MS CONTRACTOR

MUHAMMAD SHOAIB CONTRACTOR

CIVIL | ARCHITECTURAL | STRUCTURAL | GEOTECHNICAL

GEOTECHNICAL INVESTIGATION REPORT

MR. SHEIKH FIAZ AHMAD

GHANI TOWER, PARIS ROAD, SILAKOT

| HEAD OFFICE: HOUSE # 75, STREET # 03, NEW CITY PHASE I WAH CANTT |

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MUHAMMAD SHOAIB CONTRACTOR

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SUBMISSION LETTER

Date: August 11, 2023

Ref: MSCGI/C/22/014

To,

Design/Building Control Department,

Sir/Madam,

We are pleased to submit the Geotechnical Investigation Report of the Site **"GHANI TOWER, PARIS ROAD, SILAKOT".**

The Report is contingent upon our final approval of the Project Plans, Observations, Laboratory Testing, as necessary for foundation, drainage, and earthwork aspects of the construction. Scope of this geotechnical investigation report is limited to assess subsoil safe bearing capacity point of view. It does not include site visits by the undersigned to confirm any aspects during construction phase.

The Undersigned, on behalf of M/S MUHAMMAD SHOAIB CONTRACTOR confirm that this document and all attached Drawings, Logs and Test Results have been checked and reviewed for Errors, Omissions and Inaccuracies.

Rev #	Electronic	Paper	Issued to	Author Sign & Stamp	Date
1	Yes	Yes	Sheikh Fiaz Ahmad	(ENGR. KASHIF ALI) M.SC. GEOTECH. ENGG.	11/08/23

1 INTRODUCTION

The Client **"SHEIKH FIAZ AHMAD",** is intending to construct the site **"GHANI TOWER, PARIS ROAD, SIALKOT".** The proposed development consists of "**Basement, Ground Plus 05 Storey Commercial Building**". In order to place the foundation at suitable depth, a comprehensive understanding of the engineering properties of soil and evaluation of engineering parameters is pre-requisite. The assignment to carryout subsoil investigation was entrusted to Muhammad Shoaib Contractor.

Execution of Geotechnical Investigations aimed at ascertaining the subsoil conditions prevailing at the project site i.e., Generalized Lithology, Geotechnical Characteristics of each encountered stratum, and the corresponding design of foundation system.

2 SCOPE OF REPORT

This report presents the details of investigations including soil exploration, in-situ testing, sampling, laboratory testing, interpretation of in-situ and laboratory testing, site characterization and evaluation of Geotechnical Design Parameters & Foundation Systems. Considerations regarding construction of subsurface structures have also been made part of this report.

3 SCOPE OF SERVICES

Geotechnical investigation is conducted for the purposes of characterizing geotechnical, geologic and seismic conditions and providing geotechnical engineering recommendations in support of the Project conceptual design.

Scope of activities performed by Muhammad Shoaib Contractor are summarized below;

- Reviewed geologic and seismic conditions in the site vicinity and commented on the geologic hazards that could potentially impact the site.

- Performed a reconnaissance of the site in the area of the proposed construction.
- To select the suitable construction technique.
- To predict potential foundation problems.
- To perform laboratory testing and analyses on selected soil samples for soil classification and evaluated engineering properties of the subsurface materials.
- To perform geotechnical engineering analyses to develop geotechnical bearing capacity for the proposed construction.
- Recommendations for soil-related construction conditions such as site preparation, earthwork construction & excavations.

4 SITE DESCRIPTION AND GEOLOGY

4.1 PROJECT OVERVIEW

Proposed project site can be accessed through multiple roads. During the investigation, land allocated for the proposed project was found to be mainly surrounded with existing Commercial Buildings/Residential Buildings. The mainly area of site is covered up with demolished material. Pictorial view of the foremost site is shown on Figure A-1(Appendix-A).

Proposed project site is located in “SIALKOT” and is accessible through “PARIS ROAD”. Google Earth imagery showing from 2012 to present of project site are appended in Fig. A-4 (Appendix-A).

4.2 TOPOGRAPHY AND GEOLOGY

The topography of proposed project site is plain terrain. Sub-surface soils existing at site mainly underlain by Clay, Silty Sand / Sand with Silt (CL, SM & SP-SM). Stratigraphy of the various layers has been analyzed through the information data gathered from field and laboratory testing of boreholes

samples Details showing sub-surface conditions are presented in digitized logs appended in Appendix-D.

5 SUBSURFACE EXPLORATION

5.1 GENERAL

The subgrade investigation of the proposed site was carried out in following sequence:

- Excavation of Five (05) boreholes till a target depth of 40.0 Feet.
- Determination of water table depth if encountered.
- Collection of disturbed and composite soil samples for laboratory testing.
- Preparation of field log and record of information.

Field investigations for this project were carried out on August 3, 2023 to August 5, 2023. Field works were performed under the full-time supervision of qualified Engineer who was responsible for field coordination, logging and handling of the collected samples.

Location plan of project site has been shown on Fig. A-1. A general layout plan indicating the locations of investigated points is presented as Fig. A-2. Both figures have been appended in Appendix-A. whereas site photographs taken during the performance of field activities are presented in Appendix-F.

5.2 DRILLING OF BOREHOLES

As per scope of work, Five (05) boreholes were required to be drilled up to a depth of 40.0 Feet from existing ground level. All boreholes were drilled using hand auger cum light percussion drilling technique. Diameter of these boreholes was 4.0 inches.

5.3 STANDARD PENETRATION TEST

Following the ASTM 1586, a Standard penetration test was carried out on-site in each Borehole. The split spoon was driven with the 140 lb. hammer falling from 30 in height and the numbers of blows were counted, applied in each increment until the full penetration of 18 in (450 mm) was achieved. Several blows for each 6-inch (150 mm) penetration were recorded. The blows for the last 300 mm of penetration (12 inch) were added to compute the penetration resistances "N". Details are shown in the borehole log. The number of blows was later corrected for 70% efficiency for a hand-operated US Donut hammer, for the computation of bearing capacity. Profiles of observed SPT (N) values are presented as (Appendix-B).

5.4 DISTURBED / UNDISTURBED SAMPLING

Disturbed soil samples were obtained using a Split Spoon sampler while performing the SPTs in the boreholes. Undisturbed soil samples were obtained by undisturbed tube/samplers. Specimens collected were carefully placed in polythene bags which were then stored in plastic jars.

To check the suitability of natural in-situ soils to be used as pavement subgrade material, composite bulk soil samples were collected from each test pit. These bulk samples were preserved and stored in standard bags. All soil samples were clearly labelled identifying Project name, borehole designation, depth, and sample number.

5.5 GROUND WATER OBSERVATIONS

Groundwater table was not encountered up to the maximum explored depth of 40.0 Feet below the existing ground level in the boreholes drilled at the site at the time of this geotechnical investigation.

6 LABORATORY TESTING

Material testing in the laboratory was conducted to determine the engineering characteristics such as nature, type, behavior of soil on increasing and decreasing the moisture content, when subject to dynamic loading. Soil samples were tested in the laboratory for index and strength properties of the soils. These tests were carried out in geotechnical laboratory as per ASTM Standards. Following engineering tests were conducted in the laboratory and their results are annexed to this report as Appendix-D.

**Samples remaining after testing will be placed in storage for a period of one week after issuance of the final report. After this period, the samples will be discarded.*

Sr. No.	Test Description / ASTM Standard		No. of Test performed
1.	Grain Size Analysis (ASTM D-421, 422)		10
2.	Atterberg Limits (ASTM D-4318)	Liquid Limits	05
		Plastic Limits	05
3.	Soil Classification (ASTM D-2487)		10
4.	Natural Moisture Content (ASTM D-2216)		15

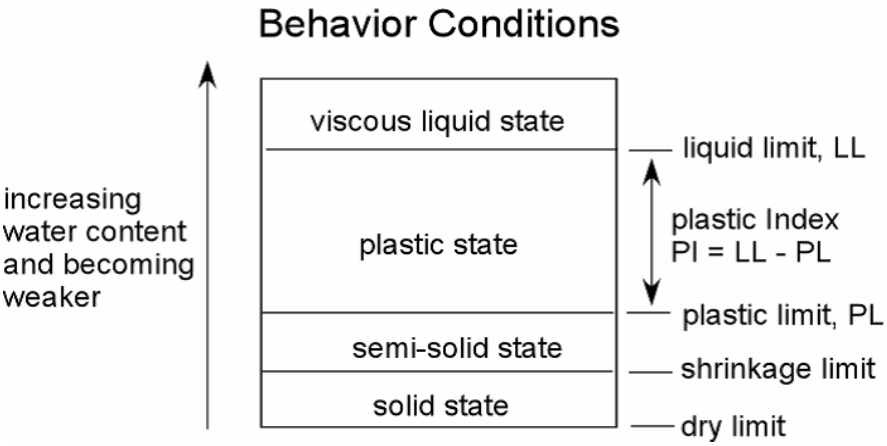
6.1 GRAIN SIZE ANALYSIS

This test is performed to determine the percentage of different grain sizes contained within a soil. The mechanical or sieve analysis is performed to determine the distribution of the coarser, larger-sized particles, and the hydrometer method is used to determine the distribution of the finer particles. Soil consists of an assembly of ultimate soil particles (discrete particles) of

various shapes and sizes. The object of a particle size analysis is to group these particles into separate ranges of sizes and so determine the relative proportion by weight of each size range. The method employs sieving and sedimentation of a soil/water/dispersant suspension to separate the particles. The sedimentation technique is based on an application of Stokes' law to a soil/water suspension and periodic measurement of the density of the suspension. The grain size distribution curves give the exact idea regarding the gradation of the soils. In non-cohesive soils, it is very important to identify whether a soil is well graded, uniformly graded or poorly graded. For this particle size is determined against 10%, 30% and 60% passing, which may be denoted D10, D30 and D60 respectively. The gradation curves are exhibited in **Appendix "E"**.

6.2 ATTERBERG LIMITS

Consistency is a term frequently used to describe the degree of firmness (e.g. soft, firm, stiff and hard) of the cohesive soil samples. The Atterberg Limits determination is an empirical method developed and widely used procedure for establishing and describing the consistency of soils. The consistency of cohesive soils is greatly affected by the water content of the soil. The Liquid Limit is the water content at the point of transition of the clay sample from a liquid state to the plastic state whereby it acquires a certain Shearing Strength (ASTM D-4318).



Atterberg's limits were also performed to further assist in classifying the soils. These tests were carried out in accordance with relevant ASTM standards. The results of these tests are attached in **Appendix "E".**

6.3 NATURAL MOISTURE CONTENT

The natural water content also called the natural moisture content is the ratio of the weight of water to the weight of the solids in a given mass of soil. This ratio is usually expressed as percentage. In almost all soil tests natural moisture content of the soil is to be determined. The knowledge of the natural moisture content is essential in all studies of soil mechanics. To sight a few, natural moisture content is used in determining the bearing capacity and settlement. The natural moisture content will give an idea of the state of soil in the field. The results of these tests are attached in **Appendix "E".**

7 GEOTECHNICAL DATA ANALYSIS

7.1 GENERAL

Geotechnical investigations were planned in such a manner to effectively explore geotechnics of the project site. This Chapter mainly discusses our evaluations for subsoil lithology/ stratigraphy, seismicity, soil seismic profile, and other geotechnical characteristics of the soils prevailing at the project site.

7.2 STRATIGRAPHY

During these investigations, sub-surface soils were explored down to the maximum depth of 40.0 Feet below EGL. General stratigraphy of the project area, as deduced from the field investigations duly corrected in the light of laboratory test results indicates the presence of following stratigraphic units;

Layers	**Stratigraphy**	
Layer-1	**0.0 – 19.0 ft**	Light Brown, Soft to Stiff, Lean Clay, Wet to Moist
Layer-2	**19.0 – 27.0 ft**	Light Brown, Medium Stiff to Stiff, Lean Clay, Moist, traces of Concretions
Layer-3	**27.0 – 40.0 ft**	Grey, Medium Dense, Medium Grained to Coarse Grained, Silty Sand / Sand with Silt
	Ground Water	
Ground Water was not encountered in any borehole.		

7.3 SEISMICITY OF THE AREA

The project site lies in Zone ***2B*** as per "Seismic Provisions-2007" of Building Code of Pakistan (BCP: SP, 2007). Keeping in view the seismotectonic set up of the project area and the degree of importance of the structures, it is recommended that the structures should be designed to withstand horizontal peak ground acceleration (PGA) of ***0.16 g – 0.24 g***. This PGA has 10 % probability of exceedance in 50 years.

7.4 SEISMIC SOIL PROFILE CHARACTERIZATION

Seismic profile of subsoils present at site has been characterized by using the guidelines provided in "Seismic Provisions-2007" of Building Code of

Pakistan (BCP: SP, 2007). Chapter 4, of this code describes the procedure for determining Soil Profile types (BCP: SP, 2007; Section 4.4).

According to the analysis results, Soil profile "S_E" is recommended to be used for this site as per Section 4.4.2 of BCP: SP (2007).

8 FOUNDATION RECCOMMENDATION & SITE CONSIDERATIONS

8.1 GENERAL

The considerations for the foundation design have been made keeping in view the topography of the area, type of structure, types of loads, settlement in foundation and the subsoil characteristics. A safe and an economical design of foundations of the structures have to be ensured.

8.2 ENGINEERING DESIGN CONSIDERATION

Keeping in view the load from the structure and subsurface soil characteristics, the analysis for foundations is considered on following criteria:

- The Allowable Bearing Capacity is calculated at shear failure and settlement analysis on the basis of subsurface profile of Borehole.
- Factor of Safety is taken as 3.0 for both shear and settlement analysis.
- The maximum allowable settlement of 25 mm is considered for strip/isolated footing and 50 mm for mat/raft footing. The angular distortion between two adjacent foundations should not exceed 1/500.
- For settlement analysis Timoshenko and Goodier Theory is used.
- For shear failure analysis, Terzaghi bearing capacity formula used for calculation of net bearing capacity of foundation.

8.3 ALLOWABLE BEARING CAPACITY

MAT FOUNDATION:

The Mat Foundation can be placed at a minimum depth of 10.0 Feet below Existing Ground Level (EGL). The Foundation excavation base soil should be proof-rolled prior to the placement of Mat Foundation.

The recommended allowable bearing capacities for 30 to 100 Feet wide Mat Foundation are provided in ***Chart-1 (Appendix-C).***

It is recommended that the foundation excavation base soil should be proof-rolled prior to the placement of mat foundation. Moreover, A 150mm PCC blinding concrete layer is recommended before placing the foundation.

8.4 MODULUS OF SUB-GRADE REACTION

Modulus of subgrade reaction (K_s) is a conceptual relationship between contact pressure and foundation settlements. It is required for modelling the structure in a computer program and to account for soil-structure interaction and the settlement-induced stresses. A simplified relationship for the determination of modulus of sub-grade reaction (K_s) for shallow foundation is as follows:

$$K_s\ (kN/m^3) = \frac{\text{Net Allowable Bearing Pressure x F.O.S}}{\text{Permissible Settlement}}$$

Factor of safety in above equation depends upon the allowable bearing capacity to be shear controlled or settlement controlled. The recommended values of modulus of sub-grade reaction (K_s) for structural design of mat foundations are appended as ***Chart. 2 (Appendix – C).***

8.5 EARTHWORK

All existing fill and any other soft/loose, disturbed or otherwise deleterious materials should be removed from beneath the footprints of the foundations for the generator, electrical panel and box, and transformer. The thickness of the fill materials was determined at a single location and may vary across the development area. Therefore, the prepared subgrade surfaces should be inspected by experienced geotechnical personnel to confirm all fill materials have been removed and the subgrade should be surface compacted/proof-rolled prior to placement of fill material or foundation construction.

8.6 TEMPORARY EXCAVATION

All temporary excavations should be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects and care should be taken to direct surface water away from the open excavations.

Excavations at the site are anticipated to extend through fill materials and compact silty sand soils. Conventional hydraulic excavating equipment is considered suitable for developing excavations in these materials. Excavated materials should not be stockpiled adjacent to excavations. The side slopes of the excavations should be inspected for signs of instability and flattened as required.

8.7 DAMP PROOFING MEASURES

Proper damp proofing measures should be taken to prevent the ingress of water in foundations. This becomes super critical considering the swelling nature of top stratum. Besides, adequate provision should be kept to prevent the excavation slopes against rains by tarpaulins. Emergency arrangements of dewatering pumps for pumping rain water from excavations should also be provided.

9 CONCLUSION & RECCOMMENDATIONS

Conclusions and recommendations based on the field data obtained from the site and laboratory test results, visual assessment of the site, professional judgements and opinions, are as follow:

- It is concluded that RAFT/MAT Foundation may be adopted at minimum depth of **"10.0 Feet Below Existing Ground Level".** The Recommended Allowable Bearing Capacities for 30 to 100 feet wide Mat Foundation are provided Chart-1 (Appendix-C)
- Any Soft / Weak Soil or Loose Fill Material, if encountered at Foundation placement level should be completely removed and backfilled with Select Fill Material. The Select Fill Material should be at least A-3 material as per AASHTO Soil Classification. The Select Fill Material should be placed in layers and compacted to at least 95% of modified AASHTO maximum density.
- As the site is situated in seismic zone 2B therefore it is recommended to design the structure which fulfill the requirements of seismic zone 2B.
- Proper Plinth protection at-least 3.28 ft. (or 1.0m) wide should be provided all around the building.
- It is highly recommended to cater to the issue of drainage/seepage during design before starting construction.
- Moisture content is likely to rise in monsoons, it is strongly recommended to provide effective drainage under the Foundation.
- It is recommended to contact the Geotechnical Engineer if any changes in strata are observed during excavation.
- The open areas surrounding the structures and enclosed within the structures should properly drain away from the built-up areas. Moreover, proper drainage should be provided to the project area.

10 LIMITATIONS

The conclusions and recommendations given in this report are based on information determined at the borehole locations. The information contained herein in no way reflects on the environmental aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Geotechnical Engineer be retained during the construction to confirm that the subsurface conditions across the site do not deviate materially from those encountered in the boreholes.

The design recommendations given in this report are applicable only to the project described in the text, and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report relating to potential construction problems and possible methods of construction are intended only for the guidance of the designer. This work has been undertaken in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

Muhammad Shoaib Contractor should be retained for a general review of the final design and specification to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, Muhammad Shoaib Contractor will assume no responsibility for interpretation of the recommendations in the report.

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

****

11 REFERENCES

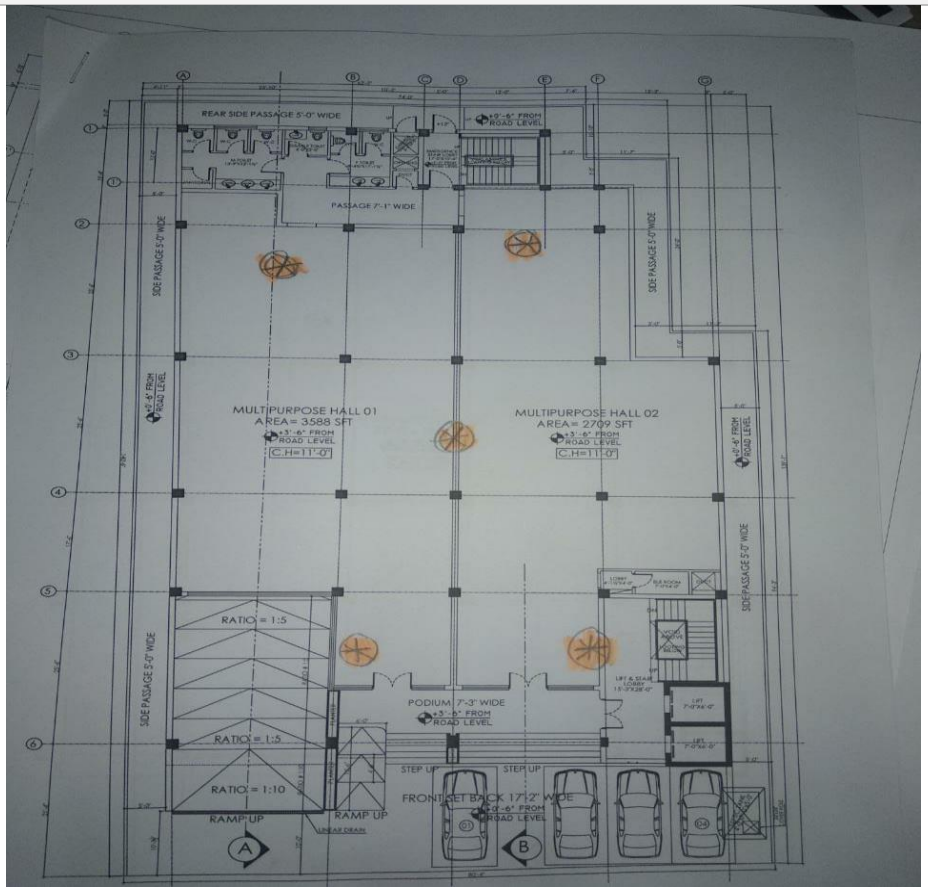
- Building Code of Pakistan, Seismic Provisions 2007.
- Bowles, J. E., (1996). "Foundation Analysis and Design, (5th Edition)", McGrawHill, New York.
- Das, B. M. (2010). "Principles of Geotechnical Engineering", 7th Edition, Cengage Learning, CT, USA.
- NAVFAC, D. M. 7.02, (1986), "Foundations & Earth Structures", Department of Naval Facilities and Engineering Command, Alexandria.
- Burt Look, "Handbook of Geotechnical Investigations & Design Tables".
- ACI-318 Building Code Requirements for Structural Concrete.

APPENDIX "A"

FIGURES

FIGURE A-1 {PROJECT SITE PLAN}

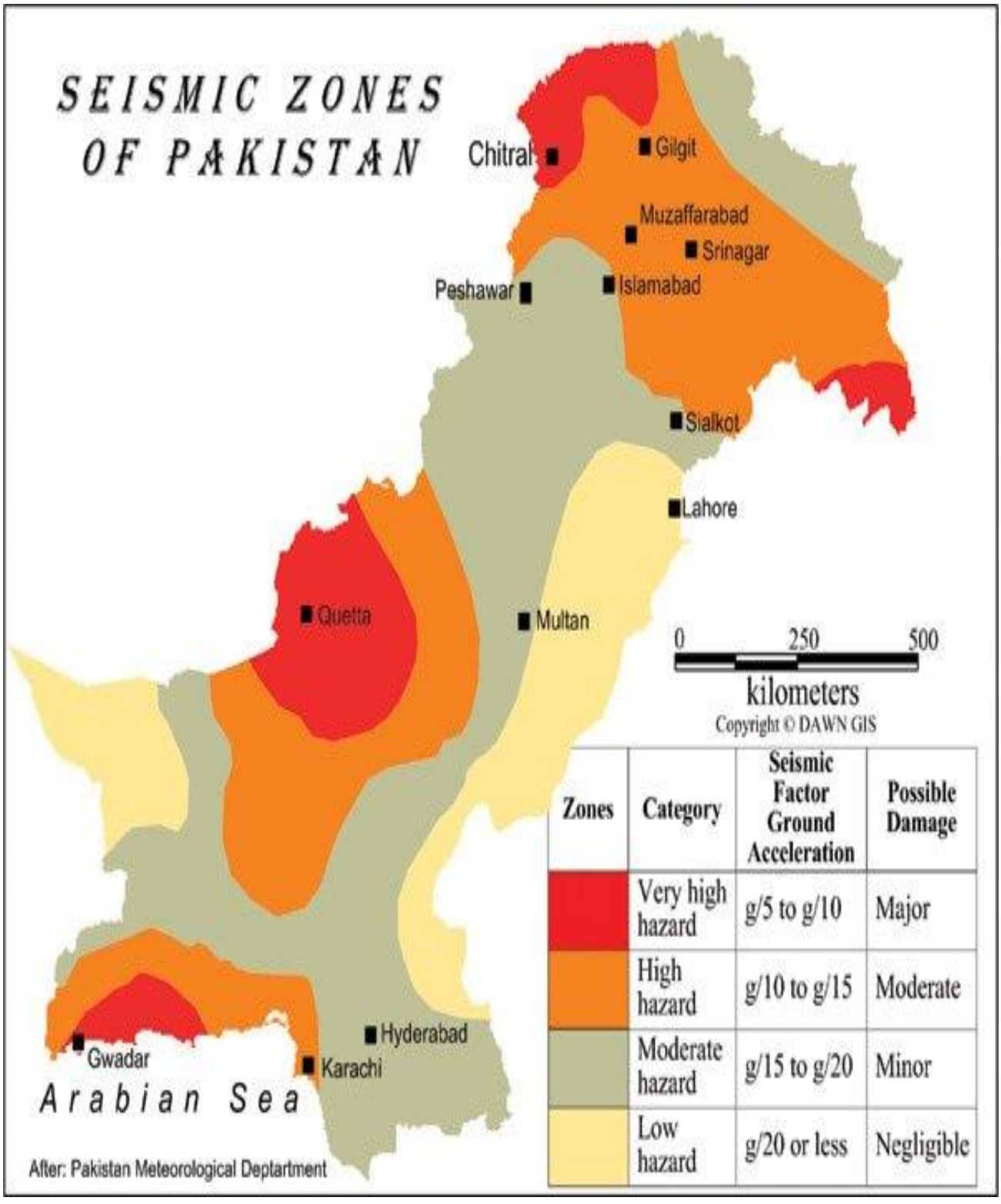
FIGURE A-2 {BOREHOLE LAYOUT PLAN}



**Borehole Location/Points were given by client*

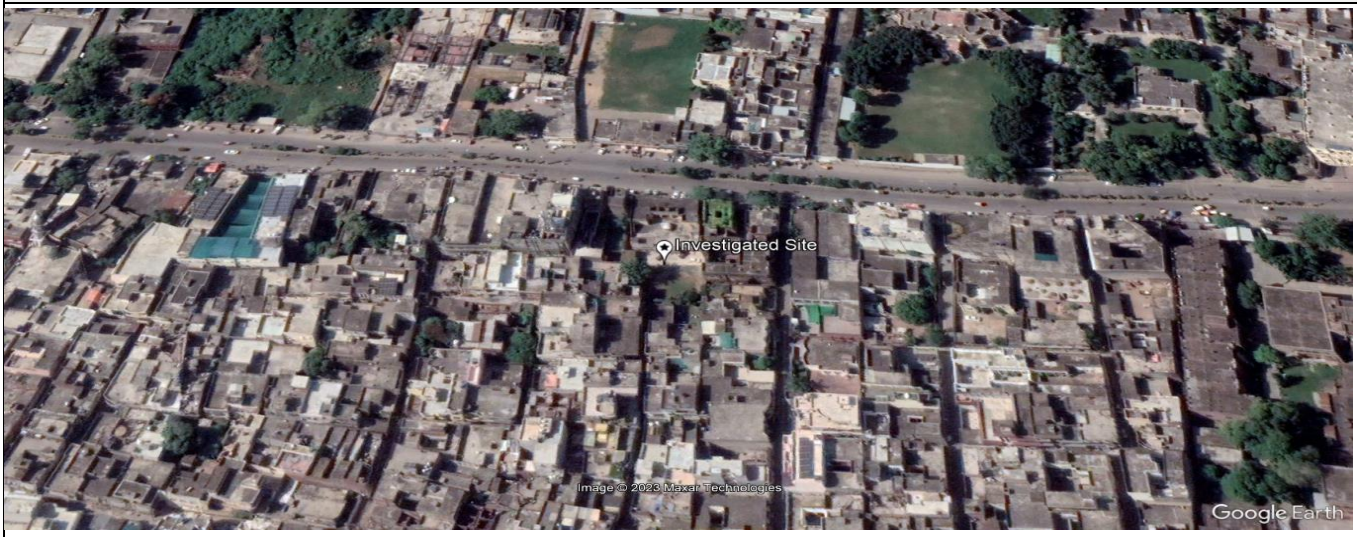
FIGURE A-3

SEISMIC ZONE MAP OF PAKISTAN



Zones	Category	Seismic Factor Ground Acceleration	Possible Damage
	Very high hazard	g/5 to g/10	Major
	High hazard	g/10 to g/15	Moderate
	Moderate hazard	g/15 to g/20	Minor
	Low hazard	g/20 or less	Negligible

“FIGURE A-4” {SATELLITE IMAGES} °YEAR - 2023°



“FIGURE A-4” {SATELLITE IMAGES} °YEAR - 2020°

“FIGURE A-4” {SATELLITE IMAGES} °YEAR - 2018°

“FIGURE A-4” {SATELLITE IMAGES} °YEAR - 2016°

“FIGURE A-4” {SATELLITE IMAGES} °YEAR - 2013°

“FIGURE A-4” {SATELLITE IMAGES} °YEAR – 2012°

APPENDIX "B"

SPT & SOIL PROFILE

SPT & SOIL PROFILE

Depth (ft)	BH-01		BH-02		BH-03		BH-04		BH-05	
	Strata	N Values	Soil	N Values	Soil	N Values	Soil	N Values	Soil	N Values
0										
3		2		3		4		2		2
5		5		5		5		4		4
8		10		8		11		12		11
12		9		11		12		11		10
15		12		12		15		12		11
20		6		7		7		8		9
25		14		15		12		15		14
30		13		14		13		12		12
35		14		16		18		15		15
40		17		19		16		18		18

Legends

LEAN CLAY

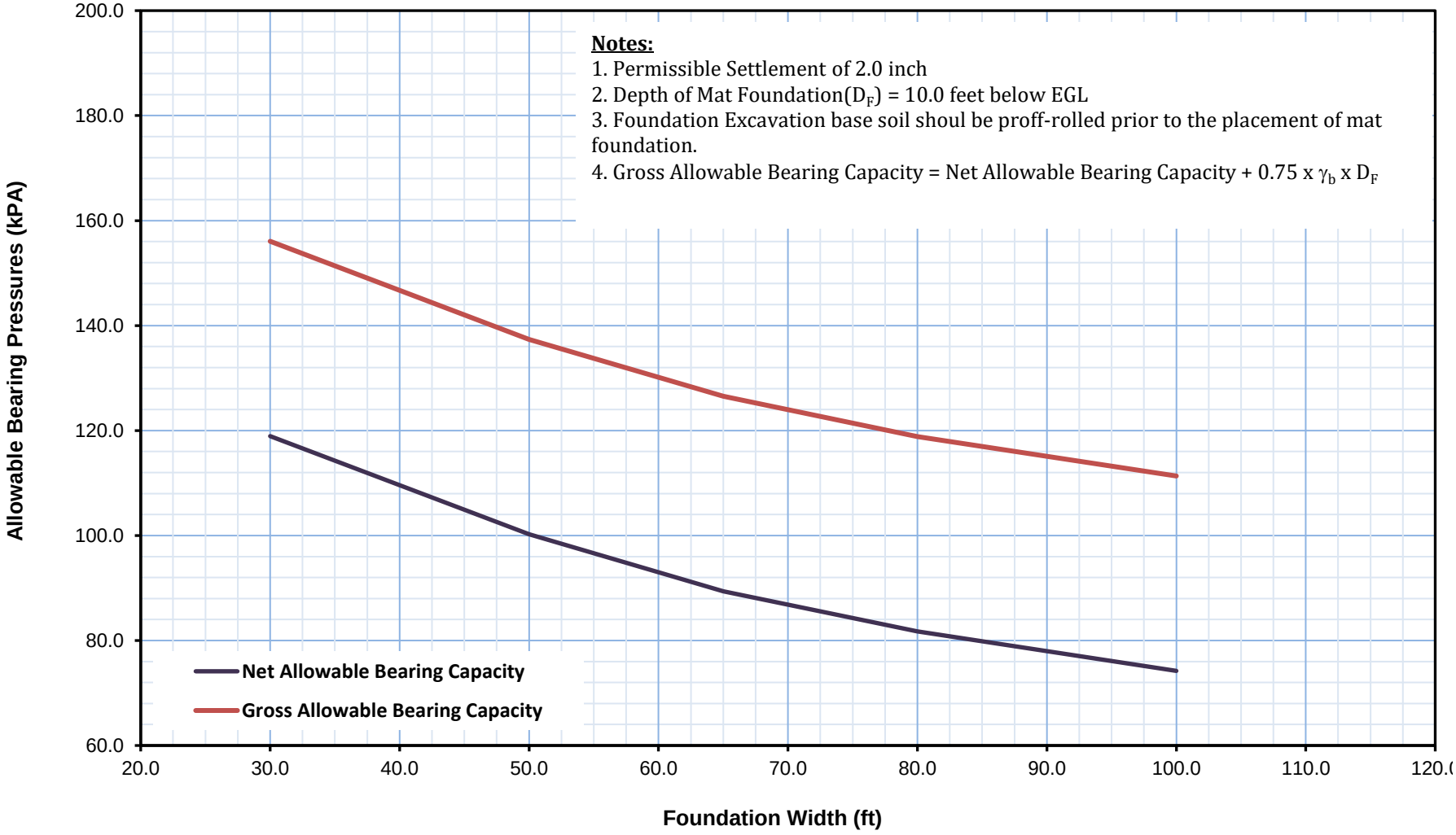
Silty Sand / Sand with Silt

APPENDIX "C"

BEARING CAPACITY CHARTS

GHANI TOWER, PARIS ROAD, SILAKOT

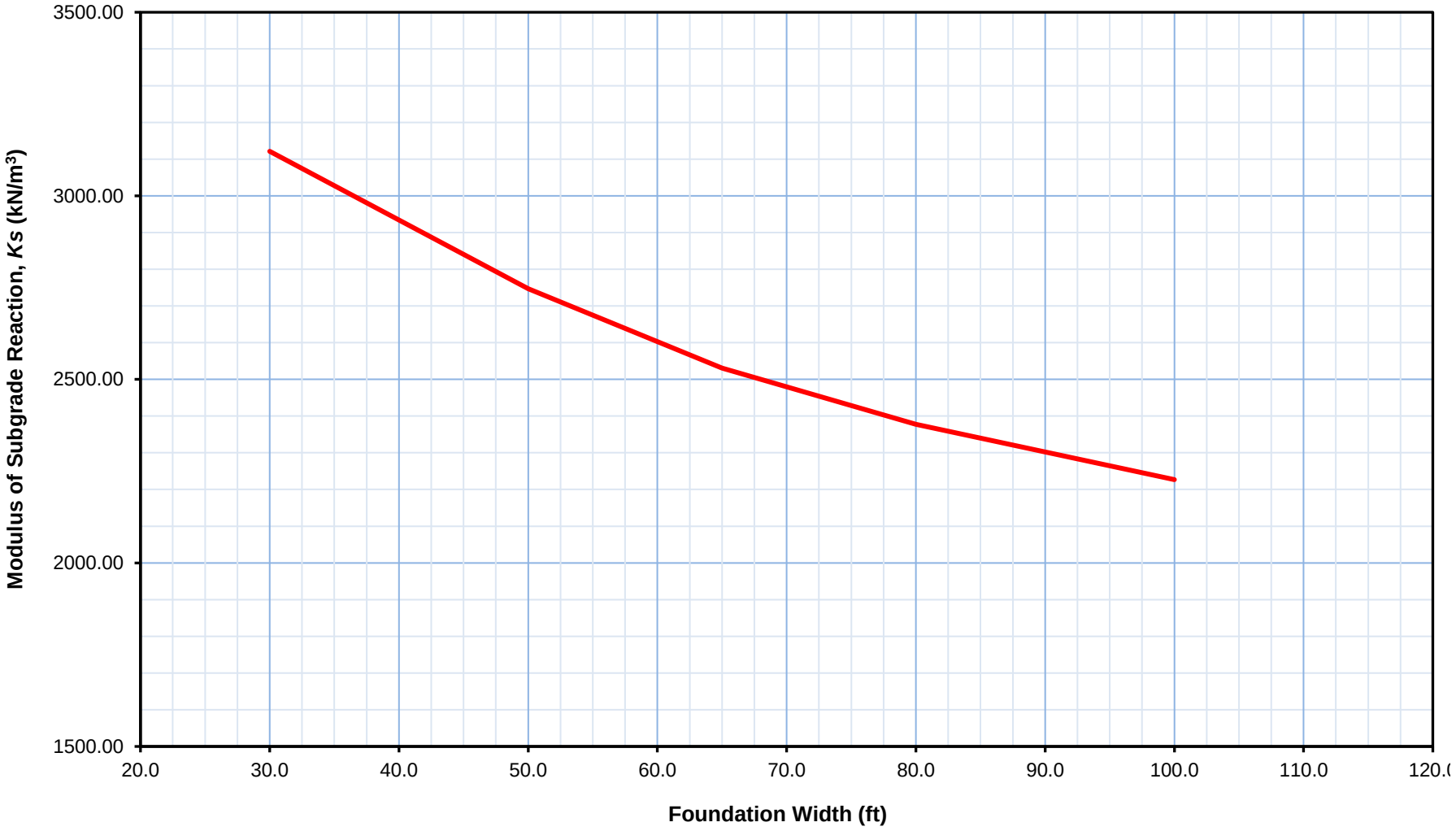
Bearing Capacity Curves for Mat Foundation



Allowable Bearing Pressure for Raft Footing Placed at 10.0 feet depth below Existing Ground Level

GHANI TOWER, PARIS ROAD, SILAKOT

Modulus of Subgrade Recation for Mat Foundations



Allowable Bearing Pressure for Raft Footing Placed at 10.0 feet depth below Existing Ground Level

APPENDIX "D"

BOREHOLE LOGS

MS CONTRACTOR	MUHAMMAD SHOAIB CONTRACTOR	BOREHOLE LOG	BH-01

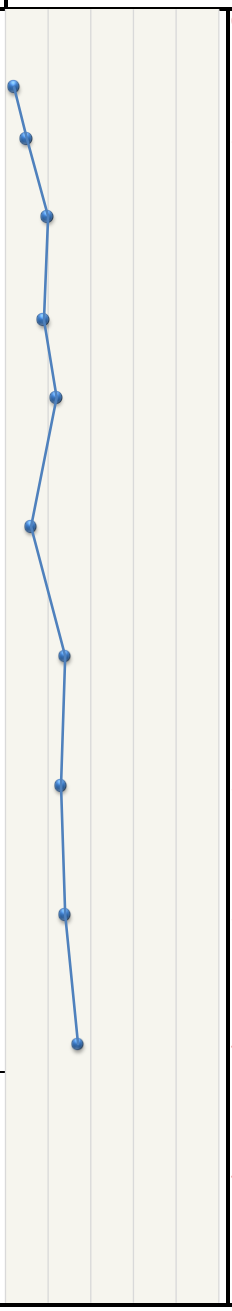
PROJECT:	GEOTECHNICAL SITE INVESTIGATION FOR GHANI TOWER								**BH Drilling Started on:**
LOCATION:	PARIS ROAD, SIALKOT.								8/3/2023
CLIENT:	SHEIKH FIAZ AHMAD								**BH Drilling Completed on:**
Drilling Information				**SAMPLING METHODS**					8/3/2023
Drilling Method:	Hand Auger	**Dia of Bore:**	4 "	**Hammer Weight:**	63.5 kg		**Drop**	30 Inch	**Logged By:**
Site Information		**CO-ORDINATES:**		**North:**	32.502375	**East:**	74.538570		Tanvir
GWT:	Not Encountered	**Borehole Level:**		Plot Level is 1.0 feet higher w.r.t adjacent Road Level					**Final Depth:** 40 feet

Depth (ft)	Soil Profile	NMC %	DESCRIPTION OF MATERIAL	SAMPLE NO.	SAMPLE TYPE	SPT BLOWS 6"	6"	6"	N VALUES
0.0			**CLAY:-**						
3.0			Light Brown, Very Soft, Low Plastic, Clay, Wet	S-1	SPT	1	1	1	2
5.0		15.48	Light Brown, Medium Stiff, Low Plastic, Clay, Moist	S-2	SPT	1	2	3	5
8.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-3	SPT	3	4	6	10
10.0									
12.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-4	SPT	4	4	5	9
15.0		19.93	Light Brown, Stiff, Low Plastic, Clay, Moist	S-5	SPT	4	5	7	12
20.0			Light Brown, Stiff, Low Plastic, Clay, Trace of Concretion, Moist	S-6	SPT	5	3	3	6
25.0			Light Brown, Stiff, Low Plastic, Clay, Trace of Concretion & Gravel, Moist	S-7	SPT	6	6	8	14
			SILTY SAND:-						
30.0		18.23	Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-8	SPT	4	6	7	13
35.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-9	SPT	4	6	8	14
40.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-10	SPT	6	7	10	17
			End of Borehole						
45.0									
50.0									

Std. Penetration Test Graphical Data Representation

SPT Blows (N Values)

0 10 20 30 40 50



MS CONTRACTOR	MUHAMMAD SHOAIB CONTRACTOR	BOREHOLE LOG	BH-02

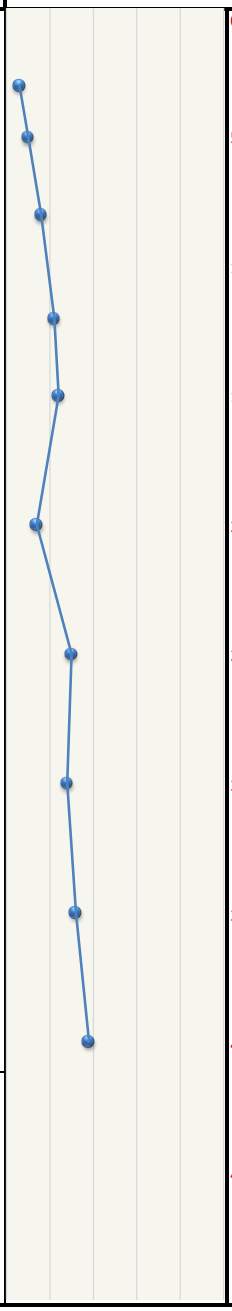
PROJECT:	GEOTECHNICAL SITE INVESTIGATION FOR GHANI TOWER		**BH Drilling Started on:** 8/3/2023
LOCATION:	PARIS ROAD, SIALKOT.		
CLIENT:	SHEIKH FIAZ AHMAD		**BH Drilling Completed on:** 8/4/2023
Drilling Information		**SAMPLING METHODS**	
Drilling Method: Hand Auger	**Dia of Bore:** 4 "	**Hammer Weight:** 63.5 kg	**Drop** 30 Inch
Site Information	**CO-ORDINATES:**	**North:** 32.502460	**East:** 74.538542
GWT: Not Encountered	**Borehole Level:**	Plot Level is 1.0 feet higher w.r.t adjacent Road Level	**Logged By:** Tanvir
			Final Depth: 40 feet

Depth (ft)	Soil Profile	NMC %	DESCRIPTION OF MATERIAL	SAMPLE NO.	SAMPLE TYPE	SPT BLOWS 6"	6"	6"	N VALUES
0.0			**CLAY:-**						
3.0			Light Brown, Soft, Low Plastic, Clay with Pieces of Bricks	S-1	SPT	1	1	2	3
5.0			Light Brown, Medium Stiff, Low Plastic, Clay, Moist	S-2	SPT	2	2	3	5
8.0		17.50	Light Brown, Medium Stiff, Low Plastic, Clay, Moist	S-3	SPT	3	3	5	8
10.0									
12.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-4	SPT	4	5	6	11
15.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-5	SPT	3	5	7	12
20.0		18.33	Light Brown, Medium Stiff, Low Plastic, Clay, Trace of Concretion, Moist	S-6	SPT	4	3	4	7
25.0			Light Brown, Stiff, Low Plastic, Clay, Trace of Concretion & Gravel, Moist	S-7	SPT	6	7	8	15
30.0			**SILTY SAND:-** Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-8	SPT	5	6	8	14
35.0		20.17	Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-9	SPT	6	7	9	16
40.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-10	SPT	6	8	11	19
			End of Borehole						
45.0									
50.0									

Std. Penetration Test Graphical Data Representation

SPT Blows (N Values)

0 10 20 30 40 50



MS CONTRACTOR	MUHAMMAD SHOAIB CONTRACTOR	BOREHOLE LOG	BH-03

PROJECT:	GEOTECHNICAL SITE INVESTIGATION FOR GHANI TOWER		**BH Drilling Started on:** 8/4/2023
LOCATION:	PARIS ROAD, SIALKOT.		
CLIENT:	SHEIKH FIAZ AHMAD		**BH Drilling Completed on:** 8/4/2023

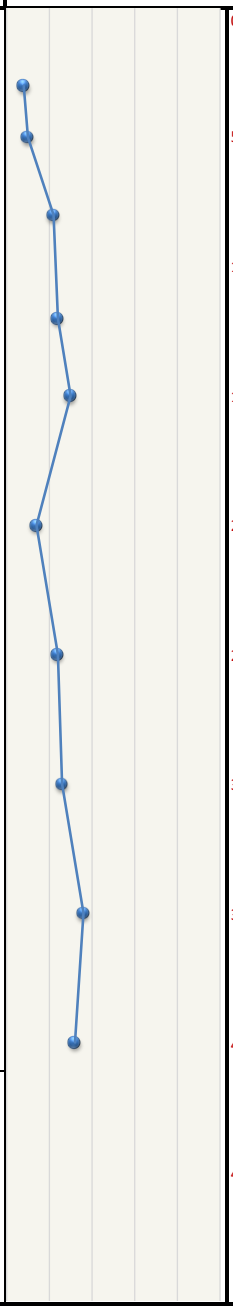
Drilling Information				SAMPLING METHODS				
Drilling Method:	Hand Auger	**Dia of Bore:**	4 "	**Hammer Weight:**	63.5 kg	**Drop**	30 Inch	**Logged By:** Tanvir
Site Information		**CO-ORDINATES:**		**North:**	32.502355	**East:**	74.538451	
GWT:	Not Encountered	**Borehole Level:**		Plot Level is 1.0 feet higher w.r.t adjacent Road Level				**Final Depth:** 40 feet

Depth (ft)	Soil Profile	NMC %	DESCRIPTION OF MATERIAL	SAMPLE NO.	SAMPLE TYPE	SPT BLOWS 6"	6"	6"	N VALUES
0.0			**CLAY:-**						
3.0		24.13	Light Brown, Soft, Low Plastic, Clay with Trace of Concretion, Wet	S-1	SPT	1	2	2	4
5.0			Light Brown, Medium Stiff, Low Plastic, Clay, Moist	S-2	SPT	1	2	3	5
8.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-3	SPT	3	5	6	11
10.0									
12.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-4	SPT	4	5	7	12
15.0		17.08	Light Brown, Stiff, Low Plastic, Clay, Moist	S-5	SPT	3	6	9	15
20.0			Light Brown, Medium Stiff, Low Plastic, Clay, Trace of Concretion, Moist	S-6	SPT	2	3	4	7
25.0		15.13	Light Brown, Stiff, Low Plastic, Clay, Trace of Concretion & Gravel, Moist	S-7	SPT	4	5	7	12
30.0			**SILTY SAND:-** Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-8	SPT	4	6	7	13
35.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-9	SPT	5	8	10	18
40.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-10	SPT	4	7	9	16
			End of Borehole						
45.0									
50.0									

Std. Penetration Test Graphical Data Representation

SPT Blows (N Values)

0 10 20 30 40 50



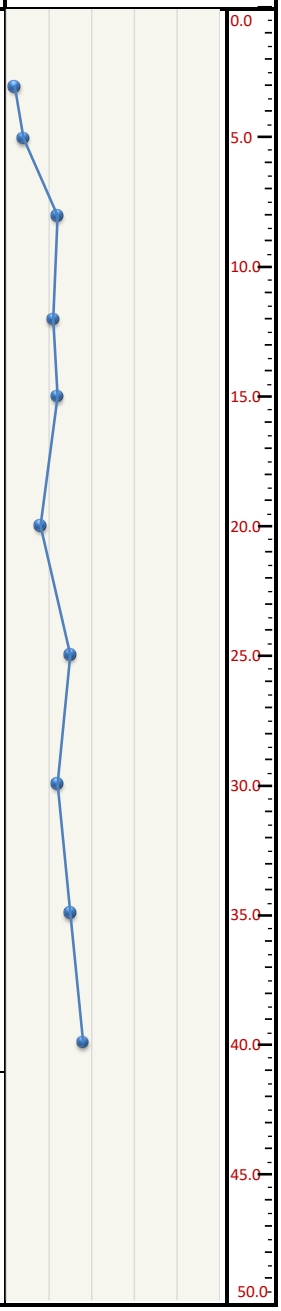
MS CONTRACTOR	MUHAMMAD SHOAIB CONTRACTOR	BOREHOLE LOG	BH-04

PROJECT:	GEOTECHNICAL SITE INVESTIGATION FOR GHANI TOWER							**BH Drilling Started on:**
LOCATION:	PARIS ROAD, SIALKOT.							8/5/2023
CLIENT:	SHEIKH FIAZ AHMAD							**BH Drilling Completed on:**
Drilling Information				**SAMPLING METHODS**				8/5/2023
Drilling Method:	Hand Auger	**Dia of Bore:**	4 "	**Hammer Weight:**	63.5 kg	**Drop**	30 Inch	**Logged By:**
Site Information		**CO-ORDINATES:**		**North:**	32.502240	**East:**	74.538355	Tanvir
GWT:	Not Encountered	**Borehole Level:**		Plot Level is 1.0 feet higher w.r.t adjacent Road Level				**Final Depth:** 40 feet

Depth (ft)	Soil Profile	NMC %	DESCRIPTION OF MATERIAL	SAMPLE NO.	SAMPLE TYPE	SPT BLOWS 6"	6"	6"	N VALUES
0.0			**CLAY:-**						
3.0			Light Brown, Very Soft, Low Plastic, Clay with Trace of Concretion, Wet	S-1	SPT	1	1	1	2
5.0		22.35	Light Brown, Soft, Low Plastic, Clay, Wet	S-2	SPT	1	2	2	4
8.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-3	SPT	3	5	7	12
10.0									
12.0		17.19	Light Brown, Stiff, Low Plastic, Clay, Moist	S-4	SPT	4	5	6	11
15.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-5	SPT	4	6	6	12
20.0			Light Brown, Medium Stiff, Low Plastic, Clay, Trace of Concretion, Moist	S-6	SPT	3	3	5	8
25.0			Light Brown, Stiff, Low Plastic, Clay, Trace of Concretion & Gravel, Moist	S-7	SPT	4	6	9	15
30.0			**SILTY SAND / SAND WITH SILT:-** Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-8	SPT	3	5	7	12
35.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-9	SPT	5	6	9	15
40.0		18.85	Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-10	SPT	6	8	10	18
			End of Borehole						
45.0									
50.0									

Std. Penetration Test Graphical Data Representation

SPT Blows (N Values)



MUHAMMAD SHOAIB CONTRACTOR

MS CONTRACTOR

BOREHOLE LOG | **BH-05**

PROJECT:	GEOTECHNICAL SITE INVESTIGATION FOR GHANI TOWER
LOCATION:	PARIS ROAD, SIALKOT.
CLIENT:	SHEIKH FIAZ AHMAD

BH Drilling Started on: 8/5/2023

BH Drilling Completed on: 8/5/2023

Logged By: Tanvir

Final Depth: 40 feet

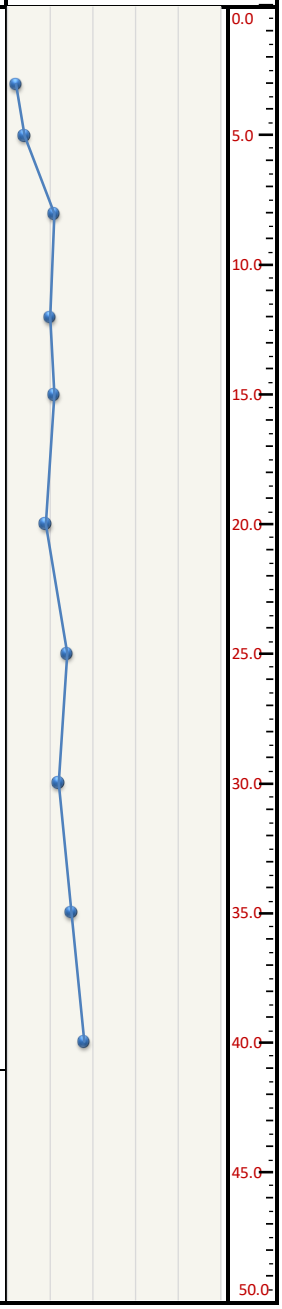
Drilling Information				SAMPLING METHODS			
Drilling Method:	Hand Auger	**Dia of Bore:**	4 "	**Hammer Weight:**	63.5 kg	**Drop**	30 Inch
Site Information		**CO-ORDINATES:**		**North:**	32.502269	**East:**	74.538337
GWT:	Not Encountered	**Borehole Level:**		Plot Level is 1.0 feet higher w.r.t adjacent Road Level			

Depth (ft)	Soil Profile	NMC %	DESCRIPTION OF MATERIAL	SAMPLE NO.	SAMPLE TYPE	SPT BLOWS 6"	6"	6"	N VALUES
0.0			**CLAY:-**						
3.0			Light Brown, Very Soft, Low Plastic, Clay with Trace of Concretion, Wet	S-1	SPT	1	1	1	2
5.0			Light Brown, Soft, Low Plastic, Clay, Moist	S-2	SPT	1	2	2	4
8.0		20.61	Light Brown, Stiff, Low Plastic, Clay, Moist	S-3	SPT	3	4	7	11
10.0									
12.0			Light Brown, Stiff, Low Plastic, Clay, Moist	S-4	SPT	4	4	6	10
15.0		19.85	Light Brown, Stiff, Low Plastic, Clay, Moist	S-5	SPT	3	5	6	11
20.0			Light Brown, Stiff, Low Plastic, Clay, Traces of Concretion, Moist	S-6	SPT	4	3	6	9
25.0			Light Brown, Stiff, Low Plastic, Clay, Traces of Concretion & Gravel, Moist	S-7	SPT	4	6	8	14
30.0			**SILTY SAND:-** Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-8	SPT	4	5	7	12
35.0		15.94	Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-9	SPT	6	7	8	15
40.0			Light Grey, Medium Dense, Medium to Coarse Grained, Silty Sand, Trace Mica, Moist	S-10	SPT	5	7	11	18
			End of Borehole						
45.0									
50.0									

Std. Penetration Test Graphical Data Representation

SPT Blows (N Values)

0 10 20 30 40 50



APPENDIX "E"

LABORATORY SUMMARY & TEST RESULTS

MS CONTRACTOR

SUMMARY OF LABORATORY RESULTS

GHANI TOWER, PARIS ROAD, SIALKOT. — **8/9/2023**

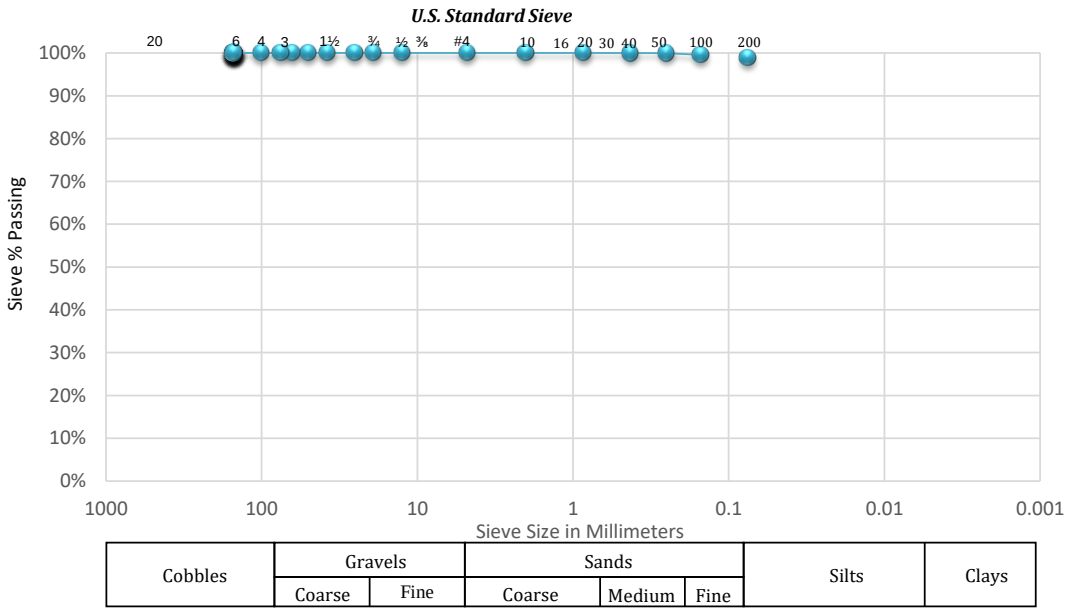
Borehole:	Depth (Feet)	Atterberg Limits			NMC (%)	Sieve Analysis			Unified Soil Classification	
		LL	PL	PI		Gravels %	Sand %	Fines %	Group Description	Group Symbol
1	5.0	28.5	20.7	7.8	15.48	0.00	1.10	98.90	Lean Clay	CL
	20.00				19.93					
	30.00				18.23	0.00	77.73	22.27	Silty Sand	SM
2	8.0	33.3	21.3	12.0	17.50	0.00	5.07	94.93	Lean Clay	CL
	20.00				18.33	0.00	5.90	94.10	Lean Clay	CL
	35.00				20.17					
3	3.0	28.8	19.6	9.2	24.13	0.00	6.12	93.88	Lean Clay	CL
	15.0				17.08					
	25.0				15.13	5.71	8.66	85.63	Lean Clay	CL
4	5.0				22.35					
	12.0	29.5	19.9	9.6	17.19	0.00	5.03	94.97	Lean Clay	CL
	40.0				18.85	0.00	88.40	11.60	Sand with Silt	SP-SM
5	8.0				20.61					
	15.0	29.5	19.9	9.6	19.85	0.00	11.10	88.90	Lean Clay	CL
	35.0				15.94	0.00	87.90	12.10	Silty Sand	SM
Total Number of Tests Performed		5	5	5	15	10	10	10	10	10
Max. Value of Test		33.3	21.3	12.0	24.13	5.71	88.40	98.90		
Min. Value of Test		28.5	19.6	7.8	15.13	0.00	1.10	11.60		

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	5.0	Borehole:	BH-01	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.00	0.00	0.00	100.00
	20	0.850	0.00	0.00	0.00	100.00
	40	0.425	0.03	0.03	0.03	99.97
	60	0.250	0.06	0.09	0.09	99.91
	100	0.150	0.39	0.48	0.48	99.52
	200	0.075	0.62	1.10	1.10	98.90
	Pan		98.90			



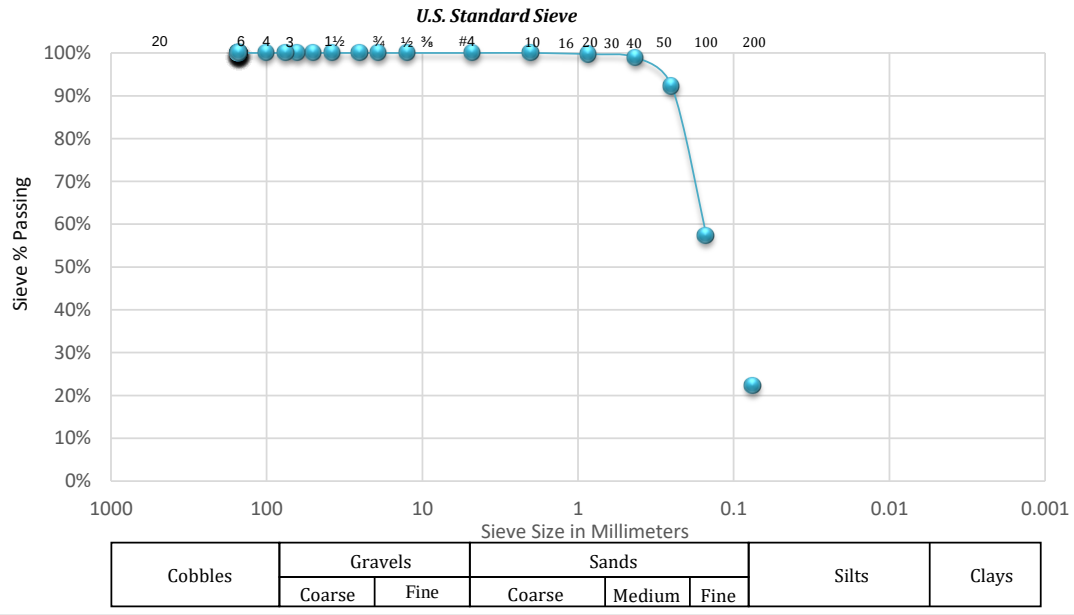
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*1.10 %*	*98.90 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	30.0	Borehole:	BH-01	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.00	0.00	0.00	100.00
	20	0.850	0.30	0.30	0.30	99.70
	40	0.425	0.78	1.08	1.08	98.92
	60	0.250	6.71	7.79	7.79	92.21
	100	0.150	34.81	42.60	42.60	57.40
	200	0.075	35.13	77.73	77.73	22.27
	Pan		22.27			



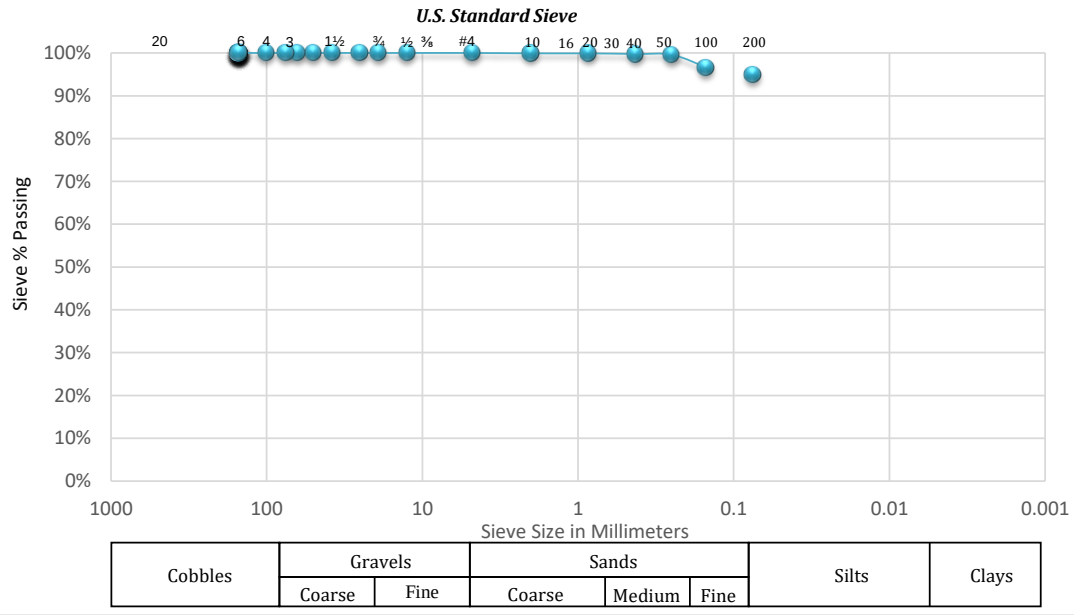
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*77.73 %*	*22.27 %*	-	-	*SM, Silty Sand*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	8.0	Borehole:	BH-02	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.10	0.10	0.10	99.90
	20	0.850	0.00	0.10	0.10	99.90
	40	0.425	0.15	0.25	0.25	99.75
	60	0.250	0.15	0.40	0.40	99.60
	100	0.150	2.98	3.38	3.38	96.62
	200	0.075	1.69	5.07	5.07	94.93
	Pan		94.93			



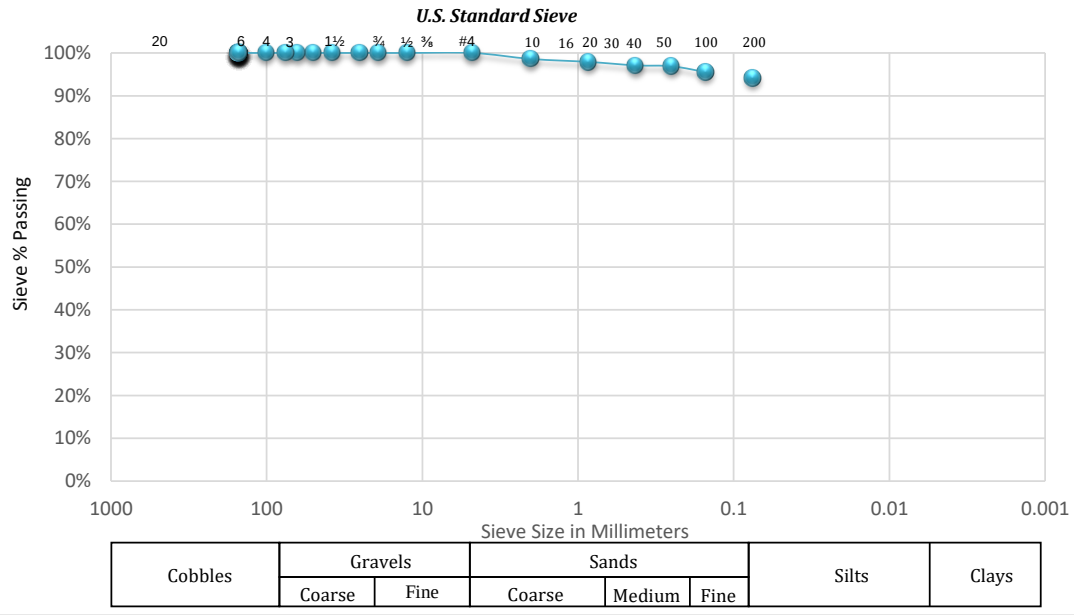
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*5.07 %*	*94.93 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	20.0	Borehole:	BH-02	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	1.40	1.40	1.40	98.60
	20	0.850	0.70	2.10	2.10	97.90
	40	0.425	0.80	2.90	2.90	97.10
	60	0.250	0.20	3.10	3.10	96.90
	100	0.150	1.42	4.52	4.52	95.48
	200	0.075	1.38	5.90	5.90	94.10
	Pan		94.10			



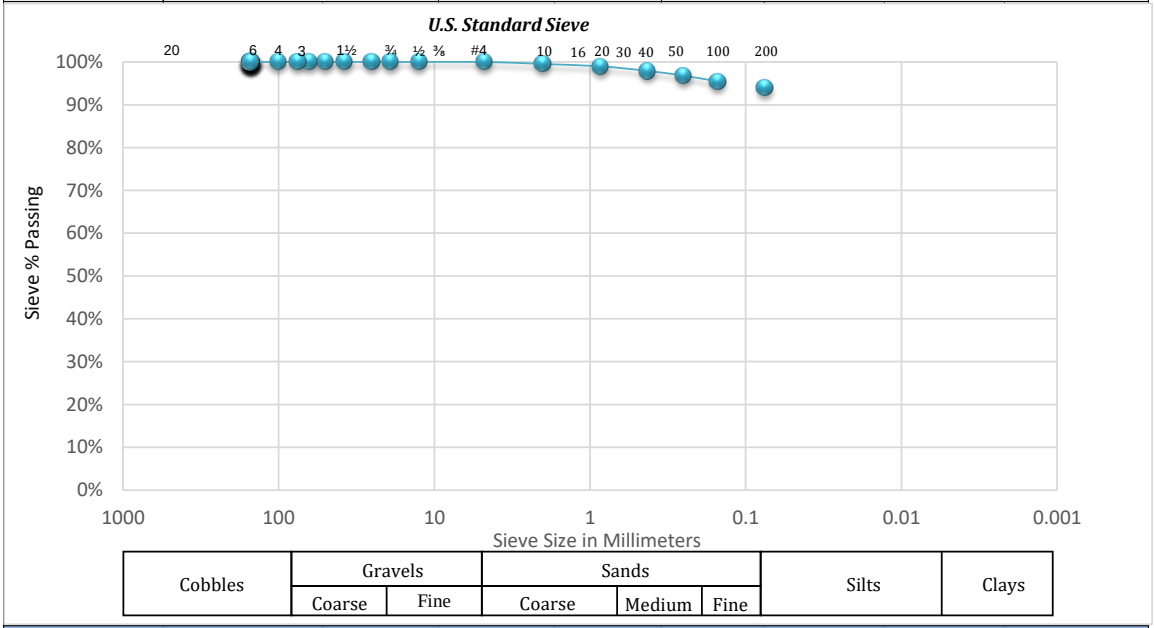
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*5.90 %*	*94.10 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	3.0	Borehole:	BH-03	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.48	0.48	0.48	99.52
	20	0.850	0.55	1.03	1.03	98.97
	40	0.425	1.07	2.10	2.10	97.90
	60	0.250	1.11	3.21	3.21	96.79
	100	0.150	1.34	4.55	4.55	95.45
	200	0.075	1.57	6.12	6.12	93.88
	Pan		93.88			



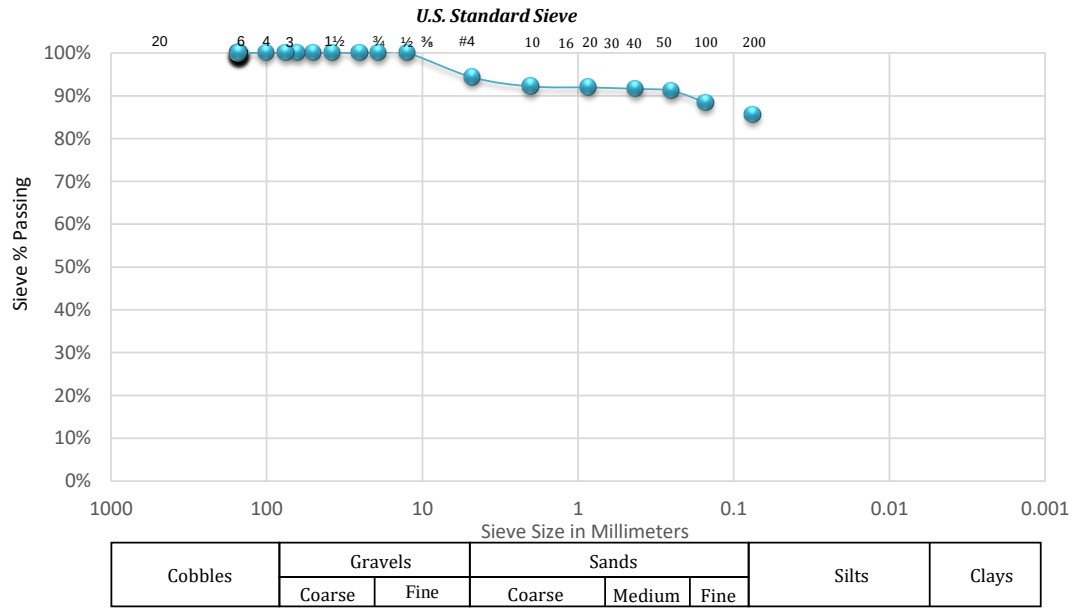
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*6.12 %*	*93.88 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	25.0	Borehole:	BH-03	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	5.71	5.71	5.71	94.29
	10	2.000	2.11	7.82	7.82	92.18
	20	0.850	0.24	8.06	8.06	91.94
	40	0.425	0.33	8.39	8.39	91.61
	60	0.250	0.46	8.85	8.85	91.15
	100	0.150	2.84	11.69	11.69	88.31
	200	0.075	2.68	14.37	14.37	85.63
	Pan		85.63			



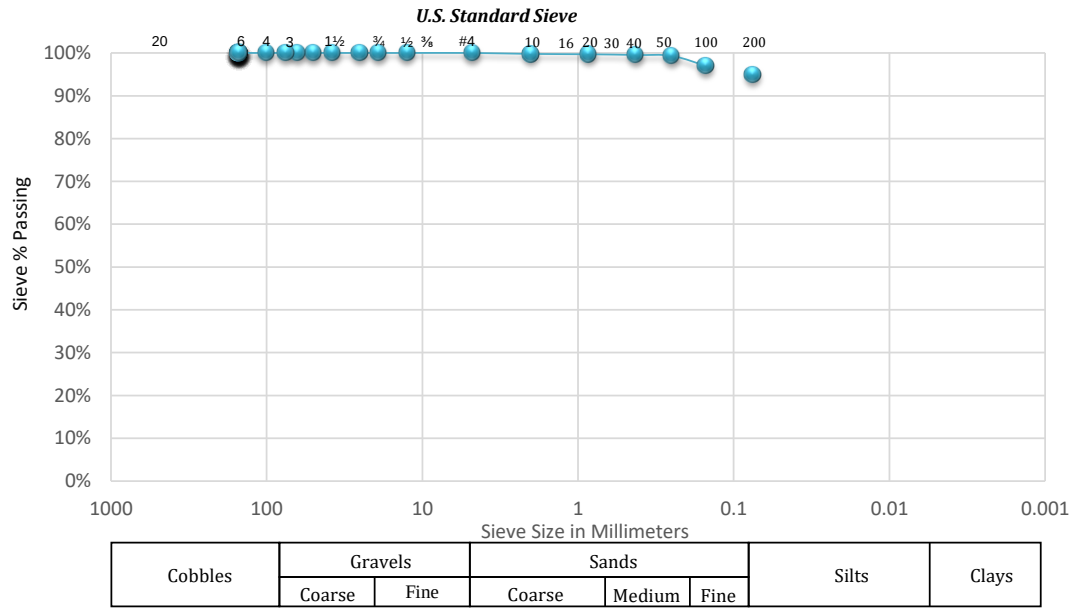
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
5.71 %	*8.66 %*	*85.63 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	12.0	Borehole:	BH-04	Date:	August 8, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.23	0.23	0.23	99.77
	20	0.850	0.08	0.31	0.31	99.69
	40	0.425	0.17	0.48	0.48	99.52
	60	0.250	0.19	0.67	0.67	99.33
	100	0.150	2.41	3.08	3.08	96.92
	200	0.075	1.95	5.03	5.03	94.97
	Pan		94.97			



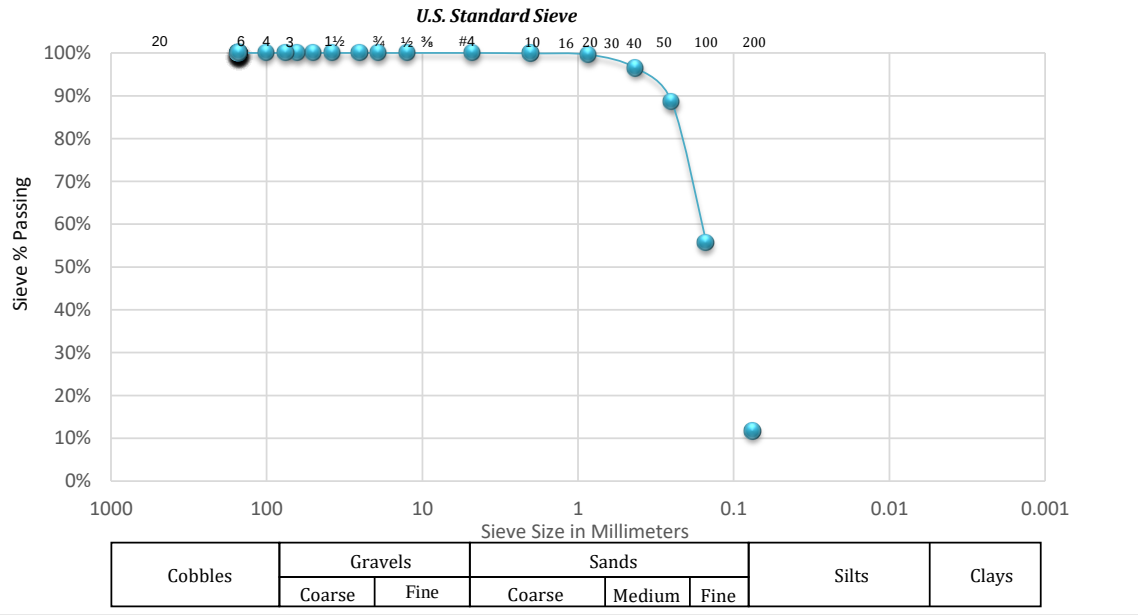
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*5.03 %*	*94.97 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,						
Location:	PARIS ROAD, SIALKOT.						
Depth (ft):	40.0	Borehole:	BH-04	Date:	August 9, 2023		

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.11	0.11	0.11	99.89
	20	0.850	0.29	0.40	0.40	99.60
	40	0.425	3.11	3.51	3.51	96.49
	60	0.250	7.91	11.42	11.42	88.58
	100	0.150	32.91	44.33	44.33	55.67
	200	0.075	44.07	88.40	88.40	11.60
	Pan		11.60			



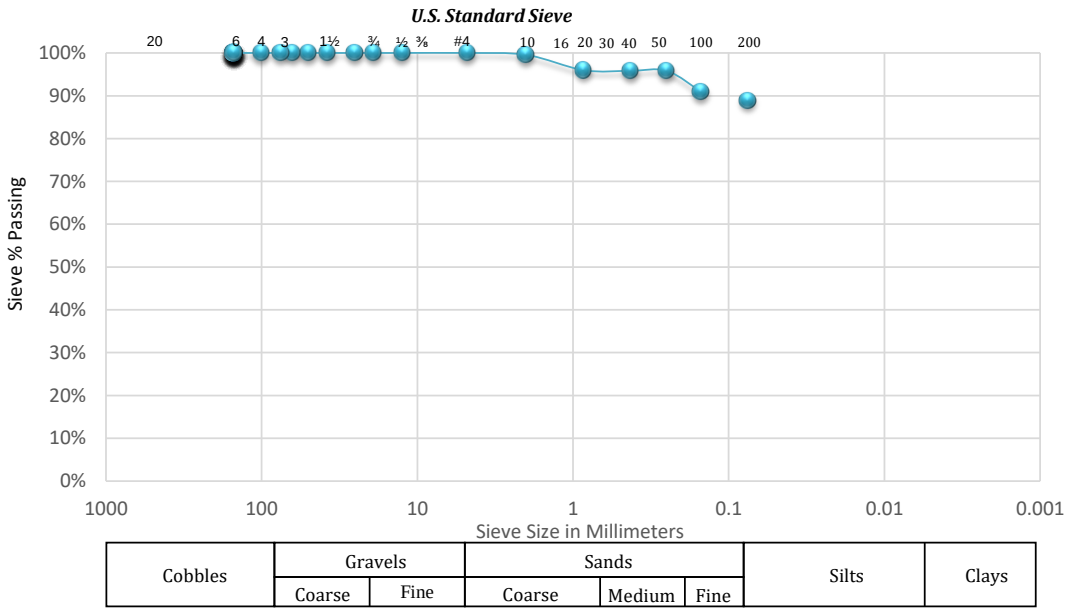
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*88.40 %*	*11.60 %*	-	-	*SP-SM, Sand with Silt*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	15.0	Borehole:	BH-05	Date:	August 9, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.44	0.44	0.44	99.56
	20	0.850	3.60	4.04	4.04	95.96
	40	0.425	0.13	4.17	4.17	95.83
	60	0.250	0.00	4.17	4.17	95.83
	100	0.150	4.96	9.13	9.13	90.87
	200	0.075	1.97	11.10	11.10	88.90
	Pan		88.90			



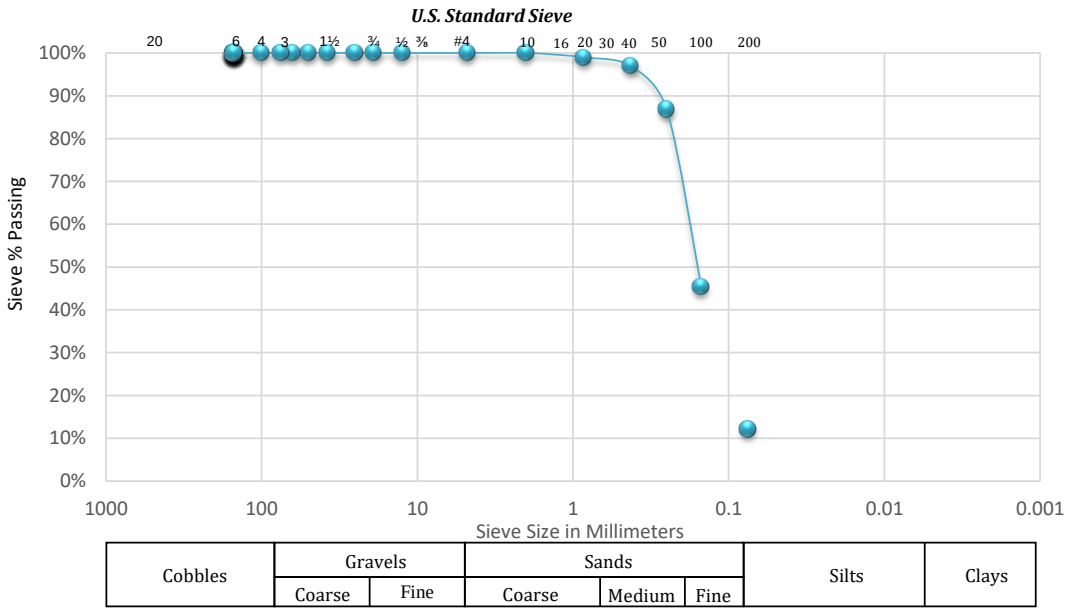
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*11.10 %*	*88.90 %*	-	-	*CL, Lean Clay*

MS CONTRACTOR	SIEVE ANALYSIS	*ASTM D-421, D-422*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth (ft):	35.0	Borehole:	BH-05	Date:	August 9, 2023

Total Weight of Dry Sample		Gms	Total Weight of Dry Sample	100	Gms

Sieve Analysis Data Sheet	Sieve Sizes		Individual Retained Weight	Comulative Retain Weight gm	Cumulated	Sieve Passing
	US	mm	gms	gms	%	%
	4	4.750	0.00	0.00	0.00	100.00
	10	2.000	0.00	0.00	0.00	100.00
	20	0.850	1.02	1.02	1.02	98.98
	40	0.425	2.06	3.08	3.08	96.92
	60	0.250	10.12	13.20	13.20	86.80
	100	0.150	41.50	54.70	54.70	45.30
	200	0.075	33.20	87.90	87.90	12.10
	Pan		12.10			



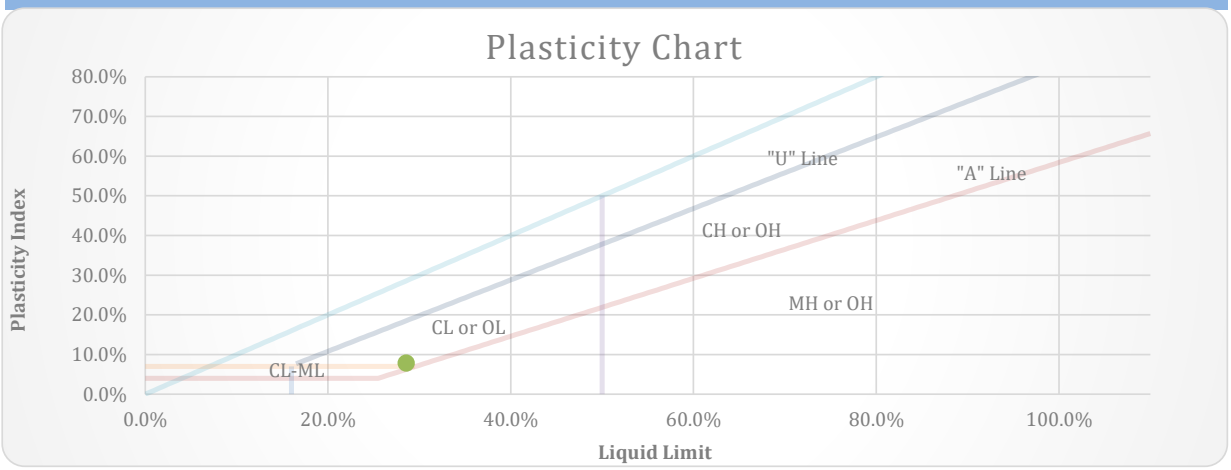
Gravel	Sand	Fines	Silt	Clay	Unified Soils Classification System
%	%	%	%	%	ASTM D-2487,
0.00 %	*87.90 %*	*12.10 %*	-	-	*SM, Silty Sand*

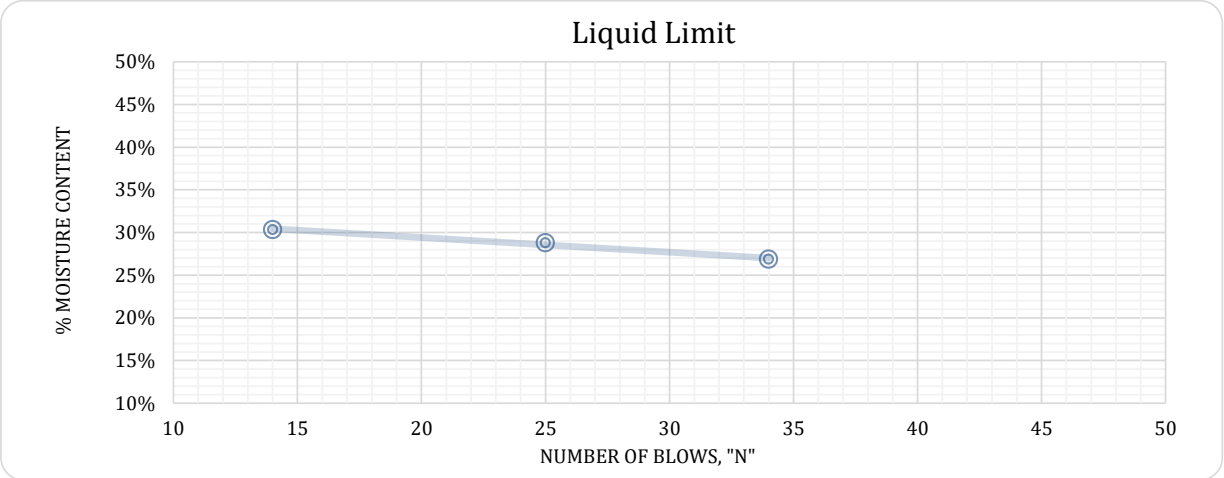
MS CONTRACTOR	ATTERBERG LIMITS	*ASTM D-4318*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth [ft]:	5.0	Borehole:	BH-01	Date:	August 8, 2023

	Liquid Limit Determination				Plastic Limit Determination		
Test No.	#1	#2	#3		#1		
Weight of Wet Soils + Pan:	**22.47**	**17.81**	**23.80**	`	**14.22**		
Weight of Dry Soils + Pan:	**20.15**	**16.03**	**21.63**		**13.65**		
Weight of Pan:	**12.50**	**9.85**	**13.55**		**10.90**		
Weight of Dry Soils:	**7.65**	**6.18**	**8.08**		**2.75**		
Weight of Moisture:	**2.32**	**1.78**	**2.17**		**0.57**		
% Moisture:	**30.3 %**	**28.8 %**	**26.9 %**		**20.7 %**		
No. of Blows:	**14**	**25**	**34**				

Liquid Limit @ 25 Blows	Plastic Limit	Plasticity Index	Unified Soils Classification System
L_L	P_L	I_P	ASTM D-2487,
28.5%	***20.7%***	***7.8%***	***CL, Lean Clay***



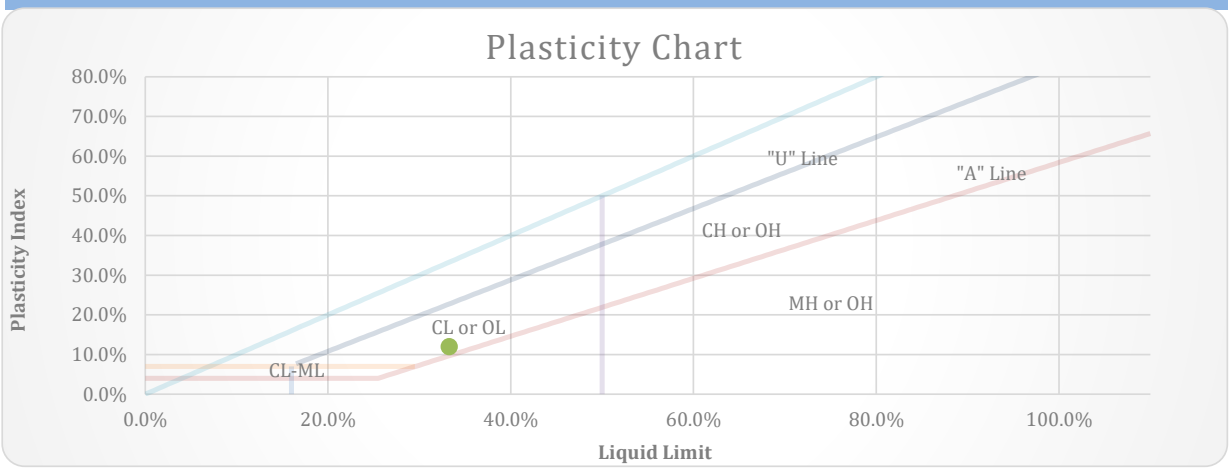


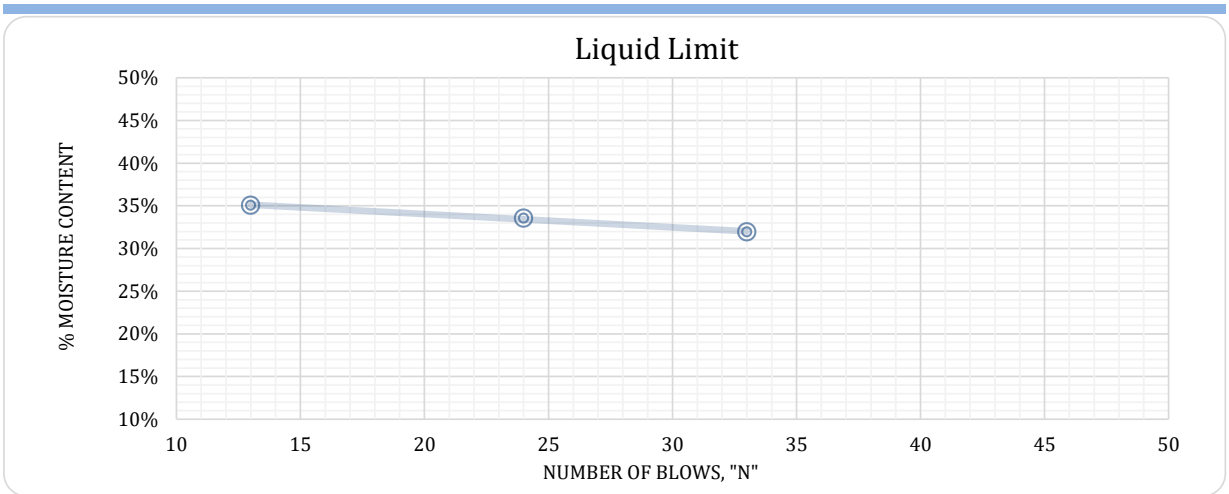
MS CONTRACTOR	ATTERBERG LIMITS	*ASTM D-4318*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth [ft]:	8.0	Borehole:	BH-02	Date:	August 8, 2023

	Liquid Limit Determination				Plastic Limit Determination		
Test No.	#1	#2	#3		#1		
Weight of Wet Soils + Pan:	**18.76**	**22.16**	**23.24**	`	**12.74**		
Weight of Dry Soils + Pan:	**16.81**	**19.86**	**20.70**		**12.28**		
Weight of Pan:	**11.25**	**13.00**	**12.75**		**10.09**		
Weight of Dry Soils:	**5.56**	**6.86**	**7.95**		**2.19**		
Weight of Moisture:	**1.95**	**2.30**	**2.54**		**0.47**		
% Moisture:	**35.1 %**	**33.5 %**	**32.0 %**		**21.3 %**		
No. of Blows:	**13**	**24**	**33**				

Liquid Limit @ 25 Blows	Plastic Limit	Plasticity Index	Unified Soils Classification System
L_L	P_L	I_P	ASTM D-2487,
33.3%	***21.3%***	***12.0%***	***CL, Lean Clay***



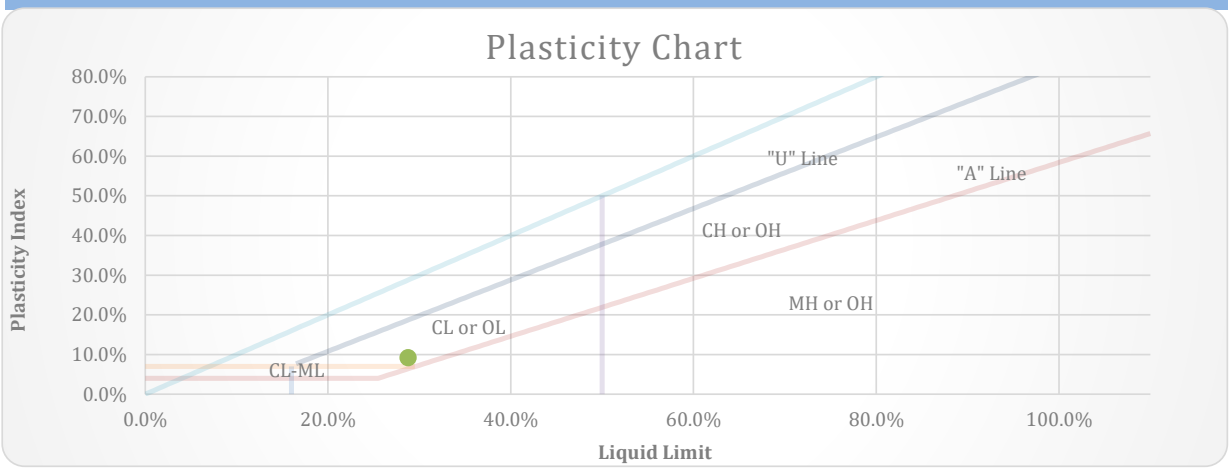


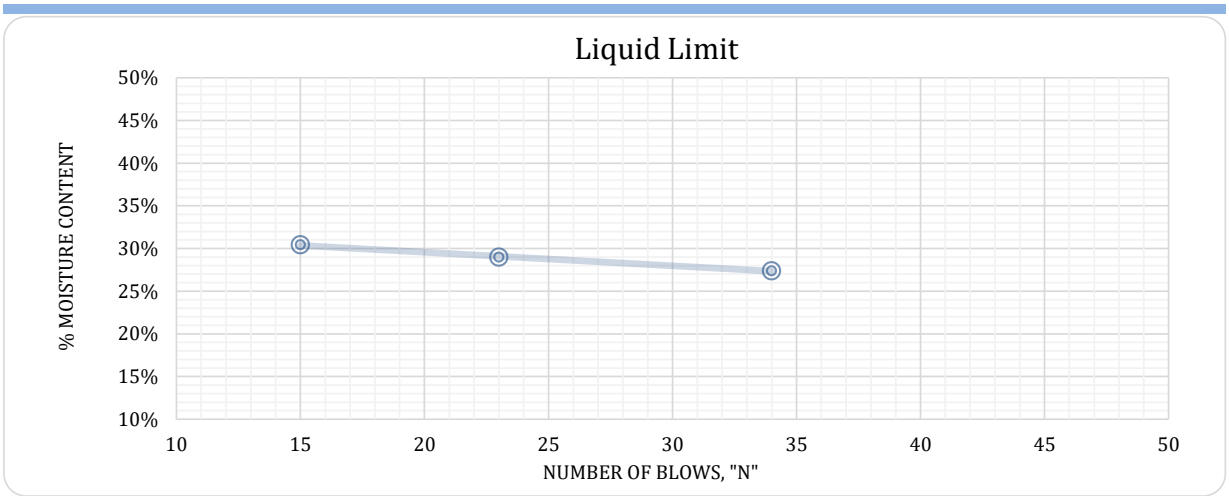
MS CONTRACTOR	ATTERBERG LIMITS	*ASTM D-4318*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth [ft]:	3.0	Borehole:	BH-03	Date:	August 8, 2023

	Liquid Limit Determination				Plastic Limit Determination		
Test No.	#1	#2	#3		#1		
Weight of Wet Soils + Pan:	**19.69**	**19.96**	**24.91**	`	**12.57**		
Weight of Dry Soils + Pan:	**17.64**	**18.25**	**22.52**		**12.08**		
Weight of Pan:	**10.90**	**12.35**	**13.79**		**9.55**		
Weight of Dry Soils:	**6.74**	**5.90**	**8.73**		**2.53**		
Weight of Moisture:	**2.05**	**1.71**	**2.39**		**0.50**		
% Moisture:	**30.4 %**	**29.0 %**	**27.4 %**		**19.6 %**		
No. of Blows:	**15**	**23**	**34**				

Liquid Limit @ 25 Blows	Plastic Limit	Plasticity Index	Unified Soils Classification System
L_L	P_L	I_P	ASTM D-2487,
28.8%	***19.6%***	***9.2%***	***CL, Lean Clay***



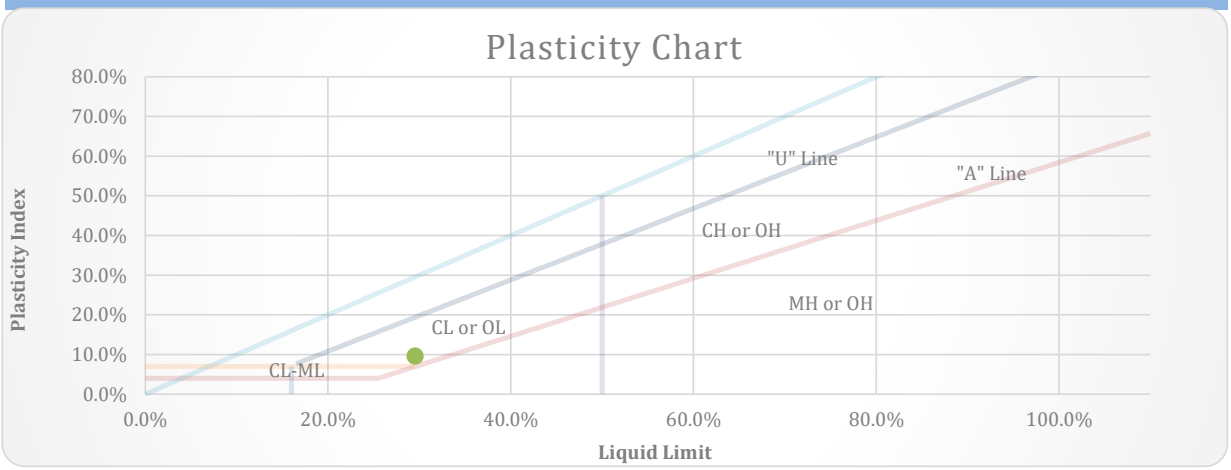


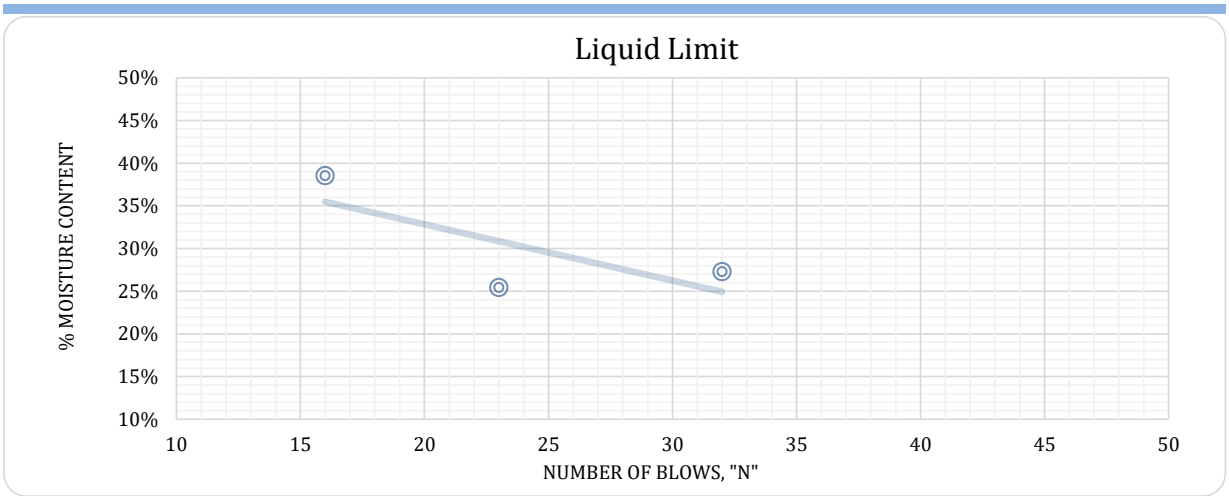
MS CONTRACTOR	**ATTERBERG LIMITS**	***ASTM D-4318***

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth [ft]:	12.0	Borehole:	BH-04	Date:	August 9, 2023

	Liquid Limit Determination				Plastic Limit Determination		
Test No.	#1	#2	#3		#1		
Weight of Wet Soils + Pan:	**17.63**	**19.80**	**22.32**	`	**13.35**		
Weight of Dry Soils + Pan:	**15.23**	**18.02**	**20.56**		**12.81**		
Weight of Pan:	**9.00**	**11.02**	**14.11**		**10.10**		
Weight of Dry Soils:	**6.23**	**7.00**	**6.45**		**2.71**		
Weight of Moisture:	**2.40**	**1.78**	**1.76**		**0.54**		
% Moisture:	**38.5 %**	**25.4 %**	**27.3 %**		**19.9 %**		
No. of Blows:	**16**	**23**	**32**				

Liquid Limit @ 25 Blows	**Plastic Limit**	**Plasticity Index**	**Unified Soils Classification System**
L_L	P_L	I_P	**ASTM D-2487,**
29.5%	***19.9%***	***9.6%***	***CL, Lean Clay***



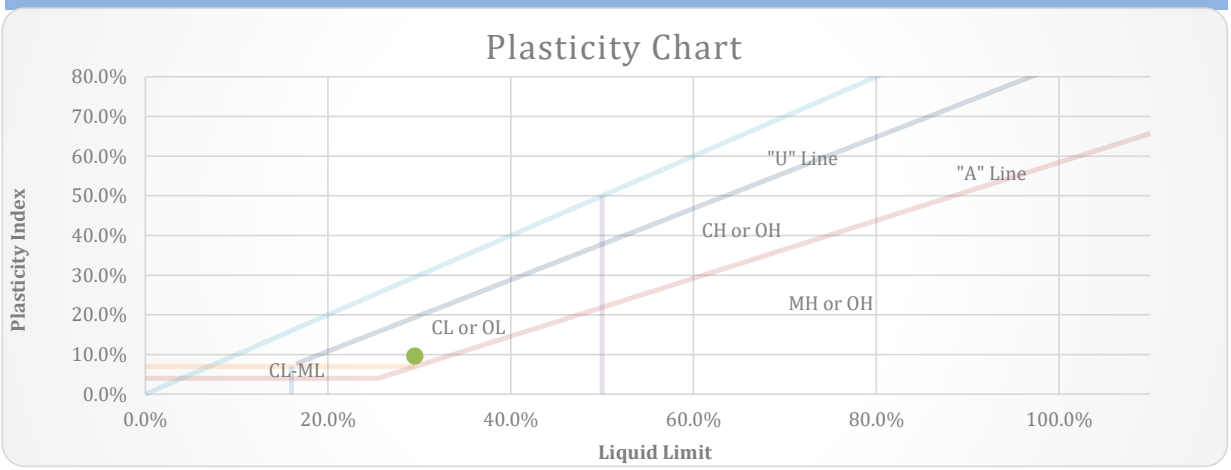


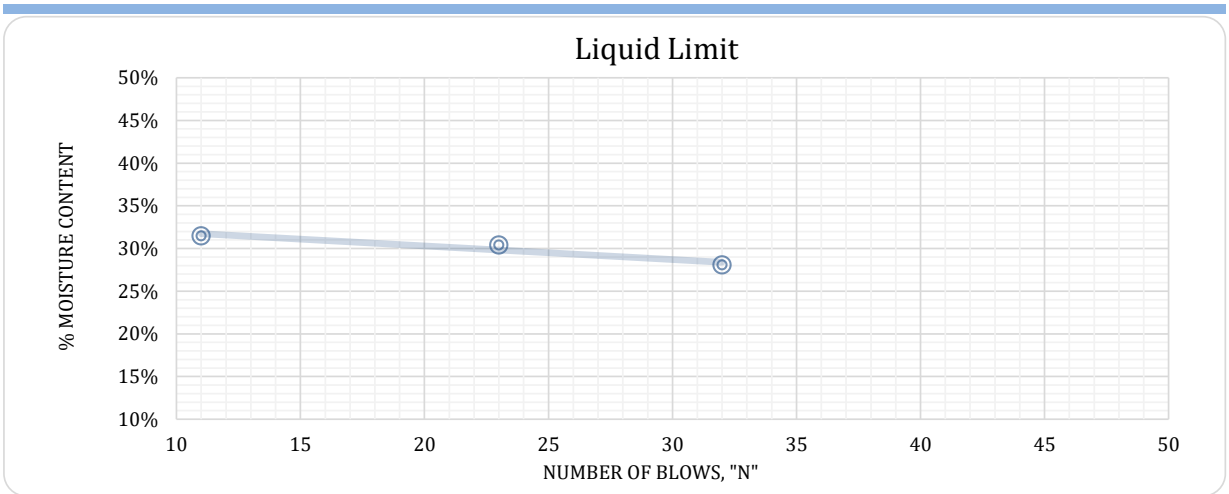
MS CONTRACTOR	ATTERBERG LIMITS	*ASTM D-4318*

Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,				
Location:	PARIS ROAD, SIALKOT.				
Depth [ft]:	15.0	Borehole:	BH-05	Date:	August 9, 2023

	Liquid Limit Determination				Plastic Limit Determination		
Test No.	#1	#2	#3		#1		
Weight of Wet Soils + Pan:	**17.98**	**20.31**	**23.92**	`	**13.35**		
Weight of Dry Soils + Pan:	**15.83**	**18.16**	**21.99**		**12.81**		
Weight of Pan:	**9.00**	**11.09**	**15.11**		**10.10**		
Weight of Dry Soils:	**6.83**	**7.07**	**6.88**		**2.71**		
Weight of Moisture:	**2.15**	**2.15**	**1.93**		**0.54**		
% Moisture:	**31.5 %**	**30.4 %**	**28.1 %**		**19.9 %**		
No. of Blows:	**11**	**23**	**32**				

Liquid Limit @ 25 Blows	Plastic Limit	Plasticity Index	Unified Soils Classification System
L_L	P_L	I_P	ASTM D-2487,
29.5%	***19.9%***	***9.6%***	***CL, Lean Clay***





MS CONTRACTOR	**Moisture Content of Soil {ASTM D 2216}**
Project:	GEOTECHNICAL INVESTIGATION OF GHANI TOWER,
Location:	PARIS ROAD, SIALKOT.
Test Date :	August 7, 2023

Moisture Content Calculation

Bore Hole No.:	BH-01	BH-01	BH-01	BH-02	BH-02
Depth (ft)	5.0	20.0	30.0	8.0	20.0
Weight of Wet Soil + Container (Gm)	52.45	51.50	57.80	79.10	50.98
Weight of Dry Soil + Container (Gm)	46.89	44.68	50.97	69.15	45.11
Weight of Container (Gm)	10.97	10.46	13.50	12.30	13.09
Weight of Water (Gm)	5.56	6.82	6.83	9.95	5.87
Weight of Dry Soil (Gm)	35.92	34.22	37.47	56.85	32.02
Moisture Content (%)	15.48	19.93	18.23	17.50	18.33

Bore Hole No.:	BH-02	BH-03	BH-03	BH-03	BH-04
Depth (ft)	35.0	3.0	15.0	25.0	5.0
Weight of Wet Soil + Container (Gm)	82.45	82.88	96.97	90.92	95.30
Weight of Dry Soil + Container (Gm)	70.76	69.22	84.65	80.69	80.56
Weight of Container (Gm)	12.80	12.60	12.50	13.06	14.60
Weight of Water (Gm)	11.69	13.66	12.32	10.23	14.74
Weight of Dry Soil (Gm)	57.96	56.62	72.15	67.63	65.96
Moisture Content (%)	20.17	24.13	17.08	15.13	22.35

Bore Hole No.:	BH-04	BH-04	BH-05	BH-05	BH-05
Depth (ft)	12.0	40.0	8.0	15.0	35.0
Weight of Wet Soil + Container (Gm)	91.99	90.64	82.86	79.38	82.43
Weight of Dry Soil + Container (Gm)	80.45	77.94	70.94	68.49	72.69
Weight of Container (Gm)	13.30	10.55	13.09	13.63	11.60
Weight of Water (Gm)	11.54	12.70	11.92	10.89	9.74
Weight of Dry Soil (Gm)	67.15	67.39	57.85	54.86	61.09
Moisture Content (%)	17.19	18.85	20.61	19.85	15.94

APPENDIX "F"

SITE PHOTOGRAPHS

BH-01	
	
A View of Performing SPT	A View of Performing SPT
	
SPT Sample	SPT Sample
	
SPT Sample	SPT Sample
	
SPT Sample	SPT Sample

BH-02

A View of Performing SPT

A View of Performing SPT

A View of Performing SPT

SPT Sample

SPT Sample

SPT Sample

SPT Sample

SPT Sample

BH-03

A View of Performing SPT

A View of Performing SPT

A View of Performing SPT

A View of during drilling activity

SPT Sample

SPT Sample

SPT Sample

SPT Sample

BH-04

	
A View of Performing SPT	A View of Performing SPT
	
SPT Sample	SPT Sample
	
SPT Sample	SPT Sample
	
SPT Sample	SPT Sample

BH-05

A View of Performing SPT

A View of Performing SPT

A View of Performing SPT

SPT Sample

SPT Sample

SPT Sample

SPT Sample

SPT Sample

MS CONTRACTOR

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