



Sampling



Sampling



Sampling BH-4 (2.0-4.0m)



Sampling BH-5 (14.0-16.0m)



Sampling



Sampling

PROJECT FOR CONSTRUCTION OF FLY-OVER AJILCHIN RAILWAY  
FLYOVER IN ULAANBAATAR CITY IN MONGOLIA

10/13



Sampling



Monitoring Borehole for Further Research

PROJECT FOR CONSTRUCTION OF FLY-OVER AJILCHIN RAILWAY  
FLYOVER IN ULAANBAATAR CITY IN MONGOLIA

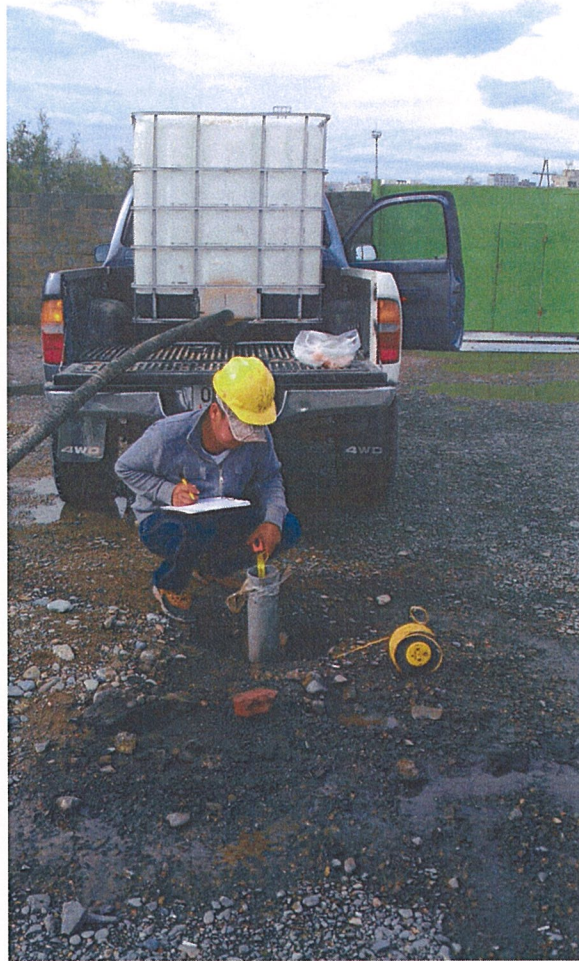
11/13



Filter Pipe



In-situ Permeability Testing



Measuring and Testing

PROJECT FOR CONSTRUCTION OF FLY-OVER AJILCHIN RAILWAY  
FLYOVER IN ULAANBAATAR CITY IN MONGOLIA

13/13

Certification of Bore Hole works

2012.01.14 ~ 2012.7.6

1. Bore Hole No.1



Photo-1 Certification the length of S.P.T  
No.1 L=19.0m

2. Bore Hole No.2



Photo-2 Certification the length of S.P.T  
No.2 L=18.0m

4. Bore Hole No.3



Photo-3 Certification the length of S.P.T  
No.3 L=12.0m

4. Bore Hole No.4



Photo-4 Certification the length of S.P.T  
No.4 L=19.0m



5. Bore Hole No.5



Photo-5 Certification the length of S.P.T  
No.5 L=16.0m

6. Bore Hole No.6



Photo-6 Certification the length of S.P.T  
No.6 L=16.0m

7. Bore Hole No.7



Photo-7 Certification the length of S.P.T  
No.7 L=12.0m

8. Bore Hole No.8



Photo-8 Certification the length of S.P.T  
No.8 L=14.0m

9. Bore Hole No.9

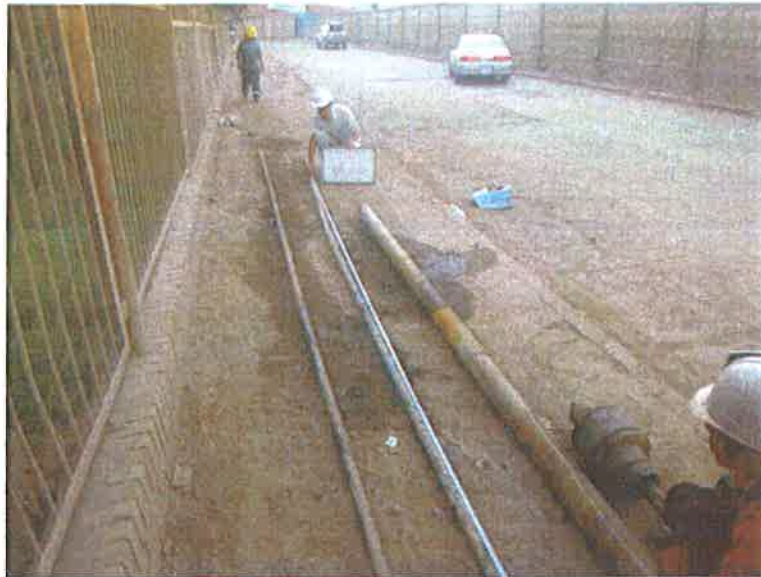


Photo-9 Certification the length of S.P.T  
No.9 L=12.0m

10. Bore Hole No.10



Photo-10 Certification the length of S.P.T  
No.10 L=14.0m

11. Bore Hole No 11



Photo-11 Certification the length of S.P.T  
No.11 L=13.0m



## APPENDIX C

### Summary of Laboratory Test Results

APPENDIX C-1	Physical properties of Soil
APPENDIX C-2	Classification by Identical Properties of Soil



**Physical Properties of Soil**  
**Object Name: Ajilchin Railway Fly-Over**

No.	Hole №	Depth (m)	Particle size, %															Particle Analysis (%)			Atterberg Limits			Cu	Cc	Soil Type	Soil name	Natural Moisture Content (W <sub>n</sub> ), %	Specific gravity G <sub>s</sub> , g/cm <sup>3</sup>	Density, ρ, g/cm <sup>3</sup>	Dry density, ρ <sub>d</sub> , g/cm <sup>3</sup>	Porosity, n, %	Voids Ratio, e	Degree of Saturation, S <sub>r</sub>	Consistency, J <sub>L</sub>
			75	50	37.5	25	19	9.5	4.75	2.00	0.850	0.425	0.250	0.106	0.075	<0.075	%	Gravel	Sand	Silt/Clay	LL	PL	PI												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	BH-1	1.5								0.3	0.4	1.5	3.9	10.2	2.1	81.6	100.0	0.0	18.4	81.6	23.7	14.5	9.2			CL	Embankment soil	24.2	2.68	1.91	1.54	42.62	0.743	0.87	<0
2	BH-1	3.6		27.4	7.3	12.1	4.0	6.8	7.6	10.5	7.6	5.2	2.7	2.4	1.5	4.9	100.0	65.2	29.9	4.9	nonplastic					GP	Poorly graded GRAVEL with sand	1.8	2.66	2.23	2.19	17.65	0.214	0.22	
3	BH-1	6.0			14.1	10.2	11.4	17.4	11.8	10.8	7.1	4.0	4.3	3.2	0.4	5.3	100.0	64.9	29.8	5.0	nonplastic					GP	Poorly graded GRAVEL with sand	8.3	2.67	2.22	2.05	23.23	0.303	0.73	
4	BH-1	7.5		18.6	13.8	9.7	6.9	12.8	9.1	7.2	4.5	3.7	5.2	2.8	0.3	5.4	100.0	70.9	23.7	4.7	nonplastic					GP	Poorly graded GRAVEL with sand	8.1	2.67	2.25	2.08	22.04	0.283	0.76	
5	BH-1	9.5			10.5	3.5	5.3	15.4	13.3	12.2	10.3	5.4	3.6	4.1	0.5	15.9	100.0	48.0	36.1	15.9	23.8	14.2	9.6			GC	Clayey GRAVEL with sand	9.3	2.69	2.17	1.99	26.19	0.355	0.70	<0
6	BH-1	10.5			9.5	11.2	9.9	1.8	14.5	11.4	6.2	4.2	6.0	4.0	1.0	20.3	100.0	46.9	32.8	20.3	25.2	14.0	11.2			GC	Clayey GRAVEL with sand	7.0	2.69	2.15	2.01	25.30	0.339	0.56	<0
7	BH-1	13.0			5.7	15.2	7.1	13.0	11.0	11.8	8.1	5.2	3.8	3.7	0.5	14.9	100.0	52.0	33.1	14.9	22.7	13.6	9.1			GC	Clayey GRAVEL with sand	8.8	2.70	2.22	2.04	24.43	0.323	0.74	<0
8	BH-1	14.0			3.9	10.3	6.0	12.3	15.0	15.9	5.0	4.8	3.9	5.0	1.0	16.9	100.0	47.5	35.6	16.9	23.8	13.8	10.0			GC	Clayey GRAVEL with sand	9.3	2.71	2.18	1.99	26.40	0.359	0.70	<0
9	BH-1	16.0				0.0	5.3	12.5	13.8	21.0	8.1	4.8	4.0	5.7	0.9	23.9	100.0	31.6	44.5	23.9	26.1	14.3	11.8			SC	Clayey SAND with gravel	11.5	2.73	2.14	1.92	29.70	0.422	0.74	<0
10	BH-1	18.0				3.9	8.2	4.6	14.7	12.0	9.0	8.7	5.0	6.4	2.5	25.0	100.0	31.4	43.6	25.0	24.9	14.5	10.4			SC	Clayey SAND with gravel	12.8	2.72	2.09	1.85	31.88	0.468	0.74	<0
11	BH-1	19.0				3.5	7.2	11.9	10.3	14.6	8.3	9.2	4.3	5.8	1.0	23.9	100.0	32.9	43.2	23.9	25.1	15.2	9.9			SC	Clayey SAND with gravel	12.3	2.72	2.12	1.89	30.60	0.441	0.76	<0
12	BH-2	2.5		9.9	13.8	12.2	10.5	16.6	12.5	8.3	4.3	4.1	2.3	1.5	0.2	3.8	100.0	75.5	20.7	3.8	nonplastic					GP	Poorly graded GRAVEL with sand	2.4	2.67	2.25	2.20	17.71	0.215	0.30	
13	BH-2	5.0		12.6	8.3	11.6	8.4	13.6	11.9	11.9	7.5	3.8	2.4	2.6	0.3	5.1	100.0	66.4	28.5	4.9	nonplastic					GP	Poorly graded GRAVEL with sand	5.2	2.68	2.23	2.12	20.90	0.264	0.53	
14	BH-2	7.0			9.8	3.4	3.5	7.1	7.8	8.9	10.7	7.1	6.2	9.6	1.2	24.7	100.0	31.6	43.7	24.7	23.7	13.9	9.8			SC	Clayey SAND with gravel	10.2	2.72	2.10	1.91	29.94	0.427	0.65	<0
15	BH-2	8.0				1.1	3.0	11.8	10.1	16.7	9.9	6.8	5.4	6.8	1.1	27.3	100.0	26.0	46.7	27.3	25.1	14.2	10.9			SC	Clayey SAND with gravel	8.7	2.73	2.07	1.90	30.24	0.434	0.55	<0
16	BH-2	9.0			3.1	17.8	15.4	17.3	15.0	10.4	6.5	3.9	2.9	2.9	0.3	4.5	100.0	68.6	26.9	4.5	nonplastic					GP	Poorly graded GRAVEL with sand	7.3	2.66	2.23	2.08	21.87	0.280	0.69	
17	BH-2	9.8				2.7	6.1	10.0	10.5	12.7	15.0	7.5	5.3	6.3	1.1	22.8	100.0	29.3	47.9	22.8	23.9	14.5	9.4			SC	Clayey SAND with gravel	5.6	2.73	2.07	1.96	28.20	0.393	0.39	<0
18	BH-2	13.0		7.4	8.7	3.1	10.5	15.6	13.6	13.4	8.4	5.0	4.8	3.9	0.6	5.0	100.0	58.9	36.1	5.0	nonplastic					GP	Poorly graded GRAVEL with sand	4.9	2.67	2.22	2.12	20.74	0.262	0.50	
19	BH-3	2.0			3.9	14.1	14.0	12.4	10.9	10.1	7.8	6.5	5.6	3.9	0.3	10.5	100.0	55.3	34.2	10.5	21.8	13.9	7.9			GP-GC	Poorly graded GRAVEL with sand and clay	2.9	2.68	2.20	2.14	20.22	0.254	0.31	<0
20	BH-3	3.0		18.6	8.5	6.8	8.7	5.0	11.6	7.7	7.7	7.2	4.8	4.0	0.4	9.0	100.0	59.2	31.8	9.0	20.7	14.3	6.4			GP-GC	Poorly graded GRAVEL with sand and clay	4.6	2.69	2.22	2.12	21.10	0.267	0.46	<0
21	BH-3	4.8			12.8	4.8	5.8	14.8	15.1	14.7	9.3	5.6	3.0	3.8	0.6	9.7	100.0	53.3	37.0	9.7	22.9	14.6	8.3			GP-GC	Poorly graded GRAVEL with sand and clay	5.7	2.68	2.20	2.08	22.34	0.288	0.53	<0
22	BH-3	6.0			3.5	13.7	8.9	15.3	11.8	11.8	7.2	5.9	5.7	5.6	0.7	11.6	100.0	53.2	35.2	11.6	21.8	13.9	7.9			GP-GC	Poorly graded GRAVEL with sand and clay	8.0	2.68	2.19	2.03	24.34	0.322	0.67	<0
23	BH-3	7.5			9.5	14.6	8.4	17.1	12.7	10.2	6.6	3.6	2.6	3.4	0.6	10.7	100.0	62.3	27.0	10.7	21.2	14.2	7.0			GP-GC	Poorly graded GRAVEL with sand and clay	8.6	2.69	2.23	2.05	23.67	0.310	0.75	<0
24	BH-3	9.0			3.4	12.7	11.8	19.3	14.1	12.3	9.0	3.8	2.8	3.4	0.3	7.1	100.0	61.3	31.6	7.1	22.3	14.6	7.7			GP-GC	Poorly graded GRAVEL with sand and clay	9.2	2.69	2.24	2.05	23.74	0.311	0.79	<0
25	BH-3	10.5				2.0	10.8	16.3	14.4	12.9	6.6	4.6	3.7	5.9	1.8	21.0	100.0	43.5	35.5	21.0	23.0	14.8	8.2			GC	Clayey GRAVEL with sand	13.4	2.72	2.17	1.91	29.65	0.421	0.86	<0
26	BH-3	12.0				6.7	8.1	16.1	11.9	10.7	6.9	5.2	5.8	7.3	1.6	19.7	100.0	42.8	37.5	19.7	24.2	13.9	10.3			GC	Clayey GRAVEL with sand	15.8	2.71	2.15	1.86	31.49	0.460	0.93	<0
27	BH-4	1.5			8.1	16.3	10.1	14.9	11.5	10.1	6.0	4.9	5.6	6.2	1.4	4.9	100.0	60.9	34.2	4.9	nonplastic					GP	Poorly graded GRAVEL with sand	6.8	2.70	2.22	2.08	23.01	0.299	0.61	
28	BH-4	4.0	20.8	17.0	8.0	13.5	1.3	3.8	8.6	12.2	3.5	2.3	1.7	2.0	0.7	4.6	100.0	73.0	22.4	4.6	nonplastic					GP	Poorly graded GRAVEL with sand	4.9	2.66	2.25	2.14	19.36	0.240	0.54	
29	BH-4	6.0			3.8	8.9	10.5	12.8	7.5	4.9	6.0	6.1	4.4	7.3	2.6	25.2	100.0	43.5	31.3	11.7	21.7	14.2	7.5			GP-GC	Poorly graded GRAVEL with sand and clay	7.9	2.69	2.14	1.98	26.27	0.356	0.60	<0
30	BH-4	14.0			11.3	7.8	6.4	13.7	10.6	7.3	10.4	7.5	4.2	5.2	1.2	14.4	100.0	49.8	35.8	14.4	23.7	14.2	9.5			GC	Clayey GRAVEL with sand	8.9	2.72	2.16	1.98	27.08	0.371	0.65	<0
31	BH-5	2.4-2.6			20.2	9.9	4.3	15.3	9.5	8.0	6.5	11.6	7.3	2.9	0.5	4.0	100.0	59.2	36.8	4.0	nonplastic					GP	Poorly graded GRAVEL with sand	5.5	2.67	2.22	2.10	21.19	0.269	0.55	
32	BH-5	5.5			12.3	6.5	9.5	14.7	12.3	12.3	9.4	6.1	4.2	5.2	2.7	4.8	100.0	55.3	39.9	4.8	nonplastic					GP	Poorly graded GRAVEL with sand	7.2	2.68	2.20	2.05	23.42	0.306	0.63	
33	BH-5	9.7		8.9	5.6	2.4	5.2	13.1	13.9	14.8	10.6	5.6	2.9	4.3	1.1	11.6	100.0	49.1	39.3	11.6	20.8	13.7	7.1			GP-GC	Poorly graded GRAVEL with sand and clay	11.4	2.68	2.19	1.97	26.65	0.363	0.84	<0
34	BH-5	12.3				3.9	2.0	12.7	12.4	14.0	9.8	6.2	5.0	7.8	2.0	24.2	100.0	31.0	44.8	24.2	25.1	15.9	9.2			SC	Clayey SAND with gravel	16.5	2.71	2.08	1.79	34.12	0.518	0.86	<0
35	BH-5	14.0				7.2	5.0	11.4	16.0	13.9	10.5	5.4	4.0	5.6	1.5	19.5	100.0	39.6	40.9	19.5	24.3	14.6	9.7			SC	Clayey SAND with gravel	13.8	2.73	2.13	1.87				



**Physical Properties of Soil**  
**Object Name: Ajilchin Railway Fly-Over**

No.	Hole №	Depth (m)	Particle size, %														Particle Analysis (%)			Atterberg Limits			Cu	Cc	Soil Type	Soil name	Natural Moisture Content (W), %	Specific gravity G <sub>s</sub> , g/cm <sup>3</sup>	Density, ρ, g/cm <sup>3</sup>	Dry density, ρ <sub>d</sub> , g/cm <sup>3</sup>	Porosity, n, %	Voids Ratio, e	Degree of Saturation, S <sub>r</sub>	Consistency, J <sub>L</sub>	
			75	50	37.5	25	19	9.5	4.75	2.00	0.850	0.425	0.250	0.106	0.075	<0.075	%	Gravel	Sand	Silt/Clay	LL	PL													PI
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
57	BH-9	10.3			11.3	15.8	3.8	11.0	8.7	5.6	10.5	6.3	4.3	5.7	1.5	15.5	100.0	50.6	33.9	15.5	23.1	15.6	7.5			GC	Clayey GRAVEL with sand	12.8	2.69	2.22	1.97	26.84	0.367	0.94	<0
58	BH-10	2.5			20.2	11.0	9.4	14.5	12.9	12.1	7.8	3.4	2.1	2.4	0.6	3.6	100.0	68.0	28.4	3.6	nonplastic					GP	Poorly graded GRAVEL with sand	3.0	2.68	2.23	2.17	19.21	0.238	0.34	
59	BH-10	4.8		4.7	1.7	5.3	6.0	14.0	17.5	16.5	10.0	5.6	3.9	4.5	0.9	9.4	100.0	49.2	41.4	9.4	21.5	14.2	7.3			GP-GC	Poorly graded GRAVEL with sand and clay	8.6	2.69	2.19	2.02	25.03	0.334	0.69	<0
60	BH-10	5.9				21.5	5.7	16.4	15.3	13.0	7.1	4.9	3.9	3.9	1.3	7.0	100.0	58.9	34.1	7.0	20.6	13.6	7.0			GP-GC	Poorly graded GRAVEL with sand and clay	6.7	2.70	2.22	2.08	22.94	0.298	0.61	<0
61	BH-10	7.0			4.6	10.3	6.8	12.4	10.6	4.6	3.8	3.9	4.3	5.9	4.8	28.0	100.0	44.7	27.3	28.0	25.6	15.2	10.4			GC	Clayey GRAVEL with sand	14.3	2.69	2.15	1.88	30.07	0.430	0.89	<0
62	BH-11	11.1				6.9	6.6	19.2	13.9	12.0	8.2	4.5	4.4	5.3	2.4	16.6	100.0	46.6	36.8	16.6	24.8	14.9	9.9			GC	Clayey GRAVEL with sand	10.0	2.70	2.14	1.95	27.95	0.388	0.70	<0
63	BH-11	2.5			11.6	17.2	10.0	18.9	11.2	8.7	3.3	3.0	6.7	6.1	1.0	2.3	100.0	68.9	28.8	2.3	nonplastic					GP	Poorly graded GRAVEL with sand	7.9	2.69	2.23	2.07	23.17	0.302	0.70	
64	BH-11	4.4				12.2	7.4	12.9	17.3	14.5	7.8	5.3	5.7	6.3	1.9	8.7	100.0	49.8	41.5	8.7	21.0	13.7	7.3			GP-GC	Poorly graded GRAVEL with sand and clay	7.4	2.70	2.19	2.04	24.48	0.324	0.62	<0
65	BH-11	6.8			3.7	6.4	6.0	10.2	10.8	17.3	15.3	9.1	4.3	3.9	0.6	12.4	100.0	37.1	50.5	12.4	26.8	14.3	12.5			SC	Clayey SAND with gravel	9.8	2.72	2.14	1.95	28.35	0.396	0.67	<0
66	TP-1	1.8-2.0		5.9	2.8	8.7	14.2	22.1	15.9	9.3	4.3	5.5	6.4	2.9	0.6	1.4	100.0	69.6	29.0	1.4	nonplastic					GP	Poorly graded GRAVEL with sand	6.5	2.68	2.23	2.09	21.87	0.280	0.62	
67	TP-2	1.7-2.1				0.7	10.3	18.1	12.2	9.5	5.4	7.5	8.8	11.4	3.4	12.7	100.0	41.3	46.0	12.7	25.3	15.8	9.5			SC	Embankment soil	13.7	2.72	2.16	1.90	30.16	0.432	0.86	<0
68	TP-3	1.8-2.0				5.2	6.6	18.3	14.6	12.7	9.0	11.5	10.1	5.7	0.8	5.5	100.0	44.7	49.8	5.5	21.5	14.0	7.5			SP-SC	Embankment soil	8.7	2.69	2.14	1.97	26.81	0.366	0.64	<0
69	TP-4	1.8-2.0		16.2	15.2	4.6	3.8	11.2	11.1	8.6	5.6	5.9	6.3	5.6	0.9	5.0	100.0	62.1	32.9	5.0	nonplastic					GP	Embankment soil	4.3	2.67	2.20	2.11	21.00	0.266	0.43	
70	TP-5	1.8-2.0		18.5	13.8	11.3	7.3	12.1	8.4	6.1	3.0	5.6	5.3	3.0	0.7	4.9	100.0	71.4	23.7	4.9	nonplastic					GP	Embankment soil	5.0	2.68	2.24	2.13	20.40	0.256	0.52	

Checked by:  
 Chief engineer  
 Senior engineer  
 Senior engineer  
 Senior technician  
 Technician  
 Technician

A. Batsaikhan  
 G. Jamsran  
 A. Sainbayar  
 T. Altanchimeg  
 D. Tungalag  
 G. Otgontuul  
 M. Enkhbayar

Summary of classification by identical properties of soil  
Object Name: Ajilchin Railway Fly-Over

No.	Hole №	Depth (m)	Particle size, %														Particle Analysis (%)			Atterberg Limits			Cu	Cc	Soil Type	Soil name	Natural Moisture Content (W), %	Specific gravity $G_s$ , g/cm <sup>3</sup>	Density, $\rho$ , g/cm <sup>3</sup>	Dry density, $\rho_d$ , g/cm <sup>3</sup>	Porosity, n, %	Voids Ratio, e	Degree of Saturation, Sr	Consistency, $J_L$			
			75	50	37.5	25	19	9.5	4.75	2.00	0.600	0.425	0.300	0.150	0.075	<0.075	%	Gravel	Sand	Silt/ Clay	LL	PL													PI		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
<b>1. Clayey SAND gravel/SC/ Хайргаай шаварлар ЭЛС/SC/</b>																																					
1	BH-1	16.0			0.0	0.0	5.3	12.5	13.8	21.0	8.1	4.8	4.0	5.7	0.9	23.9	100.0	31.6	44.5	23.9	26.1	14.3	11.8			SC	Clayey SAND with gravel	11.5	2.73	2.14	1.92	29.70	0.422	0.74	<0		
2	BH-1	18.0			0.0	3.9	8.2	4.6	14.7	12.0	9.0	8.7	5.0	6.4	2.5	25.0	100.0	31.4	43.6	25.0	24.9	14.5	10.4			SC	Clayey SAND with gravel	12.8	2.72	2.09	1.85	31.88	0.468	0.74	<0		
3	BH-1	19.0			0.0	3.5	7.2	11.9	10.3	14.6	8.3	9.2	4.3	5.8	1.0	23.9	100.0	32.9	43.2	23.9	25.1	15.2	9.9			SC	Clayey SAND with gravel	12.3	2.72	2.12	1.89	30.60	0.441	0.76	<0		
4	BH-2	7.0			9.8	3.4	3.5	7.1	7.8	8.9	10.7	7.1	6.2	9.6	1.2	24.7	100.0	31.6	43.7	24.7	23.7	13.9	9.8			SC	Clayey SAND with gravel	10.2	2.72	2.10	1.91	29.94	0.427	0.65	<0		
5	BH-2	8.0			0.0	1.1	3.0	11.8	10.1	16.7	9.9	6.8	5.4	6.8	1.1	27.3	100.0	26.0	46.7	27.3	25.1	14.2	10.9			SC	Clayey SAND with gravel	8.7	2.73	2.07	1.90	30.24	0.434	0.55	<0		
6	BH-2	9.8			0.0	2.7	6.1	10.0	10.5	12.7	15.0	7.5	5.3	6.3	1.1	22.8	100.0	29.3	47.9	22.8	23.9	14.5	9.4			SC	Clayey SAND with gravel	5.6	2.73	2.07	1.96	28.20	0.393	0.39	<0		
7	BH-5	12.3			0.0	3.9	2.0	12.7	12.4	14.0	9.8	6.2	5.0	7.8	2.0	24.2	100.0	31.0	44.8	24.2	25.1	15.9	9.2			SC	Clayey SAND with gravel	16.5	2.71	2.08	1.79	34.12	0.518	0.86	<0		
8	BH-5	14.0			0.0	7.2	5.0	11.4	16.0	13.9	10.5	5.4	4.0	5.6	1.5	19.5	100.0	39.6	40.9	19.5	24.3	14.6	9.7			SC	Clayey SAND with gravel	13.8	2.73	2.13	1.87	31.44	0.459	0.82	<0		
9	BH-5	15.8			0.0	5.6	4.9	13.0	14.8	13.0	9.2	5.7	4.6	6.5	1.5	21.2	100.0	38.3	40.5	21.2	23.0	14.8	8.2			SC	Clayey SAND with gravel	10.7	2.72	2.10	1.90	30.26	0.434	0.67	<0		
10	BH-11	6.8			3.7	6.4	6.0	10.2	10.8	17.3	15.3	9.1	4.3	3.9	0.6	12.4	100.0	37.1	50.5	12.4	26.8	14.3	12.5			SC	Clayey SAND with gravel	9.8	2.72	2.14	1.95	28.35	0.396	0.67	<0		
A max					9.8	7.2	8.2	13.0	16.0	21.0	15.3	9.2	6.2	9.6	2.5	27.3		39.6	50.5	27.3	26.8	15.9	12.5					16.5	2.73	2.14	1.96	34.12	0.518	0.86			
A min					0.0	0.0	2.0	4.6	7.8	8.9	8.1	4.8	4.0	3.9	0.6	12.4		26.0	40.5	12.4	23.0	13.9	8.2					5.6	2.71	2.07	1.79	28.20	0.393	0.39			
A average					1.4	3.8	5.1	10.5	12.1	14.4	10.6	7.1	4.8	6.4	1.3	22.5	100.0	32.9	44.6	22.5	24.8	14.6	10.2					11.2	2.72	2.10	1.89	30.47	0.439	0.69	<0		
						</																															



APPENDIX C-3  
Modified Proctor Test Results





## Soil Trade LLC Soil and Material Testing Laboratory Test Results

Type of Testing: **COMPACTION TEST DATA SHEET**  
 Test Method: **MNS ASTM D1557**  
 Client: **CIT Engineering Co. Ltd**  
 Project name: **Dly-Over Aytelehn Railway in Ulaanbaatar**  
 Sample number: **SC1305**  
 Sample Name: **TP-01(1.8-2.0m)**  
 Soil type: **GP**

Easting		
Northing		
Language(X)		English

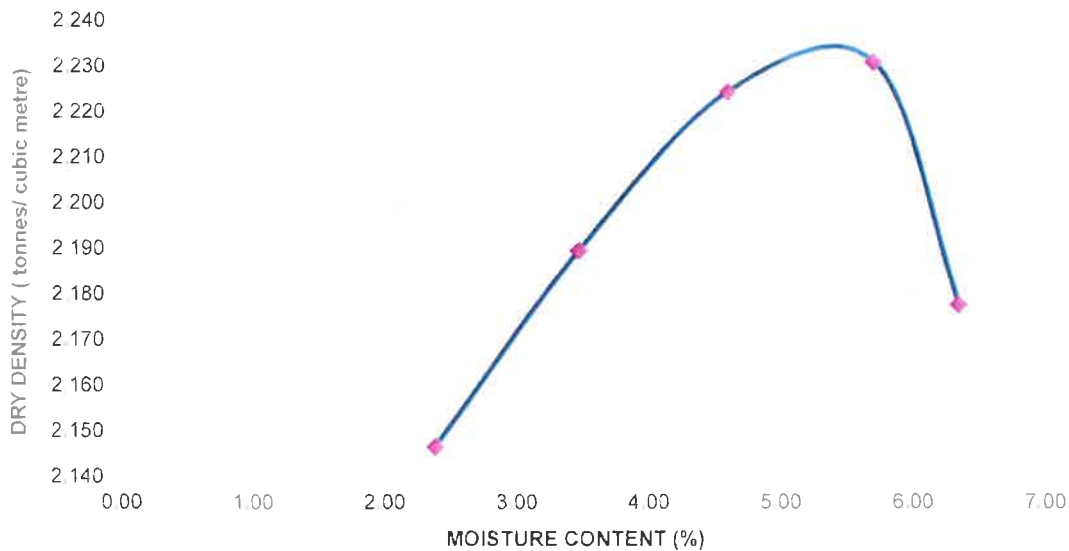
Trial No	1	2	3	4	5	6
Mass of sample & mould - wet (g)	10493.0	10637.0	10767.0	10834.0	10744.0	
Mass of mould (g)	5825.0	5825.0	5825.0	5825.0	5825.0	
Mass of sample - wet (g)	4668.0	4812.0	4942.0	5009.0	4919.0	
Volume of mould (cc)	2124	2124	2124	2124	2124	
Wet density (tonnes cubic metre)	2.198	2.266	2.327	2.358	2.316	

### MOISTURE CONTENT DETERMINATION

Container No.	007	204	179	233	027	055	031	078	104	065		
Mass of Cont. - Moist Soil (g)	84.28	84.24	78.85	82.71	99.07	98.75	82.14	68.53	76.84	80.55		
Mass of Cont. - Dry Soil (g)	82.81	82.85	76.93	80.67	95.65	95.36	78.90	65.97	73.51	76.84		
Empty Mass of Container (g)	22.74	22.79	21.30	22.18	21.79	21.33	21.73	21.57	21.25	21.40		
Mass of Water (g)	1.5	1.4	1.9	2.0	3.4	3.4	3.2	2.6	3.3	3.5		
Mass of Dry Soil (g)	60.1	60.1	55.6	58.5	73.9	74.0	57.2	44.4	52.3	55.4		
Moisture Content (%)	2.45	2.31	3.45	3.49	4.63	4.58	5.67	5.77	6.37	6.33		
Average Moisture Content (%)	2.38		3.47		4.60		5.72		6.35			
Dry density (tonnes cubic metre)	2.147		2.190		2.224		2.231		2.178			

### Test Sample Properties:

Specific Gravity	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Gravel	% Sand	% 0.075mm	Class (US)



Test Method

Modified


Optimum Moisture Content %

5.40

Maximum Dry Density (tonnes/cubic metre)

2.234

The test results apply exclusively to the sample provided by the client and the test results cannot be copied, used or multiplied in any way.

Checked By:   
 Tested By:

A. Batsaikhan  
 G. Jamsran

Date Tested: July 5, 2012



## Soil Trade LLC Soil and Material Testing Laboratory Test Results

Type of Testing: **COMPACTION TEST DATA SHEET**  
 Test Method: **MNS ASTM D1557**  
 Client: **CIT Engineering Co. Ltd**  
 Project name: **Fly-Over Ajilchin Railway in Ulaanbaatar**  
 Sample number: **SO1302**  
 Sample Name: **TP-02(1,7-2.1m)**  
 Soil Type: **SC**

Lasting	
Nothing	
Language/Хэл	English

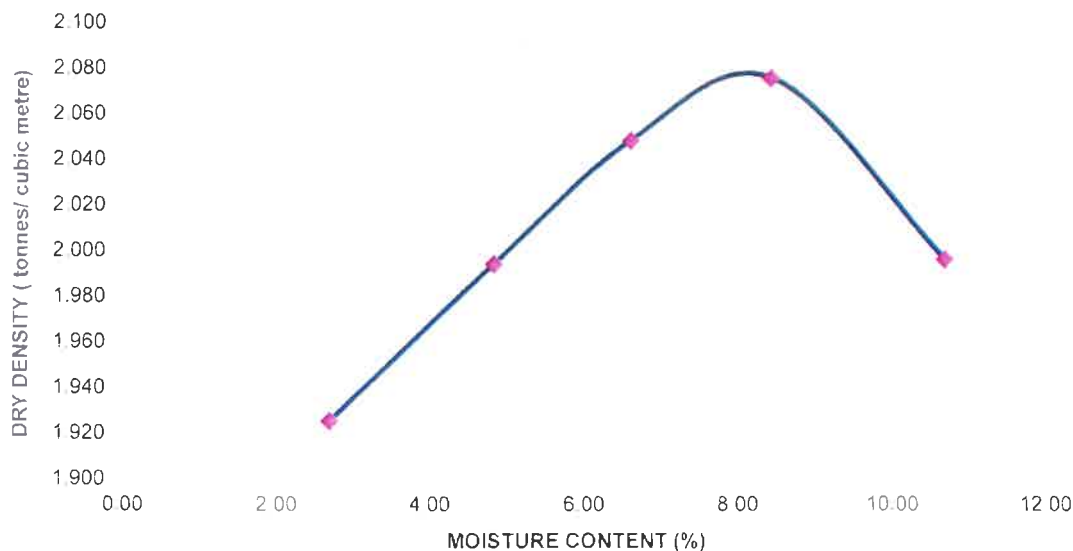
Trial No	1	2	3	4	5
Mass of sample & mould - wet (g)	10124.0	10265.0	10463.0	10696.0	10518.0
Mass of mould (g)	5825.0	5825.0	5825.0	5825.0	5825.0
Mass of sample - wet (g)	4199.0	4440.0	4638.0	4781.0	4693.0
Volume of mould (cc)	2124	2124	2124	2124	2124
Wet density (tonnes cubic metre)	1.977	2.090	2.184	2.251	2.210

### MOISTURE CONTENT DETERMINATION

Container No	138	081	090	021	210	034	200	008	227	297
Mass of Cont. + Moist Soil (g)	87.34	84.35	77.87	80.37	85.49	68.72	79.70	74.20	75.46	78.91
Mass of Cont. + Dry Soil (g)	85.66	82.68	75.35	77.57	81.53	65.84	75.13	70.09	70.35	73.45
Empty Mass of Container (g)	21.78	21.56	21.29	21.51	22.38	21.71	21.17	21.31	22.58	22.39
Mass of Water (g)	1.7	1.7	2.5	2.8	4.0	2.9	4.6	4.1	5.1	5.5
Mass of Dry Soil (g)	63.9	61.1	54.1	56.1	59.2	44.1	54.0	48.8	47.8	51.1
Moisture Content (%)	2.63	2.73	4.66	4.99	6.69	6.53	8.47	8.43	10.70	10.69
Average Moisture Content (%)	2.68		4.83		6.61		8.45		10.70	
Dry density (tonnes cubic metre)	1.925		1.994		2.048		2.076		1.996	

### Test Sample Properties:

Specific Gravity	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Gravel	% Sand	% < 0.075mm	Classif. (UCS)
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Test Method

Modified

Optimum Moisture Content %

8.20

Maximum Dry Density (tonnes/cubic metre)

2.078

The test results apply exclusively to the sample provided by the client and the test results cannot be copied, used or multiplied in any way without the written consent of the laboratory.

Checked By  
Tested By

A. Batsaikhan  
G. Jamsran

Date Tested: July 5, 2012



## Soil Trade LLC Soil and Material Testing Laboratory Test Results

Type of Testing: **COMPACTION TEST DATA SHEET**  
 Test Method: **MNS ASTM D1557**  
 Client: **CE Engineering Co Ltd**  
 Project Name: **Fly-Over Ajikheh Railway in Ulaanbaatar**  
 Sample Number: **SO1301**  
 Sample Name: **TP-05 (1.8-2.0m)**  
 Soil Type: **SP-SC**

Easting	
Northing	
Language(s)	English

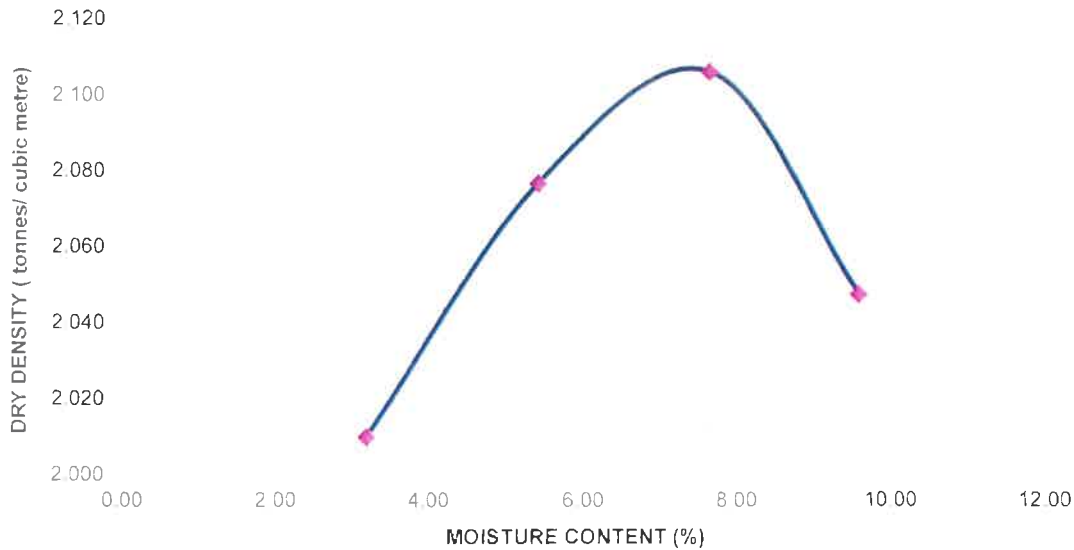
Trial No	1	2	3	4	5	6
Mass of sample & mould - wet (g)	10230.0	10475.0	10641.0	10591.0		
Mass of mould (g)	5825.0	5825.0	5825.0	5825.0		
Mass of sample - wet (g)	4405.0	4650.0	4816.0	4766.0		
Volume of mould (cc)	2124	2124	2124	2124		
Wet density (tonnes/cubic metre)	2.074	2.189	2.267	2.244		

### MOISTURE CONTENT DETERMINATION

Container No	242	024	161	056	218	049	260	083			
Mass of Cont. + Moist Soil (g)	93.81	93.29	73.12	76.63	78.48	85.36	93.42	90.23			
Mass of Cont. + Dry Soil (g)	91.58	91.10	70.52	73.72	74.51	80.77	87.24	84.13			
Empty Mass of Container (g)	22.23	21.69	21.26	21.42	22.32	21.35	22.37	21.06			
Mass of Water (g)	2.2	2.2	2.6	2.9	4.0	4.6	6.2	6.1			
Mass of Dry Soil (g)	69.4	69.4	49.3	52.3	52.2	59.4	64.9	63.1			
Moisture Content (%)	3.22	3.16	5.28	5.56	7.61	7.72	9.53	9.67			
Average Moisture Content (%)	3.19		5.42		7.67		9.60				
Dry density (tonnes/cubic metre)	2.010		2.077		2.106		2.047				

### Test Sample Properties:

Specific Gravity	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Gravel	% Sand	% < 0.075mm	Class (USCS)



Test Method

Modified

Optimum Moisture Content %

7.40

Maximum Dry Density (tonnes/cubic metre)

2.110

The test results apply exclusively to the sample provided by the client and the test results cannot be copied, used or multiplied at all.

Checked By  
Tested By:

A. Batsaikhan  
G. Jamtsan

Date Tested: July 5, 2012





## Soil Trade LLC Soil and Material Testing Laboratory Test Results

Type of Testing: **COMPACTION TEST DATA SHEET**  
 Test Method: **MNS ASTM D1557**  
 Client: **CH Engineering Co. Ltd**  
 Project name: **Fly-Over Ajilehin Railway in Ulaanbaatar**  
 Sample number: **SO1326**  
 Sample Name: **TP-0411,8-2 (m)**  
 Soil Type: **GP**

Easting	
Northing	
Language/Vari	
English	

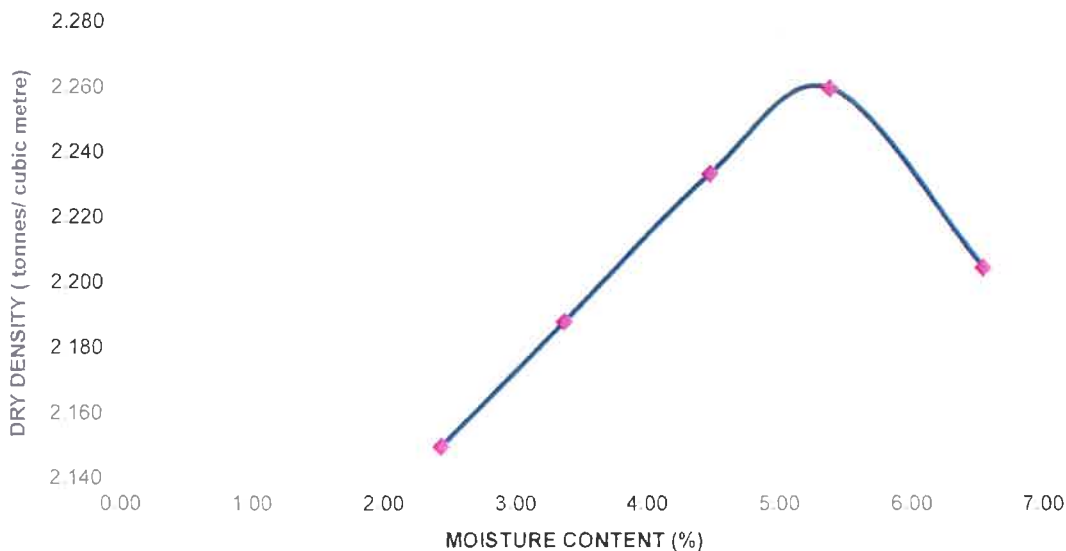
Trial No	1	2	3	4	5
Mass of sample & mould - wet (g)	10502.0	10629.0	10781.0	10883.0	10814.0
Mass of mould (g)	5825.0	5825.0	5825.0	5825.0	5825.0
Mass of sample - wet (g)	4677.0	4804.0	4956.0	5058.0	4989.0
Volume of mould (cc)	2124	2124	2124	2124	2124
Wet density (tonnes/cubic metre)	2.202	2.262	2.333	2.381	2.349

### MOISTURE CONTENT DETERMINATION

Container No.	159	059	237	120	067	181	153	055	014	036
Mass of Cont. + Moist Soil (g)	78.96	81.66	76.14	84.30	84.96	83.46	76.17	74.47	85.72	79.25
Mass of Cont. + Dry Soil (g)	77.63	80.20	74.26	82.40	82.37	80.70	73.45	71.70	81.88	75.61
Empty Mass of Container (g)	21.58	21.56	22.19	21.68	21.84	21.62	21.19	22.02	21.71	21.34
Mass of Water (g)	1.3	1.5	1.9	1.9	2.6	2.8	2.7	2.8	3.8	3.6
Mass of Dry Soil (g)	56.1	58.6	52.1	60.7	60.5	59.1	52.3	49.7	60.2	54.3
Moisture Content (%)	2.37	2.49	3.61	3.13	4.28	4.67	5.20	5.58	6.38	6.71
Average Moisture Content (%)	2.43		3.37		4.48		5.39		6.54	
Dry density (tonnes/cubic metre)	2.150		2.188		2.233		2.260		2.205	

### Test Sample Properties:

Specific Gravity	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Gravel	% Sand	C <sub>u</sub> > 0.075mm	Classif. (UCS)



Test Method:

Modified

Optimum Moisture Content %

5.30

Maximum Dry Density (tonnes/cubic metre)

2.260

The test results apply exclusively to the sample provided by the client and the test results cannot be copied, used or multiplied at all.

Checked By:  
Tested By:

A. Batsuikhan  
G. Jamstan

Date Tested: July 4, 2012



## Soil Trade LLC Soil and Material Testing Laboratory Test Results

Type of Testing: **COMPACTION TEST DATA SHEET**  
 Test Method: **MNS ASTM D1557**  
 Client: **CIT Engineering Co. Ltd**  
 Project name: **Fly-Over Ajilchun Railway in Ulaanbaatar**  
 Sample number: **SO1527**  
 Sample Name: **1P-05(1.8-2.0m)**  
 Soil Type: **GP**

Fasting	
Nonfasting	
Language/Unit	English

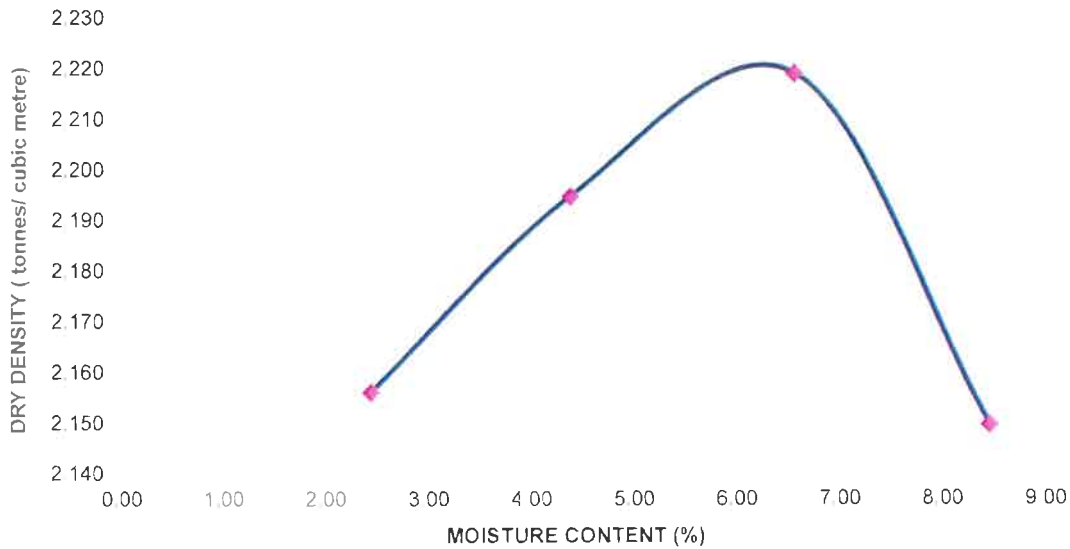
Final No	1	2	3	4	5	6
Mass of sample & mould - wet (g)	10516.0	10691.0	10848.0	10777.0		
Mass of mould (g)	5825.0	5825.0	5825.0	5825.0		
Mass of sample - wet (g)	4691.0	4866.0	5023.0	4952.0		
Volume of mould (cc)	2124	2124	2124	2124		
Wet density (tonnes cubic metre)	2.209	2.291	2.365	2.331		

### MOISTURE CONTENT DETERMINATION

Container No	014	036	204	127	254	299	031	259				
Mass of Cont. + Moist Soil (g)	85.32	79.25	91.90	77.88	81.16	73.96	80.56	80.12				
Mass of Cont. + Dry Soil (g)	83.88	<b>77.81</b>	88.90	75.60	77.62	70.62	76.06	75.52				
Empty Mass of Container (g)	21.71	21.34	22.79	21.72	21.85	21.62	21.73	22.30				
Mass of Water (g)	<b>1.4</b>	<b>1.4</b>	3.0	2.3	<b>3.5</b>	3.3	4.5	4.6				
Mass of Dry Soil (g)	62.2	56.5	66.1	53.9	55.8	49.0	54.3	53.2				
Moisture Content (%)	2.32	2.55	4.54	4.23	6.35	6.82	8.28	8.64				
Average Moisture Content (%)	<b>2.43</b>		<b>4.38</b>		<b>6.58</b>		<b>8.46</b>					
Dry density (tonnes cubic metre)	<b>2.156</b>		<b>2.195</b>		<b>2.219</b>		<b>2.150</b>					

*Test Sample Properties:*

Specific Gravity	Liquid Limit %	Plastic Limit %	Plasticity Index %	% Gravel	% Sand	% 0.075mm	Classif. (U.C.S.)



Test Method: **Modified**  
 Optimum Moisture Content %: **6.20**  
 Maximum Dry Density (tonnes/cubic metre): **2.221**

The test results apply exclusively to the sample provided by the client and the test results cannot be copied, used or multiplied at all.

Checked By:   
 Tested By:

A. Batsaikhan  
 G. Jamsran

Date Tested: July 4, 2012

