



**COMMUNICATION AND WORKS DEPARTMENT
GOVERNMENT OF THE PUNJAB**

TRANSACTION ADVISORY SERVICES

FOR

DUALIZATION OF FAISALABAD - CHINIOT - SARGODHA ROAD

(LENGTH = 67 KM)

SOIL INVESTIGATION REPORT

PUBLIC PRIVATE PARTNERSHIP MODALITY

DECEMBER 2020

JOINT VENTURE (JV):



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.



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AXIS LAW

C & W DEPARTMENT, PUNJAB

Dualization of Faisalabad ~Chiniot ~ Sargodha Road

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1. INTRODUCTION

1.1 GENERAL

The Punjab Communication & works Department decided for dualization of Faisalabad ~ Chiniot ~ Sargodha Road.

Geotechnical investigations were planned and executed for 66.6 km long Road Project. The investigations consist of studies of existing condition of the road, borrow and construction material studies. The sub-surface investigations were carried out through test pits. The field studies were followed by laboratory testing, evaluation and interpretation of test data for recommendation of design and construction of the Road Project.

All the field investigations were carried out under full-time supervision of Chief Material Specialist of NESPAK. The material samples recovered during field investigations were labeled, sealed and sent to the laboratory for testing. The bulk of laboratory testing was carried out in NESPAK authorized laboratory including some testing in NESPAK project Laboratory.

1.2 OBJECTIVES OF INVESTIGATIONS

- To delineate existing condition of road this includes testing of WBM, Sub-base and Sub-grade layers.
- To check the properties of different materials used in pavement and embankment layers.
- To identify source of suitable borrow and construction materials for construction of embankment, pavement and structures of this Project.

1.3 SCOPE OF WORK

A geotechnical investigation programme was prepared to fulfill the above mentioned objectives. The following scope of work was envisaged for this project.

- Excavation of test pits on existing road to check the in-situ thickness and compaction characteristics of different pavement and embankment layers.
- Collection of disturbed soil, sub-base and WBM samples from test pits.
- Laboratory testing of samples for classification, strength and chemical characteristics.
- Selection of borrow areas for construction of embankment.
- To check moisture content of soil up to 1.5 meters depth from ground elevation at intervals of 0.3 meters.
- Interpretation and evaluation of data for recommendations for design and construction of road project and use of appropriate construction materials for embankment, road pavement and structures.

2. INVESTIGATION ALONG ROAD ALIGNMENT

2.1 FIELD STUDIES

The existing road alignment passes mostly through agricultural lands of relatively flat topography. The general height of the embankment is more than 1.5 meters except for approaches of bridges where embankment height is more.

To evaluate the conditions of embankment and pavement on the existing road, **six** (06) test pits were excavated. The test pits were generally excavated at an interval of 10 km. on existing road.

Six (06) pits up to a depth of 1.5 meters were also excavated in proposed borrow areas to check the suitability for its use in embankment layers.

2.2 EXCAVATION OF TEST PITS

2.2.1 Field Testing

- In situ compaction tests were carried out on all layers i.e. from Water Bound Macadam (WBM) to Sub-grade layer.
- Samples for determination of moisture content were collected.
- Bulk samples from WBM, Sub-base and Sub-grade layers were collected for laboratory testing.
- Moisture samples were also collected from six (06) locations at 0.3 meter interval up to a depth of 1.5 meters.

2.2.2 Field Test Procedure

For detailed visual inspection of subsurface condition, a total of six (06) pits were excavated along the existing road with conventional digging tools. The procedure for testing and sampling was as follows:

- Removal of Asphalt layer/Triple Surface Treatment (TST).
- After cleaning the surface Field Density Test (FDT) was performed on WBM layer.
- Excavation of WBM layer up to sub-base layer.
- Collection of WBM composite sample for further testing.
- Preparation of surface for FDT on sub-base layer.
- Removal of Sub-base layer up to sub-grade level.
- Collection of composite sample from sub-base.
- Preparation of surface for FDT on sub-grade.
- Collection of composite sample from sub-grade layer.
- Packing and labelling of samples in proper bags for transportation to the laboratory.

2.3 BORROW AREA SAMPLING

Six (06) composite bulk samples (50 to 90kg) was collected from proposed borrow areas. Bulk samples were generally collected from a depth of range of 0.3 to 1.5 meter. The bulk samples were properly labeled and transported to the laboratory for the prescribed tests.

3. LABORATORY TESTING

3.1 GENERAL

Samples collected from the test pits were subjected to some or all of the following tests:

- Sieve Analysis
- Natural Moisture Content
- Atterberg Limits
- Maximum Dry Density (MDD)
- California Bearing Ratio (CBR)
- Chemical Tests on Soil

Laboratory testing was carried out in NESPAK authorized laboratories.

3.2 TEST RESULTS

Summary of test results is given in Table 1 to 4, in **Annexure 'A'** and briefly described below:

3.3 WATER BOUND MACADAM

Seven (07) in-situ compaction tests were performed on WBM layer on existing road at six (06) locations. Three (03) out of seven (07) tests were less than 100%. The moisture content varies from 3.0 to 4.4%.

The thickness of WBM was generally 8 inches except two locations where thickness of WBM layer was 12 inches or more.

3.3.1 Properties of WBM Material.

Maximum aggregate size was generally 75mm. Passing at Sieve No. 4 ranges from 16 % to 35% and that at Sieve No. 200 in the range 2% to 9%.

The above mentioned results are summarized in Table-1 of Annexure "A".

3.4 SUB-BASE

Seven (07) in-situ compaction tests were performed on subbase layer on existing road at six (06) locations. The in situ compaction ranges from 92.8 to >100.9 %. In-situ compaction at four (04) out of seven (07) tests were less than 100% and were in the range of 92.8 to 99.3%. The moisture content varies from 4.1 to 5.8 %.

The thickness of sub-base varies from 6.0 to 12.0 inches.

3.4.1 Properties of Sub-base Material

Maximum aggregate size is generally > 50 mm. Passing at sieve No. 4 ranges from 17% to 47% and that at Sieve No. 200 in the range 12% to 23% with exception at one location where passing at sieve No. 200 is only 3%.

Maximum Dry Density (MDD) carried out on three (03) samples is in the range of 2.252 to 2.284 gm/cc with optimum moisture content between 4.4% to 5.1%.

California Bearing Ratio (CBR), test was carried out on three (03) samples as per AASHTO T-193, under a surcharge load of 4.54 kg (10 lb). The values are in the range of 51.2% to 58.1%.

The above mentioned results are summarized in Table-2 of Annexure "A".

3.5 SUB-GRADE

Six (06) in-situ compaction tests were performed on Sub-grade. The in-situ compaction ranges from 91.2 to 96% with exception at one location where in-situ compaction is only 86.5%. In-situ moisture content ranges from 7.2% to 11.2%.

3.5.1 Properties of Sub-grade Material

A total of six (06) subgrade samples were tested to study the properties for material. Passing at sieve # 200 ranges from 19 % to 76 %. Five (05) soil samples are classified as A-4 and one as A-1-b as per AASHTO Soil Classification system.

Laboratory Compaction tests were performed on all six (06) soil samples in accordance with AASHTO T-180. Maximum Dry Density (MDD) value ranges from 1.784 to 2.00 gm/cc with optimum moisture content (OMC) ranging from 9.8 to 12.4 % for A-4 soils and for A-1-b MDD value is 2.244 with OMC at 6.3%..

California Bearing Ratio (CBR), test was carried out on six (6) samples as per AASHTO T-193, under a surcharge load of 4.54 kg (10 lb). The CBR samples were prepared at optimum moisture content determined earlier from modified AASHTO compaction tests. The specimens were soaked for 4 days before testing. Density versus CBR graph developed for the soils indicates that the soaked CBR value at 95 % of the MDD (AASHTO T-180) under a surcharge load of 4.54 kg ranges from 7.5% to 17.1% for A-4 soils and for A-1-b soil the value of CBR is 26.2%.

The above mentioned results are summarized in Table-3 of Annexure "A".

3.6 MOISTURE CONTENT ALONG THE ALIGNMENT OF THE ROAD

Thirty (30) soil samples were collected from six (06) locations up to depth of 1.5 meters at an interval of 0.3 meter depth. Moisture samples were collected in the month of October. Despite the dry season high moisture was encountered at few locations. The maximum moisture ranges from 9.3% to 23%.

The portions of project road where high moisture content is encountered along the alignment of the road needs to be raised from 0.5 meters to 1.0 meter in average to avoid soaking of subgrade/embankment layers.

At few locations standing water was also observed at the toe of embankment. Special treatment for construction of embankment will be required in area of high moisture content and standing water if encountered during construction period.

3.7 BORROW AREAS

3.7.1 PROPERTIES OF BORROW MATERIAL

A total of six (06) Samples were tested to study the properties for borrow material. Passing at sieve # 200 ranges from 40 to 93% and Plasticity index ranges from non-plastic to 10. All soil samples fall in Group A-4 of ASSHTO Classification.

Laboratory Compaction tests were performed on all six (06) soil samples in accordance with AASHTO T-180. Maximum Dry Density (MDD) value for A-2-4 and A-4 soil ranges from 1.821 to 1.942gm/cc with optimum moisture content ranging from 9.9 to 12.8 %.

California Bearing Ratio (CBR), test was carried out on all six (06) samples as per AASHTO T-193, under a surcharge load of 4.54 kg (10 lb). The CBR samples were prepared at optimum moisture content determined earlier from modified AASHTO compaction tests. The specimens were soaked for 4 days before testing. Density versus CBR graph developed for the soils indicates that the soaked CBR value at 95% of the MDD (AASHTO T-180) under a surcharge load of 4.54 kg ranges from 10.2 to 16.3% except at one location CBR value is 6.5%.

The above mentioned results are summarized in Table '4' Annexure A

3.7.2 CHEMICAL TESTS

The chemical tests on sub-grade soil indicate that:

- Organic matter ranges from 0.352 to 0.510%.

The above test result indicates that the of properties soil encountered are generally well within limit.

The above mentioned results are summarized in Table '4' Annexure A.

4 AGGREGATE SOURCES.

4.1 GENERAL

In order to meet the aggregate requirements of the Project, the earlier studies of the nearest sources of rock quarries were reviewed.

4.1.1 Sargodha Quarries

a) Location and Geology

Sargodha rock quarries are located about 30 km short of Sargodha on the left side of Faisalabad – Sargodha road. Several aggregate manufacturers are working on a number of quarries located near Chak No.111, 113, 116, 120, 123 and 126 etc.

The Precambrian basement complex near Sargodha is spread over an area of about 200 sq. km between Chiniot and Sargodha. These hills are called Kirana hills. The rocks are exposed as isolated ridges in an otherwise level plain, filled by alluvium. The rock outcrops start at about 66 km and continue up to 77 km on Faisalabad – Sargodha road.

The rocks in this area comprise Meta sediments, represented by quartzite, phyllite and slate. The volcanic rocks include rhyolite, volcanic tuff and brecciate volcanic matter. The basic igneous rocks are sill like igneous bodies of variable thickness and include meta-dolerite or dolerite. The meta-dolerite or dolerite is proposed for asphalt and cement concrete. The meta-dolerite is grayish black to black on broken or fresh surfaces and green to dark green on the weathered surface. The thickness of the meta-dolerite in this quarry varies from 20 to about 200 meters.

b) Evaluation of Source

By crushing meta-dolerite, quartzite and rhyolite, aggregates of desired sizes can be produced without producing a significant amount of flat and elongated particles. However, aggregates produced by crushing slate contain a considerable amount of flat and elongated particles. The inclusion of slate may therefore be avoided during blasting and crushing.

The abrasion losses in Los Angeles tests for meta-dolerite are from 5 to 13 percent and between 13 and 18 percent for quartzite.

The maximum loss of meta-dolerite in sodium sulphate soundness test is 0.7 percent. The loss for quartzite is 0.12 percent.

The average values of specific gravity on SSD basis of the meta-dolerite and quartzite are as 2.85 to 2.75 respectively, against maximum water absorption of 0.45 to 0.8 percent.

The clay lumps and friable particles in meta-dolerite and quartzite are reported as 0.14 percent and 0.16 percent respectively.

Coating and stripping of Bitumen – Aggregate mixture tests (standard test) by using bitumen of 60-70 penetration grade have indicated more than 95% bitumen adhesion of meta-dolerite. These aggregates have been extensively used at some other major projects and are performing very well.

The petrographic studies in terms of Alkali – Silica Reaction (ASR) carried out on various rock types obtained from these sources have indicated that only meta-dolerite may safely be used with cement of high alkalis (greater than 0.60 as Na_2O). Slate, quartzite and rhyolite are reactive and cannot safely be used with cement of high alkalis.

4.1.2 Sakhi Sarwar Quarries.

Sakhi Sarwar quarries are located about 140 km from the project area. Several aggregate manufacturers are working on a number of quarries located in the bed of a Nullah Deposit.

The aggregates are obtained by crushing pit-run gravels. The gravels found in the area are of igneous, metamorphic and sedimentary origin, so the properties are not uniform. Studies have indicated the presence of alkali-aggregate reaction with ordinary Portland cement so the coarse and fine aggregates from this source cannot be used in concrete. Furthermore due to stripping of bitumen these aggregates are not suitable for asphalt mix.

These aggregates however can be used in sub-base and aggregate base course provided it qualifies the criteria of crushed faces as per Project Specifications.

4.2 FINE AGGREGATE SOURCES

4.2.1 General

Good quality natural fine aggregate or sand of acceptable gradation is not available along the entire route of the project. The nearest source of sand is the Chenab River,

which is accessible from Gujrat. But the sand from this source is devoid of coarse sand sizes and requires blending of these sizes. The other source of sand of good properties and grading is Lawrencepur Sand near Tarbela Dam project. Lawrencepur Sand or more precisely Qibla Bandi or Malik Mala sand requires little or no processing. In this section both these sources are discussed.

4.2.2 Lawrencepur Sand

Lawrencepur or more precisely Qibla Bandi Malik Mala sand deposits are located about 70 km north-west of Islamabad near Lawrencepur between the Haro River and the Indus River. The sand at Lawrencepur is deposited in an area of about 60 square kilometers and these deposits on an average are more than 50 meters thick. Sand is being excavated at several locations in this area for many major and minor projects in the country.

Sand deposits of this area are heterogeneous and either shows a general absence of coarse sand sizes, or alternatively well-graded sand but containing about 5 to 10 percent gravel.

The fineness modulus (FM) of these deposits is generally from 1.80 to 3.60 as against the standard specified requirements between 2.30 and 3.10. The maximum loss in sodium sulphate soundness is reported to be not more than 4.50 percent as against maximum allowable limit of 12 percent. Organic impurities, clay lumps and friable particles are well within limits.

In petrographic studies this source is also indicated safe in terms of Alkali – Silica Reaction (ARS). It may safely be used with the recommended cements containing high alkalis.

4.3 CEMENT SOURCES

Both ordinary Portland (OPC) and Sulphate Resisting Cement (SRC) would be required for the construction of concrete structures of this project.

The nearest cement factories from where the Ordinary Portland cement can be procured are Bestway Cement and Maple Leaf Cement Factory located near Kalar Kahar. The daily capacity of OPC from these factories would be enough to cope with the requirement of the project. In addition Maple Leaf Cement factory can also produce low alkali cement on demand. Physical and chemical test results of Maple Leaf Cement and Bestway Cement meets the standard specified requirements.

In addition Askari Cement, Cherat Cement and Fecto Cement etc. can also be used for the project.

4.4 WATER

Water for mixing and curing of concrete needs to be reasonably clean and free from injurious proportions of salts, oil, acid, organic matter or other deleterious substances.

The result of analysis of water, collected at four (04) different locations along the alignment of the road indicates that:

- Samples of water collected and tested from kilometer 0+000 ~ 60+000 have the concentration of Chlorides, Sulfates (SO₃) and Total Dissolved Salts (TDS) within safe limits and can be safely used in concrete works.

Results attached as Annexure “D”.

5. DISCUSSIONS/RECOMMENDATIONS

The test results of existing road reveals the following:

- Compaction of WBM and Sub-base is generally okay between km. 20+000 to end of the project and is between 99 and 100% of MDD value.
- The compaction of sub-grade checked at six (06) locations reveals that compaction is less than 95% between 0+000 ~ 30+000 but is within specified limit of 95% between 30+000 ~ 60+000.
- Moisture content taken along the alignment of the project road on left and right side is higher between 0+000 ~ 20+000 and between 50+000 ~ 60+000.

Km. 0+000 ~ 30+000

Please note that despite the high embankment of the road, it is in deteriorating condition and settlement, cracks pot holes etc. are observed from 0+000 to 30+000 (Faisalabad ~ Chiniot section). The high moisture along the alignment between 0+000 ~ 20+000 is an indication that high moisture below embankment cannot be ruled out.

Keeping in view the present deteriorating condition of the road from 0+000 ~ 30+000 due low compaction of WBM, sub-base and subgrade layers and the expected heavy traffic on this road after completion, **it is advisable to raise the embankment of the road from 0.5 to 1.0 meter after removing the asphalt and granular layers at selected locations.** The strengthening of road by providing extra layers on top without raising the embankment will be prone to settlement with heavy traffic within a short span of time.

The material obtained from removing of water bound macadam and sub-base shall be re-used as sub-base in full width of the pavement. The properties of re-used subbase material shall be as per project specification except gradation which shall be waived off due to presence of WBM aggregates.

Km 30+000 ~ 60+000

The in-situ compaction of WBM, subbase and subgrade from 30+000 ~ 60+000 is within specified limits which is also evident from the surface condition of the road. In this section deterioration in the form of cracks, pot holes and settlement is not observed except rutting which seems to be confined in asphalt wearing course layer.

Keeping in view the stable condition of granular layers and subgrade it is recommended to keep the granular layers intact and provide WBM layer as per design after removing the asphalt layers. After removal of asphalt layers the exposed WBM shall be reworked/re-compact before placing the new WBM layer as per design.

It is to be noted that proper benching shall be ensure in widening portion for new carriageway to avoid any plane of failure within old and new embankment.

Borrow Areas for Embankment / Sub-grade Construction.

Samples collected from different locations in the vicinity of the project area indicate that A-4 soil as per AASHTO classification is available in the project area. The CBR of these soils is in the range of 10.2 to 16.3%, plasticity index of these soil is in the range of non-plastic to 8 except at one location where CBR is only 6.5% and plasticity index is 10.

As both suitable and unsuitable soils are available in the project area it shall be the responsibility of the Contractor to locate suitable soil for embankment construction.

ANNEXURE 'A'

SUMMARIES OF TEST RESULTS

Table 5

FAISALABAD ~ CHINIOT ~ SARGODHA ROAD						
SUMMARY OF MOISTURE CONTENT ALONG THE ALIGNMENT OF PROJRCT ROAD						
LOCATIONS						
DEPTHS (M)	Pit # 1	Pit # 2	Pit # 3	Pit # 4	Pit # 5	Pit # 6
0.3	14.3	14.2	10.1	14.9	15.2	8.6
0.6	15.7	15.1	12.1	10.8	11.9	6.4
0.9	13.2	15.6	12.2	9.3	11.0	12.1
1.2	13.3	16.7	12.8	9.7	10.3	14.6
1.5	13.3	23.0	13.1	9.9	10.8	14.9

ANNEXURE 'B'

EXISTING ROAD RESULT SHEETS

**FIELD DENSITY
TEST (FDT)
TEST RESULT
SHEETS**

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No. 1		Date	30-09-2020		
REACH	0+000 ~ 10+000		Location			
Gen. Data	Field Test No.		1	2	3	4
	Layer		WBM	Subbase	Subbase	Subgrade
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	7.5	8	7	6
Field Density	Wt. of Wet Soil + Cont.	gms	14825	8313	7647	4627
	Wt. of Cont.	gms	20	20	20	20
	Wt. Wet Soil	gms	14805	8293	7627	4607
	Initial Wt. of Sand + Cont	gms	14420	8716	8670	8425
	Residual Wt. of Sand+Cont	gms	2636	1809	2270	3124
	Wt. of Used Sand	gms	11784	6907	6400	5301
	Wt. of Sand in Cone	gms	3382	1780	1714	1638
	Wt. of Sand in Hole	gms	8402	5127	4686	3663
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	1.359
	Volume of Hole	cm ³	6182	3773	3448	2695
	Wet Density	g/cm ³	2.395	2.198	2.212	1.709
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	4.1	4.1	5.1	7.2
Result	Dry Density	g/cm ³	2.300	2.112	2.105	1.594
	Max. Dry Density	g/cm ³		2.268	2.268	1.748
	OMC	%		4.8	4.8	12.4
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	< 100	93.1	92.8	91.2
	Compaction Required	%	100	100	100	95
REMARKS						
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Tested by						
Checked by						

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No. 2		Date	1/10/2020		
REACH	10+000 ~ 20+000		Location			
Gen. Data	Field Test No.		1	2	3	
	Layer		WBM	Subbase	Subbase	
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	8.2	7.2	6	
Field Density	Wt. of Wet Soil + Cont.	gms	12395	7973	5318	
	Wt. of Cont.	gms	20	20	20	
	Wt. Wet Soil	gms	12375	7953	5298	
	Initial Wt. of Sand + Cont	gms	12702	8219	8072	
	Residual Wt. of Sand+Cont	gms	2374	1831	2412	
	Wt. of Used Sand	gms	10328	6388	5660	
	Wt. of Sand in Cone	gms	3300	1860	1756	
	Wt. of Sand in Hole	gms	7028	4528	3904	
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	
	Volume of Hole	cm ³	5171	3332	2873	
	Wet Density	g/cm ³	2.393	2.387	1.844	
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	4.4	5.3	10.2	
Result	Dry Density	g/cm ³	2.292	2.267	1.674	
	Max. Dry Density	g/cm ³		2.268	1.799	
	OMC	%		4.8	12.2	
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	< 100	99.9	93.0	
	Compaction Required	%	100	100	95	
REMARKS						
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Tested by						
Checked by						

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No. 3		Date	1/10/2020		
REACH	20+000 ~ 30+000		Location			
Gen. Data	Field Test No.		1	2	3	4
	Layer		WBM	WBM	Subbase	Subgrade
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	7.8	6.2	6	6
Field Density	Wt. of Wet Soil + Cont.	gms	11990	11780	6677	5325
	Wt. of Cont.	gms	20	20	20	20
	Wt. Wet Soil	gms	11970	11760	6657	5305
	Initial Wt. of Sand + Cont	gms	12635	12665	8700	8460
	Residual Wt. of Sand+Cont	gms	2536	2782	3182	2951
	Wt. of Used Sand	gms	10099	9883	5518	5509
	Wt. of Sand in Cone	gms	3282	3240	1698	1649
	Wt. of Sand in Hole	gms	6817	6643	3820	3860
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	1.359
	Volume of Hole	cm ³	5016	4888	2811	2840
	Wet Density	g/cm ³	2.386	2.406	2.368	1.868
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	3.0	4.2	4.4	10.2
Result	Dry Density	g/cm ³	2.317	2.309	2.268	1.695
	Max. Dry Density	g/cm ³			2.284	1.959
	OMC	%			4.4	10.2
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	< 100	< 100	99.3	86.5
	Compaction Required	%	100	100	100	95
REMARKS						
<hr/> <hr/>						
Tested by						
Checked by						

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No. 4		Date	2/10/2020		
REACH	30+000 ~ 40+000		Location			
Gen. Data	Field Test No.		1	2	3	
	Layer		WBM	Subbase	Subgrade	
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	7.3	6	6	
Field Density	Wt. of Wet Soil + Cont.	gms	12970	6736	5620	
	Wt. of Cont.	gms	20	20	20	
	Wt. Wet Soil	gms	12950	6716	5600	
	Initial Wt. of Sand + Cont	gms	12780	8250	8030	
	Residual Wt. of Sand+Cont	gms	2230	2743	2621	
	Wt. of Used Sand	gms	10550	5507	5409	
	Wt. of Sand in Cone	gms	3348	1691	1660	
	Wt. of Sand in Hole	gms	7202	3816	3749	
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	
	Volume of Hole	cm ³	5299	2808	2759	
	Wet Density	g/cm ³	2.444	2.392	2.030	
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	4.0	5.8	11.2	
Result	Dry Density	g/cm ³	2.350	2.261	1.826	
	Max. Dry Density	g/cm ³		2.284	1.904	
	OMC	%		4.2	10.4	
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	> 100	99.0	95.9	
	Compaction Required	%	100	100	95	
REMARKS						
<hr/> <hr/>						
Tested by						
Checked by						

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No. 5		Date	3/10/2020		
REACH	40+000 ~ 50+000		Location			
Gen. Data	Field Test No.		1	2	3	
	Layer		WBM	Subbase	Subgrade	
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	7	6.2	6	
Field Density	Wt. of Wet Soil + Cont.	gms	12075	6896	5925	
	Wt. of Cont.	gms	20	20	20	
	Wt. Wet Soil	gms	12055	6876	5905	
	Initial Wt. of Sand + Cont	gms	12350	8375	8280	
	Residual Wt. of Sand+Cont	gms	2275	2771	2823	
	Wt. of Used Sand	gms	10075	5604	5457	
	Wt. of Sand in Cone	gms	3368	1699	1652	
	Wt. of Sand in Hole	gms	6707	3905	3805	
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	
	Volume of Hole	cm ³	4935	2873	2800	
	Wet Density	g/cm ³	2.443	2.393	2.109	
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	4.0	5.3	10.1	
Result	Dry Density	g/cm ³	2.349	2.273	1.916	
	Max. Dry Density	g/cm ³		2.252	2.000	
	OMC	%		5.1	9.8	
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	> 100	100.9	95.8	
	Compaction Required	%	100	100	95	
REMARKS						
<hr/> <hr/>						
Tested by						
Checked by						

CONSULTANT:	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.					
CLIENT:	C & W DEPT. PUNJAB					
PROJECT:	FAISALABAD ~ CHINIOT ~ SARGODHA ROAD					
DENSITY OF SOIL IN-PLACE BY SAND CONE METHOD AASHTO T 191						
Pit. No.	Pit No.6		Date	3/10/2020		
REACH	50+000 ~ 60+000		Location			
Gen. Data	Field Test No.		1	2	3	
	Layer		WBM	Subbase	Subgrade	
	Location:					
	Reference To Centre Line					
	Depth of hole	inches	7.5	6.2	6	
Field Density	Wt. of Wet Soil + Cont.	gms	12385	7084	6285	
	Wt. of Cont.	gms	20	20	20	
	Wt. Wet Soil	gms	12365	7064	6265	
	Initial Wt. of Sand + Cont	gms	12500	8300	8170	
	Residual Wt. of Sand+Cont	gms	2195	2552	2821	
	Wt. of Used Sand	gms	10305	5748	5349	
	Wt. of Sand in Cone	gms	3402	1718	1668	
	Wt. of Sand in Hole	gms	6903	4030	3681	
	Unit Wt. of Sand	g/cm ³	1.359	1.359	1.359	
	Volume of Hole	cm ³	5079	2965	2709	
	Wet Density	g/cm ³	2.434	2.382	2.313	
	Retain 3/4 inch	%				
Moisture Content	Can No.					
	Wt. of can + Wet Soil	gms				
	Wt. of Can + Dry Soil	gms				
	Wt. of Water	gms				
	Wt. Of Can	gms				
	Wt. of Dry Soil	%				
	Moisture Content	%	4.1	5.1	7.4	
Result	Dry Density	g/cm ³	2.338	2.267	2.154	
	Max. Dry Density	g/cm ³		2.252	2.244	
	OMC	%		5.1	6.3	
	Adjusted MDD	g/cm ³				
	Compaction Obtained	%	> 100	100.6	96.0	
	Compaction Required	%	100	100	95	
REMARKS						
<hr/> <hr/>						
Tested by						
Checked by						

WATER BOUND MACADAM

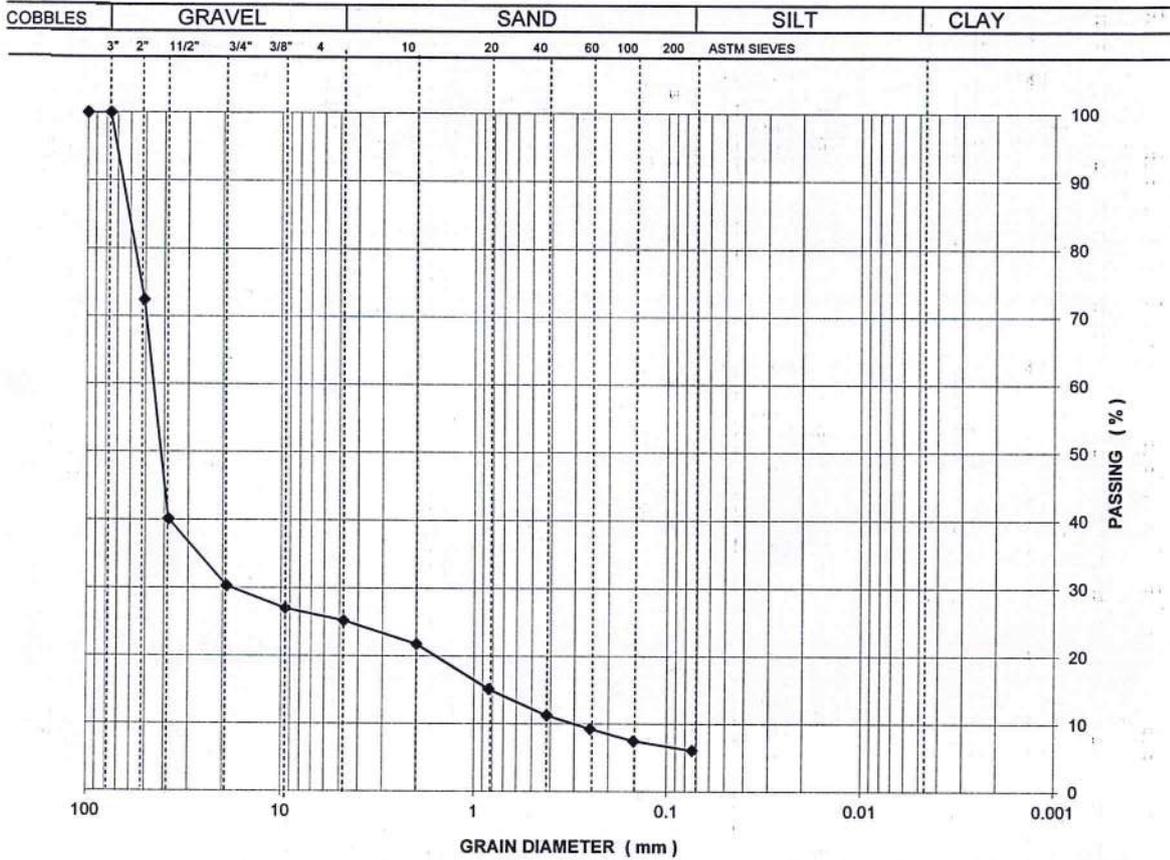
**SIEVE ANALYSIS
SHEETS**

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BASE		
BORE HOLE	TP-1	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	72	40	30	27	25	22	11	7	6

LAB. REF.	69/2020
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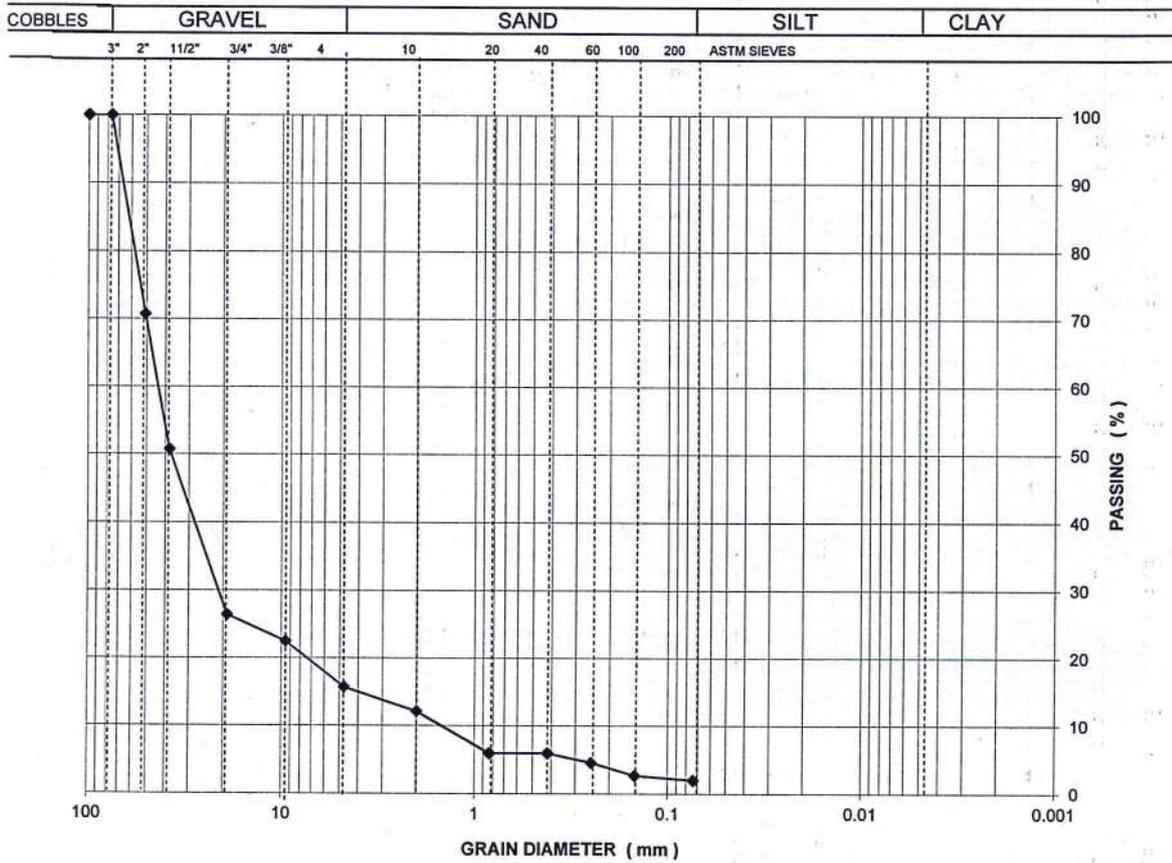
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>IKRAM</i>	<i>MAHMOOD</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BASE		
BORE HOLE	TP-3	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	71	51	26	23	16	12	6	3	2

LAB. REF.	69/2020
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REMARKS :

SUBBASE

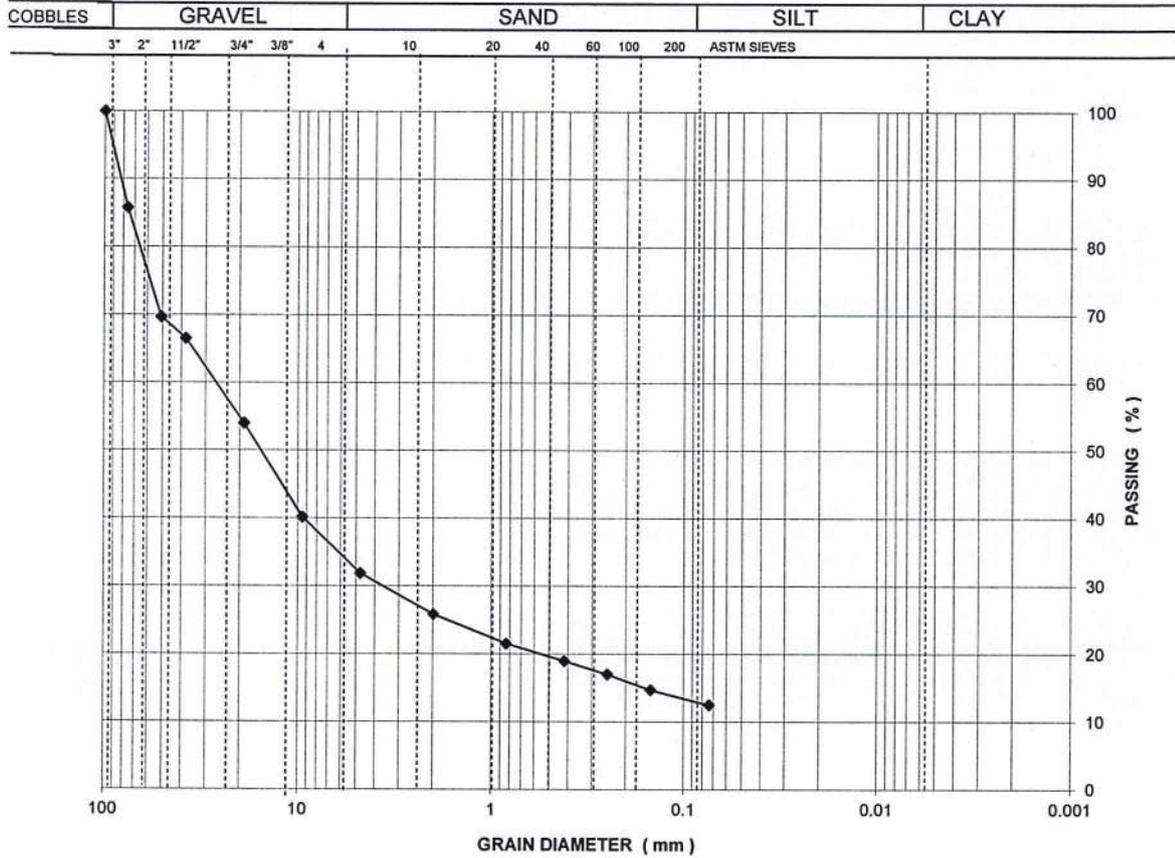
**SIEVE ANALYSIS
SHEETS**

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB BASE		
BORE HOLE	TP-1	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	70	67	54	40	32	26	19	15	13

LAB. REF.	69/2020
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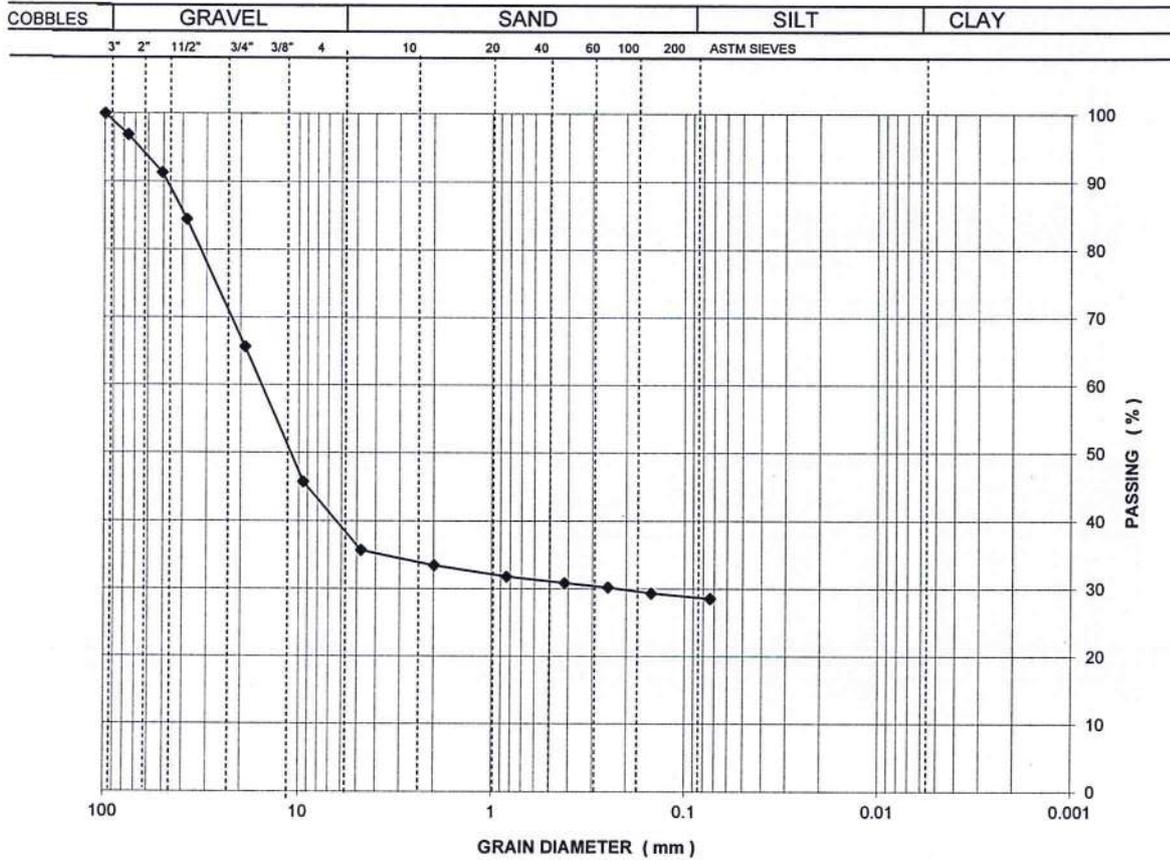
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB BASE		
BORE HOLE	TP-2	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	91	84	66	46	36	33	31	29	29

LAB. REF.	69/2020
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REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB BASE		
BORE HOLE	TP-3	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	73	55	22	18	17	13	5	4	3

LAB. REF.	69/2020
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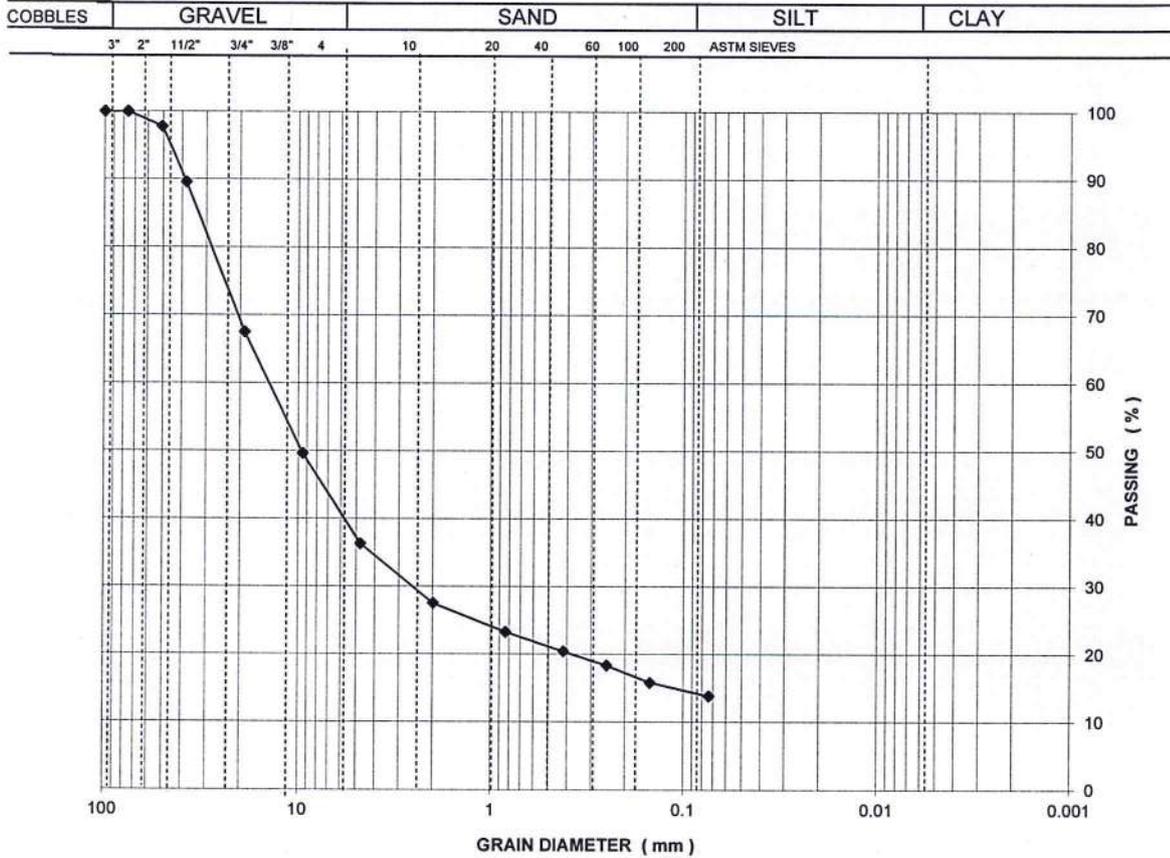
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB BASE		
BORE HOLE	TP-5	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	98	90	68	50	36	28	20	16	14

LAB. REF.	69/2020
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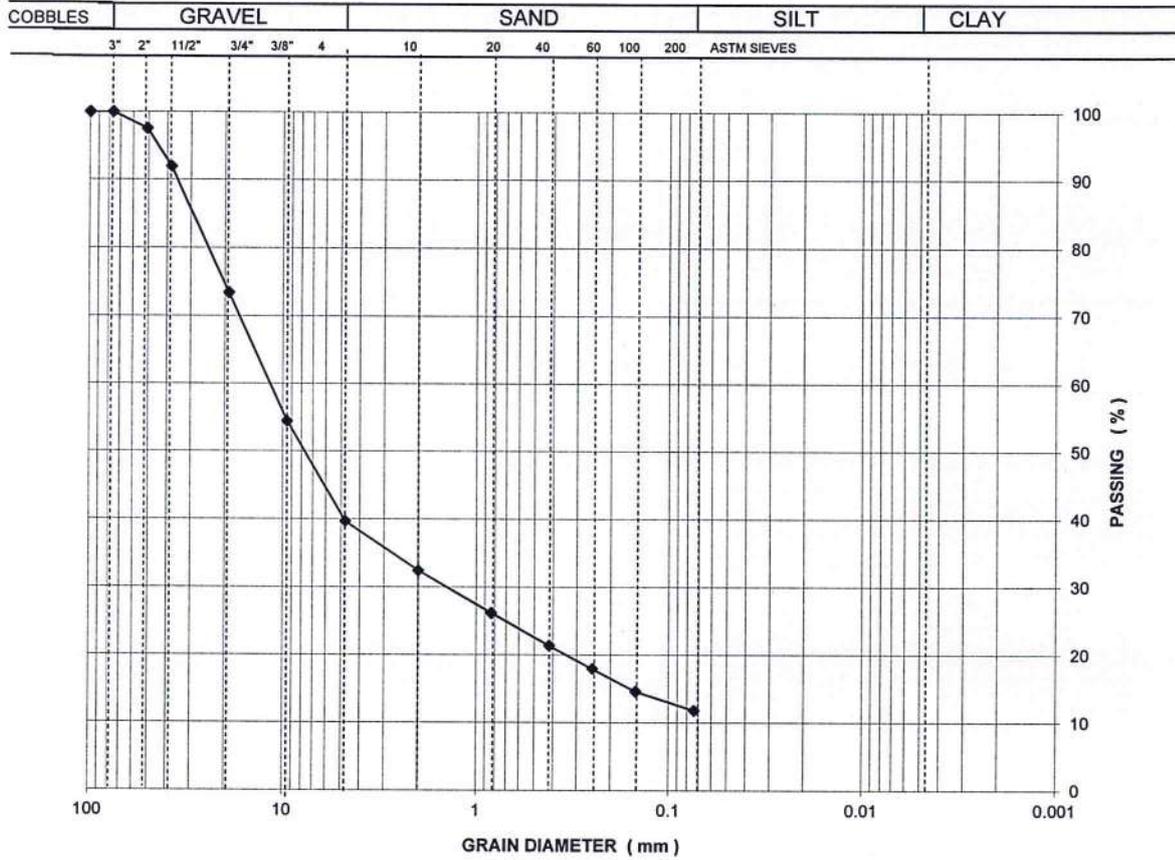
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB BASE		
BORE HOLE	TP-6	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	98	92	73	54	40	32	21	15	12

LAB. REF.	69/2020
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REMARKS :

**ATTERBERG LIMIT TEST
RESULT SHEETS**

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-1	SAMPLE	SUB BASE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

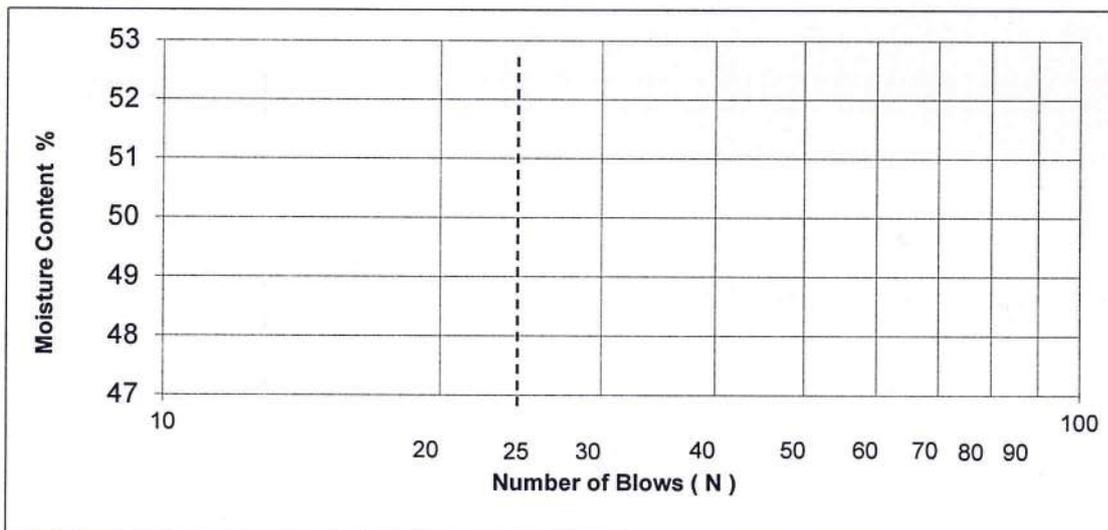
LIQUID LIMIT

Number of Blows N	10	Further readings are not possible
Moisture Content %	18.19	

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-2	SAMPLE	SUB BASE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	10.11.2020

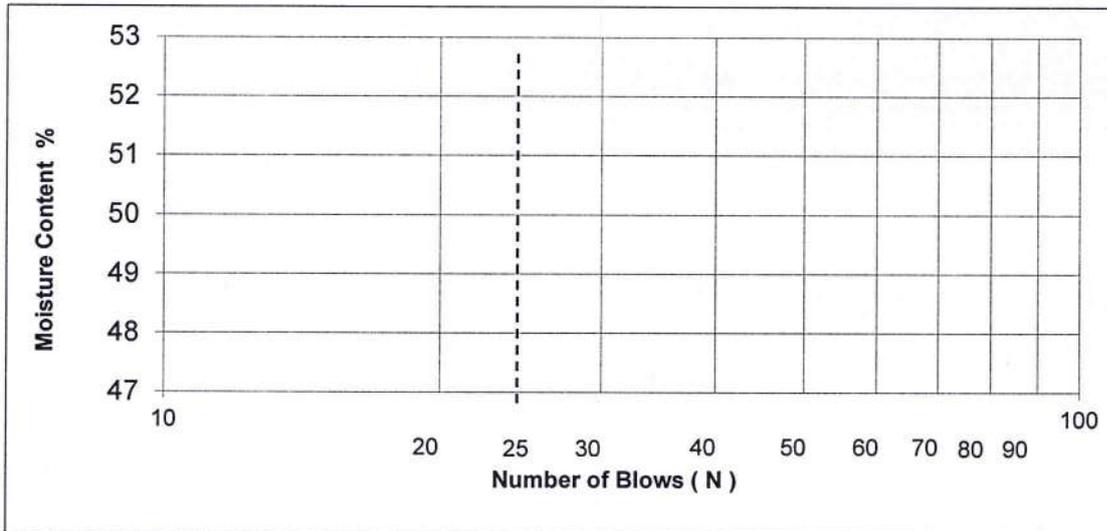
LIQUID LIMIT

Number of Blows N					
Moisture Content %					

PLASTIC LIMIT

Moisture Content %			
--------------------	--	--	--

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	NON-PLASTIC	



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-3	SAMPLE	SUB BASE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	10.11.2020

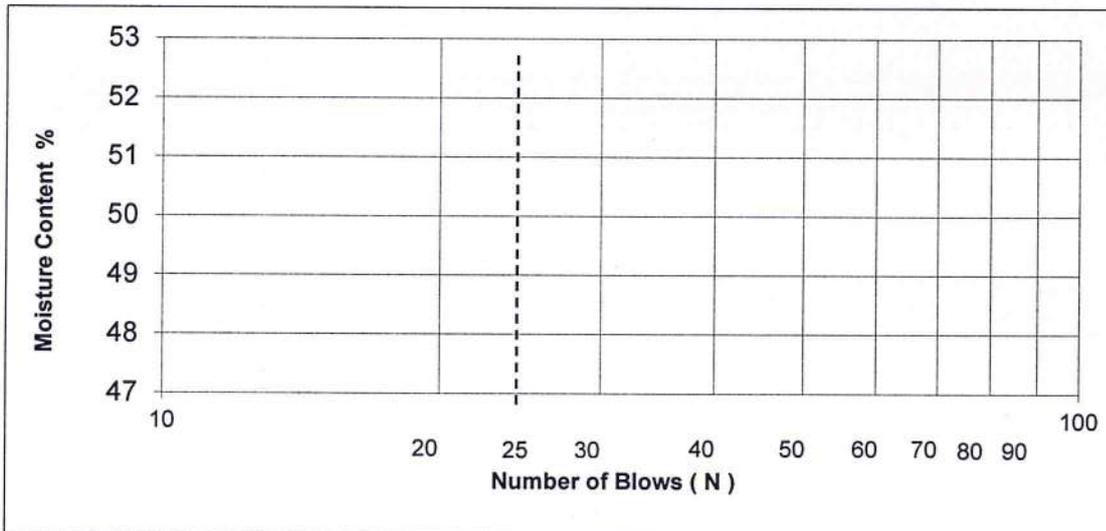
LIQUID LIMIT

Number of Blows N					
Moisture Content %					

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	NON-PLASTIC	



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-4	SAMPLE	SUB BASE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	10.11.2020

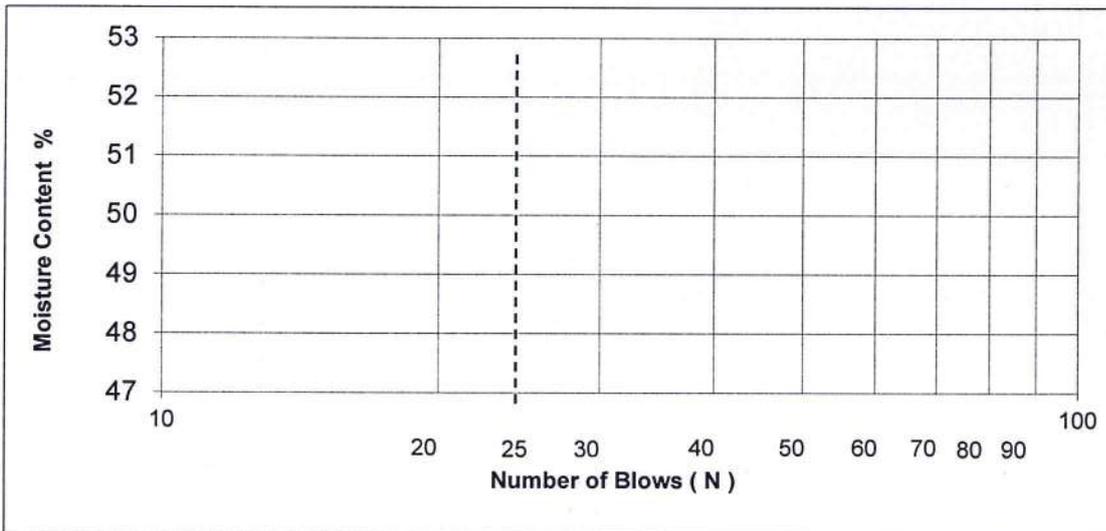
LIQUID LIMIT

Number of Blows N					
Moisture Content %					

PLASTIC LIMIT

Moisture Content %			
--------------------	--	--	--

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	NON-PLASTIC	



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-5	SAMPLE	SUB BASE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

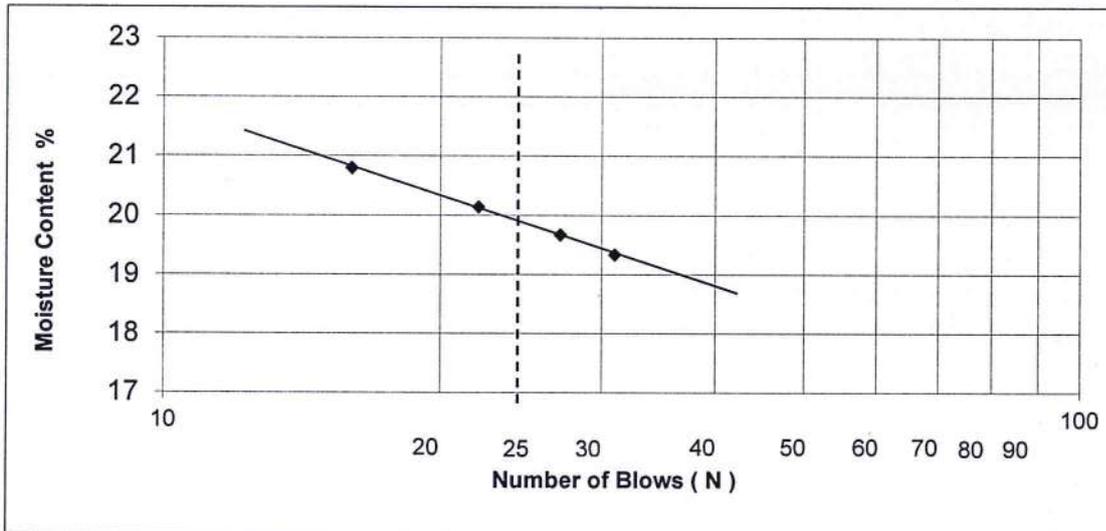
LIQUID LIMIT

Number of Blows N	16	22	27	31	
Moisture Content %	20.80	20.14	19.67	19.34	

PLASTIC LIMIT

Moisture Content %	15.09	15.14	15.19
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
20	15	5



TESTED BY MAHMOOD	CHECKED BY IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

CALIFORNIA BEARING RATIO (CBR)
&
MAXIMUM DRY DENSITY (MDD)
TEST RESULT SHEETS

SOILCON

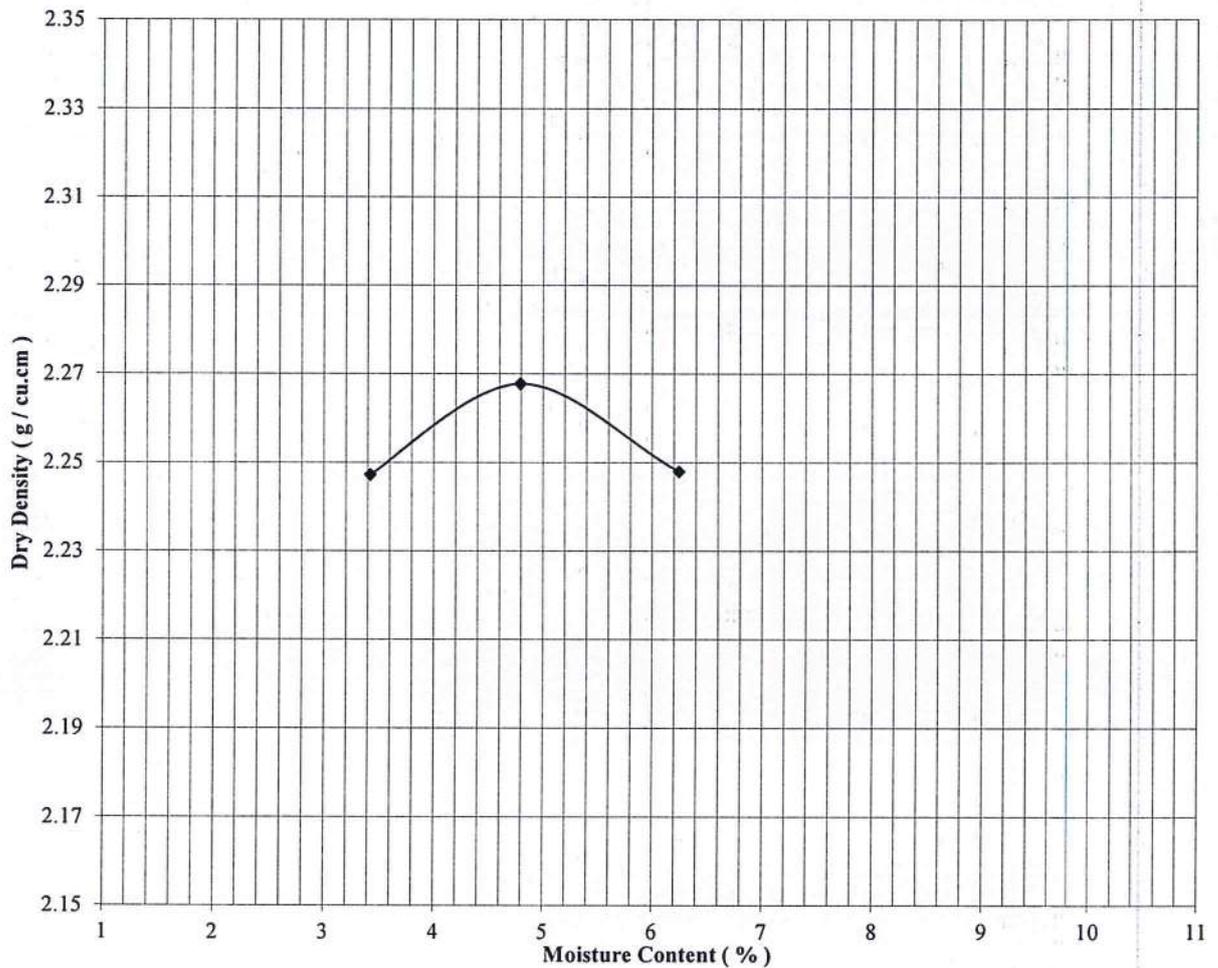
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

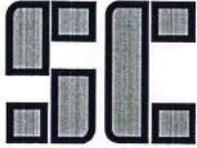
Test Method : Modified AASHTO
Dia of Mould : 6.0 inch
No of Blows : 56 No of Layers 5
Test Pit No: TP-1 Sample No. Sub Base

Volume of Mould : 2104 cm³
Drop : 18 inch
Wt of Hammer : 10 lbs
Depth (m):



Optimum Moisture Content (%)	4.79	Maximum Dry Density	2.268g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer	65	30	10		
CBR Value at 0.1 in %				COMPACTION	MODIFIED
CBR Value at 0.2 in %	54.8	39.2	19.6	M.D.D. g/cu.cm	2.268
Dry Density g/ cm ³	2.268	2.155	2.041	O.M.C %	4.79
Moisture Content %	4.61	4.61	4.61		
Absorption %	0.83	1.61	2.11		
Swelling %		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-1	SAMPLE NO:	Sub base	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY : MAHMOOD			CHECKED BY: IKRAM		

SOILCON

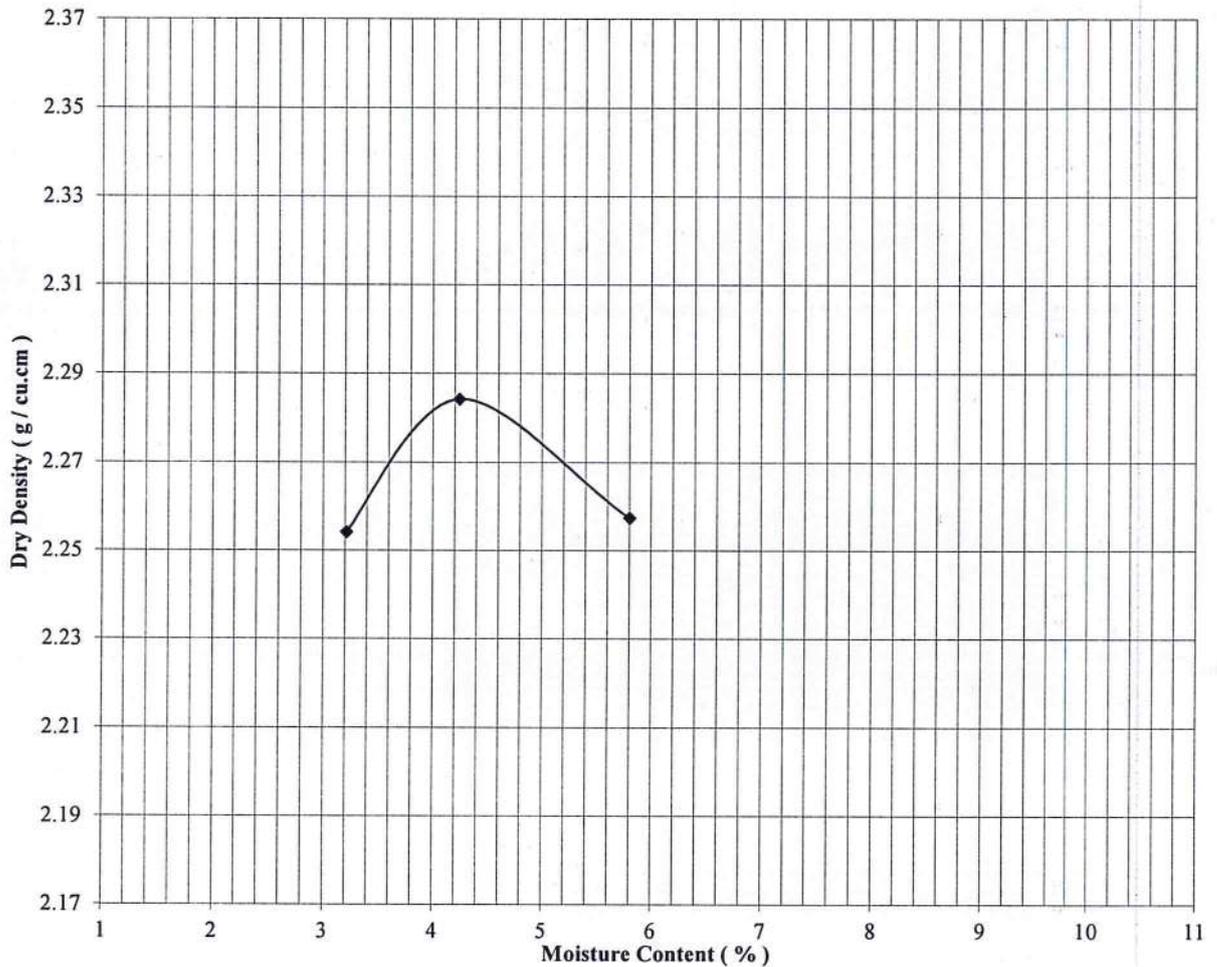
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

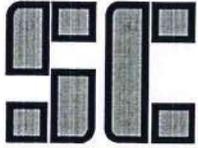
Test Method : Modified AASHTO
Dia of Mould : 6.0 inch
No of Blows : 56 No of Layers 5
Test Pit No: TP-3 Sample No. Sub Base

Volume of Mould : 2104 cm³
Drop : 18 inch
Wt of Hammer : 10 lbs
Depth (m):



Optimum Moisture Content (%)	4.24	Maximum Dry Density	2.284g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



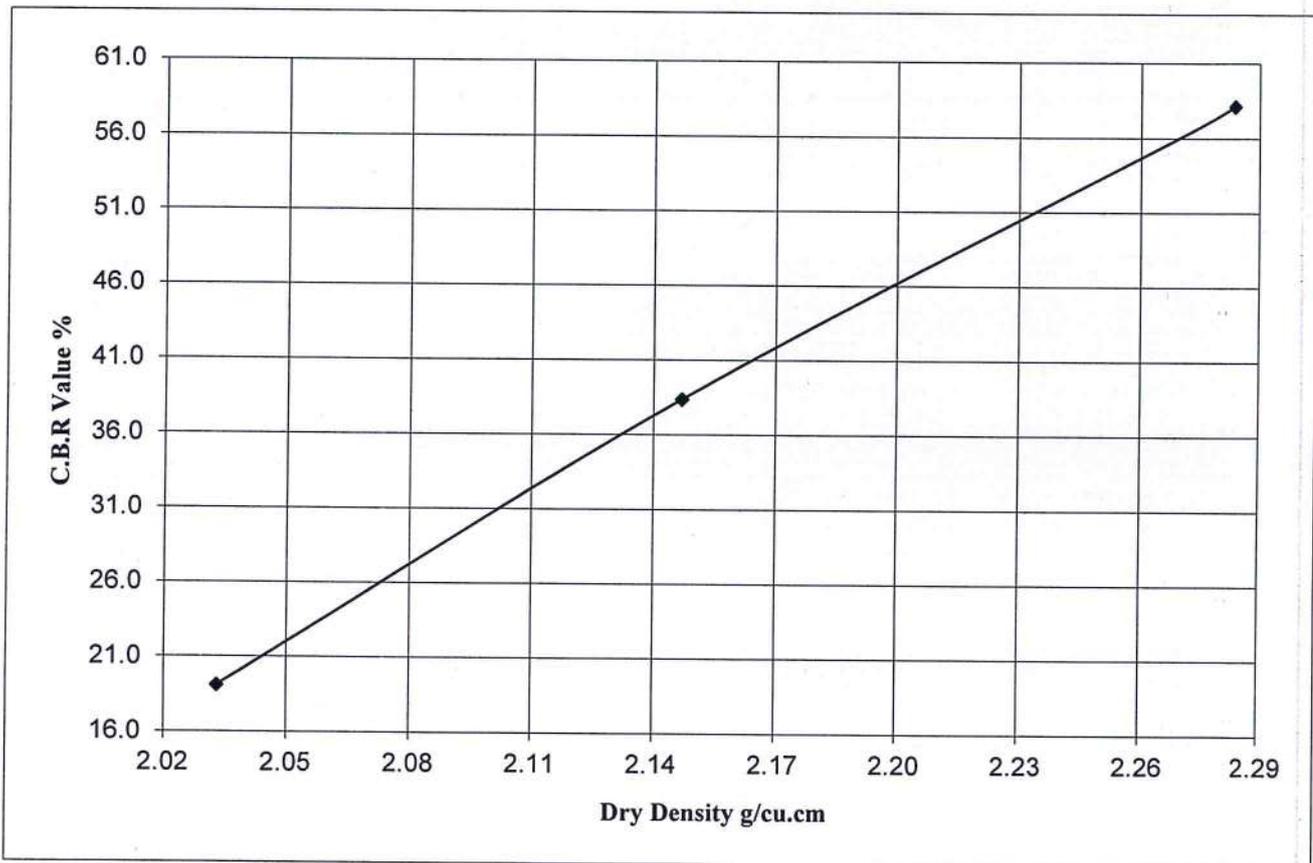
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer	65	30	10		
CBR Value at 0.1 in %				COMPACTION	MODIFIED
CBR Value at 0.2 in %	58.1	38.4	19.1	M.D.D. g/cu.cm	2.284
Dry Density g/cm ³	2.284	2.147	2.033	O.M.C %	4.24
Moisture Content %	4.11	4.11	4.11		
Absorption %	0.71	1.19	1.98		
Swelling %		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-3	SAMPLE NO:	Sub base	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :	MAHMOOD		CHECKED BY:	IKRAM	

SOILCON

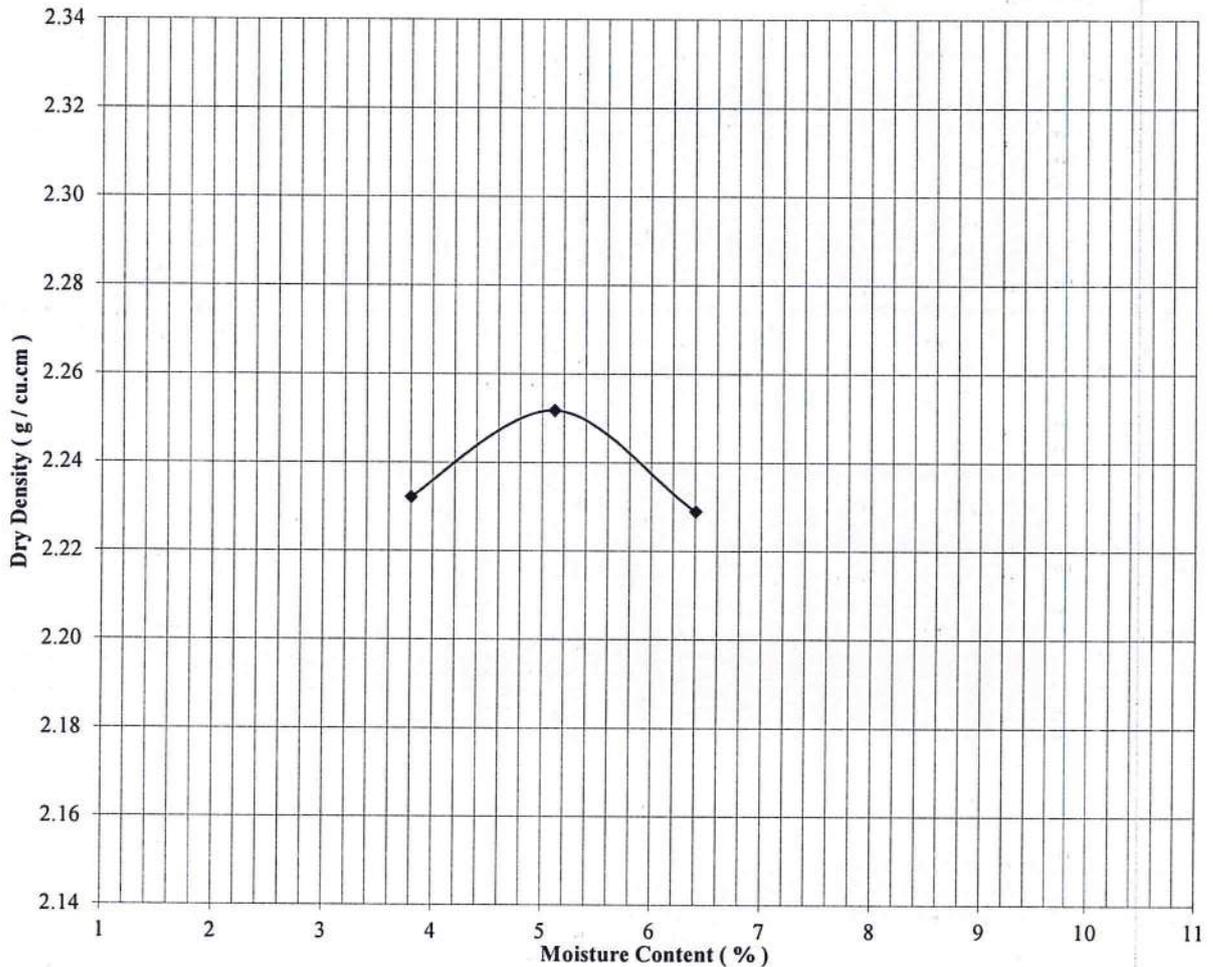
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

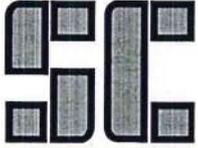
Test Method : Modified AASHTO
 Dia of Mould : 6.0 inch
 No of Blows : 56 No of Layers 5
 Test Pit No: TP-6 Sample No. Sub Base

Volume of Mould : 2104 cm³
 Drop : 18 inch
 Wt of Hammer : 10 lbs
 Depth (m):



Optimum Moisture Content (%)	5.11	Maximum Dry Density	2.252g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :		Client: SAFE SERVICES	
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



SOILCON

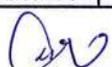
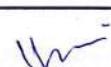
GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer	65	30	10		
CBR Value at 0.1 in %				COMPACTION	MODIFIED
CBR Value at 0.2 in %	51.2	33.7	18.2	M.D.D. g/cu.cm	2.252
Dry Density g/ cm ³	2.252	2.139	2.027	O.M.C %	5.11
Moisture Content %	4.97	4.97	4.97		
Absorption %	1.05	2.03	2.88		
Swelling %		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-6	SAMPLE NO:	Sub base	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :	MAHMOOD		CHECKED BY:	IKRAM	

SUBGRADE

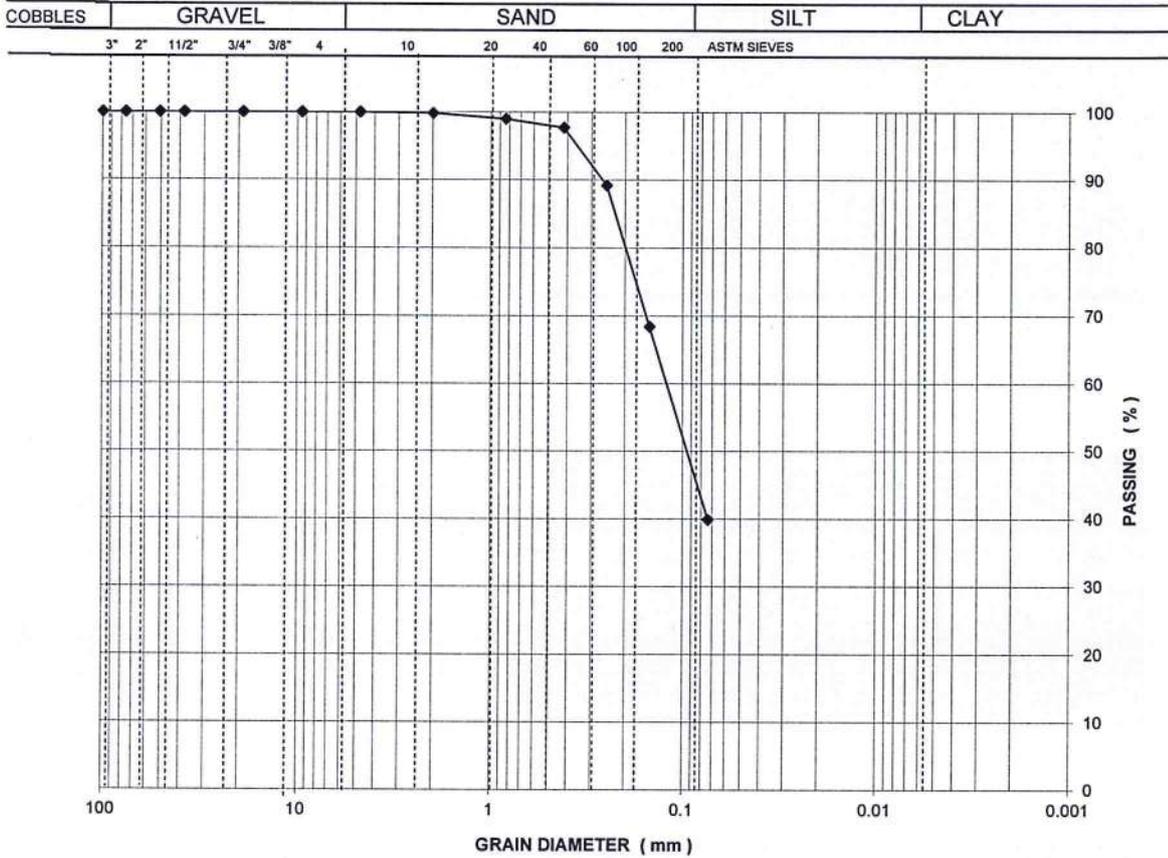
**SIEVE ANALYSIS
SHEETS**

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-1	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	100	98	68	40

LAB. REF.	69/2020
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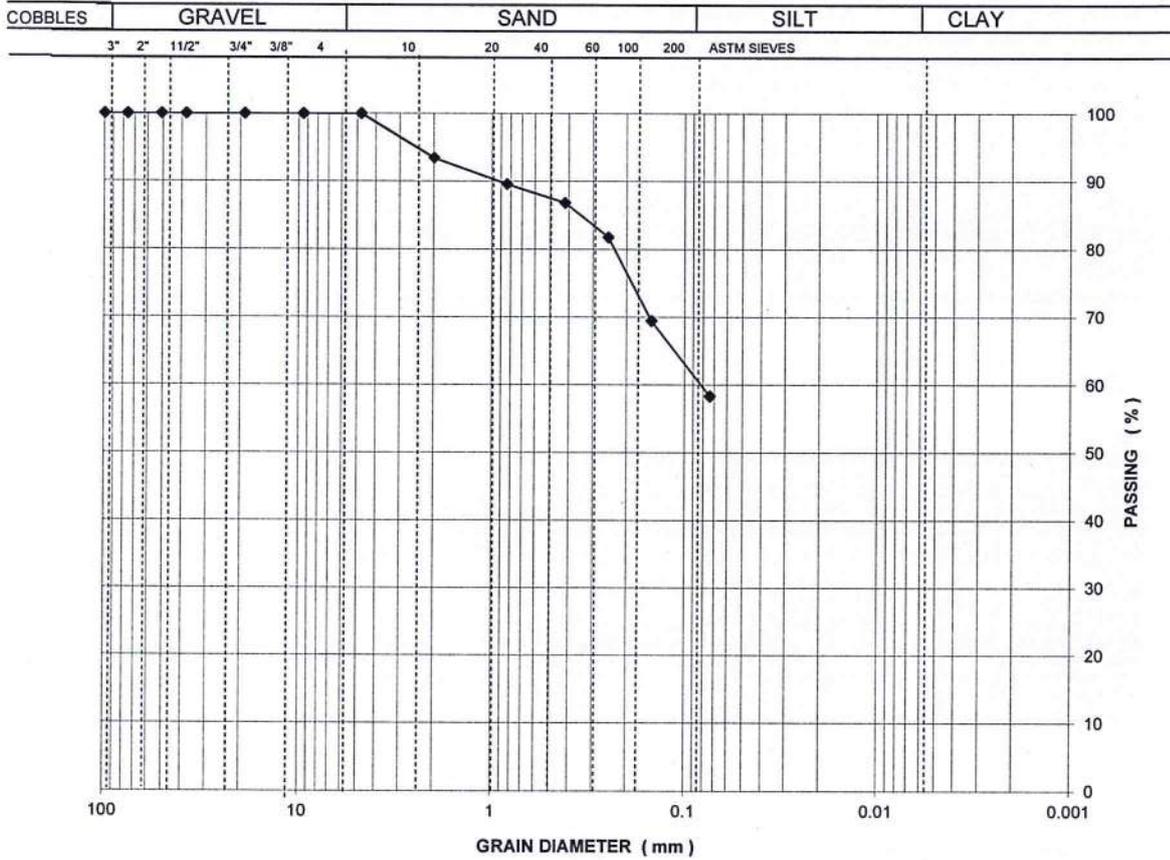
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-2	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	93	87	69	58

LAB. REF.	69/2020
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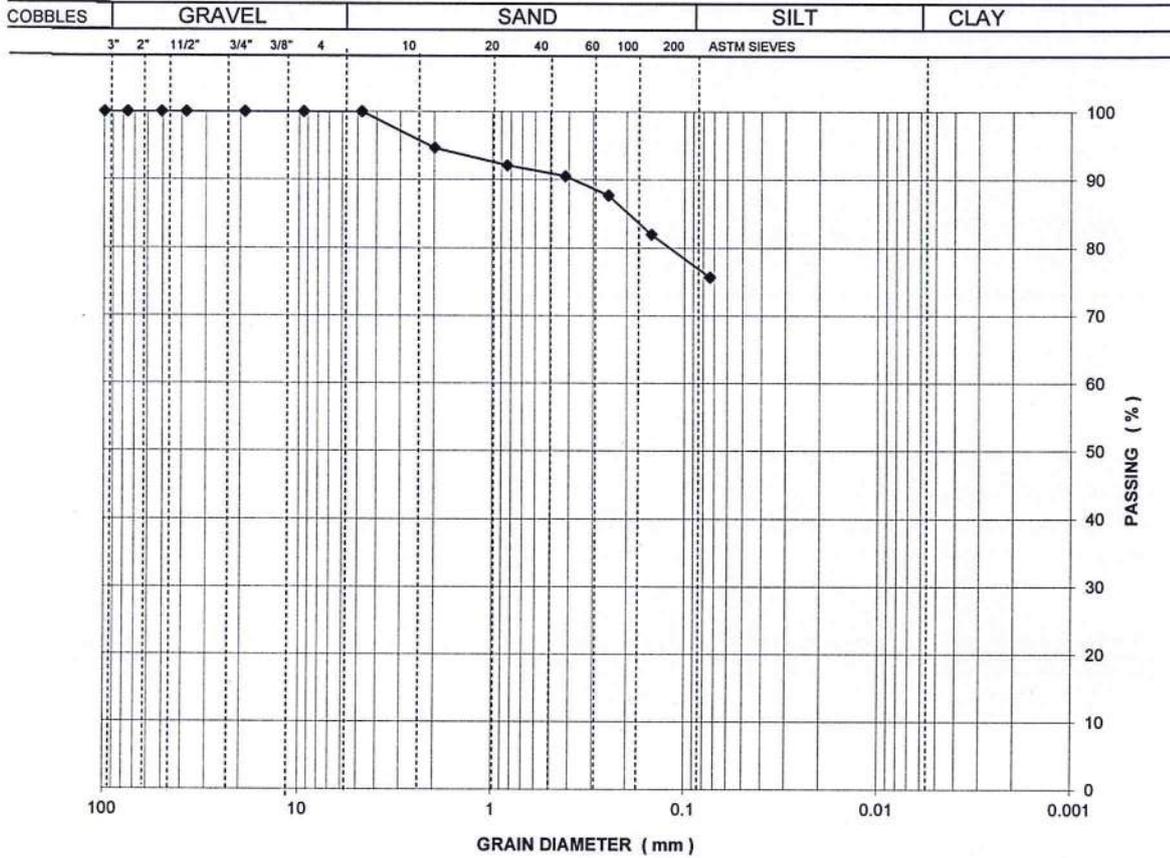
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-3	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	95	91	82	76

LAB. REF.	69/2020
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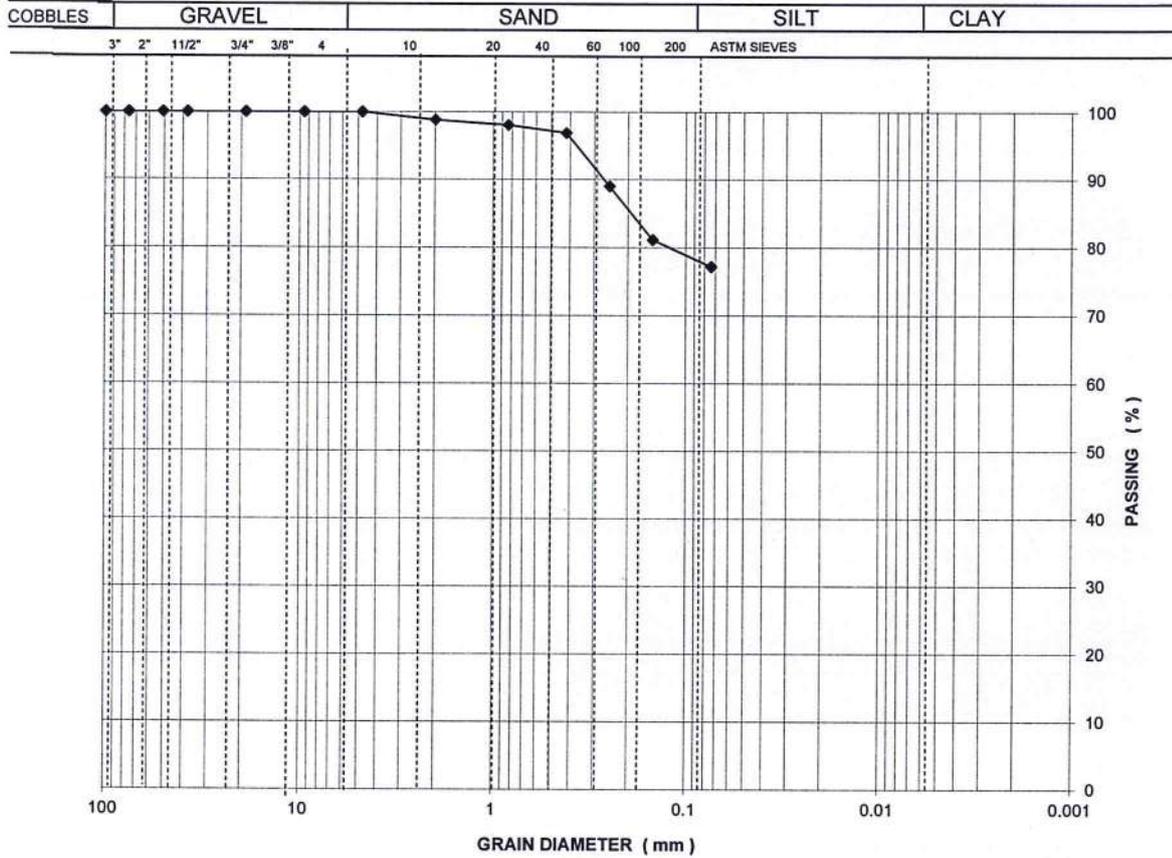
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-4	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1"1/2	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	99	97	81	77

LAB. REF.	69/2020
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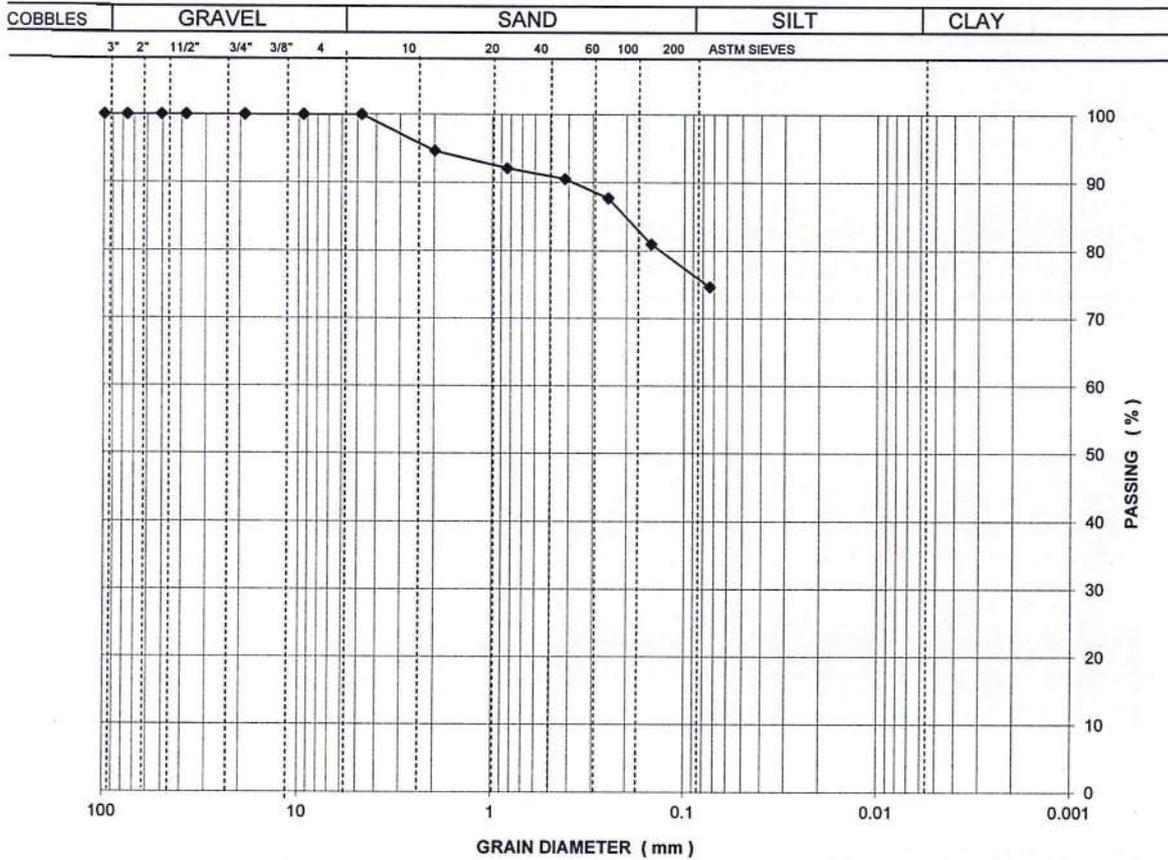
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-5	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	95	91	81	75

LAB. REF.	69/2020
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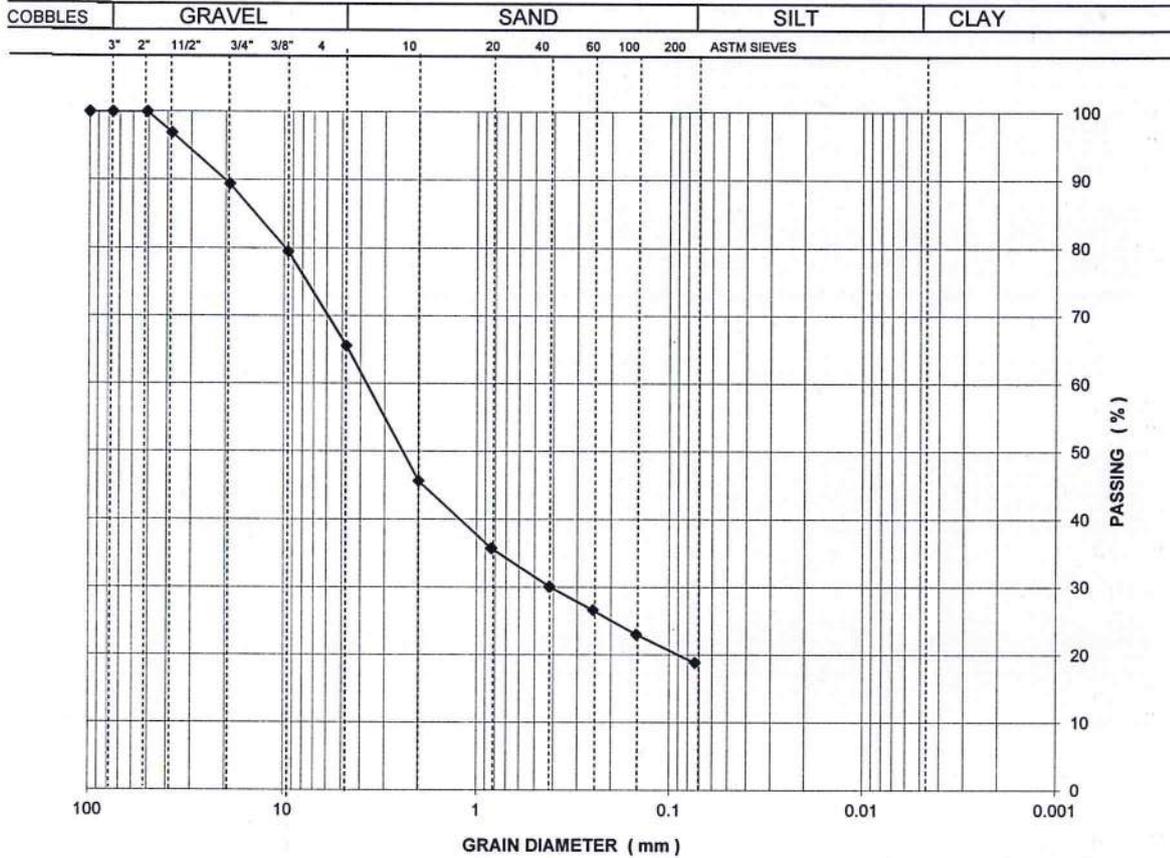
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	SUB GRADE		
BORE HOLE	TP-6	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	97	89	80	66	46	30	23	19

LAB. REF.	69/2020
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REMARKS :

**ATTERBERG LIMIT TEST
RESULT SHEETS**

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION	SUB GRADE				
CLIENT	SAFE SERVICES				
BOREHOLE	TP-1	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	10.11.2020

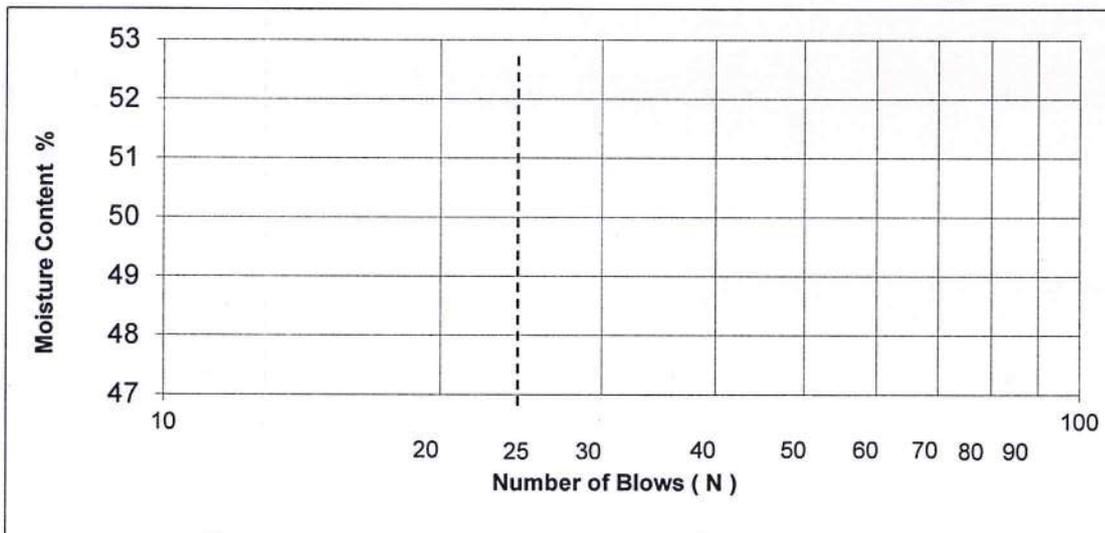
LIQUID LIMIT

Number of Blows N					
Moisture Content %					

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	NON-PLASTIC	



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-2	SAMPLE	SUB GRADE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

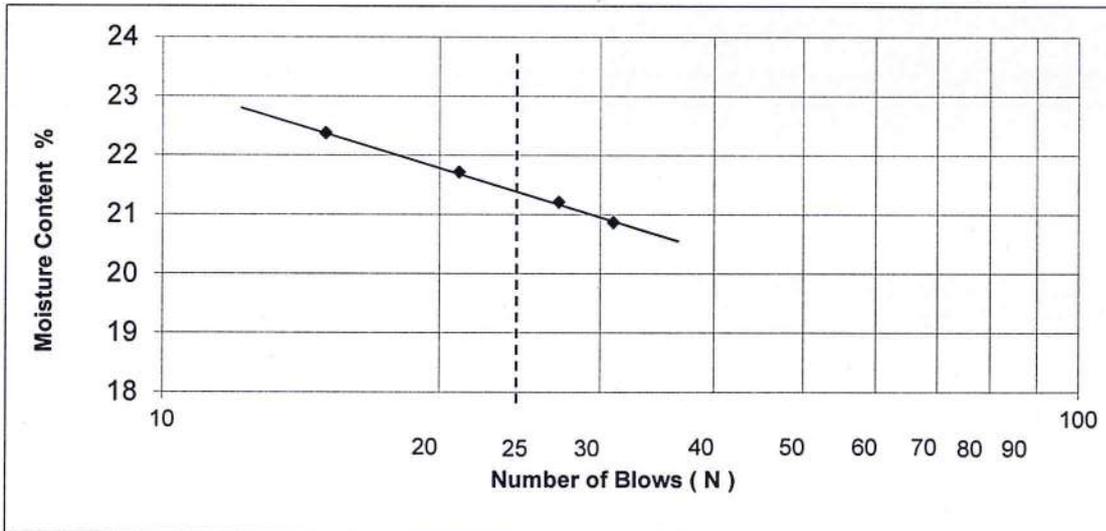
LIQUID LIMIT

Number of Blows N	15	21	27	31	
Moisture Content %	22.38	21.72	21.21	20.87	

PLASTIC LIMIT

Moisture Content %	14.81	14.86	14.91
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
21	15	6



TESTED BY MAHMOOD	CHECKED BY IKRAM
	

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-3	SAMPLE	SUB GRADE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

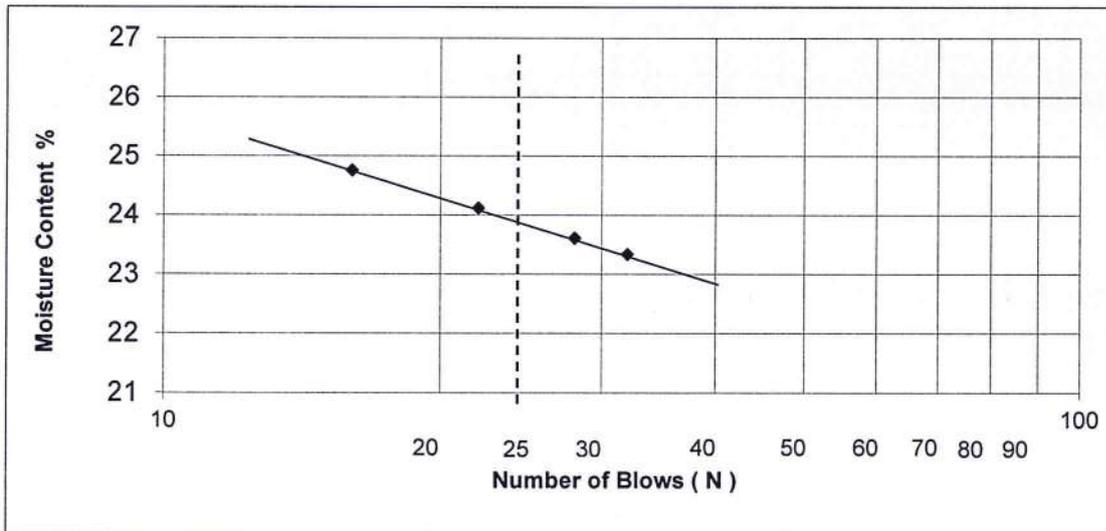
LIQUID LIMIT

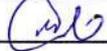
Number of Blows N	16	22	28	32	
Moisture Content %	24.76	24.12	23.61	23.34	

PLASTIC LIMIT

Moisture Content %	16.08	16.13	16.18
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
24	16	8



TESTED BY MAHMOOD	CHECKED BY IKRAM
	

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-4	SAMPLE	SUB GRADE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

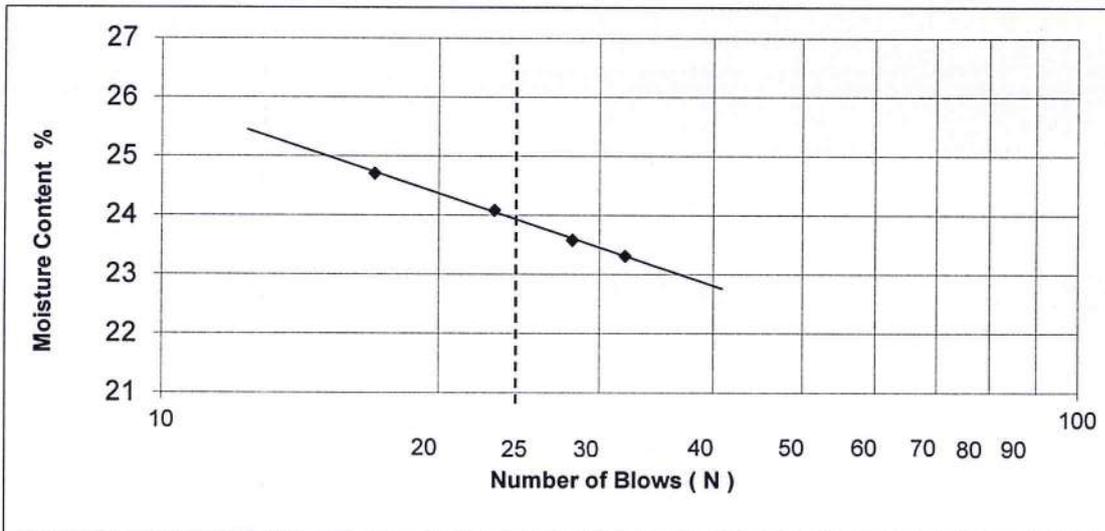
LIQUID LIMIT

Number of Blows N	17	23	28	32	
Moisture Content %	24.71	24.08	23.58	23.31	

PLASTIC LIMIT

Moisture Content %	16.21	16.26	16.31
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
24	16	8



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-5	SAMPLE	SUB GRADE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

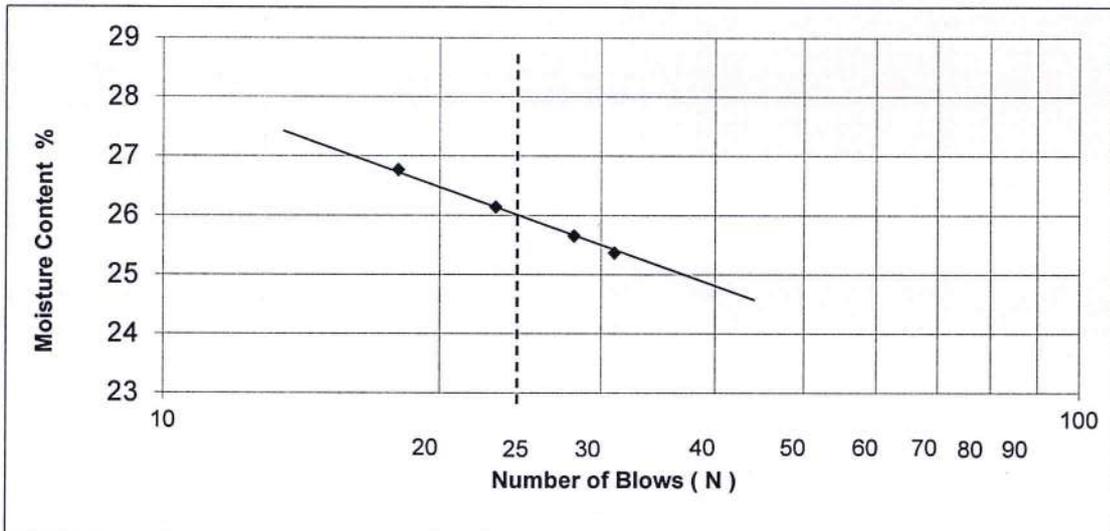
LIQUID LIMIT

Number of Blows N	18	23	28	31	
Moisture Content %	26.77	26.14	25.66	25.37	

PLASTIC LIMIT

Moisture Content %	16.93	16.98	17.03
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
26	17	9



TESTED BY MAHMOOD	CHECKED BY IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	TP-6	SAMPLE	SUB GRADE	TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

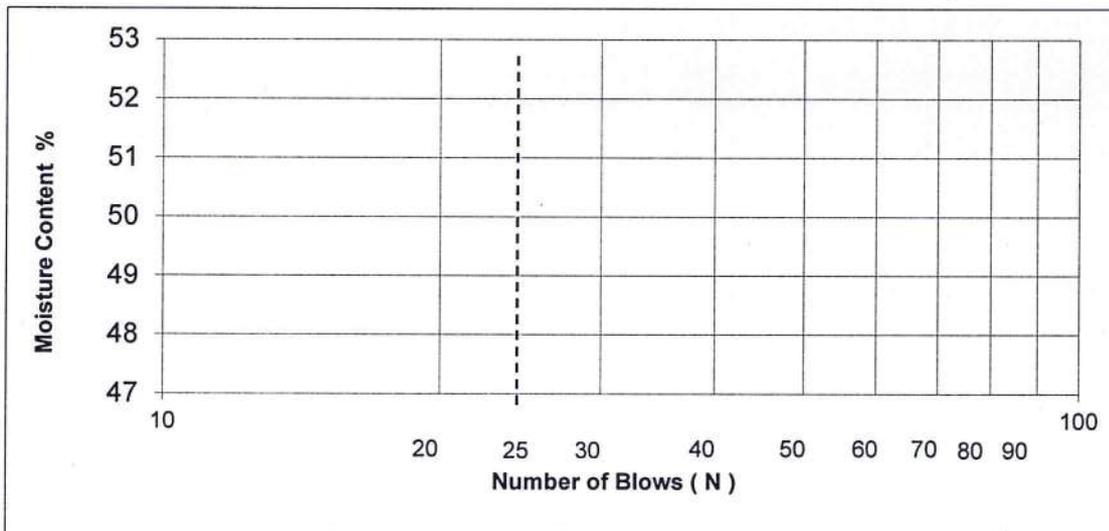
LIQUID LIMIT

Number of Blows N	11	Further readings are not possible
Moisture Content %	22.21	

PLASTIC LIMIT

Moisture Content %			
--------------------	--	--	--

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

CALIFORNIA BEARING RATIO (CBR)
&
MAXIMUM DRY DENSITY (MDD)
TEST RESULT SHEETS

SOILCON

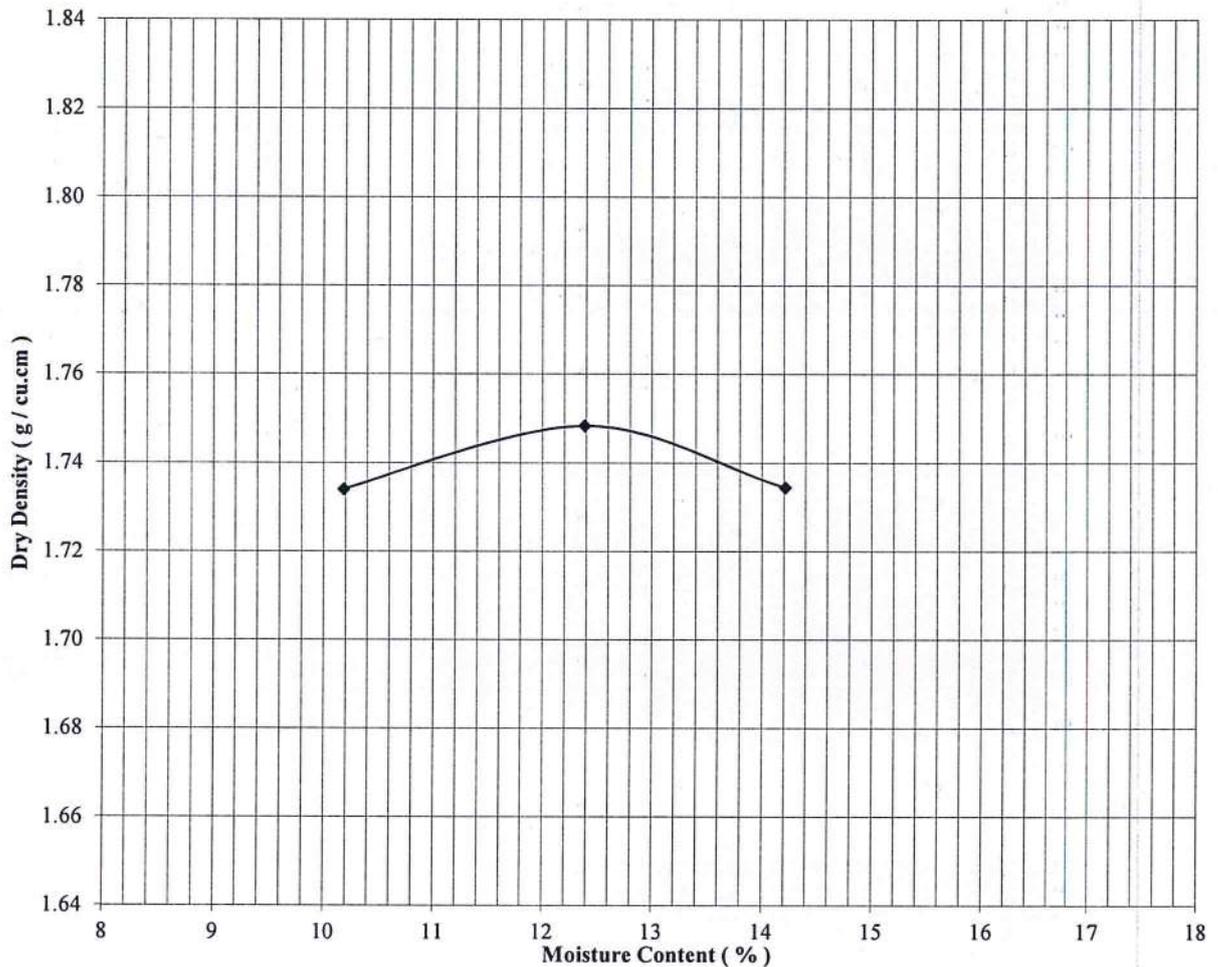
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

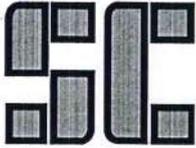
Test Method : Modified AASHTO
Dia of Mould : 6.0 inch
No of Blows : 56 No of Layers 5
Test Pit No: TP-1 Sample No. Sub Grade

Volume of Mould : 2104 cm³
Drop : 18 inch
Wt of Hammer : 10 lbs
Depth (m):



Optimum Moisture Content (%)	12.38	Maximum Dry Density	1.748g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer	65	30	10		
CBR Value at 0.1 in %				COMPACTION	MODIFIED
CBR Value at 0.2 in %	25.5	15.4	6.3	M.D.D. g/cu.cm	1.748
Dry Density g/ cm ³	1.748	1.661	1.573	O.M.C %	12.38
Moisture Content %	12.14	12.14	12.14		
Absorption %	3.69	4.23	5.51		
Swelling %		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-1	SAMPLE NO:	Sub grade	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :	MAHMOOD		CHECKED BY :	IKRAM	

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of Blows : 56 No of Layers 5

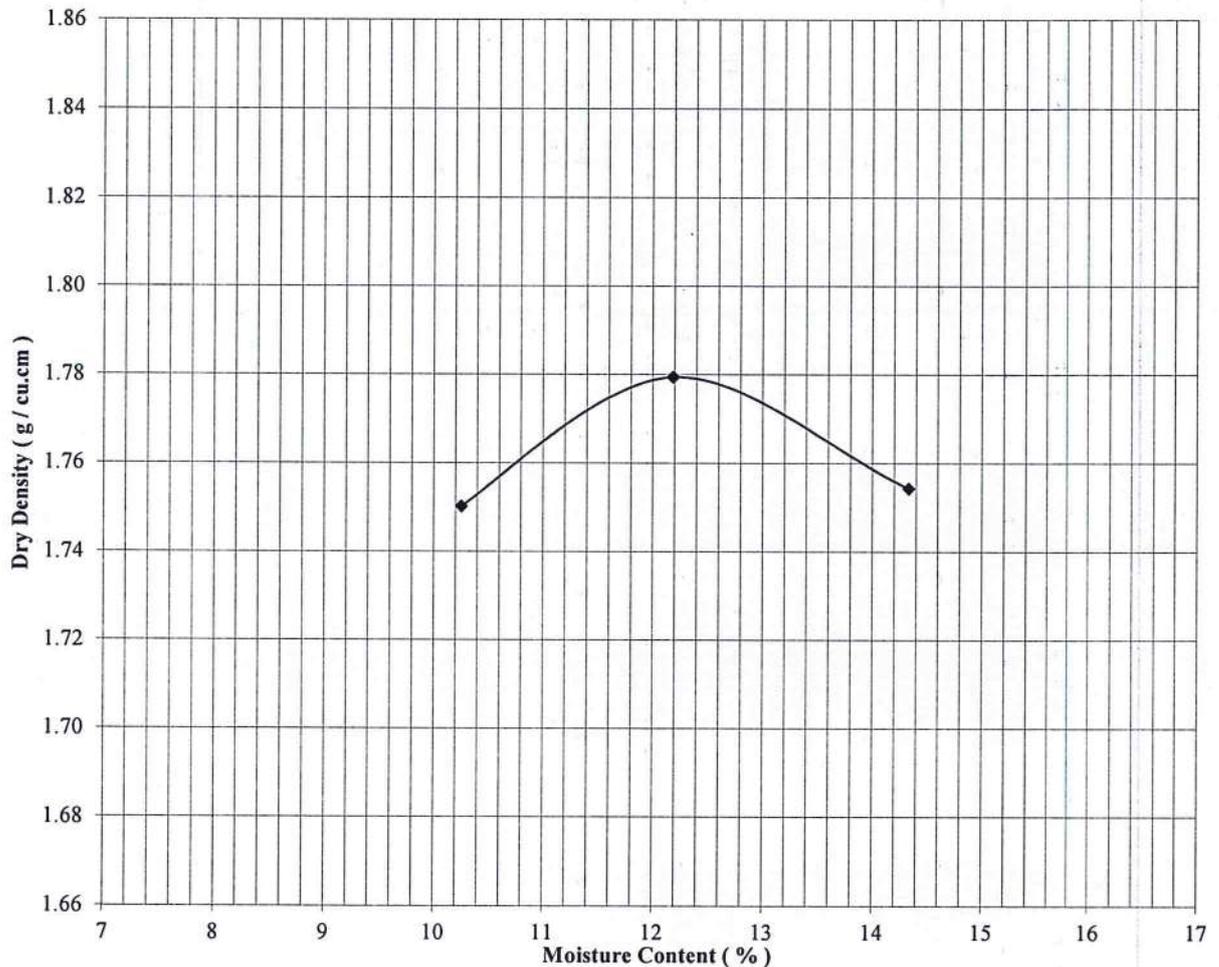
Test Pit No: TP-2 Sample No. Sub Grade

Volume of Mould : 2104 cm³

Drop : 18 inch

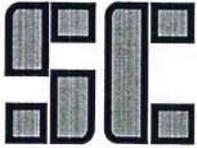
Wt of Hammer : 10 lbs

Depth (m):



Optimum Moisture Content (%)	12.18	Maximum Dry Density	1.779g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



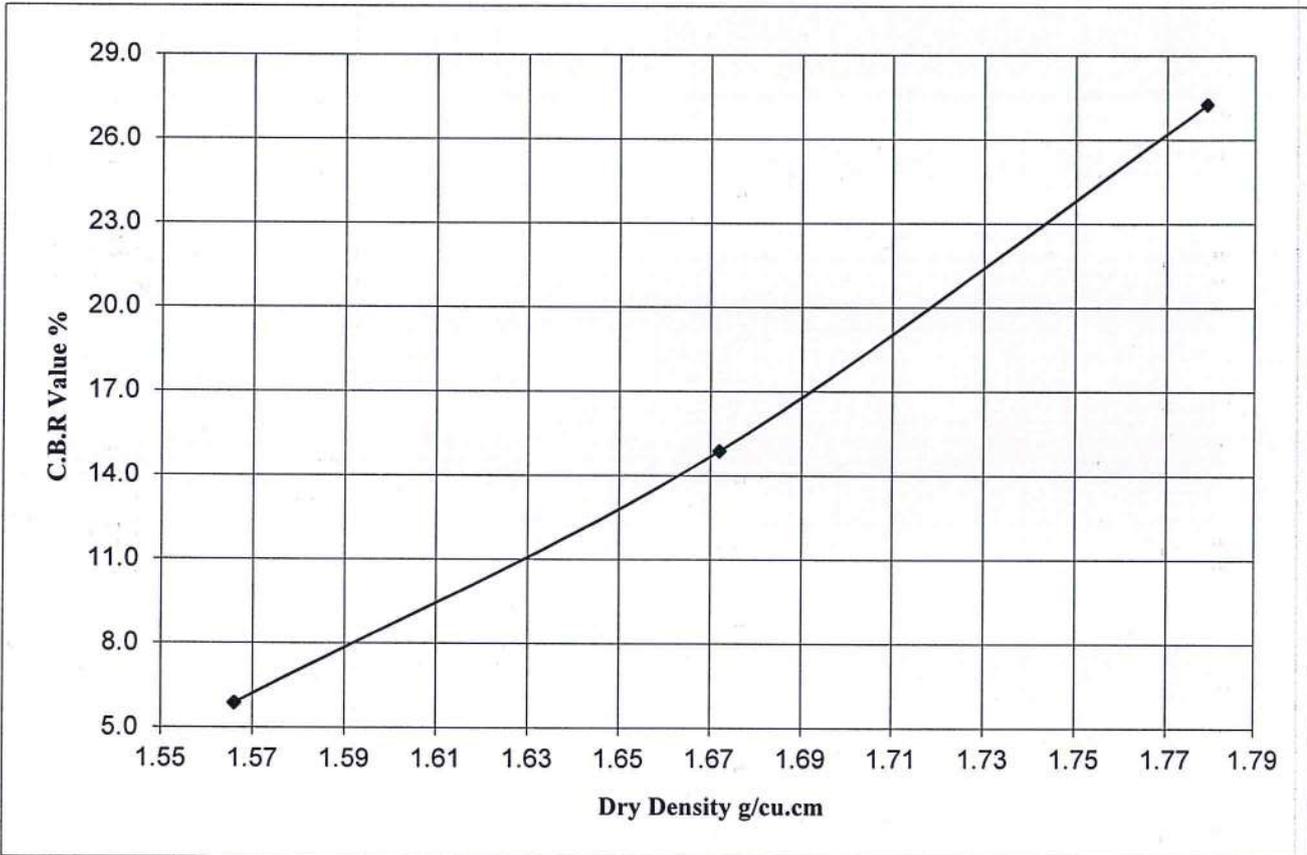
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	27.3	14.9	5.9	M.D.D. g/cu.cm	1.779
Dry Density	g/ cm ³	1.779	1.672	1.566	O.M.C %	12.18
Moisture Content	%	12.02	12.02	12.02		
Absorption	%	3.17	4.26	5.48		
Swelling	%		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-2	SAMPLE NO:	Sub grade	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY : MAHMOOD				CHECKED BY: IKRAM	

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of Blows : 56 No of Layers 5

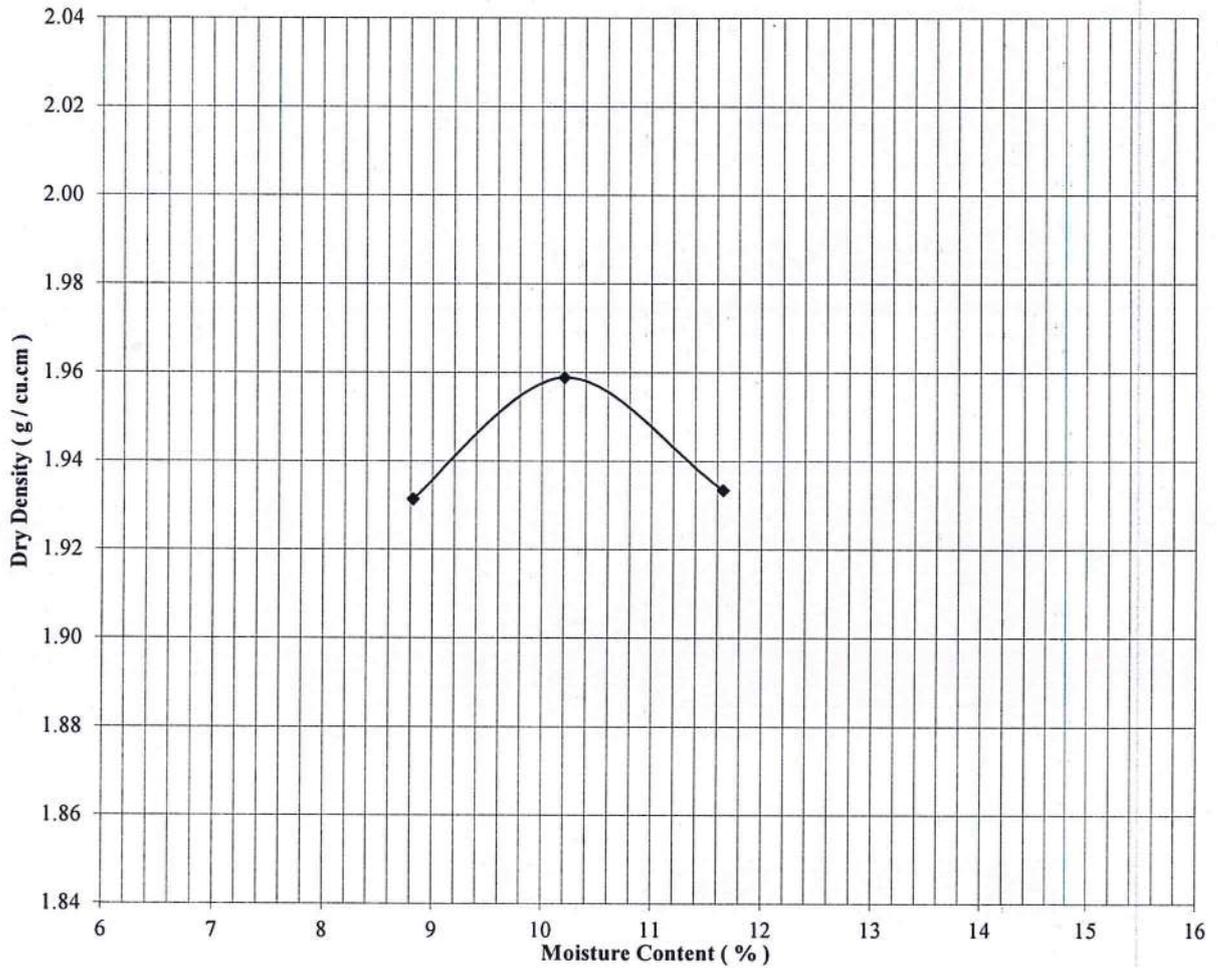
Test Pit No: TP-3 Sample No. Sub Grade

Volume of Mould : 2104 cm³

Drop : 18 inch

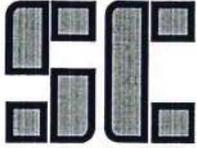
Wt of Hammer : 10 lbs

Depth (m):



Optimum Moisture Content (%)	10.20	Maximum Dry Density	1.959g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :		Client: SAFE SERVICES	
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer		65	30	10		
CBR Value at 0.1 in %					COMPACTION	MODIFIED
CBR Value at 0.2 in %		32.1	16.5	6.3	M.D.D. g/cu.cm	1.959
Dry Density g/ cm ³		1.959	1.861	1.763	O.M.C %	10.20
Moisture Content %		10.12	10.12	10.12		
Absorption %		2.48	3.19	4.53		
Swelling %			1.12			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-3	SAMPLE NO:	Sub grade	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :	MAHMOOD		CHECKED BY:	IKRAM	

SOILCON

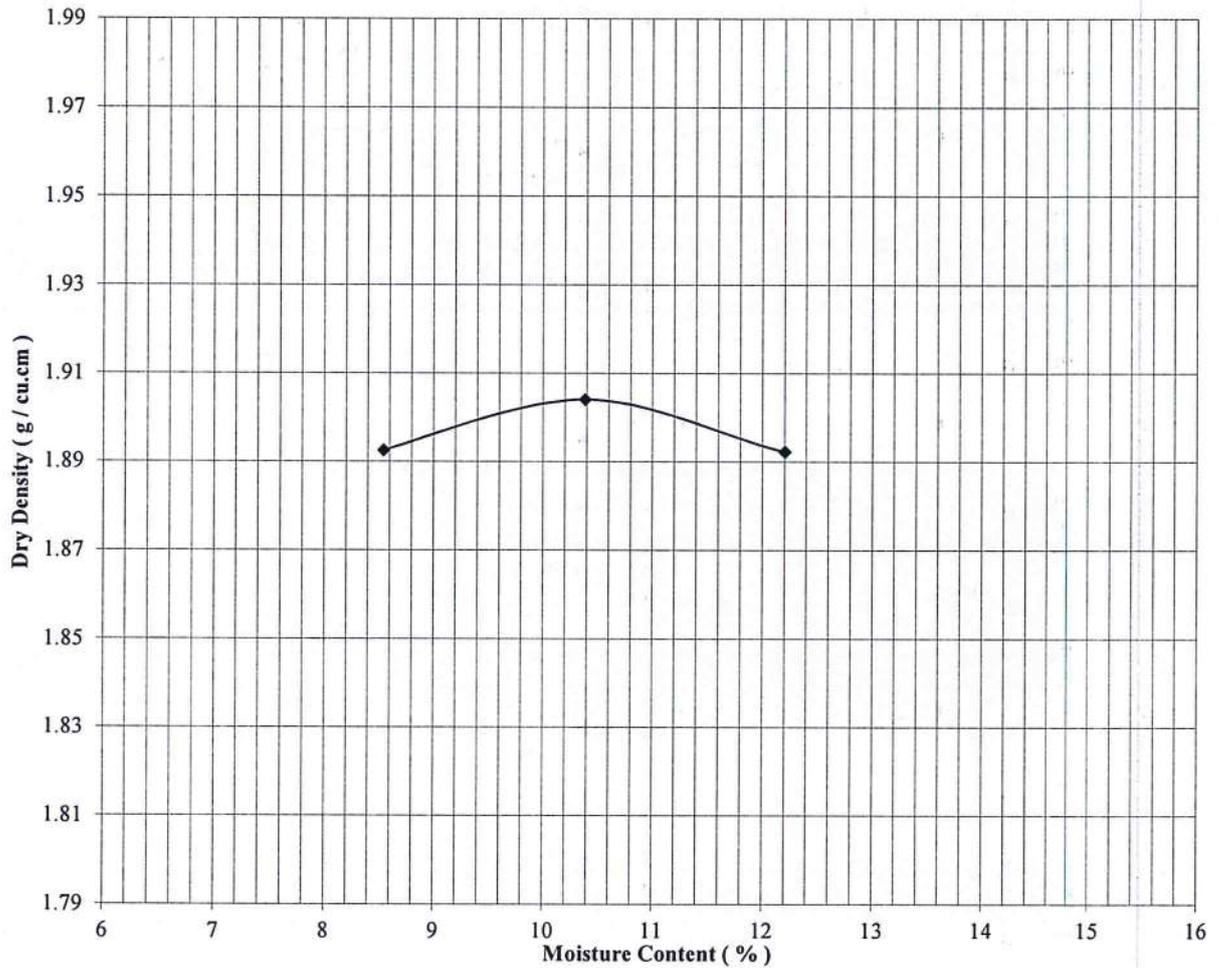
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

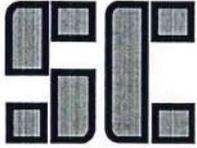
Test Method : Modified AASHTO
Dia of Mould : 6.0 inch
No of Blows : 56 No of Layers 5
Test Pit No: TP-4 Sample No. Sub Grade

Volume of Mould : 2104 cm³
Drop : 18 inch
Wt of Hammer : 10 lbs
Depth (m):



Optimum Moisture Content (%)	10.38	Maximum Dry Density	1.904g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	34.5	17.1	6.4	M.D.D. g/cu.cm	1.904
Dry Density	g/ cm ³	1.904	1.809	1.714	O.M.C %	10.38
Moisture Content	%	10.19	10.19	10.19		
Absorption	%	3.29	4.33	5.61		
Swelling	%		1.03			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-4	SAMPLE NO:	Sub grade	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :			CHECKED BY:		
MAHMOOD			IKRAM		

SOILCON

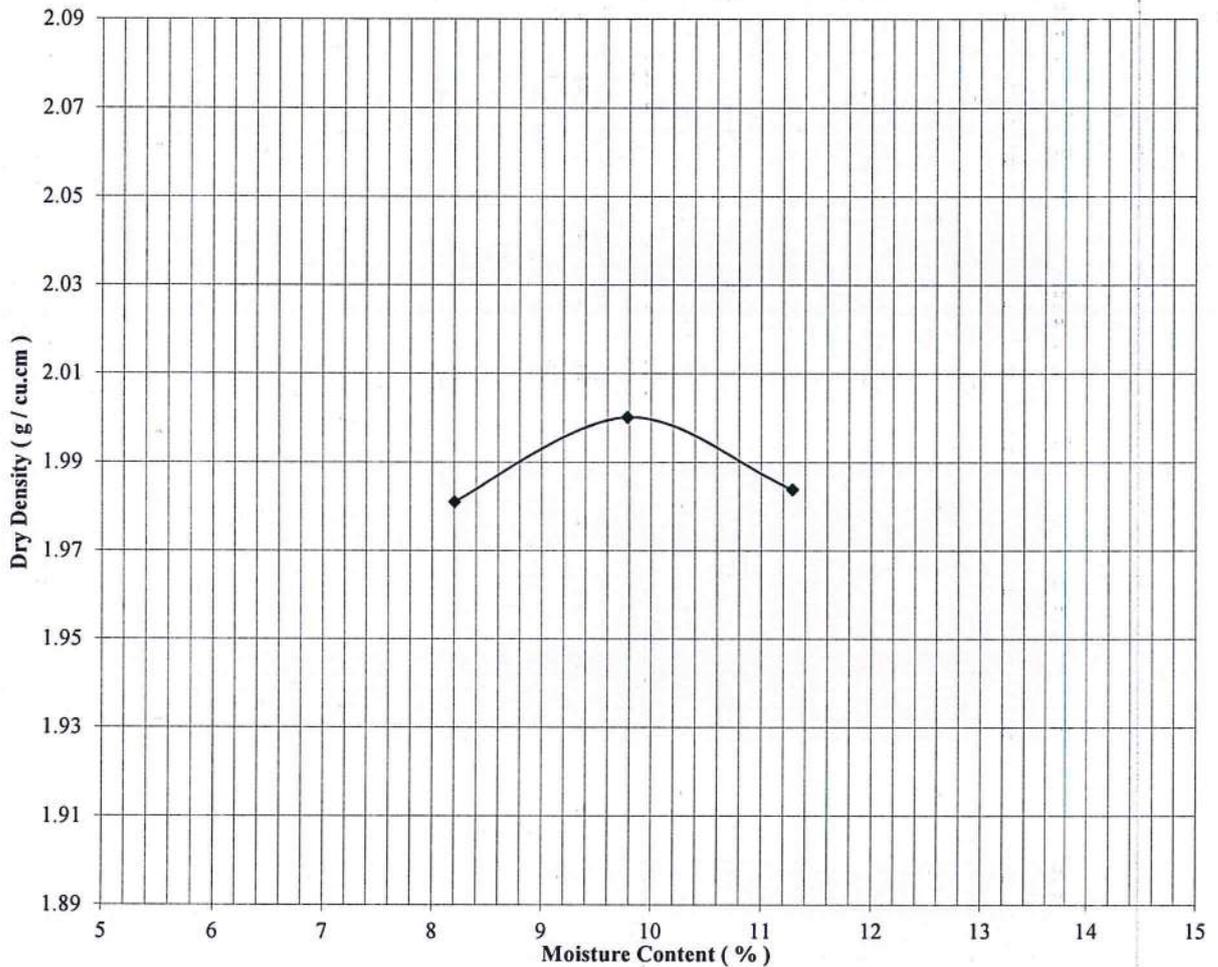
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

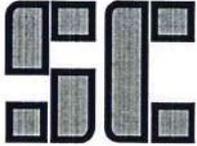
Test Method : Modified AASHTO
 Dia of Mould : 6.0 inch
 No of Blows : 56 No of Layers 5
 Test Pit No: TP-5 Sample No. Sub Grade

Volume of Mould : 2104 cm³
 Drop : 18 inch
 Wt of Hammer : 10 lbs
 Depth (m):



Optimum Moisture Content (%)		9.78	Maximum Dry Density		2.000g/cm ³
Project: FAISALABAD TO CHINIOT TO SARGODHA ROAD					
Location :				Client: SAFE SERVICES	
Tested By		Checked By		Dated	LAB. REF
Mahmood		Ikram		06.11.2020	69/2020

REMARKS:



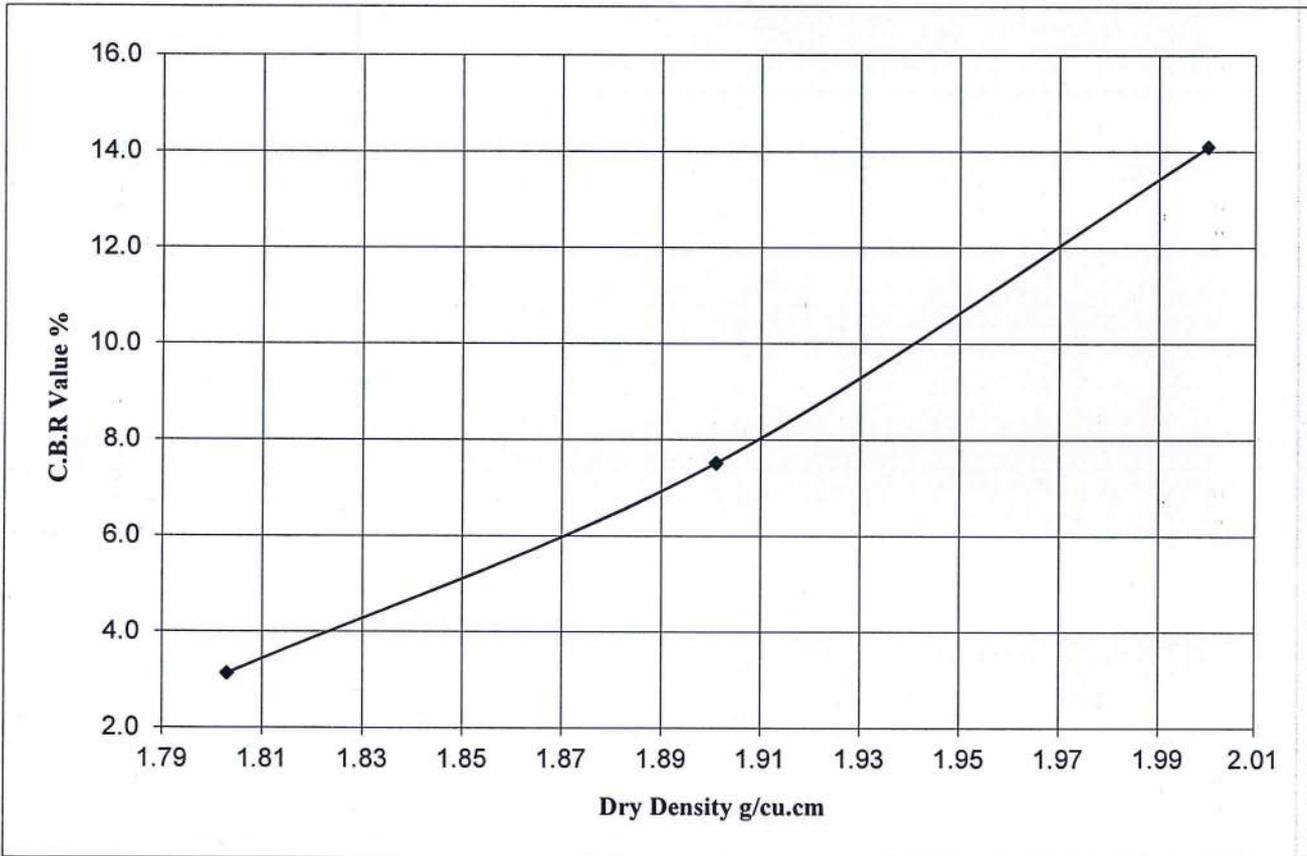
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	14.1	7.5	3.1	M.D.D. g/cu.cm	2.000
Dry Density	g/ cm ³	2.000	1.901	1.803	O.M.C %	9.78
Moisture Content	%	9.53	9.53	9.53		
Absorption	%	2.59	3.41	4.19		
Swelling	%		1.93			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP/ BH NO:	TP-5	SAMPLE NO:	Sub grade	DEPTH (m)	
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY :	MAHMOOD		CHECKED BY:	IKRAM	

SOILCON

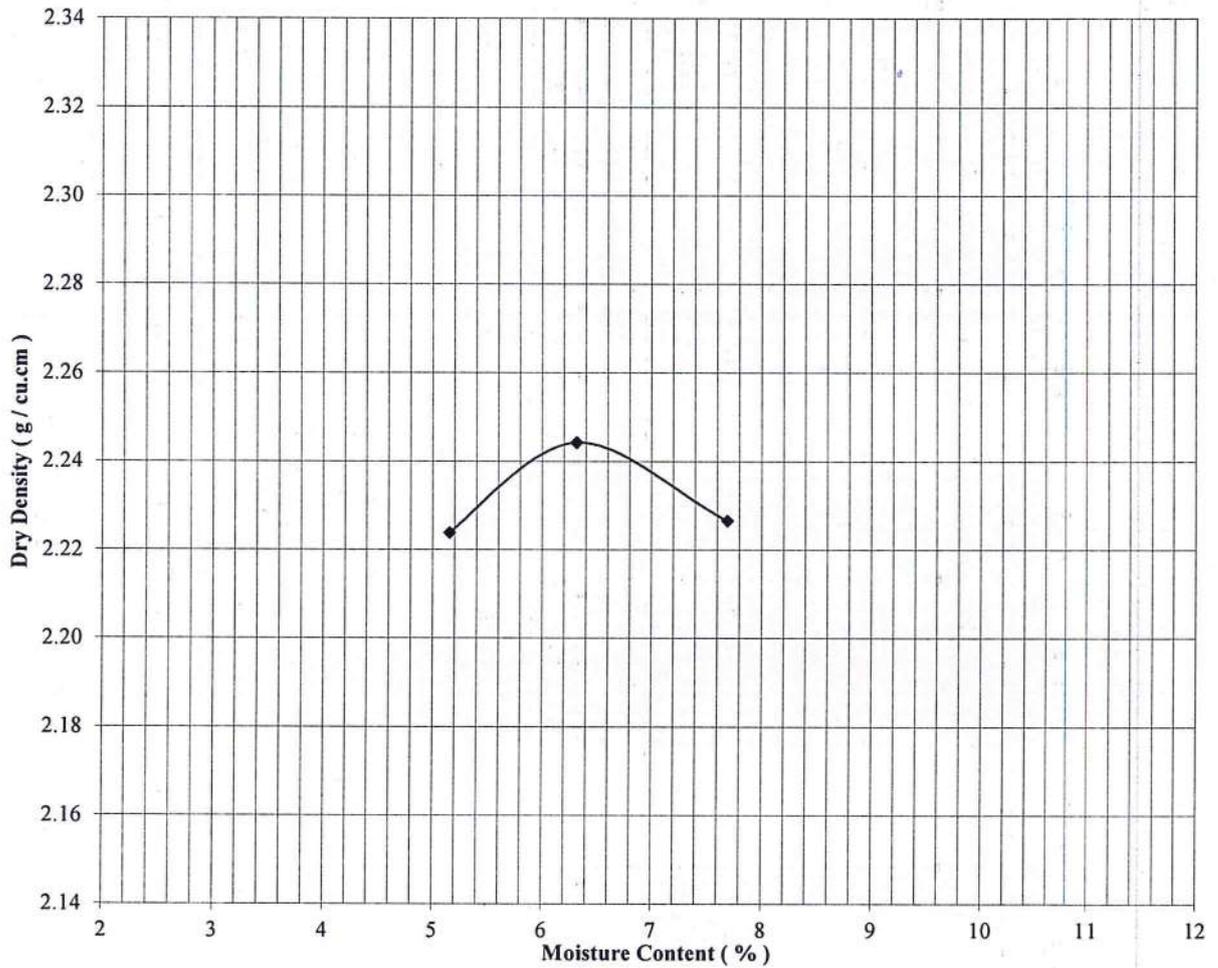
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

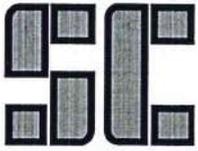
Test Method : Modified AASHTO
Dia of Mould : 6.0 inch
No of Blows : 56 No of Layers 5
Test Pit No: TP-6 Sample No. Sub Grade

Volume of Mould : 2104 cm³
Drop : 18 inch
Wt of Hammer : 10 lbs
Depth (m):



Optimum Moisture Content (%)	6.31	Maximum Dry Density	2.244g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	06.11.2020	69/2020

REMARKS:



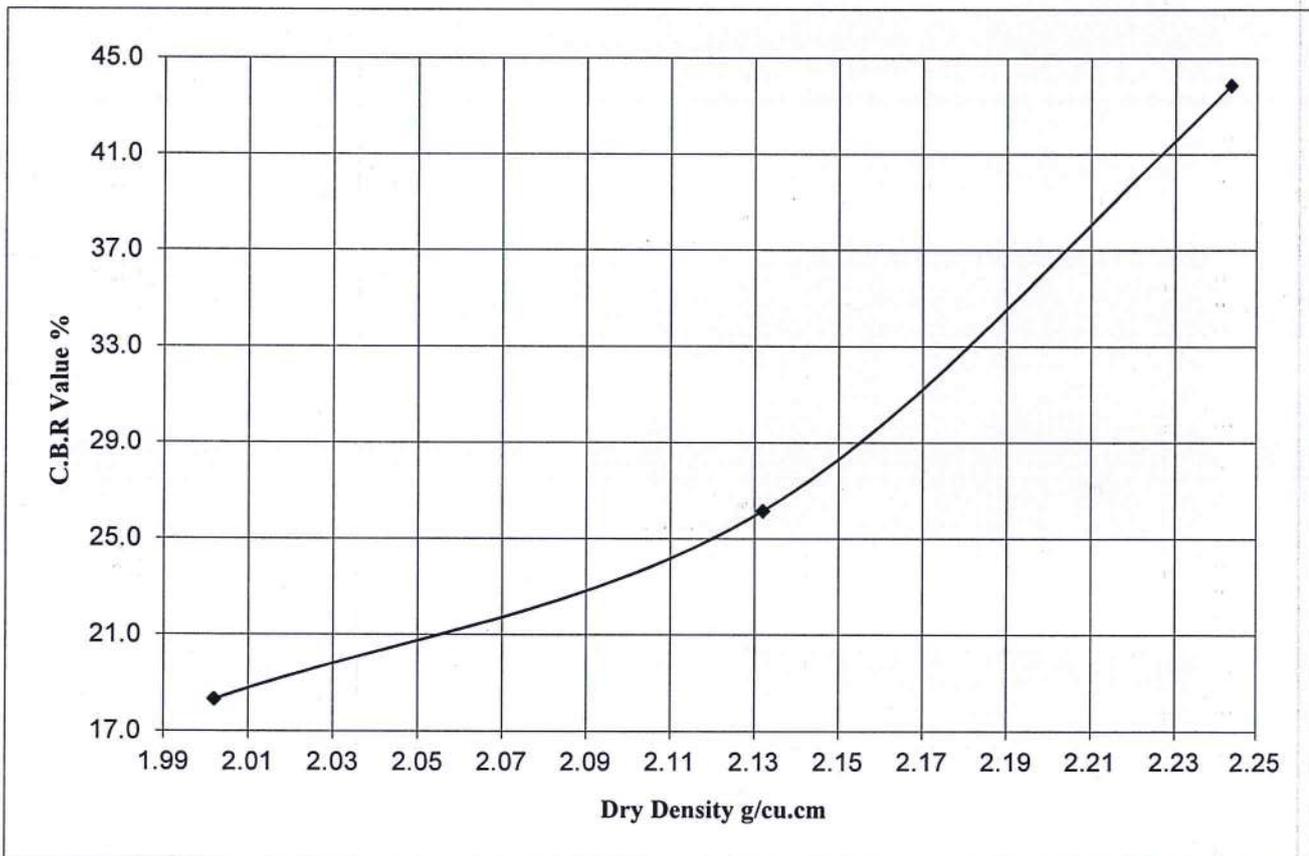
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No.of Blows per Layer	65	30	10		
CBR Value at 0.1 in %				COMPACTION	MODIFIED
CBR Value at 0.2 in %	43.9	26.2	18.3	M.D.D. g/cu.cm	2.244
Dry Density g/ cm ³	2.244	2.132	2.002	O.M.C %	6.31
Moisture Content %	6.24	6.24	6.24		
Absorption %	1.50	2.79	3.73		
Swelling %		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD			CLIENT	SAFE SERVICES
LOCATION:				DEPTH (m)	
TP/ BH NO:	TP-6	SAMPLE NO:	Sub grade		
LAB REF. NO :	69/2020	DATE :	10.11.2020		
TESTED BY : MAHMOOD			CHECKED BY: IKRAM		

ANNEXURE 'C'

BORROW AREAS RESULT SHEETS

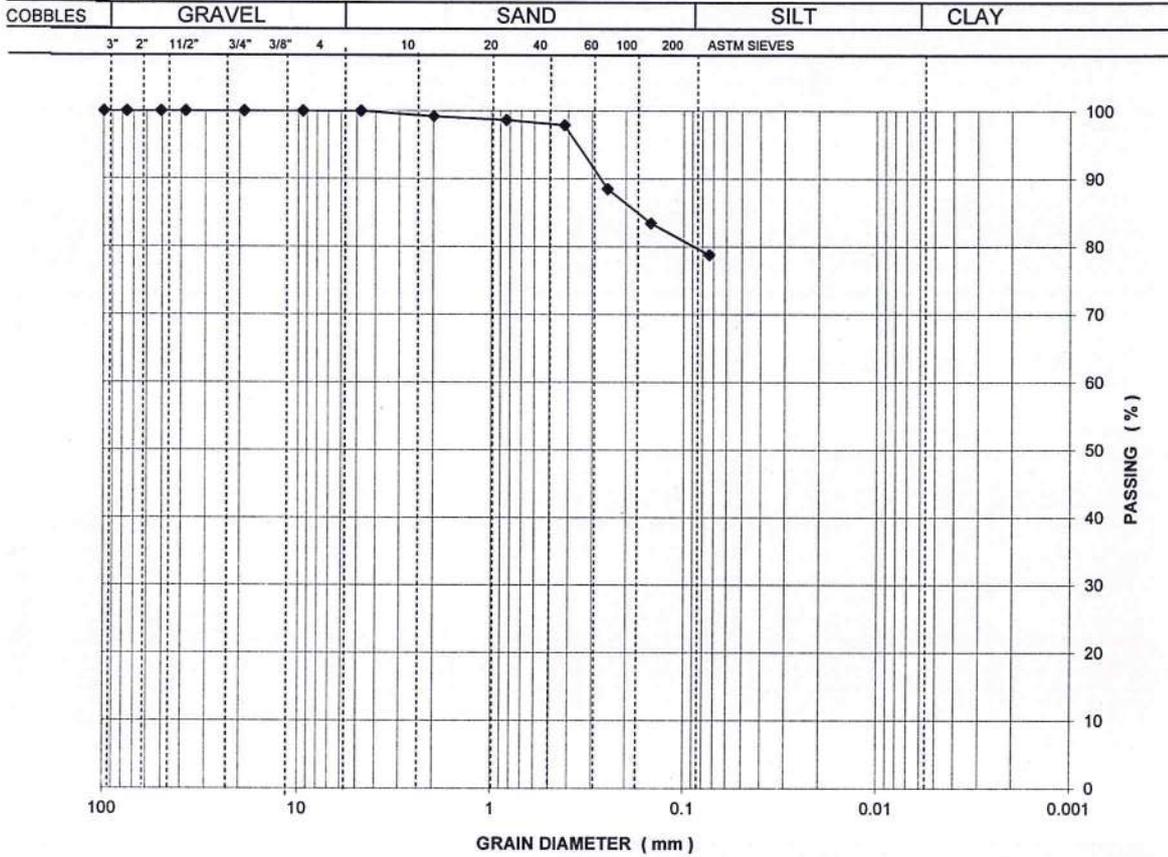
**SIEVE ANALYSIS
SHEETS**

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>IKRAM</i>	<i>MAHMOOD</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-1	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1"1/2	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	99	98	83	79

LAB. REF.	69/2020
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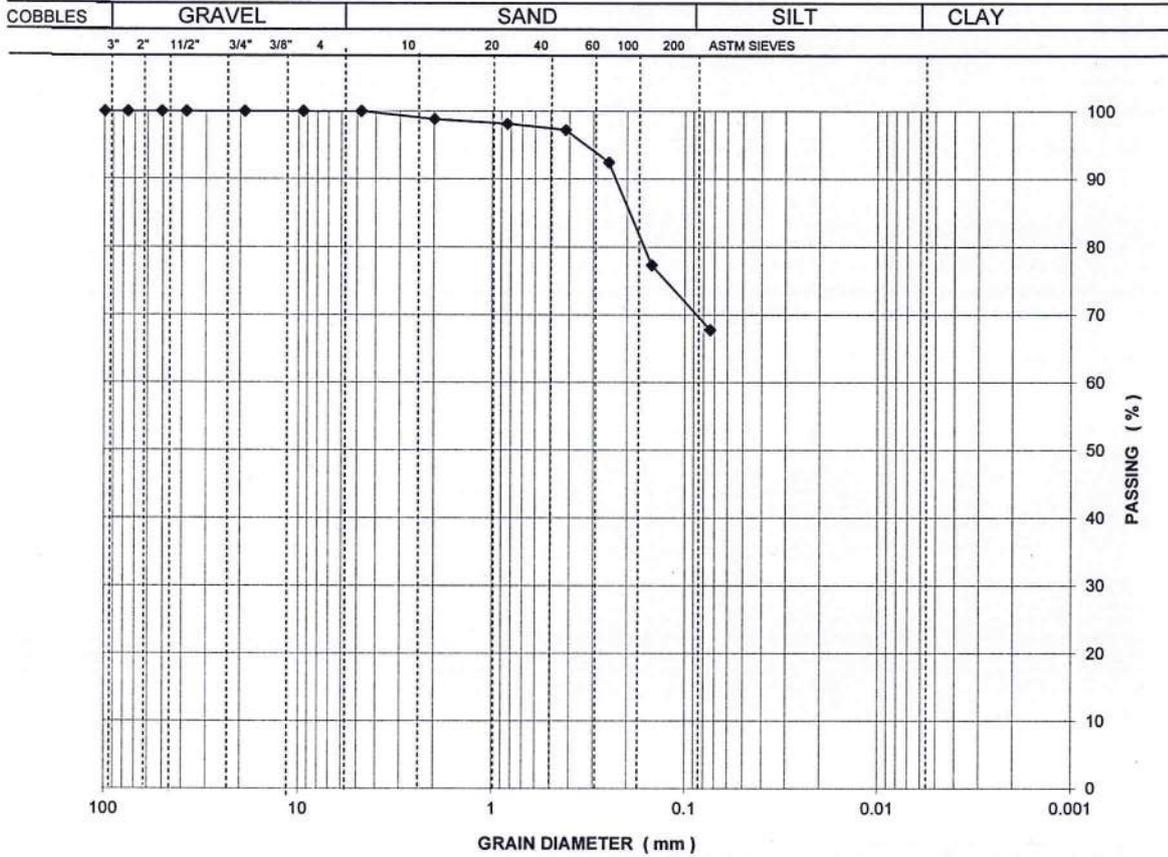
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-2	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	99	97	77	68

LAB. REF.	69/2020
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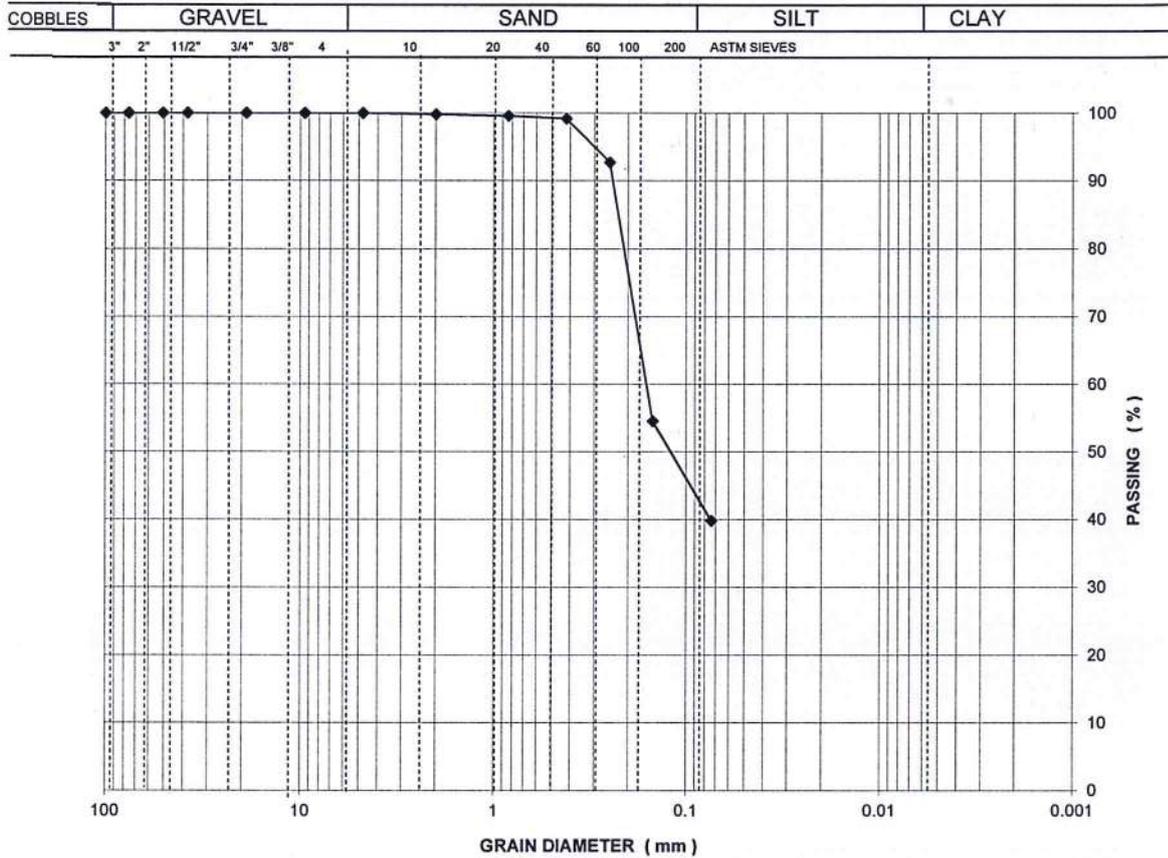
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
	

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-3	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	100	99	55	40

LAB. REF.	69/2020
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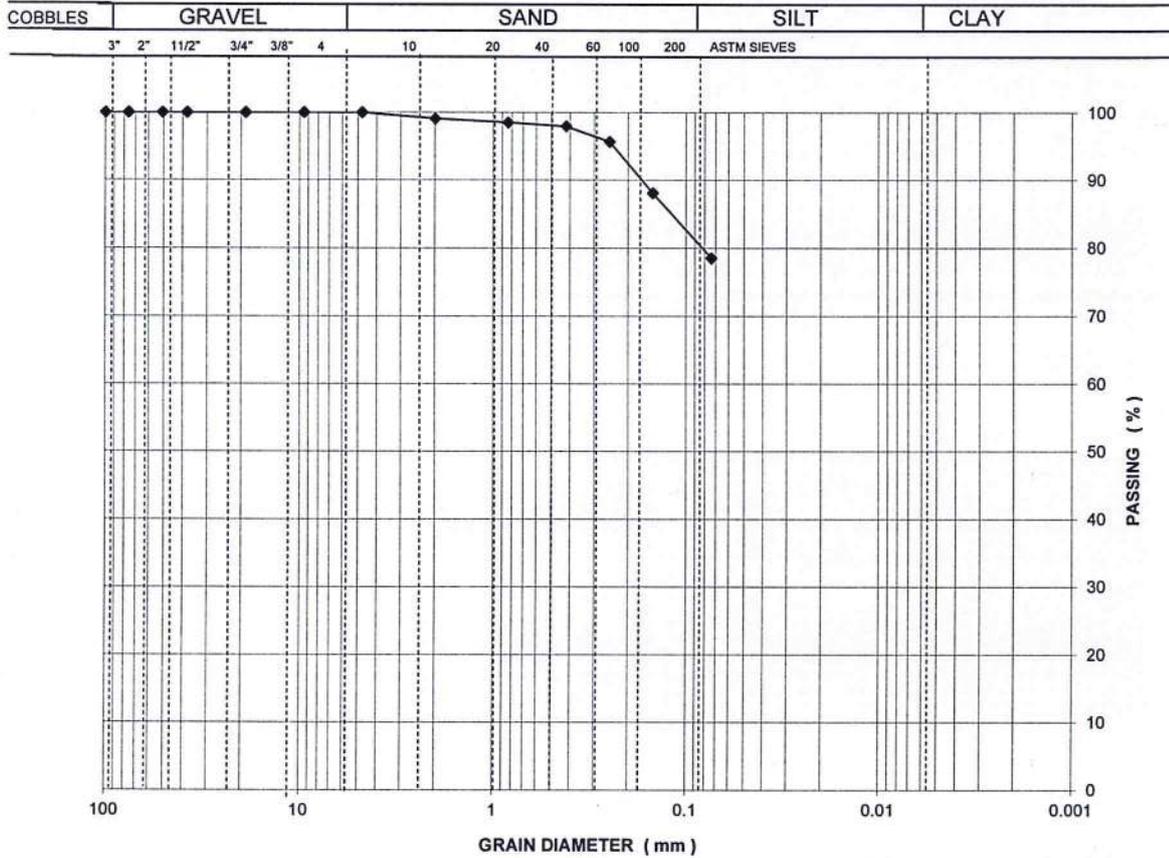
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-4	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	99	98	88	79

LAB. REF.	69/2020
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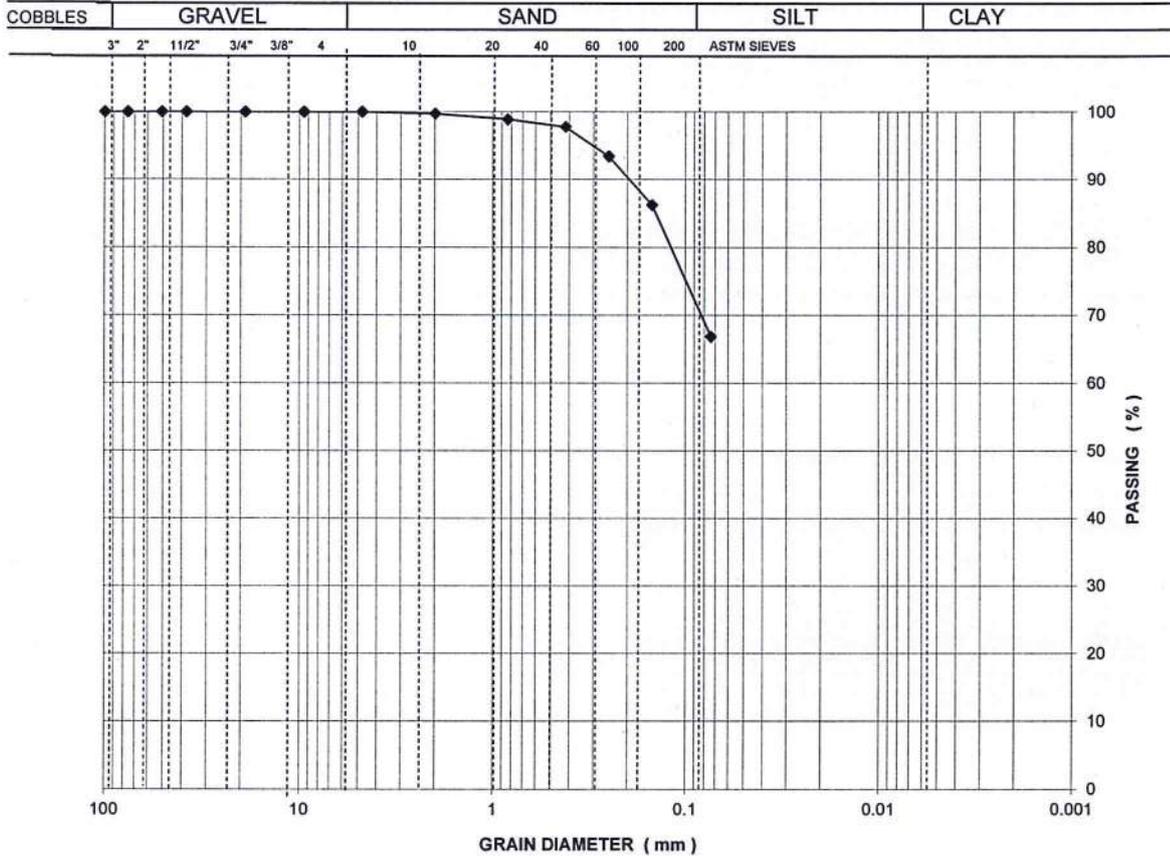
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-5	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



SIEVE NO.	3"	2"	1 1/2"	3/4"	3/8"	4	10	40	100	200
PASSING (%)	100	100	100	100	100	100	100	98	86	67

LAB. REF.	69/2020
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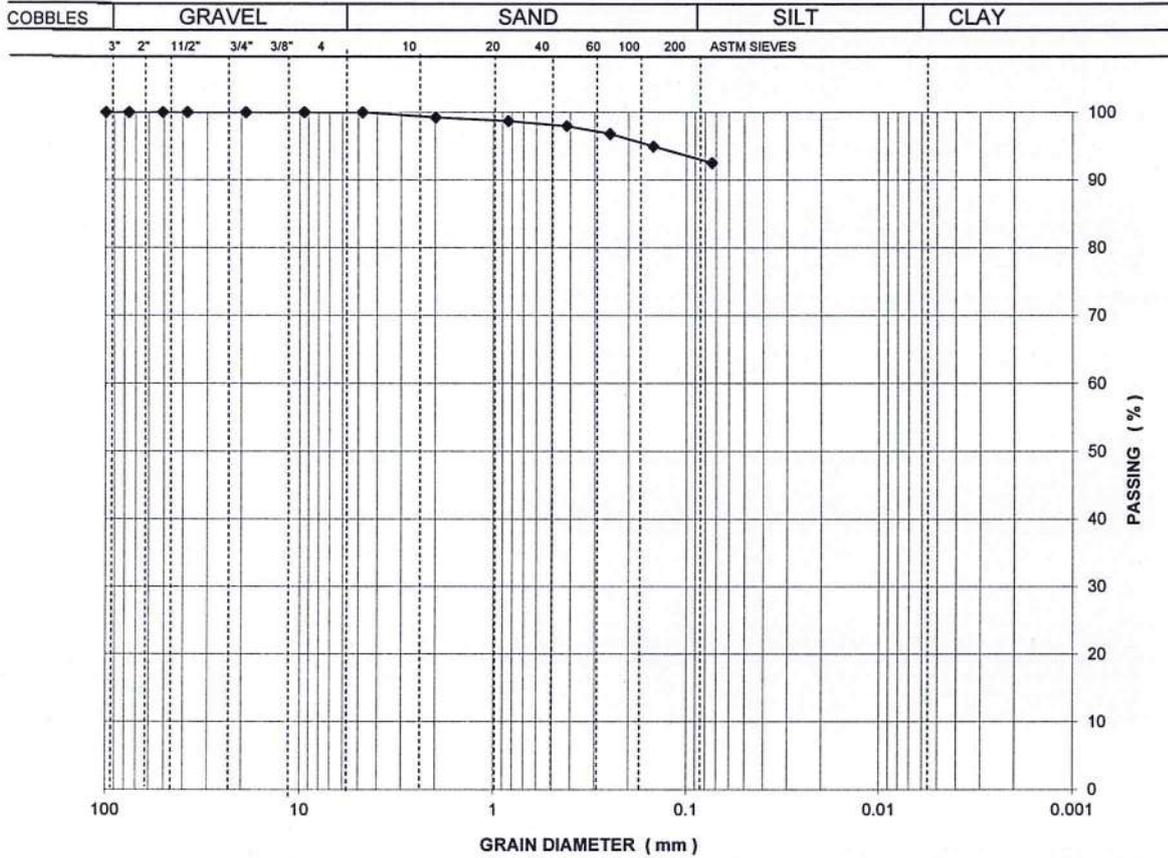
REMARKS :

SOILCON

GRAIN SIZE ANALYSIS

TESTED BY	CHECKED BY
IKRAM ULLAH	MAHMOOD
<i>[Signature]</i>	<i>[Signature]</i>

CLIENT	SAFE SERVICES		
PROJECT	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
SITE	BORROW		
BORE HOLE	BA-6	SAMPLE	
TYPE	DISTURBED	DEPTH(m)	
SPECIMEN	1	DATE	



**ATTERBERG LIMIT TEST
RESULT SHEETS**

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-1	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

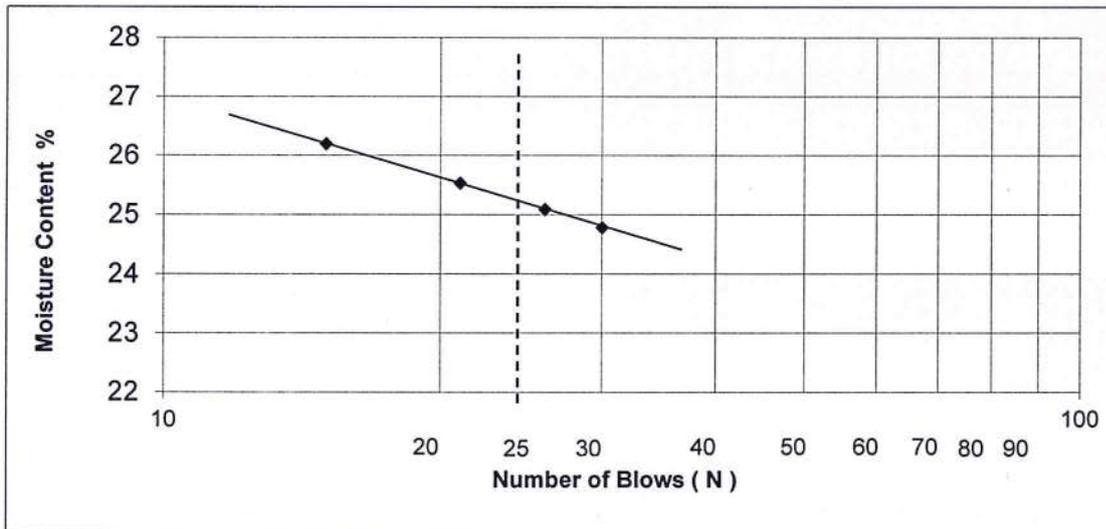
LIQUID LIMIT

Number of Blows N	15	21	26	30	
Moisture Content %	26.20	25.53	25.09	24.78	

PLASTIC LIMIT

Moisture Content %	16.92	16.98	17.04
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
25	17	8



TESTED BY MAHMOOD	CHECKED BY IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-2	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

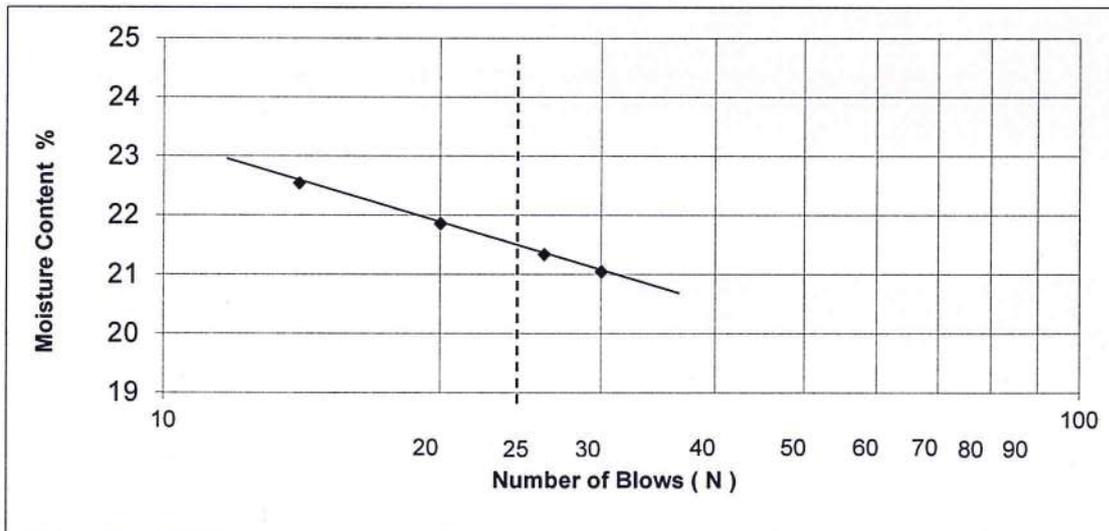
LIQUID LIMIT

Number of Blows N	14	20	26	30	
Moisture Content %	22.54	21.86	21.34	21.05	

PLASTIC LIMIT

Moisture Content %	14.93	14.98	15.04
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
21	15	6



TESTED BY MAHMOOD	CHECKED BY IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-3	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

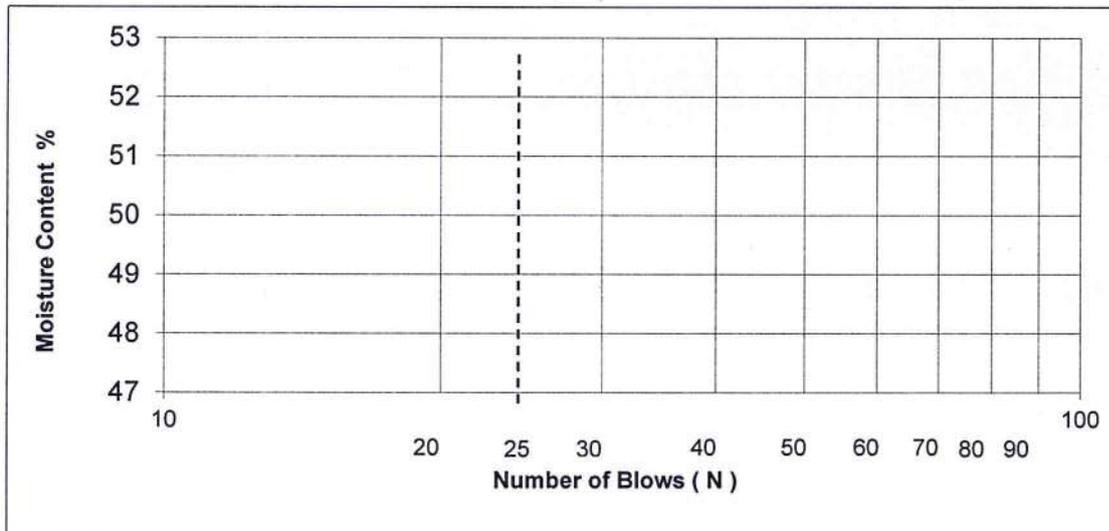
LIQUID LIMIT

Number of Blows N					
Moisture Content %					

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	NON-PLASTIC	



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-4	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

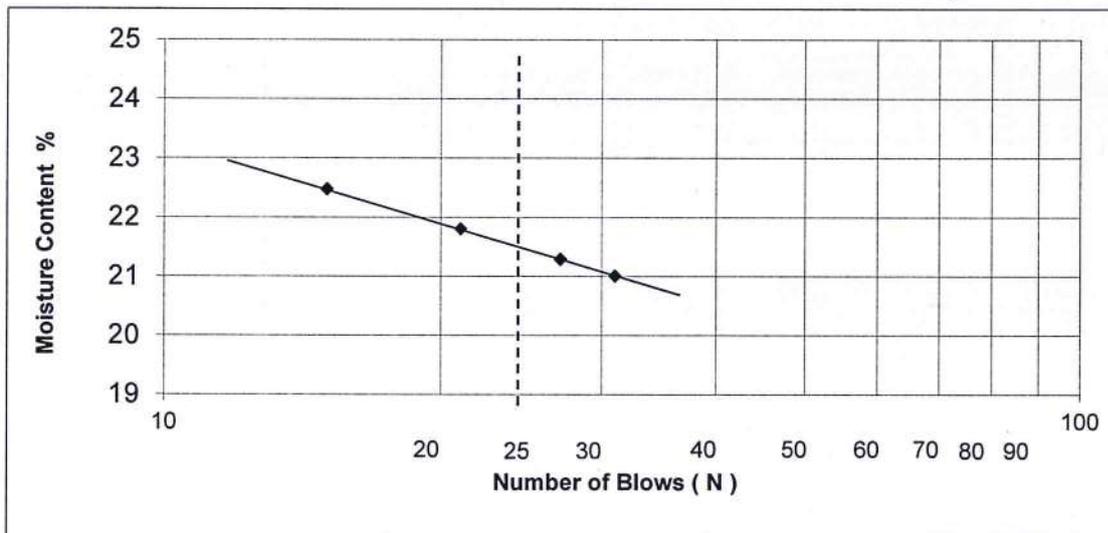
LIQUID LIMIT

Number of Blows N	15	21	27	31	
Moisture Content %	22.48	21.81	21.29	21.01	

PLASTIC LIMIT

Moisture Content %	15.21	15.26	15.31
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
21	15	6



TESTED BY MAHMOOD	CHECKED BY IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-5	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

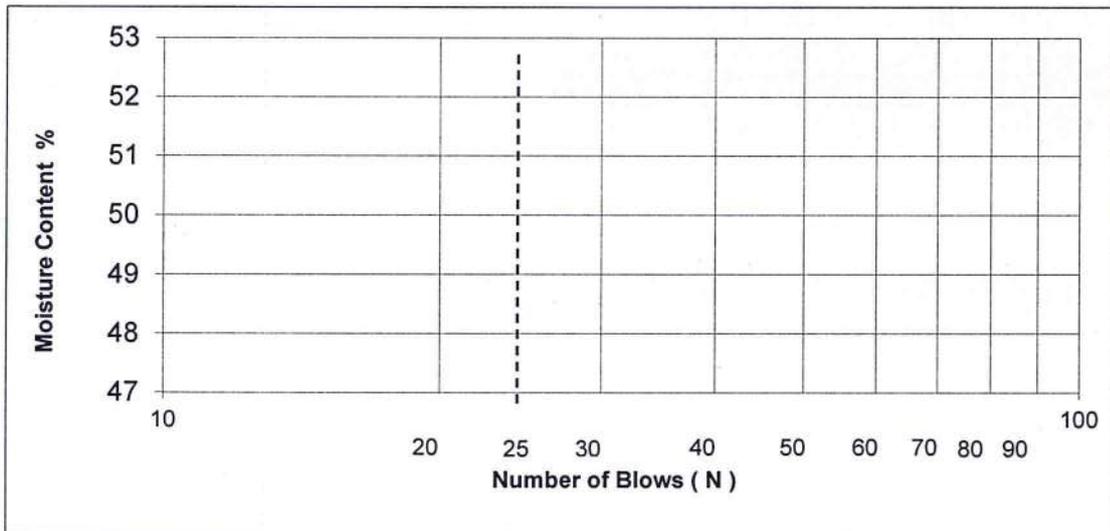
LIQUID LIMIT

Number of Blows N	13	Further readings are not possible
Moisture Content %	24.14	

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

SOILCON

LIQUID & PLASTIC LIMIT

(ASTM D - 4318)

PROJECT	FAISALABAD -CHINOT-SARGODHA ROAD				
LOCATION					
CLIENT	SAFE SERVICES				
BOREHOLE	BA-6	SAMPLE		TYPE	DISTURBED
LAB. REF.	69/2020	DEPTH m		DATE	09.11.2020

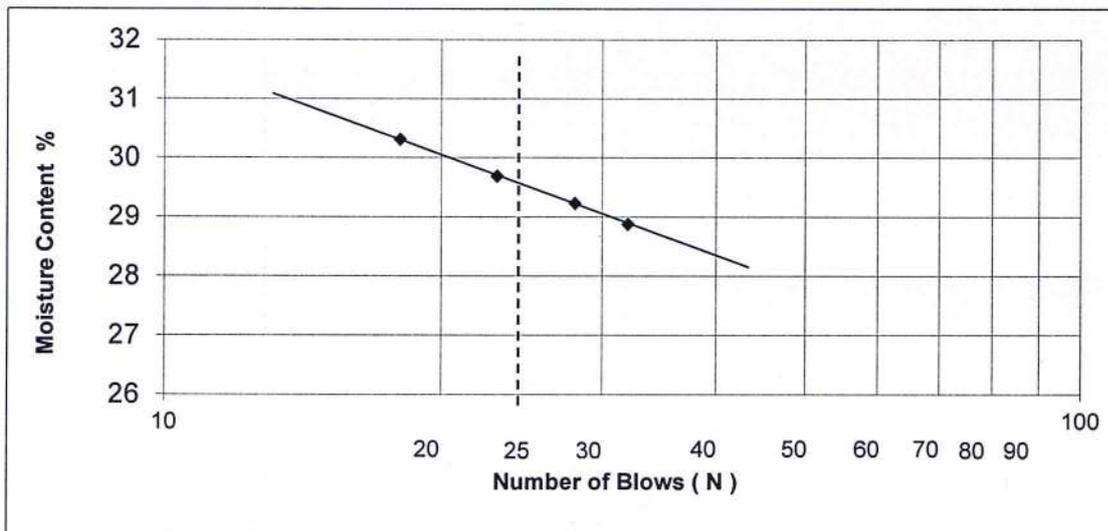
LIQUID LIMIT

Number of Blows N	18	23	28	32	
Moisture Content %	30.31	29.69	29.23	28.88	

PLASTIC LIMIT

Moisture Content %	19.81	19.87	19.92
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
30	20	10



TESTED BY	CHECKED BY
MAHMOOD	IKRAM
<i>(Signature)</i>	<i>(Signature)</i>

CALIFORNIA BEARING RATIO (CBR)
&
MAXIMUM DRY DENSITY (MDD)
TEST RESULT SHEETS

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of blows : 56 No of Layers 5

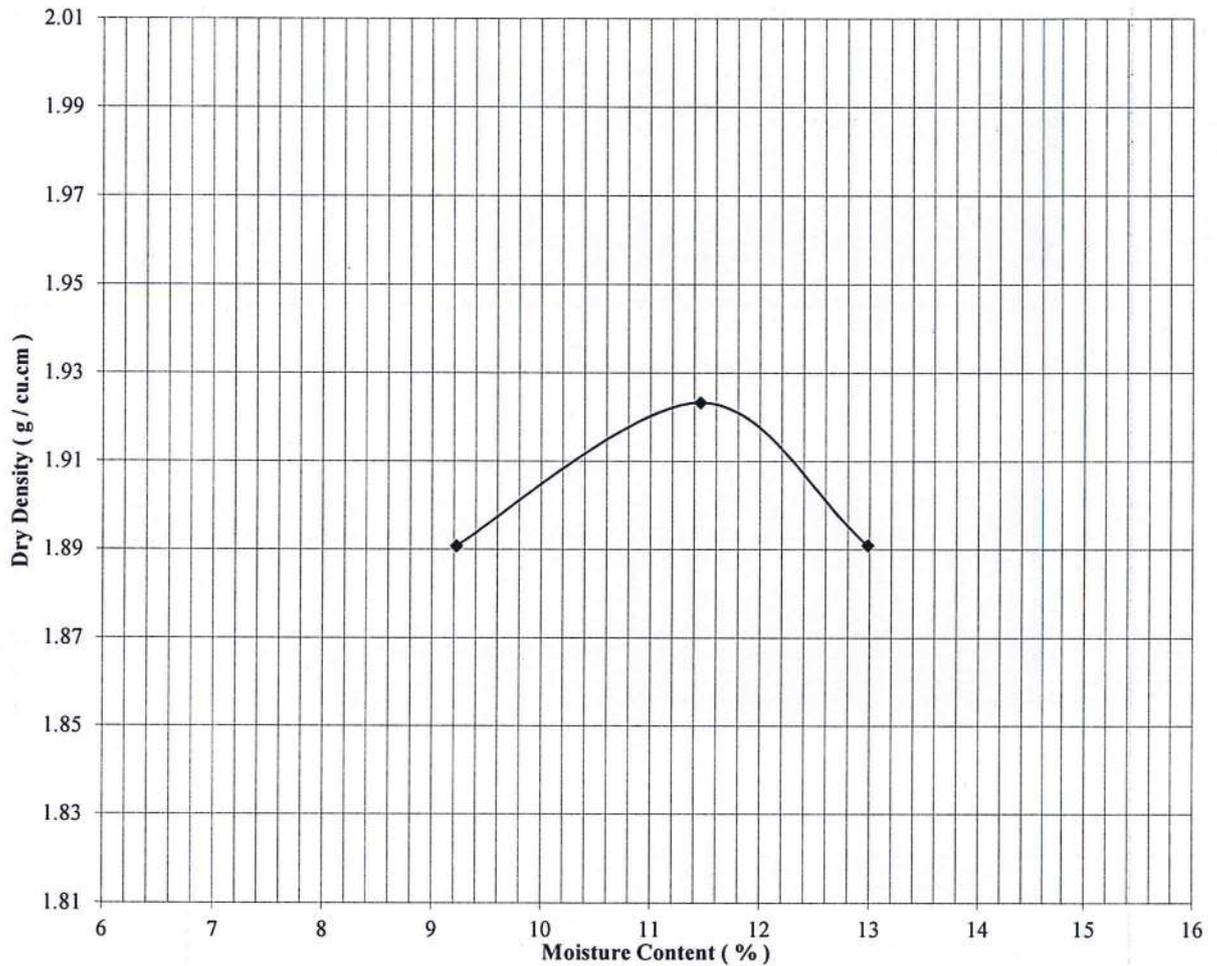
Test Pit No: _____ Sample No. BA-1

Volume of Mould : 2104 cm³

Drop : 18 inch

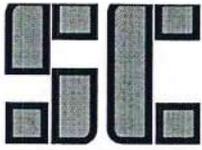
Wt of Hammer : 10 lbs

Depth (m): _____



Optimum Moisture Content (%)	11.45	Maximum Dry Density	1.923 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	21.5	10.2	4.7	M.D.D. g/cu.cm	1.923
Dry Density	g/ cm ³	1.923	1.827	1.731	O.M.C %	11.45
Moisture Content	%	11.21	11.21	11.21		
Absorption	%	3.61	4.39	5.53		
Swelling	%		0.97			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP NO:	BA-1	SAMPLE NO:		DEPTH (m)	
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY :	Mahmood		CHECKED BY :	Ikram	

SOILCON

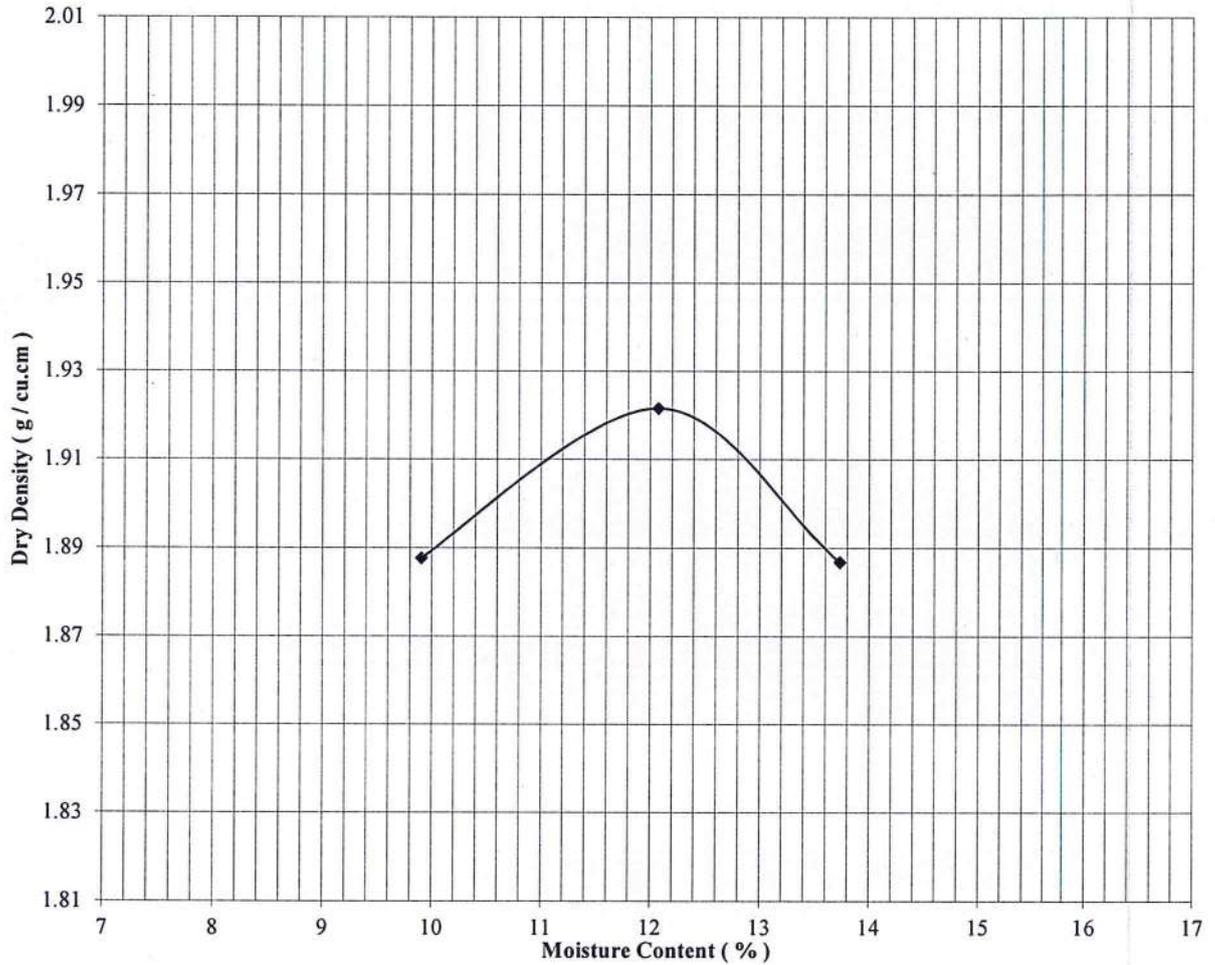
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

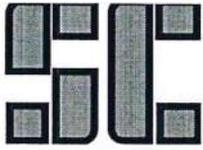
Test Method : Modified AASHTO
 Dia of Mould : 6.0 inch
 No of blows : 56 No of Layers 5
 Test Pit No: _____ Sample No. BA-2

Volume of Mould : 2104 cm³
 Drop : 18 inch
 Wt of Hammer : 10 lbs
 Depth (m): _____



Optimum Moisture Content (%)	12.07	Maximum Dry Density	1.922 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS: _____



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	23.2	12.4	5.5	M.D.D. g/cu.cm	1.922
Dry Density	g/ cm ³	1.922	1.845	1.749	O.M.C %	12.07
Moisture Content	%	11.96	11.96	11.96		
Absorption	%	4.11	5.29	6.31		
Swelling	%		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP NO:	BA-2	SAMPLE NO:		DEPTH (m)	
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY : Mahmood				CHECKED BY : Ikram	

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of blows : 56 No of Layers 5

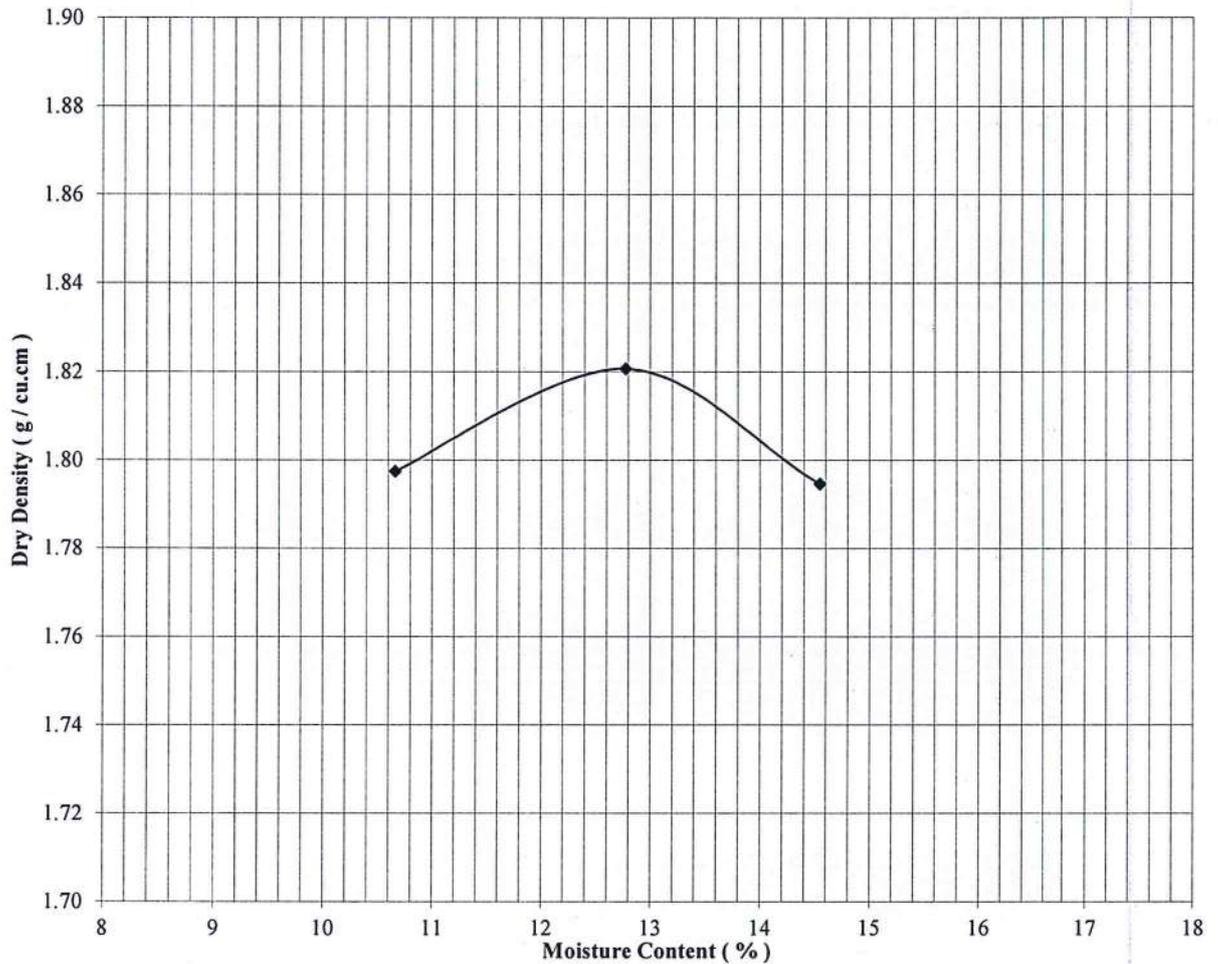
Test Pit No: _____ Sample No. BA-3

Volume of Mould : 2104 cm³

Drop : 18 inch

Wt of Hammer : 10 lbs

Depth (m): _____



Optimum Moisture Content (%)	12.77	Maximum Dry Density	1.821 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :		Client: SAFE SERVICES	
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS:



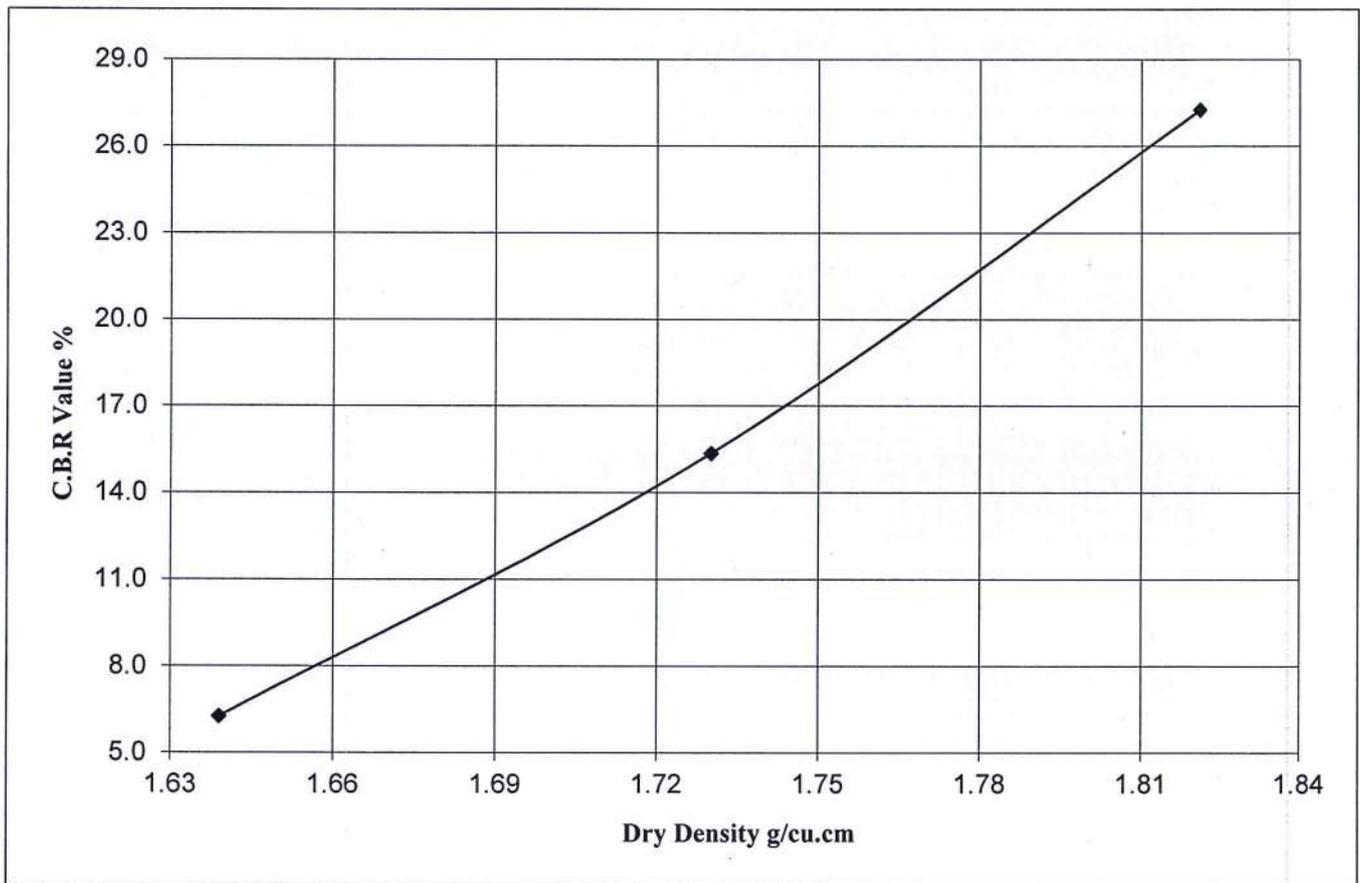
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	27.3	15.4	6.3	M.D.D. g/cu.cm	1.821
Dry Density	g/ cm ³	1.821	1.730	1.639	O.M.C %	12.77
Moisture Content	%	12.58	12.58	12.58		
Absorption	%	3.69	5.16	7.21		
Swelling	%		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP NO:	BA-3	SAMPLE NO:		DEPTH (m)	
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY :	Mahmood		CHECKED BY :	Ikram	

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of blows : 56 No of Layers 5

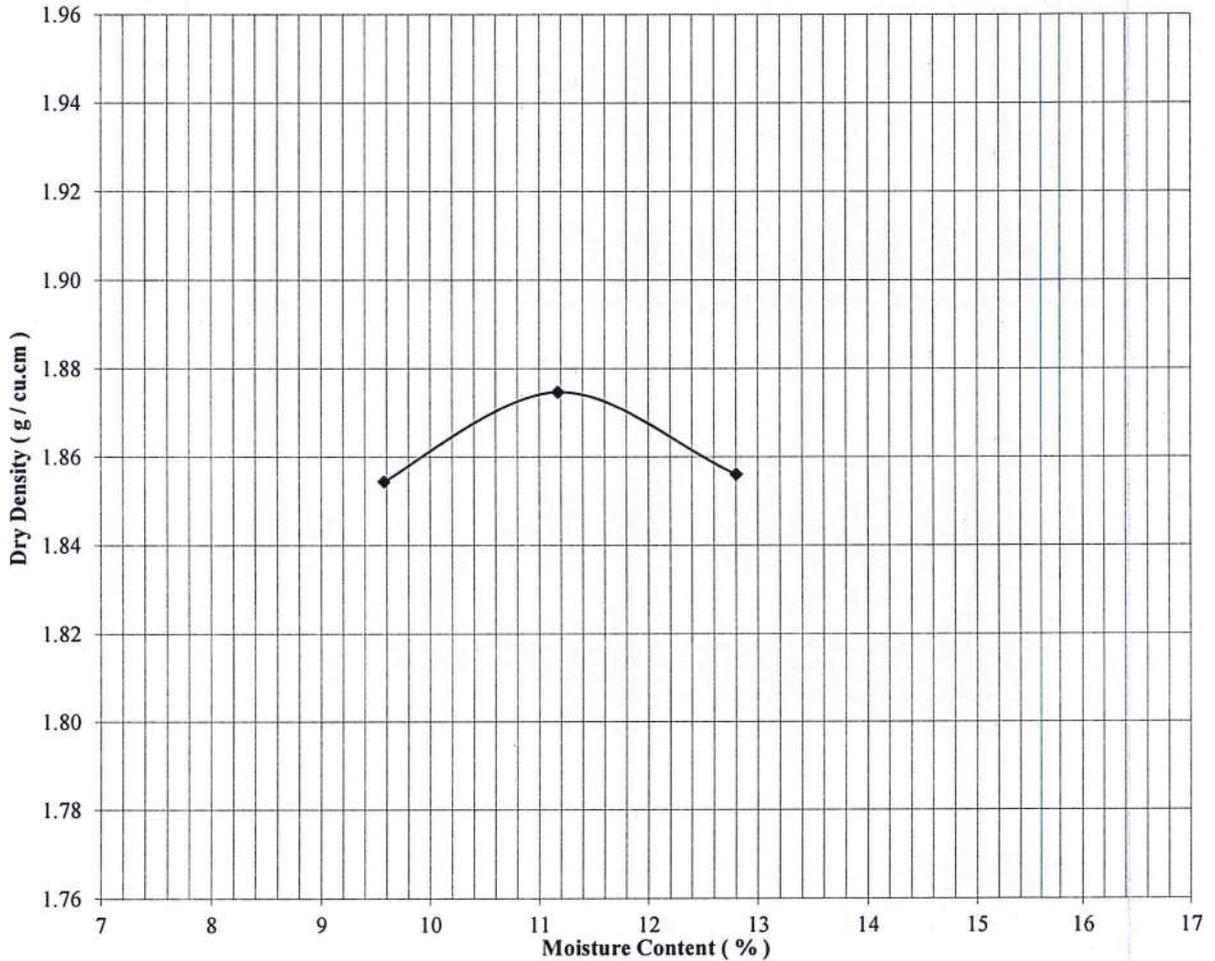
Test Pit No: _____ Sample No. BA-4

Volume of Mould : 2104 cm³

Drop : 18 inch

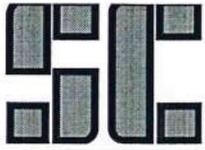
Wt of Hammer : 10 lbs

Depth (m): _____



Optimum Moisture Content (%)	11.17	Maximum Dry Density	1.875 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :	Client: SAFE SERVICES		
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS:



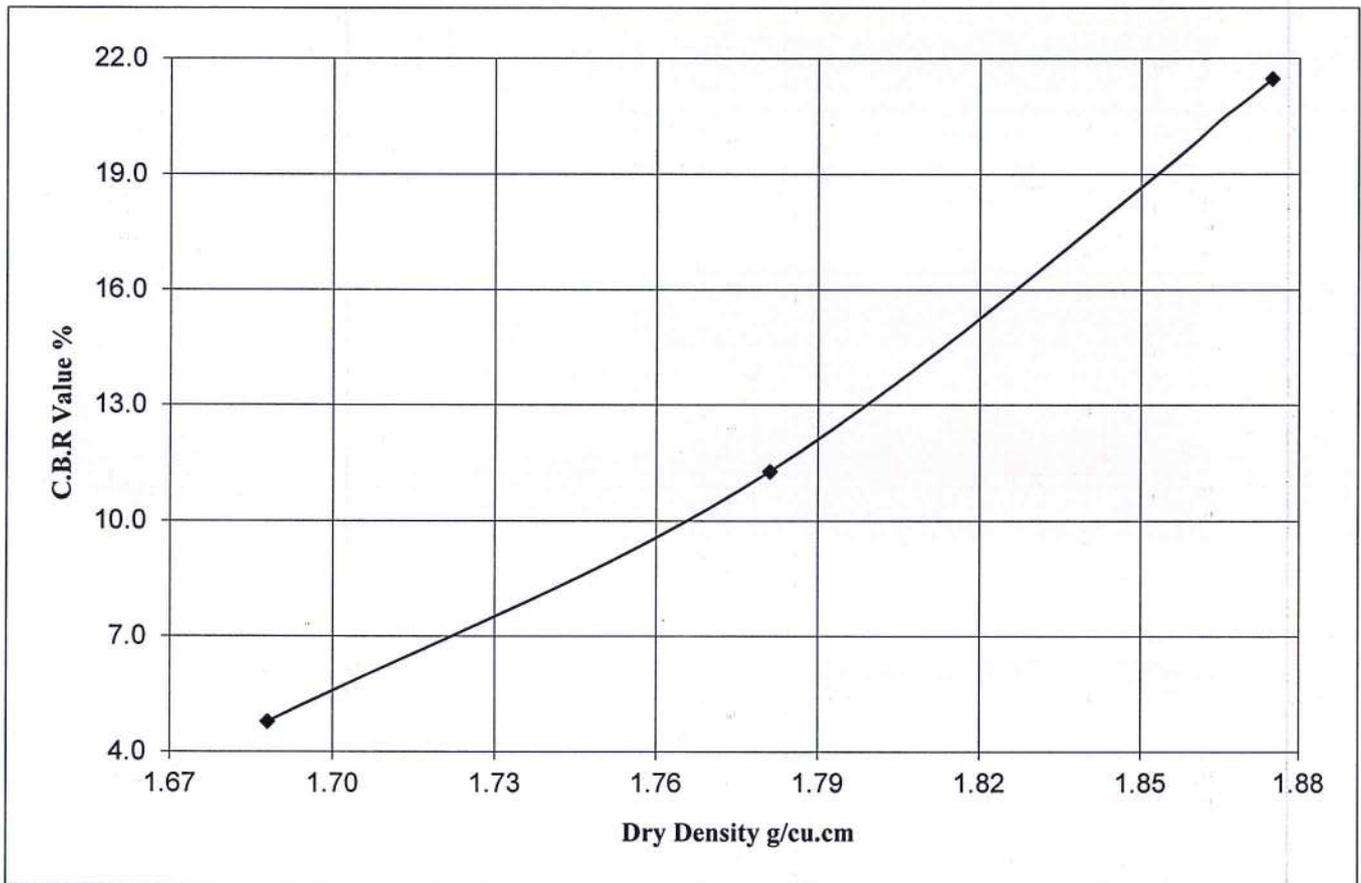
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	21.5	11.3	4.8	M.D.D. g/cu.cm	1.875
Dry Density	g/ cm ³	1.875	1.781	1.688	O.M.C %	11.17
Moisture Content	%	11.04	11.04	11.04		
Absorption	%	2.15	4.33	6.10		
Swelling	%		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:			CLIENT	SAFE SERVICES	
TP NO:	BA-4	SAMPLE NO:	DEPTH (m)		
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY :	Mahmood		CHECKED BY :	Ikram	

SOILCON

COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO

Dia of Mould : 6.0 inch

No of blows : 56 No of Layers 5

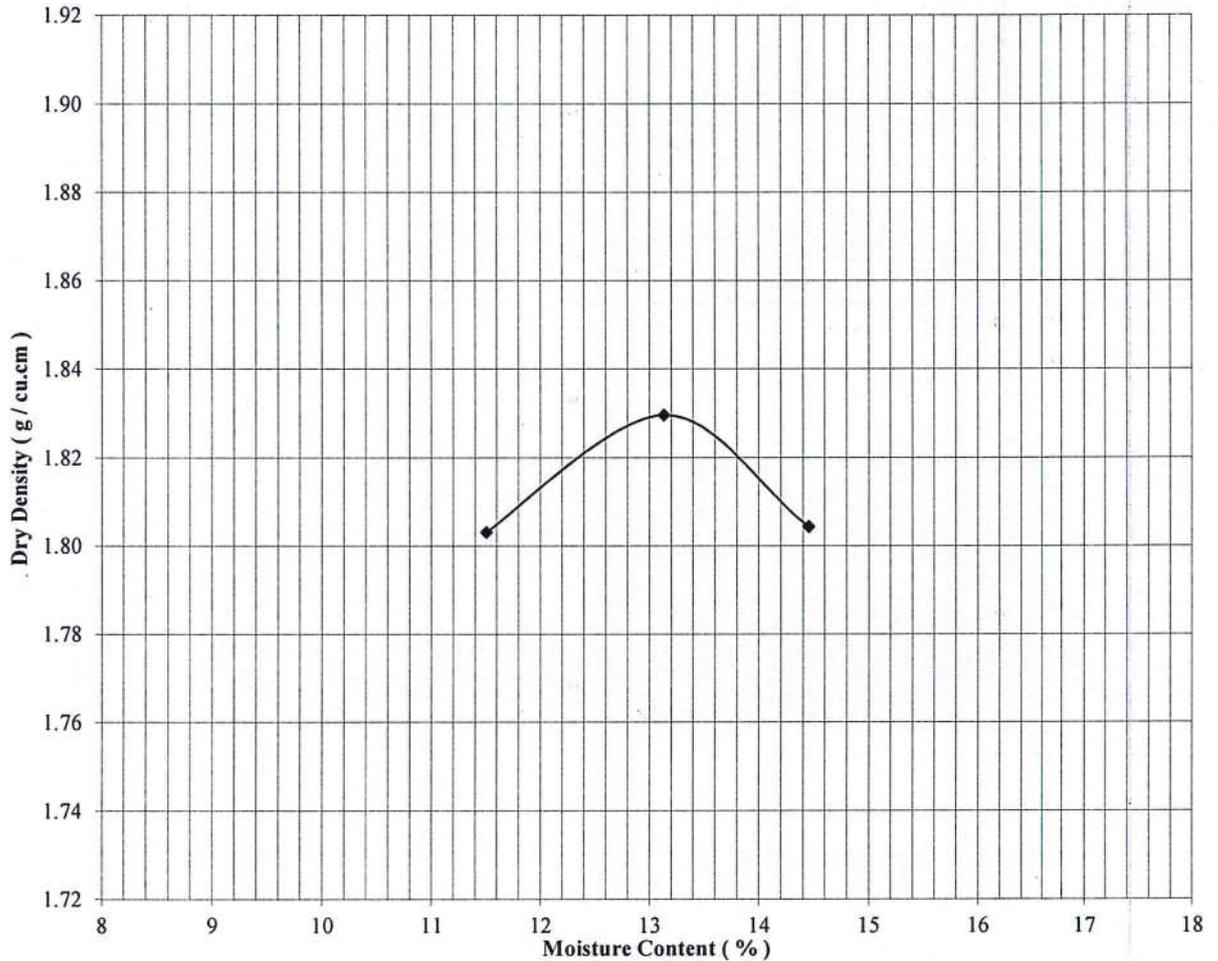
Test Pit No: _____ Sample No. BA-5

Volume of Mould : 2104 cm³

Drop : 18 inch

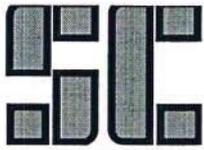
Wt of Hammer : 10 lbs

Depth (m): _____



Optimum Moisture Content (%)	13.13	Maximum Dry Density	1.830 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :		Client: SAFE SERVICES	
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS:



SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	26.5	16.3	6.6	M.D.D. g/cu.cm	1.830
Dry Density	g/ cm ³	1.830	1.739	1.647	O.M.C %	13.13
Moisture Content	%	13.07	13.07	13.07		
Absorption	%	3.17	5.43	7.65		
Swelling	%		-			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP NO:	BA-5	SAMPLE NO:		DEPTH (m)	
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY :	Mahmood		CHECKED BY :	Ikram	

SOILCON

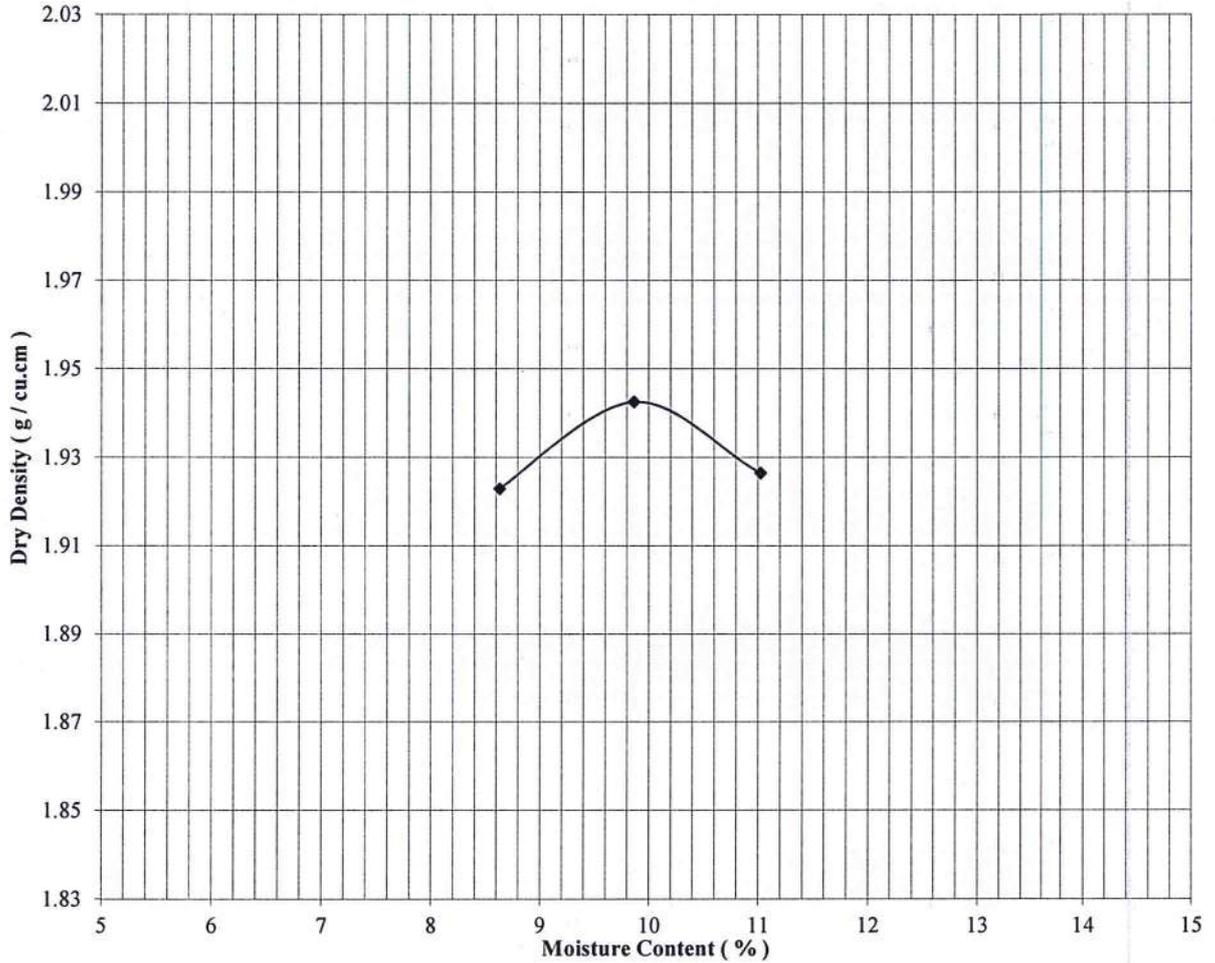
COMPACTION TEST

SOILCON GEOTECHNICAL TESTING LABORATORIES

18-Km Multan Road Lahore, Ph.No: 042-7510942-3 Fax No: 7510944

Test Method : Modified AASHTO
 Dia of Mould : 6.0 inch
 No of blows : 56 No of Layers 5
 Test Pit No: _____ Sample No. BA-6

Volume of Mould : 2104 cm³
 Drop : 18 inch
 Wt of Hammer : 10 lbs
 Depth (m): _____



Optimum Moisture Content (%)	9.86	Maximum Dry Density	1.942 g/cm ³
Project:	FAISALABAD TO CHINIOT TO SARGODHA ROAD		
Location :		Client: SAFE SERVICES	
Tested By	Checked By	Dated	LAB. REF
Mahmood	Ikram	05.11.2020	69/2020

REMARKS:



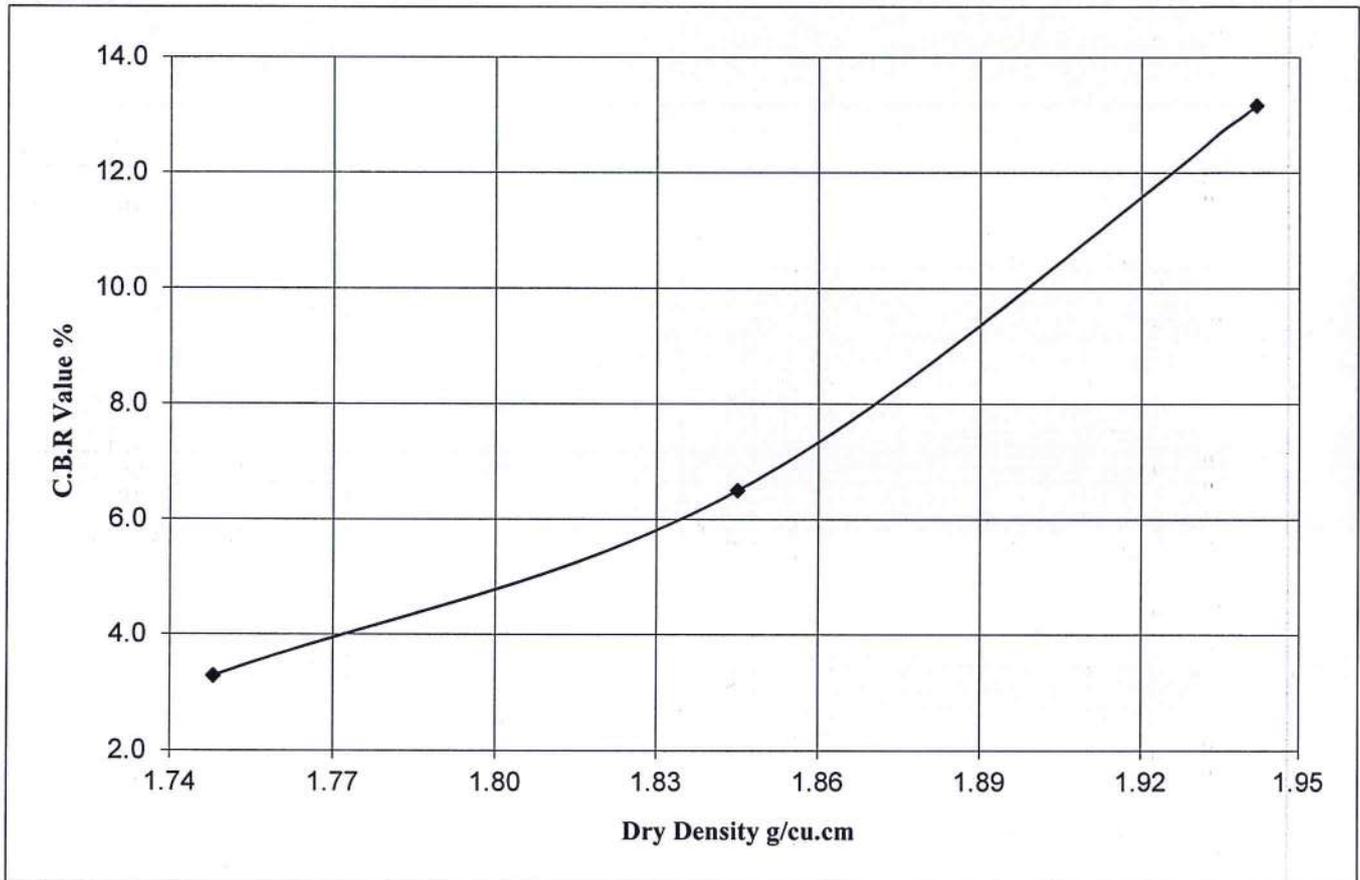
SOILCON

GEOTECHNICAL TESTING LABORATORIES, 18-Km,
MULTAN ROAD, LAHORE

C.B.R. TEST

(AASHTO T-193)

No. of Blows per Layer		65	30	10		
CBR Value at 0.1 in	%				COMPACTION	MODIFIED
CBR Value at 0.2 in	%	13.2	6.5	3.3	M.D.D. g/cu.cm	1.942
Dry Density	g/cm ³	1.942	1.845	1.748	O.M.C %	9.86
Moisture Content	%	9.71	9.71	9.71		
Absorption	%	1.09	2.28	3.34		
Swelling	%		2.53			



PROJECT:	FAISALABAD TO CHINIOT TO SARGODHA ROAD				
LOCATION:				CLIENT	SAFE SERVICES
TP NO:	BA-6	SAMPLE NO:		DEPTH (m)	
LAB REF. NO :	69/20	DATE :	09.11.2020		
TESTED BY : Mahmood				CHECKED BY : Ikram	

ANNEXURE 'D'

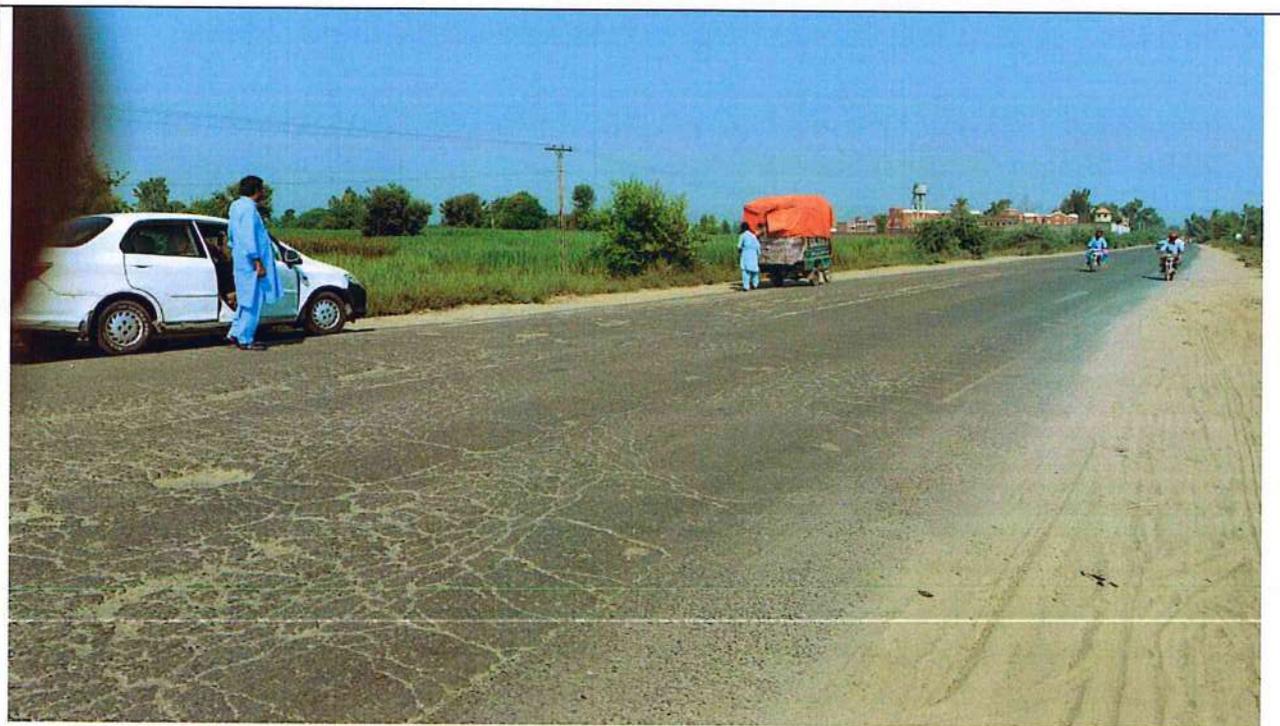
WATER TEST RESULT SHEET

ANNEXURE 'E'

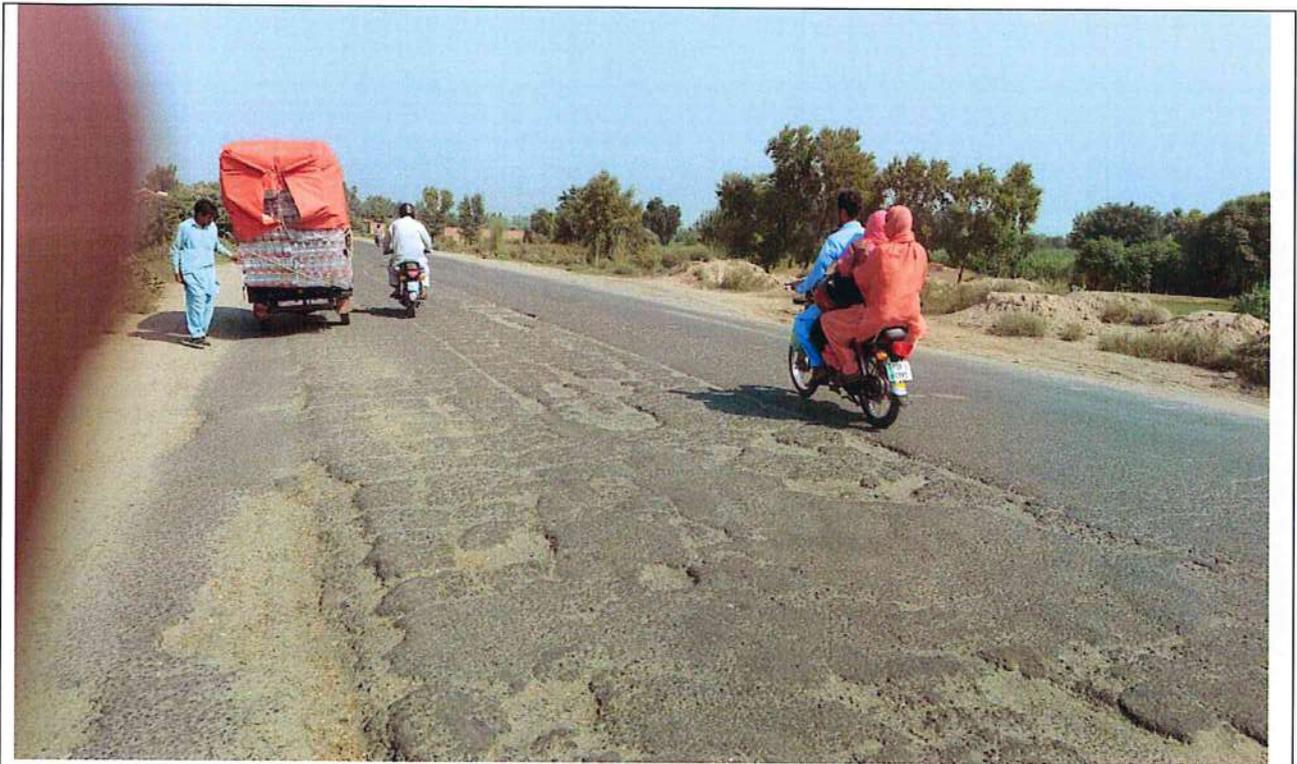
SITE PHOTOGRAPHS



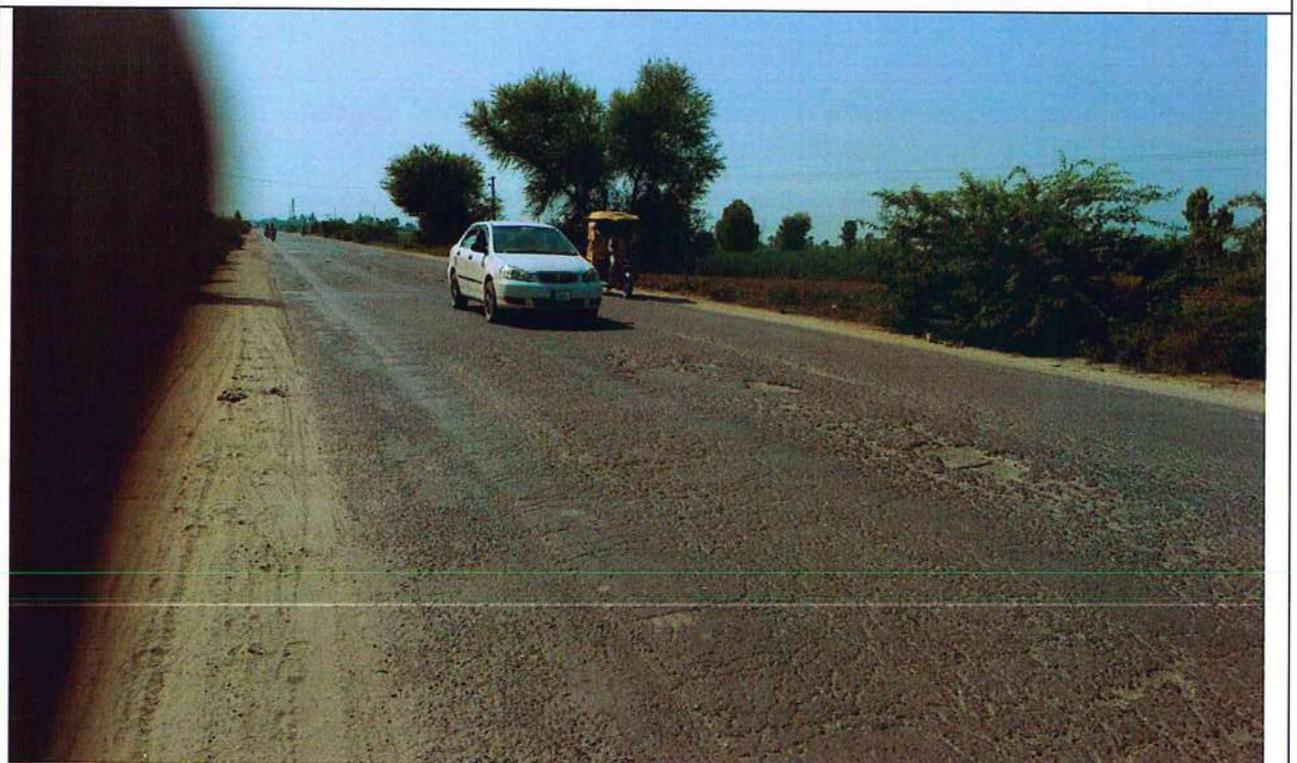
P-01 Deteriorating condition of the Project Road between Faisalabad and Chiniot.



P-02 Deteriorating condition of the Project Road between Faisalabad and Chiniot.



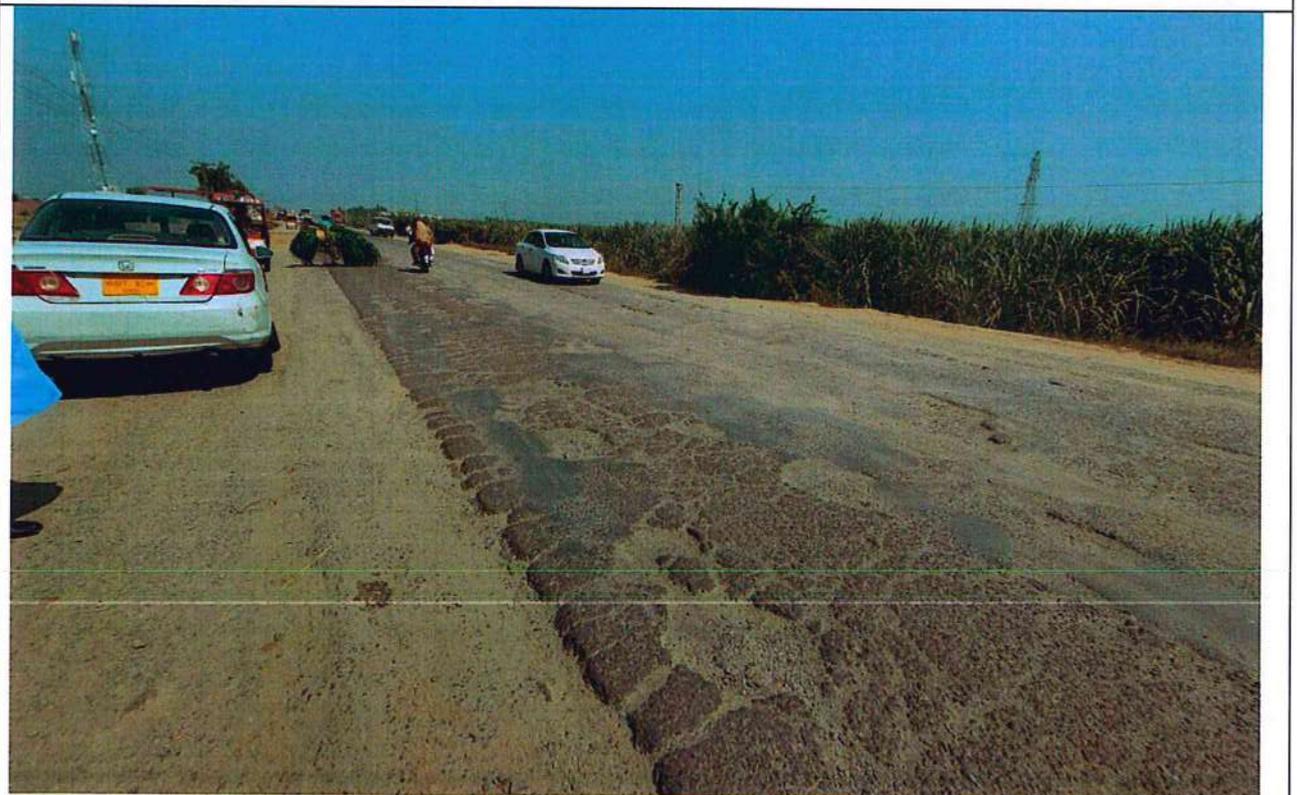
P-03 Deteriorating condition of the Project Road between Faisalabad and Chiniot.



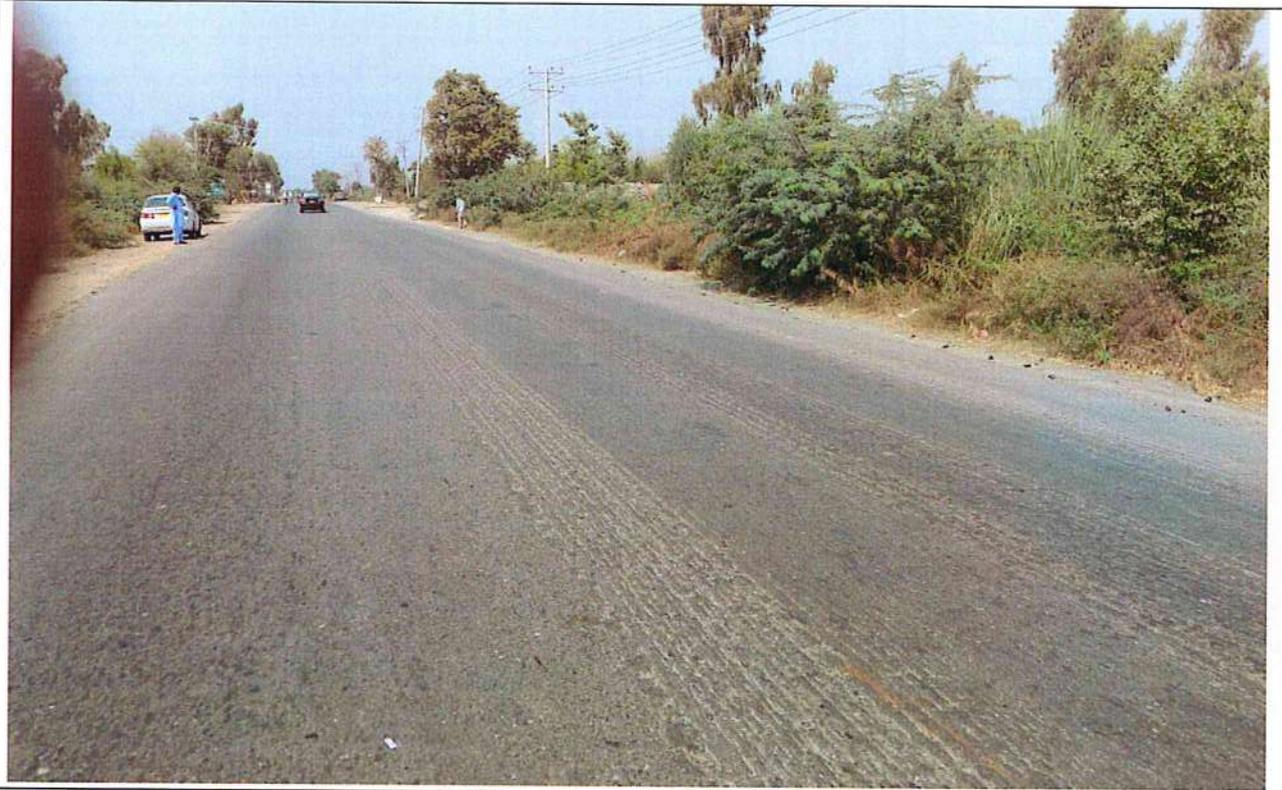
P-04 Deteriorating condition of the Project Road between Faisalabad and Chiniot.



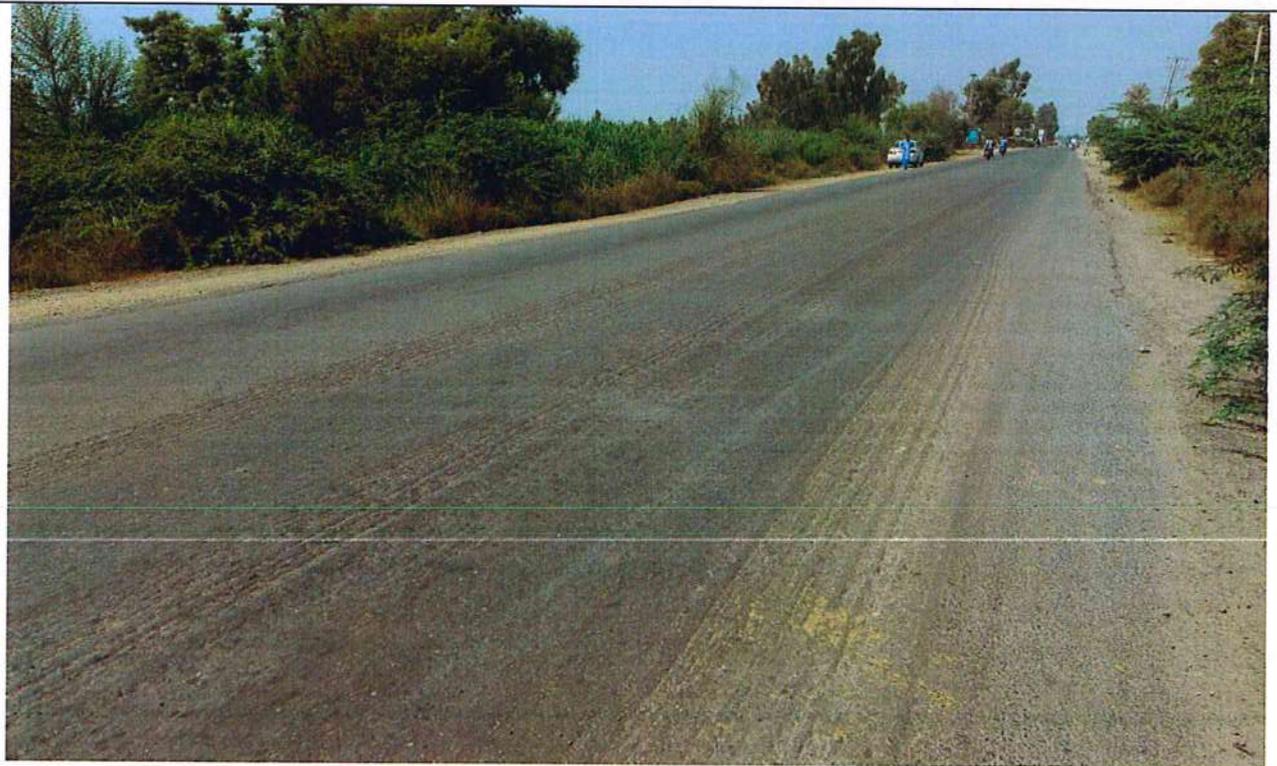
P-05 Deteriorating condition of the Project Road between Faisalabad and Chiniot..



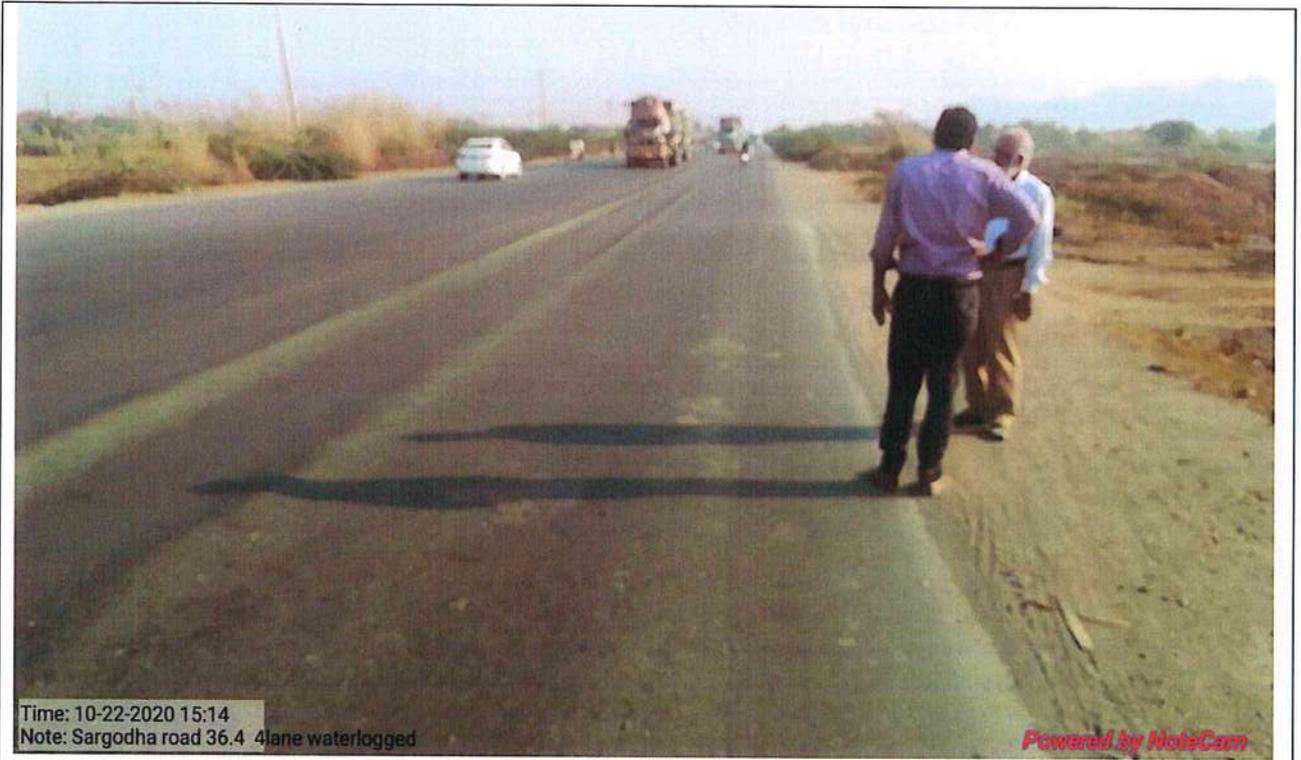
P-06 Deteriorating condition of the Project Road between Faisalabad and Chiniot.



P-07 Stable Condition of Road between Chiniot and Sargodha



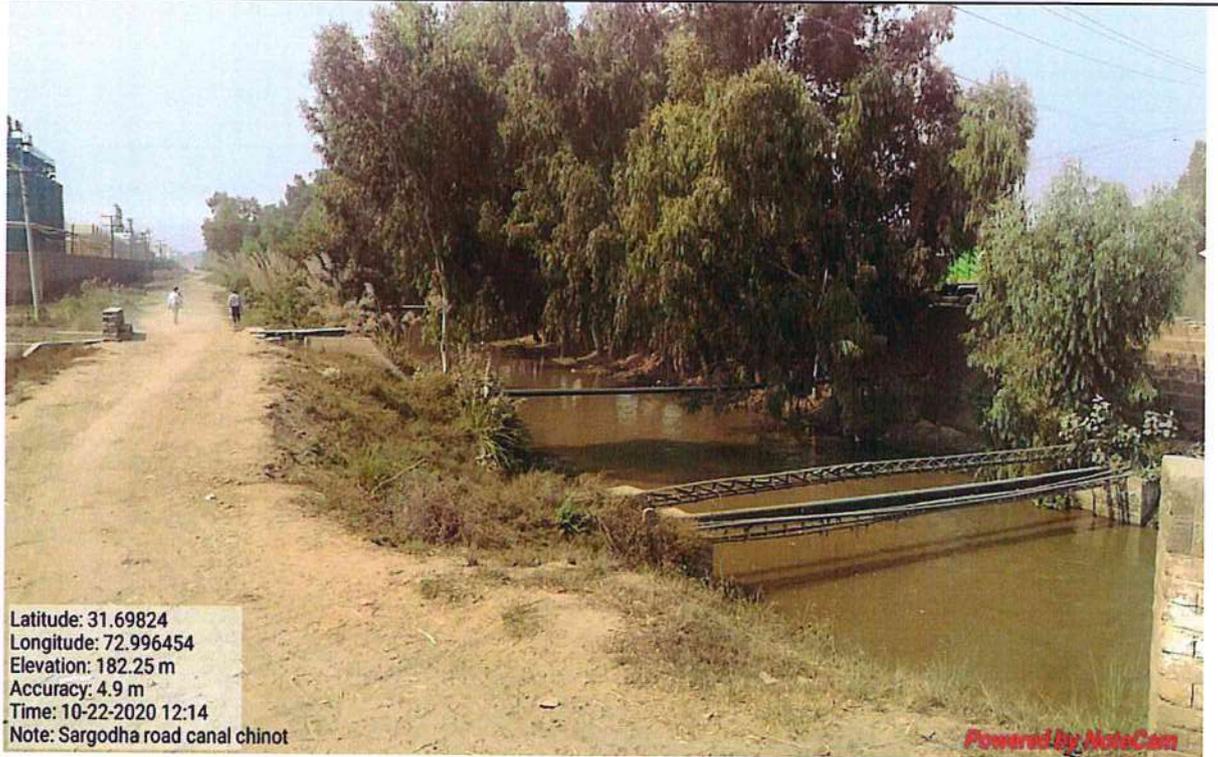
P-08 Stable Condition of Road between Chiniot and Sargodha



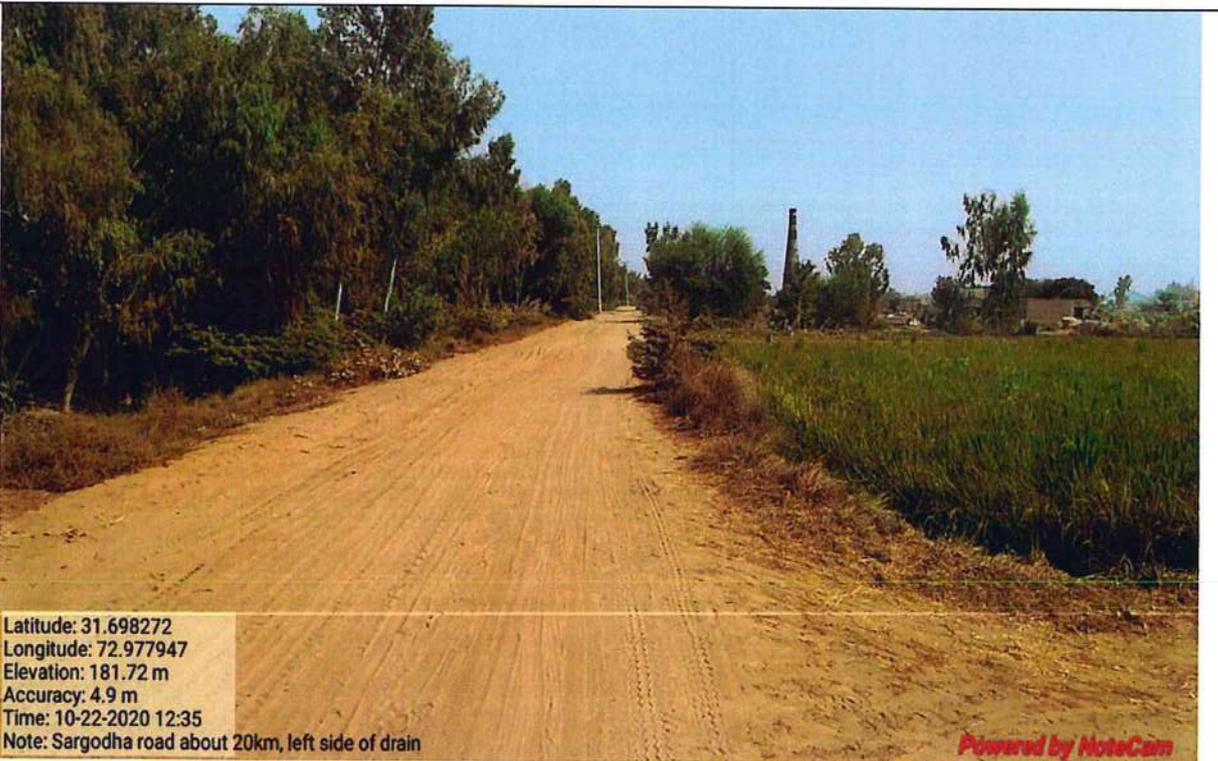
P-09 Rutting in Asphalt between Chiniot and Sargodha



P-10 Rutting in Asphalt between Chiniot and Sargodha



P-11 New Alignment along the Canal at Km -19+250



P-12 New Alignment along the Canal at Km - 20+950



P-13 Presence of Water Logged Area near Sargodha



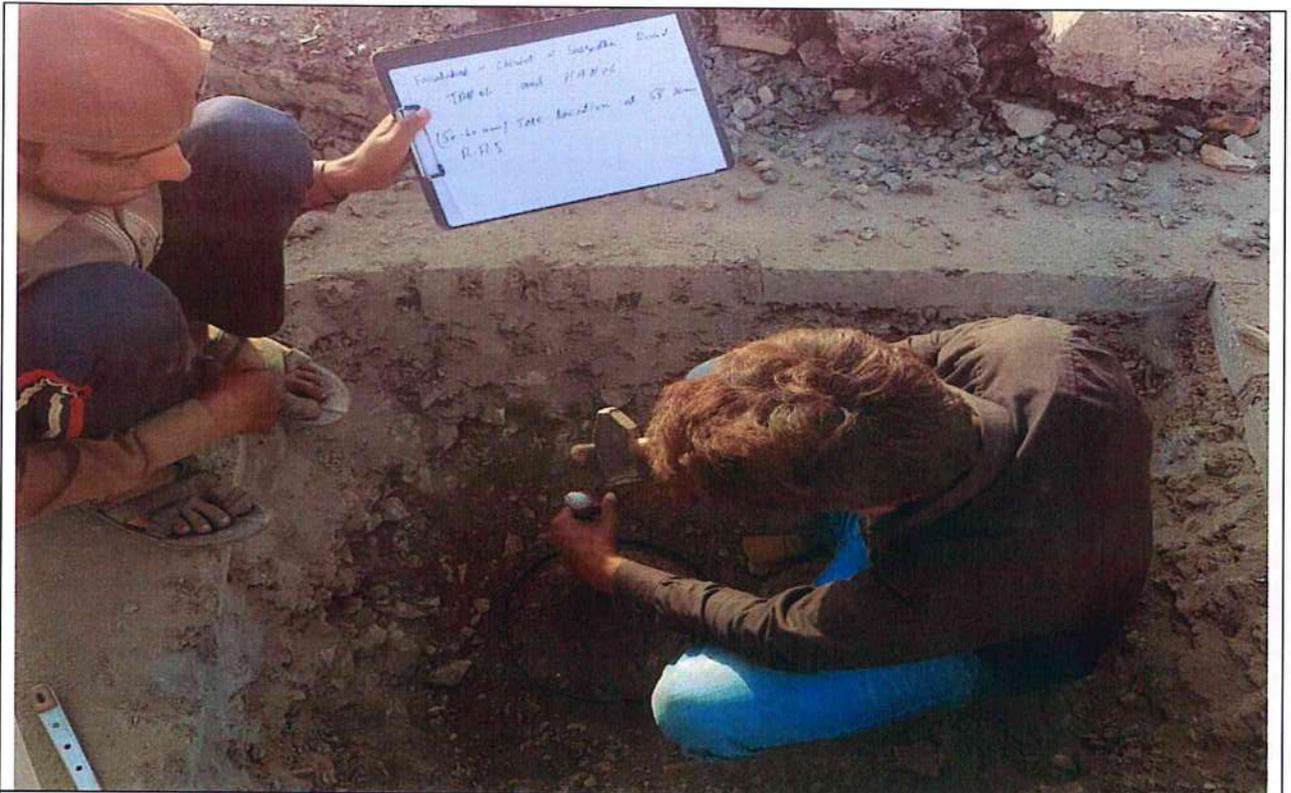
P-14 Presence of Water Logged Area near Sargodha



P-15 Cutting Asphalt layer for FDT Testing.



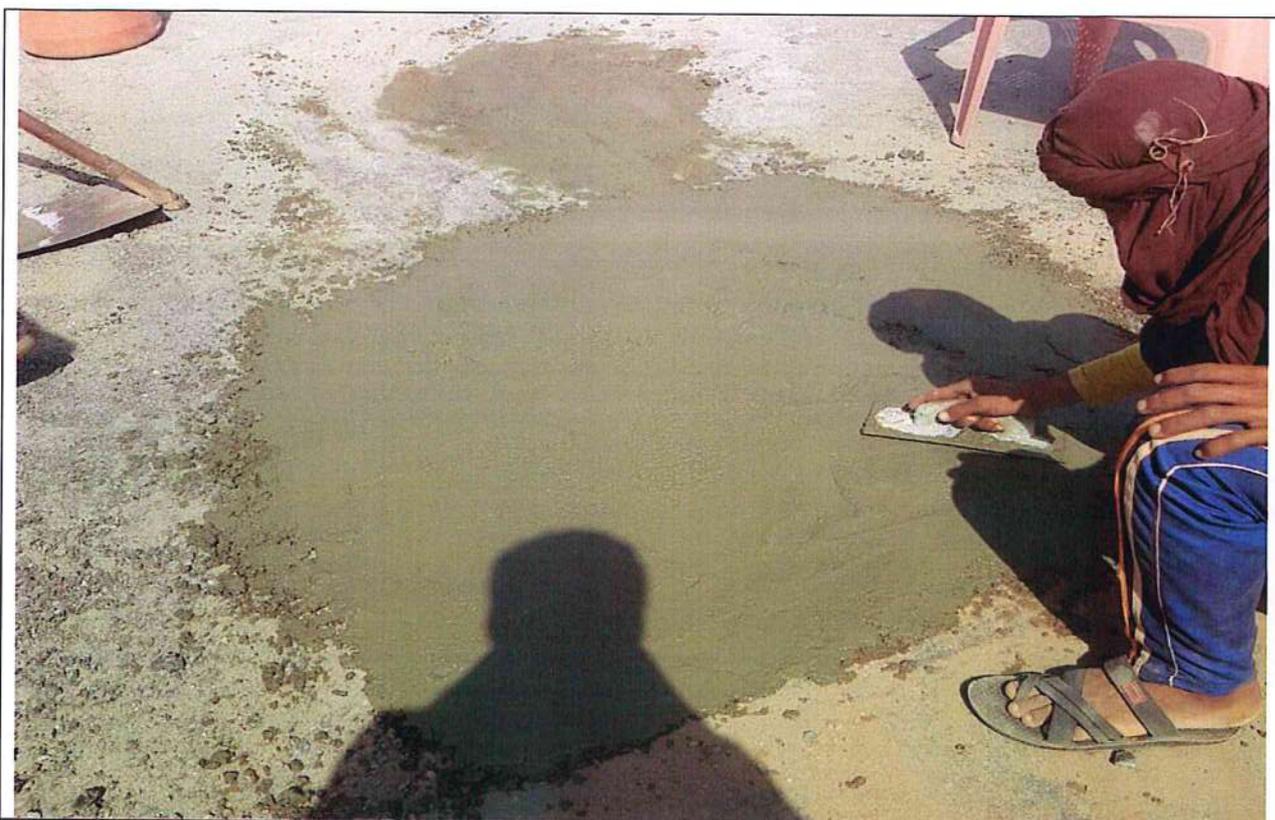
P-16 Performance of FDT Test



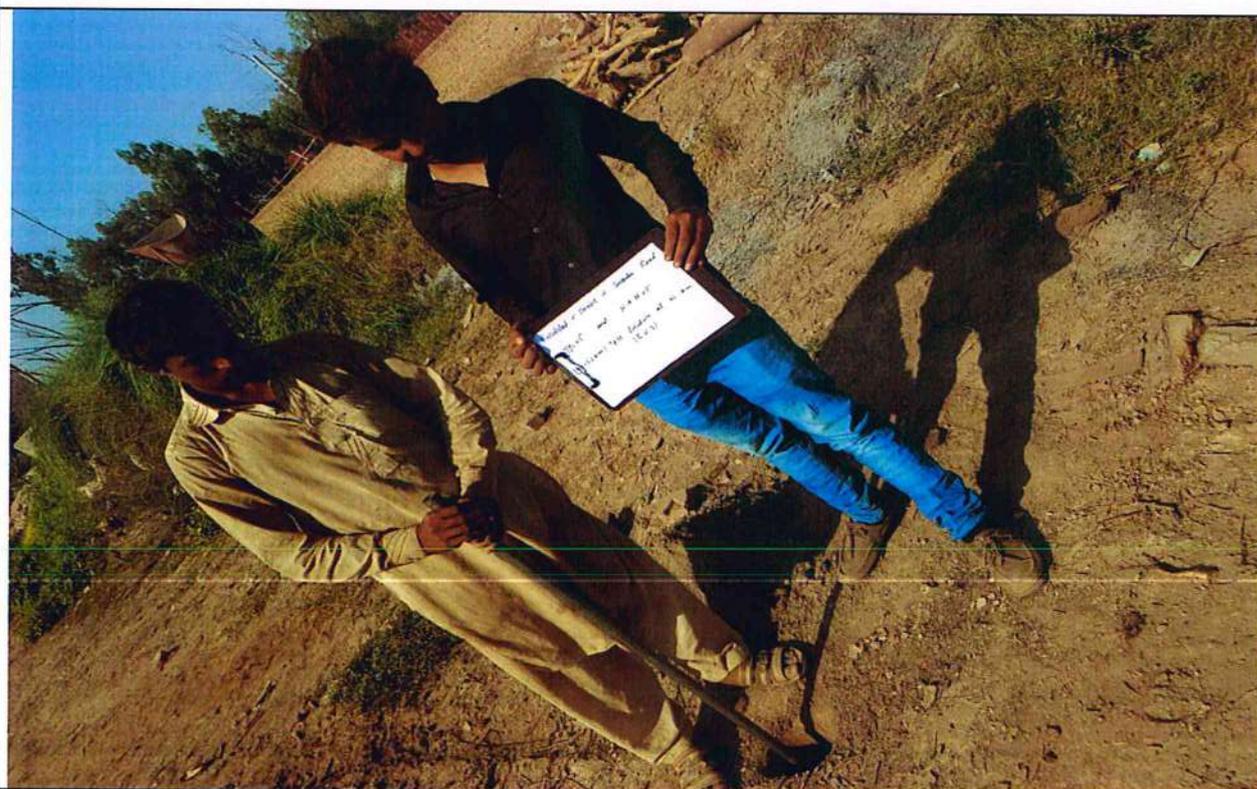
P-17 Excavating Hole for FDT



P-18 Completion of FDT at Subgrade Level



P-19 Reinstating the Road Portion after Testing of Granular Layers/Subgrade



P-20 Taking Soil samples by Hand Auger for Moisture Determination