Annex B-2: Geotechnical Investigations

Zurmat Material Testing Laboratories

GEO- TEHNICHAL INVESTIGATION
PROJECT: BCP
KANDAHAR PROVINCE, AFGHANISTAN

PREPARED BY:

ZURMAT MATERIALS TESTING LABORATORY

Feb,2009

REPORT ON GEO-TECHNECAL INVESTIGATION

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Zurmat Material Testing Laboratories

REPORT ON GEO-TECHNECAL INVESTIGATION

1. GENGERL

The Subsurface condition under the propose site for single story building evaluated through a programmer of test pits in which in-site density moisture content along with the field identification and logging of the Soil, laterally and horizontally. Test pit were excavated by Pickaxe and hand Shovel, manually. Composite bulk samples with the Change of strata were collected from each test pit. These samples were used for further physical, Mechanical and strength testing in the central Laboratory, situated in Kabul. The details of these investigations are given in the following Section.

2. Test Pit and Density Test

Five (5) test pit 1.5^m x 1.5^m size were excavated at location

- TP-1 : depth 3.1 meters.
- TP-2 :depth 2.9 meter.
- TP-3 : depth 3.0 meters.
- TP-4 : depth 3.3 meter.
- TP-5 : depth 2.8 meter

The location of test pit is shown in fig. 2 of appendix –A. Generally the Soil encountered is of homogeneous and of uniform characteristics. The range of in-situe density and moisture contents at various depths were as under.

Depth (m)	in-situe Dry density (g/cc)	Natural Moisture Content %
Top, 0.25 m	1.50 to 1.72	4.0 to 7.0
0.25 To Bottom of Pits	1.4 to1.5	4.2to 5.5

The test pit. Logs are presented in, Appendix "D"

3. Laboratory Testing of Soil Samples

The Composite samples collected from each pit excavated, were subjected to some or all of the following test in central Laboratory (ZMTL), Kandahar:-

- Grain Size analysis
- Atterberg limits test
- Standard compaction (Compective effert=12400 Lbs-ft/ft^3 or 600 Kn-m/m^3)
- 3 Point (%) C. B. R Value, Corresponding to energy =600 , 300 ,100 KN-m/m^3

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The test results are summarized in table-1 and described in the section below:

3.1 GRADATION

Grain size analysis were carried out in accordance with ASTM C 117 and C 136 (Soil by the washing through no, 200 sieve). A total 11 Nos. of composite samples were tested, two or three from each test pit. Generally the Soil passes through No, 40 Sieve and the fraction Passing No, 200 mesh varies between 16 to 35%. This indicates the Soil ecounted is coarse & fine grained mix material.

3.2 Atterberg limits

Atterberg limits test were performed on 11Nos. of Composite samples from test Pit in accordance with ASTM D 4318 -95. The liquid limit-(%) results were found to be in the range of 22 to 27 with plasticity index range 4 to 7 %. The soil posses low plasticity and falls in to hatched area representing dual characteristics as CL – SC-SM silty Clay, Refer to fig3, plasticity chart, Method ASTM Designation D 2487. The results are tabulated (table -2/Appendix B).

3.3 Standard proctor ASTM Designation D 698

(Compacted effort 12400 lb-ft/ft^3 or 600 Kn-m/m^2)
In order to evaluate the characteristics and in situe condition:-
11Nos. of specimen were subjected to modified proctor as per ASTM. The Max.Dry Density ranges 2.000 to 2.190 g/cc, with optimum moisture content of 6.5 to 8.4 %. The test results are shown table.

3.4 California Bearing Ratio (CBR Value)test

In order to evaluate the in-situe strength parameters (penetration resistance) of the Soil encountered, 10 Nos. of CBR tests 2 each on a Composite sample from every test pit were compacted at Completive effort 600, 300 and 100KN-m/m^3, respectively, close to optimum moisture determined from the proctor, 96 Hours (4 days) soaking before testing.
(%) Swell and C.B.R values under @rate of 0.05in/min penetration were tested. The test results are shown on Table-2 Appendix "B" and graphs showing % CBR value vs dry density in Appendix "C".The specimens were soaked for 96 hours, under a surcharge weight of 10 lbs.

Design Consideration

Design considerations are based on the Laboratory test results, logs of sub-surface exploration/observations, within the explored depth (2.8 to 3.3m). The strata encountered during the exploration were very stiff to hard with in-situ moisture contents ranging from 2.9% to 6.7%, while the in-situ units weight/dry densities. Varied from 1.4% to 1.5%. The % compaction with respect to standard compaction (12375 Lbs-ft/cft or 600 KN-m/m^3) was ranging between 77% to 82%. The description of the material enounced was light brown, calcareous silty clay+gravel (SC-SM) in dry condition with plasticity index value of 4 to 7.The (%) C.B.R values range 40 to 48@ 98% compactio with swell 0.02 to .07, respectively on the specimen compacted to 600KN-m/m^3 (standard proctor). Estimated modulus of sub grade "K"

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Lbs./in^2/in.,derived from C.B.R. (%) Between 40 to 48 . The modulus of sub grade 'K' determined for the in-situ condition range from.200 to 225.
The Geotechnical studies shows that one test pit showed few open voids space, roots and .few fissured place,(vertical moderate shrinkage cracks) in to the top 1.0 meter, and bottom one meter.
This aspect be given through consideration while designation the foundation of footings. Generally the strata encountered are homogenous and very stiff to hard with estimated ultimate Bearing capacity of 3 kg/cm^2. Safe design value may be kept at 1.0 kg/cm^2 with safety factor of s.f = 3.
The bottom of footing be compacted to 100% of Max.dry density (standard proctor) or 95% of modified proctor (prior to placing footing/concreting)
The Inorganic silty clay contains more than 3% by weight finer than 0.02 millimeter clay particle with Voids ratio (e) ranging 0.8 to 0.9, therefore, the soil is frost susceptible. Freezing zone is estimated 0.5 meter from the ground surface.
If the foundation rests on the pit location or back filled soil then (be sure that the back filling soil to be compacted to 95% of Max.dry density (modified proctor) in layers of thickness 20 cm to 25 cm to optimum moisture content
Calculation of ultimate bearing capacity for silty clay is based on the in-situ condition, using a safety factor F.S = 3 (Determined according to US army Corpe of Engineering).
The soil /silty clay is practically impervious degree of permeability 'K' is estimated at 10^{-4} to 10^{-5} cms/sec

LAB MANAGER

MATERIAL SPECIALIST

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TABLE – 2

SUMMARY OF LABORATORY TEST RESULT

Kabul Central Materials Laboratory

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ZURMAT MATERIALS TESTING LABORATORY

Final Results of Soil Analysis

Lab ID No.	Test Pit Number	Depth (meters)	NMC	Atterberg Limits			Mod. Proctor		CBR	CBR	Mechanical Sieve Analysis											Soil Classification	Unified Soil Classification
											Percent Passing Designated Sieves												
				LL	PL	PI	MDD	OMC	Value	Swell	75mm	50mm	37.5mm	25mm	19mm	9.5mm	6.3mm	4.75mm	2.00mm	425mm	075mm	AASHTO M145	ASTM D2487
			%	%	%		Kg/m3	%	%	%													
KDR-319	PIT#1	0.3m	2.8	29.2	22.4	6.8	2,217	7.2	45.5	0.08	100	100.0	_	93.0	82.0	60.7	_	51.3	46.3	42.2	31.1	A-2-4	SC
KDR-319	PIT#1	2.8m	5.3	29.1	22.7	6.4	2,212	7.7	55.3	0.04	100	100.0	_	88.0	77.5	57.1	_	42.3	35.1	26.6	17.8	A-2-4	SC-SM
KDR-319	PIT#2	0.40 m	3.2	30.1	24.7	5.5	2,208	8.7	43.3	0.06	100	100.0	_	93.4	84.3	63.5	_	51.7	47.6	43.9	33.1	A-2-4	SC
KDR-319	PIT#2	2.50 m	5.1	30	23.8	6.2	2,215	7.4	43.5	0.05	100	100.0	_	92.8	80.5	58.7	_	48.4	43.6	39.1	27.9	A-2-4	SC-SM
KDR-319	PIT#3	1.0m	3.4	28.9	22.8	6.4	2,217	7.6	43.6	0.05	100	100.0	_	90.3	78.4	57.7	_	47.6	40.5	38.9	28.2	A-2-4	SC
KDR-319	PIT#3	2.7m	5.4	28.5	22.7	5.8	2,219	7.6	42.5	0.05	100	100.0	_	94.8	83.3	61.4	_	53.5	47.6	43.9	33.7	A-2-4	SC-SM
KDR-319	PIT#4	0.5m	4.9	29.5	23.1	6.4	2,219	7.3	46.4	0.03	100	100.0	_	87.4	76.3	56.9	_	40.7	34.8	24.8	19.1	A-2-4	SC-SM
KDR-319	PIT#4	3.0m	5.8	31.3	24.4	6.9	2,214	7.2	41.0	0.08	100	100.0	_	89.4	78.2	58.3	_	47.9	44.6	39.7	32.5	A-2-4	SC
KDR-319	PIT#5	0.5m	4.6	32.5	24.9	7.7	2,208	8.4	41.5	0.06	100	100.0		91.3	81.4	60.9	_	51.0	46.5	41.3	34.7	A-2-4	SC
KDR-319	PIT#5	1.2m	5.4	27.9	22	3	2,229	6.7	_	_	100	100.0		86.7	71.4	50.7	_	37.6	29.4	21.0	16.7	A-2-4	SP-SC
KDR-319	PIT#5	2.3m	6.1	29.5	23.3	6.2	2,215	7.7	_	_	100	100.0		88.2	77.9	58.0	_	41.7	35.0	25.7	21.1	A-2-4	SC-SM

Remarks:
CBR Value was determined at soaked condition at 98% of Max. Dry Density (A

Prepared By: [
Abdul Ghafar LT
Date Prepared:

Checked By:
Shah Hussain SLT
Date Checked:

Certified By
Bader Zaman Lab Manager
Date Certified:

APPENDIX – C

FIELD AND LABORATORY TEST RESULT

Zurmat Material Testing Laboratories

FIELD DENSITY TEST (Sand Cone Method)

Client:	RRCC	Lab.Ref.No:		ZMTL-KDR.0319,Ac-0026				
Project:	BCP	Req.No:		Feb,11				
Contractor:		Date:		06/02/2009				
Location:	Speen Buldak	Description:		PIT# 1				
Test No.		1	2	3				
Depth of PT.		30cm	120cm	260cm				
Layer								
Depth of hole	(cm)	15	15	15				
Material source (Name & location)		Natural Material						
FIELD DENSITY								
Pouring Cylinder No.		1	1	1				
Weight of wet material from hole	(g)	4855	4018	4791				
Weight of (sand + cylinder) before pouring	(g)	8000	8000	8000				
Weight of (sand + cylinder) after pouring	(g)	2688	3462	2963				
Weight of sand in cone	(g)	1626						
Weight of sand in hole	(g)	3686.0	2912.0	3411.0				
Bulk density of sand	(g/cc)	1.350						
Volume of sand in hole	(cc)	2730	2157	2527				
Wt. of material retained on 19 mm Sieve	(g)	1087	1169	1360				
% of material retained	(cc)	22	29	28				
Bulk density of material	(g/cc)	1.778	1.863	1.896				
MOISTURE CONTENT								
Wt. of wet material+container	(g)							
Wt. of dry material+container	(g)							
Weight of Container	(g)							
Weight of Dry Material	(g)	By Speedy Tester						
Wt. of water	(g)							
Moisture content	(%)	2.8	4.9	5.3				
RESULTS								
Field Dry Density	(g/cc)	1.730	1.776	1.801				
Lab Max Dry Density	(g/cc)							
Corrected MDD								
Optimum Moisture content	(%)							
Compaction obtained	(%)							
Compaction required	(%)							
REMARKS								

Comments:

Tested by	Shah Hussain S.L.T	Lab Manager	
Checked by	Shah Hussain S.L.T	Date	
Date	08/02/2009	Client	

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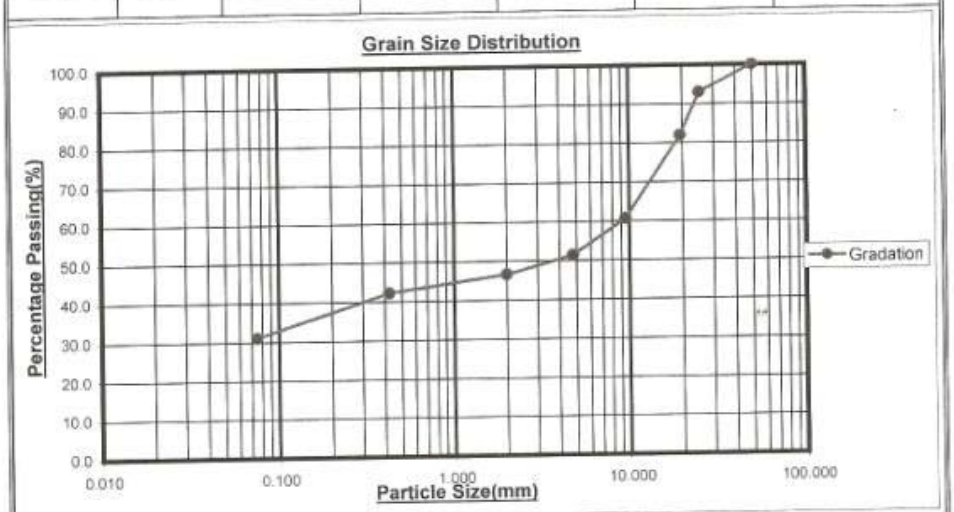
ZURMAT MATERIALS TESTING LABORATORIES

Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab,Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#1 - Sample#1	Date of Sampling	6/2/2009
Dry Constant Weight(g)	4515	Date of Testing	7/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	315	7.0	93.0		
19.5mm	3/4in	0	813	18.0	82.0		
9.5mm	3/8 In	0	1775	39.3	60.7		
4.75mm	No. 4	0	2198	48.7	51.3		
2.00 mm	No. 10	0	2411	53.4	46.6		
425 µm	No. 40	0	2610	57.8	42.2		
75 µm	No. 200	0	3111	68.9	31.1		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers	
Checked by	Shah Hussain SLT	Date.	
Date	7/2/2009	Client.	

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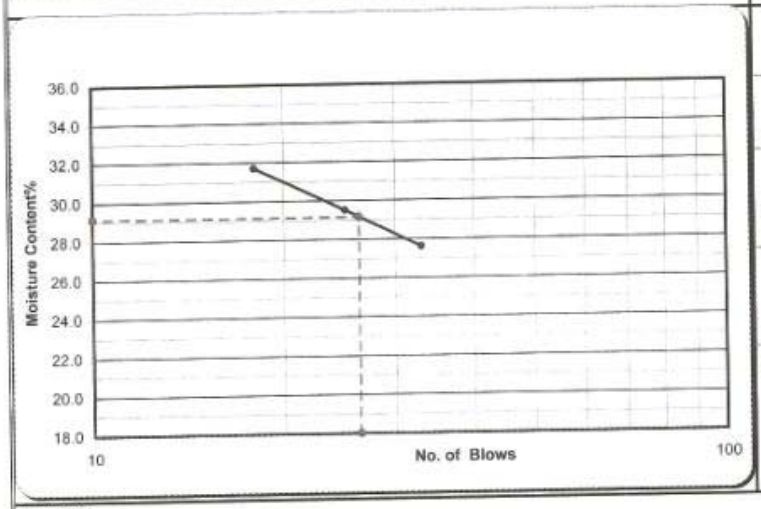
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No,	Feb,11
Contracter:		Sampie by:	Shah Hussain
Description:	PIT#1, Sample #1	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	7/2/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		33	25	18			
Container Number		A-12	A-5	A-6		A-10	A-7
Wt. of Wet Soil + Cont	g	47.66	49.69	46.15		37.89	30.96
Wt. of Dry Soil + Cont	g	41.48	43.26	39.40		35.46	28.47
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	6.18	6.43	6.75		2.43	2.49
Wt. of Dry Soil:	g	22.40	21.80	21.30		10.80	11.20
Moisture Content:	%	27.6	29.5	31.7		22.5	22.20
						Ave.(PL)	22.4



RESULTS

LIQUID LIMIT

(LL) = 29.2

PLASTIC LIMIT

(PL) = 22.4

PLASTICITY INDEX

(PI) = 6.8

SOIL CLASSIFICATION

A-2- 4

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	7/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED /SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

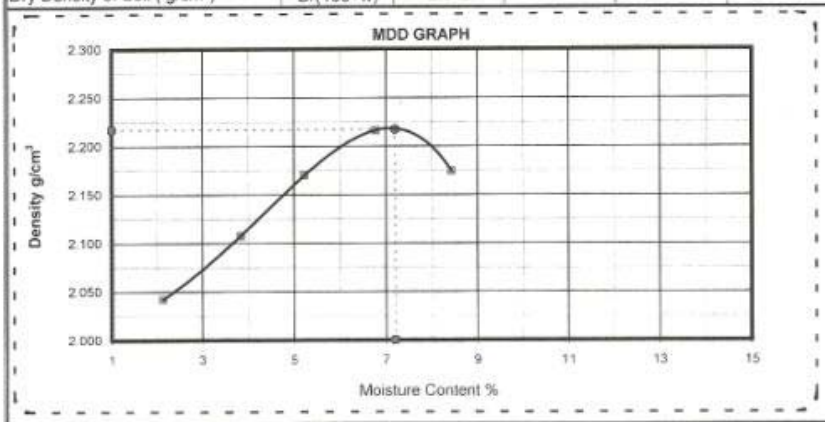
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #1 Sample #1
Location:	Speen Buldack	Date of Testing.	07/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8865	9084	9285	9461	9442
Weight of Wet Soil (g)	C-A	4430	4649	4850	5026	5007
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.086	2.189	2.283	2.366	2.357

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	316.2	318.7	303.4	335.9	307.1
Wt. of Container + Dry Soil (grm)	F	311.1	309.3	291.6	319.0	287.8
Weight of Water (grm)	G = E - F	5.1	9.4	11.8	16.9	19.3
Weight of Dry Soil (grm)	F - B	238.9	244.9	225.7	249.5	229.0
Water Content %	G/(F -B)100	2.1	3.8	5.2	6.8	8.4
Dry Density of Soil (g/cm^3)	D/(100+w)	2.042	2.108	2.170	2.216	2.174



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.217 g/cm^3	7.2 %

Tested By	Abdul Ghafar LT	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	8/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting.	08/02/2008
Description:	PIT # 1, Sample #1	Location:	Speen Buldak
Description of Material:	Natural	Date of testing.	12/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	1	2	3
Mould+Samples (A)	11242	11706	11790
Mould Wt (B)	6672	6815	6721
Sample Wt (A-B)	4570	4891	5069
Cont. + Wet Sample	446.5	455.5	432.8
Cont. + Dry Sample	420.5	426.4	408.1
Tare Weight	63.8	67.1	65.4
Dry Soil	356.7	361.3	342.7
Water Content %	7.3	7.5	7.2
Mould Volume	2115.9	2139.9	2124.3
Bulk Density	2.160	2.286	2.386
Dry Density	2.013	2.126	2.226

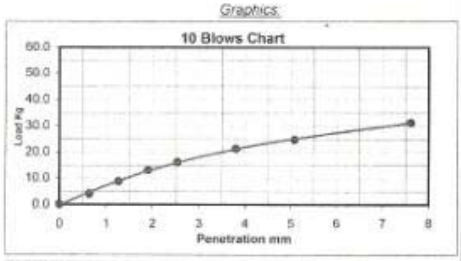
Swell Record (mm)

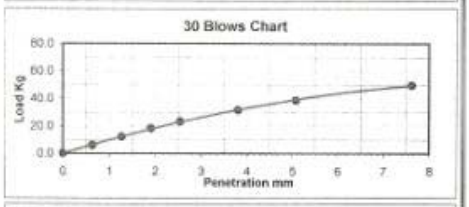
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.09	0.07	0.05
Deffirince	0.09	0.07	0.05
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.08	0.06	0.04

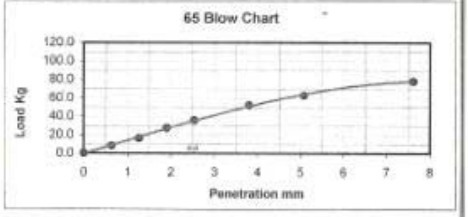
Load/Penetration Record

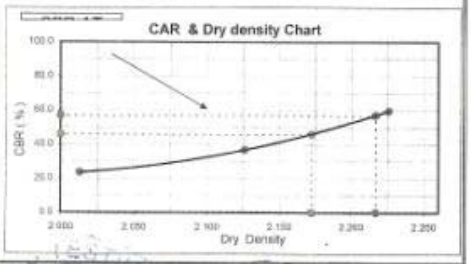
Std Load	Penet. mm	10 Blows Readings	10 Blows Load	30 Blows Readings	30 Blows Load	65 Blows Readings	65 Blows Load
	0.00	0	0	0	0	0	0
	0.64	53	4.02	80	6.08	107	8.13
	1.27	115	8.73	160	12.13	215	16.33
	1.91	170	12.91	240	18.23	361	27.41
70.3	2.54	216	16.13	306	23.24	470	35.69
	3.81	280	21.26	416	31.59	690	52.40
105.5	5.08	325	24.69	510	38.72	828	62.88
	7.62	410	31.14	653	49.59	1027	77.99

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.013	2.126	2.226
Compaction Rat %	90.8	95.9	100.4
CBR %	23.4	36.7	59.6
Maxim Dry Density (g/cm³)	2.217	OMC %	7.20%
CBR At 100% Compaction	57.0	CBR At 98%Compaction	45.8

Remarks:

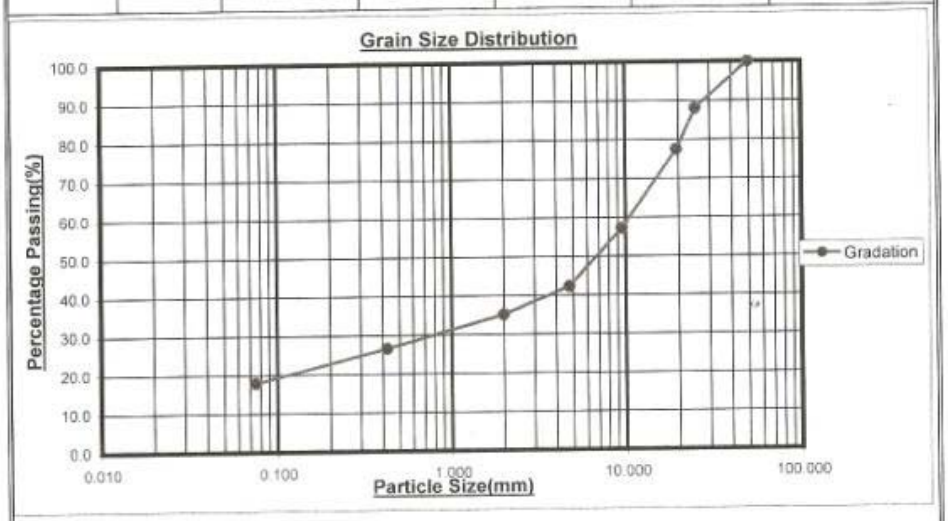
Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date.	
Date	12/02/2009	Client.	

Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#1 - Sample#2	Date of Sampling	6/2/2009
Dry Constant Weight(g)	4187	Date of Testing	7/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	504	12.0	88.0		
19.5mm	3/4in	0	943	22.5	77.5		
9.5mm	3/8 In	0	1796	42.9	57.1		
4.75mm	No. 4	0	2416	57.7	42.3		
2.00 mm	No. 10	0	2717	64.9	35.1		
425 µm	No. 40	0	3073	73.4	26.6		
75 µm	No. 200	0	3438	82.1	17.9		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers.	
Checked by	Shah Hussain SLT	Date	
Date	7/2/2009	Client	

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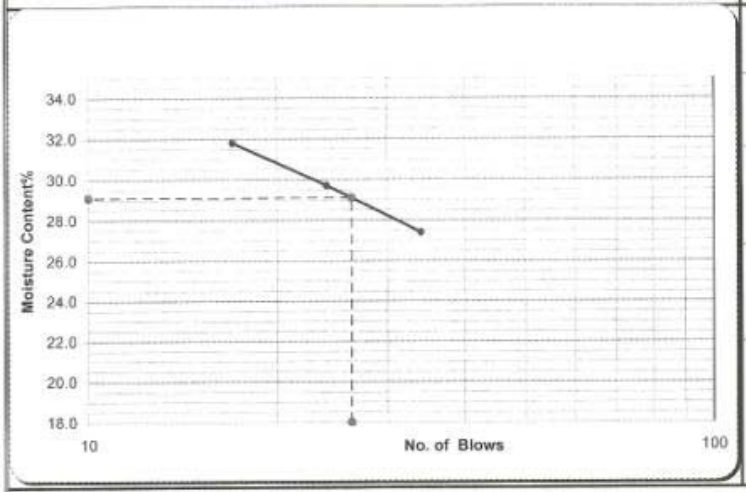
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 --- BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No.	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#1, Sample #2	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	7/2/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		34	24	17			
Container Number		A-12	A-5	A-6		A-10	A-7
Wt. of Wet Soil + Cont	g	47.87	49.22	47.49		39.15	30.39
Wt. of Dry Soil + Cont	g	41.68	42.86	40.40		36.46	27.97
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	6.19	6.36	7.09		2.69	2.42
Wt. of Dry Soil:	g	22.60	21.40	22.30		11.80	10.70
Moisture Content:	%	27.4	29.7	31.8		22.8	22.60
						Ave.(PL)	22.7



RESULTS

LIQUID LIMIT

(LL) = 29.1

PLASTIC LIMIT

(PL) = 22.7

PLASTICITY INDEX

(PI) = 6.4

SOIL CLASSIFICATION

A-2- 4

REMARKS:

Tested by	Abdurehman	Lab Managers	
Checked by	Shah Hussain SLT	Dae.	
Date	8/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED /SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

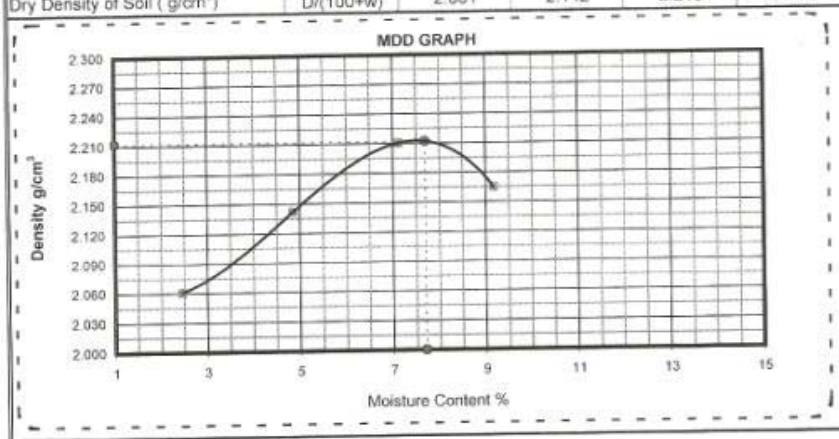
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PIT #1 Sample #2
Location:	Speen Buldack	Date of Testing	07/02/2009

Density Determination

Test No		1	2	3	4		
Wt of Mould (g)	A	4435	4435	4435	4435		
Volume of Mould (cm^3)	V	2124	2124	2124	2124		
Wt of Mould + Wet Soil (g)	C	8920	9206	9464	9455		
Weight of Wet Soil (g)	C-A	4485	4771	5029	5020		
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.112	2.246	2.368	2.363		

Water Content Determination of Soil:

Cane No.		A	B	C	D		
Wt. of Container (grm)	B	27.2	64.4	65.9	69.5		
Wt. of Container + Wet Soil (grm)	E	327.6	306.1	315.6	307.5		
Wt. of Container + Dry Soil (grm)	F	320.4	294.9	299.0	287.5		
Weight of Water (grm)	G = E - F	7.2	11.2	16.6	20.0		
Weight of Dry Soil (grm)	F - B	293.2	230.5	233.1	218.0		
Water Content %	G/(F -B)100	2.5	4.9	7.1	9.2		
Dry Density of Soil (g/cm^3)	D/(100+w)	2.061	2.142	2.210	2.165		



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.212 g/cm^3	7.7 %

Tested By	Abdul Ghafar LT	Lab Manager	
Checked By	Shah Hussain S.L.T	Date	
Date	8/2/2009	Client	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting.	08/02/2008
Description:	PIT # 1, Sample #2	Location:	Speen Buldak
Description of Material:	Natural	Date of testing.	12/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	4	5	6
Mould+Samples (A)	10478	11573	11961
Mould Wt (B)	5845	6682	6870
Sample Wt (A-B)	4633	4891	5091
Cont. + Wet Sample	447.4	384.9	437.5
Cont. + Dry Sample	420.8	361.9	411
Tare Weight	70.7	63.6	67.3
Dry Soil	350.1	298.3	343.7
Water Content %	7.6	7.7	7.7
Mould Volume	2134.4	2136.2	2130.6
Bulk Density	2.171	2.289	2.389
Dry Density	2.017	2.126	2.219

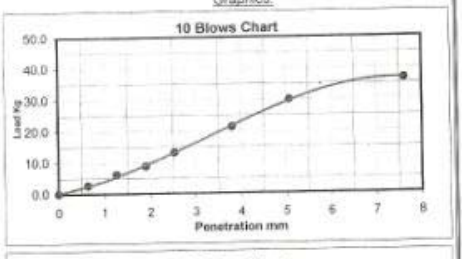
Swell Record (mm)

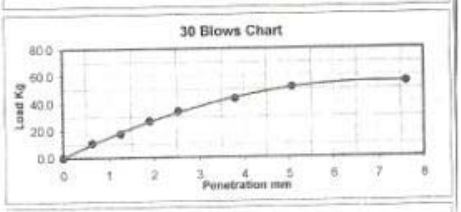
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.06	0.05	0.03
Deffirince	0.06	0.05	0.03
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.05	0.04	0.03

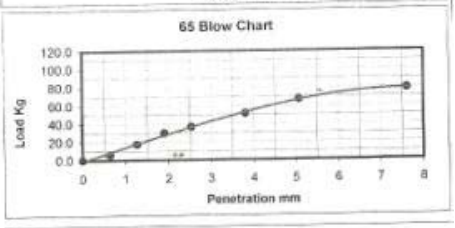
Load/Penetration Record

Std Load	Penet. mm	10 Blows Readings	10 Blows Load	30 Blows Readings	30 Blows Load	65 Blows Readings	65 Blows Load
	0.00	0	0	0	0	0	0
	0.64	34	2.58	140	10.83	80	6.08
	1.27	80	6.08	230	17.43	231	17.54
	1.91	115	8.73	350	26.58	391	29.69
70.3	2.54	175	13.07	446	33.87	482	36.60
	3.81	280	21.26	565	42.91	673	51.11
105.5	5.08	393	29.86	677	51.38	875	66.47
	7.62	480	36.45	725	55.06	1026	77.91

Graphics:

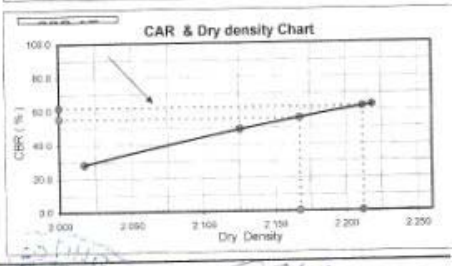






Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.017	2.126	2.219
Compaction Rat %	91.2	96.1	100.3
CBR %	26.3	48.7	63.0
Maxim Dry Density (g/cm³)	2.212	OMC %	7.70%
CBR At 100% Compaction	62.1	CBR At 98%Compaction	55.3



Remarks:

Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date	
Date	12/02/2009	Client:	

Zurmat Material Testing Laboratories

FIELD DENSITY TEST (Sand Cone Method)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR.0319,Ac-0026
Project:	BCP	Req.No:	Feb,11
Contractor:		Date:	06/02/2009
Location:	Speen Buldak	Description:	PIT# 2

Test No.		1	2	3					
Depth of PT.		40cm	130cm	250cm					
Layer									
Depth of hole	(cm)	15	15	15					
Material source (Name & location)		Natural Material							
FIELD DENSITY									
Pouring Cylinder No.		1	1	1					
Weight of wet material from hole	(g)	4280	4472	4381					
Weight of (sand + cylinder) before pouring	(g)	8000	8000	8000					
Weight of (sand + cylinder) after pouring	(g)	3284	3217	3316					
Weight of sand in cone	(g)	1626							
Weight of sand in hole	(g)	3090.0	3157.0	3058.0					
Bulk density of sand	(g/cc)	1.350							
Volume of sand in hole	(cc)	2289	2339	2265					
Wt. of material retained on 19 mm Sieve	(g)	973	1327	914					
% of material retained	(cc)	23	30	21					
Bulk density of material	(g/cc)	1.870	1.912	1.934					
MOISTURE CONTENT									
Wt. of wet material+container	(g)								
Wt. of dry material+container	(g)								
Weight of Container	(g)								
Weight of Dry Material	(g)	By Speedy Tester							
Wt. of water	(g)								
Moisture content	(%)	3.2	4.7	5.1					
RESULTS									
Field Dry Density	(g/cc)	1.812	1.826	1.840					
Lab Max Dry Density	(g/cc)								
Corrected MDD									
Optimum Moisture content	(%)								
Compaction obtained	(%)								
Compaction required	(%)								
REMARKS									

Comments:

Tested by	Shah Hussain S.L.T	Lab Manager	
Checked by	Shah Hussain S.L.T	Date	
Date	08/02/2009	Client	

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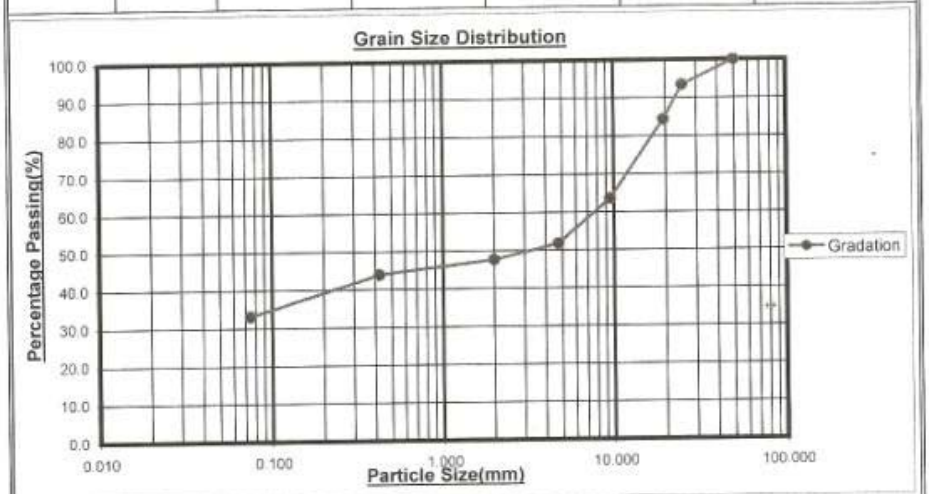
Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#2 - Sample#1	Date of Sampling	6/2/2009
Dry Constant Weight(g)	5210	Date of Testing	8/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	344	6.6	93.4		
19.5mm	3/4in	0	818	15.7	84.3		
9.5mm	3/8 In	0	1902	36.5	63.5		
4.75mm	No. 4	0	2516	48.3	51.7		
2.00 mm	No. 10	0	2730	52.4	47.6		
425 µm	No. 40	0	2923	56.1	43.9		
75 µm	No. 200	0	3485	66.9	33.1		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers.	For
Checked by	Shah Hussain SLT	Date:	
Date	8/2/2009	Client.	

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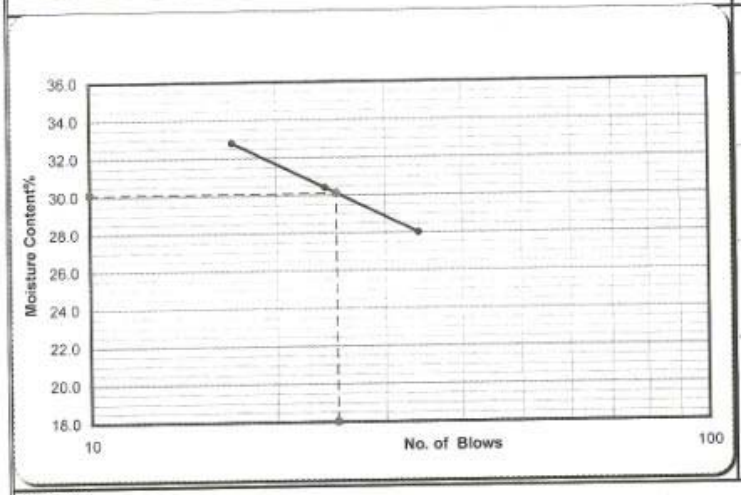
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab,Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No,	Feb,11
Contracter:		Sampie by:	Shah Hussain
Description:	PIT#2, Sample #1	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	08/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		34	24	17			
Container Number		6	7	8		9	10
Wt. of Wet Soil + Cont	g	47.32	43.74	50.25		35.94	34.70
Wt. of Dry Soil + Cont	g	41.50	37.30	43.00		33.20	31.70
Wt. of Container	g	20.70	16.10	20.90		22.10	19.50
Wt. of Water	g	5.82	6.44	7.25		2.74	3.00
Wt. of Dry Soil:	g	20.80	21.20	22.10		11.10	12.20
Moisture Content:	%	28.0	30.4	32.8		24.7	24.60
						Ave.(PL)	24.7



RESULTS

LIQUID LIMIT

(LL) = 30.1

PLASTIC LIMIT

(PL) = 24.7

PLASTICITY INDEX

(PI) = 5.5

SOIL CLASSIFICATION

A-2-4

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	9/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

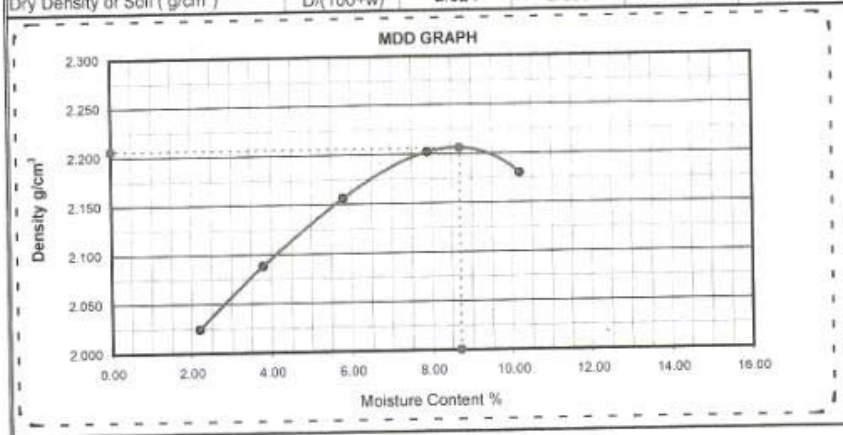
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #2 Sample #1
Location:	Speen Buldack	Date of Testing.	08/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8829	9038	8763	8770	8637
Weight of Wet Soil (g)	C-A	4394	4603	4328	4335	4202
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.069	2.167	2.038	2.041	1.978

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	497.1	478.3	388.9	518.0	524.4
Wt. of Container + Dry Soil (grm)	F	488.0	463.1	371.2	485.2	481.3
Weight of Water (grm)	G = E - F	9.1	15.2	17.7	32.8	43.1
Weight of Dry Soil (grm)	F - B	415.8	398.7	305.3	415.7	422.5
Water Content %	G/(F -B)100	2.20	3.80	5.80	7.90	10.20
Dry Density of Soil (g/cm^3)	D/(100+w)	2.024	2.088	2.156	2.202	2.180



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.206 g/cm^3	8.70 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	9/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting:	09/02/2008
Description:	PIT # 2, Sample #1	Location:	Speen Buldak
Description of Material:	Natural	Date of testing:	13/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	7	8	9
Mould+Samples (A)	11606	11944	12163
Mould Wt (B)	6976	7082	7084
Sample Wt (A-B)	4630	4862	5079
Cont. + Wet Sample	422.7	410.8	435.1
Cont. + Dry Sample	394.6	383.3	405.5
Tare Weight	68.4	63.6	65.1
Dry Soil	326.2	319.7	340.4
Water Content %	8.6	8.6	8.7
Mould Volume	2121.4	2114.0	2114.0
Bulk Density	2.182	2.300	2.403
Dry Density	2.010	2.118	2.210

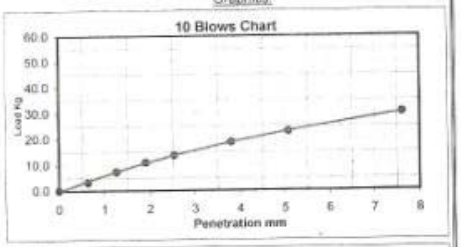
Swell Record (mm)

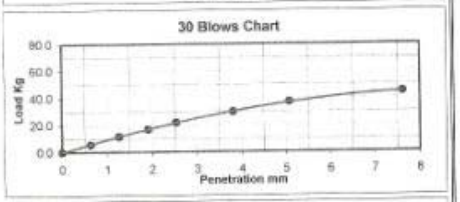
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.10	0.08	0.05
Deffirince	0.10	0.08	0.05
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.09	0.07	0.04

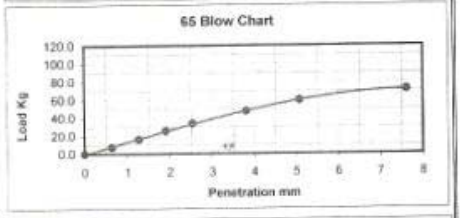
Load/Penetration Record

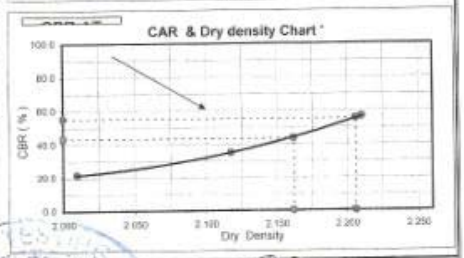
Std Load	Penet. mm	10 Blows Readings	10 Blows Load	30 Blows Readings	30 Blows Load	65 Blows Readings	65 Blows Load
	0.00	0	0	0	0	0	0
	0.64	42	3.19	71	5.39	98	7.44
	1.27	95	7.21	150	11.37	210	15.95
	1.91	143	10.86	220	16.71	335	25.44
70.3	2.54	183	13.66	287	21.79	443	33.64
	3.81	246	18.68	390	29.62	620	47.08
105.5	5.08	300	22.79	485	36.82	782	59.40
	7.62	396	30.07	583	44.27	936	71.08

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.010	2.118	2.210
Compaction Rat %	91.1	96.0	100.2
CBR %	21.6	34.9	56.3
Maxim Dry Density (g/cm³)	2.206	OMC %	8.70%
CBR At 100% Compaction	55.2	CBR At 98%Compaction	43.3

Remarks:

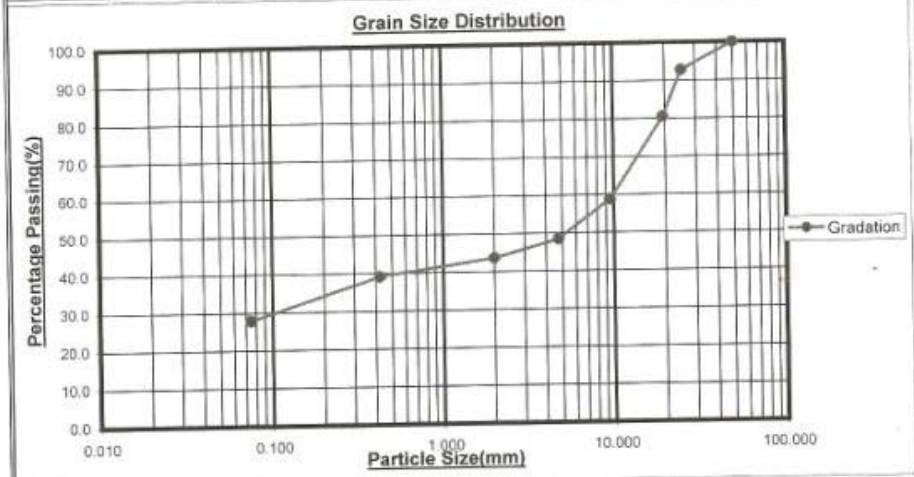
Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date:	
Date	13/02/2009	Client:	

Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#2 - Sample#2	Date of Sampling	6/2/2009
Dry Constant Weight(g)	5344	Date of Testing	8/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	385	7.2	92.8		
19.5mm	3/4in	0	1042	19.5	80.5		
9.5mm	3/8 In	0	2207	41.3	58.7		
4.75mm	No. 4	0	2758	51.6	48.4		
2.00 mm	No. 10	0	3014	56.4	43.6		
425 µm	No. 40	0	3254	60.9	39.1		
75 µm	No. 200	0	3853	72.1	27.9		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers.	
Checked by	Shah Hussain SLT	Date:	
Date	8/2/2009	Client:	

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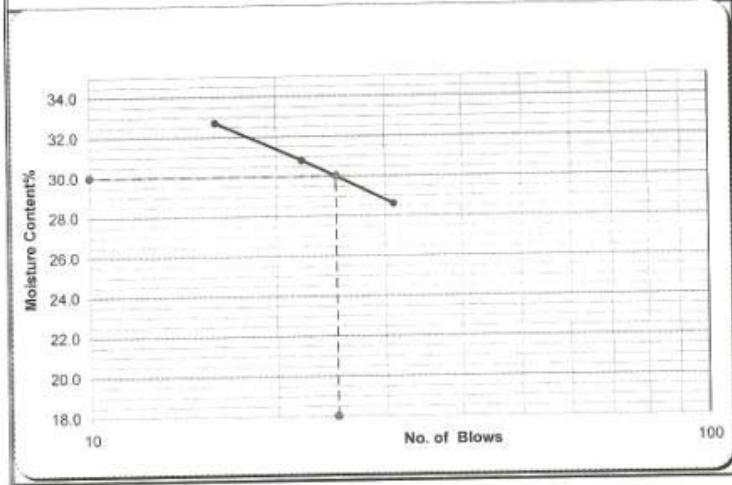
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 --- BS -1377 Part 2

Client:	RRCC	Lab,Ref.No:	ZMTL-KDR 0319-Ac26
Project:	BCP	Req No,	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#2, Sample #2	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	08/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		31	22	16			
Container Number		1	2	3		4	5
Wt. of Wet Soil + Cont	g	48.98	44.52	52.39		33.52	32.86
Wt. of Dry Soil + Cont	g	42.60	37.90	45.00		30.80	30.30
Wt. of Container	g	20.30	16.40	22.40		19.40	19.50
Wt. of Water	g	6.38	6.62	7.39		2.72	2.56
Wt. of Dry Soil:	g	22.30	21.50	22.60		11.40	10.80
Moisture Content:	%	28.6	30.8	32.7		23.9	23.70
						Ave.(PL)	23.8



RESULTS

LIQUID LIMIT

(LL) = 30.0

PLASTIC LIMIT

(PL) = 23.8

PLASTICITY INDEX

(PI) = 6.2

,, SOIL CLASSIFICATION

A-2- 4

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	9/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

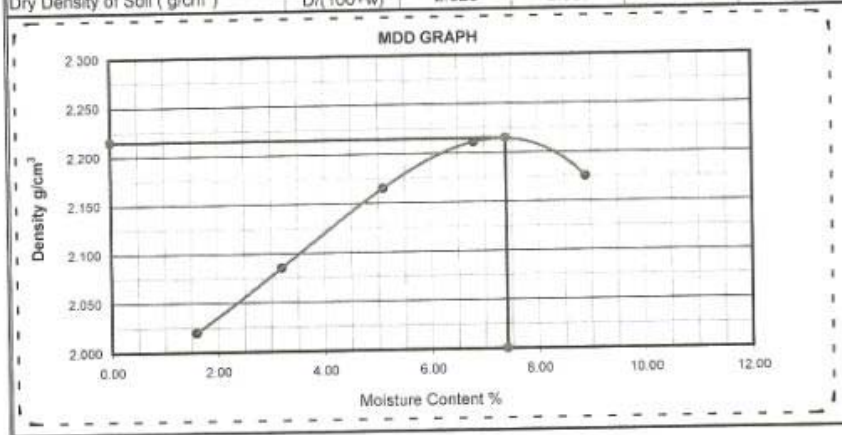
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #2 Sample #2
Location:	Speen Buldack	Date of Testing:	08/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8794	9005	8810	8832	8677
Weight of Wet Soil (g)	C-A	4359	4570	4375	4397	4242
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.052	2.152	2.060	2.070	1.997

Water Content Determination of Soil:

Cane No.		1	2	3	4	5
Wt. of Container (grm)	B	68.4	63.6	65.1	64.9	70.7
Wt. of Container + Wet Soil (grm)	E	429.7	482.3	496.2	527.9	491.8
Wt. of Container + Dry Soil (grm)	F	424.0	469.3	475.3	498.4	457.4
Weight of Water (grm)	G = E - F	5.7	13.0	20.9	29.5	34.4
Weight of Dry Soil (grm)	F - B	355.6	405.7	410.2	433.5	386.7
Water Content %	G/(F -B)100	1.60	3.20	5.10	6.80	8.90
Dry Density of Soil (g/cm^3)	D/(100+w)	2.020	2.085	2.165	2.211	2.175



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.215 g/cm^3	7.40 %

Tested By	Abdurehman	Lab Manager	
Checked By	Shah Hussain S.L.T	Date	
Date	9/2/2009	Client	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

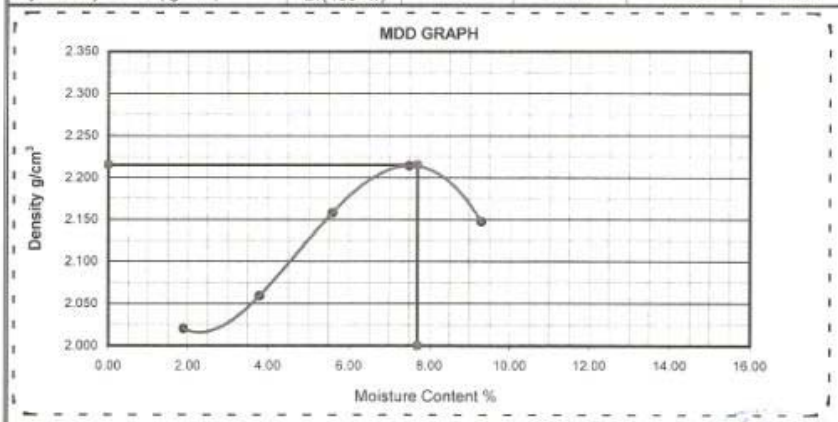
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #5 Sample #3
Location:	Speen Buldack	Date of Testing.	12/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8807	8975	8776	8809	8607
Weight of Wet Soil (g)	C-A	4372	4540	4341	4374	4172
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.058	2.137	2.044	2.060	1.964

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	347.0	323.7	356.1	370.3	342.0
Wt. of Container + Dry Soil (grm)	F	341.9	314.2	340.7	349.3	317.9
Weight of Water (grm)	G = E - F	5.1	9.5	15.4	21.0	24.1
Weight of Dry Soil (grm)	F - B	269.7	249.8	274.8	279.8	259.1
Water Content %	G/(F -B)100	1.90	3.80	5.60	7.50	9.30
Dry Density of Soil (g/cm^3)	D/(100+w)	2.020	2.059	2.158	2.214	2.147



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.215 g/cm^3	7.70 %

Tested By	Abdurehman	Lab Manager.
Checked By	Shah Hussain S.L.T	Date:
Date	13/2/2009	Client.

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting:	09/02/2008
Description:	PIT # 2, Sample #2	Location:	Speen Buldak
Description of Material:	Natural	Date of testing:	13/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	10	11	12
Mould+Samples (A)	11377	11686	11884
Mould Wt (B)	6764	6791	6820
Sample Wt (A-B)	4613	4895	5064
Cont. + Wet Sample	405.1	462.6	453.7
Cont + Dry Sample	381.7	435.6	426.7
Tare Weight	64.9	70.7	67.3
Dry Soil	316.8	364.9	359.4
Water Content %	7.4	7.4	7.5
Mould Volume	2126.2	2130.1	2124.5
Bulk Density	2.170	2.298	2.384
Dry Density	2.020	2.140	2.217

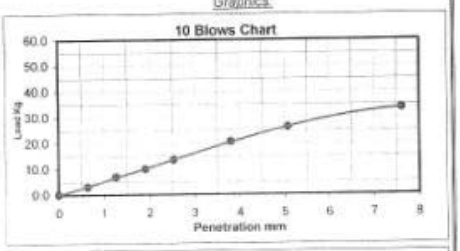
Swell Record (mm)

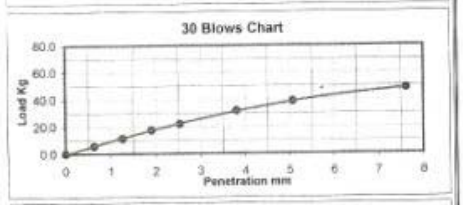
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.09	0.06	0.03
Deffirince	0.09	0.06	0.03
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.08	0.05	0.03

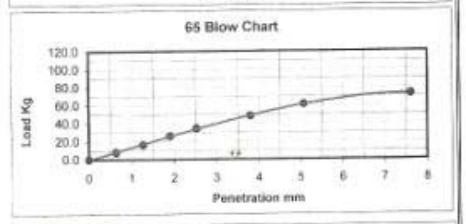
Load/Penetration Record

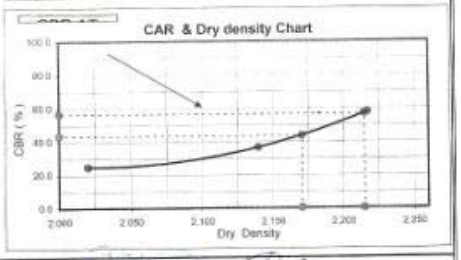
Std Load	Penet. mm	10 Blows		30 Blows		65 Blows	
		Readings	Load	Readings	Load	Readings	Load
	0.00	0	0	0	0	0	0
	0.64	40	3.04	74	5.62	105	7.97
	1.27	90	6.83	148	11.22	215	16.33
	1.91	130	9.87	230	17.47	340	25.82
70.3	2.54	180	13.44	290	22.02	450	34.17
	3.81	270	20.50	415	31.52	630	47.84
105.5	5.08	343	26.06	507	38.51	800	60.77
	7.62	440	33.41	630	47.84	950	72.14

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.020	2.140	2.217
Compaction Rat %	91.2	96.6	100.1
CBR %	24.7	36.5	57.6
Maxim Dry Density (g/cm³)	2.215	OMC %	7.40%
CBR At 100% Compaction	56.6	CBR At 98%Compaction	43.5

Remarks:

Tested by:	Abdurahman	Lab. Manager:	
Checked by:	Shah Hussain SLT	Date:	
Date:	13/02/2009	Client:	

Zurmat Material Testing Laboratories

FIELD DENSITY TEST (Sand Cone Method)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR.0319,Ac-0026
Project:	BCP	Req.No:	Feb,11
Contractor:		Date:	06/02/2009
Location:	Speen Buldak	Description:	PIT# 3

Test No.		1	2	3				
Depth of PT.		100cm	200cm	270cm				
Layer								
Depth of hole	(cm)	15	15	15				
Material source (Name & location)		Natural Material						
FIELD DENSITY								
Pouring Cylinder No.		1	1	1				
Weight of wet material from hole	(g)	4367	4494	4507				
Weight of (sand + cylinder) before pouring	(g)	8000	8000	8000				
Weight of (sand + cylinder) after pouring	(g)	3149	3167	3206				
Weight of sand in cone	(g)	1626						
Weight of sand in hole	(g)	3225.0	3207.0	3168.0				
Bulk density of sand	(g/cc)	1.350						
Volume of sand in hole	(cc)	2389	2376	2347				
Wt. of material retained on 19 mm Sieve	(g)	973	1167	1270				
% of material retained	(cc)	22	26	28				
Bulk density of material	(g/cc)	1.828	1.892	1.921				
MOISTURE CONTENT								
Wt. of wet material+container	(g)							
Wt. of dry material+container	(g)							
Weight of Container	(g)							
Weight of Dry Material	(g)	By Speedy Tester						
Wt. of water	(g)							
Moisture content	(%)	3.4	4.4	5.4				
RESULTS								
Field Dry Density	(g/cc)	1.768	1.812	1.822				
Lab Max Dry Density	(g/cc)							
Corrected MDD								
Optimum Moisture content	(%)							
Compaction obtained	(%)							
Compaction required	(%)							
REMARKS								

Comments:

Tested by	Shah Hussain S.L.T	Lab Manager.	
Checked by	Shah Hussain S.L.T	Date:	
Date	08/02/2009	Client.	

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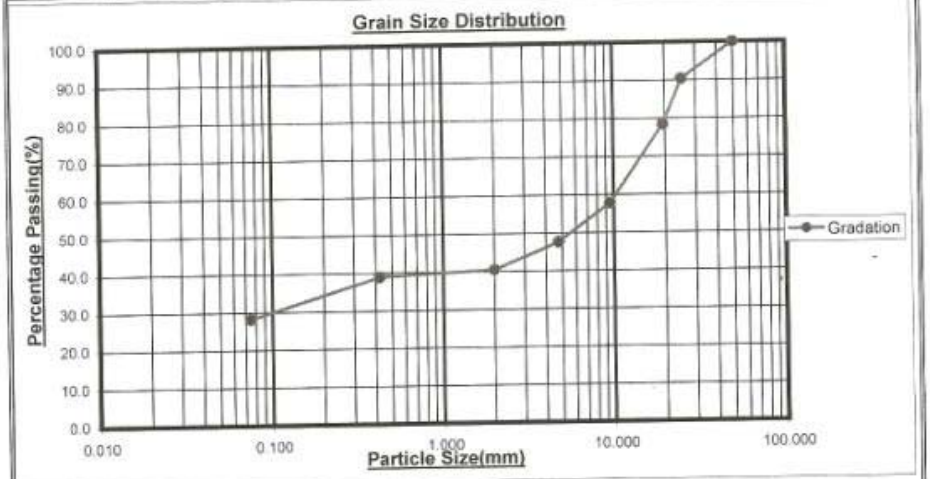
Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#3 - Sample#1	Date of Sampling	6/2/2009
Dry Constant Weight(g)	4675	Date of Testing	9/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	453	9.7	90.3		
19.5mm	3/4in	0	1010	21.6	78.4		
9.5mm	3/8 In	0	1978	42.3	57.7		
4.75mm	No. 4	0	2450	52.4	47.6		
2.00 mm	No. 10	0	2782	59.5	40.5		
425 µm	No. 40	0	2856	61.1	38.9		
75 µm	No. 200	0	3357	71.8	28.2		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers	
Checked by	Shah Hussain SLT	Date	
Date	9/2/2009	Client	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

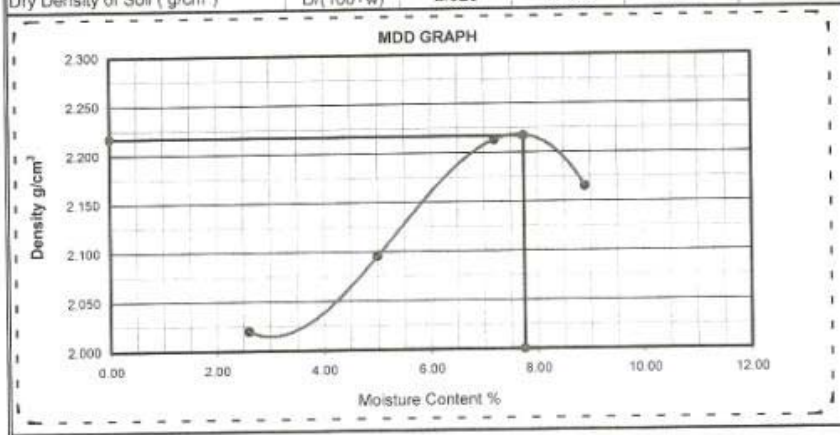
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #3 Sample #1
Location:	Speen Buldack	Date of Testing.	09/02/2009

Density Determination

Test No		1	2	3	4		
Wt of Mould (g)	A	4435	4435	4435	4435		
Volume of Mould (cm^3)	V	2124	2124	2124	2124		
Wt of Mould + Wet Soil (g)	C	8837	9107	8820	8658		
Weight of Wet Soil (g)	C-A	4402	4672	4385	4223		
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.073	2.200	2.064	1.988		

Water Content Determination of Soil:

Cane No.		A	B	C	D		
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5		
Wt. of Container + Wet Soil (grm)	E	497.4	491.0	480.1	518.4		
Wt. of Container + Dry Soil (grm)	F	486.6	470.7	452.3	481.7		
Weight of Water (grm)	G = E - F	10.8	20.3	27.8	36.7		
Weight of Dry Soil (grm)	F - B	414.4	406.3	386.4	412.2		
Water Content. %	G/(F -B)100	2.60	5.00	7.20	8.90		
Dry Density of Soil (g/cm^3)	D/(100+w)	2.020	2.095	2.213	2.165		



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.217 g/cm^3	7.75 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	10/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

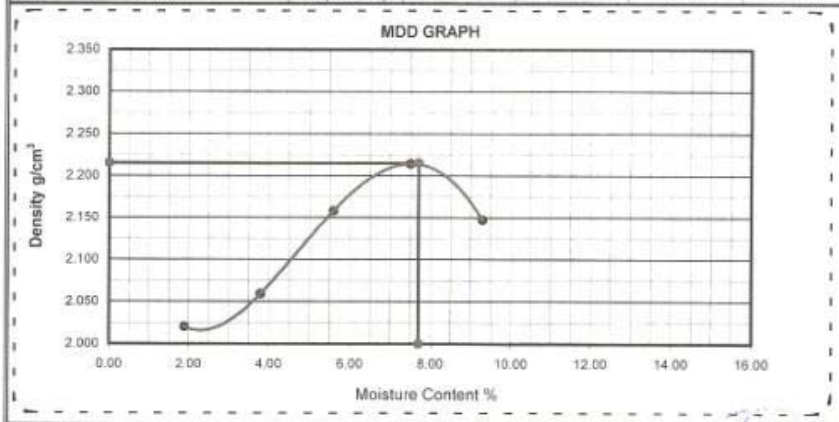
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #5 Sample #3
Location:	Speen Buldack	Date of Testing.	12/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8807	8975	8776	8809	8607
Weight of Wet Soil (g)	C-A	4372	4540	4341	4374	4172
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.058	2.137	2.044	2.060	1.964

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	347.0	323.7	356.1	370.3	342.0
Wt. of Container + Dry Soil (grm)	F	341.9	314.2	340.7	349.3	317.9
Weight of Water (grm)	G = E - F	5.1	9.5	15.4	21.0	24.1
Weight of Dry Soil (grm)	F - B	269.7	249.8	274.8	279.8	259.1
Water Content %	G/(F -B)100	1.90	3.80	5.60	7.50	9.30
Dry Density of Soil (g/cm^3)	D/(100+w)	2.020	2.059	2.158	2.214	2.147



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.215 g/cm^3	7.70 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	13/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

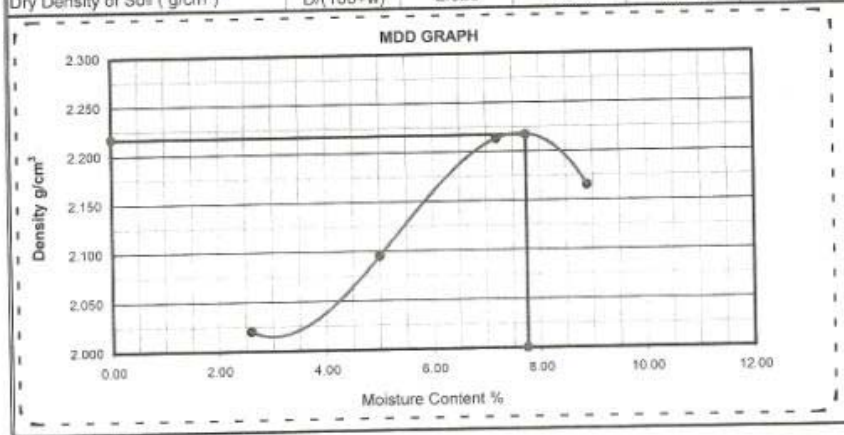
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #3 Sample #1
Location:	Speen Buldack	Date of Testing.	09/02/2009

Density Determination

Test No		1	2	3	4		
Wt of Mould (g)	A	4435	4435	4435	4435		
Volume of Mould (cm^3)	V	2124	2124	2124	2124		
Wt of Mould + Wet Soil (g)	C	8837	9107	8820	8658		
Weight of Wet Soil (g)	C-A	4402	4672	4385	4223		
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.073	2.200	2.064	1.988		

Water Content Determination of Soil:

Cane No.		A	B	C	D		
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5		
Wt. of Container + Wet Soil (grm)	E	497.4	491.0	480.1	518.4		
Wt. of Container + Dry Soil (grm)	F	486.6	470.7	452.3	481.7		
Weight of Water (grm)	G = E - F	10.8	20.3	27.8	36.7		
Weight of Dry Soil (grm)	F - B	414.4	406.3	386.4	412.2		
Water Content %	G/(F -B)100	2.60	5.00	7.20	8.90		
Dry Density of Soil (g/cm^3)	D/(100+w)	2.020	2.095	2.213	2.165		



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.217 g/cm^3	7.75 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	10/2/2009	Client.	

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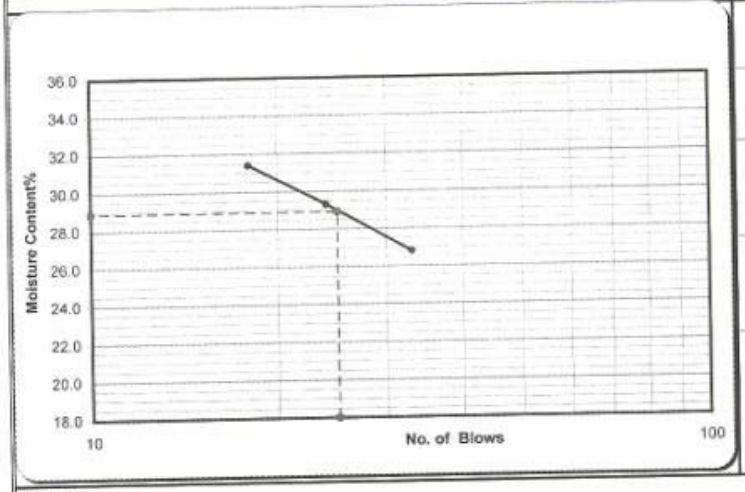
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 --- BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac26
Project:	BCP	Req No.	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#3, Sample #1	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	09/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		33	24	18			
Container Number		A-12	A-5	A-6		A-10	A-7
Wt. of Wet Soil + Cont	g	48.75	50.94	47.80		38.66	31.95
Wt. of Dry Soil + Cont	g	42.48	44.26	40.70		36.06	29.27
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	6.27	6.68	7.10		2.60	2.68
Wt. of Dry Soil:	g	23.40	22.80	22.60		11.40	12.00
Moisture Content:	%	26.8	29.3	31.4		22.8	22.30
						Ave.(PL)	22.6



RESULTS

LIQUID LIMIT

(LL) = 28.9

PLASTIC LIMIT

(PL) = 22.6

PLASTICITY INDEX

(PI) = 6.4

SOIL CLASSIFICATION

A-2- 4

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	10/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting:	12/02/2008
Description:	PIT # 3, Sample #1	Location:	Speen Buldak
Description of Material:	Natural	Date of testing:	16/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No	1	2	3
Mould+Samples (A)	11320	11714	11808
Mould Wt (B)	6672	6815	6721
Sample Wt (A-B)	4648	4899	5087
Cont. + Wet Sample	412.2	376.8	419.8
Cont. + Dry Sample	387.6	354.1	394.4
Tare Weight	68.4	63.6	65.1
Dry Soil	319.2	290.5	329.3
Water Content %	7.7	7.8	7.7
Mould Volume	2115.9	2139.9	2124.3
Bulk Density	2.197	2.290	2.395
Dry Density	2.040	2.124	2.224

Swell Record (mm)

Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.09	0.07	0.03
Deffirince	0.09	0.07	0.03
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.08	0.06	0.03

Load/Penetration Record

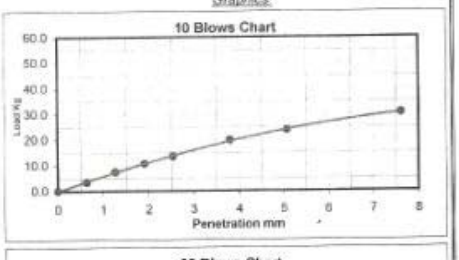
Std Load	Penet. mm	10 Blows Readings	10 Blows Load	30 Blows Readings	30 Blows Load	65 Blows Readings	65 Blows Load
	0.00	0	0	0	0	0	0
	0.64	45	3.42	75	5.70	100	7.59
	1.27	98	7.44	160	12.13	222	16.88
	1.91	140	10.63	226	17.16	340	25.82
70.3	2.54	180	13.44	294	22.33	450	34.17
	3.81	260	19.74	396	30.07	623	47.31
105.5	5.08	311	23.63	490	37.24	747	56.76
	7.62	400	30.38	610	46.32	940	71.38

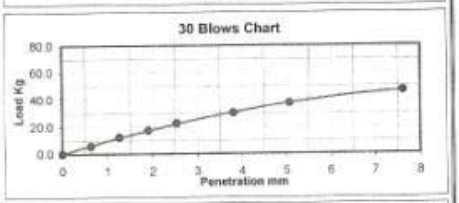
Tests Results

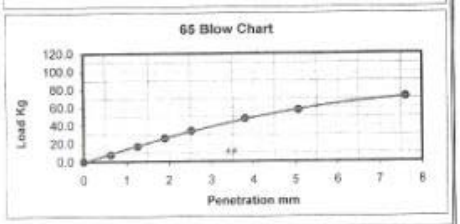
Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.040	2.124	2.224
Compaction Rat %	92.0	95.8	100.3
CBR %	22.4	35.3	53.8
Maxim Dry Density (g/cm³)	2.217	OMC %	7.75%
CBR At 100% Compaction	52.3	CBR At 98%Compaction	43.6

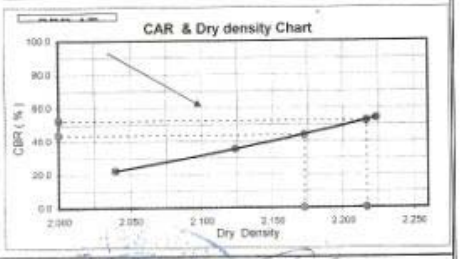
Remarks:

Graphics:









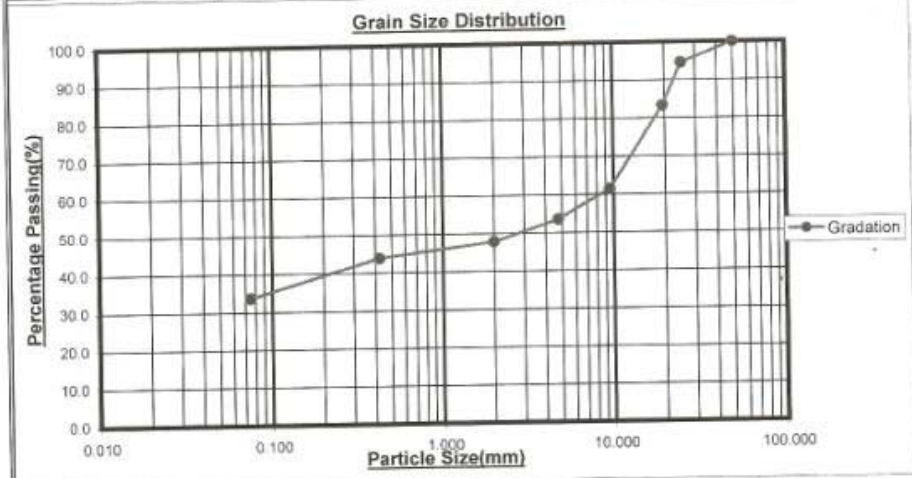
Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date:	
Date:	16/02/2009	Client:	

Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#3 - Sample#2	Date of Sampling	6/2/2009
Dry Constant Weight(g)	5235	Date of Testing	9/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	283	5.4	94.6		
19.5mm	3/4in	0	874	16.7	83.3		
9.5mm	3/8 In	0	2021	38.6	61.4		
4.75mm	No. 4	0	2434	46.5	53.5		
2.00 mm	No. 10	0	2733	52.2	47.8		
425 µm	No. 40	0	2937	56.1	43.9		
75 µm	No. 200	0	3471	66.3	33.7		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers	
Checked by	Shah Hussain SLT	Date	
Date	9/2/2009	Client	

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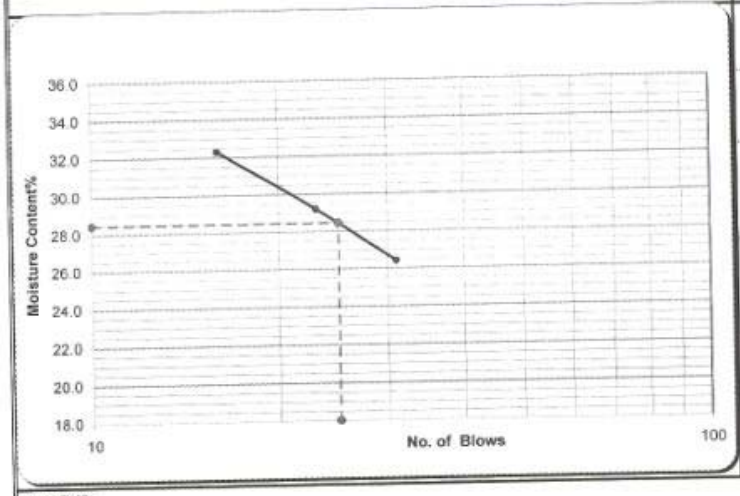
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac26
Project:	BCP	Req No.	Feb,11
Contracter:		Sampie by:	Shah Hussain
Description:	PIT#3, Sample #2	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	09/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		31	23	16			
Container Number		1	2	3		4	5
Wt. of Wet Soil + Cont	g	47.48	43.14	48.00		32.52	31.53
Wt. of Dry Soil + Cont	g	41.80	37.10	41.75		30.10	29.30
Wt. of Container	g	20.30	16.40	22.40		19.40	19.50
Wt. of Water	g	5.68	6.04	6.25		2.42	2.23
Wt. of Dry Soil:	g	21.50	20.70	19.35		10.70	9.80
Moisture Content:	%	26.4	29.2	32.3		22.6	22.80
						Ave.(PL)	22.7



RESULTS

LIQUID LIMIT

(LL) = 28.5

PLASTIC LIMIT

(PL) = 22.7

PLASTICITY INDEX

(PI) = 5.8

SOIL CLASSIFICATION

A-2- 4

REMARKS:

Tested by	Abdurehman	Lab Managers	
Checked by	Shah Hussain SLT	Dae	
Date	10/2/2009	Client	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

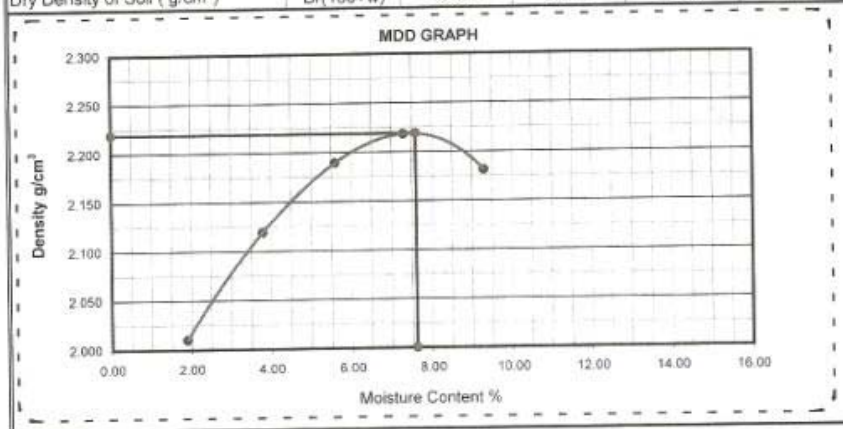
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PIT #3 Sample #2
Location:	Speen Buldack	Date of Testing.	09/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8785	9107	8838	8826	8673
Weight of Wet Soil (g)	C-A	4350	4672	4403	4391	4238
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.048	2.200	2.073	2.067	1.995

Water Content Determination of Soil:

Cane No.		1	2	3	4	5
Wt. of Container (grm)	B	68.4	63.6	65.1	64.9	70.7
Wt. of Container + Wet Soil (grm)	E	421.6	444.9	445.0	432.1	479.6
Wt. of Container + Dry Soil (grm)	F	415.0	430.9	424.9	407.1	444.8
Weight of Water (grm)	G = E - F	6.6	14.0	20.1	25.0	34.8
Weight of Dry Soil (grm)	F - B	346.6	367.3	359.8	342.2	374.1
Water Content %	G/(F -B)100	1.90	3.80	5.60	7.30	9.30
Dry Density of Soil (g/cm^3)	D/(100+w)	2.010	2.119	2.189	2.218	2.181



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.219 g/cm^3	7.60 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	10/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting.	12/02/2008
Description:	PIT # 3, Sample #2	Location:	Speen Buldak
Description of Material:	Natural	Date of testing.	16/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	4	5	6
Mould+Samples (A)	10512	11584	11967
Mould Wt (B)	5845	6682	6870
Sample Wt (A-B)	4667	4902	5097
Cont. + Wet Sample	438.4	424.9	462.3
Cont. + Dry Sample	411.7	399.9	434.4
Tare Weight	64.9	70.7	67.3
Dry Soil	346.8	329.2	367.1
Water Content %	7.7	7.6	7.6
Mould Volume	2134.4	2136.2	2130.6
Bulk Density	2.187	2.295	2.392
Dry Density	2.030	2.132	2.223

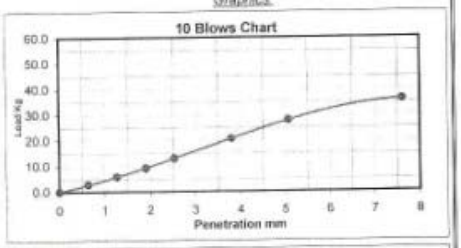
Swell Record (mm)

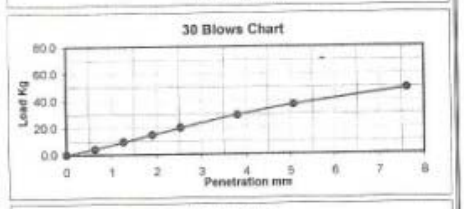
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.09	0.07	0.03
Deffinnce	0.09	0.07	0.03
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.08	0.06	0.03

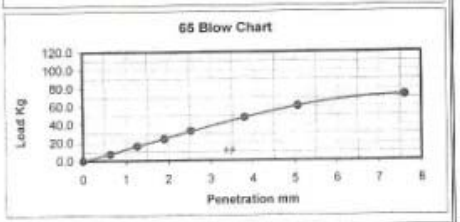
Load/Penetration Record

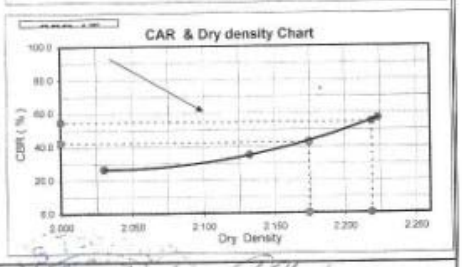
Std Load	Penet. mm	10 Blows		30 Blows		65 Blows	
		Readings	Load	Readings	Load	Readings	Load
	0.00	0	0	0	0	0	0
	0.64	38	2.89	53	4.02	96	7.29
	1.27	76	5.77	125	9.47	210	15.95
	1.91	120	9.11	190	14.43	315	23.92
70.3	2.54	174	12.99	260	19.74	432	32.81
	3.81	270	20.50	381	28.93	625	47.46
105.5	5.08	365	27.75	483	36.71	788	59.82
	7.62	472	35.84	640	48.60	947	71.92

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.030	2.132	2.223
Compaction Rat %	91.5	96.1	100.2
CBR %	26.3	34.8	56.7
Maxim Dry Density (g/cm³)	2.219	OMC %	7.60%
CBR At 100% Compaction	54.6	CBR At 98%Compaction	42.5

Remarks:

Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date	
Date	16/02/2009	Client:	

Zurmat Material Testing Laboratories

FIELD DENSITY TEST (Sand Cone Method)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR.0319,Ac-0026
Project:	BCP	Req.No:	Feb,11
Contractor:		Date:	06/02/2009
Location:	Spoen Buldak	Description:	PIT# 4

Test No.		1	2	3				
Depth of PT.		50cm	200cm	300cm				
Layer								
Depth of hole	(cm)	15	15	15				
Material source (Name & location)		Natural Material						
FIELD DENSITY								
Pouring Cylinder No.		1	1	1				
Weight of wet material from hole	(g)	3071	3738	3972				
Weight of (sand + cylinder) before pouring	(g)	8000	8000	8000				
Weight of (sand + cylinder) after pouring	(g)	3680	3267	3227				
Weight of sand in cone	(g)	1626						
Weight of sand in hole	(g)	2694.0	3107.0	3147.0				
Bulk density of sand	(g/cc)	1.350						
Volume of sand in hole	(cc)	1996	2301	2331				
Wt. of material retained on 19 mm Sieve	(g)	628	927	831				
% of material retained	(cc)	20	25	21				
Bulk density of material	(g/cc)	1.539	1.624	1.704				
MOISTURE CONTENT								
Wt. of wet material+container	(g)							
Wt. of dry material+container	(g)							
Weight of Container	(g)							
Weight of Dry Material	(g)							
Wt. of water	(g)							
Moisture content	(%)	4.9	5.3	5.8				
RESULTS								
Field Dry Density	(g/cc)	1.467	1.542	1.610				
Lab Max Dry Density	(g/cc)							
Corrected MDD								
Optimum Moisture content	(%)							
Compaction obtained	(%)							
Compaction required	(%)							
REMARKS								

By Speedy Tester

Comments:

Tested by	Shah Hussain S.L.T	Lab Manager:	
Checked by	Shah Hussain S.L.T	Date:	
Date	08/02/2009	Client:	

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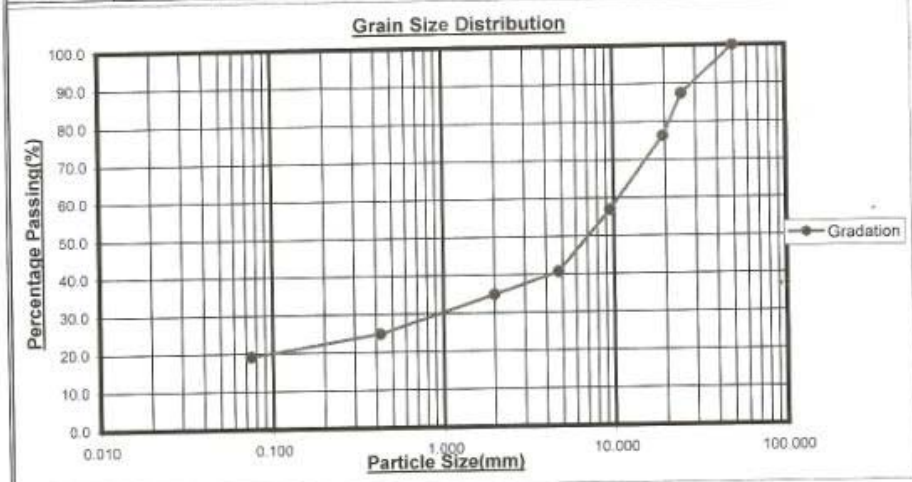
Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#4 - Sample#1	Date of Sampling	6/2/2009
Dry Constant Weight(g)	6734	Date of Testing	10/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	848	12.6	87.4		
19.5mm	3/4in	0	1596	23.7	76.3		
9.5mm	3/8 In	0	2902	43.1	56.9		
4.75mm	No. 4	0	3993	59.3	40.7		
2.00 mm	No. 10	0	4391	65.2	34.8		
425 µm	No. 40	0	5064	75.2	24.8		
75 µm	No. 200	0	5448	80.9	19.1		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers.	For
Checked by	Shah Hussain SLT	Date.	
Date	10/2/2009	Client.	

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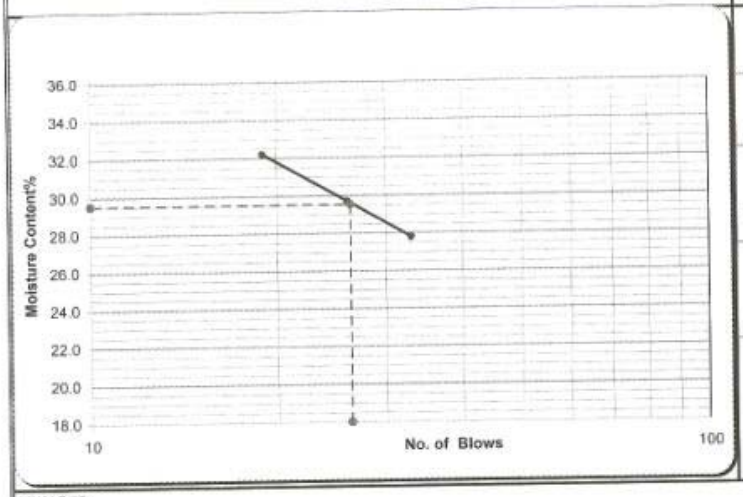
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 -- BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No.	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#4, Sample #1	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	10/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		33	26	19			
Container Number		1	2	3		4	5
Wt. of Wet Soil + Cont	g	39.96	41.99	41.42		32.51	24.54
Wt. of Dry Soil + Cont	g	35.42	37.29	35.74		31.03	23.18
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	4.54	4.70	5.68		1.48	1.36
Wt. of Dry Soil:	g	16.34	15.83	17.64		6.37	5.91
Moisture Content:	%	27.8	29.7	32.2		23.2	23.00
						Ave.(PL)	23.1



RESULTS

LIQUID LIMIT

(LL) = 29.5

PLASTIC LIMIT

(PL) = 23.1

PLASTICITY INDEX

(PI) = 6.4

SOIL CLASSIFICATION

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	11/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

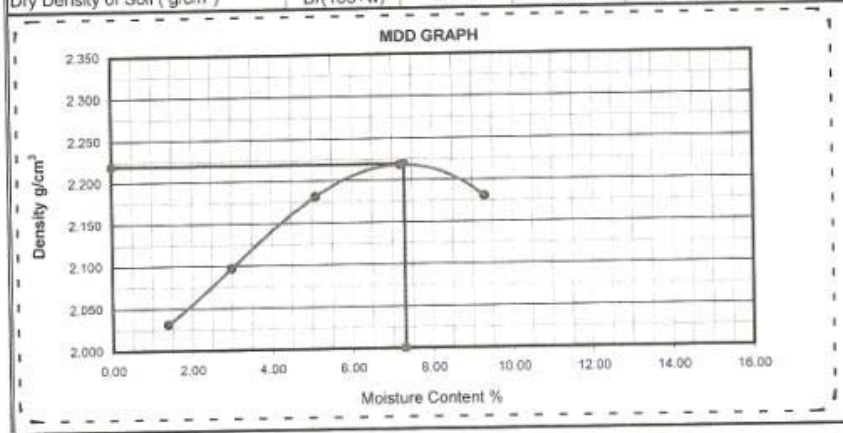
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #4 Sample #1
Location:	Speen Buldack	Date of Testing.	10/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8809	9023	8843	8830	8671
Weight of Wet Soil (g)	C-A	4374	4588	4408	4395	4236
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.059	2.160	2.075	2.069	1.995

Water Content Determination of Soil:

Cane No.		F	G	H	I	J
Wt. of Container (grm)	B	53.5	63.6	66.3	64.4	65.1
Wt. of Container + Wet Soil (grm)	E	385.4	461.6	399.0	409.5	423.7
Wt. of Container + Dry Soil (grm)	F	380.8	450.0	382.9	386.3	393.2
Weight of Water (grm)	G = E - F	4.6	11.6	16.1	23.2	30.5
Weight of Dry Soil (grm)	F - B	327.3	386.4	316.6	321.9	328.1
Water Content %	G/(F -B)100	1.40	3.00	5.10	7.20	9.30
Dry Density of Soil (g/cm^3)	D/(100+w)	2.031	2.097	2.181	2.218	2.180



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.219 g/cm^3	7.30 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	11/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req No.	Feb,11
Project:	BCP	Date of Casting.	13/02/2008
Description:	PIT # 4, Sample #1	Location:	Speen Buldak
Description of Material:	Natural	Date of testing.	17/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No.	10	11	12
Mould+Samples (A)	11372	11650	11914
Mould Wt (B)	6764	6791	6820
Sample Wt (A-B)	4608	4859	5094
Cont. + Wet Sample	435.5	462.2	418.3
Cont. + Dry Sample	410.6	435.6	394.4
Tare Weight	64.9	70.7	67.3
Dry Soil	345.7	364.9	327.1
Water Content %	7.2	7.3	7.3
Mould Volume	2126.2	2130.1	2124.5
Bulk Density	2.167	2.281	2.396
Dry Density	2.022	2.126	2.235

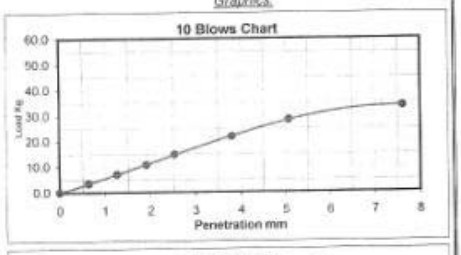
Swell Record (mm)

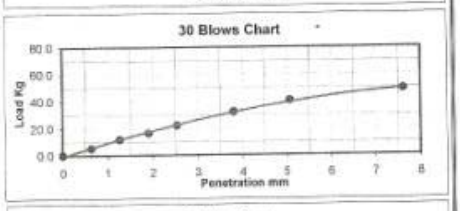
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.07	0.03	0.02
Deffirince	0.07	0.03	0.02
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.06	0.03	0.02

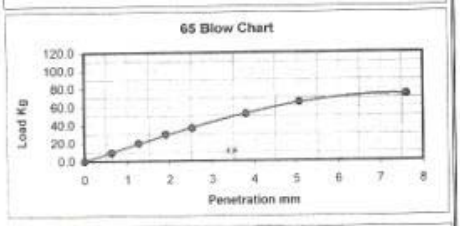
Load/Penetration Record

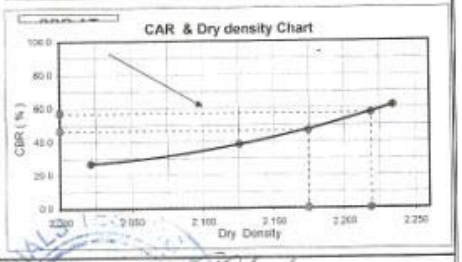
Std Load	Penet. mm	10 Blows Readings	10 Blows Load	30 Blows Readings	30 Blows Load	65 Blows Readings	65 Blows Load
	0.00	0	0	0	0	0	0
	0.64	45	3.42	68	5.16	120	9.11
	1.27	93	7.06	153	11.60	260	19.74
	1.91	140	10.63	215	16.33	390	29.62
70.3	2.54	198	14.78	290	22.02	480	36.45
	3.81	286	21.72	420	31.89	685	52.02
105.5	5.08	371	28.17	531	40.30	853	64.78
	7.62	441	33.49	640	48.60	962	73.05

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.022	2.126	2.235
Compaction Rat %	91.1	95.8	100.7
CBR %	26.7	38.2	61.4
Maxim Dry Density (g/cm³)	2.219	OMC %	7.30%
CBR At 100% Compaction	56.9	CBR At 95%Compaction	46.4

Remarks:

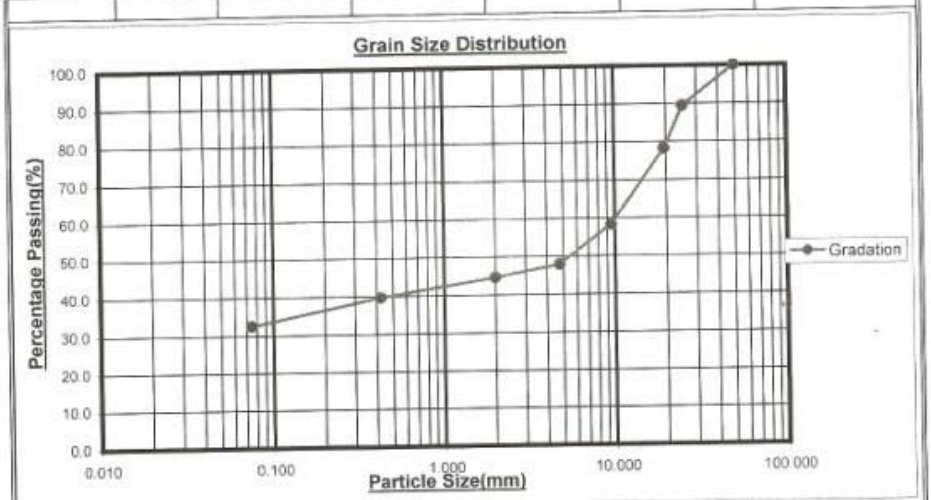
Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date.	
Date	17/02/2009	Client:	

Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab,Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req, No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#4 - Sample#2	Date of Sampling	6/2/2009
Dry Constant Weight(g)	6500	Date of Testing	10/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	689	10.6	89.4		
19.5mm	3/4in	0	1417	21.8	78.2		
9.5mm	3/8 In	0	2711	41.7	58.3		
4.75mm	No. 4	0	3387	52.1	47.9		
2.00 mm	No. 10	0	3601	55.4	44.6		
425 µm	No. 40	0	3920	60.3	39.7		
75 µm	No. 200	0	4388	67.5	32.5		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers.	For
Checked by	Shah Hussain SLT	Date.	
Date	10/2/2009	Client:	

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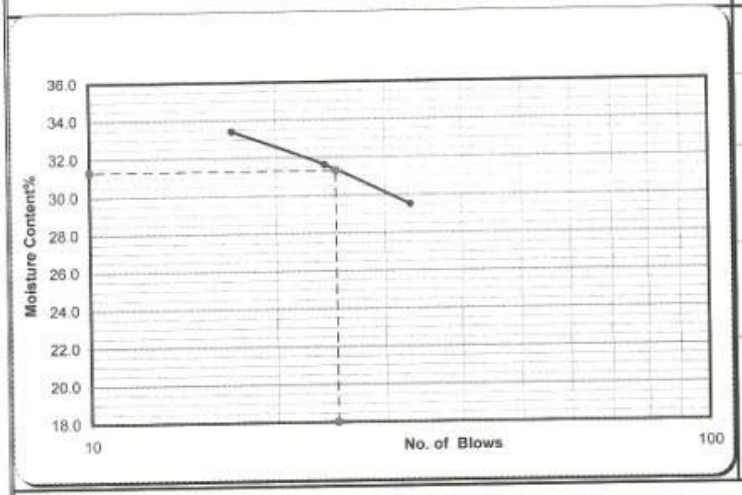
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No.	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#4, Sample #2	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	10/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		33	24	17			
Container Number		A-12	A-5	A-6		A-10	A-7
Wt. of Wet Soil + Cont	g	46.02	49.75	46.51		38.71	32.33
Wt. of Dry Soil + Cont	g	39.88	42.96	39.40		35.96	29.37
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	6.14	6.79	7.11		2.75	2.96
Wt. of Dry Soil:	g	20.80	21.50	21.30		11.30	12.10
Moisture Content:	%	29.5	31.6	33.4		24.3	24.50
						Ave.(PL)	24.4



RESULTS

LIQUID LIMIT

(LL) = 31.3

PLASTIC LIMIT

(PL) = 24.4

PLASTICITY INDEX

(PI) = 6.9

SOIL CLASSIFICATION

A-5

REMARKS:

Tested by	Abdurehman	Lab Managers.	for
Checked by	Shah Hussain SLT	Dae.	
Date	11/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

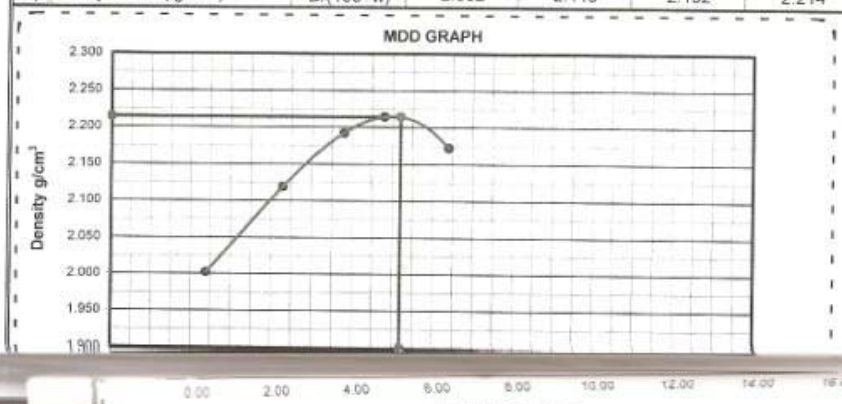
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #4 Sample #2
Location:	Speen Buldack	Date of Testing.	10/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8789	9129	8836	8838	8691
Weight of Wet Soil (g)	C-A	4354	4694	4401	4403	4256
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.050	2.210	2.072	2.073	2.004

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	395.4	463.8	388.9	368.6	401.6
Wt. of Container + Dry Soil (grm)	F	387.8	447.3	371.2	349.6	375.0
Weight of Water (grm)	G = E - F	7.6	16.5	17.7	19.0	26.6
Weight of Dry Soil (grm)	F - B	315.6	382.9	305.3	280.1	316.2
Water Content %	G/(F -B)100	2.40	4.30	5.80	6.80	8.40
Dry Density of Soil (g/cm^3)	D/(100+w)	2.002	2.119	2.192	2.214	2.172



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.214 g/cm^3	7.20 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	11/2/2009	Client.	

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Zurmat Material Testing Laboratories

CALIFORNIA BEARING RATIO TEST

AASHTO T - 193

Client:	RRCC	Lab.Ref.No.	ZMTL,KDR.319,Ac-0026
Contacter:		Req.No.	Feb,11
Project:	BCP	Date of Casting.	13/02/2008
Description:	PIT # 4, Sample #2	Location:	Speen Buldak
Description of Material:	Natural	Date of testing.	17/02/2009

Weight, Water Content, Density Calculation

Blows	10 Blows	30 Blows	65 Blows
Mould No	7	8	9
Mould+Samples (A)	11602	11908	12116
Mould Wt (B)	6976	7082	7084
Sample Wt (A-B)	4626	4826	5032
Cont. + Wet Sample	439.7	455.1	416.1
Cont. + Dry Sample	414.1	428.5	392.2
Tare Weight	68.4	63.6	65.1
Dry Soil	345.7	364.9	327.1
Water Content %	7.4	7.3	7.3
Mould Volume	2121.4	2114.0	2114.0
Bulk Density	2.180	2.283	2.380
Dry Density	2.030	2.128	2.218

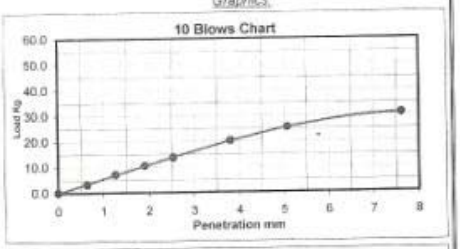
Swell Record (mm)

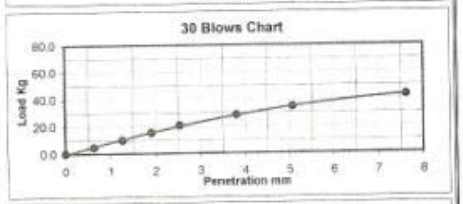
Date	10 Blows	30 Blows	65 Blows
Initial Readin	0.00	0.00	0.00
Final Readin	0.10	0.08	0.05
Deffirince	0.10	0.08	0.05
Sample Length (mm)	116.4	116.4	116.4
Swelling %	0.09	0.07	0.04

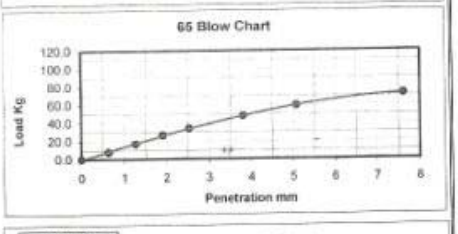
Load/Penetration Record

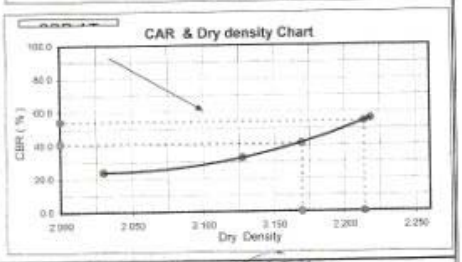
Std Load	Penet. mm	10 Blows		30 Blows		65 Blows	
		Readings	Load	Readings	Load	Readings	Load
	0.00	0	0	0	0	0	0
	0.64	42	3.19	60	4.56	102	7.75
	1.27	93	7.06	130	9.85	220	16.71
	1.91	138	10.48	200	15.19	346	26.28
70.3	2.54	182	13.59	270	20.50	445	33.79
	3.81	264	20.05	370	28.10	625	47.46
105.5	5.08	332	25.21	450	34.18	774	58.76
	7.62	405	30.76	560	42.53	946	71.84

Graphics:









Tests Results

Nomber Of Blows	10.0	30.0	65.0
Dry Density (g/cm³)	2.030	2.128	2.218
Compaction Rat %	91.7	96.1	100.2
CBR %	23.9	32.4	55.7
Maxim Dry Density (g/cm³)	2.214	OMC %	7.20%
CBR At 100% Compaction	54.1	CBR At 98%Compaction	41.0

Remarks:

Tested by:	Abdurahman	Lab. Manager:	
Checked by	Shah Hussain SLT	Date	
Date	17/02/2009	Client:	

Zurmat Material Testing Laboratories

FIELD DENSITY TEST (Sand Cone Method)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR.0319,Ac-0026
Project:	BCP	Req.No:	Feb,11
Contractor:		Date:	06/02/2009
Location:	Speen Buldak	Description:	PIT# 5

Test No.		1	2	3				
Depth of PT.		50cm	120cm	230cm				
Layer								
Depth of hole	(cm)	15	15	15				
Material source (Name & location)		Natural Material						
FIELD DENSITY								
Pouring Cylinder No.		1	1	1				
Weight of wet material from hole	(g)	4137	4369	4318				
Weight of (sand + cylinder) before pouring	(g)	8000	8000	8000				
Weight of (sand + cylinder) after pouring	(g)	3181	3079	3236				
Weight of sand in cone	(g)	1626						
Weight of sand in hole	(g)	3193.0	3295.0	3138.0				
Bulk density of sand	(g/cc)	1.350						
Volume of sand in hole	(cc)	2365	2441	2324				
Wt. of material retained on 19 mm Sieve	(g)	732	1138	943				
% of material retained	(cc)	18	26	22				
Bulk density of material	(g/cc)	1.749	1.790	1.858				
MOISTURE CONTENT								
Wt. of wet material+container	(g)							
Wt. of dry material+container	(g)							
Weight of Container	(g)							
Weight of Dry Material	(g)	By Speedy Tester						
Wt. of water	(g)							
Moisture content	(%)	4.6	5.4	6.1				
RESULTS								
Field Dry Density	(g/cc)	1.672	1.698	1.751				
Lab Max Dry Density	(g/cc)							
Corrected MDD								
Optimum Moisture content	(%)							
Compaction obtained	(%)							
Compaction required	(%)							
REMARKS								

Comments:

Tested by	Shah Hussain S.L.T	Lab Manager	
Checked by	Shah Hussain S.L.T	Date	
Date	08/02/2009	Client	

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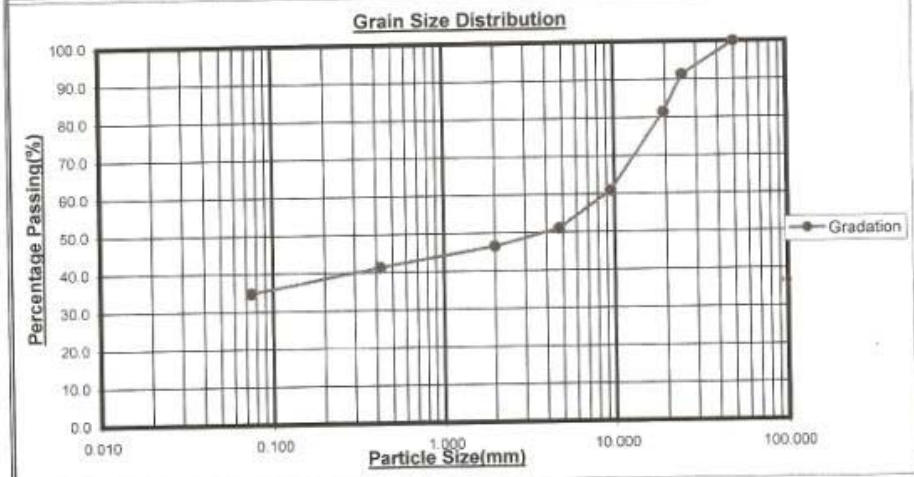
Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#5 - Sample#1	Date of Sampling	6/2/2009
Dry Constant Weight(g)	8379	Date of Testing	11/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	729	8.7	91.3		
19.5mm	3/4in	0	1558	18.6	81.4		
9.5mm	3/8 In	0	3276	39.1	60.9		
4.75mm	No. 4	0	4106	49.0	51.0		
2.00 mm	No. 10	0	4483	53.5	46.5		
425 µm	No. 40	0	4918	58.7	41.3		
75 µm	No. 200	0	5471	65.3	34.7		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers	
Checked by	Shah Hussain SLT	Date	
Date	11/2/2009	Client	

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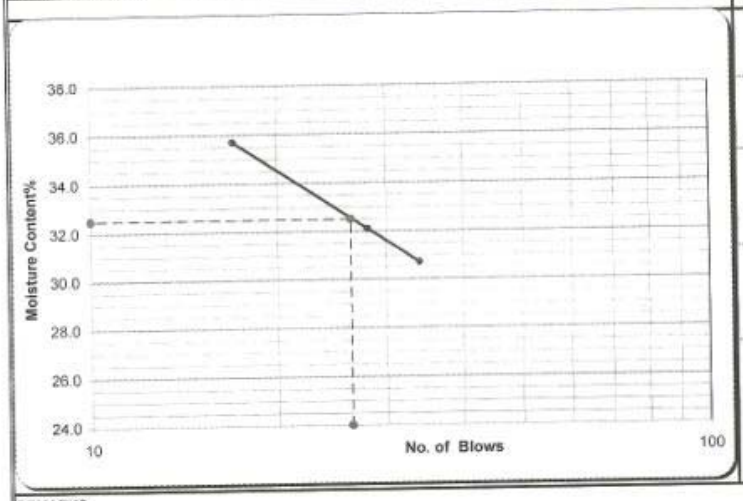
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 --- BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No,	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#5, Sample #1	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	11/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		34	28	17			
Container Number		A-12	A-5	A-6		A-10	A-7
Wt. of Wet Soil + Cont	g	42.14	2581.56	43.46		33.87	28.85
Wt. of Dry Soil + Cont	g	36.72	1959.46	36.79		32.04	26.54
Wt. of Container	g	19.08	21.46	18.10		24.66	17.27
Wt. of Water	g	5.42	622.10	6.67		1.83	2.31
Wt. of Dry Soil:	g	17.64	1938.00	18.69		7.38	9.27
Moisture Content:	%	30.7	32.1	35.7		24.8	24.90
						Ave.(PL)	24.9



RESULTS

LIQUID LIMIT

(LL) = 32.5

PLASTIC LIMIT

(PL) = 24.9

PLASTICITY INDEX

(PI) = 7.7

SOIL CLASSIFICATION

REMARKS:

Tested by	Abdurehman	Lab Managers.	for
Checked by	Shah Hussain SLT	Dae.	
Date	12/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

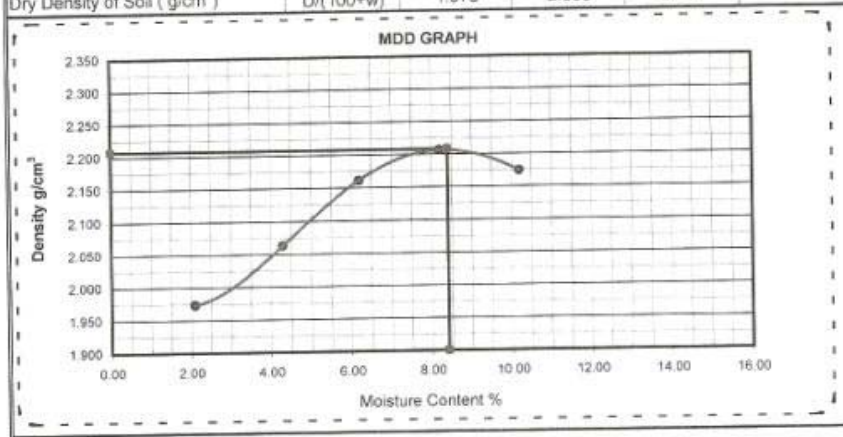
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #5 Sample #1
Location:	Speen Buldack	Date of Testing.	11/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8714	9005	8757	8765	8625
Weight of Wet Soil (g)	C-A	4279	4570	4322	4330	4190
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.014	2.152	2.035	2.039	1.973

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	397.3	441.7	413.4	382.6	405.4
Wt. of Container + Dry Soil (grm)	F	390.6	426.1	393.1	358.9	373.3
Weight of Water (grm)	G = E - F	6.7	15.6	20.3	23.7	32.1
Weight of Dry Soil (grm)	F - B	318.4	361.7	327.2	289.4	314.5
Water Content %	G/(F -B)100	2.10	4.30	6.20	8.20	10.20
Dry Density of Soil (g/cm^3)	D/(100+w)	1.973	2.063	2.161	2.206	2.174



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.208 g/cm^3	8.40 %

Tested By	Abdurehman	Lab Manager.	For
Checked By	Shah Hussain S.L.T	Date.	
Date	12/2/2009	Client.	

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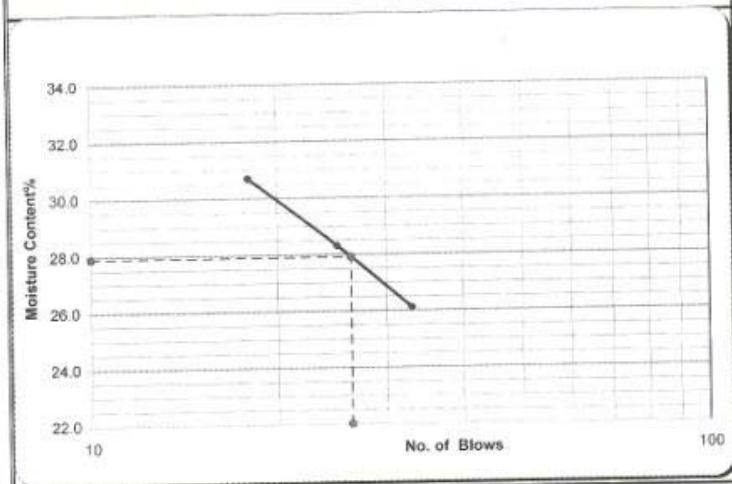
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No.	Feb,11
Contracter:		Sampie by:	Shah Hussain
Description:	PIT#5, Sample #2	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	11/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		33	25	18			
Container Number		1	2	3		4	5
Wt. of Wet Soil + Cont	g	41.36	42.69	49.84		28.66	29.64
Wt. of Dry Soil + Cont	g	37.00	36.89	43.37		27.01	27.80
Wt. of Container	g	20.30	16.40	22.30		19.40	19.50
Wt. of Water	g	4.36	5.80	6.47		1.65	1.84
Wt. of Dry Soil:	g	16.70	20.49	21.07		7.61	8.30
Moisture Content:	%	26.1	28.3	30.7		21.7	22.20
						Ave.(PL)	22.0



RESULTS

LIQUID LIMIT

(LL) = 27.9

PLASTIC LIMIT

(PL) = 22.0

PLASTICITY INDEX

(PI) = 6.0

SOIL CLASSIFICATION

REMARKS:

Tested by	Abdurehman	Lab Managers.	For
Checked by	Shah Hussain SLT	Dae.	
Date	12/2/2009	Client.	

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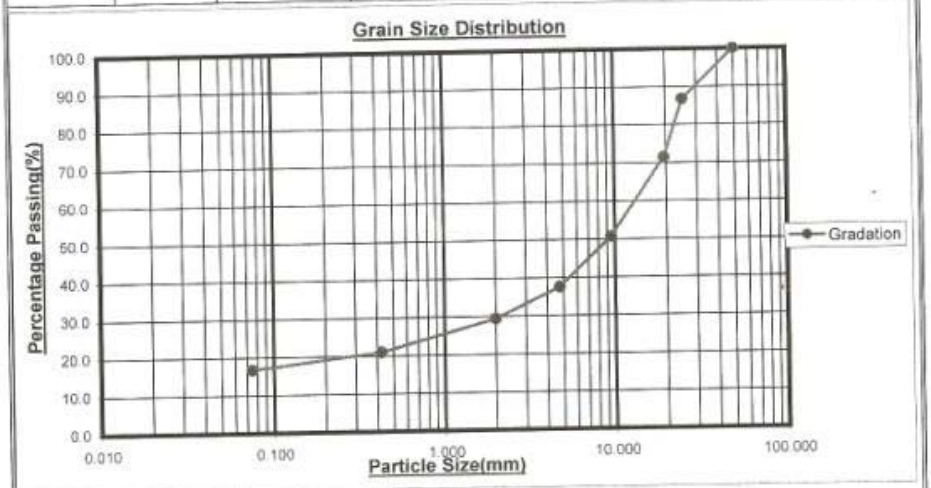
Zurmat Material Testing Laboratories

PARTICLE SIZE DISTRIBUTION OF SOIL / AGGREGATES (AASHTO T-27/T-88)

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR-0319-Ac-0026
Project:	BCP	Req. No.	Feb,11
Location:	Speen Buldak	Sampled by:	Shah Hussain
Description:	PIT#5 - Sample#2	Date of Sampling	6/2/2009
Dry Constant Weight(g)	7538	Date of Testing	11/2/2009

Sieve Size		Weight Retained	Cumulative Retained(g)	Percentage of Retained(%)	Percentage of Passing(%)	Specification Limits	
Standard	Alternative					Min	Max
50.0 mm	2 In	0	0	0.0	100.0		
25.0 mm	1 In	0	1003	13.3	86.7		
19.5mm	3/4in	0	2156	28.6	71.4		
9.5mm	3/8 In	0	3716	49.3	50.7		
4.75mm	No. 4	0	4704	62.4	37.6		
2.00 mm	No. 10	0	5322	70.6	29.4		
425 µm	No. 40	0	5955	79.0	21.0		
75 µm	No. 200	0	6279	83.3	16.7		



Remarks:

Tested by	Shah Hussain SLT	Lab Managers:	
Checked by	Shah Hussain SLT	Date:	
Date	11/2/2009	Client:	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

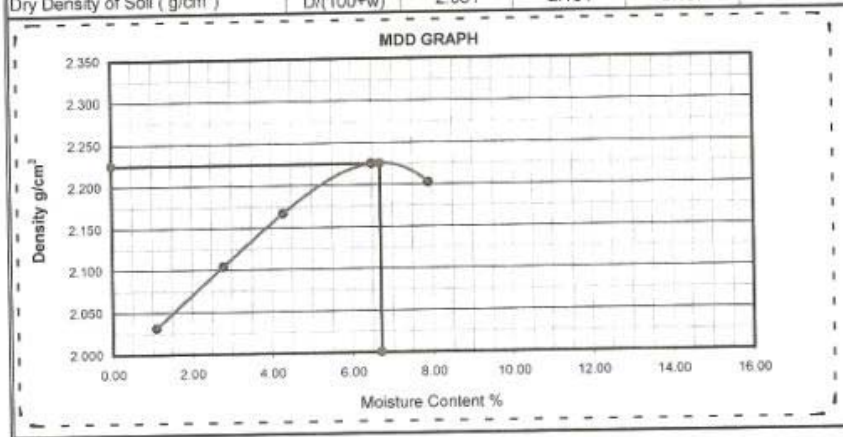
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #5 Sample #2
Location:	Speen Buldack	Date of Testing.	11/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8796	9029	8848	8872	8770
Weight of Wet Soil (g)	C-A	4361	4594	4413	4437	4335
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.053	2.163	2.078	2.089	2.041

Water Content Determination of Soil:

Cane No.		F	G	H	I	J
Wt. of Container (grm)	B	53.5	63.6	66.3	64.4	65.1
Wt. of Container + Wet Soil (grm)	E	324.9	330.7	351.9	372.9	334.2
Wt. of Container + Dry Soil (grm)	F	321.9	323.4	340.1	354.1	314.5
Weight of Water (grm)	G = E - F	3.0	7.3	11.8	18.8	19.7
Weight of Dry Soil (grm)	F - B	268.4	259.8	273.8	289.7	249.4
Water Content %	G/(F -B)100	1.10	2.80	4.30	6.50	7.90
Dry Density of Soil (g/cm^3)	D/(100+w)	2.031	2.104	2.167	2.225	2.202



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.225 g/cm^3	6.70 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	12/2/2009	Client.	

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Zurmat Material Testing Laboratories

MODIFIED / SATNDARD COMPACTION TESTS

AASHTO T - 180/ AASHTO T - 99

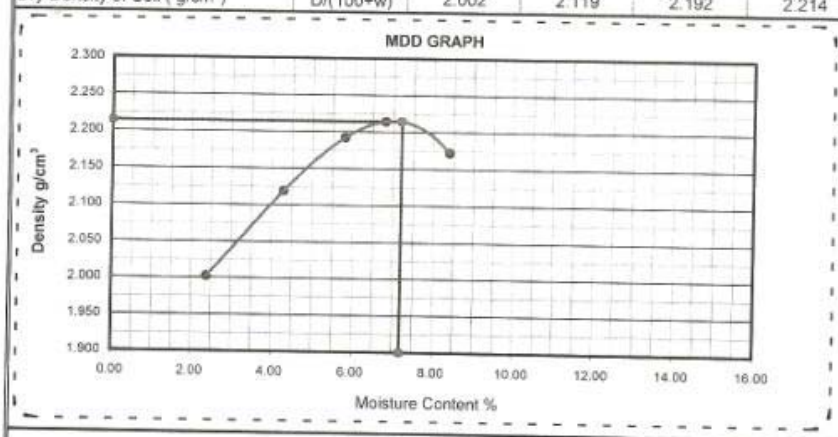
Client:	RRCC	Lab-Ref.No,	ZMTL-KDR-319Ac-026
Project:	BCP	Req.No:	Feb,11
Contractor		Description:	PT #4 Sample #2
Location:	Speen Buldack	Date of Testing.	10/02/2009

Density Determination

Test No		1	2	3	4	5
Wt of Mould (g)	A	4435	4435	4435	4435	4435
Volume of Mould (cm^3)	V	2124	2124	2124	2124	2124
Wt of Mould + Wet Soil (g)	C	8789	9129	8836	8838	8691
Weight of Wet Soil (g)	C-A	4354	4694	4401	4403	4256
Wet Density of Soil (g/cm^3)	D = (C-A)/V	2.050	2.210	2.072	2.073	2.004

Water Content Determination of Soil:

Cane No.		A	B	C	D	E
Wt. of Container (grm)	B	72.2	64.4	65.9	69.5	58.8
Wt. of Container + Wet Soil (grm)	E	395.4	463.8	388.9	368.6	401.6
Wt. of Container + Dry Soil (grm)	F	387.8	447.3	371.2	349.6	375.0
Weight of Water (grm)	G = E - F	7.6	16.5	17.7	19.0	26.6
Weight of Dry Soil (grm)	F - B	315.6	382.9	305.3	280.1	316.2
Water Content %	G/(F -B)100	2.40	4.30	5.80	6.80	8.40
Dry Density of Soil (g/cm^3)	D/(100+w)	2.002	2.119	2.192	2.214	2.172



Wt of Hammer
4.54Kg

Vol. of Mould
2124 cm^3

Test Result Summary

MDD	OMC
2.214 g/cm^3	7.20 %

Tested By	Abdurehman	Lab Manager.	
Checked By	Shah Hussain S.L.T	Date.	
Date	11/2/2009	Client.	

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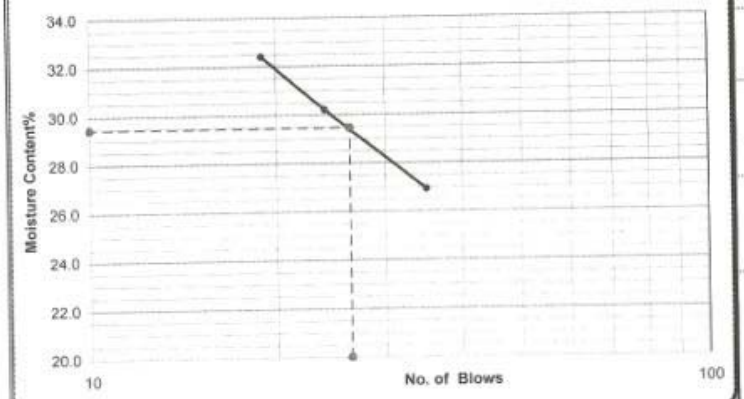
Zurmat Material Testing Laboratories

ATTERBERG LIMITS

AASHTO 189/190 — BS -1377 Part 2

Client:	RRCC	Lab.Ref.No:	ZMTL-KDR 0319-Ac026
Project:	BCP	Req No.	Feb,11
Contracter:		Sample by:	Shah Hussain
Description:	PIT#5, Sample #3	Date of Sampling:	06/02/2009
Location:	Speen Buldak	Date of Testing:	11/02/2009

Test		LIQUID LIMIT				PLASTIC LIMIT	
Test Number		1	2	3	4	1	2
No. of Blows		35	24	19			
Container Number		6	7	8		9	10
Wt. of Wet Soil + Cont	g	44.13	40.02	45.62		32.44	30.89
Wt. of Dry Soil + Cont	g	39.16	34.47	39.57		30.47	28.77
Wt. of Container	g	20.70	16.10	20.90		22.10	19.60
Wt. of Water	g	4.97	5.55	6.05		1.97	2.12
Wt. of Dry Soil:	g	18.46	18.37	18.67		8.37	9.17
Moisture Content:	%	26.9	30.2	32.4		23.5	23.10
						Ave.(PL)	23.3



RESULTS

LIQUID LIMIT

(LL) = 29.5

PLASTIC LIMIT

(PL) = 23.3

PLASTICITY INDEX

(PI) = 6.2

SOIL CLASSIFICATION

REMARKS:

Tested by	Abdurehman	Lab Managers.	
Checked by	Shah Hussain SLT	Dae.	
Date	12/2/2009	Client.	

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APPENDIX – D

TEST PIT LOGS

Zurmat Material Testing Laboratories

		Pit NO	01
		Date	06/02/2009
Project Name	BCP		
Chainage		Coordinate (N)	30°57'19.9"
Depth (m)	3.1	Coordinate (E)	066°26'22.0"
Excavation	Excavator	Elevation (Z)	1300

Depth (m)	Layer Depth (m)	Sample Depth (m)	G.W.L (m)	Profile	Geotechnical Description
	(1/1) 50kg	0.3 m			Filling Material
-1.00-	(2/1) 50kg	1.2m	SC		Clayey Sand with Gravel 30% Plus # 200 passing
-1.50- -2.00- -2.50- -3.0-	(3/1) 50kg	2.8m	SC-SM		Silty clayey Sand with Gravel 15% plus #200 passing 15% plus gravel
-3.50- -4.01-					END OF TRIAL PIT M 3.1

EXPLANATION:

LOGGED BY:	CHECKED BY:
SHAH HUSSAIN	BADER ZAMAN Lab Mang.

Zurmat Material Testing Laboratories

		Pit NO	02
		Date	06/02/2009
Project Name	BCP		
Chainage		Coordinate (N)	30°57'72.8"
Depth (m)	2.9	Coordinate (E)	066°26'43.8"
Excavation	Excavator	Elevation (Z)	1304

Depth (m)	Layer Depth (m)	Sample Depth (m)	G.W.L (m)	Profile	Geotechnical Description
					Filling Material
	(1/2) 50kg	0.4m			
-1.00-			SC		Clayey Sand with Gravel 30% Plus # 200 passing
	(2/2) 50kg	1.3m			
-1.50-					Silty clayey Sand with Gravel 15% plus #200 passing 15% plus gravel
-2.00-					
			SC-SM		
-2.50-					
	(3/2) 50kg	2.6m			
-3.0-					
-3.50-					END OF TRIAL PIT M 2.9
-4.01-					

EXPLANATION:	
LOGGED BY:	CHECKED BY:
SHAH HUSSAIN	BADER ZAMAN Lab Mang.

Zurmat Material Testing Laboratories

		Pit NO	05
		Date	06/02/2009
Project Name	BCP		
Chainage		Coordinate (N)	30°57'32.6"
Depth (m)	2.8	Coordinate (E)	066°26'12.6"
Excavation	Excavator	Elevation (Z)	1289

Depth (m)	Layer Depth (m)	Sample Depth (m)	G.W.L (m)	Profile	Geotechnical Description
			CL		Filling Material
	(1/5) 50kg	0.5m			Clayey Sand with Gravel 30% Plus # 200 passing
-1.00-			SC		
	(2/5) 50kg	1.3m	SP-SC		Poorly graded sand with clay and gravel
-1.50-					
					Silty clayey Sand with Gravel 15% plus #200 passing 15% plus gravel
-2.00-	(3/5) 50kg	1.9m			
			SC-SM		
-2.50-					
-3.0-		3.0m			
-3.50-					END OF TRIAL PIT M 2.8
-4.01-					

EXPLANATION:

LOGGED BY:	CHECKED BY:
SHAH HUSSAIN	BADER ZAMAN Lab Mang.

Zurmat Material Testing Laboratories

		Pit NO	04
		Date	06/02/2009
Project Name	BCP		
Chainage		Coordinate (N)	30°57'42.9"
Depth (m)	3.3	Coordinate (E)	066°26'37.2"
Excavation	Excavator	Elevation (Z)	1302

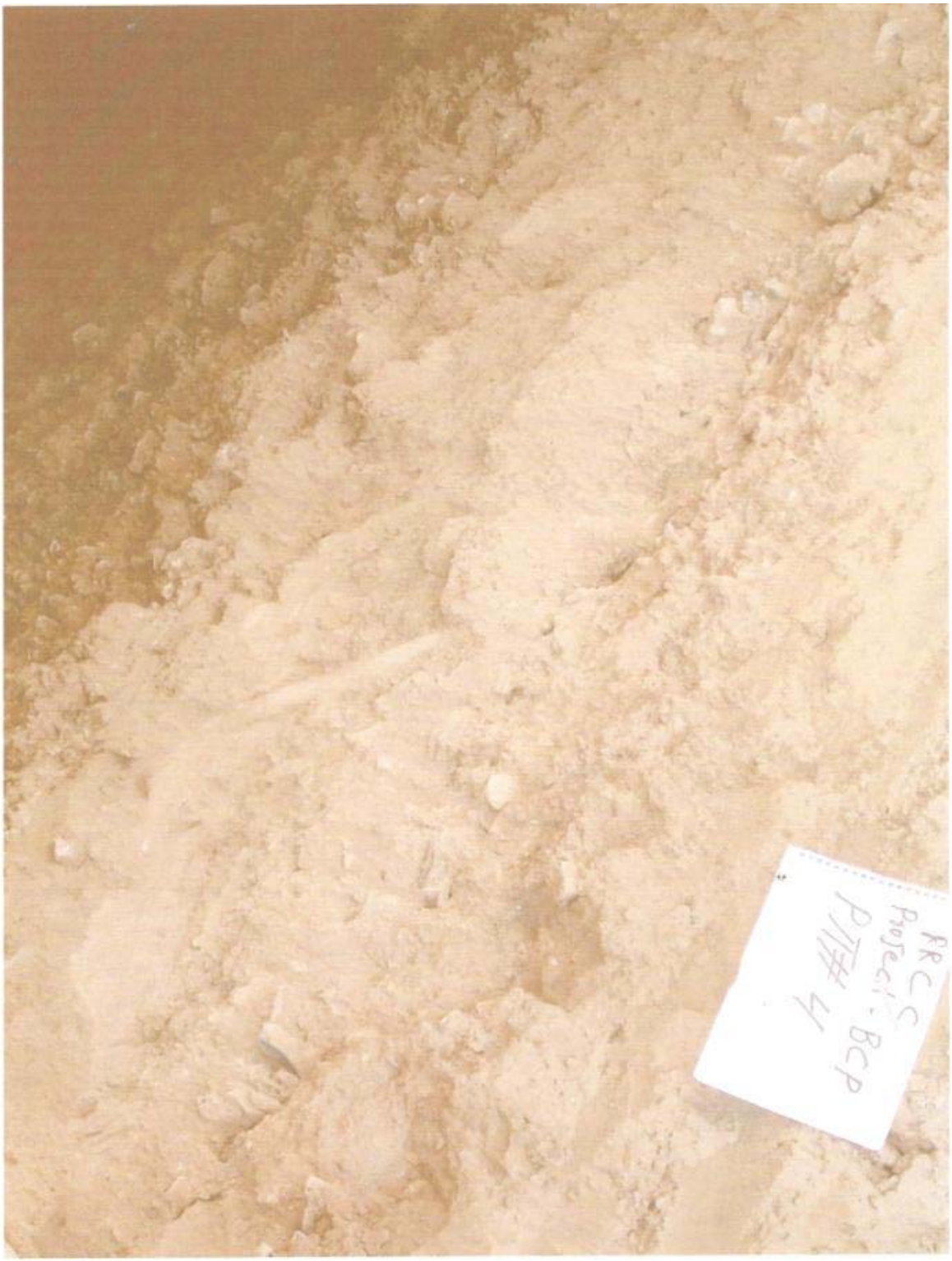
Depth (m)	Layer Depth (m)	Sample Depth (m)	G.W.L (m)	Profile	Geotechnical Description
			CL		Filling Material
-1.00-	(1/4) 50kg	0.5m	SC-SM		Silty clayey Sand with Gravel 15% plus #200 passing 15% plus gravel
-1.50-					
-2.00-	(2/4) 50kg	2.0m	SC		Clayey Sand with Gravel 30% Plus # 200 passing
-2.50-			SC-SM		Silty clayey Sand with Gravel 15% plus #200 passing 15% plus gravel
-3.0-	(3/4) 50kg	3.0m			
-3.50-					END OF TRIAL PIT M 3.3
-4.01-					

EXPLANATION:

LOGGED BY:	CHECKED BY: For
SHAH HUSSAIN	BADER ZAMAN Lab Mang.

APPENDIX – E

PHOTO GRAPHS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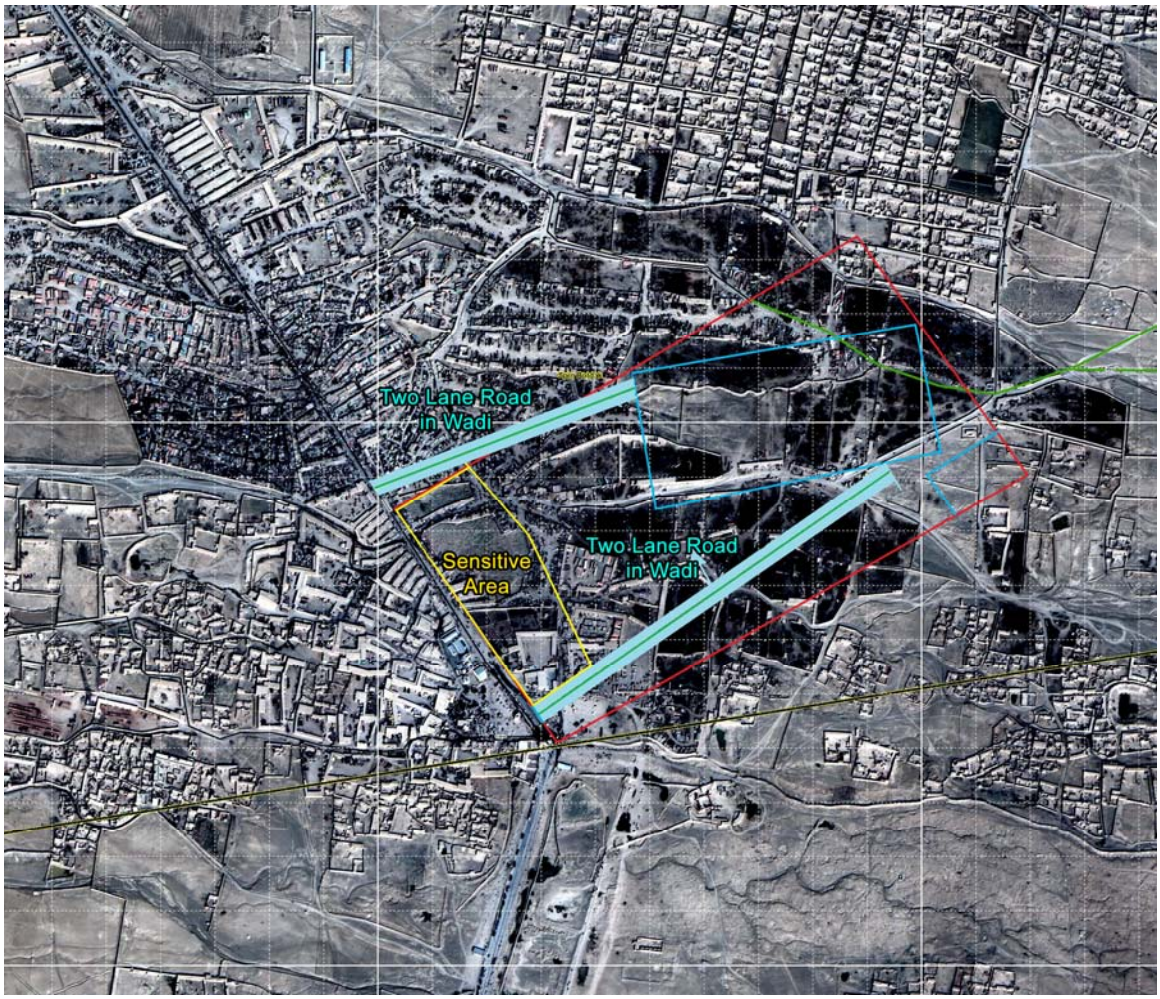
Annex B-3: Roads