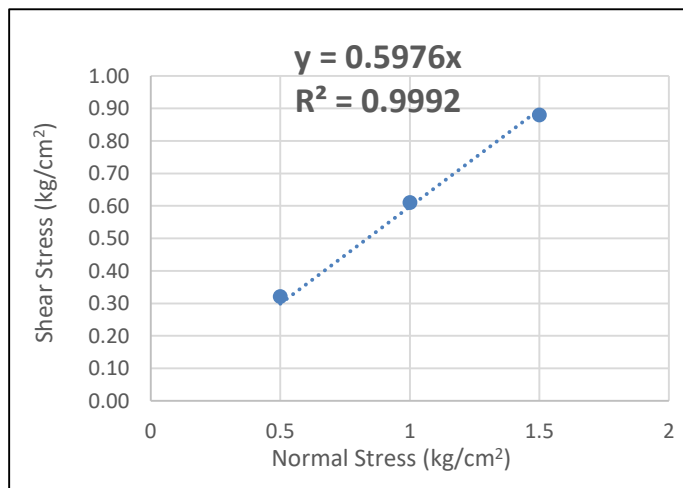
$\phi = 29.15$



Depth: 7.5 m

$C = 0.00$

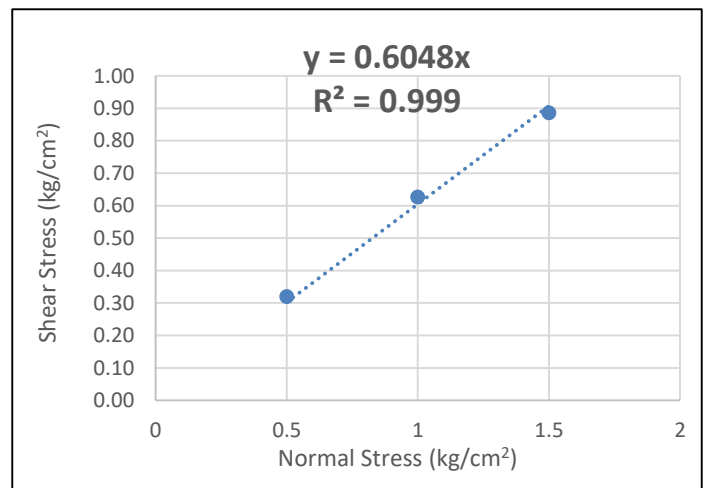
$\phi = 30.39$



Depth: 8 m

$C = 0.000$

$\phi = 30.86$



Depth: 9 m

$C = 0.000$

$\phi = 31.17$



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 11 **Job No.** : MAARK/2023-24/120

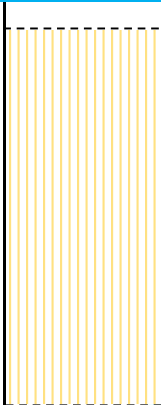
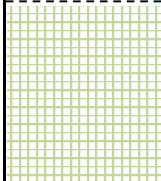
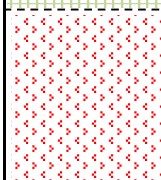
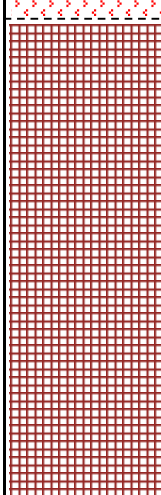
Location : Chikkchagahalli **Date of Commenced** : 11-01-2024

Chainage : 11+900 **Date of Completed** : 11-01-2024

Drilling Master : - **Ground Water Level** : -

Ground Elevation : 100.000 **Total Depth** : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
11-Jan-24	100.000	0.0			Silty Sand	SPT	DS				
	99.500	0.5									
	99.000	1.0									
	98.500	1.5						7	8	10	18
	98.000	2.0			Sandy soil mixed with Gravel	SPT	DS				
	97.500	2.5									
	97.000	3.0						5	9	12	21
	96.500	3.5									
	96.000	4.0			Morrum	SPT	DS				
	95.500	4.5						12	16	22	38
	95.000	5.0									
	94.500	5.5									
	94.000	6.0			SDR (Soft Disintegrated Rock)	SPT	DS	Refused N>100			
	93.500	6.5									
	93.000	7.0									
	92.500	7.5						Refused N>100			
	92.000	8.0									
	91.500	8.5									
	91.000	9.0						Refused N>100			
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 11

Location:Chikkchagahalli

FIELD INVESTIGATION DATA

TESTS IN SOIL

TESTS IN ROCK

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

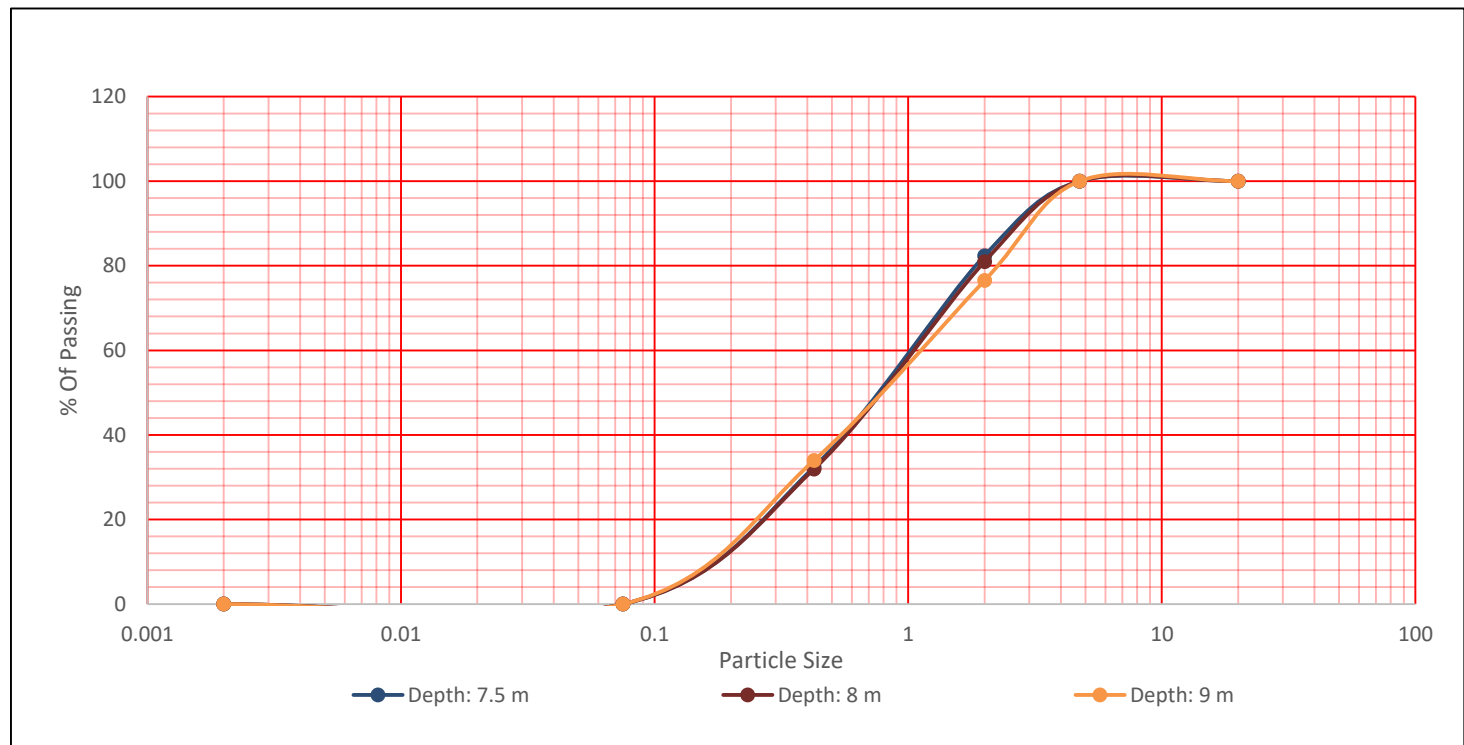
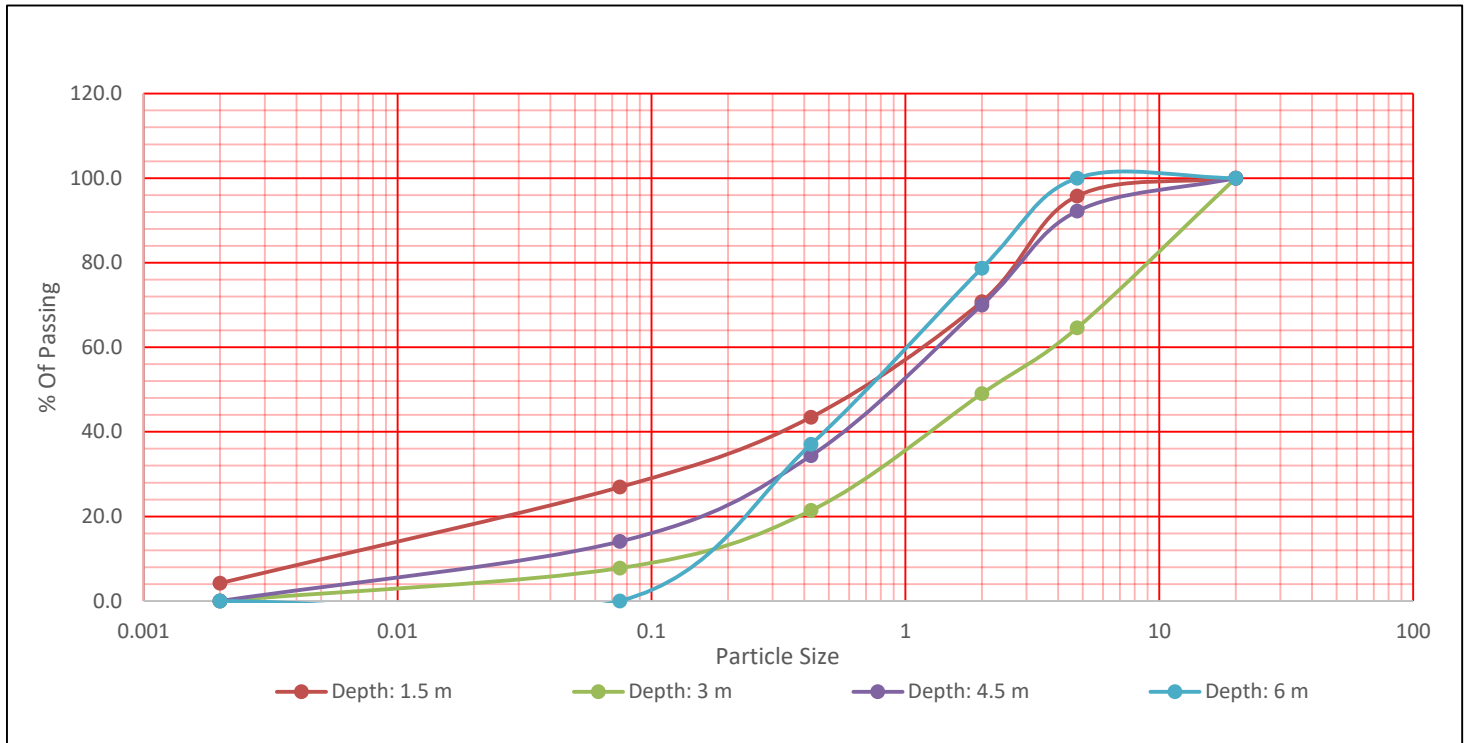
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 11

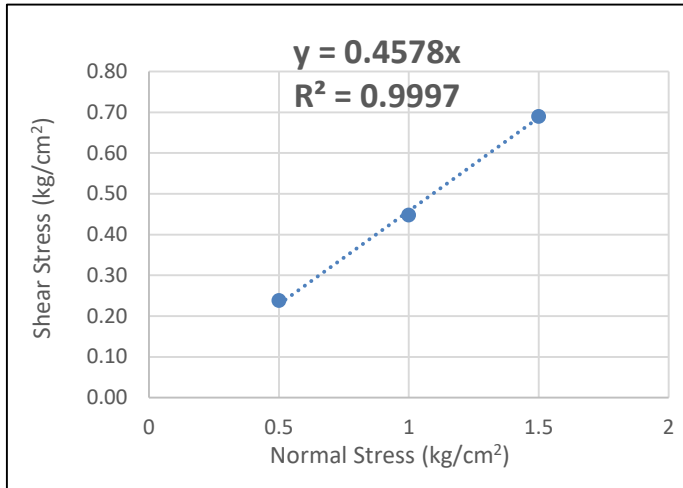
Chainage: 11+900



Graphical Representation of Direct Shear Test Results

Bore Hole Number: BH- 11

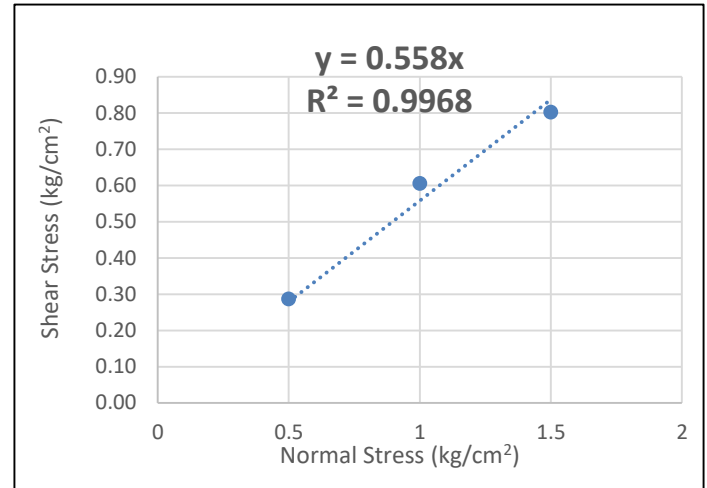
Chainage: 11+900



Depth: 1.5 m

C = 0.00

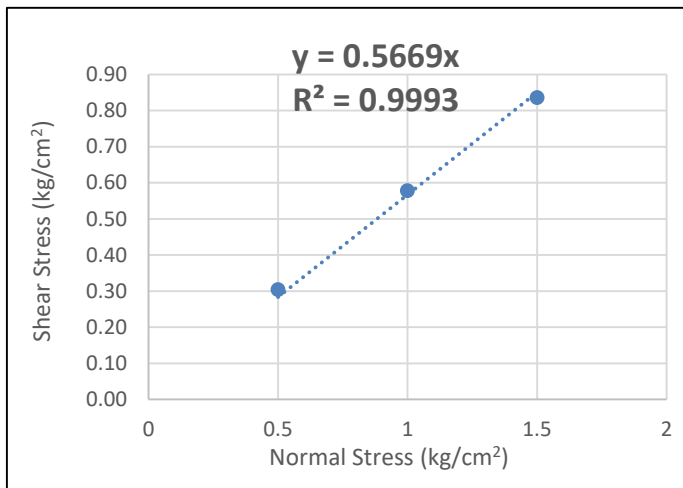
$\phi = 24.60$



Depth: 3 m

C = 0.00

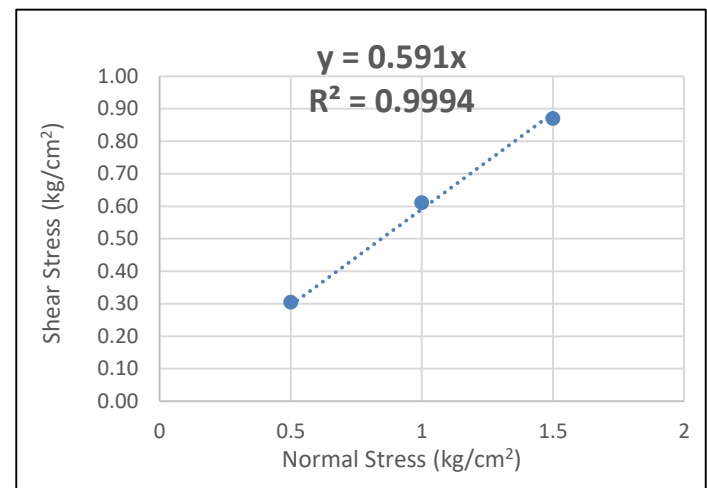
$\phi = 29.16$



Depth: 4.5 m

C = 0.00

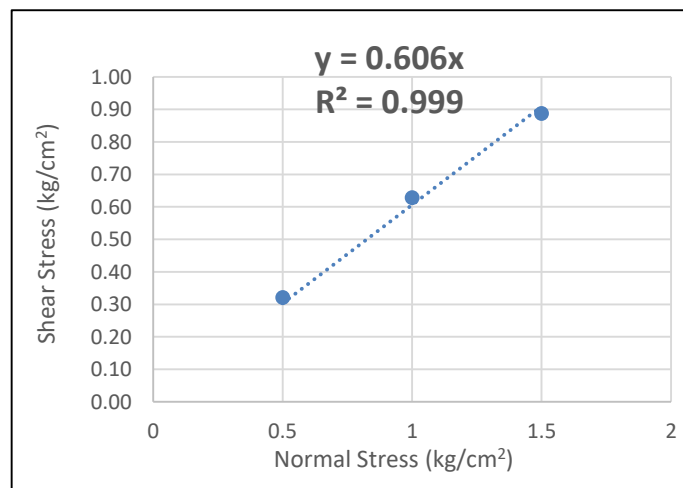
$\phi = 29.55$



Depth: 6 m

C = 0.00

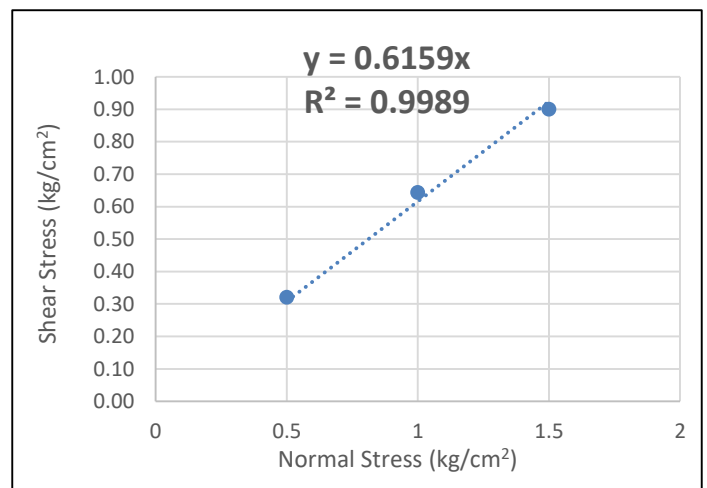
$\phi = 30.58$



Depth: 7.5 m

C = 0.000

$\phi = 31.22$

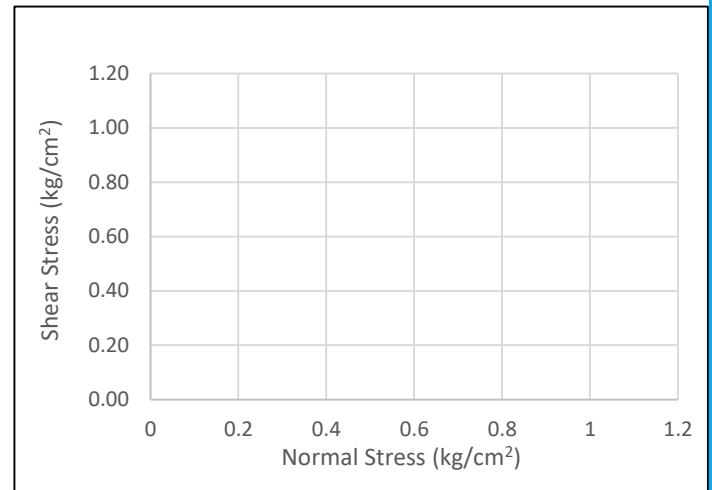
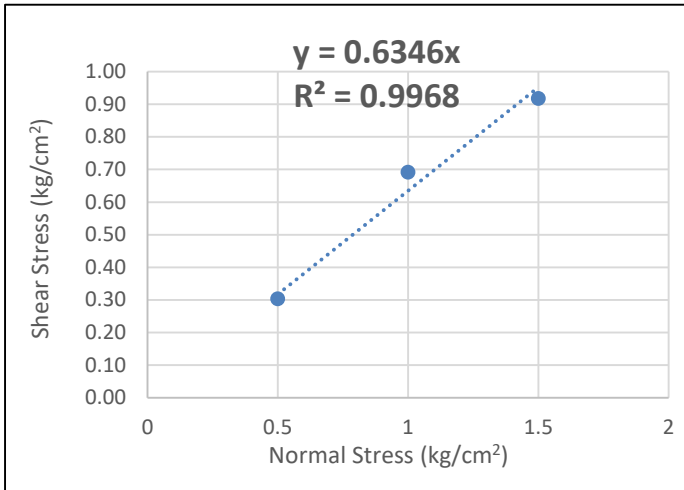


Depth: 8 m

C = 0.000

$\phi = 31.63$

Graphical Representation of Direct Shear Test Results



Depth: 9 m

C = 0.000

ϕ = 32.40

#REF!

C = -

ϕ = -



BORE LOG DATA SHEET

Project Name : Construction of Bypass to the Holenarasipura Town from Km 87.280 (Near Chikknahalli) to Km 97.580 (Near Hullahalli) on NH-373 in the state of Karnataka on EPC mode under NH(O) Annual Plan 2023-24.

Bore Hole Number : BH- 12 Job No. : MAARK/2023-24/120

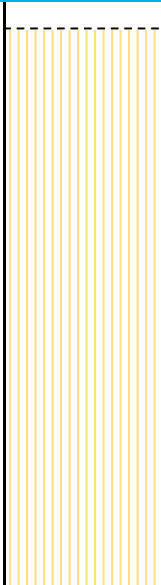
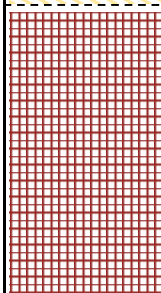
Location : Chikkchaganahalli Date of Commenced : 11-01-2024

Chainage : - Date of Completed : 11-01-2024

Drilling Master : - Ground Water Level : -

Ground Elevation : 100.000 Total Depth : 10.0 meter

SOIL PROFILE LOG

Date	R.L	Depth (m)	G.W.L	Bore Profile	Sample Descriptions	SPT Test	Type of Sample	SPT Blows 15-30-45cms	SPT 'N' Value	Standard penetration test Number of blows	Remarks
11-Jan-24	100.000	0.0	 Water Table occurs at ground surface		Silty Sand						
	99.500	0.5									
	99.000	1.0				SPT	DS	6	8	10	18
	98.500	1.5									
	98.000	2.0									
	97.500	2.5									
	97.000	3.0				SPT	DS	6	9	12	21
	96.500	3.5									
	96.000	4.0									
	95.500	4.5									
	95.000	5.0			Silty Clay	SPT	DS	8	11	17	28
	94.500	5.5									
	94.000	6.0									
	93.500	6.5									
	93.000	7.0				SPT	DS	7	7	12	19
	92.500	7.5									
	92.000	8.0									
	91.500	8.5									
	91.000	9.0			SDR (Soft Disintegrated Rock)	SPT	DS				
	90.500	9.5									
	90.000	10.0									

Note: SPT- Standard Penetration Test , UDS- Un Disturbed Sample, DS-Disturbed Sample

Bore Hole Number: BH- 12

Location:Chikkchaganahalli

Chainage:-

[illegible]



100

SAFE BEARING CAPACITY OF SOIL BASED ON SHEAR CRITERIA

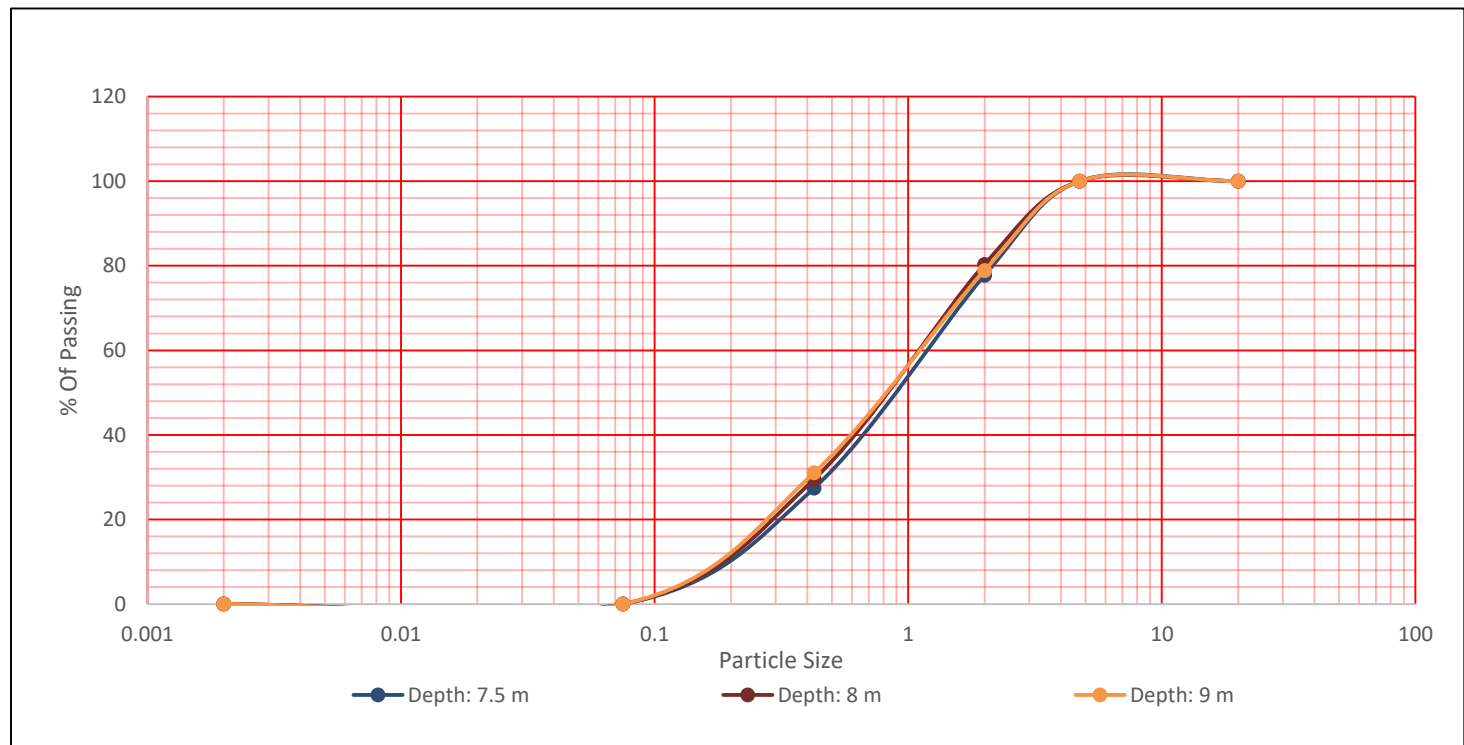
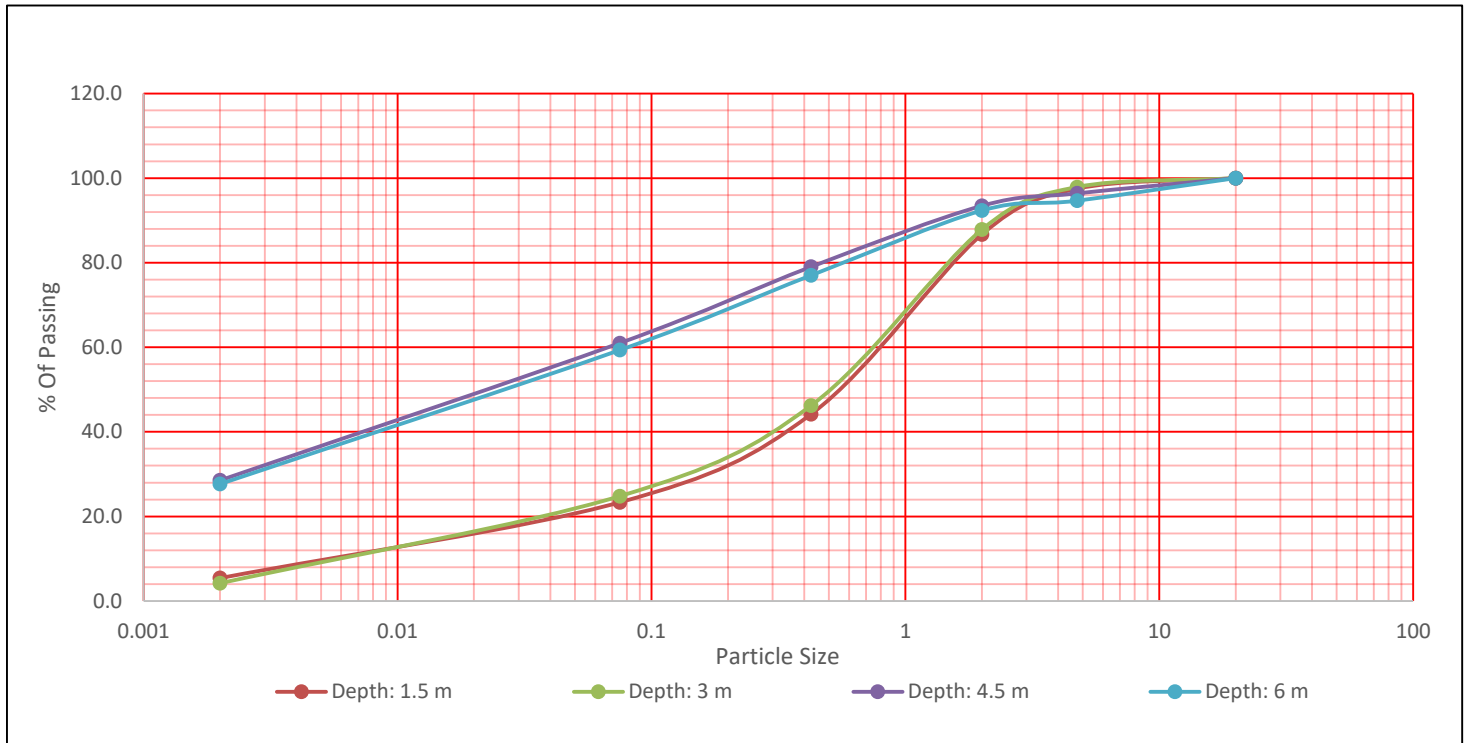
[illegible]



Particle size Distribution Curves

Bore Hole Number: BH- 12

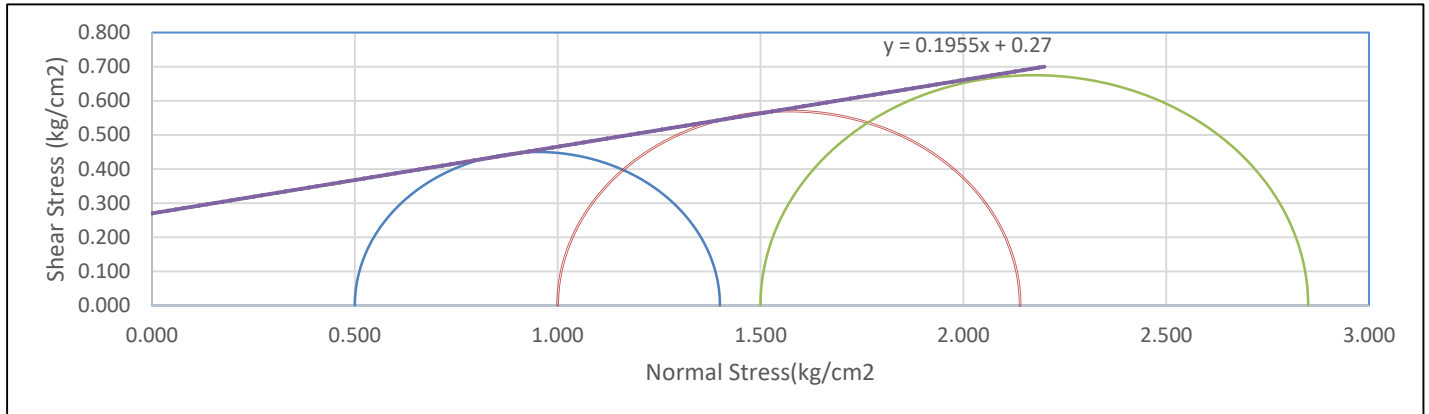
Chainage:-





Graphical Representation of Triaxial Shear Results:

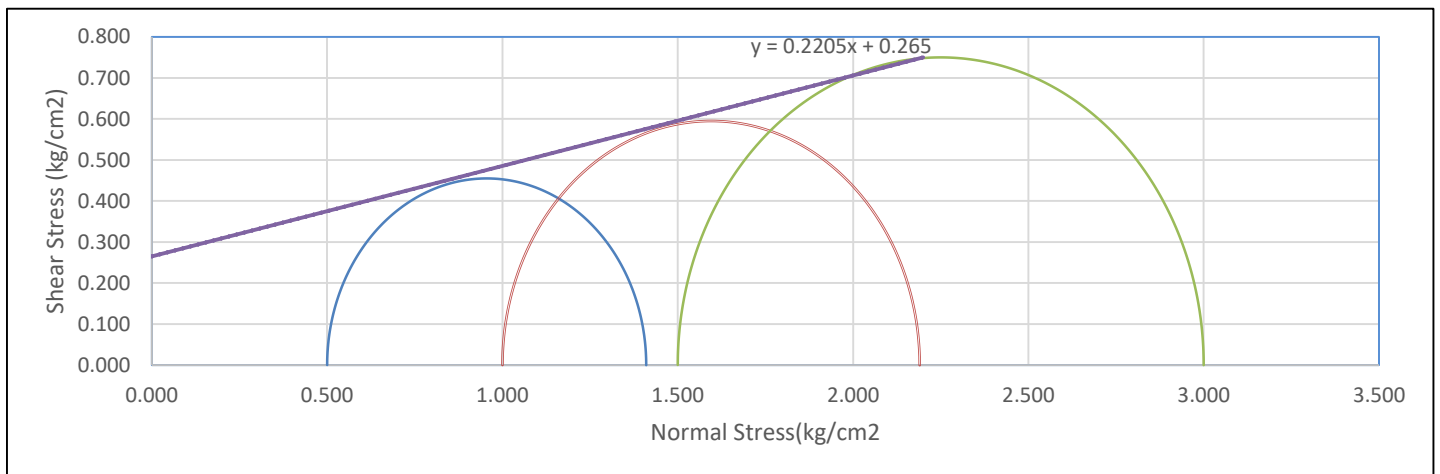
Bore Hole Number: BH- 12



Depth: 4.5 m

$C = 0.270$

$\phi = 11.07$



Depth: 6 m

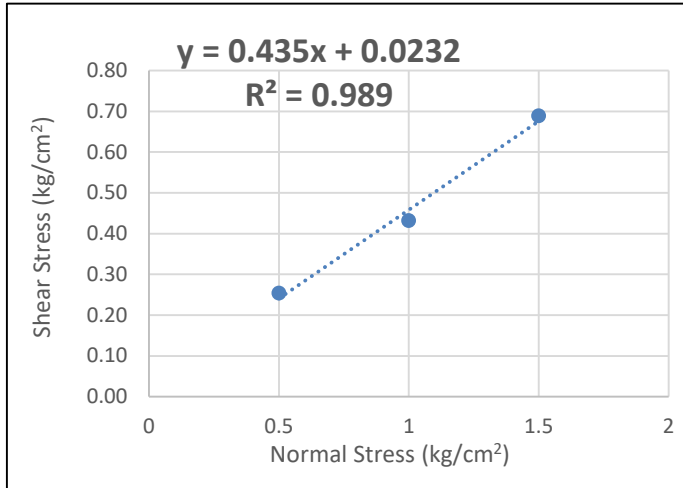
Trust is our solid reputation.
Maark Civil Engineering Services PVT. LTD.

$C = 0.265$

$\phi = 12.44$

Graphical Representation of Direct Shear Test Results

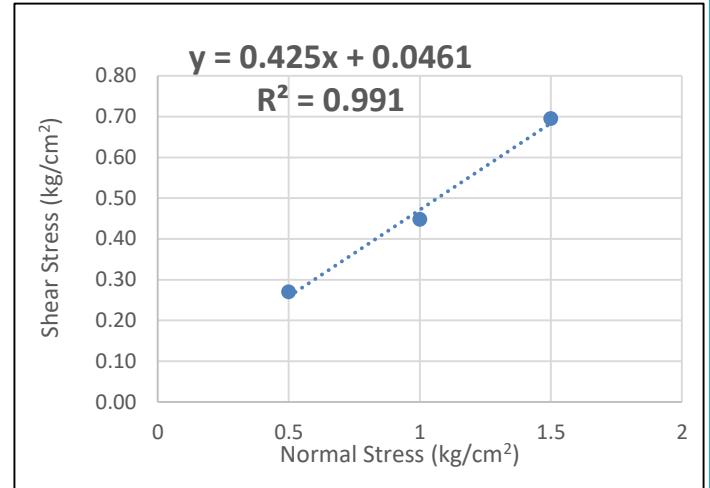
Bore Hole Number: BH- 12



Depth: 1.5 m

C = 0.02

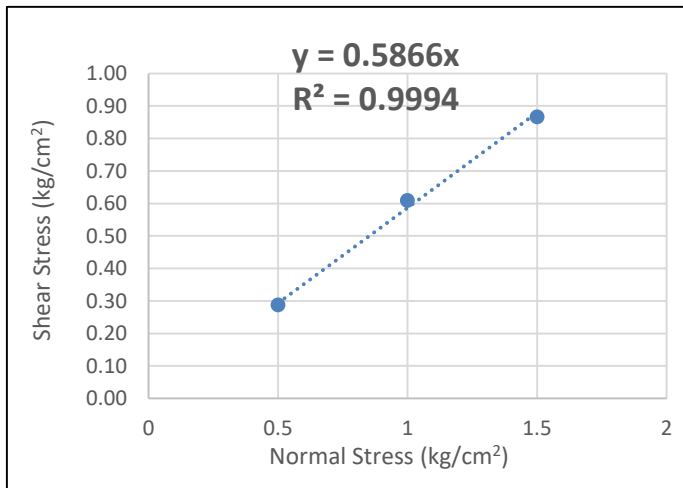
$\phi = 23.51$



Depth: 3 m

C = 0.05

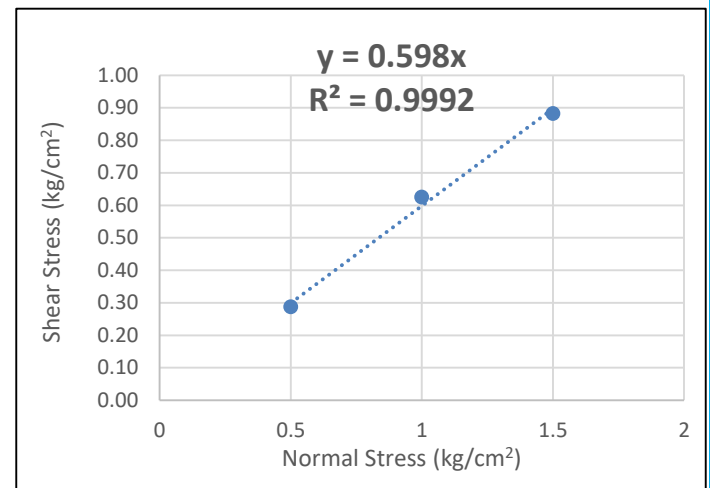
$\phi = 23.03$



Depth: 7.5 m

C = 0.00

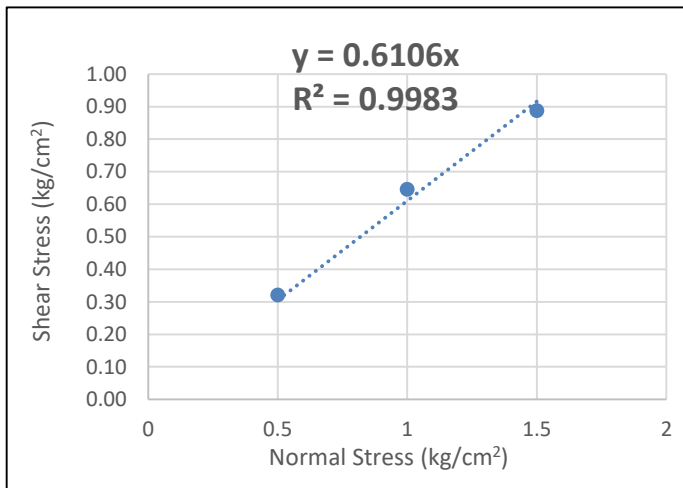
$\phi = 30.40$



Depth: 8 m

C = 0.00

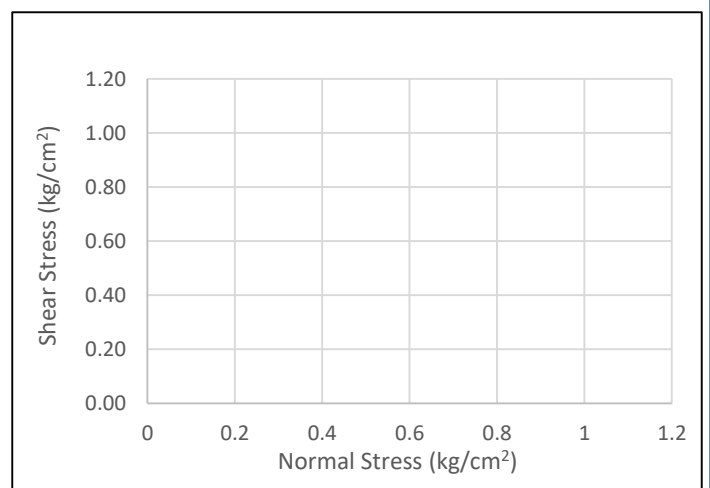
$\phi = 30.88$



Depth: 9 m

C = 0.000

$\phi = 31.41$



-

C = -

$\phi = -$