
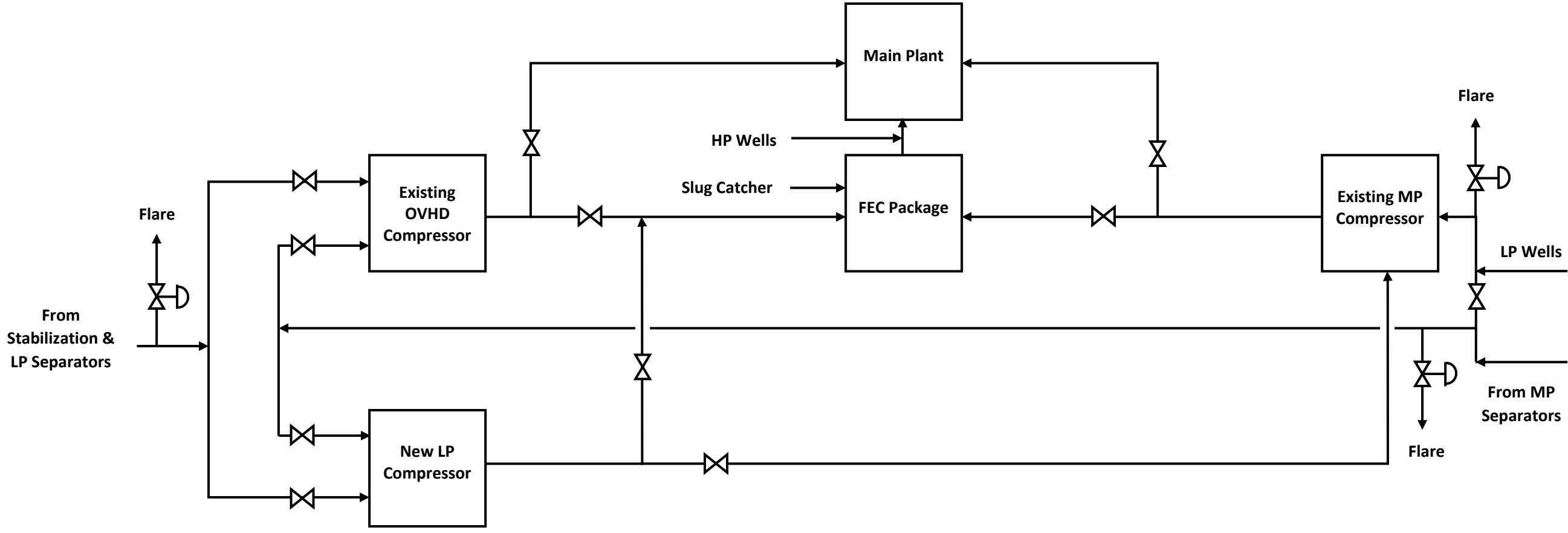


Clarification #01 - Nashpa LP compressor package

SUPPLY,INSTALLATION AND COMISSIONING OF ENGINE DRIVEN GAS RECIPROCATING COMPRESSOR PACKAGE FOR NASHPA PLANT					
Tender No.: PROC-FC/CB/P&P/NASHPA-4900/20					
ITEM	Bidder's query	description of bid clause	Tender document name	Page	OGDCL Response
1	Please provide the site electric power conditions including voltage, frequency, phase for air cooler motor, pre-lube pump motor, PLC control panel etc.	N/A	SOR-4900	N/A	3 Phase, 400 Volts, 50 Hz Electrical Supply
2	A. Please clarify the LP compressor package air cooler design ambient temperature. B. Please clarify the process gas air cooler design temperature approach. C. The ambient temperature provided by M/S OGDCL is Min 35degF and Max 122 deg F, while the discharge temperature after cooler required by M/S OGDCL is 115 Deg F. Bidder propose that when the ambient temperature is 122 F, the discharge temperature after cooler should be 140 F instead of 115 F for design economy of air cooler. Please confirm.	Max discharge temperature (deg.F) 115 F Ambient Temperature Min 35 deg F and Max 122 deg F	SOR-4900	22/26	At max ambient temperature of 122 deg F, Bidder to size the after cooler discharge temperature in range of 130 deg F to 140 deg F. Further more bidder should also control outlet temperature around 115 F (as mentioned in tender) when ambient temperature is 35 F (during winter)
2	Please provide the vendor list for compressor package.	N/A	SOR-4900	N/A	Presently Waukesha engines with Ariel and Cameron compressors are installed in OGDCL however there is NO preferred vendor list for this particular case.
3	Please provide PFD including downstream and upstream of LP compressor package for bidder reference.	N/A	SOR-4900	N/A	Attached
4	In bidder experience, below picture showing shelter with lighting and 2T,2axis movement manual overhead crane is enough for compressor & engine weather proof, lighting and maintenance. Please confirm. 	3.12 Canopy /enclosure for engine & compressor	SOR-4900	7/26	Closed Canopy is required, pics are attached. Overhead crane is required having capacity to lift any part inside the package. Accordingly, Water Deluge is required for active fire protection inside canopy.

ITEM	Bidder's query	description of bid clause	Tender document name	Page	OGDCL Response
5	<p>We understand that Supplier shall be responsible for Design and Supply of Package on C&F Karachi basis under Supply Part of Contract / PO.</p> <p>Under Services Part, Supplier shall also be responsible for Equipment unloading, Civil, Mechanical, E&I, Pre-Commissioning & Commissioning work including material on complete in all respect basis. Please confirm</p>		Overall Scope	n/a	Yes, as per scope mentioned in the tender
6	<p>In case, Supplier is responsible for Service Part with Material (Civil, Mechanical, E&I) on complete in all respect basis within battery limit of Package, we understand as follows:-</p> <p>I. As bye-laws of PEC, only engineering firms registered with PEC as Constructor (Foreign / Local) can perform work in Pakistan in Joint Venture arrangements of Foreign and Local PEC Registered Contractors only. Please confirm PEC requirement including minimum category for Foreign and Local Contractors.</p> <p>II. In order to outline services scope of work, pre-bid site visit shall be required, please confirm OGDCL plan to conduct pre-bid site visit.</p> <p>III. Payments relating to Services Part (Civil, Mechanical, E&I, Pre-commissioning, Commissioning) shall be paid by OGDCL in Foreign Currency through Services L/C or in PKR through Local Services L/C / Crossed Cheque. Please clarify.</p> <p>IV. Payments relating to Foreign Supply part through Foreign L/C shall be made as per milestones mentioned under item-23 of SOR. Please confirm the payment milestone relating to Services Part i.e. Civil, Mechanical, E&I, Pre-commissioning, Commissioning etc.</p> <p>V. Please confirm applicable taxes / WHT / deductions on payments to Supplier relating to Supply and Services Part.</p>				<p>I. Minimum PEC Registration Category required: C3 and FC-1 for local and foreign contractors, respectively.</p> <p>II. All prospective bidders may visit the site on 17-02-2022. Names, CNIC and contact nos. of the visitors to be shared prior to visit at the email addresses: asad.khaliq@ogdcl.com, amin_ullah@ogdcl.com, furqan_azeem@ogdcl.com</p> <p>III. L/c's to be opened for material and services, separately as per currency offered by foreign bidders and in PKR as for local bidder.</p> <p>IV. Payment for the supply part will be made as per payment terms mentioned in the clause 23 of the SOR of the Tender Documents. For services 100% payment shall be released after civil, mechanical, E&I, Pre-commissioning, Commissioning and performance test as per verified invoices.</p> <p>V. As per Duties / Taxes Clause (no. 12) and Composite Contract Clause (no. 35) of Master Set of Tender Documents.</p>
7	Kindly provide Soil Investigation Report for Foundation Design.				Soil investigation report is attached.





河南信黄河防务机械有限公司





ANNEXURE - VII

SOIL INVESTIGATION REPORT



DEPARTMENT OF CIVIL ENGINEERING,
UNIVERSITY OF ENGINEERING & TECHNOLOGY,
PESHAWAR.

SOIL MECHANICS & HIGHWAY ENGINEERING LABORATORY

Reference:

S & M- 62

Dated: June 19, 2011

To

Engr. Muhammad Azam Bhatti

Managing Partner

AJ Corporation.

Subject: Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak.

With reference to your letter AJC/UET/244/11 dated June 27, 2011 regarding the proposed soil investigations plan we have revised our quotation for 3 boreholes for soil investigation for Tank No 3.

We take the pleasure in submitting to you the Detailed Soil Investigation Report of "Soil investigation at OGDCL Nashpa Karak."

This Report describes the details of various field & laboratory tests, various soil properties and design.

parameters for the site. However, this is "Geotechnical investigation report", therefore it is for the Geotechnical consultant to interpret the soil properties from the number of tests conducted by the Soil Mechanics and Highways Engineering Lab and prepare a "Geotechnical interpretive report" for the project. Should you require any further information about consultancy services we offer, please contact the "Consultancy Cell, Civil Engineering Department, UET Peshawar" for further information.

Best Regards

Dr. Qaiser Iqbal

Geotechnical Consultant

Soil Mechanics & Highways

Engineering Lab. UET Peshawar

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3. BEARING CAPACITY 4

 3.1. Bearing Capacity from SPT Results 4

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 3.3. Bearing Capacity from Unconfined Compression test Results 5

4. CONCLUSIONS AND RECOMMENDATIONS 6

ANNEXURES

SPT Bore Log and field moisture contents.

Direct Shear/ Unconfined Test Results

Gradation/Atterburgs analysis Results

1. INTRODUCTION

This document is prepared for the soil investigation for Soil investigation at OGDCL Nashpa Karak. The soil investigation was proposed by Engr. Muhammad Azam Bhatti, Managing Partner, AJ Corporation.

The Soil Investigation was carried out by the Soil Mechanics & Highway Engineering Laboratory of Department of Civil Engineering, University of Engineering & Technology Peshawar from July 01 to July 19, 2011.

The required soil investigation was carried-out through three 8m deep bore holes in the areas where settlement of storage tank was observed. The location of Bore Holes is shown on the soil investigation plan.

Standard Penetration Test (SPT) was carried out in the bore hole at different interval. Shelby Samples & other disturbed Samples were also collected from the bore hole for Soil Classification.

This Report describes the details of various field & laboratory tests, various soil properties and design parameters for the site.

2. SCOPE OF WORK

The Scope of Work for the soil investigation of the proposed site are as follows:

Drilling bore holes to 08, 08 and 08m depth including preparation of bore hole logs.

Performing standard penetration tests in the bore hole at different interval.

Extraction of disturbed samples from the bore hole.

Grain size distribution tests on disturbed samples from the bore hole.

Natural moisture content tests on all samples collected from bore holes and test pits.

Atterberg's limit tests. (liquid limit & plastic limit) on clayey samples samples (if any).

Direct Shear Tests on granular samples from the borehole.

Unconfined compression Tests on Clayey samples from the borehole.

Compilation and preparation of 02 copies of geotechnical report of field and laboratory testing.

3. BEARING CAPACITY

3.1. Bearing Capacity from SPT Results

Standard Penetration Tests (SPT) were carried out at different interval in the bore hole. The SPT numbers recorded at the site were corrected for submergence & overburden. The Bearing capacity value is calculated from the following equation which is based on Terzaghi's work.

$$q_a = 0.72(N - 3) \left(\frac{B + 1}{2B} \right)^2$$

Where q_a = Allowable Net increase in soil Pressure in KSF for an estimated settlement of 1 inch.

N = SPT Number Corrected for submergence & overburden.

B = Width of Footing in Feet.

Bearing Capacity Value is Calculated for an assumed width of B = 3 ft. Average value of N is taken up to the influence depth (first five SPT count). Details of the Bore Hole results are given in the Annexure.

3.2. Bearing Capacity from Direct Shear Test Results

Direct Shear Tests were carried out on Samples Collected to determine the Shear Strength Parameters (Cohesion & Angle of Internal Friction)

To determine bearing capacity from the direct shear test parameters, Terzaghi's Bearing Capacity equation was used.

Terzaghi's Bearing Capacity Equation:

$$q_{ult} = cN_c + R_{w1}(\gamma DN_q) + R_{w2} \left(\frac{1}{2} \gamma B N_\gamma S_r \right)$$

Where q_{ult} = Ultimate Bearing Capacity of Soil

N_c, N_q & N_γ = Bearing Capacity factors based on angle of internal friction " ϕ "

c = Cohesion of Soil

R_{w1}, R_{w2} = Water Table Correction Factor

Based on above equation, the bearing capacities computed for assumed width & depth of 3 ft, are given in the Annexure.

3.3. Bearing Capacity from Unconfined Compression test Results

Unconfined Compression Tests were to be carried out on Shelby samples collected from the bore hole to determine the maximum compression taken by the sample. The length to diameter ratio for the sample was to be 2.5.

4. CONCLUSIONS AND RECOMMENDATIONS

From SPT test bore log results and gradation analyses of the samples, the dominant strata observed is 3 to 4ft thick layer of soft Clayey recently fill material underlain by Hard Clayey Gravel Strata.

The Field Moisture Content is between 13.3 % and 6.5%. The Cohesion "C" & angle of Internal friction " Φ " values for foundation design are provided in the table 1. The Water Table was not found in any of the borehole for the investigated depth.

Based on soil type, Direct shear test, and SPT tests the Recommended Safe Bearing Capacity values for 3 x 3 feet foundation at given depth are provided in the results (Direct Shear tests) and the investigation results from tests conducted on samples collected from test pits, the recommended minimum bearing capacity for this site is suggested to be 0.6 TSF due to presence of compressible lean clay within the reach of foundation. Also there is a clear indication that the location BH01 and BH02 are recent fill having thickness varying between 3 to 5ft as indicated by the relatively lesser shear strength compared to BH03 both from table 1 and SPT test results (Appendix) and previous report on soil investigation where the samples were collected from the centre of the storage tank foundation. The SPT test results may be used in conjunction with lab tests to get overlap between field and lab tests for further design parameters if required by the designer.

Table 1: Bearing capacity factors from lab tests

Depth (m)	Borehole 1			Borehole 2			Borehole 3		
	C (PSF)	Angle of friction (degrees)	BC (TSF)	C (PSF)	Angle of friction (degrees)	BC (TSF)	C (PSF)	Angle of friction (degrees)	BC (TSF)
0.3	255.15	-	0.23	480.05	-	0.44	1147.6	-	1.04
1	696.9	20.3	0.79	804	21.9	0.96	886.9	29.1	1.56
5	1114.6	28.4	1.75	886.9	29.1	1.56	1110.9	32.4	2.26
7	1187.8	29.7	2.01	1052.1	30.6	1.94	843.6	33.5	2.03



DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY OF ENGINEERING AND TECHNOLOGY PESHAWAR

SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

Bearing capacity from SPT results

Test Date : 19 July, 2011

Test Report No. : 169 / 11 / SM / CE

Test : Standard Penetration Test, SPT

Ref.No.: AJC/UET/244/11

Agency : Engr. Muhammad Azam Bhatti - Managing Partner - AJ Corporation

Dated : June 27, 2011

Project : Soil investigation at OGDCL Nashpa Distt Karak

S.No.	Bore Hole No.	Weighted Average SPT No. (N)	Safe Bearing Capacity (TSF)	Remarks
1	BH-01	22.0	0.70	These Values are on the basis of Foundation width 3ft x 3ft, and water table approaching base of the footing
2	BH-02	25.0	0.60	
3	BH-03	26.0	3.00	

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SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

SUBSURFACE EXPLORATION LOG

Test Report No. : 169 / 11 / SMHW/ CE

Ref.No.: AJC/UET/244/11

Client : Engr. Muhammad Azam Bhatti - Managing Partner - AJ Corporation

Dated: June 27, 2011

Project: Soil investigation at OGDCL Nashpa Distt Karak

Bore Hole No.1 Depth 08 m

Sample Depth (m)	Sample No.	Natural Moisture Content (%)	Soil Type	BH Stratas	SPT No.	Remarks
0.3	1	10.8	Soft Clay		5	Water table was not found in full run of the borehole
1	2	11.2	Soft Clay		11	
5	3	13.3	Clayey Gravel		Refusal	
7	4	8.0	Clayey Gravel		Refusal	
End of Boring						

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Bore Hole No.2 Depth 08 m

Sample Depth (m)	Sample No.	Natural Moisture Content (%)	Soil Type	BH Stratas	SPT No.	Remarks
0.3	1	10.0	Soft Clay		6	Water table was not found in full run of the borehole
1	2	12.3	Soft Clay		8	
5	3	13.5	Clayey Gravel		Refusal	
7	4	11.3	Clayey Gravel		Refusal	
End of Boring						

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SUBSURFACE EXPLORATION LOG

Test Report No. : 169 / 11 / SMHW/ CE

Ref.No.: AJC/UET/244/11

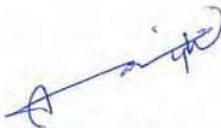
Client : Engr. Muhammad Azam Bhatti - Managing Partner - AJ Corporation

Dated: June 27, 2011

Project: Soil investigation at OGDCL Nashpa Distt Karak

Bore Hole No.3 Depth 08 m

Sample Depth (m)	Sample No.	Natural Moisture Content (%)	Soil Type	BH Stratas	SPT No.	Remarks
0.3	1	6.5	Soft Clay		21	Water table was not found in full run of the borehole
1	2	10.1	Soft Clay		27	
5	3	10.7	Clayey Gravel		Refusal	
7	4	11.2	Clayey Gravel		Refusal	
End of Boring						


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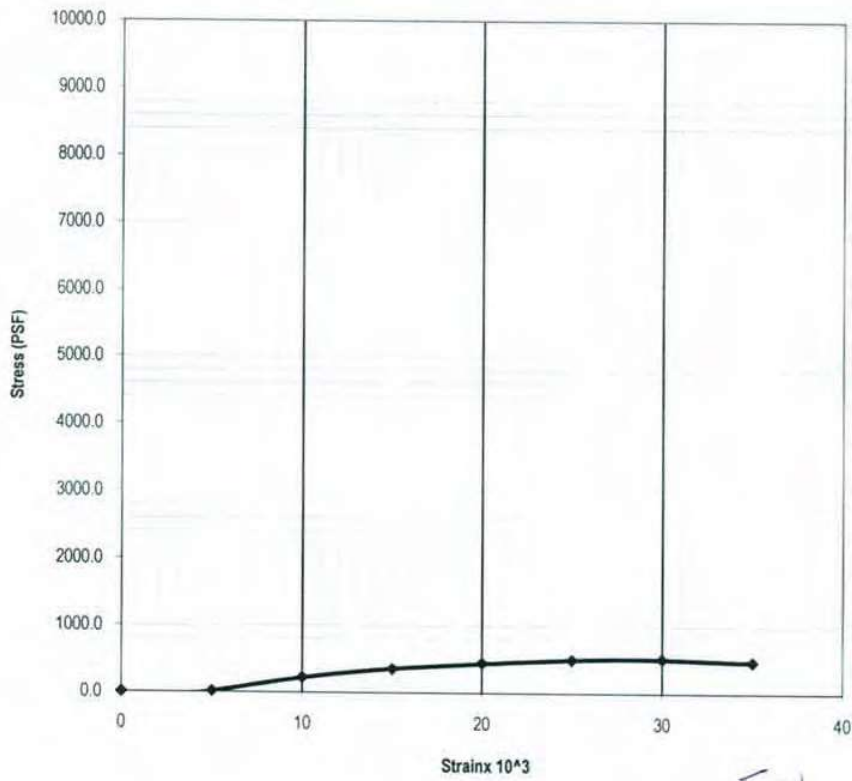


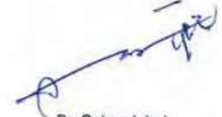
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Test No. 169/ 11 / SMHW / CE

Stress Vs Strain Curve
Un-Confined Compression Test

◆ BH 01 - Sample No. 2 Depth 1m




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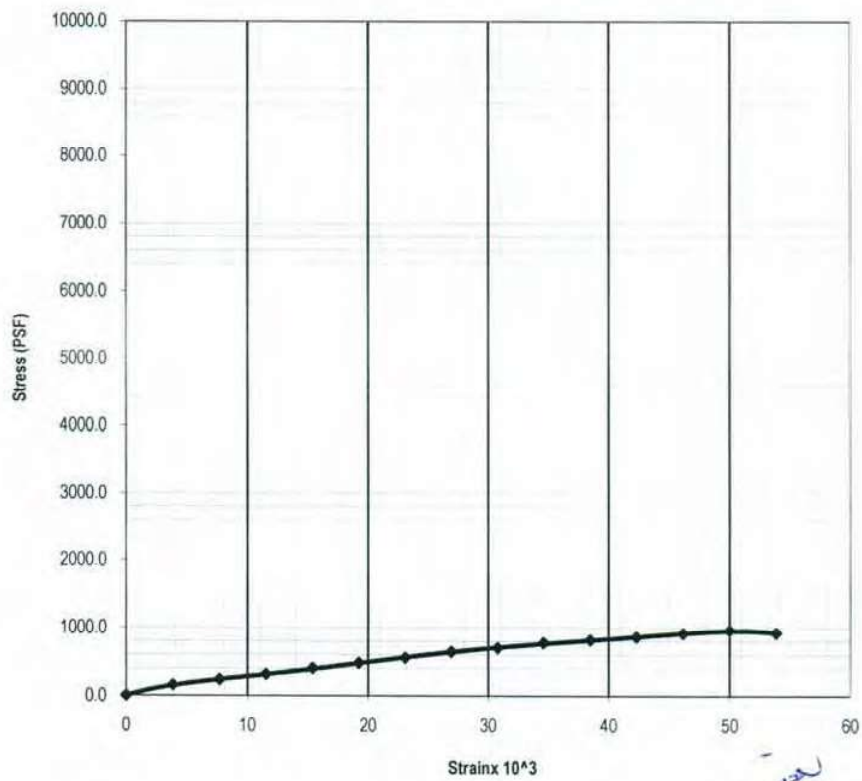


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Test No. 169/11 / SMHW / CE

Stress Vs Strain Curve
Un-Confined Compression Test

◆ BH 02 - Sample No. 1 Depth 0.3m



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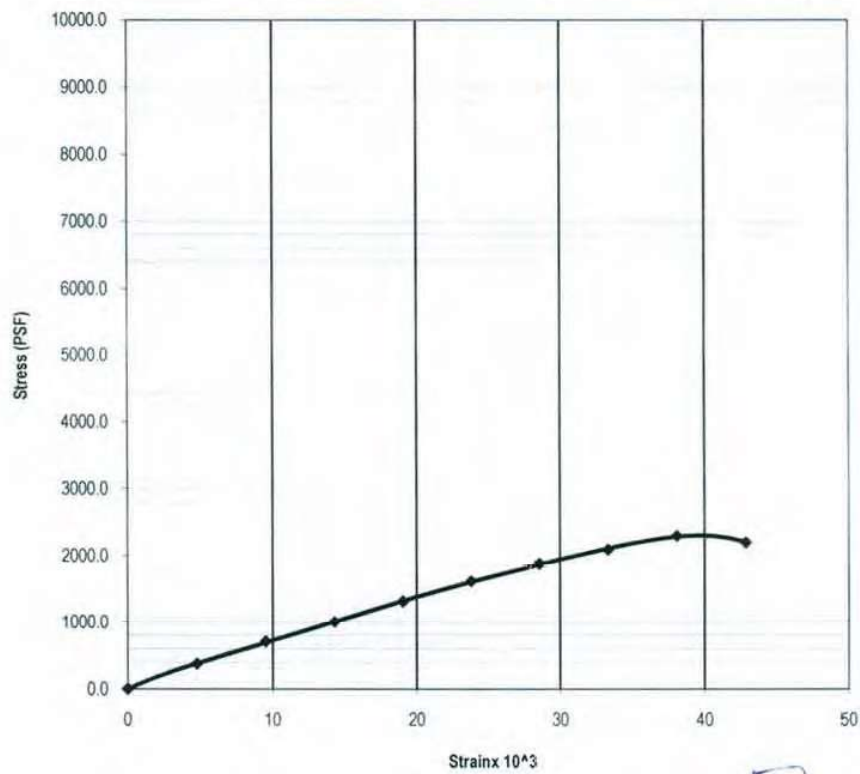



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Test No. 169/ 11 / SMHW / CE

Stress Vs Strain Curve
Un-Confined Compression Test

◆ BH 03 - Sample No. 1 Depth 0.3m




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SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 July, 2011

Test Report No. : 169 /11/ SMHW / CE

Ref.No.: AJC/UET/244/11

Dated : June 29, 2011

Engr. Muhammad Azam Bhatti Managing Partner

Project: Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 1 Depth 1 Feet

S.No.	Test Description	Results
1	Depth of Sample (F)	1.0
2	Angle of Internal Friction (degree)	20.3
3	Cohesion (PSF)	696.9
4	Safe Bearing Capacity (TSF)	0.79
5	Bulk Unit Weight (PCF)	110.7
6	Natural Moisture Content (%)	10.1

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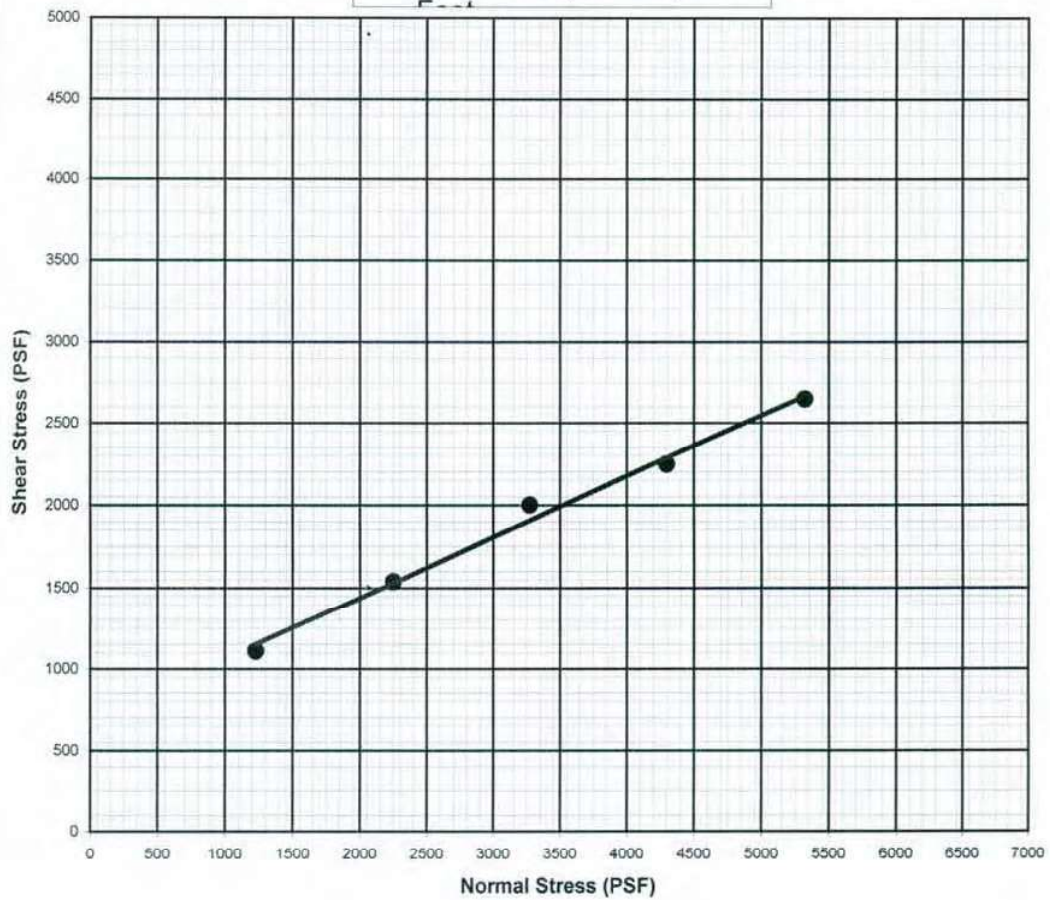


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Test Ref No. 169 / 11 / SMHW / CE

Quick Direct Shear Test

● BH01 Sample 1 Depth 1



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Test Report No. : 169 /11/ SMHW / CE

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Dated : June 29, 2011

Engr. Muhammad Azam Bhatti Managing Partner

Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 2 Depth 5 Meter

S.No.	Test Description	Results
1	Depth of Sample (m)	5.0
2	Angle of Internal Friction (degree)	28.4
3	Cohesion (PSF)	1114.6
4	Safe Bearing Capacity (TSF)	1.75
5	Bulk Unit Weight (PCF)	118.1
6	Natural Moisture Content (%)	8.7


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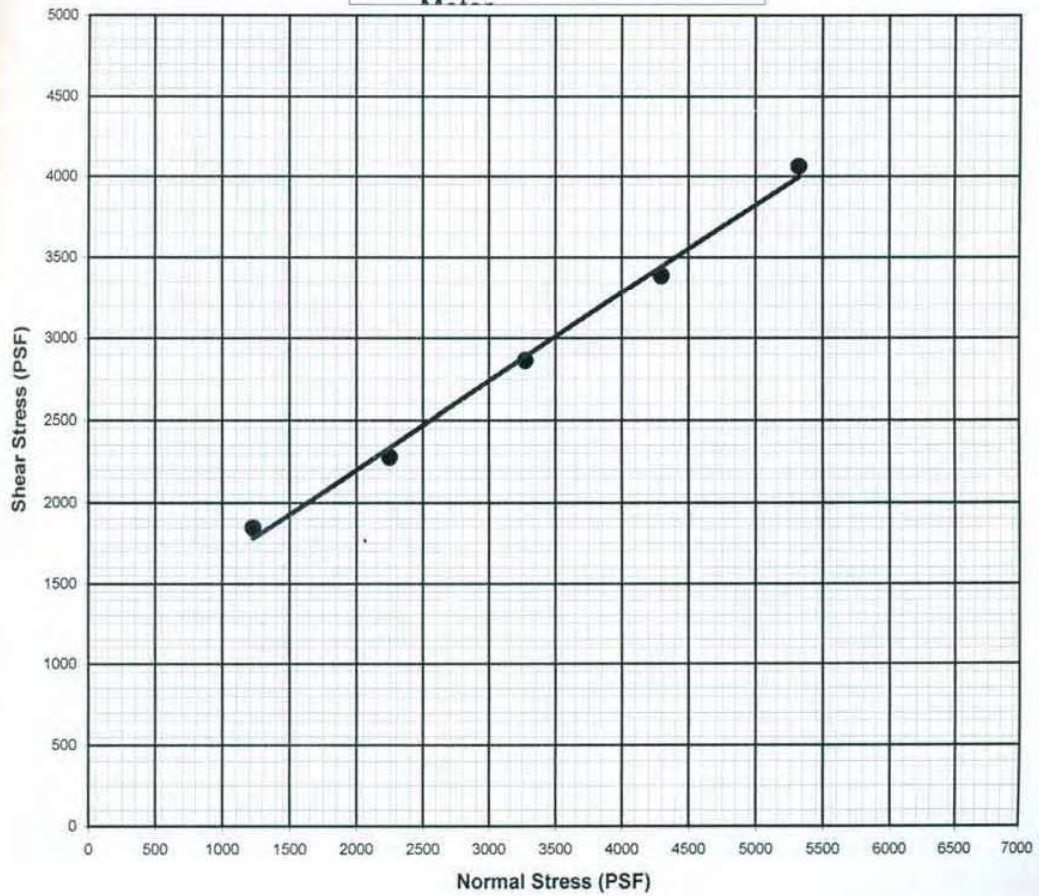


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Test Ref No. 169 / 11 / SMHW / CE

Quick Direct Shear Test

● BH 1 Sample 2 Depth 5




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Dated : June 29, 2011

Engr. Muhammad Azam Bhatti Managing Partner

Project: Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 3 Depth 7 meter

S.No.	Test Description	Results
1	Depth of Sample (m)	7.0
2	Angle of Internal Friction (degree)	29.7
3	Cohesion (PSF)	1187.8
4	Safe Bearing Capacity (TSF)	2.01
5	Bulk Unit Weight (PCF)	124.0
6	Natural Moisture Content (%)	9.0

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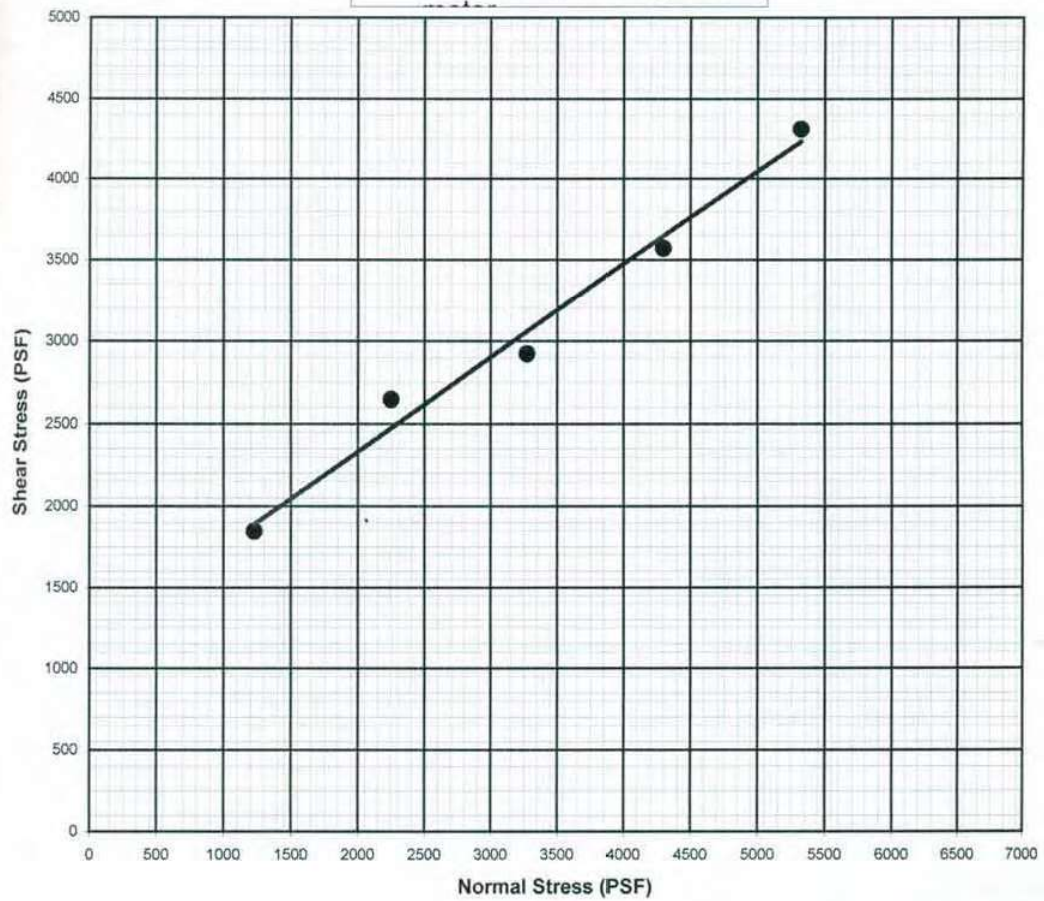


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Test Ref No. 169 / 11 / SMHW / CE

Quick Direct Shear Test

● BH 1 Sample 3 Depth 7



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SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 July, 2011

Test Report No. : 169 /11/ SMHW / CE

Ref.No.: AJC/UET/244/11

Dated : June 29, 2011

Eng. Muhammad Azam Bhatti Managing Partner

Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 2 Sample 2

No.	Test Description	Results
1	Depth of Sample (f)	3.0
2	Angle of Internal Friction (degree)	21.9
3	Cohesion (PSF)	804.0
4	Safe Bearing Capacity (TSF)	0.96
5	Bulk Unit Weight (PCF)	117.2
6	Natural Moisture Content (%)	12.4

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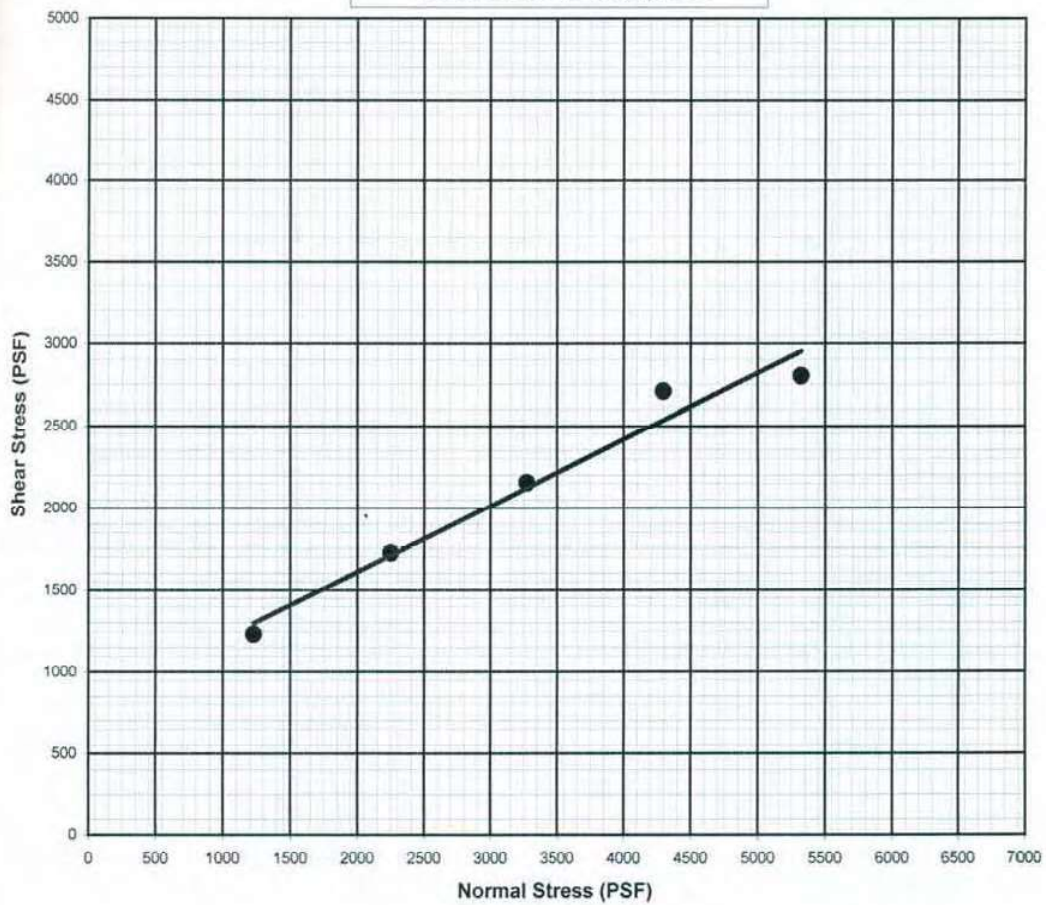


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Test Ref No. 169 / 11 / SMHW / CE

Quick Direct Shear Test

● Bore hole 2 Sample 2



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SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 July, 2011

Test Report No. : 169 /11/ SMHW / CE

Ref.No.: AJC/UET/244/11

Dated : June 29, 2011

Eng. Muhammad Azam Bhatti Managing Partner

Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 3

No.	Test Description	Results
1	Depth of Sample (m)	5.0
2	Angle of Internal Friction (degree)	29.1
3	Cohesion (PSF)	886.9
4	Safe Bearing Capacity (TSF)	1.56
5	Bulk Unit Weight (PCF)	120.6
6	Natural Moisture Content (%)	9.4

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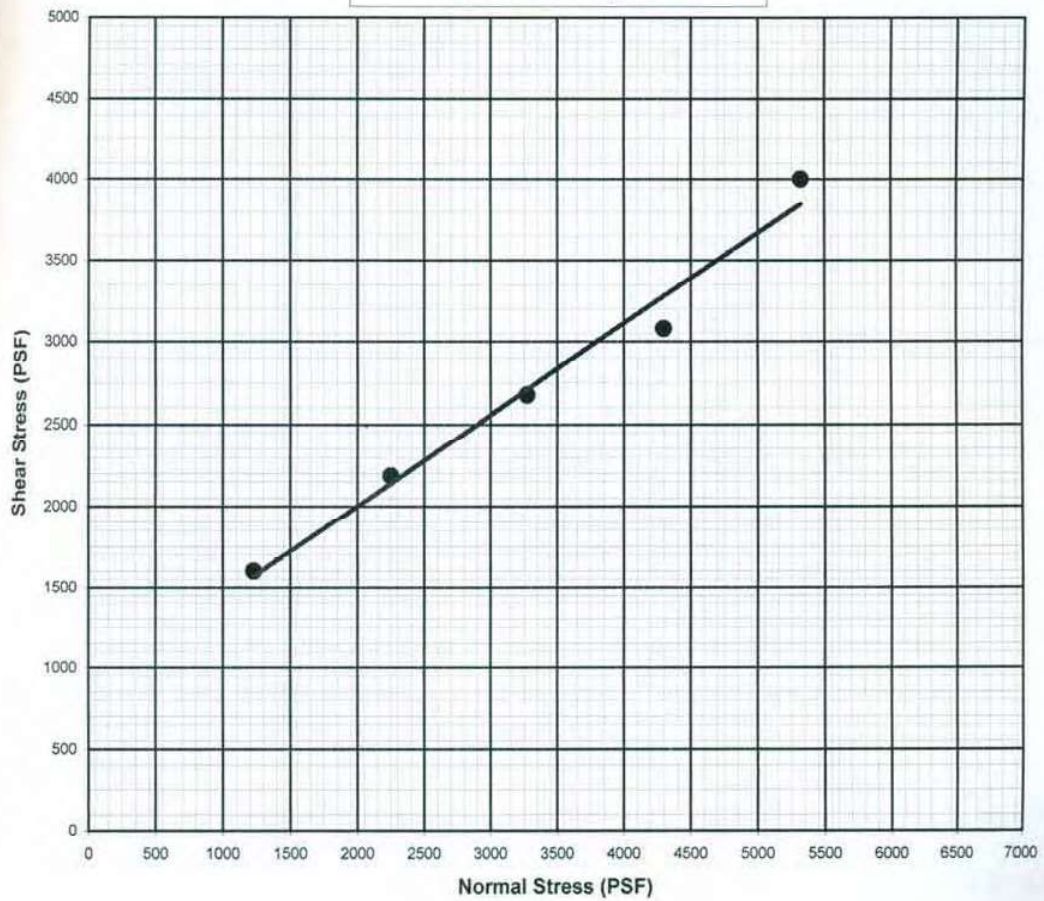



DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY OF ENGINEERING AND TECHNOLOGY PESHAWAR

Test Ref No. 169/ 11 / SMHW / CE

Quick Direct Shear Test

● BH 2 Sample 3




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SOIL MECHANICS AND HIGHWAY ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 Julay, 2011

Test Report No. : 169 /11/ SMHW / CE

Ref.No.: AJC/UET/244/11

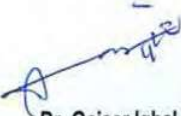
Dated : June 29, 2011

By: Muhammad Azam Bhatti Managing Partner

Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 4

	Test Description	Results
1	Depth of Sample (m)	7.0
2	Angle of Internal Friction (degree)	30.6
3	Cohesion (PSF)	1052.1
4	Safe Bearing Capacity (TSF)	1.94
5	Bulk Unit Weight (PCF)	124.0
6	Natural Moisture Content (%)	10.3


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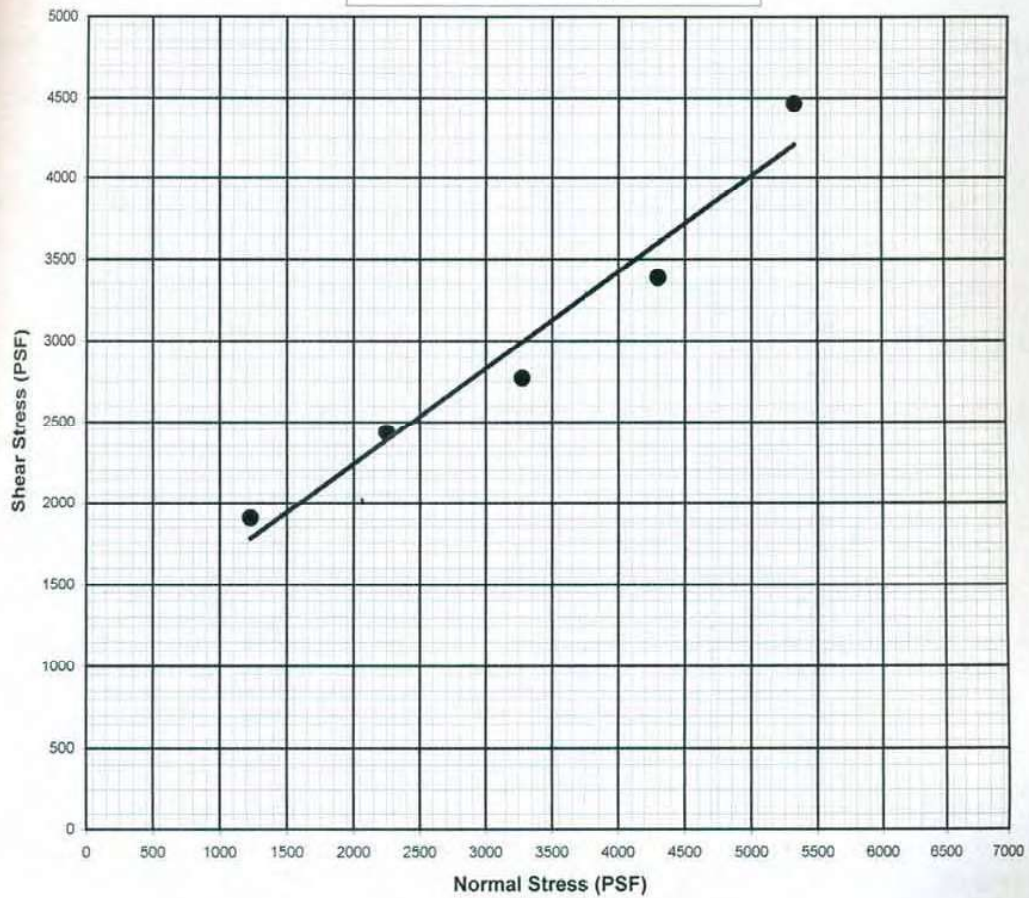


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TEST REPORT

Test Date : 19 July, 2011

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Ref.No.: AJC/UET/244/11


Dated : June 29, 2011

Muhammad Azam Bhatti Managing Partner

Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 2

Test Description	Results
Depth of Sample (f)	3.0
Angle of Internal Friction (degree)	29.1
Cohesion (PSF)	886.9
Safe Bearing Capacity (TSF)	1.56
Bulk Unit Weight (PCF)	120.6
Natural Moisture Content (%)	9.4



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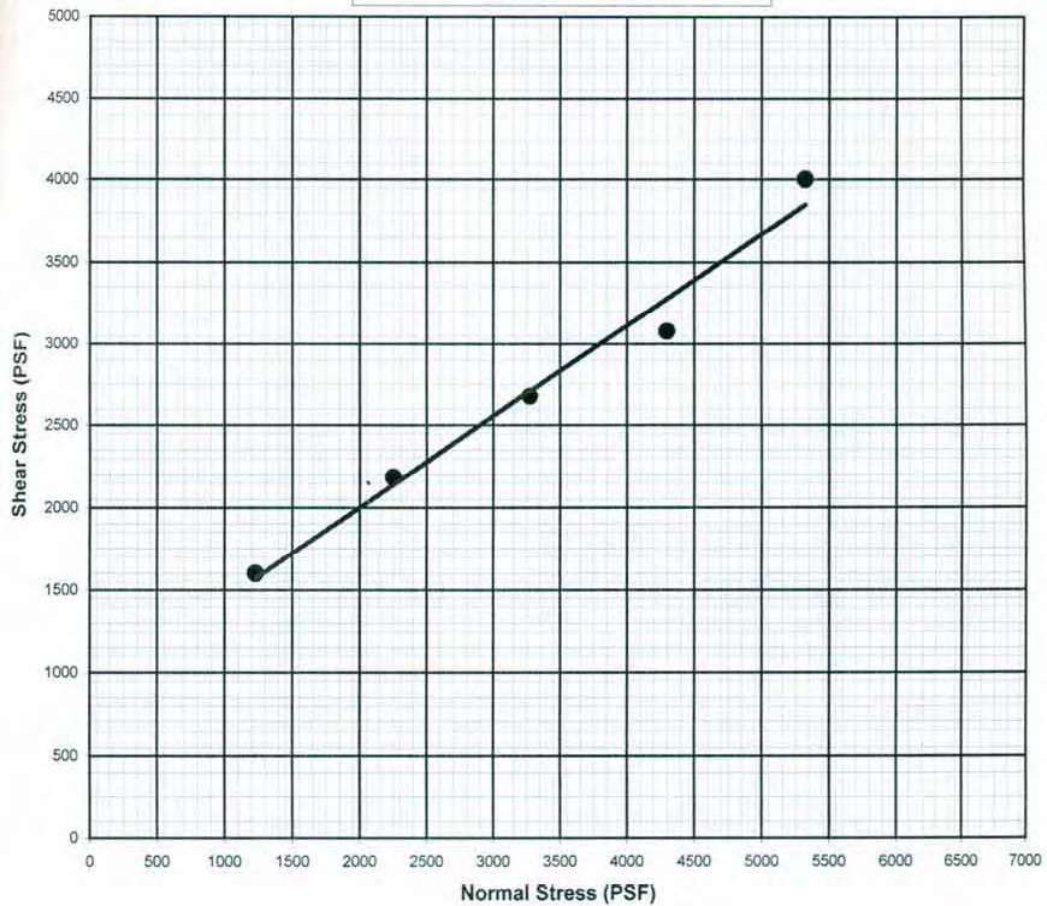


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● BH 3 Sample 2



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Bearing Capacity Test- OGDCL Nashpa, Distt Karak

Sample 3

Test Description	Results
Depth of Sample (m)	5.0
Angle of Internal Friction (degree)	32.4
Cohesion (PSF)	1110.9
Safe Bearing Capacity (TSF)	2.26
Bulk Unit Weight (PCF)	122.7
Natural Moisture Content (%)	7.1

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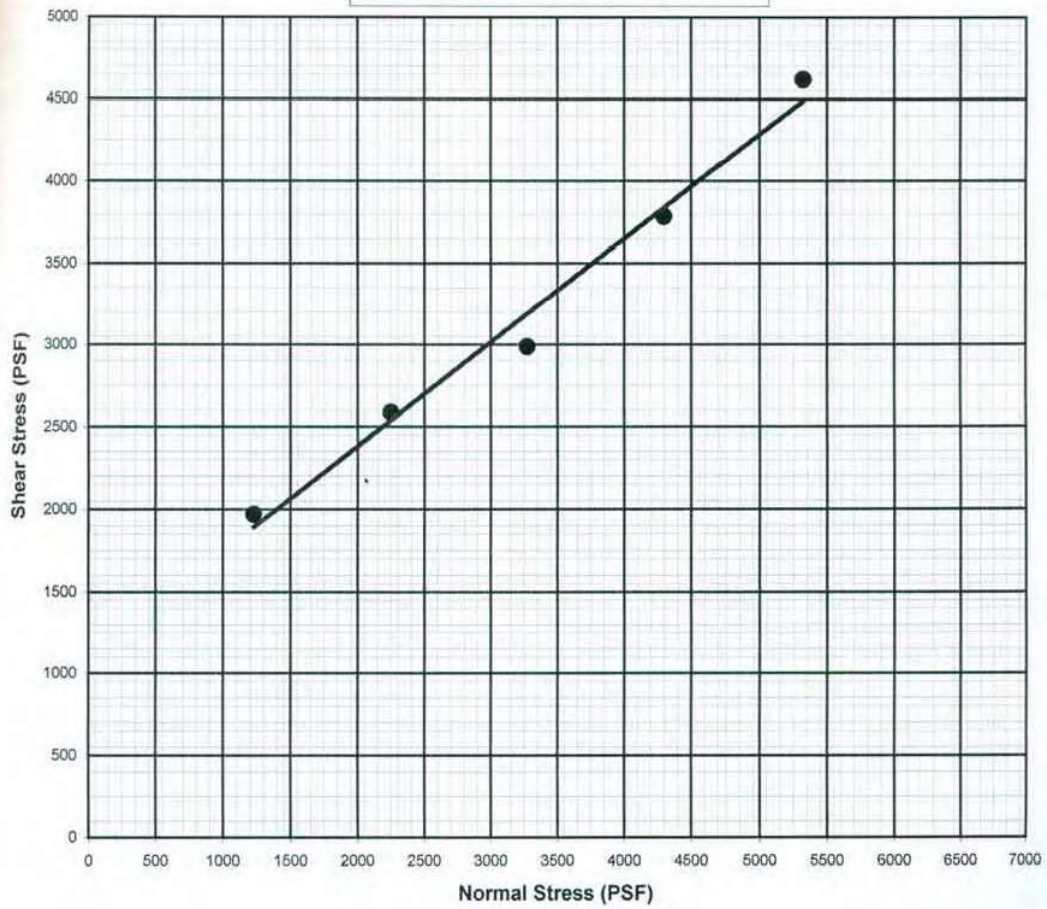


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● BH 3 Sample 3



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Dated : June 29, 2011

By: Muhammad Azam Bhatti Managing Partner
Soil Bearing Capacity Test- OGDCL Nashpa, Distt Karak
Sample 4

Test Description	Results
Depth of Sample (m)	7.0
Angle of Internal Friction (degree)	33.5
Cohesion (PSF)	843.6
Safe Bearing Capacity (TSF)	2.03
Bulk Unit Weight (PCF)	123.5
Natural Moisture Content (%)	10.3


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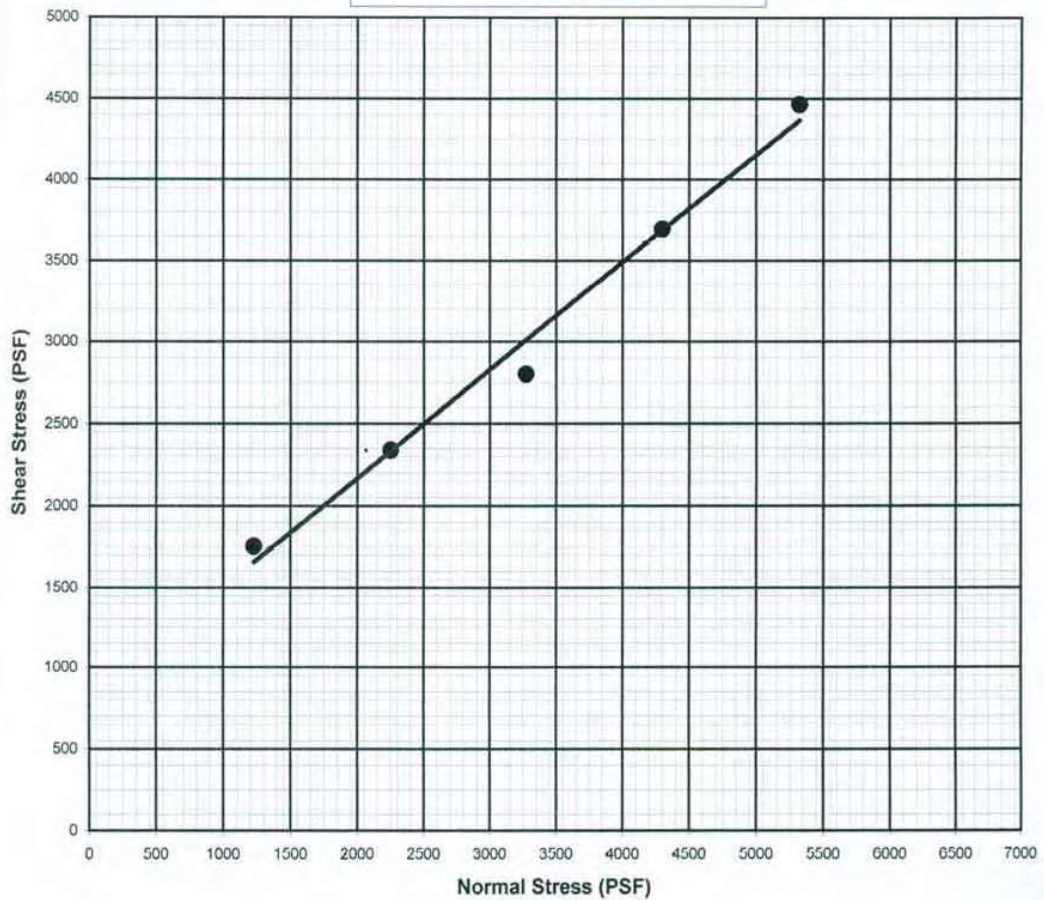



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SOIL MECHANICS AND HIGHWAYS ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 July, 2011

Test Report No. : 169 / 11 / SMHW / CE

Test : Atterberg's Limits (Classification for fine grained soils)

Ref.No.: AJC/UET/244/11

Client : Engr. Muhammad Azam Bhatti Managing Partner

Dated : June 27, 2011

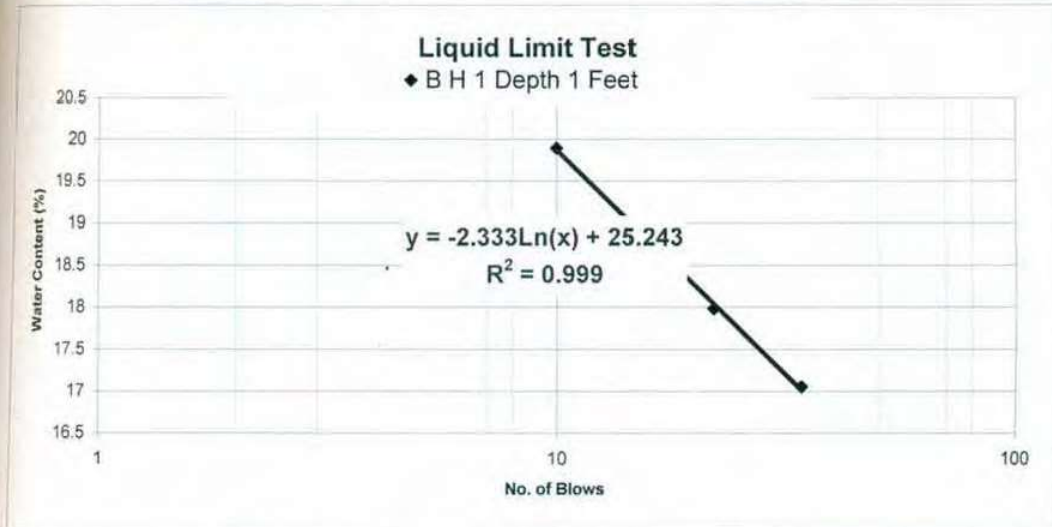
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	B H 1 Depth 1 Feet
1	Liquid Limit (%)	17.7
2	Plastic Limit (%)	14.8
3	Plasticity Index (%)	2.9

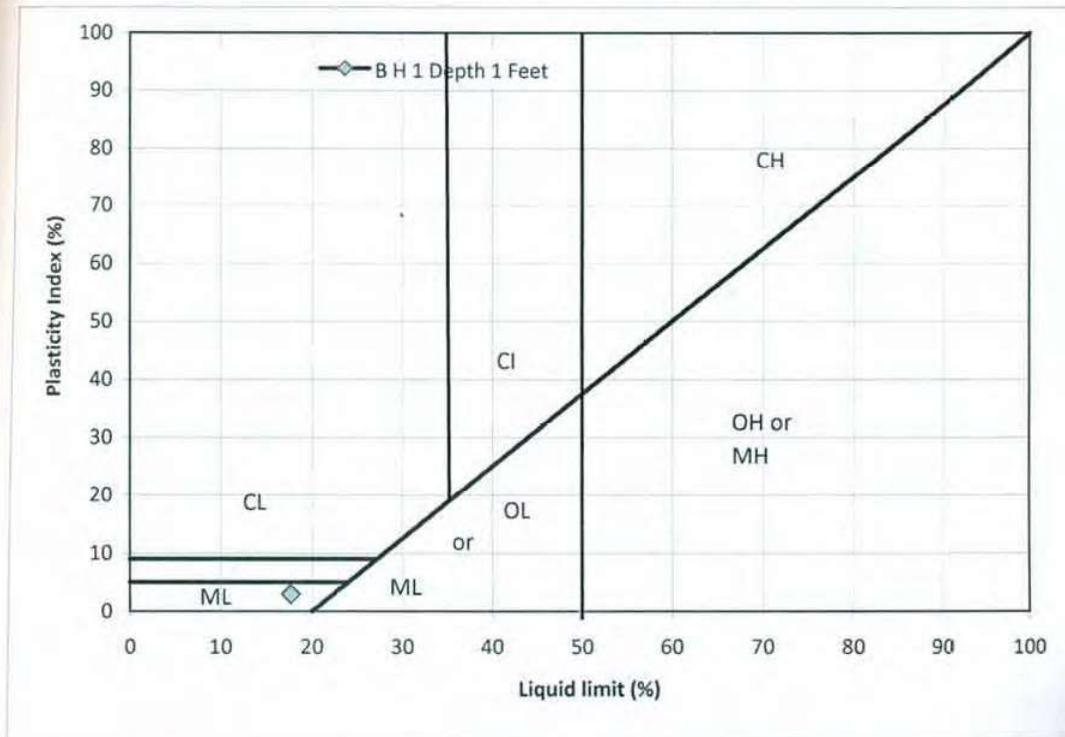
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Plasticity chart for laboratory classification of fine grained soils



- KEY:
- CH High plasticity clay
 - CI Intermediate plasticity clay
 - CL Low plasticity clay
 - MH High plasticity silt
 - ML Low plasticity silt
 - OH High plasticity organic soil
 - Pt Peat

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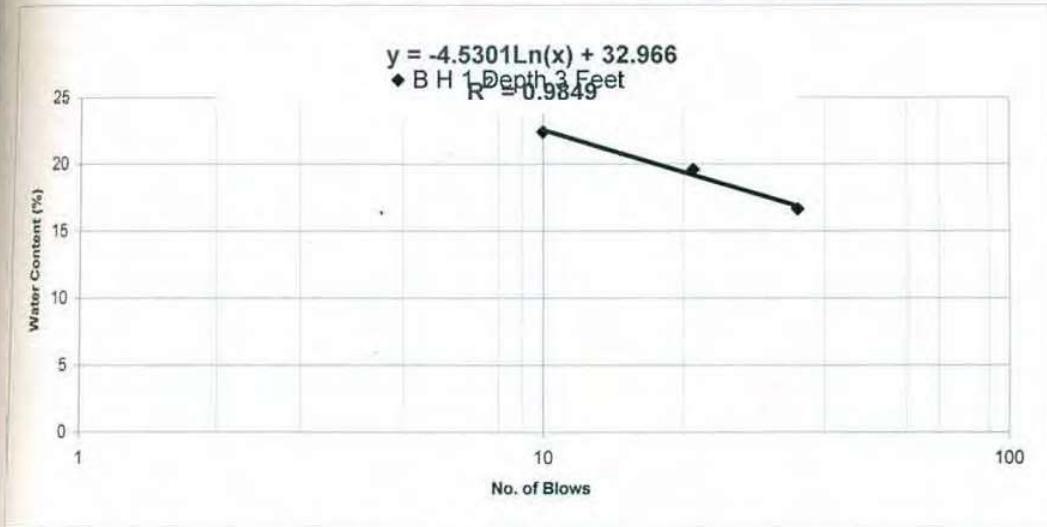
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	B H 1 Depth 3 Feet
1	Liquid Limit (%)	18.4
2	Plastic Limit (%)	14.3
3	Plasticity Index (%)	4.1

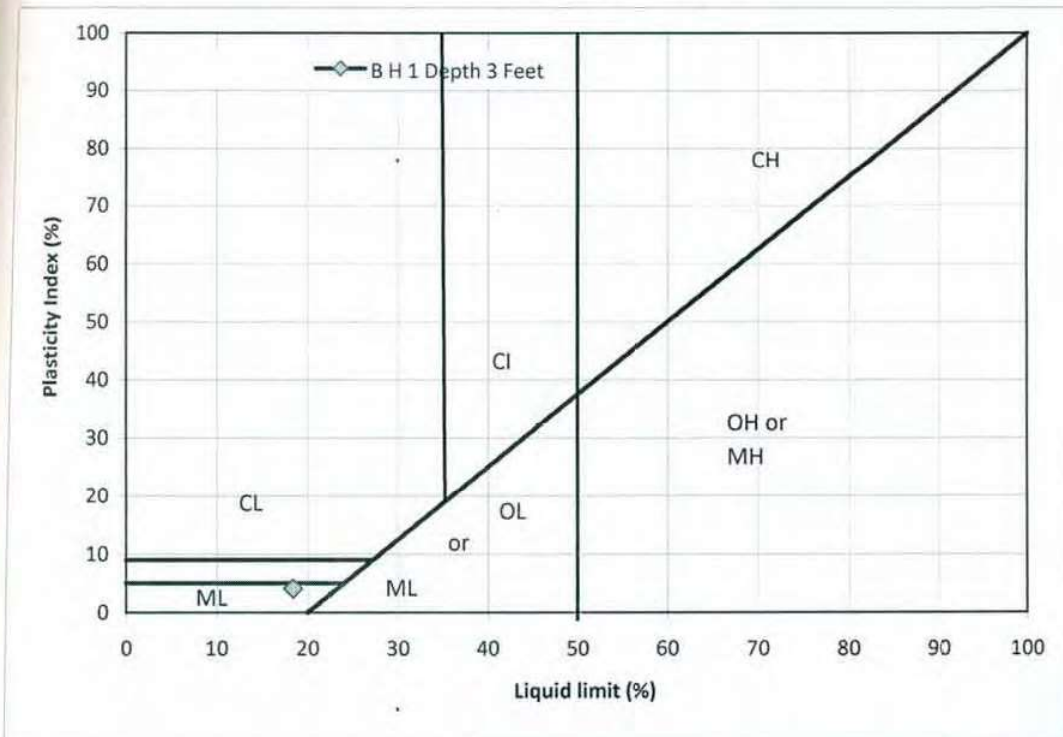
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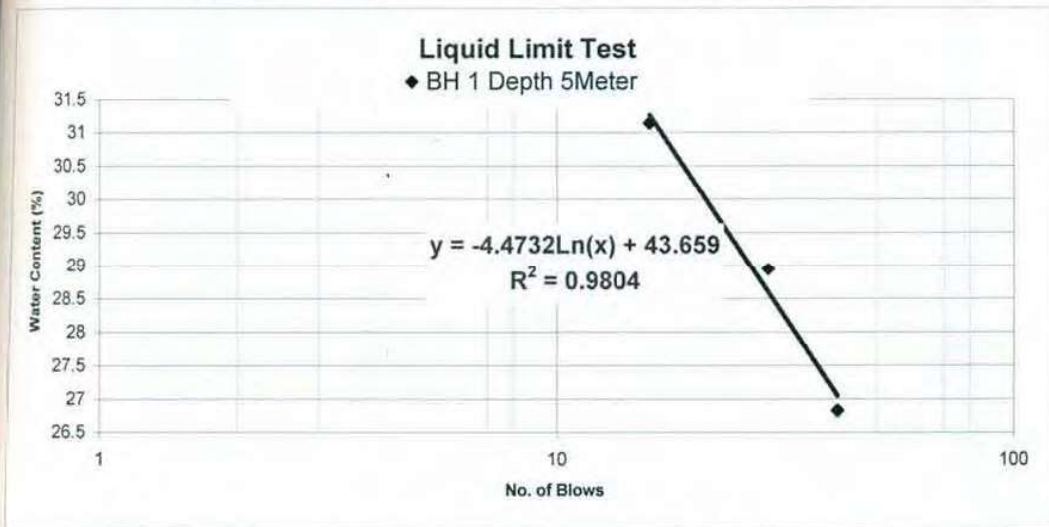
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 1 Depth 5Meter
1	Liquid Limit (%)	29.3
2	Plastic Limit (%)	20.1
3	Plasticity Index (%)	9.2

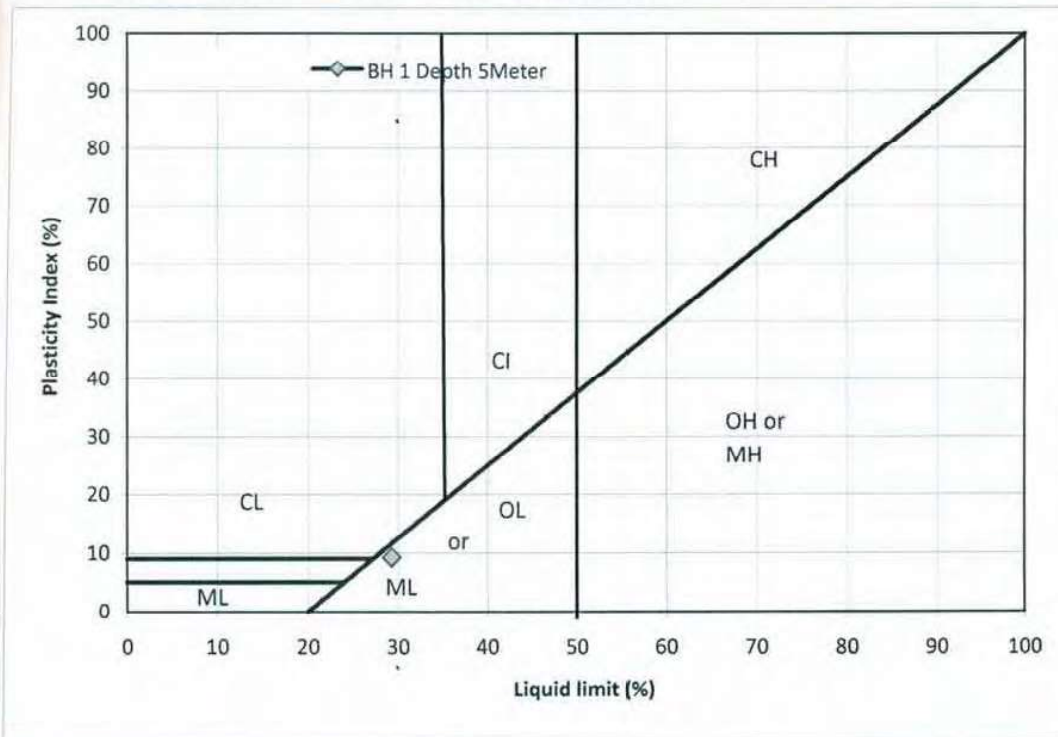
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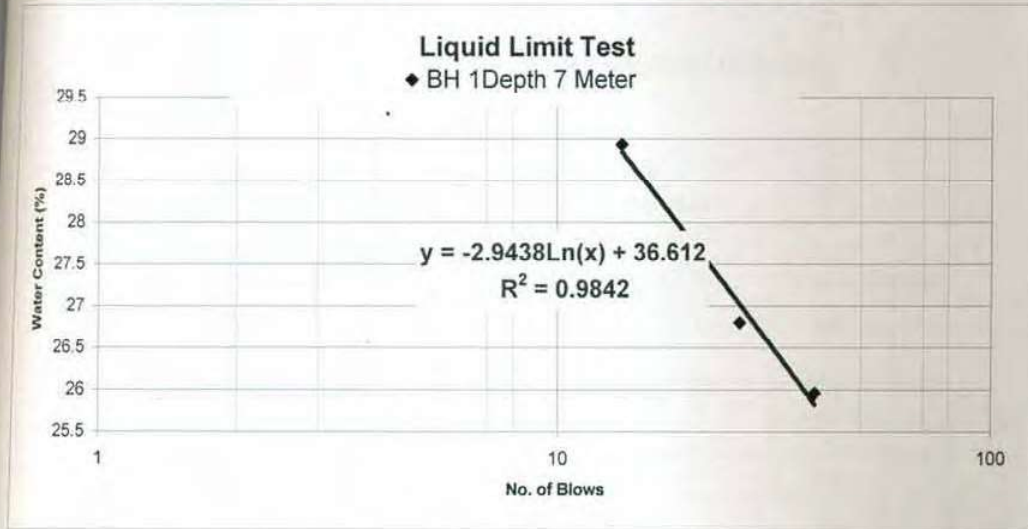
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 1Depth 7 Meter
1	Liquid Limit (%)	27.1
2	Plastic Limit (%)	19.9
3	Plasticity Index (%)	7.2

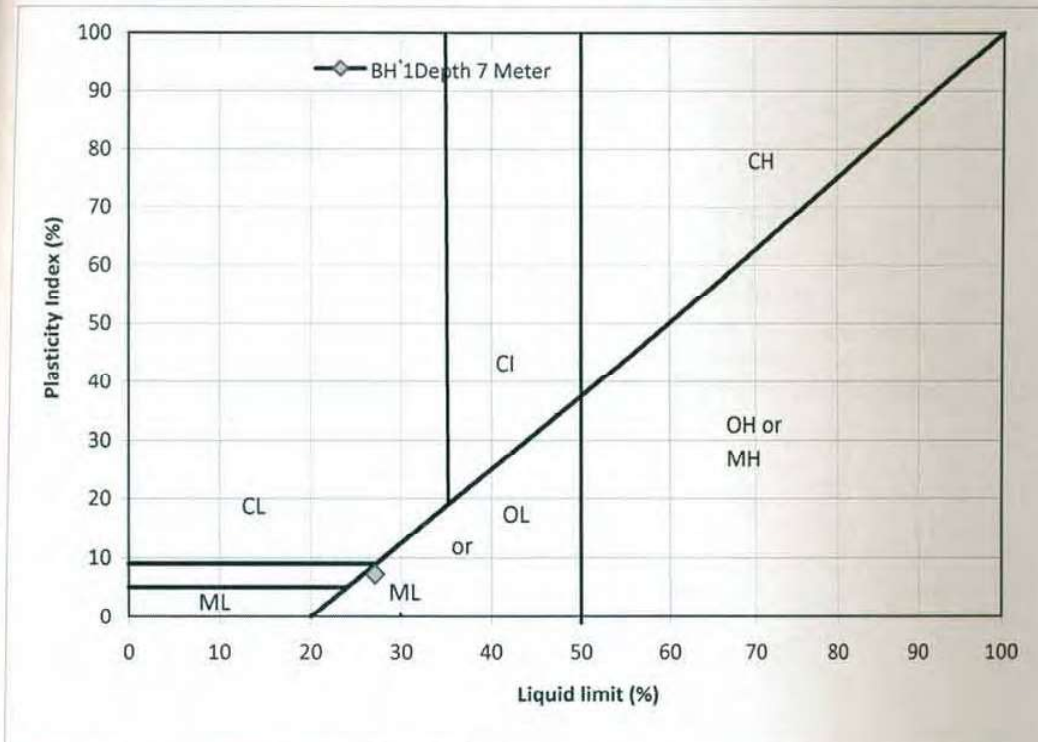
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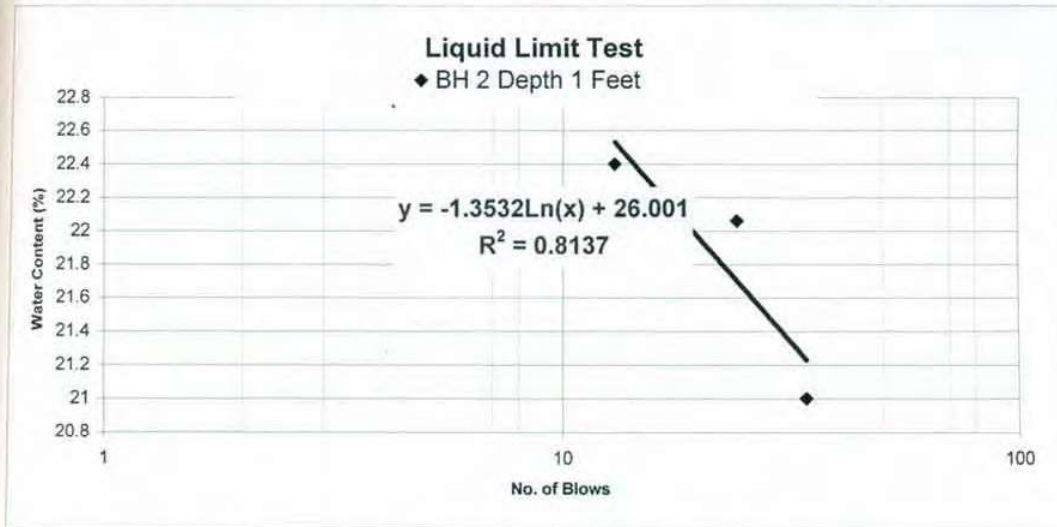
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 2 Depth 1 Feet
1	Liquid Limit (%)	21.6
2	Plastic Limit (%)	9.8
3	Plasticity Index (%)	11.8

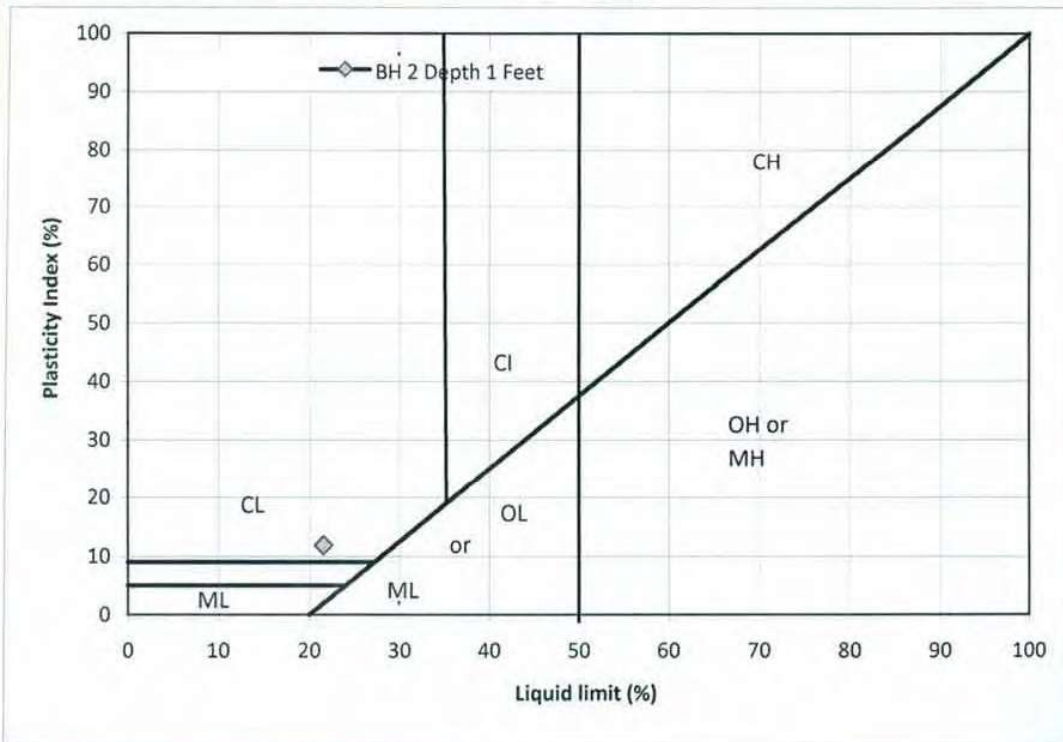
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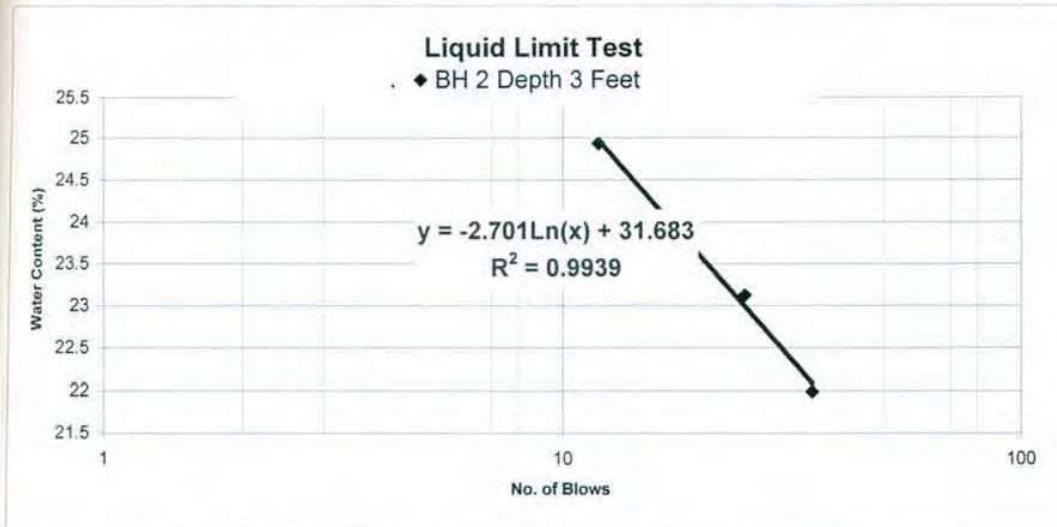
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 2 Depth 3 Feet
1	Liquid Limit (%)	23.0
2	Plastic Limit (%)	14.7
3	Plasticity Index (%)	8.3

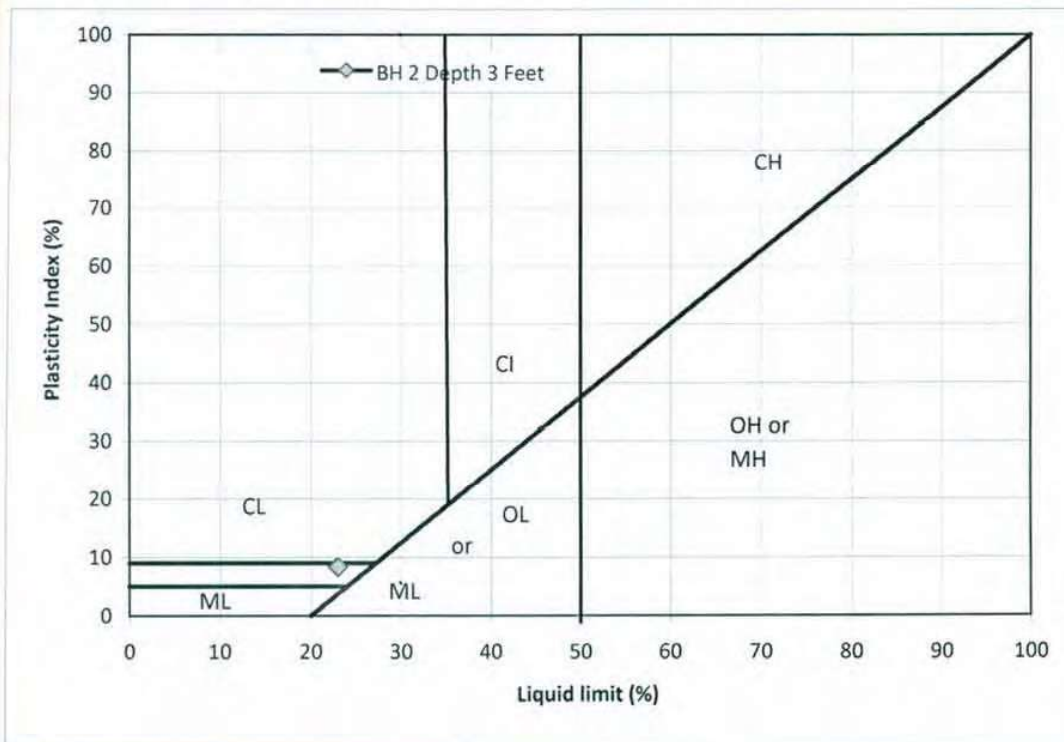
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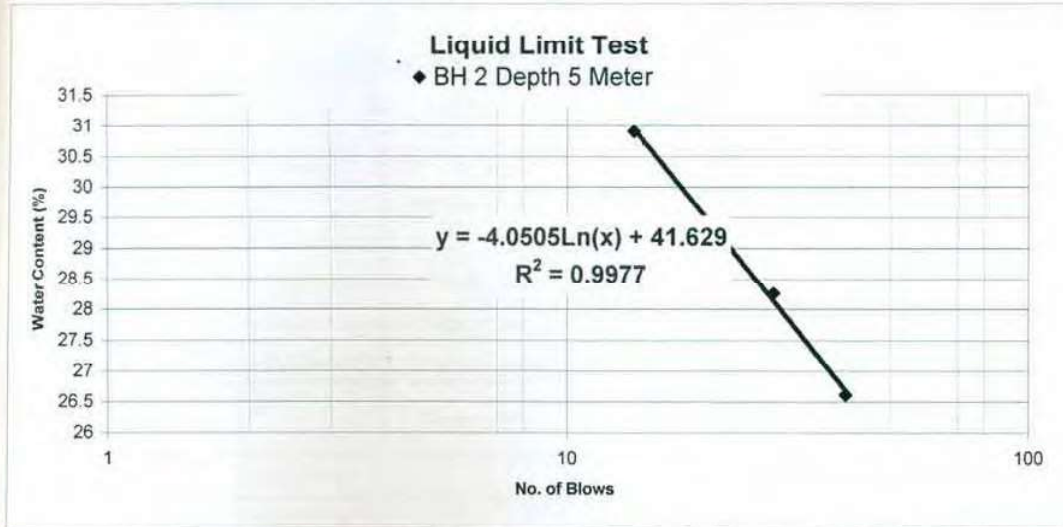
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S.No.	Test Description	BH 2 Depth 5 Meter
1	Liquid Limit (%)	28.6
2	Plastic Limit (%)	21.8
3	Plasticity Index (%)	6.8

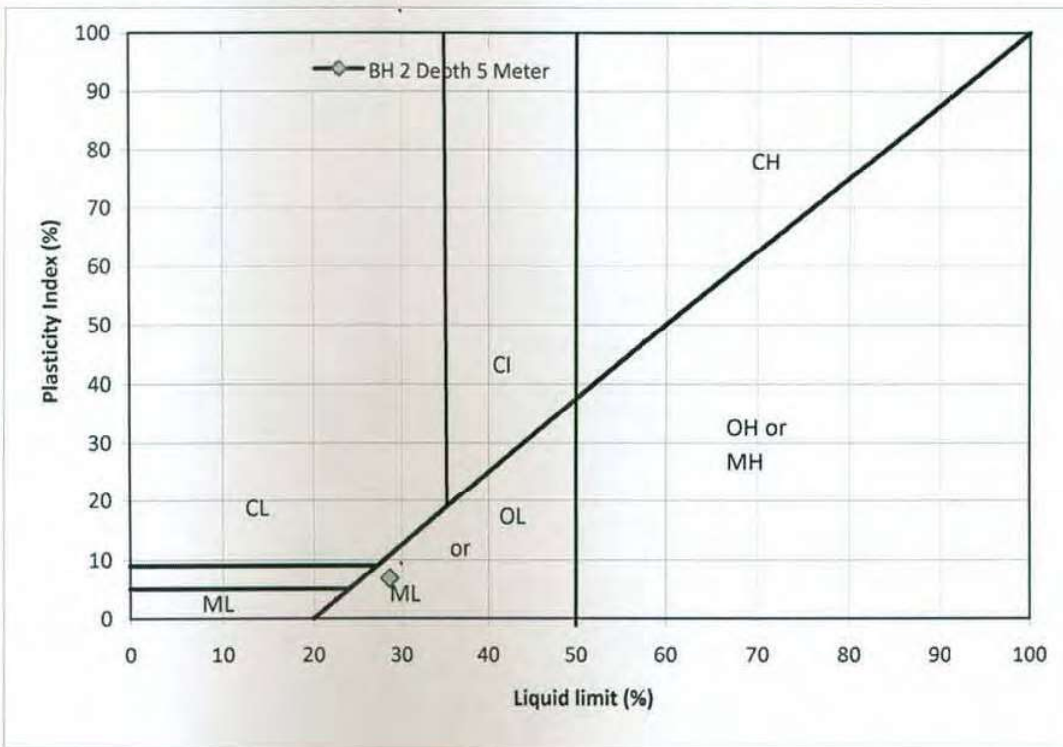
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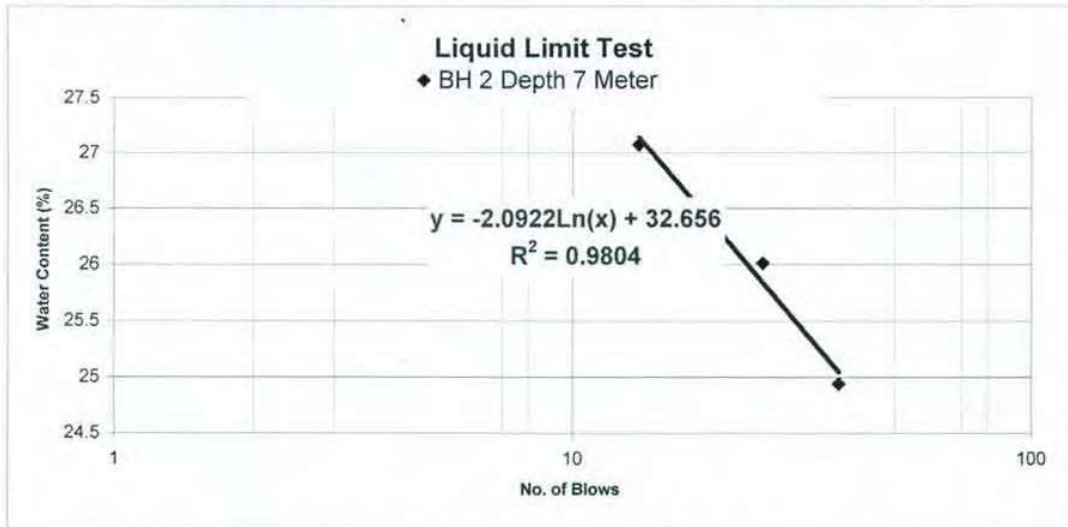
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S.No.	Test Description	BH 2 Depth 7 Meter
1	Liquid Limit (%)	25.9
2	Plastic Limit (%)	18.6
3	Plasticity Index (%)	7.3

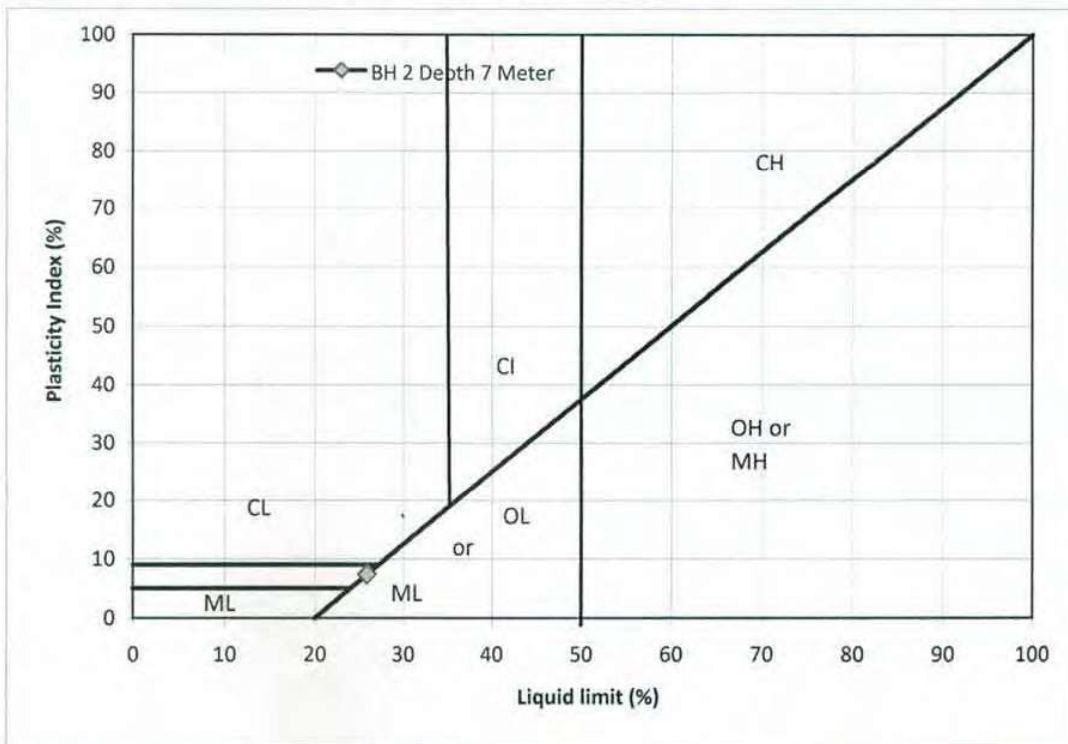
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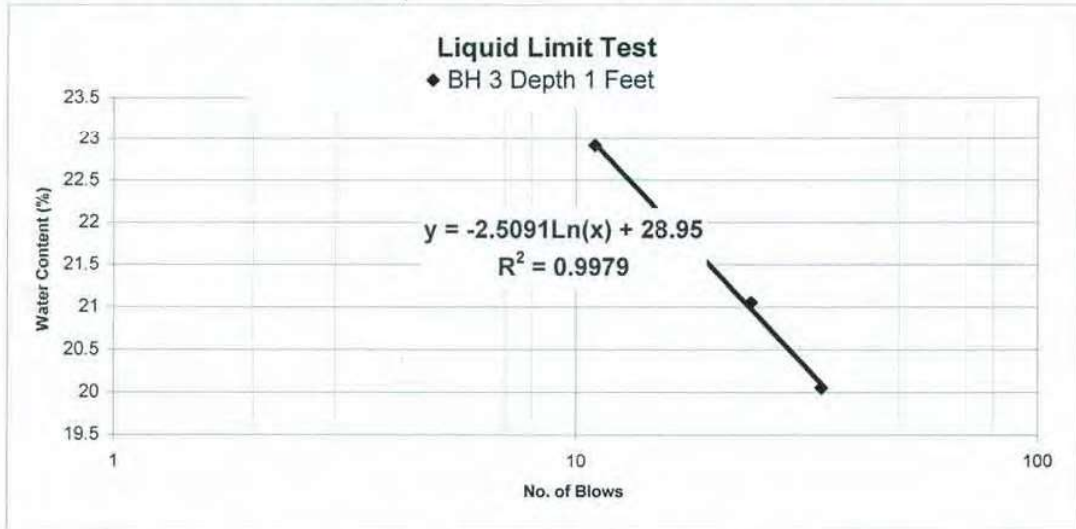
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 3 Depth 1 Feet
1	Liquid Limit (%)	20.9
2	Plastic Limit (%)	15.4
3	Plasticity Index (%)	5.5

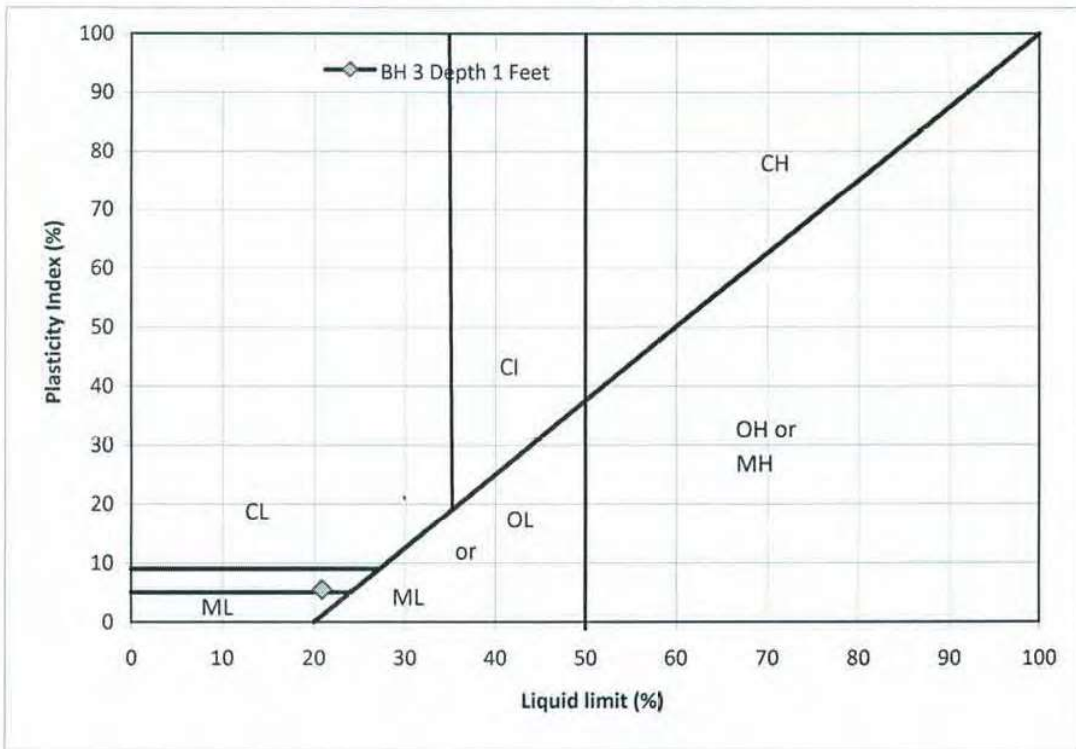
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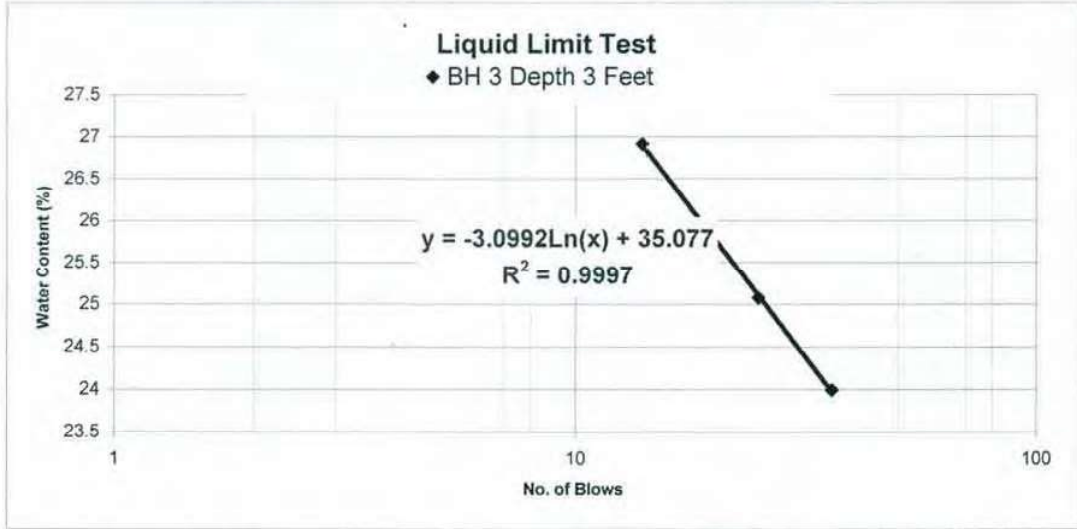
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 3 Depth 3 Feet
1	Liquid Limit (%)	25.1
2	Plastic Limit (%)	16.2
3	Plasticity Index (%)	8.9

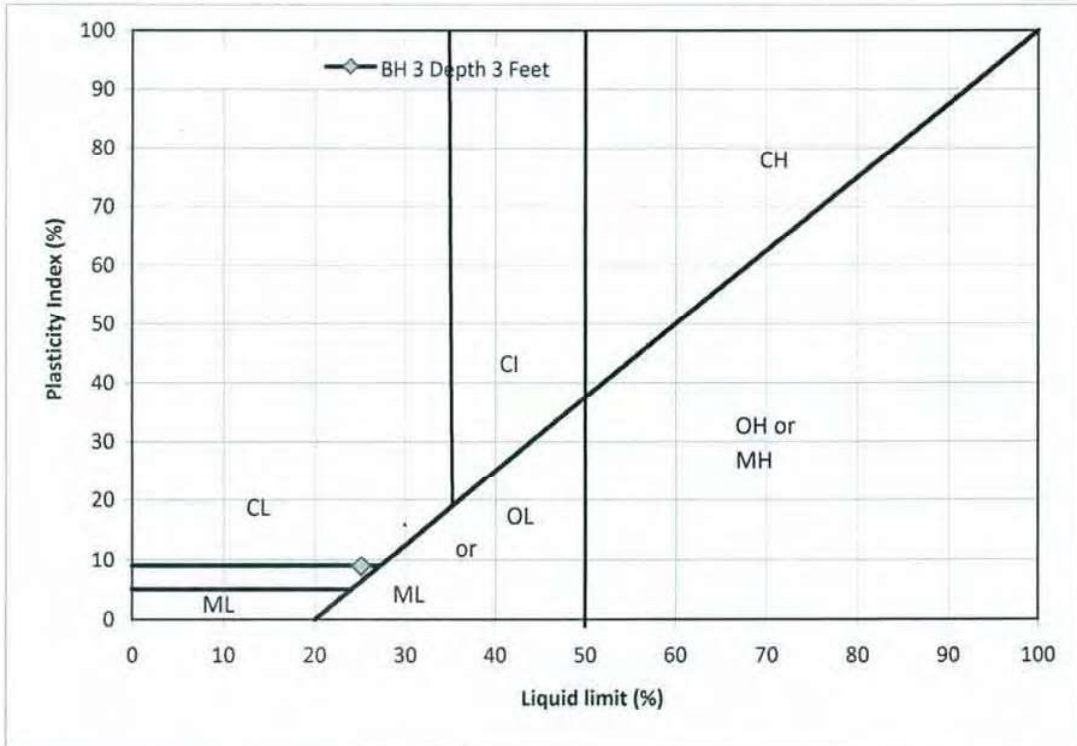
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Plasticity chart for laboratory classification of fine grained soils



KEY:
 CH High plasticity clay
 CI Intermediate plasticity clay
 CL Low plasticity clay
 MH High plasticity silt
 ML Low plasticity silt
 CH High plasticity organic soil
 Pt Peat

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SOIL MECHANICS AND HIGHWAYS ENGINEERING LABORATORY

TEST REPORT

Test Date : 19 July, 2011

Test Report No. : 169 / 11 / SMHW / CE

Test : Atterberg's Limits (Classification for fine grained soils)

Ref.No.: AJC/UET/244/11

Client : Engr. Muhammad Azam Bhatti Managing Partner

Dated : June 27, 2011

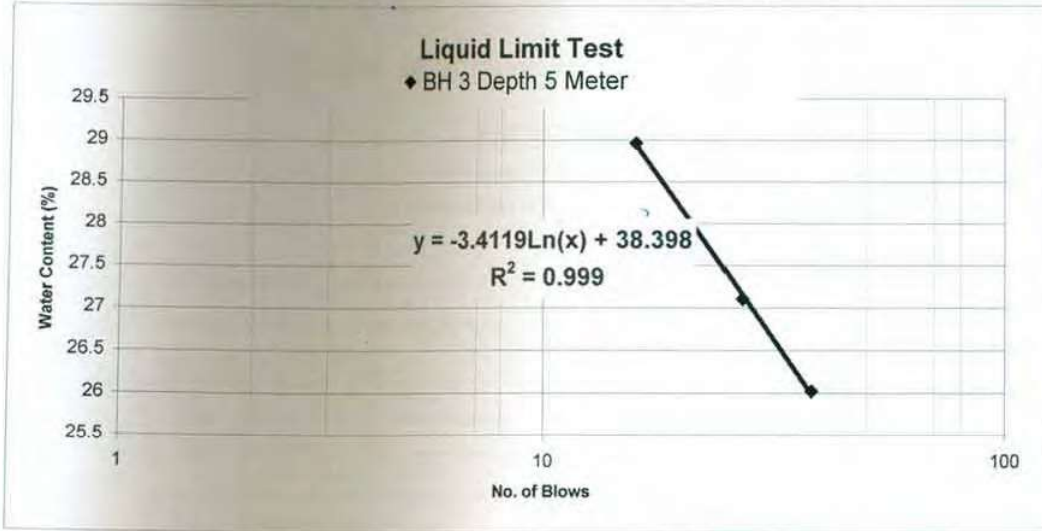
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 3 Depth 5 Meter
1	Liquid Limit (%)	27.4
2	Plastic Limit (%)	17.9
3	Plasticity Index (%)	9.5

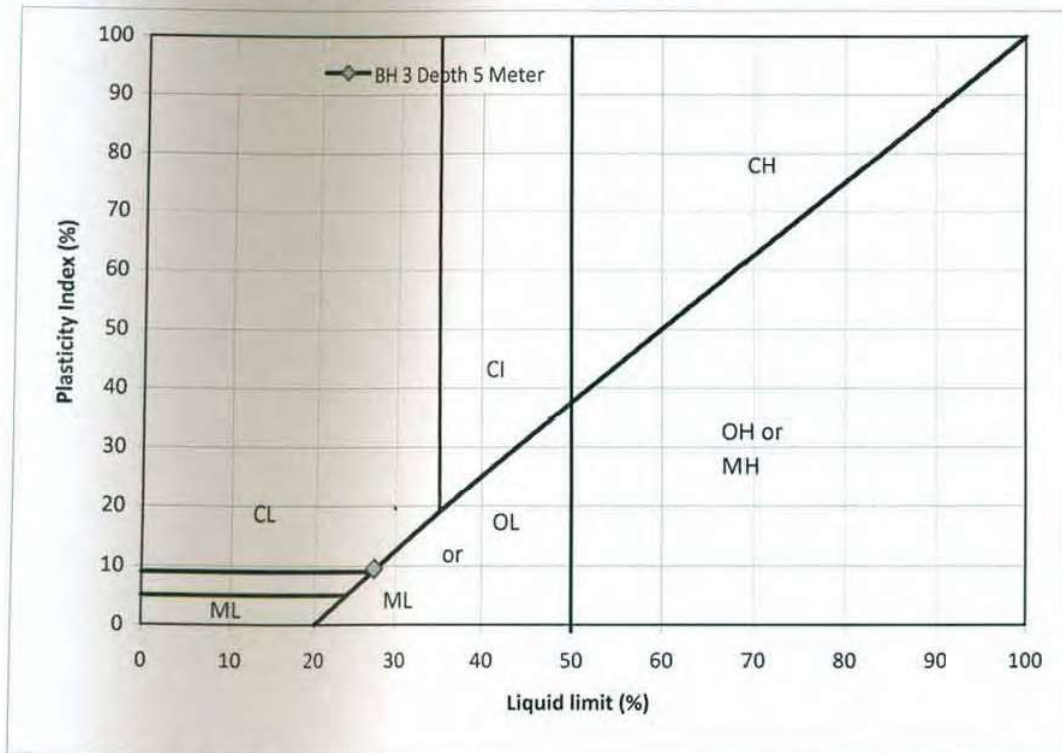
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Plasticity chart for laboratory classification of fine grained soils



- KEY:
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 - CI Intermediate plasticity clay
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 - OH High plasticity organic soil
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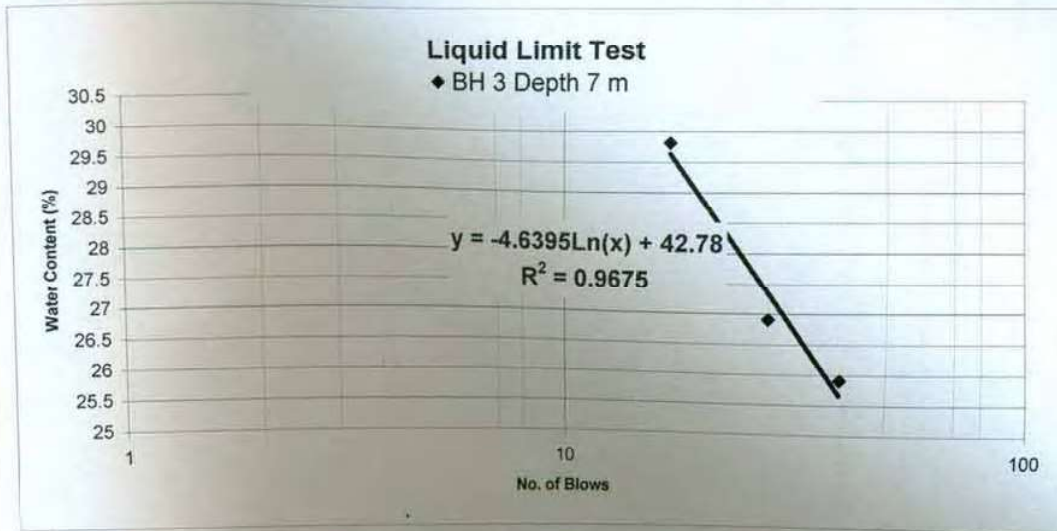
Project : Soil Investigation at OGDCL, NASHPA, Dist. Karak

S.No.	Test Description	BH 3 Depth 7 m
1	Liquid Limit (%)	27.8
2	Plastic Limit (%)	18.2
3	Plasticity Index (%)	9.6

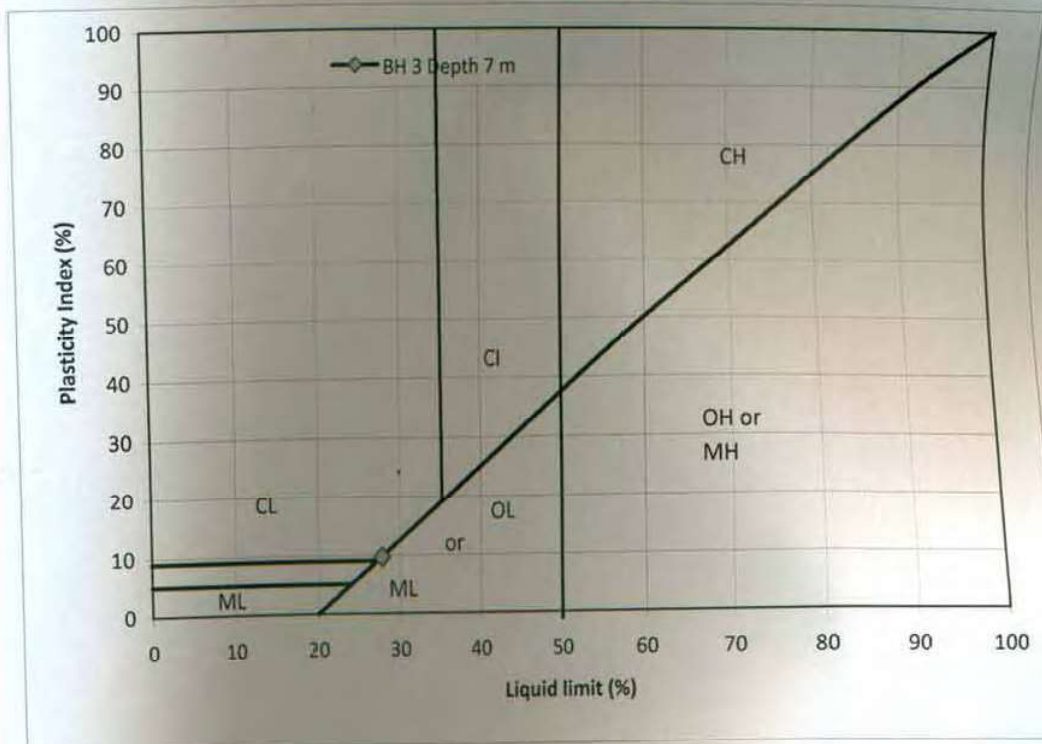
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Plasticity chart for laboratory classification of fine grained soils



KEY:

- CH High plasticity clay
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- Pt Peat

(Signature)

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