

# **Appendix-C17-02**

## **Results of Swedish Weight Soundings Logs**



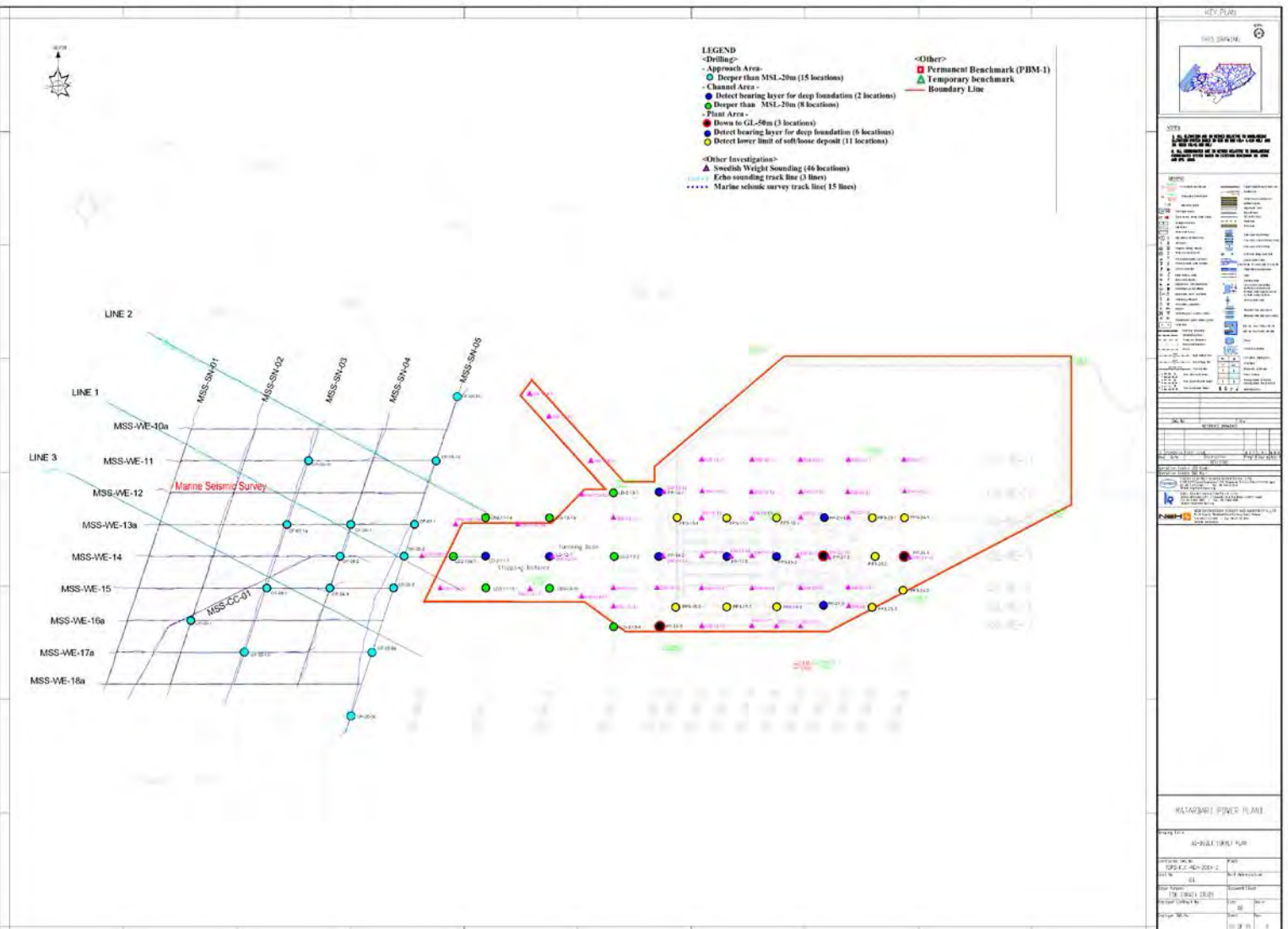


Figure 2 Locations of site investigation points and line

## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-10a-13a

Location : N 2400321.06: E 382480.85

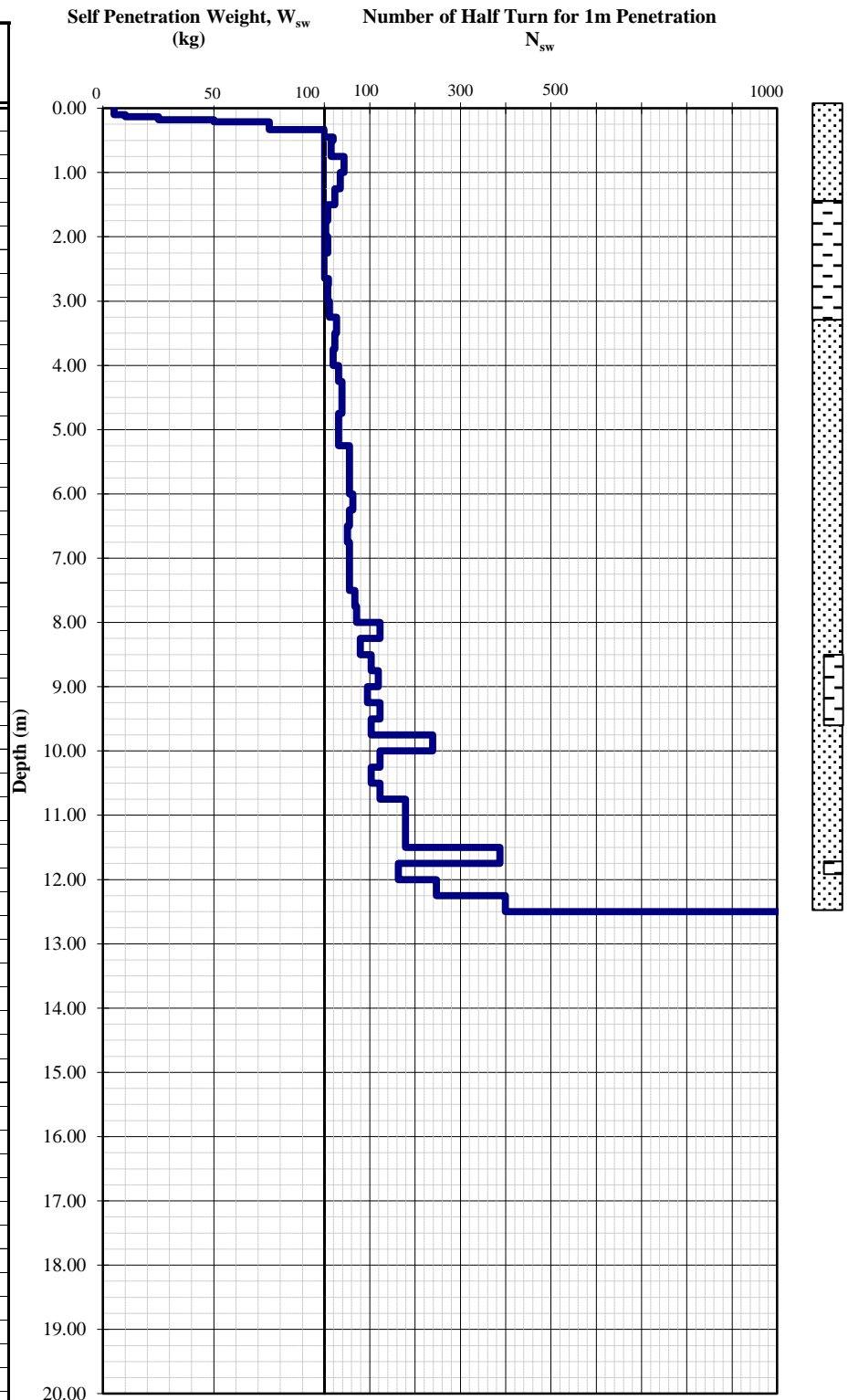
Ground Level : +0.42mMSL

Tested Date : 2014/10/27to 10/28

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	$W_{sw}$ (kg)	Nos of Half-Turns, $N_a$	Penetration, L (cm)	Nos of Half-Turns/m, $N_{sw}$
0.00 - 0.10	5	N.A.	10	N.A.
0.10 - 0.13	10	N.A.	3	N.A.
0.13 - 0.18	25	N.A.	5	N.A.
0.18 - 0.21	50	N.A.	3	N.A.
0.21 - 0.33	75	N.A.	12	N.A.
0.33 - 0.45	100	N.A.	12	N.A.
0.45 - 0.50	100	1	5	20
0.50 - 0.75	100	4	25	16
0.75 - 1.00	100	11	25	44
1.00 - 1.25	100	9	25	36
1.25 - 1.50	100	6	25	24
1.50 - 1.75	100	2	25	8
1.75 - 2.00	100	1	25	4
2.00 - 2.25	100	2	25	8
2.25 - 2.50	100	N.A.	25	N.A.
2.50 - 2.65	100	N.A.	15	N.A.
2.65 - 2.75	100	1	10	10
2.75 - 3.00	100	2	25	8
3.00 - 3.25	100	3	25	12
3.25 - 3.50	100	7	25	28
3.50 - 3.75	100	6	25	24
3.75 - 4.00	100	5	25	20
4.00 - 4.25	100	8	25	32
4.25 - 4.50	100	10	25	40
4.50 - 4.75	100	10	25	40
4.75 - 5.00	100	8	25	32
5.00 - 5.25	100	8	25	32
5.25 - 5.50	100	14	25	56
5.50 - 5.75	100	14	25	56
5.75 - 6.00	100	14	25	56
6.00 - 6.25	100	16	25	64
6.25 - 6.50	100	14	25	56
6.50 - 6.75	100	13	25	52
6.75 - 7.00	100	14	25	56
7.00 - 7.25	100	14	25	56
7.25 - 7.50	100	14	25	56
7.50 - 7.75	100	17	25	68
7.75 - 8.00	100	18	25	72
8.00 - 8.25	100	31	25	124
8.25 - 8.50	100	20	25	80
8.50 - 8.75	100	26	25	104
8.75 - 9.00	100	30	25	120
9.00 - 9.25	100	24	25	96
9.25 - 9.50	100	31	25	124
9.50 - 9.75	100	26	25	104
9.75 - 10.00	100	60	25	240
10.00 - 10.25	100	31	25	124
10.25 - 10.50	100	26	25	104
10.50 - 10.75	100	31	25	124
10.75 - 11.00	100	45	25	180
11.00 - 11.25	100	45	25	180
11.25 - 11.50	100	45	25	180
11.50 - 11.75	100	97	25	388
11.75 - 12.00	100	41	25	164
12.00 - 12.25	100	62	25	248
12.25 - 12.50	100	100	25	400
12.50 - 12.58	100	100	7	1333





## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-10a-15

Location : N2399919.98 : E 382384.63

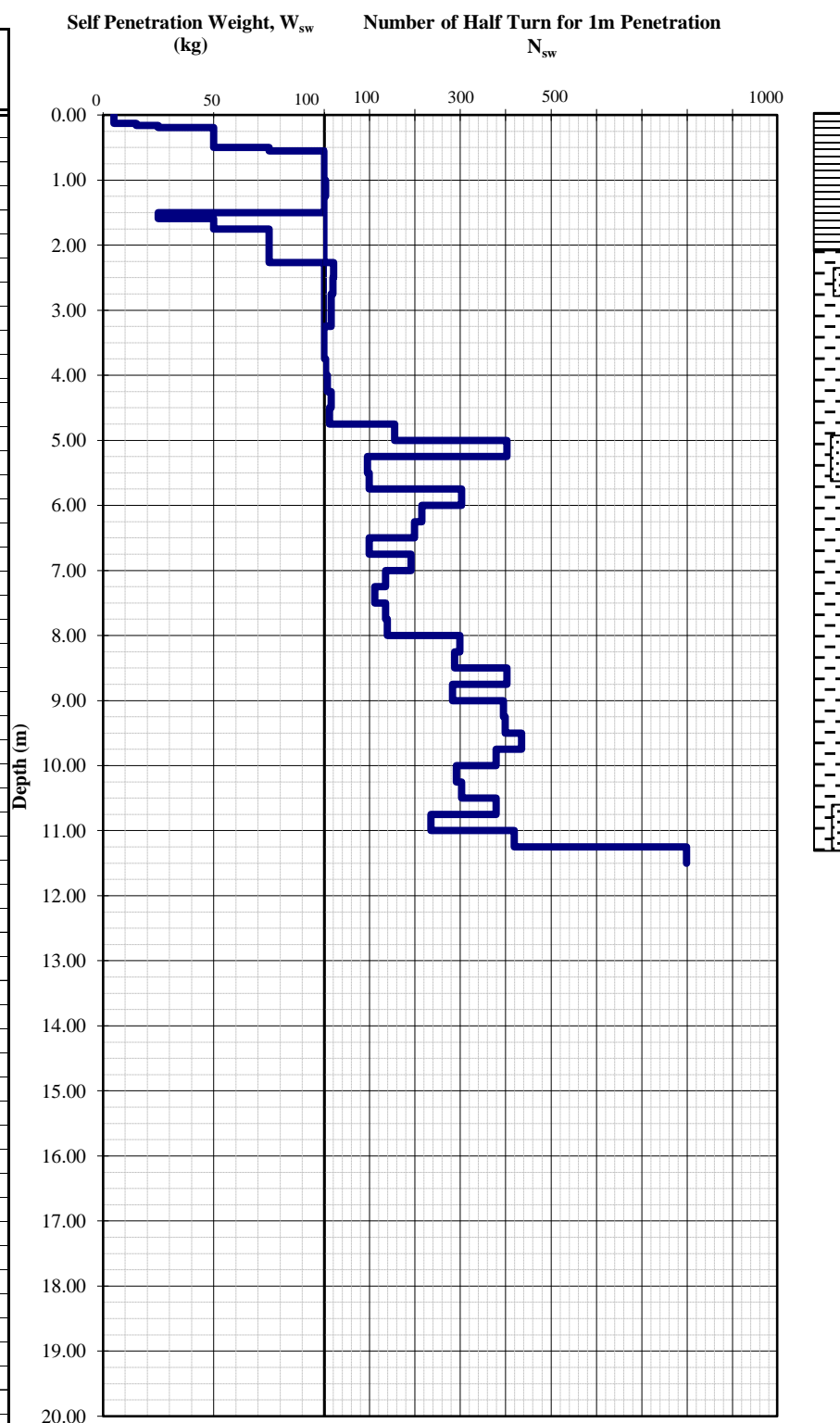
Ground Level : +1.37mMSL

Tested Date : 2014/10/28 to 10/29

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.13	5	N.A.	13	N.A.
0.13 - 0.16	15	N.A.	3	N.A.
0.16 - 0.19	25	N.A.	3	N.A.
0.19 - 0.50	50	N.A.	31	N.A.
0.50 - 0.55	75	N.A.	5	N.A.
0.55 - 1.00	100	N.A.	45	N.A.
1.00 - 1.25	100	1	25	4
1.25 - 1.50	100	N.A.	25	N.A.
1.50 - 1.59	25	N.A.	9	N.A.
1.59 - 1.75	50	N.A.	16	N.A.
1.75 - 2.00	75	N.A.	25	N.A.
2.00 - 2.27	75	N.A.	27	N.A.
2.27 - 2.27	100	N.A.	0	N.A.
2.27 - 2.50	100	5	23	22
2.50 - 2.75	100	5	25	20
2.75 - 3.00	100	4	25	16
3.00 - 3.25	100	4	25	16
3.25 - 3.50	100	N.A.	25	N.A.
3.50 - 3.75	100	N.A.	25	N.A.
3.75 - 4.00	100	1	25	4
4.00 - 4.25	100	2	25	8
4.25 - 4.50	100	4	25	16
4.50 - 4.75	100	3	25	12
4.75 - 5.00	100	39	25	156
5.00 - 5.25	100	101	25	404
5.25 - 5.50	100	24	25	96
5.50 - 5.75	100	25	25	100
5.75 - 6.00	100	76	25	304
6.00 - 6.25	100	54	25	216
6.25 - 6.50	100	50	25	200
6.50 - 6.75	100	25	25	100
6.75 - 7.00	100	48	25	192
7.00 - 7.25	100	34	25	136
7.25 - 7.50	100	28	25	112
7.50 - 7.75	100	34	25	136
7.75 - 8.00	100	35	25	140
8.00 - 8.25	100	75	25	300
8.25 - 8.50	100	72	25	288
8.50 - 8.75	100	101	25	404
8.75 - 9.00	100	71	25	284
9.00 - 9.25	100	99	25	396
9.25 - 9.50	100	100	25	400
9.50 - 9.75	100	109	25	436
9.75 - 10.00	100	95	25	380
10.00 - 10.25	100	73	25	292
10.25 - 10.50	100	76	25	304
10.50 - 10.75	100	95	25	380
10.75 - 11.00	100	59	25	236
11.00 - 11.25	100	105	25	420
11.25 - 11.50	100	200	25	800
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## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :           

Test No. : SW-11a-13a

Location : N 2400319.97: E 382869.29

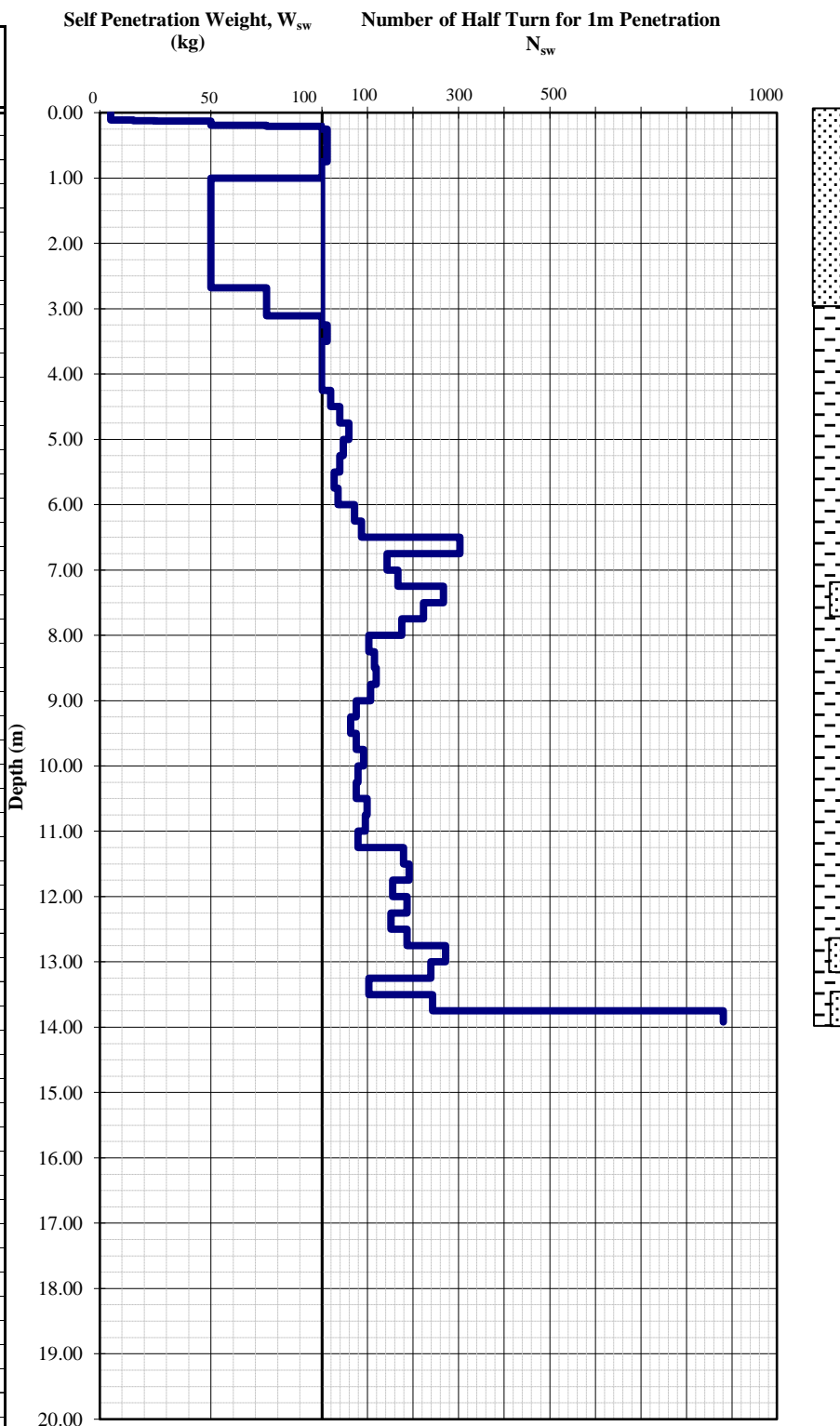
Ground Level : +1.53mMSL

Tested Date : 30-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.11	5	N.A.	11	N.A.
0.11 - 0.12	15	N.A.	1	N.A.
0.12 - 0.13	25	N.A.	1	N.A.
0.13 - 0.19	50	N.A.	6	N.A.
0.19 - 0.21	75	N.A.	2	N.A.
0.21 - 0.25	100	N.A.	4	N.A.
0.25 - 0.50	100	3	25	12
0.50 - 0.75	100	3	25	12
0.75 - 1.00	100	N.A.	25	N.A.
1.00 - 1.50	50	N.A.	50	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 2.50	50	N.A.	50	N.A.
2.50 - 2.68	50	N.A.	18	N.A.
2.68 - 3.00	75	N.A.	32	N.A.
3.00 - 3.11	75	N.A.	11	N.A.
3.11 - 3.25	100	N.A.	14	N.A.
3.25 - 3.50	100	3	25	12
3.50 - 4.00	100	N.A.	50	N.A.
4.00 - 4.25	100	N.A.	25	N.A.
4.25 - 4.50	100	5	25	20
4.50 - 4.75	100	10	25	40
4.75 - 5.00	100	15	25	60
5.00 - 5.25	100	12	25	48
5.25 - 5.50	100	10	25	40
5.50 - 5.75	100	7	25	28
5.75 - 6.00	100	9	25	36
6.00 - 6.25	100	18	25	72
6.25 - 6.50	100	22	25	88
6.50 - 6.75	100	76	25	304
6.75 - 7.00	100	36	25	144
7.00 - 7.25	100	42	25	168
7.25 - 7.50	100	67	25	268
7.50 - 7.75	100	56	25	224
7.75 - 8.00	100	44	25	176
8.00 - 8.25	100	26	25	104
8.25 - 8.50	100	29	25	116
8.50 - 8.75	100	30	25	120
8.75 - 9.00	100	27	25	108
9.00 - 9.25	100	19	25	76
9.25 - 9.50	100	16	25	64
9.50 - 9.75	100	19	25	76
9.75 - 10.00	100	23	25	92
10.00 - 10.25	100	20	25	80
10.25 - 10.50	100	19	25	76
10.50 - 10.75	100	25	25	100
10.75 - 11.00	100	24	25	96
11.00 - 11.25	100	20	25	80
11.25 - 11.50	100	45	25	180
11.50 - 11.75	100	48	25	192
11.75 - 12.00	100	39	25	156
12.00 - 12.25	100	47	25	188
12.25 - 12.50	100	38	25	152
12.50 - 12.75	100	47	25	188
12.75 - 13.00	100	68	25	272
13.00 - 13.25	100	60	25	240
13.25 - 13.50	100	26	25	104
13.50 - 13.75	100	61	25	244
13.75 - 13.92	100	150	17	882
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## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-12-10

Location : N 2400996.10: E 383067.61

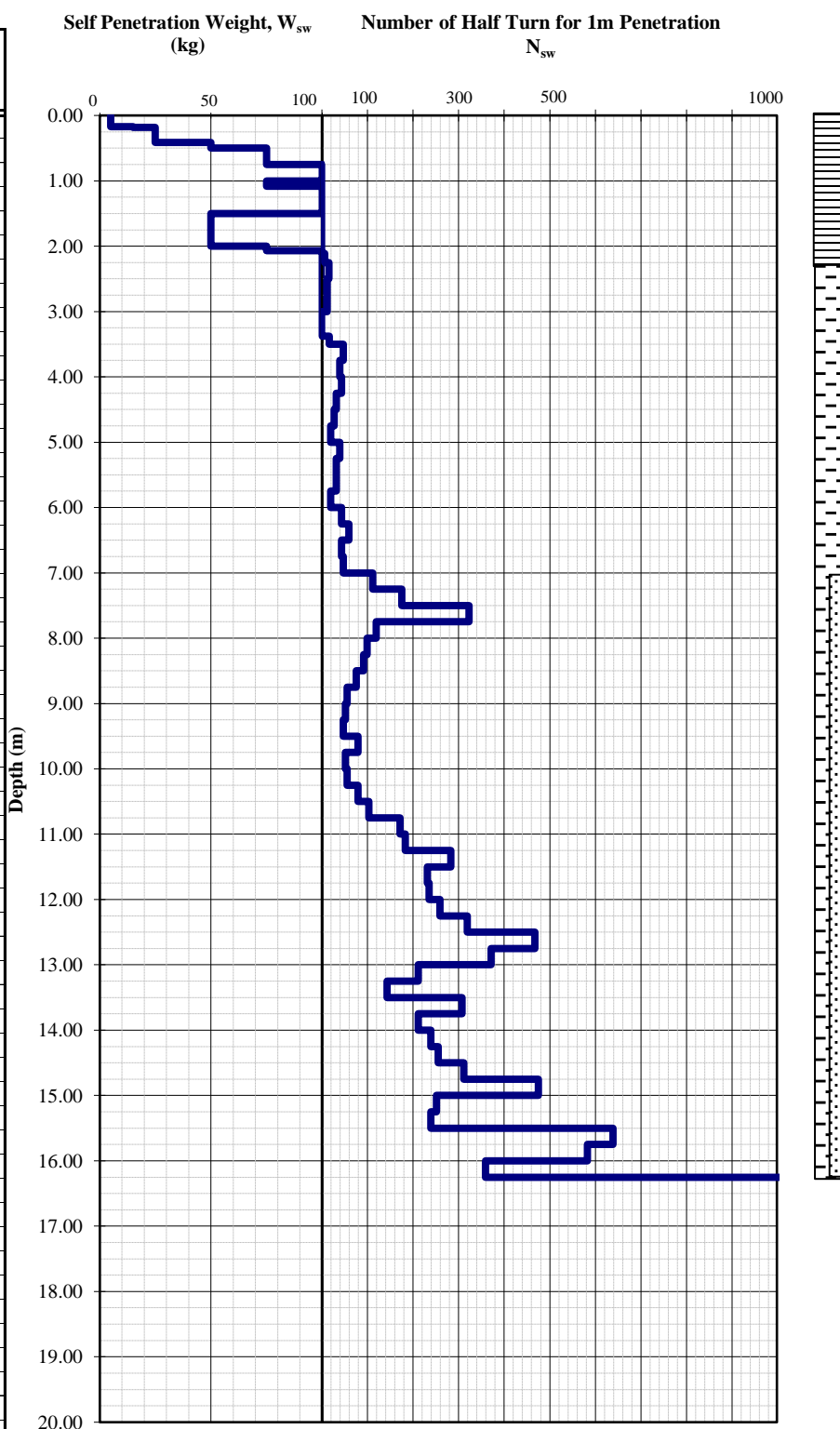
Ground Level : +1.87mMSL

Tested Date : 30-Sep-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.17	5	N.A.	17	N.A.
0.17 - 0.18	15	N.A.	1	N.A.
0.18 - 0.41	25	N.A.	23	N.A.
0.41 - 0.50	50	N.A.	9	N.A.
0.50 - 0.75	75	N.A.	25	N.A.
0.75 - 1.00	100	N.A.	25	N.A.
1.00 - 1.08	75	N.A.	8	N.A.
1.08 - 1.50	100	N.A.	42	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 2.07	75	N.A.	7	N.A.
2.07 - 2.11	100	N.A.	4	N.A.
2.11 - 2.25	100	1	14	7
2.25 - 2.50	100	4	25	16
2.50 - 2.75	100	3	25	12
2.75 - 3.00	100	3	25	12
3.00 - 3.38	100	N.A.	38	N.A.
3.38 - 3.50	100	2	12	17
3.50 - 3.75	100	12	25	48
3.75 - 4.00	100	10	25	40
4.00 - 4.25	100	11	25	44
4.25 - 4.50	100	8	25	32
4.50 - 4.75	100	7	25	28
4.75 - 5.00	100	5	25	20
5.00 - 5.25	100	10	25	40
5.25 - 5.50	100	8	25	32
5.50 - 5.75	100	8	25	32
5.75 - 6.00	100	5	25	20
6.00 - 6.25	100	11	25	44
6.25 - 6.50	100	15	25	60
6.50 - 6.75	100	11	25	44
6.75 - 7.00	100	12	25	48
7.00 - 7.25	100	28	25	112
7.25 - 7.50	100	44	25	176
7.50 - 7.75	100	81	25	324
7.75 - 8.00	100	30	25	120
8.00 - 8.25	100	25	25	100
8.25 - 8.50	100	23	25	92
8.50 - 8.75	100	19	25	76
8.75 - 9.00	100	14	25	56
9.00 - 9.25	100	13	25	52
9.25 - 9.50	100	12	25	48
9.50 - 9.75	100	20	25	80
9.75 - 10.00	100	13	25	52
10.00 - 10.25	100	14	25	56
10.25 - 10.50	100	20	25	80
10.50 - 10.75	100	26	25	104
10.75 - 11.00	100	43	25	172
11.00 - 11.25	100	46	25	184
11.25 - 11.50	100	71	25	284
11.50 - 11.75	100	58	25	232
11.75 - 12.00	100	59	25	236
12.00 - 12.25	100	65	25	260
12.25 - 12.50	100	80	25	320
12.50 - 12.75	100	117	25	468
12.75 - 13.00	100	93	25	372
13.00 - 13.25	100	53	25	212
13.25 - 13.50	100	36	25	144
13.50 - 13.75	100	77	25	308
13.75 - 14.00	100	53	25	212
14.00 - 14.25	100	60	25	240
14.25 - 14.50	100	64	25	256
14.50 - 14.75	100	78	25	312
14.75 - 15.00	100	119	25	476
15.00 - 15.25	100	63	25	252
15.25 - 15.50	100	60	25	240
15.50 - 15.75	100	160	25	640
15.75 - 16.00	100	146	25	584
16.00 - 16.25	100	90	25	360
16.25 - 16.28	100	50	3	1667







## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-12a-12a

Location : N 2400505.14: E 383269.33

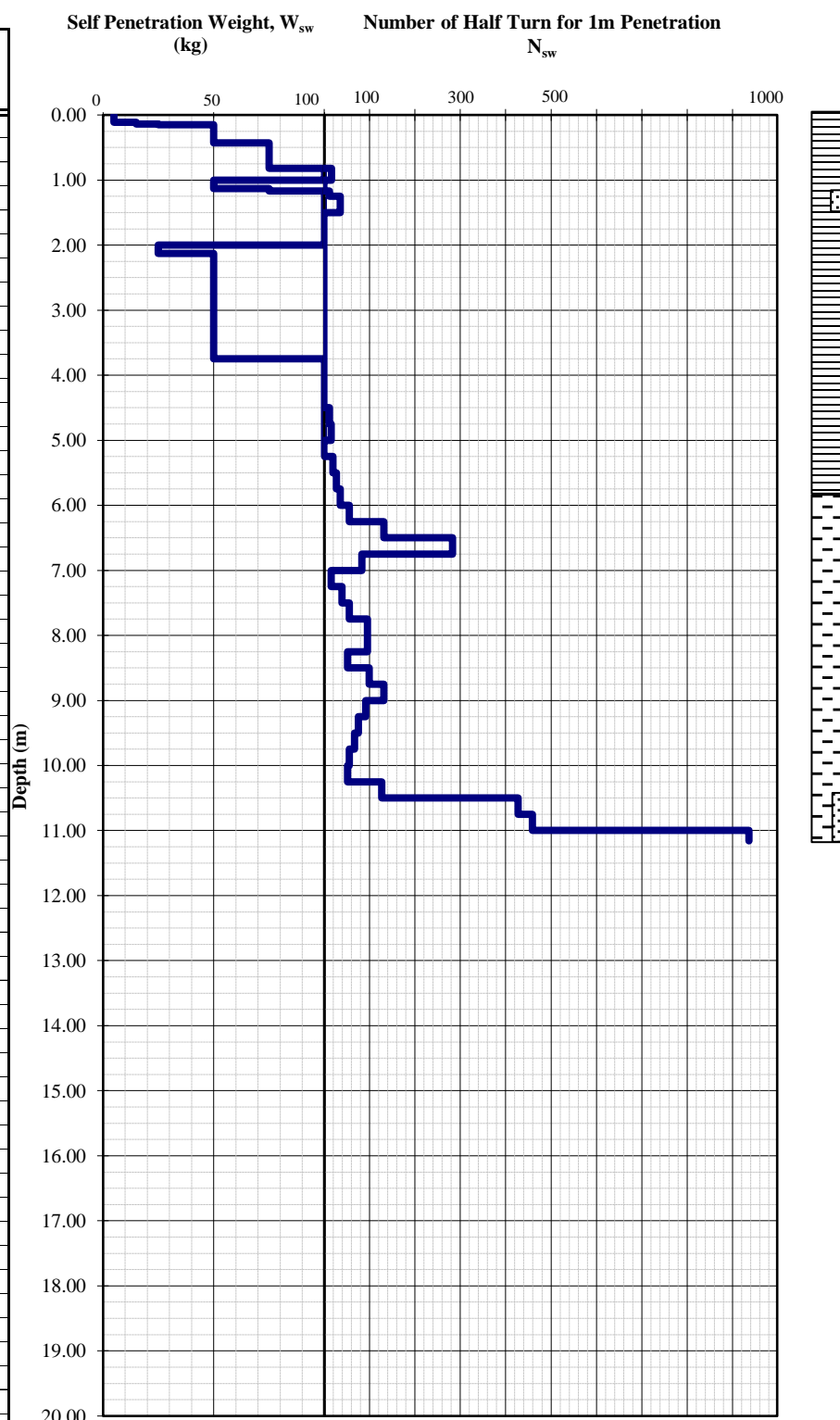
Ground Level : +1.54mMSL

Tested Date : 31-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.11	5	N.A.	11	N.A.
0.11 - 0.14	15	N.A.	3	N.A.
0.14 - 0.15	25	N.A.	1	N.A.
0.15 - 0.43	50	N.A.	28	N.A.
0.43 - 0.82	75	N.A.	39	N.A.
0.82 - 0.82	100	N.A.	0	N.A.
0.82 - 1.00	100	3	18	17
1.00 - 1.00	100	N.A.	0	N.A.
1.00 - 1.13	50	N.A.	13	N.A.
1.13 - 1.17	75	N.A.	4	N.A.
1.17 - 1.17	100	N.A.	0	N.A.
1.17 - 1.25	100	1	8	13
1.25 - 1.50	100	9	25	36
1.50 - 2.00	100	N.A.	50	N.A.
2.00 - 2.00	50	N.A.	0	N.A.
2.00 - 2.13	25	N.A.	13	N.A.
2.13 - 2.50	50	N.A.	37	N.A.
2.50 - 3.00	50	N.A.	50	N.A.
3.00 - 3.25	50	N.A.	25	N.A.
3.25 - 3.50	50	N.A.	25	N.A.
3.50 - 3.75	50	N.A.	25	N.A.
3.75 - 4.00	100	N.A.	25	N.A.
4.00 - 4.50	100	N.A.	50	N.A.
4.50 - 4.75	100	3	25	12
4.75 - 5.00	100	4	25	16
5.00 - 5.25	100	N.A.	25	N.A.
5.25 - 5.50	100	5	25	20
5.50 - 5.75	100	7	25	28
5.75 - 6.00	100	9	25	36
6.00 - 6.25	100	14	25	56
6.25 - 6.50	100	33	25	132
6.50 - 6.75	100	71	25	284
6.75 - 7.00	100	21	25	84
7.00 - 7.25	100	4	25	16
7.25 - 7.50	100	10	25	40
7.50 - 7.75	100	14	25	56
7.75 - 8.00	100	24	25	96
8.00 - 8.25	100	24	25	96
8.25 - 8.50	100	13	25	52
8.50 - 8.75	100	25	25	100
8.75 - 9.00	100	33	25	132
9.00 - 9.25	100	23	25	92
9.25 - 9.50	100	19	25	76
9.50 - 9.75	100	17	25	68
9.75 - 10.00	100	14	25	56
10.00 - 10.25	100	13	25	52
10.25 - 10.50	100	32	25	128
10.50 - 10.75	100	107	25	428
10.75 - 11.00	100	115	25	460
11.00 - 11.16	100	150	16	937
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## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. : -

Test No. : SW-14-15

Location : N : 2399922.10 E : 383742.37

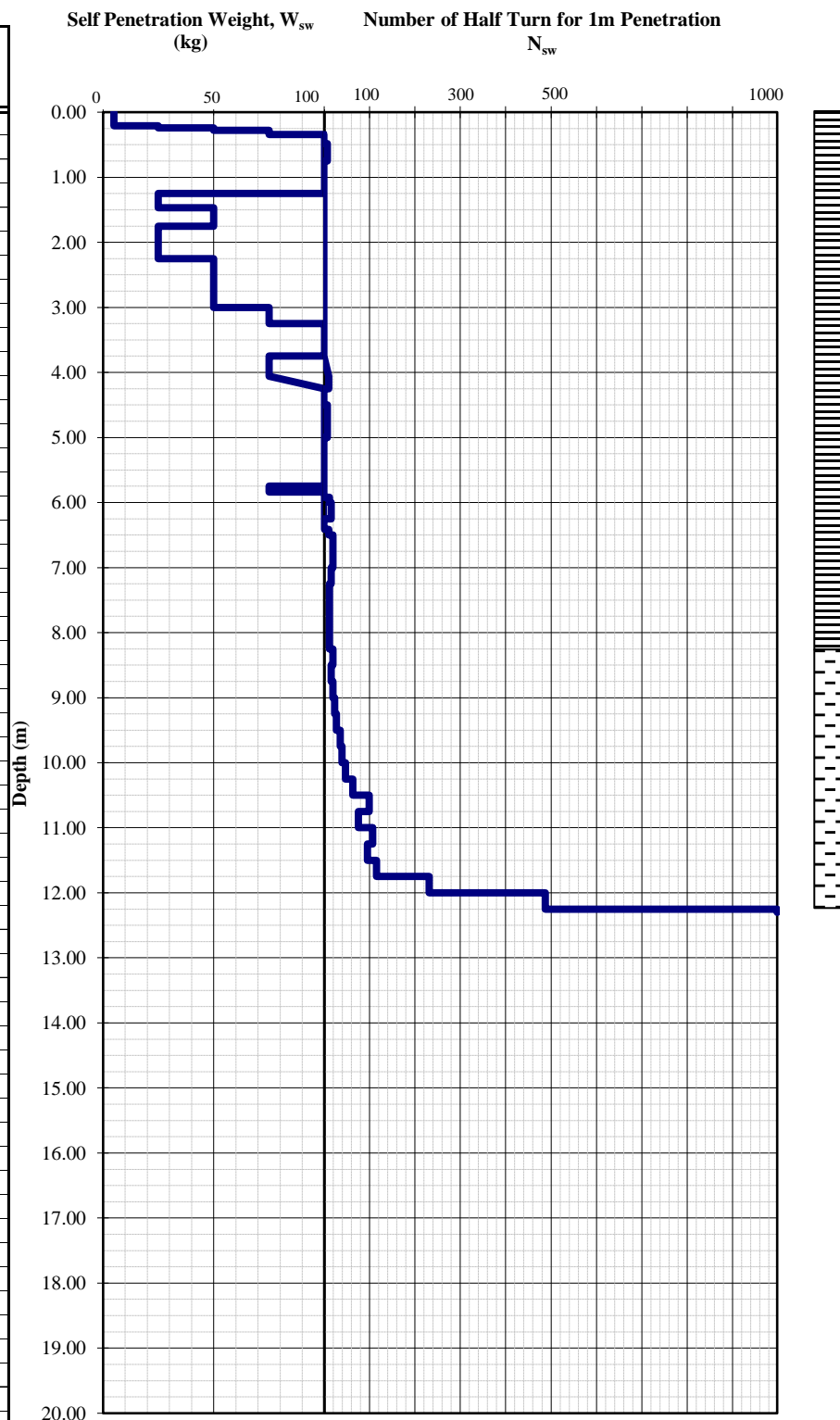
Ground Level : +1.19mMSL

Tested Date : 25-Sep-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.21	5	N.A.	21	N.A.
0.21 - 0.21	15	N.A.	0	N.A.
0.21 - 0.24	25	N.A.	3	N.A.
0.24 - 0.28	50	N.A.	4	N.A.
0.28 - 0.34	75	N.A.	6	N.A.
0.34 - 0.48	100	N.A.	14	N.A.
0.48 - 0.75	100	2	27	7
0.75 - 1.25	100	N.A.	50	N.A.
1.25 - 1.47	25	N.A.	22	N.A.
1.47 - 1.75	50	N.A.	28	N.A.
1.75 - 2.25	25	N.A.	50	N.A.
2.25 - 3.00	50	N.A.	75	N.A.
3.00 - 3.25	75	N.A.	25	N.A.
3.25 - 3.75	100	N.A.	50	N.A.
3.75 - 4.06	75	N.A.	31	N.A.
4.06 - 4.25	100	2	19	11
4.25 - 4.50	100	N.A.	25	N.A.
4.50 - 4.75	100	2	25	8
4.75 - 5.00	100	2	25	8
5.00 - 5.75	100	N.A.	75	N.A.
5.75 - 5.84	75	N.A.	9	N.A.
5.84 - 5.92	100	N.A.	8	N.A.
5.92 - 6.00	100	1	8	13
6.00 - 6.25	100	4	25	16
6.25 - 6.41	100	N.A.	16	N.A.
6.41 - 6.50	100	1	9	11
6.50 - 6.75	100	5	25	20
6.75 - 7.00	100	5	25	20
7.00 - 7.25	100	4	25	16
7.25 - 7.50	100	3	25	12
7.50 - 7.75	100	3	25	12
7.75 - 8.00	100	3	25	12
8.00 - 8.25	100	3	25	12
8.25 - 8.50	100	5	25	20
8.50 - 8.75	100	4	25	16
8.75 - 9.00	100	5	25	20
9.00 - 9.25	100	6	25	24
9.25 - 9.50	100	7	25	28
9.50 - 9.75	100	9	25	36
9.75 - 10.00	100	10	25	40
10.00 - 10.25	100	12	25	48
10.25 - 10.50	100	16	25	64
10.50 - 10.75	100	25	25	100
10.75 - 11.00	100	19	25	76
11.00 - 11.25	100	27	25	108
11.25 - 11.50	100	24	25	96
11.50 - 11.75	100	29	25	116
11.75 - 12.00	100	58	25	232
12.00 - 12.25	100	122	25	488
12.25 - 12.30	100	50	5	1000
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## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-16-14

Location : N : 2400120.13 E : 384024.51

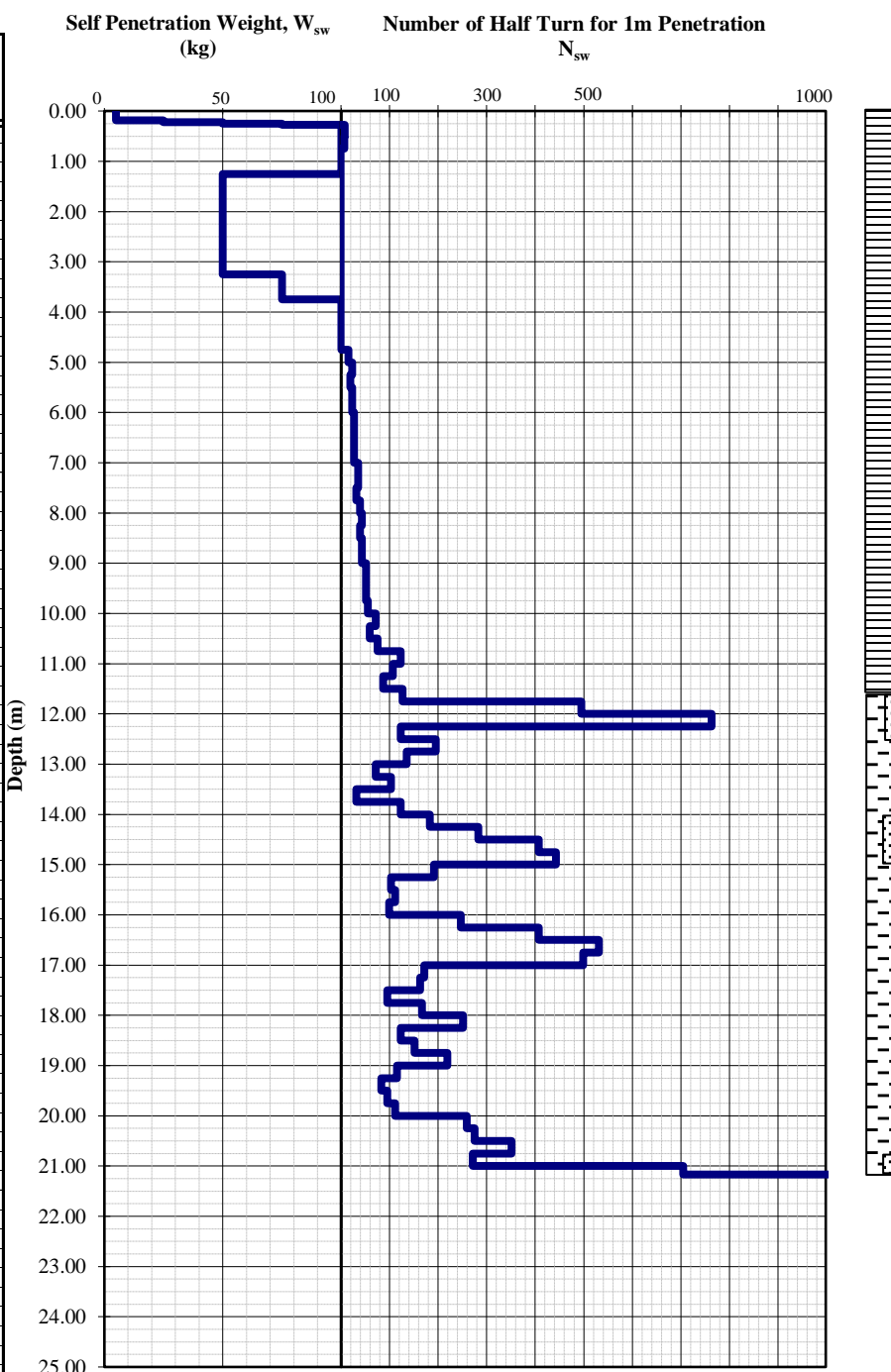
Ground Level : +1.11mMSL

Tested Date : 22-Sep-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.18	5	N.A.	18	N.A.
0.18 - 0.18	15	N.A.	0	N.A.
0.18 - 0.22	25	N.A.	4	N.A.
0.22 - 0.25	50	N.A.	3	N.A.
0.25 - 0.27	75	N.A.	2	N.A.
0.27 - 0.27	100	N.A.	0	N.A.
0.27 - 0.50	100	2	23	9
0.50 - 0.75	100	2	25	8
0.75 - 1.25	100	N.A.	50	N.A.
1.25 - 3.25	50	N.A.	200	N.A.
3.25 - 3.75	75	N.A.	50	N.A.
3.75 - 4.75	100	N.A.	100	N.A.
4.75 - 5.00	100	4	25	16
5.00 - 5.25	100	6	25	24
5.25 - 5.50	100	5	25	20
5.50 - 5.75	100	6	25	24
5.75 - 6.00	100	6	25	24
6.00 - 6.25	100	7	25	28
6.25 - 6.50	100	7	25	28
6.50 - 6.75	100	7	25	28
6.75 - 7.00	100	7	25	28
7.00 - 7.25	100	9	25	36
7.25 - 7.50	100	9	25	36
7.50 - 7.75	100	8	25	32
7.75 - 8.00	100	10	25	40
8.00 - 8.25	100	11	25	44
8.25 - 8.50	100	10	25	40
8.50 - 8.75	100	11	25	44
8.75 - 9.00	100	11	25	44
9.00 - 9.25	100	13	25	52
9.25 - 9.50	100	13	25	52
9.50 - 9.75	100	13	25	52
9.75 - 10.00	100	14	25	56
10.00 - 10.25	100	18	25	72
10.25 - 10.50	100	15	25	60
10.50 - 10.75	100	19	25	76
10.75 - 11.00	100	31	25	124
11.00 - 11.25	100	27	25	108
11.25 - 11.50	100	22	25	88
11.50 - 11.75	100	32	25	128
11.75 - 12.00	100	124	25	496
12.00 - 12.25	100	191	25	764
12.25 - 12.50	100	31	25	124
12.50 - 12.75	100	49	25	196
12.75 - 13.00	100	34	25	136
13.00 - 13.25	100	18	25	72
13.25 - 13.50	100	26	25	104
13.50 - 13.75	100	8	25	32
13.75 - 14.00	100	31	25	124
14.00 - 14.25	100	46	25	184
14.25 - 14.50	100	71	25	284
14.50 - 14.75	100	102	25	408
14.75 - 15.00	100	111	25	444
15.00 - 15.25	100	48	25	192
15.25 - 15.50	100	26	25	104
15.50 - 15.75	100	28	25	112
15.75 - 16.00	100	25	25	100
16.00 - 16.25	100	62	25	248
16.25 - 16.50	100	102	25	408
16.50 - 16.75	100	133	25	532
16.75 - 17.00	100	125	25	500
17.00 - 17.25	100	43	25	172
17.25 - 17.50	100	41	25	164
17.50 - 17.75	100	24	25	96
17.75 - 18.00	100	42	25	168
18.00 - 18.25	100	63	25	252
18.25 - 18.50	100	31	25	124
18.50 - 18.75	100	38	25	152
18.75 - 19.00	100	55	25	220
19.00 - 19.25	100	29	25	116
19.25 - 19.50	100	21	25	84
19.50 - 19.75	100	24	25	96
19.75 - 20.00	100	28	25	112
20.00 - 20.25	100	65	25	260
20.25 - 20.50	100	69	25	276
20.50 - 20.75	100	88	25	352
20.75 - 21.00	100	68	25	272
21.00 - 21.17	100	120	17	706
21.17 - 21.20	100	50	3	1667
-				





## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :           

Test No. : SW-16-15

Location : N : 2399918.38 E : 384020.89

Ground Level : +1.21mMSL

Tested Date : 3-Oct-14

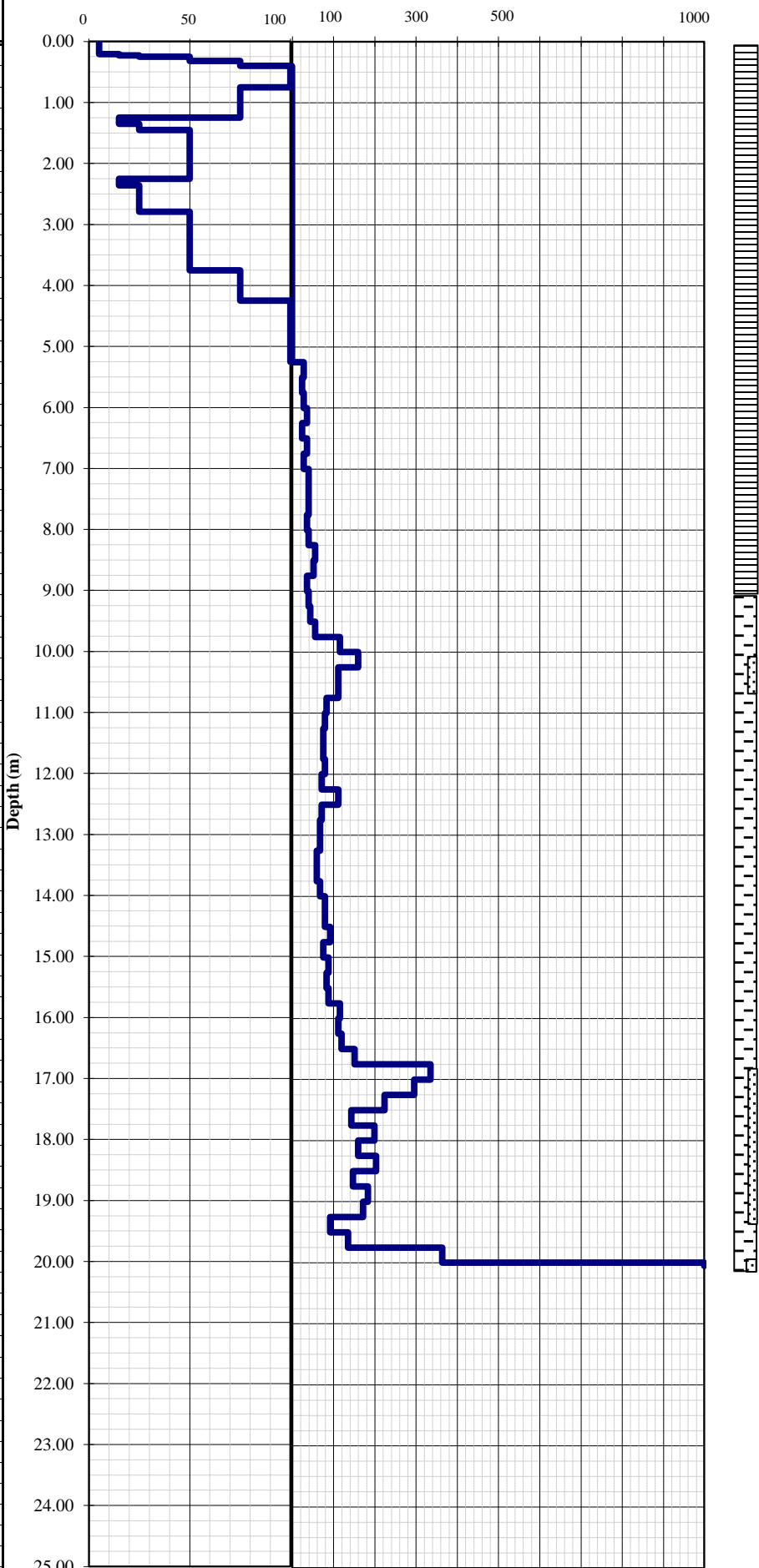
Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Self Penetration Weight,  $W_{sw}$   
(kg)

Number of Half Turn for 1m Penetration  
 $N_{sw}$

Depth (m)	$W_{sw}$ (kg)	Nos of Half-Turns, $N_a$	Penetration, L (cm)	Nos of Half-Turns/m, $N_{sw}$
0.00 - 0.21	5	N.A.	21	N.A.
0.21 - 0.23	15	N.A.	2	N.A.
0.23 - 0.25	25	N.A.	2	N.A.
0.25 - 0.32	50	N.A.	7	N.A.
0.32 - 0.40	75	N.A.	8	N.A.
0.40 - 0.75	100	N.A.	35	N.A.
0.75 - 1.25	75	N.A.	50	N.A.
1.25 - 1.35	15	N.A.	10	N.A.
1.35 - 1.45	25	N.A.	10	N.A.
1.45 - 1.75	50	N.A.	30	N.A.
1.75 - 2.25	50	N.A.	50	N.A.
2.25 - 2.36	15	N.A.	11	N.A.
2.36 - 2.75	25	N.A.	39	N.A.
2.75 - 2.79	25	N.A.	4	N.A.
2.79 - 3.25	50	N.A.	46	N.A.
3.25 - 3.75	50	N.A.	50	N.A.
3.75 - 4.25	75	N.A.	50	N.A.
4.25 - 4.75	100	N.A.	50	N.A.
4.75 - 5.25	100	N.A.	50	N.A.
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	6	25	24
5.75 - 6.00	100	7	25	28
6.00 - 6.25	100	9	25	36
6.25 - 6.50	100	6	25	24
6.50 - 6.75	100	9	25	36
6.75 - 7.00	100	7	25	28
7.00 - 7.25	100	10	25	40
7.25 - 7.50	100	10	25	40
7.50 - 7.75	100	10	25	40
7.75 - 8.00	100	9	25	36
8.00 - 8.25	100	10	25	40
8.25 - 8.50	100	14	25	56
8.50 - 8.75	100	13	25	52
8.75 - 9.00	100	9	25	36
9.00 - 9.25	100	10	25	40
9.25 - 9.50	100	11	25	44
9.50 - 9.75	100	14	25	56
9.75 - 10.00	100	29	25	116
10.00 - 10.25	100	40	25	160
10.25 - 10.50	100	28	25	112
10.50 - 10.75	100	28	25	112
10.75 - 11.00	100	21	25	84
11.00 - 11.25	100	20	25	80
11.25 - 11.50	100	19	25	76
11.50 - 11.75	100	19	25	76
11.75 - 12.00	100	20	25	80
12.00 - 12.25	100	18	25	72
12.25 - 12.50	100	28	25	112
12.50 - 12.75	100	18	25	72
12.75 - 13.00	100	17	25	68
13.00 - 13.25	100	17	25	68
13.25 - 13.50	100	15	25	60
13.50 - 13.75	100	15	25	60
13.75 - 14.00	100	17	25	68
14.00 - 14.25	100	20	25	80
14.25 - 14.50	100	20	25	80
14.50 - 14.75	100	23	25	92
14.75 - 15.00	100	19	25	76
15.00 - 15.25	100	22	25	88
15.25 - 15.50	100	21	25	84
15.50 - 15.75	100	22	25	88
15.75 - 16.00	100	29	25	116
16.00 - 16.25	100	28	25	112
16.25 - 16.50	100	30	25	120
16.50 - 16.75	100	38	25	152
16.75 - 17.00	100	84	25	336
17.00 - 17.25	100	74	25	296
17.25 - 17.50	100	56	25	224
17.50 - 17.75	100	36	25	144
17.75 - 18.00	100	50	25	200
18.00 - 18.25	100	40	25	160
18.25 - 18.50	100	51	25	204
18.50 - 18.75	100	37	25	148
18.75 - 19.00	100	46	25	184
19.00 - 19.25	100	43	25	172
19.25 - 19.50	100	23	25	92
19.50 - 19.75	100	34	25	136
19.75 - 20.00	100	91	25	364
20.00 - 20.05	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-16-17

Location : N : 2399681.52 E : 384023.40

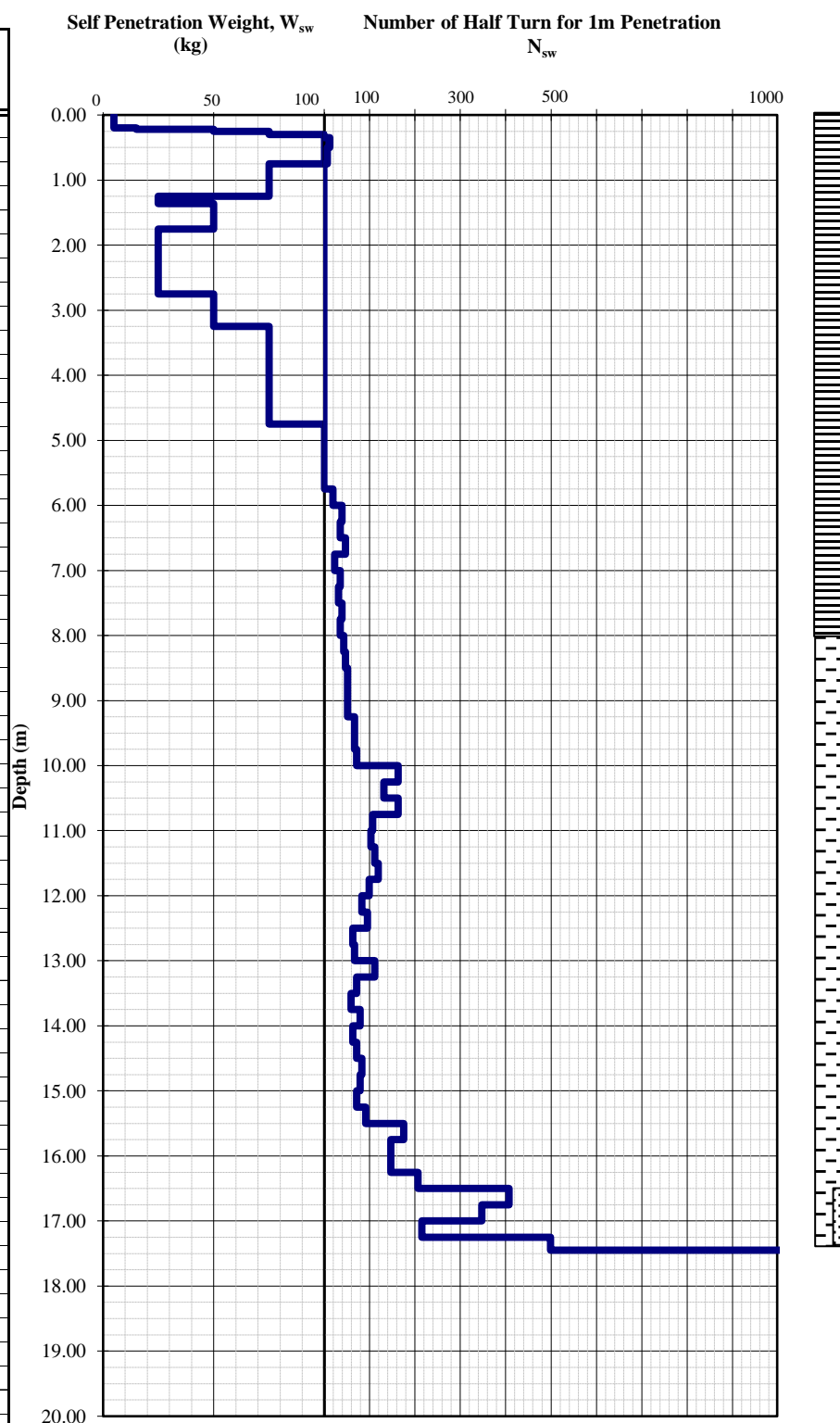
Ground Level : +1.08mMSL

Tested Date : 3-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.20	5	N.A.	20	N.A.
0.20 - 0.22	15	N.A.	2	N.A.
0.22 - 0.22	25	N.A.	0	N.A.
0.22 - 0.25	50	N.A.	3	N.A.
0.25 - 0.30	75	N.A.	5	N.A.
0.30 - 0.35	100	N.A.	5	N.A.
0.35 - 0.50	100	2	15	13
0.50 - 0.75	100	2	25	8
0.75 - 0.75	100	N.A.	0	N.A.
0.75 - 1.25	75	N.A.	50	N.A.
1.25 - 1.36	25	N.A.	11	N.A.
1.36 - 1.75	50	N.A.	39	N.A.
1.75 - 2.25	25	N.A.	50	N.A.
2.25 - 2.75	25	N.A.	50	N.A.
2.75 - 2.95	50	N.A.	20	N.A.
2.95 - 3.25	50	N.A.	30	N.A.
3.25 - 3.75	75	N.A.	50	N.A.
3.75 - 4.25	75	N.A.	50	N.A.
4.25 - 4.75	75	N.A.	50	N.A.
4.75 - 5.25	100	N.A.	50	N.A.
5.25 - 5.75	100	N.A.	50	N.A.
5.75 - 6.00	100	5	25	20
6.00 - 6.25	100	10	25	40
6.25 - 6.50	100	9	25	36
6.50 - 6.75	100	12	25	48
6.75 - 7.00	100	6	25	24
7.00 - 7.25	100	9	25	36
7.25 - 7.50	100	8	25	32
7.50 - 7.75	100	10	25	40
7.75 - 8.00	100	9	25	36
8.00 - 8.25	100	11	25	44
8.25 - 8.50	100	12	25	48
8.50 - 8.75	100	13	25	52
8.75 - 9.00	100	13	25	52
9.00 - 9.25	100	13	25	52
9.25 - 9.50	100	17	25	68
9.50 - 9.75	100	17	25	68
9.75 - 10.00	100	18	25	72
10.00 - 10.25	100	41	25	164
10.25 - 10.50	100	33	25	132
10.50 - 10.75	100	41	25	164
10.75 - 11.00	100	27	25	108
11.00 - 11.25	100	26	25	104
11.25 - 11.50	100	28	25	112
11.50 - 11.75	100	30	25	120
11.75 - 12.00	100	25	25	100
12.00 - 12.25	100	21	25	84
12.25 - 12.50	100	24	25	96
12.50 - 12.75	100	16	25	64
12.75 - 13.00	100	17	25	68
13.00 - 13.25	100	28	25	112
13.25 - 13.50	100	18	25	72
13.50 - 13.75	100	15	25	60
13.75 - 14.00	100	20	25	80
14.00 - 14.25	100	16	25	64
14.25 - 14.50	100	18	25	72
14.50 - 14.75	100	21	25	84
14.75 - 15.00	100	20	25	80
15.00 - 15.25	100	18	25	72
15.25 - 15.50	100	23	25	92
15.50 - 15.75	100	44	25	176
15.75 - 16.00	100	37	25	148
16.00 - 16.25	100	37	25	148
16.25 - 16.50	100	52	25	208
16.50 - 16.75	100	102	25	408
16.75 - 17.00	100	87	25	348
17.00 - 17.25	100	54	25	216
17.25 - 17.45	100	100	20	500
17.45 - 17.48	100	50	3	1667



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-17-14

Location : N : 2400120.00 E : 384179.12

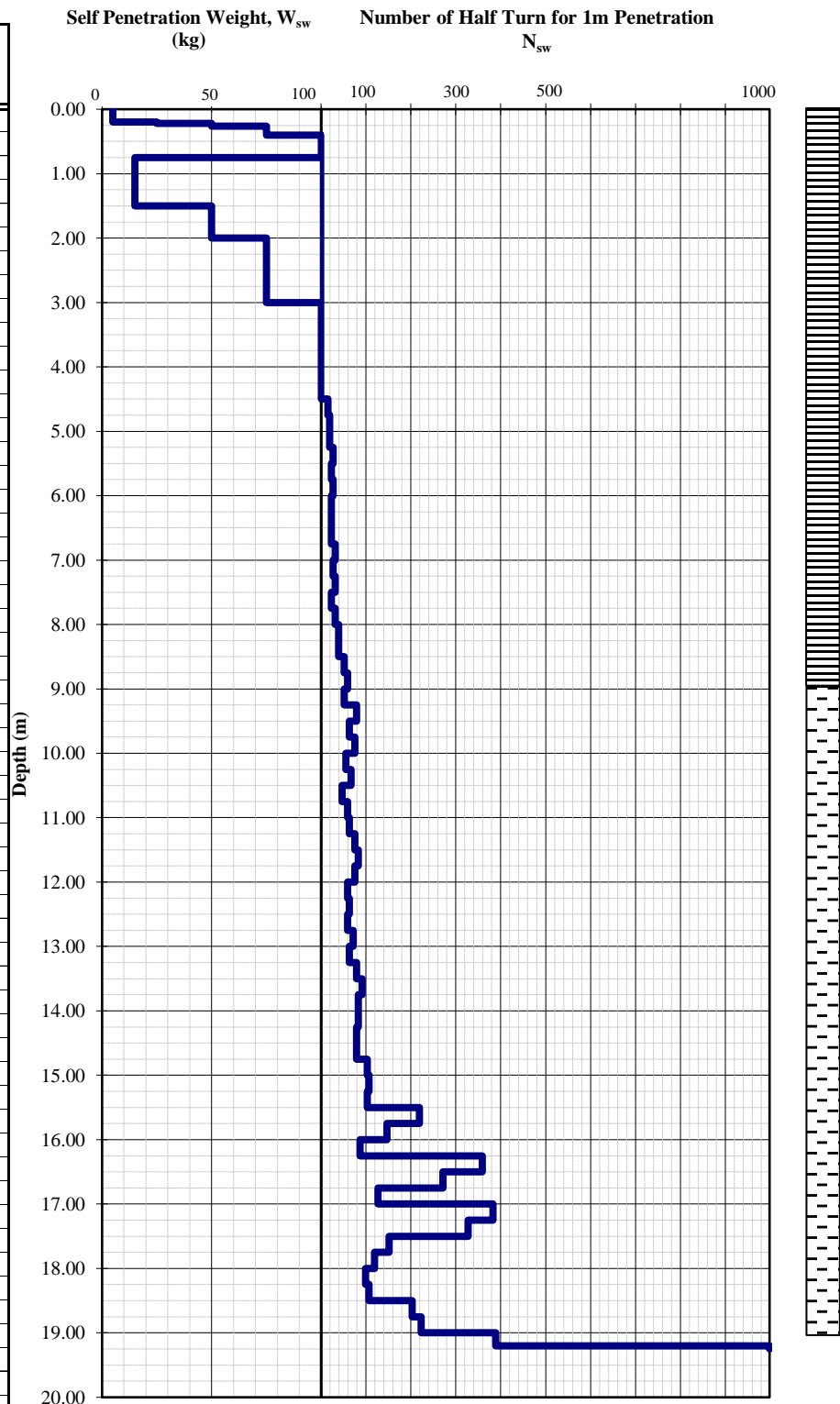
Ground Level : +0.82mMSL

Tested Date : 20-Sep-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.20	5	N.A.	20	N.A.
0.20 - 0.20	15	N.A.	0	N.A.
0.20 - 0.22	25	N.A.	2	N.A.
0.22 - 0.26	50	N.A.	4	N.A.
0.26 - 0.40	75	N.A.	14	N.A.
0.40 - 0.75	100	N.A.	35	N.A.
0.75 - 1.50	15	N.A.	75	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 3.00	75	N.A.	100	N.A.
3.00 - 4.50	100	N.A.	150	N.A.
4.50 - 4.75	100	4	25	16
4.75 - 5.00	100	5	25	20
5.00 - 5.25	100	5	25	20
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	6	25	24
5.75 - 6.00	100	7	25	28
6.00 - 6.25	100	6	25	24
6.25 - 6.50	100	6	25	24
6.50 - 6.75	100	6	25	24
6.75 - 7.00	100	8	25	32
7.00 - 7.25	100	7	25	28
7.25 - 7.50	100	8	25	32
7.50 - 7.75	100	6	25	24
7.75 - 8.00	100	8	25	32
8.00 - 8.25	100	10	25	40
8.25 - 8.50	100	10	25	40
8.50 - 8.75	100	13	25	52
8.75 - 9.00	100	15	25	60
9.00 - 9.25	100	13	25	52
9.25 - 9.50	100	20	25	80
9.50 - 9.75	100	16	25	64
9.75 - 10.00	100	19	25	76
10.00 - 10.25	100	14	25	56
10.25 - 10.50	100	17	25	68
10.50 - 10.75	100	12	25	48
10.75 - 11.00	100	15	25	60
11.00 - 11.25	100	16	25	64
11.25 - 11.50	100	19	25	76
11.50 - 11.75	100	21	25	84
11.75 - 12.00	100	19	25	76
12.00 - 12.25	100	15	25	60
12.25 - 12.50	100	16	25	64
12.50 - 12.75	100	15	25	60
12.75 - 13.00	100	18	25	72
13.00 - 13.25	100	16	25	64
13.25 - 13.50	100	20	25	80
13.50 - 13.75	100	23	25	92
13.75 - 14.00	100	21	25	84
14.00 - 14.25	100	21	25	84
14.25 - 14.50	100	20	25	80
14.50 - 14.75	100	20	25	80
14.75 - 15.00	100	26	25	104
15.00 - 15.25	100	27	25	108
15.25 - 15.50	100	26	25	104
15.50 - 15.75	100	55	25	220
15.75 - 16.00	100	37	25	148
16.00 - 16.25	100	22	25	88
16.25 - 16.50	100	90	25	360
16.50 - 16.75	100	68	25	272
16.75 - 17.00	100	32	25	128
17.00 - 17.25	100	96	25	384
17.25 - 17.50	100	82	25	328
17.50 - 17.75	100	38	25	152
17.75 - 18.00	100	30	25	120
18.00 - 18.25	100	25	25	100
18.25 - 18.50	100	27	25	108
18.50 - 18.75	100	51	25	204
18.75 - 19.00	100	56	25	224
19.00 - 19.20	100	78	20	390
19.20 - 19.25	100	50	5	1000





## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. : -

Test No. : SW-18-12

Location : N :2400523.71 E : 384334.91

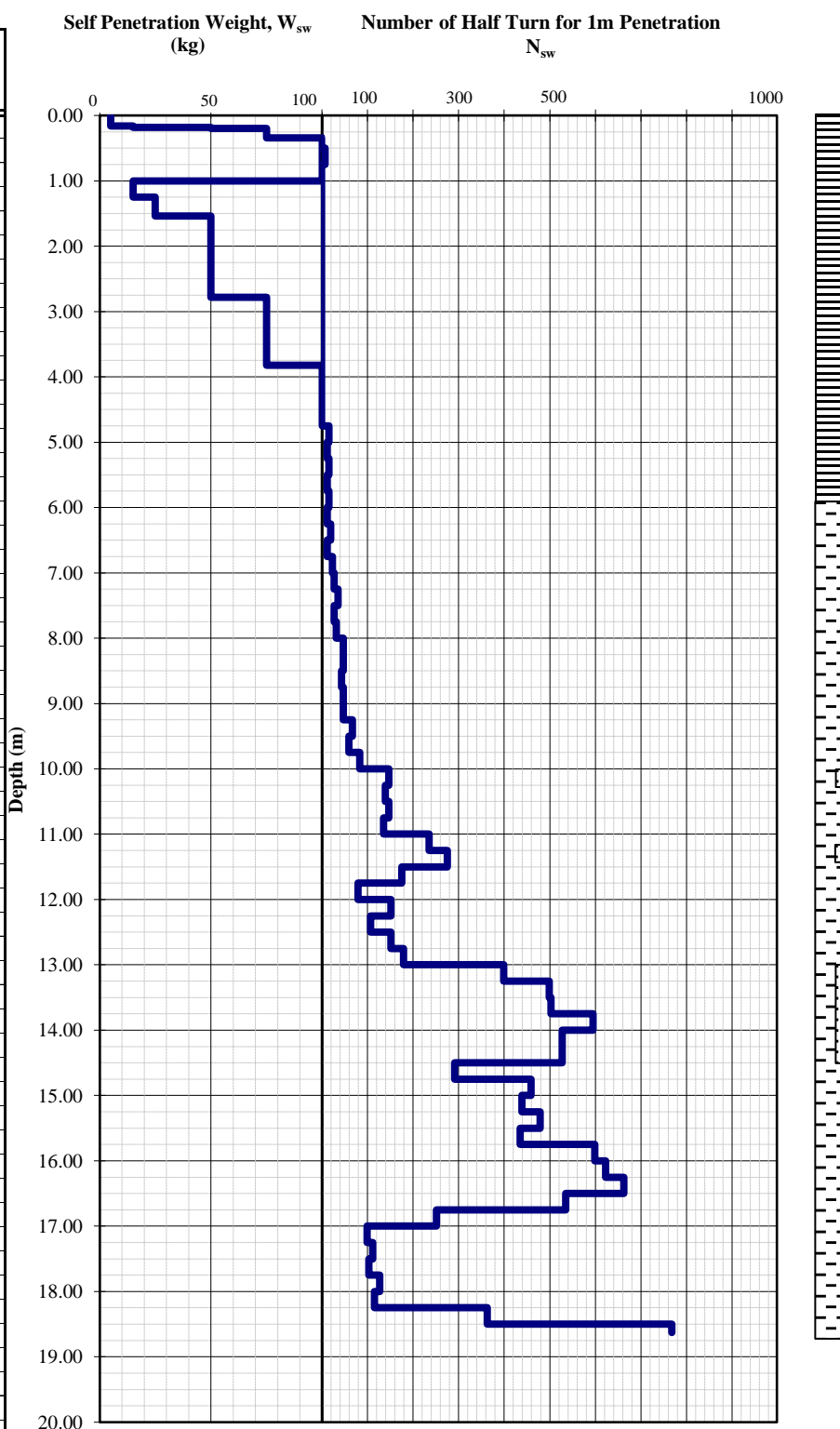
Ground Level : +1.04mMSL

Tested Date : 2014/10/20to2014/10/21

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.16	5	N.A.	16	N.A.
0.16 - 0.18	15	N.A.	2	N.A.
0.18 - 0.18	25	N.A.	0	N.A.
0.18 - 0.20	50	N.A.	2	N.A.
0.20 - 0.34	75	N.A.	14	N.A.
0.34 - 0.50	100	N.A.	16	N.A.
0.50 - 0.75	100	2	25	8
0.75 - 1.00	100	N.A.	25	N.A.
1.00 - 1.25	15	N.A.	25	N.A.
1.25 - 1.54	25	N.A.	29	N.A.
1.54 - 2.78	50	N.A.	124	N.A.
2.78 - 3.82	75	N.A.	104	N.A.
3.82 - 4.75	100	N.A.	93	N.A.
4.75 - 5.00	100	4	25	16
5.00 - 5.25	100	3	25	12
5.25 - 5.50	100	4	25	16
5.50 - 5.75	100	3	25	12
5.75 - 6.00	100	4	25	16
6.00 - 6.25	100	3	25	12
6.25 - 6.50	100	5	25	20
6.50 - 6.75	100	3	25	12
6.75 - 7.00	100	6	25	24
7.00 - 7.25	100	7	25	28
7.25 - 7.50	100	9	25	36
7.50 - 7.75	100	7	25	28
7.75 - 8.00	100	8	25	32
8.00 - 8.25	100	12	25	48
8.25 - 8.50	100	12	25	48
8.50 - 8.75	100	11	25	44
8.75 - 9.00	100	12	25	48
9.00 - 9.25	100	12	25	48
9.25 - 9.50	100	17	25	68
9.50 - 9.75	100	15	25	60
9.75 - 10.00	100	21	25	84
10.00 - 10.25	100	37	25	148
10.25 - 10.50	100	35	25	140
10.50 - 10.75	100	37	25	148
10.75 - 11.00	100	34	25	136
11.00 - 11.25	100	59	25	236
11.25 - 11.50	100	69	25	276
11.50 - 11.75	100	44	25	176
11.75 - 12.00	100	20	25	80
12.00 - 12.25	100	38	25	152
12.25 - 12.50	100	27	25	108
12.50 - 12.75	100	38	25	152
12.75 - 13.00	100	45	25	180
13.00 - 13.25	100	100	25	400
13.25 - 13.50	100	125	25	500
13.50 - 13.75	100	126	25	504
13.75 - 14.00	100	149	25	596
14.00 - 14.25	100	132	25	528
14.25 - 14.50	100	132	25	528
14.50 - 14.75	100	73	25	292
14.75 - 15.00	100	115	25	460
15.00 - 15.25	100	110	25	440
15.25 - 15.50	100	120	25	480
15.50 - 15.75	100	109	25	436
15.75 - 16.00	100	150	25	600
16.00 - 16.25	100	156	25	624
16.25 - 16.50	100	166	25	664
16.50 - 16.75	100	134	25	536
16.75 - 17.00	100	63	25	252
17.00 - 17.25	100	25	25	100
17.25 - 17.50	100	28	25	112
17.50 - 17.75	100	26	25	104
17.75 - 18.00	100	32	25	128
18.00 - 18.25	100	29	25	116
18.25 - 18.50	100	91	25	364
18.50 - 18.63	100	100	13	769
-				
-				
-				
-				
-				



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-18-13

Location : N : 2400358.21 E : 384337.66

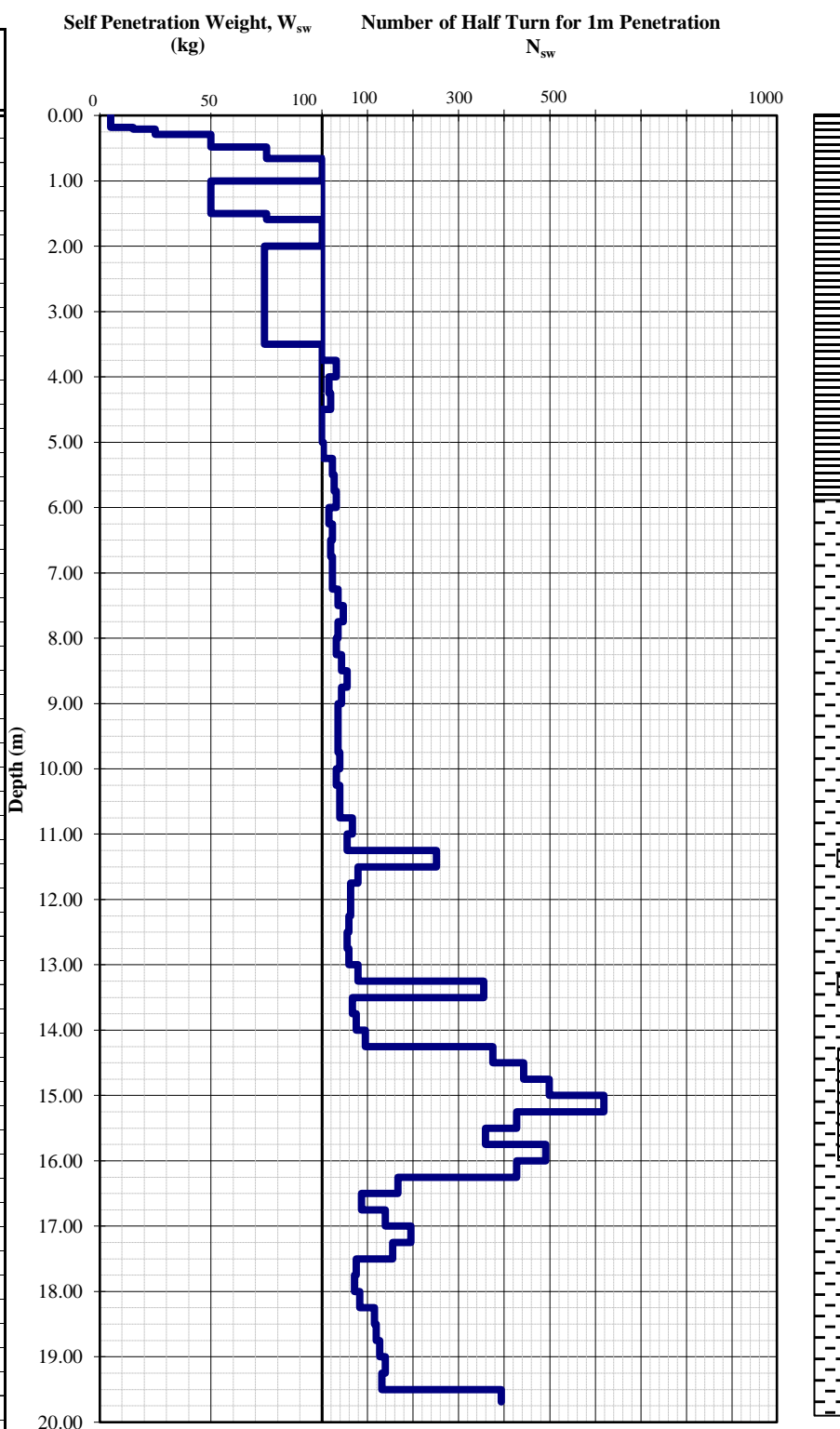
Ground Level : +0.90mMSL

Tested Date : 2014/10/19to2014/10/20

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.18	5	N.A.	18	N.A.
0.18 - 0.21	15	N.A.	3	N.A.
0.21 - 0.29	25	N.A.	8	N.A.
0.29 - 0.48	50	N.A.	19	N.A.
0.48 - 0.66	75	N.A.	18	N.A.
0.66 - 1.00	100	N.A.	34	N.A.
1.00 - 1.50	50	N.A.	50	N.A.
1.50 - 1.59	75	N.A.	9	N.A.
1.59 - 2.00	100	N.A.	41	N.A.
2.00 - 3.50	74	N.A.	150	N.A.
3.50 - 3.75	100	N.A.	25	N.A.
3.75 - 4.00	100	8	25	32
4.00 - 4.25	100	4	25	16
4.25 - 4.50	100	5	25	20
4.50 - 5.00	100	N.A.	50	N.A.
5.00 - 5.25	100	1	25	4
5.25 - 5.50	100	6	25	24
5.50 - 5.75	100	7	25	28
5.75 - 6.00	100	8	25	32
6.00 - 6.25	100	4	25	16
6.25 - 6.50	100	6	25	24
6.50 - 6.75	100	5	25	20
6.75 - 7.00	100	6	25	24
7.00 - 7.25	100	6	25	24
7.25 - 7.50	100	9	25	36
7.50 - 7.75	100	12	25	48
7.75 - 8.00	100	9	25	36
8.00 - 8.25	100	8	25	32
8.25 - 8.50	100	11	25	44
8.50 - 8.75	100	14	25	56
8.75 - 9.00	100	11	25	44
9.00 - 9.25	100	9	25	36
9.25 - 9.50	100	9	25	36
9.50 - 9.75	100	9	25	36
9.75 - 10.00	100	10	25	40
10.00 - 10.25	100	8	25	32
10.25 - 10.50	100	10	25	40
10.50 - 10.75	100	10	25	40
10.75 - 11.00	100	17	25	68
11.00 - 11.25	100	14	25	56
11.25 - 11.50	100	63	25	252
11.50 - 11.75	100	20	25	80
11.75 - 12.00	100	16	25	64
12.00 - 12.25	100	16	25	64
12.25 - 12.50	100	15	25	60
12.50 - 12.75	100	14	25	56
12.75 - 13.00	100	15	25	60
13.00 - 13.25	100	20	25	80
13.25 - 13.50	100	89	25	356
13.50 - 13.75	100	17	25	68
13.75 - 14.00	100	19	25	76
14.00 - 14.25	100	24	25	96
14.25 - 14.50	100	94	25	376
14.50 - 14.75	100	111	25	444
14.75 - 15.00	100	125	25	500
15.00 - 15.25	100	155	25	620
15.25 - 15.50	100	107	25	428
15.50 - 15.75	100	90	25	360
15.75 - 16.00	100	123	25	492
16.00 - 16.25	100	107	25	428
16.25 - 16.50	100	42	25	168
16.50 - 16.75	100	22	25	88
16.75 - 17.00	100	35	25	140
17.00 - 17.25	100	49	25	196
17.25 - 17.50	100	39	25	156
17.50 - 17.75	100	19	25	76
17.75 - 18.00	100	18	25	72
18.00 - 18.25	100	21	25	84
18.25 - 18.50	100	29	25	116
18.50 - 18.75	100	30	25	120
18.75 - 19.00	100	32	25	128
19.00 - 19.25	100	35	25	140
19.25 - 19.50	100	33	25	132
19.50 - 19.69	100	75	19	395



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-18-14

Location : N : 2400120.17 E : 384337.61

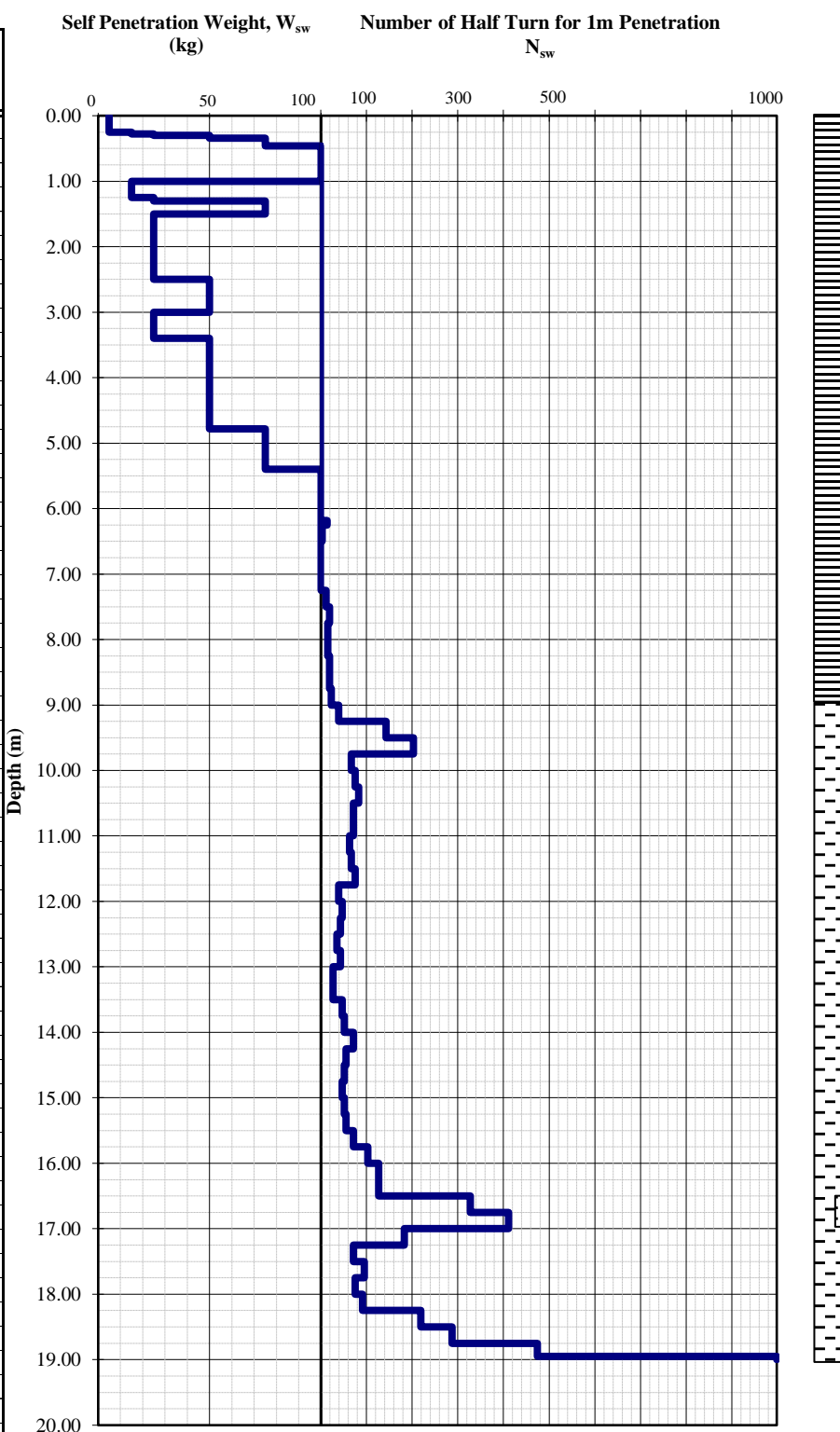
Ground Level : +0.84mMSL

Tested Date : 2014/9/19~9/20

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.25	5	N.A.	25	N.A.
0.25 - 0.28	15	N.A.	3	N.A.
0.28 - 0.30	25	N.A.	2	N.A.
0.30 - 0.34	50	N.A.	4	N.A.
0.34 - 0.46	75	N.A.	12	N.A.
0.46 - 1.00	100	N.A.	54	N.A.
1.00 - 1.25	15	N.A.	25	N.A.
1.25 - 1.30	25	N.A.	5	N.A.
1.30 - 1.50	75	N.A.	20	N.A.
1.50 - 2.50	25	N.A.	100	N.A.
2.50 - 3.00	50	N.A.	50	N.A.
3.00 - 3.40	25	N.A.	40	N.A.
3.40 - 4.78	50	N.A.	138	N.A.
4.78 - 5.40	75	N.A.	62	N.A.
5.40 - 6.18	100	N.A.	78	N.A.
6.18 - 6.25	100	1	7	14
6.25 - 6.50	100	1	25	4
6.50 - 7.00	100	N.A.	50	N.A.
7.00 - 7.25	100	N.A.	25	N.A.
7.25 - 7.50	100	3	25	12
7.50 - 7.75	100	5	25	20
7.75 - 8.00	100	4	25	16
8.00 - 8.25	100	4	25	16
8.25 - 8.50	100	5	25	20
8.50 - 8.75	100	5	25	20
8.75 - 9.00	100	6	25	24
9.00 - 9.25	100	10	25	40
9.25 - 9.50	100	36	25	144
9.50 - 9.75	100	51	25	204
9.75 - 10.00	100	17	25	68
10.00 - 10.25	100	19	25	76
10.25 - 10.50	100	21	25	84
10.50 - 10.75	100	18	25	72
10.75 - 11.00	100	18	25	72
11.00 - 11.25	100	16	25	64
11.25 - 11.50	100	17	25	68
11.50 - 11.75	100	19	25	76
11.75 - 12.00	100	10	25	40
12.00 - 12.25	100	12	25	48
12.25 - 12.50	100	11	25	44
12.50 - 12.75	100	9	25	36
12.75 - 13.00	100	11	25	44
13.00 - 13.25	100	7	25	28
13.25 - 13.50	100	7	25	28
13.50 - 13.75	100	12	25	48
13.75 - 14.00	100	13	25	52
14.00 - 14.25	100	18	25	72
14.25 - 14.50	100	14	25	56
14.50 - 14.75	100	13	25	52
14.75 - 15.00	100	12	25	48
15.00 - 15.25	100	13	25	52
15.25 - 15.50	100	14	25	56
15.50 - 15.75	100	18	25	72
15.75 - 16.00	100	26	25	104
16.00 - 16.25	100	32	25	128
16.25 - 16.50	100	32	25	128
16.50 - 16.75	100	82	25	328
16.75 - 17.00	100	103	25	412
17.00 - 17.25	100	46	25	184
17.25 - 17.50	100	18	25	72
17.50 - 17.75	100	24	25	96
17.75 - 18.00	100	19	25	76
18.00 - 18.25	100	23	25	92
18.25 - 18.50	100	55	25	220
18.50 - 18.75	100	72	25	288
18.75 - 18.95	100	95	20	475
18.95 - 19.00	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :           

Test No. : SW-18-15

Location : N : 2399919.02 E :384338.04

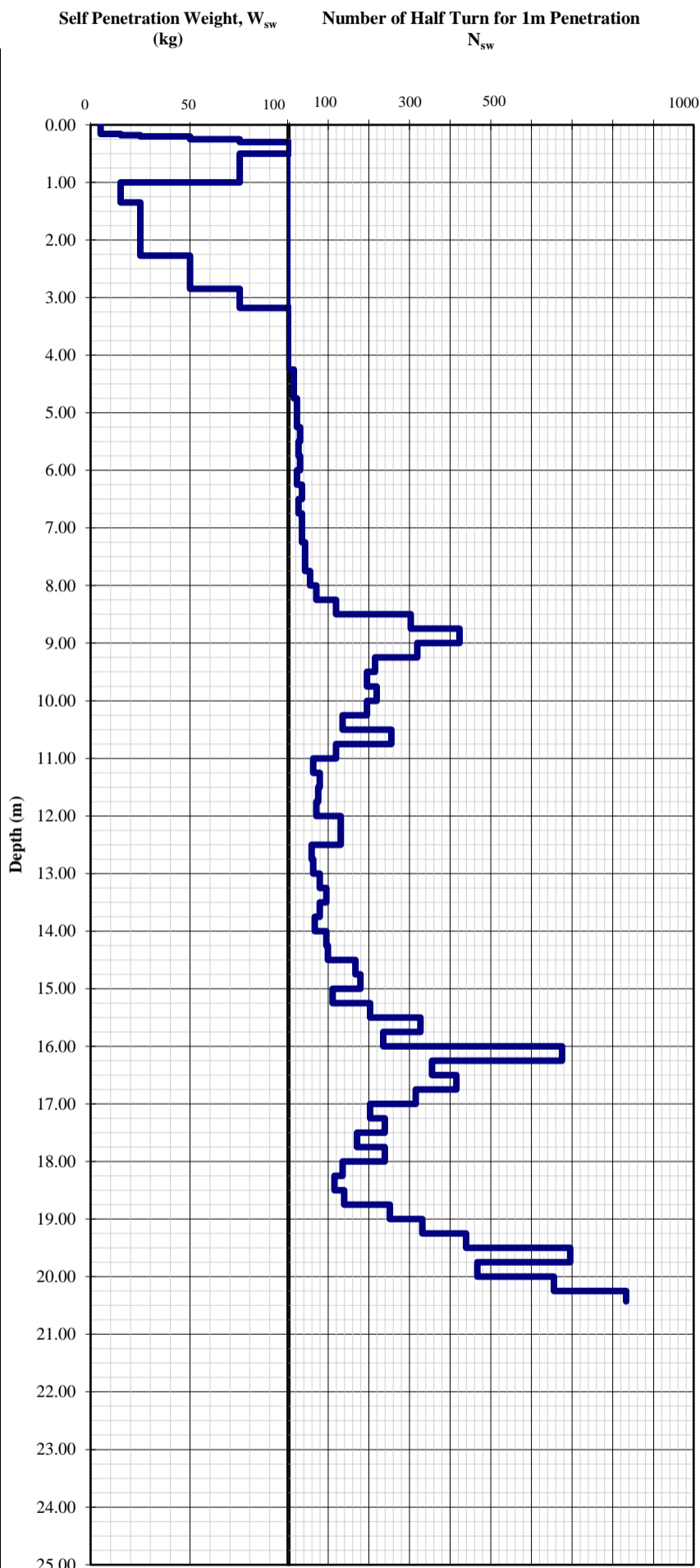
Ground Level : +0.89mMSL

Tested Date : 18-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	$W_{sw}$ (kg)	Nos of Half-Turns, $N_a$	Penetration, L (cm)	Nos of Half-Turns/m, $N_{sw}$
0.00 - 0.16	5	N.A.	16	N.A.
0.16 - 0.18	15	N.A.	2	N.A.
0.18 - 0.20	25	N.A.	2	N.A.
0.20 - 0.25	50	N.A.	5	N.A.
0.25 - 0.30	75	N.A.	5	N.A.
0.30 - 0.50	100	N.A.	20	N.A.
0.50 - 1.00	75	N.A.	50	N.A.
1.00 - 1.35	15	N.A.	35	N.A.
1.35 - 2.27	25	N.A.	92	N.A.
2.27 - 2.85	50	N.A.	58	N.A.
2.85 - 3.18	75	N.A.	33	N.A.
3.18 - 4.25	100	N.A.	107	N.A.
4.25 - 4.50	100	4	25	16
4.50 - 4.75	100	4	25	16
4.75 - 5.00	100	6	25	24
5.00 - 5.25	100	6	25	24
5.25 - 5.50	100	8	25	32
5.50 - 5.75	100	7	25	28
5.75 - 6.00	100	8	25	32
6.00 - 6.25	100	6	25	24
6.25 - 6.50	100	9	25	36
6.50 - 6.75	100	7	25	28
6.75 - 7.00	100	9	25	36
7.00 - 7.25	100	9	25	36
7.25 - 7.50	100	11	25	44
7.50 - 7.75	100	11	25	44
7.75 - 8.00	100	14	25	56
8.00 - 8.25	100	18	25	72
8.25 - 8.50	100	30	25	120
8.50 - 8.75	100	76	25	304
8.75 - 9.00	100	106	25	424
9.00 - 9.25	100	80	25	320
9.25 - 9.50	100	54	25	216
9.50 - 9.75	100	49	25	196
9.75 - 10.00	100	55	25	220
10.00 - 10.25	100	49	25	196
10.25 - 10.50	100	34	25	136
10.50 - 10.75	100	64	25	256
10.75 - 11.00	100	30	25	120
11.00 - 11.25	100	16	25	64
11.25 - 11.50	100	20	25	80
11.50 - 11.75	100	19	25	76
11.75 - 12.00	100	18	25	72
12.00 - 12.25	100	33	25	132
12.25 - 12.50	100	33	25	132
12.50 - 12.75	100	15	25	60
12.75 - 13.00	100	16	25	64
13.00 - 13.25	100	20	25	80
13.25 - 13.50	100	24	25	96
13.50 - 13.75	100	20	25	80
13.75 - 14.00	100	17	25	68
14.00 - 14.25	100	24	25	96
14.25 - 14.50	100	25	25	100
14.50 - 14.75	100	42	25	168
14.75 - 15.00	100	45	25	180
15.00 - 15.25	100	28	25	112
15.25 - 15.50	100	51	25	204
15.50 - 15.75	100	82	25	328
15.75 - 16.00	100	59	25	236
16.00 - 16.25	100	169	25	676
16.25 - 16.50	100	89	25	356
16.50 - 16.75	100	104	25	416
16.75 - 17.00	100	79	25	316
17.00 - 17.25	100	51	25	204
17.25 - 17.50	100	60	25	240
17.50 - 17.75	100	43	25	172
17.75 - 18.00	100	60	25	240
18.00 - 18.25	100	34	25	136
18.25 - 18.50	100	29	25	116
18.50 - 18.75	100	35	25	140
18.75 - 19.00	100	63	25	252
19.00 - 19.25	100	83	25	332
19.25 - 19.50	100	110	25	440
19.50 - 19.75	100	174	25	696
19.75 - 20.00	100	117	25	468
20.00 - 20.25	100	164	25	656
20.25 - 20.43	100	150	18	833





## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-18-17

Location : N : 2399681.505 E : 384338.12

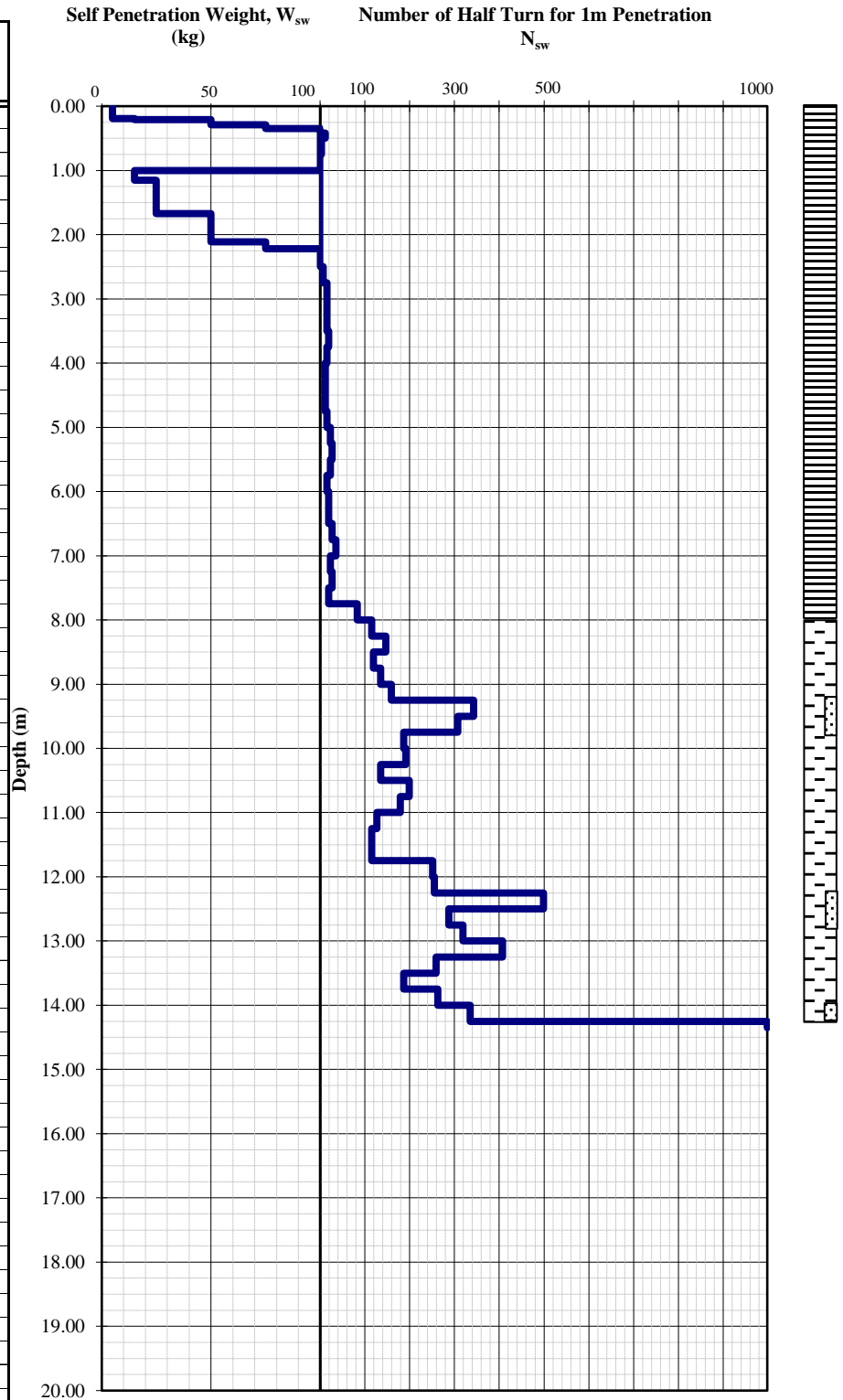
Ground Level : +1.07mMSL

Tested Date : 2014/10/16~10/17

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.19	5	N.A.	19	N.A.
0.19 - 0.21	15	N.A.	2	N.A.
0.21 - 0.21	25	N.A.	0	N.A.
0.21 - 0.29	50	N.A.	8	N.A.
0.29 - 0.35	75	N.A.	6	N.A.
0.35 - 0.42	100	N.A.	7	N.A.
0.42 - 0.50	100	1	8	13
0.50 - 0.75	100	1	25	4
0.75 - 1.00	100	N.A.	25	N.A.
1.00 - 1.15	15	N.A.	15	N.A.
1.15 - 1.67	25	N.A.	52	N.A.
1.67 - 2.11	50	N.A.	44	N.A.
2.11 - 2.22	75	N.A.	11	N.A.
2.22 - 2.50	100	N.A.	28	N.A.
2.50 - 2.75	100	2	25	8
2.75 - 3.00	100	4	25	16
3.00 - 3.25	100	4	25	16
3.25 - 3.50	100	4	25	16
3.50 - 3.75	100	5	25	20
3.75 - 4.00	100	4	25	16
4.00 - 4.25	100	3	25	12
4.25 - 4.50	100	3	25	12
4.50 - 4.75	100	3	25	12
4.75 - 5.00	100	4	25	16
5.00 - 5.25	100	6	25	24
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	6	25	24
5.75 - 6.00	100	4	25	16
6.00 - 6.25	100	5	25	20
6.25 - 6.50	100	5	25	20
6.50 - 6.75	100	7	25	28
6.75 - 7.00	100	9	25	36
7.00 - 7.25	100	6	25	24
7.25 - 7.50	100	7	25	28
7.50 - 7.75	100	5	25	20
7.75 - 8.00	100	21	25	84
8.00 - 8.25	100	29	25	116
8.25 - 8.50	100	37	25	148
8.50 - 8.75	100	30	25	120
8.75 - 9.00	100	34	25	136
9.00 - 9.25	100	40	25	160
9.25 - 9.50	100	86	25	344
9.50 - 9.75	100	77	25	308
9.75 - 10.00	100	47	25	188
10.00 - 10.25	100	48	25	192
10.25 - 10.50	100	34	25	136
10.50 - 10.75	100	50	25	200
10.75 - 11.00	100	45	25	180
11.00 - 11.25	100	32	25	128
11.25 - 11.50	100	29	25	116
11.50 - 11.75	100	29	25	116
11.75 - 12.00	100	63	25	252
12.00 - 12.25	100	64	25	256
12.25 - 12.50	100	125	25	500
12.50 - 12.75	100	72	25	288
12.75 - 13.00	100	80	25	320
13.00 - 13.25	100	102	25	408
13.25 - 13.50	100	65	25	260
13.50 - 13.75	100	47	25	188
13.75 - 14.00	100	66	25	264
14.00 - 14.25	100	84	25	336
14.25 - 14.35	100	100	10	1000
-				
-				



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-19-17

Location : N : 2399680.61 E : 384491.12

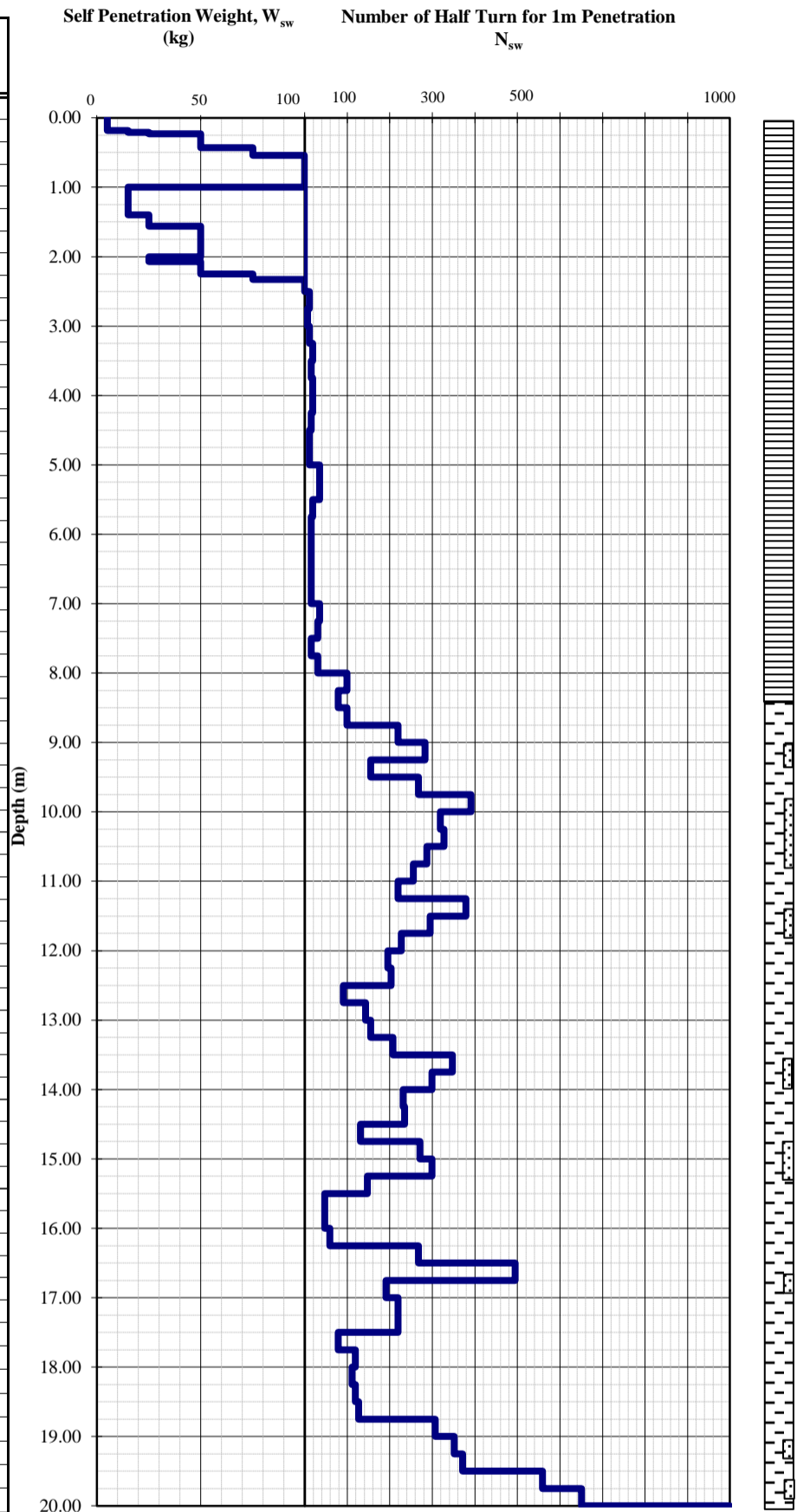
Ground Level : +1.13mMSL

Tested Date : 17-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>sw</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.18	5	N.A.	18	N.A.
0.18 - 0.21	15	N.A.	3	N.A.
0.21 - 0.23	25	N.A.	2	N.A.
0.23 - 0.43	50	N.A.	20	N.A.
0.43 - 0.54	75	N.A.	11	N.A.
0.54 - 1.00	100	N.A.	46	N.A.
1.00 - 1.40	15	N.A.	40	N.A.
1.40 - 1.56	25	N.A.	16	N.A.
1.56 - 2.00	50	N.A.	44	N.A.
2.00 - 2.07	25	N.A.	7	N.A.
2.07 - 2.25	50	N.A.	18	N.A.
2.25 - 2.33	75	N.A.	8	N.A.
2.33 - 2.50	100	N.A.	17	N.A.
2.50 - 2.75	100	3	25	12
2.75 - 3.00	100	2	25	8
3.00 - 3.25	100	3	25	12
3.25 - 3.50	100	5	25	20
3.50 - 3.75	100	4	25	16
3.75 - 4.00	100	5	25	20
4.00 - 4.25	100	5	25	20
4.25 - 4.50	100	4	25	16
4.50 - 4.75	100	3	25	12
4.75 - 5.00	100	3	25	12
5.00 - 5.25	100	9	25	36
5.25 - 5.50	100	9	25	36
5.50 - 5.75	100	5	25	20
5.75 - 6.00	100	4	25	16
6.00 - 6.25	100	4	25	16
6.25 - 6.50	100	4	25	16
6.50 - 6.75	100	4	25	16
6.75 - 7.00	100	4	25	16
7.00 - 7.25	100	9	25	36
7.25 - 7.50	100	8	25	32
7.50 - 7.75	100	4	25	16
7.75 - 8.00	100	8	25	32
8.00 - 8.25	100	25	25	100
8.25 - 8.50	100	20	25	80
8.50 - 8.75	100	25	25	100
8.75 - 9.00	100	55	25	220
9.00 - 9.25	100	71	25	284
9.25 - 9.50	100	39	25	156
9.50 - 9.75	100	67	25	268
9.75 - 10.00	100	98	25	392
10.00 - 10.25	100	80	25	320
10.25 - 10.50	100	82	25	328
10.50 - 10.75	100	72	25	288
10.75 - 11.00	100	64	25	256
11.00 - 11.25	100	55	25	220
11.25 - 11.50	100	95	25	380
11.50 - 11.75	100	74	25	296
11.75 - 12.00	100	57	25	228
12.00 - 12.25	100	49	25	196
12.25 - 12.50	100	51	25	204
12.50 - 12.75	100	23	25	92
12.75 - 13.00	100	36	25	144
13.00 - 13.25	100	39	25	156
13.25 - 13.50	100	52	25	208
13.50 - 13.75	100	87	25	348
13.75 - 14.00	100	75	25	300
14.00 - 14.25	100	58	25	232
14.25 - 14.50	100	59	25	236
14.50 - 14.75	100	33	25	132
14.75 - 15.00	100	68	25	272
15.00 - 15.25	100	75	25	300
15.25 - 15.50	100	37	25	148
15.50 - 15.75	100	12	25	48
15.75 - 16.00	100	12	25	48
16.00 - 16.25	100	15	25	60
16.25 - 16.50	100	67	25	268
16.50 - 16.75	100	124	25	496
16.75 - 17.00	100	48	25	192
17.00 - 17.25	100	55	25	220
17.25 - 17.50	100	55	25	220
17.50 - 17.75	100	20	25	80
17.75 - 18.00	100	30	25	120
18.00 - 18.25	100	28	25	112
18.25 - 18.50	100	30	25	120
18.50 - 18.75	100	32	25	128
18.75 - 19.00	100	77	25	308
19.00 - 19.25	100	88	25	352
19.25 - 19.50	100	93	25	372
19.50 - 19.75	100	140	25	560
19.75 - 20.00	100	163	25	652
20.00 - 20.05	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-20-11

Location : N : 2400723.56 E : 384642.02

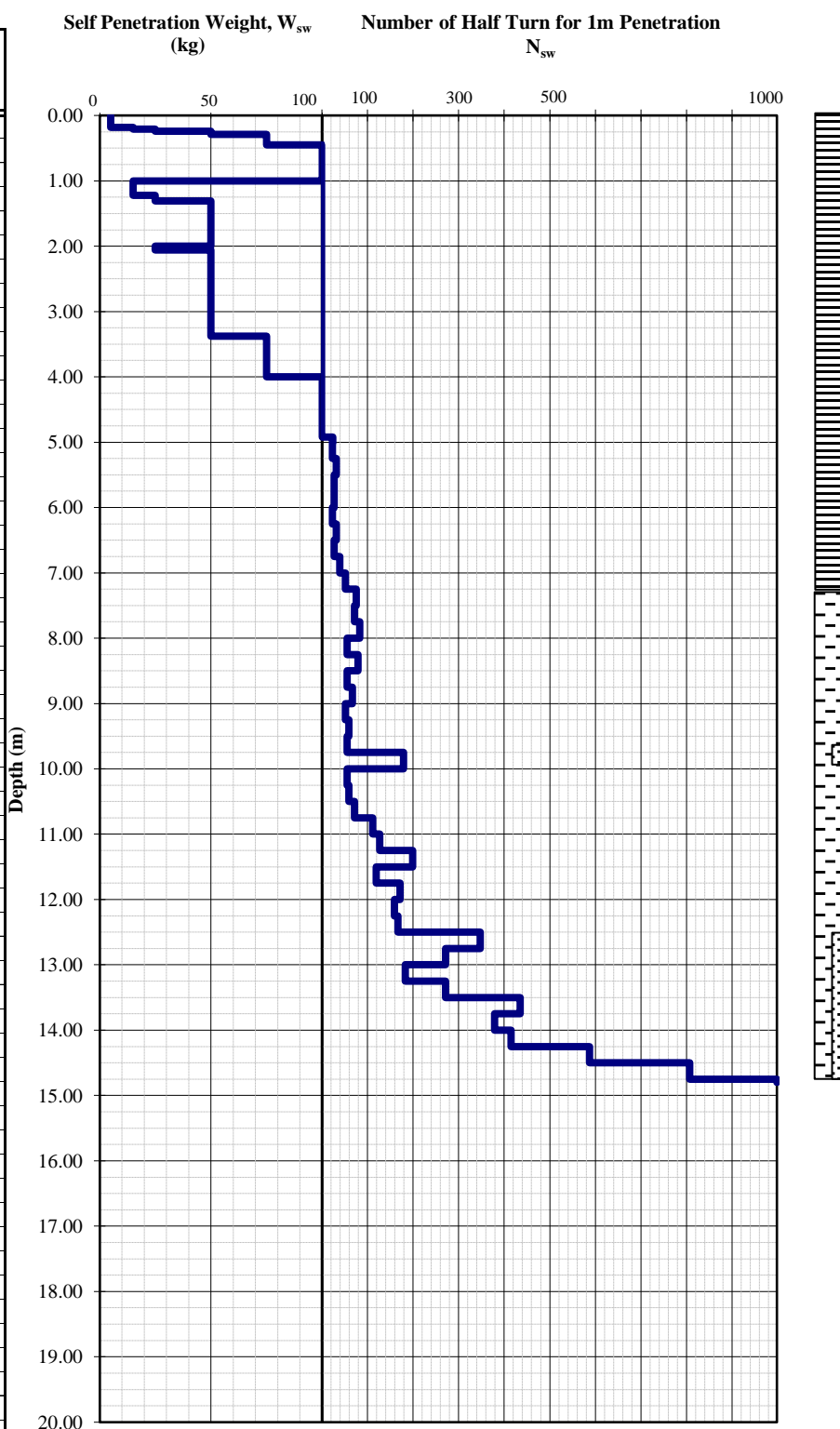
Ground Level : MSL+0.98m

Tested Date : 8-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.18	5	N.A.	18	N.A.
0.18 - 0.21	15	N.A.	3	N.A.
0.21 - 0.24	25	N.A.	3	N.A.
0.24 - 0.29	50	N.A.	5	N.A.
0.29 - 0.45	75	N.A.	16	N.A.
0.45 - 0.50	100	N.A.	5	N.A.
0.50 - 1.00	100	N.A.	50	N.A.
1.00 - 1.22	15	N.A.	22	N.A.
1.22 - 1.31	25	N.A.	9	N.A.
1.31 - 1.50	50	N.A.	19	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 2.06	25	N.A.	6	N.A.
2.06 - 2.50	50	N.A.	44	N.A.
2.50 - 3.00	50	N.A.	50	N.A.
3.00 - 3.38	50	N.A.	38	N.A.
3.38 - 3.50	75	N.A.	12	N.A.
3.50 - 4.00	75	N.A.	50	N.A.
4.00 - 4.50	100	N.A.	50	N.A.
4.50 - 4.92	100	N.A.	42	N.A.
4.92 - 5.00	100	2	8	25
5.00 - 5.25	100	6	25	24
5.25 - 5.50	100	8	25	32
5.50 - 5.75	100	7	25	28
5.75 - 6.00	100	7	25	28
6.00 - 6.25	100	6	25	24
6.25 - 6.50	100	8	25	32
6.50 - 6.75	100	7	25	28
6.75 - 7.00	100	10	25	40
7.00 - 7.25	100	13	25	52
7.25 - 7.50	100	19	25	76
7.50 - 7.75	100	18	25	72
7.75 - 8.00	100	21	25	84
8.00 - 8.25	100	14	25	56
8.25 - 8.50	100	20	25	80
8.50 - 8.75	100	14	25	56
8.75 - 9.00	100	17	25	68
9.00 - 9.25	100	13	25	52
9.25 - 9.50	100	15	25	60
9.50 - 9.75	100	14	25	56
9.75 - 10.00	100	45	25	180
10.00 - 10.25	100	14	25	56
10.25 - 10.50	100	15	25	60
10.50 - 10.75	100	18	25	72
10.75 - 11.00	100	28	25	112
11.00 - 11.25	100	32	25	128
11.25 - 11.50	100	50	25	200
11.50 - 11.75	100	30	25	120
11.75 - 12.00	100	43	25	172
12.00 - 12.25	100	40	25	160
12.25 - 12.50	100	42	25	168
12.50 - 12.75	100	87	25	348
12.75 - 13.00	100	68	25	272
13.00 - 13.25	100	46	25	184
13.25 - 13.50	100	68	25	272
13.50 - 13.75	100	109	25	436
13.75 - 14.00	100	95	25	380
14.00 - 14.25	100	104	25	416
14.25 - 14.50	100	147	25	588
14.50 - 14.75	100	202	25	808
14.75 - 14.80	100	50	5	1000
-				
-				



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-20-12

Location : N : 2400525.67 E : 384643.55

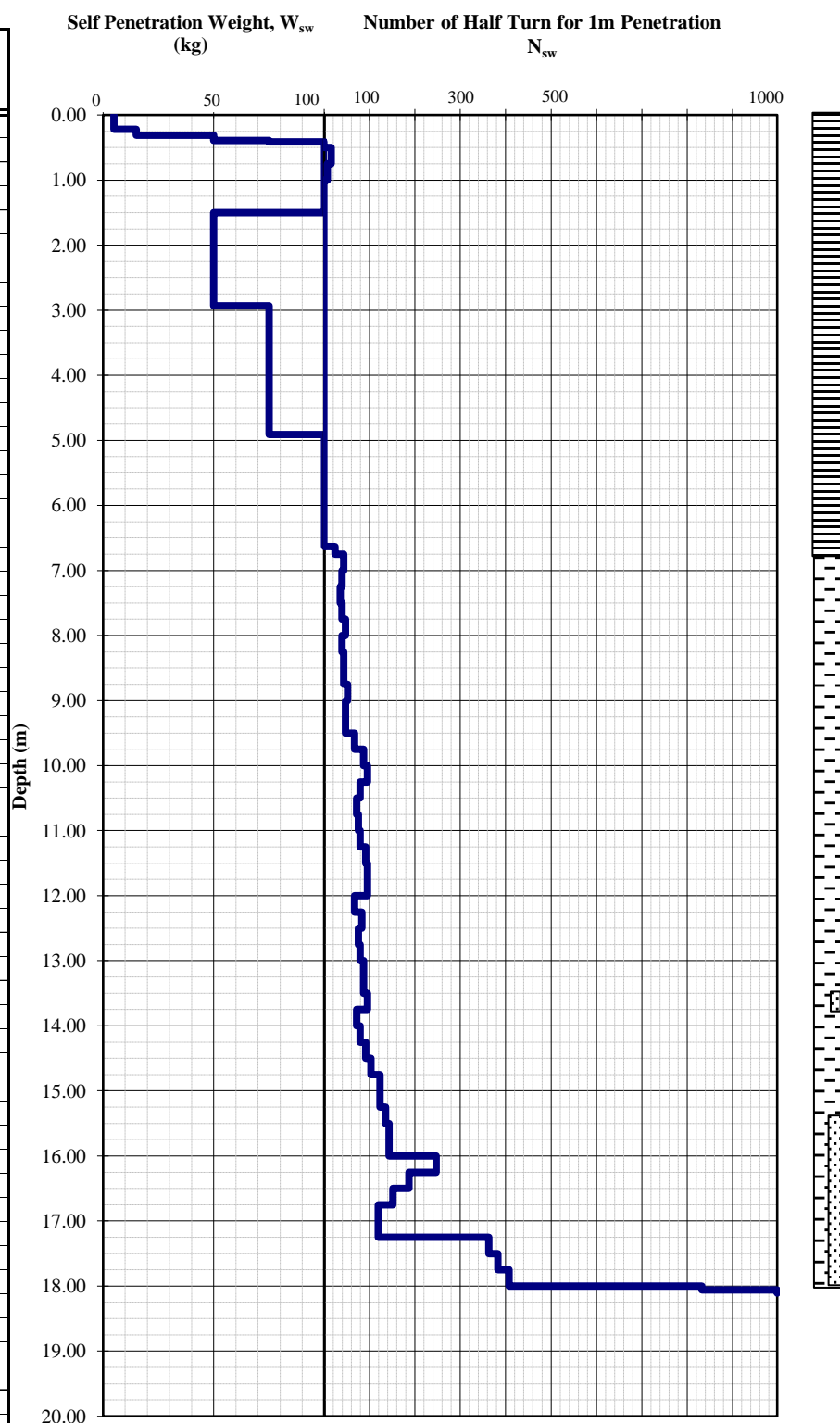
Ground Level : +0.89mMSL

Tested Date : 9-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.22	5	N.A.	22	N.A.
0.22 - 0.31	15	N.A.	9	N.A.
0.31 - 0.31	25	N.A.	0	N.A.
0.31 - 0.39	50	N.A.	8	N.A.
0.39 - 0.41	75	N.A.	2	N.A.
0.41 - 0.50	100	N.A.	9	N.A.
0.50 - 0.75	100	4	25	16
0.75 - 1.00	100	2	25	8
1.00 - 1.50	100	N.A.	50	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 2.50	50	N.A.	50	N.A.
2.50 - 2.93	50	N.A.	43	N.A.
2.93 - 3.00	75	N.A.	7	N.A.
3.00 - 3.50	75	N.A.	50	N.A.
3.50 - 4.00	75	N.A.	50	N.A.
4.00 - 4.50	75	N.A.	50	N.A.
4.50 - 4.91	75	N.A.	41	N.A.
4.91 - 5.00	100	N.A.	9	N.A.
5.00 - 5.50	100	N.A.	50	N.A.
5.50 - 6.00	100	N.A.	50	N.A.
6.00 - 6.50	100	N.A.	50	N.A.
6.50 - 6.63	100	N.A.	13	N.A.
6.63 - 6.75	100	3	12	25
6.75 - 7.00	100	11	25	44
7.00 - 7.25	100	10	25	40
7.25 - 7.50	100	9	25	36
7.50 - 7.75	100	10	25	40
7.75 - 8.00	100	12	25	48
8.00 - 8.25	100	10	25	40
8.25 - 8.50	100	11	25	44
8.50 - 8.75	100	11	25	44
8.75 - 9.00	100	13	25	52
9.00 - 9.25	100	12	25	48
9.25 - 9.50	100	12	25	48
9.50 - 9.75	100	17	25	68
9.75 - 10.00	100	22	25	88
10.00 - 10.25	100	24	25	96
10.25 - 10.50	100	20	25	80
10.50 - 10.75	100	18	25	72
10.75 - 11.00	100	19	25	76
11.00 - 11.25	100	20	25	80
11.25 - 11.50	100	23	25	92
11.50 - 11.75	100	24	25	96
11.75 - 12.00	100	24	25	96
12.00 - 12.25	100	17	25	68
12.25 - 12.50	100	21	25	84
12.50 - 12.75	100	19	25	76
12.75 - 13.00	100	20	25	80
13.00 - 13.25	100	22	25	88
13.25 - 13.50	100	22	25	88
13.50 - 13.75	100	24	25	96
13.75 - 14.00	100	18	25	72
14.00 - 14.25	100	20	25	80
14.25 - 14.50	100	23	25	92
14.50 - 14.75	100	26	25	104
14.75 - 15.00	100	31	25	124
15.00 - 15.25	100	31	25	124
15.25 - 15.50	100	34	25	136
15.50 - 15.75	100	36	25	144
15.75 - 16.00	100	36	25	144
16.00 - 16.25	100	62	25	248
16.25 - 16.50	100	47	25	188
16.50 - 16.75	100	38	25	152
16.75 - 17.00	100	30	25	120
17.00 - 17.25	100	30	25	120
17.25 - 17.50	100	91	25	364
17.50 - 17.75	100	96	25	384
17.75 - 18.00	100	102	25	408
18.00 - 18.06	100	50	6	833
18.06 - 18.11	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-20-13

Location : N :2400361.98 E :384642.32

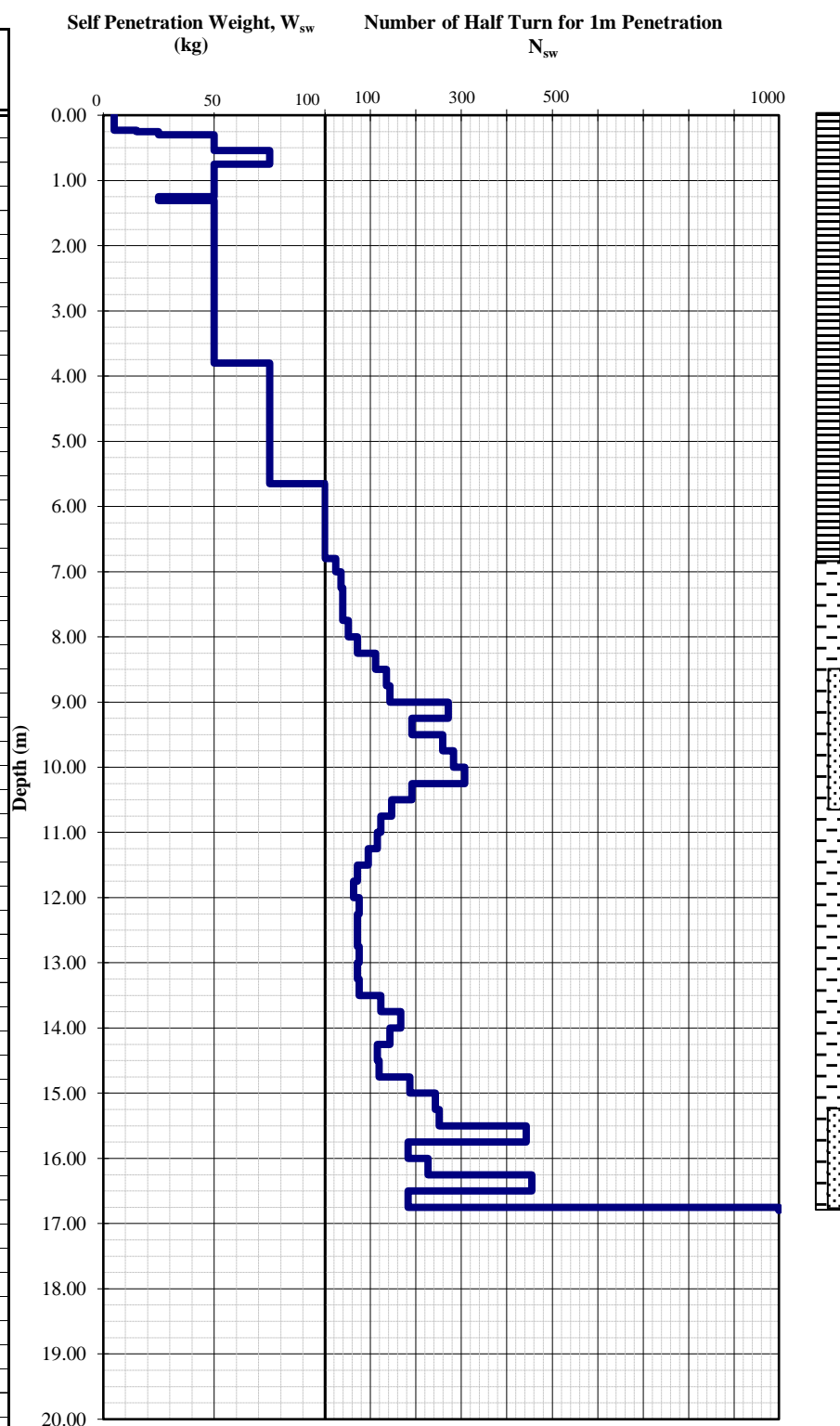
Ground Level : +0.82mMSL

Tested Date : 9-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.23	5	N.A.	23	N.A.
0.23 - 0.25	15	N.A.	2	N.A.
0.25 - 0.30	25	N.A.	5	N.A.
0.30 - 0.54	50	N.A.	24	N.A.
0.54 - 0.75	75	N.A.	21	N.A.
0.75 - 1.25	50	N.A.	50	N.A.
1.25 - 1.31	25	N.A.	6	N.A.
1.31 - 1.75	50	N.A.	44	N.A.
1.75 - 2.25	50	N.A.	50	N.A.
2.25 - 2.75	50	N.A.	50	N.A.
2.75 - 3.25	50	N.A.	50	N.A.
3.25 - 3.75	50	N.A.	50	N.A.
3.75 - 3.80	50	N.A.	5	N.A.
3.80 - 4.25	75	N.A.	45	N.A.
4.25 - 4.75	75	N.A.	50	N.A.
4.75 - 5.25	75	N.A.	50	N.A.
5.25 - 5.65	75	N.A.	40	N.A.
5.65 - 5.75	100	N.A.	10	N.A.
5.75 - 6.25	100	N.A.	50	N.A.
6.25 - 6.75	100	N.A.	50	N.A.
6.75 - 6.80	100	N.A.	5	N.A.
6.80 - 7.00	100	5	20	25
7.00 - 7.25	100	9	25	36
7.25 - 7.50	100	10	25	40
7.50 - 7.75	100	10	25	40
7.75 - 8.00	100	13	25	52
8.00 - 8.25	100	18	25	72
8.25 - 8.50	100	28	25	112
8.50 - 8.75	100	34	25	136
8.75 - 9.00	100	36	25	144
9.00 - 9.25	100	68	25	272
9.25 - 9.50	100	48	25	192
9.50 - 9.75	100	65	25	260
9.75 - 10.00	100	71	25	284
10.00 - 10.25	100	77	25	308
10.25 - 10.50	100	48	25	192
10.50 - 10.75	100	37	25	148
10.75 - 11.00	100	31	25	124
11.00 - 11.25	100	29	25	116
11.25 - 11.50	100	24	25	96
11.50 - 11.75	100	18	25	72
11.75 - 12.00	100	16	25	64
12.00 - 12.25	100	19	25	76
12.25 - 12.50	100	18	25	72
12.50 - 12.75	100	18	25	72
12.75 - 13.00	100	19	25	76
13.00 - 13.25	100	18	25	72
13.25 - 13.50	100	19	25	76
13.50 - 13.75	100	31	25	124
13.75 - 14.00	100	42	25	168
14.00 - 14.25	100	36	25	144
14.25 - 14.50	100	29	25	116
14.50 - 14.75	100	30	25	120
14.75 - 15.00	100	47	25	188
15.00 - 15.25	100	61	25	244
15.25 - 15.50	100	63	25	252
15.50 - 15.75	100	111	25	444
15.75 - 16.00	100	46	25	184
16.00 - 16.25	100	57	25	228
16.25 - 16.50	100	114	25	456
16.50 - 16.75	100	46	25	184
16.75 - 16.80	100	50	5	1000
-				
-				



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-20-14

Location : N : 2400120.58 E : 384622.92

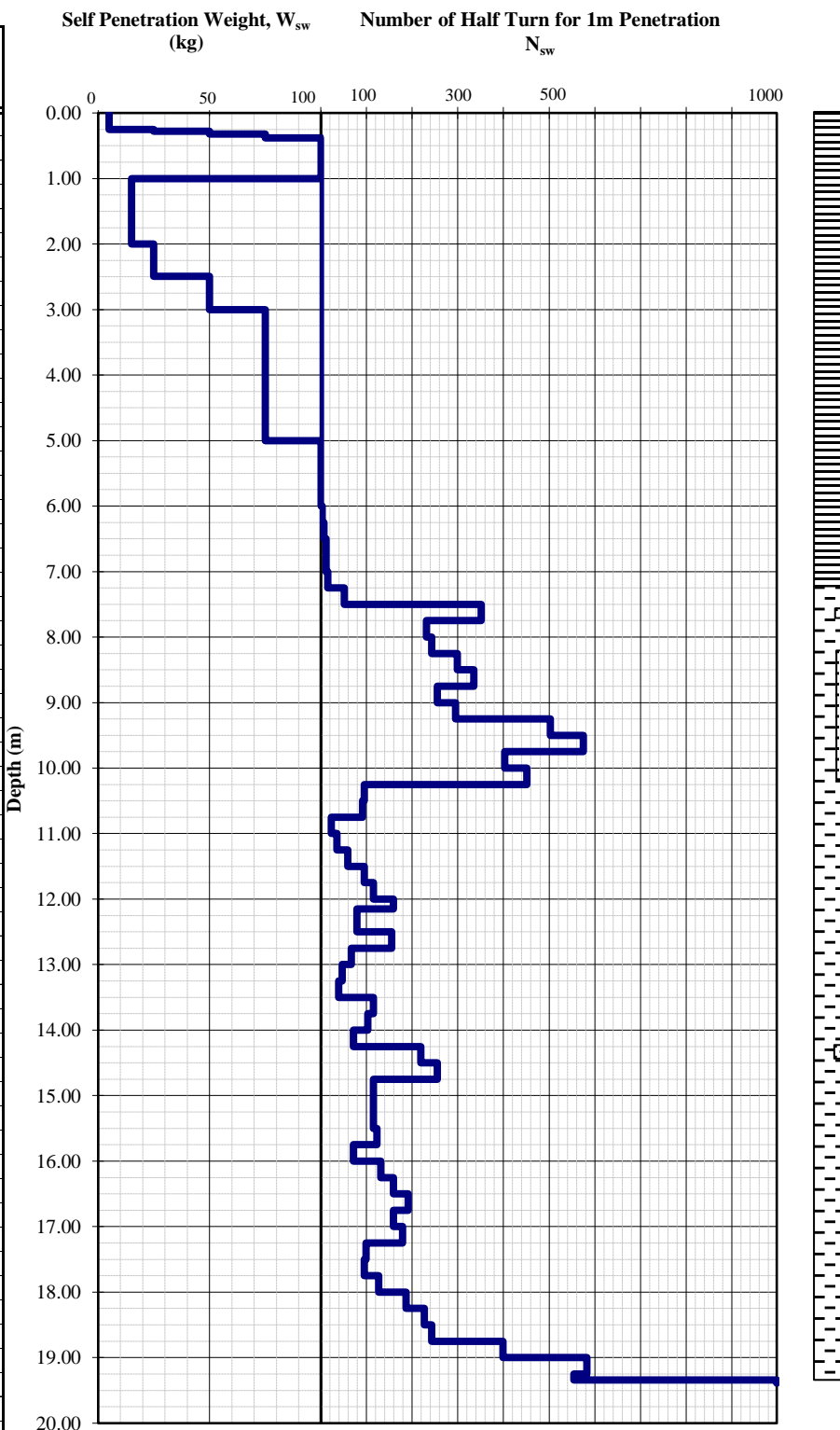
Ground Level : +0.96mMSL

Tested Date : 2014/9/18~9/19

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	$W_{sw}$ (kg)	Nos of Half-Turns, $N_s$	Penetration, L (cm)	Nos of Half-Turns/m, $N_{sw}$
0.00 - 0.25	5	N.A.	25	N.A.
0.25 - 0.25	15	N.A.	0	N.A.
0.25 - 0.28	25	N.A.	3	N.A.
0.28 - 0.32	50	N.A.	4	N.A.
0.32 - 0.38	75	N.A.	6	N.A.
0.38 - 1.00	100	N.A.	62	N.A.
1.00 - 1.35	15	N.A.	35	N.A.
1.35 - 2.00	15	N.A.	65	N.A.
2.00 - 2.49	25	N.A.	49	N.A.
2.49 - 3.00	50	N.A.	51	N.A.
3.00 - 5.00	75	N.A.	200	N.A.
5.00 - 6.00	100	N.A.	100	N.A.
6.00 - 6.25	100	1	25	4
6.25 - 6.50	100	2	25	8
6.50 - 6.75	100	3	25	12
6.75 - 7.00	100	3	25	12
7.00 - 7.25	100	4	25	16
7.25 - 7.50	100	13	25	52
7.50 - 7.75	100	88	25	352
7.75 - 8.00	100	58	25	232
8.00 - 8.25	100	61	25	244
8.25 - 8.50	100	75	25	300
8.50 - 8.75	100	84	25	336
8.75 - 9.00	100	64	25	256
9.00 - 9.25	100	74	25	296
9.25 - 9.50	100	126	25	504
9.50 - 9.75	100	144	25	576
9.75 - 10.00	100	101	25	404
10.00 - 10.25	100	113	25	452
10.25 - 10.50	100	24	25	96
10.50 - 10.75	100	23	25	92
10.75 - 11.00	100	6	25	24
11.00 - 11.25	100	9	25	36
11.25 - 11.50	100	15	25	60
11.50 - 11.75	100	24	25	96
11.75 - 12.00	100	29	25	116
12.00 - 12.15	100	24	15	160
12.15 - 12.50	100	28	35	80
12.50 - 12.75	100	39	25	156
12.75 - 13.00	100	17	25	68
13.00 - 13.25	100	12	25	48
13.25 - 13.50	100	10	25	40
13.50 - 13.75	100	29	25	116
13.75 - 14.00	100	26	25	104
14.00 - 14.25	100	18	25	72
14.25 - 14.50	100	55	25	220
14.50 - 14.75	100	64	25	256
14.75 - 15.00	100	29	25	116
15.00 - 15.25	100	29	25	116
15.25 - 15.50	100	29	25	116
15.50 - 15.75	100	31	25	124
15.75 - 16.00	100	18	25	72
16.00 - 16.25	100	33	25	132
16.25 - 16.50	100	40	25	160
16.50 - 16.75	100	48	25	192
16.75 - 17.00	100	40	25	160
17.00 - 17.25	100	45	25	180
17.25 - 17.50	100	25	25	100
17.50 - 17.75	100	24	25	96
17.75 - 18.00	100	32	25	128
18.00 - 18.25	100	47	25	188
18.25 - 18.50	100	57	25	228
18.50 - 18.75	100	61	25	244
18.75 - 19.00	100	100	25	400
19.00 - 19.25	100	146	25	584
19.25 - 19.34	100	50	9	556
19.34 - 19.39	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. : \_

Test No. : SW-20-15

Location : N : 2399921.60 E : 384641.54

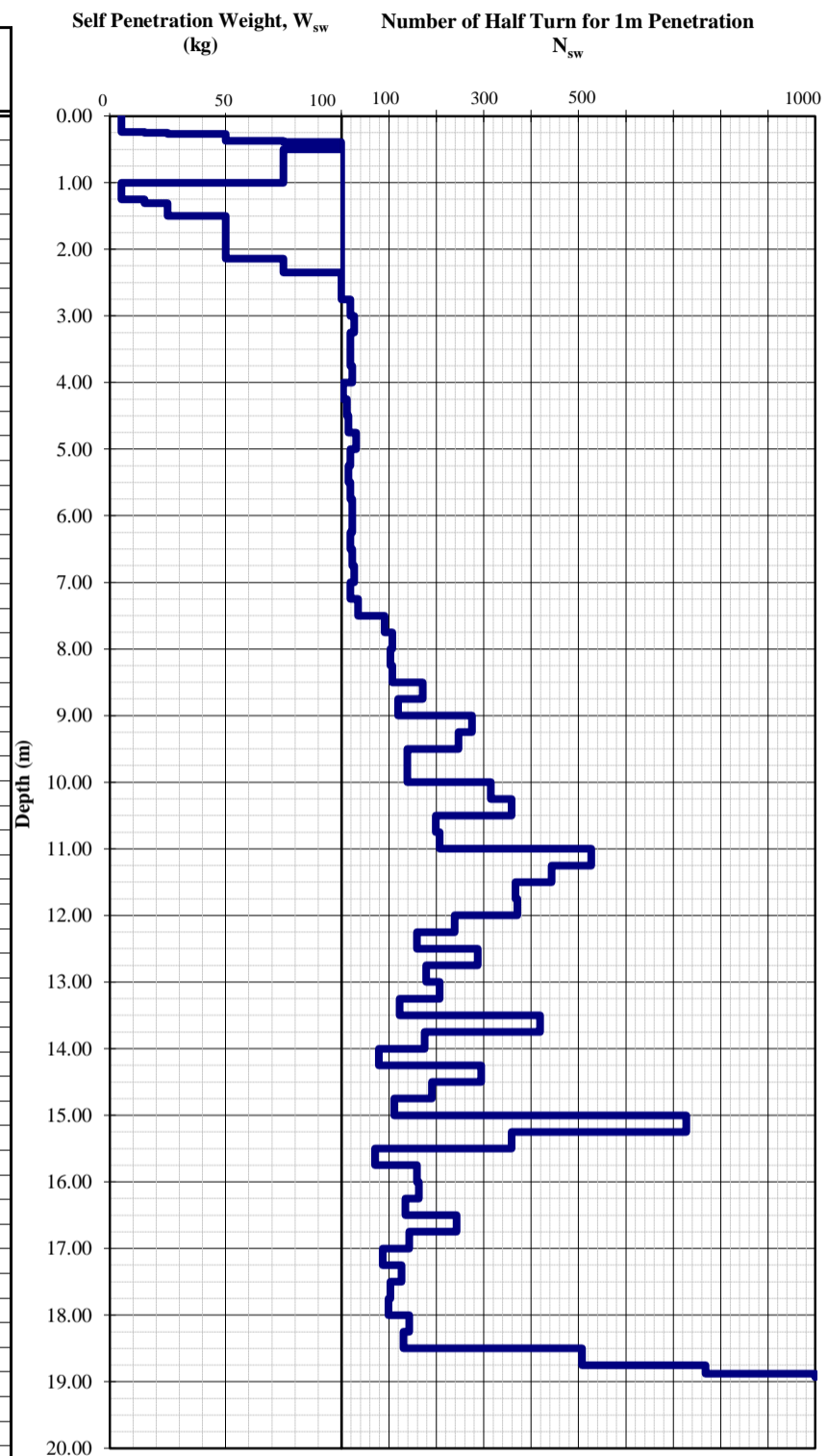
Ground Level : +0.98mMSL

Tested Date : 10-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	$W_{sw}$ (kg)	Nos of Half-Turns, $N_a$	Penetration, L (cm)	Nos of Half-Turns/m, $N_{sw}$
0.00 - 0.24	5	N.A.	24	N.A.
0.24 - 0.25	15	N.A.	1	N.A.
0.25 - 0.27	25	N.A.	2	N.A.
0.27 - 0.37	50	N.A.	10	N.A.
0.37 - 0.39	75	N.A.	2	N.A.
0.39 - 0.50	100	N.A.	11	N.A.
0.50 - 1.00	75	N.A.	50	N.A.
1.00 - 1.25	5	N.A.	25	N.A.
1.25 - 1.31	15	N.A.	6	N.A.
1.31 - 1.50	25	N.A.	19	N.A.
1.50 - 1.93	50	N.A.	43	N.A.
1.93 - 2.00	50	N.A.	7	N.A.
2.00 - 2.14	50	N.A.	14	N.A.
2.14 - 2.35	75	N.A.	21	N.A.
2.35 - 2.50	100	N.A.	15	N.A.
2.50 - 2.75	100	N.A.	25	N.A.
2.75 - 3.00	100	5	25	20
3.00 - 3.25	100	7	25	28
3.25 - 3.50	100	5	25	20
3.50 - 3.75	100	5	25	20
3.75 - 4.00	100	6	25	24
4.00 - 4.25	100	1	25	4
4.25 - 4.50	100	3	25	12
4.50 - 4.75	100	4	25	16
4.75 - 5.00	100	8	25	32
5.00 - 5.25	100	5	25	20
5.25 - 5.50	100	4	25	16
5.50 - 5.75	100	5	25	20
5.75 - 6.00	100	6	25	24
6.00 - 6.25	100	6	25	24
6.25 - 6.50	100	5	25	20
6.50 - 6.75	100	6	25	24
6.75 - 7.00	100	7	25	28
7.00 - 7.25	100	5	25	20
7.25 - 7.50	100	9	25	36
7.50 - 7.75	100	23	25	92
7.75 - 8.00	100	27	25	108
8.00 - 8.25	100	26	25	104
8.25 - 8.50	100	27	25	108
8.50 - 8.75	100	43	25	172
8.75 - 9.00	100	30	25	120
9.00 - 9.25	100	69	25	276
9.25 - 9.50	100	62	25	248
9.50 - 9.75	100	35	25	140
9.75 - 10.00	100	35	25	140
10.00 - 10.25	100	79	25	316
10.25 - 10.50	100	90	25	360
10.50 - 10.75	100	50	25	200
10.75 - 11.00	100	52	25	208
11.00 - 11.25	100	132	25	528
11.25 - 11.50	100	111	25	444
11.50 - 11.75	100	92	25	368
11.75 - 12.00	100	93	25	372
12.00 - 12.25	100	60	25	240
12.25 - 12.50	100	40	25	160
12.50 - 12.75	100	72	25	288
12.75 - 13.00	100	45	25	180
13.00 - 13.25	100	52	25	208
13.25 - 13.50	100	31	25	124
13.50 - 13.75	100	105	25	420
13.75 - 14.00	100	44	25	176
14.00 - 14.25	100	20	25	80
14.25 - 14.50	100	74	25	296
14.50 - 14.75	100	48	25	192
14.75 - 15.00	100	28	25	112
15.00 - 15.25	100	182	25	728
15.25 - 15.50	100	90	25	360
15.50 - 15.75	100	18	25	72
15.75 - 16.00	100	40	25	160
16.00 - 16.25	100	41	25	164
16.25 - 16.50	100	34	25	136
16.50 - 16.75	100	61	25	244
16.75 - 17.00	100	36	25	144
17.00 - 17.25	100	22	25	88
17.25 - 17.50	100	32	25	128
17.50 - 17.75	100	26	25	104
17.75 - 18.00	100	25	25	100
18.00 - 18.25	100	36	25	144
18.25 - 18.50	100	33	25	132
18.50 - 18.75	100	127	25	508
18.75 - 18.88	100	100	13	769
18.88 - 18.93	100	50	5	1000



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-20-17

Location : N : 2399679.97 E : 384641.96

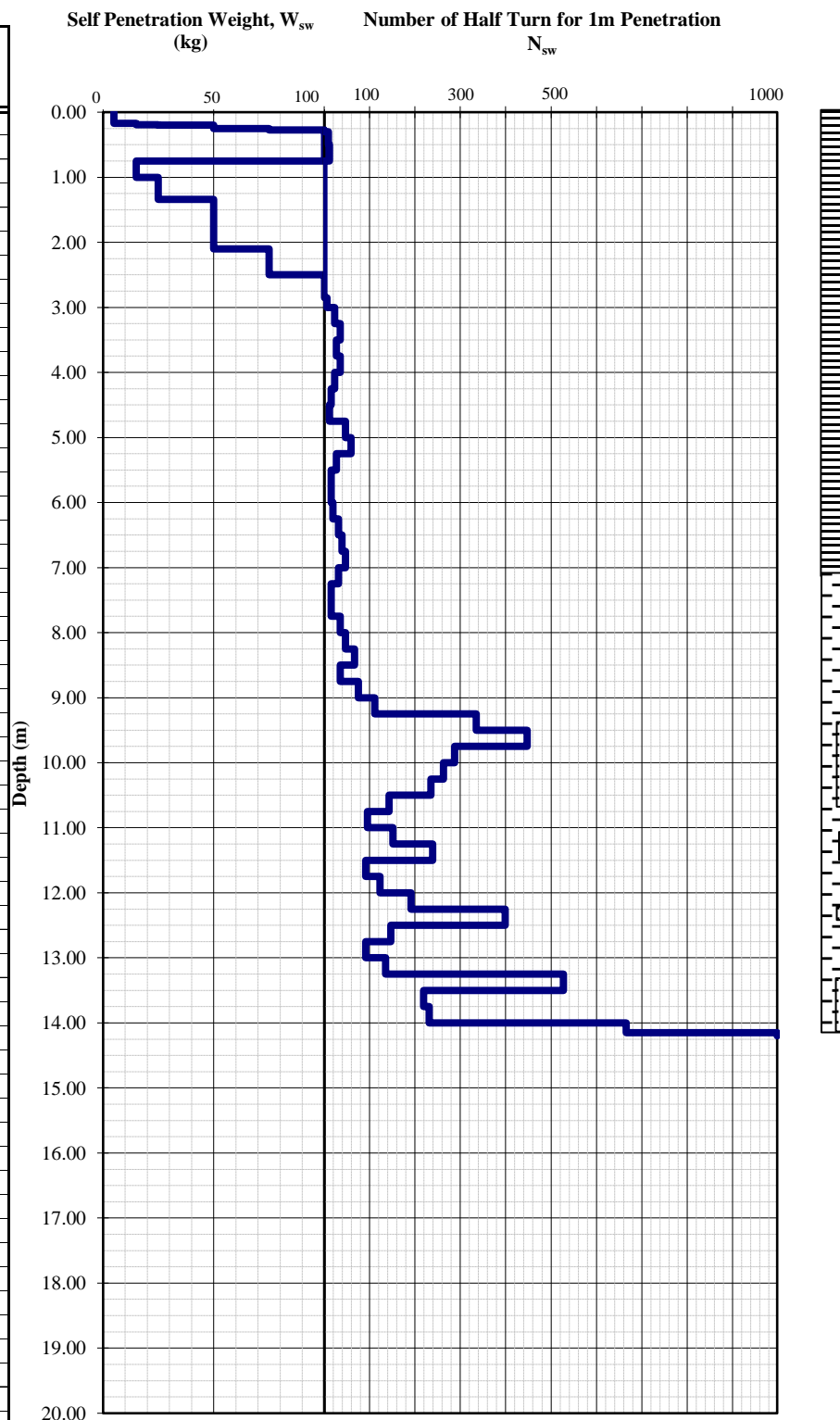
Ground Level : +0.97mMSL

Tested Date : 11-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.17	5	N.A.	17	N.A.
0.17 - 0.19	15	N.A.	2	N.A.
0.19 - 0.20	25	N.A.	1	N.A.
0.20 - 0.25	50	N.A.	5	N.A.
0.25 - 0.27	75	N.A.	2	N.A.
0.27 - 0.30	100	N.A.	3	N.A.
0.30 - 0.50	100	2	20	10
0.50 - 0.75	100	3	25	12
0.75 - 0.75	100	N.A.	0	N.A.
0.75 - 1.00	15	N.A.	25	N.A.
1.00 - 1.34	25	N.A.	34	N.A.
1.34 - 1.50	50	N.A.	16	N.A.
1.50 - 2.00	50	N.A.	50	N.A.
2.00 - 2.10	50	N.A.	10	N.A.
2.10 - 2.50	75	N.A.	40	N.A.
2.50 - 2.85	100	N.A.	35	N.A.
2.85 - 3.00	100	1	15	7
3.00 - 3.25	100	6	25	24
3.25 - 3.50	100	9	25	36
3.50 - 3.75	100	7	25	28
3.75 - 4.00	100	9	25	36
4.00 - 4.25	100	6	25	24
4.25 - 4.50	100	4	25	16
4.50 - 4.75	100	3	25	12
4.75 - 5.00	100	12	25	48
5.00 - 5.25	100	15	25	60
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	4	25	16
5.75 - 6.00	100	4	25	16
6.00 - 6.25	100	5	25	20
6.25 - 6.50	100	8	25	32
6.50 - 6.75	100	10	25	40
6.75 - 7.00	100	12	25	48
7.00 - 7.25	100	8	25	32
7.25 - 7.50	100	4	25	16
7.50 - 7.75	100	4	25	16
7.75 - 8.00	100	9	25	36
8.00 - 8.25	100	12	25	48
8.25 - 8.50	100	17	25	68
8.50 - 8.75	100	9	25	36
8.75 - 9.00	100	19	25	76
9.00 - 9.25	100	28	25	112
9.25 - 9.50	100	84	25	336
9.50 - 9.75	100	112	25	448
9.75 - 10.00	100	72	25	288
10.00 - 10.25	100	66	25	264
10.25 - 10.50	100	59	25	236
10.50 - 10.75	100	36	25	144
10.75 - 11.00	100	24	25	96
11.00 - 11.25	100	38	25	152
11.25 - 11.50	100	60	25	240
11.50 - 11.75	100	23	25	92
11.75 - 12.00	100	31	25	124
12.00 - 12.25	100	48	25	192
12.25 - 12.50	100	100	25	400
12.50 - 12.75	100	37	25	148
12.75 - 13.00	100	23	25	92
13.00 - 13.25	100	34	25	136
13.25 - 13.50	100	132	25	528
13.50 - 13.75	100	55	25	220
13.75 - 14.00	100	58	25	232
14.00 - 14.15	100	100	15	667
14.15 - 14.20	100	50	5	1000
-				
-				





## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-21-14

Location : N : 2400119.98 E : 384791.12

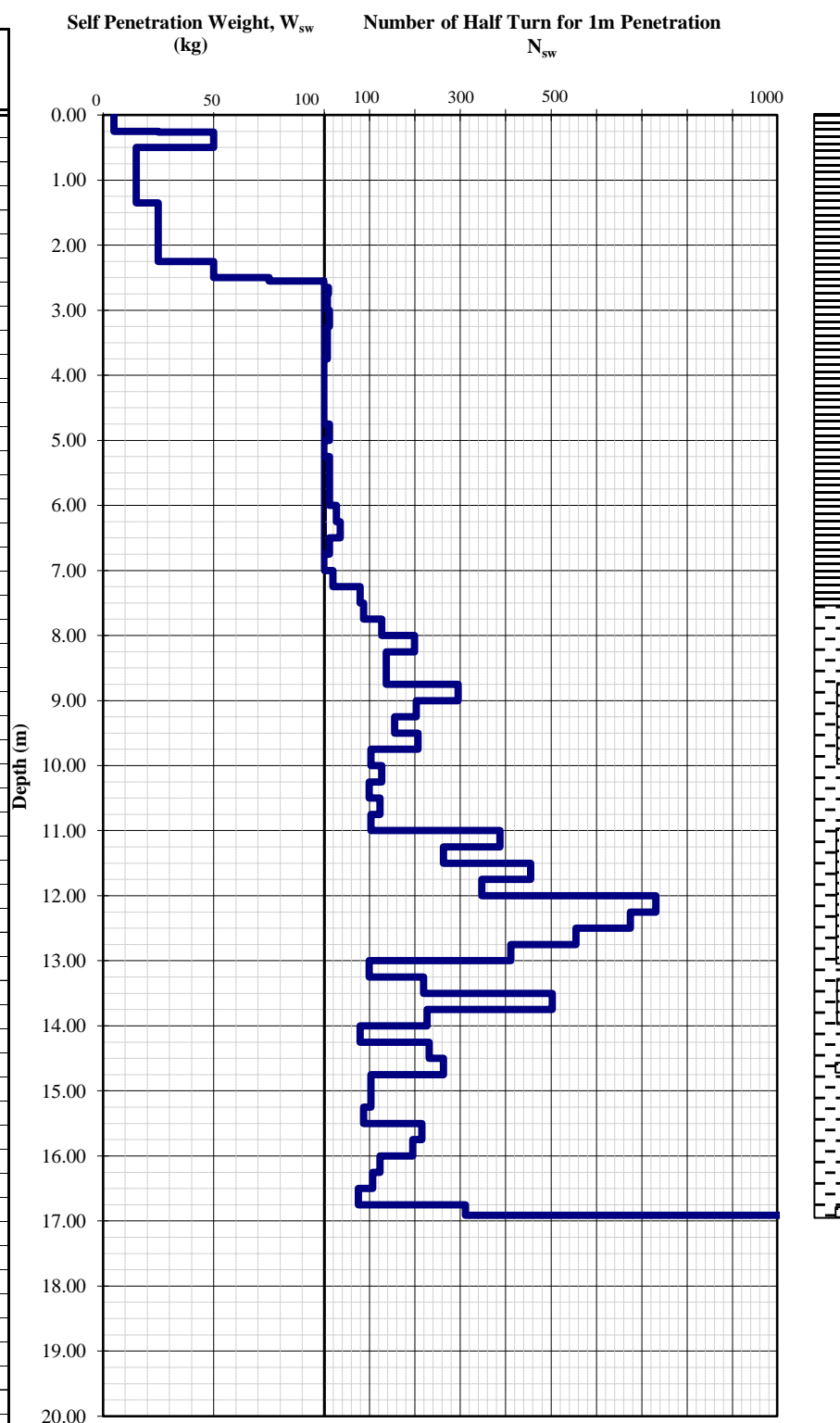
Ground Level : +0.79mMSL

Tested Date : 2014/9/17~9/18

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.25	5	N.A.	25	N.A.
0.25 - 0.25	15	N.A.	0	N.A.
0.25 - 0.26	25	N.A.	1	N.A.
0.26 - 0.50	50	N.A.	24	N.A.
0.50 - 1.35	15	N.A.	85	N.A.
1.35 - 2.25	25	N.A.	90	N.A.
2.25 - 2.50	50	N.A.	25	N.A.
2.50 - 2.55	75	N.A.	5	N.A.
2.55 - 2.65	100	N.A.	10	N.A.
2.65 - 2.75	100	1	10	10
2.75 - 3.00	100	2	25	8
3.00 - 3.25	100	3	25	12
3.25 - 3.50	100	2	25	8
3.50 - 3.75	100	2	25	8
3.75 - 4.75	100	N.A.	100	N.A.
4.75 - 5.00	100	3	25	12
5.00 - 5.25	100	N.A.	25	N.A.
5.25 - 5.50	100	3	25	12
5.50 - 5.75	100	3	25	12
5.75 - 6.00	100	3	25	12
6.00 - 6.25	100	7	25	28
6.25 - 6.50	100	9	25	36
6.50 - 6.75	100	3	25	12
6.75 - 7.00	100	N.A.	25	N.A.
7.00 - 7.25	100	5	25	20
7.25 - 7.50	100	20	25	80
7.50 - 7.75	100	22	25	88
7.75 - 8.00	100	32	25	128
8.00 - 8.25	100	50	25	200
8.25 - 8.75	100	69	50	138
8.75 - 9.00	100	74	25	296
9.00 - 9.25	100	51	25	204
9.25 - 9.50	100	39	25	156
9.50 - 9.75	100	52	25	208
9.75 - 10.00	100	26	25	104
10.00 - 10.25	100	32	25	128
10.25 - 10.50	100	25	25	100
10.50 - 10.75	100	31	25	124
10.75 - 11.00	100	26	25	104
11.00 - 11.25	100	97	25	388
11.25 - 11.50	100	66	25	264
11.50 - 11.75	100	114	25	456
11.75 - 12.00	100	87	25	348
12.00 - 12.25	100	183	25	732
12.25 - 12.50	100	169	25	676
12.50 - 12.75	100	139	25	556
12.75 - 13.00	100	103	25	412
13.00 - 13.25	100	25	25	100
13.25 - 13.50	100	55	25	220
13.50 - 13.75	100	126	25	504
13.75 - 14.00	100	57	25	228
14.00 - 14.25	100	20	25	80
14.25 - 14.50	100	58	25	232
14.50 - 14.75	100	66	25	264
14.75 - 15.00	100	26	25	104
15.00 - 15.25	100	26	25	104
15.25 - 15.50	100	22	25	88
15.50 - 15.75	100	54	25	216
15.75 - 16.00	100	49	25	196
16.00 - 16.25	100	31	25	124
16.25 - 16.50	100	27	25	108
16.50 - 16.75	100	19	25	76
16.75 - 16.91	100	50	16	313
16.91 - 16.95	100	50	4	1250



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-22-11

Location : N : 2400723.40 E : 384942.53

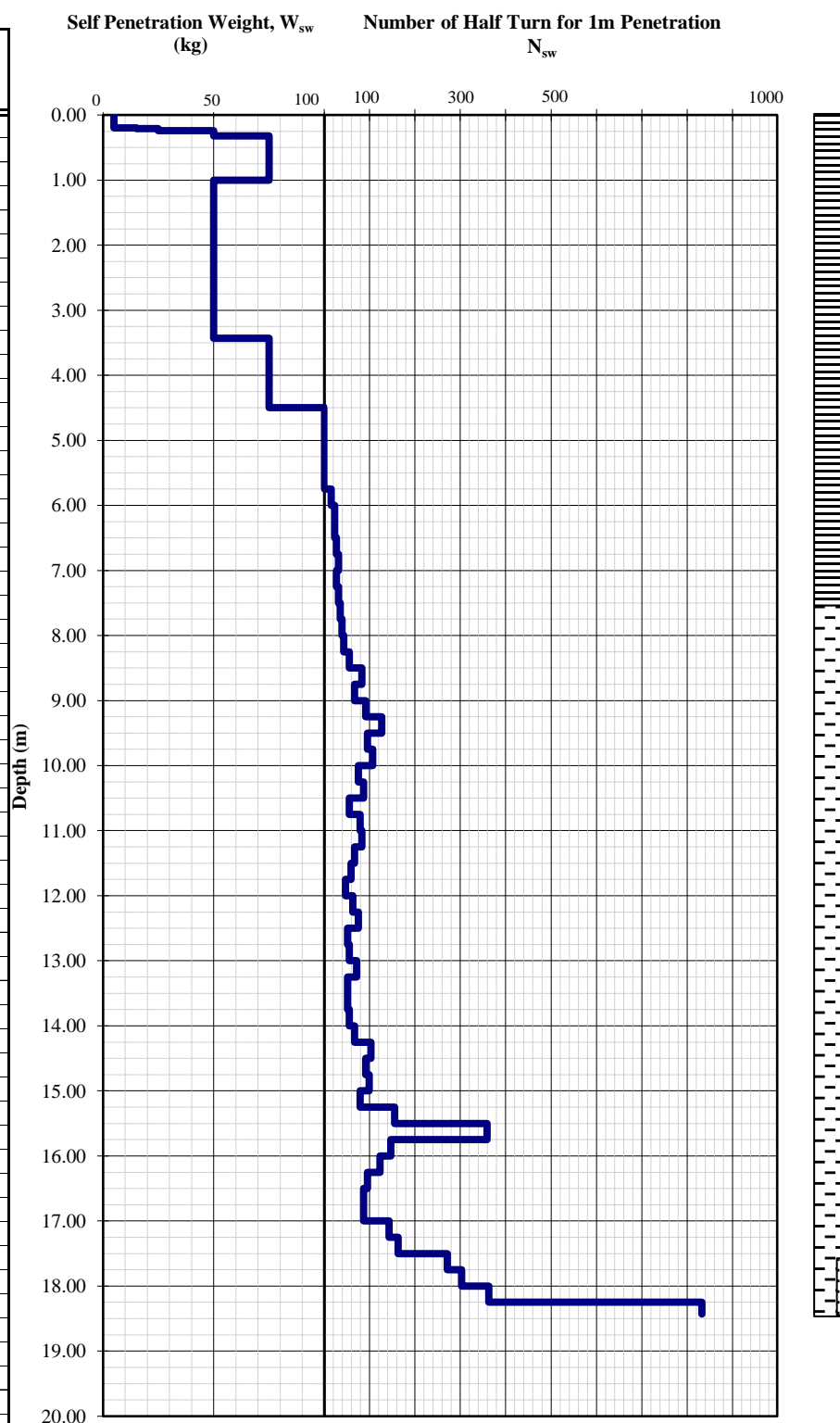
Ground Level : +0.92mMSL

Tested Date : 15-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.20	5	N.A.	20	N.A.
0.20 - 0.21	15	N.A.	1	N.A.
0.21 - 0.24	25	N.A.	3	N.A.
0.24 - 0.32	50	N.A.	8	N.A.
0.32 - 1.00	75	N.A.	68	N.A.
1.00 - 3.43	50	N.A.	243	N.A.
3.43 - 4.50	75	N.A.	107	N.A.
4.50 - 5.75	100	N.A.	125	N.A.
5.75 - 6.00	100	4	25	16
6.00 - 6.25	100	6	25	24
6.25 - 6.50	100	6	25	24
6.50 - 6.75	100	7	25	28
6.75 - 7.00	100	8	25	32
7.00 - 7.25	100	7	25	28
7.25 - 7.50	100	8	25	32
7.50 - 7.75	100	9	25	36
7.75 - 8.00	100	10	25	40
8.00 - 8.25	100	11	25	44
8.25 - 8.50	100	14	25	56
8.50 - 8.75	100	21	25	84
8.75 - 9.00	100	17	25	68
9.00 - 9.25	100	23	25	92
9.25 - 9.50	100	32	25	128
9.50 - 9.75	100	24	25	96
9.75 - 10.00	100	27	25	108
10.00 - 10.25	100	19	25	76
10.25 - 10.50	100	22	25	88
10.50 - 10.75	100	14	25	56
10.75 - 11.00	100	20	25	80
11.00 - 11.25	100	21	25	84
11.25 - 11.50	100	17	25	68
11.50 - 11.75	100	15	25	60
11.75 - 12.00	100	12	25	48
12.00 - 12.25	100	16	25	64
12.25 - 12.50	100	19	25	76
12.50 - 12.75	100	13	25	52
12.75 - 13.00	100	14	25	56
13.00 - 13.25	100	18	25	72
13.25 - 13.50	100	13	25	52
13.50 - 13.75	100	13	25	52
13.75 - 14.00	100	14	25	56
14.00 - 14.25	100	17	25	68
14.25 - 14.50	100	26	25	104
14.50 - 14.75	100	23	25	92
14.75 - 15.00	100	25	25	100
15.00 - 15.25	100	20	25	80
15.25 - 15.50	100	39	25	156
15.50 - 15.75	100	90	25	360
15.75 - 16.00	100	37	25	148
16.00 - 16.25	100	31	25	124
16.25 - 16.50	100	24	25	96
16.50 - 16.75	100	22	25	88
16.75 - 17.00	100	22	25	88
17.00 - 17.25	100	36	25	144
17.25 - 17.50	100	41	25	164
17.50 - 17.75	100	68	25	272
17.75 - 18.00	100	76	25	304
18.00 - 18.25	100	91	25	364
18.25 - 18.43	100	150	18	833
-				
-				
-				
-				
-				











## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-24-11

Location : N : 2400725.39 E : 385290.26

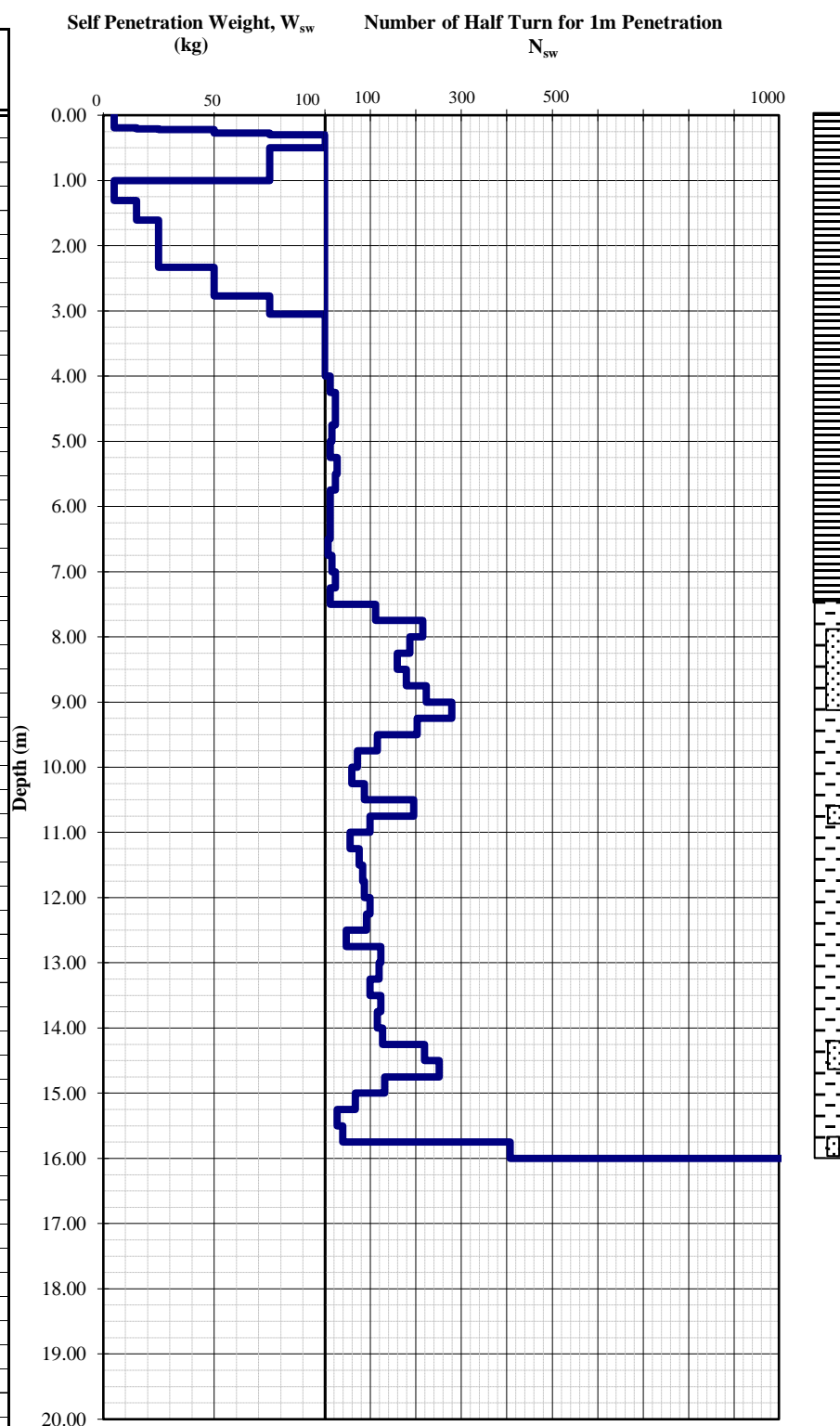
Ground Level : +0.89mMSL

Tested Date : 14-Oct-14

Performed by : Kenji Teshima

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.19	5	N.A.	19	N.A.
0.19 - 0.21	15	N.A.	2	N.A.
0.21 - 0.22	25	N.A.	1	N.A.
0.22 - 0.27	50	N.A.	5	N.A.
0.27 - 0.30	75	N.A.	3	N.A.
0.30 - 0.50	100	N.A.	20	N.A.
0.50 - 1.00	75	N.A.	50	N.A.
1.00 - 1.31	5	N.A.	31	N.A.
1.31 - 1.61	15	N.A.	30	N.A.
1.61 - 2.33	25	N.A.	72	N.A.
2.33 - 2.77	50	N.A.	44	N.A.
2.77 - 3.05	75	N.A.	28	N.A.
3.05 - 4.00	100	N.A.	95	N.A.
4.00 - 4.25	100	3	25	12
4.25 - 4.50	100	6	25	24
4.50 - 4.75	100	6	25	24
4.75 - 5.00	100	4	25	16
5.00 - 5.25	100	3	25	12
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	6	25	24
5.75 - 6.00	100	3	25	12
6.00 - 6.25	100	3	25	12
6.25 - 6.50	100	3	25	12
6.50 - 6.75	100	2	25	8
6.75 - 7.00	100	4	25	16
7.00 - 7.25	100	6	25	24
7.25 - 7.50	100	3	25	12
7.50 - 7.75	100	28	25	112
7.75 - 8.00	100	54	25	216
8.00 - 8.25	100	47	25	188
8.25 - 8.50	100	40	25	160
8.50 - 8.75	100	45	25	180
8.75 - 9.00	100	56	25	224
9.00 - 9.25	100	70	25	280
9.25 - 9.50	100	51	25	204
9.50 - 9.75	100	29	25	116
9.75 - 10.00	100	18	25	72
10.00 - 10.25	100	15	25	60
10.25 - 10.50	100	22	25	88
10.50 - 10.75	100	49	25	196
10.75 - 11.00	100	25	25	100
11.00 - 11.25	100	14	25	56
11.25 - 11.50	100	19	25	76
11.50 - 11.75	100	21	25	84
11.75 - 12.00	100	22	25	88
12.00 - 12.25	100	25	25	100
12.25 - 12.50	100	23	25	92
12.50 - 12.75	100	12	25	48
12.75 - 13.00	100	31	25	124
13.00 - 13.25	100	30	25	120
13.25 - 13.50	100	25	25	100
13.50 - 13.75	100	31	25	124
13.75 - 14.00	100	29	25	116
14.00 - 14.25	100	32	25	128
14.25 - 14.50	100	55	25	220
14.50 - 14.75	100	63	25	252
14.75 - 15.00	100	33	25	132
15.00 - 15.25	100	17	25	68
15.25 - 15.50	100	7	25	28
15.50 - 15.75	100	10	25	40
15.75 - 16.00	100	102	25	408
16.00 - 16.03	100	50	3	1667
-				
-				



## Result of Swedish Weight Sounding

Project Name : Matarbari PP

Project No. :   

Test No. : SW-24-12

Location : N : 2400525.82 E : 385293.53

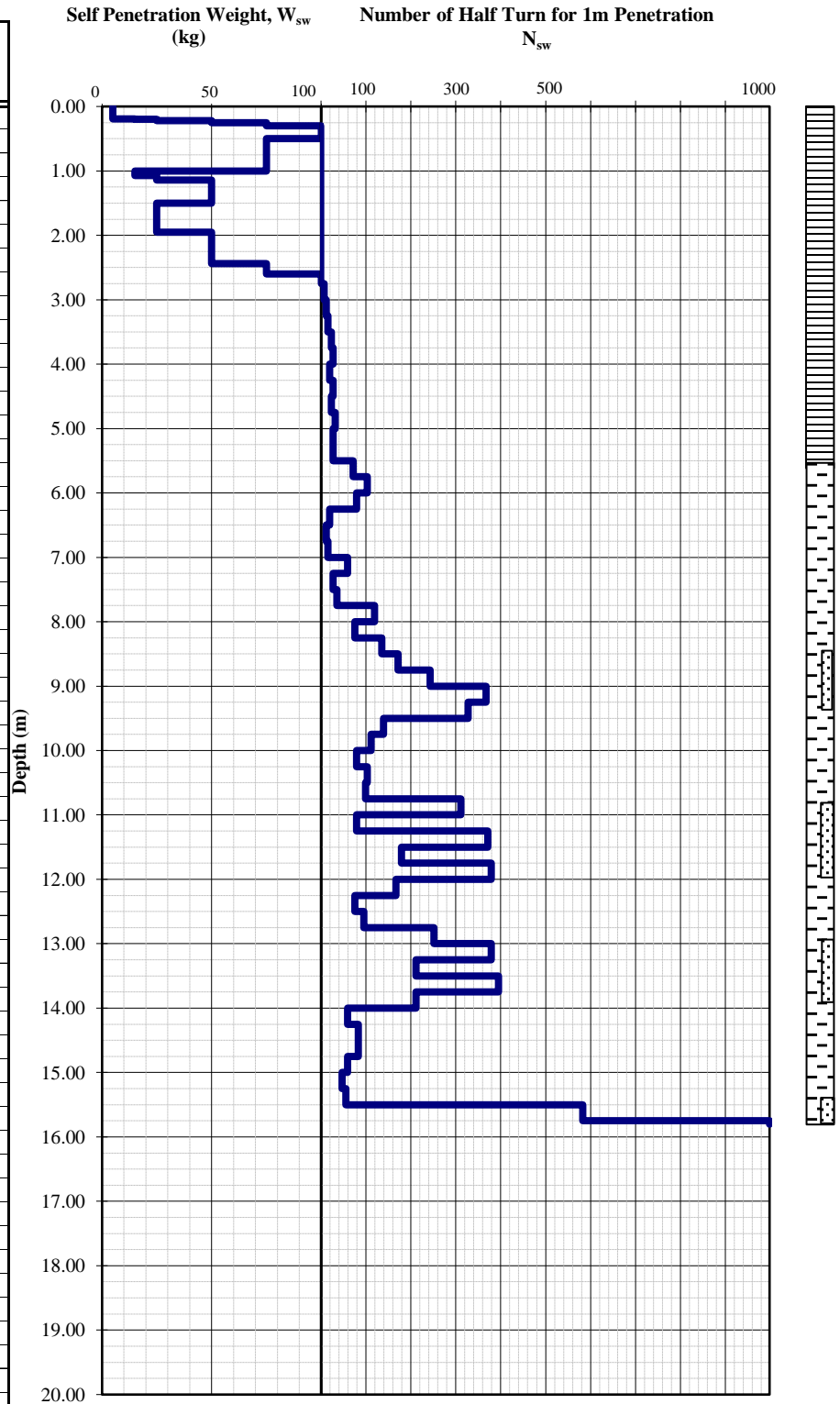
Ground Level : +1.02mMSL

Tested Date : 13-Oct-14

Performed by : Tomohiro Sadamoto

Remarks : SWS-EQ001

Depth (m)	W <sub>sw</sub> (kg)	Nos of Half-Turns, N <sub>s</sub>	Penetration, L (cm)	Nos of Half-Turns/m, N <sub>sw</sub>
0.00 - 0.19	5	N.A.	19	N.A.
0.19 - 0.20	15	N.A.	1	N.A.
0.20 - 0.22	25	N.A.	2	N.A.
0.22 - 0.25	50	N.A.	3	N.A.
0.25 - 0.30	75	N.A.	5	N.A.
0.30 - 0.50	100	N.A.	20	N.A.
0.50 - 1.00	75	N.A.	50	N.A.
1.00 - 1.07	15	N.A.	7	N.A.
1.07 - 1.14	25	N.A.	7	N.A.
1.14 - 1.50	50	N.A.	36	N.A.
1.50 - 1.95	25	N.A.	45	N.A.
1.95 - 2.00	50	N.A.	5	N.A.
2.00 - 2.44	50	N.A.	44	N.A.
2.44 - 2.50	75	N.A.	6	N.A.
2.50 - 2.60	75	N.A.	10	N.A.
2.60 - 2.75	100	N.A.	15	N.A.
2.75 - 3.00	100	2	25	8
3.00 - 3.25	100	3	25	12
3.25 - 3.50	100	4	25	16
3.50 - 3.75	100	6	25	24
3.75 - 4.00	100	7	25	28
4.00 - 4.25	100	5	25	20
4.25 - 4.50	100	7	25	28
4.50 - 4.75	100	6	25	24
4.75 - 5.00	100	8	25	32
5.00 - 5.25	100	7	25	28
5.25 - 5.50	100	7	25	28
5.50 - 5.75	100	18	25	72
5.75 - 6.00	100	26	25	104
6.00 - 6.25	100	20	25	80
6.25 - 6.50	100	5	25	20
6.50 - 6.75	100	3	25	12
6.75 - 7.00	100	4	25	16
7.00 - 7.25	100	15	25	60
7.25 - 7.50	100	7	25	28
7.50 - 7.75	100	9	25	36
7.75 - 8.00	100	30	25	120
8.00 - 8.25	100	19	25	76
8.25 - 8.50	100	34	25	136
8.50 - 8.75	100	43	25	172
8.75 - 9.00	100	61	25	244
9.00 - 9.25	100	92	25	368
9.25 - 9.50	100	82	25	328
9.50 - 9.75	100	35	25	140
9.75 - 10.00	100	28	25	112
10.00 - 10.25	100	20	25	80
10.25 - 10.50	100	26	25	104
10.50 - 10.75	100	25	25	100
10.75 - 11.00	100	78	25	312
11.00 - 11.25	100	20	25	80
11.25 - 11.50	100	93	25	372
11.50 - 11.75	100	45	25	180
11.75 - 12.00	100	95	25	380
12.00 - 12.25	100	42	25	168
12.25 - 12.50	100	19	25	76
12.50 - 12.75	100	24	25	96
12.75 - 13.00	100	63	25	252
13.00 - 13.25	100	95	25	380
13.25 - 13.50	100	53	25	212
13.50 - 13.75	100	99	25	396
13.75 - 14.00	100	53	25	212
14.00 - 14.25	100	15	25	60
14.25 - 14.50	100	21	25	84
14.50 - 14.75	100	21	25	84
14.75 - 15.00	100	15	25	60
15.00 - 15.25	100	12	25	48
15.25 - 15.50	100	14	25	56
15.50 - 15.75	100	146	25	584
15.75 - 15.80	100	50	5	1000
-				







# **Appendix-C17-03**

## **Results of Laboratory Tests**



**Table 6** Quantities of laboratory tests done, off-site laboratory

Area	BH No	Sample No	Depth (m)		Sample Material	Test Item											
			from	to		QU	UU	CU bar	Cons	Wn	Gs	LL & PL	Sieve	Hydro	Compaction	Triaxial(CD)	
Approach Area	OF-02-1	D-1	2.00	2.80	Silty Sand					1	1	1	1	1			
		D-2	5.00	5.80	Silty Sand					1	1	1	1	1			
		D-3	8.00	8.80	Silty Sand, Sandy Silt					1	1	1	1	1			
		D-4	11.00	11.90	Silty Sand, Sandy Silt					1	1	1	1	1			
	OF-03-1	D-1	1.00	1.80	Silty sand					1	1	1	1	1			
		D-2	5.00	5.80	Silty sand, Clayey Silt					1	1	1	1	1			
		D-3	8.00	8.80	Sandy Silt, Silty Sand					1	1	1	1	1			
	OF-03-1a	D-1	4.00	4.80	Silty Sand					1	1	1	1	1			
		D-2	7.00	7.80	Silty Sand					1	1	1	1	1			
	OF-03-1b	D-1	2.00	2.80	Silty Sand					1	1	1	1	1			
		D-2	5.00	5.80	Silty Sand					1	1	1	1	1			
		D-3	8.00	8.80	Sandy Silt, Silty Sand					1	1	1	1	1			
	OF-03-1c	D-1	1.00	1.90	Silty Sand					1	1	1	1	1	1	1	
		D-2	1.00	1.90	Silty Sand					1	1	1	1	1	1	1	
	OF-04-1	D-2	5.00	5.5.9	Silty Sand					1	1	1	1	1			
		HP-1	8.00	8.90	Silty Sand					1	1	1	1	1			
		D-3	11.00	11.90	Silty Sand					1	1	1	1	1			
		D-1	2.00	2.80	Silty Sand					1	1	1	1	1			
	OF-04-2	D-2	5.00	5.80	Silty Sand					1	1	1	1	1	1	1	
		D-3	8.00	8.78	Silty Sand					1	1	1	1	1		1	
		D-4	14.00	14.95	Silty Sand with Sandy Silt					1	1	1	1	1			
		D-5	18.00	18.95	Silty Sand					1	1	1	1	1			
		D-1	3.00	3.90	Silty Sand					1	1	1	1	1			
	OF-04-3	D-2	6.00	6.90	Silty Sand					1	1	1	1	1			
		D-3	9.00	9.90	Silty Sand					1	1	1	1	1			
		D-4	12.00	12.90	Silty Sand					1	1	1	1	1			
		D-1	2.00	2.50	Silty Sand					1	1	1	1	1			
	OF-05-1	D-2	2.50	3.30	Silty Sand					1	1	1	1	1			
		D-3	6.00	6.80	Silty Sand					1	1	1	1	1			
		D-4	9.00	9.50	Silty Sand					1	1	1	1	1			
		D-5	12.00	12.30	Silty Sand					1	1	1	1	1			
		D-6	12.30	12.90	Silty Sand					1	1	1	1	1			
		D-7	15.00	15.75	Silty Sand					1	1	1	1	1			
		D-8	18.00	18.80	Silty Sand					1	1	1	1	1			
		D-1	4.00	4.90	Silty Sand					1	1	1	1	1			
	OF-05-1a	D-2	4.90	5.70	Silty Sand					1	1	1	1	1			
		D-3	8.00	8.75	Silty Sand					1	1	1	1	1			
		D-4	11.00	11.90	Silty Sand					1	1	1	1	1			
		D-5	15.00	15.90	Sandy Silt					1	1	1	1	1			
		D-6	18.00	18.90	Silty Sand, Sandy Silt					1	1	1	1	1			
		D-1	7.00	7.80	Silty Sand					1	1	1	1	1			
	OF-05-1b	D-2	10.00	10.90	Silty sand					1	1	1	1	1			
		D-3	13.00	13.70	Silty sand					1	1	1	1	1			
		D-4	16.00	16.80	Silty Sand					1	1	1	1	1			
		D-1	1.00	1.80	Silty Sand					1	1	1	1	1	1	1	
	OF-05-2	D-2	3.00	3.80	Sandy Silt					1	1	1	1	1		1	
		D-3	5.00	5.80	Silty Sand					1	1	1	1	1	1	1	
		D-4	7.00	7.80	Silty Sand					1	1	1	1	1			
		D-5	10.00	10.50	Silty Sand					1	1	1	1	1			
		D-6	10.50	11.30	Silty Sand					1	1	1	1	1			
		D-7	14.00	14.80	Silty Sand					1	1	1	1	1	1	1	
		D-8	17.00	17.80	Silty Sand with Sandy Silt					1	1	1	1	1			
		D-9	20.00	20.80	Silty Sand					1	1	1	1	1			
		D-10	23.00	23.75	Silty Sand with Silty Clay					1	1	1	1	1			
		D-11	25.00	25.50	Silty Sand					1	1	1	1	1			
		OF-05-3	D-1	2.00	2.80	Silty Clay					1	1	1	1	1		
	D-2		5.00	5.80	Silty Sand					1	1	1	1	1			
	D-3		8.00	8.90	Silty Sand					1	1	1	1	1			
	D-4		11.00	11.60	Silty Sand					1	1	1	1	1			
	D-5		14.00	14.60	Silty Sand					1	1	1	1	1			
	D-6		17.00	17.60	Silty Sand with Clay					1	1	1	1	1			
	D-7		20.00	20.70	Silty Sand					1	1	1	1	1			
	OF-05-3a	D-1	10.00	10.70	Silty Sand					1	1	1	1	1	1	1	
		D-2	13.00	13.80	Silty Sand					1	1	1	1	1			
		D-3	18.00	18.50	Silty Sand with Sandy Silt					1	1	1	1	1			
	OF-05-3b	D-1	3.00	3.90	Silty Sand					1	1	1	1	1			
		D-2	6.00	6.90	Sandy Silt					1	1	1	1	1			
		D-3	10.20	10.93	Silty Sand					1	1	1	1	1	1	1	
	<b>Total</b>						<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>69</b>	<b>69</b>	<b>58</b>	<b>69</b>	<b>69</b>	<b>7</b>	<b>7</b>

Area	BH No	Sample No	Depth (m)		Sample Material	Test Item												
			from	to		QU	UU	CU bar	Cons	Wn	Gs	LL & PL	Sieve	Hydro	Compaction	Triaxial(CD)		
Channel Area	LD2-11-1	HP-1	2.00	2.90	Clay		1			1	1	1	1	1	1			
		D-1	5.00	5.80	Sand					1	1	1	1	1		1	1	
		D-2	8.00	8.85	Sand					1	1	1	1	1			1	
		D-3	11.00	11.50	Sand					1	1	1	1	1	1		1	1
		D-4	14.00	14.50	Silty Sand					1	1	1	1	1	1			
		D-5	17.00	17.60	Sand					1	1	1	1	1	1	1		1
	D-6	23.00	23.60	Sand					1	1	1	1	1	1				
	LD2-10a-1	HP-1	2.00	2.85	Silt					1	1	1	1	1	1			
		HP-2	5.00	5.90	Sandy Silt, Silty Sand					1	1	1	1	1	1			
		D-1	8.00	8.85	Silty Sand					1	1	1	1	1	1			
		D-2	11.00	11.80	Silty Sand					1	1	1	1	1	1			
		D-3	16.00	16.90	Sandy Silt					1	1	1	1	1	1			
		D-4	19.00	19.80	Silty Sand					1	1	1	1	1	1			
	LD2-11-1	HP-1	2.00	2.80	Clay		1			1	1	1	1	1	1			
		HP-2	5.00	5.90	Sandy Silt		1	1		1	1	1	1	1	1			
		HP-3	8.00	8.90	Clay		1			1	1	1	1	1	1			
		HP-4	11.00	11.80	Silty Sand					1	1	1	1	1	1			
		D-1	14.00	14.80	Silty Sand					1	1	1	1	1	1	1		1
		D-2	17.00	17.80	Sandy Silt					1	1	1	1	1	1			
	LD2-11-1a	D-3	20.00	20.80	Silty Sand					1	1	1	1	1	1			
		HP-1	2.00	2.85	Clayey Silt					1	1	1	1	1	1			
		HP-2	5.00	5.90	Clayey Silt					1	1	1	1	1	1			
		HP-3	8.00	8.90	Silty Clay					1	1	1	1	1	1			
		D-1	11.00	11.80	Silty Sand					1	1	1	1	1	1			
		D-2	14.00	14.60	Silty Sand					1	1	1	1	1	1	1		1
	LD2-11-1b	D-3	17.00	17.80	Sand					1	1	1	1	1	1			
		D-4	20.00	20.70	Silty Sand					1	1	1	1	1	1			
		HP-1	2.00	2.90	Clay		1			1	1	1	1	1	1			
		HP-2	6.00	6.90	Clayey Silt			1		1	1	1	1	1	1			
		HP-3	9.00	9.50	Silty Sand					1	1	1	1	1	1			
		D-1	12.00	12.85	Sandy Silt					1	1	1	1	1	1			
	LD2-12-1a	D-2	15.00	15.85	Sandy Silt					1	1	1	1	1	1			
		D-3	18.00	18.60	Silty Sand					1	1	1	1	1	1			
		HP-1	2.00	2.90	Clay		1			1	1	1	1	1	1			
		D-1	6.00	6.70	Sand					1	1	1	1	1	1		1	
		D-2	9.00	9.85	Sandy Silt			1		1	1	1	1	1	1			
		D-3	12.00	12.30	Clay					1	1	1	1	1	1			
	LD2-12-1b	D-3	12.30	12.80	Silty Sand					1	1	1	1	1	1		1	
		D-4	15.00	15.70	Silty Sand					1	1	1	1	1	1		1	
		D-1	3.00	3.90	Silty Sand					1	1	1	1	1	1			
		HP-1	6.00	6.60	Clay					1	1	1	1	1	1			
			6.60	6.80	Silty Sand					1	1	1	1	1	1			
		D-2	9.00	9.65	Silty Sand					1	1	1	1	1	1	1		1
	LD2-13-1	D-3	12.00	12.65	Silty Sand					1	1	1	1	1	1			
		D-4	16.00	16.90	Silty Sand					1	1	1	1	1	1			
		D-5	18.00	18.90	Silty Sand with Silty Clay					1	1	1	1	1	1			
		D-6	22.00	22.90	Silty Clay with Silty Sand					1	1	1	1	1	1			
		HP-1	2.00	2.80	Silty Clay					1	1	1	1	1	1			
		HP-2	5.00	5.80	Sandy Silt					1	1	1	1	1	1			
	LD2-13-2	D-1	8.00	8.85	Silty Sand					1	1	1	1	1	1			
		D-2	11.00	11.80	Silty Sand					1	1	1	1	1	1	1		1
		HP-3	14.00	14.70	Clayey Silt, Sandy Silt					1	1	1	1	1	1			
		D-3	17.00	17.85	Silty Sand					1	1	1	1	1	1			
		HP-1	4.00	4.85	Clay					1	1	1	1	1	1			
		D-1	6.00	6.50	Silty Sand											5	4	
	LD2-13-3	D-2	6.50	7.00	Silty Sand													
		D-3	9.00	9.90	Sand													
		D-4	12.00	12.80	Clay					1	1	1	1	1	1			
		D-5	18.00	18.80	Sandy Silt		1			1	1	1	1	1	1			
		D-1	3.00	3.80	Silty Sand					1	1	1	1	1	1	1		1
		D-2	6.00	6.80	Silty Sand					1	1	1	1	1	1			
		HP-1	9.00	9.80	Clay with Silty Sand					1	1	1	1	1	1			
		D-3	12.00	12.45	Silty Sand					1	1	1	1	1	1	1		1
		D-4	12.50	13.40	Silty Sand					1	1	1	1	1	1			
		D-5	15.50	16.40	Silty Sand					1	1	1	1	1	1			
	D-6	18.50	19.40	Sandy Silt with Silty Clay					1	1	1	1	1	1				
	D-7	21.50	22.40	Silty Clay with Sandy Silt					1	1	1	1	1	1				
	<b>Total</b>						<b>1</b>	<b>7</b>	<b>2</b>	<b>7</b>	<b>68</b>	<b>68</b>	<b>68</b>	<b>68</b>	<b>68</b>	<b>14</b>	<b>17</b>	

Final Report on Topographic Survey and Soil Investigation for  
 Preparatory Survey on Chittagong Area Coal Fired Power Plant Development  
 Project in Bangladesh Volume 1: Main Text <Draft>

Area	BH No	Sample No	Depth (m)		Sample Material	Test Item											
			from	to		QU	UU	CU bar	Cons	Wn	Gs	LL & PL	Sieve	Hydro	Compaction	Triaxial(CD)	
Power Plant Area	PP-14-1	HP-1	1.00	1.50	Clay						1	1	1	1	1		
		HP-2	2.00	2.75	Clay						1	1	1	1	1		
		HP-3	5.00	5.80	Sandy Silt						1	1	1	1	1		
	PP-14-2	D-1	8.00	8.80	Silty Sand						1	1	1	1	1		
		HP-1	3.00	3.70	Sandy Silt	1	1		1	1	1	1	1	1	1		
		HP-2	6.00	6.80	Sandy Silt	1	1		1	1	1	1	1	1	1		
		HP-3	9.00	9.90	Sandy Silt		1		1	1	1	1	1	1	1		
		D-1	12.50	13.40	Sand						1	1	1	1	1	1	1
		D-2	16.00	16.80	Sand						1	1	1	1	1	1	1
		D-3	19.00	19.90	Sandy Silt		1		1	1	1	1	1	1	1		
		D-4	22.00	22.50	Silty Sand						1	1	1	1	1	1	
	PP-14-3	HP-1	1.00	1.80	Organic Clay						1	1	1	1	1		
		HP-2	4.00	4.80	Clay						1	1	1	1	1		
		HP-3	7.00	7.80	Silty Clay						1	1	1	1	1		
		HP-4	10.00	10.70	Silty Clay						1	1	1	1	1		
		HP-5	13.00	13.90	Sandy Silt						1	1	1	1	1		
		HP-6	16.00	16.90	Silty Clay						1	1	1	1	1		
	PP-17-1	HP-1	2.00	2.85	Clay		1	1		1	1	1	1	1	1		
		HP-2	5.00	5.85	Clay		1	1		1	1	1	1	1	1		
		HP-3	8.00	8.85	Sandy Clay		1			1	1	1	1	1	1		
		D-1	15.00	15.85	Clay						1	1	1	1	1	1	
	PP-21-1	HP-1	1.00	1.65	Silty Clay			1	1	1	1	1	1	1	1		
		HP-2	3.00	3.85	Clayey Silt		1			1	1	1	1	1	1		
		HP-3	6.00	6.85	Silty Clay		1				1	1	1	1	1		
		D-1	11.00	11.85	Silty Sand with Clayey Silt						1	1	1	1	1	1	1
	PP-21-2	HP-1	2.00	2.90	Clay		1			1	1	1	1	1	1		
		HP-2	5.00	5.85	Silt		1	1		1	1	1	1	1	1		
		D-1	8.00	8.85	Silty Sand						1	1	1	1	1		
		D-2	11.00	11.85	Sand							1	1	1	1	1	1
		D-3	14.00	14.85	Silty Sand							1	1	1	1	1	1
	PP-21-3	HP-1	1.00	1.90	Silty Clay			1	1		1	1	1	1	1		
		D-1	4.00	4.20	Silty Sand						1	1	1	1	1		
		HP-2	5.00	5.90	Silty Sand						1	1	1	1	1		
		D-2	7.00	7.75	Silty Sand						1	1	1	1	1		
	PP-24-1	HP-1	2.00	2.85	Clay		1			1	1	1	1	1	1		
		HP-2	5.00	5.90	Clay		1			1	1	1	1	1	1		1
		D-1	8.00	8.70	Silty Sand						1	1	1	1	1		
		D-2	11.00	11.60	Silty Sand						1	1	1	1	1		1
	PP3-15-1	D-3	14.00	14.85	Silty Sand						1	1	1	1	1		
		HP-1	1.00	1.75	Clay						1	1	1	1	1		
		HP-2	4.00	4.75	Silty Clay						1	1	1	1	1		
		HP-1	1.00	1.50	Clay						1	1	1	1	1		
		HP-2	2.00	2.85	Organic Clay						1	1	1	1	1		
		HP-3	5.00	5.90	Clay						1	1	1	1	1		
	PP3-15-2	HP-4	8.00	8.90	Clay with Sandy Silt						1	1	1	1	1		
		HP-5	11.00	11.80	Clay with Sandy Silt						1	1	1	1	1		
		HP-6	14.00	14.60	Clay with Sandy Silt						1	1	1	1	1		
		HP-1	1.00	1.80	Organic Clay						1	1	1	1	1		
		HP-2	4.00	4.77	Silty Clay						1	1	1	1	1		
		HP-3	7.00	7.24	Silty Clay						1	1	1	1	1		
	PP3-17-1	HP-4	7.50	8.40	Silty Clay						1	1	1	1	1		
		HP-1	1.00	1.90	Organic Clay						1	1	1	1	1		
		HP-2	4.00	4.90	Clay						1	1	1	1	1		
		HP-3	7.00	7.90	Clay						1	1	1	1	1		
	PP3-17-2	HP-4	11.00	11.90	Silty Sand with Sandy Silt						1	1	1	1	1		
		HP-1	1.00	1.70	Organic Clay						1	1	1	1	1		
		HP-2	3.00	3.83	Silty Clay						1	1	1	1	1		
		HP-3	6.00	6.40	Silty Clay						1	1	1	1	1		
	PP3-19-1	HP-4	6.50	7.35	Silty Clay						1	1	1	1	1		
		HP-5	10.00	10.85	Silty Clay						1	1	1	1	1		
		HP-6	13.00	13.85	Silty Clay						1	1	1	1	1		
		HP-1	3.00	3.85	Clay		1	1		1	1	1	1	1	1		
		HP-2	6.00	6.90	Clay		1			1	1	1	1	1	1		
		D-1	9.50	10.30	Silty Sand						1	1	1	1	1		
	PP3-19-2	HP-3	13.00	13.85	Silt						1	1	1	1	1		
		HP-4	16.00	16.85	Silty Sand						1	1	1	1	1		
		HP-1	1.00	1.90	Clay						1	1	1	1	1		
		HP-2	4.00	4.85	Silty Sand						1	1	1	1	1		
	PP3-19-3	HP-3	7.00	7.85	Clay with Silty Sand						1	1	1	1	1		
		HP-1	1.00	1.85	Silty Clay						1	1	1	1	1		
		HP-2	4.00	4.85	Sandy Silt, Clayey Silt						1	1	1	1	1		
	PP3-23-1	D-1	7.00	7.85	Silty Sand						1	1	1	1	1		
		HP-1	2.00	2.55	Silty Clay		1			1	1	1	1	1	1		
		HP-2	5.00	5.80	Sandy Silt		1			1	1	1	1	1	1		
		D-1	8.00	8.60	Silty Sand						1	1	1	1	1		
	PP3-23-2	D-2	11.00	11.85	Silty Sand						1	1	1	1	1		
		HP-1	2.00	2.75	Silty Clay						1	1	1	1	1		
		HP-2	5.00	5.75	Silty Clay, Clayey Silt						1	1	1	1	1		
	PP3-23-3	HP-1	2.00	2.80	Clayey Silt						1	1	1	1	1		
		HP-2	5.00	5.85	Silty Sand						1	1	1	1	1		
		D-1	8.00	8.85	Silty Sand						1	1	1	1	1		
	PP3-24-1	HP-1	2.00	2.70	Silty Clay						1	1	1	1	1		
		HP-2	5.00	5.85	Silty Clay, Clayey Silt						1	1	1	1	1		
		D-1	9.00	9.85	Clay, Silty Sand						1	1	1	1	1		
	PP3-24-2	HP-1	2.00	2.70	Silty Clay						1	1	1	1	1		
		HP-2	5.00	5.85	Silty Clay, Clayey Silt						1	1	1	1	1		
		D-1	9.00	9.85	Clay, Silty Sand						1	1	1	1	1		
	Total						3	18	5	20	86	86	86	86	86	1	6
	Total (OF+LD+PP)						4	25	7	27	223	223	212	223	223	22	30

**Table 7** Quantities of laboratory tests done, site laboratory

Area	BH No	Sample No	Depth (m)		Sample Material	Test Item			Remarks
			from	to		LL & PL	Sieve	TSS	
Channel Area	LD2-11-1	SPT-6	9.00	9.45	Silty Sand		1		
		SPT-7	10.00	10.45	Silty Sand		1		
		SPT-8	12.00	12.45	Silty Sand		1		
		SPT-9	13.00	13.45	Silty Sand		1		
		D-1	14.00	14.80	Silty Sand		1		
		SPT-10	15.00	15.45	Silty Sand		1		
		SPT-11	16.00	16.45	Silty Sand		1		
		SPT-12	18.00	18.45	Silty Sand		1		
		SPT-13	19.00	19.45	Silty Sand		1		
		SPT-17	24.00	24.45	Sandy Silt		1		
		SPT-18	25.00	25.45	Sandy Silt		1		
		SPT-19	26.00	26.45	Sandy Silt		1		
		SPT-20	27.00	27.45	Sandy Silt		1		
	SPT-21	28.00	28.45	Silty Sand		1			
	SPT-22	29.00	29.45	Silty Sand		1			
	SPT-23	30.00	30.45	Silty Sand		1			
	LD2-13-2	SPT-4	5.00	5.45	Silty Sand		1		
		D-1	6.00	6.50	Silty Sand	1	1		
		D-2	6.50	7.00	Silty Sand	1	1		
		SPT-5R	7.00	7.45	Silty Sand		1		
		SPT-6R	8.00	8.45	Silty Sand		1		
		D-3	9.00	9.60	Silty Sand	1	1		
			9.60	9.90	Silty Sand	1	1		
SPT-7		10.00	10.45	Silty Sand		1			
SPT-8		11.00	11.45	Silty Sand		1			
D-4		12.00	12.80	Clayey Silt	1	1			
SPT-12		16.00	16.45	Sandy Silt		1			
SPT-13		17.00	17.45	Silty Sand		1			
D-5		18.00	18.80	Sandy Silt	1	1			
SPT-14		19.00	19.45	Sandy Silt		1			
Power Plant Area	PP-14-2	SPT-8	11.00	11.45	Silty Sand		1		
		D-1	12.00	12.95	Silty Sand		1		
		SPT-9	14.00	14.45	Silty Sand		1		
		SPT-10	15.00	15.45	Silty Sand		1		
		D-2	16.00	16.80	Sandy Silt		1		
		SPT-11	17.00	17.45	Sandy Silt		1		
		SPT-12	18.00	18.45	Sandy Silt		1		
		D-3	19.00	19.90	Sandy Silt		1		
		SPT-13	20.00	0.44	Sandy Silt		1		
		SPT-14	21.00	21.45	Clayey Sand		1		
	D-4	22.00	22.50	Clayey Sand		1			
	PP-21-2	SPT-26	31.00	31.28	Silt		1		
		SPT-27	32.00	32.27	Silt		1		
		SPT-28	33.00	33.23	Silty Sand		1		
		SPT-29	34.00	34.21	Silty Sand		1		
		SPT-30	35.00	35.26	Silt		1		
		SPT-31	36.00	36.38	Sandy Silt		1		
		SPT-32	37.00	37.35	Silty Sand		1		
		SPT-33	38.00	38.31	Silty Sand		1		
		SPT-34	40.00	40.33	Silty Sand		1		
SPT-35		42.00	42.33	Silty Sand		1			
SPT-36	44.00	44.23	Silty Sand		1				
SPT-37	46.00	46.29	Silty Sand		1				
SPT-38	48.00	48.29	Silty Sand		1				
SPT-39	50.00	50.25	Silty Sand		1				
Addotlional	Cx-1	-	-	Sand		1		Sample provided by the client	
	Cx-2	-	-	Sand		1			
	Sh-1	-	-	Sand		1			
<b>Total</b>					<b>6</b>	<b>58</b>	<b>14</b>		

1) OF-02-1



**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-02-1							
Sample No.		D-1	D-2	D-3	D-4				
Sample Depth		2.00m ~2.80m	5.00m ~5.80m	8.00m ~8.80m	11.00m ~11.90m				
Condition of Sample		Disturbed							
Natural Water Content	%	24.4	20.3	25.0	22.4				
Specific Gravity		2.69	2.69	2.69	2.70				
Wet Density	Mg/m <sup>3</sup>	1.97	-	1.94	2.02				
Dry Density	Mg/m <sup>3</sup>	1.58	-	1.55	1.65				
Natural Void Ratio		0.70	-	0.74	0.63				
Degree of Saturation	%	94	-	91	95				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0	0			
	Sand,	%	76	73	49	63			
	Silt,	%	11	11	30	13			
	Clay & Colloid,	%	13	16	21	24			
	Max. diameter,	mm	0.850	4.75	0.850	4.75			
	Diam. at 60%	mm	0.150	0.24	0.12	0.20			
	Diam. at 10%	mm	-	-	-	-			
Visual soil description		Clayey Sand	Clayey Sand	Sandy Silt	Clayey Sand				
Unified soil classification		-	-	-	-				
Triaxial compression test	Angle of Internal Friction (°)	-	-	-	-				
	Cohesion Intercept, kPa	-	-	-	-				
	Condition of drainage	-	-	-	-				
	Angle of Internal Friction * <sup>2</sup> (°)	-	-	-	-				
	Cohesion Intercept, kPa * <sup>2</sup>	-	-	-	-				
	Condition of drainage	-	-	-	-				
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-				
	Compression Index(Average)	-	-	-	-				
	Pressure Range for Compression Index(kPa)	-	-	-	-				
	Swell index	-	-	-	-				
Chemical Test	pH value	-	-	-	-				
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-			
	Chloride content as Cl,	%	-	-	-	-			
	Organic Matter content,	%	-	-	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 10.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

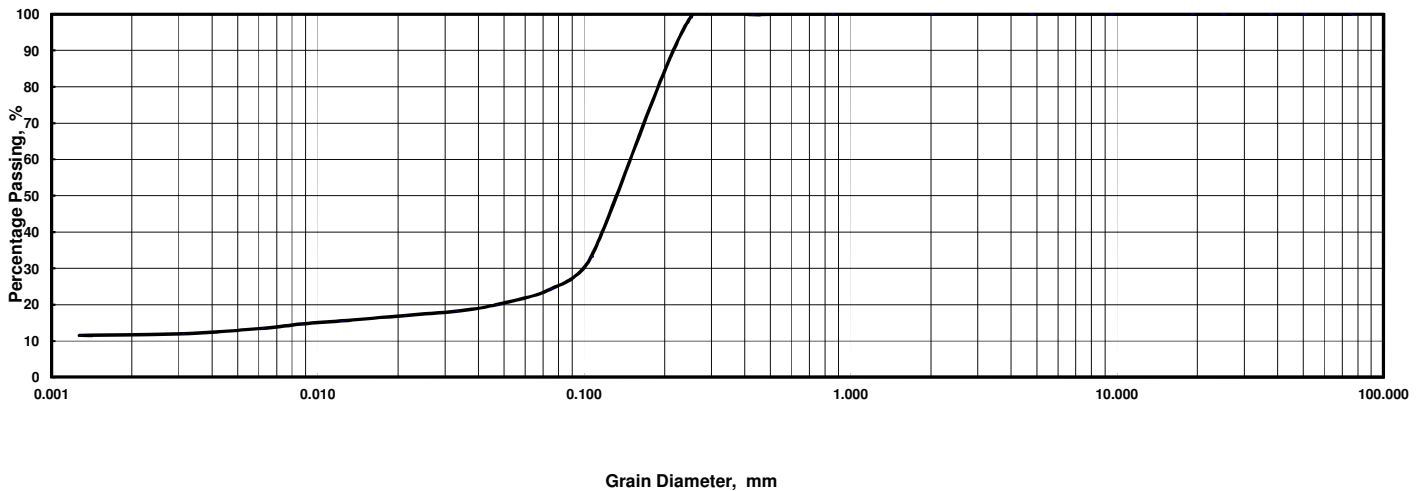
Sample No. : **OF-02-1 D-1** Depth : **2.00-2.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.1	33.2	24.4
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	20.0	18.2	17.0	15.5	14.7	13.5	12.0	11.5							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



CLAY	0.005	0.075	0.425	2.00	4.75	19.0	75.0
	SILT		FINE SAND		MEDIUM SAND		COARSE SAND

Sample No.	OF-02-1 D-1		Sample No.	OF-02-1 D-1	
Depth	2.00-2.80m		Depth	2.00-2.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.150 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.094 mm	
0.425 - 0.075 mm	75.4 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	11.4 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	12.9 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	24.4 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 10.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

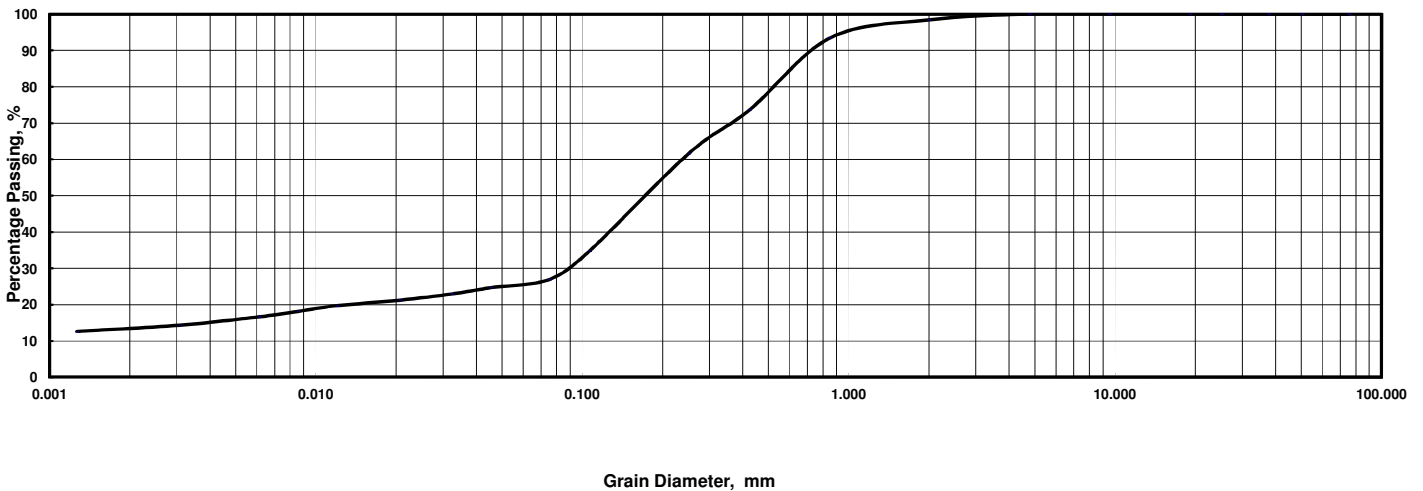
Sample No. : **OF-02-1 D-2** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm				75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	93.4	73.7	61.6	34.7	26.9
Hydro.	Dia., mm	0.045	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0013								
	% Passing	24.7	23.0	21.2	19.7	18.1	16.6	14.3	12.6								

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-02-1 D-2		Sample No.	OF-02-1 D-2	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	1.6	%	Dia. at 60%	0.24	mm
2.00 - 0.425 mm	24.7	%	Dia. at 30%	0.086	mm
0.425 - 0.075 mm	46.8	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	11.1	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	15.8	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	93.4	%			
75um Sieve Passing	26.9	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 10.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

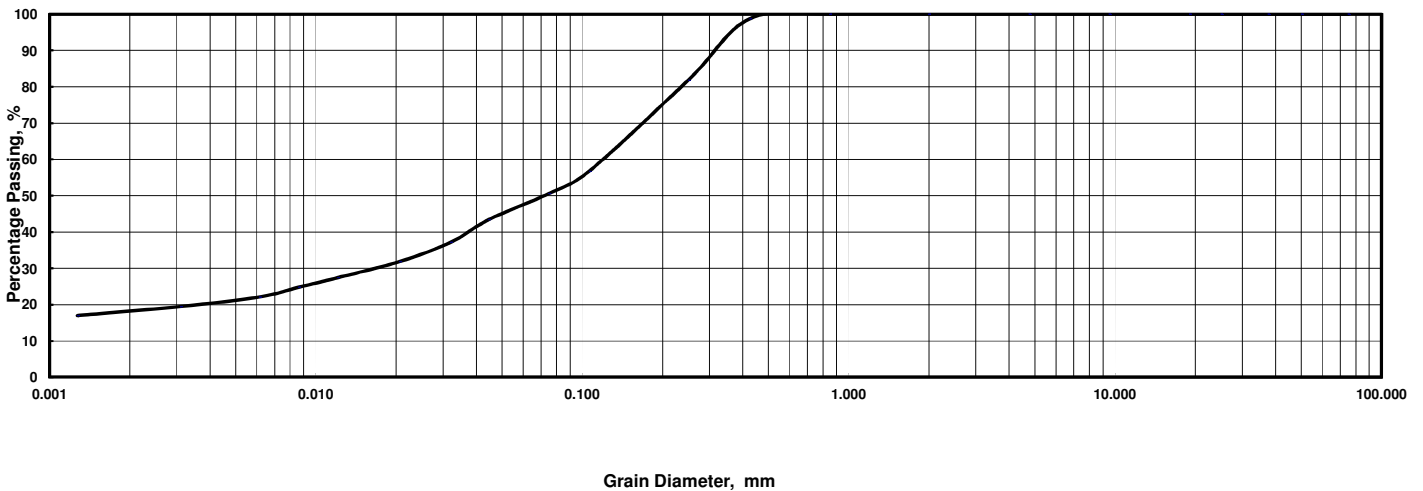
Sample No. : **OF-02-1 D-3** Depth : **8.00-8.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.7	81.9	56.8	50.6
Hydro.	Dia., mm	0.044	0.032	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	43.4	37.2	31.9	27.5	24.8	22.1	19.5	17.0							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-02-1 D-3		Sample No.	OF-02-1 D-3	
Depth	8.00-8.80m		Depth	8.00-8.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.12	mm
2.00 - 0.425 mm	1.3	%	Dia. at 30%	0.016	mm
0.425 - 0.075 mm	48.1	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	29.5	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	21.2	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	50.6	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 10.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

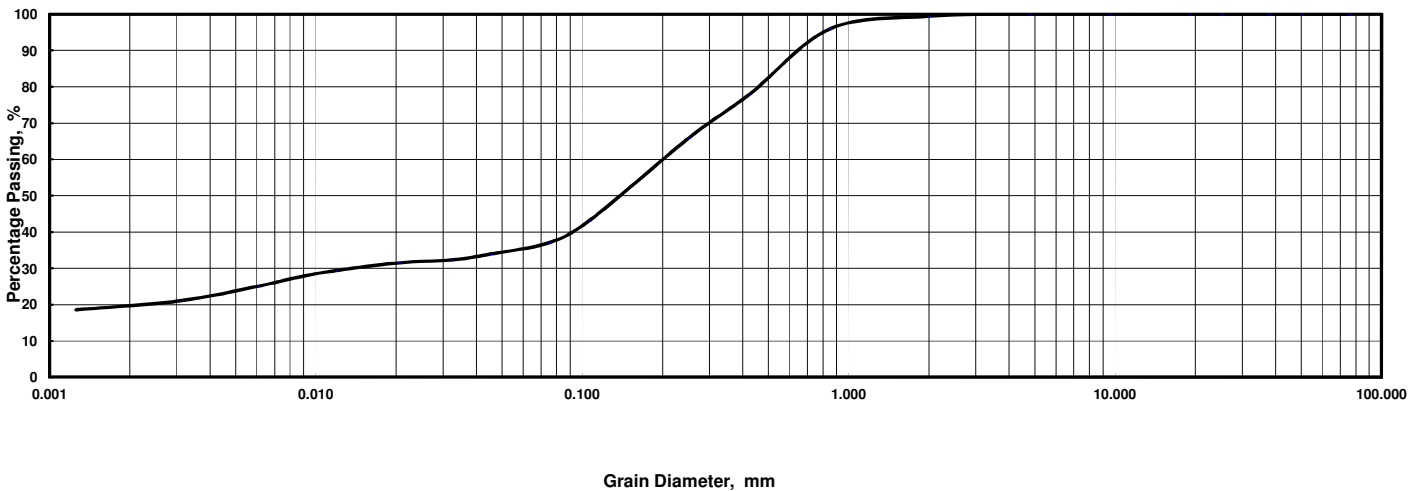
Sample No. : **OF-02-1 D-4** Depth : **11.00-11.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	95.9	78.0	65.8	43.1	37.1
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0085	0.0060	0.0031	0.0013							
	% Passing	33.9	32.3	31.5	29.4	27.5	25.0	21.0	18.6							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-02-1 D-4		Sample No.	OF-02-1 D-4	
Depth	11.00-11.90m		Depth	11.00-11.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.6 %		Dia. at 60%	0.20 mm	
2.00 - 0.425 mm	21.4 %		Dia. at 30%	0.014 mm	
0.425 - 0.075 mm	40.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	13.4 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	95.9 %				
75um Sieve Passing	37.1 %				

2) OF-03-1

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-03-1							
Sample No.		D-1	D-2	D-3	D-4				
Sample Depth		1.00m ~1.80m	5.00m ~5.80m	8.00m ~8.80m	11.00m ~11.80m				
Condition of Sample		Disturbed							
Natural Water Content	%	23.1	33.6	29.8	29.1				
Specific Gravity		2.69	2.72	2.71	2.71				
Wet Density	Mg/m <sup>3</sup>	2.04	2.01	-	2.12				
Dry Density	Mg/m <sup>3</sup>	1.66	1.50	-	1.64				
Natural Void Ratio		0.62	0.81	-	0.65				
Degree of Saturation	%	99	100	-	100				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	24	27	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	17	19	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	7	8	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0	0			
	Sand,	%	65	50	32	24			
	Silt,	%	19	22	40	52			
	Clay & Colloid,	%	16	28	28	24			
	Max. diameter,	mm	2.00	0.425	2.00	0.850			
	Diam. at 60%	mm	0.16	0.11	0.054	0.048			
	Diam. at 10%	mm	-	-	-	-			
Visual soil description		Silty Sand	Clayey Sand	Sandy Clay	Silt with Sand				
Unified soil classification		-	SC	CL	-				
Triaxial compression test	Angle of Internal Friction (°)	-	-	-	-				
	Cohesion Intercept, kPa	-	-	-	-				
	Condition of drainage	-	-	-	-				
	Angle of Internal Friction * <sup>2</sup> (°)	-	-	-	-				
	Cohesion Intercept, kPa * <sup>2</sup>	-	-	-	-				
	Condition of drainage	-	-	-	-				
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-				
	Compression Index(Average)	-	-	-	-				
	Pressure Range for Compression Index(kPa)	-	-	-	-				
	Swell index	-	-	-	-				
Chemical Test	pH value	-	-	-	-				
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-			
	Chloride content as Cl,	%	-	-	-	-			
	Organic Matter content,	%	-	-	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

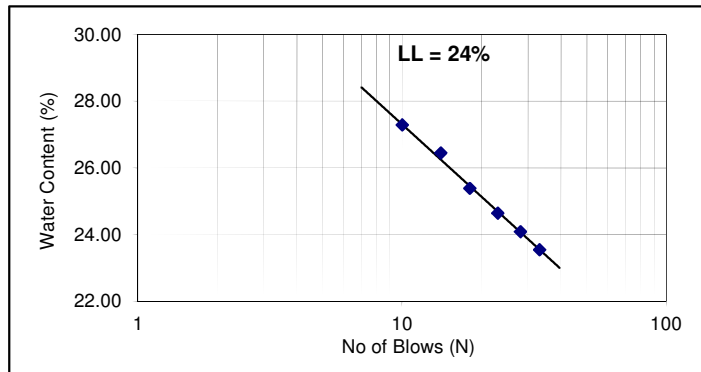
### ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 13.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-03-01 D-2 Depth : 5.00-5.80m

Remarks : Tested on material at natural state

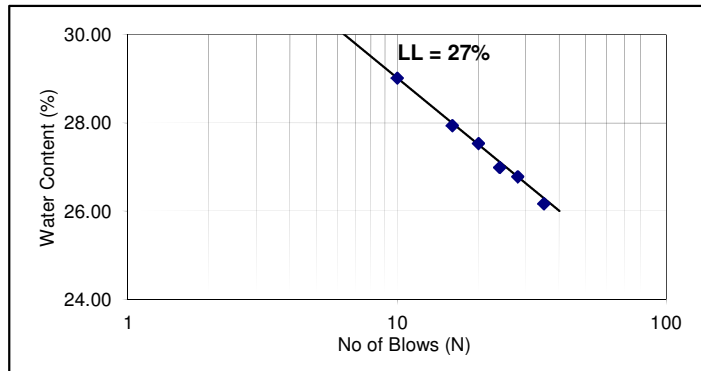
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	33	23.55
2	28	24.09
3	23	24.64
4	18	25.38
5	14	26.45
6	10	27.29
<b>Liquid Limits %</b>		<b>24</b>
<b>Plastic Limits %</b>		<b>17</b>
<b>Plasticity Index</b>		<b>7</b>



Sample No. : OF-03-01 D-3 Depth : 8.00-8.80m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	35	26.17
2	28	26.78
3	24	26.99
4	20	27.53
5	16	27.93
6	10	29.01
<b>Liquid Limits %</b>		<b>27</b>
<b>Plastic Limits %</b>		<b>19</b>
<b>Plasticity Index</b>		<b>8</b>





# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

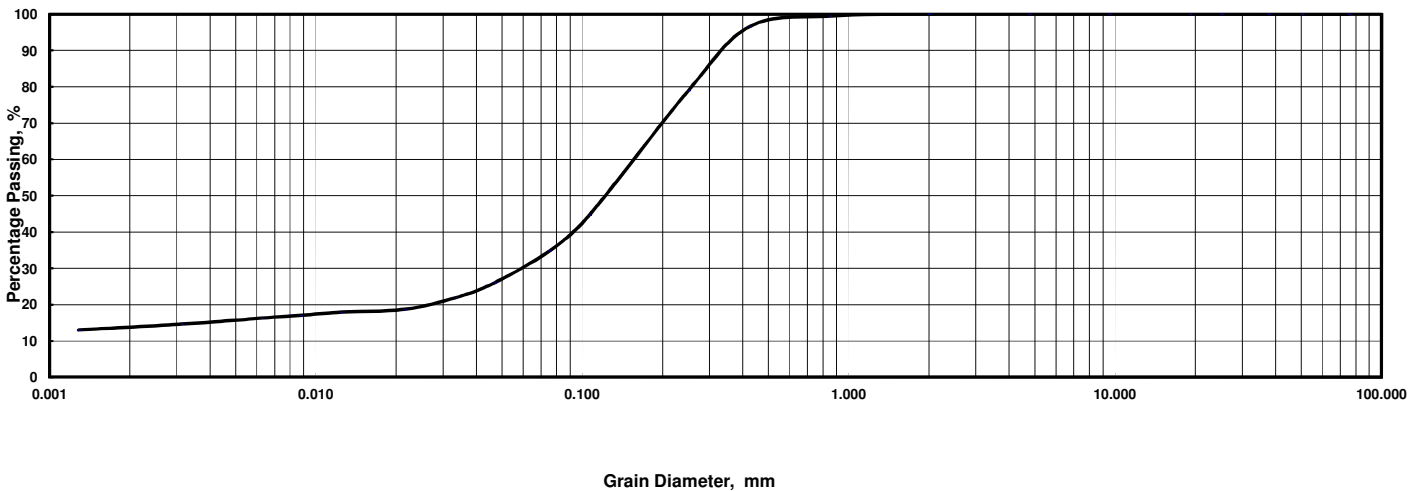
Sample No. : **OF-03-1 D-1** Depth : **1.00-1.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	96.6	79.0	44.6	34.8
Hydro.	Dia., mm	0.047	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	26.0	22.0	18.7	17.9	17.1	16.3	14.6	13.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1 D-1		Sample No.	OF-03-1 D-1	
Depth	1.00-1.80m		Depth	1.00-1.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.16 mm	
2.00 - 0.425 mm	3.4 %		Dia. at 30%	0.058 mm	
0.425 - 0.075 mm	61.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	19.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	15.6 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.5 %				
75um Sieve Passing	34.8 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

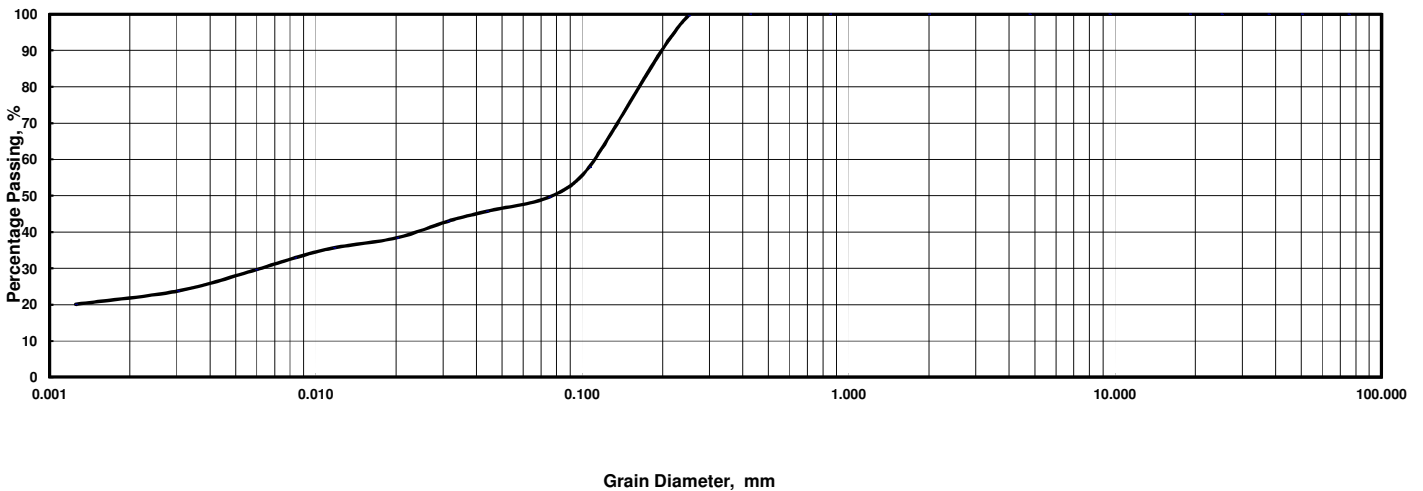
Sample No. : **OF-03-1 D-2** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	57.9	49.6
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0083	0.0060	0.0030	0.0013							
	% Passing	45.7	43.0	38.4	35.7	32.9	29.6	23.8	20.1							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1 D-2		Sample No.	OF-03-1 D-2	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.11 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.0062 mm	
0.425 - 0.075 mm	50.4 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	21.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	27.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	49.6 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

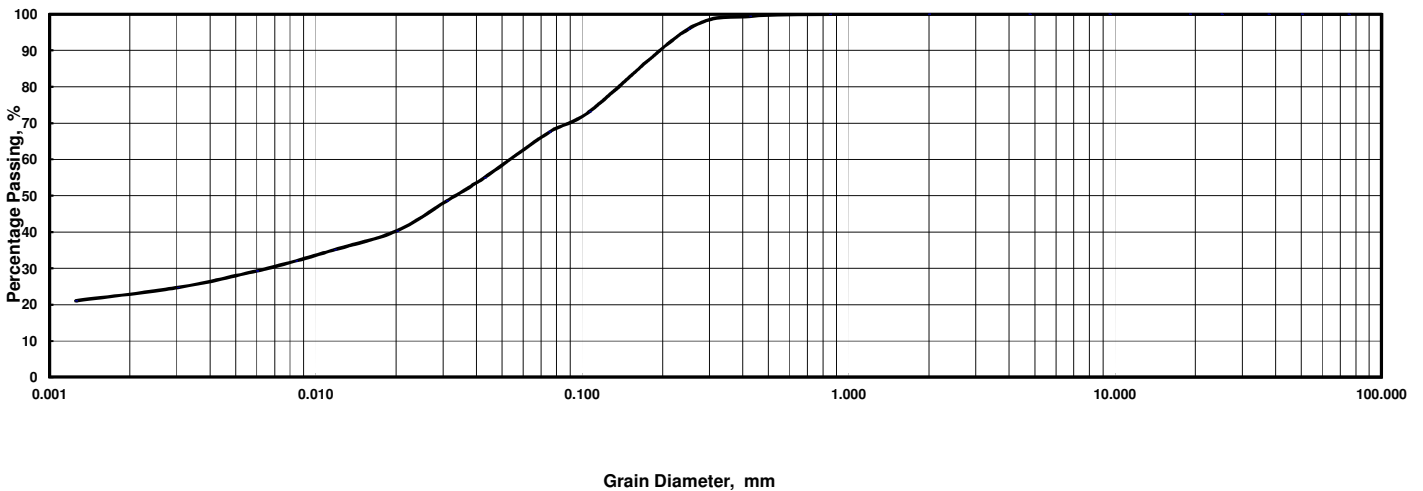
Sample No. : **OF-03-1 D-3** Depth : **8.00-8.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.4	95.9	73.1	67.5
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	55.0	48.5	40.3	35.2	32.1	29.3	24.7	21.1							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1 D-3		Sample No.	OF-03-1 D-3	
Depth	8.00-8.80m		Depth	8.00-8.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.054 mm	
2.00 - 0.425 mm	0.6 %		Dia. at 30%	0.0065 mm	
0.425 - 0.075 mm	31.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	39.7 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	27.8 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	67.5 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

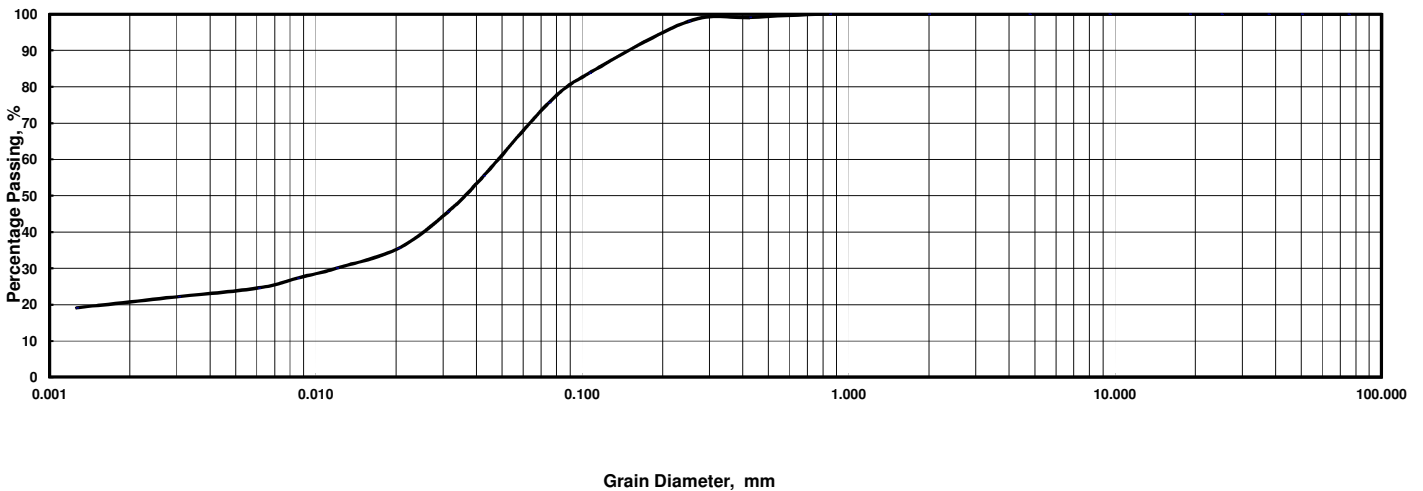
Sample No. : **OF-03-1 D-4** Depth : **11.00-11.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	98.0	83.8	75.7
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	55.6	45.5	35.5	30.1	27.3	24.6	22.2	19.1							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1 D-4		Sample No.	OF-03-1 D-4	
Depth	11.00-11.80m		Depth	11.00-11.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.048	mm
2.00 - 0.425 mm	0.9	%	Dia. at 30%	0.012	mm
0.425 - 0.075 mm	23.4	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	52.0	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.7	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	75.7	%			



3) OF-03-1a

**TABLE SUMMARY OF SOIL TEST**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Standard: ASTM

Borehole No.		<b>OF-03-1a</b>							
Sample No.		D-1	D-2						
Sample Depth		4.00m ~4.80m	7.00m ~7.80m						
Condition of Sample		Disturbed							
Natural Water Content		%	25.5	27.5					
Specific Gravity			2.69	2.70					
Wet Density		Mg/m <sup>3</sup>	1.92	1.93					
Dry Density		Mg/m <sup>3</sup>	1.53	1.51					
Natural Void Ratio			0.76	0.78					
Degree of Saturation		%	90	95					
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>					
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>					
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>					
Grain Size Analysis	Gravel,	%	0	0					
	Sand,	%	74	58					
	Silt,	%	10	18					
	Clay & Colloid,	%	16	24					
	Max. diameter,	mm	0.850	0.850					
	Diam. at 60%	mm	0.15	0.12					
	Diam. at 10%	mm	-	-					
Visual soil description			Clayey Sand	Clayey Sand					
Unified soil classification			-	-					
Triaxial compression test	Angle of Internal Friction (°)		-	-					
	Cohesion Intercept, kPa		-	-					
	Condition of drainage		-	-					
	Angle of Internal Friction * <sup>2</sup> (°)		-	-					
	Cohesion Intercept, kPa * <sup>2</sup>		-	-					
	Condition of drainage		-	-					
Consolidation Test	Preconsolidation Pressure, kPa		-	-					
	Compression Index(Average)		-	-					
	Pressure Range for Compression Index(kPa)		-	-					
	Swell index		-	-					
Chemical Test	pH value		-	-					
	Total sulphate content as SO <sub>3</sub> ,	%	-	-					
	Chloride content as Cl,	%	-	-					
	Organic Matter content,	%	-	-					
Unconfined Compression Strength (kPa)			-	-					
Strain at failure (%)			-	-					

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

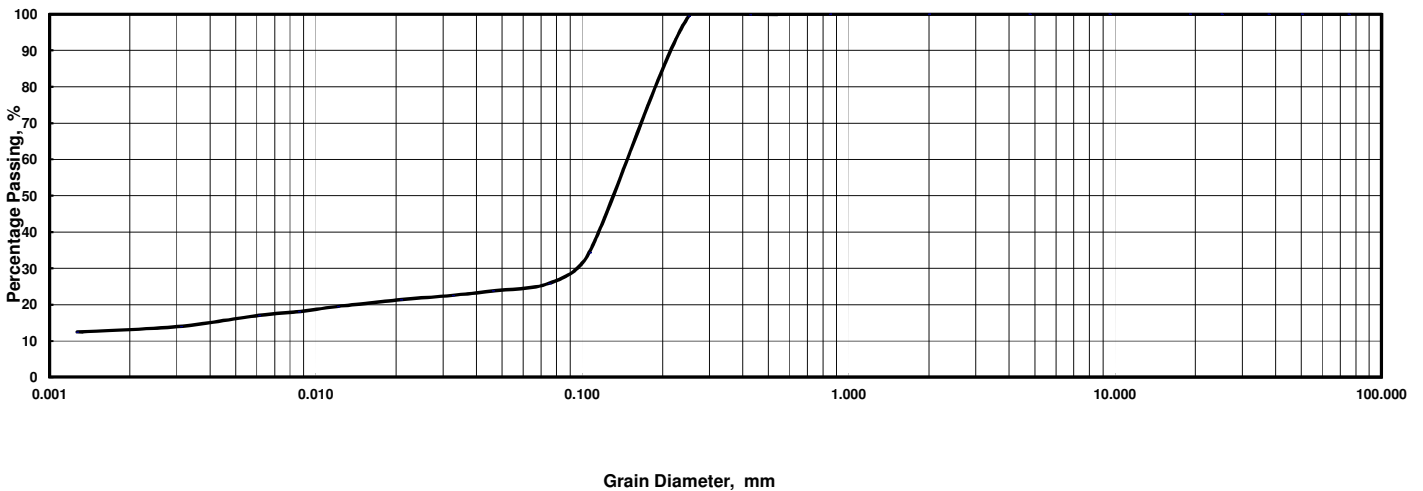
Sample No. : **OF-03-1a D-1** Depth : **4.00-4.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	34.3	25.9
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	23.8	22.6	21.4	19.5	18.1	17.1	14.0	12.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1a D-1		Sample No.	OF-03-1a D-1	
Depth	4.00-4.80m		Depth	4.00-4.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.089 mm	
0.425 - 0.075 mm	73.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	9.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	16.0 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	25.9 %				



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

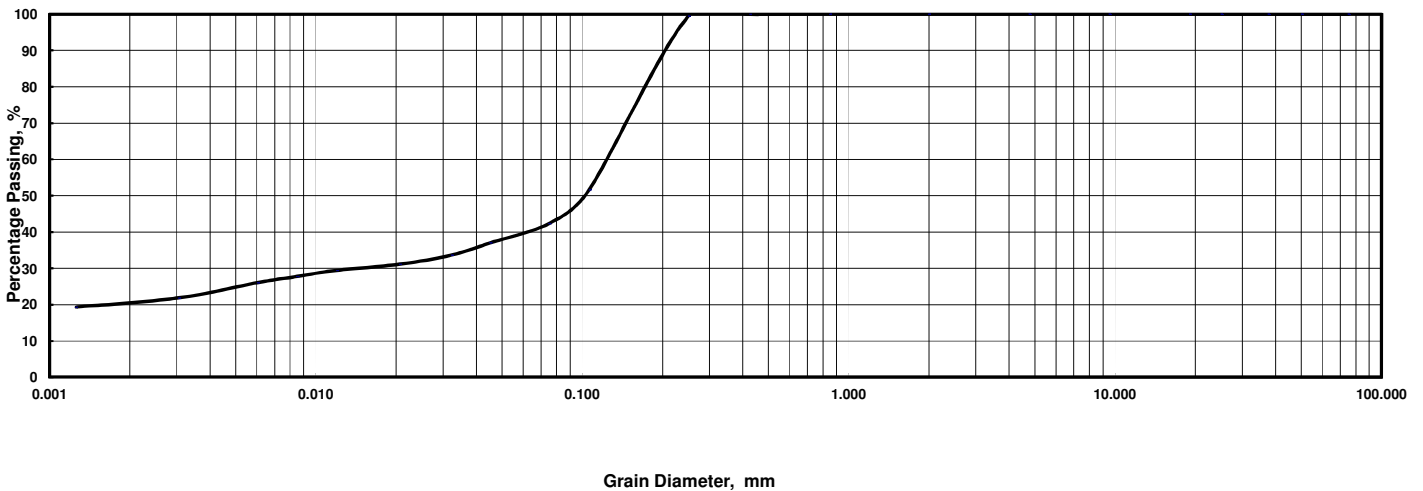
Sample No. : **OF-03-1a D-2** Depth : **7.00-7.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.4	51.6	42.4
Hydro.	Dia., mm	0.045	0.032	0.021	0.012	0.0085	0.0060	0.0031	0.0013							
	% Passing	37.0	33.7	31.1	29.5	27.8	26.1	21.9	19.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1a D-2		Sample No.	OF-03-1a D-2	
Depth	7.00-7.80m		Depth	7.00-7.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.12 mm	
2.00 - 0.425 mm	0.1 %		Dia. at 30%	0.014 mm	
0.425 - 0.075 mm	57.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	17.7 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	24.6 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	42.4 %				

## 4) OF-03-1b

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-03-1b						
Sample No.		D-1	D-2	D-3				
Sample Depth		2.00m ~2.80m	5.00m ~5.80m	8.00m ~8.80m				
Condition of Sample		Disturbed						
Natural Water Content	%	25.9	28.6	24.4				
Specific Gravity		2.70	2.70	2.69				
Wet Density	Mg/m <sup>3</sup>	2.05	1.87	-				
Dry Density	Mg/m <sup>3</sup>	1.63	1.45					
Natural Void Ratio		0.66	0.86					
Degree of Saturation	%	100	90					
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0			
	Sand,	%	67	70	64			
	Silt,	%	13	9	18			
	Clay & Colloid,	%	20	21	18			
	Max. diameter,	mm	0.850	0.850	4.75			
	Diam. at 60%	mm	0.15	0.15	0.13			
	Diam. at 10%	mm	-	-	-			
Visual soil description		Clayey Sand	Clayey Sand	Clayey Sand				
Unified soil classification		-	-	-				
Triaxial compression test	Angle of Internal Friction (°)		-	-				
	Cohesion Intercept, kPa		-	-				
	Condition of drainage		-	-				
	Angle of Internal Friction * <sup>2</sup> (°)		-	-				
	Cohesion Intercept, kPa * <sup>2</sup>		-	-				
	Condition of drainage		-	-				
Consolidation Test	Preconsolidation Pressure, kPa		-	-				
	Compression Index(Average)		-	-				
	Pressure Range for Compression Index(kPa)		-	-				
	Swell index		-	-				
Chemical Test	pH value		-	-				
	Total sulphate content as SO <sub>3</sub> , %		-	-				
	Chloride content as Cl, %		-	-				
	Organic Matter content, %		-	-				
Unconfined Compression Strength (kPa)		-	-					
Strain at failure (%)		-	-					

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

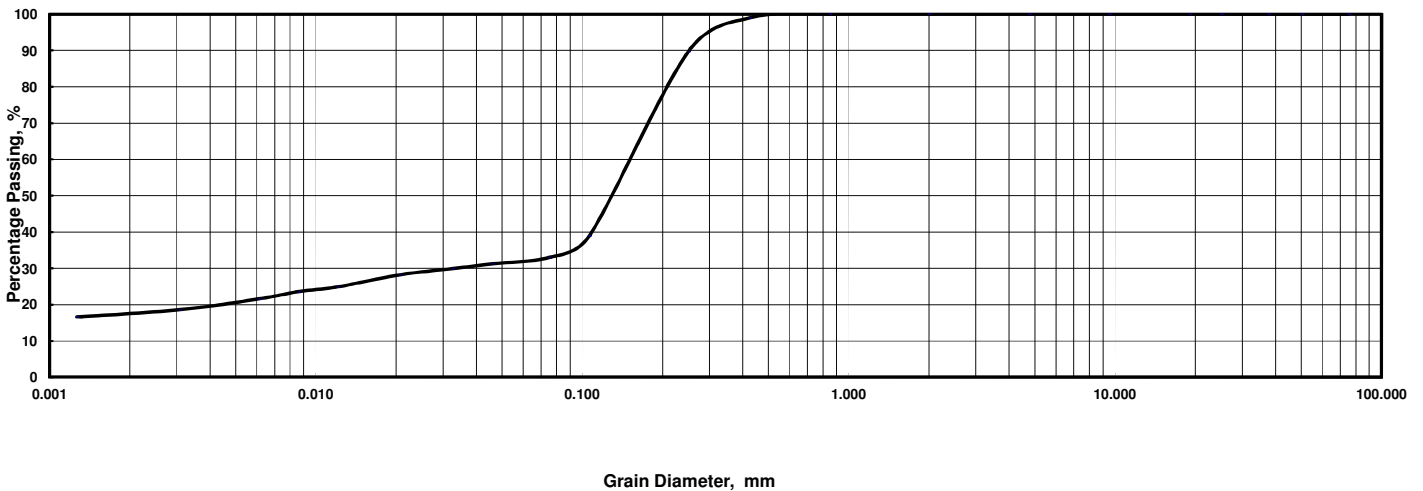
Sample No. : **OF-03-1b D-1** Depth : **2.00-2.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	89.7	38.9	33.0
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	31.2	29.9	28.2	24.9	23.6	21.6	18.6	16.6							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1b D-1		Sample No.	OF-03-1b D-1	
Depth	2.00-2.80m		Depth	2.00-2.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	1.0 %		Dia. at 30%	0.033 mm	
0.425 - 0.075 mm	66.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	12.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	20.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	33.0 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hün/Motiur

Checked by : A. B. Tan

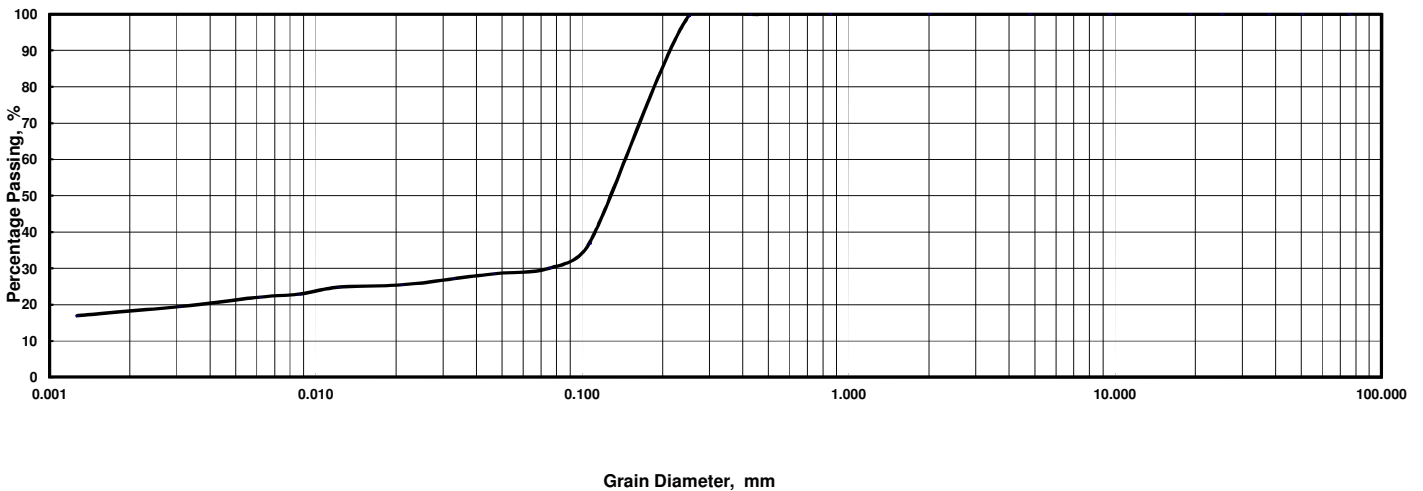
Sample No. : **OF-03-1b D-2** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	36.8	30.0
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	28.5	27.2	25.5	24.8	22.9	22.1	19.5	17.0							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1b D-2		Sample No.	OF-03-1b D-2	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	0.1 %		Dia. at 30%	0.074 mm	
0.425 - 0.075 mm	69.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	8.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	21.1 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	30.0 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

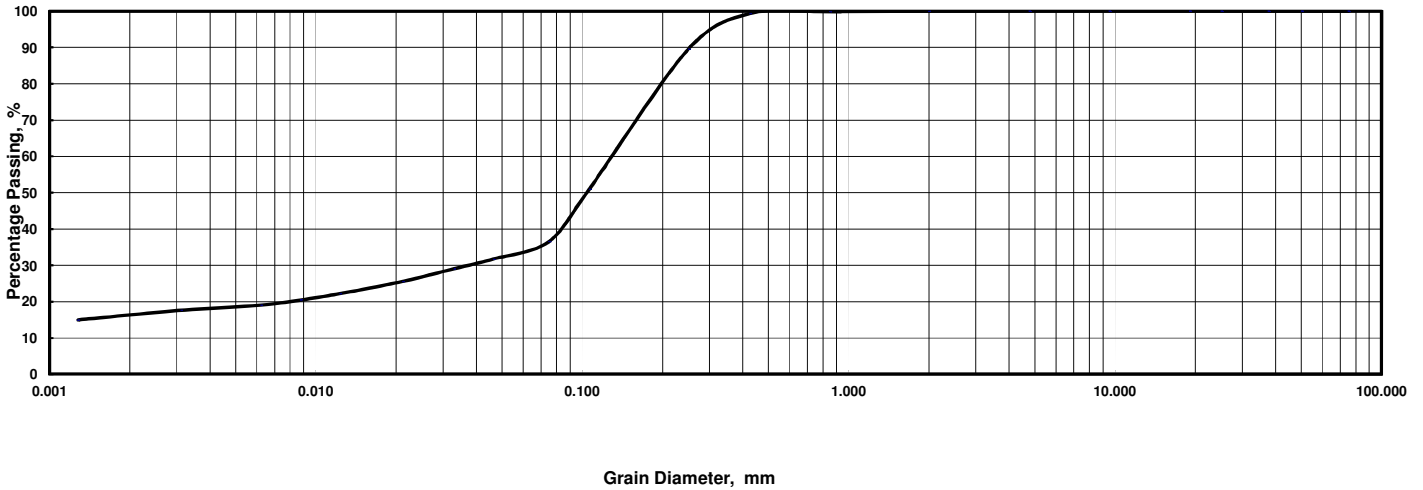
Sample No. : **OF-03-1b D-3** Depth : **8.00-8.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.3	89.6	50.9	36.6
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	31.7	29.1	25.6	22.2	20.4	19.0	17.6	15.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-03-1b D-3		Sample No.	OF-03-1b D-3	
Depth	8.00-8.80m		Depth	8.00-8.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.1 %		Dia. at 60%	0.13 mm	
2.00 - 0.425 mm	0.6 %		Dia. at 30%	0.037 mm	
0.425 - 0.075 mm	62.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	18.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	18.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.8 %				
75um Sieve Passing	36.6 %				



5) OF-03-1c



**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: ASTM

Borehole No.		<b>OF-03-1c</b>							
Sample No.		D-1							
Sample Depth		1.00m ~1.90m							
Condition of Sample		Disturbed							
Natural Water Content	%	22.4							
Specific Gravity		2.70							
Wet Density	Mg/m <sup>3</sup>	2.00							
Dry Density	Mg/m <sup>3</sup>	1.63							
Natural Void Ratio		0.65							
Degree of Saturation	%	93							
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>						
	Plastic Limit,	%	- * <sup>3</sup>						
	Plasticity Index,	%	- * <sup>3</sup>						
Grain Size Analysis	Gravel,	%	0						
	Sand,	%	68						
	Silt,	%	11						
	Clay & Colloid,	%	21						
	Max. diameter,	mm	0.850						
	Diam. at 60%	mm	0.17						
	Diam. at 10%	mm	-						
Visual soil description		Clayey Sand							
Unified soil classification		-							
Triaxial compression test	Angle of Internal Friction (°)		-						
	Cohesion Intercept, kPa		-						
	Condition of drainage		-						
	Angle of Internal Friction * <sup>2</sup> (°)		36						
	Cohesion Intercept, kPa * <sup>2</sup>		0						
	Condition of drainage		CD* <sup>5</sup>						
Consolidation Test	Preconsolidation Pressure, kPa		-						
	Compression Index(Average)		-						
	Pressure Range for Compression Index(kPa)		-						
	Swell index		-						
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>		1.73						
	Optimum Moisture Content , %		14.4						
Unconfined Compression Strength (kPa)		-							
Strain at failure (%)		-							

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : By using 2.5 kg Rammer

\*<sup>5</sup> : Specimens are prepared at 90% of Maximum dry density

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

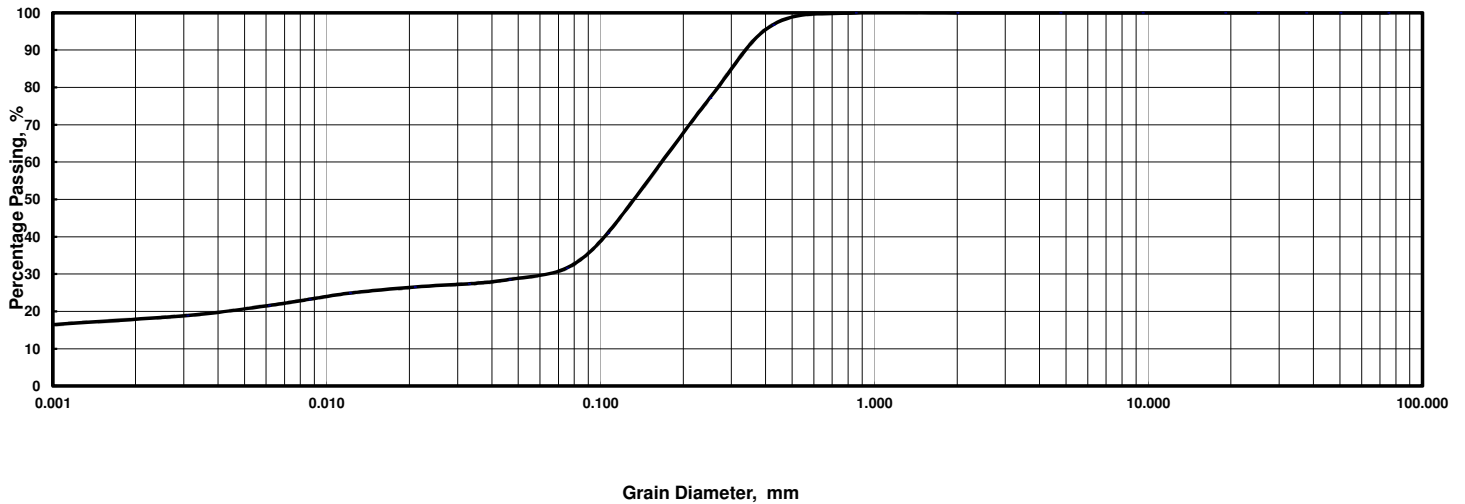
Sample No. : **OF-03-1C D-1** Depth : **1.00-1.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.8	77.1	41.0	31.6
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0009							
	% Passing	28.5	27.4	26.6	24.9	23.2	21.6	18.9	16.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-03-1C D-1		Sample No.	OF-03-1C D-1
Depth	1.00-1.90m		Depth	1.00-1.90m
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.17 mm
2.00 - 0.425 mm	3.2 %		Dia. at 30%	0.058 mm
0.425 - 0.075 mm	65.2 %		Dia. at 10%	- mm
0.075 - 0.005 mm	11.0 %		Coeff. of Uniformity	-
Smaller than 0.005 mm	20.6 %		Coeff. of Curvature	-
2000um Sieve Passing	100.0 %			
425um Sieve Passing	100.0 %			
75um Sieve Passing	31.6 %			

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 06.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-03-1c		Sample No.:D-1		Depth : 1.00-1.90m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.56	1.56	1.56		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.98	0.95		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	559	586		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.07	0.08	0.13		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	571	311	288		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.018	0.012	0.013		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	132	223	265		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	0.87	1.36	1.61		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	13.60	12.68	15.02		
Shear Strength Parameters	$\phi_d = 36$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.56 Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

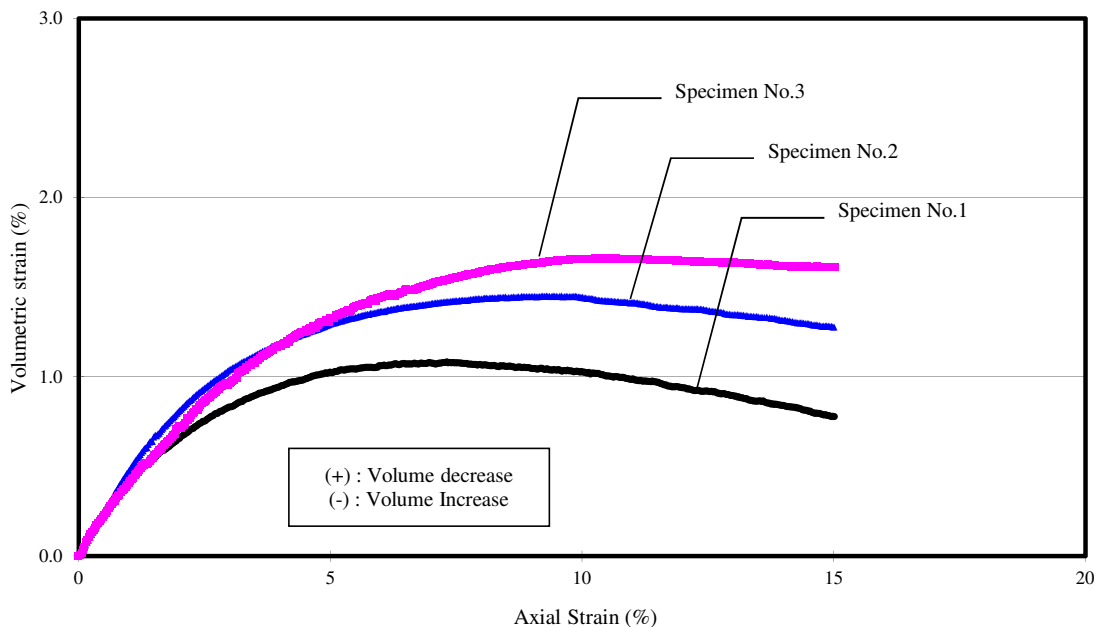
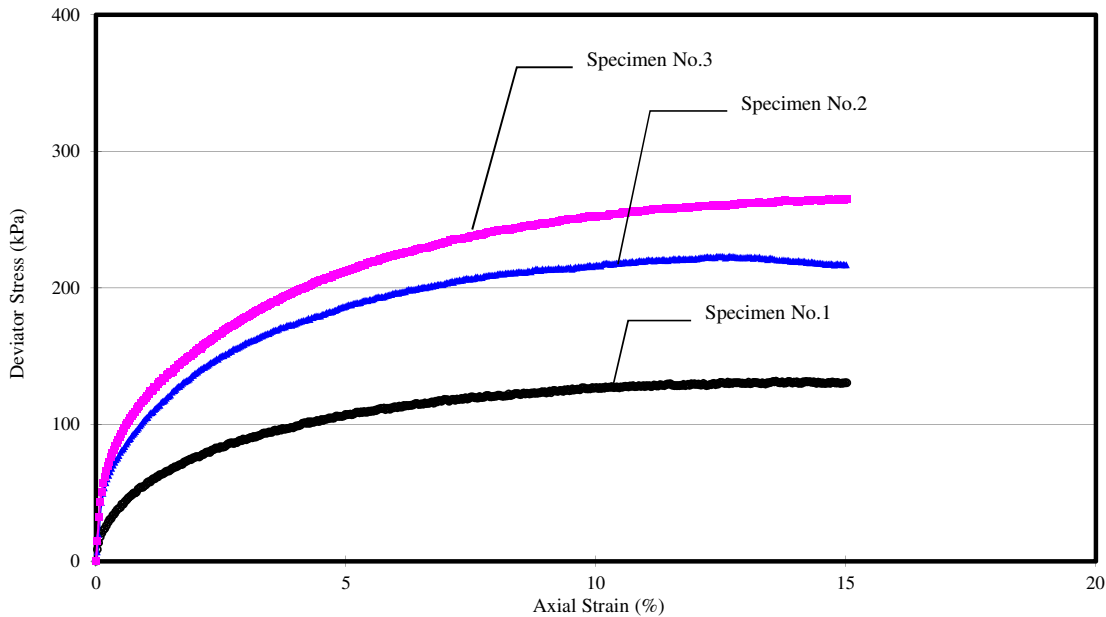
Project No.: S27-14

Sample No.: D-1

Soil Type: Clayey Sand

Borehole No.: OF-03-1c

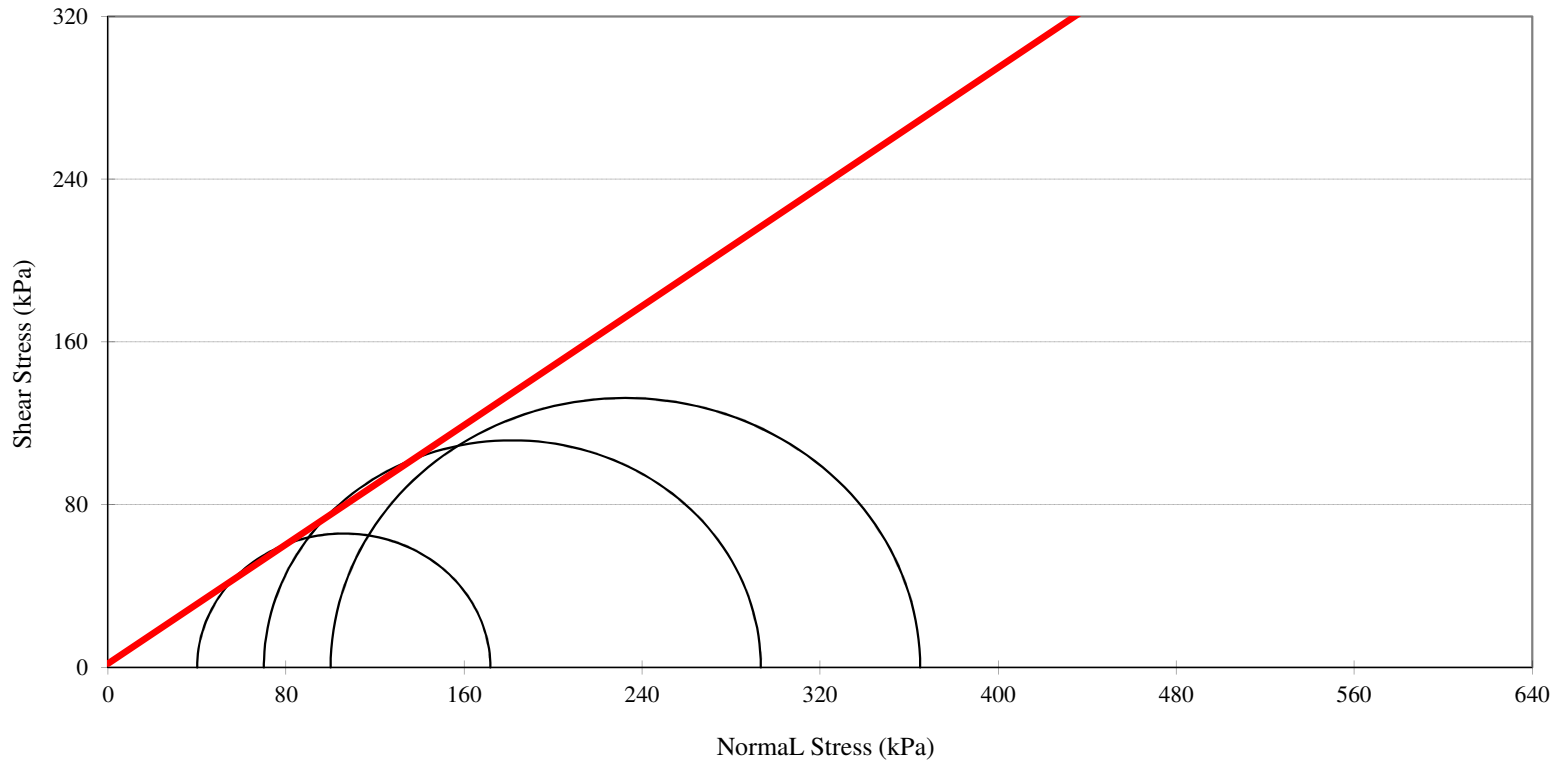
Depth : 1.00-1.90m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-03-1c      Soil Type: Clayey Sand  
 Sample No. : D-1              Depth : 1.00-1.90m  
 Angle of Internal Friction,  $\phi_d$  36 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

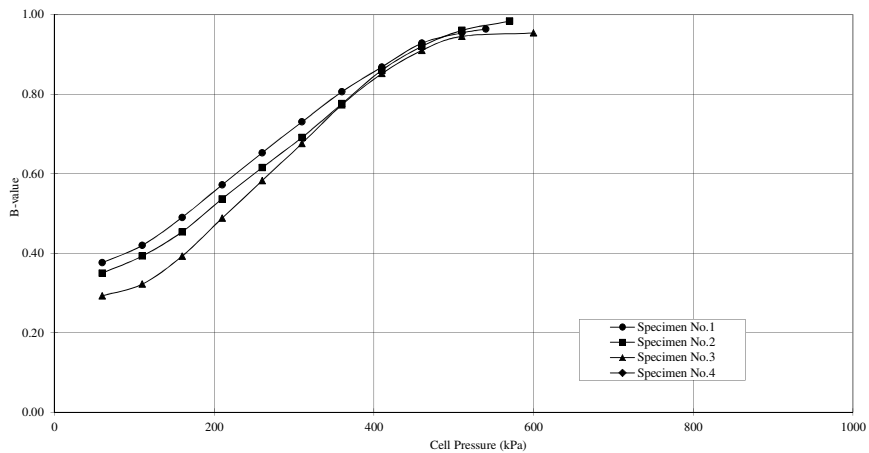
Borehole No.: OF-03-1c

Sample No.: D-1

Depth : 1.00-1.90m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	31.3	20	30.5	20	28.8		
	Back Pressure (kPa)	20		20		20			
	B-value	0.38		0.35		0.29			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	71.0	50	69.6	50	66.1		
	Back Pressure (kPa)	50		50		50			
	B-value	0.42		0.39		0.32			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	124.5	100	122.7	100	119.6		
	Back Pressure (kPa)	100		100		100			
	B-value	0.49		0.45		0.39			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	178.6	150	176.8	150	174.4		
	Back Pressure (kPa)	150		150		150			
	B-value	0.57		0.54		0.49			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	232.6	200	230.7	200	229.1		
	Back Pressure (kPa)	200		200		200			
	B-value	0.65		0.61		0.58			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	286.5	250	284.5	250	283.8		
	Back Pressure (kPa)	250		250		250			
	B-value	0.73		0.69		0.68			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	340.3	300	338.8	300	338.7		
	Back Pressure (kPa)	300		300		300			
	B-value	0.81		0.78		0.77			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	393.4	350	393.0	350	392.6		
	Back Pressure (kPa)	350		350		350			
	B-value	0.87		0.86		0.85			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	446.4	400	446.0	400	445.5		
	Back Pressure (kPa)	400		400		400			
	B-value	0.93		0.92		0.91			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.7	450	498.0	450	497.3		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.96		0.95			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.9	500	559.0	500	585.8		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.98		0.95			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

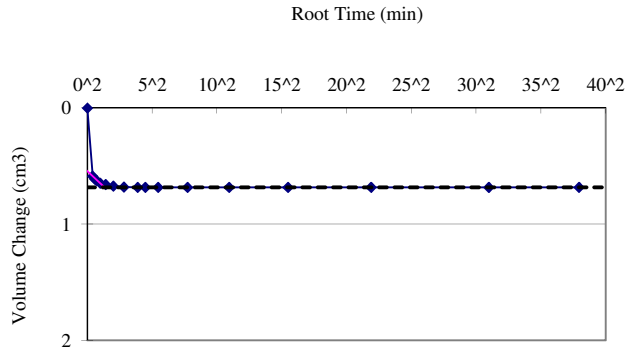
Project No.: S27-14

Borehole No.: OF-03-1c

Soil Type: Clayey Sand

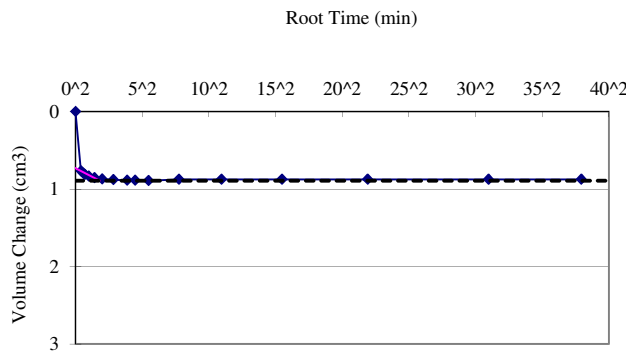
Sample No.: D-1

Depth : 1.00-1.90m



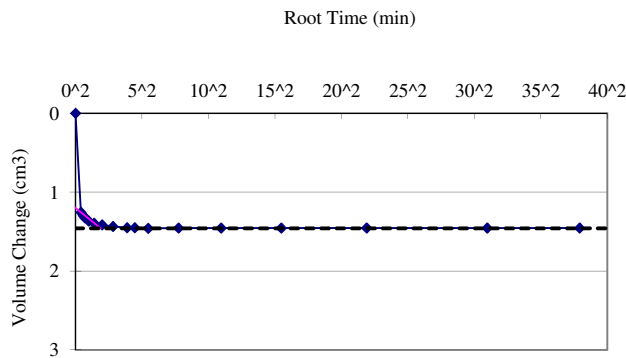
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.8$  min  
 $C_v = 571$  m<sup>2</sup>/year  
 $m_{vi} = 0.018$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 3.3$  min  
 $C_v = 311$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.6$  min  
 $C_v = 288$  m<sup>2</sup>/year  
 $m_{vi} = 0.013$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 24-Nov-14

Tested by : Perera/Bala

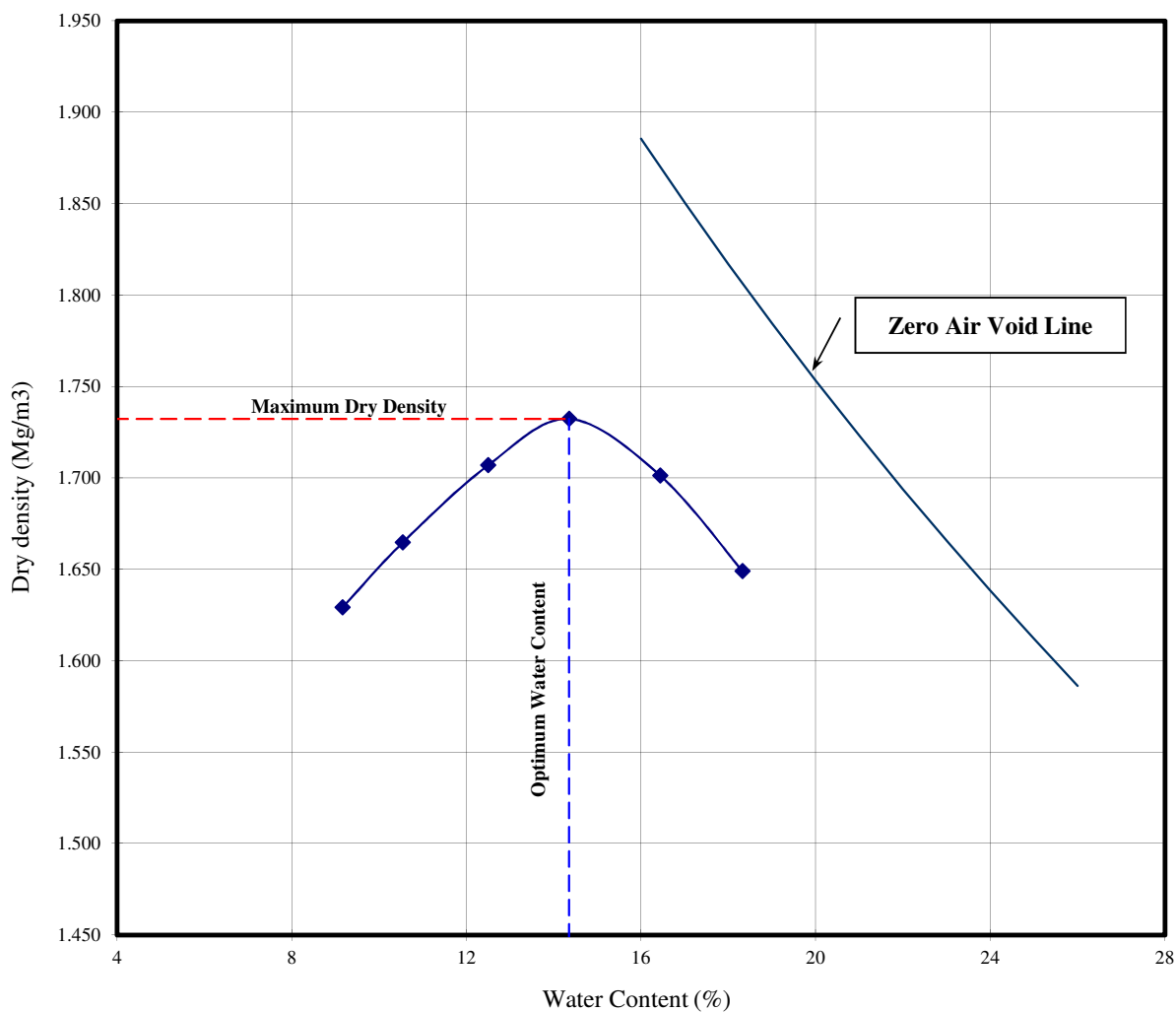
Sample No. : OF-03-1c D-1(1.00-1.90m)

Ref. No. -

Soil Type :	Clayey Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.70		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.2	10.5	12.5	14.4	16.4	18.3		
Wet Density (Mg/m <sup>3</sup> )	1.778	1.840	1.920	1.981	1.981	1.951		
Dry Density (Mg/m <sup>3</sup> )	1.629	1.665	1.707	1.732	1.701	1.649		

Maximum Dry Density	1.732 Mg/m <sup>3</sup>
Optimum Water Content	14.4 %







6) OF-04-1

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-04-1							
Sample No.		D-1	D-2	HP-1	D-3				
Sample Depth		1.00m ~1.90m	5.00m ~5.90m	8.00m ~8.90m	11.00m ~11.90m				
Condition of Sample		Disturbed		Undisturbed	Disturbed				
Natural Water Content	%	26.8	22.5	34.7	26.6				
Specific Gravity		2.69	2.70	2.73	2.70				
Wet Density	Mg/m <sup>3</sup>	1.91	2.12	1.89	1.91				
Dry Density	Mg/m <sup>3</sup>	1.51	1.73	1.40	1.51				
Natural Void Ratio		0.78	0.56	0.95	0.79				
Degree of Saturation	%	92	100	100	91				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	31	23			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	18	16			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	13	7			
Grain Size Analysis	Gravel,	%	0	0	0	0			
	Sand,	%	70	66	25	47			
	Silt,	%	19	11	38	26			
	Clay & Colloid,	%	11	23	37	27			
	Max. diameter,	mm	0.425	4.75	0.425	2.00			
	Diam. at 60%	mm	0.10	0.26	0.027	0.11			
	Diam. at 10%	mm	-	-	-	-			
Visual soil description		Silty Sand	Clayey Sand	Clay with Sand	Sandy Silty Clay				
Unified soil classification		-	-	CL	CL-ML				
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-			
	Cohesion Intercept, kPa		-	-	-	-			
	Condition of drainage		-	-	-	-			
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-			
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-			
	Condition of drainage		-	-	-	-			
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-			
	Compression Index(Average)		-	-	-	-			
	Pressure Range for Compression Index(kPa)		-	-	-	-			
	Swell index		-	-	-	-			
Chemical Test	pH value		-	-	-	-			
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-			
	Chloride content as Cl,	%	-	-	-	-			
	Organic Matter content,	%	-	-	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

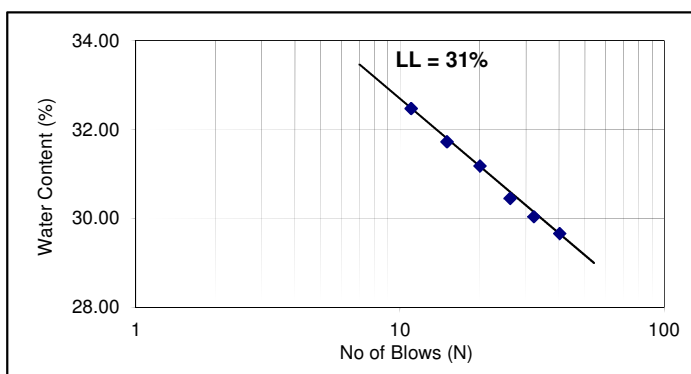
### ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 13.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-04-1 HP-1 Depth : 8.00-8.90m

Remarks : Tested on material at natural state

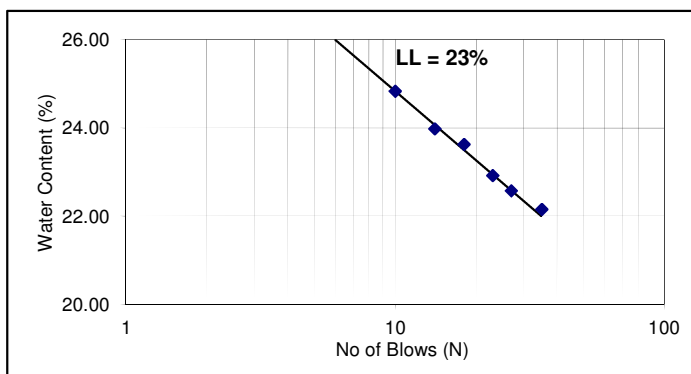
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	40	29.66
2	32	30.03
3	26	30.45
4	20	31.18
5	15	31.72
6	11	32.47
<b>Liquid Limits %</b>		<b>31</b>
<b>Plastic Limits %</b>		<b>8</b>
<b>Plasticity Index</b>		<b>23</b>



Sample No. : OF-04-1 HP-1 Depth : 11.00-11.90m

Remarks : \* Tested on wet sieved material passing 0.425mm sieve  
 Material passing through 0.425mm sieve : 72.6 %

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	35	22.15
2	27	22.58
3	23	22.92
4	18	23.62
5	14	23.98
6	10	24.83
<b>Liquid Limits %</b>		<b>23</b>
<b>Plastic Limits %</b>		<b>16</b>
<b>Plasticity Index</b>		<b>7</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

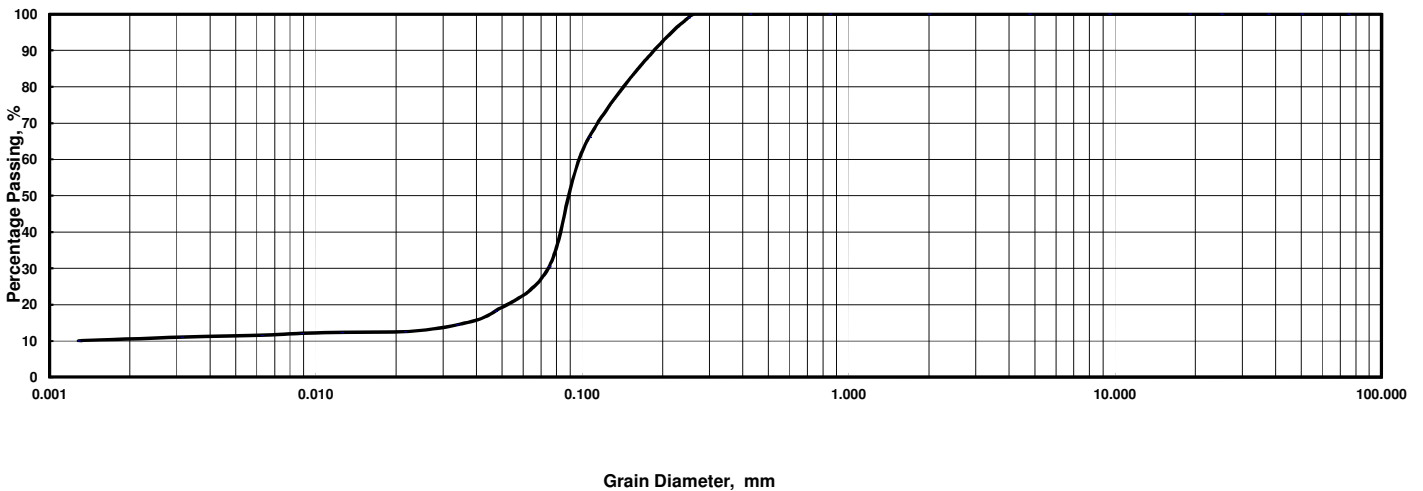
Sample No. : **OF-04-1 D-1** Depth : **1.00-1.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	66.1	30.5
Hydro.	Dia., mm	0.047	0.034	0.022	0.012	0.0088	0.0063	0.0031	0.0013							
	% Passing	18.2	14.5	12.6	12.3	12.1	11.6	11.1	10.1							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-1 D-1		Sample No.	OF-04-1 D-1	
Depth	1.00-1.90m		Depth	1.00-1.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.10 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.074 mm	
0.425 - 0.075 mm	69.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	19.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	11.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	30.5 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

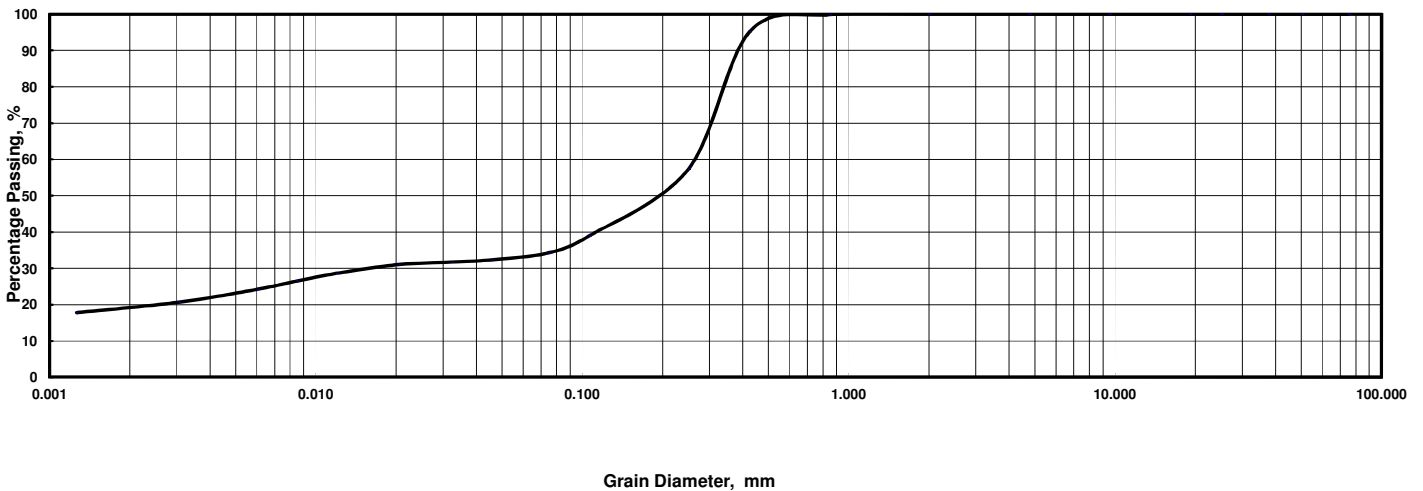
Sample No. : **OF-04-1 D-2** Depth : **5.00-5.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm				75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.2	57.4	38.9	34.3
Hydro.	Dia., mm	0.046	0.032	0.020	0.012	0.0085	0.0060	0.0031	0.0013								
	% Passing	32.3	31.7	31.1	28.6	26.5	24.3	20.7	17.8								

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-1 D-2		Sample No.	OF-04-1 D-2	
Depth	5.00-5.90m		Depth	5.00-5.90m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.26	mm
2.00 - 0.425 mm	4.8	%	Dia. at 30%	0.016	mm
0.425 - 0.075 mm	60.9	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	11.3	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.0	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.8	%			
75um Sieve Passing	34.3	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

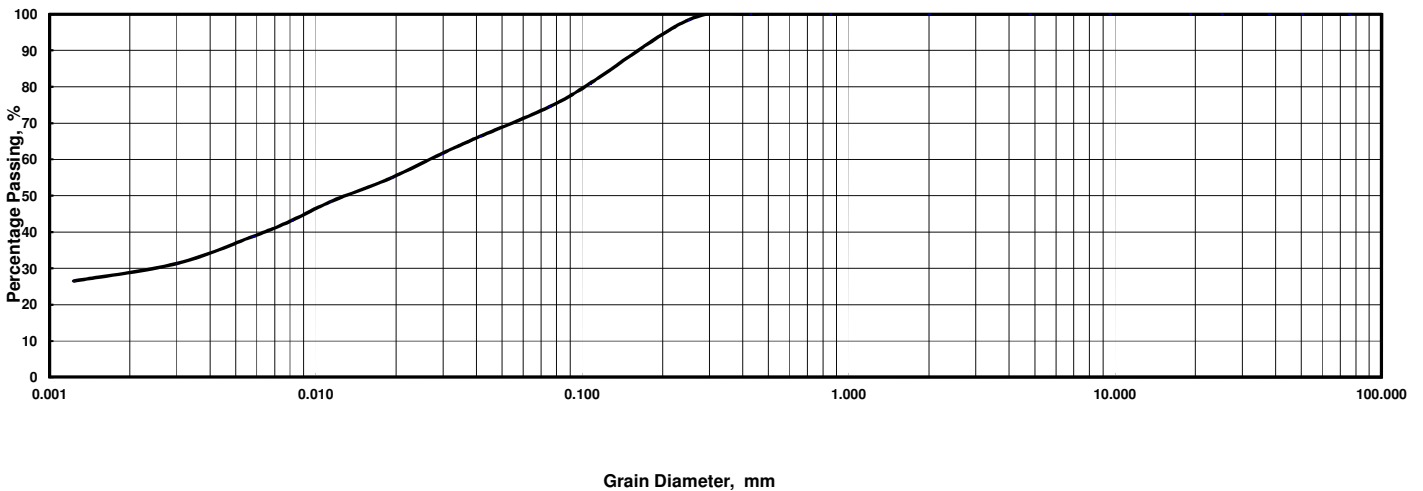
Sample No. : OF-04-1 HP-1 Depth : 8.00-8.90m ( \_\_\_\_\_ ) Specific Gravity : 2.73

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	80.8	74.4
Hydro.	Dia., mm	0.041	0.030	0.019	0.011	0.0081	0.0058	0.0030	0.0012							
	% Passing	66.3	61.6	54.9	48.3	43.2	38.8	31.2	26.5							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-1 HP-1		Sample No.	OF-04-1 HP-1	
Depth	8.00-8.90m		Depth	8.00-8.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.027 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.0024 mm	
0.425 - 0.075 mm	25.6 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	37.8 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	36.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	74.4 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 11.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

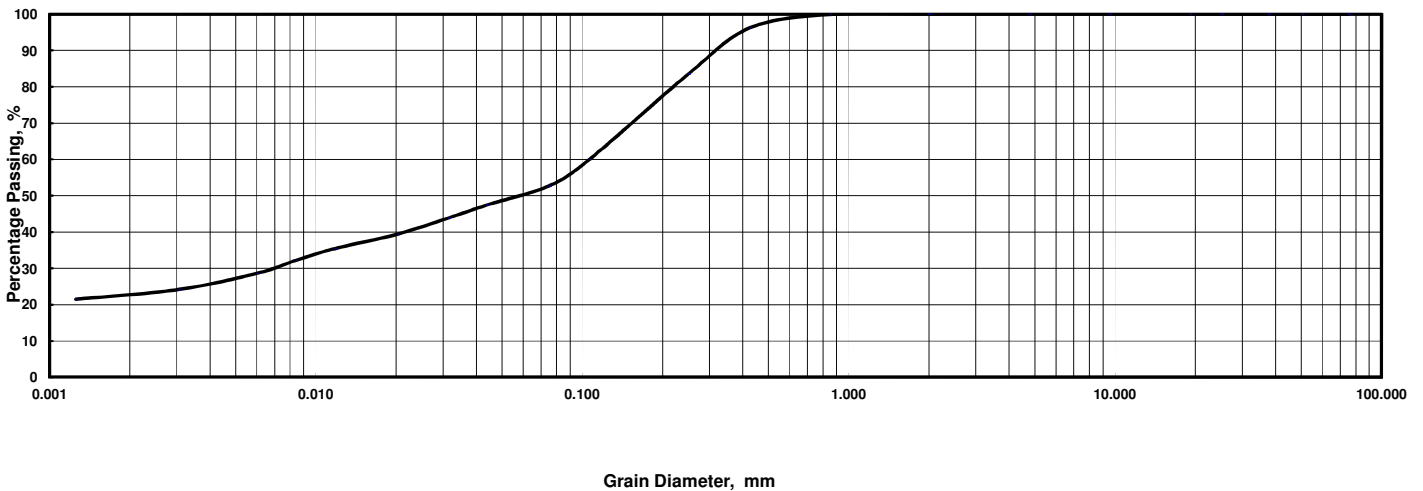
Sample No. : **OF-04-1 D-3** Depth : **11.00-11.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	96.2	83.5	59.9	52.7
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	47.4	43.9	39.4	35.5	32.2	28.6	24.2	21.5							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-1 D-3		Sample No.	OF-04-1 D-3	
Depth	11.00-11.90m		Depth	11.00-11.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.11 mm	
2.00 - 0.425 mm	3.8 %		Dia. at 30%	0.0068 mm	
0.425 - 0.075 mm	43.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	25.6 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	27.1 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	52.7 %				





7) OF-04-2

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-04-2							
Sample No.		D-1	D-2	D-3	D-4	D-5			
Sample Depth		2.00m ~2.80m	5.00m ~5.80m	8.00m ~8.78m	14.00m ~14.95m	18.00m ~18.95m			
Condition of Sample		Disturbed							
Natural Water Content	%	21.1	21.3	24.0	28.4	19.0			
Specific Gravity		2.69	2.69	2.68	2.72	2.68			
Wet Density	Mg/m <sup>3</sup>	-	-	1.93	1.90	2.01			
Dry Density	Mg/m <sup>3</sup>	-	-	1.55	1.48	1.69			
Natural Void Ratio		-	-	0.73	0.84	0.59			
Degree of Saturation	%	-	-	89	92	87			
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
Grain Size Analysis	Gravel,	%	0	0	0	0	0		
	Sand,	%	88	81	62	13	78		
	Silt,	%	2	8	17	57	8		
	Clay & Colloid,	%	10	11	21	30	14		
	Max. diameter,	mm	0.850	2.00	4.75	4.75	4.75		
	Diam. at 60%	mm	0.17	0.15	0.18	0.033	0.27		
	Diam. at 10%	mm	0.0042	0.0025	-	-	-		
Visual soil description		Clayey Sand	Clayey Sand	Clayey Sand	Silt with Sand	Clayey Sand			
Unified soil classification		-	-	-	-	-			
Triaxial compression test	Angle of Internal Friction	( <sup>0</sup> )	-	-	-	-			
	Cohesion Intercept, kPa		-	-	-	-			
	Condition of drainage		-	-	-	-			
	Angle of Internal Friction * <sup>2</sup>	( <sup>0</sup> )	-	36	-	-			
	Cohesion Intercept, kPa * <sup>2</sup>		-	0	-	-			
	Condition of drainage		-	CD* <sup>5</sup>	-	-			
Consolidation Test	Preconsolidation Pressure,	kPa	-	-	-	-			
	Compression Index(Average)		-	-	-	-			
	Pressure Range for Compression Index(kPa)		-	-	-	-			
	Swell index		-	-	-	-			
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>		-	1.64	-	-			
	Optimum Moisture Content , %		-	15.7	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : By using 2.5 kg Rammer

\*<sup>5</sup> : Specimens are prepared at 90% of Maximum dry density

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

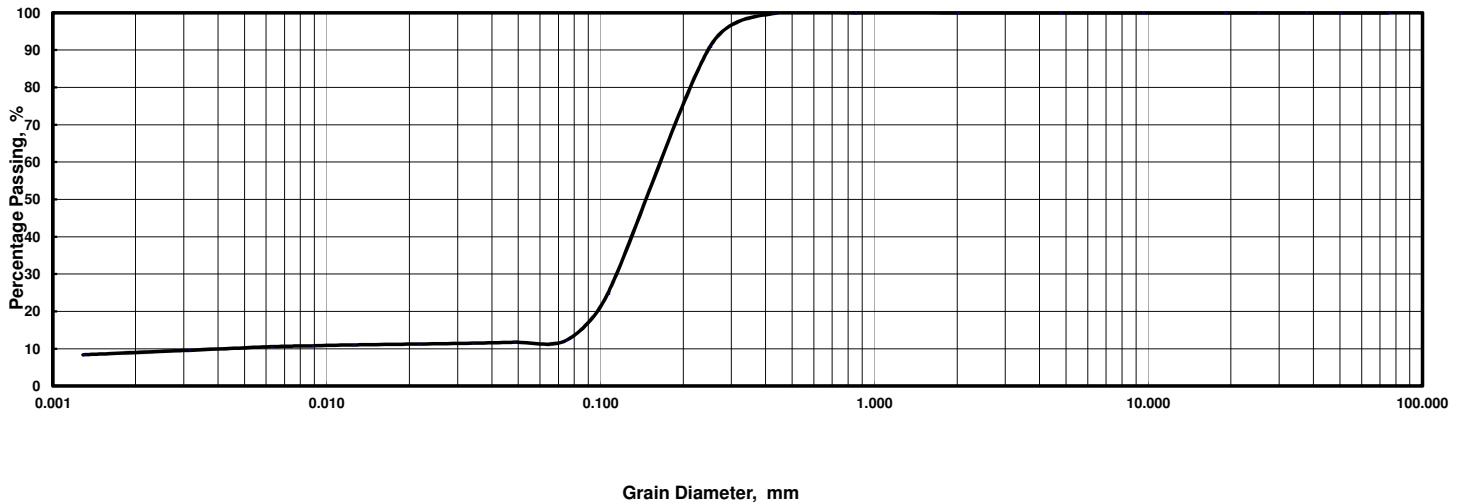
Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

Sample No. :	<b>OF-04-2 D-1</b>		Depth :	<b>2.00-2.80m</b>		( _____ )	Specific Gravity :	2.69								
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	90.8	24.7	12.3
Hydro.	Dia., mm	0.048	0.034	0.022	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	11.7	11.5	11.3	11.0	10.8	10.5	9.6	8.4							

Sample No. :			Depth :	( _____ )		Specific Gravity :		
Sieve	Dia., mm							
	% Passing							
Hydro.	Dia., mm							
	% Passing							

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-04-2 D-1		Sample No.	OF-04-2 D-1	
Depth	2.00-2.80m		Depth	2.00-2.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.17	mm
2.00 - 0.425 mm	0.2	%	Dia. at 30%	0.11	mm
0.425 - 0.075 mm	87.5	%	Dia. at 10%	0.0042	mm
0.075 - 0.005 mm	2.1	%	Coeff. of Uniformity	39.9	
Smaller than 0.005 mm	10.2	%	Coeff. of Curvature	18.3	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	12.3	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

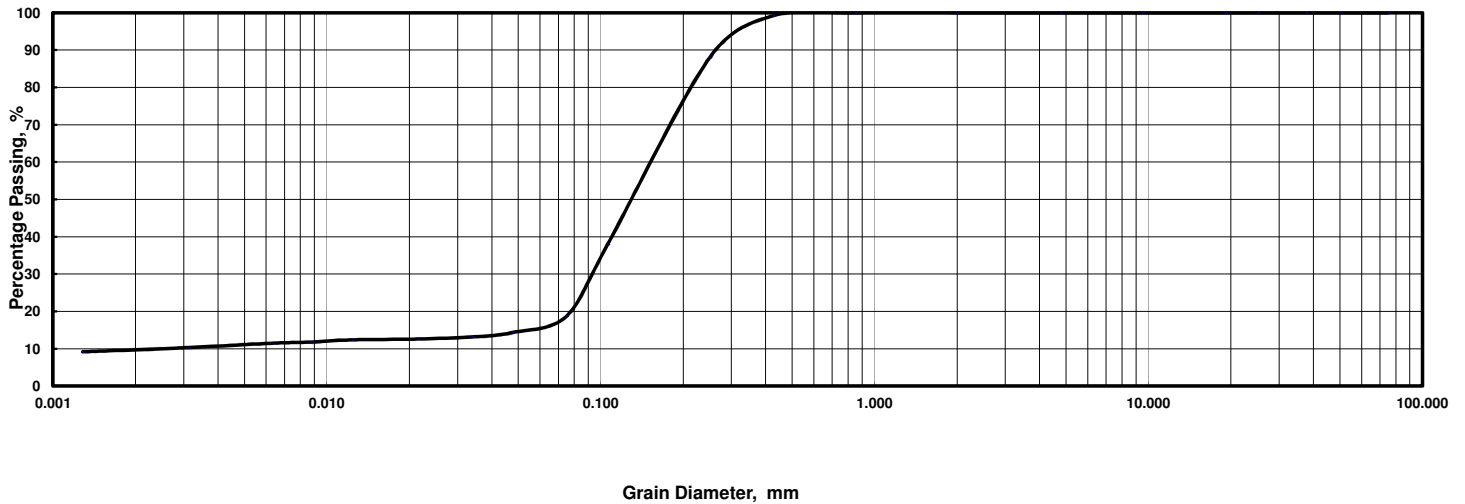
Sample No. : **OF-04-2 D-2** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	88.0	38.0	18.7
Hydro.	Dia., mm	0.048	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	14.3	13.2	12.6	12.4	11.8	11.5	10.3	9.2							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-04-2 D-2		Sample No.	OF-04-2 D-2	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.15	mm
2.00 - 0.425 mm	0.8	%	Dia. at 30%	0.092	mm
0.425 - 0.075 mm	80.4	%	Dia. at 10%	0.0025	mm
0.075 - 0.005 mm	7.7	%	Coeff. of Uniformity	61.9	
Smaller than 0.005 mm	11.0	%	Coeff. of Curvature	21.8	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	18.7	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

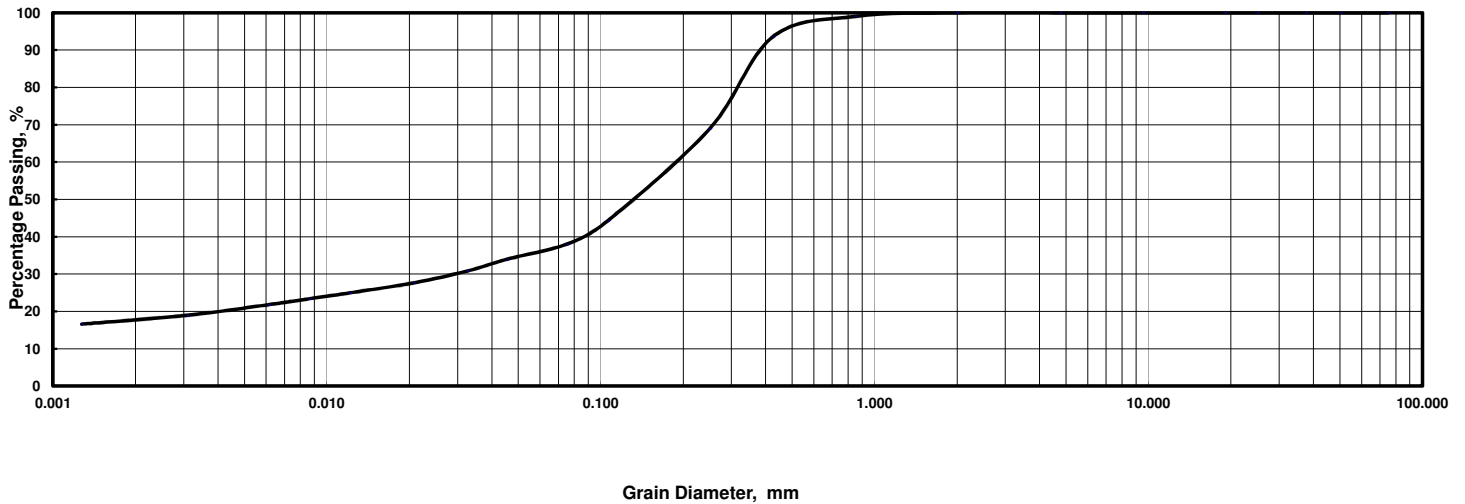
Sample No. : **OF-04-2 D-3** Depth : **8.00-8.78m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	93.6	68.9	44.3	38.0
Hydro.	Dia., mm	0.045	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	34.0	30.8	27.7	25.0	23.4	21.8	19.0	16.6							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-04-2 D-3		Sample No.	OF-04-2 D-3	
Depth	8.00-8.78m		Depth	8.00-8.78m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.18 mm	
2.00 - 0.425 mm	6.4 %		Dia. at 30%	0.029 mm	
0.425 - 0.075 mm	55.6 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	17.2 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	20.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.0 %				
75um Sieve Passing	38.0 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

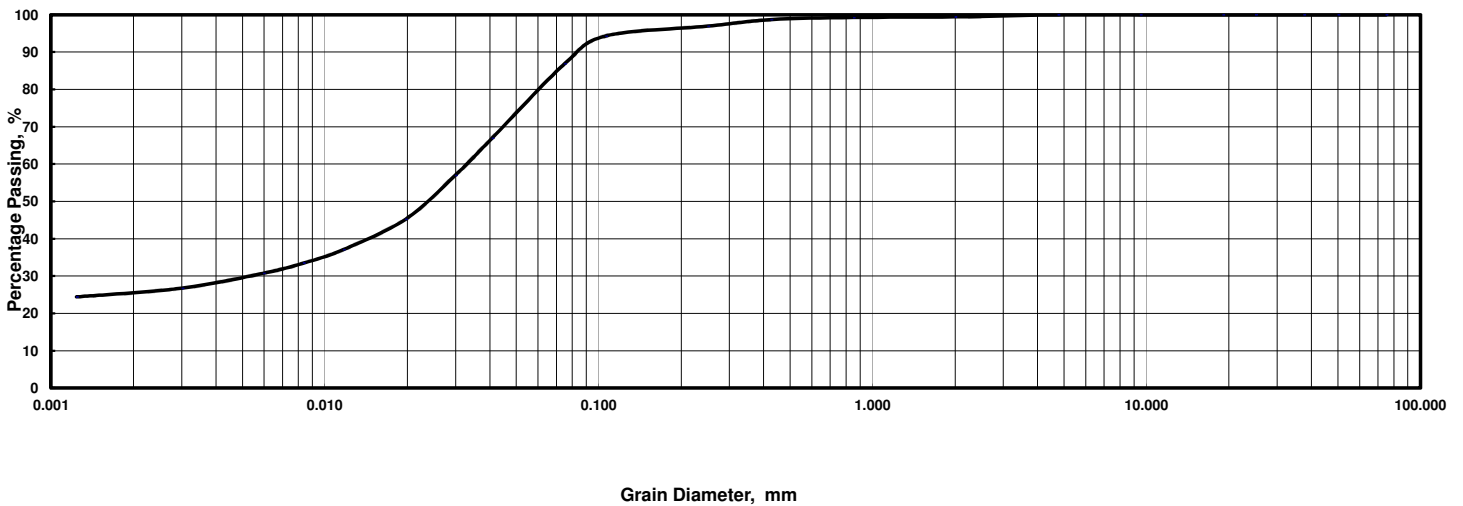
Sample No. : **OF-04-2 D-4** Depth : **14.00-14.95m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	99.2	98.7	96.9	94.3	86.8
Hydro.	Dia., mm	0.041	0.030	0.020	0.012	0.0083	0.0060	0.0030	0.0012							
	% Passing	66.9	57.0	45.2	37.1	33.5	30.7	26.8	24.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-04-2 D-4		Sample No.	OF-04-2 D-4	
Depth	14.00-14.95m		Depth	14.00-14.95m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.6 %		Dia. at 60%	0.033 mm	
2.00 - 0.425 mm	0.8 %		Dia. at 30%	0.0052 mm	
0.425 - 0.075 mm	11.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	57.4 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	29.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.2 %				
75um Sieve Passing	86.8 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

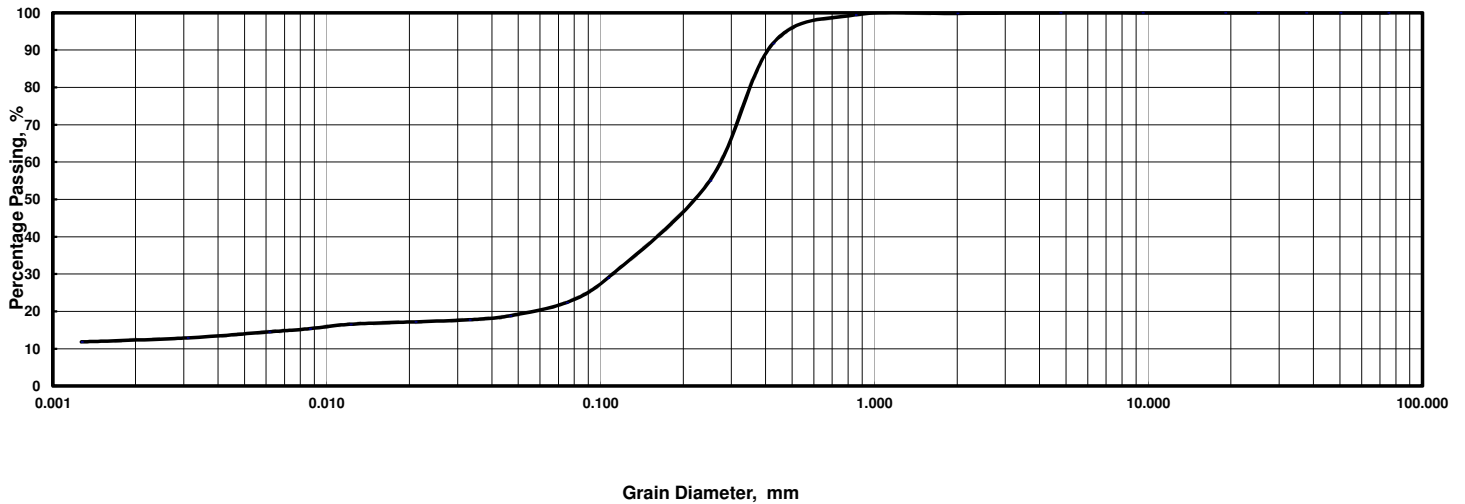
Sample No. : **OF-04-2 D-5** Depth : **18.00-18.95m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	91.8	55.0	28.9	22.4
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	18.8	17.7	17.2	16.6	15.4	14.5	12.9	11.8							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**




	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-04-2 D-5		Sample No.	OF-04-2 D-5	
Depth	18.00-18.95m		Depth	18.00-18.95m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.2 %		Dia. at 60%	0.27 mm	
2.00 - 0.425 mm	8.0 %		Dia. at 30%	0.11 mm	
0.425 - 0.075 mm	69.4 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	8.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	13.9 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.4 %				
75um Sieve Passing	22.4 %				



### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 08.12.14		Tested by : Rahim		Checked by : A. B. Tan		
Borehole No.: OF-04-02		Sample No.:D-2		Depth : 5.00-5.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.48	1.48	1.48		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.95	0.96	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.07	0.09	0.15		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	773	391	557		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.017	0.014	0.015		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	103	198	287		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	0.11	0.30	1.38		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	12.63	11.62	14.05		
Shear Strength Parameters	$\phi_d = 36$ Degree $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.48 Mg/m <sup>3</sup>						

## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

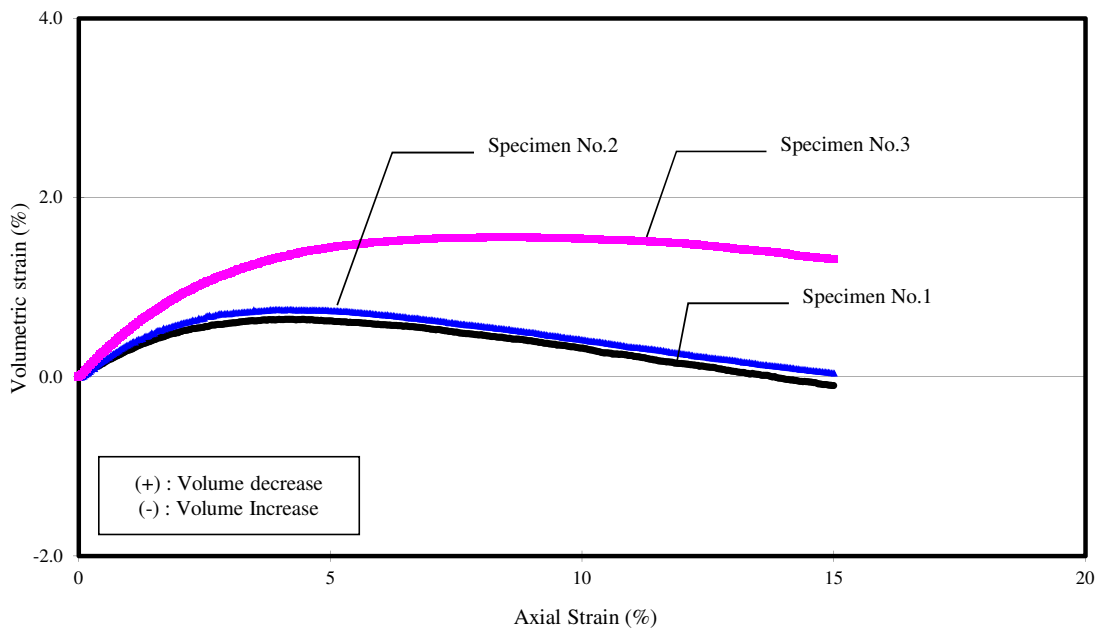
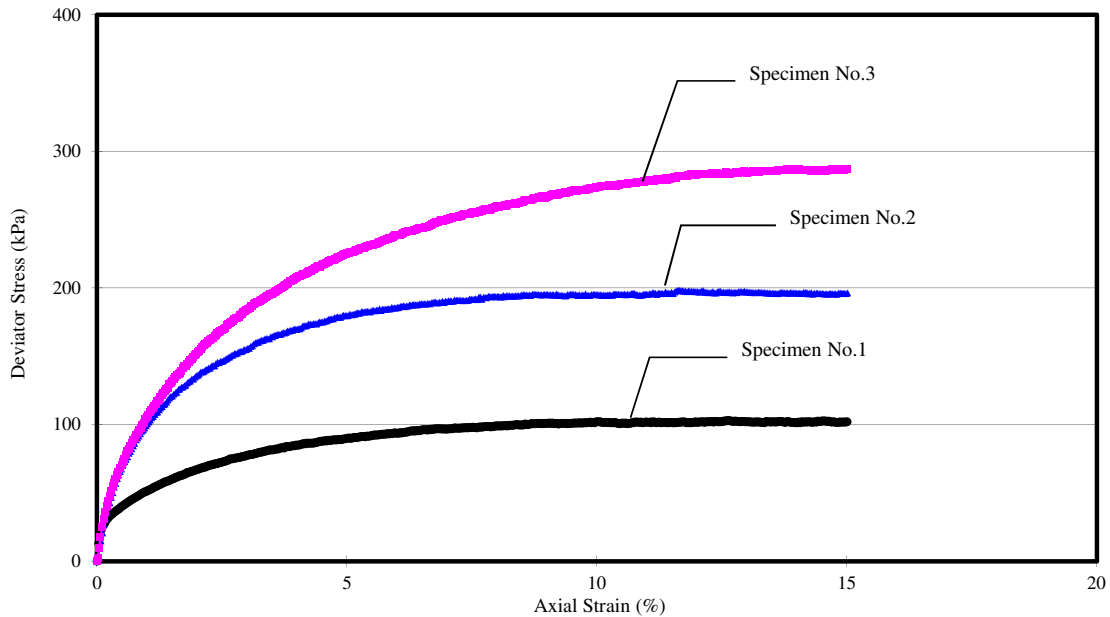
Project No.: S27-14

Sample No.: D-2

Soil Type: Clayey Sand

Borehole No.: OF-04-02

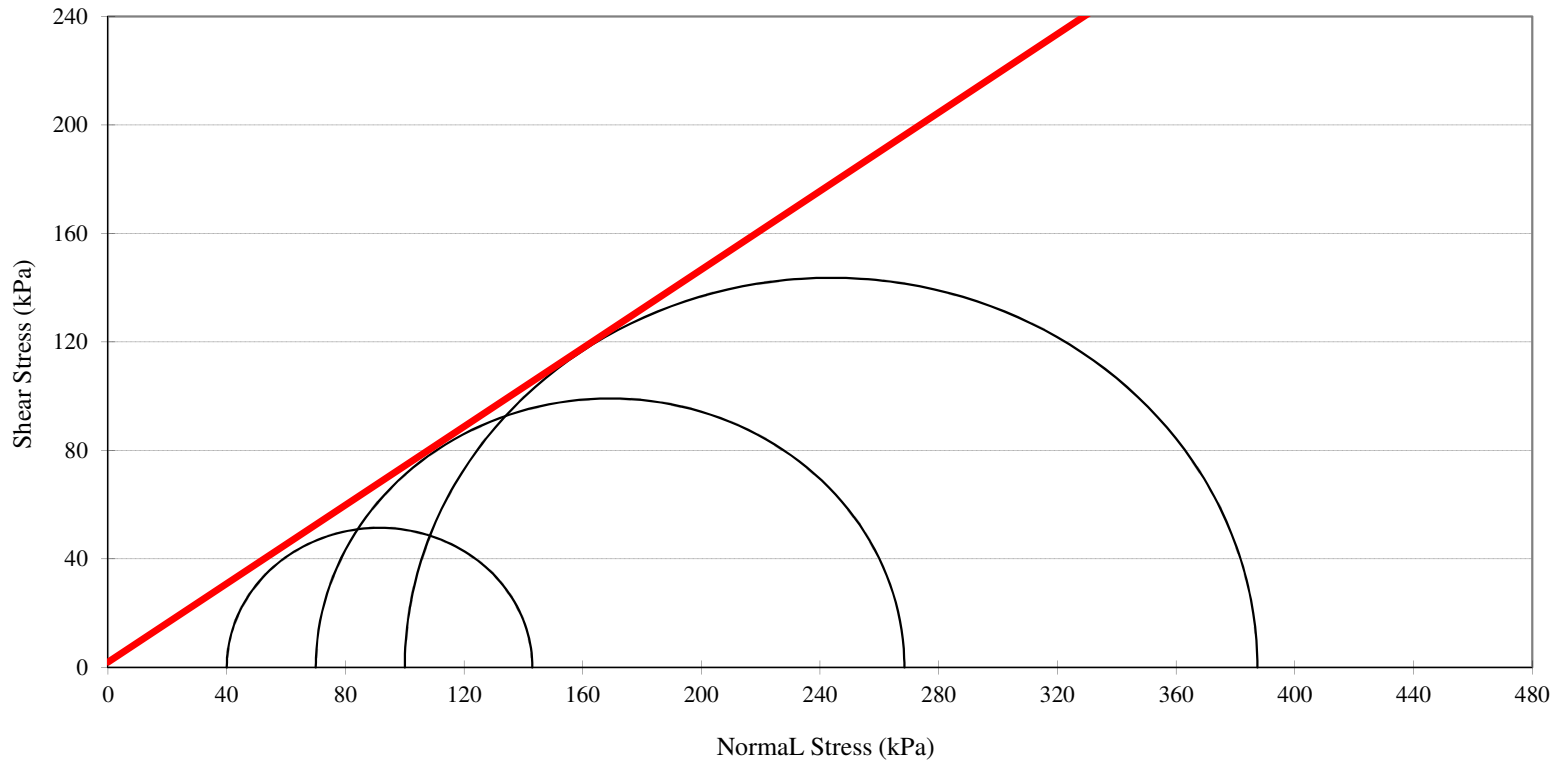
Depth : 5.00-5.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-04-02      Soil Type: Clayey Sand  
 Sample No. : D-2              Depth : 5.00-5.80m  
 Angle of Internal Friction,  $\phi_d$  36 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

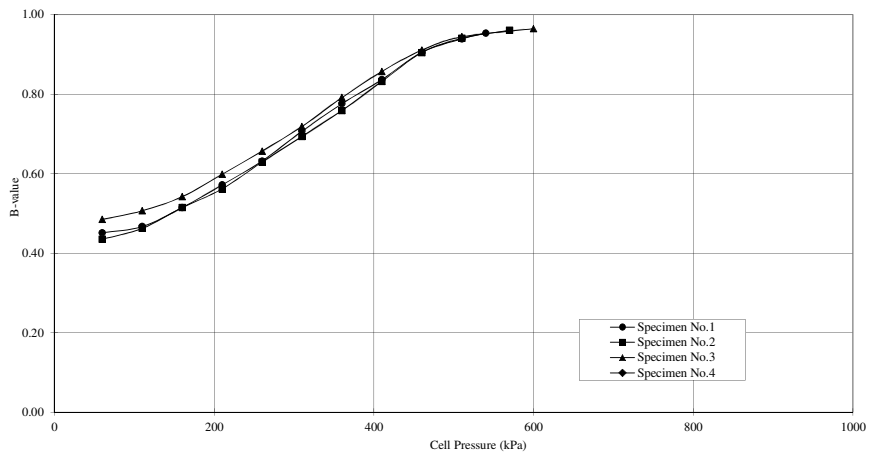
Borehole No.: OF-04-02

Sample No.: D-2

Depth : 5.00-5.80m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	33.5	20	33.1	20	34.6		
	Back Pressure (kPa)	20		20		20			
	B-value	0.45		0.44		0.49			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	73.3	50	73.1	50	75.3		
	Back Pressure (kPa)	50		50		50			
	B-value	0.47		0.46		0.51			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	125.7	100	125.7	100	127.1		
	Back Pressure (kPa)	100		100		100			
	B-value	0.51		0.51		0.54			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	178.6	150	178.1	150	179.9		
	Back Pressure (kPa)	150		150		150			
	B-value	0.57		0.56		0.60			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.6	200	231.5	200	232.8		
	Back Pressure (kPa)	200		200		200			
	B-value	0.63		0.63		0.66			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	285.3	250	284.7	250	285.9		
	Back Pressure (kPa)	250		250		250			
	B-value	0.71		0.69		0.72			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	338.8	300	337.9	300	339.6		
	Back Pressure (kPa)	300		300		300			
	B-value	0.78		0.76		0.79			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	391.8	350	391.6	350	392.8		
	Back Pressure (kPa)	350		350		350			
	B-value	0.84		0.83		0.86			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.3	400	445.2	400	445.5		
	Back Pressure (kPa)	400		400		400			
	B-value	0.91		0.90		0.91			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.0	450	497.0	450	497.2		
	Back Pressure (kPa)	450		450		450			
	B-value	0.94		0.94		0.94			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.6	500	557.6	500	586.8		
	Back Pressure (kPa)	500		500		500			
	B-value	0.95		0.96		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

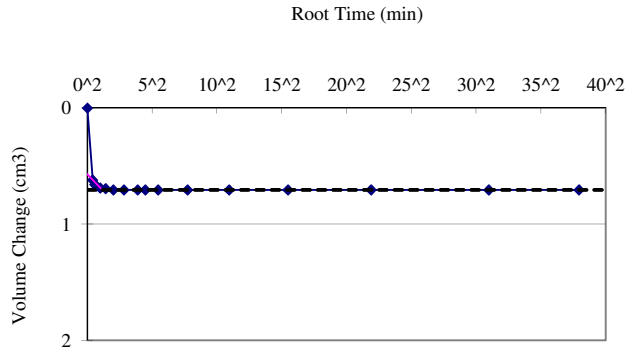
Project No.: S27-14

Borehole No.: OF-04-02

Soil Type: Clayey Sand

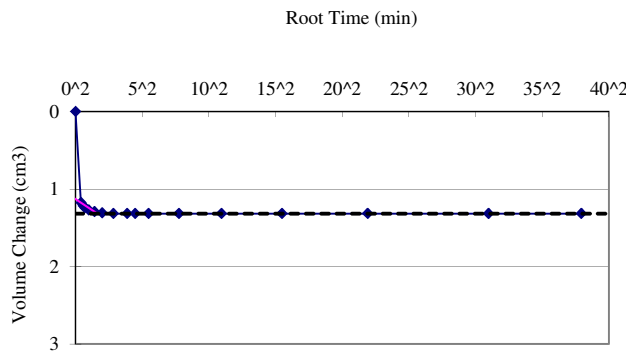
Sample No.: D-2

Depth : 5.00-5.80m



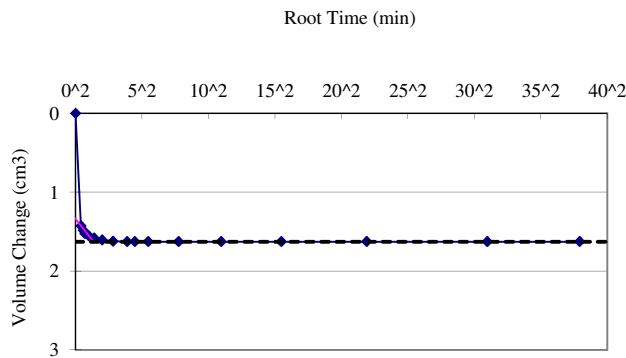
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.3$  min  
 $C_v = 773$  m<sup>2</sup>/year  
 $m_{vi} = 0.017$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 2.6$  min  
 $C_v = 391$  m<sup>2</sup>/year  
 $m_{vi} = 0.014$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 1.8$  min  
 $C_v = 557$  m<sup>2</sup>/year  
 $m_{vi} = 0.015$  m<sup>2</sup>/MN

# RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 4-Dec-14

Tested by : Perera/Bala

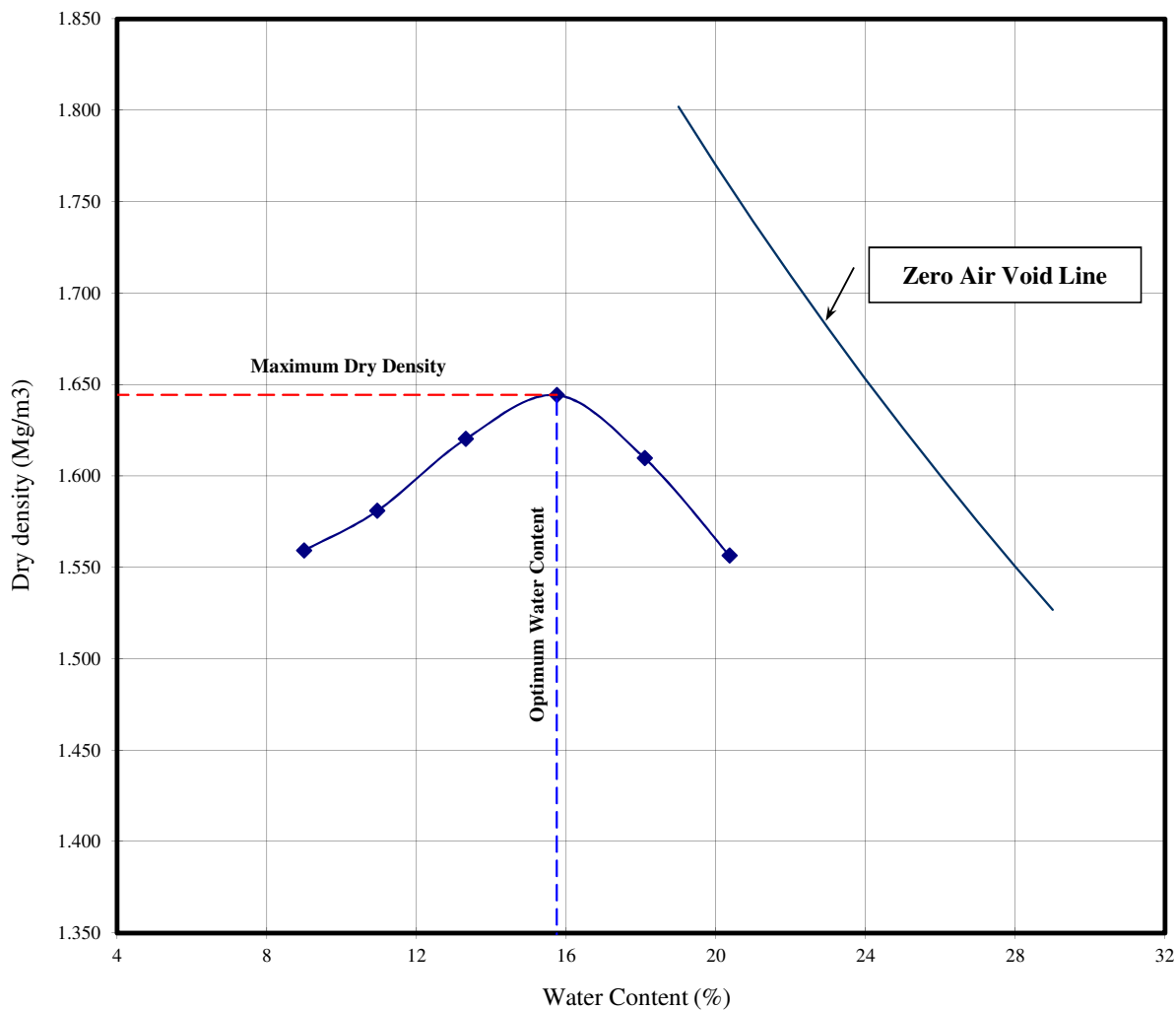
Sample No. : OF-04-02 D-2(5.00-5.80m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.0	10.9	13.3	15.7	18.1	20.4		
Wet Density (Mg/m <sup>3</sup> )	1.700	1.754	1.836	1.903	1.901	1.873		
Dry Density (Mg/m <sup>3</sup> )	1.559	1.581	1.620	1.644	1.610	1.556		

<b>Maximum Dry Density</b>	<b>1.644 Mg/m<sup>3</sup></b>
<b>Optimum Water Content</b>	<b>15.7 %</b>





8) OF-04-3



**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-04-3							
Sample No.		D-1	D-2	D-3	D-4				
Sample Depth		3.00m ~3.90m	6.00m ~6.90m	9.00m ~9.90m	12.00m ~12.90m				
Condition of Sample		Disturbed							
Natural Water Content	%	21.5	24.3	18.8	20.6				
Specific Gravity		2.70	2.69	2.69	2.70				
Wet Density	Mg/m <sup>3</sup>	2.05	2.02	2.11	1.98				
Dry Density	Mg/m <sup>3</sup>	1.68	1.63	1.78	1.64				
Natural Void Ratio		0.60	0.66	0.51	0.64				
Degree of Saturation	%	96	100	99	87				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0	0			
	Sand,	%	80	72	82	66			
	Silt,	%	8	10	6	13			
	Clay & Colloid,	%	12	18	12	21			
	Max. diameter,	mm	2.00	2.00	4.75	2.00			
	Diam. at 60%	mm	0.17	0.18	0.18	0.19			
	Diam. at 10%	mm	-	-	-	-			
Visual soil description		Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand				
Unified soil classification		-	-	-	-				
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-			
	Cohesion Intercept, kPa		-	-	-	-			
	Condition of drainage		-	-	-	-			
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-			
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-			
	Condition of drainage		-	-	-	-			
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-			
	Compression Index(Average)		-	-	-	-			
	Pressure Range for Compression Index(kPa)		-	-	-	-			
	Swell index		-	-	-	-			
Chemical Test	pH value		-	-	-	-			
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-			
	Chloride content as Cl,	%	-	-	-	-			
	Organic Matter content,	%	-	-	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

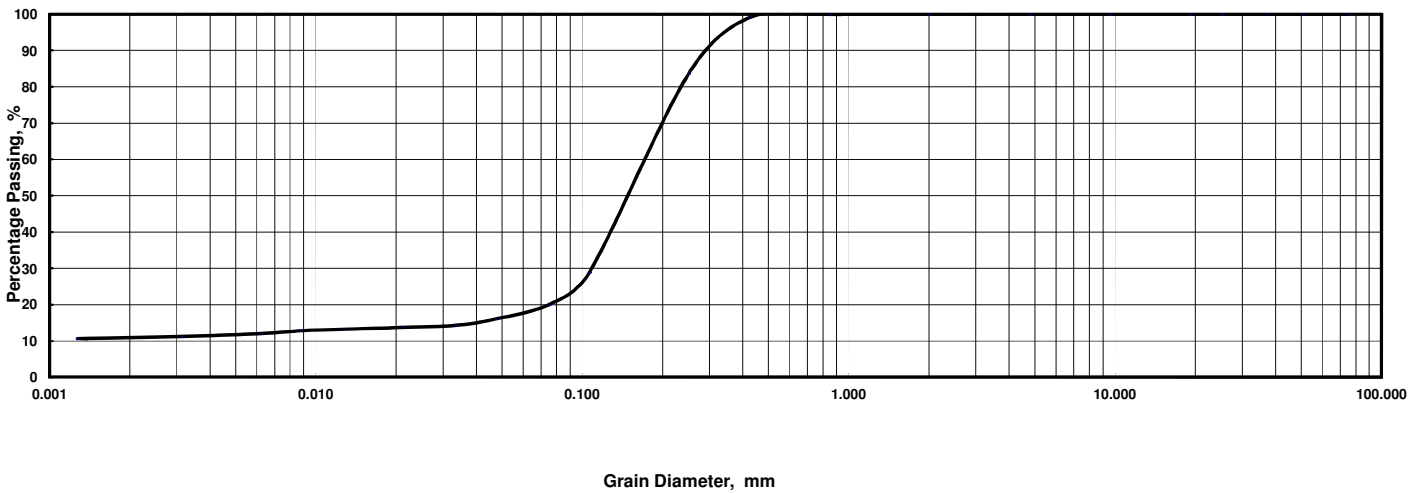
Sample No. : **OF-04-3 D-1** Depth : **3.00-3.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm				75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.1	83.5	28.8	20.1
Hydro.	Dia., mm	0.047	0.034	0.021	0.012	0.0087	0.0062	0.0031	0.0013								
	% Passing	16.0	14.3	13.7	13.2	12.8	12.0	11.2	10.7								

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-3 D-1		Sample No.	OF-04-3 D-1	
Depth	3.00-3.90m		Depth	3.00-3.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.17 mm	
2.00 - 0.425 mm	0.9 %		Dia. at 30%	0.11 mm	
0.425 - 0.075 mm	79.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	8.3 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	11.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	20.1 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

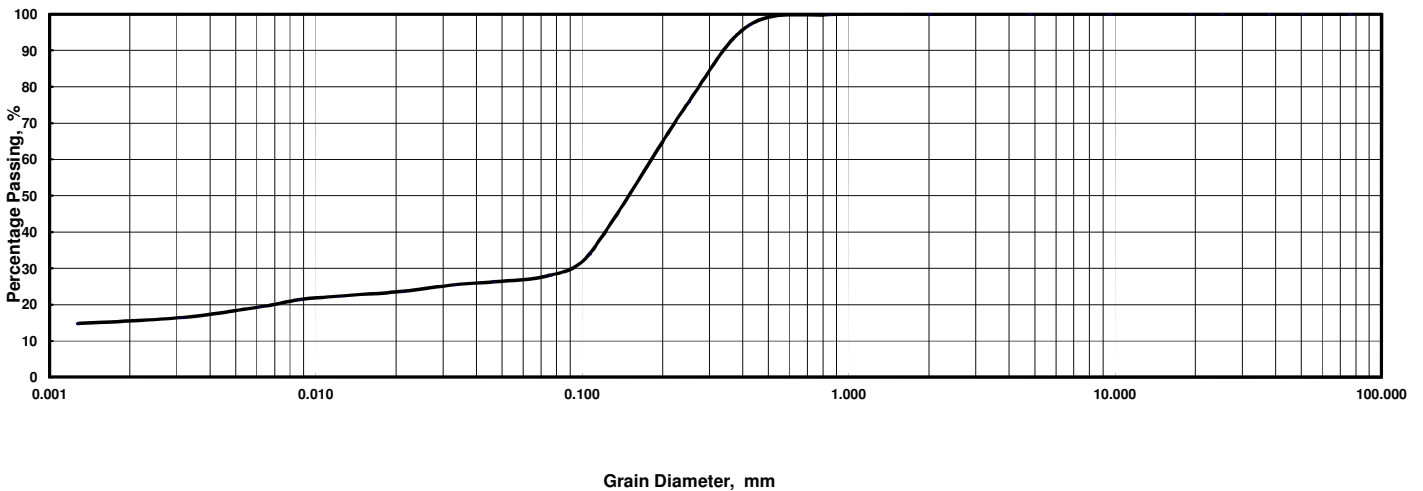
Sample No. : **OF-04-3 D-2** Depth : **6.00-6.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.1	75.8	33.9	28.0
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	26.3	25.5	23.7	22.4	21.4	19.4	16.4	14.8							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-3 D-2		Sample No.	OF-04-3 D-2	
Depth	6.00-6.90m		Depth	6.00-6.90m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.18	mm
2.00 - 0.425 mm	2.9	%	Dia. at 30%	0.084	mm
0.425 - 0.075 mm	69.0	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	9.8	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	18.3	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.8	%			
75um Sieve Passing	28.0	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

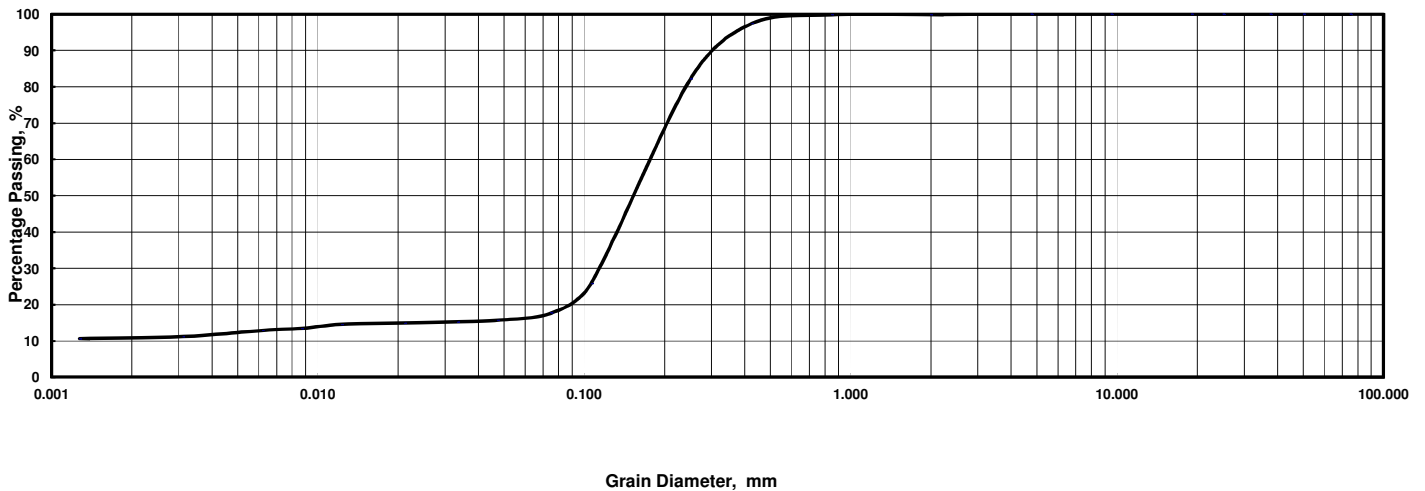
Sample No. : **OF-04-3 D-3** Depth : **9.00-9.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.8	97.4	82.2	25.9	17.7
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	15.7	15.3	14.9	14.6	13.5	12.9	11.2	10.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-3 D-3		Sample No.	OF-04-3 D-3	
Depth	9.00-9.90m		Depth	9.00-9.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.2 %		Dia. at 60%	0.18 mm	
2.00 - 0.425 mm	2.4 %		Dia. at 30%	0.11 mm	
0.425 - 0.075 mm	79.7 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	5.4 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	12.3 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.8 %				
75um Sieve Passing	17.7 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

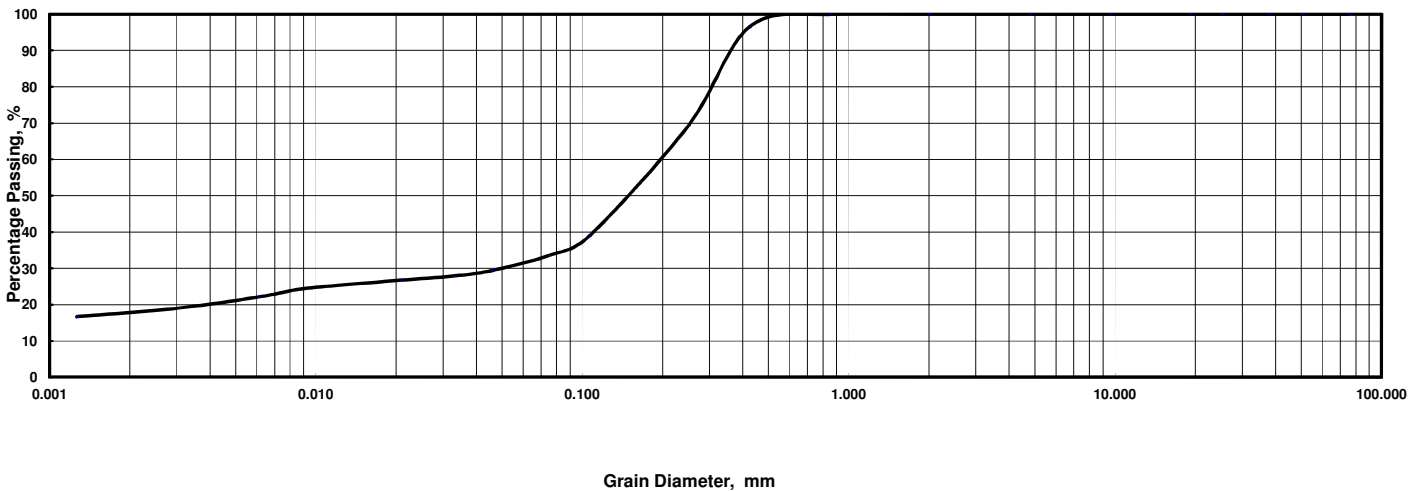
Sample No. : **OF-04-3 D-4** Depth : **12.00-12.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.6	69.3	38.9	33.6
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	29.4	27.9	26.7	25.3	24.2	22.1	19.1	16.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-04-3 D-4		Sample No.	OF-04-3 D-4	
Depth	12.00-12.90m		Depth	12.00-12.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.19 mm	
2.00 - 0.425 mm	3.4 %		Dia. at 30%	0.049 mm	
0.425 - 0.075 mm	63.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	12.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	21.0 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	33.6 %				

9) OF-05-1

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-05-1								
Sample No.		D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	
Sample Depth		2.00m ~2.50m	2.50m ~3.30m	6.00m ~6.80m	9.00m ~9.50m	12.00m ~12.30m	12.30m ~12.90m	15.00m ~15.75m	18.00m ~18.80m	
Condition of Sample		Disturbed								
Natural Water Content		%	20.2	19.3	13.9	22.3	17.3	12.9	26.5	28.9
Specific Gravity			2.70	2.70	2.69	2.68	2.68	2.69	2.70	2.71
Wet Density		Mg/m <sup>3</sup>	1.98	-	-	-	-	1.966	1.905	-
Dry Density		Mg/m <sup>3</sup>	1.64	-	-	-	-	1.74	1.51	-
Natural Void Ratio			0.64	-	-	-	-	0.54	0.79	-
Degree of Saturation		%	85	-	-	-	-	64	90	-
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	23	27
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	15	18
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	8	9
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0	0	0
	Sand,	%	66	77	94	83	77	94	55	50
	Silt,	%	19	11	6	6	10	6	20	25
	Clay & Colloid,	%	15	12		11	13		25	25
	Max. diameter,	mm	4.75	4.75	2.00	0.850	2.00	4.75	4.75	4.75
	Diam. at 60%	mm	0.21	0.22	0.34	0.16	0.31	0.47	0.12	0.11
	Diam. at 10%	mm	-	0.0015	0.10	0.0024	0.0011	0.17	-	-
Visual soil description			Silty Sand	Clayey Sand	Sand with Clay	Clayey Sand	Clayey Sand	Sand with Clay	Clayey Sand	Clayey Sand
Unified soil classification			-	-	-	-	-	-	CL	CL
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-	-	-	-	-
	Cohesion Intercept, kPa		-	-	-	-	-	-	-	-
	Condition of drainage		-	-	-	-	-	-	-	-
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-	-	-	-	-
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-	-	-	-	-
	Condition of drainage		-	-	-	-	-	-	-	-
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-	-	-	-	-
	Compression Index(Average)		-	-	-	-	-	-	-	-
	Pressure Range for Compression Index(kPa)		-	-	-	-	-	-	-	-
	Swell index		-	-	-	-	-	-	-	-
Chemical Test	pH value		-	-	-	-	-	-	-	-
	Total sulphate content as SO <sub>3</sub> , %		-	-	-	-	-	-	-	-
	Chloride content as Cl, %		-	-	-	-	-	-	-	-
	Organic Matter content, %		-	-	-	-	-	-	-	-
Unconfined Compression Strength (kPa)			-	-	-	-	-	-	-	-
Strain at failure (%)			-	-	-	-	-	-	-	-

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

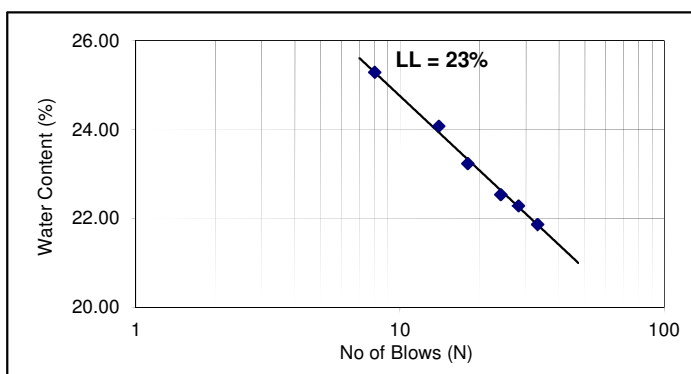
### ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 15.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-05-1 D-7 Depth : 15.00-15.75m

Remarks : Tested on material at natural state

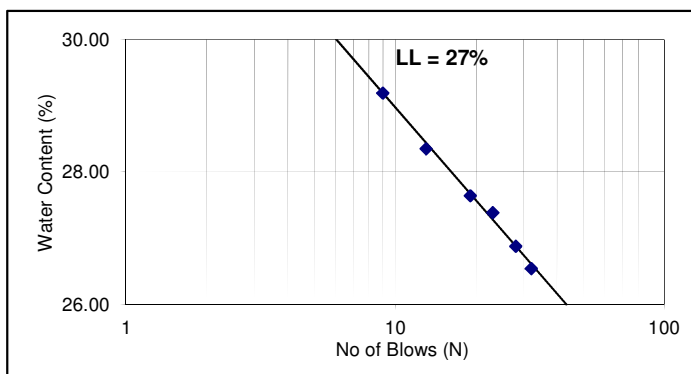
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	33	21.86
2	28	22.28
3	24	22.53
4	18	23.23
5	14	24.07
6	8	25.28
<b>Liquid Limits %</b>		<b>23</b>
<b>Plastic Limits %</b>		<b>15</b>
<b>Plasticity Index</b>		<b>8</b>



Sample No. : OF-05-1 D-8 Depth : 18.00-18.80m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	32	26.54
2	28	26.88
3	23	27.39
4	19	27.64
5	13	28.35
6	9	29.19
<b>Liquid Limits %</b>		<b>27</b>
<b>Plastic Limits %</b>		<b>18</b>
<b>Plasticity Index</b>		<b>9</b>





# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

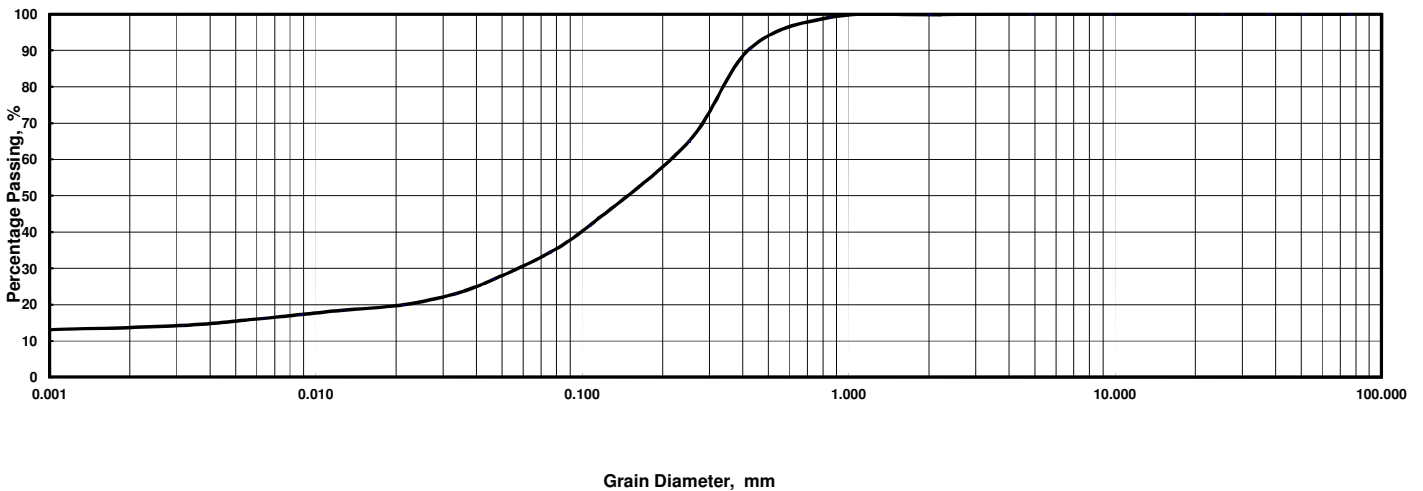
Sample No. : **OF-05-1 D-1** Depth : **2.00-2.50m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.1	90.5	64.8	41.7	34.3
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0009							
	% Passing	27.0	23.0	20.0	18.4	17.3	16.2	14.3	13.0							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-1		Sample No.	OF-05-1 D-1	
Depth	2.00-2.50m		Depth	2.00-2.50m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.2 %		Dia. at 60%	0.21 mm	
2.00 - 0.425 mm	9.3 %		Dia. at 30%	0.057 mm	
0.425 - 0.075 mm	56.2 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	18.8 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	15.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.1 %				
75um Sieve Passing	34.3 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

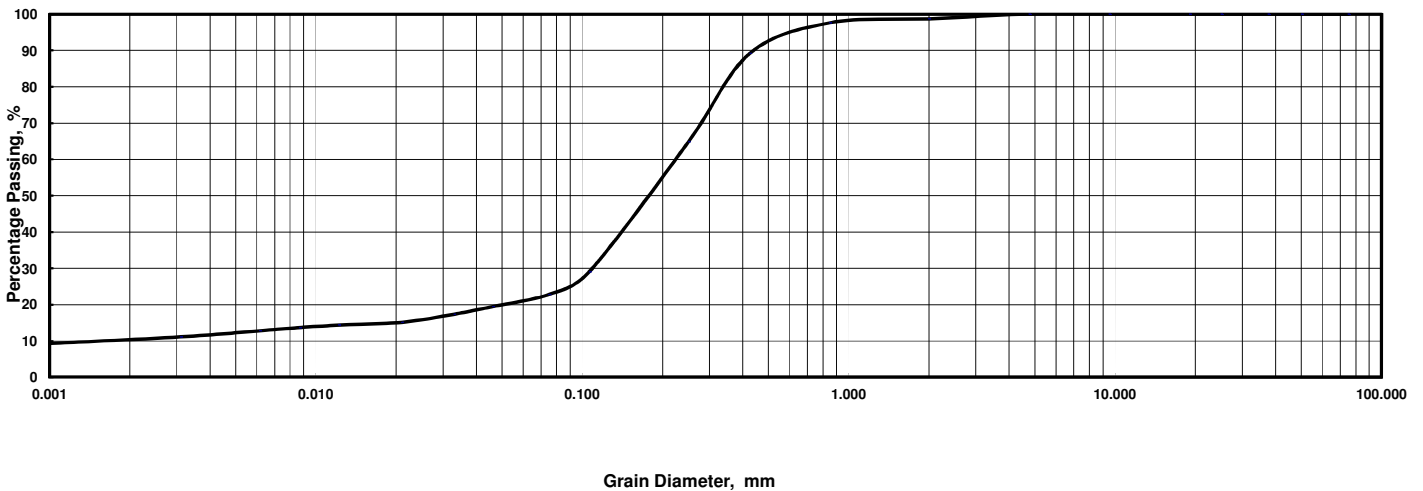
Sample No. : **OF-05-1 D-2** Depth : **2.50-3.30m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.7	97.6	89.2	64.9	29.0	22.8
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0061	0.0031	0.0009							
	% Passing	19.5	17.4	15.2	14.4	13.7	12.8	11.1	9.1							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-2		Sample No.	OF-05-1 D-2	
Depth	2.50-3.30m		Depth	2.50-3.30m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	1.3	%	Dia. at 60%	0.22	mm
2.00 - 0.425 mm	9.5	%	Dia. at 30%	0.11	mm
0.425 - 0.075 mm	66.4	%	Dia. at 10%	0.0015	mm
0.075 - 0.005 mm	10.7	%	Coeff. of Uniformity	148	
Smaller than 0.005 mm	12.2	%	Coeff. of Curvature	35.3	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	97.6	%			
75um Sieve Passing	22.8	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

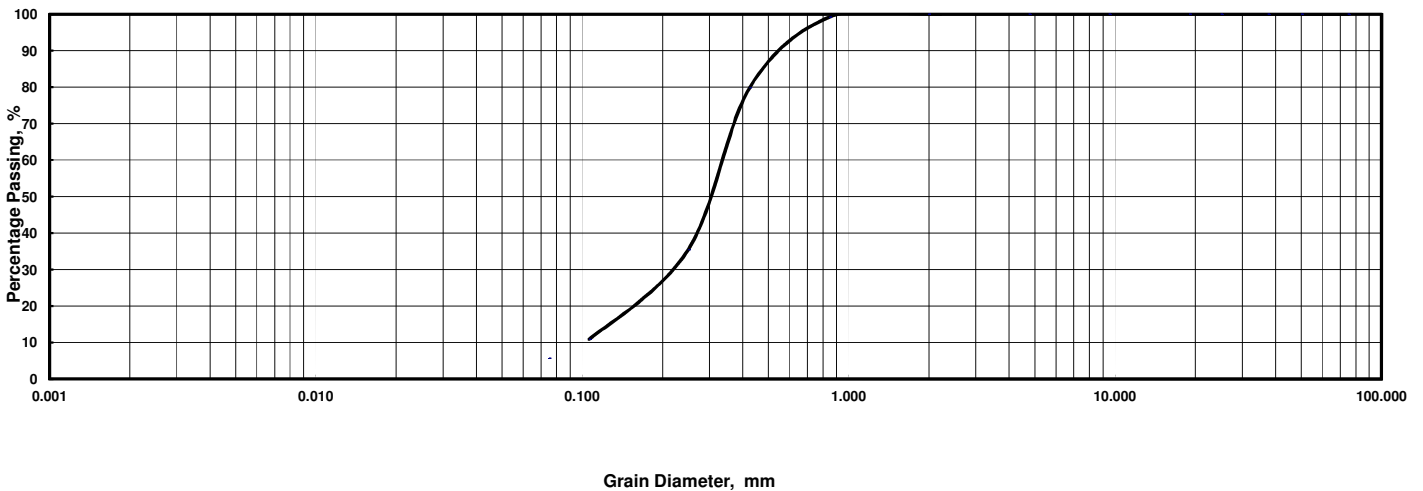
Sample No. : **OF-05-1 D-3** Depth : **6.00-6.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	79.9	35.5	11.0	5.7
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-3		Sample No.	OF-05-1 D-3	
Depth	6.00-6.80m		Depth	6.00-6.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.34	mm
2.00 - 0.425 mm	20.1	%	Dia. at 30%	0.21	mm
0.425 - 0.075 mm	74.2	%	Dia. at 10%	0.10	mm
0.075 - 0.005 mm	5.7	%	Coeff. of Uniformity	3.37	
Smaller than 0.005 mm			Coeff. of Curvature	1.27	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.3	%			
75um Sieve Passing	5.7	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

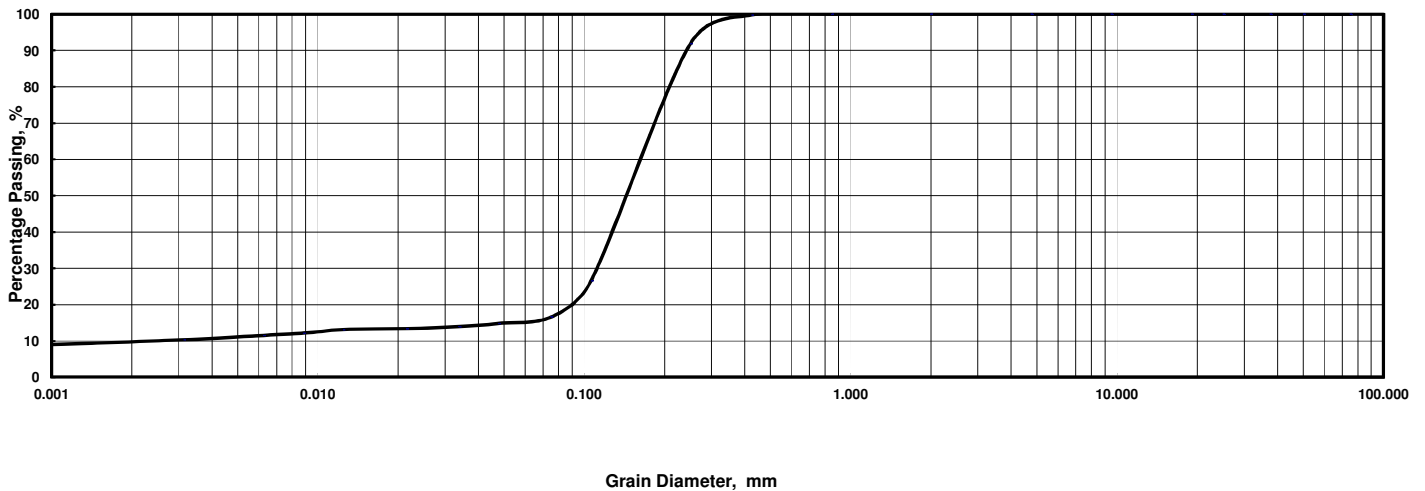
Sample No. : **OF-05-1 D-4** Depth : **9.00-9.50m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	91.9	26.6	16.6
Hydro.	Dia., mm	0.048	0.034	0.022	0.012	0.0088	0.0063	0.0031	0.0009							
	% Passing	14.8	14.0	13.4	13.1	12.2	11.6	10.3	8.9							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-4		Sample No.	OF-05-1 D-4	
Depth	9.00-9.50m		Depth	9.00-9.50m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.16 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.11 mm	
0.425 - 0.075 mm	83.2 %		Dia. at 10%	0.0024 mm	
0.075 - 0.005 mm	5.5 %		Coeff. of Uniformity	68.5	
Smaller than 0.005 mm	11.1 %		Coeff. of Curvature	31.2	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	16.6 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hün/Motiur

Checked by : A. B. Tan

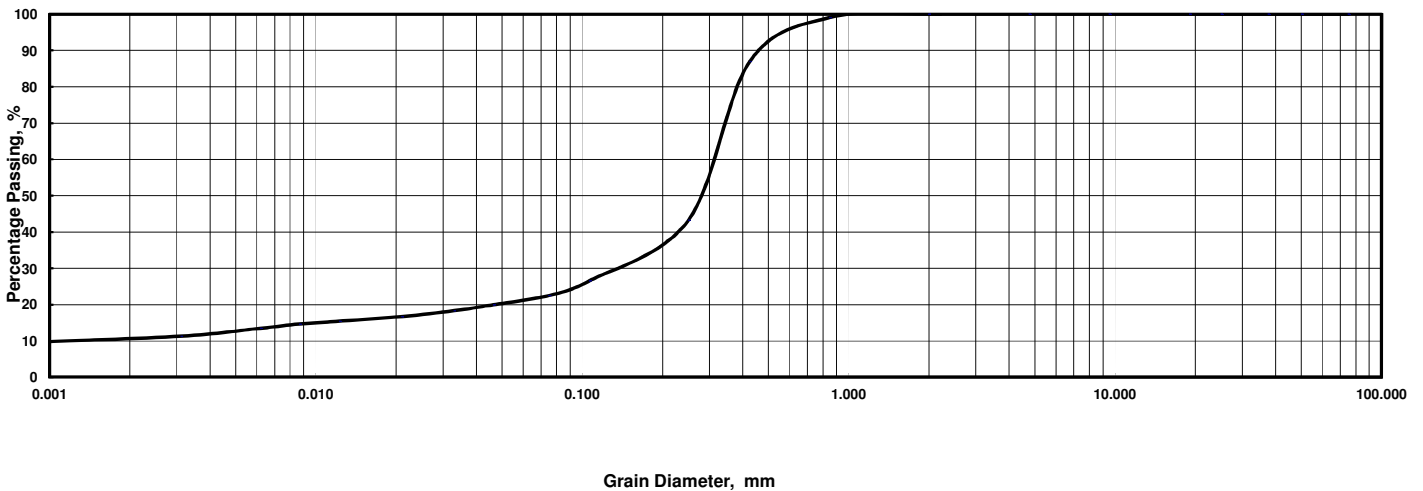
Sample No. : **OF-05-1 D-5** Depth : **12.00-12.30m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	87.0	43.3	26.5	22.5
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0009							
	% Passing	20.0	18.4	16.7	15.4	14.7	13.5	11.3	9.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-5		Sample No.	OF-05-1 D-5	
Depth	12.00-12.30m		Depth	12.00-12.30m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.31	mm
2.00 - 0.425 mm	13.0	%	Dia. at 30%	0.13	mm
0.425 - 0.075 mm	64.4	%	Dia. at 10%	0.0011	mm
0.075 - 0.005 mm	9.9	%	Coeff. of Uniformity	278	
Smaller than 0.005 mm	12.7	%	Coeff. of Curvature	47.6	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.1	%			
75um Sieve Passing	22.5	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

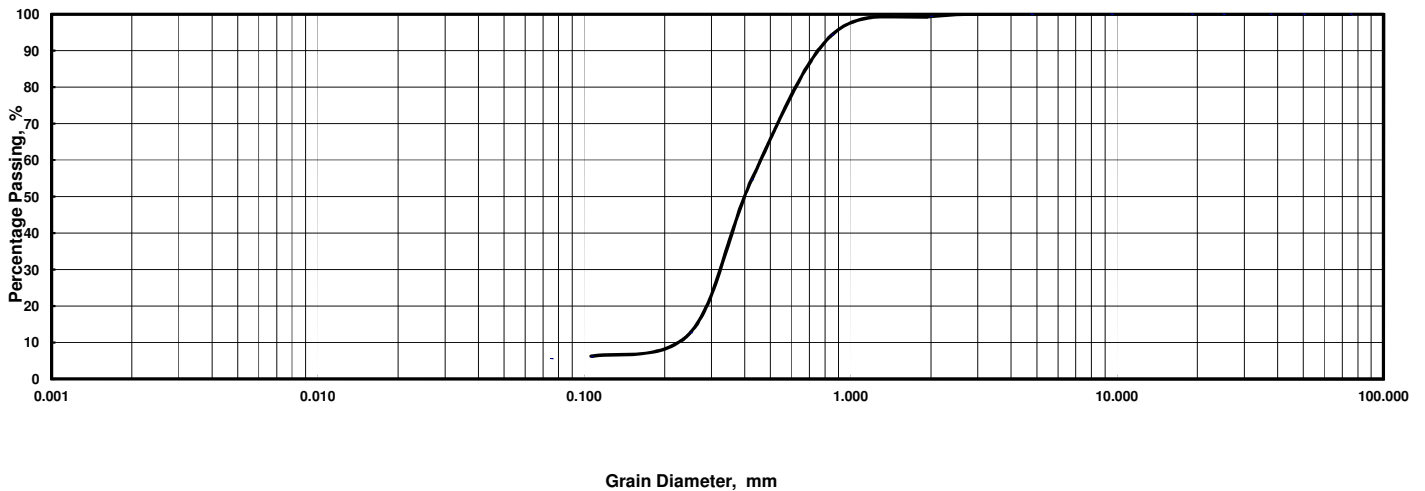
Sample No. : **OF-05-1 D-6** Depth : **12.30-12.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	94.3	54.7	12.7	6.2	5.7
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-6		Sample No.	OF-05-1 D-6	
Depth	12.30-12.90m		Depth	12.30-12.90m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.6	%	Dia. at 60%	0.47	mm
2.00 - 0.425 mm	44.7	%	Dia. at 30%	0.31	mm
0.425 - 0.075 mm	49.0	%	Dia. at 10%	0.17	mm
0.075 - 0.005 mm	5.7	%	Coeff. of Uniformity	2.68	
Smaller than 0.005 mm			Coeff. of Curvature	1.19	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	94.3	%			
75um Sieve Passing	5.7	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hün/Motiur

Checked by : A. B. Tan

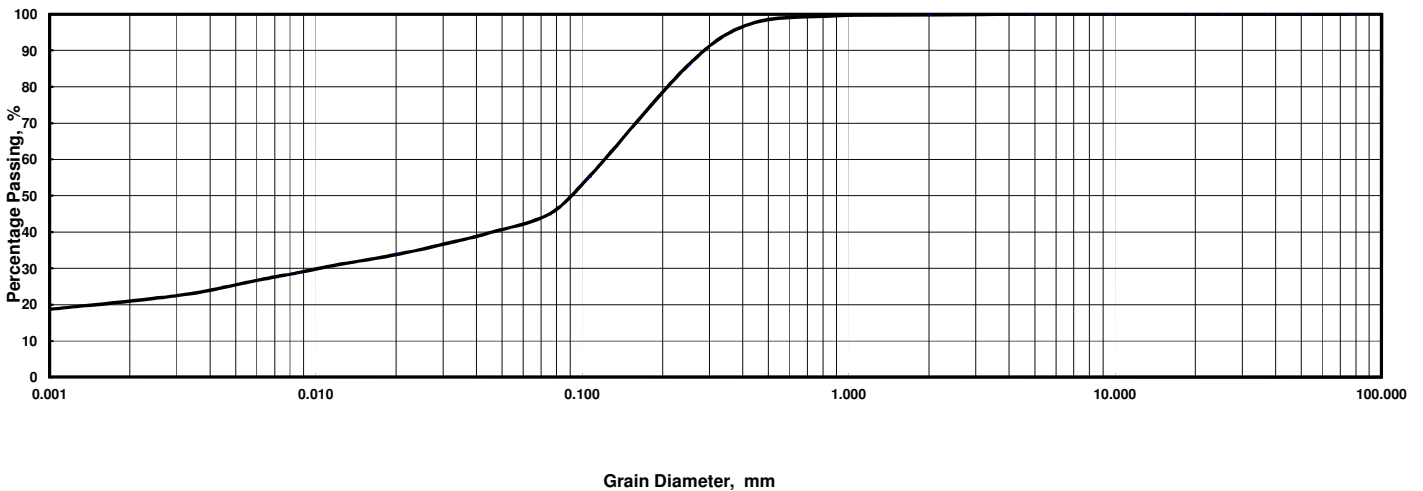
Sample No. : **OF-05-1 D-7** Depth : **15.00-15.75m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.5	97.2	86.0	55.2	44.9
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0085	0.0060	0.0030	0.0009							
	% Passing	39.8	37.1	33.9	30.9	28.7	26.7	22.5	18.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-7		Sample No.	OF-05-1 D-7	
Depth	15.00-15.75m		Depth	15.00-15.75m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.3 %		Dia. at 60%	0.12 mm	
2.00 - 0.425 mm	2.5 %		Dia. at 30%	0.010 mm	
0.425 - 0.075 mm	52.3 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	19.6 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	25.3 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.5 %				
75um Sieve Passing	44.9 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

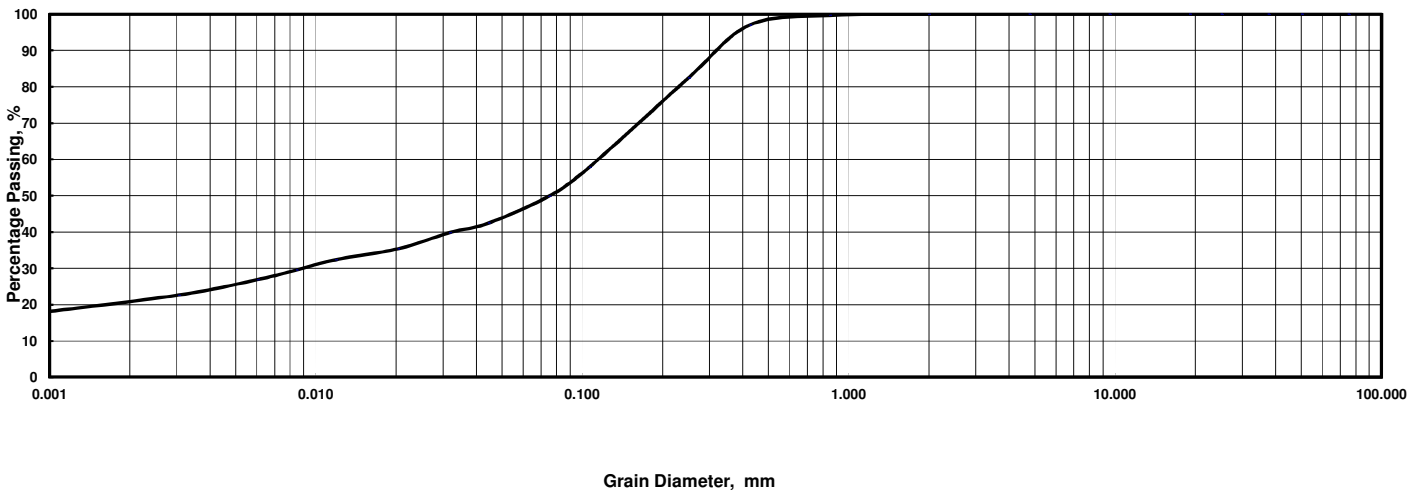
Sample No. : **OF-05-1 D-8** Depth : **18.00-18.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	97.0	82.4	57.8	49.9
Hydro.	Dia., mm	0.044	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0009							
	% Passing	42.5	39.8	35.4	32.4	29.5	26.9	22.6	17.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1 D-8		Sample No.	OF-05-1 D-8	
Depth	18.00-18.80m		Depth	18.00-18.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.1 %		Dia. at 60%	0.11 mm	
2.00 - 0.425 mm	2.9 %		Dia. at 30%	0.0089 mm	
0.425 - 0.075 mm	47.1 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	24.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	25.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.6 %				
75um Sieve Passing	49.9 %				





10) OF-05-1a

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-05-1a							
Sample No.		D-1	D-2	D-3	D-4	D-5	D-6		
Sample Depth		4.00m ~4.90m	4.90m ~5.70m	8.00m ~8.75m	11.00m ~11.90m	15.00m ~15.90m	18.00m ~18.90m		
Condition of Sample		Disturbed							
Natural Water Content		% 27.5	28.0	22.7	24.3	28.2	20.9		
Specific Gravity		2.70	2.69	2.68	2.68	2.72	2.70		
Wet Density		Mg/m <sup>3</sup> 1.96	1.97	2.07	2.01	1.98	2.01		
Dry Density		Mg/m <sup>3</sup> 1.53	1.54	1.68	1.62	1.55	1.66		
Natural Void Ratio		0.76	0.75	0.59	0.65	0.76	0.63		
Degree of Saturation		% 98	100	100	100	100	90		
Atterberg Limits	Liquid Limit,	% - * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	26	- * <sup>3</sup>		
	Plastic Limit,	% - * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	18	- * <sup>3</sup>		
	Plasticity Index,	% - * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	8	- * <sup>3</sup>		
Grain Size Analysis	Gravel,	% 0	0	0	0	0	0		
	Sand,	% 75	76	93	93	33	52		
	Silt,	% 10	11	7	7	40	27		
	Clay & Colloid,	% 15	13			27	21		
	Max. diameter,	mm 0.425	2.00	2.00	2.00	2.00	2.00		
	Diam. at 60%	mm 0.13	0.15	0.24	0.19	0.042	0.12		
	Diam. at 10%	mm -	-	0.095	0.094	-	-		
Visual soil description		Clayey Sand	Clayey Sand	Sand with Clay	Sand with Clay	Sandy Clay	Silty Sand		
Unified soil classification		-	-	-	-	CL	-		
Triaxial compression test	Angle of Internal Friction (°)	-	-	-	-	-	-		
	Cohesion Intercept, kPa	-	-	-	-	-	-		
	Condition of drainage	-	-	-	-	-	-		
	Angle of Internal Friction * <sup>2</sup> (°)	-	-	-	-	-	-		
	Cohesion Intercept, kPa * <sup>2</sup>	-	-	-	-	-	-		
	Condition of drainage	-	-	-	-	-	-		
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-	-	-		
	Compression Index(Average)	-	-	-	-	-	-		
	Pressure Range for Compression Index(kPa)	-	-	-	-	-	-		
	Swell index	-	-	-	-	-	-		
Chemical Test	pH value	-	-	-	-	-	-		
	Total sulphate content as SO <sub>3</sub> ,	% -	-	-	-	-	-		
	Chloride content as Cl,	% -	-	-	-	-	-		
	Organic Matter content,	% -	-	-	-	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-		
Strain at failure (%)		-	-	-	-	-	-		

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

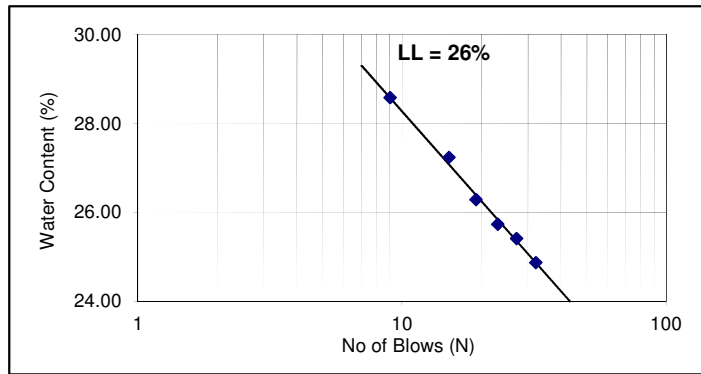
Checked by : A. B. Tan

## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 15.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-05-1A D-5 Depth : 15.00-15.90m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	32	24.87
2	27	25.40
3	23	25.73
4	19	26.28
5	15	27.23
6	9	28.57
<b>Liquid Limits %</b>		<b>26</b>
<b>Plastic Limits %</b>		<b>18</b>
<b>Plasticity Index</b>		<b>8</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

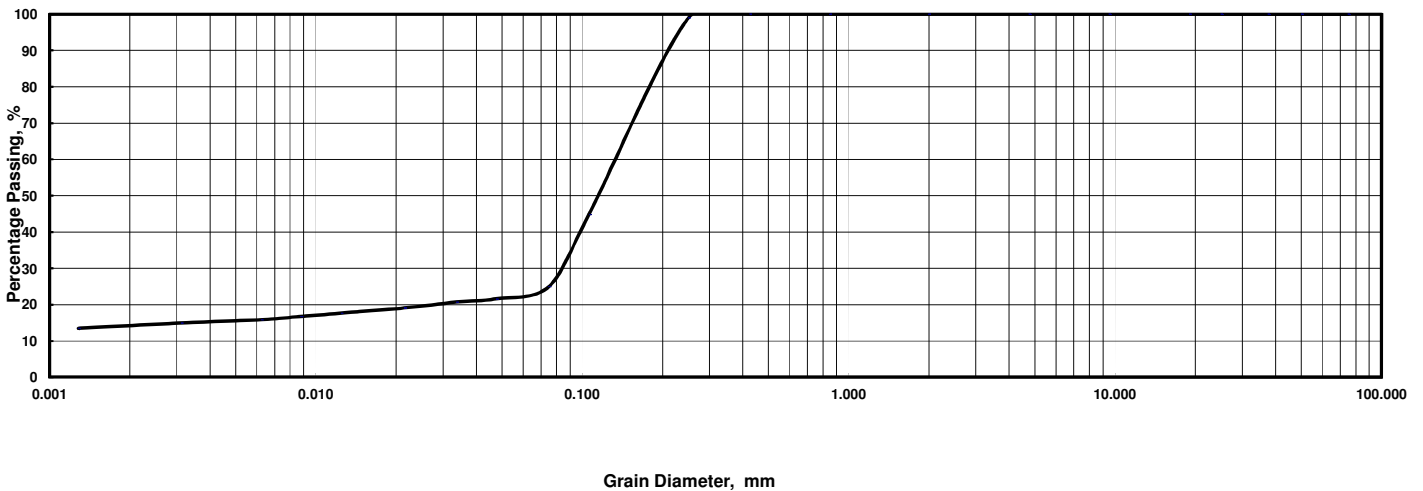
Sample No. : **OF-05-1a D-1** Depth : **4.00-4.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.9	44.9	25.0
Hydro.	Dia., mm	0.048	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	21.6	20.7	19.1	17.7	16.8	15.9	15.0	13.5							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-1		Sample No.	OF-05-1a D-1	
Depth	4.00-4.90m		Depth	4.00-4.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.13 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.082 mm	
0.425 - 0.075 mm	75.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	9.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	15.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	25.0 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

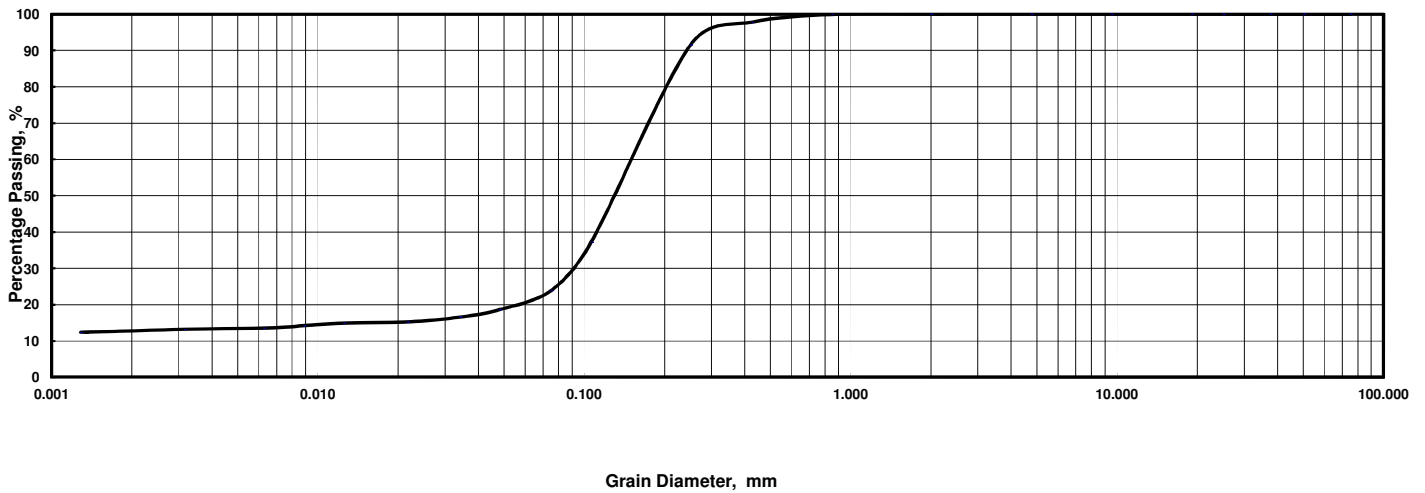
Sample No. : **OF-05-1a D-2** Depth : **4.90-5.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	97.8	91.5	37.2	23.9
Hydro.	Dia., mm	0.048	0.034	0.022	0.013	0.0089	0.0063	0.0031	0.0013							
	% Passing	18.6	16.6	15.2	14.9	14.2	13.5	13.2	12.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-2		Sample No.	OF-05-1a D-2	
Depth	4.90-5.70m		Depth	4.90-5.70m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	2.2 %		Dia. at 30%	0.088 mm	
0.425 - 0.075 mm	73.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	10.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	13.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	23.9 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

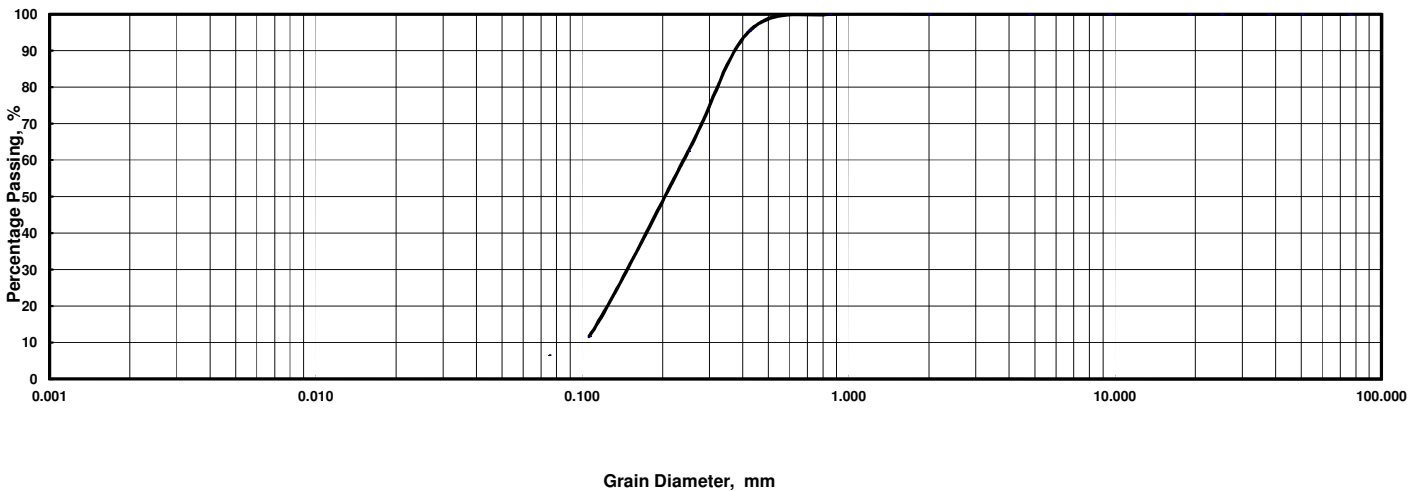
Sample No. : **OF-05-1a D-3** Depth : **8.00-8.75m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.5	62.5	11.7	6.6
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-3		Sample No.	OF-05-1a D-3	
Depth	8.00-8.75m		Depth	8.00-8.75m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.24 mm	
2.00 - 0.425 mm	4.5 %		Dia. at 30%	0.14 mm	
0.425 - 0.075 mm	88.8 %		Dia. at 10%	0.095 mm	
0.075 - 0.005 mm	6.6 %		Coeff. of Uniformity	2.54	
Smaller than 0.005 mm			Coeff. of Curvature	0.92	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	6.6 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

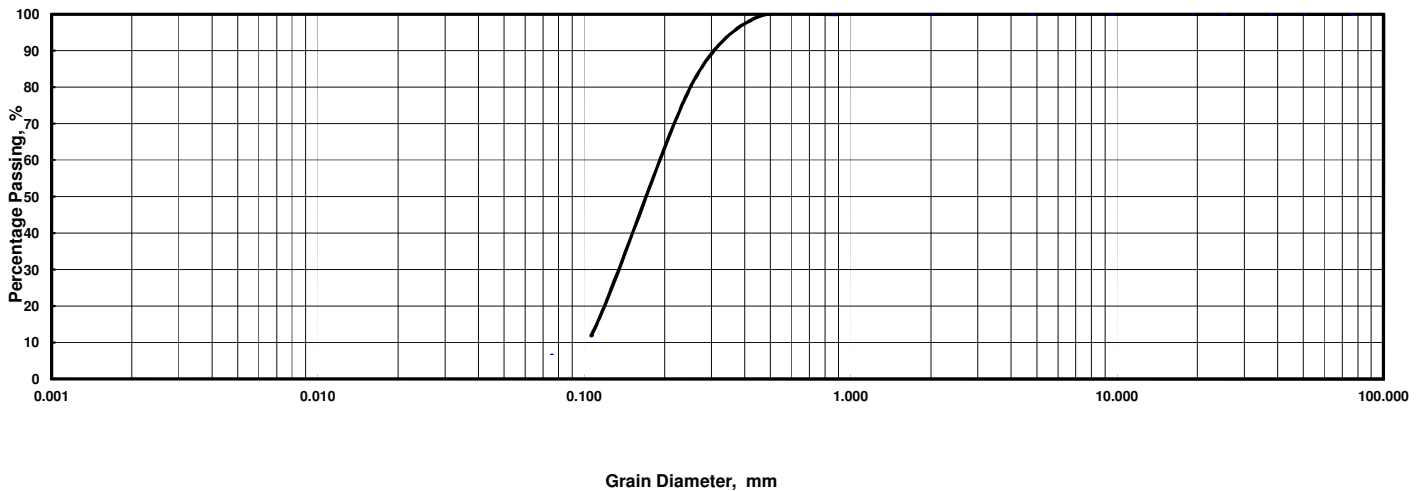
Sample No. : **OF-05-1a D-4** Depth : **11.00-11.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	98.5	80.0	11.8	6.8
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-4		Sample No.	OF-05-1a D-4	
Depth	11.00-11.90m		Depth	11.00-11.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.19 mm	
2.00 - 0.425 mm	1.5 %		Dia. at 30%	0.13 mm	
0.425 - 0.075 mm	91.7 %		Dia. at 10%	0.094 mm	
0.075 - 0.005 mm	6.8 %		Coeff. of Uniformity	2.08	
Smaller than 0.005 mm			Coeff. of Curvature	0.98	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	6.8 %				



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

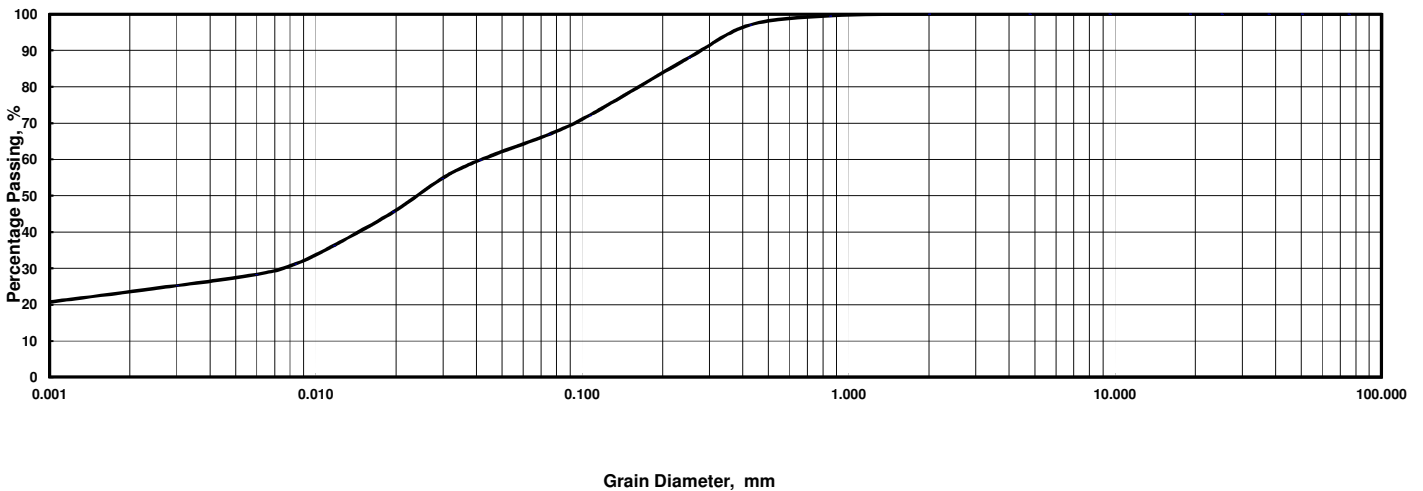
Sample No. : **OF-05-1a D-5** Depth : **15.00-15.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	97.0	88.0	72.1	66.9
Hydro.	Dia., mm	0.041	0.030	0.019	0.012	0.0083	0.0060	0.0030	0.0009							
	% Passing	59.8	54.8	45.5	36.2	31.2	28.3	25.3	20.2							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-5		Sample No.	OF-05-1a D-5	
Depth	15.00-15.90m		Depth	15.00-15.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.042 mm	
2.00 - 0.425 mm	3.0 %		Dia. at 30%	0.0073 mm	
0.425 - 0.075 mm	30.1 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	39.6 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	27.3 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.5 %				
75um Sieve Passing	66.9 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14 Tested By : Hün/Motiur Checked by : A. B. Tan

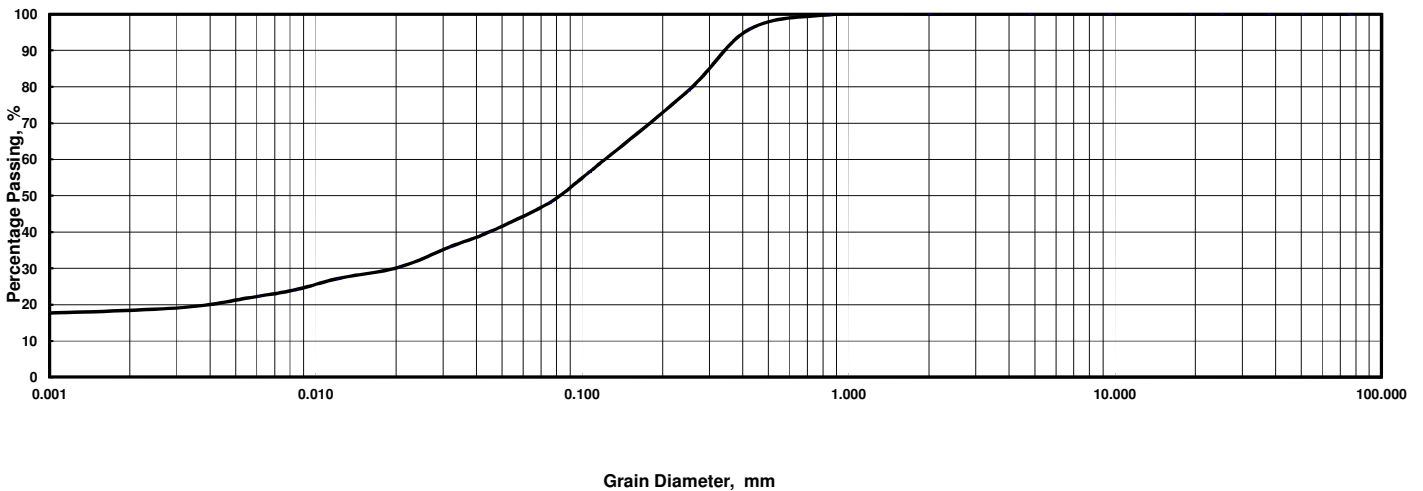
Sample No. : **OF-05-1a D-6** Depth : **18.00-18.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.9	79.0	56.5	48.0
Hydro.	Dia., mm	0.044	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0009							
	% Passing	39.9	35.9	30.3	27.1	24.3	22.3	19.2	17.6							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1a D-6		Sample No.	OF-05-1a D-6	
Depth	18.00-18.90m		Depth	18.00-18.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.12 mm	
2.00 - 0.425 mm	4.1 %		Dia. at 30%	0.019 mm	
0.425 - 0.075 mm	47.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	26.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	21.2 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.8 %				
75um Sieve Passing	48.0 %				



11) OF-05-1b

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-05-1b							
Sample No.		D-1	D-2	D-3	D-4				
Sample Depth		7.00m ~7.85m	10.00m ~10.90m	13.00m ~13.70m	16.00m ~16.80m				
Condition of Sample		Disturbed							
Natural Water Content	%	25.6	25.0	19.8	20.0				
Specific Gravity		2.69	2.70	2.67	2.67				
Wet Density	Mg/m <sup>3</sup>	1.95	1.95	1.98	2.00				
Dry Density	Mg/m <sup>3</sup>	1.55	1.56	1.65	1.67				
Natural Void Ratio		0.73	0.73	0.61	0.60				
Degree of Saturation	%	94	92	86	88				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0	0			
	Sand,	%	78	62	96	92			
	Silt,	%	9	19	4	8			
	Clay & Colloid,	%	13	19					
	Max. diameter,	mm	2.00	0.425	2.00	0.85			
	Diam. at 60%	mm	0.16	0.13	0.33	0.33			
	Diam. at 10%	mm	-	-	0.12	0.090			
Visual soil description		Clayey Sand	Clayey Sand	Sand	Sand with Clay				
Unified soil classification		-	-	-	-				
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-			
	Cohesion Intercept, kPa		-	-	-	-			
	Condition of drainage		-	-	-	-			
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-			
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-			
	Condition of drainage		-	-	-	-			
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-			
	Compression Index(Average)		-	-	-	-			
	Pressure Range for Compression Index(kPa)		-	-	-	-			
	Swell index		-	-	-	-			
Chemical Test	pH value		-	-	-	-			
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-			
	Chloride content as Cl,	%	-	-	-	-			
	Organic Matter content,	%	-	-	-	-			
Unconfined Compression Strength (kPa)		-	-	-	-				
Strain at failure (%)		-	-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

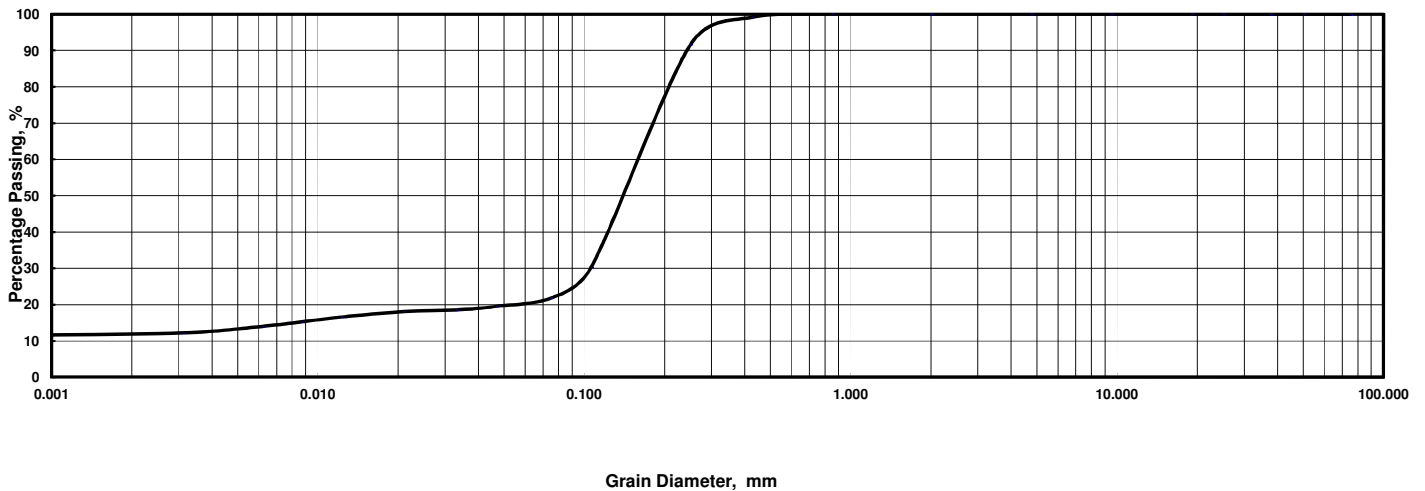
Sample No. : **OF-05-1b D-1** Depth : **7.00-7.85m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	91.6	30.2	21.8
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0009							
	% Passing	19.5	18.6	18.1	16.6	15.3	14.0	12.2	11.6							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1b D-1		Sample No.	OF-05-1b D-1	
Depth	7.00-7.80m		Depth	7.00-7.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.16 mm	
2.00 - 0.425 mm	0.9 %		Dia. at 30%	0.11 mm	
0.425 - 0.075 mm	77.3 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	8.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	13.3 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	21.8 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 13.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

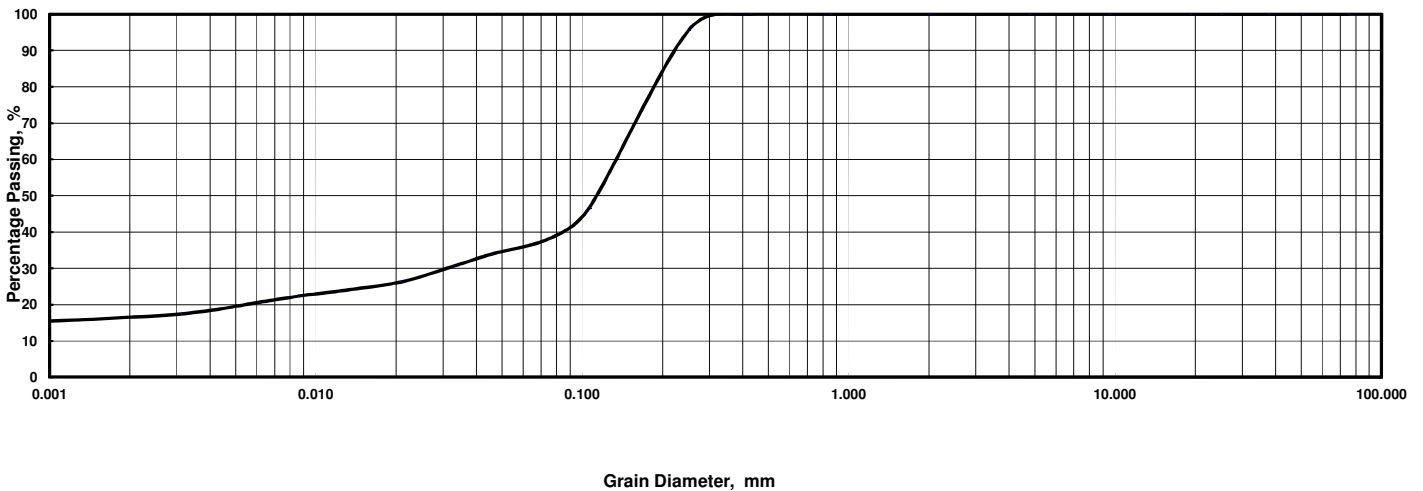
Sample No. : **OF-05-1b D-2** Depth : **10.00-10.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.5	46.7	38.2
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0009							
	% Passing	33.9	30.5	26.3	23.7	22.4	20.7	17.5	15.3							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1b D-2		Sample No.	OF-05-1b D-2	
Depth	10.00-10.90m		Depth	10.00-10.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.13 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.031 mm	
0.425 - 0.075 mm	61.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	18.7 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	19.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	38.2 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

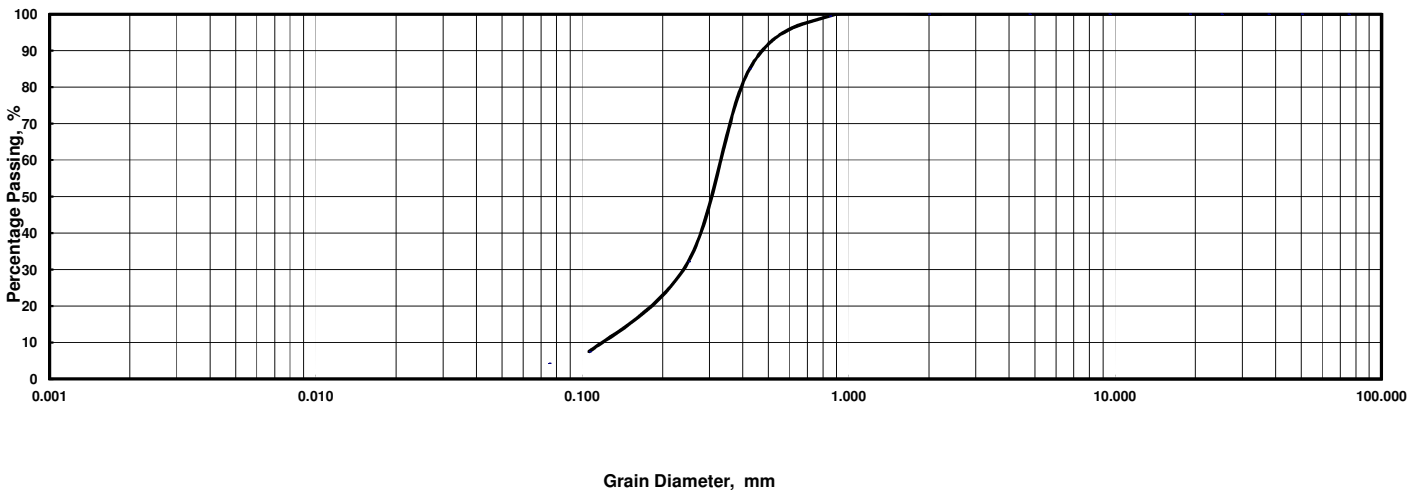
Sample No. : **OF-05-1b D-3** Depth : **13.00-13.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.67

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	85.1	32.2	7.6	4.4
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1b D-3		Sample No.	OF-05-1b D-3	
Depth	13.00-13.70m		Depth	13.00-13.70m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.33 mm	
2.00 - 0.425 mm	14.9 %		Dia. at 30%	0.23 mm	
0.425 - 0.075 mm	80.7 %		Dia. at 10%	0.12 mm	
0.075 - 0.005 mm	4.4 %		Coeff. of Uniformity	2.86	
Smaller than 0.005 mm			Coeff. of Curvature	1.40	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.5 %				
75um Sieve Passing	4.4 %				



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 12.12.14

Tested By : Motiur

Checked by : A. B. Tan

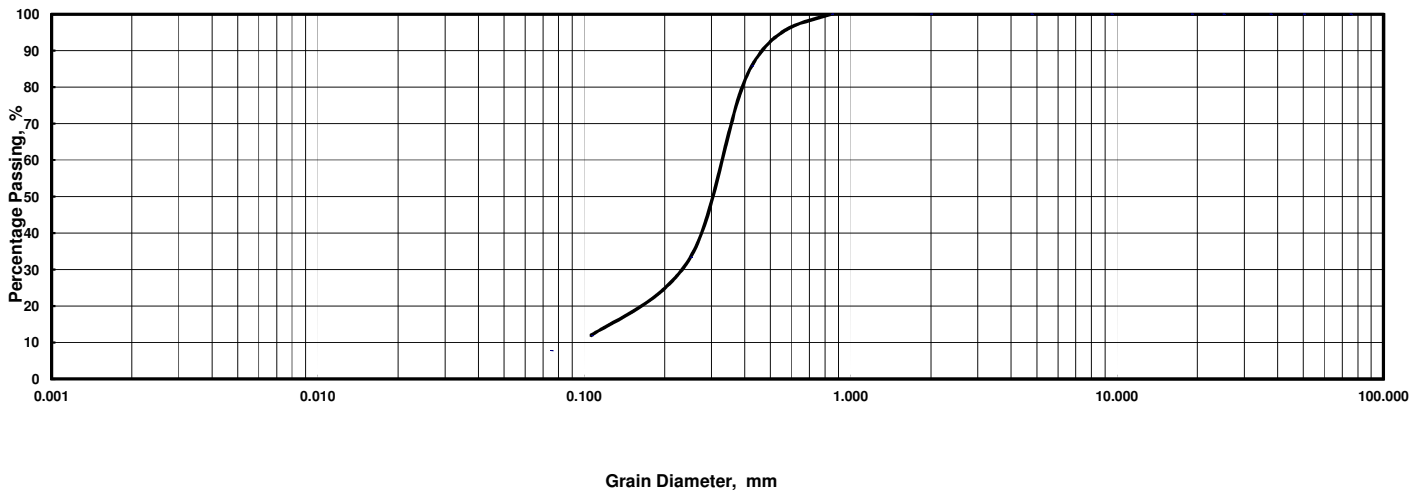
Sample No. : **OF-05-1b D-4** Depth : **16.00-16.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.67

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.9	33.4	12.0	7.9
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-1b D-4		Sample No.	OF-05-1b D-4	
Depth	16.00-16.80m		Depth	16.00-16.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.85 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.33 mm	
2.00 - 0.425 mm	14.1 %		Dia. at 30%	0.22 mm	
0.425 - 0.075 mm	78.0 %		Dia. at 10%	0.090 mm	
0.075 - 0.005 mm	7.9 %		Coeff. of Uniformity	3.64	
Smaller than 0.005 mm			Coeff. of Curvature	1.62	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	7.9 %				

12) OF-05-2

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		<b>OF-05-2</b>								
Sample No.		D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9
Sample Depth		1.00m ~1.80m	3.00m ~3.80m	5.00m ~5.80m	7.00m ~7.80m	10.00m ~10.50m	10.50m ~11.30m	14.00m ~14.80m	17.00m ~17.80m	20.00m ~20.80m
Condition of Sample		Disturbed								
Natural Water Content	%	19.5	34.5	23.5	25.8	20.8	21.6	15.6	25.2	23.2
Specific Gravity		2.77	2.72	2.69	2.70	2.69	2.68	2.67	2.70	2.70
Wet Density	Mg/m <sup>3</sup>	1.90	1.90	1.96	1.83	-	1.81	-	-	-
Dry Density	Mg/m <sup>3</sup>	1.59	1.41	1.58	1.45	-	1.49	-	-	-
Natural Void Ratio		0.74	0.92	0.70	0.86	-	0.80	-	-	-
Degree of Saturation	%	73	100	91	81	-	72	-	-	-
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>
Grain Size Analysis	Gravel,	%	0	0	0	0	0	1	0	0
	Sand,	%	97	32	59	75	77	89	87	62
	Silt,	%	3	38	18	12	10	11	12	13
	Clay & Colloid,	%		30	23	13	13		25	27
	Max. diameter,	mm	4.75	2.00	2.00	2.00	0.850	2.00	9.50	2.00
	Diam. at 60%	mm	0.23	0.050	0.15	0.14	0.17	0.18	0.34	0.14
	Diam. at 10%	mm	0.11	-	-	-	-	-	-	-
Visual soil description		Sand	Sandy Clay	Clayey Sand	Clayey Sand	Clayey Sand	Sand with Clay	Clayey Sand	Clayey Sand	Sandy Clay
Unified soil classification		-	-	-	-	-	-	-	-	-
Triaxial compression test	Angle of Internal Friction (°)	-	-	-	-	-	-	-	-	-
	Cohesion Intercept, kPa	-	-	-	-	-	-	-	-	-
	Condition of drainage	-	-	-	-	-	-	-	-	-
	Angle of Internal Friction * <sup>2</sup> (°)	38	-	35	-	-	-	39	-	-
	Cohesion Intercept, kPa * <sup>2</sup>	0	-	0	-	-	-	0	-	-
	Condition of drainage	CD* <sup>5</sup>	-	CD* <sup>5</sup>	-	-	-	CD* <sup>5</sup>	-	-
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-	-	-	-	-	-
	Compression Index(Average)	-	-	-	-	-	-	-	-	-
	Pressure Range for Compression Index(kPa)	-	-	-	-	-	-	-	-	-
	Swell index	-	-	-	-	-	-	-	-	-
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>	1.67	-	1.91	-	-	-	1.79	-	-
	Optimum Moisture Content, %	15.7	-	12.9	-	-	-	13.0	-	-
Unconfined Compression Strength (kPa)		-	-	-	-	-	-	-	-	-
Strain at failure (%)		-	-	-	-	-	-	-	-	-

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : By using 2.5 kg Rammer

\*<sup>5</sup> : Specimens are prepared at 90% of Maximum dry density

Checked by : A. B. Tan



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 24.11.14 Tested By : Motiur Checked by : A. B. Tan

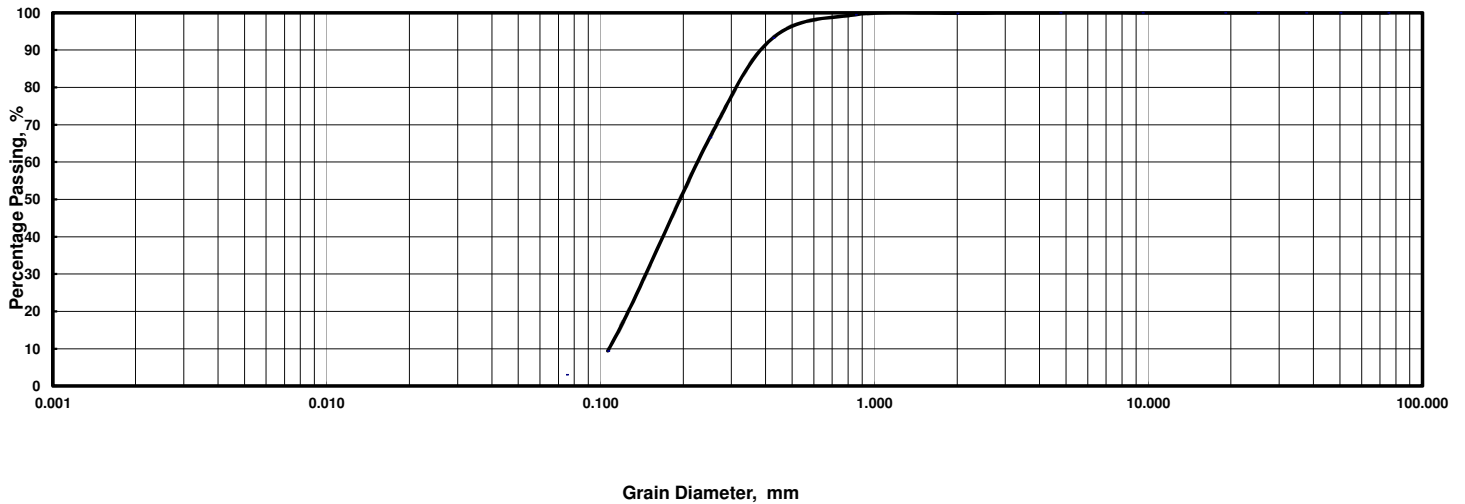
Sample No. : **OF-05-2 D-1** Depth : **1.00-1.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.77

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	93.2	66.6	9.4	3.0
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-1		Sample No.	OF-05-2 D-1
Depth	1.00-1.80m		Depth	1.00-1.80m
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm
4.75 - 2.00 mm	0.1 %		Dia. at 60%	0.23 mm
2.00 - 0.425 mm	6.6 %		Dia. at 30%	0.14 mm
0.425 - 0.075 mm	90.2 %		Dia. at 10%	0.11 mm
0.075 - 0.005 mm	3.0 %		Coeff. of Uniformity	2.12
Smaller than 0.005 mm			Coeff. of Curvature	0.86
2000um Sieve Passing	100.0 %			
425um Sieve Passing	99.5 %			
75um Sieve Passing	3.0 %			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

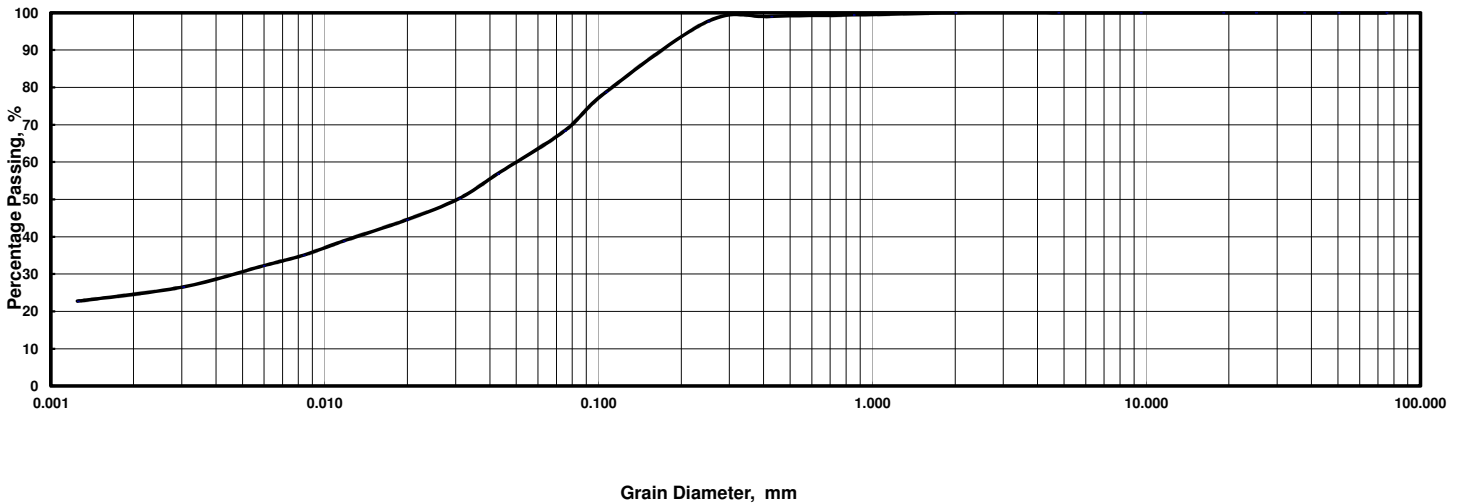
Sample No. : **OF-05-2 D-2** Depth : **3.00-3.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	99.0	97.7	78.7	68.4
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0083	0.0060	0.0030	0.0012							
	% Passing	56.8	50.2	44.5	38.8	35.1	32.2	26.5	22.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-2		Sample No.	OF-05-2 D-2	
Depth	3.00-3.80m		Depth	3.00-3.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.050 mm	
2.00 - 0.425 mm	1.0 %		Dia. at 30%	0.0046 mm	
0.425 - 0.075 mm	30.6 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	38.0 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	30.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.4 %				
75um Sieve Passing	68.4 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

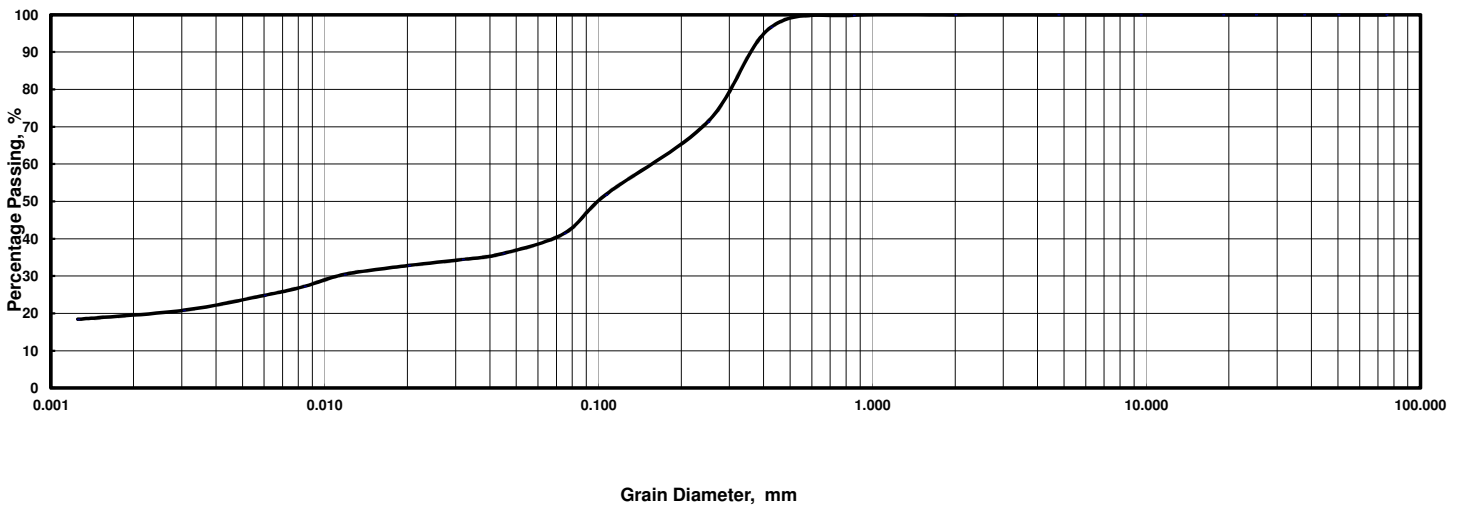
Sample No. : **OF-05-2 D-3** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	96.6	71.3	51.8	41.5
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	36.0	34.4	32.8	30.4	27.2	24.8	20.8	18.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-3		Sample No.	OF-05-2 D-3	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	3.4 %		Dia. at 30%	0.011 mm	
0.425 - 0.075 mm	55.2 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	18.0 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	41.5 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

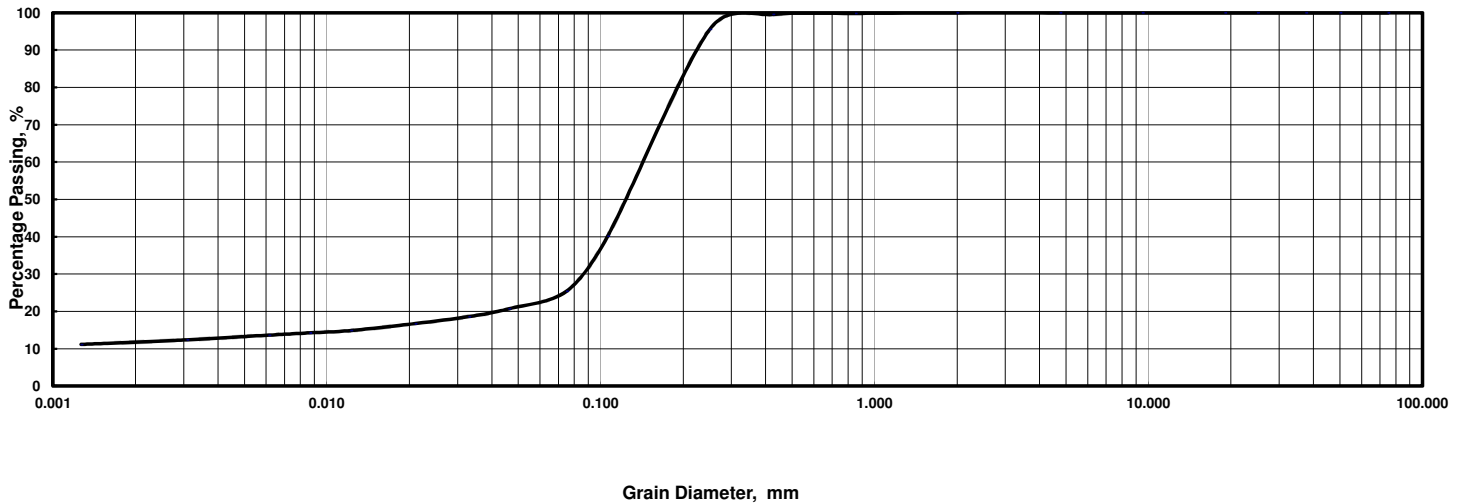
Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

(Assumed)

Sample No. :	<b>OF-05-2 D-4</b>		Depth :	<b>7.00-7.80m</b> ( _____ )								Specific Gravity :	2.72				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075	
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.5	95.5	40.1	25.4	
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0061	0.0031	0.0013								
	% Passing	20.7	18.6	16.7	14.9	14.3	13.6	12.4	11.2								

Sample No. :			Depth :	( _____ )								Specific Gravity :					
Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-4		Sample No.	OF-05-2 D-4	
Depth	7.00-7.80m		Depth	7.00-7.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.14	mm
2.00 - 0.425 mm	0.5	%	Dia. at 30%	0.084	mm
0.425 - 0.075 mm	74.1	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	12.2	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	13.2	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.8	%			
75um Sieve Passing	25.4	%			



# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

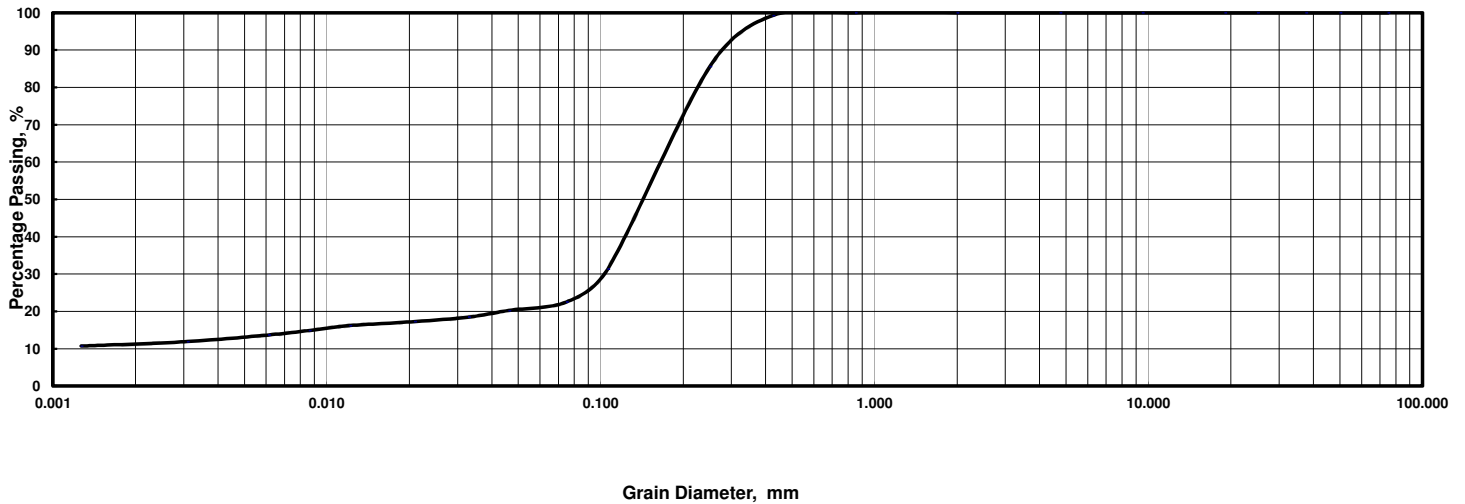
Tested Method : **ASTM D422-63** Date of Testing : **27.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

(Assumed)

Sample No. :	<b>OF-05-2 D-5</b>		Depth :	<b>10.00-10.50m</b> ( _____ )								Specific Gravity :	<b>2.72</b>			
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	85.6	31.3	22.5
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	20.3	18.5	17.3	16.2	14.9	13.7	11.9	10.7							

Sample No. :			Depth :	( _____ )								Specific Gravity :				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-5		Sample No.	OF-05-2 D-5	
Depth	10.00-10.50m		Depth	10.00-10.50m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.17	mm
2.00 - 0.425 mm	0.7	%	Dia. at 30%	0.10	mm
0.425 - 0.075 mm	76.7	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	9.5	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	13.0	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	22.5	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 24.11.14 Tested By : Motiuir Checked by : A. B. Tan

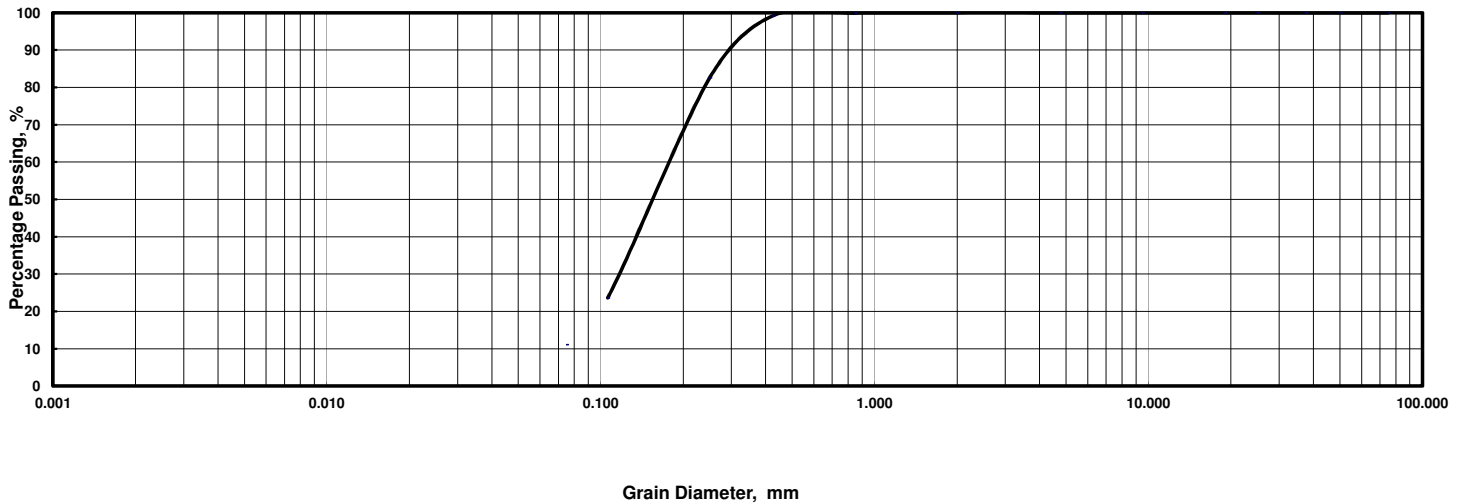
Sample No. : **OF-05-2 D-6** Depth : **10.50-11.30m** ( \_\_\_\_\_ ) Specific Gravity :

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.2	82.6	23.6	11.2
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity :

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-6		Sample No.	OF-05-2 D-6	
Depth	10.50-11.30m		Depth	10.50-11.30m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.18 mm	
2.00 - 0.425 mm	0.8 %		Dia. at 30%	0.12 mm	
0.425 - 0.075 mm	88.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	11.2 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm			Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.9 %				
75um Sieve Passing	11.2 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 24.11.14 Tested By : Motiuir Checked by : A. B. Tan

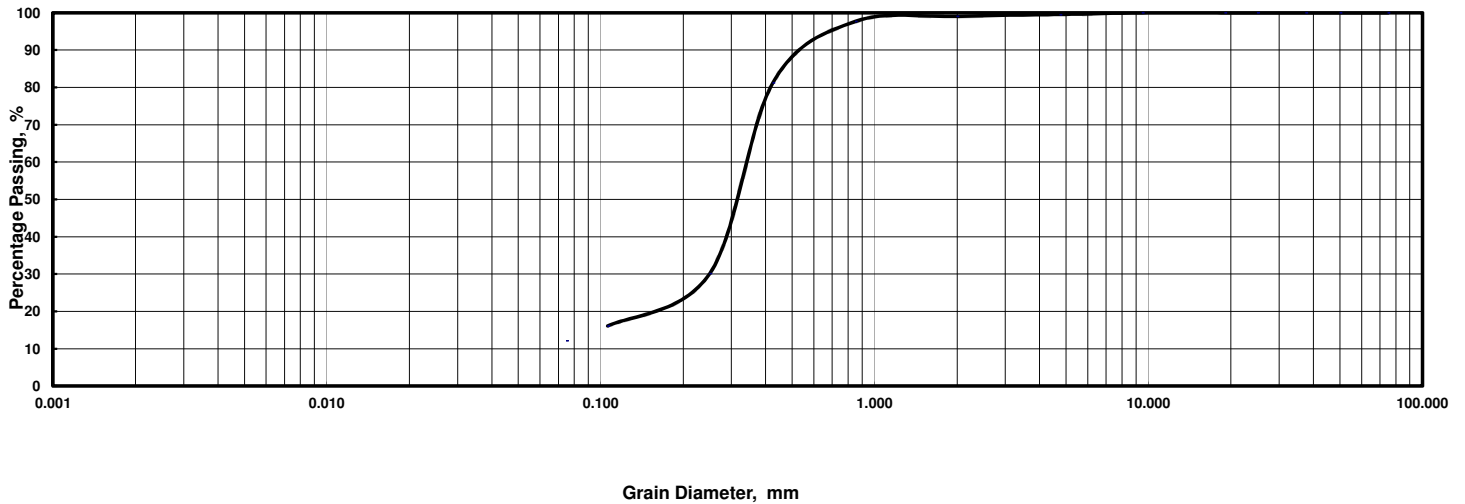
Sample No. : **OF-05-2 D-7** Depth : **14.00-14.80m** ( \_\_\_\_\_ ) Specific Gravity :

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	99.0	97.6	81.2	30.1	16.1	12.1
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity :

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-7		Sample No.	OF-05-2 D-7	
Depth	14.00-14.80m		Depth	14.00-14.80m	
Larger than 4.75 mm	0.5 %		Max. Diameter	9.50 mm	
4.75 - 2.00 mm	0.5 %		Dia. at 60%	0.34 mm	
2.00 - 0.425 mm	17.8 %		Dia. at 30%	0.25 mm	
0.425 - 0.075 mm	69.1 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	12.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm			Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	97.6 %				
75um Sieve Passing	12.1 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

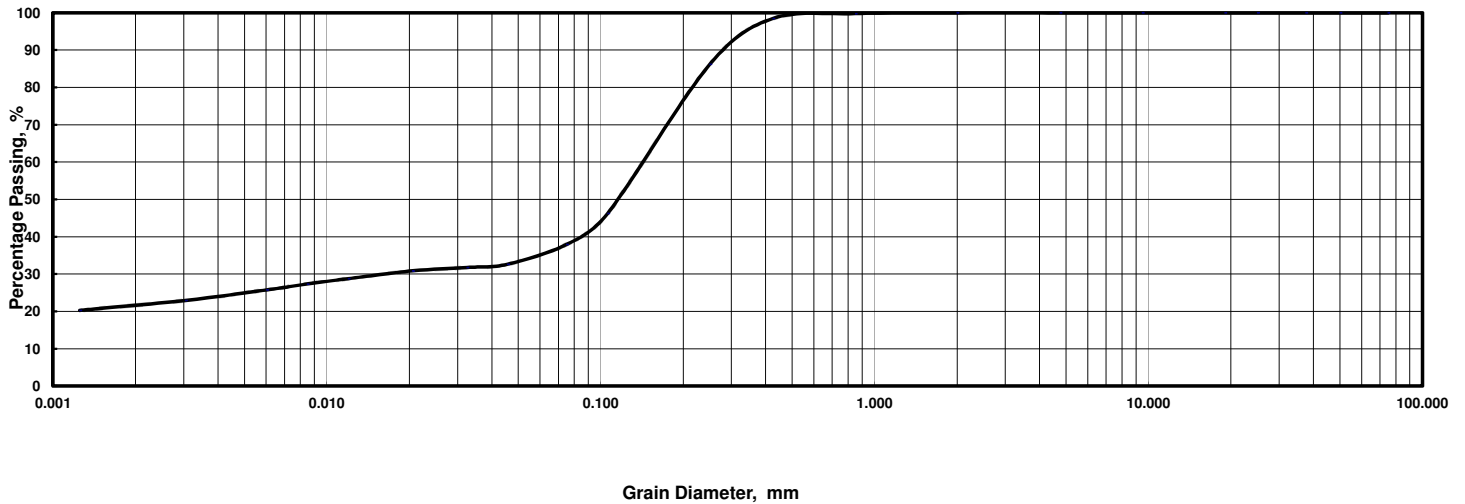
Tested Method : ASTM D422-63 Date of Testing : 27.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

(Assumed)

Sample No. :	<b>OF-05-2 D-8</b>		Depth :	<b>17.00-17.80m</b> ( _____ )								Specific Gravity :	2.72				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075	
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	98.4	86.2	46.3	37.9	
Hydro.	Dia., mm	0.046	0.032	0.021	0.012	0.0085	0.0060	0.0030	0.0013								
	% Passing	32.6	31.8	30.9	28.8	27.3	25.8	22.9	20.3								

Sample No. :			Depth :	( _____ )								Specific Gravity :					
Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-8		Sample No.	OF-05-2 D-8	
Depth	17.00-17.80m		Depth	17.00-17.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.14	mm
2.00 - 0.425 mm	1.6	%	Dia. at 30%	0.016	mm
0.425 - 0.075 mm	60.5	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	13.1	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	24.8	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.7	%			
75um Sieve Passing	37.9	%			

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

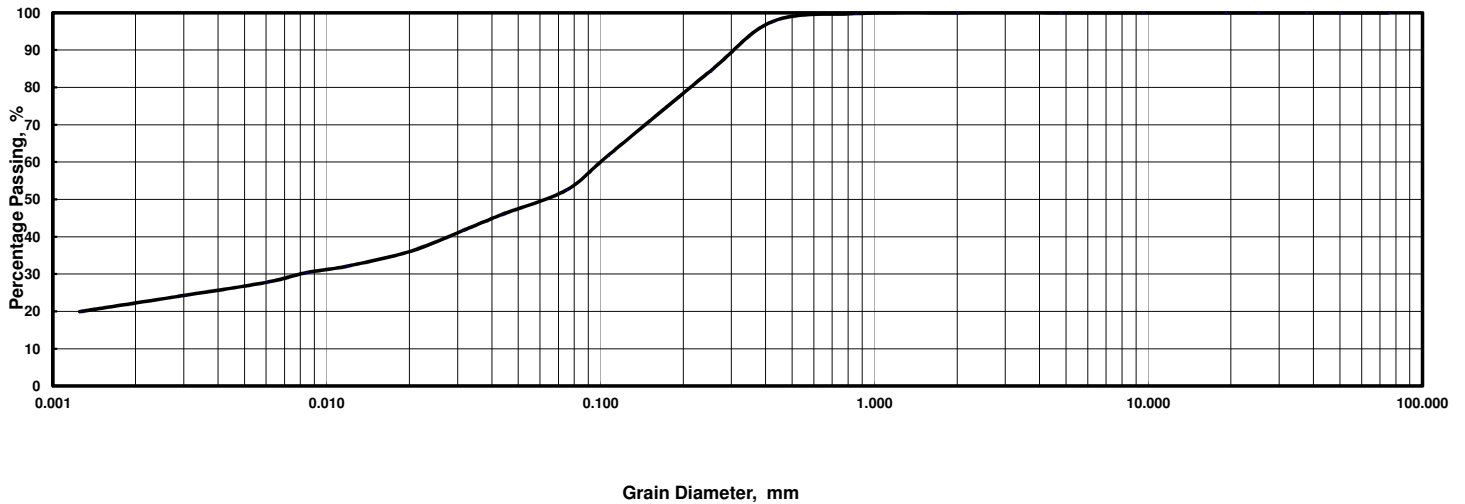
Tested Method : **ASTM D422-63** Date of Testing : **28.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

(Assumed)

Sample No. :	<b>OF-05-2 D-9</b>		Depth :	<b>20.00-20.80m</b> ( _____ )								Specific Gravity :	<b>2.72</b>				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075	
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.7	84.3	61.7	52.5	
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013								
	% Passing	46.0	41.6	36.1	32.1	30.4	27.8	24.3	20.0								

Sample No. :			Depth :	( _____ )								Specific Gravity :					
Sieve	Dia., mm																
	% Passing																
Hydro.	Dia., mm																
	% Passing																

**Grain Size Distribution Curves**



	<b>0.005</b>	<b>0.075</b>	<b>0.425</b>	<b>2.00</b>	<b>4.75</b>	<b>19.0</b>	<b>75.0</b>
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-9		Sample No.	OF-05-2 D-9	
Depth	20.00-20.80m		Depth	20.00-20.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.000	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.10	mm
2.00 - 0.425 mm	2.3	%	Dia. at 30%	0.0080	mm
0.425 - 0.075 mm	45.2	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	25.9	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	26.6	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.8	%			
75um Sieve Passing	52.5	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

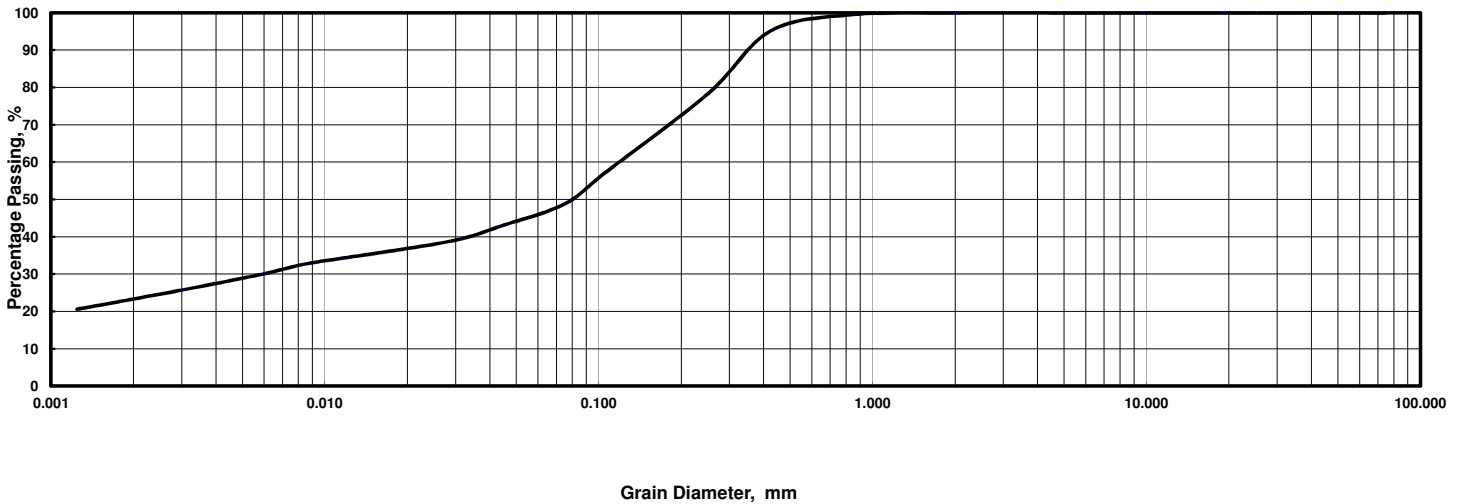
Tested Method : ASTM D422-63 Date of Testing : 28.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

(Assumed)

Sample No. : <b>OF-05-2 D-10</b>		Depth : <b>23.00-23.75m</b> ( _____ )										Specific Gravity : <b>2.72</b>				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	95.2	78.2	57.3	48.7
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0083	0.0059	0.0030	0.0012							
	% Passing	42.8	39.4	36.8	34.3	32.6	30.0	25.7	20.6							

Sample No. :		Depth :										Specific Gravity :				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-10		Sample No.	OF-05-2 D-10
Depth	23.00-23.75m		Depth	23.00-23.75m
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.12 mm
2.00 - 0.425 mm	4.8 %		Dia. at 30%	0.0059 mm
0.425 - 0.075 mm	46.4 %		Dia. at 10%	- mm
0.075 - 0.005 mm	20.1 %		Coeff. of Uniformity	-
Smaller than 0.005 mm	28.6 %		Coeff. of Curvature	-
2000um Sieve Passing	100.0 %			
425um Sieve Passing	99.5 %			
75um Sieve Passing	48.7 %			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 28.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

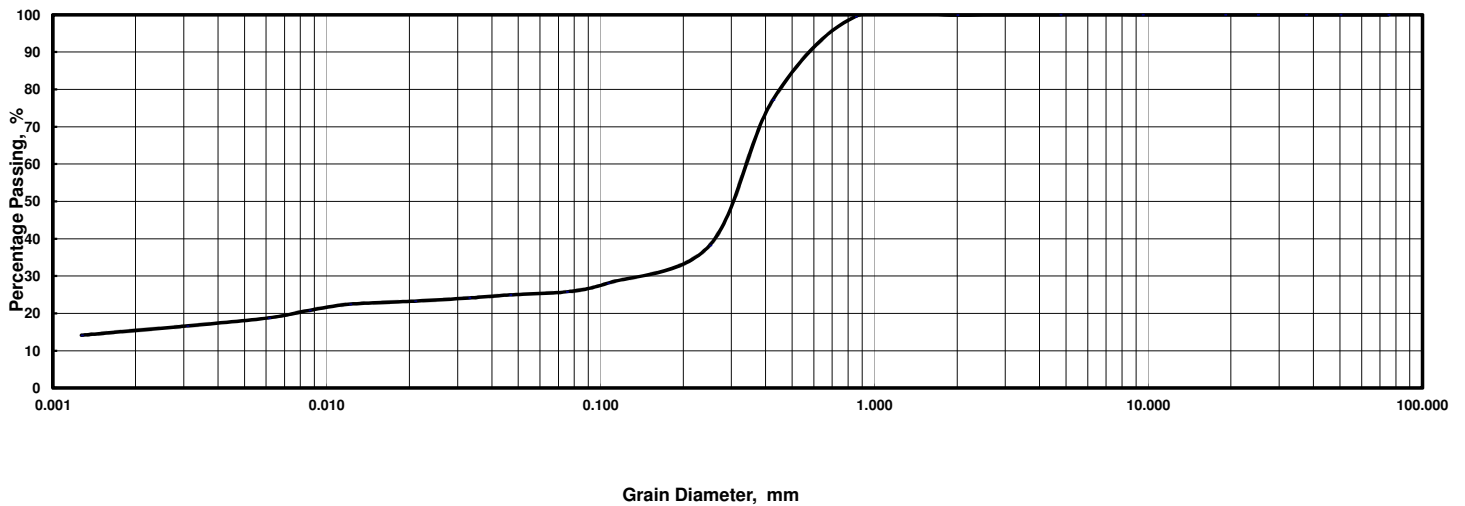
Sample No. : **OF-05-2 D-11** Depth : **25.00-25.50m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	77.2	38.2	28.1	25.8
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	25.0	24.1	23.3	22.5	20.8	18.8	16.6	14.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-2 D-11		Sample No.	OF-05-2 D-11	
Depth	25.00-25.50m		Depth	25.00-25.50m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.1	%	Dia. at 60%	0.34	mm
2.00 - 0.425 mm	22.7	%	Dia. at 30%	0.12	mm
0.425 - 0.075 mm	51.4	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	7.8	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	18.0	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.5	%			
75um Sieve Passing	25.8	%			

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 05.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-05-2		Sample No.:D-1		Depth : 1.00-1.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand		Ave. Diameter : 50.0mm		Ave. Height : 99.9mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.50	1.50	1.50		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.95	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	557	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.05	0.11	0.22		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	362	388	285		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.011	0.016	0.022		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	149	199	326		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-1.24	-0.46	0.32		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	5.27	6.61	10.93		
Shear Strength Parameters	$\phi_d = 38$ Degree $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.50 Mg/m <sup>3</sup>						



## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

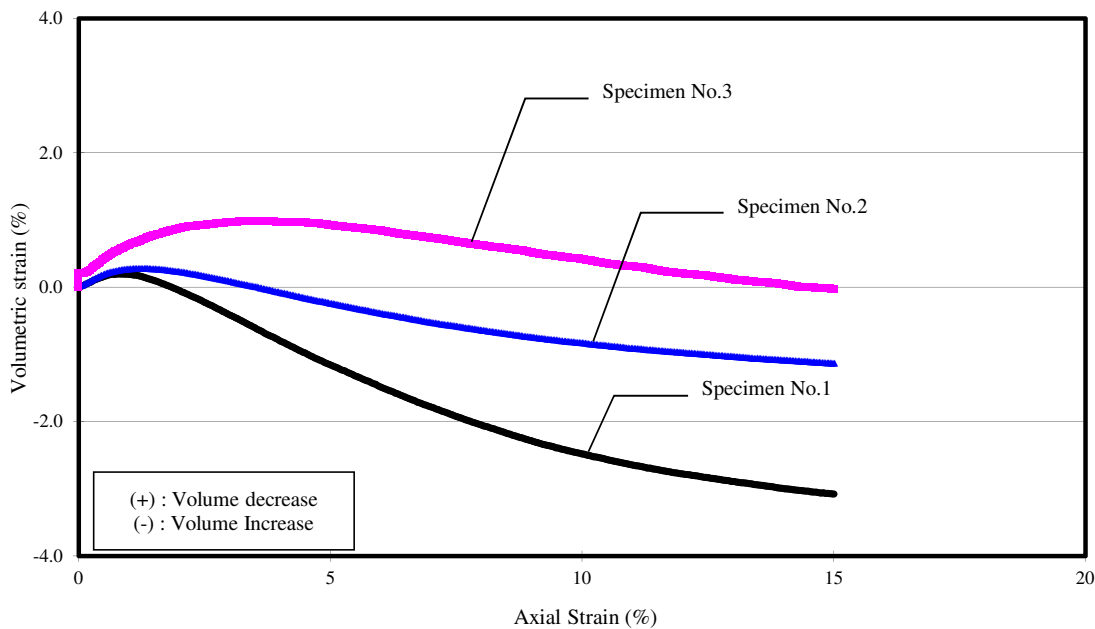
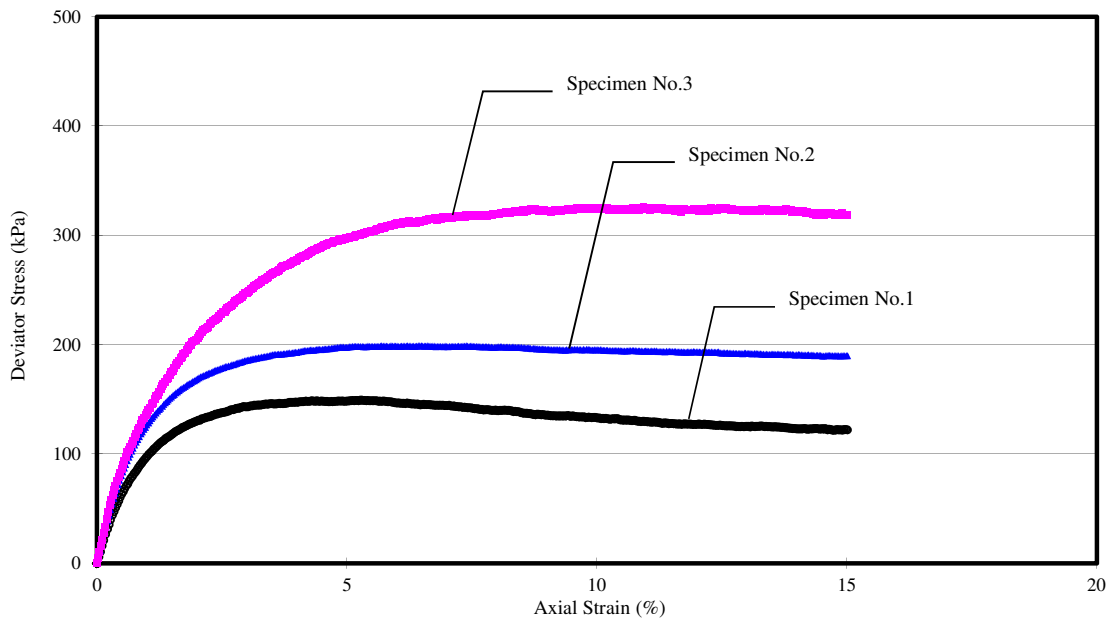
Project No.: S27-14

Sample No.: D-1

Soil Type: Sand

Borehole No.: OF-05-2

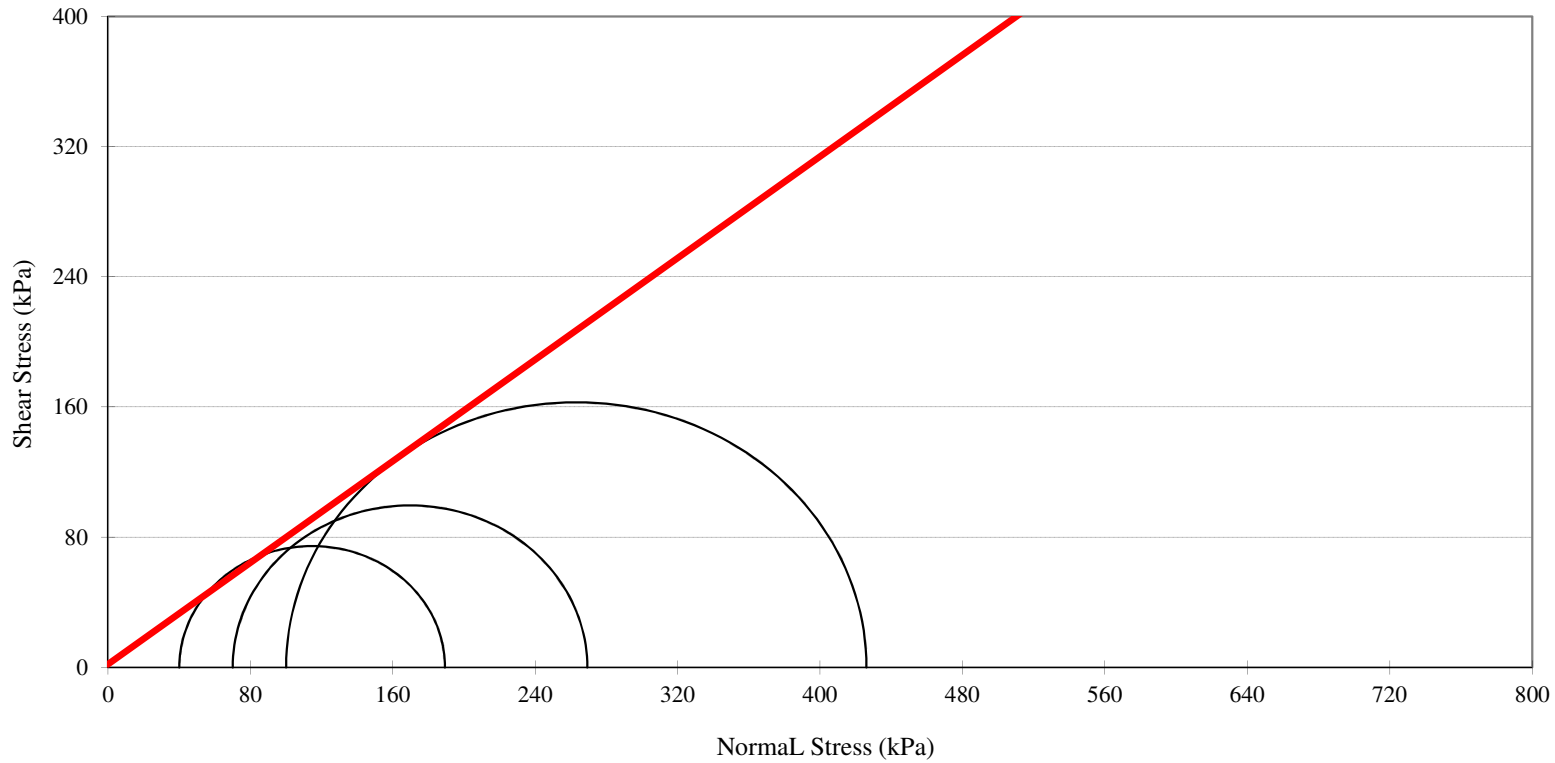
Depth : 1.00-1.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-05-2      Soil Type: Sand  
 Sample No. : D-1      Depth : 1.00-1.80m  
 Angle of Internal Friction,  $\phi_d$  38 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

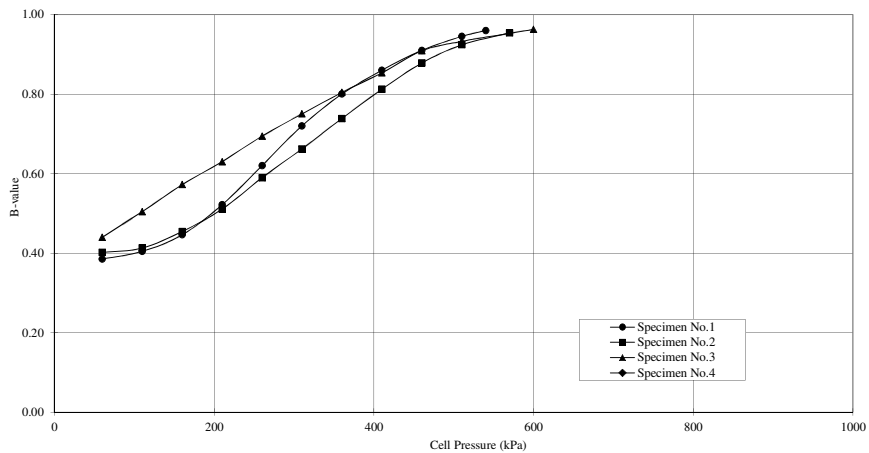
Borehole No.: OF-05-2

Sample No.: D-1

Depth : 1.00-1.80m

Soil Type: Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	31.6	20	32.1	20	33.2		
	Back Pressure (kPa)	20		20		20			
	B-value	0.39		0.40		0.44			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	70.2	50	70.7	50	75.2		
	Back Pressure (kPa)	50		50		50			
	B-value	0.40		0.41		0.50			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	122.3	100	122.7	100	128.6		
	Back Pressure (kPa)	100		100		100			
	B-value	0.45		0.45		0.57			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	176.1	150	175.5	150	181.5		
	Back Pressure (kPa)	150		150		150			
	B-value	0.52		0.51		0.63			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.0	200	229.5	200	234.7		
	Back Pressure (kPa)	200		200		200			
	B-value	0.62		0.59		0.69			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	286.0	250	283.1	250	287.5		
	Back Pressure (kPa)	250		250		250			
	B-value	0.72		0.66		0.75			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	340.0	300	336.9	300	340.2		
	Back Pressure (kPa)	300		300		300			
	B-value	0.80		0.74		0.80			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	393.0	350	390.6	350	392.7		
	Back Pressure (kPa)	350		350		350			
	B-value	0.86		0.81		0.85			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.5	400	443.9	400	445.4		
	Back Pressure (kPa)	400		400		400			
	B-value	0.91		0.88		0.91			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.3	450	496.2	450	496.6		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.92		0.93			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.8	500	557.2	500	586.6		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.95		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

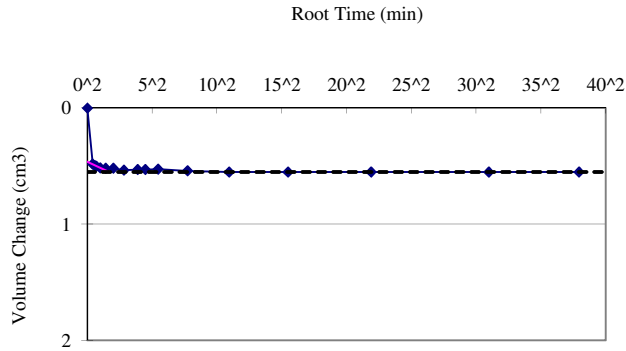
Project No.: S27-14

Borehole No.: OF-05-2

Soil Type: Sand

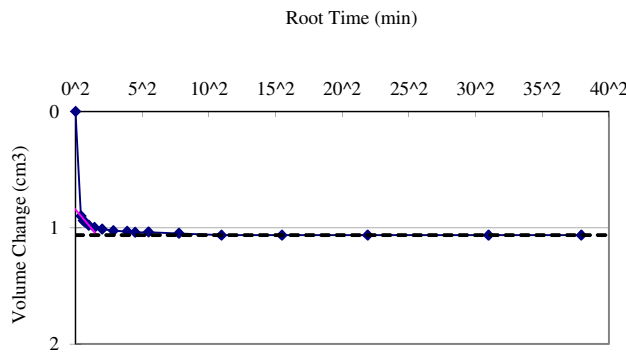
Sample No.: D-1

Depth : 1.00-1.80m



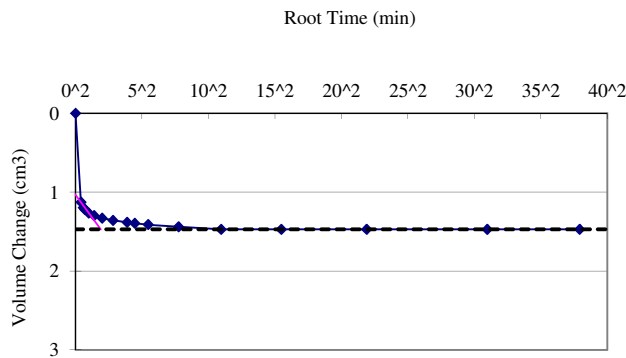
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 2.8$  min  
 $C_v = 362$  m<sup>2</sup>/year  
 $m_{vi} = 0.011$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 2.7$  min  
 $C_v = 388$  m<sup>2</sup>/year  
 $m_{vi} = 0.016$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.6$  min  
 $C_v = 285$  m<sup>2</sup>/year  
 $m_{vi} = 0.022$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 04.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-05-02		Sample No.:D-3		Depth : 5.00-5.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.72	1.72	1.72		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.95	0.96	0.97		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	528	558	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.14	0.54	1.45		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	703	587	151		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.034	0.078	0.145		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	127	198	279		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	1.83	3.96	2.97		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	14.56	14.92	13.31		
Shear Strength Parameters	$\phi_d = 36$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.72 Mg/m <sup>3</sup>						

## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

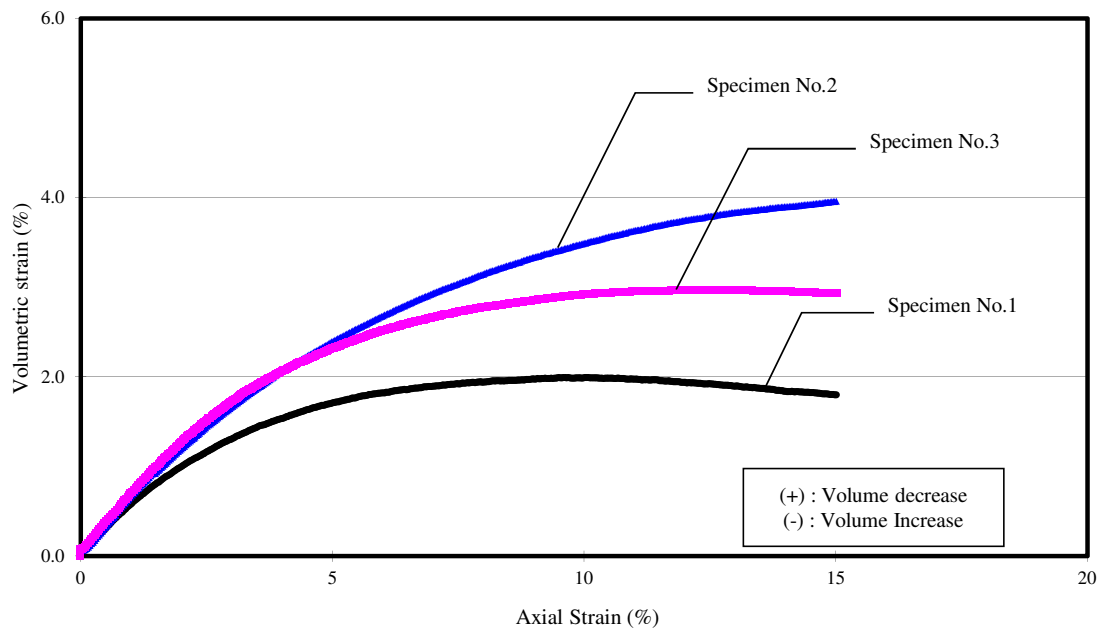
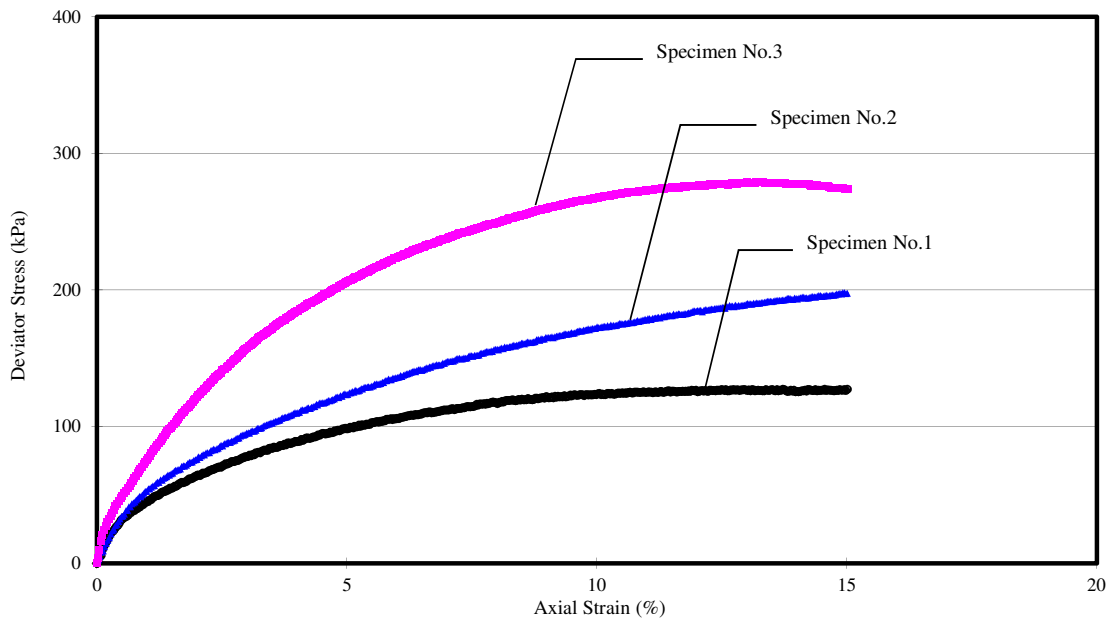
Project No.: S27-14

Sample No.: D-3

Soil Type: Clayey Sand

Borehole No.: OF-05-02

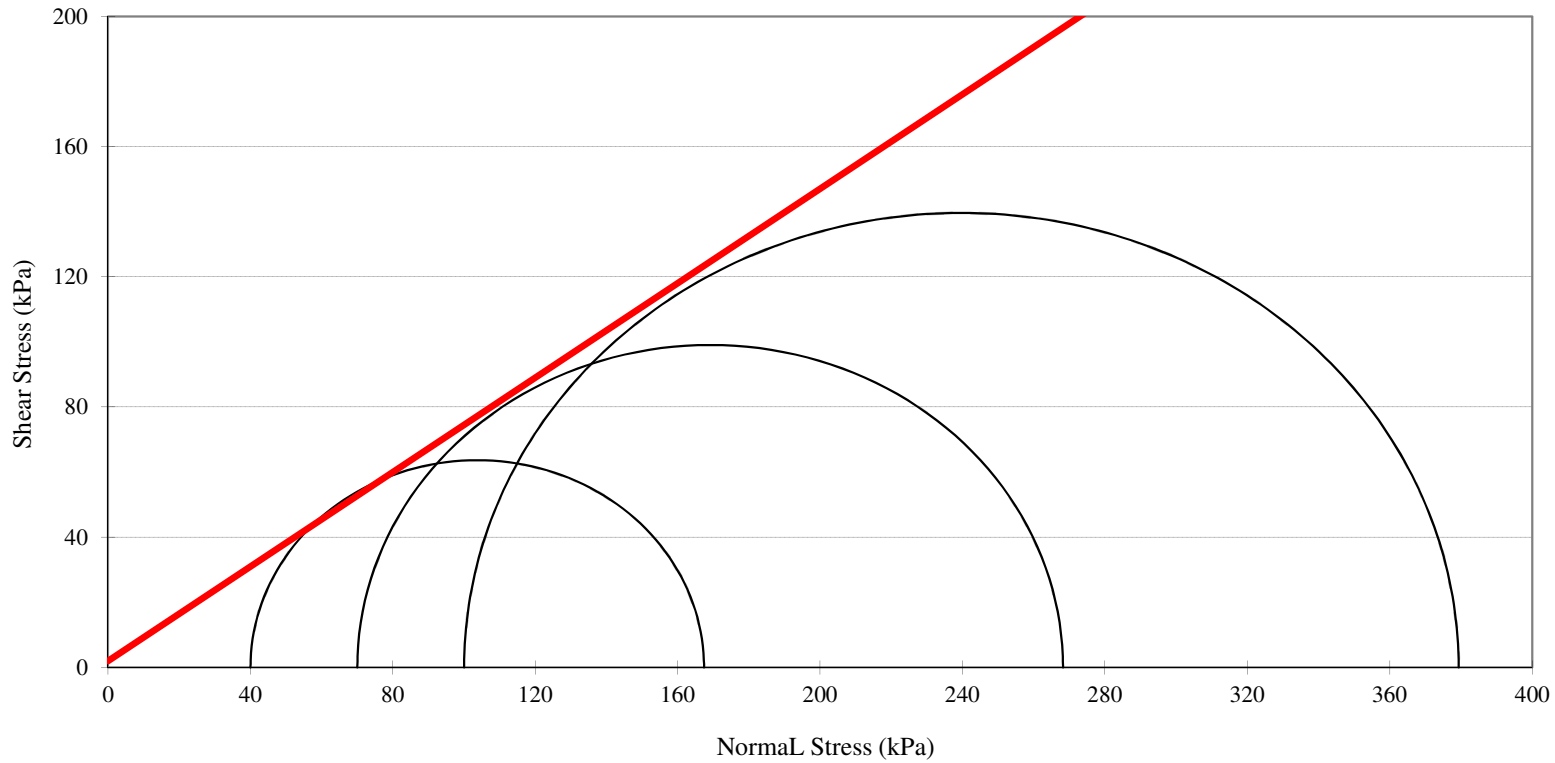
Depth : 5.00-5.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-05-02      Soil Type: Clayey Sand  
 Sample No. : D-3              Depth : 5.00-5.80m  
 Angle of Internal Friction,  $\phi_d$  36 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

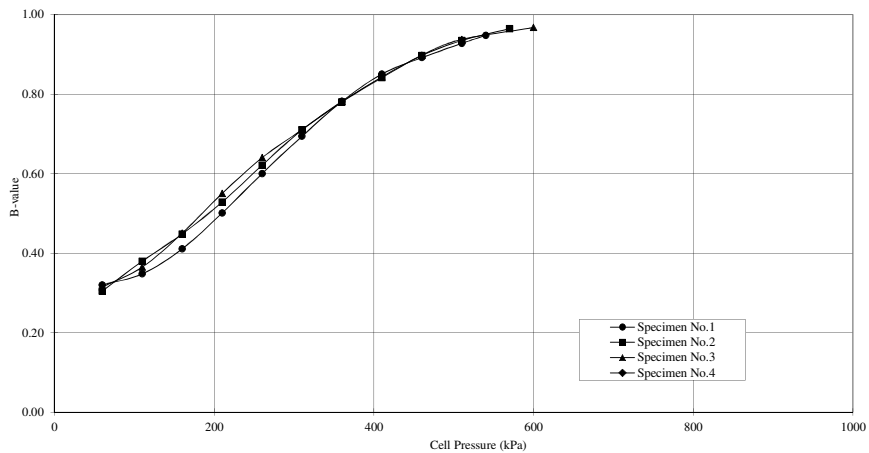
Borehole No.: OF-05-02

Sample No.: D-3

Depth : 5.00-5.80m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	29.6	20	29.1	20	29.5		
	Back Pressure (kPa)	20		20		20			
	B-value	0.32		0.30		0.32			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	67.4	50	69.0	50	68.2		
	Back Pressure (kPa)	50		50		50			
	B-value	0.35		0.38		0.36			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	120.5	100	122.4	100	122.5		
	Back Pressure (kPa)	100		100		100			
	B-value	0.41		0.45		0.45			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	175.1	150	176.4	150	177.5		
	Back Pressure (kPa)	150		150		150			
	B-value	0.50		0.53		0.55			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	230.0	200	231.1	200	232.0		
	Back Pressure (kPa)	200		200		200			
	B-value	0.60		0.62		0.64			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	284.7	250	285.5	250	285.5		
	Back Pressure (kPa)	250		250		250			
	B-value	0.69		0.71		0.71			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	339.1	300	339.0	300	339.1		
	Back Pressure (kPa)	300		300		300			
	B-value	0.78		0.78		0.78			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	392.5	350	392.2	350	392.1		
	Back Pressure (kPa)	350		350		350			
	B-value	0.85		0.84		0.84			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	444.6	400	444.8	400	444.9		
	Back Pressure (kPa)	400		400		400			
	B-value	0.89		0.90		0.90			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	496.4	450	496.7	450	496.9		
	Back Pressure (kPa)	450		450		450			
	B-value	0.93		0.93		0.94			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.4	500	557.9	500	587.1		
	Back Pressure (kPa)	500		500		500			
	B-value	0.95		0.96		0.97			





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

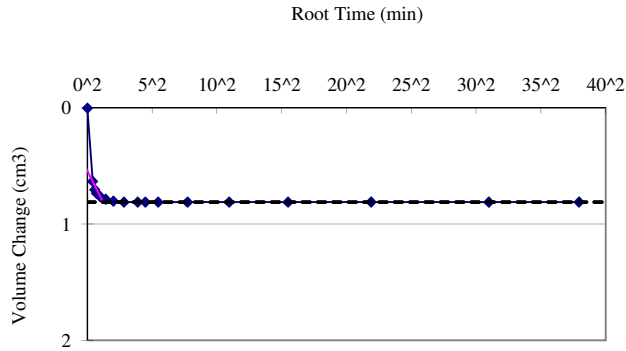
Project No.: S27-14

Borehole No.: OF-05-02

Soil Type: Clayey Sand

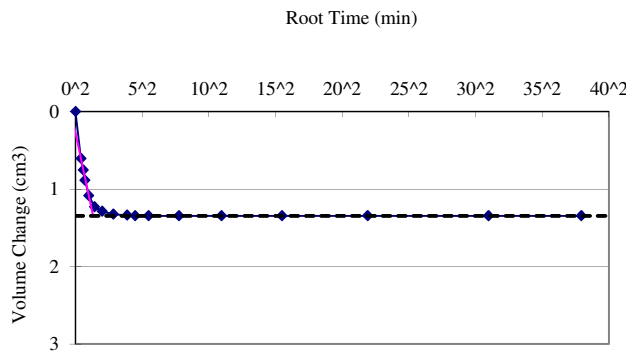
Sample No.: D-3

Depth : 5.00-5.80m



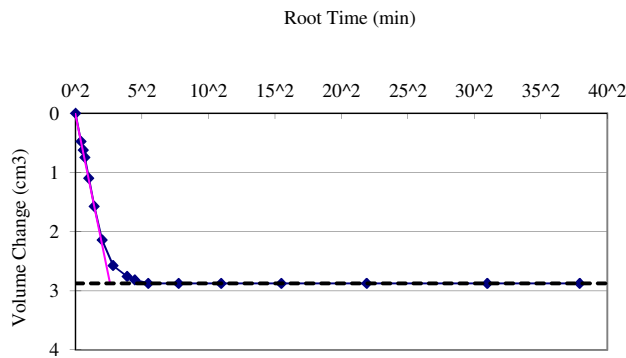
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.5$  min  
 $C_v = 703$  m<sup>2</sup>/year  
 $m_{vi} = 0.034$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 1.8$  min  
 $C_v = 587$  m<sup>2</sup>/year  
 $m_{vi} = 0.078$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 6.8$  min  
 $C_v = 151$  m<sup>2</sup>/year  
 $m_{vi} = 0.145$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 08.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-05-02		Sample No.:D-7		Depth : 14.00-14.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.61	1.61	1.61		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.97	0.96	0.95		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	585		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.05	0.23	0.09		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	441	350	299		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.012	0.033	0.009		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	129	208	364		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-1.34	-0.33	-1.07		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	6.07	11.31	6.15		
Shear Strength Parameters	$\phi_d = 39$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test)= 1.61 Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

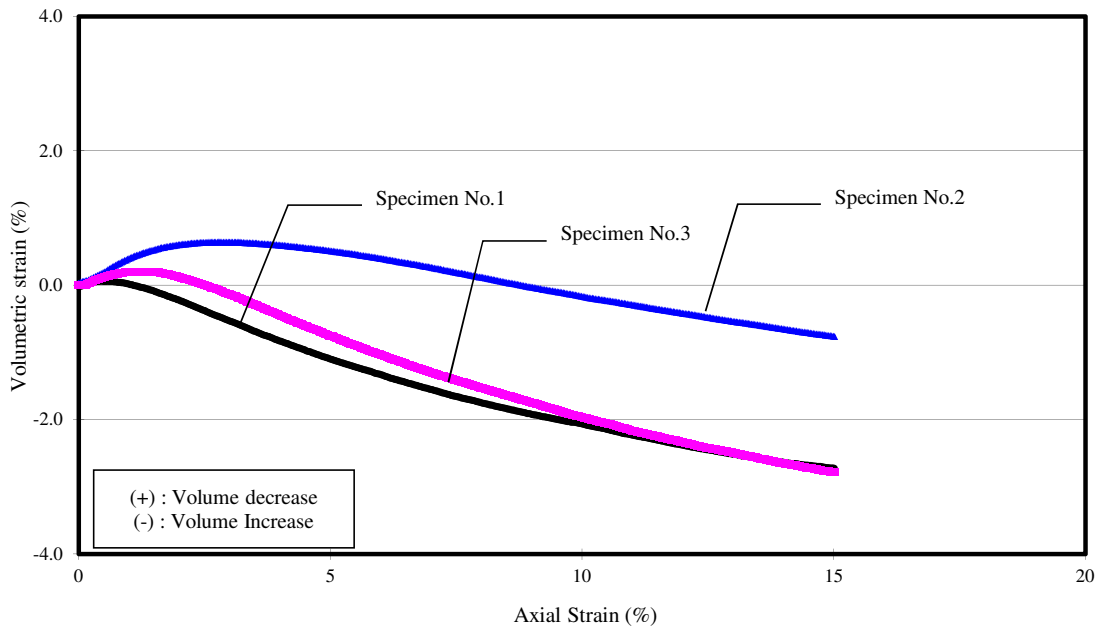
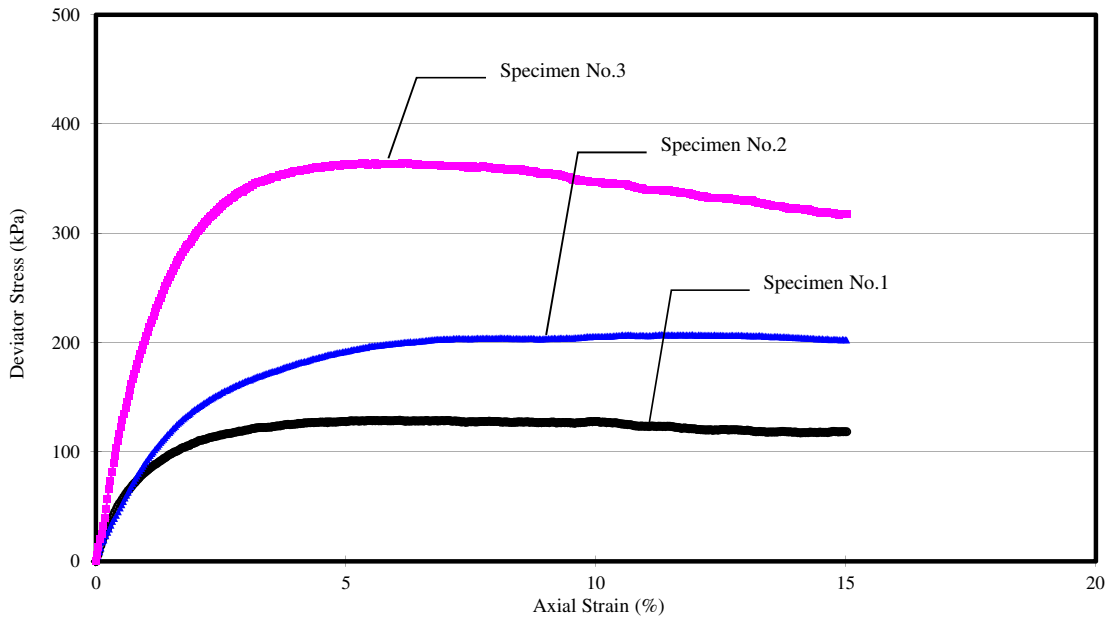
Project No.: S27-14

Sample No.: D-7

Soil Type: Clayey Sand

Borehole No.: OF-05-02

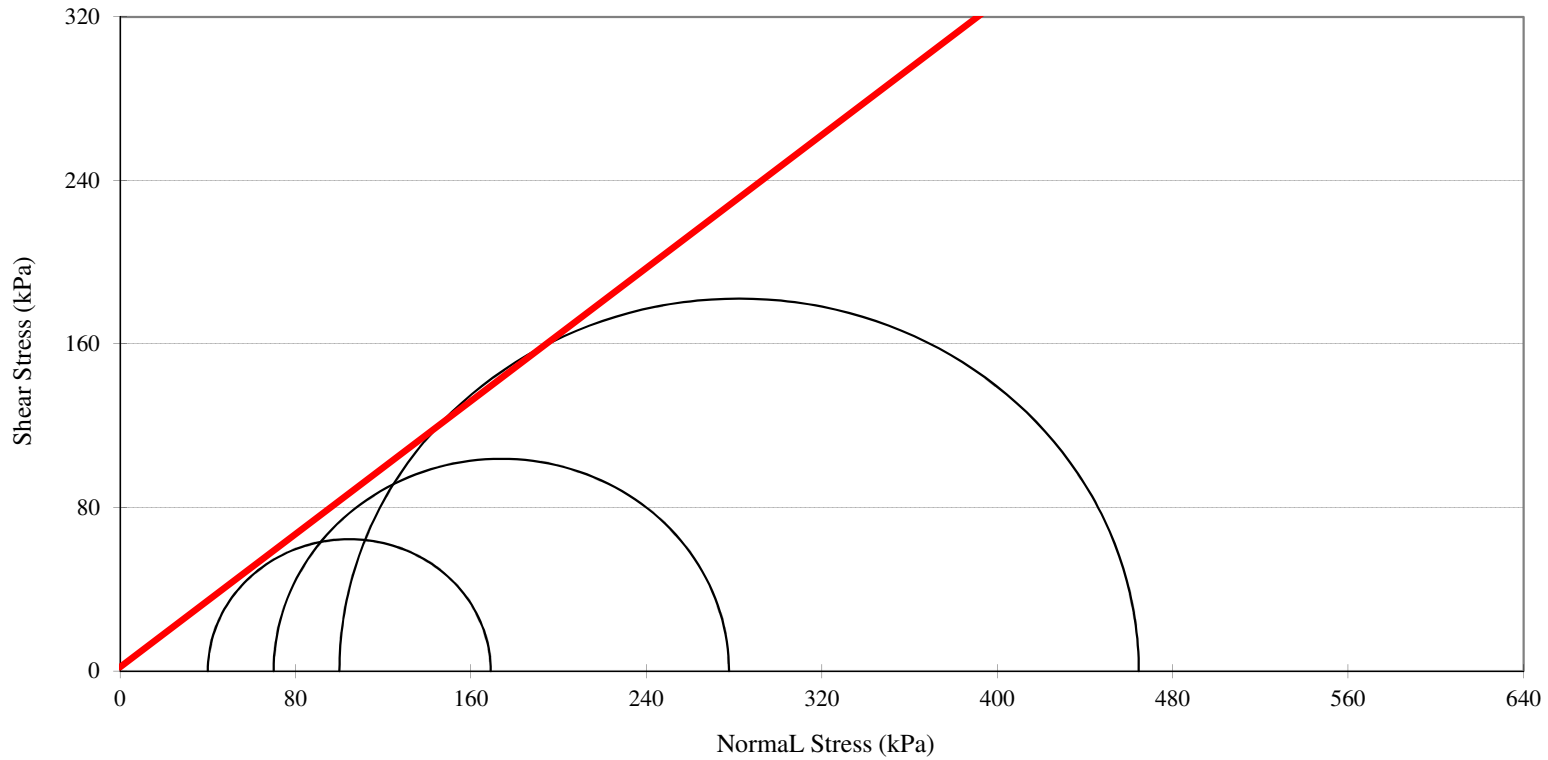
Depth : 14.00-14.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-05-02      Soil Type: Clayey Sand  
 Sample No. : D-7              Depth : 14.00-14.80m  
 Angle of Internal Friction,  $\phi_d$  39 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

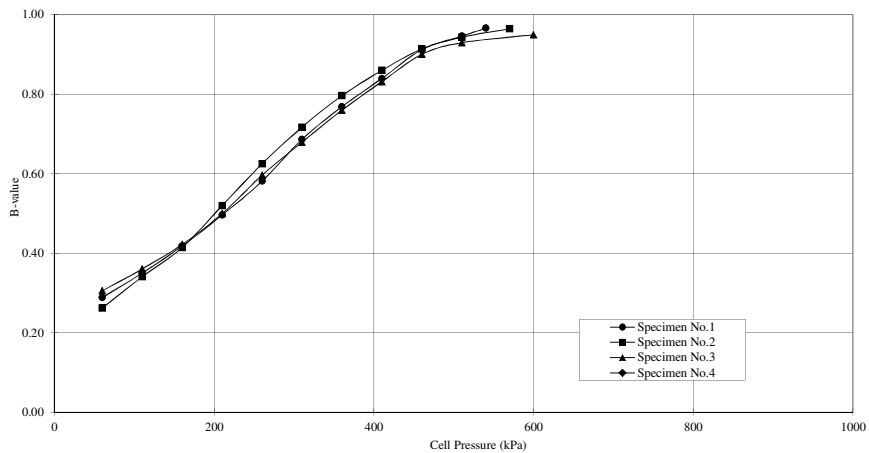
Borehole No.: OF-05-02

Sample No.: D-7

Depth : 14.00-14.80m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	28.7	20	27.9	20	29.2		
	Back Pressure (kPa)	20		20		20			
	B-value	0.29		0.26		0.31			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	67.5	50	67.0	50	68.0		
	Back Pressure (kPa)	50		50		50			
	B-value	0.35		0.34		0.36			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	120.9	100	120.7	100	121.1		
	Back Pressure (kPa)	100		100		100			
	B-value	0.42		0.41		0.42			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	174.8	150	176.0	150	175.0		
	Back Pressure (kPa)	150		150		150			
	B-value	0.50		0.52		0.50			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	229.1	200	231.2	200	229.8		
	Back Pressure (kPa)	200		200		200			
	B-value	0.58		0.62		0.60			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	284.3	250	285.8	250	284.0		
	Back Pressure (kPa)	250		250		250			
	B-value	0.69		0.72		0.68			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	338.4	300	339.8	300	338.0		
	Back Pressure (kPa)	300		300		300			
	B-value	0.77		0.80		0.76			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	392.0	350	393.0	350	391.6		
	Back Pressure (kPa)	350		350		350			
	B-value	0.84		0.86		0.83			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.6	400	445.7	400	445.0		
	Back Pressure (kPa)	400		400		400			
	B-value	0.91		0.91		0.90			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.3	450	497.2	450	496.5		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.94		0.93			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	529.0	500	557.9	500	585.4		
	Back Pressure (kPa)	500		500		500			
	B-value	0.97		0.96		0.95			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

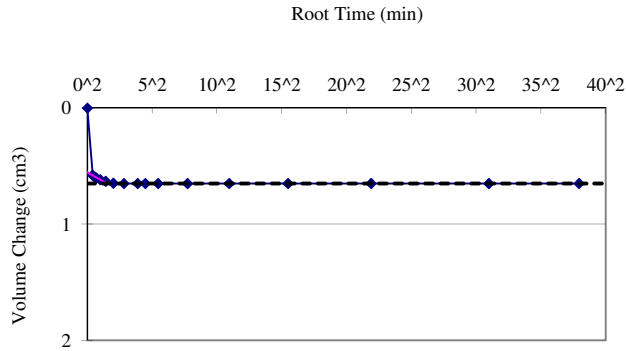
Project No.: S27-14

Borehole No.: OF-05-02

Soil Type: Clayey Sand

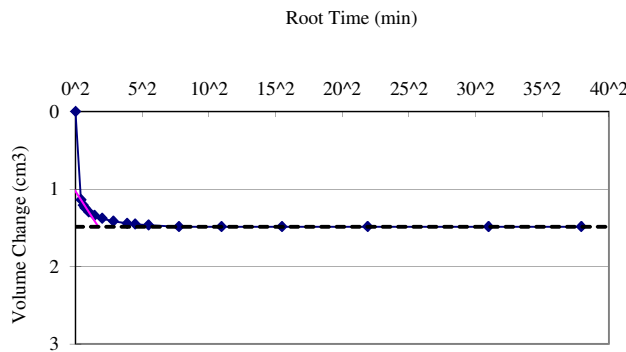
Sample No.: D-7

Depth : 14.00-14.80m



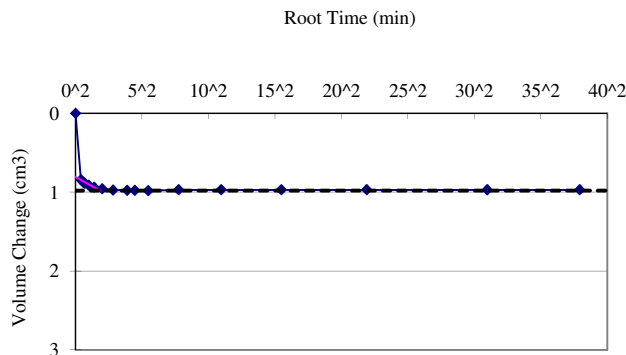
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 2.3$  min  
 $C_v = 441$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 2.9$  min  
 $C_v = 350$  m<sup>2</sup>/year  
 $m_{vi} = 0.033$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.5$  min  
 $C_v = 299$  m<sup>2</sup>/year  
 $m_{vi} = 0.009$  m<sup>2</sup>/MN

# RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 23-Nov-14

Tested by : Perera/Bala

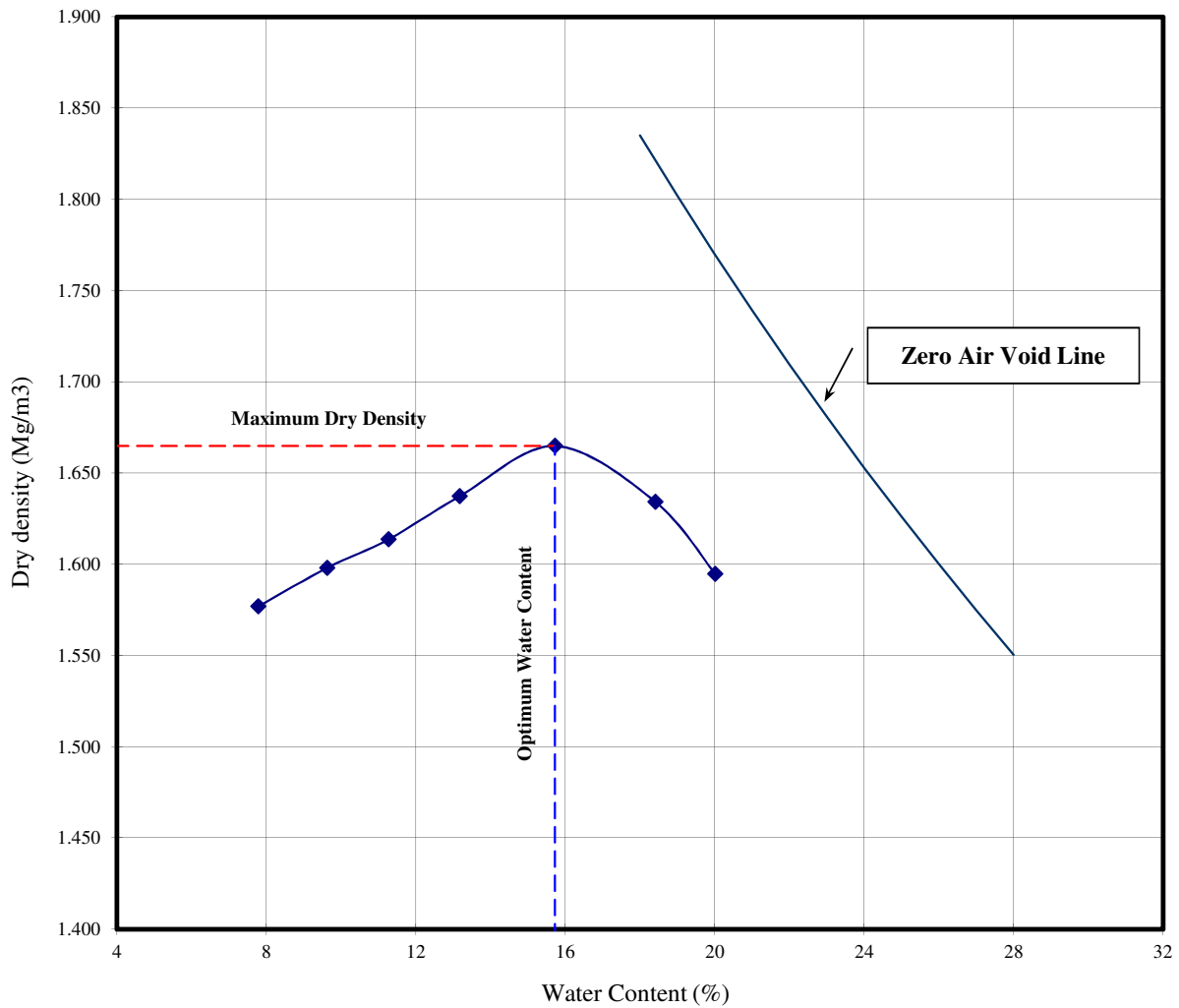
Sample No. : OF-05-2 D-1(1.00-1.80m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	7.8	9.6	11.3	13.2	15.7	18.4	20.0	
Wet Density (Mg/m <sup>3</sup> )	1.700	1.752	1.796	1.853	1.927	1.935	20.009	
Dry Density (Mg/m <sup>3</sup> )	1.577	1.598	1.614	1.637	1.665	1.634	1.595	

Maximum Dry Density	<b>1.665 Mg/m<sup>3</sup></b>
Optimum Water Content	<b>15.7 %</b>



## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 23-Nov-14

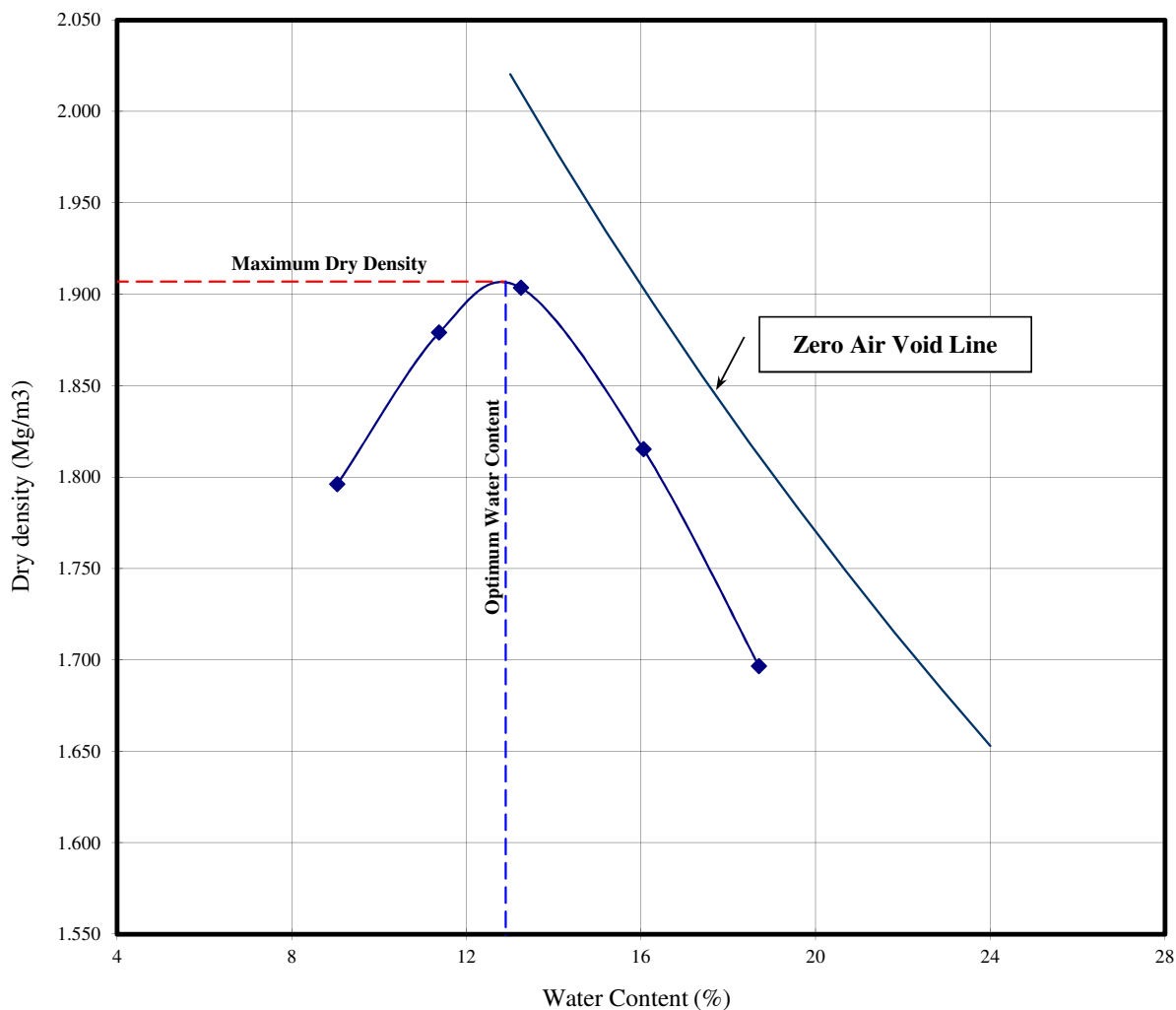
Tested by : Perera/Bala

Sample No. : OF-05-02 D-3 (5.00-5.80m)

Ref. No. -

Soil Type :	Silty Clay with Sand	Standard : ASTM D698-07				Weight of Rammer :	2.5 kg	
Specific Gravity :	2.74	Mold	Diameter :	10.11 cm	Drop Height :	30.5 cm		
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3		
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25		
Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.0	11.4	13.2	16.1	18.7			
Wet Density (Mg/m <sup>3</sup> )	1.959	2.093	2.156	2.107	2.014			
Dry Density (Mg/m <sup>3</sup> )	1.796	1.879	1.903	1.815	1.697			

Maximum Dry Density	1.907 Mg/m <sup>3</sup>
Optimum Water Content	12.9 %





# RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 28-Nov-14

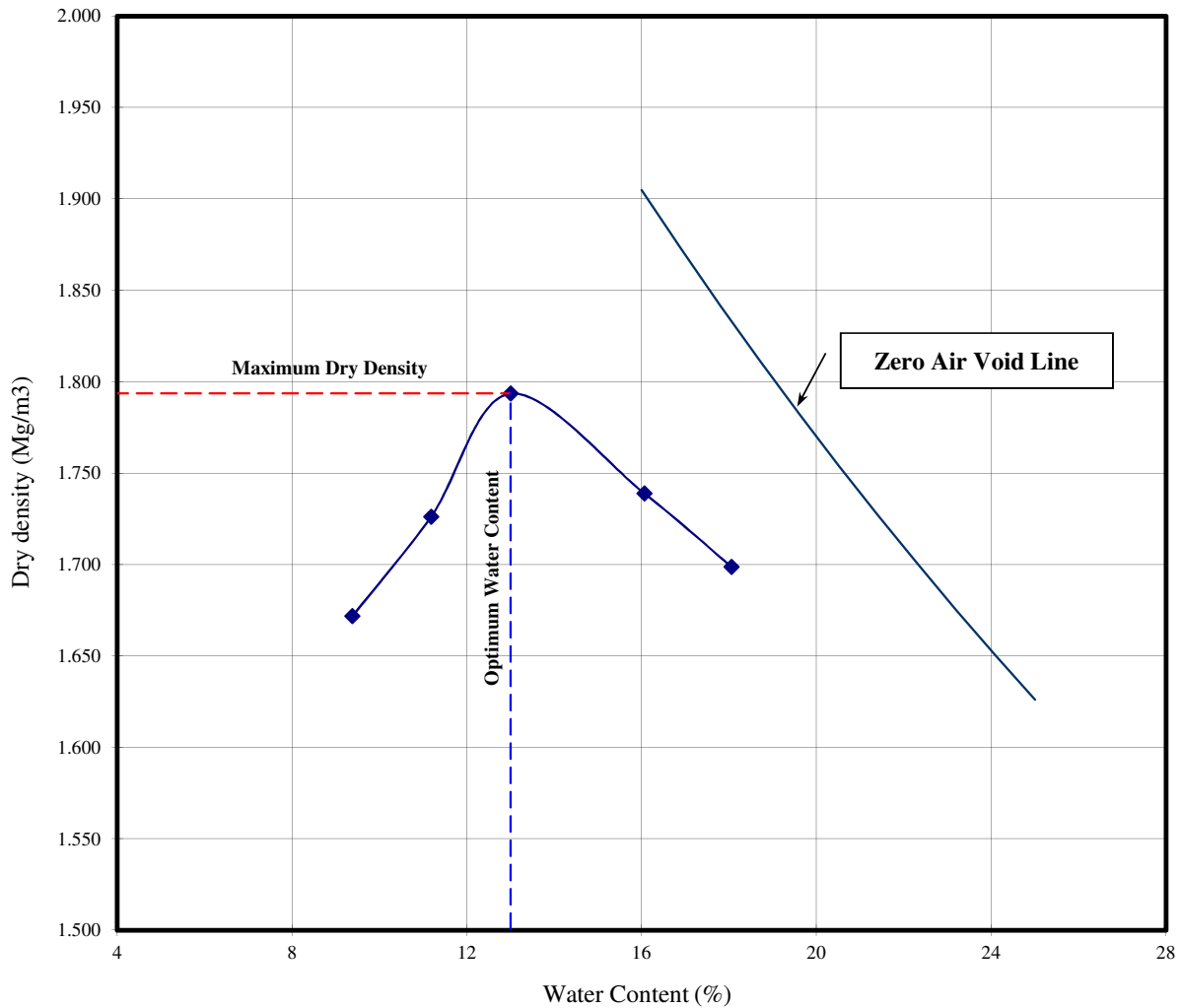
Tested by : Perera/Bala

Sample No. : OF-05-02 D-7(14.00-14.80m)

Ref. No. =

Soil Type :	Silty Clay with Sand	Standard : ASTM D698-07				Weight of Rammer :	2.5 kg	
Specific Gravity :	2.74	Mold	Diameter :		10.11 cm	Drop Height :	30.5 cm	
Natural Water Content :	N.A.		Height :		11.69 cm	No. of layers :	3	
Water Content after Dried :	N.A.		Volume :		938 cm <sup>3</sup>	No. of blows / layers :	25	
Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.4	11.2	13.0	16.1	18.1			
Wet Density (Mg/m <sup>3</sup> )	1.829	1.919	2.027	2.018	2.005			
Dry Density (Mg/m <sup>3</sup> )	1.672	1.726	1.794	1.739	1.699			

Maximum Dry Density	<b>1.794 Mg/m<sup>3</sup></b>
Optimum Water Content	<b>13.0 %</b>



13) OF-05-3

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-05-3									
Sample No.		D-1	D-2	D-3	D-4	D-5	D-6	D-7			
Sample Depth		2.00m ~2.80m	5.00m ~5.80m	8.00m ~8.90m	11.00m ~11.60m	14.00m ~14.60m	17.00m ~17.60m	20.00m ~20.70m			
Condition of Sample		Disturbed									
Natural Water Content	%	33.6	27.8	22.3	14.9	17.2	25.8	21.3			
Specific Gravity		2.74	2.71	2.70	2.68	2.67	2.71	2.69			
Wet Density	Mg/m <sup>3</sup>	1.83	1.95	-	-	-	1.89	-			
Dry Density	Mg/m <sup>3</sup>	1.37	1.52	-	-	-	1.50	-			
Natural Void Ratio		1.00	0.78	-	-	-	0.80	-			
Degree of Saturation	%	92	97	-	-	-	87	-			
Atterberg Limits	Liquid Limit,	%	31	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	24	- * <sup>3</sup>		
	Plastic Limit,	%	18	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	17	- * <sup>3</sup>		
	Plasticity Index,	%	13	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	7	- * <sup>3</sup>		
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0	0		
	Sand,	%	29	45	60	95	95	44	63		
	Silt,	%	30	29	17	5	5	29	16		
	Clay & Colloid,	%	41	26	23			27	21		
	Max. diameter,	mm	0.850	0.425	2.00	4.75	0.850	4.75	2.00		
	Diam. at 60%	mm	0.030	0.088	0.15	0.31	0.34	0.097	0.19		
	Diam. at 10%	mm	-	-	-	0.11	0.11	-	-		
Visual soil description		Clay with Sand	Sandy Clay	Clayey Sand	Sand	Sand	Sandy Silty Clay	Clayey Sand			
Unified soil classification		CL	-	-	-	-	CL-ML	-			
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-	-	-	-		
	Cohesion Intercept, kPa		-	-	-	-	-	-	-		
	Condition of drainage		-	-	-	-	-	-	-		
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-	-	-	-		
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-	-	-	-		
	Condition of drainage		-	-	-	-	-	-	-		
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-	-	-	-		
	Compression Index(Average)		-	-	-	-	-	-	-		
	Pressure Range for Compression Index(kPa)		-	-	-	-	-	-	-		
	Swell index		-	-	-	-	-	-	-		
Chemical Test	pH value		-	-	-	-	-	-	-		
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-	-	-	-		
	Chloride content as Cl,	%	-	-	-	-	-	-	-		
	Organic Matter content,	%	-	-	-	-	-	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-	-			
Strain at failure (%)		-	-	-	-	-	-	-			

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

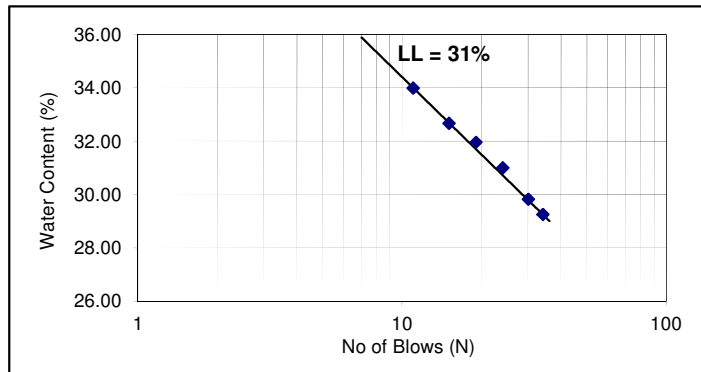
### ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 01.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-05-3 D-1 Depth : 2.00-2.80m

Remarks : Tested on material at natural state

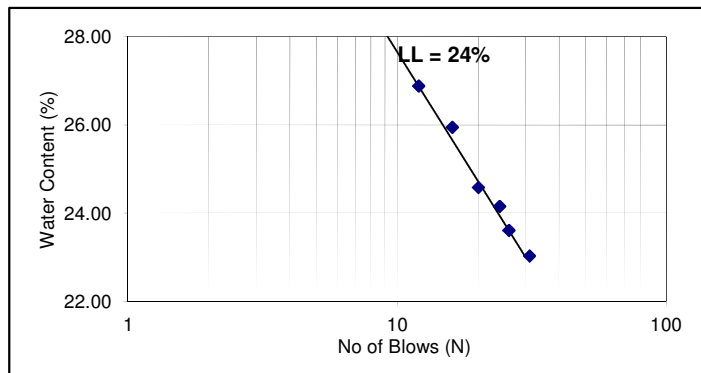
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	34	29.25
2	30	29.82
3	24	31.00
4	19	31.96
5	15	32.67
6	11	33.98
<b>Liquid Limits %</b>		<b>31</b>
<b>Plastic Limits %</b>		<b>18</b>
<b>Plasticity Index</b>		<b>13</b>



Sample No. : OF-05-3 D-6 Depth : 17.00-17.60m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	31	23.03
2	26	23.61
3	24	24.15
4	20	24.58
5	16	25.94
6	12	26.88
<b>Liquid Limits %</b>		<b>24</b>
<b>Plastic Limits %</b>		<b>17</b>
<b>Plasticity Index</b>		<b>7</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

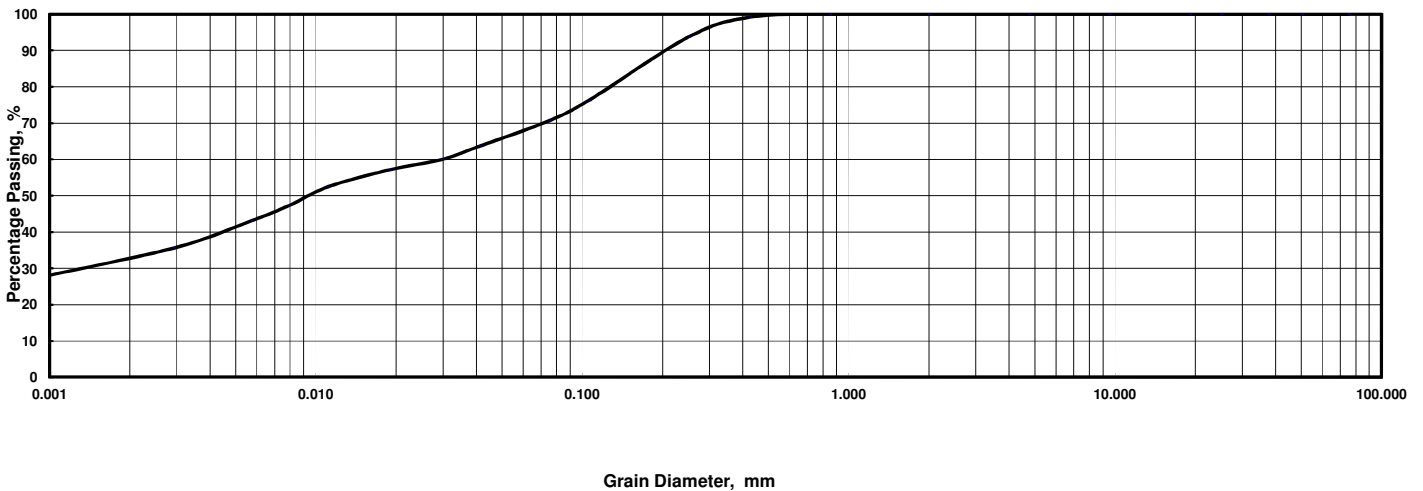
Sample No. : **OF-05-3 D-1** Depth : **2.00-2.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.74

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	93.7	76.3	70.7
Hydro.	Dia., mm	0.041	0.030	0.019	0.011	0.0080	0.0057	0.0029	0.0009							
	% Passing	63.7	60.0	57.2	52.5	47.4	43.1	35.6	27.2							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-1		Sample No.	OF-05-3 D-1	
Depth	2.00-2.80m		Depth	2.00-2.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.030 mm	
2.00 - 0.425 mm	0.9 %		Dia. at 30%	0.0013 mm	
0.425 - 0.075 mm	28.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	29.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	41.2 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	70.7 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

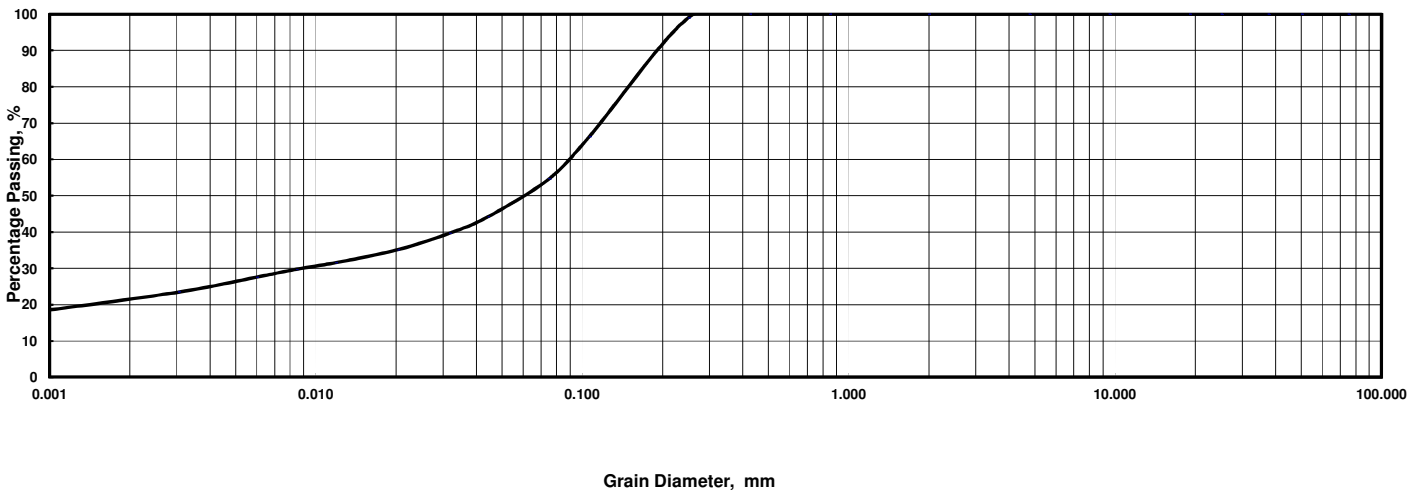
Sample No. : **OF-05-3 D-2** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	66.2	54.7
Hydro.	Dia., mm	0.044	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0009							
	% Passing	44.2	39.7	35.2	31.6	29.8	27.6	23.4	18.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-2		Sample No.	OF-05-3 D-2	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.088 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.0088 mm	
0.425 - 0.075 mm	45.3 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	28.5 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	26.2 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	54.7 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14 Tested By : Hin/Motiur Checked by : A. B. Tan

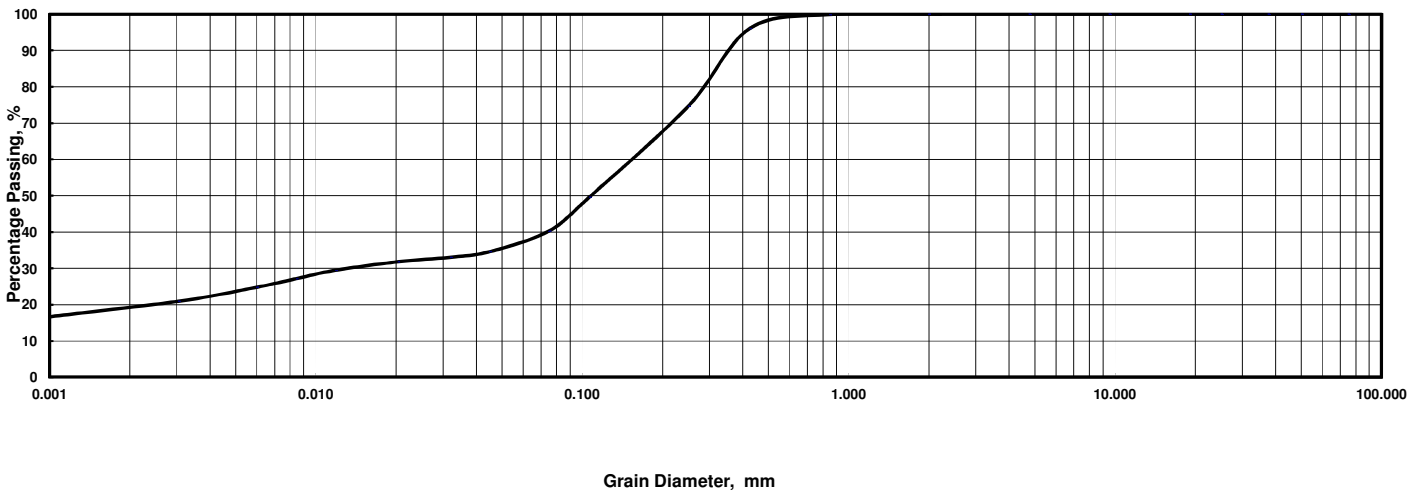
Sample No. : **OF-05-3 D-3** Depth : **8.00-8.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	96.0	74.7	49.6	40.3
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0009							
	% Passing	34.6	33.1	31.8	29.5	27.2	24.8	21.0	16.3							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-3		Sample No.	OF-05-3 D-3	
Depth	8.00-8.90m		Depth	8.00-8.90m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.15	mm
2.00 - 0.425 mm	4.0	%	Dia. at 30%	0.013	mm
0.425 - 0.075 mm	55.8	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	16.8	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.5	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.9	%			
75um Sieve Passing	40.3	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Motiur Checked by : A. B. Tan

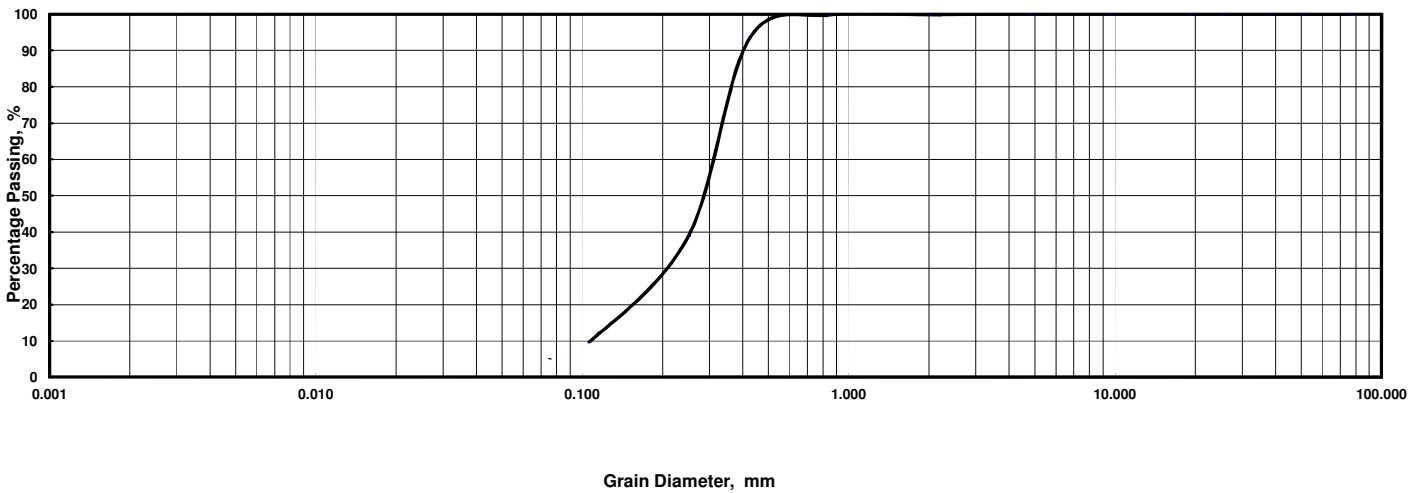
Sample No. : OF-05-3 D-4 Depth : 11.00-11.60m ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.7	93.5	38.9	9.8	5.2
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-4		Sample No.	OF-05-3 D-4	
Depth	11.00-11.60m		Depth	11.00-11.60m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.2 %		Dia. at 60%	0.31 mm	
2.00 - 0.425 mm	6.4 %		Dia. at 30%	0.19 mm	
0.425 - 0.075 mm	88.3 %		Dia. at 10%	0.11 mm	
0.075 - 0.005 mm	5.2 %		Coeff. of Uniformity	2.87	
Smaller than 0.005 mm			Coeff. of Curvature	1.13	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.7 %				
75um Sieve Passing	5.2 %				



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14

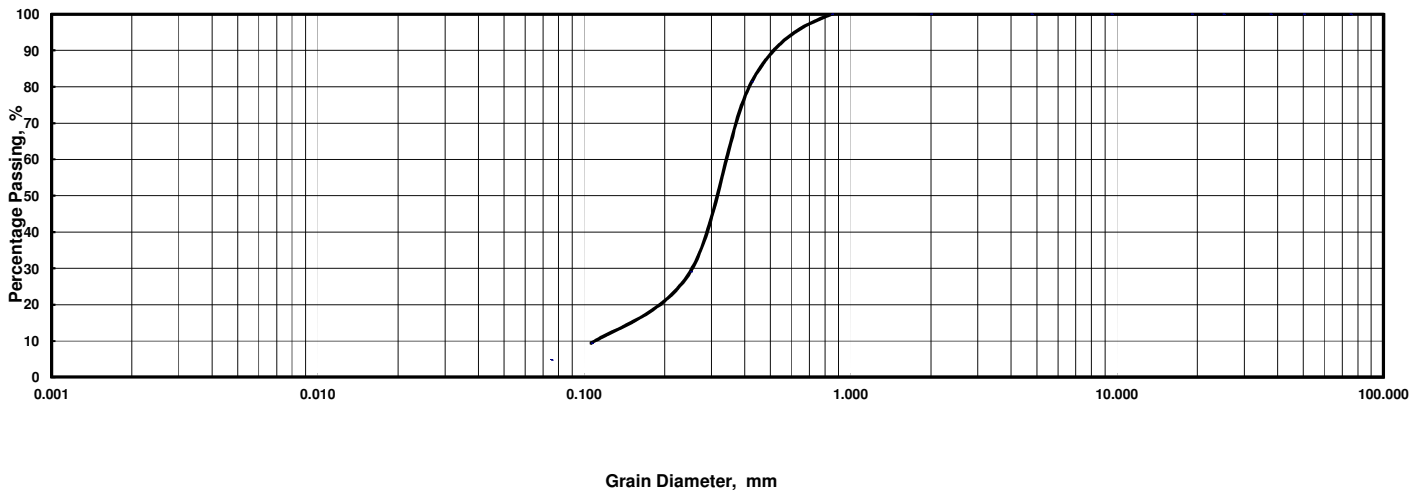
Tested By : Motiur

Checked by : A. B. Tan

Sample No. : <b>OF-05-3 D-5</b>		Depth : <b>14.00-14.60m</b> ( _____ )										Specific Gravity :				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.4	29.2	9.4	4.8
Hydro.	Dia., mm															
	% Passing															

Sample No. :		Depth : ( _____ )										Specific Gravity :				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-5		Sample No.	OF-05-3 D-5	
Depth	14.00-14.60m		Depth	14.00-14.60m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.34 mm	
2.00 - 0.425 mm	18.6 %		Dia. at 30%	0.25 mm	
0.425 - 0.075 mm	76.6 %		Dia. at 10%	0.11 mm	
0.075 - 0.005 mm	4.8 %		Coeff. of Uniformity	3.15	
Smaller than 0.005 mm			Coeff. of Curvature	1.71	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	4.8 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14 Tested By : Hin/Motiur Checked by : A. B. Tan

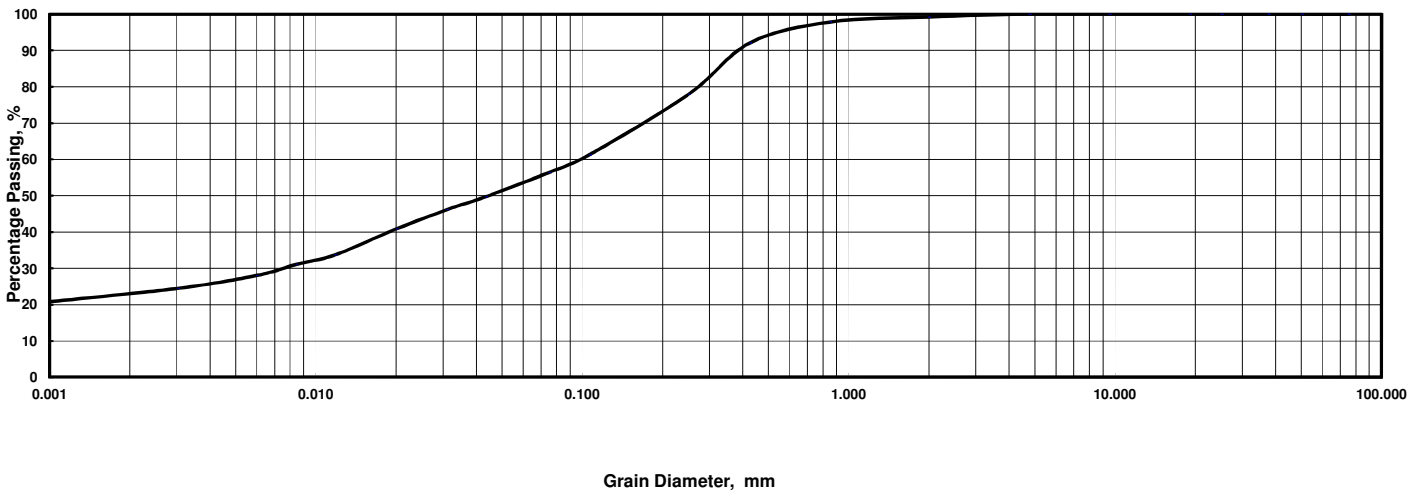
Sample No. : **OF-05-3 D-6** Depth : **17.00-17.60m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	97.8	92.1	77.9	61.3	56.4
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0009							
	% Passing	49.7	46.2	40.8	33.7	31.1	28.1	24.5	20.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-6		Sample No.	OF-05-3 D-6	
Depth	17.00-17.60m		Depth	17.00-17.60m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.750 mm	
4.75 - 2.00 mm	0.8 %		Dia. at 60%	0.097 mm	
2.00 - 0.425 mm	7.2 %		Dia. at 30%	0.0075 mm	
0.425 - 0.075 mm	35.6 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	29.6 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	26.9 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	97.8 %				
75um Sieve Passing	56.4 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

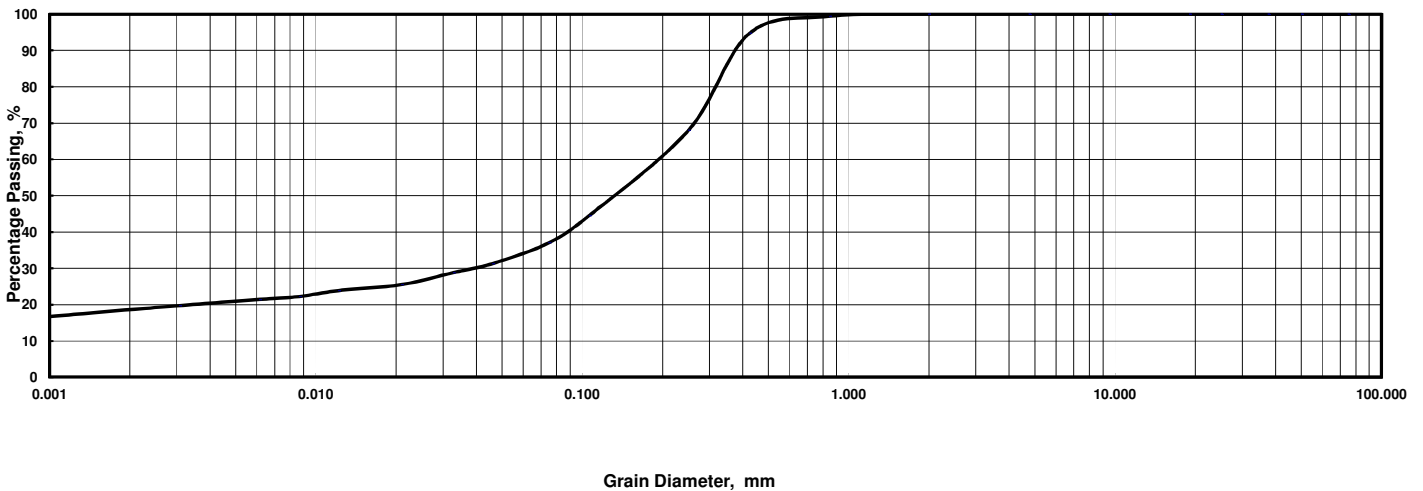
Sample No. : **OF-05-3 D-7** Depth : **20.00-20.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	94.8	68.0	44.5	37.1
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0087	0.0061	0.0031	0.0009							
	% Passing	31.3	28.8	25.5	23.9	22.2	21.4	19.8	16.5							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	OF-05-3 D-7		Sample No.	OF-05-3 D-7	
Depth	20.00-20.70m		Depth	20.00-20.70m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.19 mm	
2.00 - 0.425 mm	5.2 %		Dia. at 30%	0.039 mm	
0.425 - 0.075 mm	57.7 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	16.3 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	20.8 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.4 %				
75um Sieve Passing	37.1 %				

14) OF-05-3a

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Motiur Checked by : A. B. Tan

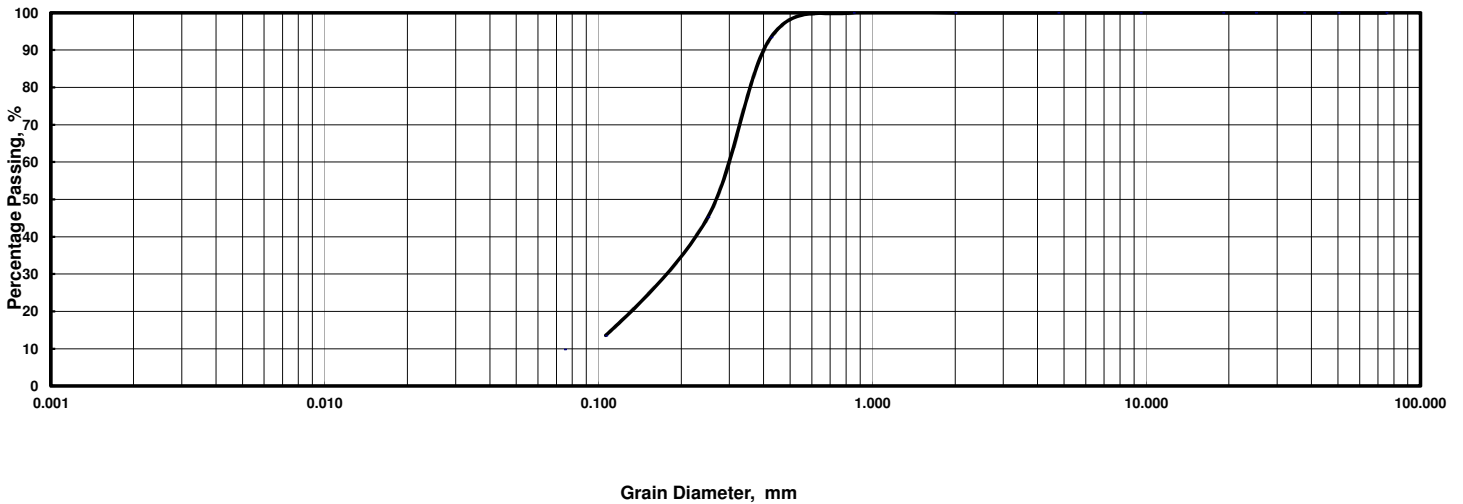
Sample No. : **OF-05-3a D-1** Depth : **10.00-10.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.4	45.2	13.6	9.8
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3a D-1		Sample No.	OF-05-3a D-1	
Depth	10.00-10.70m		Depth	10.00-10.70m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.29	mm
2.00 - 0.425 mm	6.6	%	Dia. at 30%	0.17	mm
0.425 - 0.075 mm	83.6	%	Dia. at 10%	0.12	mm
0.075 - 0.005 mm	9.8	%	Coeff. of Uniformity	2.64	
Smaller than 0.005 mm			Coeff. of Curvature	1.09	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	9.8	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Motiuur Checked by : A. B. Tan

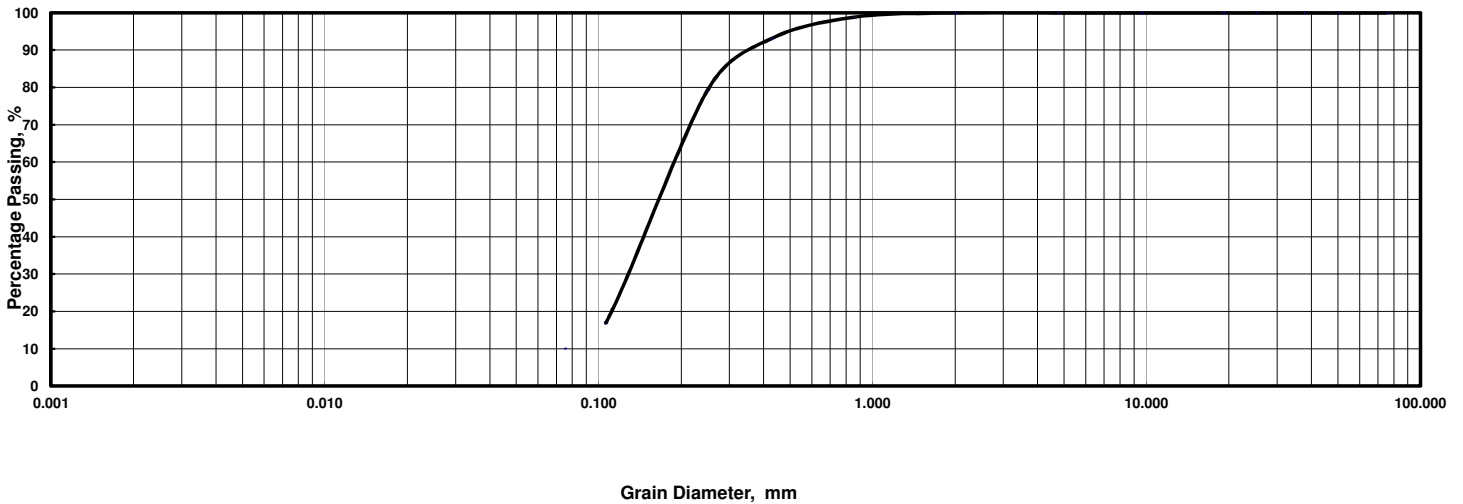
Sample No. : **OF-05-3a D-2** Depth : **13.00-13.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8	93.0	79.4	16.9	10.1
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3a D-2		Sample No.	OF-05-3a D-2	
Depth	13.00-13.80m		Depth	13.00-13.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.19	mm
2.00 - 0.425 mm	7.0	%	Dia. at 30%	0.13	mm
0.425 - 0.075 mm	82.9	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	10.1	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm			Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	98.8	%			
75um Sieve Passing	10.1	%			

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **01.12.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

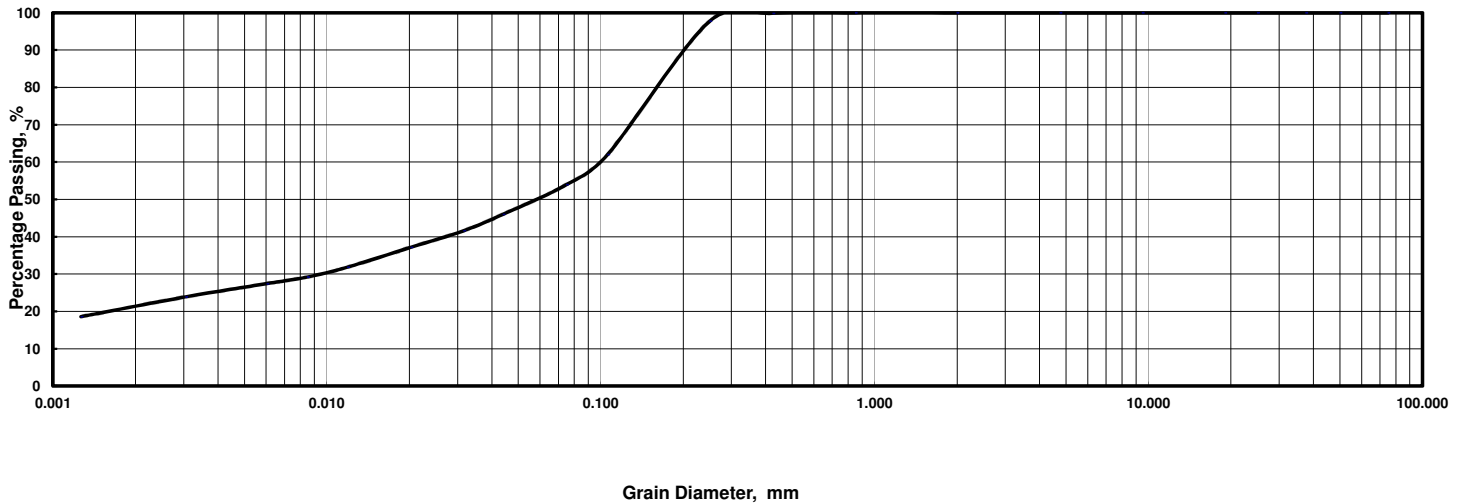
Sample No. : **OF-05-3a D-3** Depth : **18.50-19.40m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.7	62.0	54.0
Hydro.	Dia., mm	0.044	0.032	0.020	0.012	0.0085	0.0060	0.0030	0.0013							
	% Passing	46.0	41.6	37.2	31.9	29.2	27.4	23.9	18.6							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3a D-3		Sample No.	OF-05-3a D-3	
Depth	18.50-19.40m		Depth	18.50-19.40m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.097 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.0094 mm	
0.425 - 0.075 mm	45.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	27.7 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	26.2 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	54.0 %				

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 06.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-05-3a		Sample No.:D-1		Depth : 10.00-10.70m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.54	1.54	1.54		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.97	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	586		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.07	0.10	0.14		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	525	492	263		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.018	0.014	0.014		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	144	214	323		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-0.96	-0.79	-0.73		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	5.18	8.36	5.47		
Shear Strength Parameters	$\phi_d = 38$ Degree $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test)= 1.54 Mg/m <sup>3</sup>						



## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

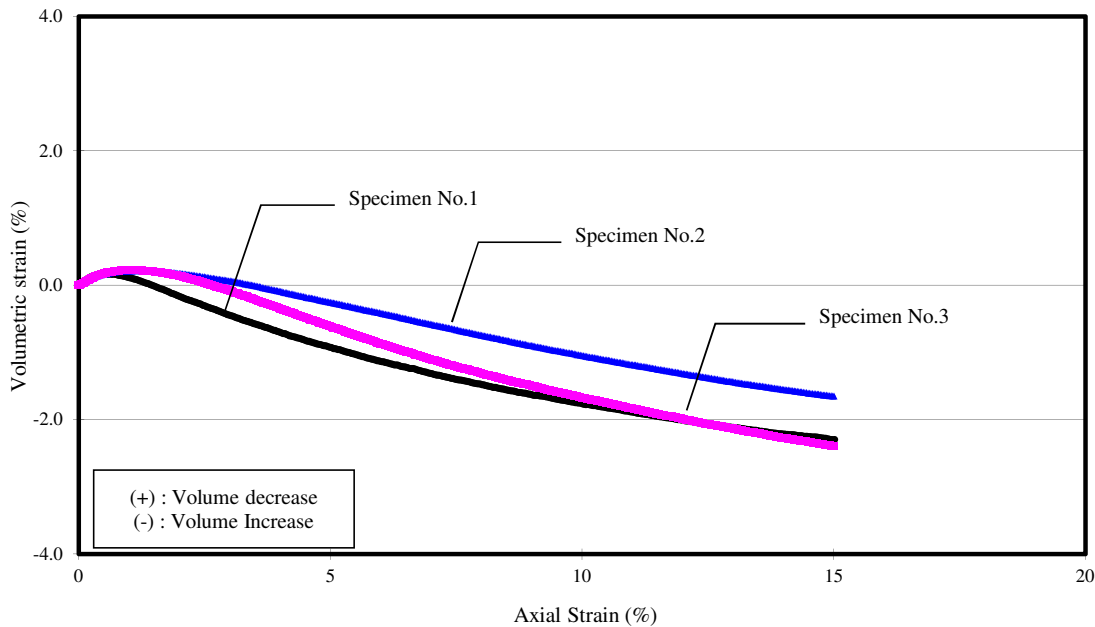
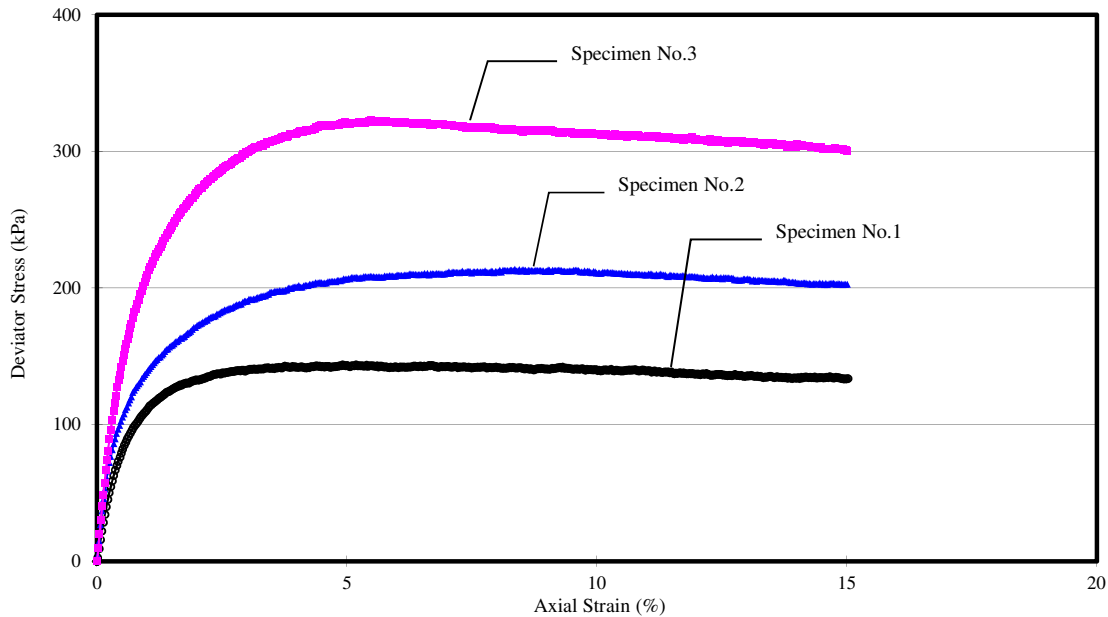
Project No.: S27-14

Sample No.: D-1

Soil Type: Sand with Clay

Borehole No.: OF-05-3a

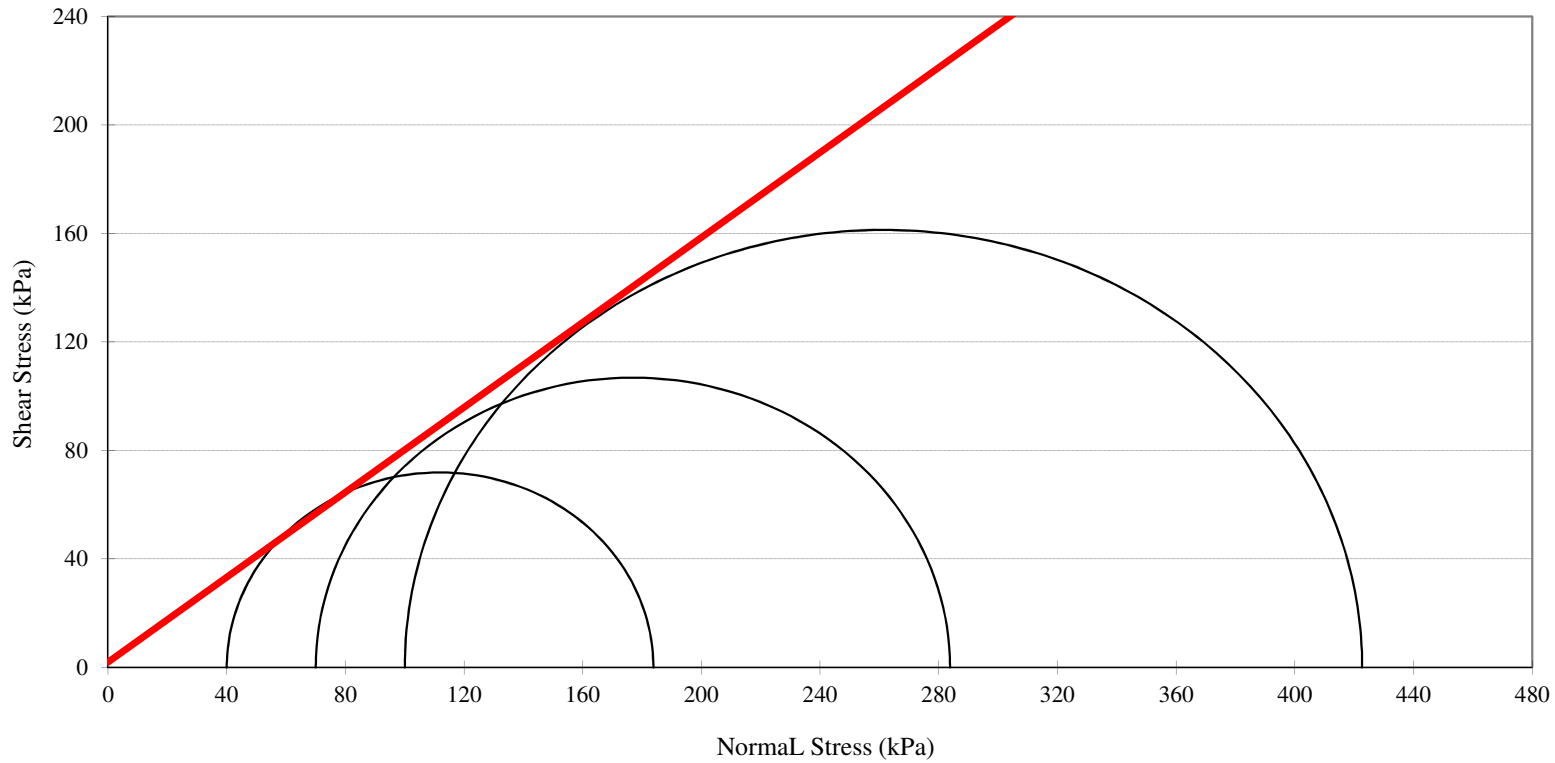
Depth : 10.00-10.70m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : OF-05-3a      Soil Type: Sand with Clay  
 Sample No. : D-1              Depth : 10.00-10.70m  
 Angle of Internal Friction,  $\phi_d$       38 deg  
 Cohesion,  $c_d$                       0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

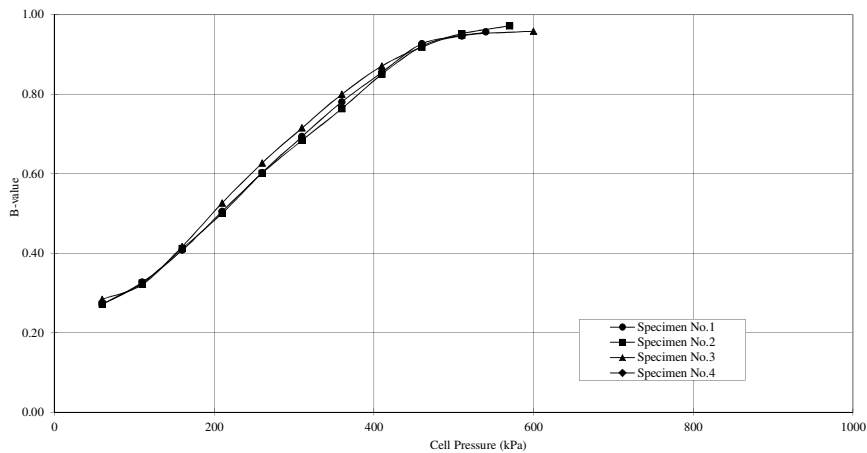
Borehole No.: OF-05-3a

Sample No.: D-1

Depth : 10.00-10.70m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	28.2	20	28.1	20	28.5		
	Back Pressure (kPa)	20		20		20			
	B-value	0.27		0.27		0.28			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	66.3	50	66.2	50	66.1		
	Back Pressure (kPa)	50		50		50			
	B-value	0.33		0.32		0.32			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	120.4	100	120.6	100	120.8		
	Back Pressure (kPa)	100		100		100			
	B-value	0.41		0.41		0.42			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	175.2	150	175.0	150	176.3		
	Back Pressure (kPa)	150		150		150			
	B-value	0.50		0.50		0.53			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	230.1	200	230.0	200	231.3		
	Back Pressure (kPa)	200		200		200			
	B-value	0.60		0.60		0.63			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	284.7	250	284.2	250	285.8		
	Back Pressure (kPa)	250		250		250			
	B-value	0.69		0.68		0.72			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	339.0	300	338.2	300	340.0		
	Back Pressure (kPa)	300		300		300			
	B-value	0.78		0.76		0.80			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	392.7	350	392.5	350	393.5		
	Back Pressure (kPa)	350		350		350			
	B-value	0.85		0.85		0.87			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	446.3	400	446.0	400	445.9		
	Back Pressure (kPa)	400		400		400			
	B-value	0.93		0.92		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.3	450	497.6	450	497.4		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.95		0.95			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.7	500	558.3	500	586.2		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.97		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

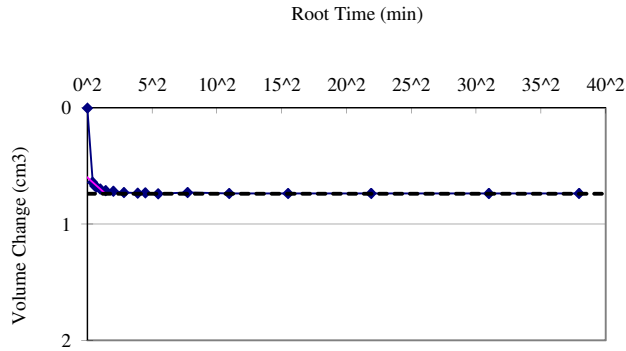
Project No.: S27-14

Borehole No.: OF-05-3a

Soil Type: Sand with Clay

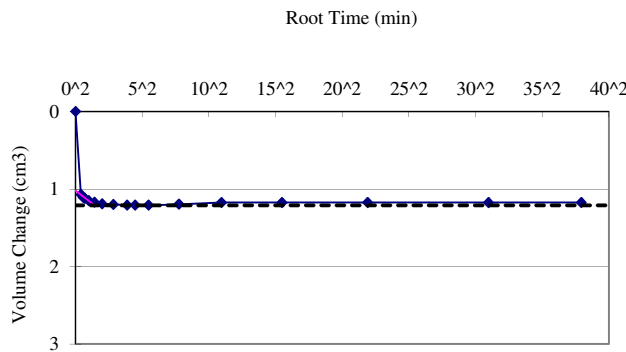
Sample No.: D-1

Depth : 10.00-10.70m



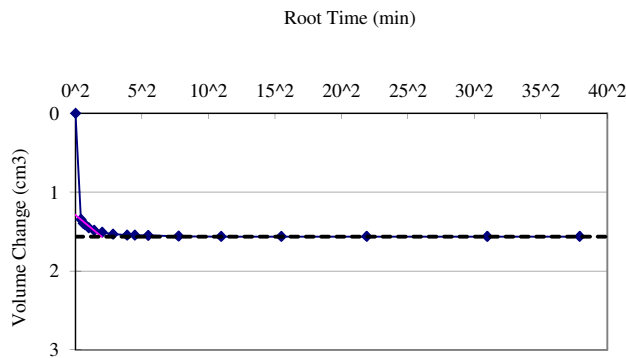
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 2.0$  min  
 $C_v = 525$  m<sup>2</sup>/year  
 $m_{vi} = 0.018$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 2.1$  min  
 $C_v = 492$  m<sup>2</sup>/year  
 $m_{vi} = 0.014$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.9$  min  
 $C_v = 263$  m<sup>2</sup>/year  
 $m_{vi} = 0.014$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 1-Dec-14

Tested by : Perera/Bala

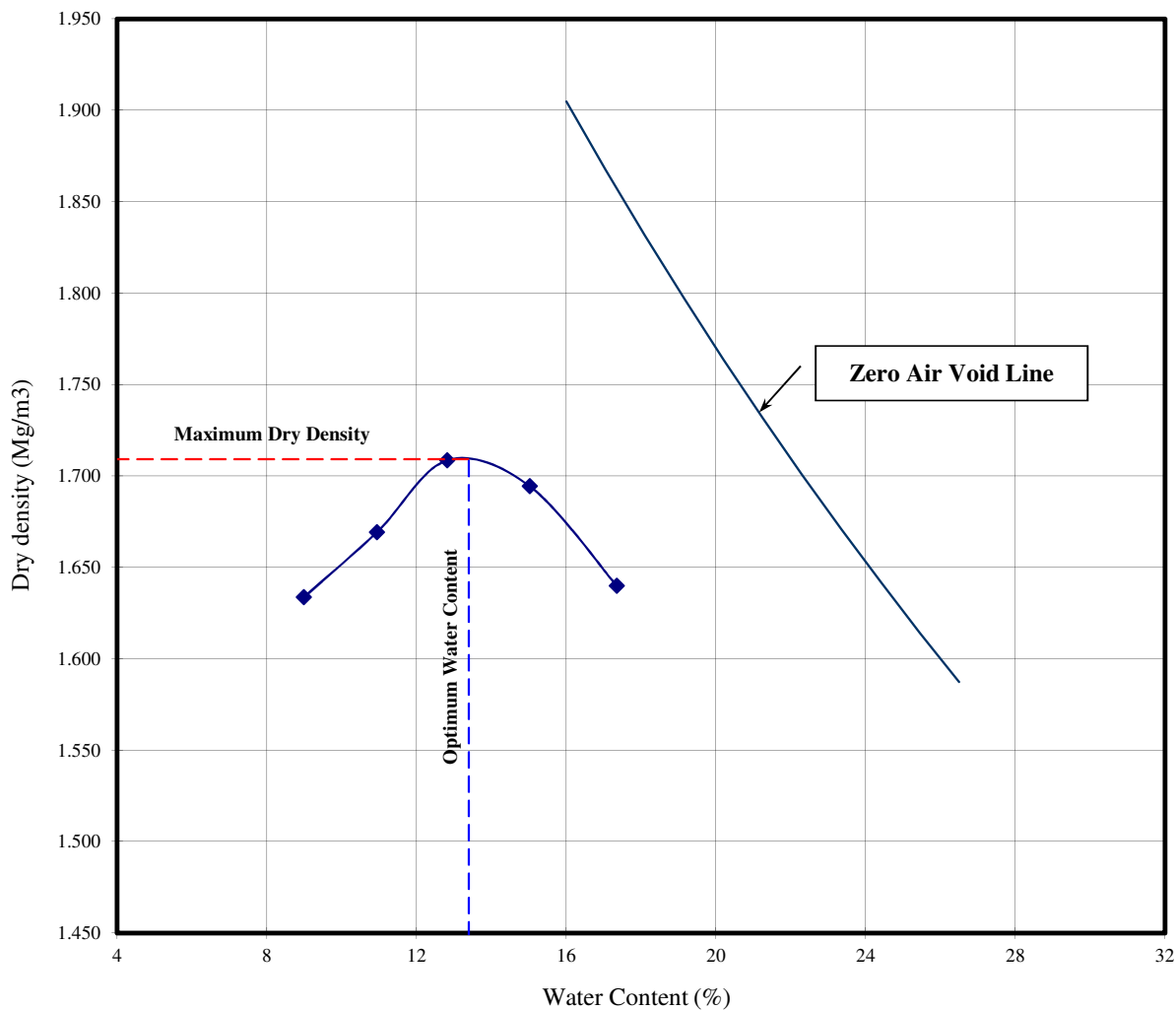
Sample No. : OF-05-3a D-1 (10.00-10.70m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.0	10.9	12.8	15.0	17.3			
Wet Density (Mg/m <sup>3</sup> )	1.781	1.852	1.928	1.949	1.924			
Dry Density (Mg/m <sup>3</sup> )	1.634	1.669	1.709	1.694	1.640			

Maximum Dry Density	1.709 Mg/m <sup>3</sup>
Optimum Water Content	13.4 %





**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		OF-05-3a						
Sample No.		D-1	D-2	D-3				
Sample Depth		10.00m ~10.70m	13.00m ~13.80m	18.50m ~19.40m				
Condition of Sample		Disturbed						
Natural Water Content	%	22.7	21.9	25.2				
Specific Gravity		2.68	2.68	2.70				
Wet Density	Mg/m <sup>3</sup>	1.94	1.85	-				
Dry Density	Mg/m <sup>3</sup>	1.58	1.52	-				
Natural Void Ratio		0.69	0.76	-				
Degree of Saturation	%	88	77	-				
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plastic Limit,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
	Plasticity Index,	%	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>			
Grain Size Analysis	Gravel,	%	0	0	0			
	Sand,	%	90	90	46			
	Silt,	%	10	10	28			
	Clay & Colloid,	%			26			
	Max. diameter,	mm	0.850	2.00	0.850			
	Diam. at 60%	mm	0.29	0.19	0.097			
	Diam. at 10%	mm	0.12	-	-			
Visual soil description		Sand with Clay	Sand with Clay	Sandy Clay				
Unified soil classification		-	-	-				
Triaxial compression test	Angle of Internal Friction (°)		-	-	-			
	Cohesion Intercept, kPa		-	-	-			
	Condition of drainage		-	-	-			
	Angle of Internal Friction * <sup>2</sup> (°)		38	-	-			
	Cohesion Intercept, kPa * <sup>2</sup>		0	-	-			
	Condition of drainage		CD* <sup>5</sup>	-	-			
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-			
	Compression Index(Average)		-	-	-			
	Pressure Range for Compression Index(kPa)		-	-	-			
	Swell index		-	-	-			
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>		1.71	-	-			
	Optimum Moisture Content , %		13.4	-	-			
Unconfined Compression Strength (kPa)		-	-	-				
Strain at failure (%)		-	-	-				

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : By using 2.5 kg Rammer

\*<sup>5</sup> : Specimens are prepared at 90% of Maximum dry density

Checked by : A. B. Tan

15) OF-05-3b



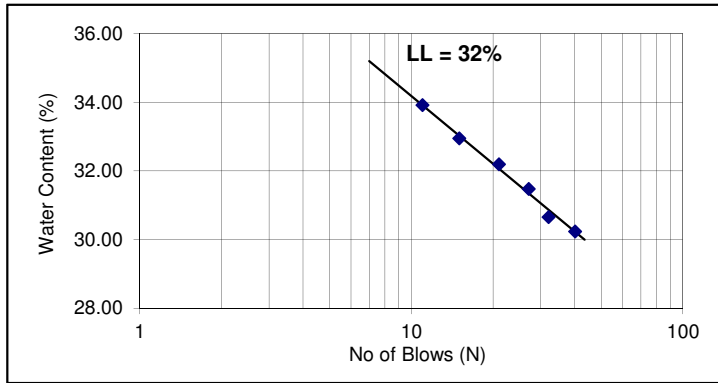


## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 01.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : OF-05-3b D2 Depth : 6.00-6.90m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	40	30.23
2	32	30.65
3	27	31.47
4	21	32.18
5	15	32.94
6	11	33.92
<b>Liquid Limits</b> %		<b>32</b>
<b>Plastic Limits</b> %		<b>18</b>
<b>Plasticity Index</b>		<b>14</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

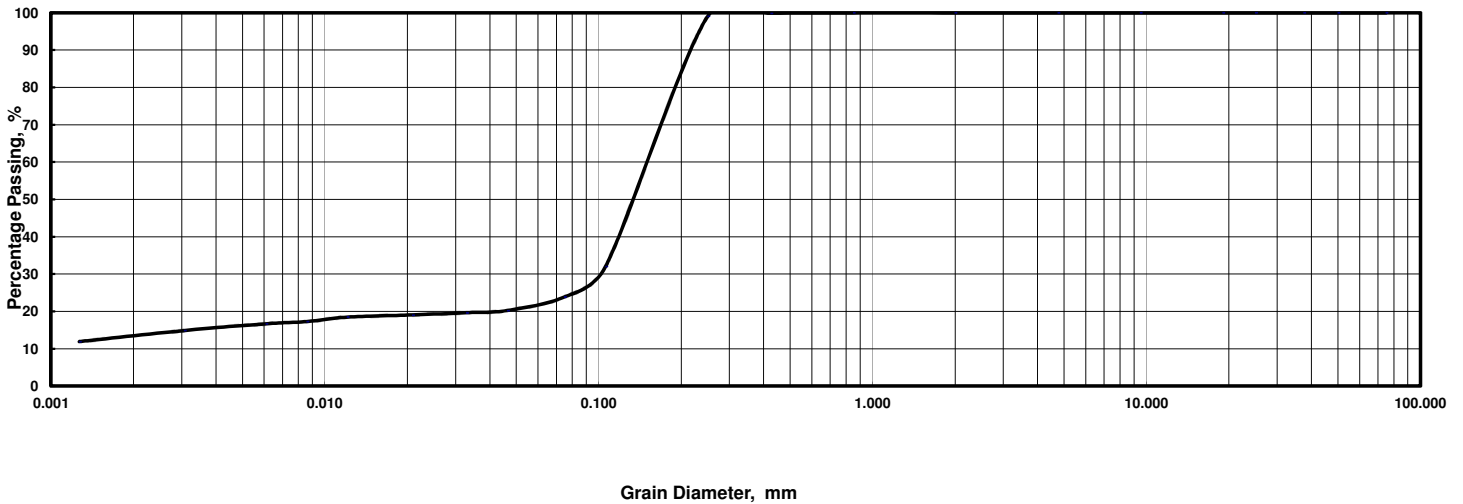
Sample No. : **OF-05-3b D-1** Depth : **3.00-3.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.1	32.1	23.9
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	20.3	19.7	19.1	18.5	17.3	16.7	14.9	11.9							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3b D-1		Sample No.	OF-05-3b D-1	
Depth	3.00-3.90m		Depth	3.00-3.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.15 mm	
2.00 - 0.425 mm	0.1 %		Dia. at 30%	0.097 mm	
0.425 - 0.075 mm	76.0 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	7.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	16.0 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	23.9 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

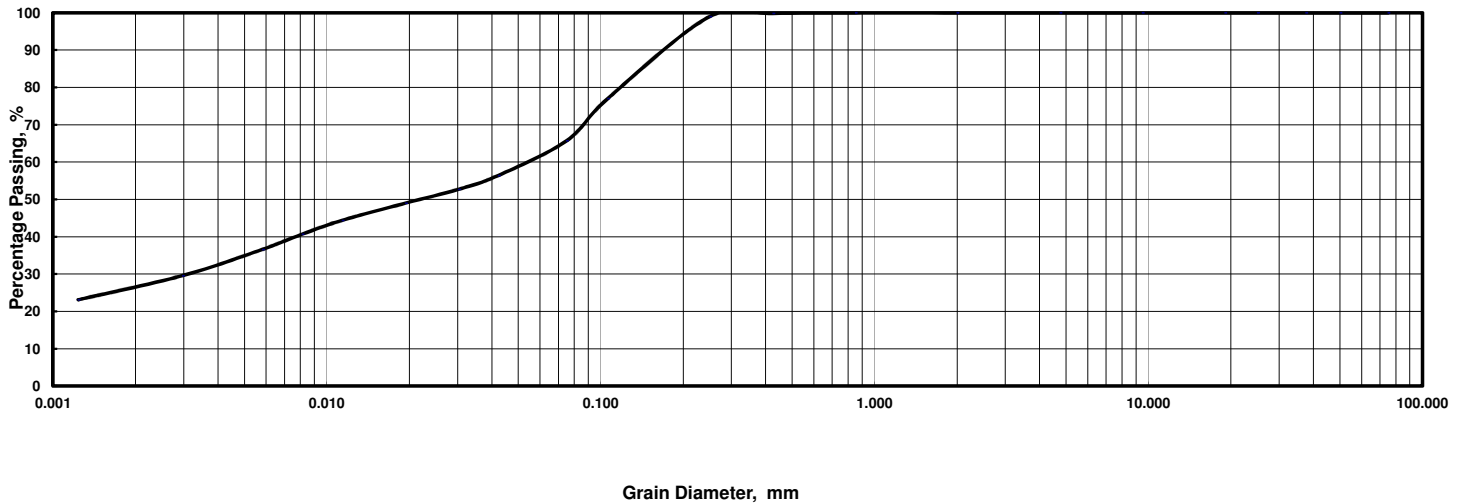
Sample No. : **OF-05-3b D-2** Depth : **6.00-6.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.74

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.0	77.0	65.7
Hydro.	Dia., mm	0.042	0.030	0.019	0.011	0.0081	0.0058	0.0030	0.0012							
	% Passing	56.4	52.7	49.0	44.4	40.7	36.6	29.6	23.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3b D-2		Sample No.	OF-05-3b D-2	
Depth	6.00-6.90m		Depth	6.00-6.90m	
Larger than 4.75 mm	0.0	%	Max. Diameter	0.850	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.053	mm
2.00 - 0.425 mm	0.2	%	Dia. at 30%	0.0031	mm
0.425 - 0.075 mm	34.1	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	31.1	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	34.6	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	65.7	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Motiur Checked by : A. B. Tan

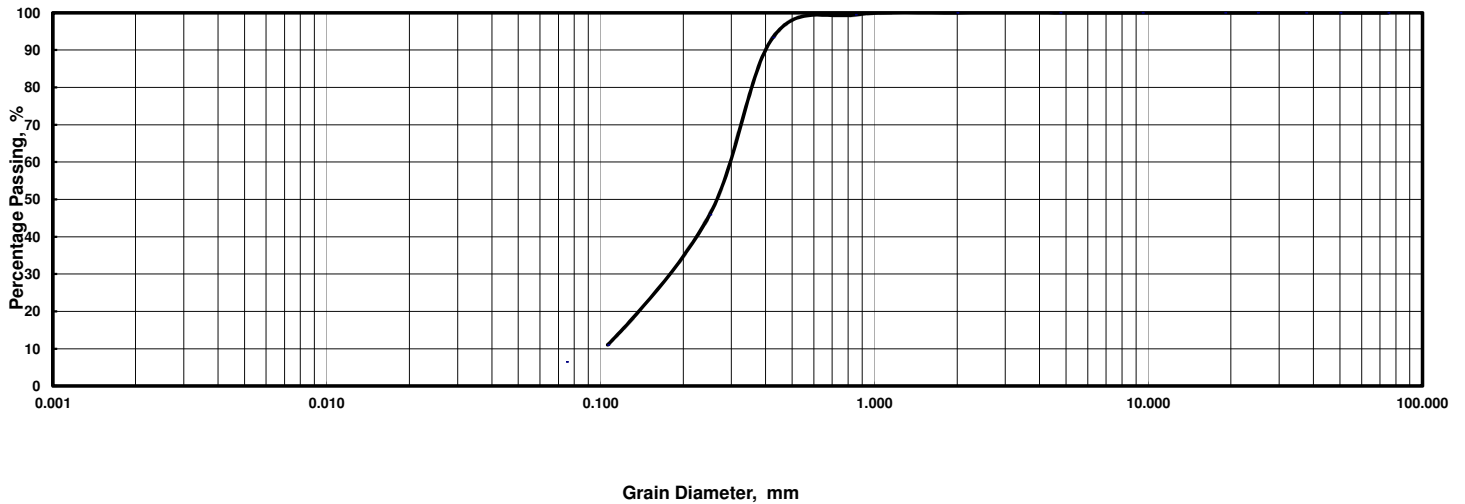
Sample No. : **OF-05-3b D-3** Depth : **10.20-10.93m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	93.4	45.9	11.0	6.5
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	OF-05-3b D-3		Sample No.	OF-05-3b D-3
Depth	10.20-10.93m		Depth	10.20-10.93m
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.29 mm
2.00 - 0.425 mm	6.6 %		Dia. at 30%	0.17 mm
0.425 - 0.075 mm	86.9 %		Dia. at 10%	0.10 mm
0.075 - 0.005 mm	6.5 %		Coeff. of Uniformity	2.98
Smaller than 0.005 mm			Coeff. of Curvature	1.00
2000um Sieve Passing	100.0 %			
425um Sieve Passing	99.4 %			
75um Sieve Passing	6.5 %			

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 13.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: OF-05-3b		Sample No.:D-3		Depth :10.20-10.93m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.51	1.51	1.51		
Saturation Stage	Saturated PWP, kPa	200	200	200		
	Final Cell Pressure, kPa	240	270	300		
	B-value	0.97	0.97	0.96		
Consolidation Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Initial PWP, kPa	228	252	282		
	Final PWP kPa	200	200	200		
Consolidation Parameter	Volume Change, %	0.04	0.04	0.14		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	22.94	48.76	11.10		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.01	0.01	0.01		
Compression Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f, kPa	160	182	335		
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ )f (%)	-2.13	-2.28	-1.65		
	Strain at ( $\sigma_1 - \sigma_3$ )f (%)	6.39	8.56	6.70		
Shear Strength Parameters	In terms of Effective Stress	Mode of Failure				
	$\phi' = 37$ deg $c' = 0$ kPa	1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.51 Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

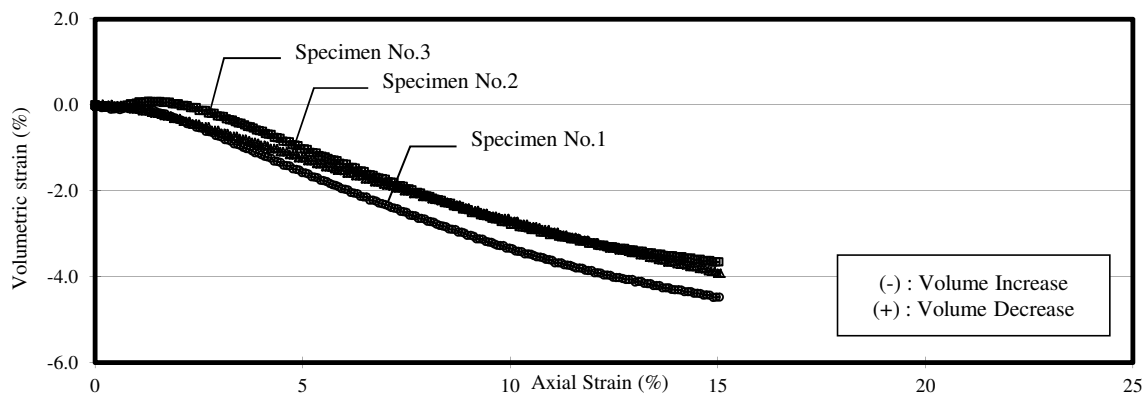
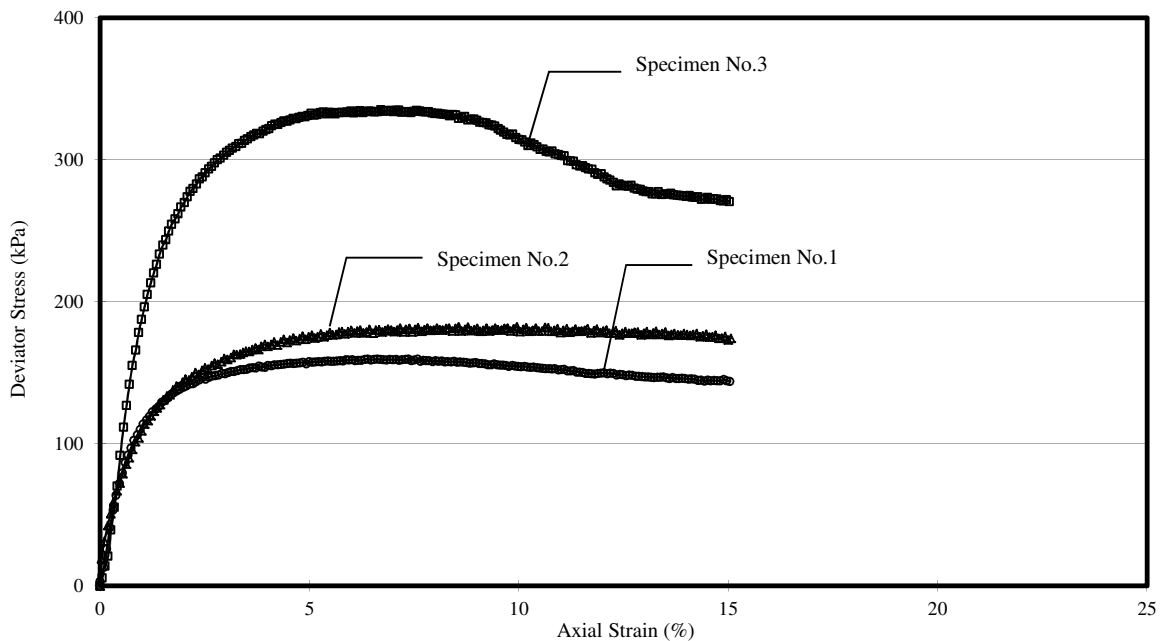
Project No.: S27-14

Sample No.: D-3

Soil Type: Sand with Clay

Borehole No.: OF-05-3b

Depth : 10.20-10.93m

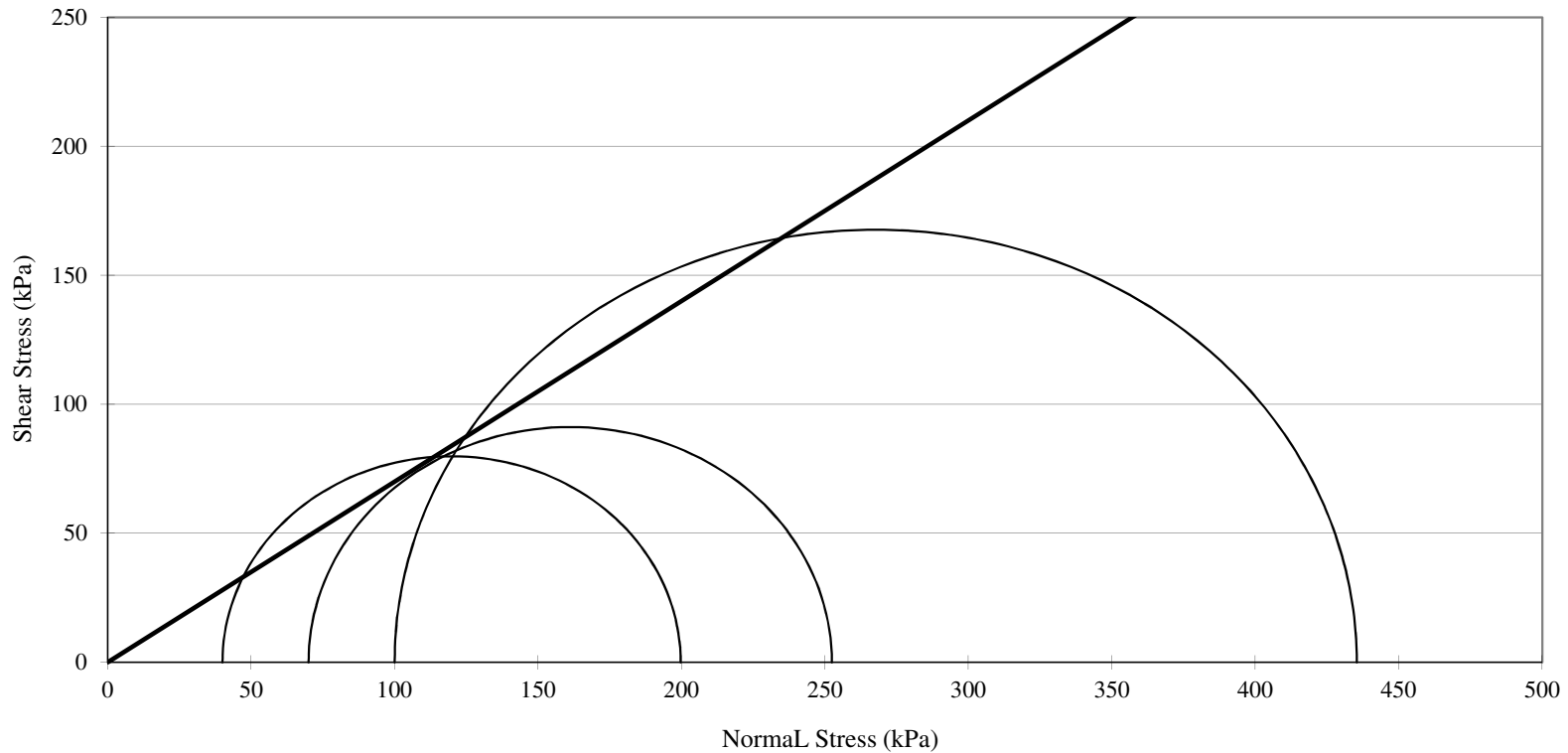


# Consolidated Drained Triaxial Compression Test

## - Mohr's Circle (In terms of Total Stress) -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No. : S27-14

Borehole No. :	<u>OF-05-3b</u>	Soil Type: <u>Sand with Clay</u>
Sample No. :	<u>D-3</u>	Depth : <u>10.20-10.93m</u>
Angle of Internal Friction, $\phi$	<u>35</u>	deg
Cohesion, $c$	<u>0</u>	kPa





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

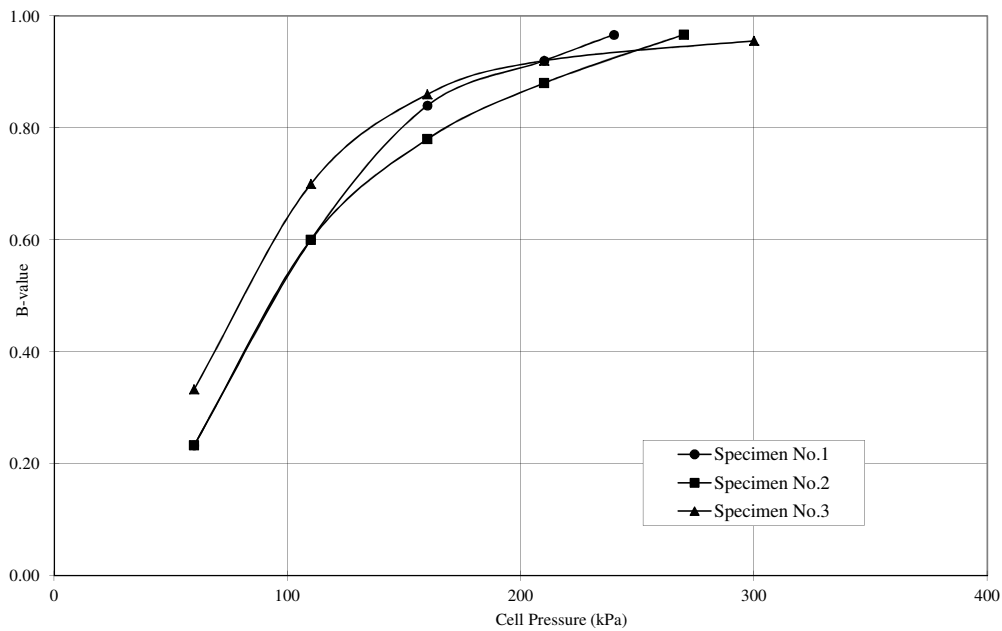
Borehole No.: OF-05-3b

Sample No.: D-3

Depth : 10.20-10.93m

Soil Type: Sand with Clay

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	27	20	27	20	30
	Back Pressure (kPa)	20		20		20	
	B-value	0.23		0.23		0.33	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	80	50	80	50	85
	Back Pressure (kPa)	50		50		50	
	B-value	0.60		0.60		0.70	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	142	100	139	100	143
	Back Pressure (kPa)	100		100		100	
	B-value	0.84		0.78		0.86	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	196	150	194	150	196
	Back Pressure (kPa)	150		150		150	
	B-value	0.92		0.88		0.92	
B-check Step.5	Cell Pressure (kPa)	210	240	210	270	210	300
	P.W.P (kPa)	200	229	200	258	200	286
	Back Pressure (kPa)	200		200		200	
	B-value	0.97		0.97		0.96	



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

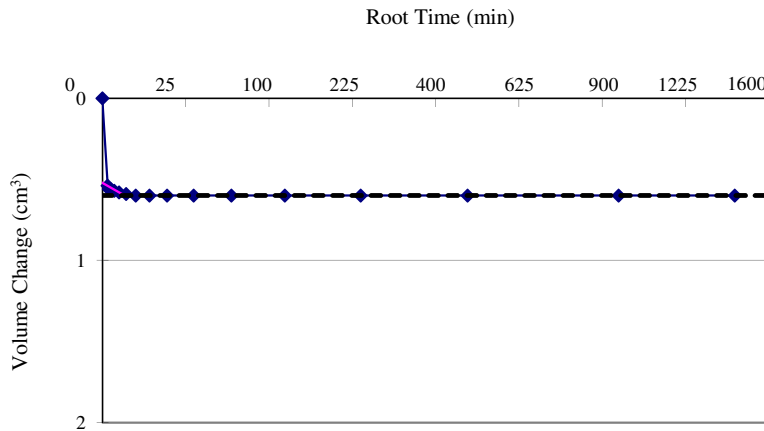
Project No.: S27-14

Sample No.: D-3

Soil Type: Sand with Clay

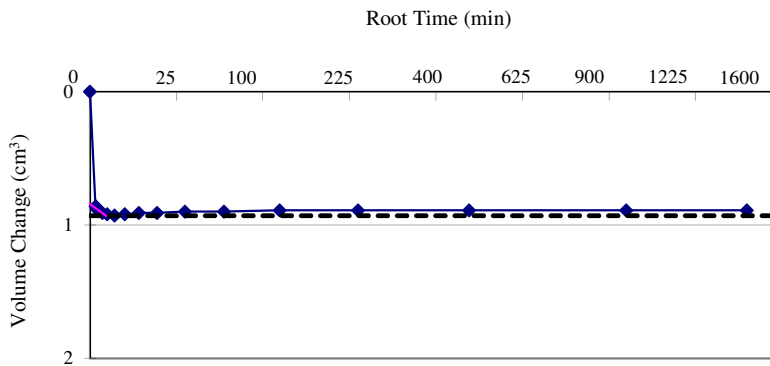
Borehole No.: OF-05-3b

Depth : 10.20-10.93m



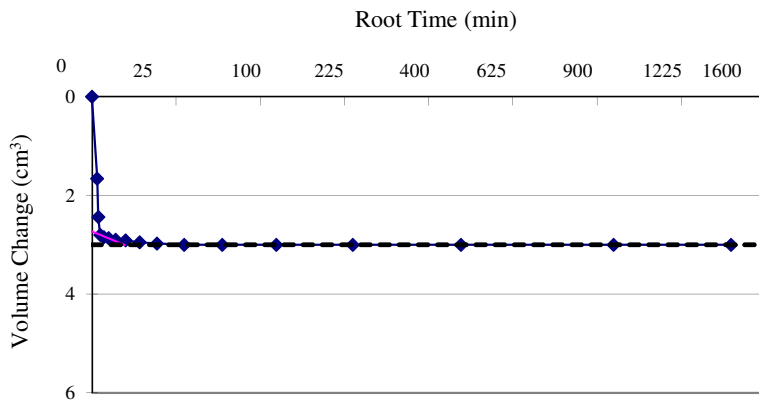
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.8$  min  
 $C_v = 22.94$  m<sup>2</sup>/year  
 $m_{vi} = 0.01$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 0.8$  min  
 $C_v = 48.76$  m<sup>2</sup>/year  
 $m_{vi} = 0.01$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.7$  min  
 $C_v = 11.10$  m<sup>2</sup>/year  
 $m_{vi} = 0.01$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 9-Dec-14

Tested by : Perera/Bala

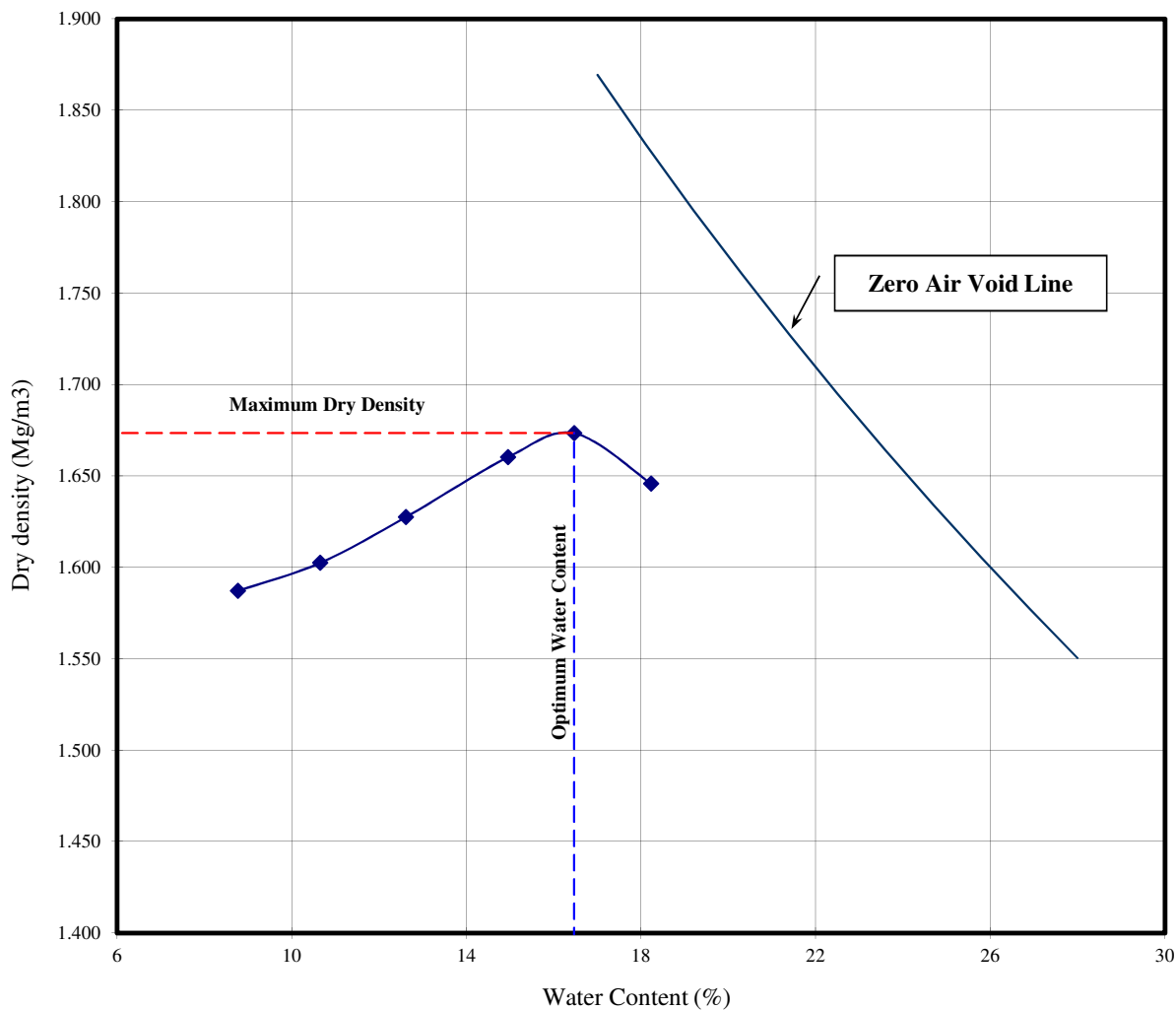
Sample No. : OF-05-3b D-3(10.20-10.93m)

Ref. No. : -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	8.8	10.7	12.6	14.9	16.5	18.2		
Wet Density (Mg/m <sup>3</sup> )	1.726	1.773	1.833	1.908	1.949	1.946		
Dry Density (Mg/m <sup>3</sup> )	1.587	1.602	1.628	1.660	1.673	1.646		

<b>Maximum Dry Density</b>	<b>1.673 Mg/m<sup>3</sup></b>
<b>Optimum Water Content</b>	<b>16.5 %</b>



16) LD-12-1



# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **25.10.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

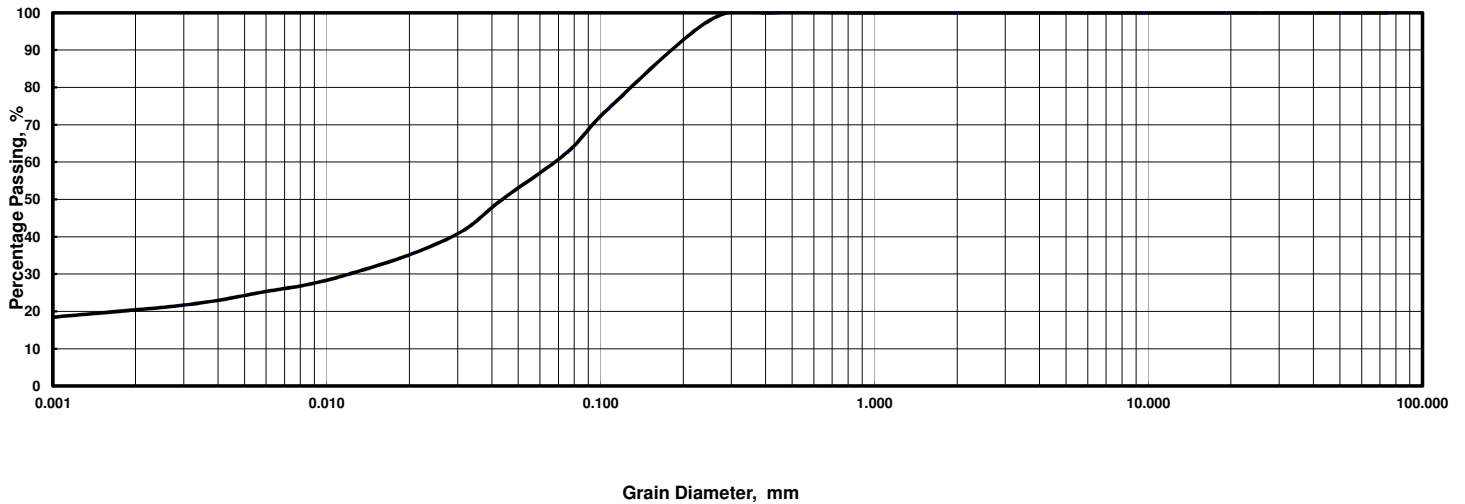
Sample No. : **LD-12-1 HP-1B** Depth : **2.35-2.90m** ( \_\_\_\_\_ ) Specific Gravity : **2.72**

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.9	74.1	62.5
Hydro.	Dia., mm	0.043	0.032	0.020	0.012	0.0085	0.0060	0.0031	0.0009							
	% Passing	49.9	41.7	35.4	29.9	27.2	25.4	21.8	18.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 HP-1B		Sample No.	LD-12-1 HP-1B	
Depth	2.35-2.90m		Depth	2.35-2.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.067 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.012 mm	
0.425 - 0.075 mm	37.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	38.4 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	24.1 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	62.5 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 17.10.14 Tested By : Htet Paing/Motiur Checked by : A. B. Tan

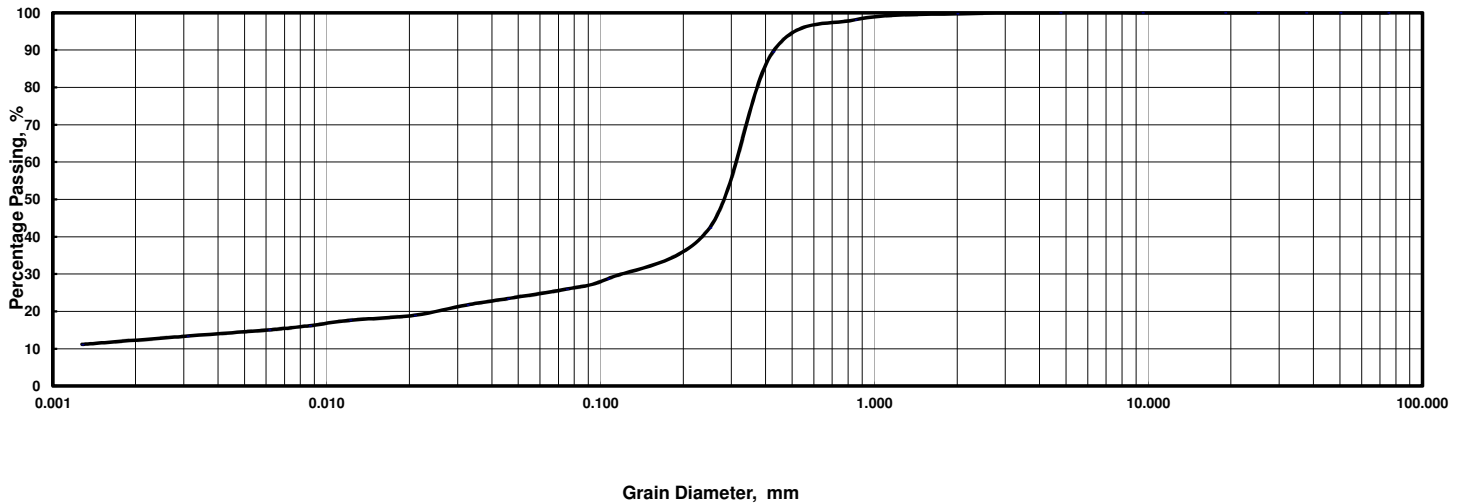
Sample No. : **LD-12-1 D-1** Depth : **5.00-5.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	98.1	89.5	42.4	28.7	26.0
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	23.4	21.7	19.0	17.6	16.2	15.1	13.4	11.2							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-1		Sample No.	LD-12-1 D-1	
Depth	5.00-5.80m		Depth	5.00-5.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.3	%	Dia. at 60%	0.30	mm
2.00 - 0.425 mm	10.2	%	Dia. at 30%	0.11	mm
0.425 - 0.075 mm	63.5	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	11.5	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	14.4	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	98.1	%			
75um Sieve Passing	26.0	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 21.10.14 Tested By : Shariful Checked by : A. B. Tan

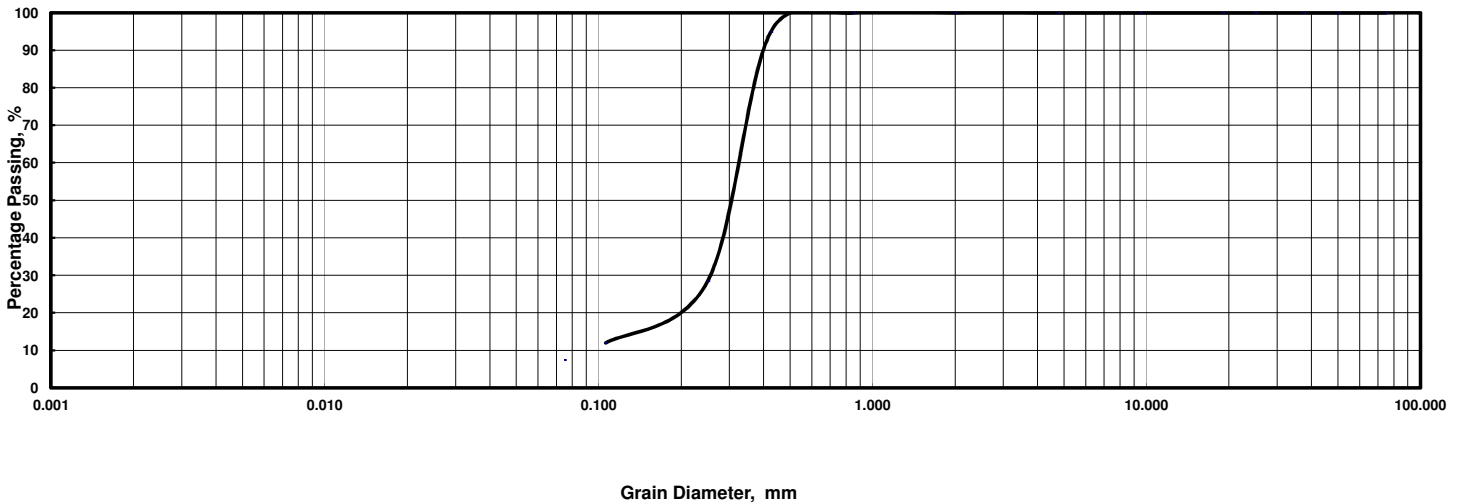
Sample No. : **LD-12-1 D-2** Depth : **8.00-8.85m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.9	28.5	12.0	7.5
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-2		Sample No.	LD-12-1 D-2	
Depth	8.00-8.85m		Depth	8.00-8.85m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.32	mm
2.00 - 0.425 mm	5.1	%	Dia. at 30%	0.25	mm
0.425 - 0.075 mm	87.4	%	Dia. at 10%	0.091	mm
0.075 - 0.005 mm	7.5	%	Coeff. of Uniformity	3.53	
Smaller than 0.005 mm			Coeff. of Curvature	2.19	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	7.5	%			



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 21.10.14 Tested By : Shariful Checked by : A. B. Tan

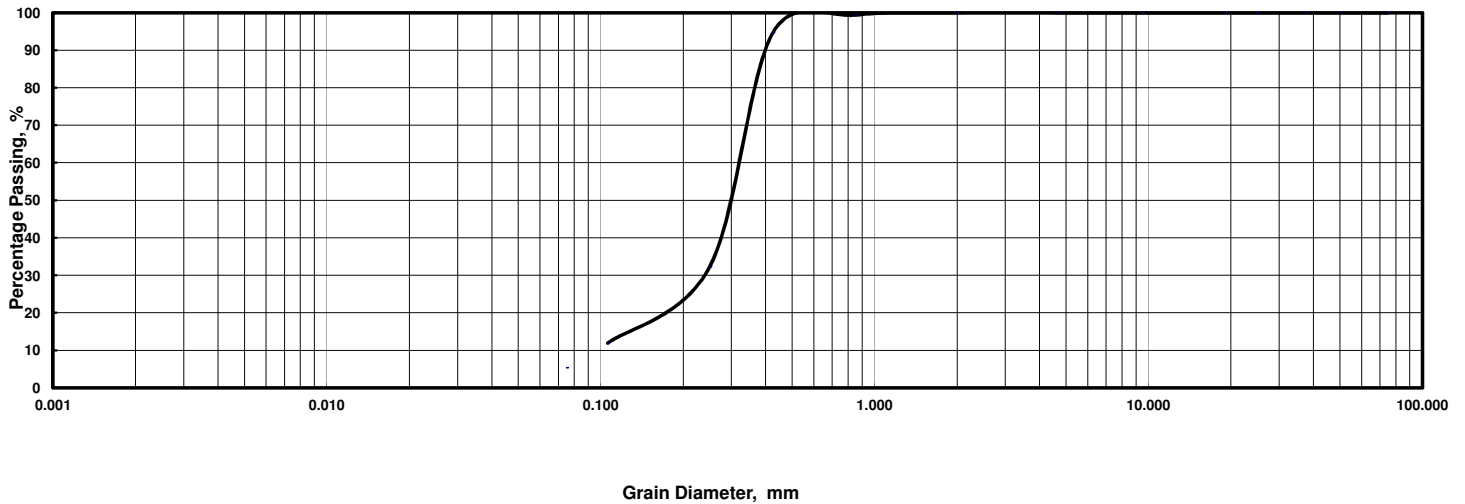
Sample No. : **LD-12-1 D-3** Depth : **11.00-11.50m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	94.7	32.3	11.9	5.4
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-3		Sample No.	LD-12-1 D-3
Depth	11.00-11.50m		Depth	11.00-11.50m
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.32 mm
2.00 - 0.425 mm	5.3 %		Dia. at 30%	0.23 mm
0.425 - 0.075 mm	89.3 %		Dia. at 10%	0.096 mm
0.075 - 0.005 mm	5.4 %		Coeff. of Uniformity	3.31
Smaller than 0.005 mm			Coeff. of Curvature	1.70
2000um Sieve Passing	100.0 %			
425um Sieve Passing	99.4 %			
75um Sieve Passing	5.4 %			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 17.10.14 Tested By : Htin/Motiur Checked by : A. B. Tan

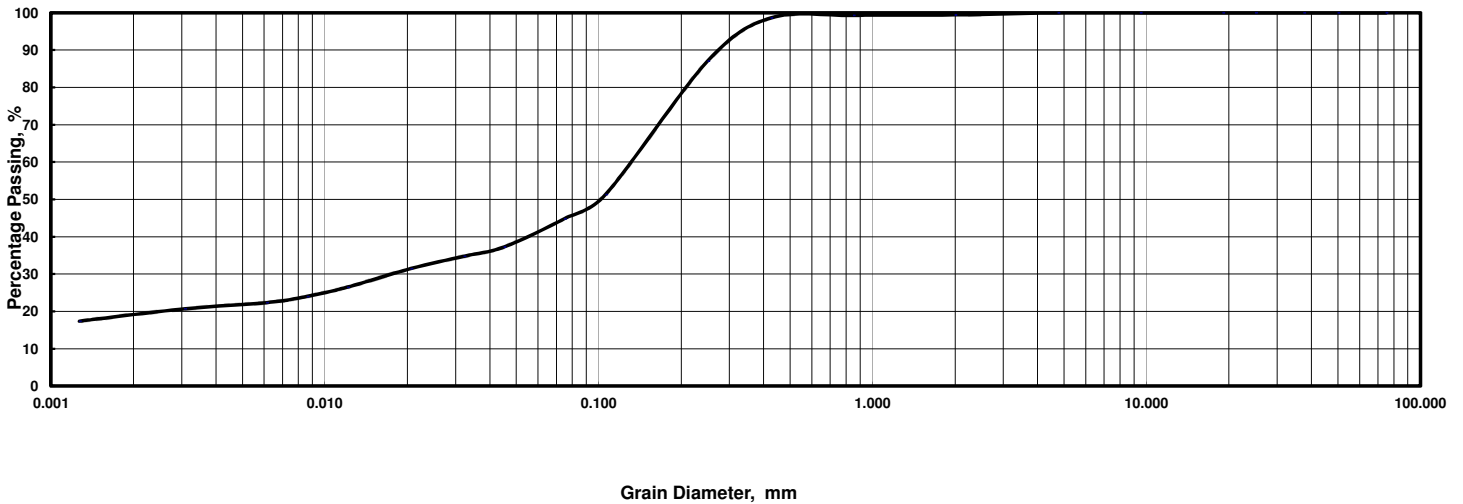
Sample No. : **LD-12-1 D-4** Depth : **14.00-14.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	99.3	98.6	87.1	51.3	44.8
Hydro.	Dia., mm	0.045	0.032	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	37.3	34.8	31.5	26.5	24.0	22.4	20.7	17.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-4		Sample No.	LD-12-1 D-4	
Depth	14.00-14.80m		Depth	14.00-14.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.6 %		Dia. at 60%	0.13 mm	
2.00 - 0.425 mm	0.8 %		Dia. at 30%	0.018 mm	
0.425 - 0.075 mm	53.8 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	23.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	21.7 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.3 %				
75um Sieve Passing	44.8 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 21.10.14 Tested By : Shariful Checked by : A. B. Tan

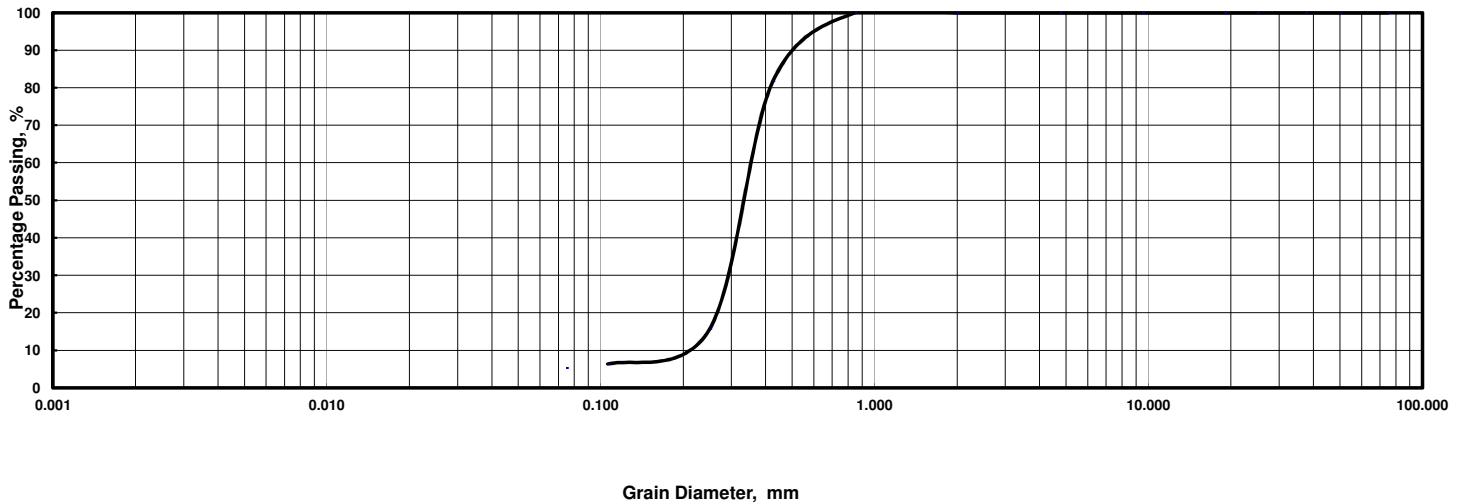
Sample No. : **LD-12-1 D-5** Depth : **17.00-17.60m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.7	15.7	6.3	5.4
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-5		Sample No.	LD-12-1 D-5	
Depth	17.00-17.60m		Depth	17.00-17.60m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.36	mm
2.00 - 0.425 mm	18.3	%	Dia. at 30%	0.28	mm
0.425 - 0.075 mm	76.4	%	Dia. at 10%	0.15	mm
0.075 - 0.005 mm	5.4	%	Coeff. of Uniformity	2.41	
Smaller than 0.005 mm			Coeff. of Curvature	1.49	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	100.0	%			
75um Sieve Passing	5.4	%			

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **20.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

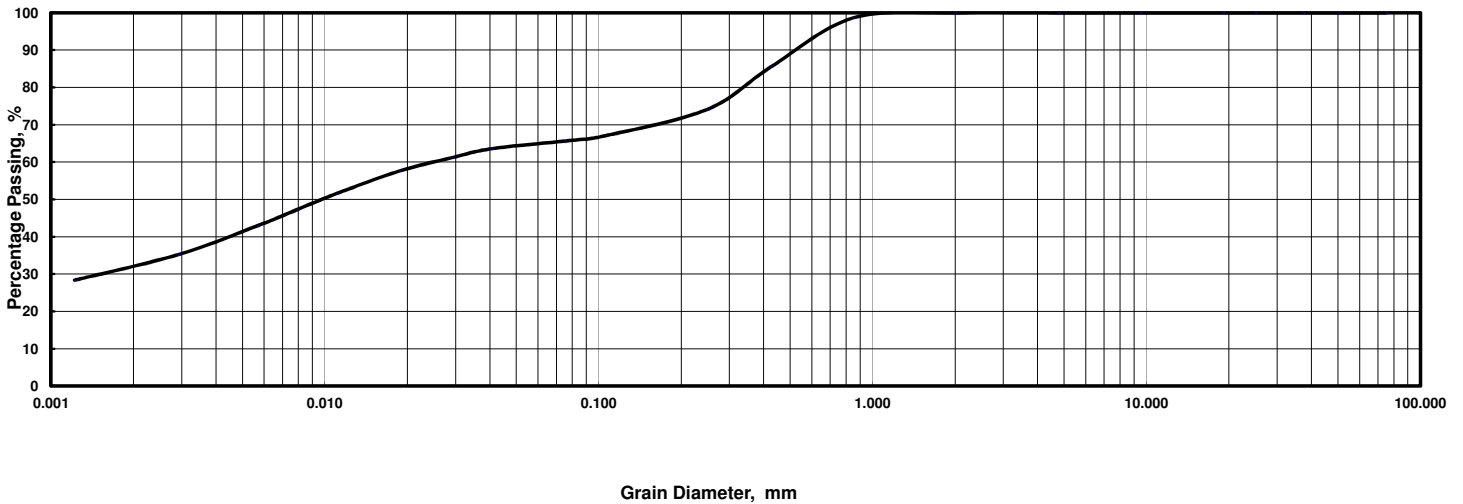
Sample No. : **LD-12-1 D-6** Depth : **23.00-23.60m** ( \_\_\_\_\_ ) Specific Gravity : **2.72**

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	85.5	74.2	67.1	65.6
Hydro.	Dia., mm	0.041	0.029	0.019	0.011	0.0079	0.0057	0.0029	0.0012							
	% Passing	63.6	61.2	57.6	51.6	47.3	43.0	35.2	28.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



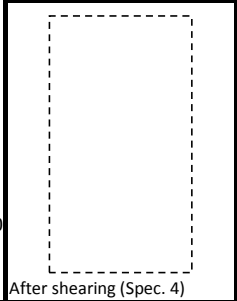
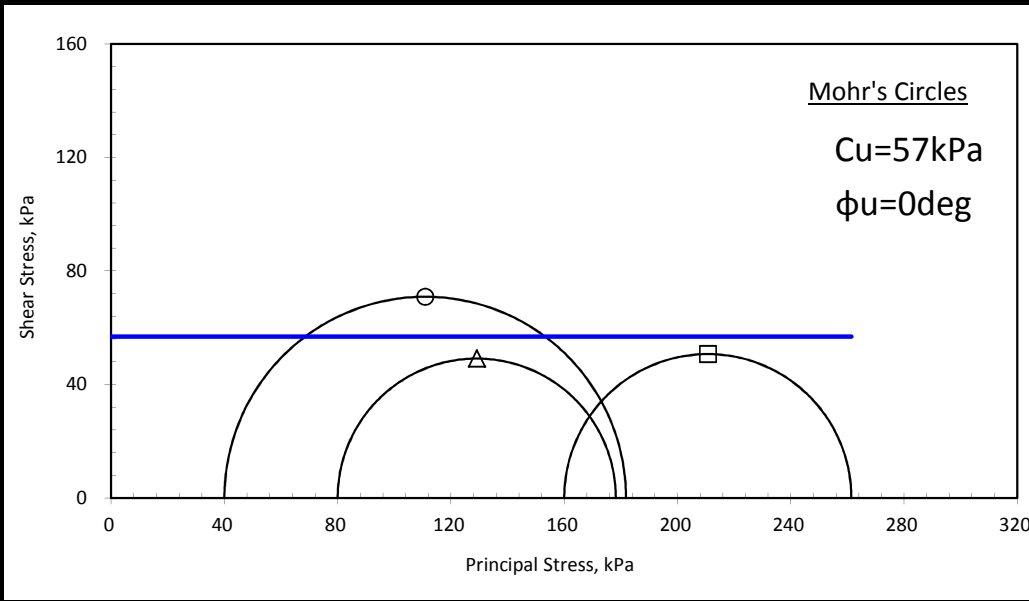
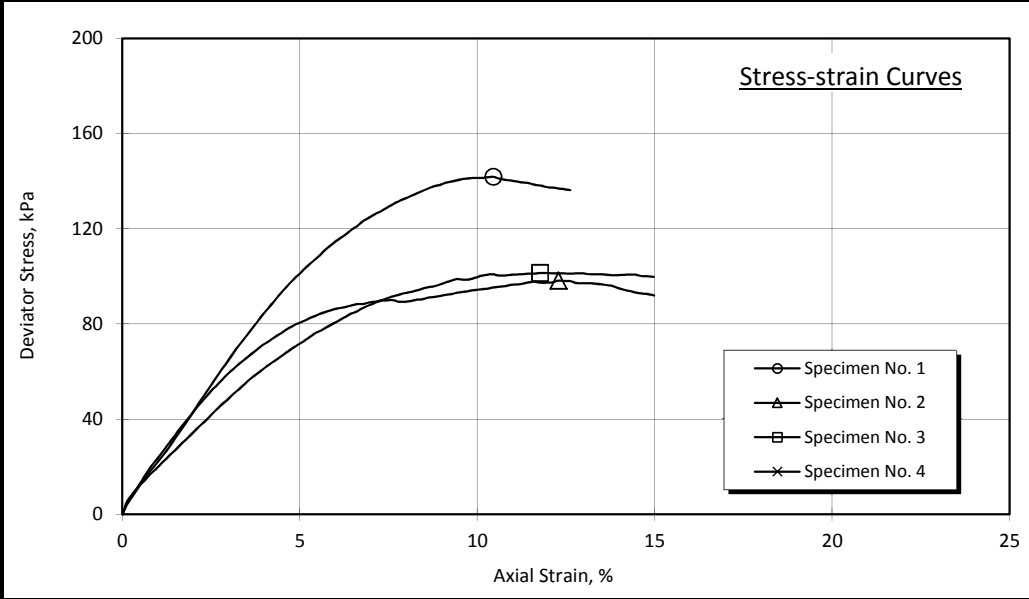
	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD-12-1 D-6		Sample No.	LD-12-1 D-6	
Depth	23.00-23.60m		Depth	23.00-23.60m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.025 mm	
2.00 - 0.425 mm	14.5 %		Dia. at 30%	0.0015 mm	
0.425 - 0.075 mm	19.9 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	24.6 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	41.0 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	98.6 %				
75um Sieve Passing	65.6 %				

# UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project : <u>Preparatory Survey on Matarbari USC Coral-fired Power Project</u>		Project No. : <u>S27-14</u>
Standard : <u>ASTM D2850-03a</u>		Date of Testing : <u>23.10.14</u>
Borehole No.: <u>LD-12-1</u>	Depth : <u>2.35-2.90m</u>	Tested by : <u>Perera</u>
Sample No. : <u>HP-1B</u>	Strain Rate : <u>1.00 %/min</u>	Checked by : <u>A. B. Tan</u>

Specimen No.	Condition of Sample	Size of Specimen (mm)		Natural Water Content (%)	Bulk Density (Mg/m3)	Dy Density (Mg/m3)	Cell Pressure (kPa)	Peak Deviator Stress (kPa)	Modulus of Deformation E50 (kPa)	Corrected Initial Strain (%)	Strain at Failure (%)
		Height	Diameter								
1	Undisturbed	99.80	50.00	29.5	1.90	1.46	40	141.8	2159	N/A	10.45
2	Undisturbed	99.80	50.00	26.4	1.94	1.54	80	98.2	2098	N/A	12.28
3	Undisturbed	99.80	50.00	28.1	1.90	1.48	160	101.4	1616	N/A	11.76
4											



Remarks :

- [Strain at failure]=[Recorded strain at failure] - [Corrected Initial Strain]
- Latex membrane with 0.2mm in thickness is used.
- Membrane correction is carried out based on BS 1377 : 1990

Portion Tested (Bottom Layer)

Top								
			3	2	1			
								Bottom

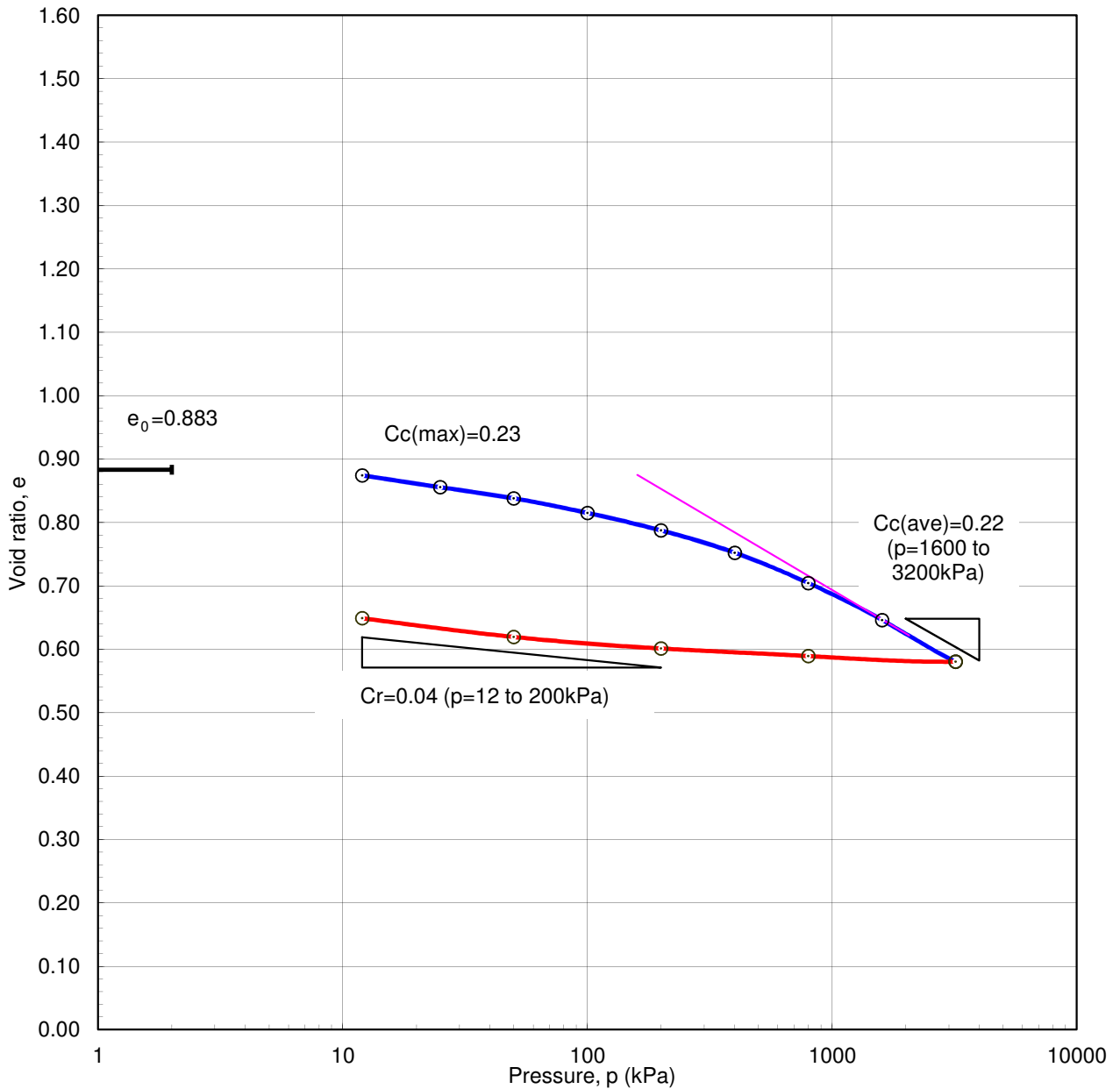
**CONSOLIDATION TEST (*e-log p* curves)**

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Sandy Silt Checked by : A. B. Tan

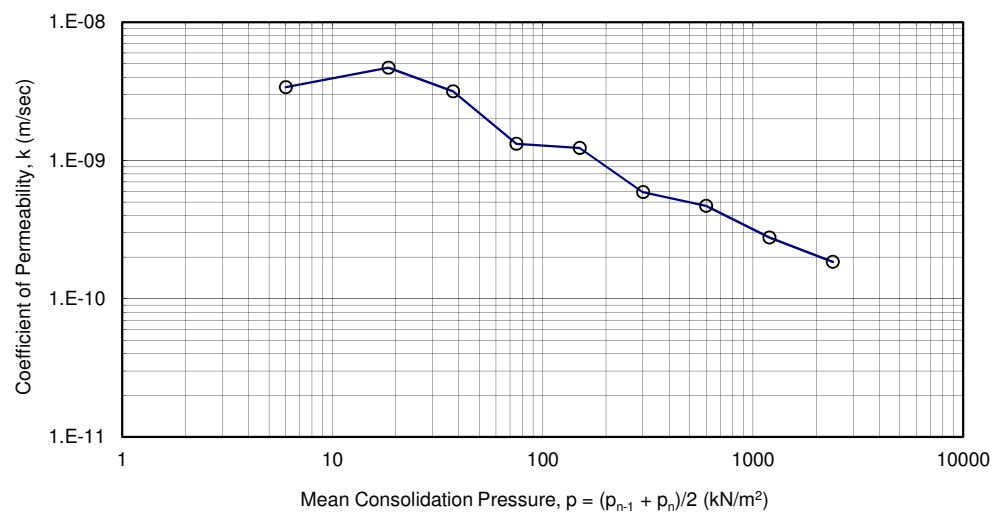
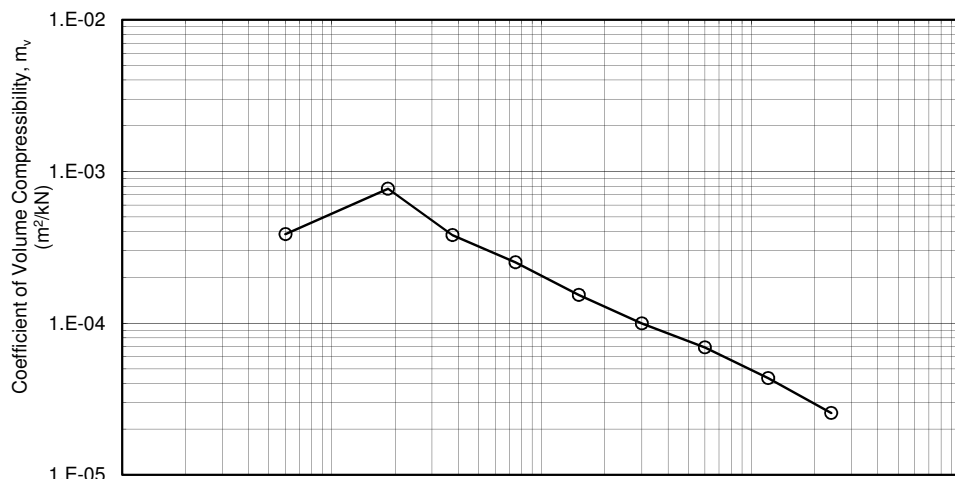
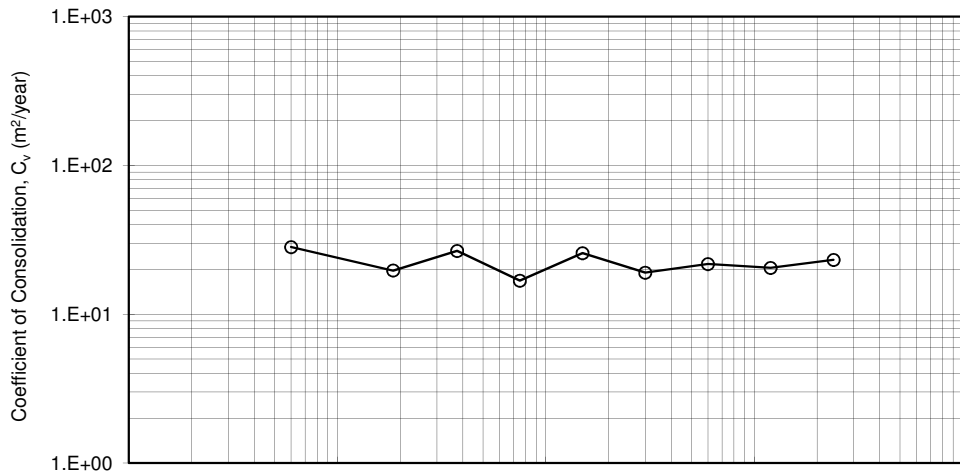
Borehole No. : LD-12-1  
 Sample No. : HP-1B  
 Depth of Sample : 2.35-2.90 m

Sample No.	Depth of sample (m)	Initial void ratio $e_0$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
HP-1B	2.35-2.90	0.883	-	0.23 (max)	0.22(average)	0.039 (average)	N/A



Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project :	Preparatory Survey on Matarbari USC Coal-fired Power Project	Borehole No. :	LD-12-1
Project No. :	S27-14	Sample No. :	HP-1B
Date of testing :	17-Oct-14	Tested by :	Lim
		Depth of Sample :	2.35-2.90 m



PROJECT NAME : Preparatory Survey on Matarbari USC Coal-fired Power Project PROJECT NO.: S27-14  
 BOREHOLE NO. : LD-12-1 TESTING STANDARD : ASTM D2435-11 DATE : 17-Oct-14  
 SAMPLE NO. : HP-1B INITIAL HEIGHT OF SPECIMEN : 18.000 mm NO. OF LOADING STEP : 9  
 DEPTH : 2.35-2.90 m DIAMETER OF SPECIMEN : 53.900 mm SPECIFIC GRAVITY : 2.72  
 TESTER NO. : 17 DRY WEIGHT OF SPECIMEN : 59.340 grams SOLID HEIGHT OF SPECIMEN : 9.560 mm  
 INITIAL MOISTURE CONTENT : 30.7 % BULK DENSITY : 1.89 Mg/m<sup>3</sup>  
 METHOD OF TIME FITTING USED : SQUARE ROOT TIME CURVE - FITTING METHOD LABORATORY TEMPERATURE : 23.0 °C

PRESSURE	PRESSURE INCREMENT	CHANGE IN HEIGHT	HEIGHT	AVERAGE HEIGHT	STRAIN	MV	VOLUME RATIO	VOID RATIO
kN/m <sup>2</sup>	kN/m <sup>2</sup>	*E-2 mm	mm	mm	%	m <sup>2</sup> /kN		
0.000			18.000				1.883	0.883
12.000	12.000	8.3	17.917	17.959	0.46	3.85E-04	1.874	0.874
25.000	13.000	17.8	17.739	17.828	1.00	7.68E-04	1.856	0.856
50.000	25.000	16.8	17.571	17.655	0.95	3.81E-04	1.838	0.838
100.000	50.000	22.0	17.351	17.461	1.26	2.52E-04	1.815	0.815
200.000	100.000	26.4	17.087	17.219	1.53	1.53E-04	1.787	0.787
400.000	200.000	33.7	16.750	16.919	1.99	9.96E-05	1.752	0.752
800.000	400.000	45.7	16.293	16.522	2.77	6.92E-05	1.704	0.704
1600.000	800.000	55.6	15.737	16.015	3.47	4.34E-05	1.646	0.646
3200.000	1600.000	63.0	15.107	15.422	4.09	2.55E-05	1.580	0.580

PRESSURE	AVERAGE PRESSURE	T90	CV	CV	CV	PRIMARY COMPRESSION	PRIMARY COMPRESSION	COEFFICIENT OF PERMEABILITY
kN/m <sup>2</sup>	kN/m <sup>2</sup>	min	m <sup>2</sup> /sec	m <sup>2</sup> /day	m <sup>2</sup> /year	*E-2 mm	RATIO	m/sec
0.000								
12.000	6.000	1.18	8.96E-07	7.74E-02	2.83E+01	1.6	0.194	3.38E-09
25.000	18.500	1.68	6.23E-07	5.38E-02	1.96E+01	2.2	0.126	4.69E-09
50.000	37.500	1.21	8.46E-07	7.31E-02	2.67E+01	2.7	0.162	3.16E-09
100.000	75.000	1.88	5.33E-07	4.60E-02	1.68E+01	3.4	0.154	1.32E-09
200.000	150.000	1.19	8.17E-07	7.06E-02	2.58E+01	3.8	0.143	1.23E-09
400.000	300.000	1.56	6.03E-07	5.21E-02	1.90E+01	5.2	0.156	5.89E-10
800.000	600.000	1.30	6.90E-07	5.96E-02	2.18E+01	6.5	0.142	4.68E-10
1600.000	1200.000	1.30	6.50E-07	5.62E-02	2.05E+01	8.4	0.152	2.77E-10
3200.000	2400.000	1.06	7.36E-07	6.36E-02	2.32E+01	8.7	0.137	1.84E-10


REBOUND  
 P 800.000 200.000 50.000 12.000  
 H 15.193 15.307 15.481 15.764  
 E 0.589 0.601 0.619 0.649



KISO-JIBAN CONSULTANTS CO., LTD.



### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 09.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD-12-1		Sample No.:D-1		Depth : 5.00-5.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.52	1.52	1.52		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.96	0.97		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.04	0.06	0.15		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	614	444	542		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.009	0.009	0.015		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	170	229	345		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-1.90	-1.53	-1.04		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	4.33	5.97	5.96		
Shear Strength Parameters	$\phi_d = 39$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.52Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

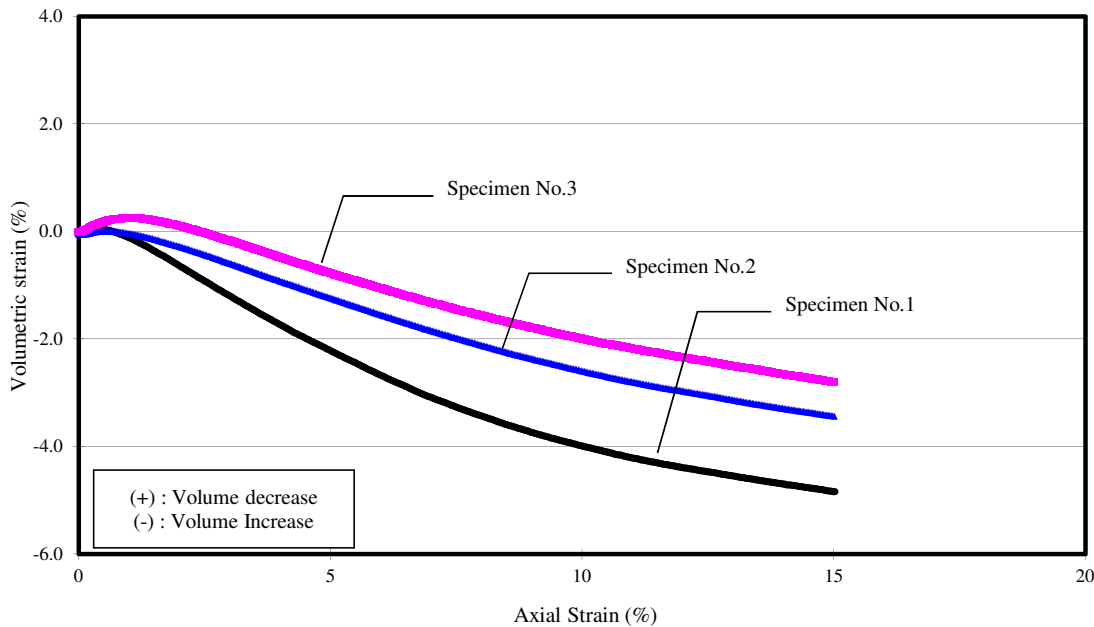
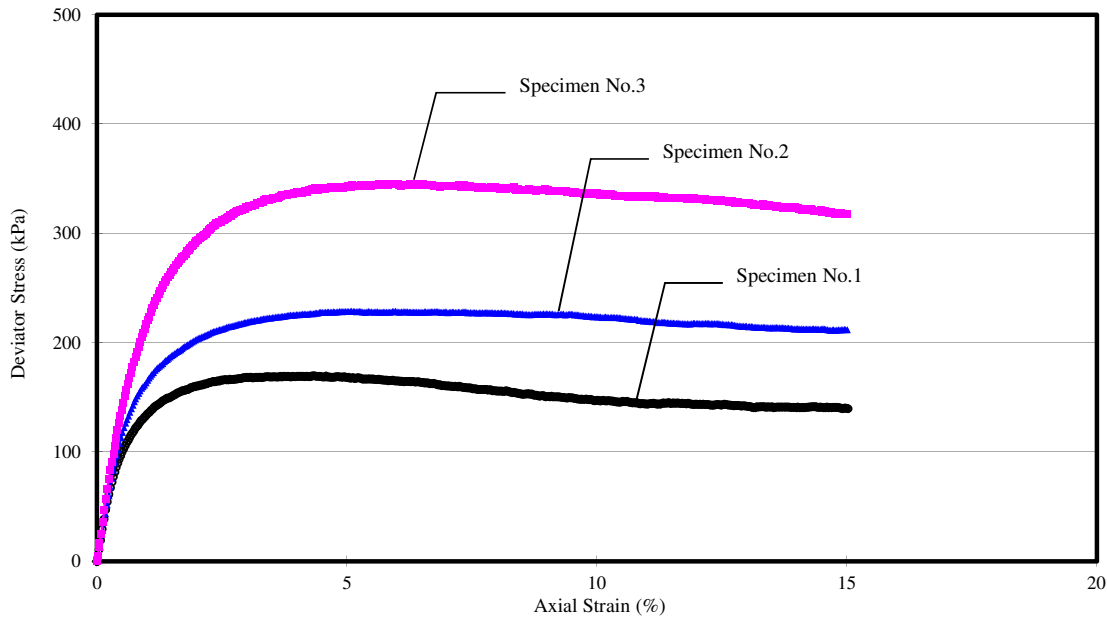
Project No.: S27-14

Sample No.: D-1

Soil Type: Clayey Sand

Borehole No.: LD-12-1

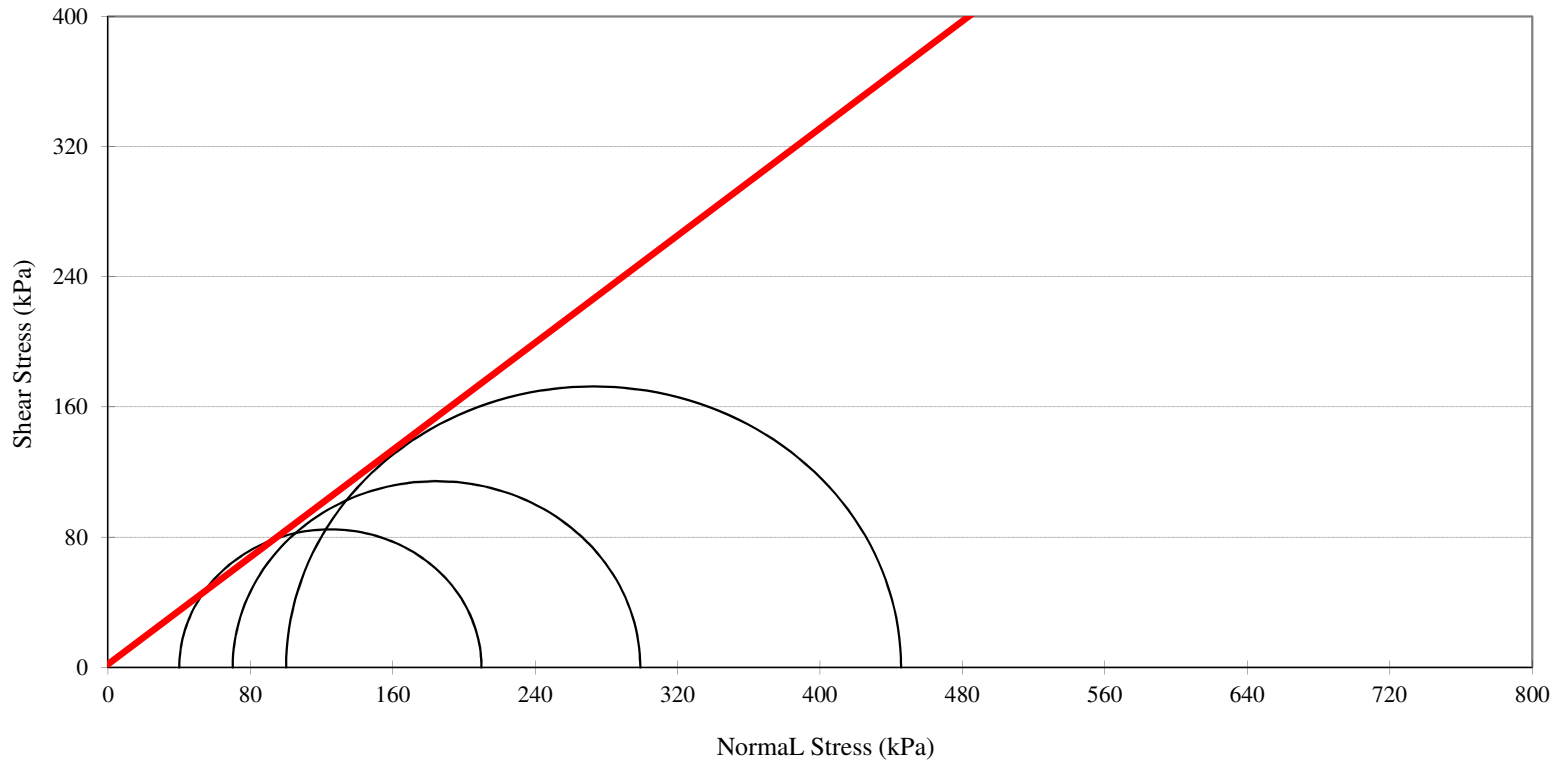
Depth : 5.00-5.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD-12-1      Soil Type: Clayey Sand  
 Sample No. : D-1            Depth : 5.00-5.80m  
 Angle of Internal Friction,  $\phi_d$  39 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

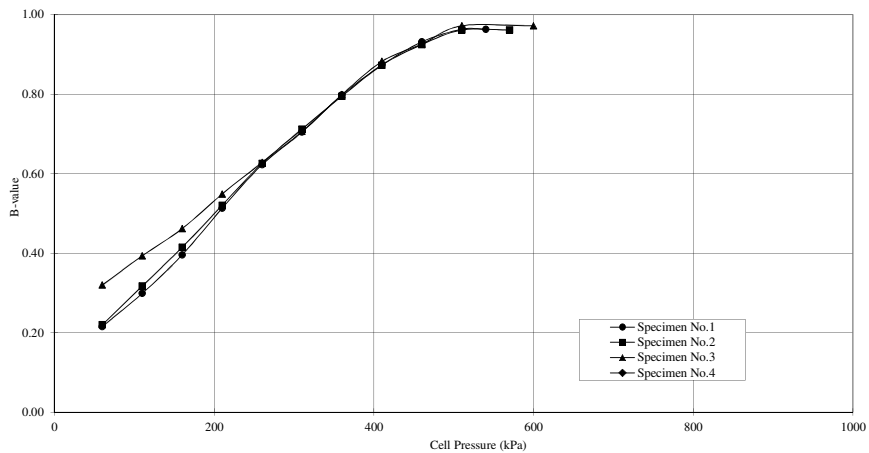
Borehole No.: LD-12-1

Sample No.: D-1

Depth : 5.00-5.80m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	26.5	20	26.6	20	29.6		
	Back Pressure (kPa)	20		20		20			
	B-value	0.22		0.22		0.32			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	64.9	50	65.9	50	69.7		
	Back Pressure (kPa)	50		50		50			
	B-value	0.30		0.32		0.39			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	119.8	100	120.7	100	123.1		
	Back Pressure (kPa)	100		100		100			
	B-value	0.40		0.41		0.46			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	175.6	150	176.0	150	177.4		
	Back Pressure (kPa)	150		150		150			
	B-value	0.51		0.52		0.55			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.1	200	231.3	200	231.4		
	Back Pressure (kPa)	200		200		200			
	B-value	0.62		0.63		0.63			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	285.2	250	285.6	250	285.3		
	Back Pressure (kPa)	250		250		250			
	B-value	0.70		0.71		0.71			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	339.9	300	339.7	300	339.9		
	Back Pressure (kPa)	300		300		300			
	B-value	0.80		0.79		0.80			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	393.6	350	393.6	350	394.1		
	Back Pressure (kPa)	350		350		350			
	B-value	0.87		0.87		0.88			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	446.6	400	446.2	400	446.3		
	Back Pressure (kPa)	400		400		400			
	B-value	0.93		0.92		0.93			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	498.2	450	498.1	450	498.6		
	Back Pressure (kPa)	450		450		450			
	B-value	0.96		0.96		0.97			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.9	500	557.7	500	587.5		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.96		0.97			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

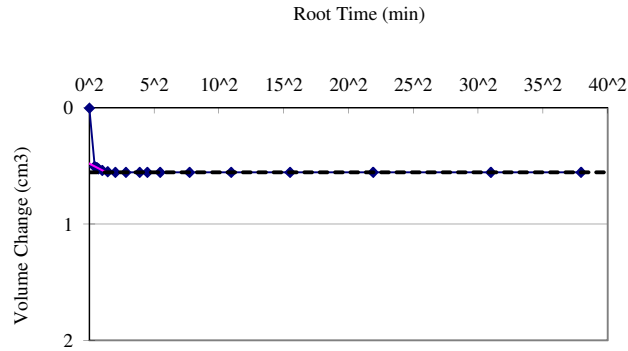
Project No.: S27-14

Borehole No.: LD-12-1

Soil Type: Clayey Sand

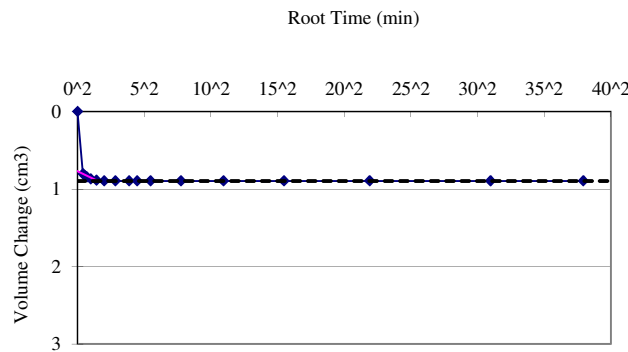
Sample No.: D-1

Depth : 5.00-5.80m



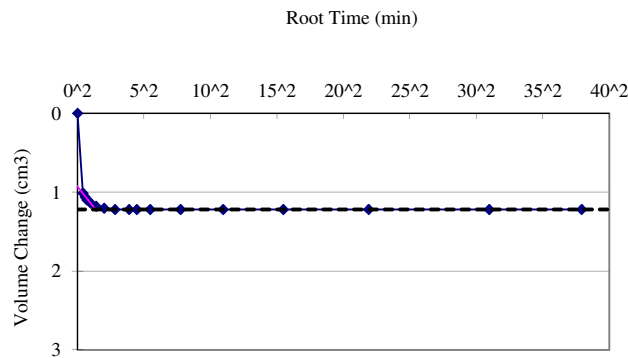
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.7$  min  
 $C_v = 614$  m<sup>2</sup>/year  
 $m_{vi} = 0.009$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 2.3$  min  
 $C_v = 444$  m<sup>2</sup>/year  
 $m_{vi} = 0.009$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 1.9$  min  
 $C_v = 542$  m<sup>2</sup>/year  
 $m_{vi} = 0.015$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 14.12.14		Tested by : Rahim		Checked by : A. B. Tan		
Borehole No.: LD-12-1		Sample No.:D-2		Depth : 8.00-8.85m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Saturated Wet Density, Mg/m <sup>3</sup>	1.95	1.95	1.95		
	Water Content, %	28.7	28.7	28.7		
	Dry Density Mg/m <sup>3</sup>	1.52	1.52	1.52		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.95	0.96	0.98		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	557	588		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.05	0.09	0.10		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	898	711	719		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.013	0.013	0.010		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	129	236	340		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-2.81	-1.73	-1.62		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	11.65	4.78	5.97		
Shear Strength Parameters	$\phi_d = 39$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at required saturated wet density = 1.95 Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

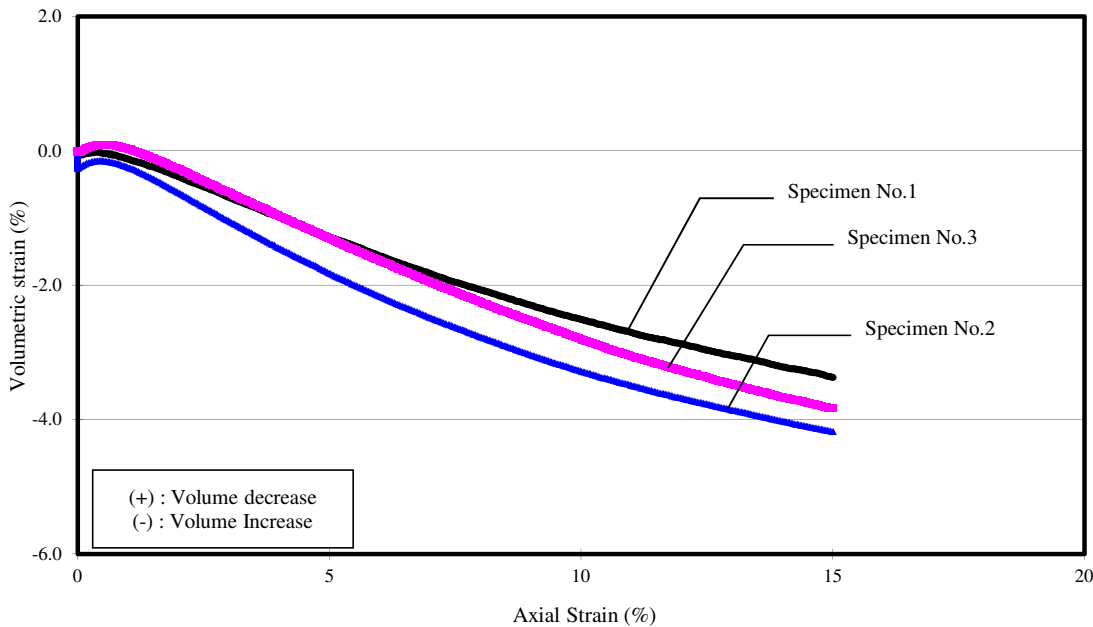
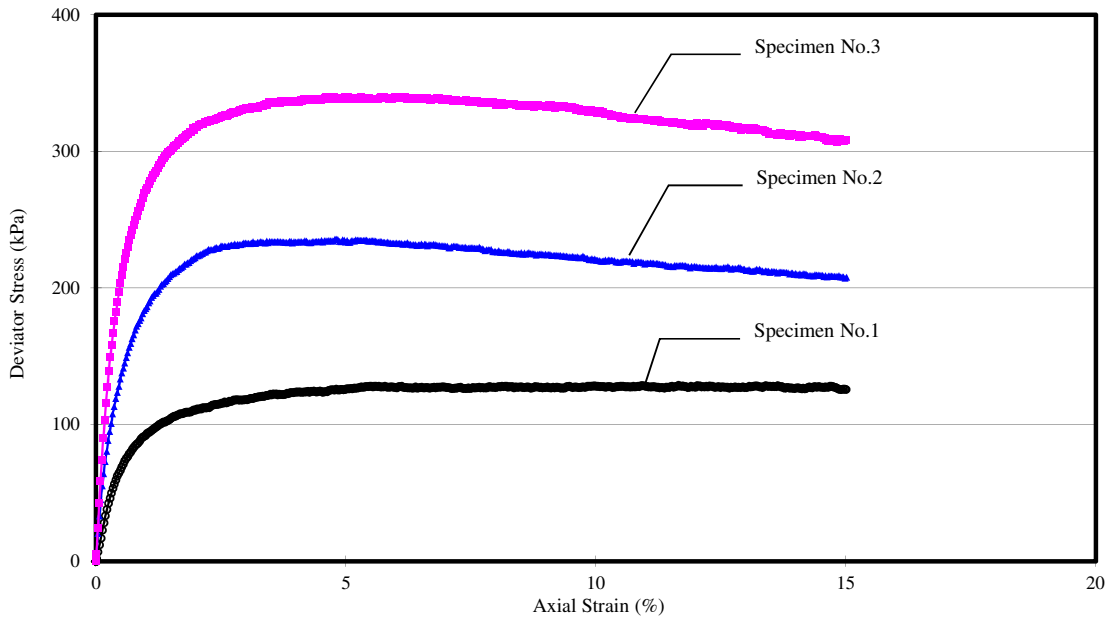
Project No.: S27-14

Sample No.: D-2

Soil Type: Sand with Clay

Borehole No.: LD-12-1

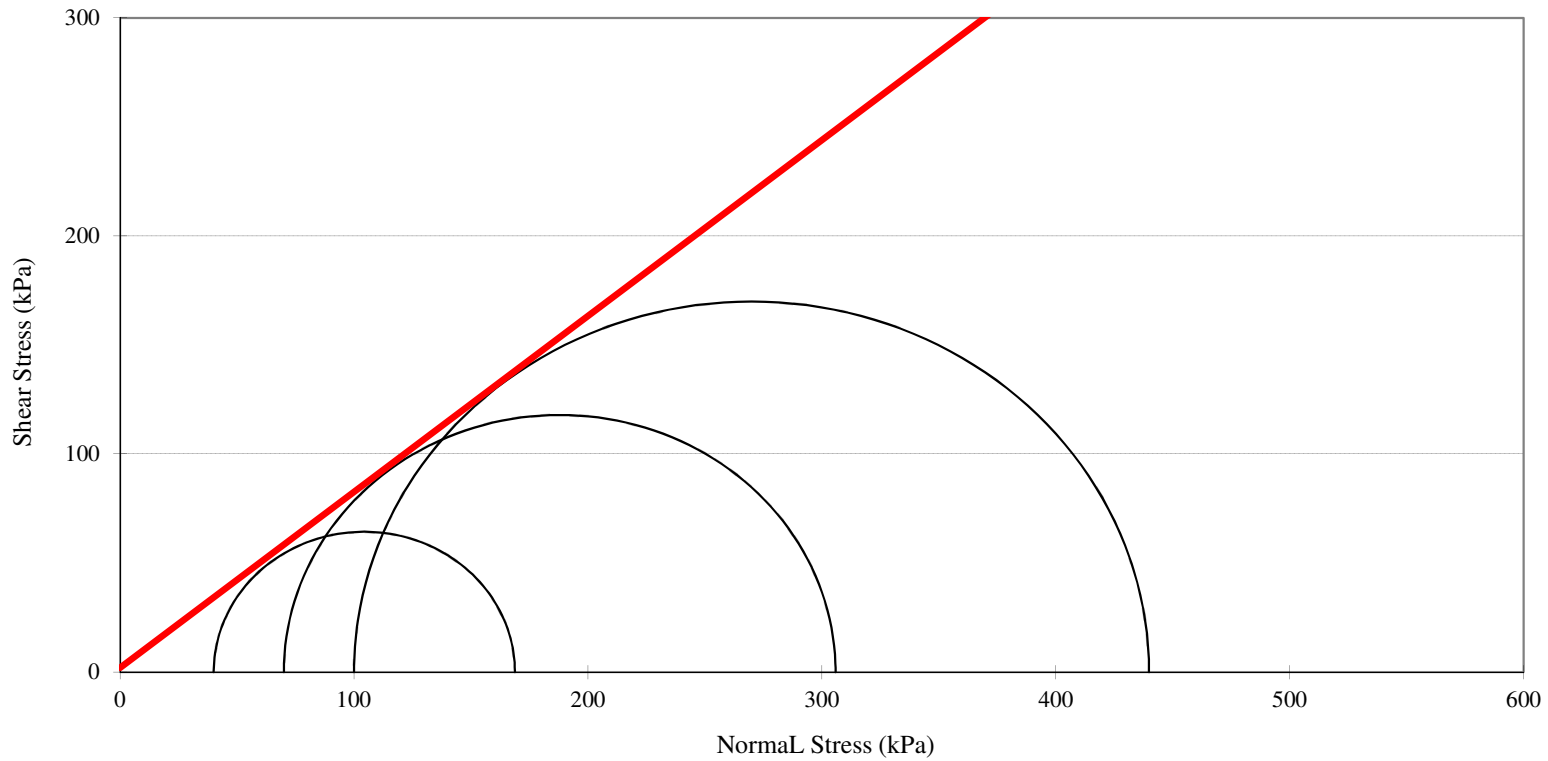
Depth : 8.00-8.85m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD-12-1      Soil Type: Sand with Clay  
 Sample No. : D-2              Depth : 8.00-8.85m  
 Angle of Internal Friction,  $\phi_d$  39 deg  
 Cohesion,  $c_d$  0 kPa





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

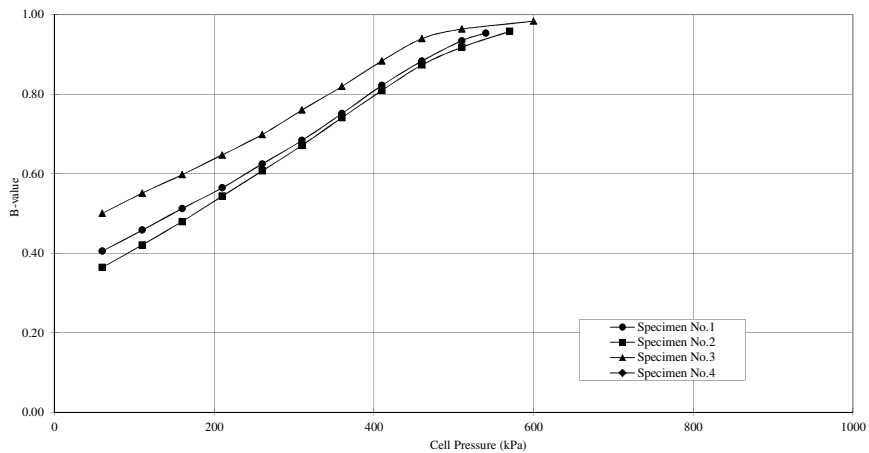
Borehole No.: LD-12-1

Sample No.: D-2

Depth : 8.00-8.85m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	32.2	20	30.9	20	35.0		
	Back Pressure (kPa)	20		20		20			
	B-value	0.41		0.36		0.50			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	72.9	50	71.0	50	77.6		
	Back Pressure (kPa)	50		50		50			
	B-value	0.46		0.42		0.55			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	125.6	100	124.0	100	129.9		
	Back Pressure (kPa)	100		100		100			
	B-value	0.51		0.48		0.60			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	178.2	150	177.2	150	182.3		
	Back Pressure (kPa)	150		150		150			
	B-value	0.56		0.54		0.65			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.2	200	230.3	200	234.9		
	Back Pressure (kPa)	200		200		200			
	B-value	0.62		0.61		0.70			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	284.2	250	283.6	250	288.0		
	Back Pressure (kPa)	250		250		250			
	B-value	0.68		0.67		0.76			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	337.6	300	337.0	300	341.0		
	Back Pressure (kPa)	300		300		300			
	B-value	0.75		0.74		0.82			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	391.1	350	390.5	350	394.2		
	Back Pressure (kPa)	350		350		350			
	B-value	0.82		0.81		0.88			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	444.1	400	443.7	400	447.0		
	Back Pressure (kPa)	400		400		400			
	B-value	0.88		0.87		0.94			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	496.7	450	495.9	450	498.2		
	Back Pressure (kPa)	450		450		450			
	B-value	0.93		0.92		0.96			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.6	500	557.5	500	588.5		
	Back Pressure (kPa)	500		500		500			
	B-value	0.95		0.96		0.98			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

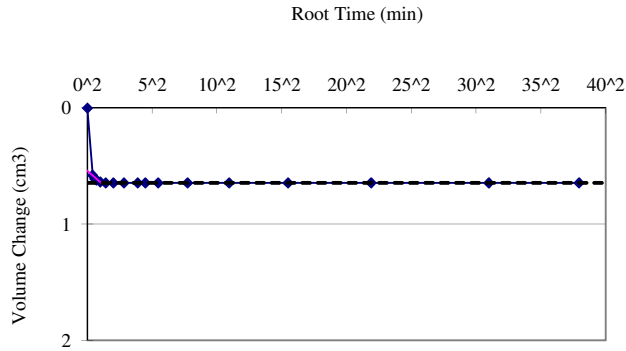
Project No.: S27-14

Borehole No.: LD-12-1

Soil Type: Sand with Clay

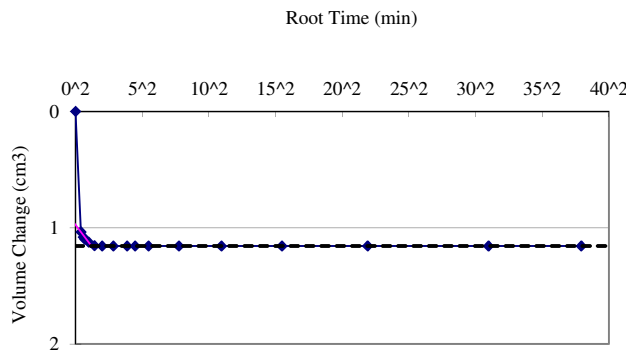
Sample No.: D-2

Depth : 8.00-8.85m



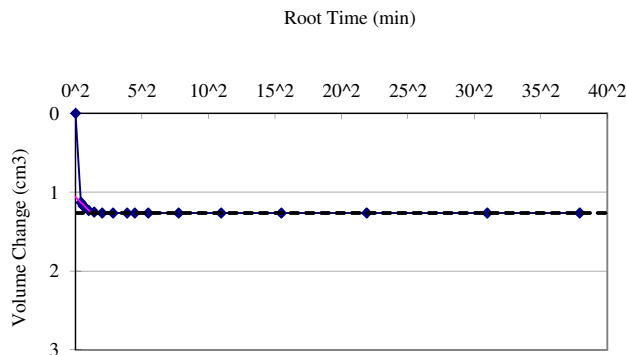
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.1$  min  
 $C_v = 898$  m<sup>2</sup>/year  
 $m_{vi} = 0.013$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 1.4$  min  
 $C_v = 711$  m<sup>2</sup>/year  
 $m_{vi} = 0.013$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 1.4$  min  
 $C_v = 719$  m<sup>2</sup>/year  
 $m_{vi} = 0.010$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 09.12.14		Tested by : Rahim		Checked by : A. B. Tan		
Borehole No.: LD-12-1		Sample No.:D-3		Depth : 11.00-11.50m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.54	1.54	1.54		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.96	0.97		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	588		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.13	0.09	0.12		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	530	474	412		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.032	0.012	0.012		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	128	222	280		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	0.67	-1.36	-0.84		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	14.58	6.92	11.98		
Shear Strength Parameters	$\phi_d = 37$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.54Mg/m <sup>3</sup>						

## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

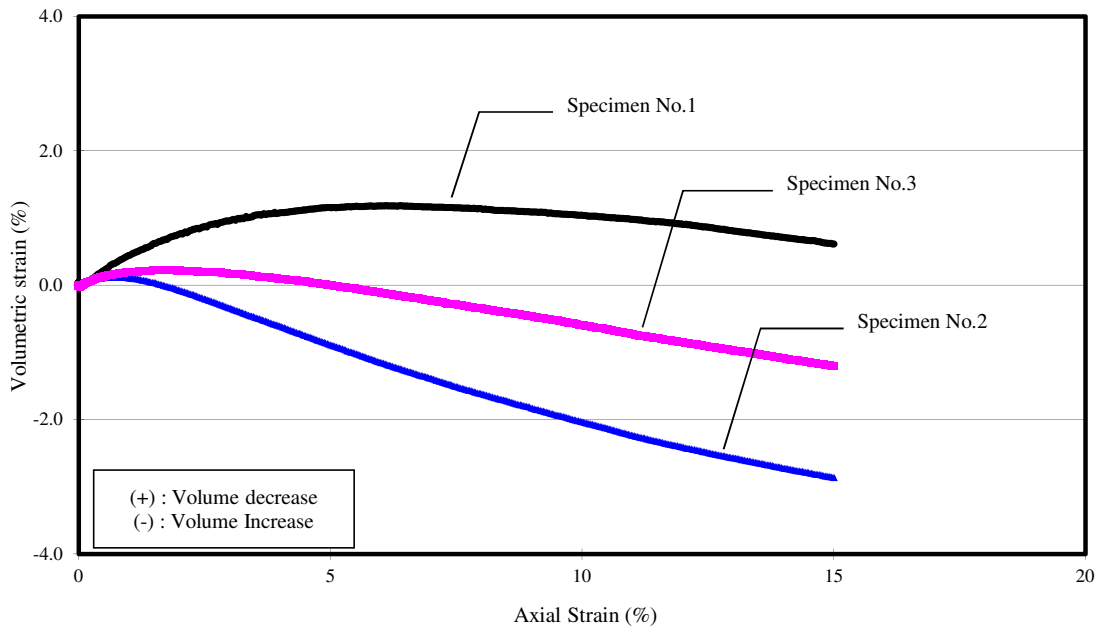
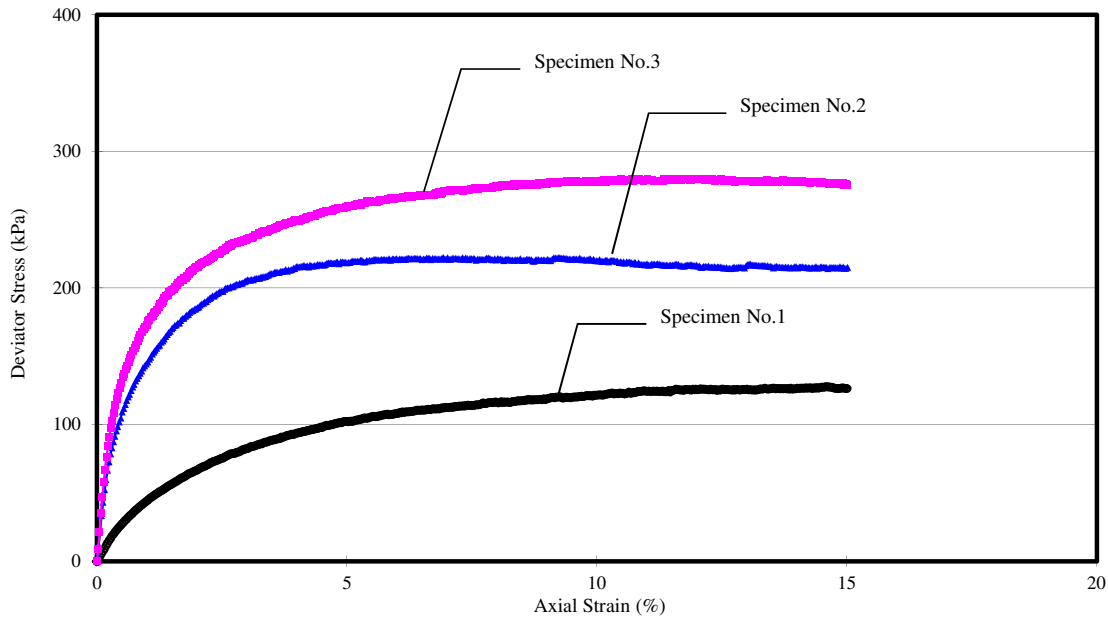
Project No.: S27-14

Sample No.: D-3

Soil Type: Sand with Clay

Borehole No.: LD-12-1

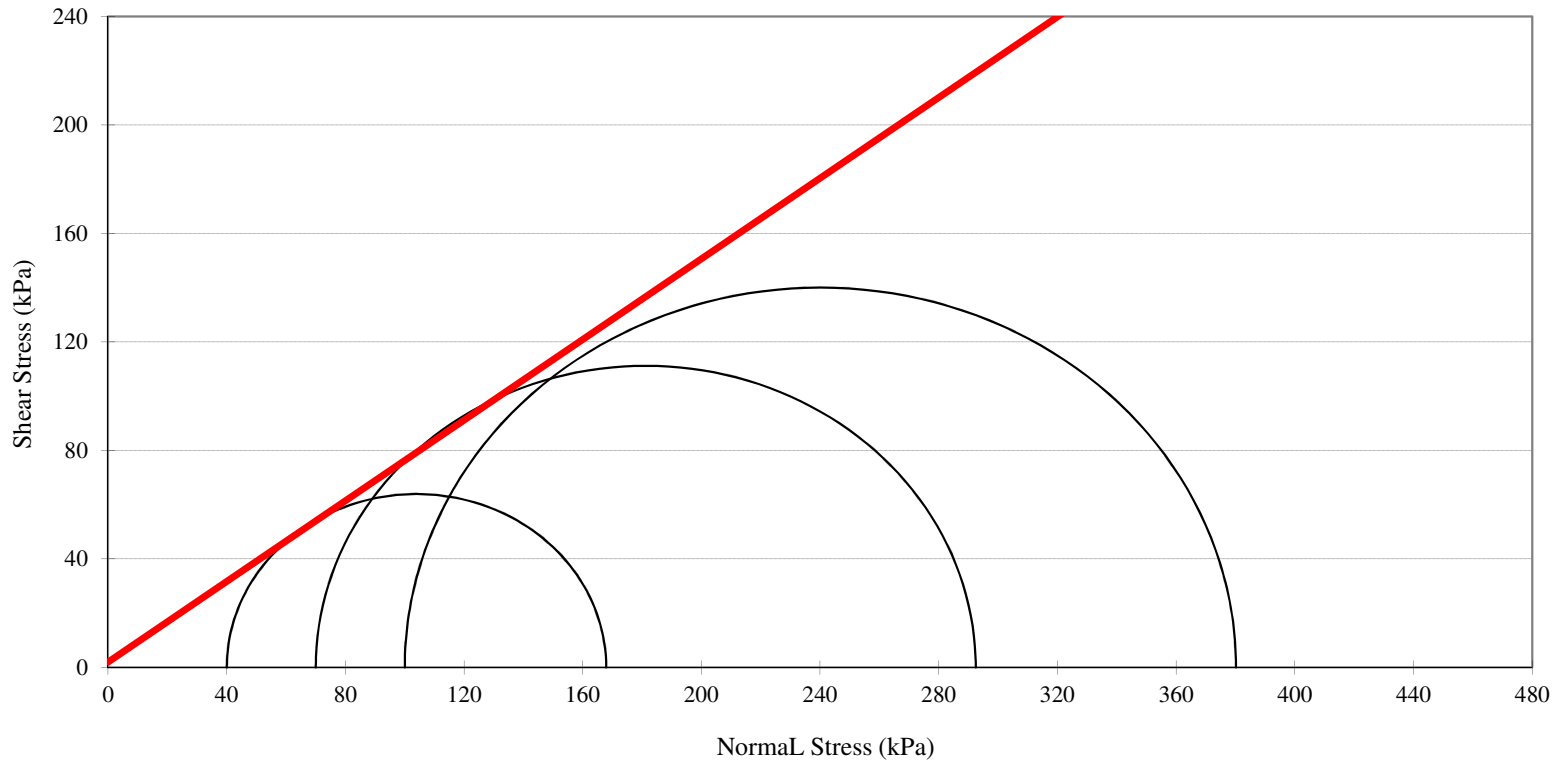
Depth : 11.00-11.50m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD-12-1      Soil Type: Sand with Clay  
 Sample No. : D-3              Depth : 11.00-11.50m  
 Angle of Internal Friction,  $\phi_d$  37 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

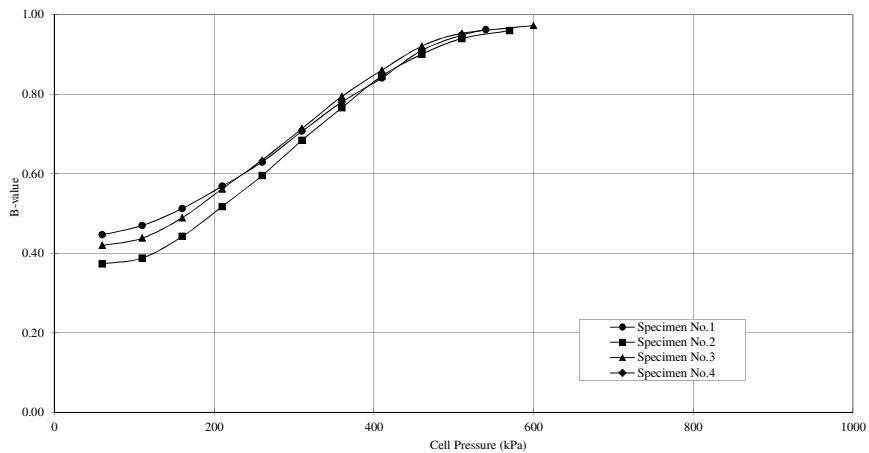
Borehole No.: LD-12-1

Sample No.: D-3

Depth : 11.00-11.50m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	33.4	20	31.2	20	32.6		
	Back Pressure (kPa)	20		20		20			
	B-value	0.45		0.37		0.42			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	73.5	50	69.4	50	71.9		
	Back Pressure (kPa)	50		50		50			
	B-value	0.47		0.39		0.44			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	125.6	100	122.1	100	124.5		
	Back Pressure (kPa)	100		100		100			
	B-value	0.51		0.44		0.49			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	178.4	150	175.9	150	178.1		
	Back Pressure (kPa)	150		150		150			
	B-value	0.57		0.52		0.56			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.5	200	229.8	200	231.7		
	Back Pressure (kPa)	200		200		200			
	B-value	0.63		0.60		0.63			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	285.3	250	284.2	250	285.7		
	Back Pressure (kPa)	250		250		250			
	B-value	0.71		0.68		0.71			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	339.0	300	338.3	300	339.7		
	Back Pressure (kPa)	300		300		300			
	B-value	0.78		0.77		0.79			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	392.0	350	392.3	350	393.0		
	Back Pressure (kPa)	350		350		350			
	B-value	0.84		0.85		0.86			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.5	400	445.0	400	446.0		
	Back Pressure (kPa)	400		400		400			
	B-value	0.91		0.90		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.4	450	497.0	450	497.6		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.94		0.95			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.9	500	557.6	500	587.5		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.96		0.97			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

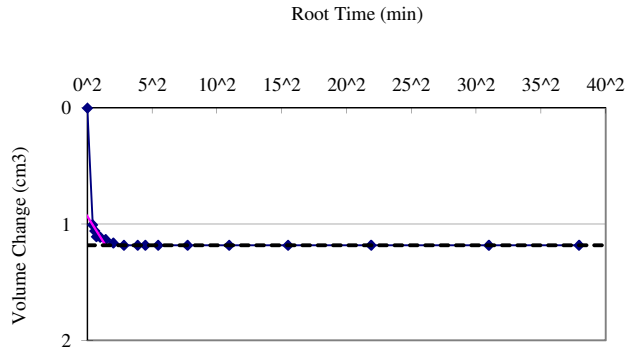
Project No.: S27-14

Borehole No.: LD-12-1

Soil Type: Sand with Clay

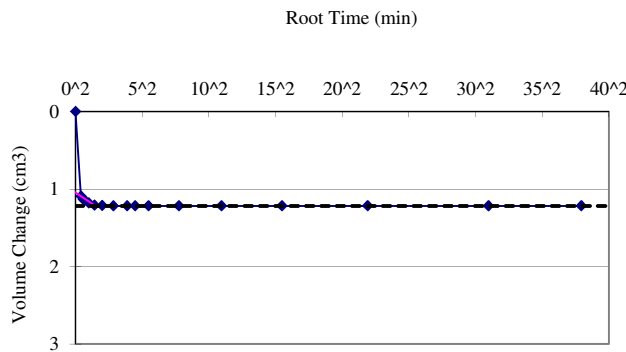
Sample No.: D-3

Depth : 11.00-11.50m



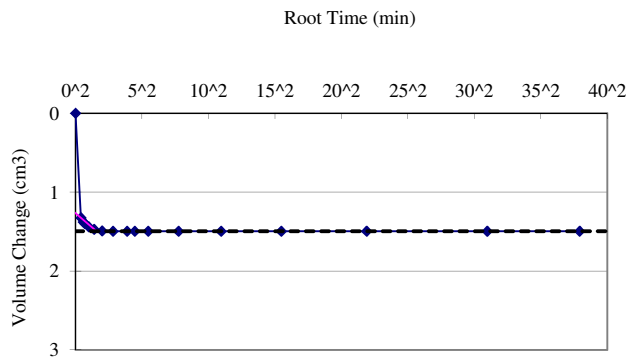
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.9$  min  
 $C_v = 530$  m<sup>2</sup>/year  
 $m_{vi} = 0.032$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 2.2$  min  
 $C_v = 474$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 2.5$  min  
 $C_v = 412$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 10.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD-12-1		Sample No.:D-5		Depth : 17.00-17.60m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.53	1.53	1.53		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.95	0.96	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	528	558	586		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.04	0.10	0.17		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	497	399	336		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.011	0.015	0.017		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	174	252	384		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-2.26	-1.56	-1.04		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	6.25	6.94	5.36		
Shear Strength Parameters	$\phi_d = 41$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.53Mg/m <sup>3</sup>						



### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

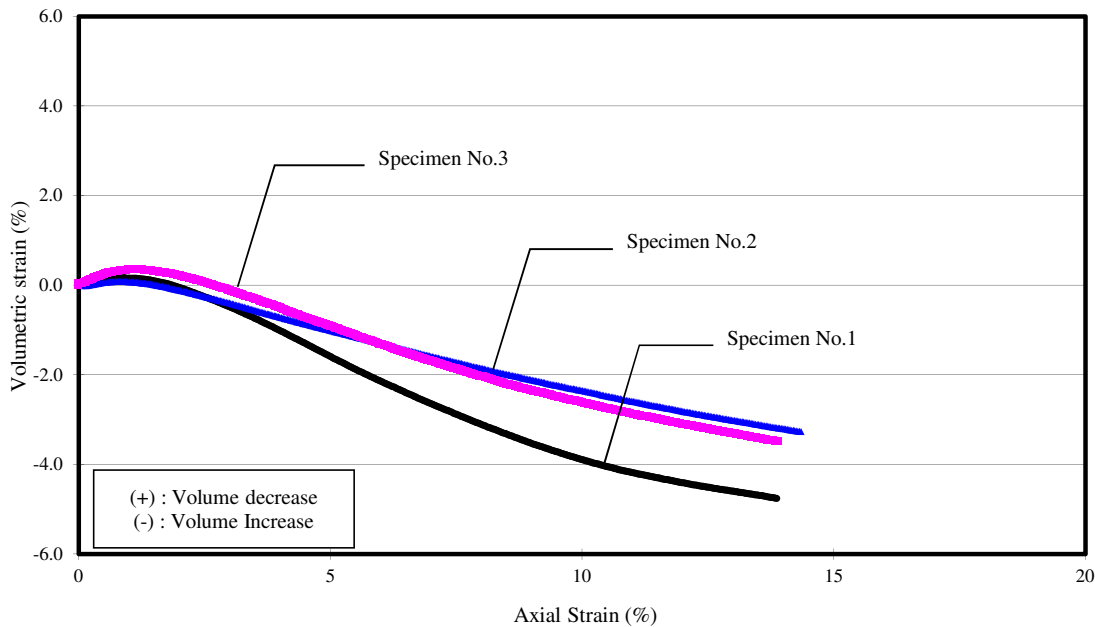
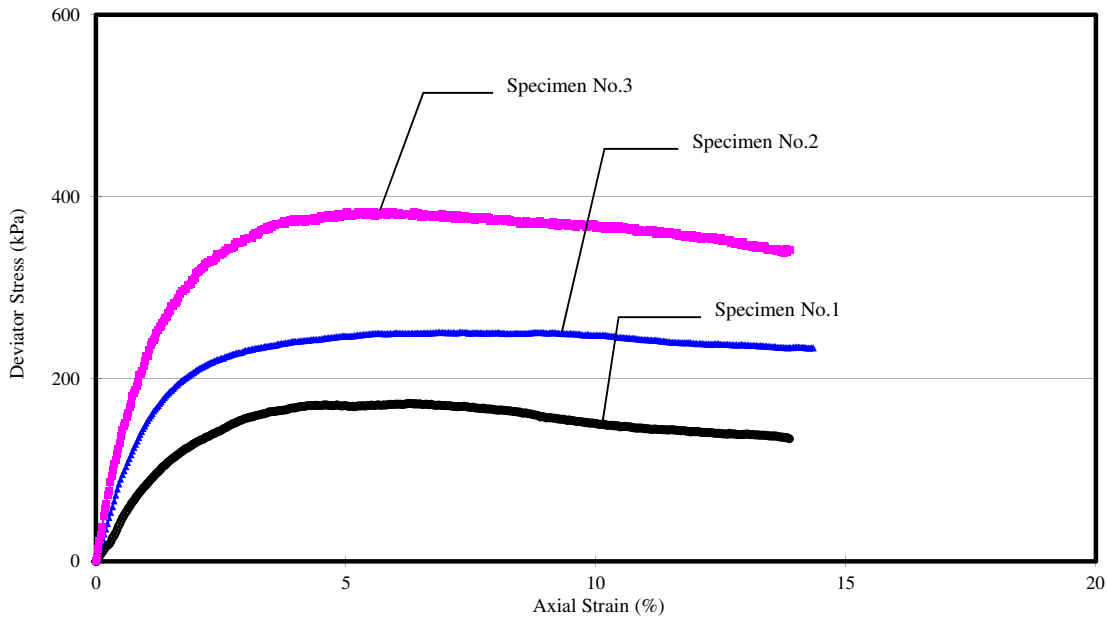
Project No.: S27-14

Sample No.: D-5

Soil Type: Sand with Clay

Borehole No.: LD-12-1

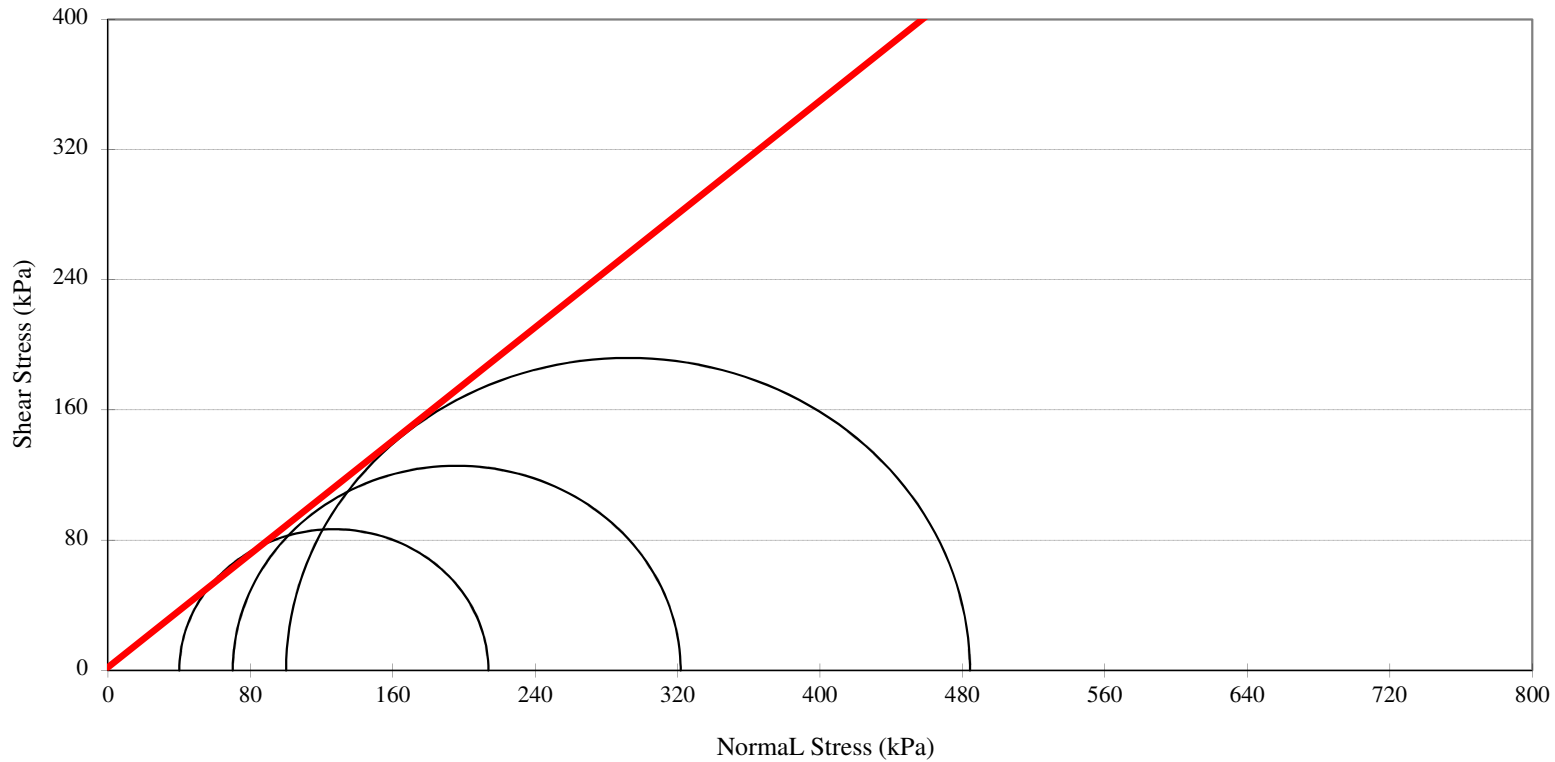
Depth : 17.00-17.60mm



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD-12-1      Soil Type: Sand with Clay  
 Sample No. : D-5              Depth : 17.00-17.60m  
 Angle of Internal Friction,  $\phi_d$  41 deg  
 Cohesion,  $c_d$  0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

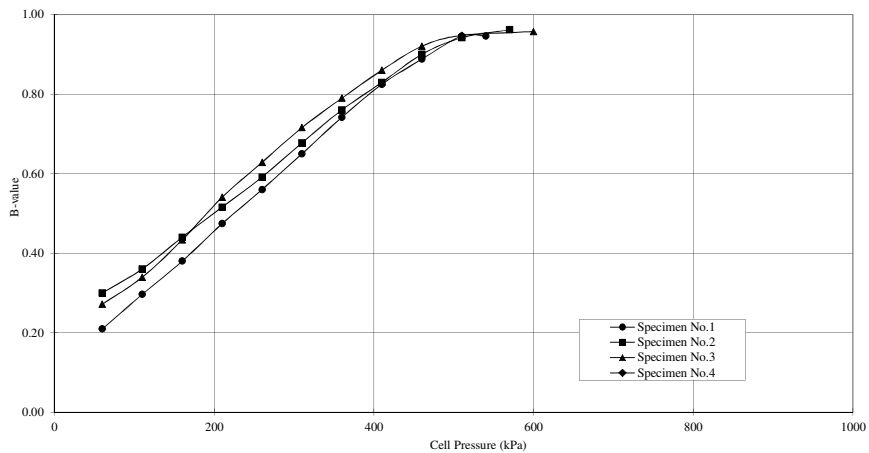
Borehole No.: LD-12-1

Sample No.: D-5

Depth : 17.00-17.60m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	26.3	20	29.0	20	28.1		
	Back Pressure (kPa)	20		20		20			
	B-value	0.21		0.30		0.27			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	64.8	50	68.0	50	67.0		
	Back Pressure (kPa)	50		50		50			
	B-value	0.30		0.36		0.34			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	119.0	100	122.0	100	121.7		
	Back Pressure (kPa)	100		100		100			
	B-value	0.38		0.44		0.43			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	173.7	150	175.8	150	177.0		
	Back Pressure (kPa)	150		150		150			
	B-value	0.47		0.52		0.54			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	228.0	200	229.6	200	231.4		
	Back Pressure (kPa)	200		200		200			
	B-value	0.56		0.59		0.63			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	282.5	250	283.9	250	285.8		
	Back Pressure (kPa)	250		250		250			
	B-value	0.65		0.68		0.72			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	337.1	300	338.0	300	339.5		
	Back Pressure (kPa)	300		300		300			
	B-value	0.74		0.76		0.79			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	391.2	350	391.5	350	393.0		
	Back Pressure (kPa)	350		350		350			
	B-value	0.82		0.83		0.86			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	444.4	400	445.0	400	446.0		
	Back Pressure (kPa)	400		400		400			
	B-value	0.89		0.90		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.3	450	497.1	450	497.4		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.94		0.95			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.4	500	557.7	500	586.2		
	Back Pressure (kPa)	500		500		500			
	B-value	0.95		0.96		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

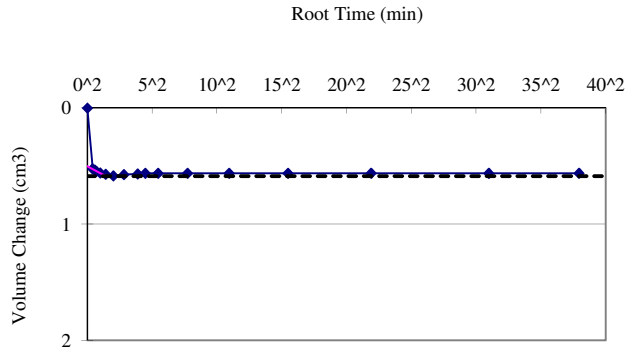
Project No.: S27-14

Borehole No.: LD-12-1

Soil Type: Sand with Clay

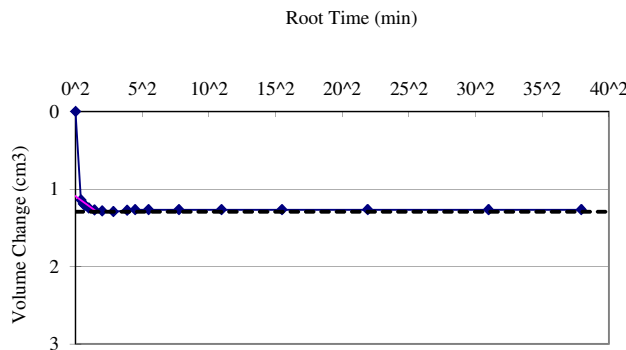
Sample No.: D-5

Depth : 17.00-17.60m



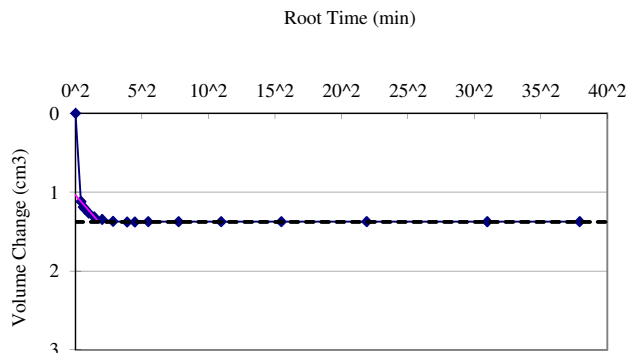
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 2.1$  min  
 $C_v = 497$  m<sup>2</sup>/year  
 $m_{vi} = 0.011$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 2.6$  min  
 $C_v = 399$  m<sup>2</sup>/year  
 $m_{vi} = 0.015$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.1$  min  
 $C_v = 336$  m<sup>2</sup>/year  
 $m_{vi} = 0.017$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 5-Dec-14

Tested by : Perera/Bala

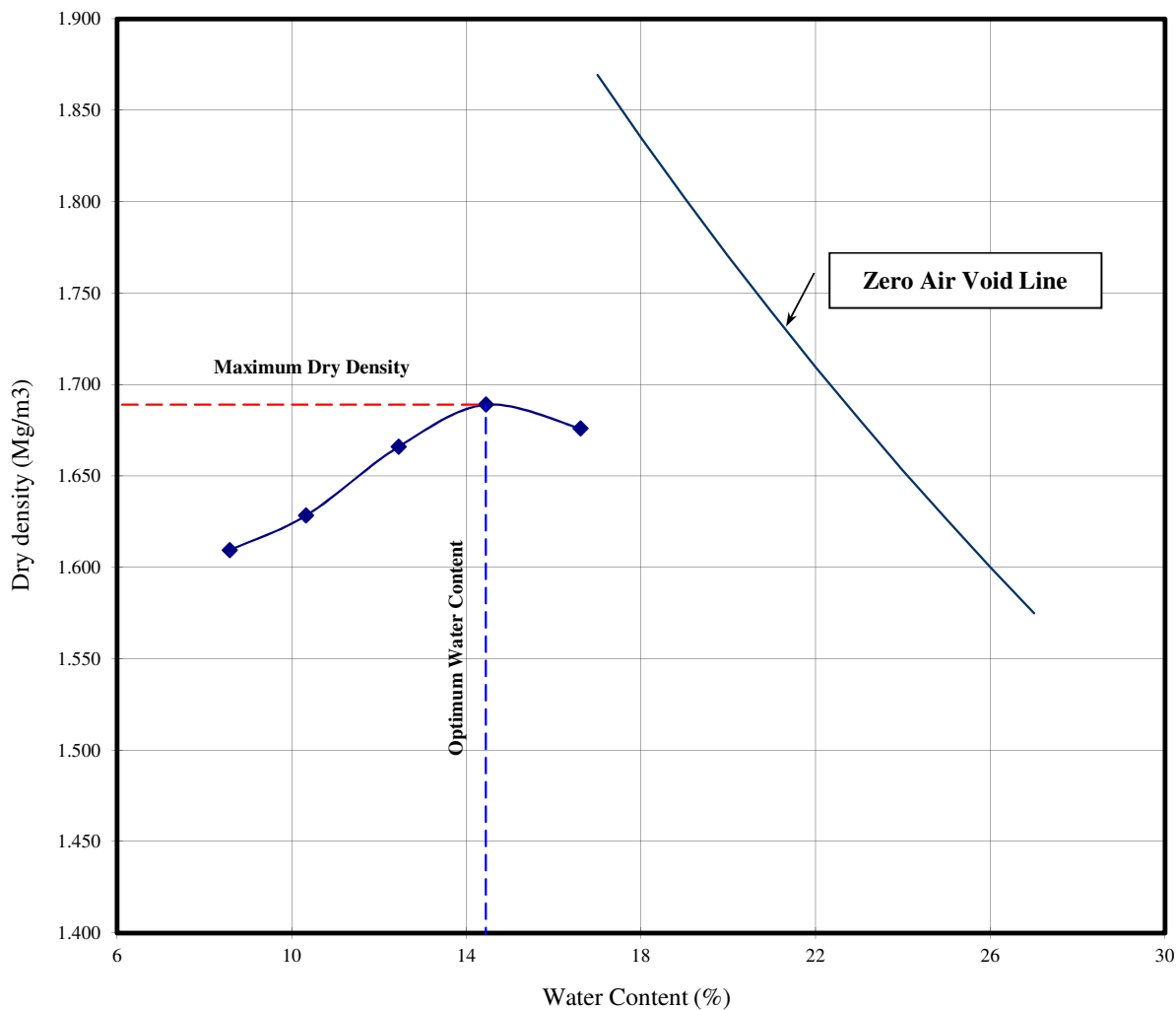
Sample No. : LD-12-1 D-1(5.00-5.80m)

Ref. No. : -

Soil Type :	Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	8.6	10.3	12.4	14.4	16.6			
Wet Density (Mg/m <sup>3</sup> )	1.748	1.797	1.873	1.933	1.954			
Dry Density (Mg/m <sup>3</sup> )	1.609	1.628	1.666	1.689	1.676			

<b>Maximum Dry Density</b>	<b>1.689 Mg/m<sup>3</sup></b>
<b>Optimum Water Content</b>	<b>14.4 %</b>



## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 5-Dec-14

Tested by : Perera/Bala

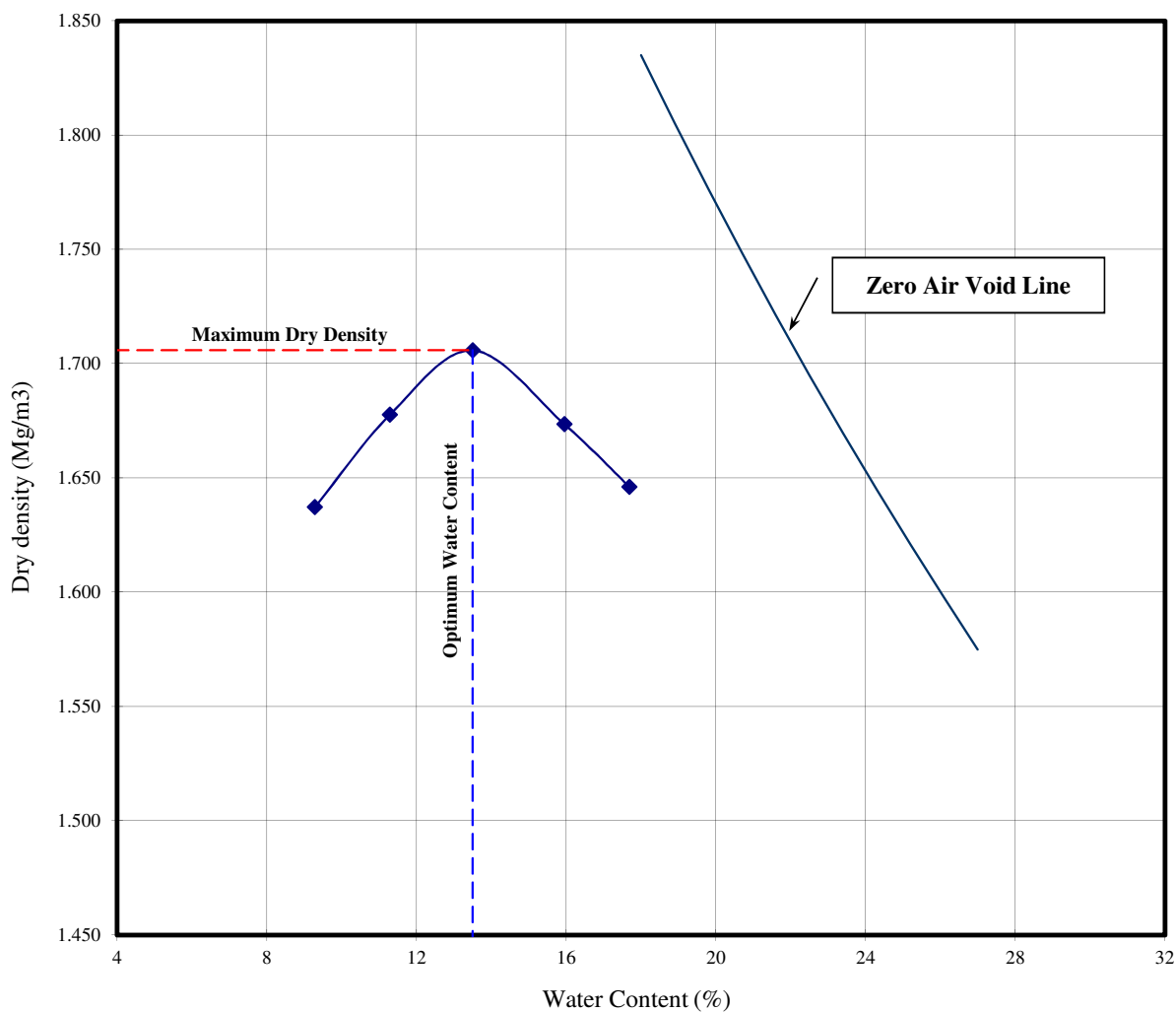
Sample No. : LD-12-1 D-3(11.00-11.50m)

Ref. No. -

Soil Type :	Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.3	11.3	13.5	16.0	17.7			
Wet Density (Mg/m <sup>3</sup> )	1.789	1.867	1.936	1.940	1.937			
Dry Density (Mg/m <sup>3</sup> )	1.637	1.678	1.706	1.673	1.646			

<b>Maximum Dry Density</b>	<b>1.706 Mg/m<sup>3</sup></b>
<b>Optimum Water Content</b>	<b>13.5 %</b>



## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 6-Dec-14

Tested by : Perera/Bala

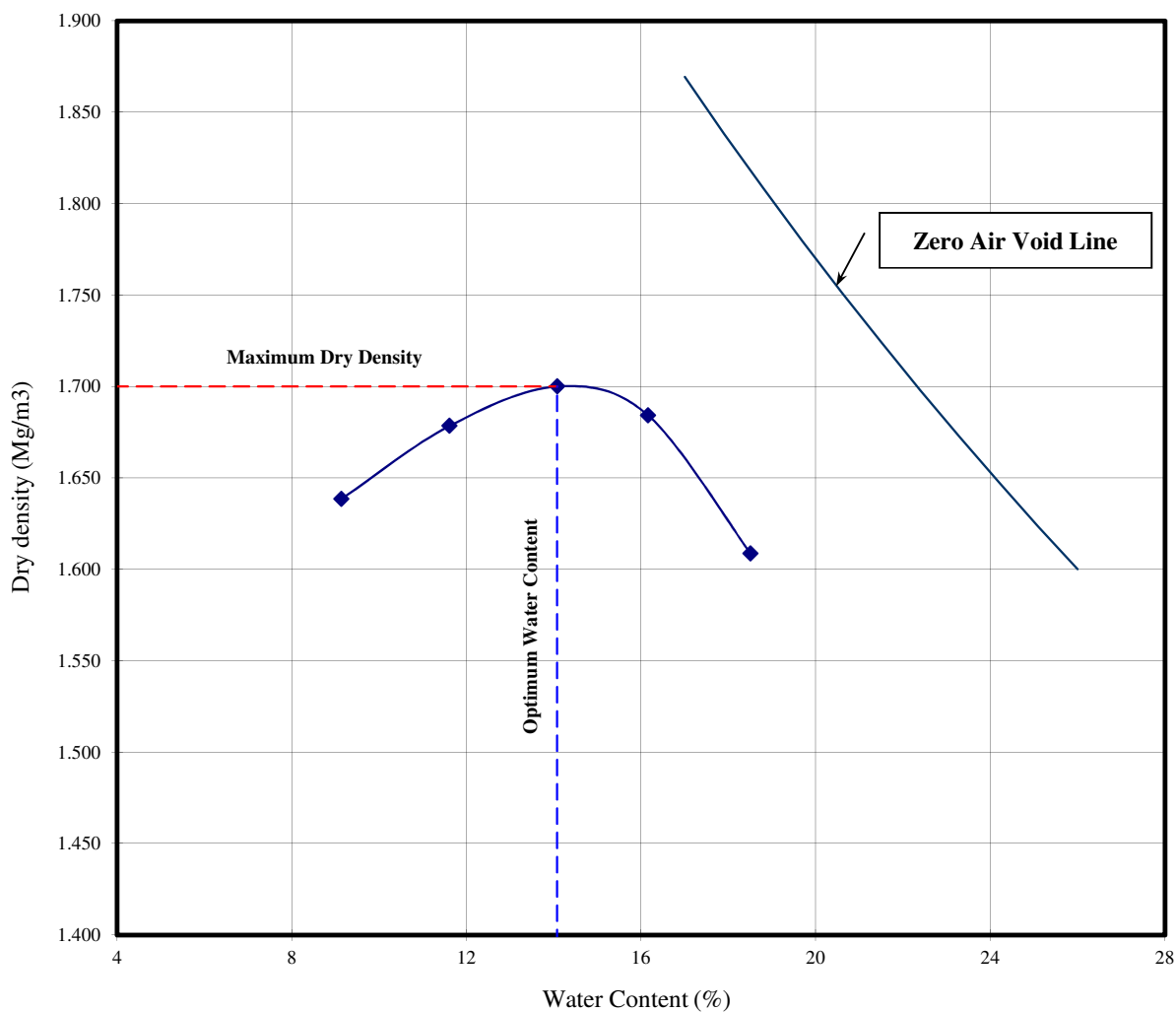
Sample No. : LD-12-1 D-5(17.00-17.60m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.1	11.6	14.1	16.2	18.5			
Wet Density (Mg/m <sup>3</sup> )	1.788	1.873	1.939	1.956	1.906			
Dry Density (Mg/m <sup>3</sup> )	1.638	1.678	1.700	1.684	1.609			

Maximum Dry Density	1.700 Mg/m <sup>3</sup>
Optimum Water Content	14.1 %



17) LD2-10a-1



**TABLE SUMMARY OF SOIL TEST**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Standard: ASTM

Borehole No.		LD2-10a-1								
Sample No.		HP-1	HP-2	D-1	D-2	D-3	D-4			
Sample Depth		2.00m ~2.85m	5.00m ~5.90m	8.00m ~8.85m	11.00m ~11.80m	16.00m ~16.90m	19.00m ~19.80m			
Condition of Sample		Undisturbed			Undisturbed					
Natural Water Content	%	36.9	27.0	26.7	22.9	29.5	26.9			
Specific Gravity		2.72	2.71	2.71	2.68	2.71	2.70			
Wet Density	Mg/m <sup>3</sup>	1.84	1.95	1.94	2.00	1.90	1.97			
Dry Density	Mg/m <sup>3</sup>	1.34	1.53	-	-	-	-			
Natural Void Ratio		1.03	0.77	-	-	-	-			
Degree of Saturation	%	98	95	-	-	-	-			
Atterberg Limits	Liquid Limit,	%	39	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	33	- * <sup>3</sup>		
	Plastic Limit,	%	22	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	20	- * <sup>3</sup>		
	Plasticity Index,	%	17	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	13	- * <sup>3</sup>		
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0		
	Sand,	%	12	24	38	81	14	33		
	Silt,	%	53	51	38	7	50	43		
	Clay & Colloid,	%	35	25	24	12	36	24		
	Max. diameter,	mm	0.850	0.850	0.850	2.00	0.850	0.850		
	Diam. at 60%	mm	0.020	0.047	0.072	0.24	0.017	0.060		
	Diam. at 10%	mm	-	-	-	0.0014	-	-		
Visual soil description		Clay	Clay with Sand	Sandy Clay	Clayey Sand	Clay	Sandy Clay			
Unified soil classification		CL	-	-	-	CL	-			
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-	-	-		
	Cohesion Intercept, kPa		-	-	-	-	-	-		
	Condition of drainage		-	-	-	-	-	-		
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	-	-	-		
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	-	-	-		
	Condition of drainage		-	-	-	-	-	-		
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-	-	-		
	Compression Index(Average)		-	-	-	-	-	-		
	Pressure Range for Compression Index(kPa)		-	-	-	-	-	-		
	Swell index		-	-	-	-	-	-		
Chemical Test	pH value		-	-	-	-	-	-		
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-	-	-		
	Chloride content as Cl,	%	-	-	-	-	-	-		
	Organic Matter content,	%	-	-	-	-	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-			
Strain at failure (%)		-	-	-	-	-	-			

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

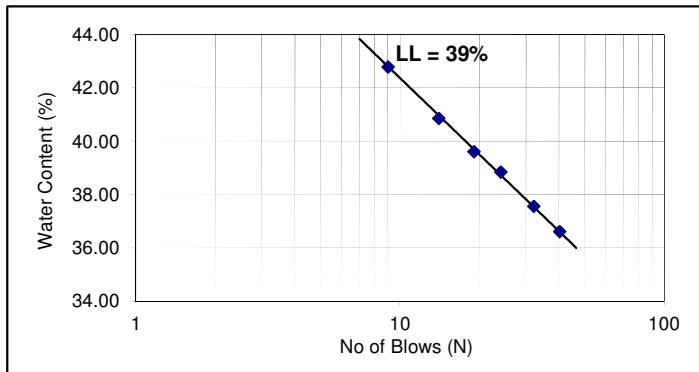
### ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 11.10.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : LD2-10a-1 HP-1 Depth : 2.00-2.85m

Remarks : Tested on material at natural state

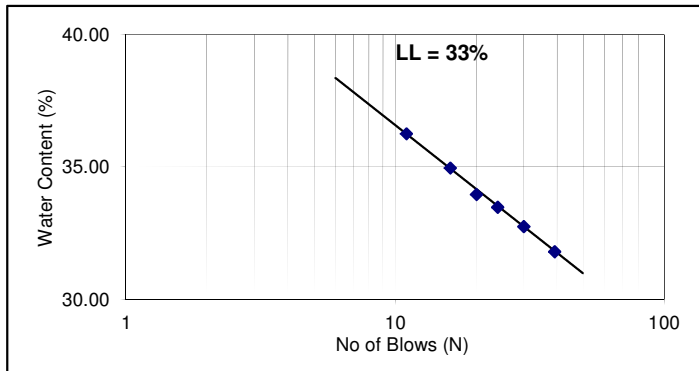
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	40	36.61
2	32	37.56
3	24	38.84
4	19	39.60
5	14	40.85
6	9	42.78
<b>Liquid Limits %</b>		<b>39</b>
<b>Plastic Limits %</b>		<b>22</b>
<b>Plasticity Index</b>		<b>17</b>



Sample No. : LD2-10a-1 D-3 Depth : 16.00-16.90m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	39	31.80
2	30	32.76
3	24	33.48
4	20	33.96
5	16	34.96
6	11	36.26
<b>Liquid Limits %</b>		<b>33</b>
<b>Plastic Limits %</b>		<b>20</b>
<b>Plasticity Index</b>		<b>13</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

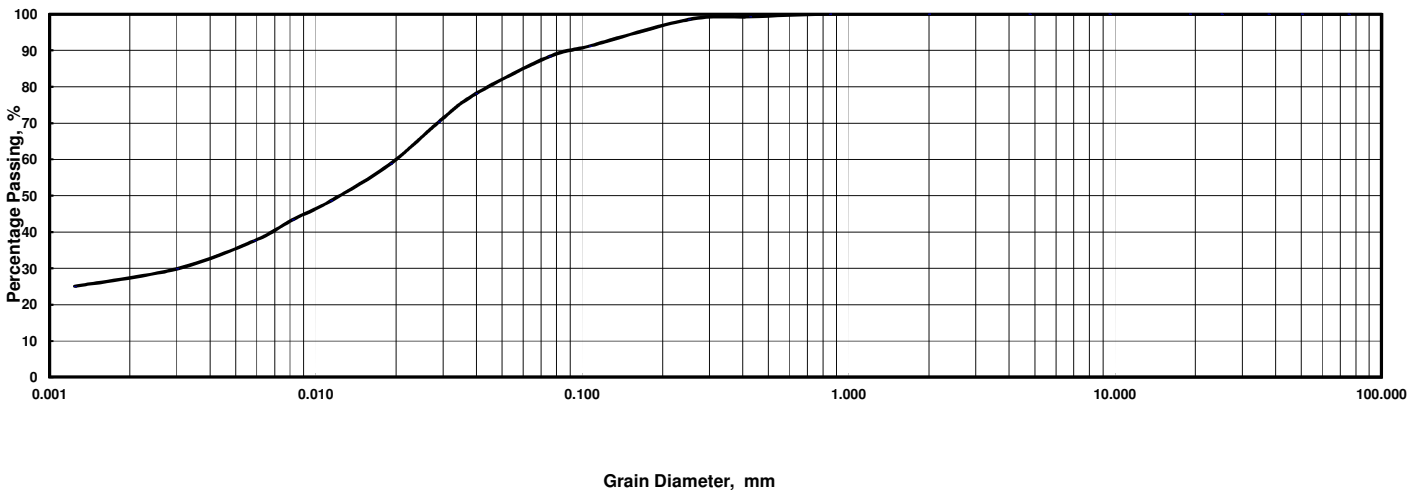
Sample No. : LD2-10a-1 HP-1 Depth : 2.00-2.85m ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	98.5	91.2	88.3
Hydro.	Dia., mm	0.040	0.029	0.019	0.011	0.0082	0.0059	0.0030	0.0012							
	% Passing	78.1	70.4	58.8	48.6	43.4	37.6	29.9	25.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



CLAY	0.005	0.075	0.425	2.00	4.75	19.0	75.0
	SILT		FINE SAND		MEDIUM SAND		GRAVEL

Sample No.	LD2-10a-1 HP-1	Sample No.	LD2-10a-1 HP-1
Depth	2.00-2.85m	Depth	2.00-2.85m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.020 mm
2.00 - 0.425 mm	0.7 %	Dia. at 30%	0.0030 mm
0.425 - 0.075 mm	11.0 %	Dia. at 10%	- mm
0.075 - 0.005 mm	53.1 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	35.3 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	88.3 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14 Tested By : Hin/Motiur Checked by : A. B. Tan

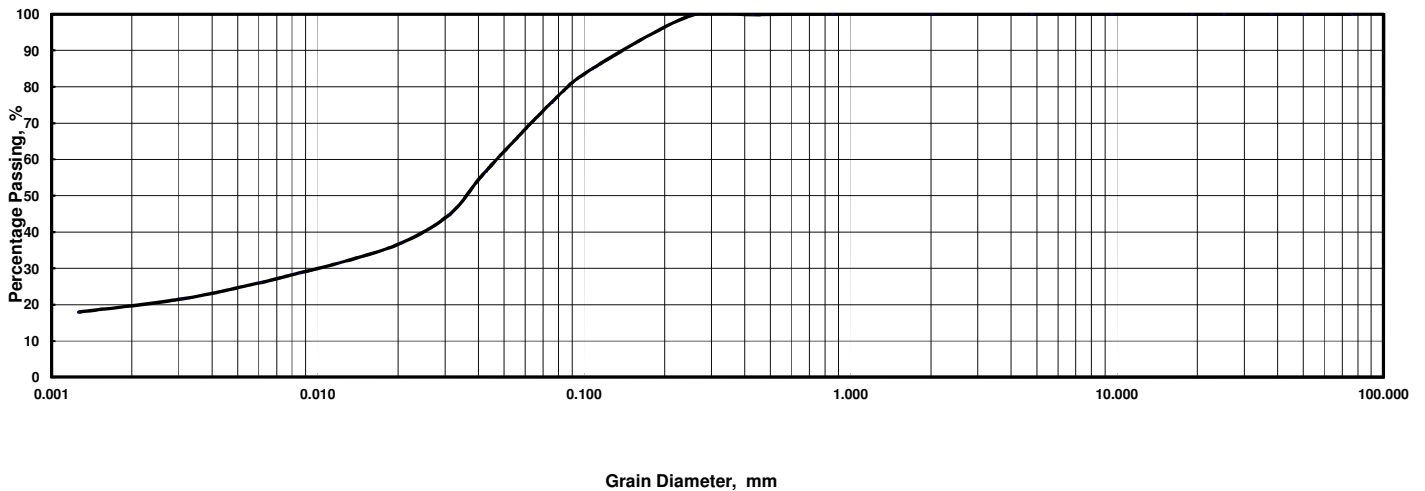
Sample No. : LD2-10a-1 HP-2 Depth : 5.00-5.90m ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.5	84.8	75.6
Hydro.	Dia., mm	0.042	0.031	0.020	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	56.6	44.9	36.8	31.4	28.7	26.1	21.6	18.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-10a-1 HP-2		Sample No.	LD2-10a-1 HP-2	
Depth	5.00-5.90m		Depth	5.00-5.90m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.047 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.010 mm	
0.425 - 0.075 mm	24.2 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	51.1 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	24.5 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	75.6 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

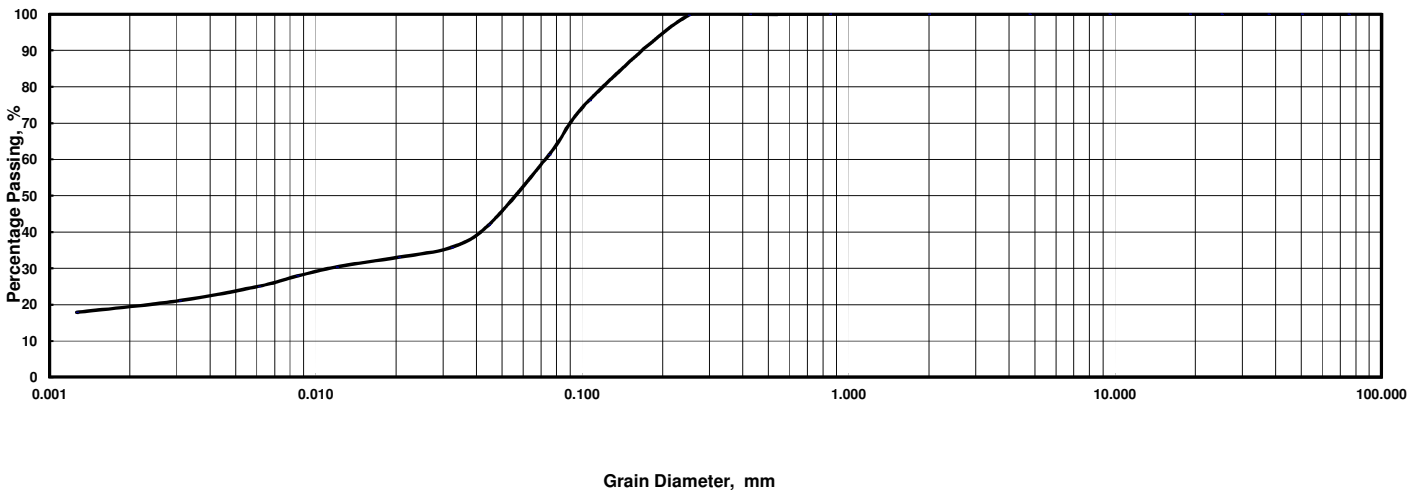
Sample No. : LD2-10a-1 D-1 Depth : 8.00-8.85m ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	76.3	61.3
Hydro.	Dia., mm	0.045	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	42.0	35.8	33.1	30.4	27.9	25.0	21.1	17.9							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-10a-1 D-1		Sample No.	LD2-10a-1 D-1	
Depth	8.00-8.85m		Depth	8.00-8.85m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.072 mm	
2.00 - 0.425 mm	0.1 %		Dia. at 30%	0.011 mm	
0.425 - 0.075 mm	38.5 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	37.7 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.6 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	61.3 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

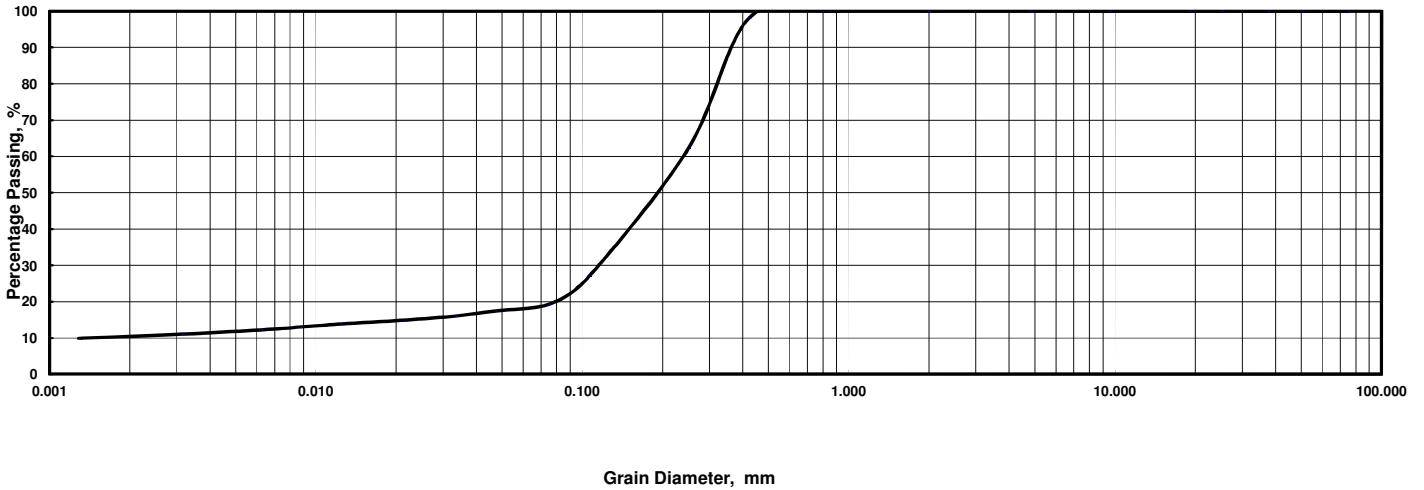
Sample No. : LD2-10a-1 D-2 Depth : 11.00-11.80m ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	98.3	62.2	27.0	19.3
Hydro.	Dia., mm	0.047	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	17.5	16.1	14.9	13.8	13.0	12.2	11.1	9.9							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-10a-1 D-2		Sample No.	LD2-10a-1 D-2	
Depth	11.00-11.80m		Depth	11.00-11.80m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.24	mm
2.00 - 0.425 mm	1.7	%	Dia. at 30%	0.11	mm
0.425 - 0.075 mm	79.0	%	Dia. at 10%	0.0014	mm
0.075 - 0.005 mm	7.6	%	Coeff. of Uniformity	169	
Smaller than 0.005 mm	11.8	%	Coeff. of Curvature	39.2	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.9	%			
75um Sieve Passing	19.3	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

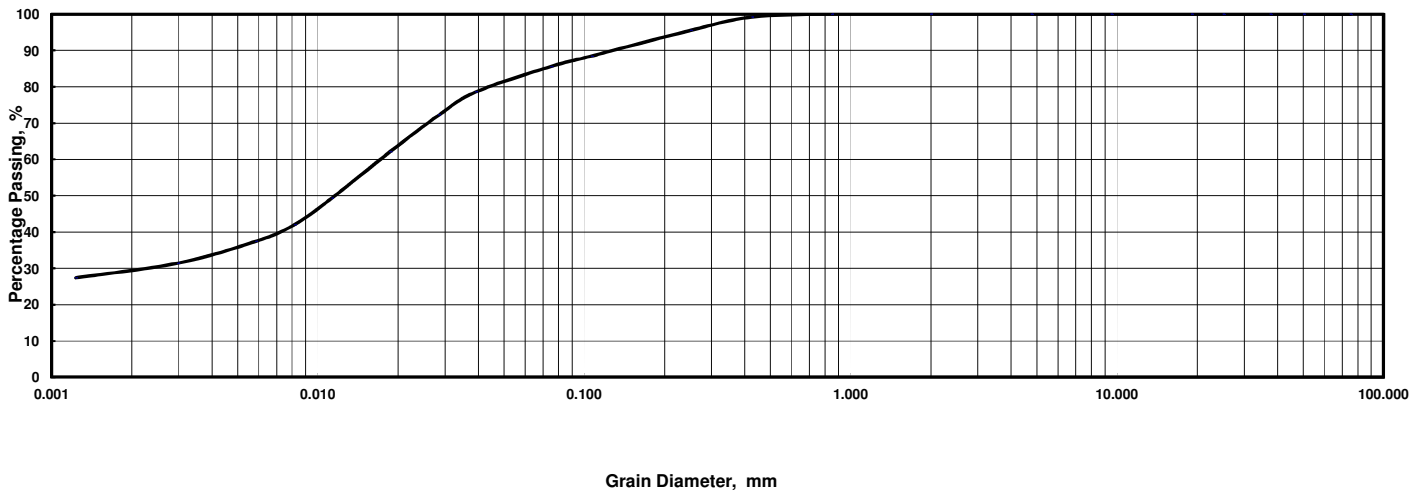
Sample No. : LD2-10a-1 D-3 Depth : 16.00-16.90m ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	95.5	88.4	85.6
Hydro.	Dia., mm	0.039	0.028	0.019	0.011	0.0082	0.0059	0.0030	0.0012							
	% Passing	78.6	72.2	62.1	49.3	42.0	37.5	31.4	27.4							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-10a-1 D-3		Sample No.	LD2-10a-1 D-3
Depth	16.00-16.90m		Depth	16.00-16.90m
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.017 mm
2.00 - 0.425 mm	0.8 %		Dia. at 30%	0.0022 mm
0.425 - 0.075 mm	13.6 %		Dia. at 10%	- mm
0.075 - 0.005 mm	49.9 %		Coeff. of Uniformity	-
Smaller than 0.005 mm	35.7 %		Coeff. of Curvature	-
2000um Sieve Passing	100.0 %			
425um Sieve Passing	100.0 %			
75um Sieve Passing	85.6 %			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14

Tested By : Hin/Motiur

Checked by : A. B. Tan

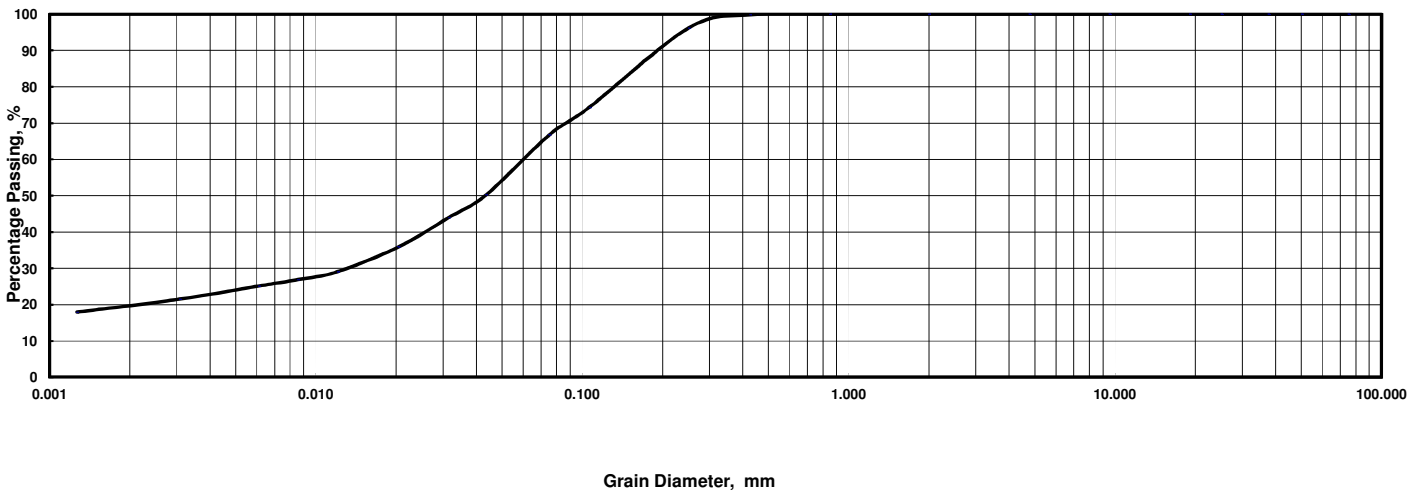
Sample No. : LD2-10a-1 D-4 Depth : 19.00-19.80m ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	96.1	74.3	66.7
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	50.2	44.0	35.9	29.1	26.9	25.1	21.5	17.9							

Sample No. : \_\_\_\_\_ Depth : ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

Grain Size Distribution Curves



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-10a-1 D-4		Sample No.	LD2-10a-1 D-4	
Depth	19.00-19.80m		Depth	19.00-19.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.850 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.060 mm	
2.00 - 0.425 mm	0.2 %		Dia. at 30%	0.013 mm	
0.425 - 0.075 mm	33.1 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	42.9 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.8 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	66.7 %				





18) LD2-11-1







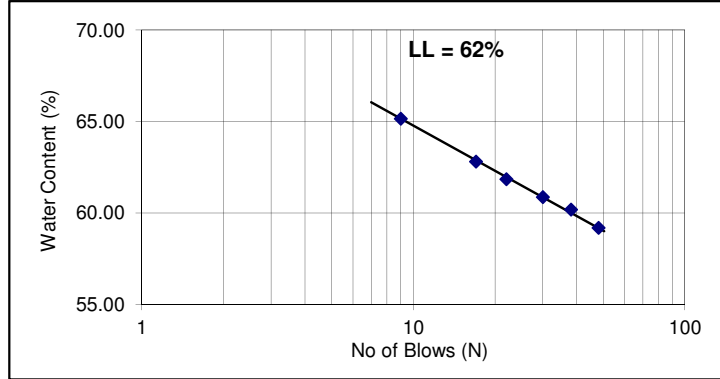
## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 20.10.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : LD2-11-1 HP-1 Depth : 2.00-2.80m

Remarks : Tested on material at natural state

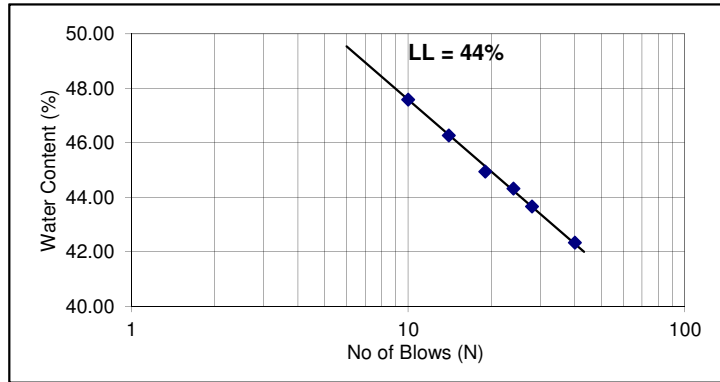
Liquid Limits Test		
Test No.	Blows	Wn
1	48	59.18
2	38	60.17
3	30	60.86
4	22	61.84
5	17	62.79
6	9	65.15
<b>Liquid Limits %</b>		<b>62</b>
<b>Plastic Limits %</b>		<b>31</b>
<b>Plasticity Index</b>		<b>31</b>



Sample No. : LD2-11-1 HP-3 Depth : 8.00-8.90m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	40	42.33
2	28	43.65
3	24	44.31
4	19	44.94
5	14	46.26
6	10	47.58
<b>Liquid Limits %</b>		<b>44</b>
<b>Plastic Limits %</b>		<b>24</b>
<b>Plasticity Index</b>		<b>20</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 16.10.14 Tested By : Htet Paing/Shariful Checked by : A. B. Tan

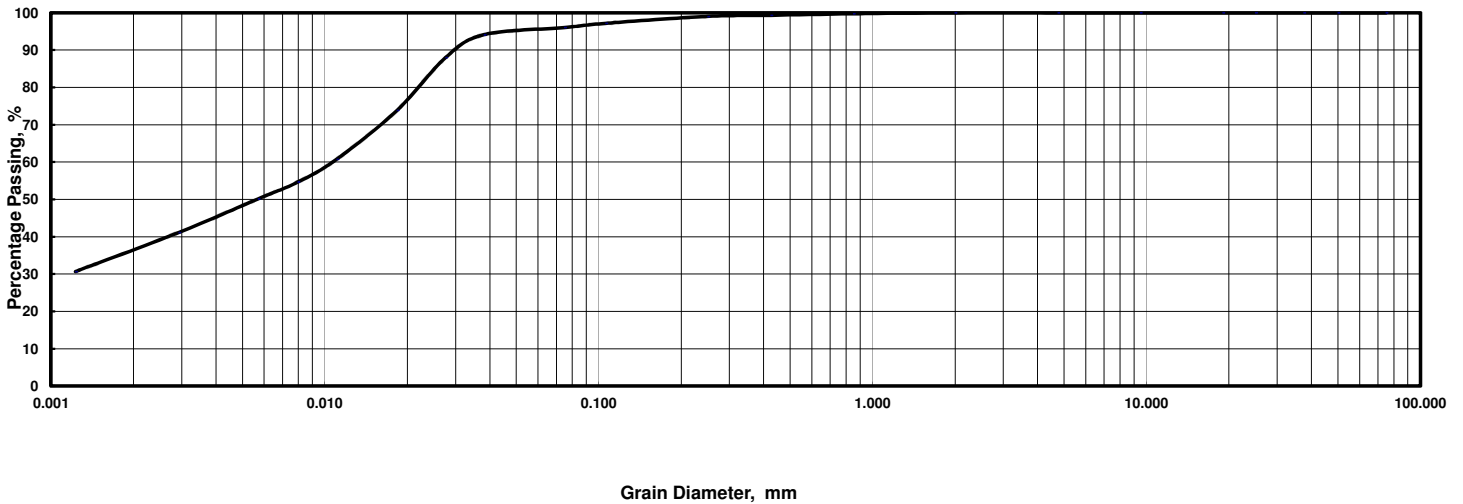
Sample No. : **LD2-11-1 HP-1** Depth : **2.00-2.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.3	99.0	97.2	96.0
Hydro.	Dia., mm	0.038	0.028	0.018	0.011	0.0080	0.0057	0.0029	0.0012							
	% Passing	94.1	88.0	73.9	60.8	54.6	50.1	41.1	30.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 HP-1	Sample No.	LD2-11-1 HP-1
Depth	2.00-2.80m	Depth	2.00-2.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.011 mm
2.00 - 0.425 mm	0.7 %	Dia. at 30%	- mm
0.425 - 0.075 mm	3.3 %	Dia. at 10%	- mm
0.075 - 0.005 mm	48.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	47.8 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.7 %		
75um Sieve Passing	96.0 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 16.10.14

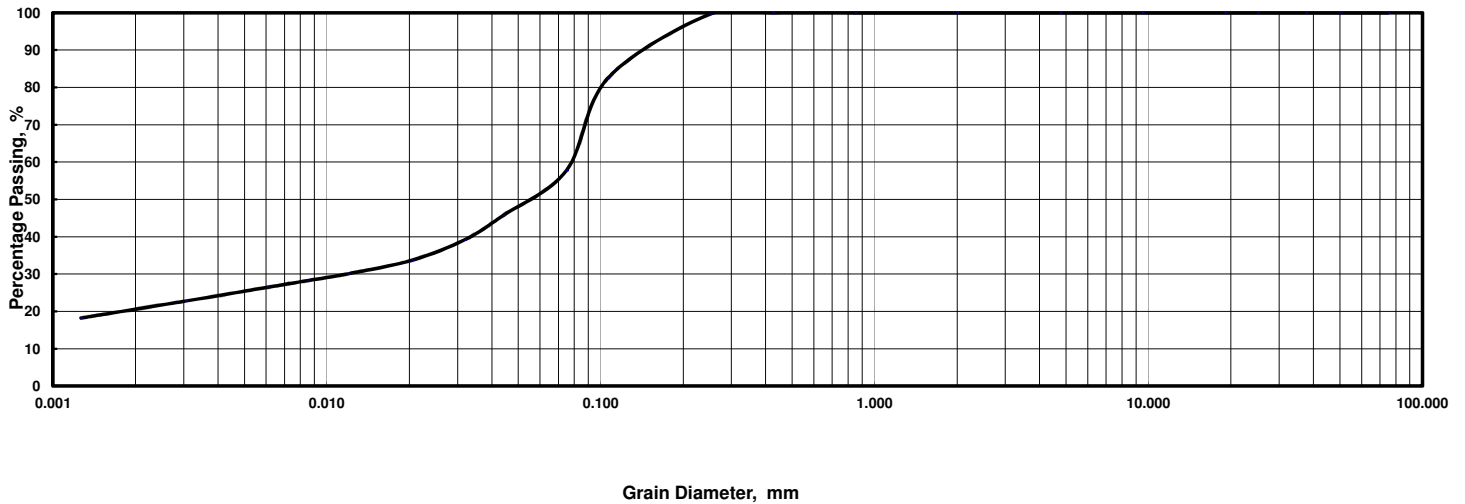
Tested By : Htet Paing/Shariful

Checked by : A. B. Tan

Sample No. :	<b>LD2-11-1 HP-2</b>		Depth :	<b>5.00-5.90m</b>		( _____ )	Specific Gravity :	2.71								
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	82.4	57.8
Hydro.	Dia., mm	0.044	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	45.8	39.2	33.7	30.1	28.3	26.4	22.8	18.2							

Sample No. :			Depth :	( _____ )		Specific Gravity :		
Sieve	Dia., mm							
	% Passing							
Hydro.	Dia., mm							
	% Passing							

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 HP-2	Sample No.	LD2-11-1 HP-2
Depth	5.00-5.90m	Depth	5.00-5.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.077 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.012 mm
0.425 - 0.075 mm	42.2 %	Dia. at 10%	- mm
0.075 - 0.005 mm	32.6 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	25.2 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	57.8 %		



# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422** Date of Testing : **17.10.14** Tested By : **Htet Paing/Motiur** Checked by : **A. B. Tan**

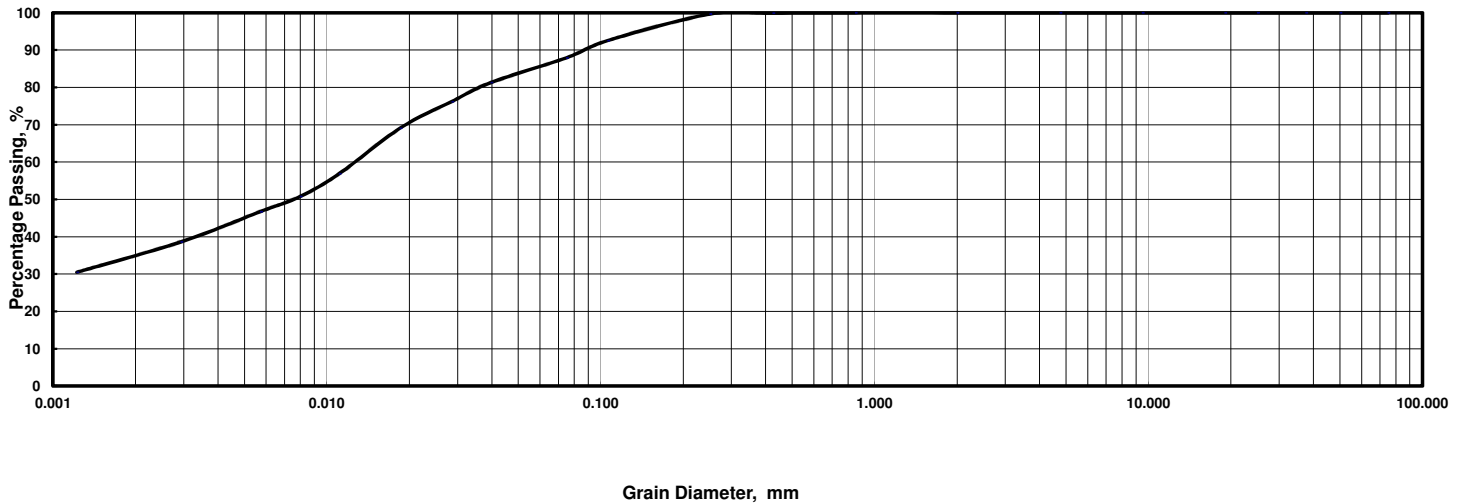
Sample No. : **LD2-11-1 HP-3** Depth : **8.00-8.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.74

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	92.5	87.9
Hydro.	Dia., mm	0.040	0.029	0.019	0.011	0.0080	0.0057	0.0029	0.0012							
	% Passing	81.3	76.2	69.1	56.9	50.8	46.7	38.6	30.5							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 HP-3	Sample No.	LD2-11-1 HP-3
Depth	8.00-8.80m	Depth	8.00-8.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.013 mm
2.00 - 0.425 mm	0.1 %	Dia. at 30%	- mm
0.425 - 0.075 mm	11.9 %	Dia. at 10%	- mm
0.075 - 0.005 mm	43.3 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	44.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	87.9 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 20.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

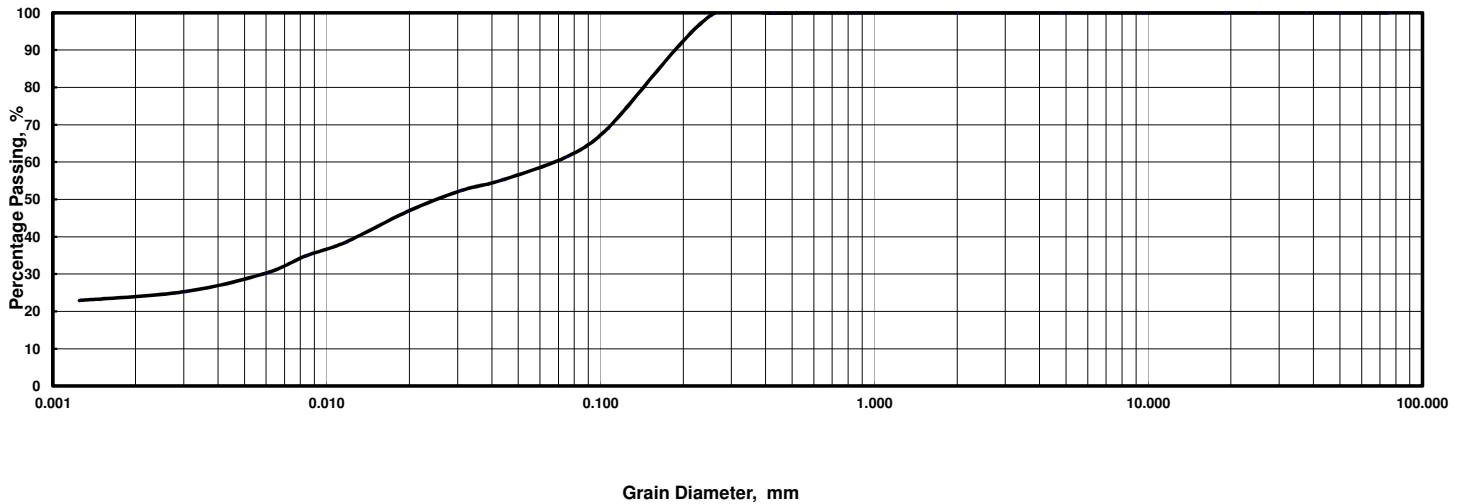
Sample No. : **LD2-11-1 HP-4** Depth : **11.00-11.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.1	69.0	61.4
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0012							
	% Passing	55.0	52.3	46.8	38.5	34.8	30.3	25.3	22.9							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 HP-4	Sample No.	LD2-11-1 HP-4
Depth	11.00-11.80m	Depth	11.00-11.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.066 mm
2.00 - 0.425 mm	0.2 %	Dia. at 30%	0.0058 mm
0.425 - 0.075 mm	38.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	32.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	28.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	61.4 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 18.11.14 Tested By : Motiur Checked by : A. B. Tan

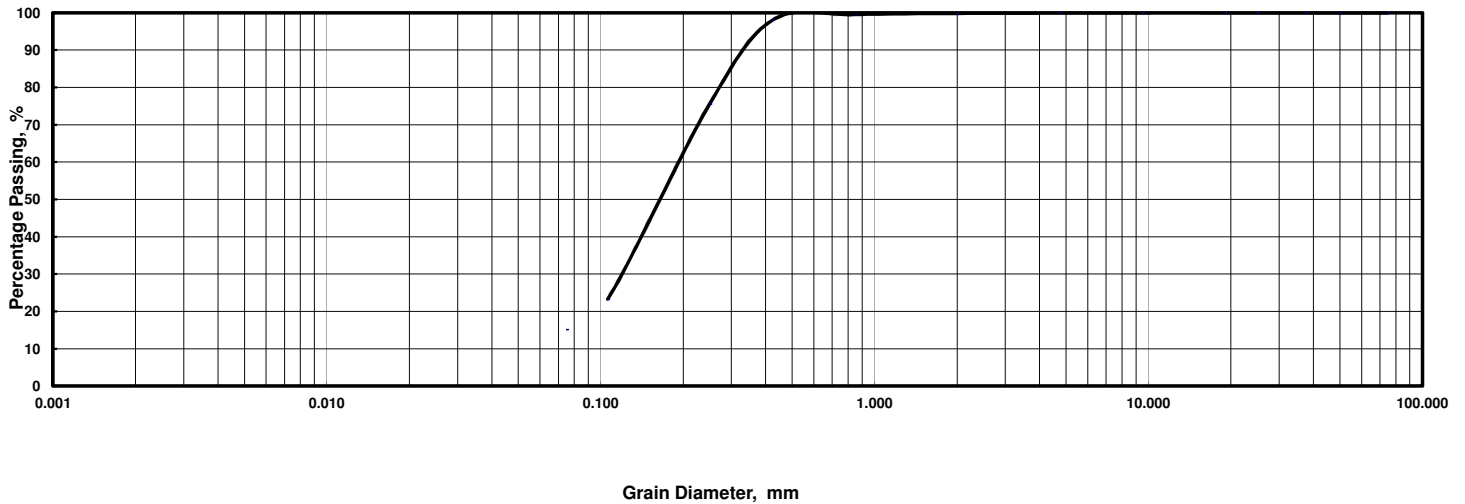
Sample No. : **LD2-11-1 D-1** Depth : **14.00-14.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.5	98.1	75.6	23.3	15.2
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 D-1		Sample No.	LD2-11-1 D-1
Depth	14.00-14.80m		Depth	14.00-14.80m
Larger than 4.75 mm	0.1 %		Max. Diameter	9.50 mm
4.75 - 2.00 mm	0.1 %		Dia. at 60%	0.19 mm
2.00 - 0.425 mm	1.7 %		Dia. at 30%	0.12 mm
0.425 - 0.075 mm	82.9 %		Dia. at 10%	- mm
0.075 - 0.005 mm	15.2 %		Coeff. of Uniformity	-
Smaller than 0.005 mm			Coeff. of Curvature	-
2000um Sieve Passing	100.0 %			
425um Sieve Passing	99.5 %			
75um Sieve Passing	15.2 %			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 20.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

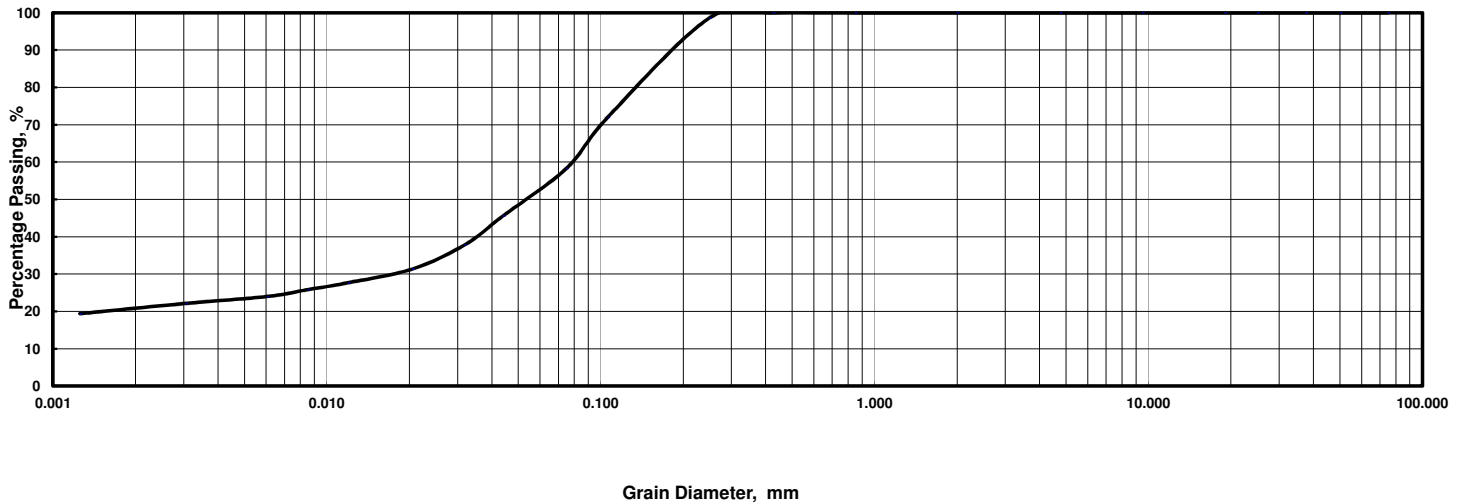
Sample No. : **LD2-11-1 D-2** Depth : **17.00-17.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.7	72.0	58.3
Hydro.	Dia., mm	0.044	0.032	0.021	0.012	0.0085	0.0061	0.0030	0.0013							
	% Passing	45.6	37.8	31.4	27.7	25.8	24.0	22.1	19.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 D-2		Sample No.	LD2-11-1 D-2	
Depth	17.00-17.80m		Depth	17.00-17.80m	
Larger than 4.75 mm	0.0 %		Max. Diameter	0.425 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.078 mm	
2.00 - 0.425 mm	0.0 %		Dia. at 30%	0.017 mm	
0.425 - 0.075 mm	41.7 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	35.0 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	23.3 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	100.0 %				
75um Sieve Passing	58.3 %				

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 18.11.14 Tested By : Motiur Checked by : A. B. Tan

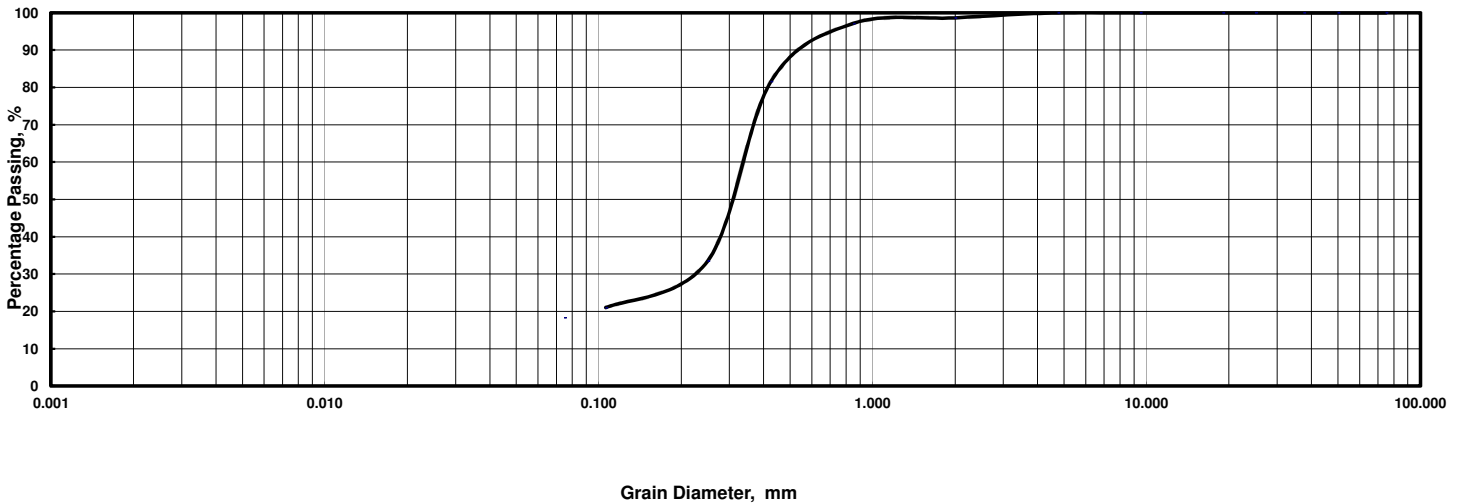
Sample No. : **LD2-11-1 D-3** Depth : **20.00-20.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	97.1	81.5	33.5	21.0	18.4
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1 D-3		Sample No.	LD2-11-1 D-3
Depth	20.00-20.80m		Depth	20.00-20.80m
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm
4.75 - 2.00 mm	1.4 %		Dia. at 60%	0.33 mm
2.00 - 0.425 mm	17.1 %		Dia. at 30%	0.20 mm
0.425 - 0.075 mm	63.2 %		Dia. at 10%	- mm
0.075 - 0.005 mm	18.4 %		Coeff. of Uniformity	-
Smaller than 0.005 mm			Coeff. of Curvature	-
2000um Sieve Passing	100.0 %			
425um Sieve Passing	97.1 %			
75um Sieve Passing	18.4 %			










**Summary of Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement**

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 21.10.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No : LD2-11-1		Sample No.:HP-2		Depth :5.00-5.90m		
Specimen Condition : Undisturbed			Test Method : ASTM D4767-11			
Soil Description : Sandy Silt		Ave. Diameter : 50.0mm		Ave. Height : 99.8mm		
Specimen No.			1	2	3	
Initial Condition	Wet Density,	Mg/m <sup>3</sup>	1.91	1.88	1.85	
	Water Content,	%	30.4	29.3	31.0	
	Dry Density	Mg/m <sup>3</sup>	1.47	1.45	1.41	
Saturation Stage	Saturated PWP,	kPa	500	500	500	
	Final Cell Pressure,	kPa	540	580	660	
	B-value		0.97	0.95	0.95	
Consolidation	Cell Pressure	kPa	540	580	660	
	Back Pressure	kPa	500	500	500	
	Initial PWP,	kPa	529	566	642	
	Final PWP	kPa	500	500	500	
Consolidation Parameter	Total Volume Change,	%	0.34	1.00	1.40	
	Coefficient of Consolidation Cv,	m <sup>2</sup> /year	28.70	13.63	10.21	
	Coefficient of Volume Compressibility mvi,	m <sup>2</sup> /MN	0.09	0.13	0.09	
Compression Stage	Cell Pressure	kPa	540	580	660	
	Back Pressure	kPa	500	500	500	
	Effective Cell Pressure	kPa	40	80	160	
	Shearing Speed	mm/min	0.03	0.03	0.03	
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f,	kPa	407	171	283	
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f	kPa	-90	28	73	
	A-Coefficient		-0.22	0.17	0.26	
	Strain at ( $\sigma_1 - \sigma_3$ )f	(%)	15.02	15.01	8.96	
	Effective Principal Stress Ratio		4.12	4.29	4.26	
Final Conditions	Wet Density,	Mg/m <sup>3</sup>	1.99	1.94	1.97	
	Water Content,	%	26.9	29.9	28.2	
Shear Strength Parameters	In terms of Effective Stress	Mode of Failure				
	$\phi' = 37$ Degree $c' = 4$ kPa					
Remarks : Specimen 1 contains more sand						

## Consolidated Undrained Triaxial Compression Test With Porewater Pressure Measurement

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

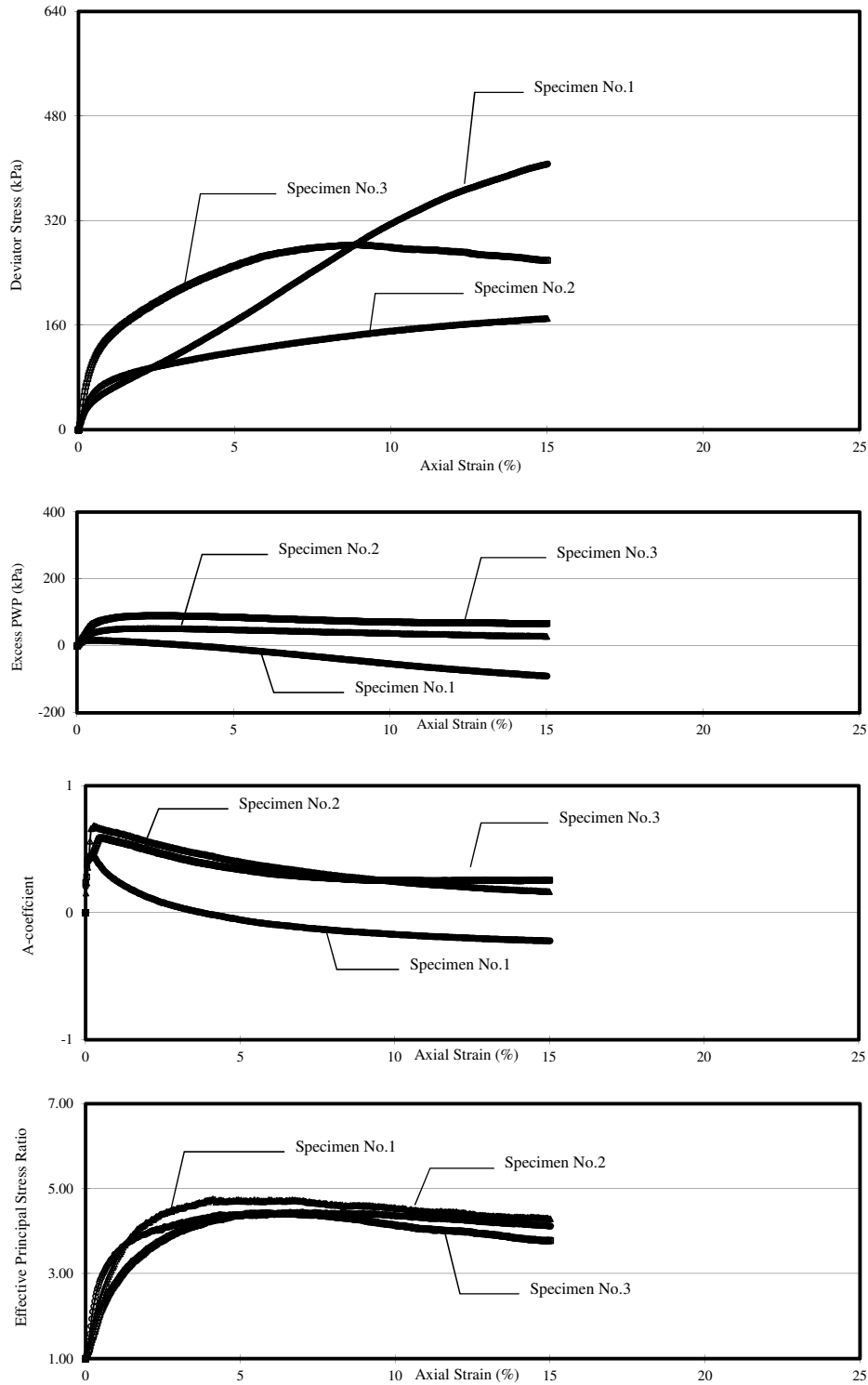
Project No.: S27-14

Sample No.: HP-2

Soil Type: Sandy Silt

Borehole No.: LD2-11-1

Depth :5.00-5.90m



# Consolidated Undrained Triaxial Compression Test With Pore water Pressure Measurement - Mohr' s Circle (In terms of Total Stress) -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No. : S27-14

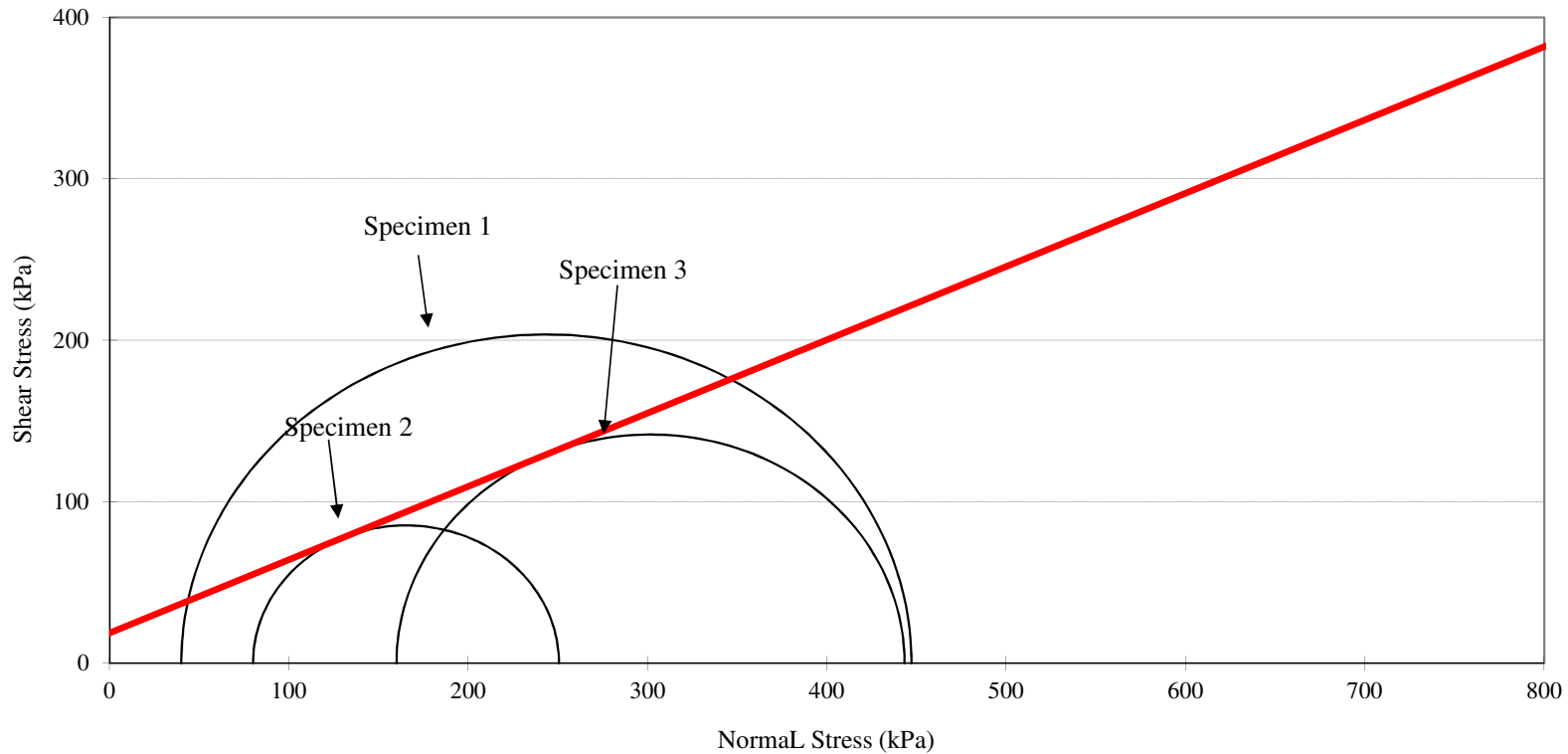
Borehole No.: LD2-11-1

Sample No. : HP-2

Soil Type: Sandy Silt

Depth :5.00-5.90m

Angle of Internal Friction,  $\phi$  24 deg  
Cohesion, c 19 kPa



# Consolidated Undrained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Effective Stress at Peak Deviator Stress)-

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No. : S27-14

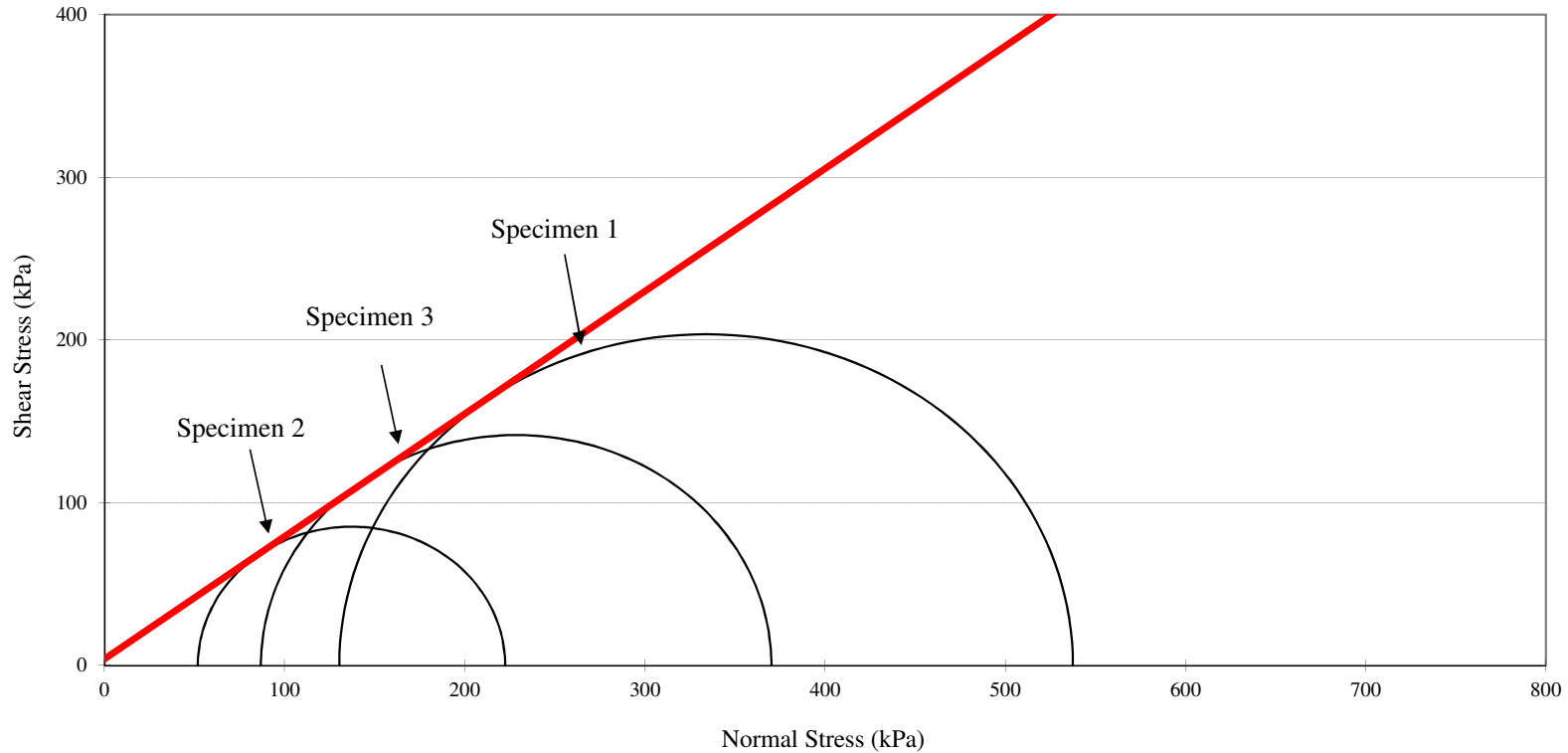
Borehole No.: LD2-11-1

Sample No. : HP-2

Soil Type: Sandy Silt

Depth : 5.00-5.90m

Angle of Internal Friction,  $\phi'$  37 deg  
Cohesion,  $c'$  4 kPa



# Consolidated Undrained Triaxial Compression Test With Pore water Pressure Measurement

## - Stress Path -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No. : S27-14

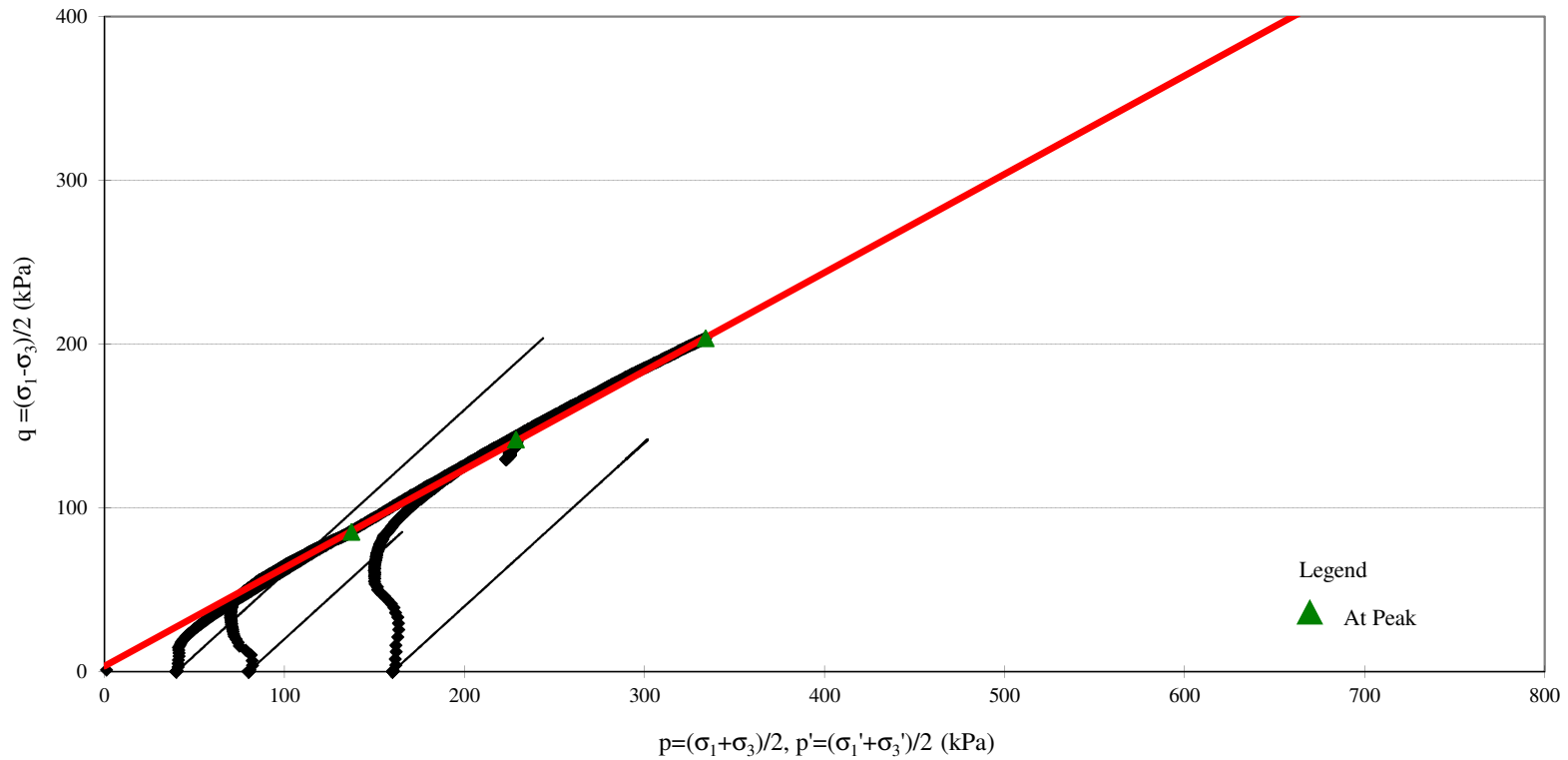
Borehole No.: LD2-11-1

Sample No. : HP-2

Soil Type: Sandy Silt

Depth : 5.00-5.90m

$\alpha'$	31	deg
$a'$	3	kPa

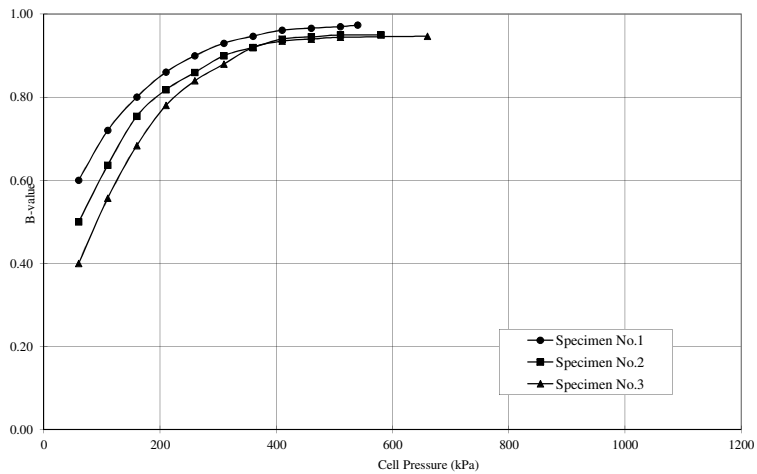


**Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No.: S27-14  
Borehole No.: LD2-11-1  
Sample No.: HP-2

Depth : 5.00-5.90m  
Soil Type: Sandy Silt

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	38.0	20	35.0	20	32.0
	Back Pressure (kPa)	20		20		20	
	B-value	0.60		0.50		0.40	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	86.0	50	81.8	50	77.9
	Back Pressure (kPa)	50		50		50	
	B-value	0.72		0.64		0.56	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	140.0	100	137.7	100	134.2
	Back Pressure (kPa)	100		100		100	
	B-value	0.80		0.75		0.68	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	193.0	150	190.9	150	189.0
	Back Pressure (kPa)	150		150		150	
	B-value	0.86		0.82		0.78	
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260
	P.W.P (kPa)	200	245.0	200	243.0	200	242.0
	Back Pressure (kPa)	200		200		200	
	B-value	0.90		0.86		0.84	
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310
	P.W.P (kPa)	250	296.5	250	295.0	250	294.0
	Back Pressure (kPa)	250		250		250	
	B-value	0.93		0.90		0.88	
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360
	P.W.P (kPa)	300	347.4	300	346.0	300	346.0
	Back Pressure (kPa)	300		300		300	
	B-value	0.95		0.92		0.92	
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410
	P.W.P (kPa)	350	398.1	350	397.0	350	396.8
	Back Pressure (kPa)	350		350		350	
	B-value	0.96		0.94		0.94	
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460
	P.W.P (kPa)	400	448.3	400	447.3	400	447.0
	Back Pressure (kPa)	400		400		400	
	B-value	0.97		0.95		0.94	
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510
	P.W.P (kPa)	450	498.5	450	497.5	450	497.2
	Back Pressure (kPa)	450		450		450	
	B-value	0.97		0.95		0.94	
B-check Step.11	Cell Pressure (kPa)	510	540	510	580	510	660
	P.W.P (kPa)	500	529.2	500	566.5	500	642.0
	Back Pressure (kPa)	500		500		500	
	B-value	0.97		0.95		0.95	



**Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

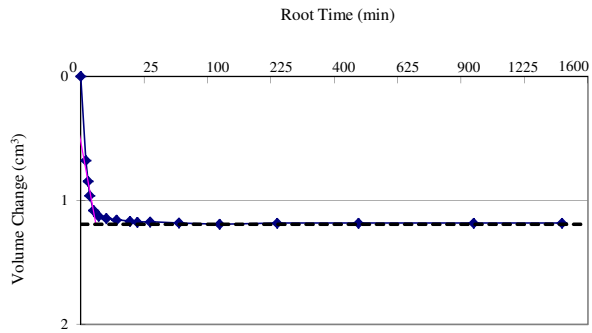
Project No.: S27-14

Sample No.: HP-2

Soil Type: Sandy Silt

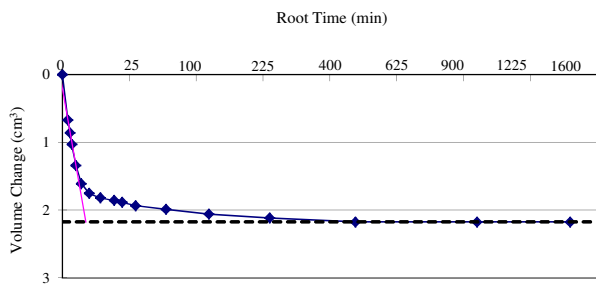
Borehole No.: LD2-11-1

Depth : 5.00-5.90m



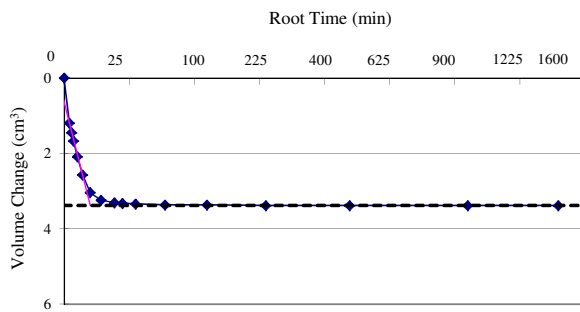
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.4$  min  
 $C_v = 28.70$  m<sup>2</sup>/year  
 $m_{vi} = 0.09$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 80$  kPa  
 $t_{100} = 3.0$  min  
 $C_v = 13.63$  m<sup>2</sup>/year  
 $m_{vi} = 0.13$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 160$  kPa  
 $t_{100} = 4.0$  min  
 $C_v = 10.21$  m<sup>2</sup>/year  
 $m_{vi} = 0.09$  m<sup>2</sup>/MN

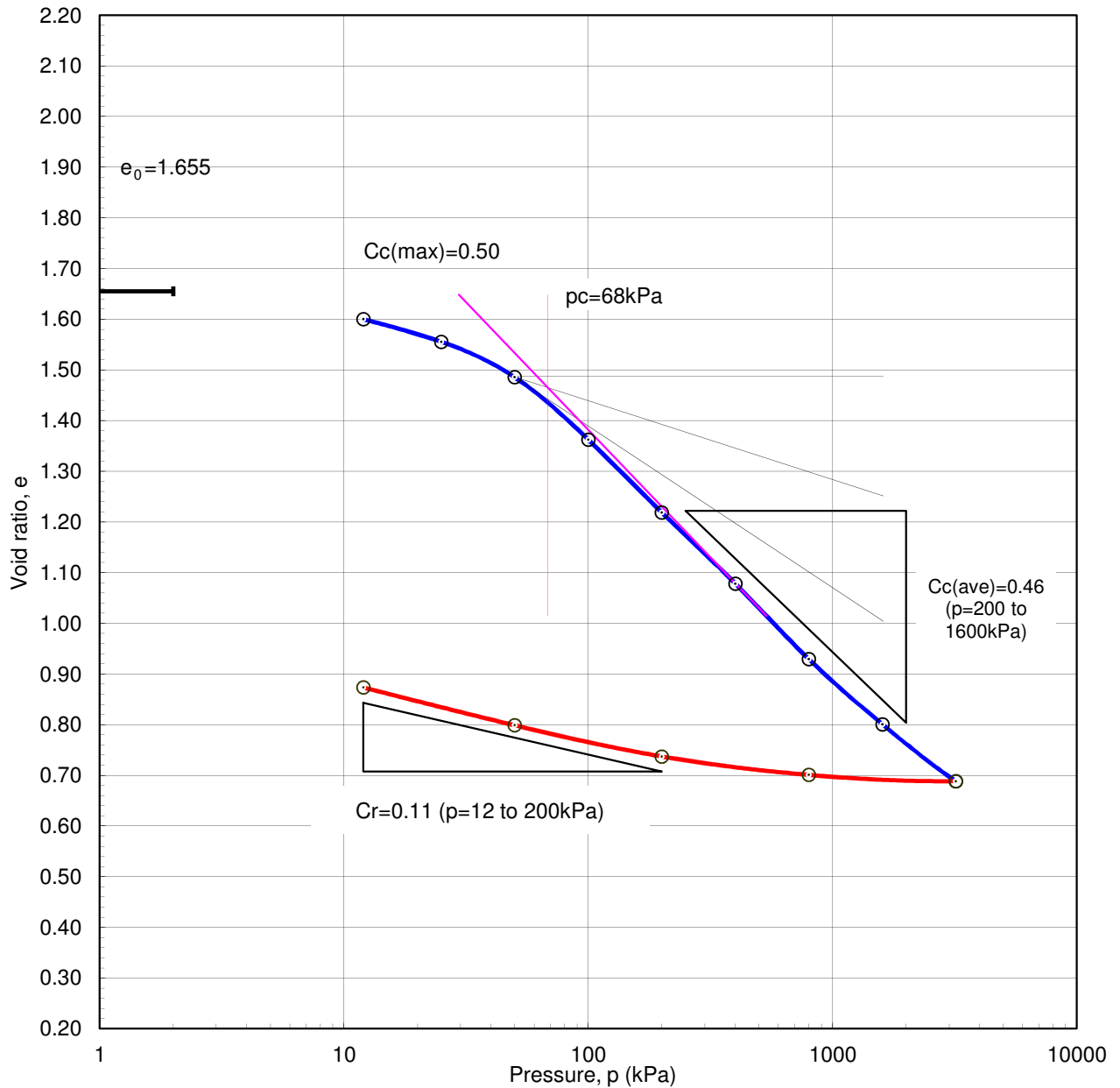
**CONSOLIDATION TEST (*e-log p* curves)**

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Clay Checked by : A. B. Tan

Borehole No. : LD2-11-1  
 Sample No. : HP-1  
 Depth of Sample : 2.00-2.80 m

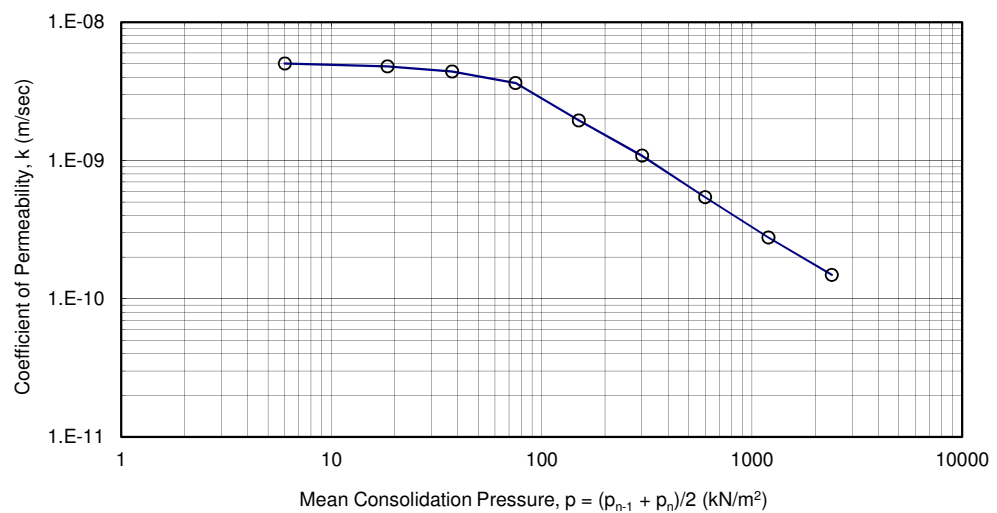
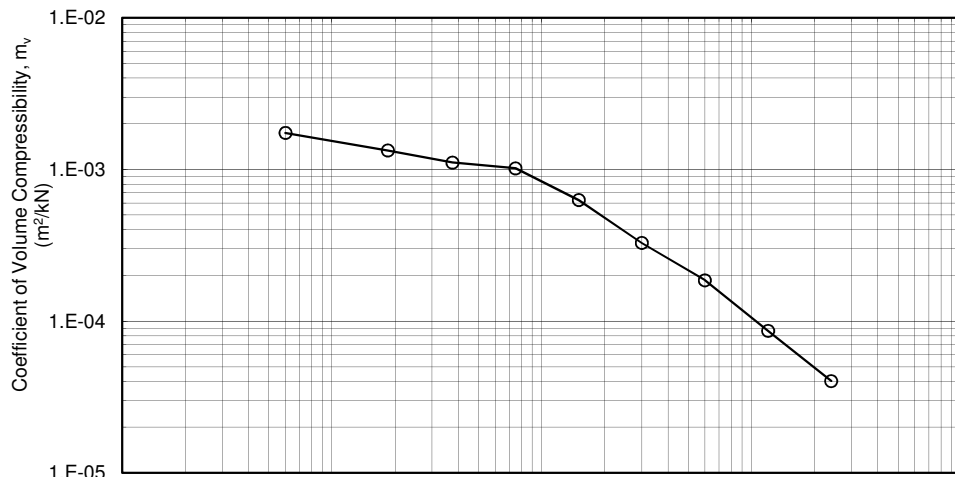
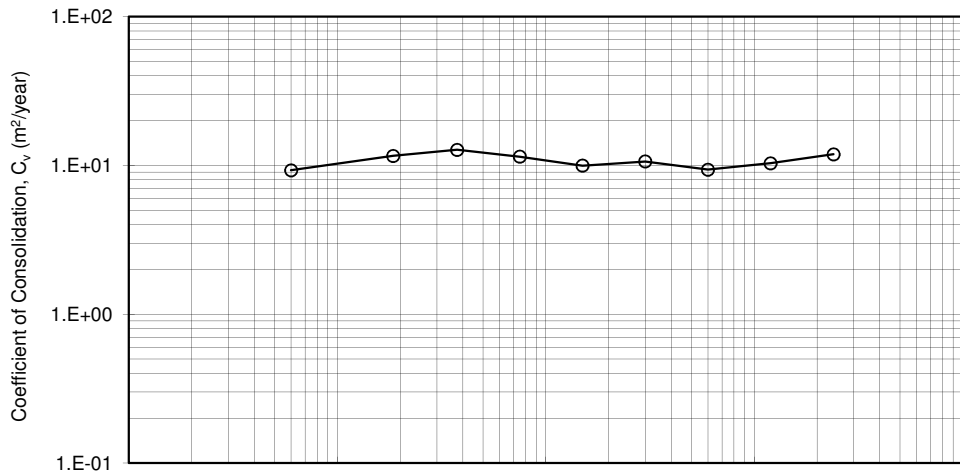
Sample No.	Depth of sample (m)	Initial void ratio $e_0$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
HP-1	2.00-2.80	1.655	68	0.50 (max)	0.46(average)	0.11 (average)	N/A





Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project :	Preparatory Survey on Matarbari USC Coal-fired Power Project	Borehole No. :	LD2-11-1
Project No. :	S27-14	Sample No. :	HP-1
Date of testing :	8-Oct-14	Tested by :	Lim
		Depth of Sample :	2.00-2.80 m



PROJECT NAME : Preparatory Survey on Matarbari USC Coal-fired Power Project PROJECT NO.: S27-14  
BOREHOLE NO. : LD2-11-1 TESTING STANDARD : ASTM D2435-11 DATE : 8-Oct-14  
SAMPLE NO. : HP-1 INITIAL HEIGHT OF SPECIMEN : 18.000 mm NO. OF LOADING STEP : 9  
DEPTH : 2.00-2.80 m DIAMETER OF SPECIMEN : 53.900 mm SPECIFIC GRAVITY : 2.72  
TESTER NO. : 13 DRY WEIGHT OF SPECIMEN : 42.080 grams SOLID HEIGHT OF SPECIMEN : 6.780 mm  
INITIAL MOISTURE CONTENT : 57.7 % BULK DENSITY : 1.64 Mg/m<sup>3</sup>  
METHOD OF TIME FITTING USED : SQUARE ROOT TIME CURVE - FITTING METHOD LABORATORY TEMPERATURE : 23.0 °C

PRESSURE	PRESSURE INCREMENT	CHANGE IN HEIGHT	HEIGHT	AVERAGE HEIGHT	STRAIN	MV	VOLUME RATIO	VOID RATIO
kN/m <sup>2</sup>	kN/m <sup>2</sup>	*E-2 mm	mm	mm	%	m <sup>2</sup> /kN		
0.000			18.000				2.655	1.655
12.000	12.000	37.2	17.628	17.814	2.09	1.74E-03	2.600	1.600
25.000	13.000	30.2	17.326	17.477	1.73	1.33E-03	2.555	1.555
50.000	25.000	47.4	16.852	17.089	2.77	1.11E-03	2.486	1.486
100.000	50.000	83.5	16.017	16.435	5.08	1.02E-03	2.362	1.362
200.000	100.000	97.4	15.043	15.530	6.27	6.27E-04	2.219	1.219
400.000	200.000	95.4	14.089	14.566	6.55	3.27E-04	2.078	1.078
800.000	400.000	100.9	13.080	13.585	7.43	1.86E-04	1.929	0.929
1600.000	800.000	87.1	12.209	12.645	6.89	8.61E-05	1.801	0.801
3200.000	1600.000	76.1	11.448	11.829	6.43	4.02E-05	1.688	0.688

PRESSURE	AVERAGE PRESSURE	T90	CV	CV	CV	PRIMARY COMPRESSION	PRIMARY COMPRESSION	COEFFICIENT OF PERMEABILITY
kN/m <sup>2</sup>	kN/m <sup>2</sup>	min	m <sup>2</sup> /sec	m <sup>2</sup> /day	m <sup>2</sup> /year	*E-2 mm	RATIO	m/sec
0.000								
12.000	6.000	3.55	2.94E-07	2.54E-02	9.27E+00	17.9	0.482	5.02E-09
25.000	18.500	2.73	3.67E-07	3.17E-02	1.16E+01	13.1	0.433	4.79E-09
50.000	37.500	2.38	4.04E-07	3.49E-02	1.27E+01	17.0	0.359	4.39E-09
100.000	75.000	2.44	3.63E-07	3.14E-02	1.15E+01	37.8	0.427	3.62E-09
200.000	150.000	2.51	3.16E-07	2.73E-02	9.97E+00	35.2	0.403	1.94E-09
400.000	300.000	2.07	3.37E-07	2.91E-02	1.06E+01	42.6	0.429	1.08E-09
800.000	600.000	2.04	2.97E-07	2.57E-02	9.37E+00	43.1	0.423	5.41E-10
1600.000	1200.000	1.60	3.28E-07	2.83E-02	1.03E+01	36.0	0.413	2.77E-10
3200.000	2400.000	1.22	3.76E-07	3.25E-02	1.19E+01	29.5	0.388	1.48E-10

REBOUND  
P 800.000 200.000 50.000 12.000  
H 11.532 11.778 12.195 12.701  
E 0.701 0.737 0.799 0.873



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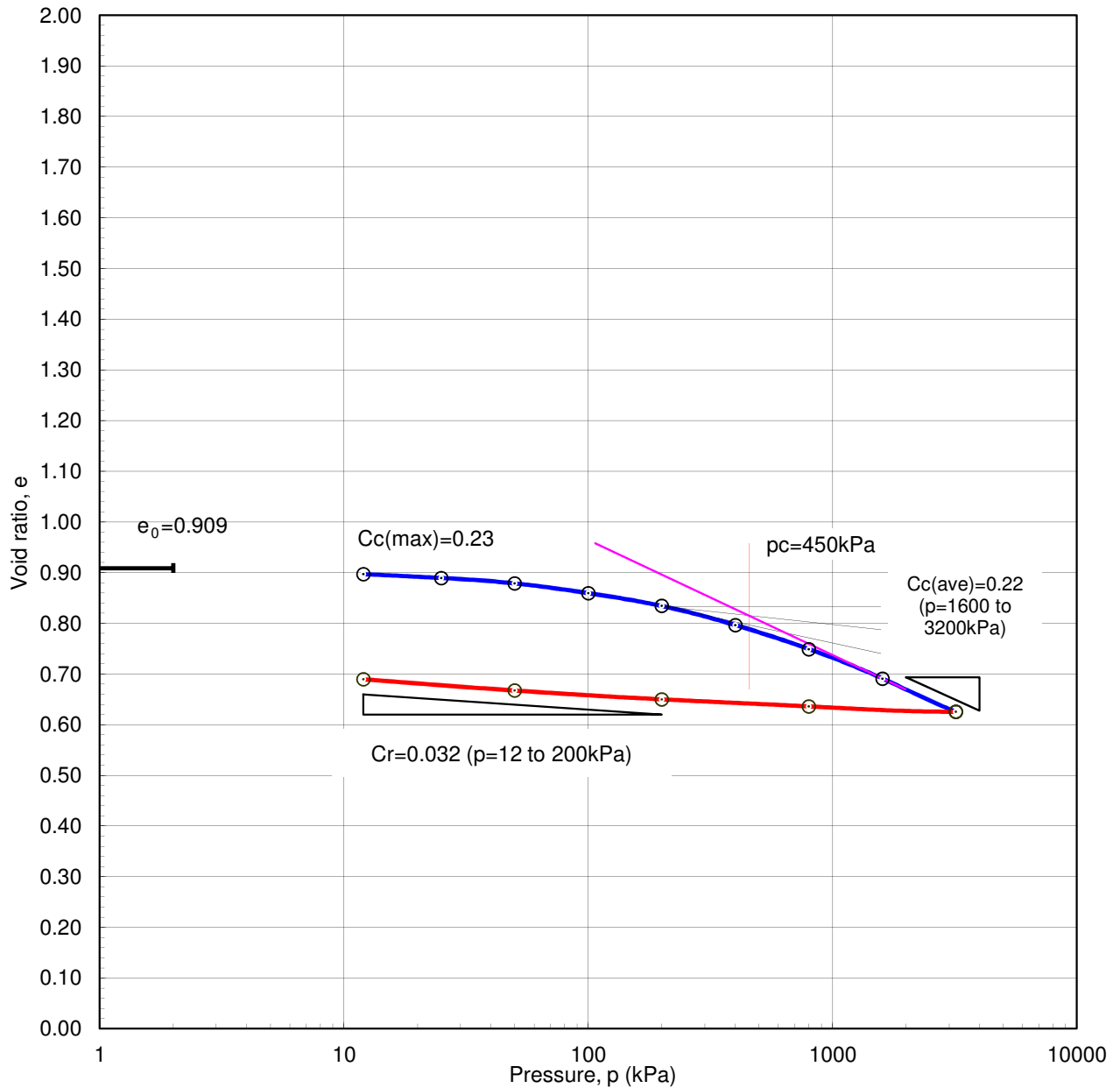
**CONSOLIDATION TEST (*e-log p* curves)**

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Sandy Silt Checked by : A. B. Tan

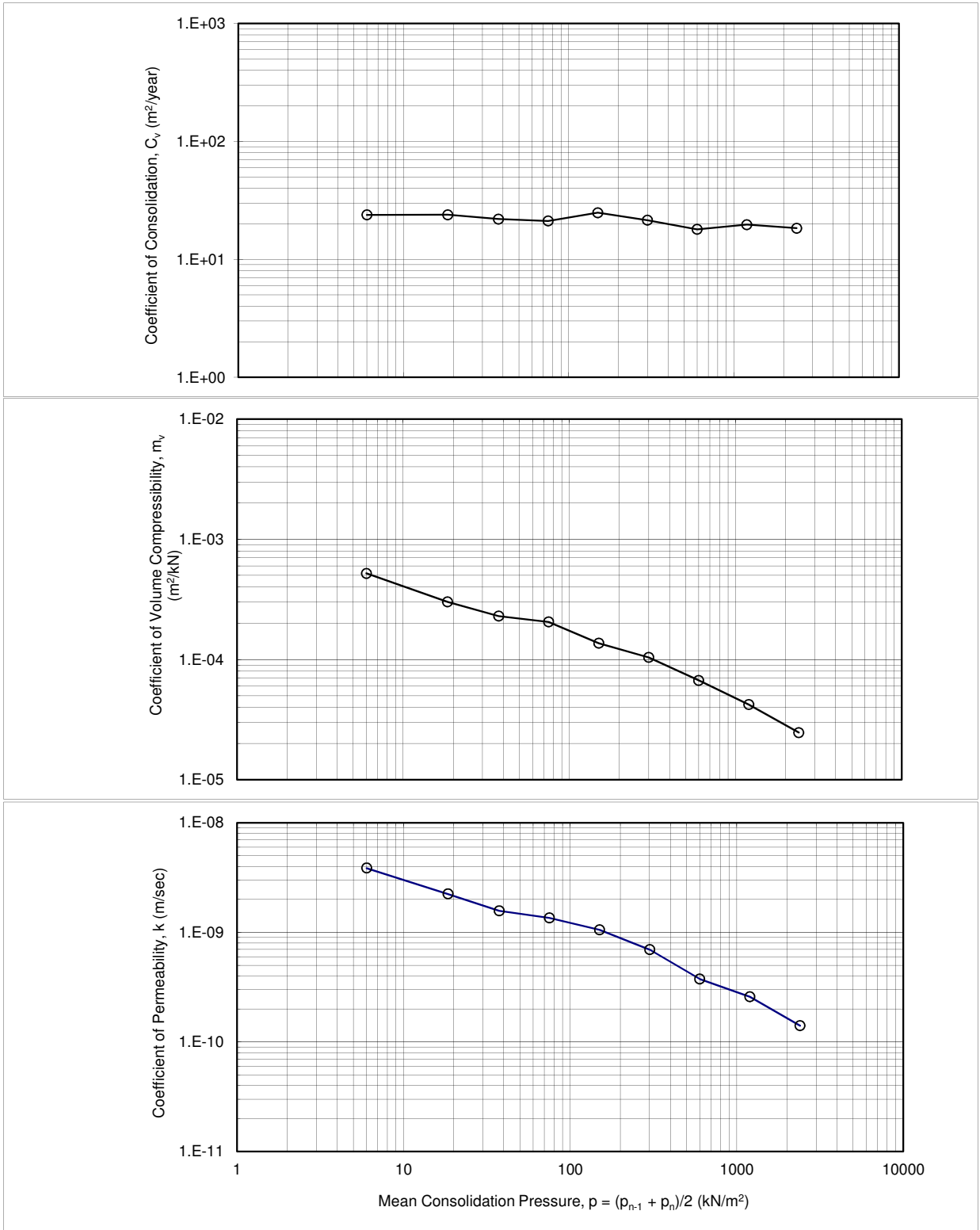
Borehole No. : LD2-11-1  
 Sample No. : HP-2  
 Depth of Sample : 5.00-5.90 m

Sample No.	Depth of sample (m)	Initial void ratio $e_o$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
				(max)	(average)		
HP-2	5.00-5.90	0.909	450	0.23 (max)	0.22(average)	0.032 (average)	N/A



Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project :	Preparatory Survey on Matarbari USC Coal-fired Power Project	Borehole No. :	LD2-11-1
Project No. :	S27-14	Sample No. :	HP-2
Date of testing :	8-Oct-14	Tested by :	Lim
		Depth of Sample :	5.00-5.90 m



PROJECT NAME : Preparatory Survey on Matarbari USC Coal-fired Power Project PROJECT NO. : S27-14  
BOREHOLE NO. : LD2-11-1 TESTING STANDARD : ASTM D2435-11 DATE : 8-Oct-14  
SAMPLE NO. : HP-2 INITIAL HEIGHT OF SPECIMEN : 18.000 mm NO. OF LOADING STEP : 9  
DEPTH : 5.00-5.90 m DIAMETER OF SPECIMEN : 53.900 mm SPECIFIC GRAVITY : 2.71  
TESTER NO. : 14 DRY WEIGHT OF SPECIMEN : 58.310 grams SOLID HEIGHT OF SPECIMEN : 9.430 mm  
INITIAL MOISTURE CONTENT : 31.5 % BULK DENSITY : 1.89 Mg/m<sup>3</sup>  
METHOD OF TIME FITTING USED : SQUARE ROOT TIME CURVE - FITTING METHOD LABORATORY TEMPERATURE : 23.0 °C

PRESSURE	PRESSURE INCREMENT	CHANGE IN HEIGHT	HEIGHT	AVERAGE HEIGHT	STRAIN	MV	VOLUME RATIO	VOID RATIO
kN/m <sup>2</sup>	kN/m <sup>2</sup>	*E-2 mm	mm	mm	%	m <sup>2</sup> /kN		
0.000			18.000				1.909	0.909
12.000	12.000	11.2	17.888	17.944	0.62	5.20E-04	1.897	0.897
25.000	13.000	7.0	17.818	17.853	0.39	3.02E-04	1.890	0.890
50.000	25.000	10.2	17.716	17.767	0.57	2.30E-04	1.879	0.879
100.000	50.000	18.1	17.535	17.626	1.03	2.05E-04	1.859	0.859
200.000	100.000	23.8	17.297	17.416	1.37	1.37E-04	1.834	0.834
400.000	200.000	35.6	16.941	17.119	2.08	1.04E-04	1.797	0.797
800.000	400.000	44.8	16.493	16.717	2.68	6.70E-05	1.749	0.749
1600.000	800.000	54.7	15.946	16.220	3.37	4.22E-05	1.691	0.691
3200.000	1600.000	61.7	15.329	15.638	3.95	2.47E-05	1.626	0.626

PRESSURE	AVERAGE PRESSURE	T90	CV	CV	CV	PRIMARY COMPRESSION	PRIMARY COMPRESSION	COEFFICIENT OF PERMEABILITY
kN/m <sup>2</sup>	kN/m <sup>2</sup>	min	m <sup>2</sup> /sec	m <sup>2</sup> /day	m <sup>2</sup> /year	*E-2 mm	RATIO	m/sec
0.000								
12.000	6.000	1.40	7.56E-07	6.53E-02	2.38E+01	1.2	0.104	3.86E-09
25.000	18.500	1.38	7.57E-07	6.54E-02	2.39E+01	1.1	0.152	2.24E-09
50.000	37.500	1.49	6.96E-07	6.02E-02	2.20E+01	1.8	0.177	1.57E-09
100.000	75.000	1.52	6.71E-07	5.79E-02	2.11E+01	2.6	0.144	1.35E-09
200.000	150.000	1.27	7.87E-07	6.80E-02	2.48E+01	2.5	0.105	1.05E-09
400.000	300.000	1.41	6.81E-07	5.88E-02	2.15E+01	4.4	0.124	6.95E-10
800.000	600.000	1.61	5.69E-07	4.92E-02	1.80E+01	5.3	0.119	3.74E-10
1600.000	1200.000	1.39	6.23E-07	5.39E-02	1.97E+01	6.2	0.113	2.58E-10
3200.000	2400.000	1.38	5.82E-07	5.03E-02	1.84E+01	7.3	0.118	1.41E-10

REBOUND  
P 800.000 200.000 50.000 12.000  
H 15.428 15.559 15.723 15.931  
E 0.636 0.650 0.667 0.689



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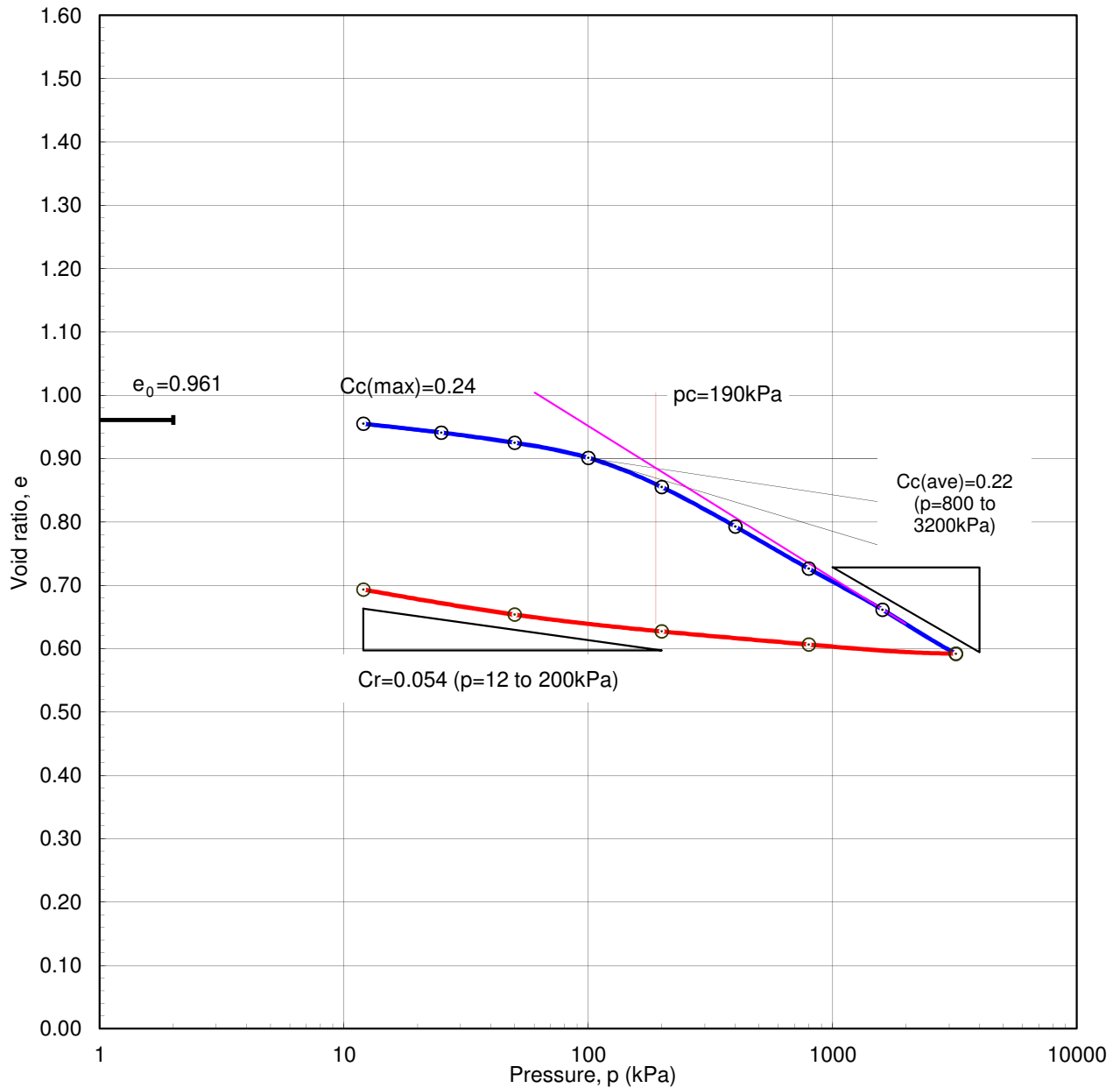
### CONSOLIDATION TEST (*e-log p* curves)

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Clay Checked by : A. B. Tan

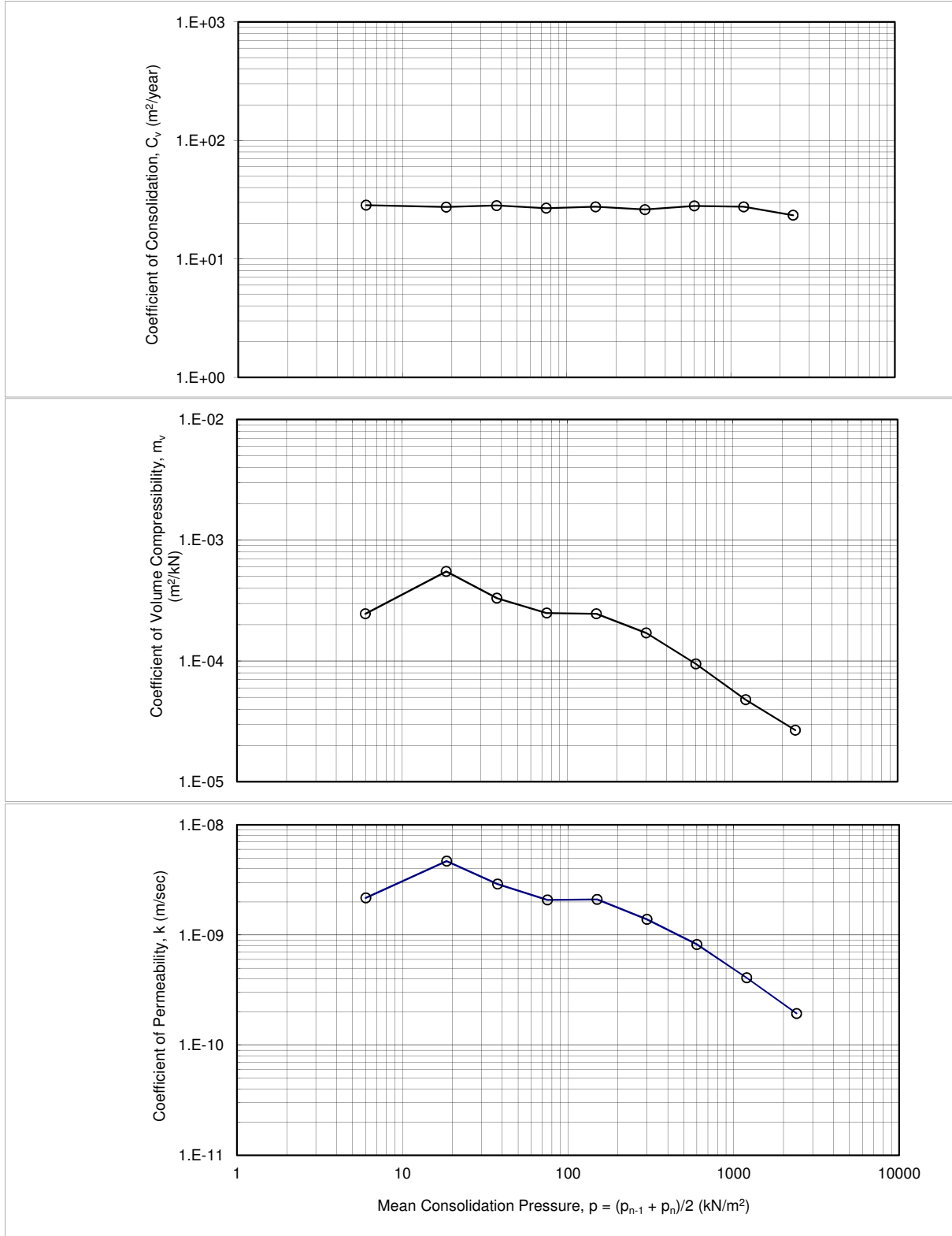
Borehole No. : LD2-11-1  
 Sample No. : HP-3  
 Depth of Sample : 8.00-8.90 m

Sample No.	Depth of sample (m)	Initial void ratio $e_0$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
				(max)	(average)		
HP-3	8.00-8.80	0.961	190	0.24 (max)	0.22(average)	0.054 (average)	N/A



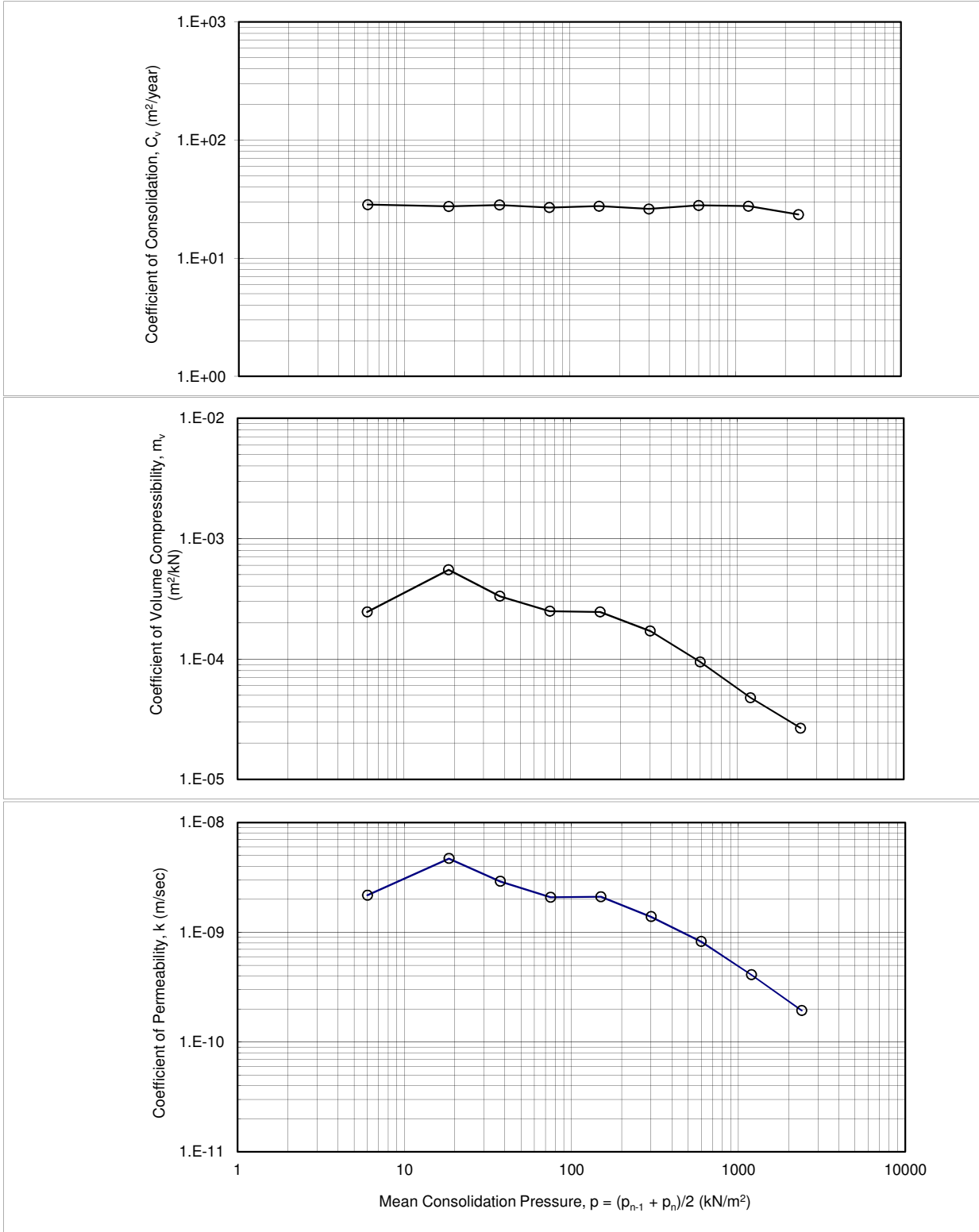
Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Preparatory Survey on Matarbari USC Coal-fired Power		Borehole No. :	<u>LD2-11-1</u>
Project :	<u>Project</u>	Sample No. :	<u>HP-3</u>
Project No. :	<u>S27-14</u>	Depth of Sample :	<u>8.00-8.90 m</u>
Date of testing :	<u>8-Oct-14</u>	Tested by :	<u>Lim</u>




Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project :	Preparatory Survey on Matarbari USC Coal-fired Power	Borehole No. :	LD2-11-1
Project No. :	S27-14	Sample No. :	HP-3
Date of testing :	8-Oct-14	Tested by :	Lim
		Depth of Sample :	8.00-8.90 m





### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 09.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-11-1		Sample No.:D-1		Depth :14.00-14.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Silty Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.66	1.66	1.66		
Saturation Stage	Saturated PWP, kPa	200	200	200		
	Final Cell Pressure, kPa	240	270	300		
	B-value	0.97	0.95	0.96		
Consolidation Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Initial PWP, kPa	229	257	286		
	Final PWP kPa	200	200	200		
Consolidation Parameter	Volume Change, %	0.78	0.69	0.86		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	2.84	8.55	9.42		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.20	0.10	0.09		
Compression Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f, kPa	42	197	263		
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ )f (%)	-0.21	1.34	2.48		
	Strain at ( $\sigma_1 - \sigma_3$ )f (%)	13.99	14.55	12.25		
Shear Strength Parameters	In terms of Effective Stress	Mode of Failure				
	$\phi' = 35$ deg $c' = 0$ kPa	1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.66Mg/m <sup>3</sup>						

# Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

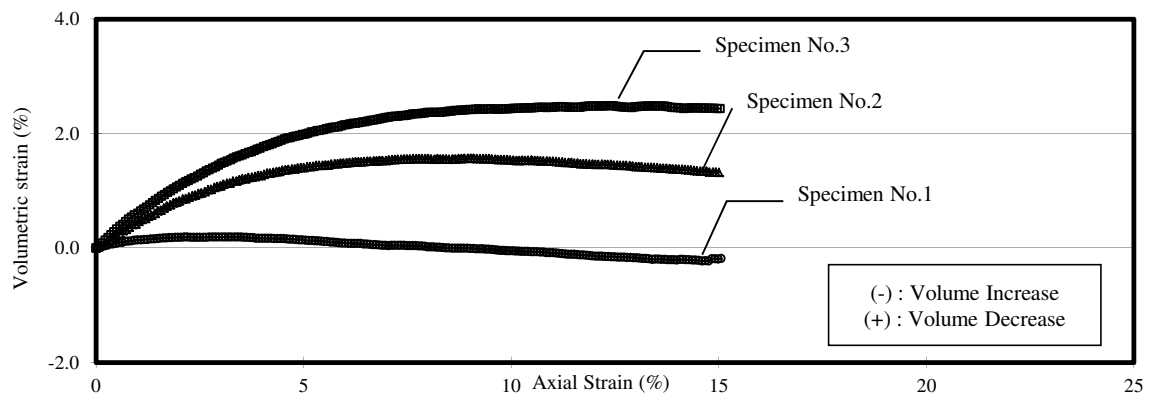
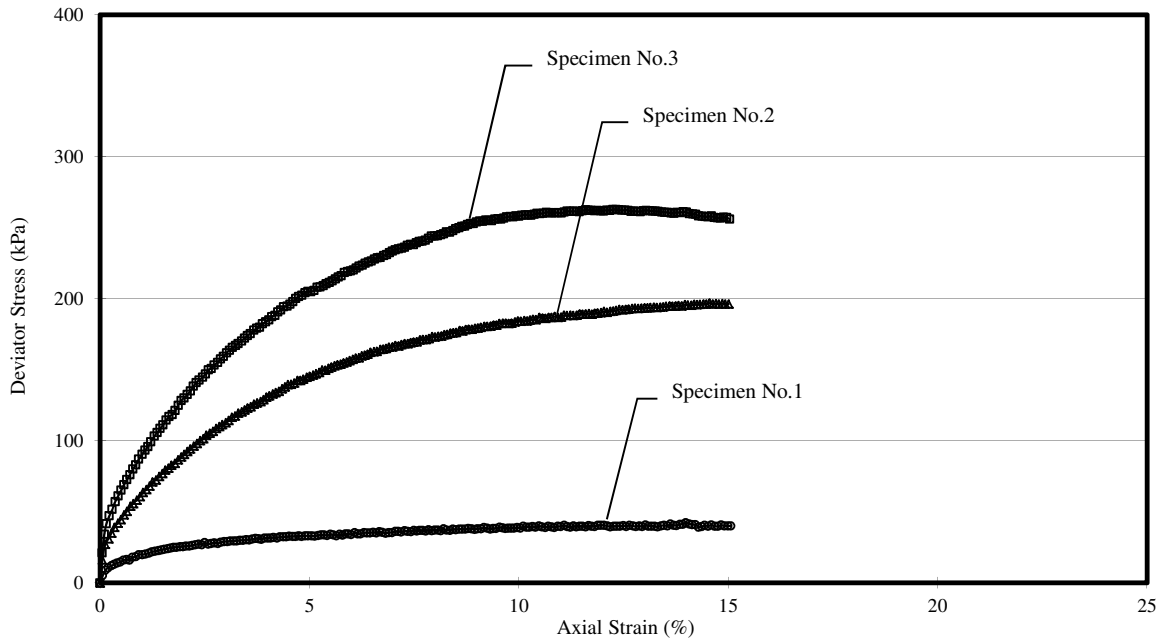
Project No.: S27-14

Sample No.: D-1

Soil Type: Silty Sand

Borehole No.: LD2-11-1

Depth : 14.00-14.80m

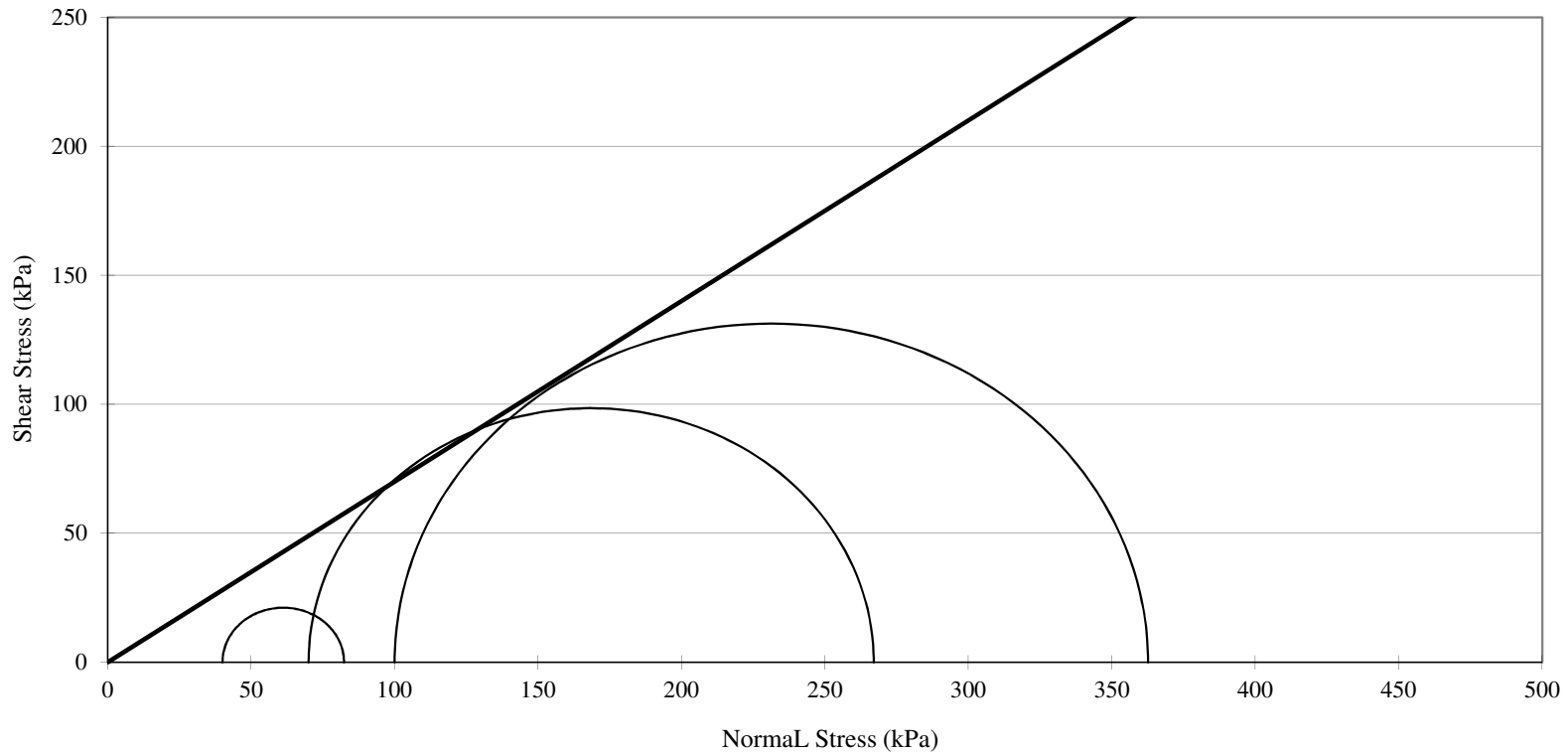


# Consolidated Drained Triaxial Compression Test

## - Mohr's Circle (In terms of Total Stress) -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. :	<u>LD2-11-1</u>	Soil Type:	<u>Silty Sand</u>
Sample No. :	<u>D-1</u>	Depth :	<u>14.00-14.80m</u>
Angle of Internal Friction, $\phi$	<u>35</u>		<u>deg</u>
Cohesion, $c$	<u>0</u>		<u>kPa</u>



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

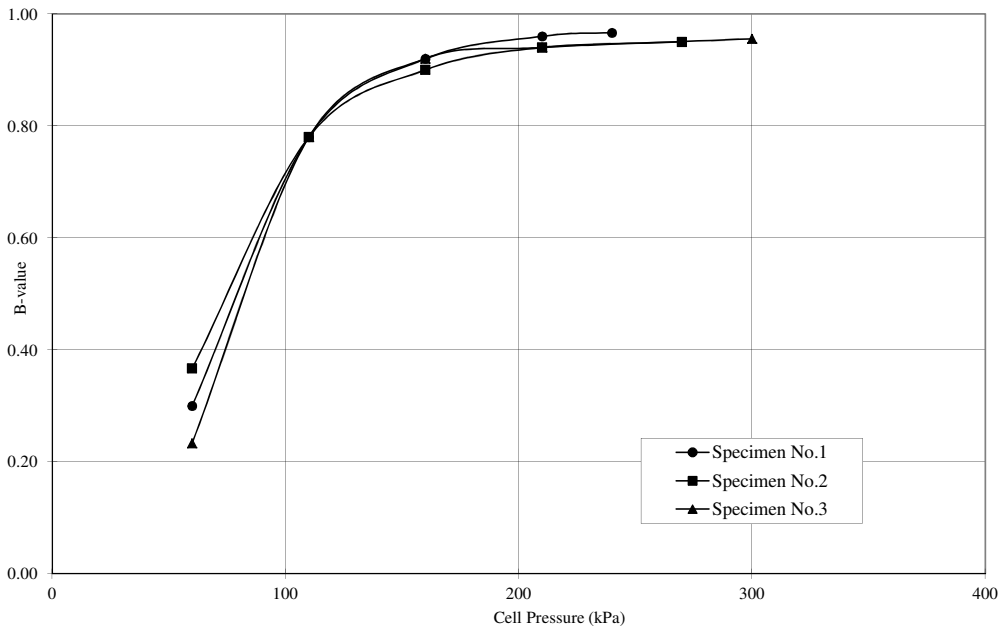
Borehole No.: LD2-11-1

Sample No.: D-1

Depth : 14.00-14.80m

Soil Type: Silty Sand

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	29	20	31	20	27
	Back Pressure (kPa)	20		20		20	
	B-value	0.30		0.37		0.23	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	89	50	89	50	89
	Back Pressure (kPa)	50		50		50	
	B-value	0.78		0.78		0.78	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	146	100	145	100	146
	Back Pressure (kPa)	100		100		100	
	B-value	0.92		0.90		0.92	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	198	150	197	150	197
	Back Pressure (kPa)	150		150		150	
	B-value	0.96		0.94		0.94	
B-check Step.5	Cell Pressure (kPa)	210	240	210	270	210	300
	P.W.P (kPa)	200	229	200	257	200	286
	Back Pressure (kPa)	200		200		200	
	B-value	0.97		0.95		0.96	



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

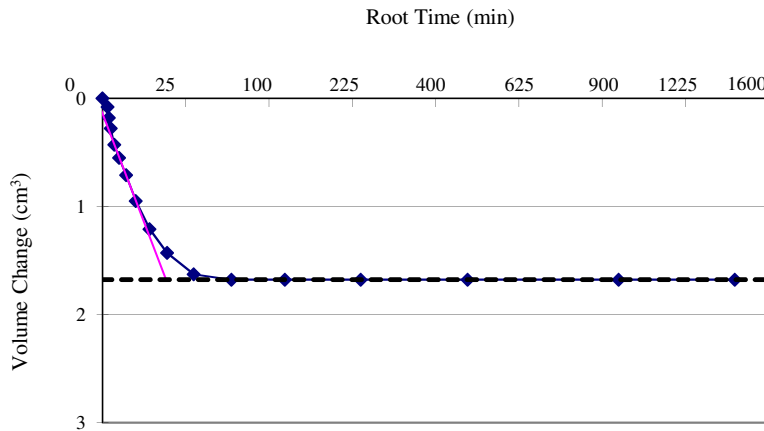
Project No.: S27-14

Sample No.: D-1

Soil Type: Silty Sand

Borehole No.: LD2-11-1

Depth : 14.00-14.80m



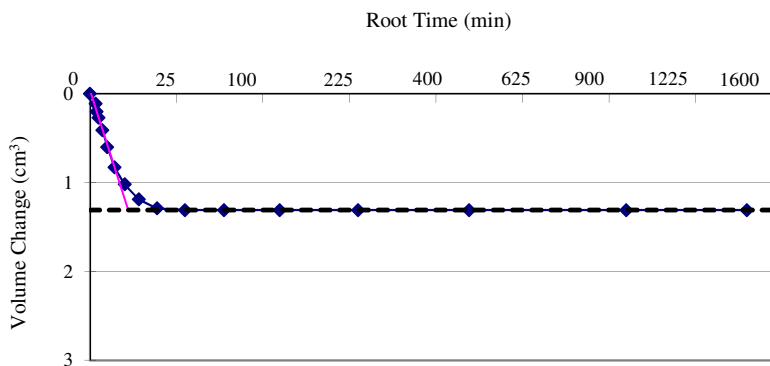
Specimen No.: 1

$p' = 40$  kPa

$t_{100} = 14.6$  min

$C_v = 2.84$  m<sup>2</sup>/year

$m_{vi} = 0.20$  m<sup>2</sup>/MN



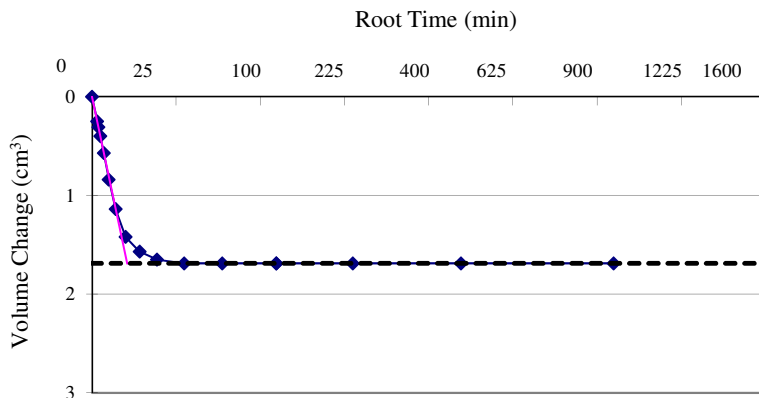
Specimen No.: 2

$p' = 70$  kPa

$t_{100} = 4.8$  min

$C_v = 8.55$  m<sup>2</sup>/year

$m_{vi} = 0.10$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa

$t_{100} = 4.4$  min

$C_v = 9.42$  m<sup>2</sup>/year

$m_{vi} = 0.09$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 4-Dec-14

Tested by : Perera/Bala

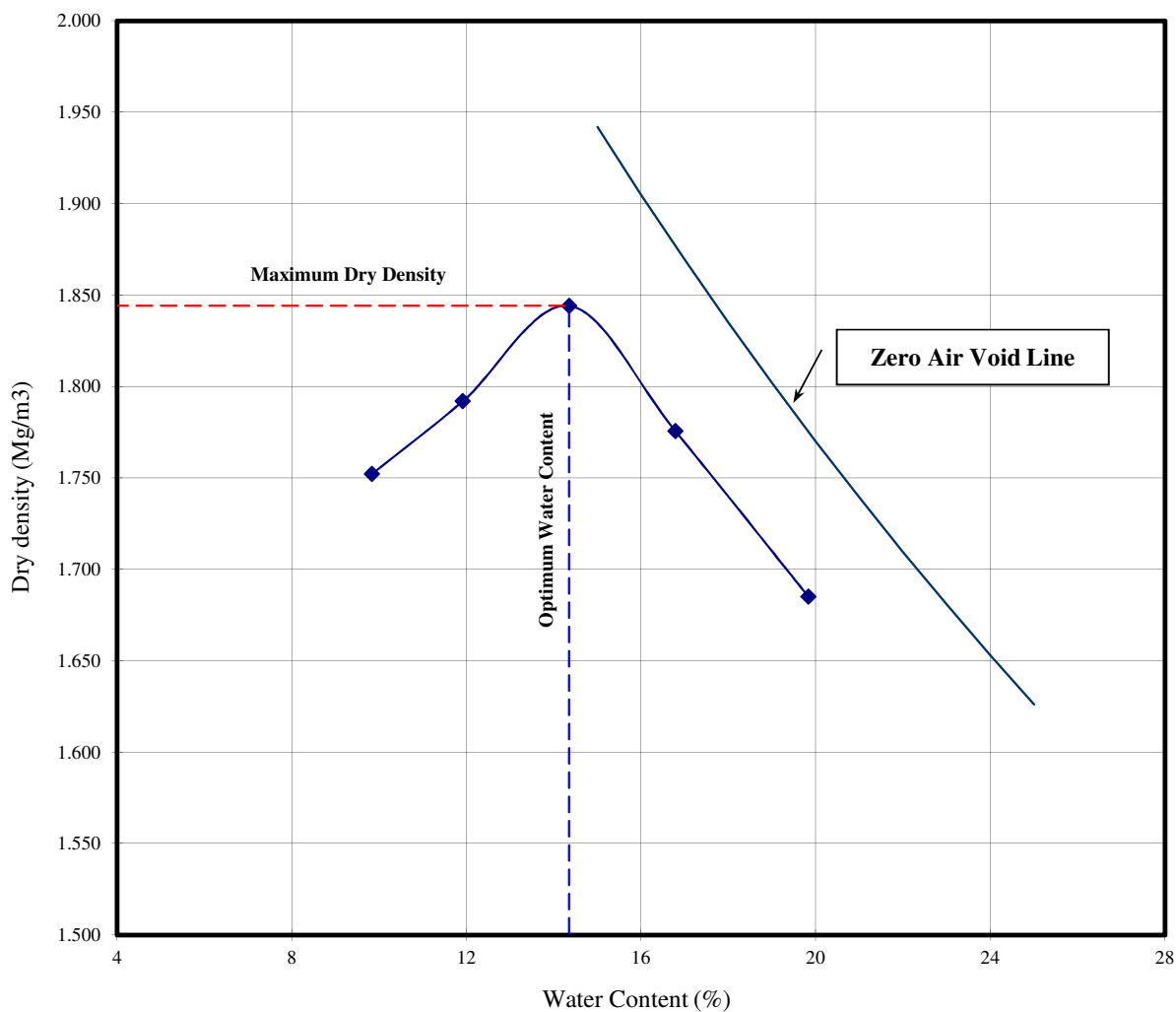
Sample No. : LD2-11-1 D-1(14.00-14.80m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.8	11.9	14.4	16.8	19.8			
Wet Density (Mg/m <sup>3</sup> )	1.924	2.005	2.109	2.074	2.019			
Dry Density (Mg/m <sup>3</sup> )	1.752	1.792	1.844	1.776	1.685			

Maximum Dry Density	<b>1.844 Mg/m<sup>3</sup></b>
Optimum Water Content	<b>14.4 %</b>



# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/11/21**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

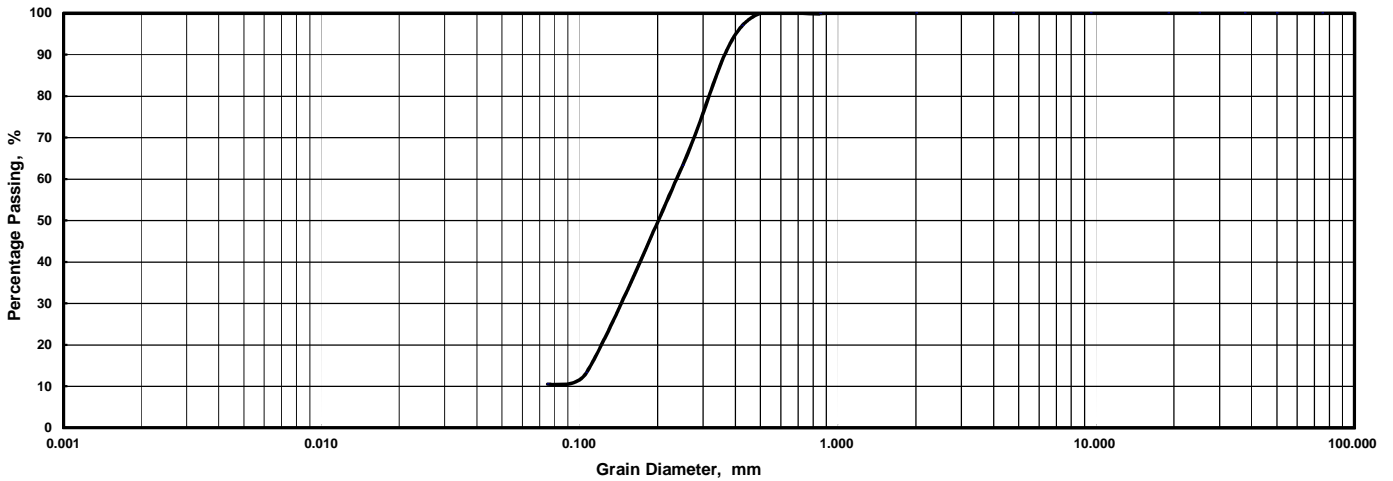
Sample No. : **SPT-6**

Depth : **9.00-9.45 m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	97.0	63.3	13.3	10.5
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.3	27.7	65.4	67.5
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.0	36.7	86.7	89.5

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-6 9.00-9.45 m		Sample No. Depth	SPT-6 9.00-9.45 m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.24	mm
2.00 - 0.425 mm	3.0	%	Dia. at 50%	0.20	mm
0.425 - 0.075 mm	86.5	%	Dia. at 30%	0.14	mm
0.075 - 0.005 mm	10.5	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	100.0	%	Coeff. of Curvature		
425um Sieve Passing	97.0	%			
75um Sieve Passing	10.5	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/11/21**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

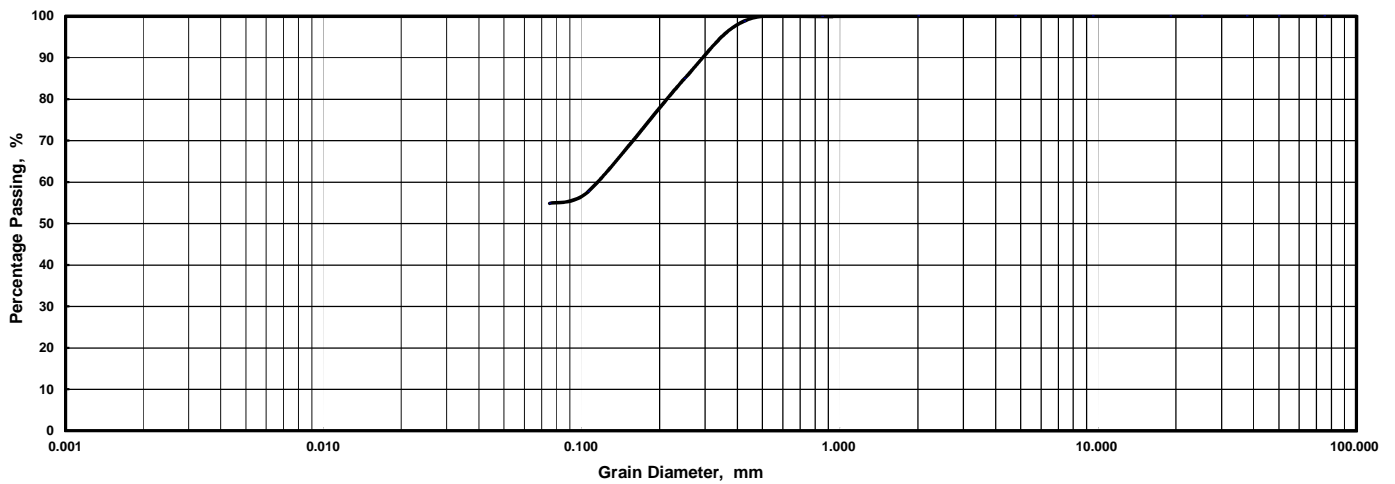
Sample No. : **SPT-7**

Depth : **10.00-10.45 m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	98.8	85.0	57.7	54.9
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	9.8	27.6	29.5
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	15.0	42.3	45.1

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	SPT-7		Sample No.	SPT-7	
Depth	10.00-10.45 m		Depth	10.00-10.45 m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.11 mm	
2.00 - 0.425 mm	1.2 %		Dia. at 50%	mm	
0.425 - 0.075 mm	44.0 %		Dia. at 30%	mm	
0.075 - 0.005 mm	54.9 %		Dia. at 10%	mm	
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	100.0 %		Coeff. of Curvature		
425um Sieve Passing	98.8 %				
75um Sieve Passing	54.9 %				



# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/11/21**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

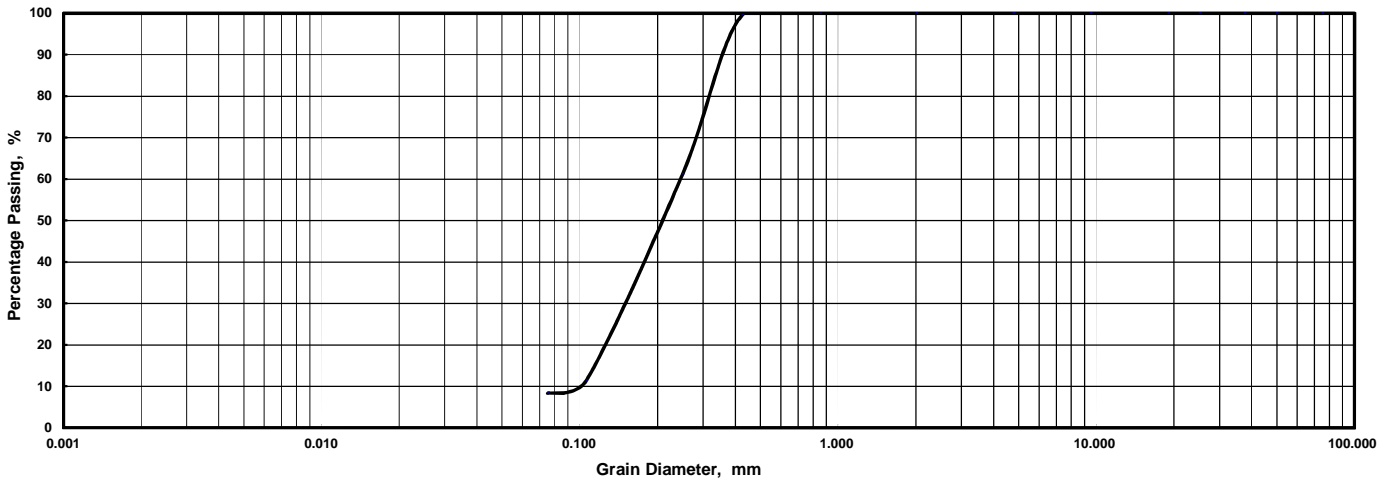
Sample No. : **SPT-8**

Depth : **12.00-12.45 m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	61.2	11.5	8.3
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	28.4	64.8	67.1
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	38.8	88.5	91.7

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-8 12.00-12.45 m		Sample No. Depth	SPT-8 12.00-12.45 m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.24 mm	
2.00 - 0.425 mm	0.4 %		Dia. at 50%	0.21 mm	
0.425 - 0.075 mm	91.2 %		Dia. at 30%	0.15 mm	
0.075 - 0.005 mm	8.3 %		Dia. at 10%	0.090 mm	
Smaller than 0.005 mm			Coeff. of Uniformity	2.72	
2000um Sieve Passing	100.0 %		Coeff. of Curvature	0.96	
425um Sieve Passing	99.6 %				
75um Sieve Passing	8.3 %				

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/29**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

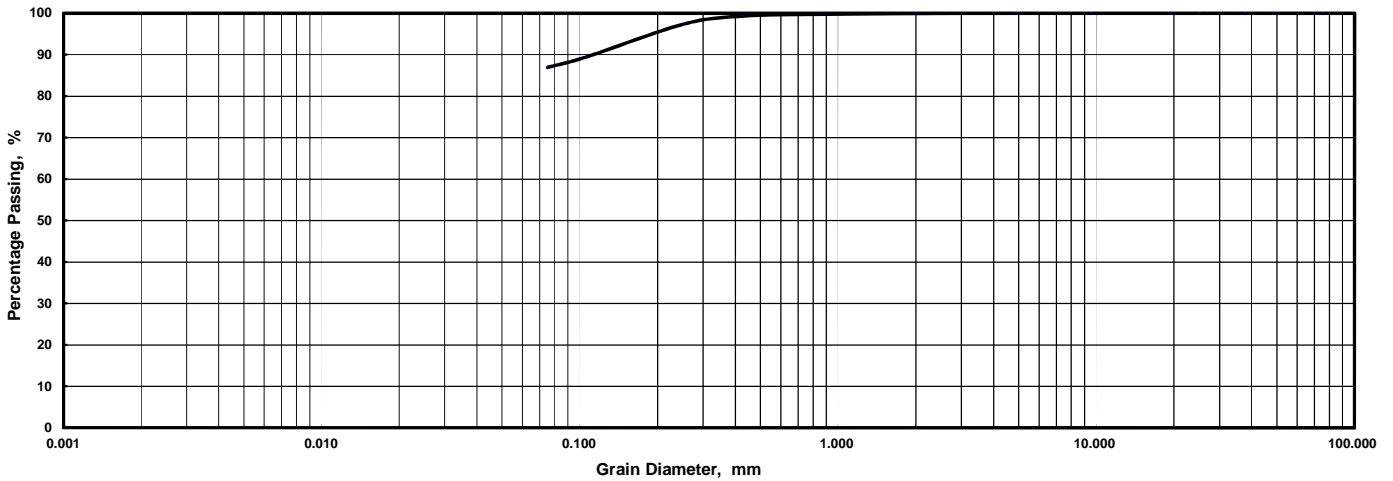
Sample No. : **SPT-9**

Depth : **13.00-13.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.3	97.3	89.5	86.9
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	1.8	7.0	8.7
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.7	2.7	10.5	13.1

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-9 13.00-13.45m		Sample No. Depth	SPT-9 13.00-13.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.1	%	Dia. at 60%		mm
2.00 - 0.425 mm	0.6	%	Dia. at 50%		mm
0.425 - 0.075 mm	12.4	%	Dia. at 30%		mm
0.075 - 0.005 mm	86.9	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.9	%	Coeff. of Curvature		
425um Sieve Passing	99.3	%			
75um Sieve Passing	86.9	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/26**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

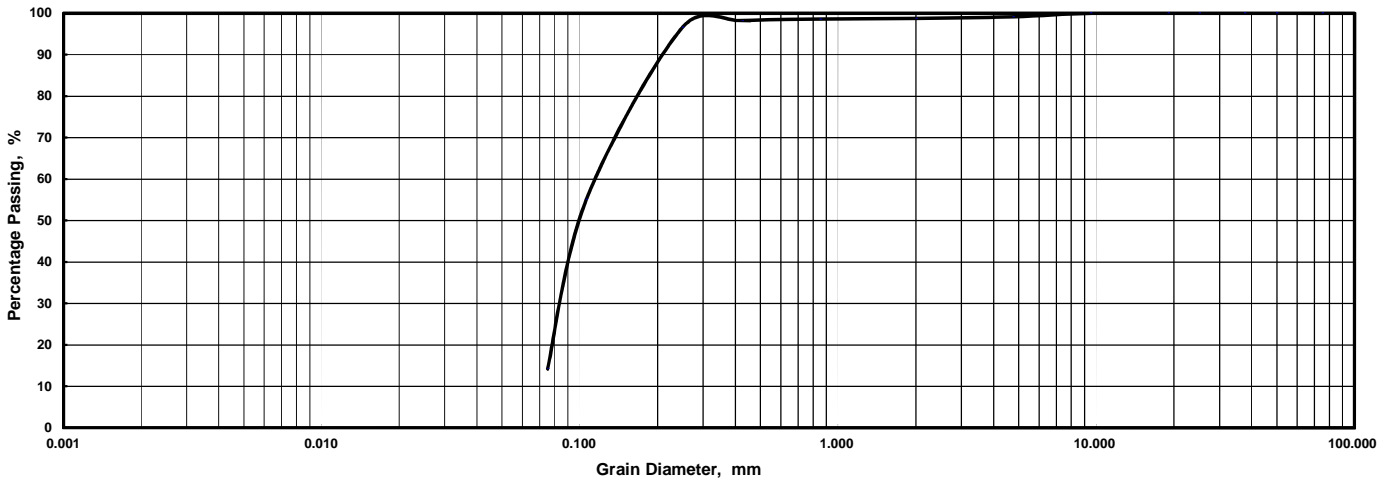
Sample No. : **D-1**

Depth : **14.00-14.80m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	99.1	98.7	98.6	98.2	96.6	55.1	14.2
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.1	1.3	1.6	3.0	40.2	76.7
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.3	1.4	1.8	3.4	44.9	85.8

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	D-1		Sample No.	D-1	
Depth	14.00-14.80m		Depth	14.00-14.80m	
Larger than 4.75 mm	0.9	%	Max. Diameter	9.50	mm
4.75 - 2.00 mm	0.4	%	Dia. at 60%	0.12	mm
2.00 - 0.425 mm	0.5	%	Dia. at 50%	0.10	mm
0.425 - 0.075 mm	84.0	%	Dia. at 30%	0.09	mm
0.075 - 0.005 mm	14.2	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	98.7	%	Coeff. of Curvature		
425um Sieve Passing	98.2	%			
75um Sieve Passing	14.2	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/29**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

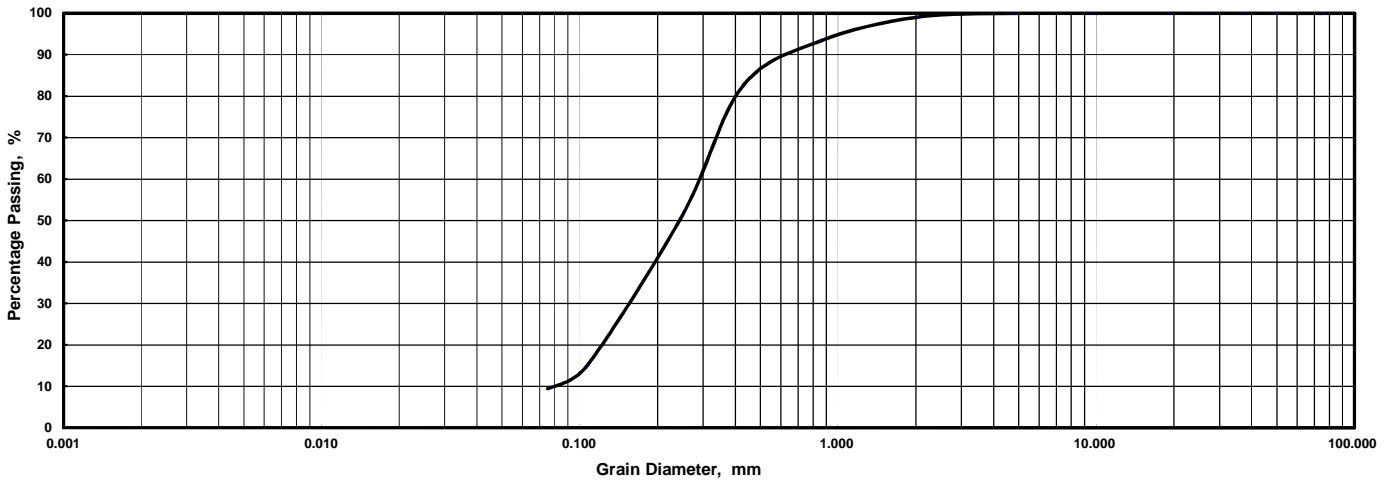
Sample No. : **SPT-10**

Depth : **15.00-15.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.0	93.3	82.2	51.4	14.8	9.4
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	6.0	15.7	43.0	75.4	80.1
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	6.7	17.8	48.6	85.2	90.6

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-10 15.00-15.45m		Sample No. Depth	SPT-10 15.00-15.45m	
Larger than 4.75 mm	0.1	%	Max. Diameter	9.50	mm
4.75 - 2.00 mm	0.9	%	Dia. at 60%	0.29	mm
2.00 - 0.425 mm	16.8	%	Dia. at 50%	0.24	mm
0.425 - 0.075 mm	72.8	%	Dia. at 30%	0.15	mm
0.075 - 0.005 mm	9.4	%	Dia. at 10%	0.078	mm
Smaller than 0.005 mm			Coeff. of Uniformity	3.73	
2000um Sieve Passing	99.0	%	Coeff. of Curvature	1.02	
425um Sieve Passing	82.2	%			
75um Sieve Passing	9.4	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/29**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

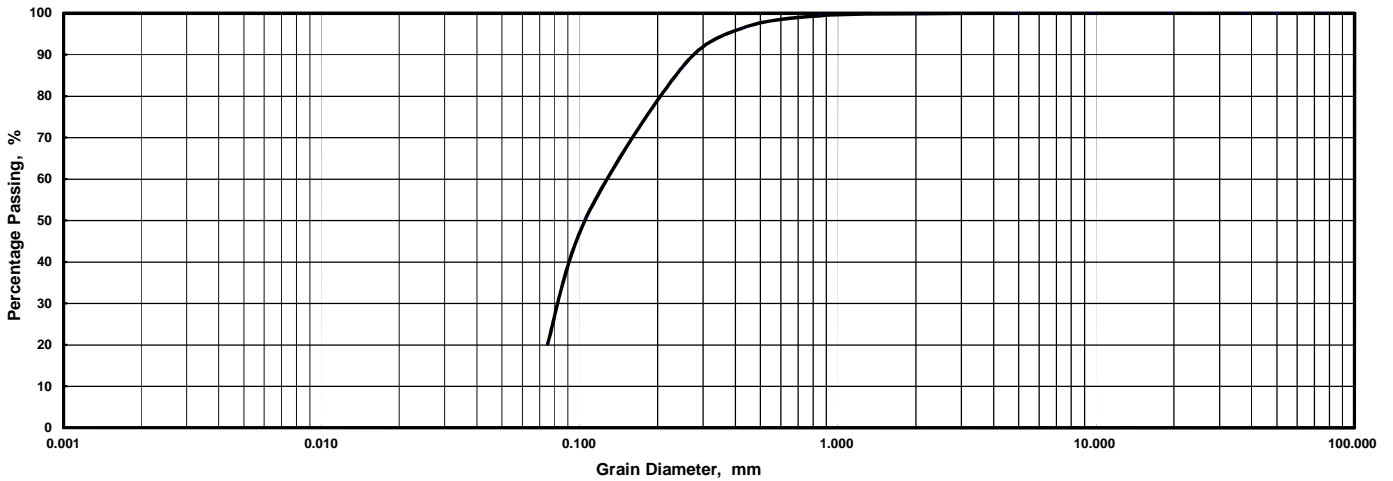
Sample No. : **SPT-11**

Depth : **16.00-16.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
Di., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.4	96.4	87.1	50.8	20.2
Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	2.1	7.4	28.3	45.8
Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	3.6	12.9	49.2	79.8

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-11 16.00-16.45m		Sample No. Depth	SPT-11 16.00-16.45m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.1 %		Dia. at 60%	0.13 mm	
2.00 - 0.425 mm	3.5 %		Dia. at 50%	0.11 mm	
0.425 - 0.075 mm	76.2 %		Dia. at 30%	0.08 mm	
0.075 - 0.005 mm	20.2 %		Dia. at 10%	mm	
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.9 %		Coeff. of Curvature		
425um Sieve Passing	96.4 %				
75um Sieve Passing	20.2 %				

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/29**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

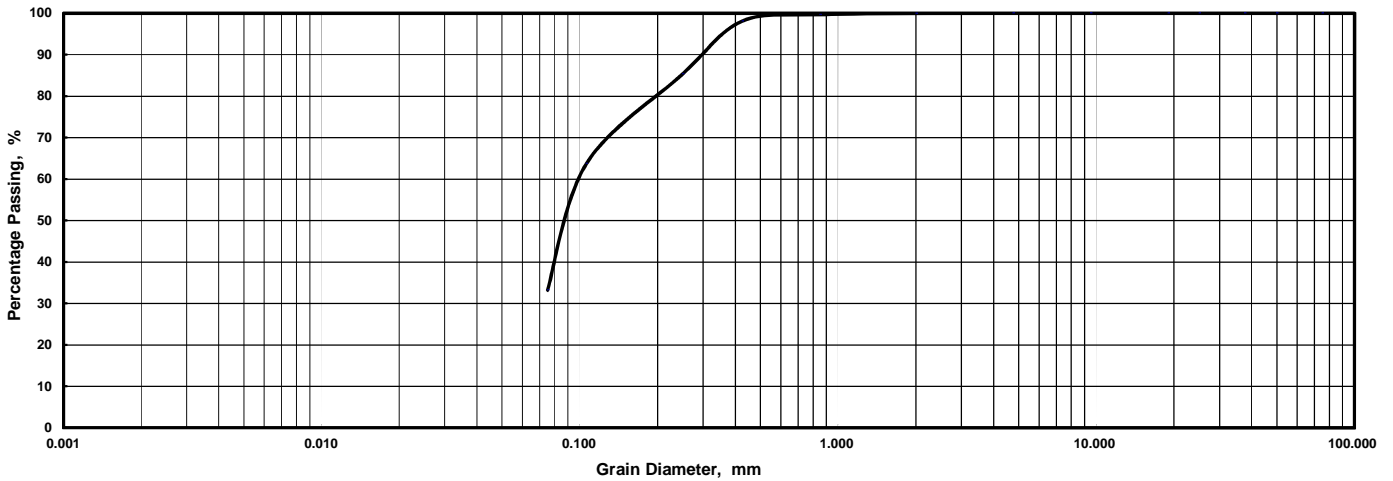
Sample No. : **SPT-12**

Depth : **18.00-18.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	98.1	85.3	63.7	33.2
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.9	14.6	36.2	66.6
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.9	14.7	36.3	66.8

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-12 18.00-18.45m		Sample No. Depth	SPT-12 18.00-18.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.1	%	Dia. at 60%	0.10	mm
2.00 - 0.425 mm	1.8	%	Dia. at 50%	0.09	mm
0.425 - 0.075 mm	64.9	%	Dia. at 30%		mm
0.075 - 0.005 mm	33.2	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.9	%	Coeff. of Curvature		
425um Sieve Passing	98.1	%			
75um Sieve Passing	33.2	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/29**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

Sample No. : **SPT-13**

Depth : **19.00-19.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	99.0	97.4	81.3	51.1	39.3
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	2.0	14.3	37.4	46.4
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	2.6	18.7	48.9	60.7

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-13 19.00-19.45m		Sample No. Depth	SPT-13 19.00-19.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.5	%	Dia. at 60%	0.14	mm
2.00 - 0.425 mm	2.1	%	Dia. at 50%	0.10	mm
0.425 - 0.075 mm	58.1	%	Dia. at 30%		mm
0.075 - 0.005 mm	39.3	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.5	%	Coeff. of Curvature		
425um Sieve Passing	97.4	%			
75um Sieve Passing	39.3	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

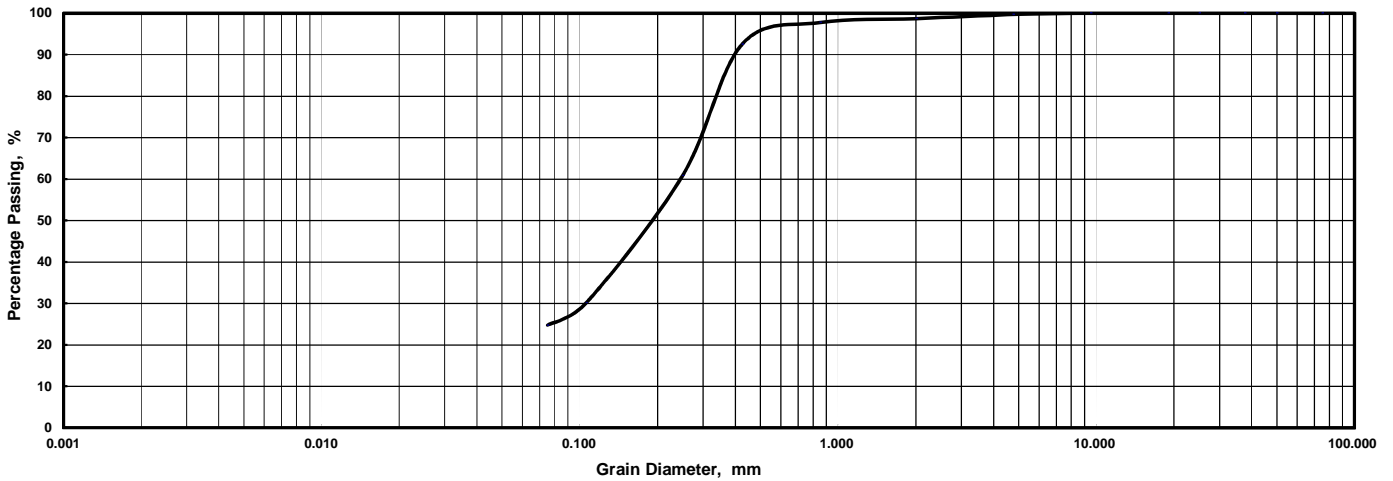
Sample No. : **SPT-17**

Depth : **24.00-24.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	99.7	98.7	97.8	92.5	60.8	30.2	24.8
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	2.2	7.3	38.2	68.1	73.4
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	2.2	7.5	39.2	69.8	75.2

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-17 24.00-24.45m		Sample No. Depth	SPT-17 24.00-24.45m	
Larger than 4.75 mm	0.3	%	Max. Diameter	9.50	mm
4.75 - 2.00 mm	1.0	%	Dia. at 60%	0.24	mm
2.00 - 0.425 mm	6.2	%	Dia. at 50%	0.18	mm
0.425 - 0.075 mm	67.8	%	Dia. at 30%	0.10	mm
0.075 - 0.005 mm	24.8	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	98.7	%	Coeff. of Curvature		
425um Sieve Passing	92.5	%			
75um Sieve Passing	24.8	%			



# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

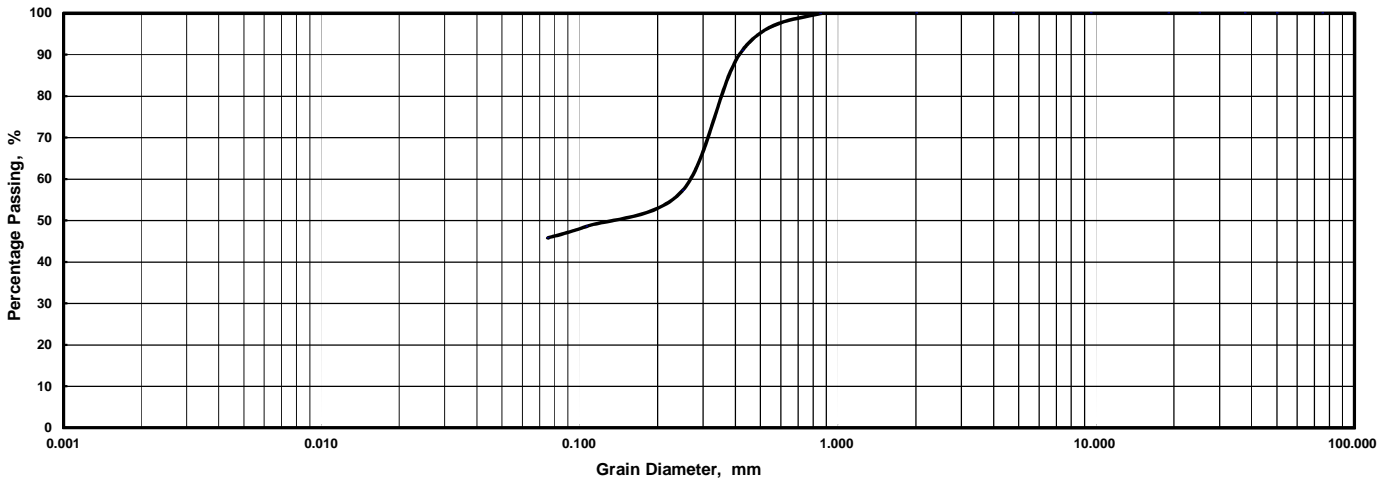
Sample No. : **SPT-18**

Depth : **25.00-25.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	91.0	57.3	48.6	45.8
Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	7.8	37.1	44.6	47.1
Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	9.0	42.7	51.4	54.2

**Grain Size Distribution Curves**



0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY		FINE	MEDIUM	COARSE	FINE	COARSE
	SILT		SAND		GRAVEL	

Sample No. Depth	SPT-18 25.00-25.45m	Sample No. Depth	SPT-18 25.00-25.45m
Larger than 4.75 mm	0.0 %	Max. Diameter	4.75 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.26 mm
2.00 - 0.425 mm	9.0 %	Dia. at 50%	0.12 mm
0.425 - 0.075 mm	45.2 %	Dia. at 30%	mm
0.075 - 0.005 mm	45.8 %	Dia. at 10%	mm
Smaller than 0.005 mm		Coeff. of Uniformity	
2000um Sieve Passing	100.0 %	Coeff. of Curvature	
425um Sieve Passing	91.0 %		
75um Sieve Passing	45.8 %		

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

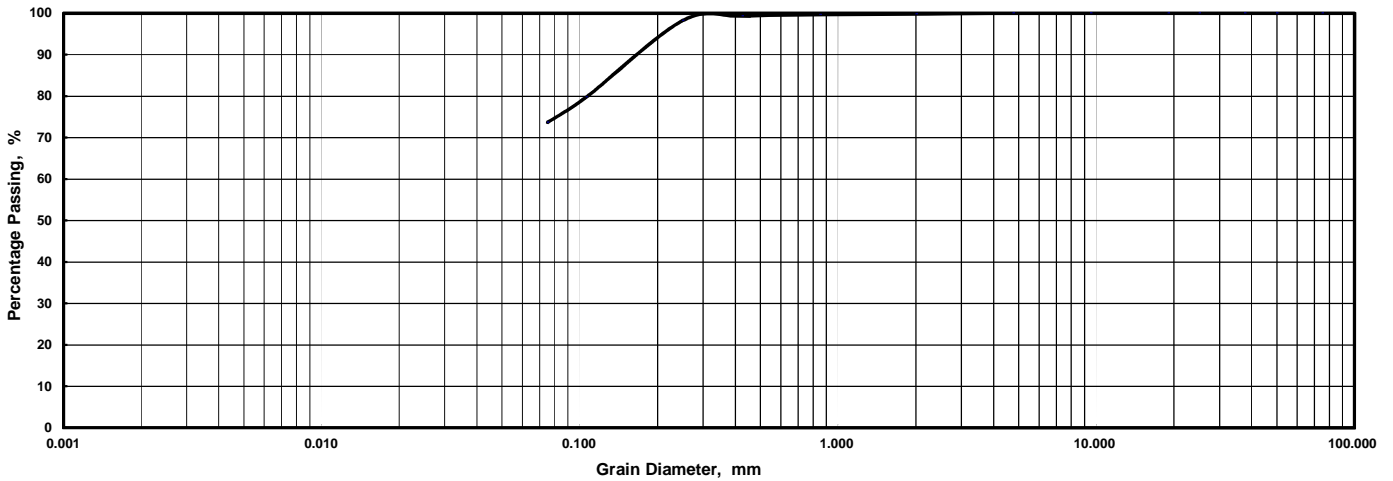
Sample No. : **SPT-19**

Depth : **26.00-26.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.3	98.2	79.8	73.7
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.6	1.5	17.3	22.6
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.7	1.8	20.2	26.3

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	SPT-19		Sample No.	SPT-19	
Depth	26.00-26.45m		Depth	26.00-26.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.2	%	Dia. at 60%		mm
2.00 - 0.425 mm	0.5	%	Dia. at 50%		mm
0.425 - 0.075 mm	25.6	%	Dia. at 30%		mm
0.075 - 0.005 mm	73.7	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.8	%	Coeff. of Curvature		
425um Sieve Passing	99.3	%			
75um Sieve Passing	73.7	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

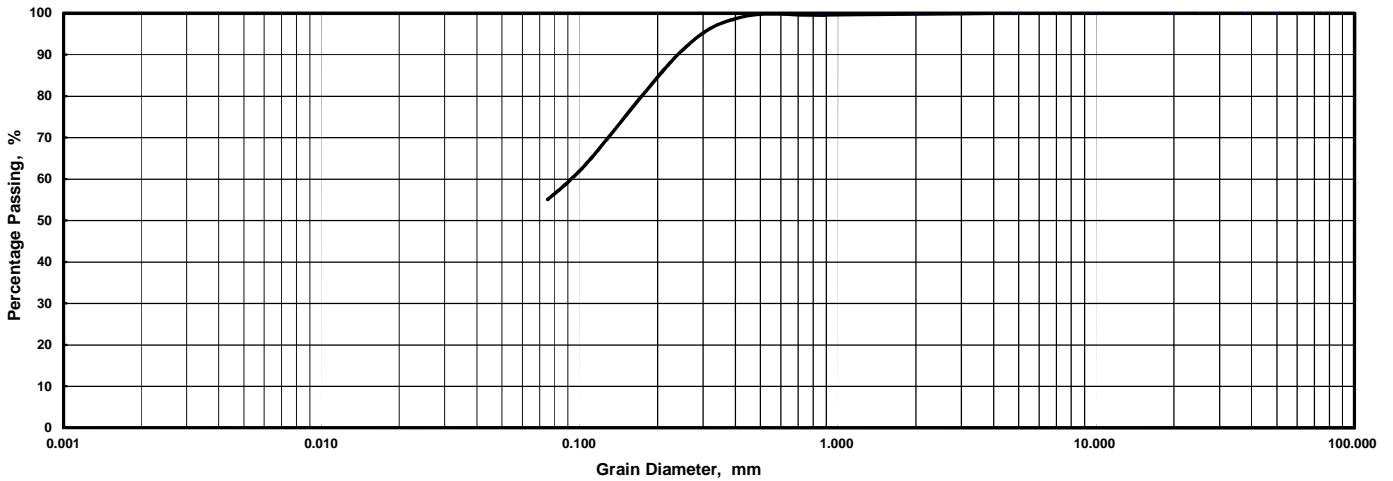
Sample No. : **SPT-20**

Depth : **27.00-27.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.1	91.2	63.7	55.0
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.6	6.3	25.9	32.1
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.9	8.8	36.3	45.0

**Grain Size Distribution Curves**



0.005		0.075		0.425		2.00		4.75		19.0		75.0	
CLAY	SILT		FINE SAND		MEDIUM SAND		COARSE SAND		FINE GRAVEL		COARSE GRAVEL		

Sample No. Depth	SPT-20 27.00-27.45m		Sample No. Depth	SPT-20 27.00-27.45m	
Larger than 4.75 mm	0.0 %		Max. Diameter	4.75 mm	
4.75 - 2.00 mm	0.2 %		Dia. at 60%	0.09 mm	
2.00 - 0.425 mm	0.7 %		Dia. at 50%	mm	
0.425 - 0.075 mm	44.1 %		Dia. at 30%	mm	
0.075 - 0.005 mm	55.0 %		Dia. at 10%	mm	
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	99.8 %		Coeff. of Curvature		
425um Sieve Passing	99.1 %				
75um Sieve Passing	55.0 %				

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

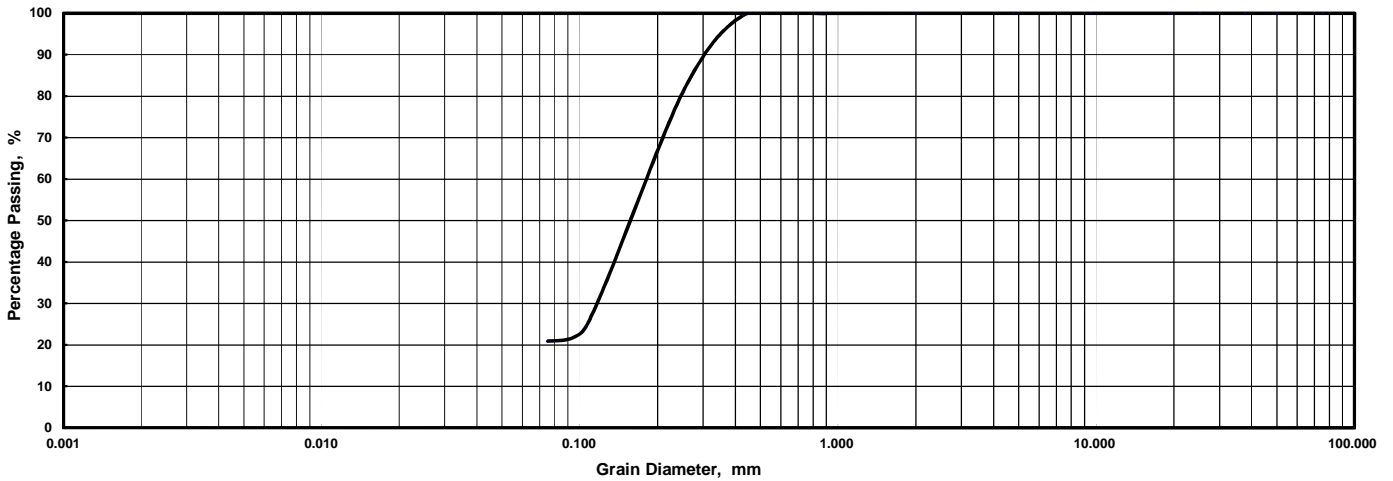
Sample No. : **SPT-21**

Depth : **28.00-28.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.3	80.9	24.5	20.9
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	15.8	62.5	65.5
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	19.1	75.5	79.1

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-21 28.00-28.45m		Sample No. Depth	SPT-21 28.00-28.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.18	mm
2.00 - 0.425 mm	0.7	%	Dia. at 50%	0.16	mm
0.425 - 0.075 mm	78.4	%	Dia. at 30%	0.12	mm
0.075 - 0.005 mm	20.9	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	100.0	%	Coeff. of Curvature		
425um Sieve Passing	99.3	%			
75um Sieve Passing	20.9	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

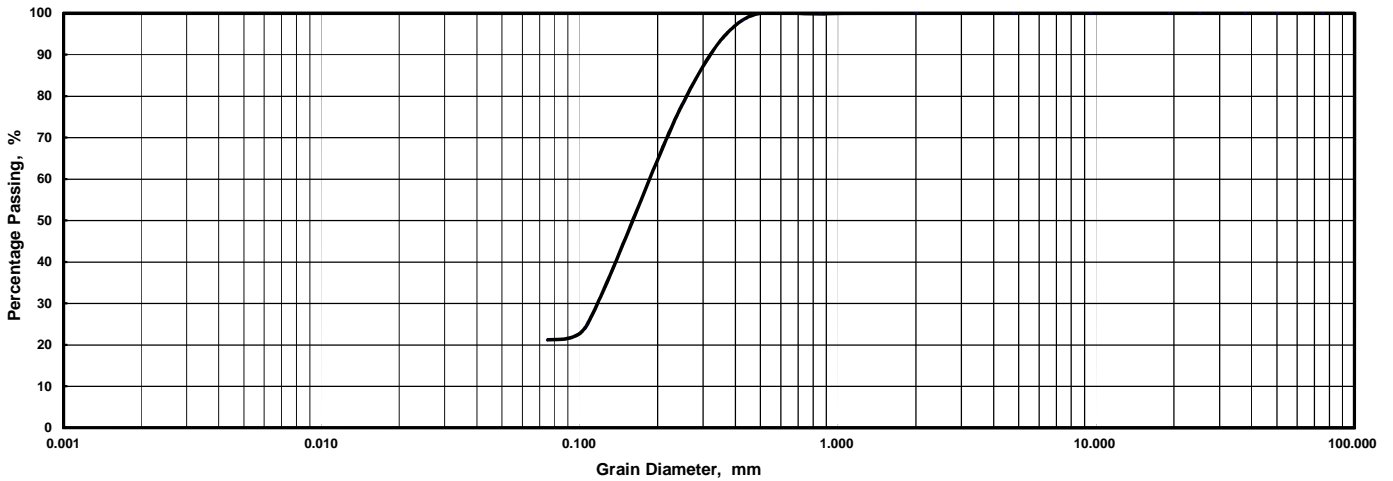
Sample No. : **SPT-22**

Depth : **29.00-29.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.3	78.1	24.6	21.2
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	10.8	37.2	38.8
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.7	21.9	75.4	78.8

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	SPT-22		Sample No.	SPT-22	
Depth	29.00-29.45m		Depth	29.00-29.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.19	mm
2.00 - 0.425 mm	1.7	%	Dia. at 50%	0.16	mm
0.425 - 0.075 mm	77.1	%	Dia. at 30%	0.12	mm
0.075 - 0.005 mm	21.2	%	Dia. at 10%		mm
Smaller than 0.005 mm			Coeff. of Uniformity		
2000um Sieve Passing	100.0	%	Coeff. of Curvature		
425um Sieve Passing	98.3	%			
75um Sieve Passing	21.2	%			

# GRAIN SIZE DISTRIBUTION

Project : **PS on Matarbari USC Coal-fired Power Project**

Location : **LD 2-11-1**

Project No. : **S27-14**

Tested Method : **ASTM D422-63**

Date of Testing : **2014/9/17**

Tested By : **Sadamoto**

Checked by : \_\_\_\_\_

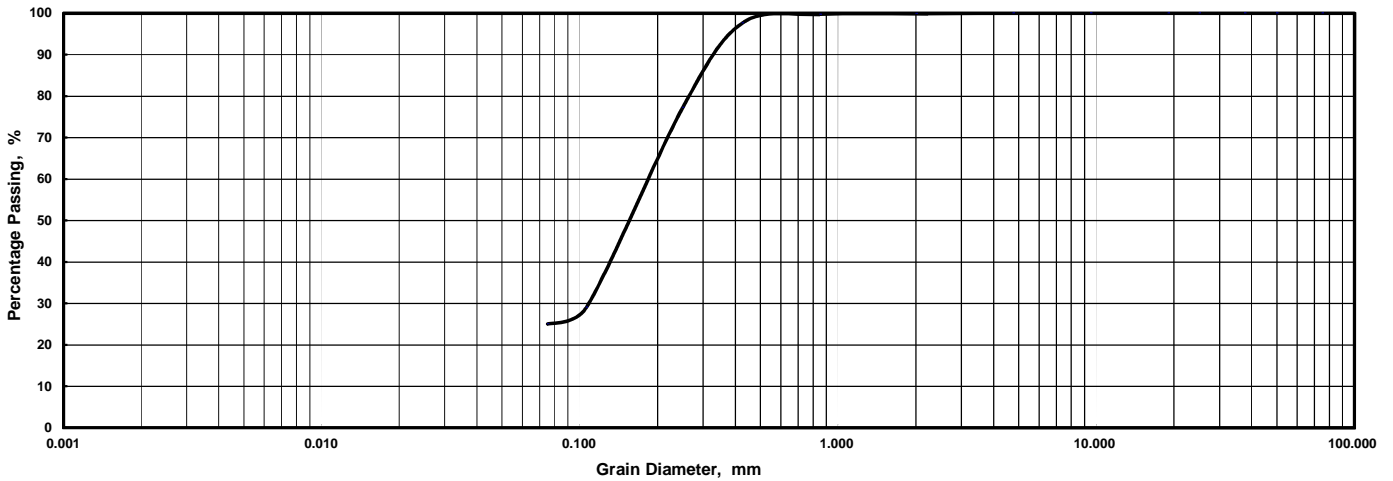
Sample No. : **SPT-23**

Depth : **30.00-30.45m** ( \_\_\_\_\_ )

Particle Density, Mg/m<sup>3</sup> : -

Sieve	Dia., mm	75.0	50.00	37.50	25.00	19.00	9.50	4.75	2.000	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	97.6	77.2	29.0	25.0
	Retained Mass, g	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.4	13.0	40.4	42.6
	Cumulative % Retained	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	2.4	22.8	71.0	75.0

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No. Depth	SPT-23 30.00-30.45m		Sample No. Depth	SPT-23 30.00-30.45m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.1	%	Dia. at 60%	0.18	mm
2.00 - 0.425 mm	2.3	%	Dia. at 50%	0.15	mm
0.425 - 0.075 mm	72.6	%	Dia. at 30%	0.11	mm
0.075 - 0.005 mm			Dia. at 10%		mm
Smaller than 0.005 mm	25.0	%	Coeff. of Uniformity		
2000um Sieve Passing	99.9	%	Coeff. of Curvature		
425um Sieve Passing	97.6	%			
75um Sieve Passing	25.0	%			



19) LD2-11-1a



**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		LD2-11-1a								
Sample No.		HP-1	HP-2	HP-3	D-1	D-2	D-3	D-4		
Sample Depth		2.00m ~2.85m	5.00m ~5.90m	8.00m ~8.90m	11.00m ~11.80m	14.00m ~14.60m	17.00m ~17.80m	20.00m ~20.70m		
Condition of Sample		Undisturbed			Disturbed					
Natural Water Content %		30.2	30.8	36.4	26.4	27.7	22.8	25.6		
Specific Gravity		2.73	2.73	2.74	2.70	2.69	2.68	2.71		
Wet Density Mg/m <sup>3</sup>		1.89	1.91	1.82	1.96	-	-	1.94		
Dry Density Mg/m <sup>3</sup>		1.45	1.46	1.34	1.55	-	-	1.54		
Natural Void Ratio		0.88	0.87	1.05	0.74	-	-	0.75		
Degree of Saturation %		94	97	95	96	-	-	92		
Atterberg Limits	Liquid Limit, %	- *3	28	38	- *3	- *3	- *3	25		
	Plastic Limit, %	- *3	22	21	- *3	- *3	- *3	14		
	Plasticity Index, %	- *3	6	17	- *3	- *3	- *3	11		
Grain Size Analysis	Gravel, %	0	0	0	0	0	0	0		
	Sand, %	18	34	12	58	80	76	48		
	Silt, %	56	39	45	17	8	8	24		
	Clay & Colloid, %	26	27	43	25	12	16	28		
	Max. diameter, mm	0.850	0.425	2.00	0.850	0.425	4.75	4.75		
	Diam. at 60%, mm	0.044	0.055	0.014	0.14	0.16	0.27	0.20		
	Diam. at 10%, mm	-	-	-	-	-	-	-		
Visual soil description		Clayey Silt	Sandy Silt	Clay with Sand	Clayey Sand	Clayey Sand	Clayey Sand	Sandy Clay		
Unified soil classification		-	ML	CL	-	-	-	CL		
Triaxial compression test	Angle of Internal Friction (°)	-	-	-	-	-	-	-		
	Cohesion Intercept, kPa	-	-	-	-	-	-	-		
	Condition of drainage	-	-	-	-	-	-	-		
	Angle of Internal Friction *2 (°)	-	-	-	-	36	-	-		
	Cohesion Intercept, kPa *2	-	-	-	-	0	-	-		
	Condition of drainage	-	-	-	-	CD*5	-	-		
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-	-	-	-		
	Compression Index(Average)	-	-	-	-	-	-	-		
	Pressure Range for Compression Index(kPa)	-	-	-	-	-	-	-		
	Swell index	-	-	-	-	-	-	-		
Compaction Test *4	Maximum Dry Density, Mg/m <sup>3</sup>	-	-	-	-	1.60	-	-		
	Optimum Moisture Content, %	-	-	-	-	17.8	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-	-		
Strain at failure (%)		-	-	-	-	-	-	-		

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*2 : In terms of effective stress

\*3 : Unable to test because sample contains lot of sand

\*4 : By using 2.5 kg Rammer

\*5 : Specimens are prepared at 90% of Maximum dry density

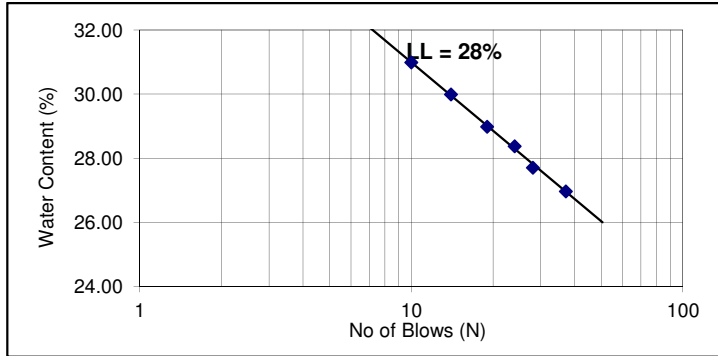
Checked by : A. B. Tan

## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project      Project No. : S27-14  
 Standard : ASTM D4318-10      Date of Testing : 04.12.14  
 Tested By : Vasantha      Checked By : A. B. Tan

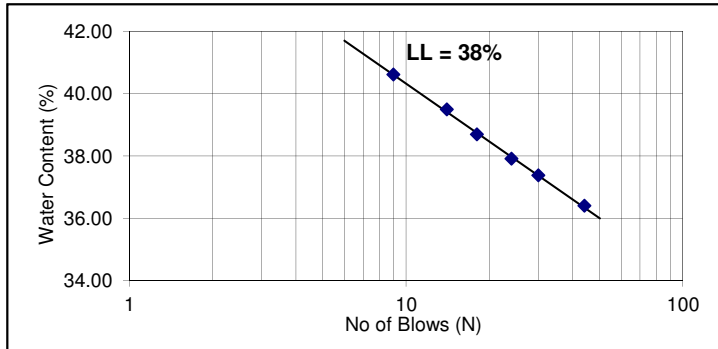
Sample No. : LD2-11-1a HP-2      Depth : 5.00-5.90m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	37	26.96
2	28	27.71
3	24	28.37
4	19	28.98
5	14	29.98
6	10	30.99
<b>Liquid Limits</b>	<b>%</b>	<b>28</b>
<b>Plastic Limits</b>	<b>%</b>	<b>22</b>
<b>Plasticity Index</b>		<b>6</b>



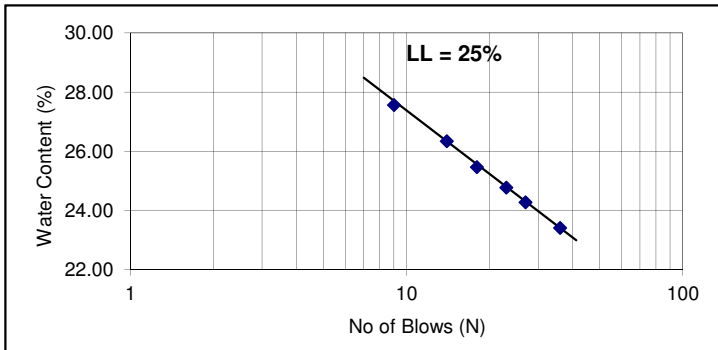
Sample No. : LD2-11-1a HP-3      Depth : 8.00-8.90m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	44	36.40
2	30	37.38
3	24	37.91
4	18	38.69
5	14	39.49
6	9	40.61
<b>Liquid Limits</b>	<b>%</b>	<b>38</b>
<b>Plastic Limits</b>	<b>%</b>	<b>21</b>
<b>Plasticity Index</b>		<b>17</b>



Sample No. : LD2-11-1a D-4      Depth : 20.00-20.70m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	36	23.42
2	27	24.28
3	23	24.78
4	18	25.47
5	14	26.34
6	9	27.56
<b>Liquid Limits</b>	<b>%</b>	<b>25</b>
<b>Plastic Limits</b>	<b>%</b>	<b>14</b>
<b>Plasticity Index</b>		<b>11</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

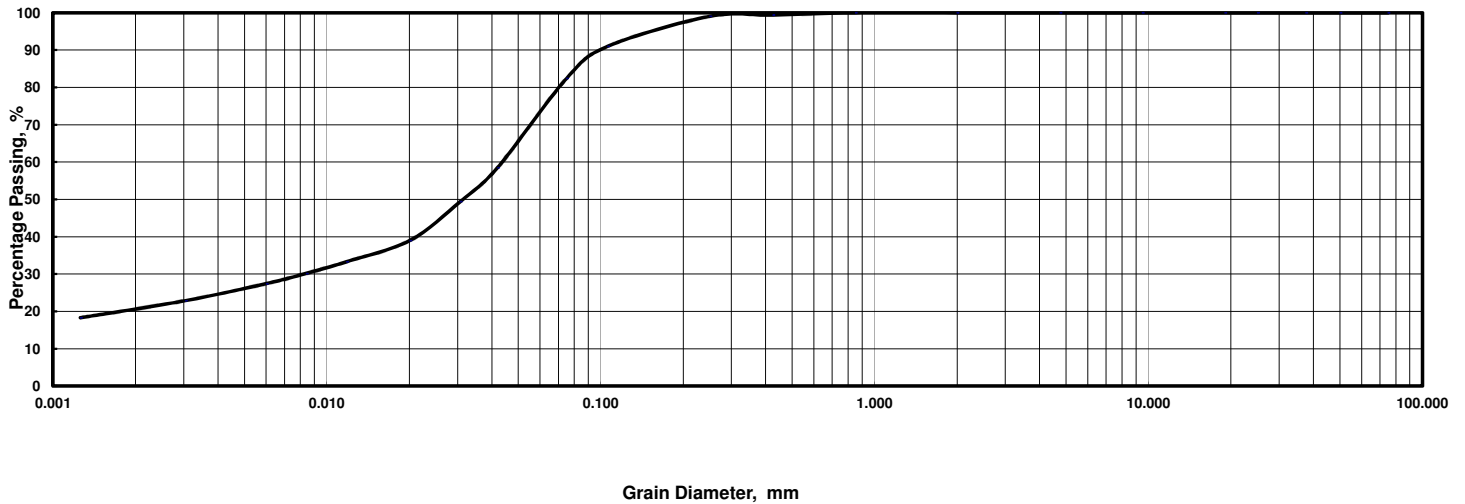
Sample No. : **LD2-11-1a HP-1** Depth : **2.00-2.85m** ( \_\_\_\_\_ ) Specific Gravity : 2.73

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	99.0	91.0	82.4
Hydro.	Dia., mm	0.042	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	58.6	49.4	39.0	33.3	30.2	27.4	22.9	18.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a HP-1	Sample No.	LD2-11-1a HP-1
Depth	2.00-2.85m	Depth	2.00-2.85m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.044 mm
2.00 - 0.425 mm	0.6 %	Dia. at 30%	0.0082 mm
0.425 - 0.075 mm	17.0 %	Dia. at 10%	- mm
0.075 - 0.005 mm	56.5 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	25.9 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	82.4 %		

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **01.12.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

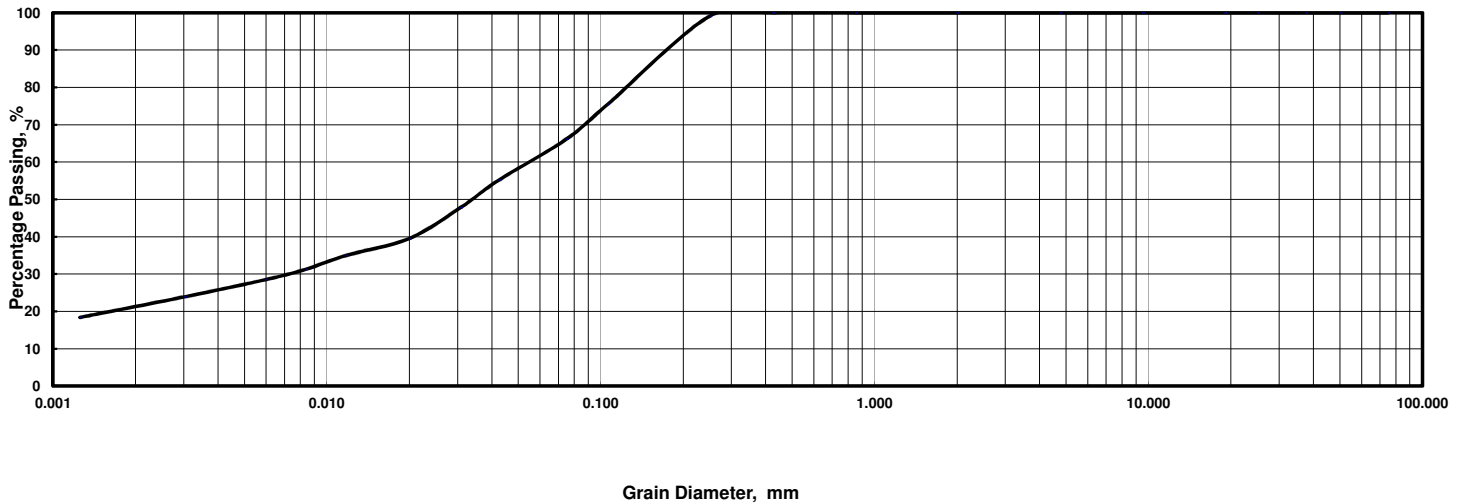
Sample No. : **LD2-11-1a HP-2** Depth : **5.00-5.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.73

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	75.5	66.2
Hydro.	Dia., mm	0.042	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	55.2	47.8	39.5	34.9	31.3	28.5	23.9	18.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a HP-2	Sample No.	LD2-11-1a HP-2
Depth	5.00-5.90m	Depth	5.00-5.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.055 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.0072 mm
0.425 - 0.075 mm	33.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	39.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	27.0 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	66.2 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

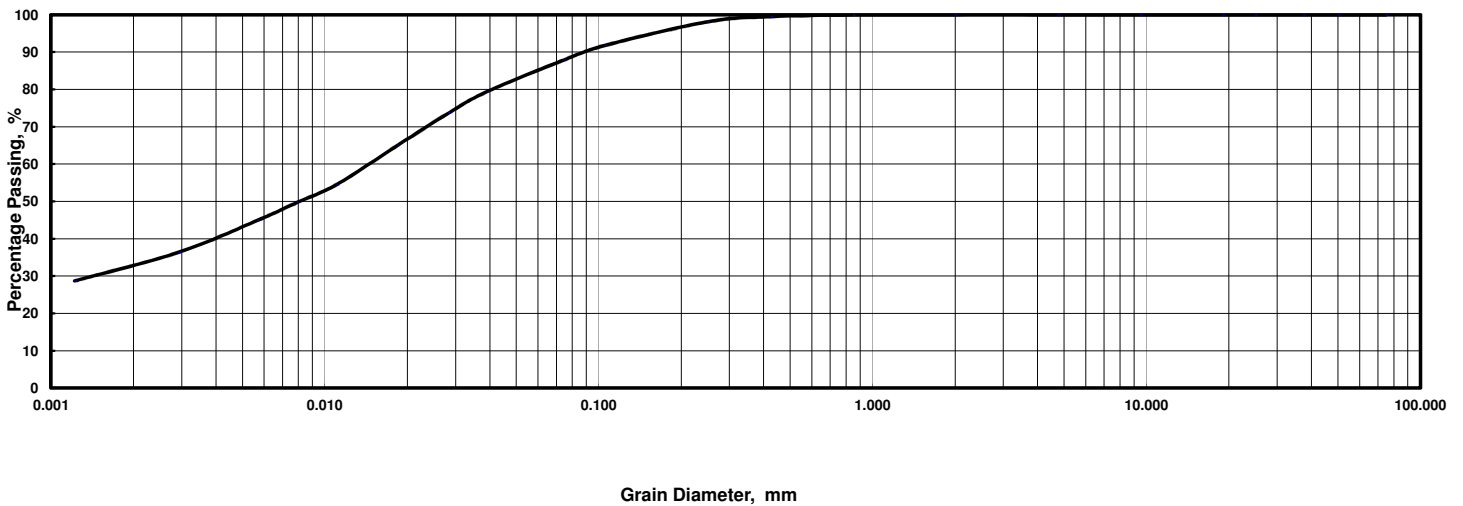
Sample No. : **LD2-11-1a HP-3** Depth : **8.00-8.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.74

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	98.1	91.8	87.9
Hydro.	Dia., mm	0.039	0.028	0.018	0.011	0.0079	0.0057	0.0029	0.0012							
	% Passing	79.4	73.7	65.1	54.5	49.8	45.0	36.4	28.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a HP-3	Sample No.	LD2-11-1a HP-3
Depth	8.00-8.90m	Depth	8.00-8.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.014 mm
2.00 - 0.425 mm	0.5 %	Dia. at 30%	0.0014 mm
0.425 - 0.075 mm	11.5 %	Dia. at 10%	- mm
0.075 - 0.005 mm	45.1 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	42.8 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.9 %		
75um Sieve Passing	87.9 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

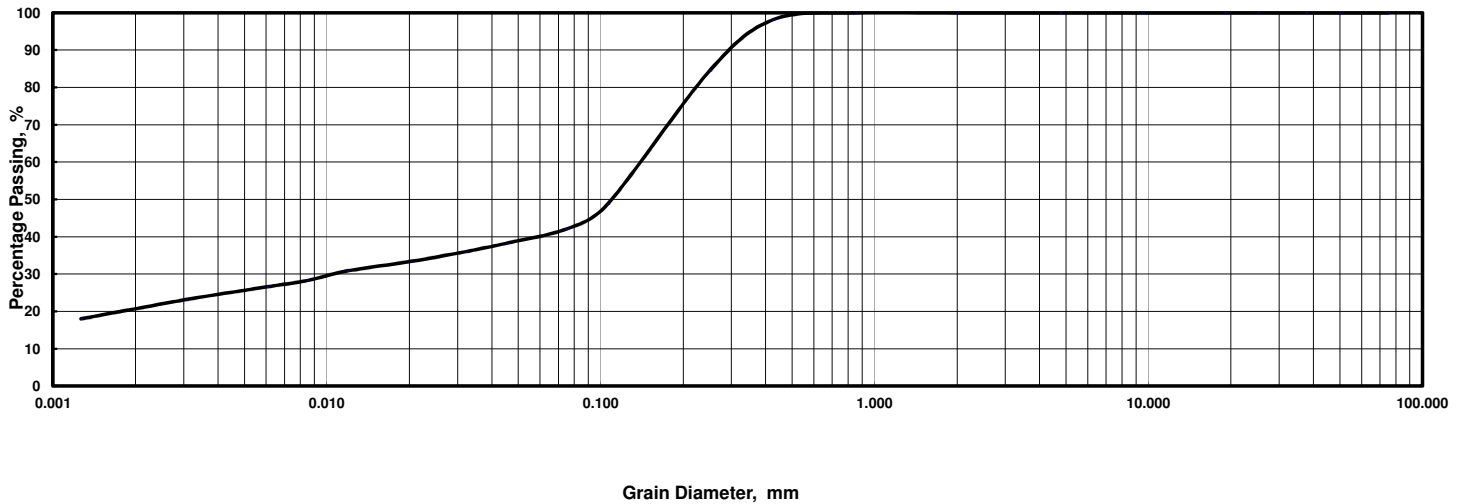
Sample No. : **LD2-11-1a D-1** Depth : **11.00-11.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1	84.5	48.8	42.1
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0085	0.0060	0.0030	0.0013							
	% Passing	38.2	36.0	33.4	30.9	28.3	26.6	23.1	18.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a D-1	Sample No.	LD2-11-1a D-1
Depth	11.00-11.80m	Depth	11.00-11.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.14 mm
2.00 - 0.425 mm	1.9 %	Dia. at 30%	0.011 mm
0.425 - 0.075 mm	56.0 %	Dia. at 10%	- mm
0.075 - 0.005 mm	16.7 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	25.4 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	42.1 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 02.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

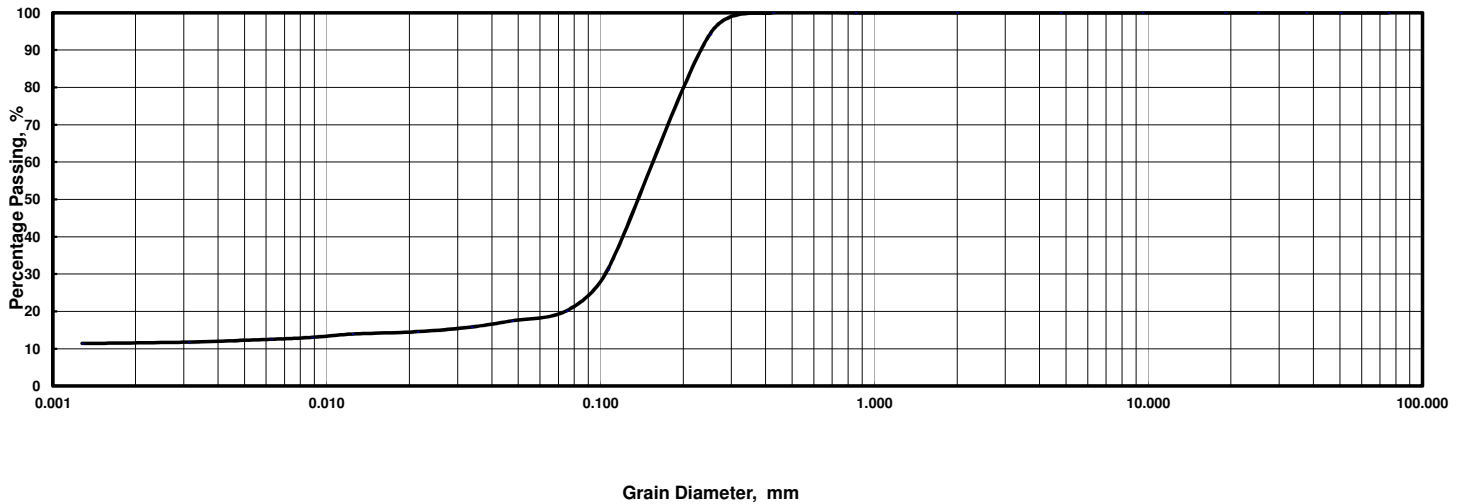
Sample No. : **LD2-11-1a D-2** Depth : **14.00-14.60m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	31.2	20.2
Hydro.	Dia., mm	0.047	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	17.5	15.8	14.6	13.9	13.0	12.5	11.8	11.4							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a D-2	Sample No.	LD2-11-1a D-2
Depth	14.00-14.60m	Depth	14.00-14.60m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.16 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.10 mm
0.425 - 0.075 mm	79.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	7.9 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	12.2 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	20.2 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 21.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

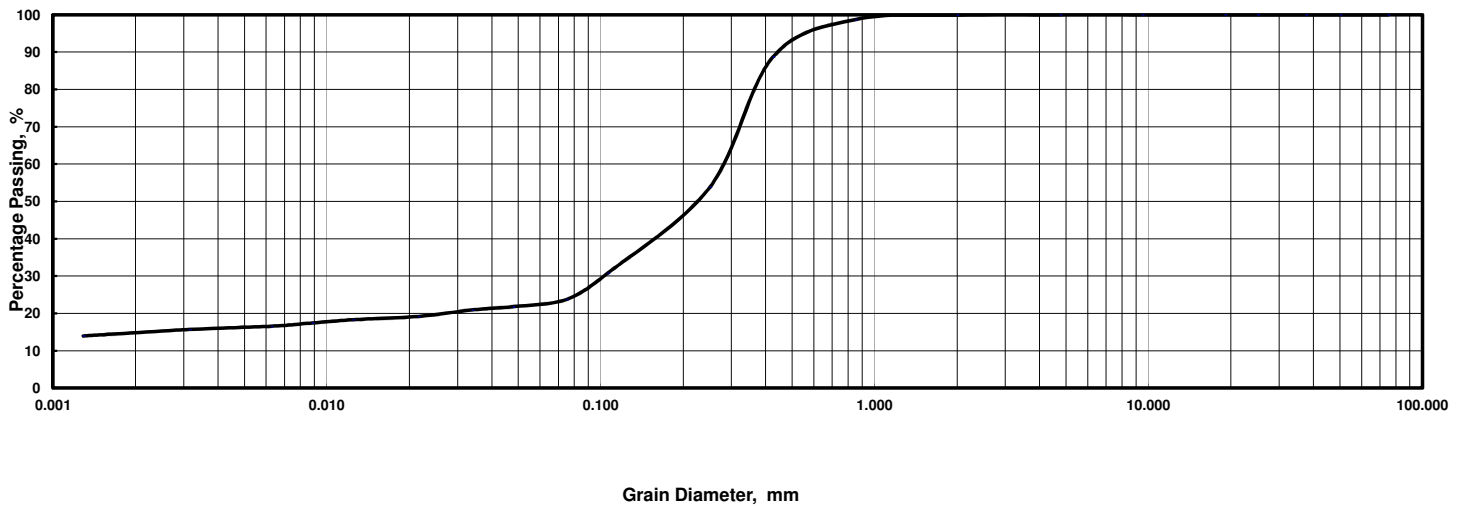
Sample No. : **LD2-11-1a D-3** Depth : **17.00-17.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	98.7	88.7	53.8	30.8	23.8
Hydro.	Dia., mm	0.048	0.034	0.022	0.012	0.0088	0.0063	0.0031	0.0013							
	% Passing	21.8	20.9	19.2	18.3	17.4	16.6	15.7	14.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a D-3	Sample No.	LD2-11-1a D-3
Depth	17.00-17.80m	Depth	17.00-17.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	4.75 mm
4.75 - 2.00 mm	0.1 %	Dia. at 60%	0.27 mm
2.00 - 0.425 mm	11.2 %	Dia. at 30%	0.10 mm
0.425 - 0.075 mm	64.9 %	Dia. at 10%	- mm
0.075 - 0.005 mm	7.5 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	16.2 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	98.7 %		
75um Sieve Passing	23.8 %		



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 02.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

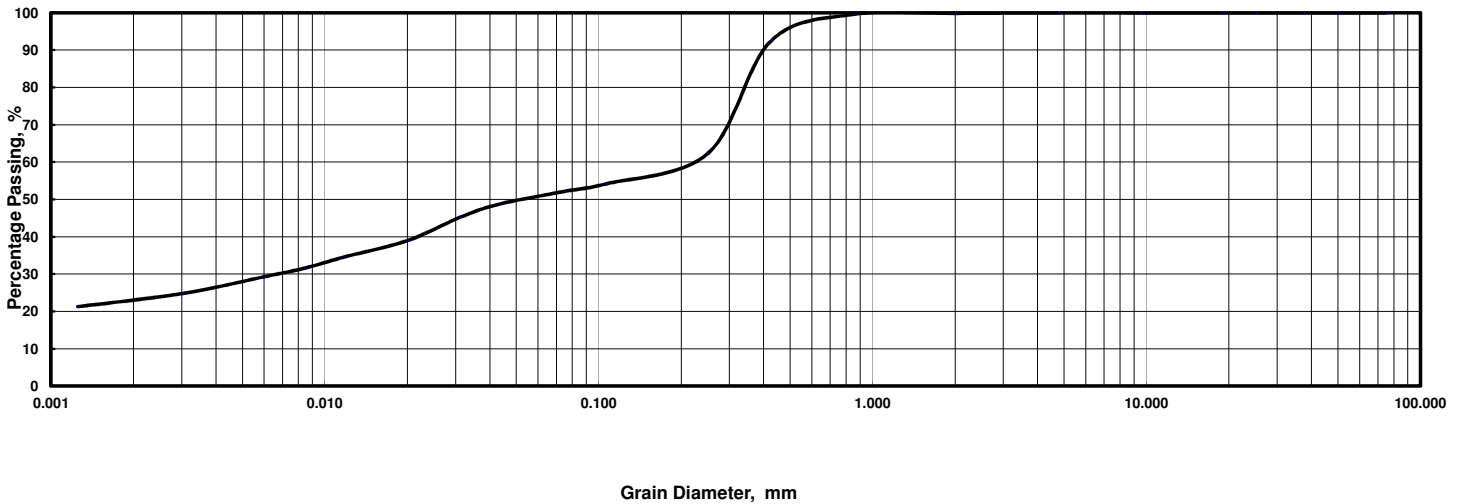
Sample No. : **LD2-11-1a D-4** Depth : **20.00-20.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	92.4	62.3	54.1	52.1
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	48.8	45.2	39.0	34.6	31.6	29.3	24.8	21.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1a D-4		Sample No.	LD2-11-1a D-4	
Depth	20.00-20.70m		Depth	20.00-20.70m	
Larger than 4.75 mm	0.0	%	Max. Diameter	4.75	mm
4.75 - 2.00 mm	0.2	%	Dia. at 60%	0.20	mm
2.00 - 0.425 mm	7.4	%	Dia. at 30%	0.0067	mm
0.425 - 0.075 mm	40.3	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	24.4	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	27.8	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.6	%			
75um Sieve Passing	52.1	%			

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 11.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-11-1a		Sample No.:D-2		Depth : 14.00-14.60m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.44	1.44	1.44		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.96	0.97	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.04	0.10	0.10		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	930	788	676		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.010	0.014	0.010		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	127	198	289		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-1.26	-0.22	0.05		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	10.48	11.85	9.32		
Shear Strength Parameters	$\phi_d = 36$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test)= 1.44Mg/m <sup>3</sup>						

## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

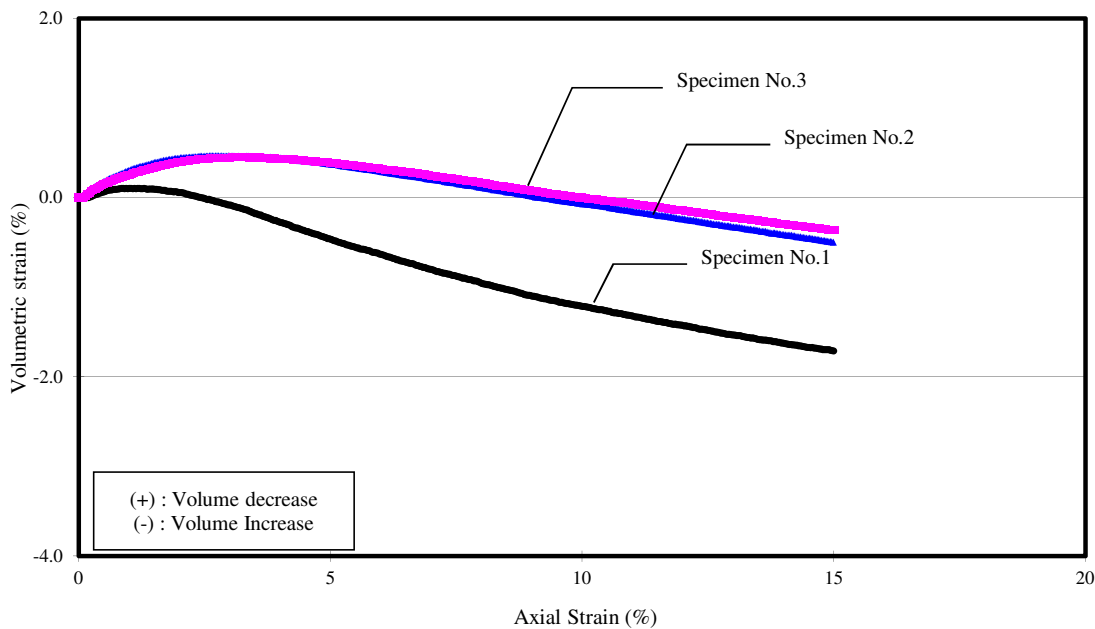
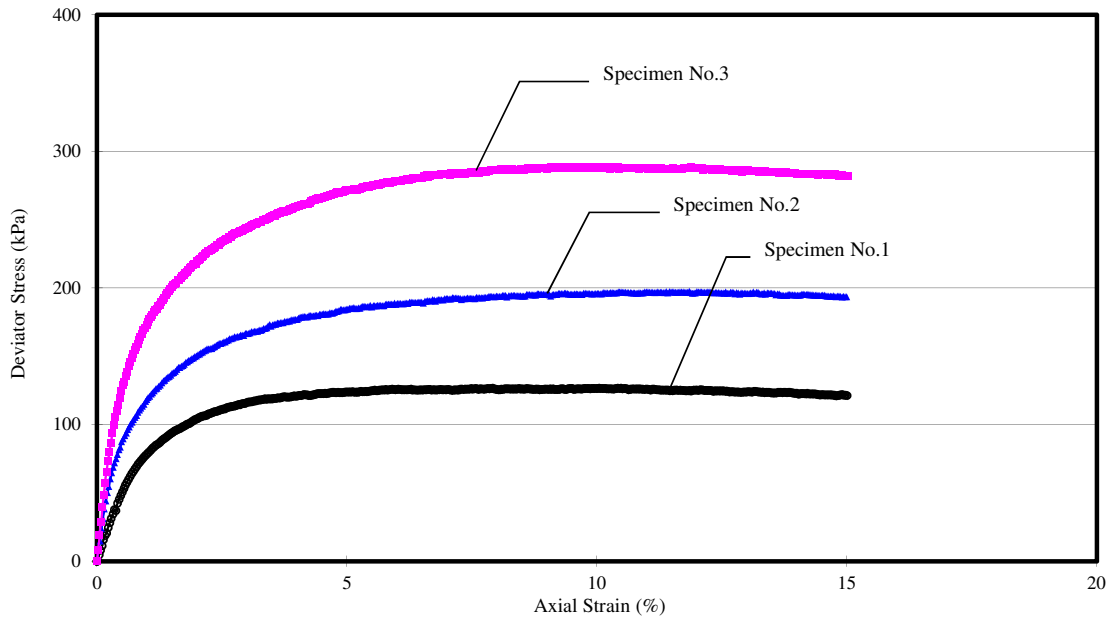
Project No.: S27-14

Sample No.: D-2

Soil Type: Clayey Sand

Borehole No.: LD2-11-1a

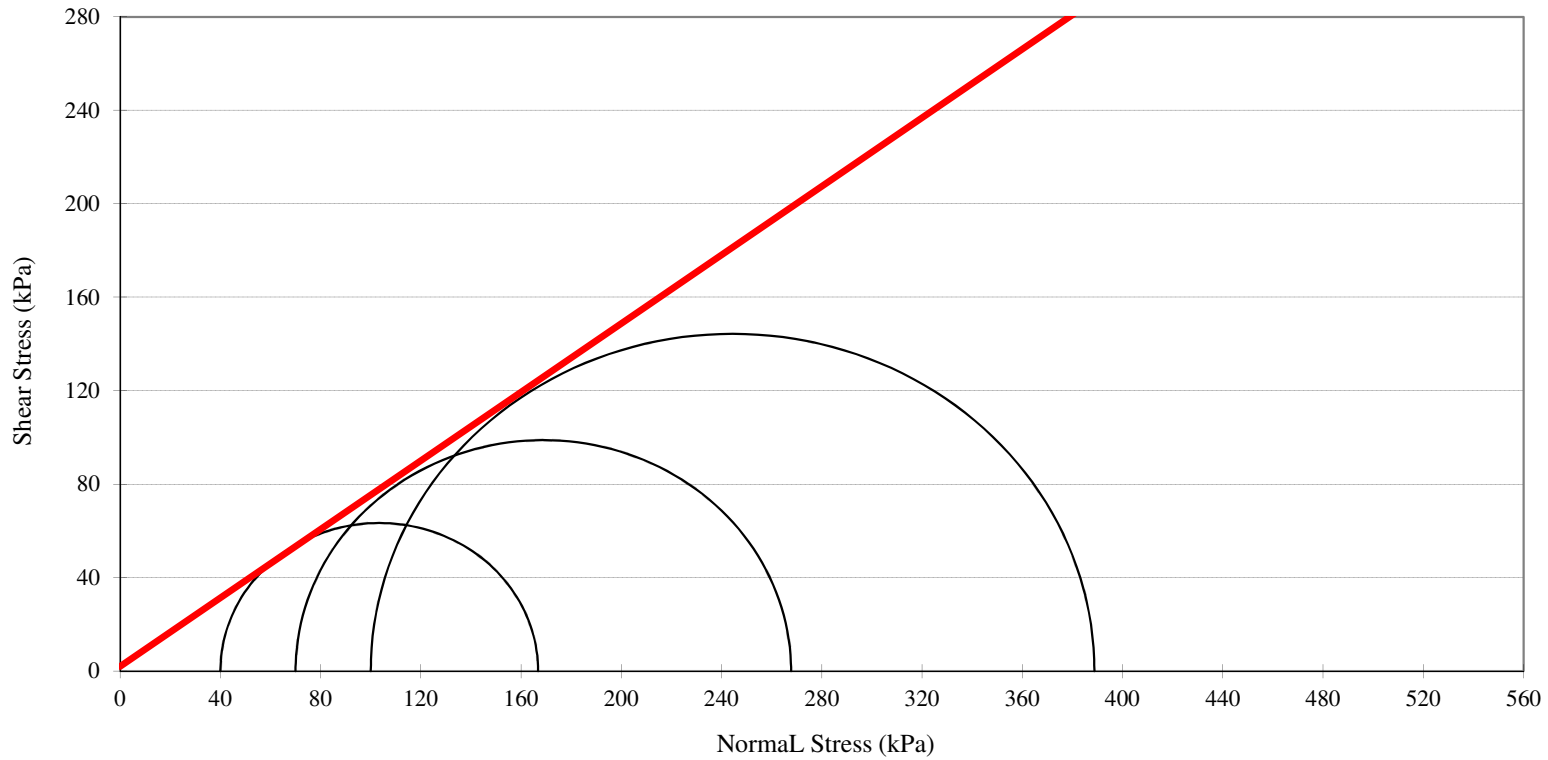
Depth : 14.00-14.60m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD2-11-1a      Soil Type: Clayey Sand  
 Sample No. : D-2              Depth : 14.00-14.60m  
 Angle of Internal Friction,  $\phi_d$       36 deg  
 Cohesion,  $c_d$                       0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

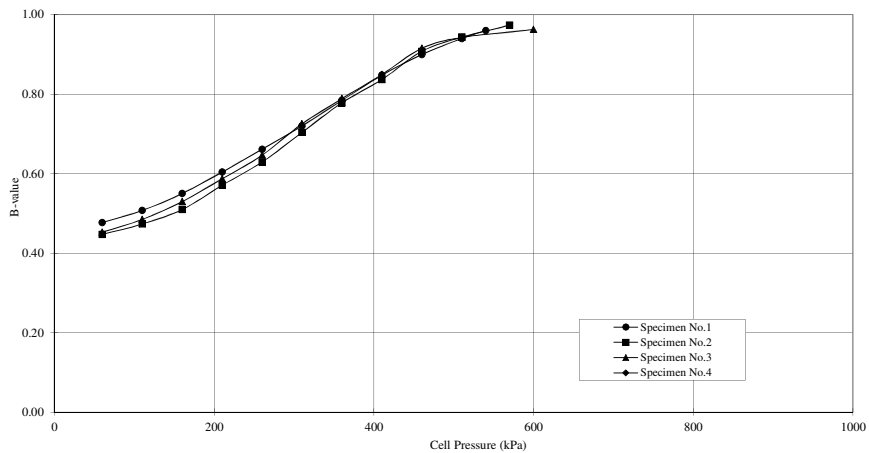
Borehole No.: LD2-11-1a

Sample No.: D-2

Depth : 14.00-14.60m

Soil Type: Clayey Sand

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	34.3	20	33.4	20	33.6		
	Back Pressure (kPa)	20		20		20			
	B-value	0.48		0.45		0.45			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	75.4	50	73.7	50	74.2		
	Back Pressure (kPa)	50		50		50			
	B-value	0.51		0.47		0.48			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	127.5	100	125.5	100	126.5		
	Back Pressure (kPa)	100		100		100			
	B-value	0.55		0.51		0.53			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	180.2	150	178.5	150	179.3		
	Back Pressure (kPa)	150		150		150			
	B-value	0.60		0.57		0.59			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	233.1	200	231.5	200	232.3		
	Back Pressure (kPa)	200		200		200			
	B-value	0.66		0.63		0.65			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	286.0	250	285.2	250	286.3		
	Back Pressure (kPa)	250		250		250			
	B-value	0.72		0.70		0.73			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	339.2	300	338.9	300	339.4		
	Back Pressure (kPa)	300		300		300			
	B-value	0.78		0.78		0.79			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	392.4	350	391.8	350	392.5		
	Back Pressure (kPa)	350		350		350			
	B-value	0.85		0.84		0.85			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.0	400	445.4	400	445.8		
	Back Pressure (kPa)	400		400		400			
	B-value	0.90		0.91		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.0	450	497.2	450	497.1		
	Back Pressure (kPa)	450		450		450			
	B-value	0.94		0.94		0.94			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.8	500	558.4	500	586.6		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.97		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

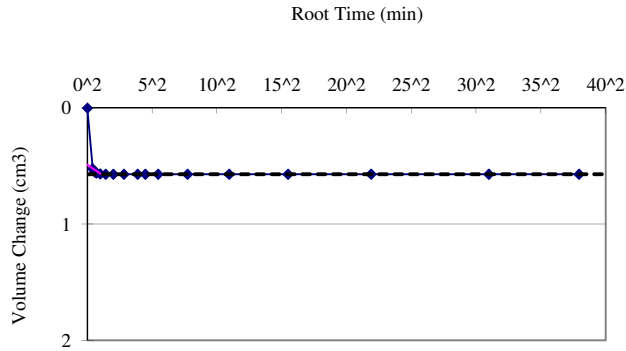
Project No.: S27-14

Borehole No.: LD2-11-1a

Soil Type: Clayey Sand

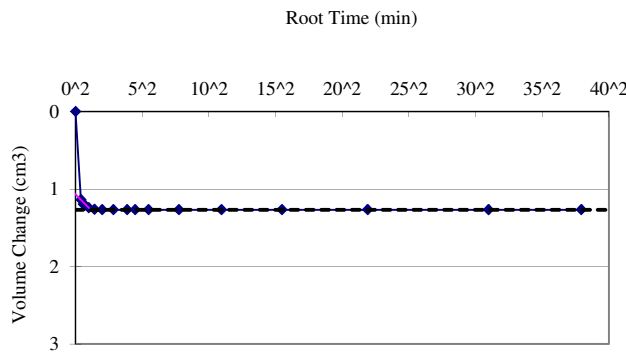
Sample No.: D-2

Depth : 14.00-14.60m



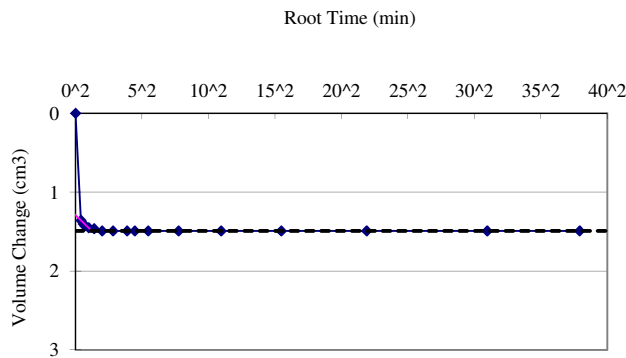
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 1.1$  min  
 $C_v = 930$  m<sup>2</sup>/year  
 $m_{vi} = 0.010$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 1.3$  min  
 $C_v = 788$  m<sup>2</sup>/year  
 $m_{vi} = 0.014$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 1.5$  min  
 $C_v = 676$  m<sup>2</sup>/year  
 $m_{vi} = 0.010$  m<sup>2</sup>/MN

# RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 2-Dec-14

Tested by : Perera/Bala

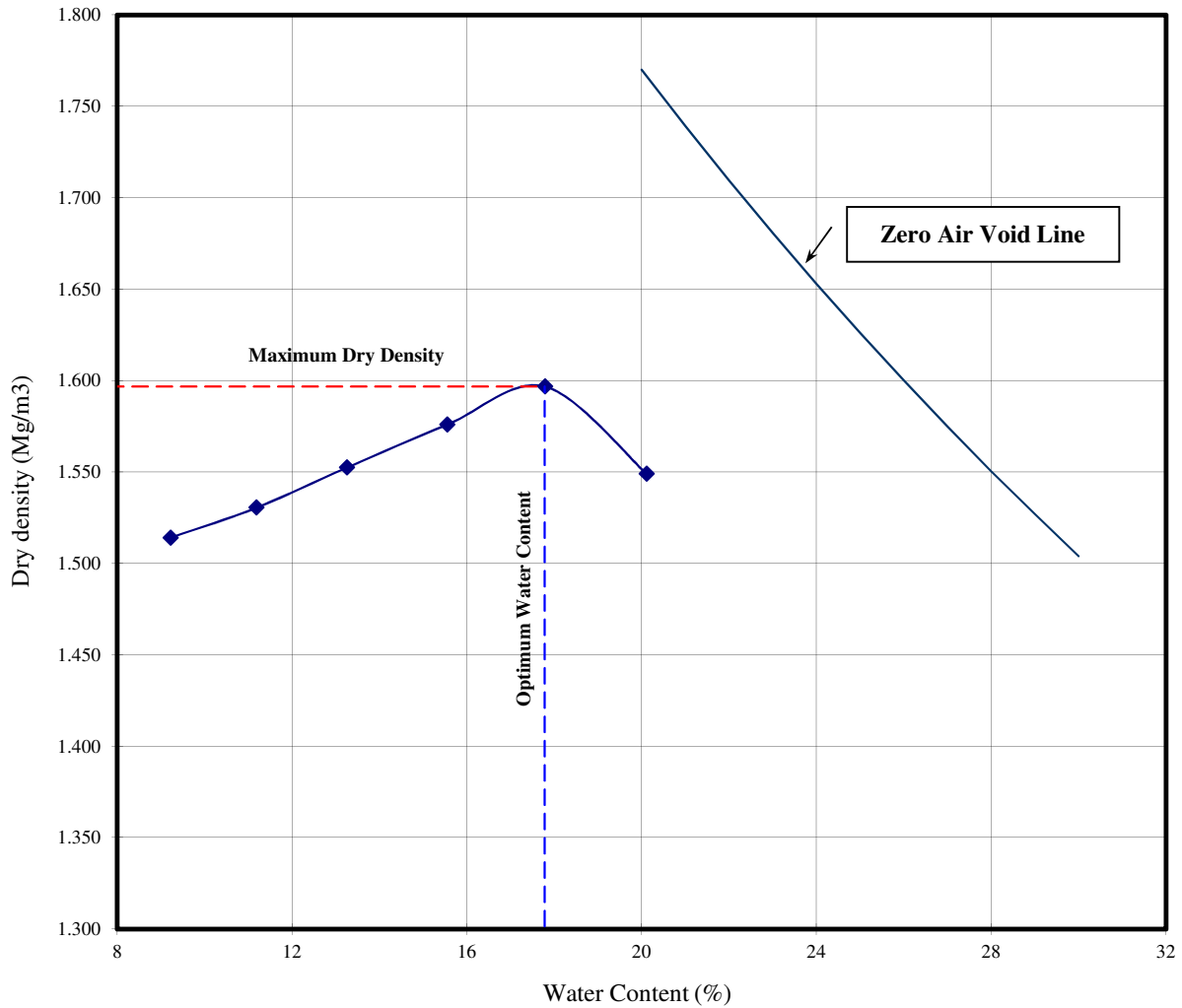
Sample No. : LD2-11-1a D-2(14.00-14.60m)

Ref. No. : -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.2	11.2	13.3	15.6	17.8	20.1		
Wet Density (Mg/m <sup>3</sup> )	1.654	1.702	1.758	1.821	1.881	1.861		
Dry Density (Mg/m <sup>3</sup> )	1.514	1.531	1.552	1.576	1.597	1.549		

<b>Maximum Dry Density</b>	<b>1.597 Mg/m<sup>3</sup></b>
<b>Optimum Water Content</b>	<b>17.8 %</b>



20) LD2-11-1b



**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		LD2-11-1b							
Sample No.		HP-1	HP-2	HP-3	D-1	D-2	D-3		
Sample Depth		2.00m ~2.90m	6.00m ~6.90m	9.00m ~9.50m	12.00m ~12.85m	15.00m ~15.85m	18.00m ~18.60m		
Condition of Sample		Undisturbed			Disturbed				
Natural Water Content %		51.8	32.3	24.2	19.8	34.3	23.9		
Specific Gravity		2.72	2.72	2.68	2.68	2.72	2.69		
Wet Density Mg/m <sup>3</sup>		1.72	1.90	1.87	1.99	1.79	-		
Dry Density Mg/m <sup>3</sup>		1.13	1.44	1.51	1.66	1.33	-		
Natural Void Ratio		1.40	0.89	0.78	0.61	1.04	-		
Degree of Saturation %		100	99	83	87	90	-		
Atterberg Limits	Liquid Limit, %	64	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	33	- * <sup>3</sup>		
	Plastic Limit, %	30	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	19	- * <sup>3</sup>		
	Plasticity Index, %	34	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	14	- * <sup>3</sup>		
Grain Size Analysis	Gravel, %	0	0	0	0	0	0		
	Sand, %	8	41	84	80	34	70		
	Silt, %	41	34	16	8	37	17		
	Clay & Colloid, %	51	25		12	29	13		
	Max. diameter, mm	0.850	0.425	0.850	2.00	0.850	2.00		
	Diam. at 60%, mm	0.0079	0.078	0.16	0.31	0.060	0.13		
	Diam. at 10%, mm	-	-	-	-	-	-		
Visual soil description		Clay	Sandy Silt	Clayey Sand	Clayey Sand	Sandy Clay	Silty Sand		
Unified soil classification		CH	-	-	-	CL	-		
Triaxial compression test	Angle of Internal Friction (°)	0	-	-	-	-	-		
	Cohesion Intercept, kPa	19	-	-	-	-	-		
	Condition of drainage	UU	-	-	-	-	-		
	Angle of Internal Friction * <sup>2</sup> (°)	-	31	-	-	-	-		
	Cohesion Intercept, kPa * <sup>2</sup>	-	14	-	-	-	-		
	Condition of drainage	-	CU	-	-	-	-		
Consolidation Test	Preconsolidation Pressure, kPa	-	-	-	-	-	-		
	Compression Index(Average)	-	-	-	-	-	-		
	Pressure Range for Compression Index(kPa)	-	-	-	-	-	-		
	Swell index	-	-	-	-	-	-		
Chemical Test	pH value	-	-	-	-	-	-		
	Total sulphate content as SO <sub>4</sub> , %	-	-	-	-	-	-		
	Chloride content as Cl, %	-	-	-	-	-	-		
	Organic Matter content, %	-	-	-	-	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-		
Strain at failure (%)		-	-	-	-	-	-		

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.  
 \*<sup>2</sup> : In terms of effective stress                      \*<sup>3</sup> : Unable to test because sample contains lot of sand

Checked by : A. B. Tan

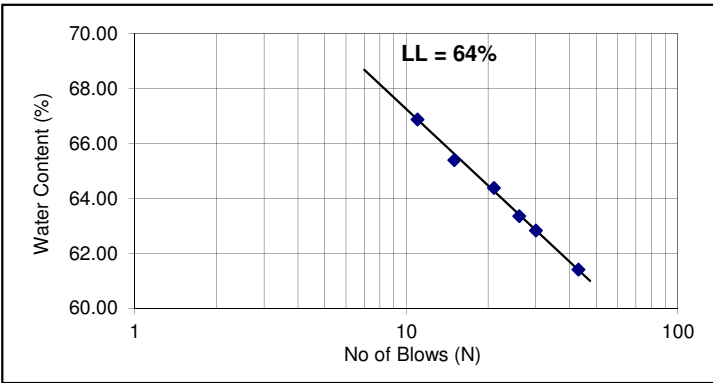
## ATTERBERG LIMITS DETERMINATION

Project Name : <u>Preparatory Survey on Matarbari USC Coral-fired Power Project</u>	Project No. : <u>S27-14</u>
Standard : <u>ASTM D4318-10</u>	Date of Testing : <u>22.11.14</u>
Tested By : <u>Vasantha</u>	Checked By : <u>A. B. Tan</u>

Sample No. : LD2-11-1b HP-1                      Depth : 2.00-2.90m

Remarks :     Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	43	61.40
2	30	62.83
3	26	63.35
4	21	64.38
5	15	65.38
6	11	66.87
<b>Liquid Limits %</b>		<b>64</b>
<b>Plastic Limits %</b>		<b>30</b>
<b>Plasticity Index</b>		<b>34</b>



## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No. : S27-14

Standard : ASTM D4318-10

Date of Testing : 04.12.14

Tested By : Vasantha

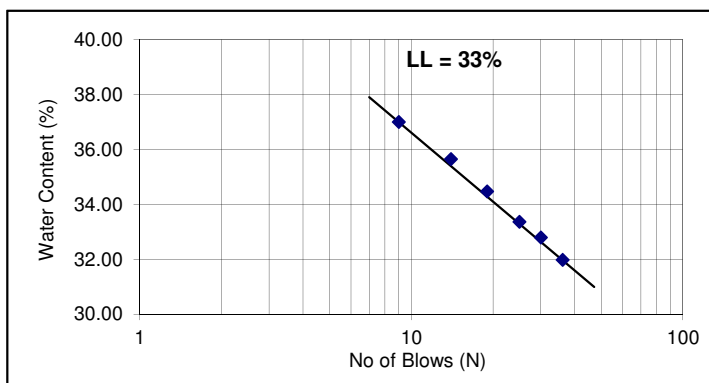
Checked By : A. B. Tan

Sample No. : LD2-11-1b D-2

Depth : 15.00-15.85m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	36	31.98
2	30	32.79
3	25	33.36
4	19	34.47
5	14	35.64
6	9	36.99
<b>Liquid Limits %</b>		<b>33</b>
<b>Plastic Limits %</b>		<b>19</b>
<b>Plasticity Index</b>		<b>14</b>



# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **24.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

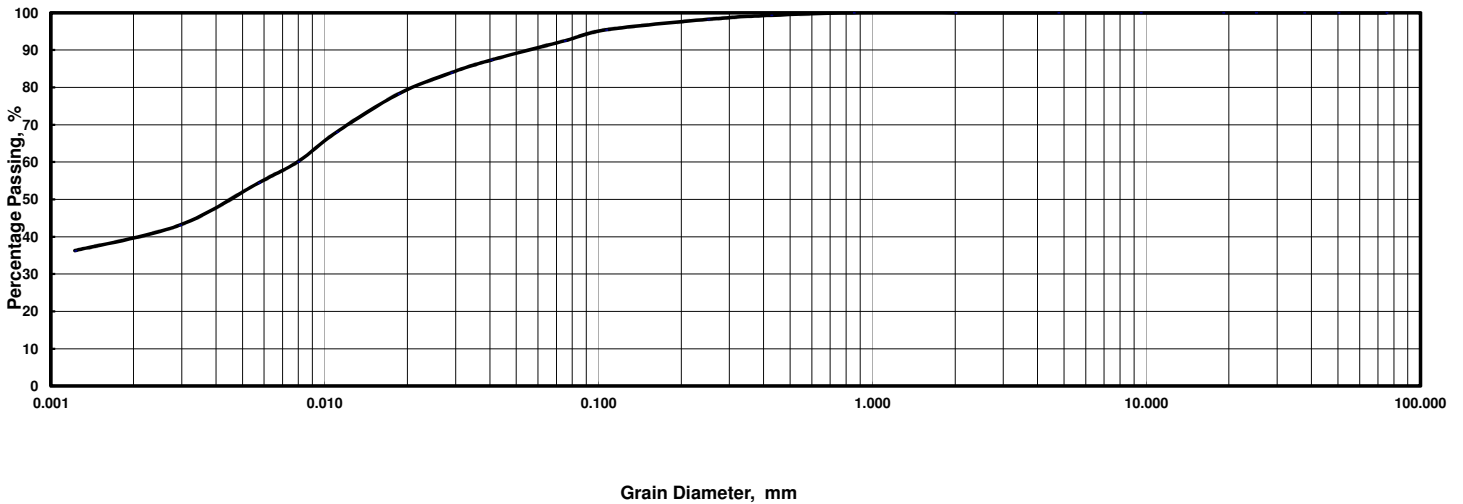
Sample No. : **LD2-11-1b HP-1** Depth : **2.00-2.90m** ( \_\_\_\_\_ ) Specific Gravity : **2.72**

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	98.2	95.4	92.5
Hydro.	Dia., mm	0.040	0.029	0.019	0.011	0.0080	0.0057	0.0029	0.0012							
	% Passing	87.3	83.9	78.2	68.0	60.1	54.4	43.1	36.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b HP-1	Sample No.	LD2-11-1b HP-1
Depth	2.00-2.90m	Depth	2.00-2.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.0079 mm
2.00 - 0.425 mm	0.7 %	Dia. at 30%	- mm
0.425 - 0.075 mm	6.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	41.0 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	51.5 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	92.5 %		

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **24.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

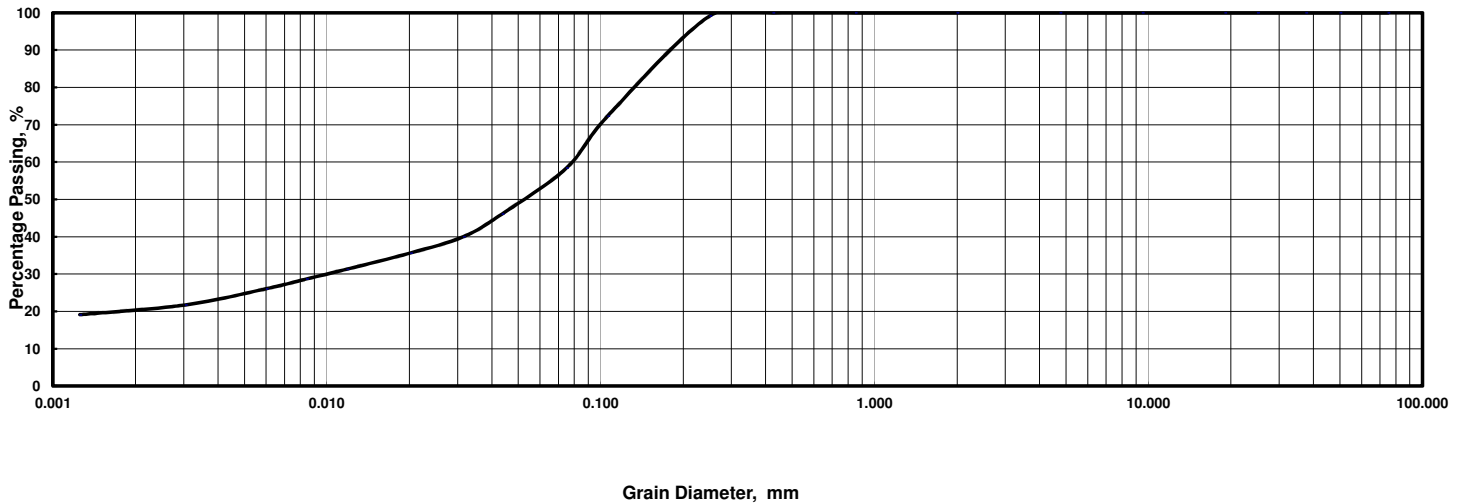
Sample No. : **LD2-11-1b HP-2** Depth : **6.00-6.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	72.3	58.4
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	46.1	40.0	35.6	31.3	28.7	26.1	21.7	19.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b HP-2	Sample No.	LD2-11-1b HP-2
Depth	6.00-6.90m	Depth	6.00-6.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.078 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.010 mm
0.425 - 0.075 mm	41.6 %	Dia. at 10%	- mm
0.075 - 0.005 mm	33.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	24.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	58.4 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 01.12.14 Tested By : Motiuir Checked by : A. B. Tan

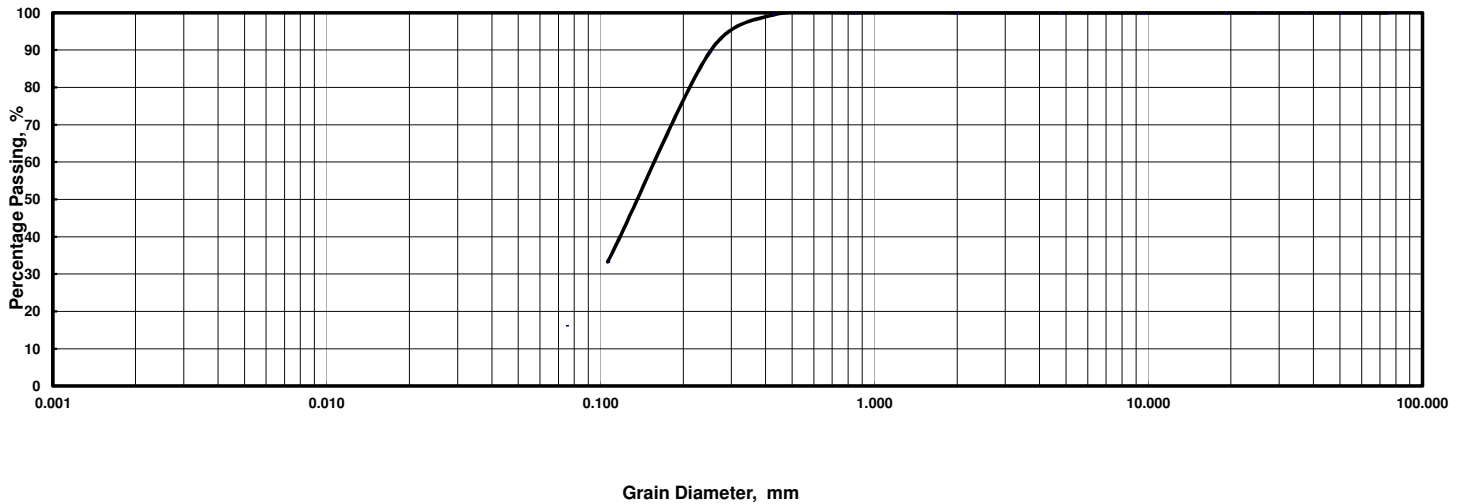
Sample No. : **LD2-11-1b HP-3** Depth : **9.00-9.50m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	89.5	33.3	16.2
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b HP-3	Sample No.	LD2-11-1b HP-3
Depth	9.00-9.50m	Depth	9.00-9.50m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.16 mm
2.00 - 0.425 mm	0.6 %	Dia. at 30%	0.10 mm
0.425 - 0.075 mm	83.1 %	Dia. at 10%	- mm
0.075 - 0.005 mm	16.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm		Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	16.2 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

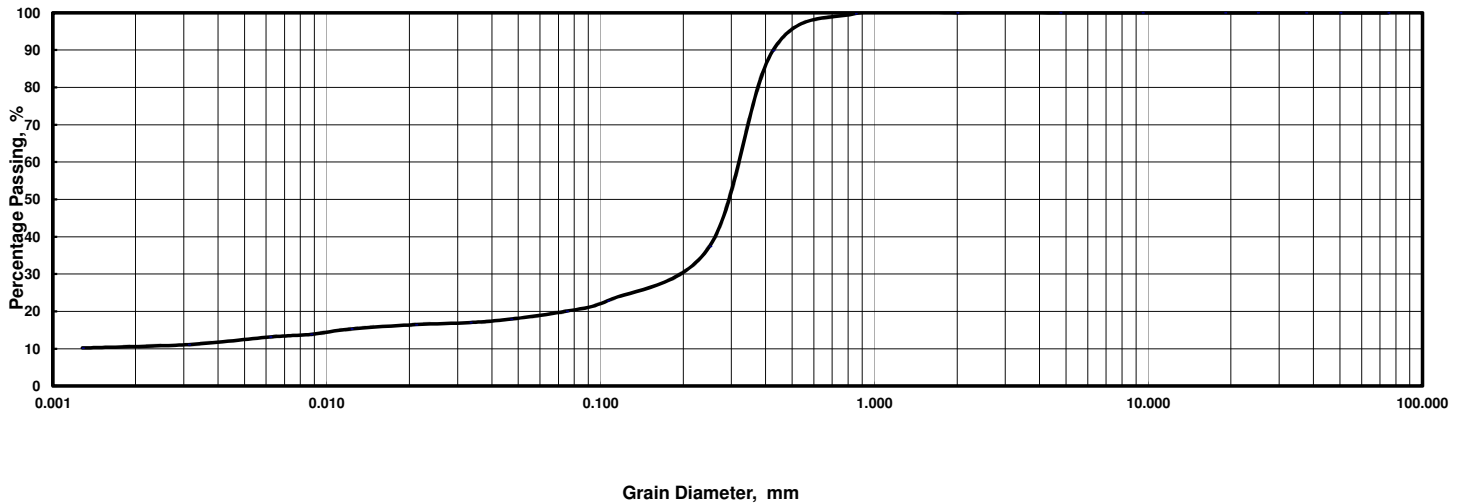
Sample No. : **LD2-11-1b D-1** Depth : **12.00-12.85m** ( \_\_\_\_\_ ) Specific Gravity : 2.68

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	89.9	37.5	22.9	20.1
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	17.9	17.0	16.4	15.3	13.8	13.2	11.1	10.2							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b D-1	Sample No.	LD2-11-1b D-1
Depth	12.00-12.85m	Depth	12.00-12.85m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.31 mm
2.00 - 0.425 mm	10.1 %	Dia. at 30%	0.16 mm
0.425 - 0.075 mm	69.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	7.7 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	12.4 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.7 %		
75um Sieve Passing	20.1 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 21.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

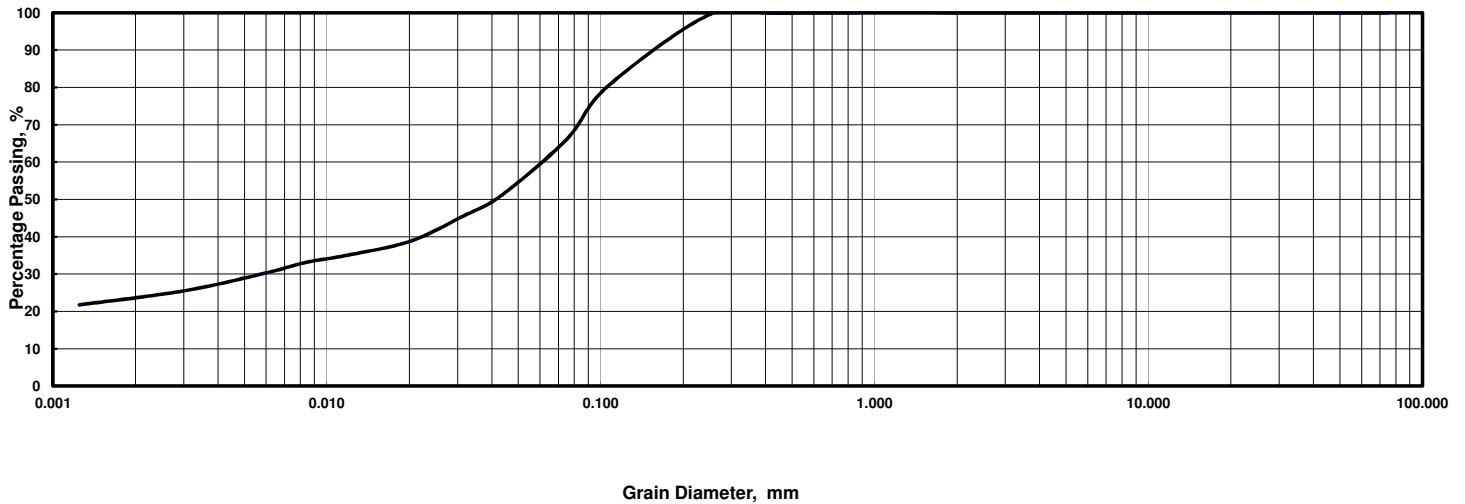
Sample No. : **LD2-11-1b D-2** Depth : **15.00-15.85m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.5	80.3	66.1
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0012							
	% Passing	51.1	45.4	38.8	35.0	33.1	30.3	25.5	21.8							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b D-2	Sample No.	LD2-11-1b D-2
Depth	15.00-15.85m	Depth	15.00-15.85m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.060 mm
2.00 - 0.425 mm	0.2 %	Dia. at 30%	0.0057 mm
0.425 - 0.075 mm	33.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	37.4 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	28.7 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	66.1 %		



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 28.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

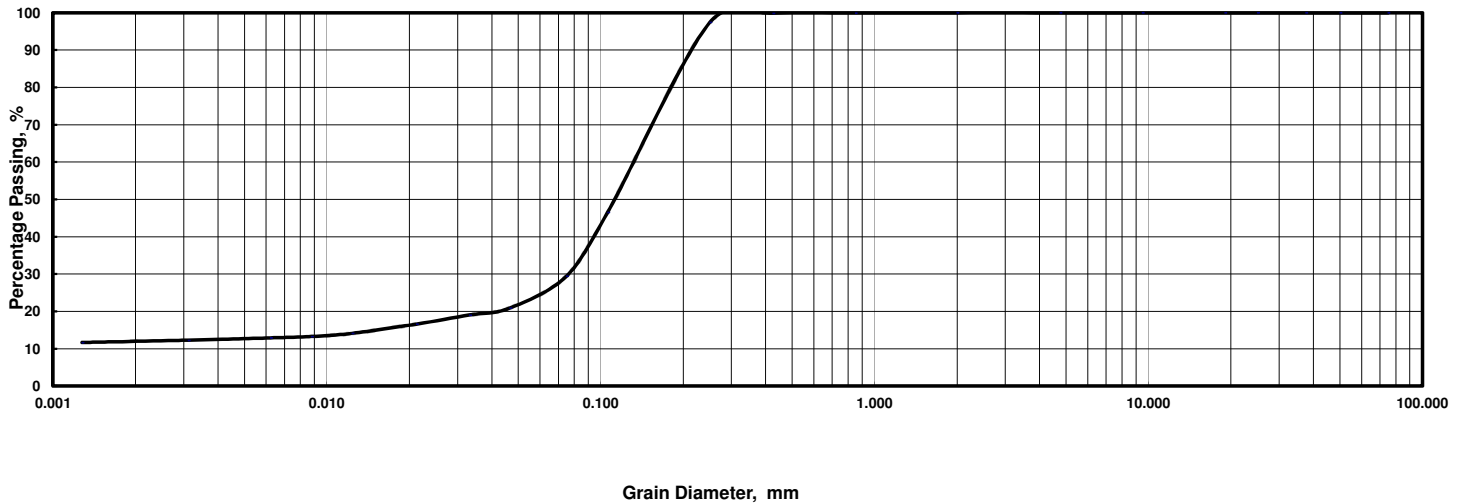
Sample No. : **LD2-11-1b D-3** Depth : **18.00-18.60m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	97.4	46.5	29.5
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	20.9	19.1	16.6	14.1	13.3	12.9	12.3	11.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**




	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-11-1b D-3	Sample No.	LD2-11-1b D-3
Depth	18.00-18.60m	Depth	18.00-18.60m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.13 mm
2.00 - 0.425 mm	0.1 %	Dia. at 30%	0.076 mm
0.425 - 0.075 mm	70.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	16.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	12.7 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.9 %		
75um Sieve Passing	29.5 %		



**Summary of Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement**

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 19.11.14		Tested by : Rahim		Checked by : A. B. Tan		
Borehole No : LD2-11-1b		Sample No.:HP-2		Depth :6.00-6.90m		
Specimen Condition : Undisturbed			Test Method : ASTM D4767-11			
Soil Description : Sandy Silt		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.			1	2	3	
Initial Condition	Wet Density,	Mg/m <sup>3</sup>	1.93	1.92	1.86	
	Water Content,	%	28.3	30.4	33.9	
	Dry Density	Mg/m <sup>3</sup>	1.51	1.47	1.39	
Saturation Stage	Saturated PWP,	kPa	500	500	500	
	Final Cell Pressure,	kPa	540	580	660	
	B-value		0.99	1.00	0.97	
Consolidation	Cell Pressure	kPa	540	580	660	
	Back Pressure	kPa	500	500	500	
	Initial PWP,	kPa	530	570	646	
	Final PWP	kPa	500	500	500	
Consolidation Parameter	Total Volume Change,	%	1.18	1.16	4.09	
	Coefficient of Consolidation Cv,	m <sup>2</sup> /year	12.43	43.26	7.73	
	Coefficient of Volume Compressibility mvi,	m <sup>2</sup> /MN	0.30	0.14	0.26	
Compression Stage	Cell Pressure	kPa	540	580	660	
	Back Pressure	kPa	500	500	500	
	Effective Cell Pressure	kPa	40	80	160	
	Shearing Speed	mm/min	0.03	0.03	0.03	
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f,	kPa	182	200	151	
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f	kPa	-26	14	114	
	A-Coefficient		-0.15	0.07	0.76	
	Strain at ( $\sigma_1 - \sigma_3$ )f	(%)	15.01	14.98	10.65	
	Effective Principal Stress Ratio		3.74	4.05	4.28	
Final Conditions	Wet Density,	Mg/m <sup>3</sup>	1.95	1.94	1.92	
	Water Content,	%	29.9	30.7	31.7	
Shear Strength Parameters	In terms of Effective Stress		Mode of Failure			
	$\phi' = 31$ Degree $c' = 14$ kPa					
Remarks : Specimen 3 has lower density and higher water content						

**Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

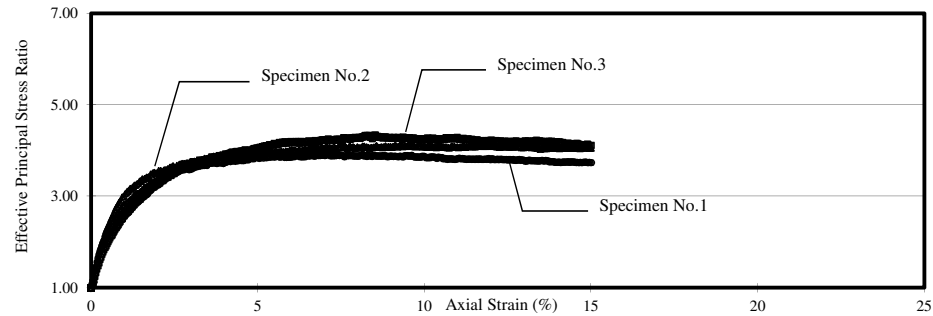
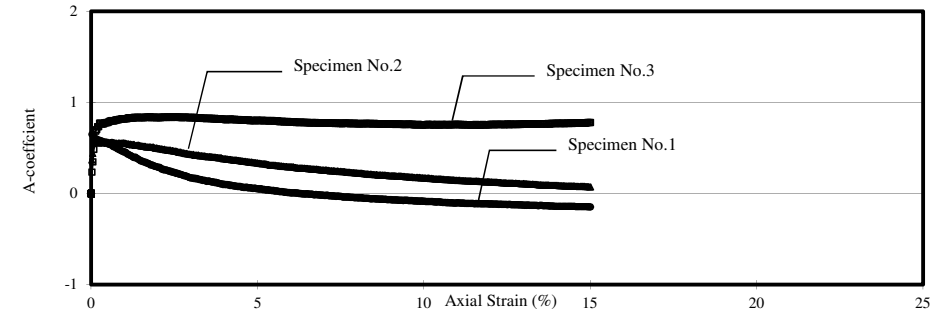
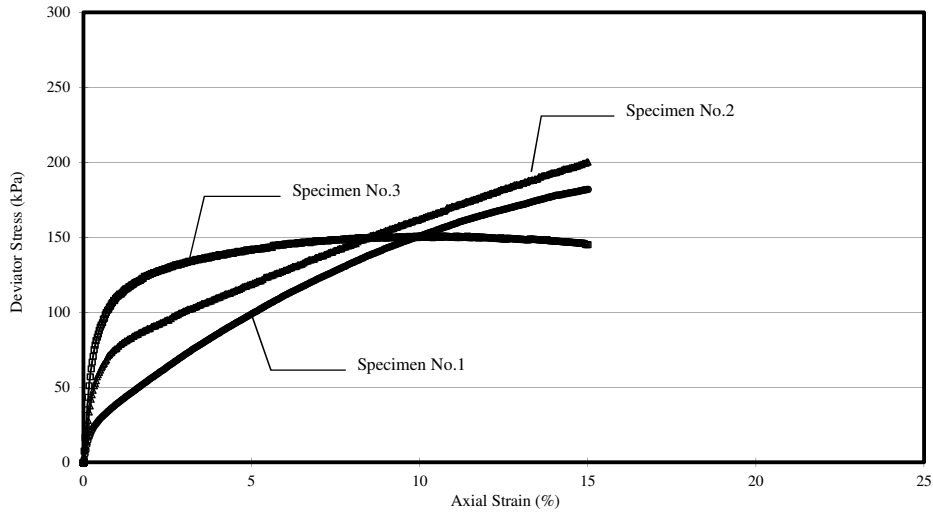
Project No.: S27-14

Sample No.: HP-2

Soil Type: Sandy Silt

Borehole No.: LD2-11-1b

Depth :6.00-6.90m



**Consolidated Undrained Triaxial Compression Test  
With Pore water Pressure Measurement  
- Mohr' s Circle (In terms of Total Stress) -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No. : S27-14

Borehole No.: LD2-11-1b

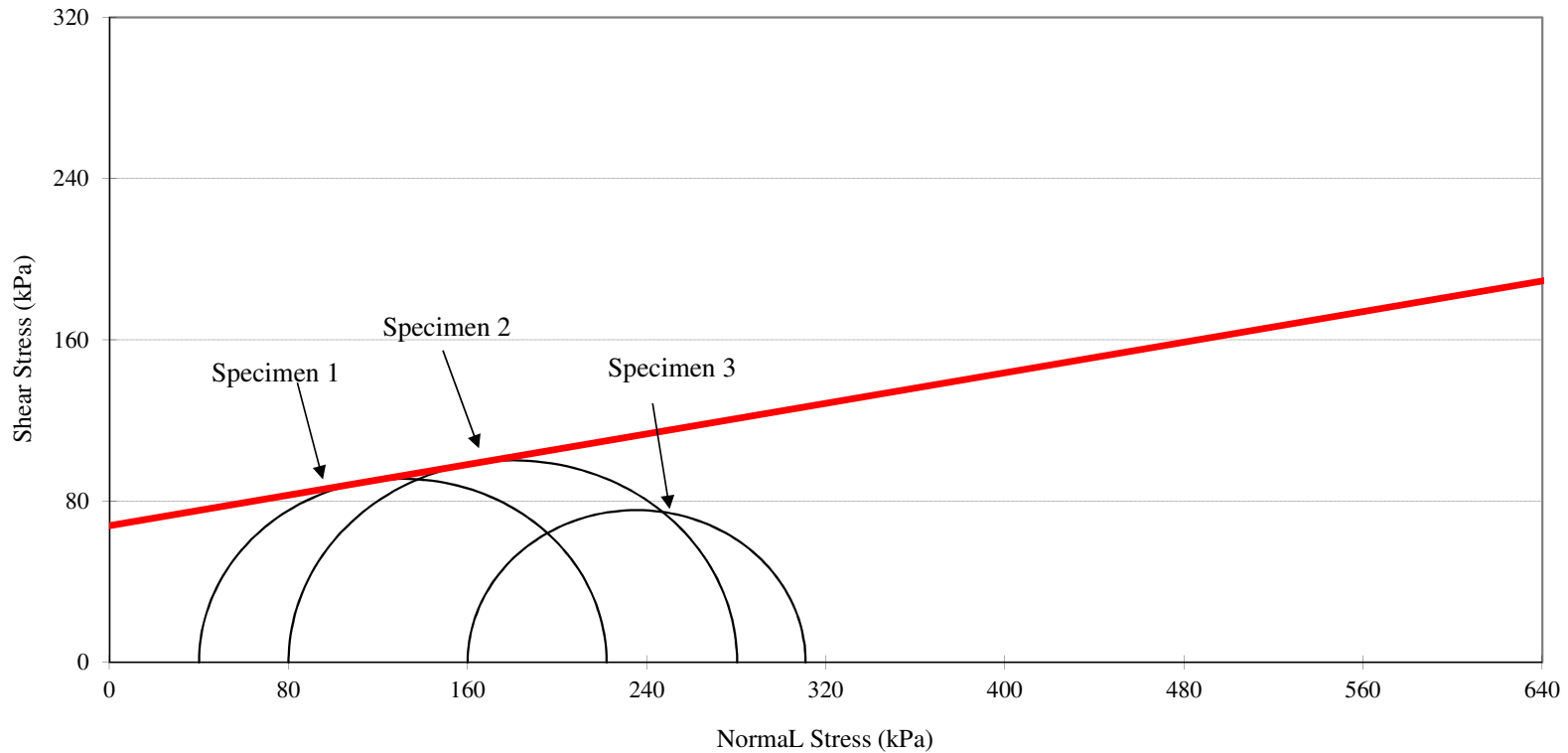
Soil Type: Sandy Silt

Sample No. : HP-2

Depth :6.00-6.90m

Angle of Internal Friction,  $\phi$  11 deg

Cohesion,  $c$  68 kPa



# Consolidated Undrained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Effective Stress at Peak Deviator Stress)-

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No. : S27-14

Borehole No.: LD2-11-1b

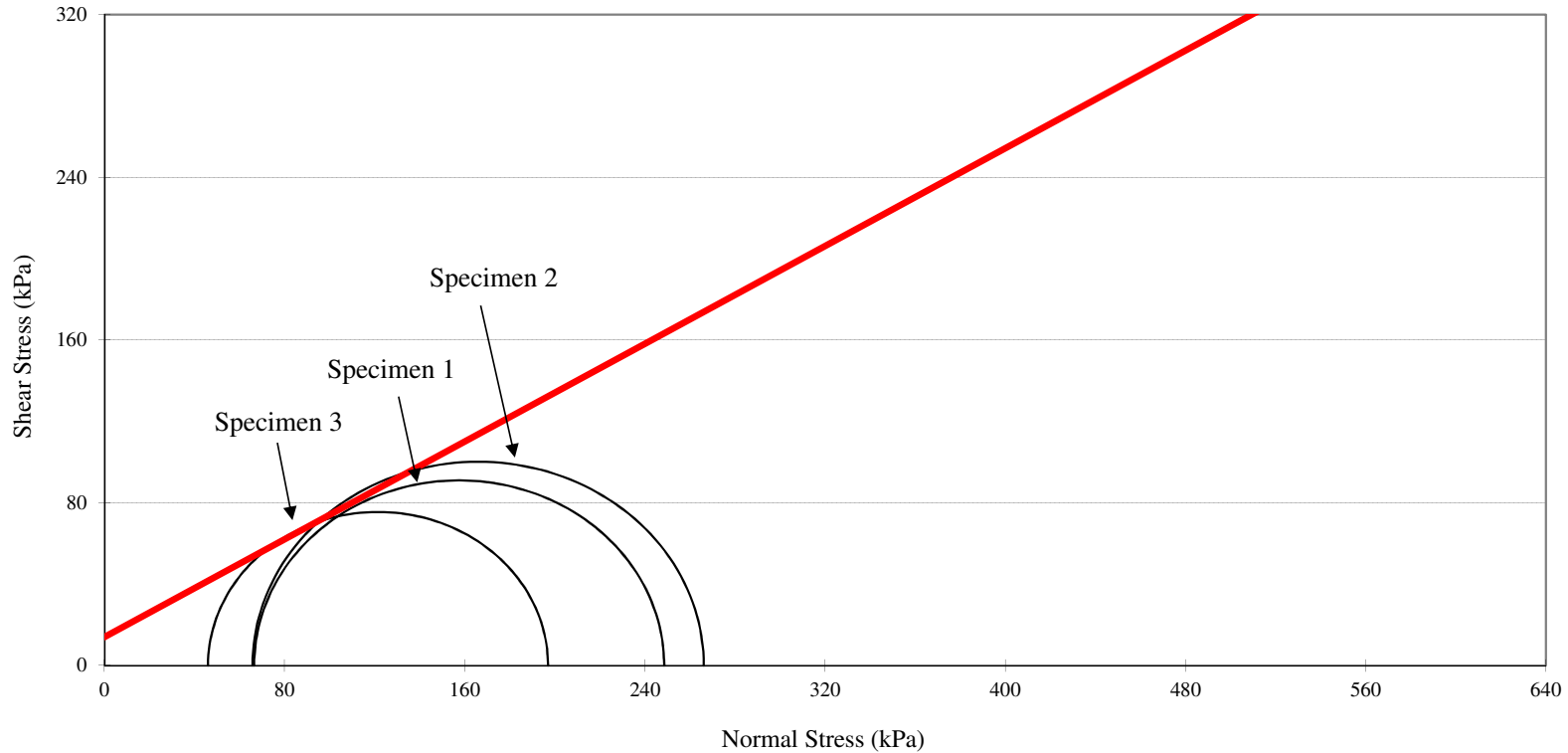
Soil Type: Sandy Silt

Sample No. : HP-2

Depth : 6.00-6.90m

Angle of Internal Friction,  $\phi'$  31 deg

Cohesion,  $c'$  14 kPa



# Consolidated Undrained Triaxial Compression Test With Pore water Pressure Measurement

## - Stress Path -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

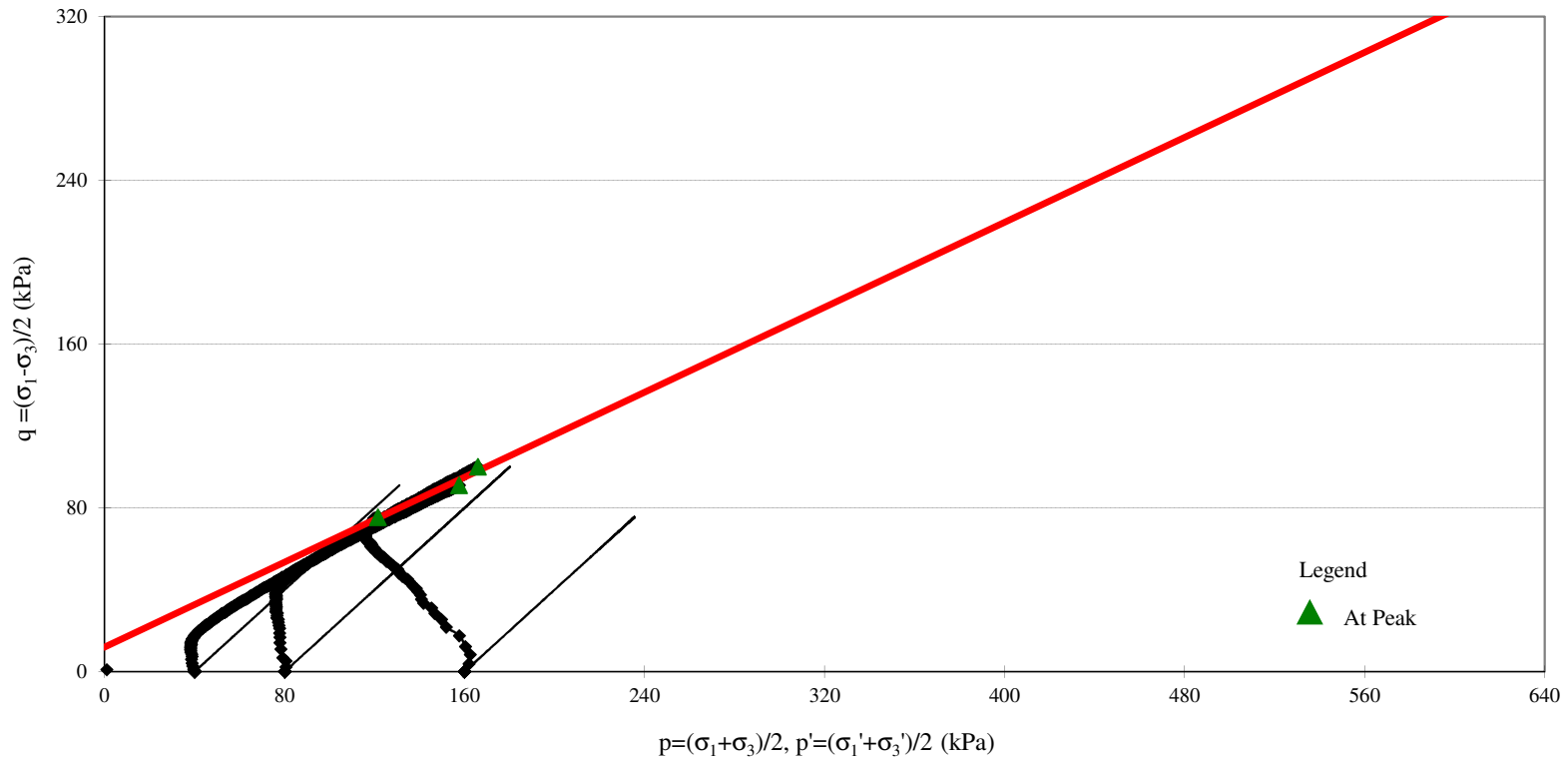
Borehole No.: LD2-11-1b

Sample No. : HP-2

Soil Type: Sandy Silt

Depth :6.00-6.90m

$\alpha'$	27	deg
$a'$	12	kPa

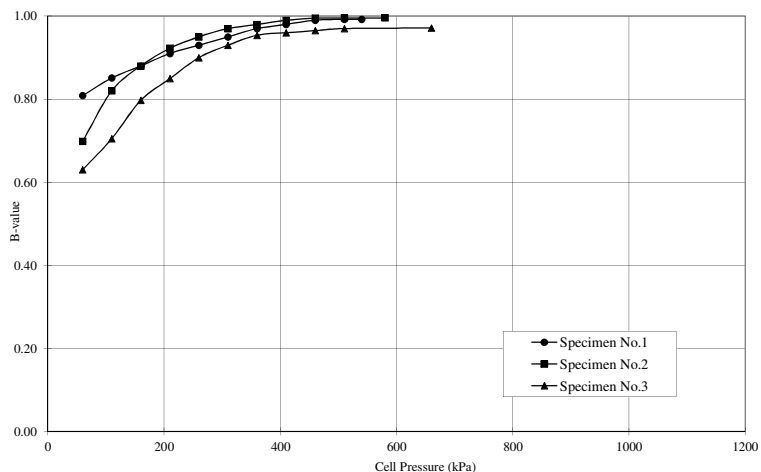


**Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
Project No.: S27-14  
Borehole No.: LD2-11-1b  
Sample No.: HP-2

Depth : 6.00-6.90m  
Soil Type: Sandy Silt

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	44.3	20	40.9	20	38.9
	Back Pressure (kPa)	20		20		20	
	B-value	0.81		0.70		0.63	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	92.6	50	91.0	50	85.2
	Back Pressure (kPa)	50		50		50	
	B-value	0.85		0.82		0.70	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	144.0	100	144.0	100	139.9
	Back Pressure (kPa)	100		100		100	
	B-value	0.88		0.88		0.80	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	195.5	150	196.1	150	192.5
	Back Pressure (kPa)	150		150		150	
	B-value	0.91		0.92		0.85	
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260
	P.W.P (kPa)	200	246.5	200	247.5	200	245.0
	Back Pressure (kPa)	200		200		200	
	B-value	0.93		0.95		0.90	
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310
	P.W.P (kPa)	250	297.5	250	298.5	250	296.5
	Back Pressure (kPa)	250		250		250	
	B-value	0.95		0.97		0.93	
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360
	P.W.P (kPa)	300	348.5	300	349.0	300	347.7
	Back Pressure (kPa)	300		300		300	
	B-value	0.97		0.98		0.95	
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410
	P.W.P (kPa)	350	399.0	350	399.5	350	398.0
	Back Pressure (kPa)	350		350		350	
	B-value	0.98		0.99		0.96	
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460
	P.W.P (kPa)	400	449.5	400	449.8	400	448.3
	Back Pressure (kPa)	400		400		400	
	B-value	0.99		1.00		0.97	
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510
	P.W.P (kPa)	450	499.6	450	499.8	450	498.5
	Back Pressure (kPa)	450		450		450	
	B-value	0.99		1.00		0.97	
B-check Step.11	Cell Pressure (kPa)	510	540	510	580	510	660
	P.W.P (kPa)	500	529.8	500	569.7	500	645.7
	Back Pressure (kPa)	500		500		500	
	B-value	0.99		1.00		0.97	



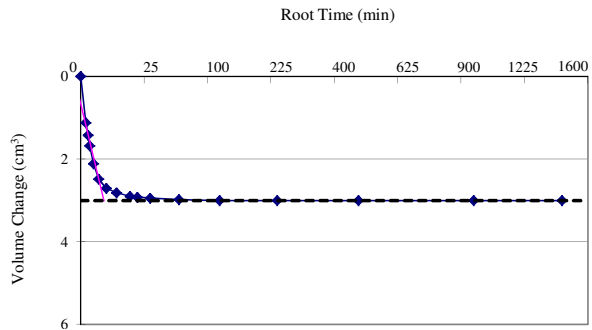


**Consolidated Undrained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages**

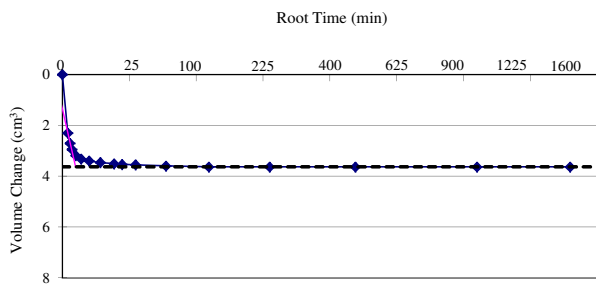
Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14      Sample No.: HP-2      Soil Type: Sandy Silt

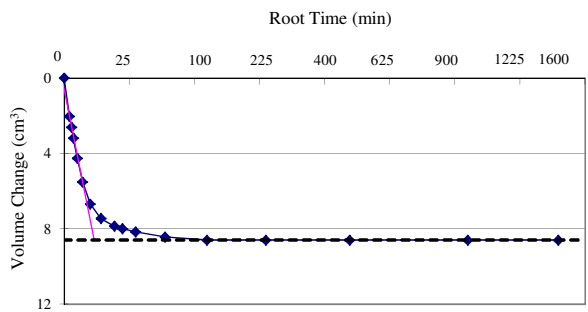
Borehole No.: LD2-11-1b      Depth : 6.00-6.90m



Specimen No.: 1  
 $p' = 40$  kPa  
 $t_{100} = 3.3$  min  
 $C_v = 12.43$  m<sup>2</sup>/year  
 $m_{vi} = 0.30$  m<sup>2</sup>/MN



Specimen No.: 2  
 $p' = 80$  kPa  
 $t_{100} = 1.0$  min  
 $C_v = 43.26$  m<sup>2</sup>/year  
 $m_{vi} = 0.14$  m<sup>2</sup>/MN



Specimen No.: 3  
 $p' = 160$  kPa  
 $t_{100} = 5.3$  min  
 $C_v = 7.73$  m<sup>2</sup>/year  
 $m_{vi} = 0.26$  m<sup>2</sup>/MN

21) LD2-12-1a

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		LD2-12-1a								
Sample No.		HP-1	D-1	D-2	D-3Top	D-3Bottom	D-4			
Sample Depth		2.00m ~2.90m	6.00m ~6.70m	9.00m ~9.70m	12.00m ~12.30m	12.30m ~12.80m	15.00m ~15.70m			
Condition of Sample		Undisturbed	Disturbed							
Natural Water Content	%	34.1	21.5	25.2	37.9	21.6	25.1			
Specific Gravity		2.74	2.67	2.71	2.72	2.67	2.69			
Wet Density	Mg/m <sup>3</sup>	1.89	-	2.02	-	-	-			
Dry Density	Mg/m <sup>3</sup>	1.41	-	1.61	-	-	-			
Natural Void Ratio		0.95	-	0.68	-	-	-			
Degree of Saturation	%	98	-	100	-	-	-			
Atterberg Limits	Liquid Limit,	%	36	- * <sup>3</sup>	29	25* <sup>1</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
	Plastic Limit,	%	22	- * <sup>3</sup>	19	15* <sup>1</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
	Plasticity Index,	%	14	- * <sup>3</sup>	10	10* <sup>1</sup>	- * <sup>3</sup>	- * <sup>3</sup>		
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0		
	Sand,	%	19	92	42	42	92	71		
	Silt,	%	48	8	29	29	8	10		
	Clay & Colloid,	%	33		29	29		19		
	Max. diameter,	mm	2.00	2.00	0.850	2.00	4.75	2.00		
	Diam. at 60%	mm	0.023	0.31	0.081	0.088	0.32	0.16		
	Diam. at 10%	mm	-	0.11	-	-	0.11	-		
Visual soil description		Clay with Sand	Sand with Clay	Sandy Clay	Sandy Clay	Sand with Clay	Clayey Sand			
Unified soil classification		CL	-	CL	CL	-	-			
Triaxial compression test	Angle of Internal Friction	( <sup>0</sup> )	0	-	0	-	-	-		
	Cohesion Intercept, kPa		26	-	71	-	-	-		
	Condition of drainage		UU	-	UU	-	-	-		
	Angle of Internal Friction * <sup>2</sup>	( <sup>0</sup> )	-	39	-	-	36	36		
	Cohesion Intercept, kPa * <sup>2</sup>		-	0	-	-	0	0		
	Condition of drainage		-	CD* <sup>4</sup>	-	-	CD* <sup>4</sup>	CD* <sup>4</sup>		
Consolidation Test	Preconsolidation Pressure,	kPa	74	-	-	-	-	-		
	Compression Index(Average)		0.39	-	0.16	-	-	-		
	Pressure Range for Compression Index(kPa)		200-1600	-	1600-3200	-	-	-		
	Swell index		0.079	-	0.028	-	-	-		
Chemical Test	pH value		-	-	-	-	-	-		
	Total sulphate content as SO <sub>3</sub> ,	%	-	-	-	-	-	-		
	Chloride content as Cl,	%	-	-	-	-	-	-		
	Organic Matter content,	%	-	-	-	-	-	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-			
Strain at failure (%)		-	-	-	-	-	-			

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : Specimens are prepared at required saturated wet density

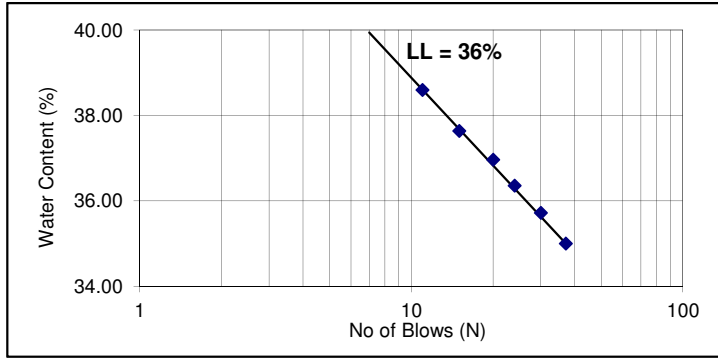
Checked by : A. B. Tan

## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project      Project No. : S27-14  
 Standard : ASTM D4318-10      Date of Testing : 19.11.14  
 Tested By : Vasantha      Checked By : A. B. Tan

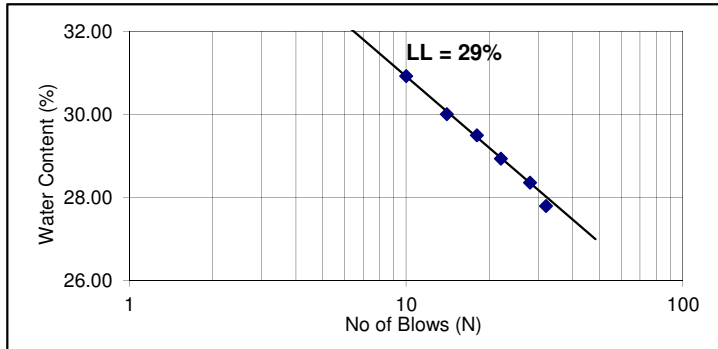
Sample No. : LD2-12-1a HP-1      Depth : 2.00-2.90m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	37	35.01
2	30	35.72
3	24	36.36
4	20	36.97
5	15	37.64
6	11	38.60
<b>Liquid Limits</b> %		<b>36</b>
<b>Plastic Limits</b> %		<b>22</b>
<b>Plasticity Index</b>		<b>14</b>



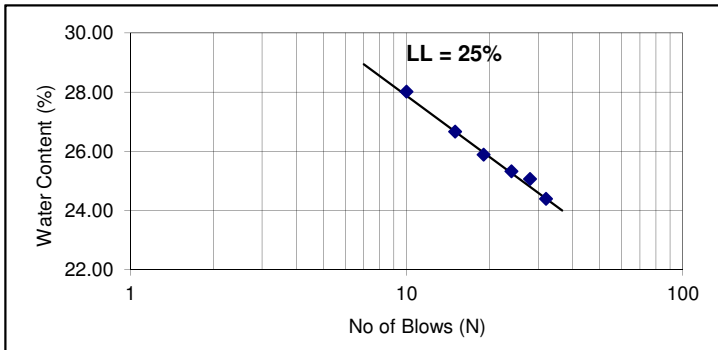
Sample No. : LD2-12-1a D-2      Depth : 9.00-9.70m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	Wn
1	32	27.79
2	28	28.36
3	22	28.93
4	18	29.49
5	14	30.00
6	10	30.92
<b>Liquid Limits</b> %		<b>29</b>
<b>Plastic Limits</b> %		<b>19</b>
<b>Plasticity Index</b>		<b>10</b>



Sample No. : LD2-12-1a D-3      Depth : 12.00-12.30m  
 Remarks : \* Tested on dry sieved material passing 0.425mm sieve  
                   Material passing through 0.425mm sieve :      94.4%

Liquid Limits Test		
Test No.	Blows	Wn
1	32	24.40
2	28	25.07
3	24	25.32
4	19	25.89
5	15	26.67
6	10	28.02
<b>Liquid Limits</b> %		<b>25</b>
<b>Plastic Limits</b> %		<b>15</b>
<b>Plasticity Index</b>		<b>10</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 19.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

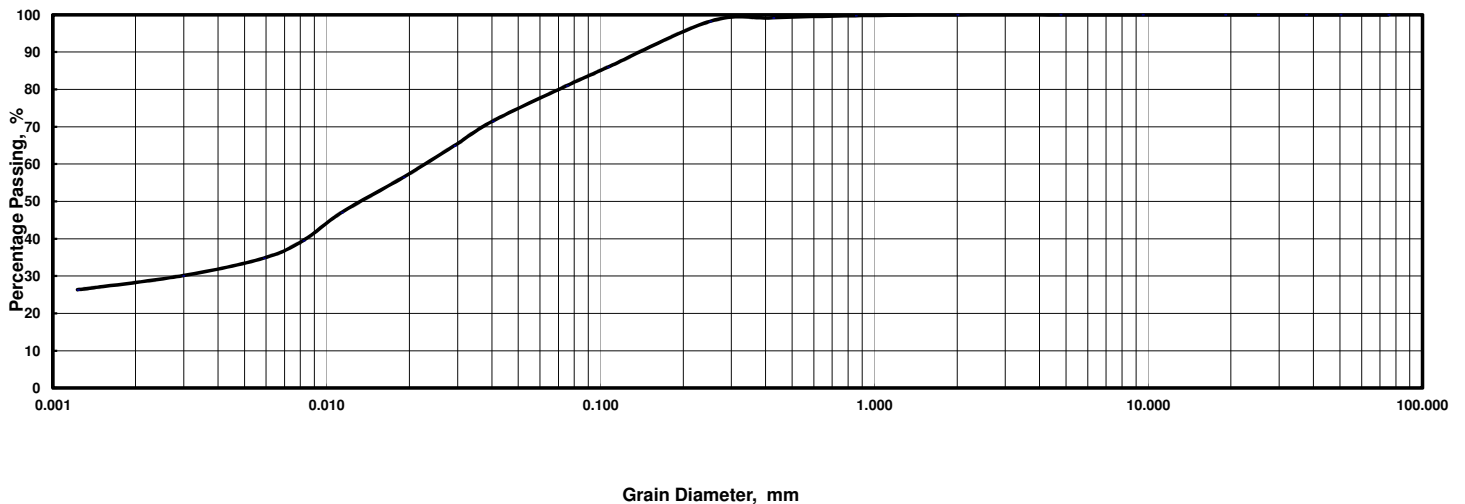
Sample No. : **LD2-12-1a HP-1** Depth : **2.00-2.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.74

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.2	98.2	85.9	81.0
Hydro.	Dia., mm	0.040	0.029	0.019	0.011	0.0082	0.0059	0.0030	0.0012							
	% Passing	71.5	64.9	56.4	47.0	39.5	34.8	30.1	26.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a HP-1	Sample No.	LD2-12-1a HP-1
Depth	2.00-2.90m	Depth	2.00-2.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.023 mm
2.00 - 0.425 mm	0.8 %	Dia. at 30%	0.0029 mm
0.425 - 0.075 mm	18.2 %	Dia. at 10%	- mm
0.075 - 0.005 mm	47.6 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	33.4 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.7 %		
75um Sieve Passing	81.0 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 18.11.14 Tested By : Motiur Checked by : A. B. Tan

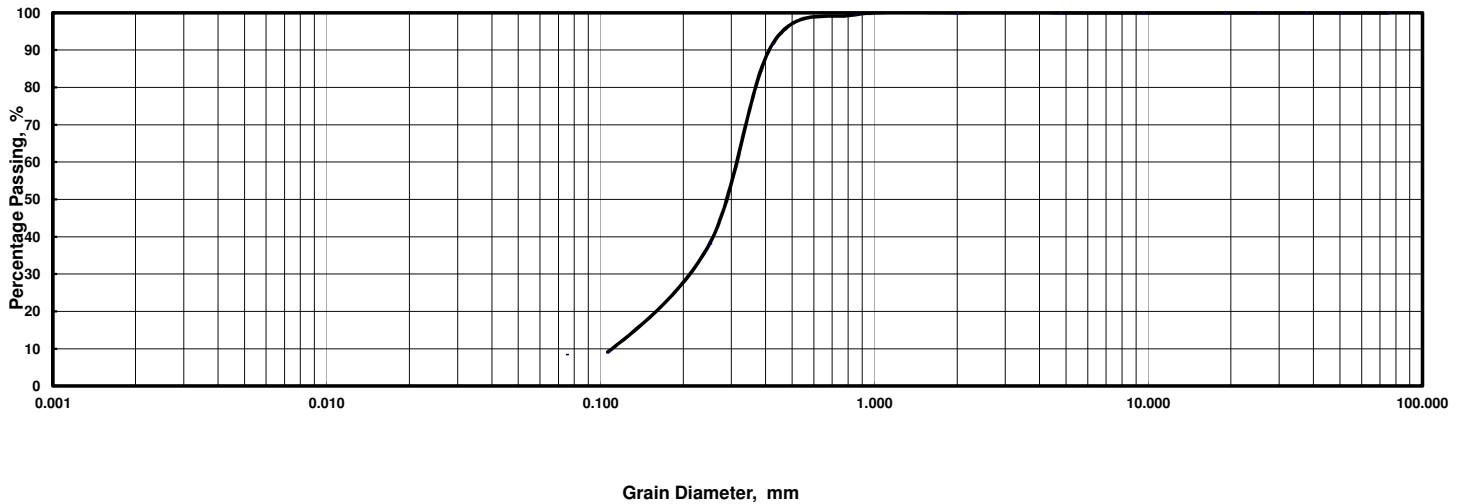
Sample No. : **LD2-12-1a D-1** Depth : **6.00-6.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.67

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	91.8	38.2	9.1	8.5
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a D-1	Sample No.	LD2-12-1a D-1
Depth	6.00-6.70m	Depth	6.00-6.70m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.31 mm
2.00 - 0.425 mm	8.2 %	Dia. at 30%	0.20 mm
0.425 - 0.075 mm	83.3 %	Dia. at 10%	0.11 mm
0.075 - 0.005 mm	8.5 %	Coeff. of Uniformity	2.85
Smaller than 0.005 mm		Coeff. of Curvature	1.14
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.4 %		
75um Sieve Passing	8.5 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 19.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

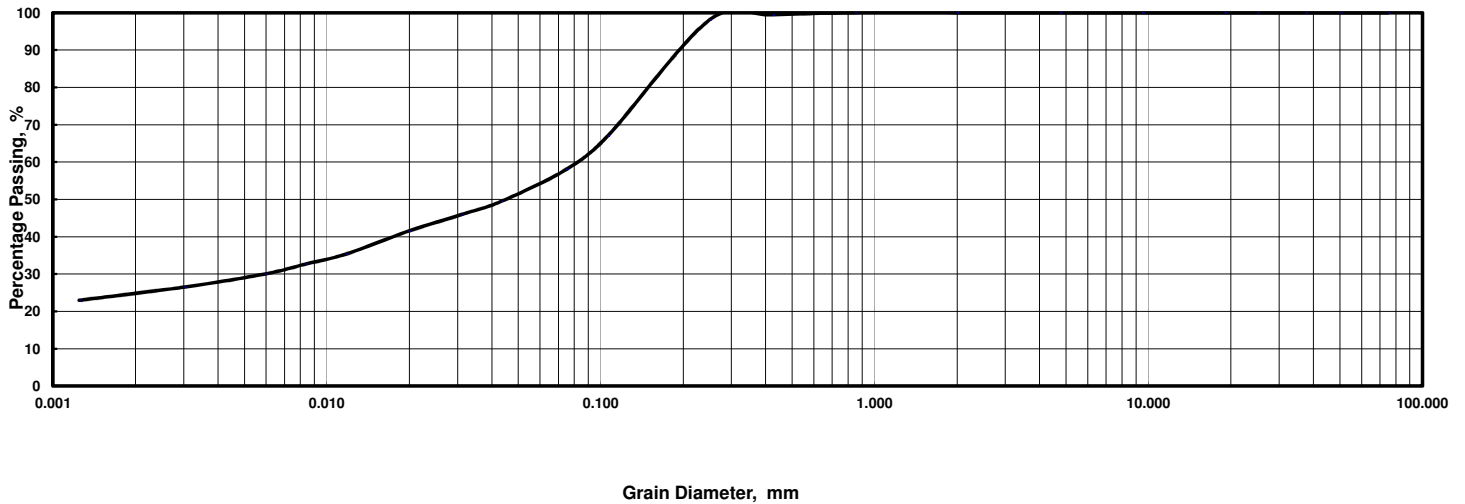
Sample No. : **LD2-12-1a D-2** Depth : **9.00-9.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	98.1	67.0	58.1
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0012							
	% Passing	49.5	46.0	41.5	35.4	32.7	30.0	26.5	23.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a D-2	Sample No.	LD2-12-1a D-2
Depth	9.00-9.85m	Depth	9.00-9.85m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.081 mm
2.00 - 0.425 mm	0.6 %	Dia. at 30%	0.0059 mm
0.425 - 0.075 mm	41.3 %	Dia. at 10%	- mm
0.075 - 0.005 mm	29.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	28.9 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	58.1 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 18.11.14 Tested By : Motiuur Checked by : A. B. Tan

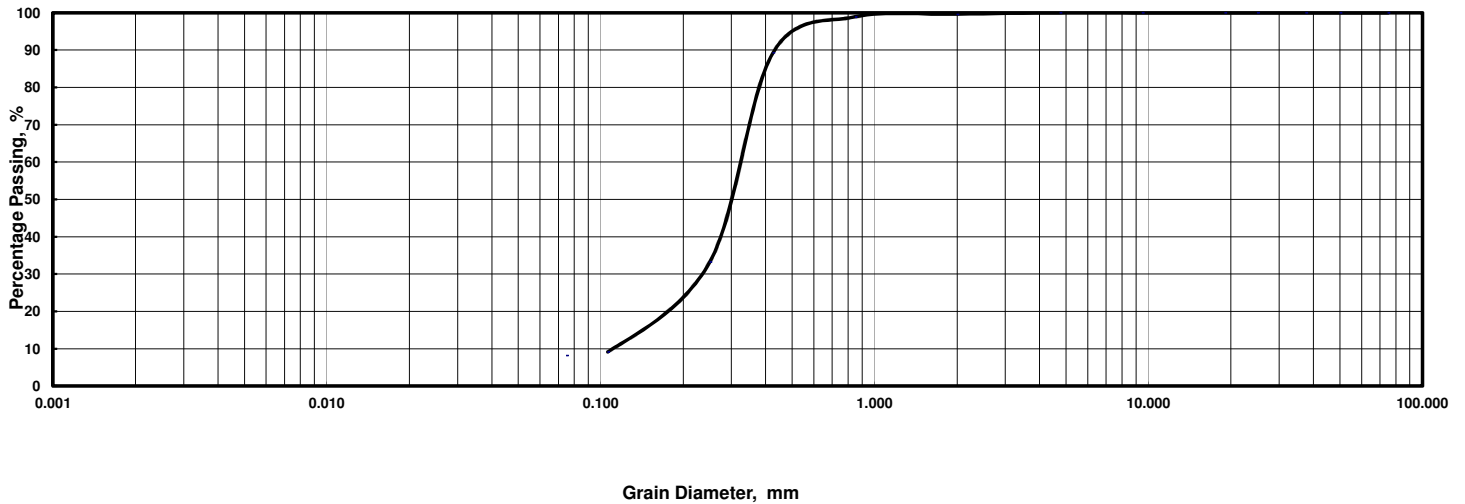
Sample No. : **LD2-12-1a D-3** Depth : **12.30-12.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.67

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	98.9	89.2	33.2	9.1	8.3
Hydro.	Dia., mm															
	% Passing															

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a D-3	Sample No.	LD2-12-1a D-3
Depth	12.30-12.80m	Depth	12.30-12.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	4.75 mm
4.75 - 2.00 mm	0.4 %	Dia. at 60%	0.32 mm
2.00 - 0.425 mm	10.4 %	Dia. at 30%	0.22 mm
0.425 - 0.075 mm	81.0 %	Dia. at 10%	0.11 mm
0.075 - 0.005 mm	8.3 %	Coeff. of Uniformity	2.95
Smaller than 0.005 mm		Coeff. of Curvature	1.41
2000um Sieve Passing	100.0 %		
425um Sieve Passing	98.9 %		
75um Sieve Passing	8.3 %		



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 19.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

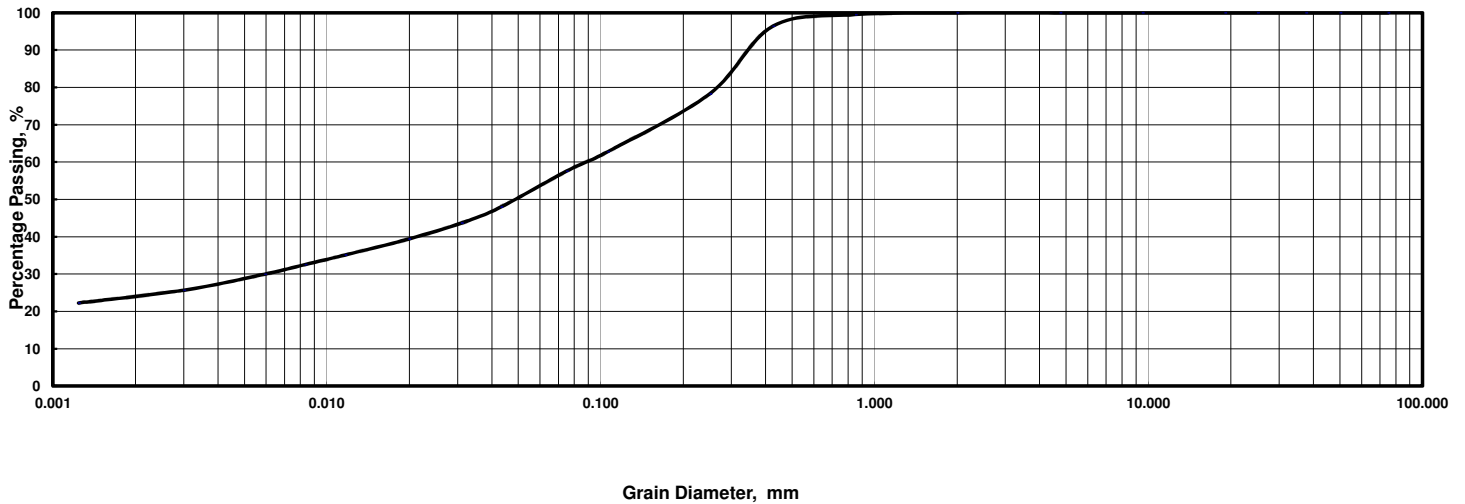
Sample No. : **LD2-12-1a D-3** Depth : **12.00-12.30m** ( \_\_\_\_\_ ) Specific Gravity : 2.72

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	96.4	78.3	62.8	57.6
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0083	0.0059	0.0030	0.0012							
	% Passing	48.0	43.7	39.4	35.1	32.5	30.0	25.7	22.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a D-3	Sample No.	LD2-12-1a D-3
Depth	12.00-12.30m	Depth	12.00-12.30m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.088 mm
2.00 - 0.425 mm	3.6 %	Dia. at 30%	0.0059 mm
0.425 - 0.075 mm	38.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	29.0 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	28.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.5 %		
75um Sieve Passing	57.6 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 19.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

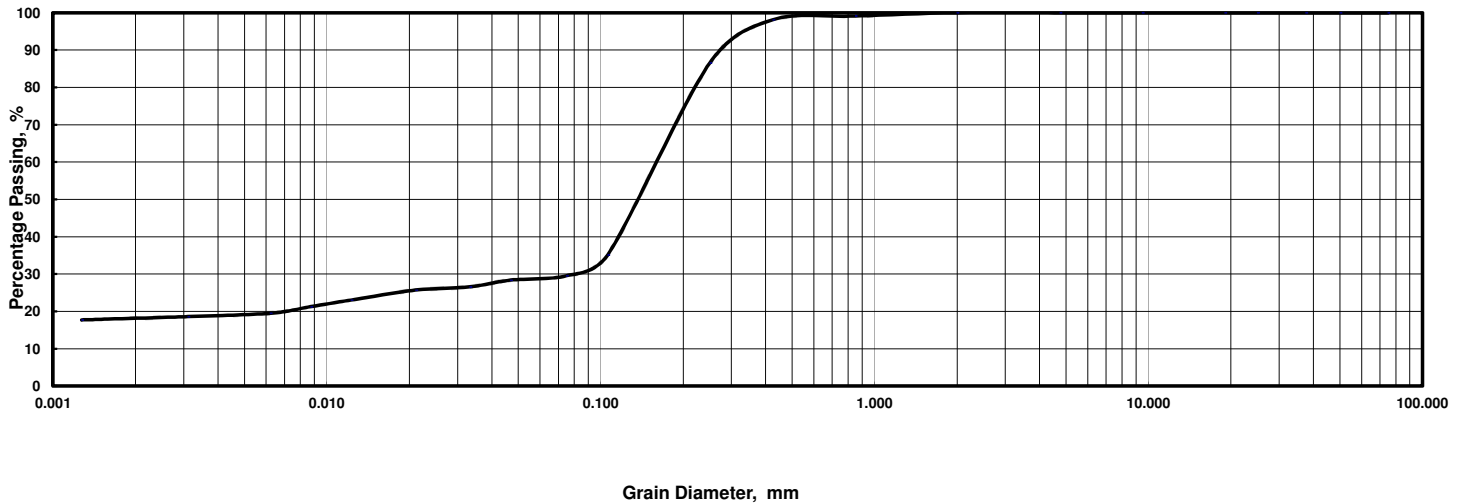
Sample No. : **LD2-12-1a D-4** Depth : **15.00-15.70m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	98.1	86.5	35.1	29.6
Hydro.	Dia., mm	0.047	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	28.4	26.6	25.7	23.0	21.3	19.5	18.6	17.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



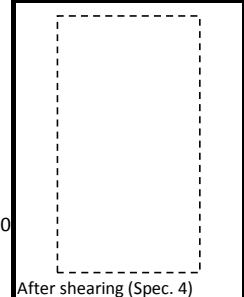
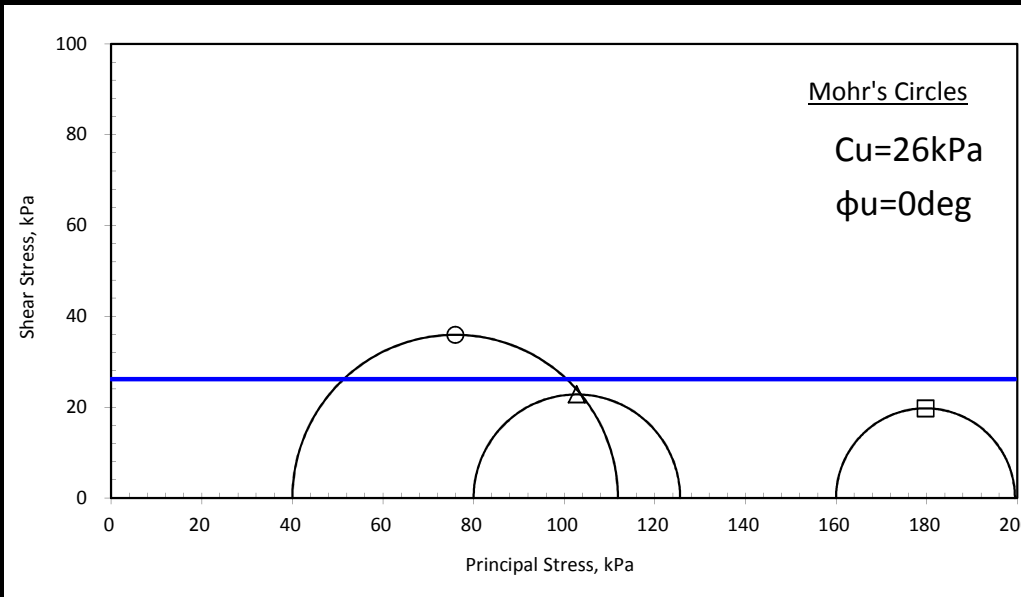
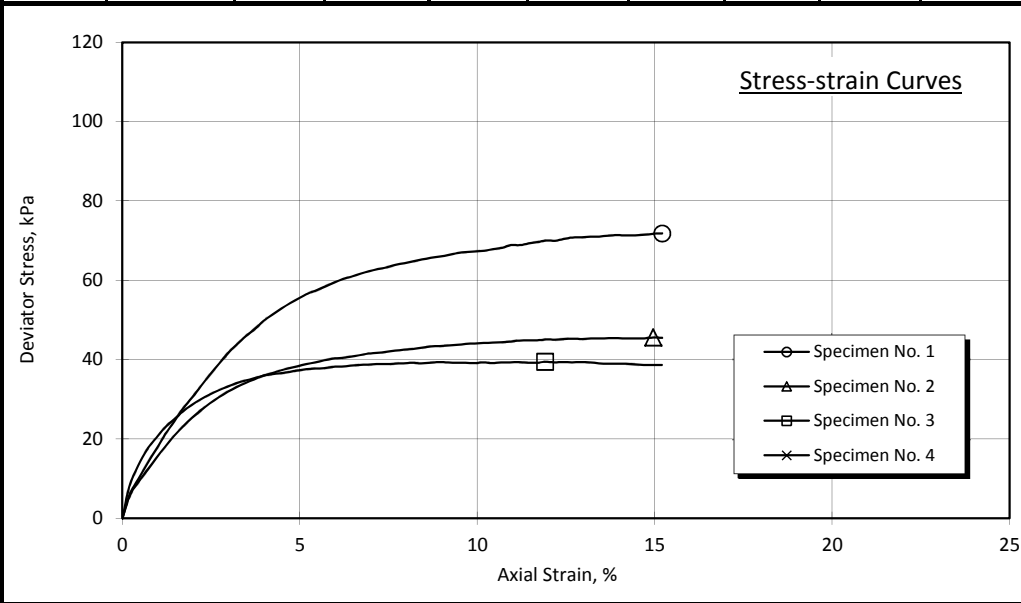
	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1a D-4		Sample No.	LD2-12-1a D-4	
Depth	15.00-15.70m		Depth	15.00-15.70m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.16	mm
2.00 - 0.425 mm	1.9	%	Dia. at 30%	0.077	mm
0.425 - 0.075 mm	68.5	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	10.4	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	19.2	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.1	%			
75um Sieve Passing	29.6	%			

# UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project : <u>Preparatory Survey on Matarbari USC Coral-fired Power Project</u>		Project No. : <u>S27-14</u>
Standard : <u>ASTM D2850-03a</u>		Date of Testing : <u>17.11.14</u>
Borehole No.: <u>LD2-12-1a</u>	Depth : <u>2.00-2.90m</u>	Tested by : <u>Perera</u>
Sample No. : <u>HP-1</u>	Strain Rate : <u>1.00 %/min</u>	Checked by : <u>A. B. Tan</u>

Specimen No.	Condition of Sample	Size of Specimen (mm)		Natural Water Content (%)	Bulk Density (Mg/m3)	Dy Density (Mg/m3)	Cell Pressure (kPa)	Peak Deviator Stress (kPa)	Modulus of Deformation E50 (kPa)	Corrected Initial Strain (%)	Strain at Failure (%)
		Height	Diameter								
1	Undisturbed	99.80	50.00	29.1	1.90	1.48	40	71.8	1472	N/A	15.21
2	Undisturbed	99.80	50.00	34.4	1.88	1.40	80	45.6	1367	N/A	14.96
3	Undisturbed	99.80	50.10	39.6	1.80	1.29	160	39.5	2182	N/A	11.91
4											



Remarks : - [Strain at failure]=[Recorded strain at failure] - [Corrected Initial Strain]  
 - Latex membrane with 0.2mm in thickness is used.  
 - Membrane correction is carried out based on BS 1377 : 1990

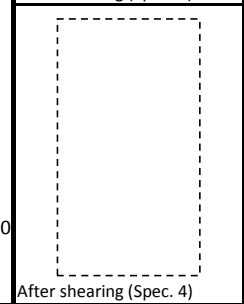
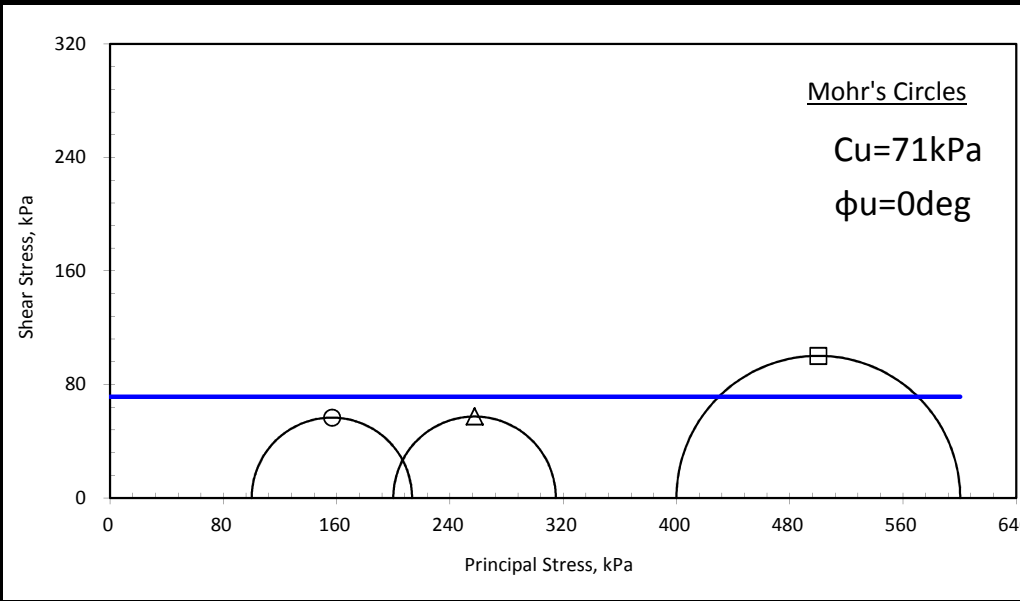
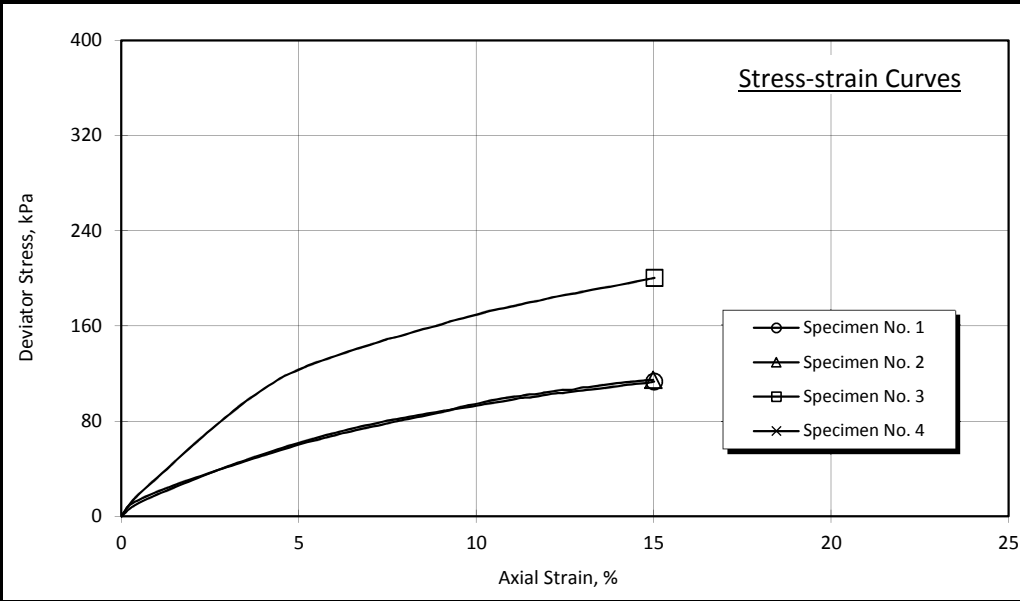
Portion Tested


Top							Bottom
		3	2	1			

# UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project : <u>Preparatory Survey on Matarbari USC Coral-fired Power Project</u>		Project No. : <u>S27-14</u>
Standard : <u>ASTM D2850-03a</u>		Date of Testing : <u>17.11.14</u>
Borehole No.: <u>LD2-12-1a</u>	Depth : <u>9.00-9.70m</u>	Tested by : <u>Perera</u>
Sample No. : <u>D-2</u>	Strain Rate : <u>1.00 %/min</u>	Checked by : <u>A. B. Tan</u>

Specimen No.	Condition of Sample	Size of Specimen (mm)		Natural Water Content (%)	Bulk Density (Mg/m3)	Dy Density (Mg/m3)	Cell Pressure (kPa)	Peak Deviator Stress (kPa)	Modulus of Deformation E50 (kPa)	Corrected Initial Strain (%)	Strain at Failure (%)
		Height	Diameter								
1	Undisturbed	99.80	50.00	28.6	1.95	1.52	100	113.2	1276	N/A	15.01
2	Undisturbed	99.80	50.00	29.9	1.91	1.47	200	114.7	1227	N/A	14.98
3	Undisturbed	99.80	50.10	24.7	1.94	1.56	400	200.4	2724	N/A	15.02
4											



Remarks :	- [Strain at failure]=[Recorded strain at failure] - [Corrected Initial Strain]	Portion Tested Top  Bottom
	- Latex membrane with 0.2mm in thickness is used.	
	- Membrane correction is carried out based on BS 1377 : 1990	

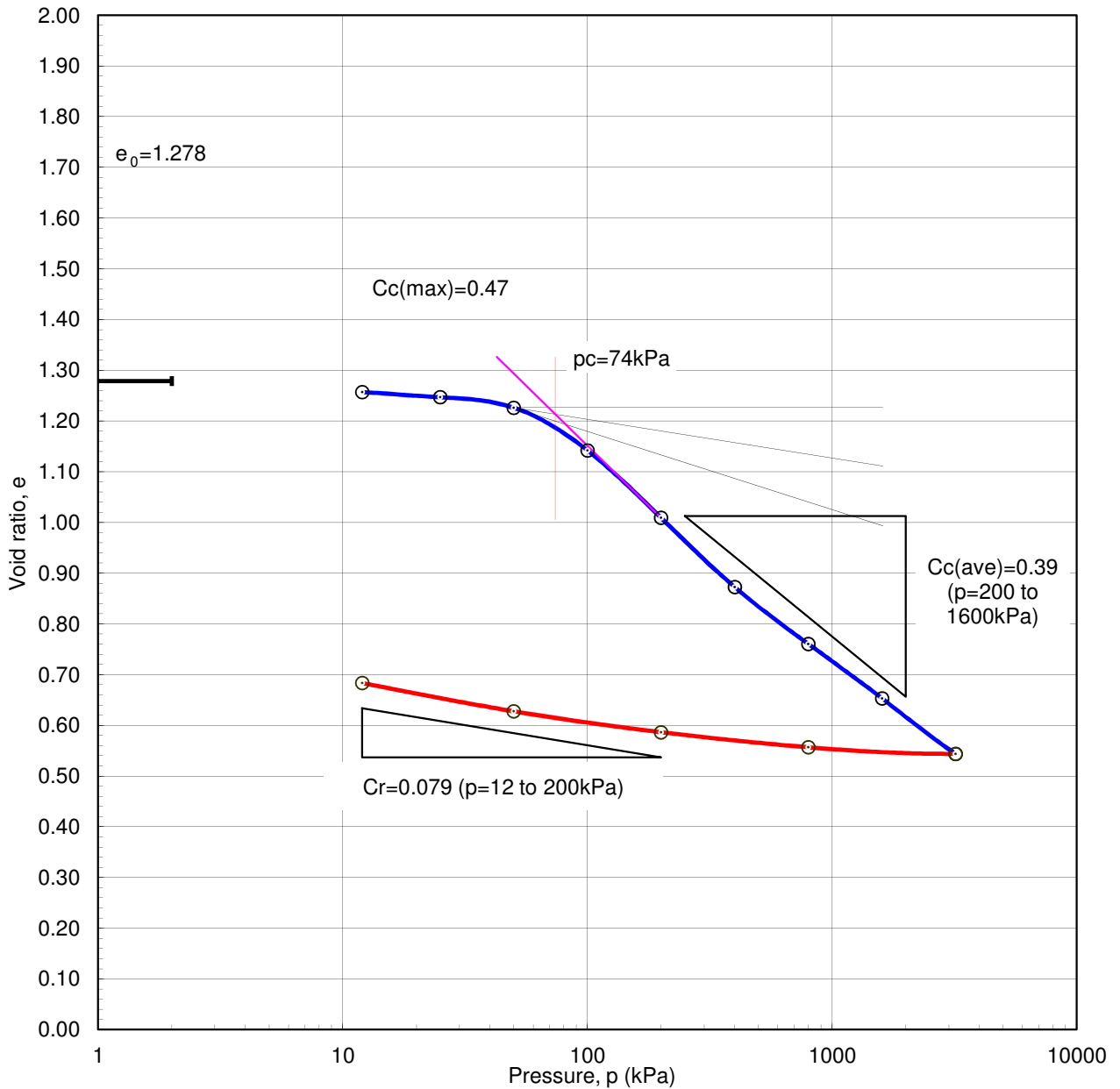
**CONSOLIDATION TEST (*e-log p* curves)**

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Clay with Sand Checked by : A. B. Tan

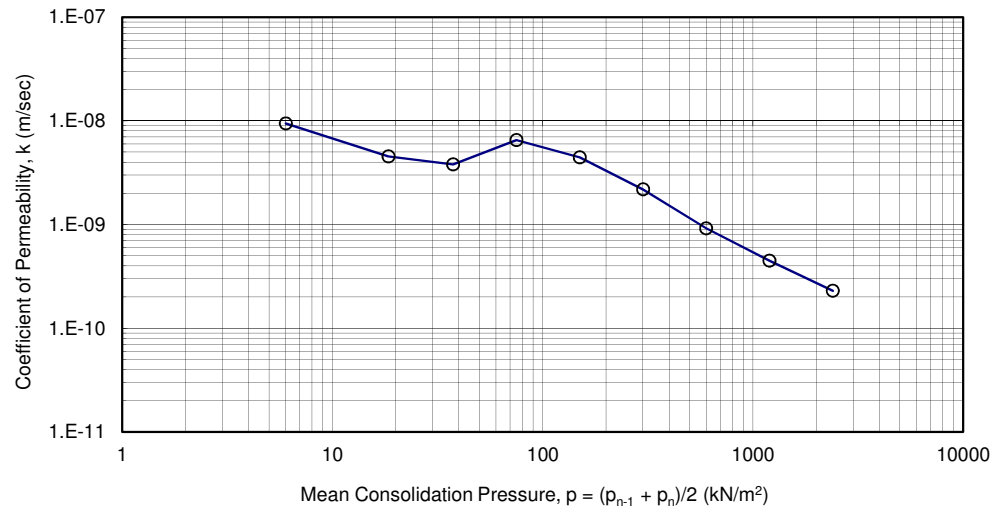
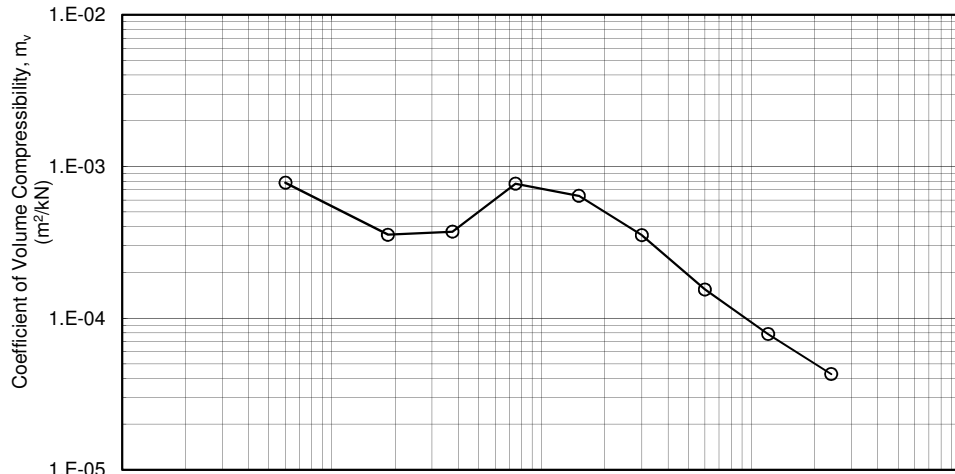
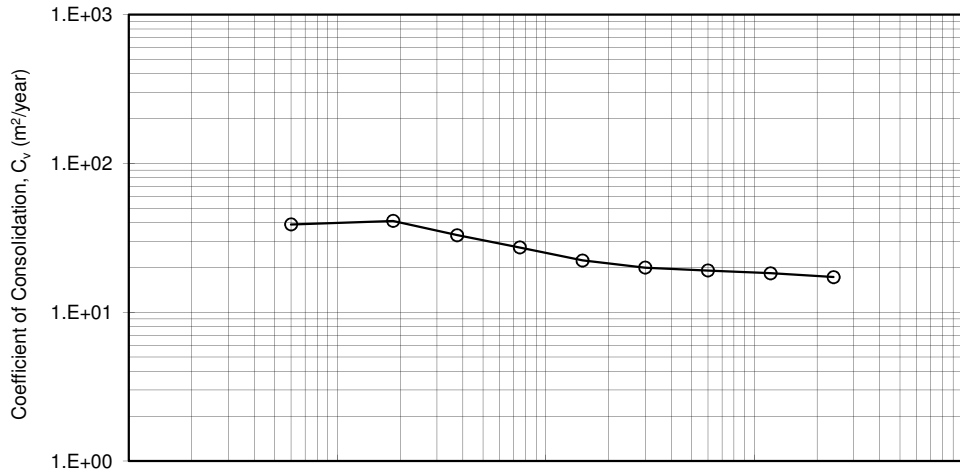
Borehole No. : LD2-12-1a  
 Sample No. : HP-1  
 Depth of Sample : 2.00-2.90 m

Sample No.	Depth of sample (m)	Initial void ratio $e_0$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
				(max)	(average)		
HP-1	2.00-2.90	1.278	74	0.47 (max)	0.39(average)	0.079 (average)	N/A



Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project	: <u>Preparatory Survey on Matarbari USC Coal-fired Power Project</u>	Borehole No.	: <u>LD2-12-1a</u>
Project No.	: <u>S27-14</u>	Sample No.	: <u>HP-1</u>
Date of testing	: <u>17-Nov-14</u>	Tested by	: <u>Lim</u>
		Depth of Sample	: <u>2.00-2.90 m</u>



PROJECT NAME : Preparatory Survey on Matarbari USC Coal-fired Power Project PROJECT NO. : S27-14  
BOREHOLE NO. : LD2-12-1a TESTING STANDARD : ASTM D2435-11 DATE : 17-Nov-14  
SAMPLE NO. : HP-1 INITIAL HEIGHT OF SPECIMEN : 18.000 mm NO. OF LOADING STEP : 9  
DEPTH : 2.00-2.90 m DIAMETER OF SPECIMEN : 53.900 mm SPECIFIC GRAVITY : 2.74  
TESTER NO. : 29 DRY WEIGHT OF SPECIMEN : 49.360 grams SOLID HEIGHT OF SPECIMEN : 7.900 mm  
INITIAL MOISTURE CONTENT : 42.6 % BULK DENSITY : 1.74 Mg/m<sup>3</sup>  
METHOD OF TIME FITTING USED : SQUARE ROOT TIME CURVE - FITTING METHOD LABORATORY TEMPERATURE : 23.0 °C

PRESSURE	PRESSURE INCREMENT	CHANGE IN HEIGHT	HEIGHT	AVERAGE HEIGHT	STRAIN	MV	VOLUME RATIO	VOID RATIO
kN/m <sup>2</sup>	kN/m <sup>2</sup>	*E-2 mm	mm	mm	%	m <sup>2</sup> /kN		
0.000			18.000				2.278	1.278
	12.000	16.8		17.916	0.94	7.81E-04		
12.000			17.832				2.257	1.257
	13.000	8.2		17.791	0.46	3.55E-04		
25.000			17.750				2.247	1.247
	25.000	16.4		17.668	0.93	3.71E-04		
50.000			17.586				2.226	1.226
	50.000	66.4		17.254	3.85	7.70E-04		
100.000			16.922				2.142	1.142
	100.000	105.0		16.397	6.40	6.40E-04		
200.000			15.872				2.009	1.009
	200.000	107.9		15.333	7.04	3.52E-04		
400.000			14.793				1.873	0.873
	400.000	88.7		14.350	6.18	1.55E-04		
800.000			13.906				1.760	0.760
	800.000	84.7		13.483	6.28	7.85E-05		
1600.000			13.059				1.653	0.653
	1600.000	86.3		12.628	6.83	4.27E-05		
3200.000			12.196				1.544	0.544

PRESSURE	AVERAGE PRESSURE	T90	CV	CV	CV	PRIMARY COMPRESSION	PRIMARY COMPRESSION	COEFFICIENT OF PERMEABILITY
kN/m <sup>2</sup>	kN/m <sup>2</sup>	min	m <sup>2</sup> /sec	m <sup>2</sup> /day	m <sup>2</sup> /year	*E-2 mm	RATIO	m/sec
0.000								
	6.000	0.86	1.23E-06	1.07E-01	3.89E+01	2.8	0.166	9.45E-09
12.000								
	18.500	0.80	1.30E-06	1.13E-01	4.11E+01	1.3	0.162	4.53E-09
25.000								
	37.500	0.98	1.04E-06	9.02E-02	3.29E+01	1.8	0.158	3.80E-09
50.000								
	75.000	1.13	8.63E-07	7.46E-02	2.72E+01	17.4	0.243	6.52E-09
100.000								
	150.000	1.25	7.06E-07	6.10E-02	2.23E+01	42.3	0.403	4.43E-09
200.000								
	300.000	1.22	6.32E-07	5.46E-02	1.99E+01	41.3	0.383	2.18E-09
400.000								
	600.000	1.12	6.04E-07	5.22E-02	1.91E+01	33.2	0.375	9.16E-10
800.000								
	1200.000	1.03	5.80E-07	5.01E-02	1.83E+01	29.9	0.352	4.47E-10
1600.000								
	2400.000	0.96	5.46E-07	4.72E-02	1.72E+01	24.0	0.278	2.29E-10
3200.000								

REBOUND  
P 800.000 200.000 50.000 12.000  
H 12.298 12.533 12.858 13.299  
E 0.557 0.586 0.628 0.683



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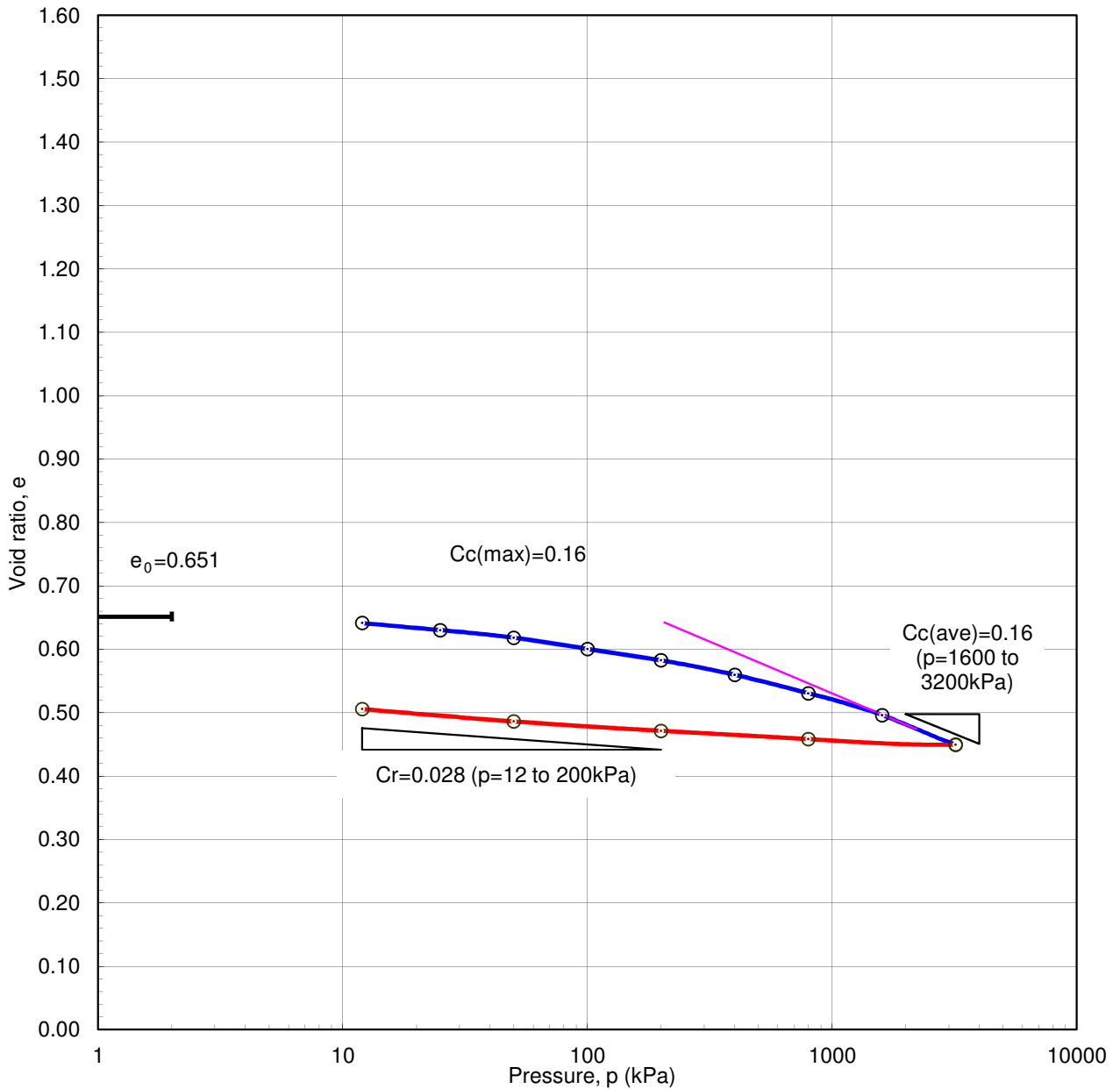
**CONSOLIDATION TEST (*e-log p* curves)**

Preparatory Survey on Matarbari USC Coal-fired Power

Project : Project  
 Project No.: S27-14 Tested by : Lim  
 Soil Type : Sandy Clay Checked by : A. B. Tan

Borehole No. : LD2-12-1a  
 Sample No. : D-2  
 Depth of Sample : 9.00-9.70 m

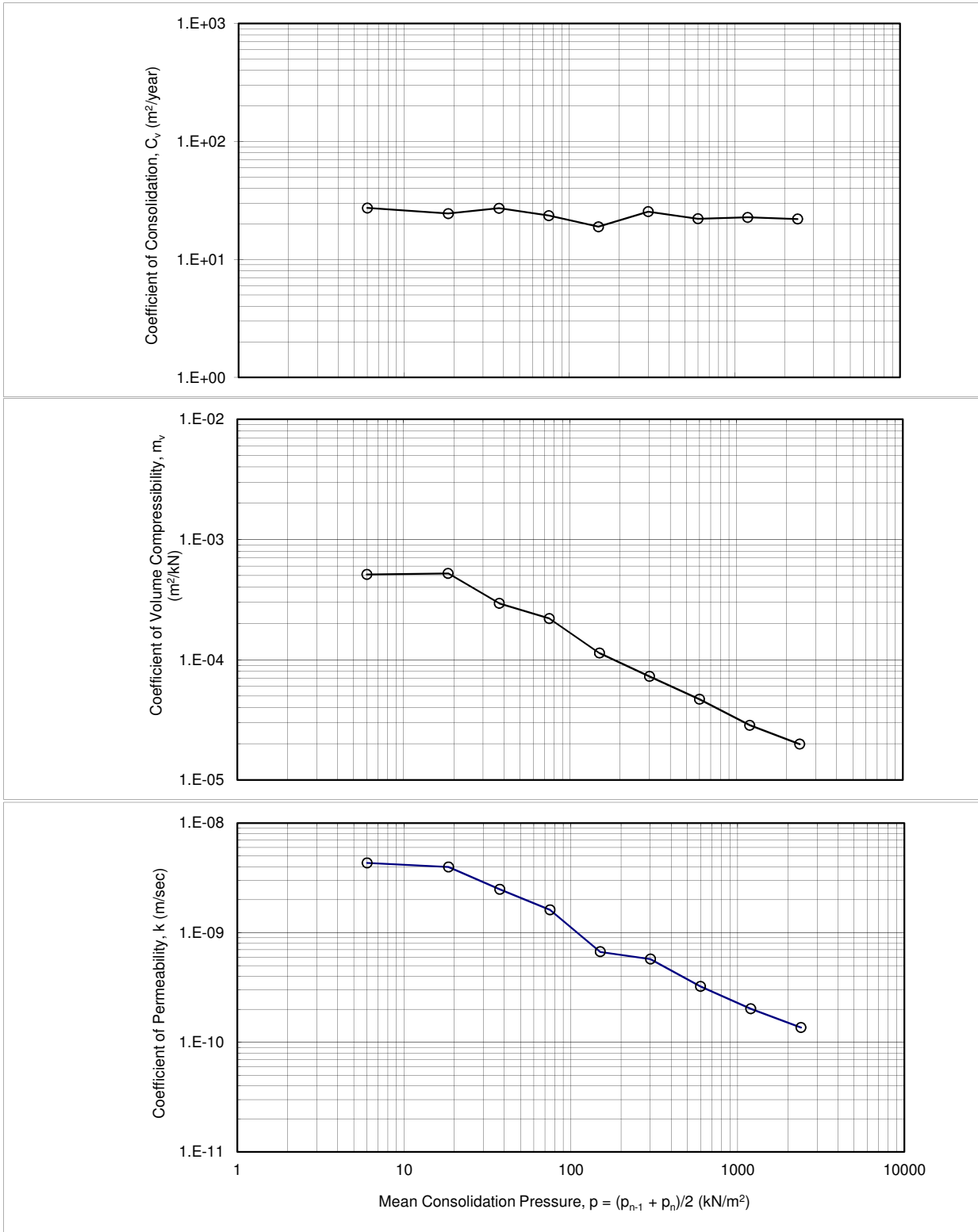
Sample No.	Depth of sample (m)	Initial void ratio $e_0$	Preconsolidation Pressure, $p_c$ (kPa)	Compression Index $C_c$		Swell Index $C_r$	Unload-reload-Compression Index $C_{ur}$
				(max)	(average)		
D-2	9.00-9.85	0.651	-	0.16 (max)	0.16(average)	0.028 (average)	N/A





Consolidation Test (  $p - \bar{c}_v$ ,  $m_v$ ,  $k$  curves )

Project :	Preparatory Survey on Matarbari USC Coal-fired Power Project	Borehole No. :	LD2-12-1a
Project No. :	S27-14	Sample No. :	D-2
Date of testing :	17-Nov-14	Tested by :	Lim
		Depth of Sample :	9.00-9.70 m



PROJECT NAME : Preparatory Survey on Matarbari USC Coal-fired Power Project PROJECT NO. : S27-14  
BOREHOLE NO. : LD2-12-1a TESTING STANDARD : ASTM D2435-11 DATE : 17-Nov-14  
SAMPLE NO. : D-2 INITIAL HEIGHT OF SPECIMEN : 18.000 mm NO. OF LOADING STEP : 9  
DEPTH : 9.00-9.70 m DIAMETER OF SPECIMEN : 53.900 mm SPECIFIC GRAVITY : 2.71  
TESTER NO. : 30 DRY WEIGHT OF SPECIMEN : 67.370 grams SOLID HEIGHT OF SPECIMEN : 10.900 mm  
INITIAL MOISTURE CONTENT : 22.1 % BULK DENSITY : 2.01 Mg/m<sup>3</sup>  
METHOD OF TIME FITTING USED : SQUARE ROOT TIME CURVE - FITTING METHOD LABORATORY TEMPERATURE : 23.0 °C

PRESSURE	PRESSURE INCREMENT	CHANGE IN HEIGHT	HEIGHT	AVERAGE HEIGHT	STRAIN	MV	VOLUME RATIO	VOID RATIO
kN/m <sup>2</sup>	kN/m <sup>2</sup>	*E-2 mm	mm	mm	%	m <sup>2</sup> /kN		
0.000			18.000				1.651	0.651
12.000	12.000	11.0	17.890	17.945	0.61	5.11E-04	1.641	0.641
25.000	13.000	12.1	17.769	17.830	0.68	5.22E-04	1.630	0.630
50.000	25.000	13.0	17.639	17.704	0.73	2.94E-04	1.618	0.618
100.000	50.000	19.3	17.446	17.543	1.10	2.20E-04	1.601	0.601
200.000	100.000	19.7	17.249	17.348	1.14	1.14E-04	1.582	0.582
400.000	200.000	24.9	17.000	17.125	1.45	7.27E-05	1.560	0.560
800.000	400.000	31.6	16.684	16.842	1.88	4.69E-05	1.531	0.531
1600.000	800.000	37.6	16.308	16.496	2.28	2.85E-05	1.496	0.496
3200.000	1600.000	51.0	15.798	16.053	3.18	1.99E-05	1.449	0.449


PRESSURE	AVERAGE PRESSURE	T90	CV	CV	CV	PRIMARY COMPRESSION	PRIMARY COMPRESSION	COEFFICIENT OF PERMEABILITY
kN/m <sup>2</sup>	kN/m <sup>2</sup>	min	m <sup>2</sup> /sec	m <sup>2</sup> /day	m <sup>2</sup> /year	*E-2 mm	RATIO	m/sec
0.000								
12.000	6.000	1.22	8.64E-07	7.47E-02	2.73E+01	2.0	0.182	4.33E-09
25.000	18.500	1.35	7.77E-07	6.71E-02	2.45E+01	2.0	0.166	3.98E-09
50.000	37.500	1.20	8.62E-07	7.44E-02	2.72E+01	2.2	0.166	2.48E-09
100.000	75.000	1.35	7.47E-07	6.45E-02	2.36E+01	3.1	0.158	1.61E-09
200.000	150.000	1.65	6.00E-07	5.18E-02	1.89E+01	2.9	0.145	6.68E-10
400.000	300.000	1.20	8.06E-07	6.96E-02	2.54E+01	3.0	0.119	5.75E-10
800.000	600.000	1.33	7.02E-07	6.06E-02	2.21E+01	3.7	0.117	3.23E-10
1600.000	1200.000	1.24	7.22E-07	6.23E-02	2.28E+01	4.7	0.124	2.02E-10
3200.000	2400.000	1.21	6.98E-07	6.03E-02	2.20E+01	5.2	0.101	1.36E-10

REBOUND  
P 800.000 200.000 50.000 12.000  
H 15.895 16.038 16.199 16.411  
E 0.458 0.471 0.486 0.506



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### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 13.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-12-1a		Sample No.:D-1		Depth : 6.00-6.70m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Saturated Wet Density, Mg/m <sup>3</sup>	1.95	1.95	1.95		
	Water Content, %	29.5	29.5	29.5		
	Dry Density Mg/m <sup>3</sup>	1.51	1.51	1.51		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.95	0.98	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	559	586		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.08	0.10	0.12		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	381	194	267		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.020	0.015	0.012		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	135	239	343		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-0.86	-0.88	-1.19		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	4.80	4.80	8.14		
Shear Strength Parameters	$\phi_d = 39$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at required saturated wet density = 1.95 Mg/m <sup>3</sup>						

## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

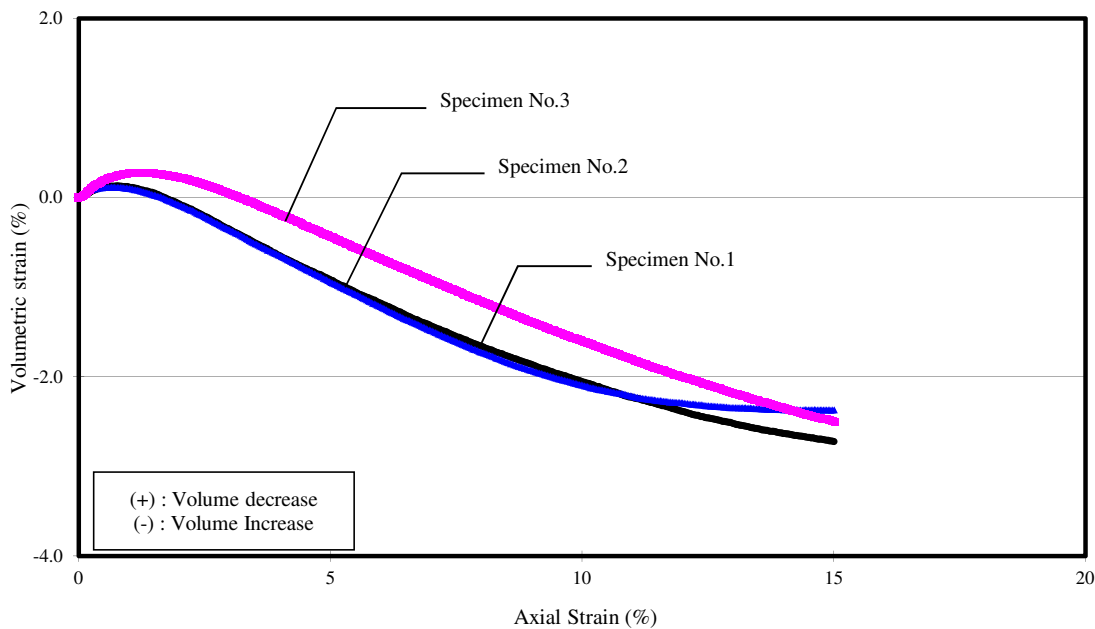
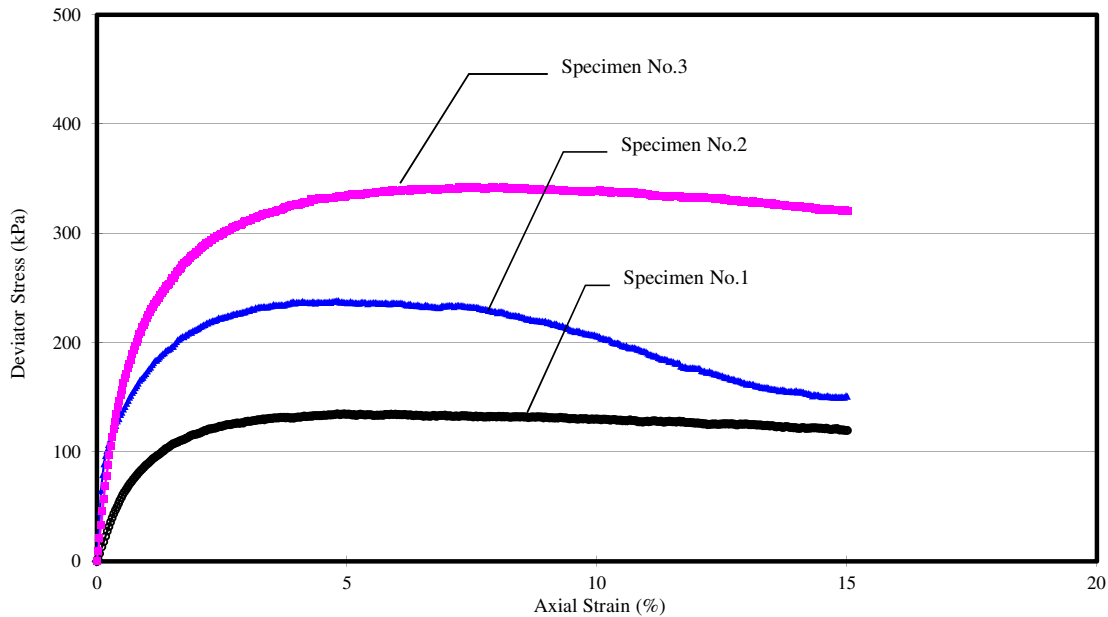
Project No.: S27-14

Sample No.: D-1

Soil Type: Sand with Clay

Borehole No.: LD2-12-1a

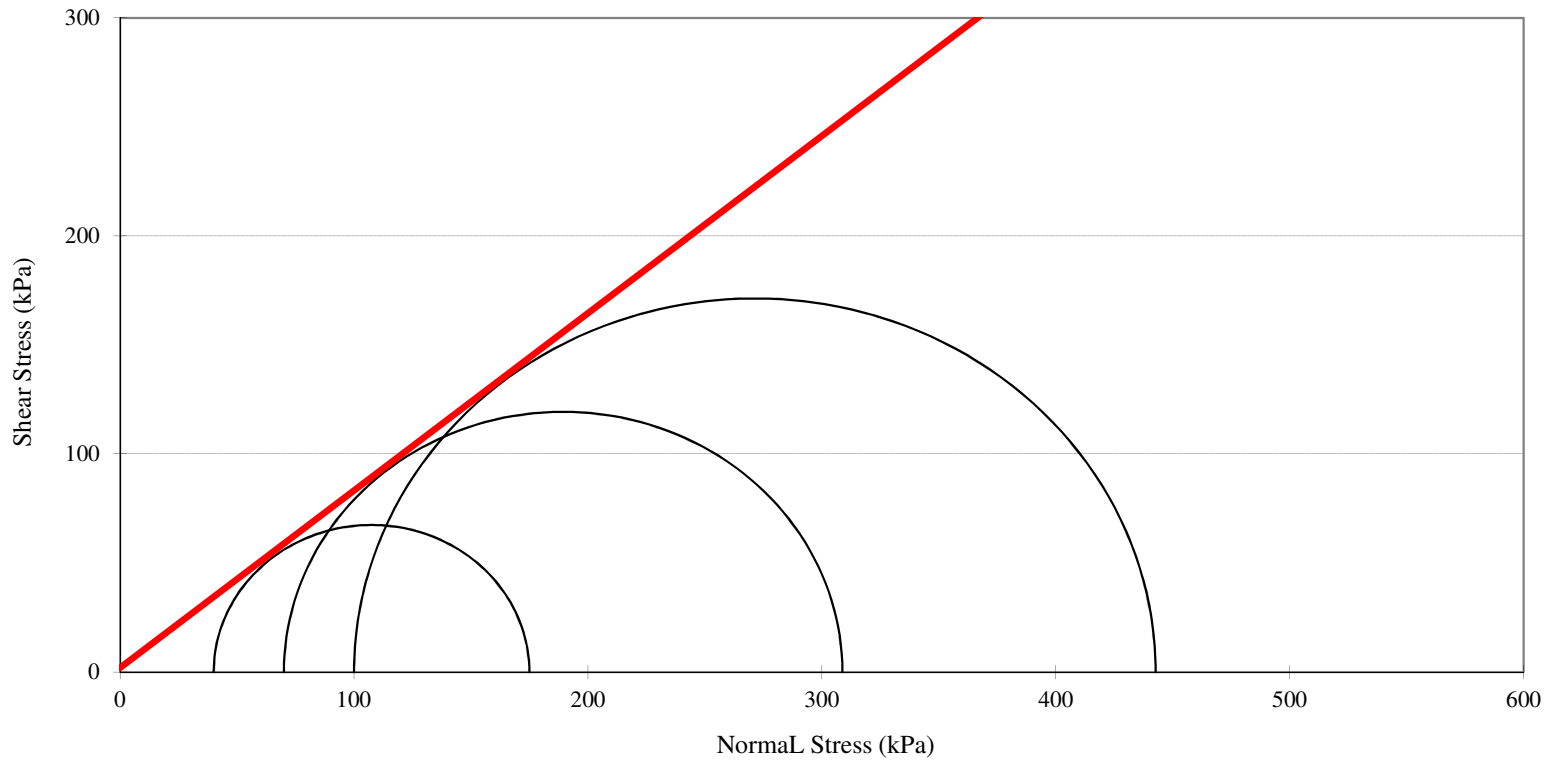
Depth : 6.00-6.70mm



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD2-12-1a      Soil Type: Sand with Clay  
 Sample No. : D-1                      Depth : 6.00-6.70m  
 Angle of Internal Friction,  $\phi_d$       39 deg  
 Cohesion,  $c_d$                               0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

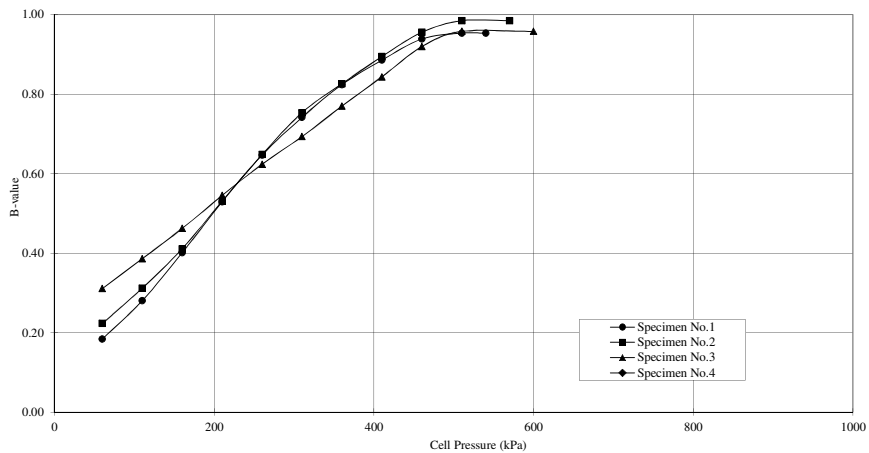
Borehole No.: LD2-12-1a

Sample No.: D-1

Depth : 6.00-6.70m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	25.5	20	26.7	20	29.3		
	Back Pressure (kPa)	20		20		20			
	B-value	0.18		0.22		0.31			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	64.0	50	65.6	50	69.3		
	Back Pressure (kPa)	50		50		50			
	B-value	0.28		0.31		0.39			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	120.1	100	120.6	100	123.1		
	Back Pressure (kPa)	100		100		100			
	B-value	0.40		0.41		0.46			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	176.5	150	176.5	150	177.3		
	Back Pressure (kPa)	150		150		150			
	B-value	0.53		0.53		0.55			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	232.3	200	232.4	200	231.2		
	Back Pressure (kPa)	200		200		200			
	B-value	0.65		0.65		0.62			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	287.1	250	287.7	250	284.7		
	Back Pressure (kPa)	250		250		250			
	B-value	0.74		0.75		0.69			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	341.2	300	341.3	300	338.5		
	Back Pressure (kPa)	300		300		300			
	B-value	0.82		0.83		0.77			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	394.3	350	394.7	350	392.2		
	Back Pressure (kPa)	350		350		350			
	B-value	0.89		0.89		0.84			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	446.9	400	447.8	400	446.0		
	Back Pressure (kPa)	400		400		400			
	B-value	0.94		0.96		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.7	450	499.2	450	497.9		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.98		0.96			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	528.6	500	559.1	500	586.2		
	Back Pressure (kPa)	500		500		500			
	B-value	0.95		0.98		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

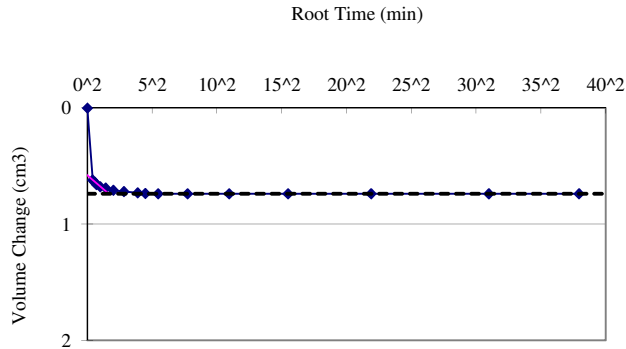
Project No.: S27-14

Borehole No.: LD2-12-1a

Soil Type: Sand with Clay

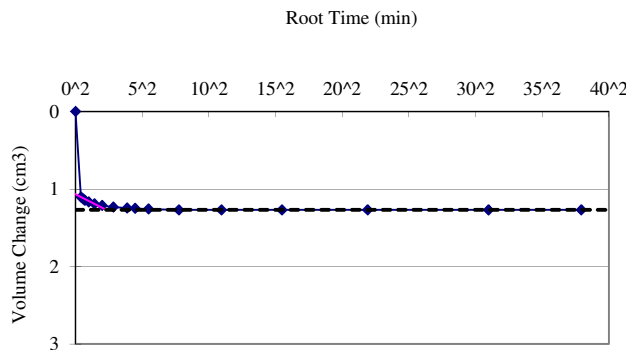
Sample No.: D-1

Depth : 6.00-6.70m



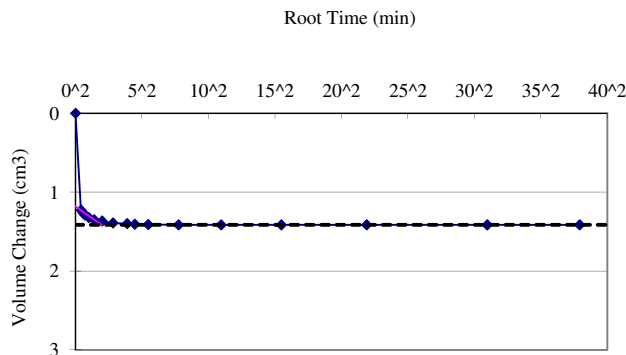
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 2.7$  min  
 $C_v = 381$  m<sup>2</sup>/year  
 $m_{vi} = 0.020$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 70$  kPa  
 $t_{100} = 5.3$  min  
 $C_v = 194$  m<sup>2</sup>/year  
 $m_{vi} = 0.015$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.9$  min  
 $C_v = 267$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 13.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-12-1a		Sample No.:D-3B		Depth : 12.30-12.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sand with Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Saturated Wet Density, Mg/m <sup>3</sup>	1.90	1.90	1.90		
	Water Content, %	32.1	32.1	32.1		
	Dry Density Mg/m <sup>3</sup>	1.44	1.44	1.44		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	550	600	650		
	B-value	0.96	0.96	0.95		
Consolidation Stage	Cell Pressure kPa	550	600	650		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	538	586	633		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.09	0.15	0.19		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	286	303	344		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.018	0.015	0.012		
Compression Stage	Cell Pressure kPa	550	600	650		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	50	100	150		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	154	283	421		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-0.21	0.15	0.68		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	9.17	11.14	12.48		
Shear Strength Parameters	$\phi_d = 36$ Degree  $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
Remarks : Specimens are prepared at required saturated wet density = 1.90 Mg/m <sup>3</sup>						



## Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

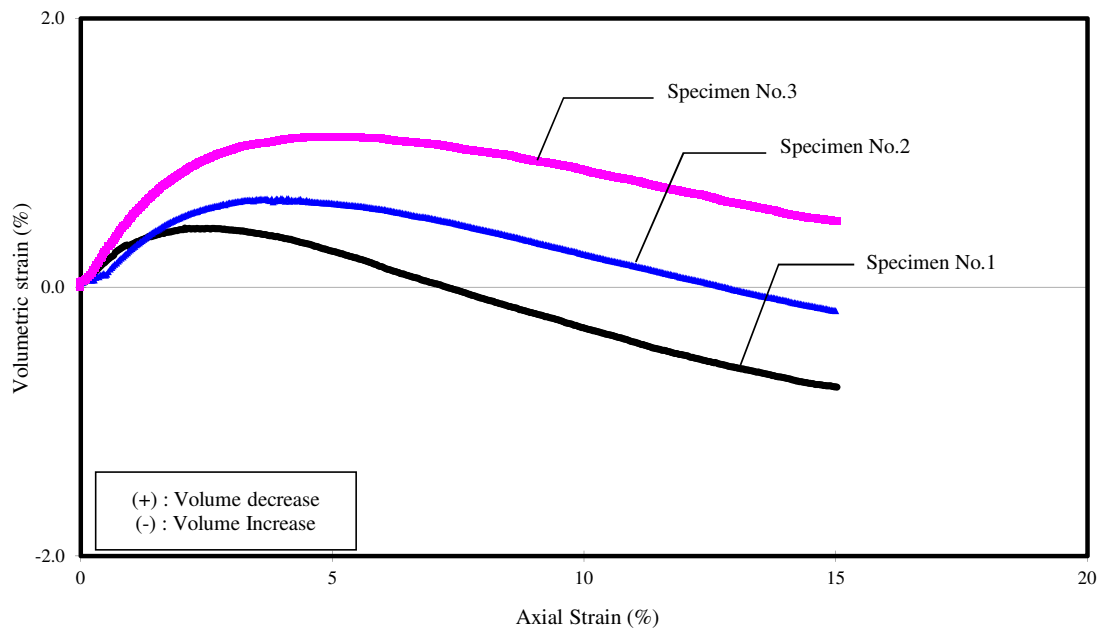
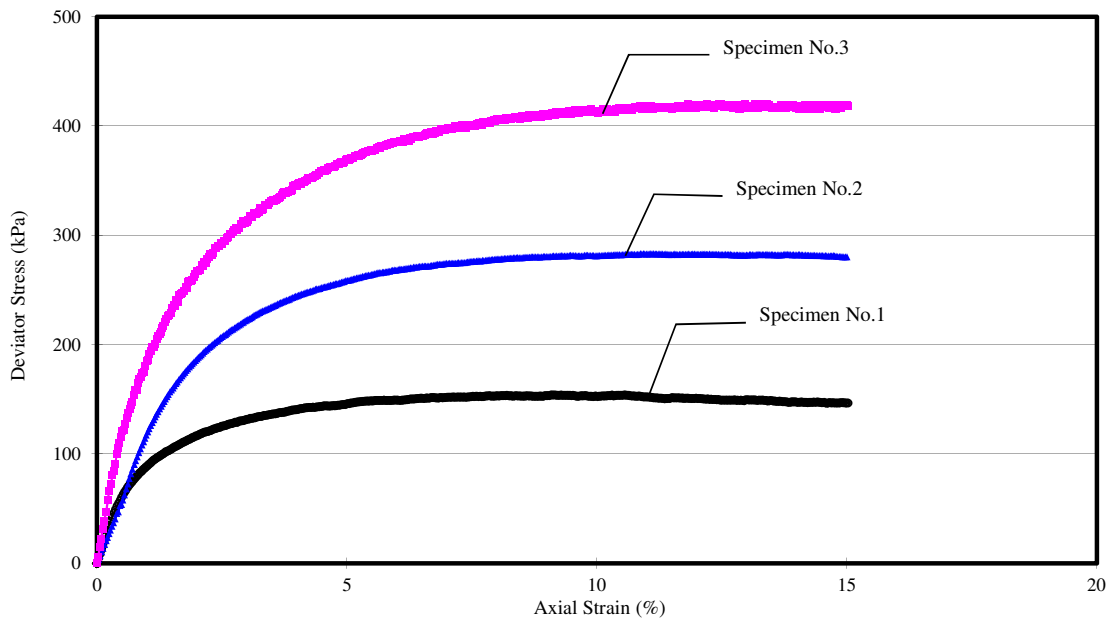
Project No.: S27-14

Sample No.: D-3B

Soil Type: Sand with Clay

Borehole No.: LD2-12-1a

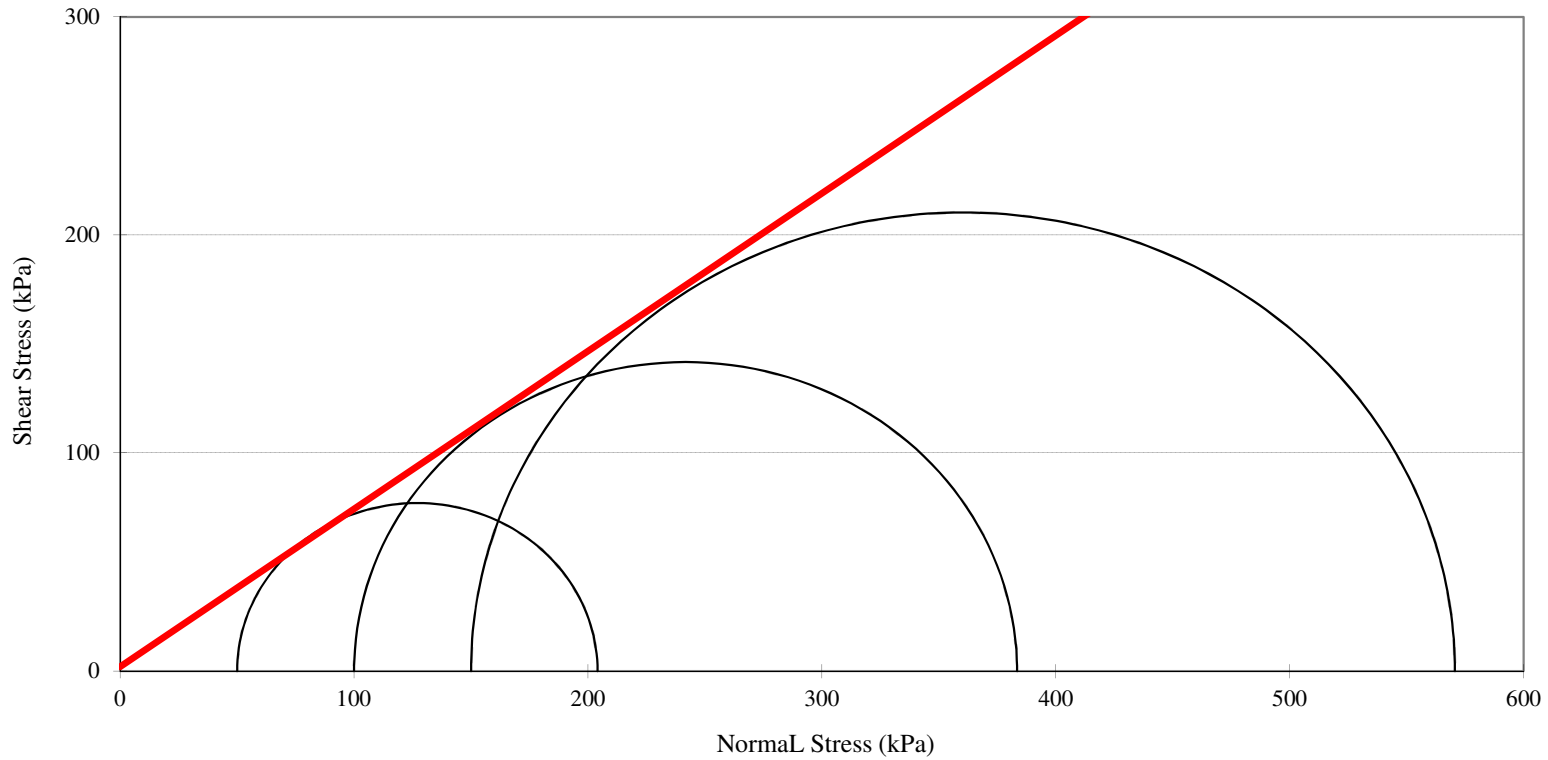
Depth : 12.30-12.80mm



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr's Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD2-12-1a      Soil Type: Sand with Clay  
 Sample No. : D-3B              Depth : 12.30-12.80m  
 Angle of Internal Friction,  $\phi_d$       36 deg  
 Cohesion,  $c_d$                       0 kPa



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

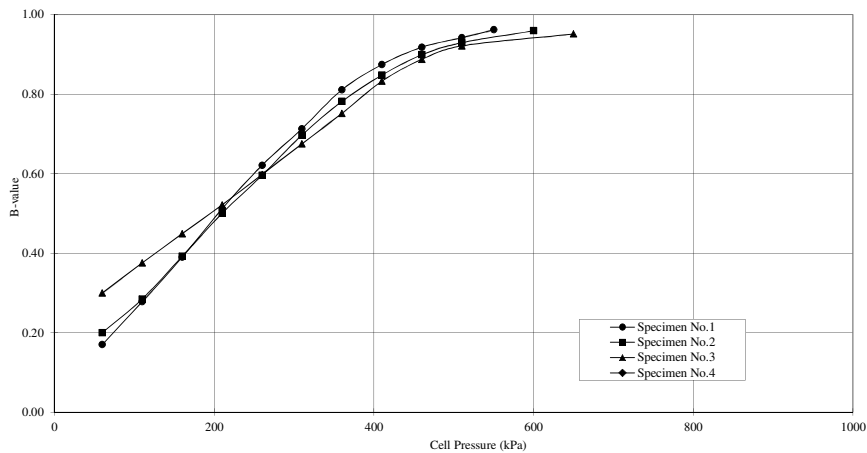
Borehole No.: LD2-12-1a

Sample No.: D-3B

Depth : 12.30-12.80m

Soil Type: Sand with Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	25.1	20	26.0	20	29.0		
	Back Pressure (kPa)	20		20		20			
	B-value	0.17		0.20		0.30			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	63.9	50	64.2	50	68.8		
	Back Pressure (kPa)	50		50		50			
	B-value	0.28		0.28		0.38			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	119.5	100	119.6	100	122.4		
	Back Pressure (kPa)	100		100		100			
	B-value	0.39		0.39		0.45			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	175.6	150	175.0	150	176.1		
	Back Pressure (kPa)	150		150		150			
	B-value	0.51		0.50		0.52			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	231.1	200	229.8	200	229.9		
	Back Pressure (kPa)	200		200		200			
	B-value	0.62		0.60		0.60			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	285.6	250	284.8	250	283.8		
	Back Pressure (kPa)	250		250		250			
	B-value	0.71		0.70		0.68			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	340.5	300	339.1	300	337.6		
	Back Pressure (kPa)	300		300		300			
	B-value	0.81		0.78		0.75			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	393.7	350	392.4	350	391.6		
	Back Pressure (kPa)	350		350		350			
	B-value	0.87		0.85		0.83			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	445.9	400	444.9	400	444.4		
	Back Pressure (kPa)	400		400		400			
	B-value	0.92		0.90		0.89			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.1	450	496.5	450	496.1		
	Back Pressure (kPa)	450		450		450			
	B-value	0.94		0.93		0.92			
B-check Step.11	Cell Pressure (kPa)	510	550	510	600	510	650		
	P.W.P (kPa)	500	538.5	500	586.3	500	633.2		
	Back Pressure (kPa)	500		500		500			
	B-value	0.96		0.96		0.95			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

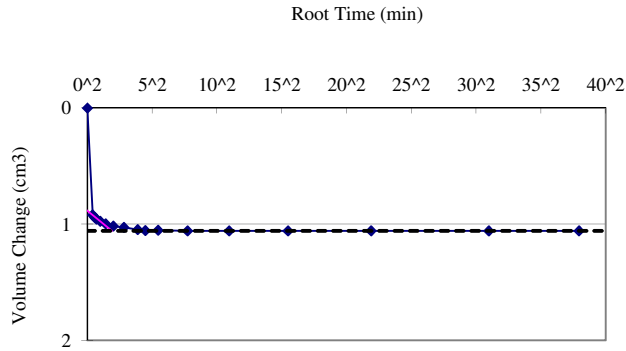
Project No.: S27-14

Borehole No.: LD2-12-1a

Soil Type: Sand with Clay

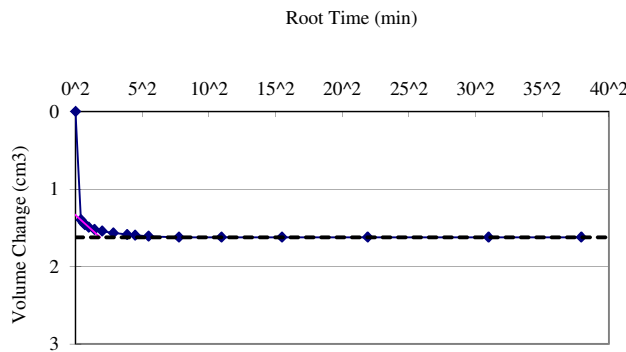
Sample No.: D-3B

Depth : 12.30-12.80m



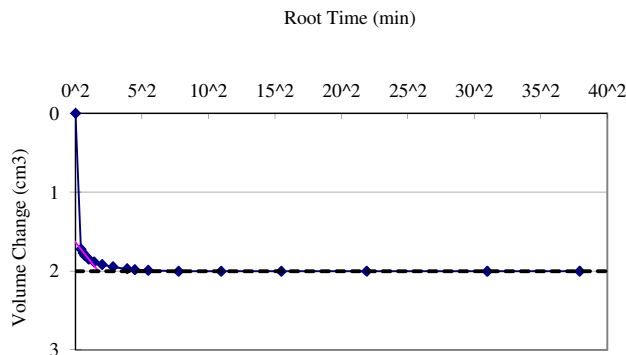
Specimen No.: 1

$p' = 50$  kPa  
 $t_{100} = 3.6$  min  
 $C_v = 286$  m<sup>2</sup>/year  
 $m_{vi} = 0.018$  m<sup>2</sup>/MN



Specimen No.: 2


$p' = 100$  kPa  
 $t_{100} = 3.4$  min  
 $C_v = 303$  m<sup>2</sup>/year  
 $m_{vi} = 0.015$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 150$  kPa  
 $t_{100} = 3.0$  min  
 $C_v = 344$  m<sup>2</sup>/year  
 $m_{vi} = 0.012$  m<sup>2</sup>/MN

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project					
Date Tested : 13.12.14		Tested by : Perera		Checked by : A. B. Tan			
Borehole No.: LD2-12-1a		Sample No.:D-4		Depth :15.00-15.70m			
Specimen Condition : Remoulded		Test Method : ASTM D7181-11					
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm			Ave. Height : 100.0mm		
Specimen No.		1	2	3	4		
Initial Condition	Saturated Wet Density, Mg/m <sup>3</sup>	1.90	1.90	1.90			
	Water Content, %	32.6	32.6	32.6			
	Dry Density Mg/m <sup>3</sup>	1.43	1.43	1.43			
Saturation Stage	Saturated PWP, kPa	200	200	200			
	Final Cell Pressure, kPa	250	300	350			
	B-value	0.95	0.96	0.96			
Consolidation Stage	Cell Pressure kPa	250	300	350			
	Back Pressure kPa	200	200	200			
	Initial PWP, kPa	236	282	326			
	Final PWP kPa	200	200	200			
Consolidation Parameter	Volume Change, %	0.18	0.30	0.57			
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	114.63	95.45	54.45			
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.04	0.03	0.04			
Compression Stage	Cell Pressure kPa	250	300	350			
	Back Pressure kPa	200	200	200			
	Effective Cell Pressure kPa	50	100	150			
	Shearing Speed mm/min	0.015	0.015	0.015			
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f, kPa	176	299	418			
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f kPa	N/A	N/A	N/A			
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ )f (%)	-1.87	-1.17	-0.28			
	Strain at ( $\sigma_1 - \sigma_3$ )f (%)	7.91	12.26	14.96			
Shear Strength Parameters	In terms of Effective Stress	Mode of Failure					
	$\phi' = 36$ deg $c' = 0$ kPa	1	2	3	4		
							
Remarks :		Specimens are prepared at required saturated wet density = 1.90 Mg/m <sup>3</sup>					

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

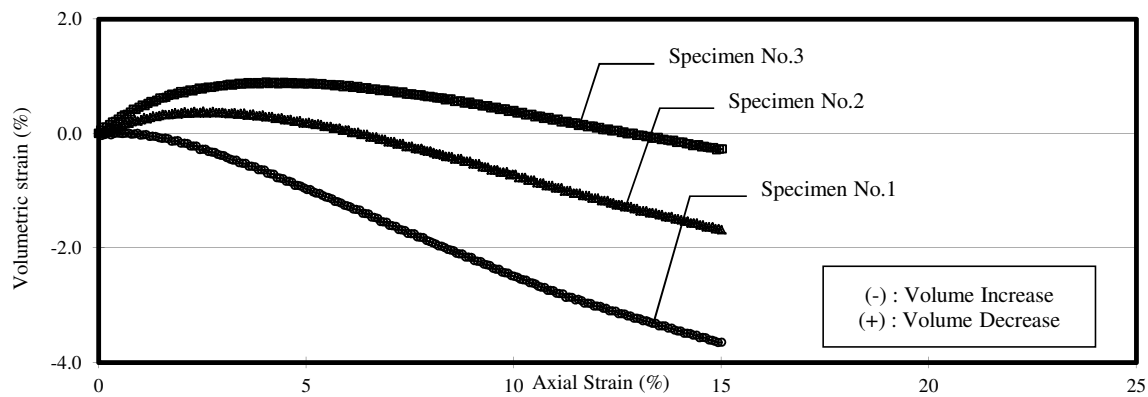
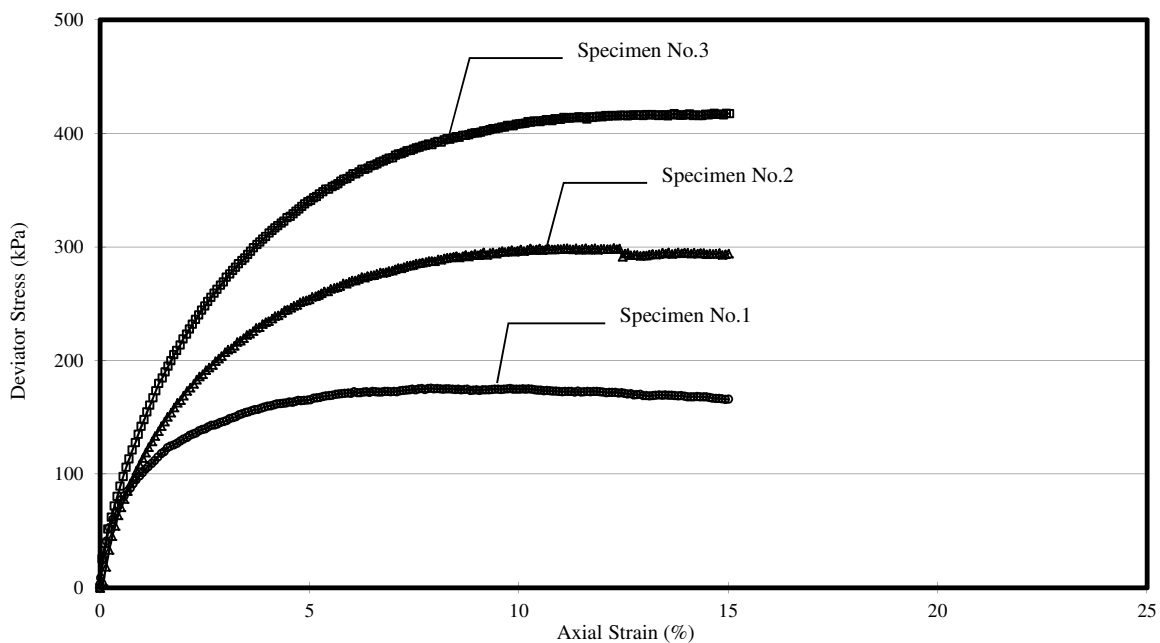
Project No.: S27-14

Sample No.: D-4

Soil Type: Clayey Sand

Borehole No.: LD2-12-1a

Depth : 15.00-15.70m

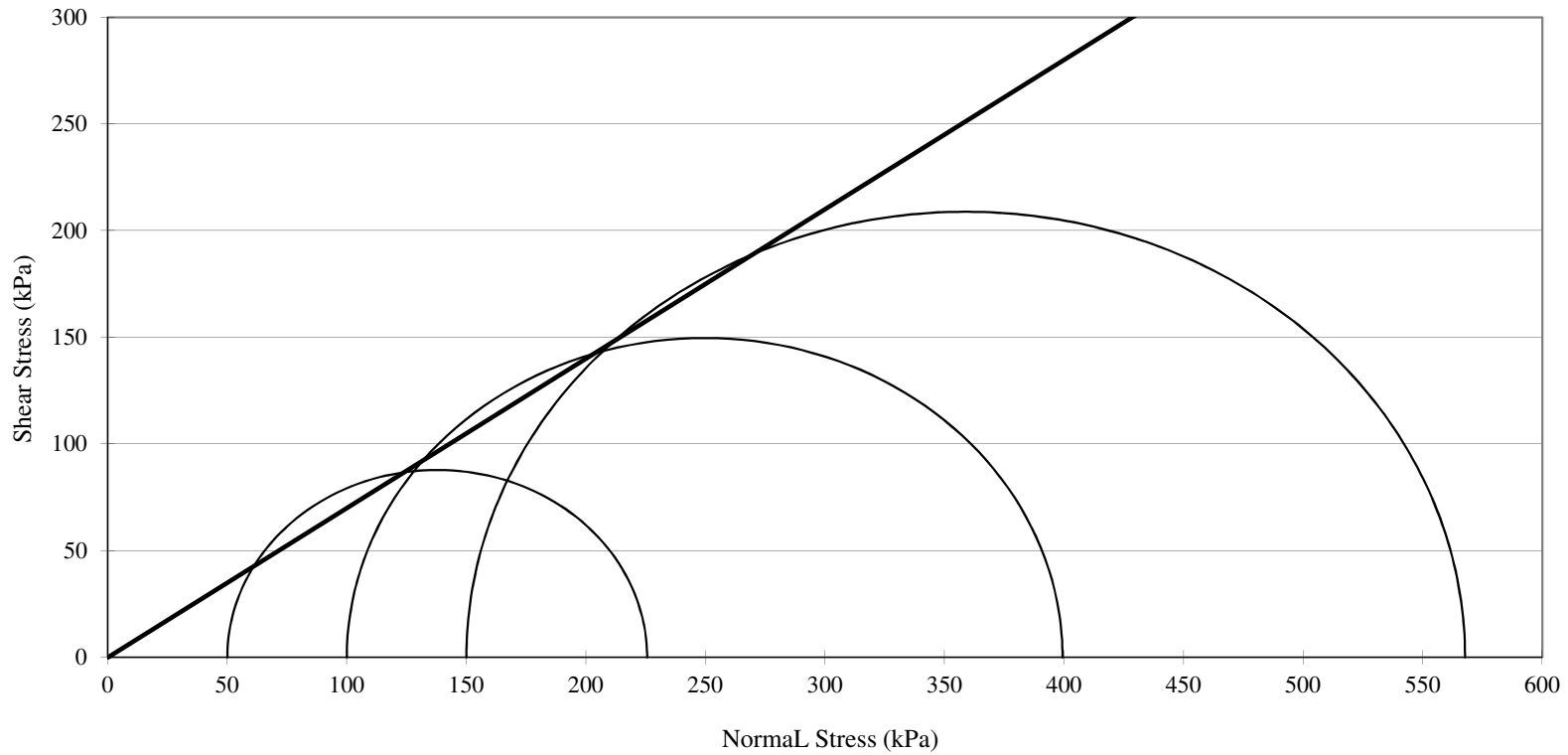


# Consolidated Drained Triaxial Compression Test

## - Mohr's Circle (In terms of Total Stress) -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. :	<u>LD2-12-1a</u>	Soil Type:	<u>Clayey Sand</u>
Sample No. :	<u>D-4</u>	Depth :	<u>15.00-15.70m</u>
Angle of Internal Friction, $\phi$	<u>35</u>	deg	
Cohesion, $c$	<u>0</u>	kPa	



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

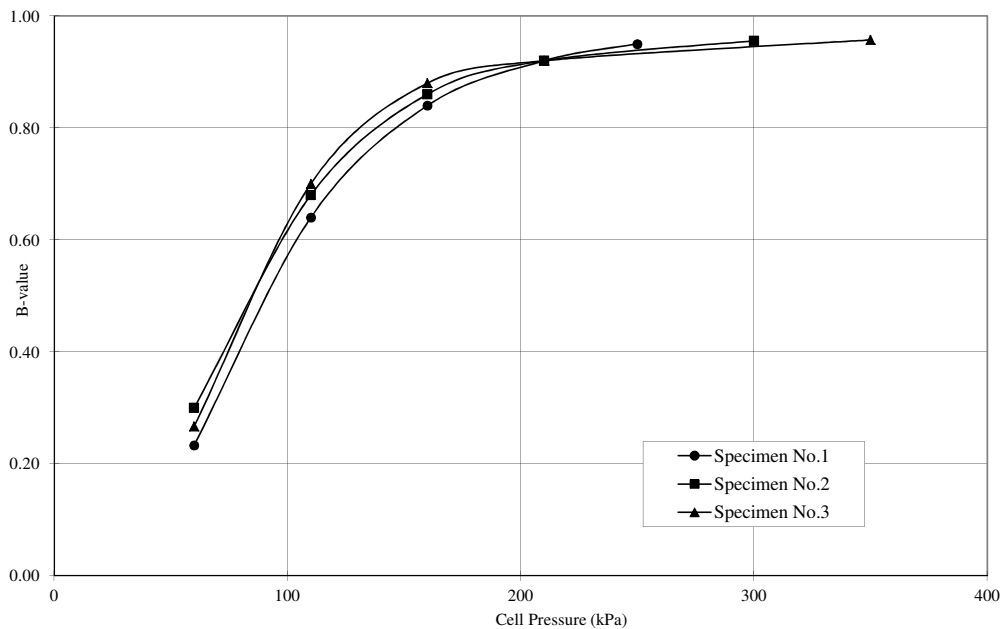
Borehole No.: LD2-12-1a

Sample No.: D-4

Depth : 15.00-15.70m

Soil Type: Clayey Sand

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	27	20	29	20	28
	Back Pressure (kPa)	20		20		20	
	B-value	0.23		0.30		0.27	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	82	50	84	50	85
	Back Pressure (kPa)	50		50		50	
	B-value	0.64		0.68		0.70	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	142	100	143	100	144
	Back Pressure (kPa)	100		100		100	
	B-value	0.84		0.86		0.88	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	196	150	196	150	196
	Back Pressure (kPa)	150		150		150	
	B-value	0.92		0.92		0.92	
B-check Step.5	Cell Pressure (kPa)	210	250	210	300	210	350
	P.W.P (kPa)	200	238	200	286	200	334
	Back Pressure (kPa)	200		200		200	
	B-value	0.95		0.96		0.96	





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

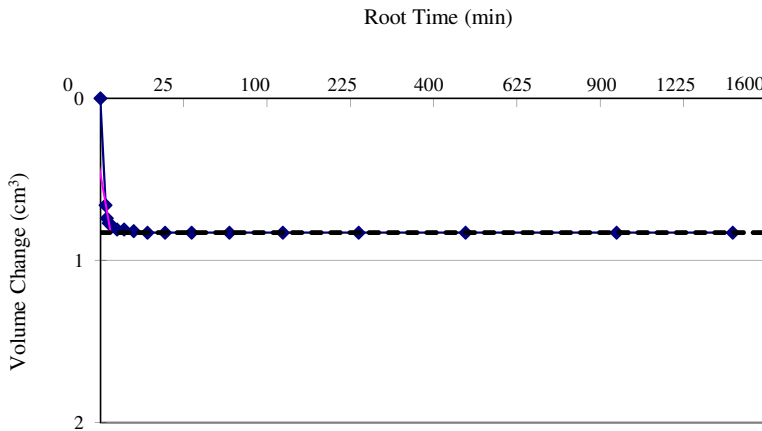
Project No.: S27-14

Sample No.: D-4

Soil Type: Clayey Sand

Borehole No.: LD2-12-1a

Depth : 15.00-15.70m



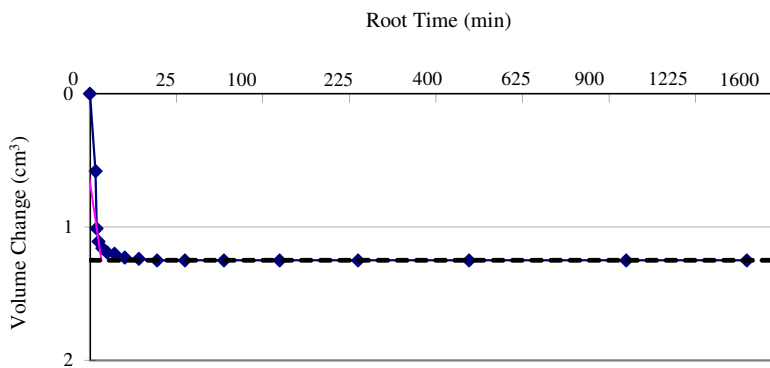
Specimen No.: 1

$p' = 50$  kPa

$t_{100} = 0.4$  min

$C_v = 114.63$  m<sup>2</sup>/year

$m_{vi} = 0.04$  m<sup>2</sup>/MN



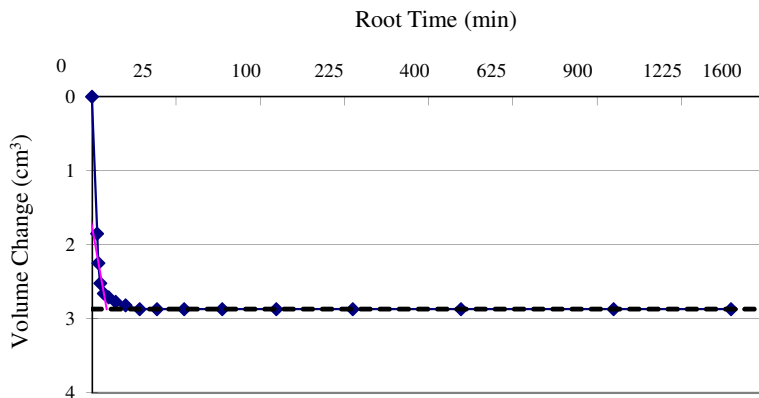
Specimen No.: 2

$p' = 100$  kPa

$t_{100} = 0.4$  min

$C_v = 95.45$  m<sup>2</sup>/year

$m_{vi} = 0.03$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 150$  kPa

$t_{100} = 0.8$  min

$C_v = 54.45$  m<sup>2</sup>/year

$m_{vi} = 0.04$  m<sup>2</sup>/MN

22) LD2-12-1b

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		LD2-12-1b								
Sample No.		D-1	HP-1Top	HP-1Bottom	D-2	D-3	D-4	D-5	D-6	
Sample Depth		3.00m ~3.90m	6.00m ~6.60m	6.60m ~6.80m	9.00m ~9.65m	12.00m ~12.65m	15.00m ~15.90m	18.00m ~18.90m	22.00m ~22.90m	
Condition of Sample		Disturbed	Undisturbed		Disturbed					
Natural Water Content	%	22.4	38.9	30.5	24.4	24.7	26.1	29.2	26.5	
Specific Gravity		2.69	2.73	2.70	2.69	2.70	2.70	2.71	2.73	
Wet Density	Mg/m <sup>3</sup>	1.91	1.71	1.71	-	1.79	1.88	-	-	
Dry Density	Mg/m <sup>3</sup>	1.56	1.23	1.31	-	1.43	1.49	-	-	
Natural Void Ratio		0.73	1.21	1.06	-	0.88	0.81	-	-	
Degree of Saturation	%	83	88	78	-	76	87	-	-	
Atterberg Limits	Liquid Limit,	%	- * <sup>3</sup>	44	- * <sup>3</sup>	-	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	30
	Plastic Limit,	%	- * <sup>3</sup>	24	- * <sup>3</sup>	-	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	18
	Plasticity Index,	%	- * <sup>3</sup>	20	- * <sup>3</sup>	-	- * <sup>3</sup>	- * <sup>3</sup>	- * <sup>3</sup>	12
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0	0	0
	Sand,	%	73	9	53	66	50	56	38	26
	Silt,	%	10	47	19	14	30	21	37	40
	Clay & Colloid,	%	17	44	28	20	20	23	25	34
	Max. diameter,	mm	0.850	0.850	2.00	2.00	2.00	0.425	0.425	0.850
	Diam. at 60%	mm	0.15	0.014	0.12	0.25	0.095	0.11	0.072	0.030
	Diam. at 10%	mm	-	-	-	-	-	-	-	-
Visual soil description		Clayey Sand	Clay	Clayey Sand	Clayey Sand	Silty Sand	Clayey Sand	Sandy Silt	Clay with Sand	
Unified soil classification		-	CL	-	-	-	-	-	CL	
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-	-	-	-	-
	Cohesion Intercept, kPa		-	-	-	-	-	-	-	-
	Condition of drainage		-	-	-	-	-	-	-	-
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	36	-	-	-	-
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	0	-	-	-	-
	Condition of drainage		-	-	-	CD* <sup>4</sup>	-	-	-	-
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-	-	-	-	-
	Compression Index(Average)		-	-	-	-	-	-	-	-
	Pressure Range for Compression Index(kPa)		-	-	-	-	-	-	-	-
	Swell index		-	-	-	-	-	-	-	-
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>		-	-	-	1.85	-	-	-	-
	Optimum Moisture Content , %		-	-	-	12.4	-	-	-	-
Unconfined Compression Strength (kPa)		-	-	-	-	-	-	-	-	
Strain at failure (%)		-	-	-	-	-	-	-	-	

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : Samples are prepared at 90% of Maximum dry density

Checked by : A. B. Tan

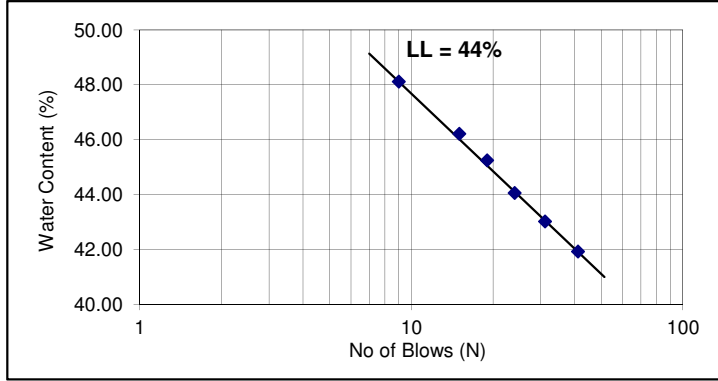
## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 06.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : LD2-12-1b HP-1 Depth : 6.00-6.60m

Remarks : Tested on material at natural state

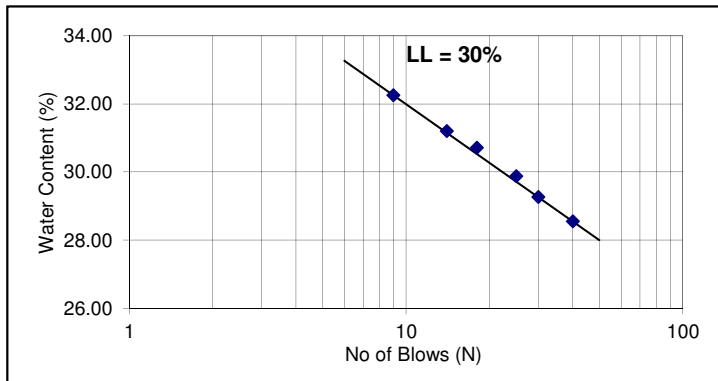
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	41	41.92
2	31	43.03
3	24	44.06
4	19	45.25
5	15	46.21
6	9	48.11
<b>Liquid Limits %</b>		<b>44</b>
<b>Plastic Limits %</b>		<b>24</b>
<b>Plasticity Index</b>		<b>20</b>



Sample No. : LD2-12-1b D-6 Depth : 22.00-22.90m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	40	28.55
2	30	29.26
3	25	29.88
4	18	30.71
5	14	31.20
6	9	32.26
<b>Liquid Limits %</b>		<b>30</b>
<b>Plastic Limits %</b>		<b>18</b>
<b>Plasticity Index</b>		<b>12</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

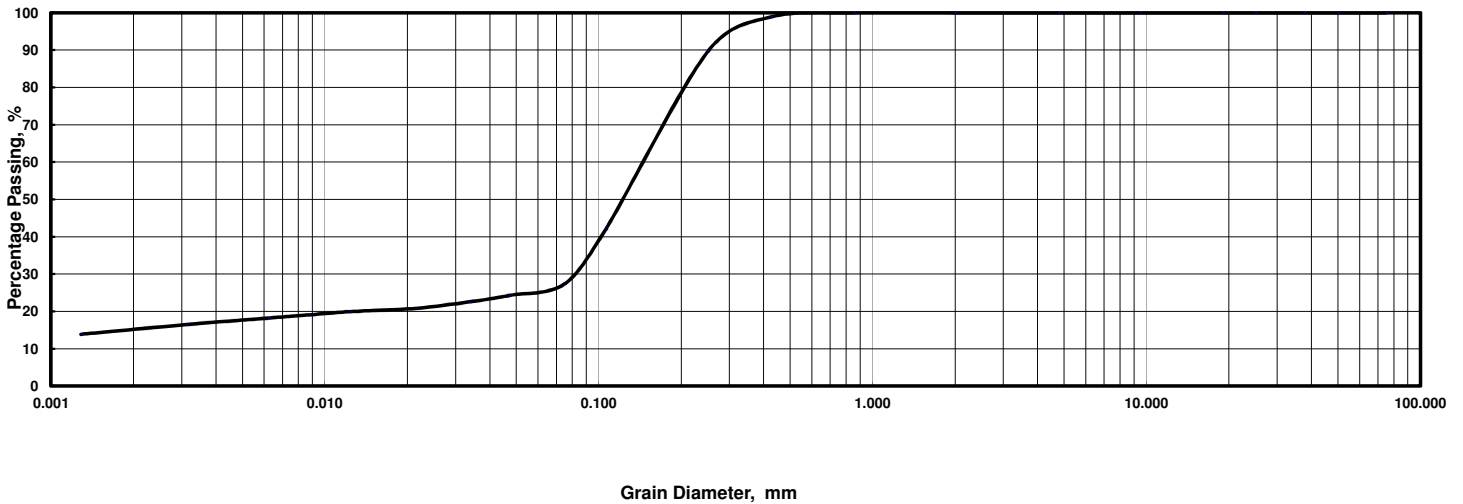
Sample No. : **LD2-12-1b D-1** Depth : **3.00-3.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8	89.6	42.0	27.3
Hydro.	Dia., mm	0.047	0.034	0.021	0.012	0.0088	0.0062	0.0031	0.0013							
	% Passing	24.3	22.5	20.8	19.9	19.1	18.2	16.5	13.9							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-1	Sample No.	LD2-12-1b D-1
Depth	3.00-3.90m	Depth	3.00-3.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.15 mm
2.00 - 0.425 mm	1.2 %	Dia. at 30%	0.080 mm
0.425 - 0.075 mm	71.5 %	Dia. at 10%	- mm
0.075 - 0.005 mm	9.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	17.5 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	27.3 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

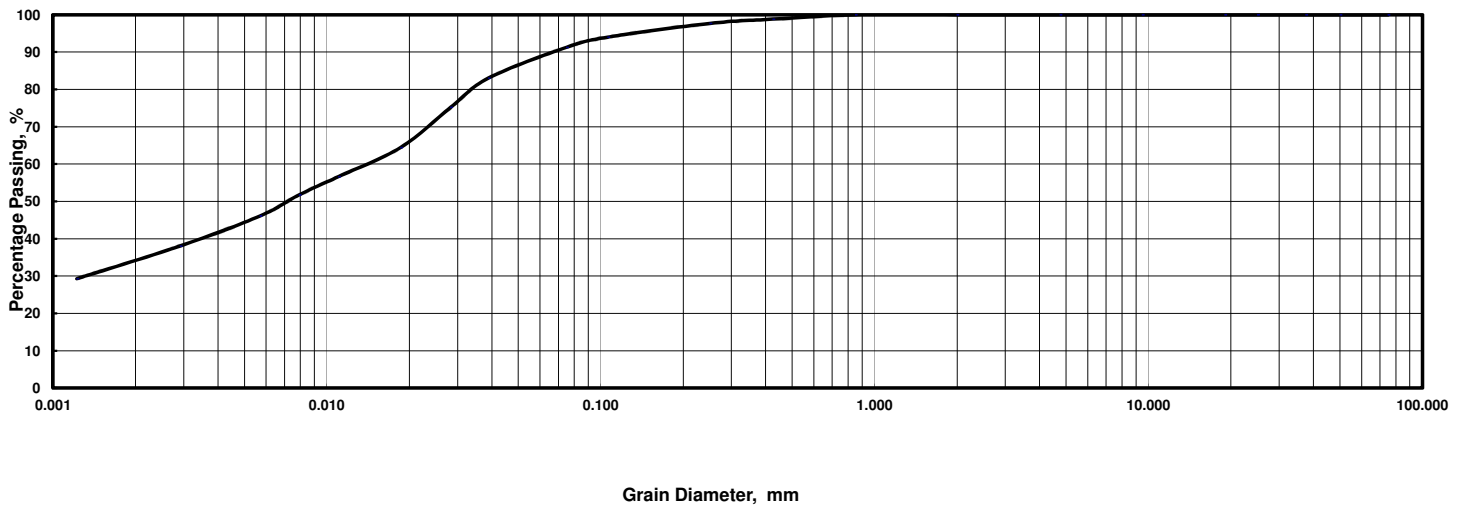
Sample No. : **LD2-12-1b HP-1T** Depth : **6.00-6.60m** ( \_\_\_\_\_ ) Specific Gravity : 2.73

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8	97.7	94.0	91.3
Hydro.	Dia., mm	0.039	0.028	0.019	0.011	0.0079	0.0057	0.0029	0.0012							
	% Passing	83.0	75.2	64.5	56.6	51.8	46.1	38.1	29.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b HP-1T	Sample No.	LD2-12-1b HP-1T
Depth	6.00-6.60m	Depth	6.00-6.60m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.014 mm
2.00 - 0.425 mm	1.2 %	Dia. at 30%	0.0013 mm
0.425 - 0.075 mm	7.5 %	Dia. at 10%	- mm
0.075 - 0.005 mm	47.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	44.1 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	91.3 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

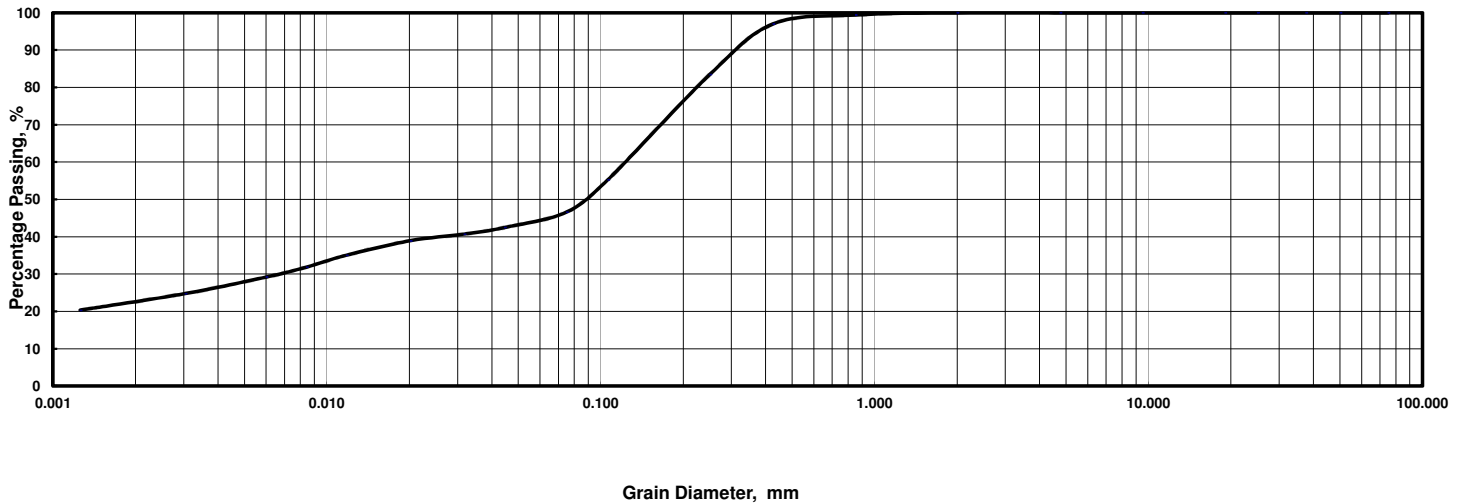
Sample No. : **LD2-12-1b HP-1B** Depth : **6.60-6.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	97.0	83.4	55.2	46.6
Hydro.	Dia., mm	0.044	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	42.5	40.7	38.9	35.0	31.8	29.2	24.8	20.3							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b HP-1B	Sample No.	LD2-12-1b HP-1B
Depth	6.60-6.80m	Depth	6.60-6.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.12 mm
2.00 - 0.425 mm	3.0 %	Dia. at 30%	0.0066 mm
0.425 - 0.075 mm	50.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	18.9 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	27.7 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.4 %		
75um Sieve Passing	46.6 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

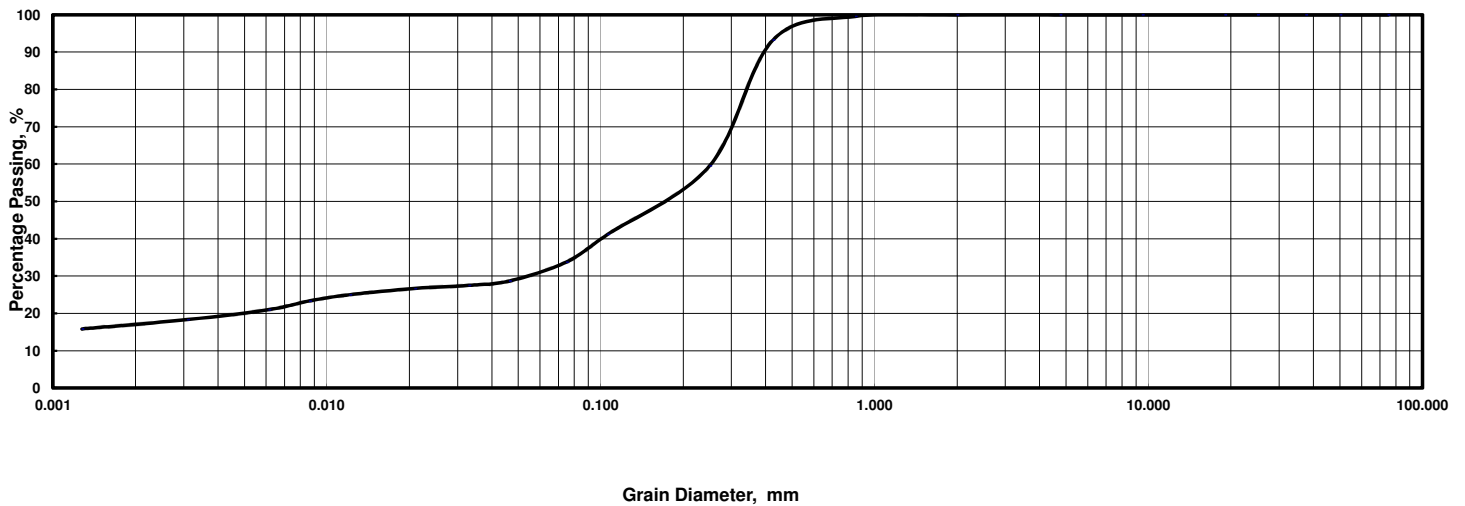
Sample No. : **LD2-12-1b D-2** Depth : **9.00-9.65m** ( \_\_\_\_\_ ) Specific Gravity : 2.69

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	93.2	59.6	41.2	33.8
Hydro.	Dia., mm	0.046	0.033	0.021	0.012	0.0086	0.0061	0.0031	0.0013							
	% Passing	28.7	27.5	26.7	25.0	23.3	21.0	18.3	15.8							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-2	Sample No.	LD2-12-1b D-2
Depth	9.00-9.65m	Depth	9.00-9.65m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.25 mm
2.00 - 0.425 mm	6.8 %	Dia. at 30%	0.053 mm
0.425 - 0.075 mm	59.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	13.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	20.0 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.6 %		
75um Sieve Passing	33.8 %		



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

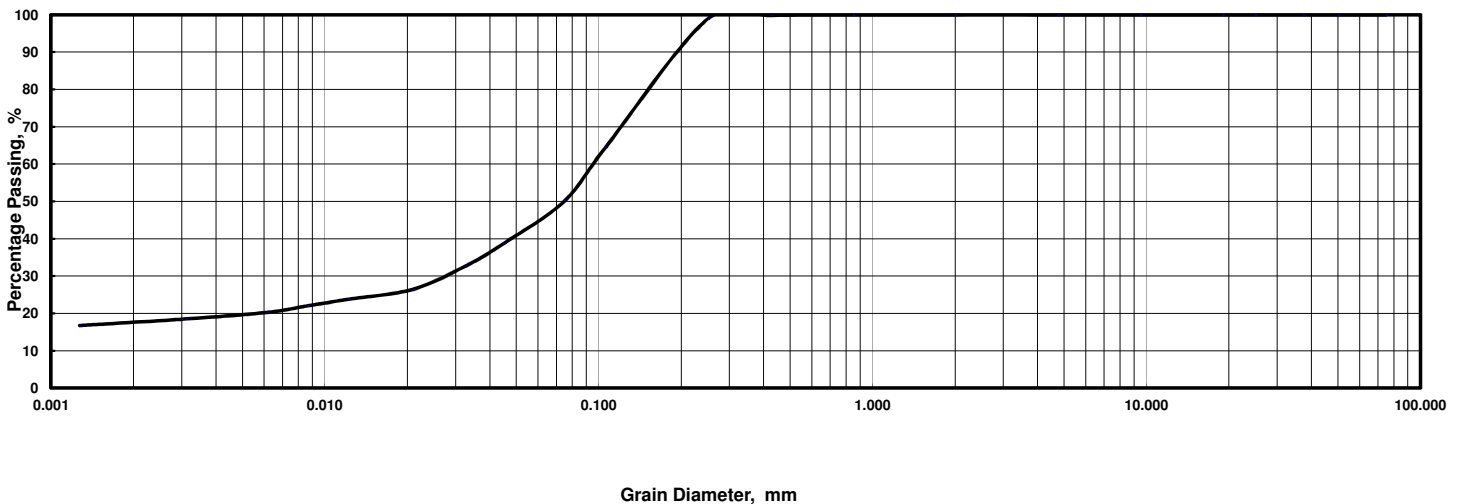
Sample No. : **LD2-12-1b D-3** Depth : **12.00-12.65m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	98.9	64.5	50.1
Hydro.	Dia., mm	0.045	0.033	0.021	0.012	0.0087	0.0062	0.0031	0.0013							
	% Passing	38.8	32.6	26.4	23.8	22.0	20.3	18.5	16.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-3	Sample No.	LD2-12-1b D-3
Depth	12.00-12.65m	Depth	12.00-12.65m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.00 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.095 mm
2.00 - 0.425 mm	0.2 %	Dia. at 30%	0.027 mm
0.425 - 0.075 mm	49.7 %	Dia. at 10%	- mm
0.075 - 0.005 mm	30.5 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	19.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.9 %		
75um Sieve Passing	50.1 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

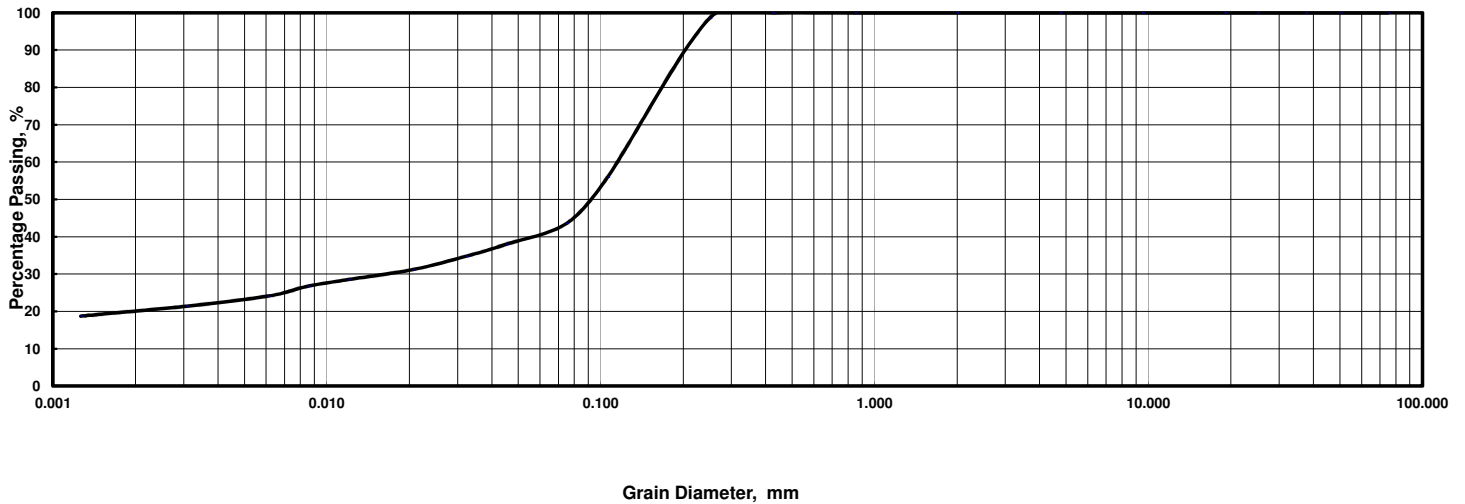
Sample No. : **LD2-12-1b D-4** Depth : **15.00-15.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.70

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	56.0	43.6
Hydro.	Dia., mm	0.045	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	38.0	34.8	31.2	28.5	26.8	24.1	21.4	18.7							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-4	Sample No.	LD2-12-1b D-4
Depth	15.00-15.90m	Depth	15.00-15.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.11 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.016 mm
0.425 - 0.075 mm	56.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	20.5 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	23.1 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	43.6 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

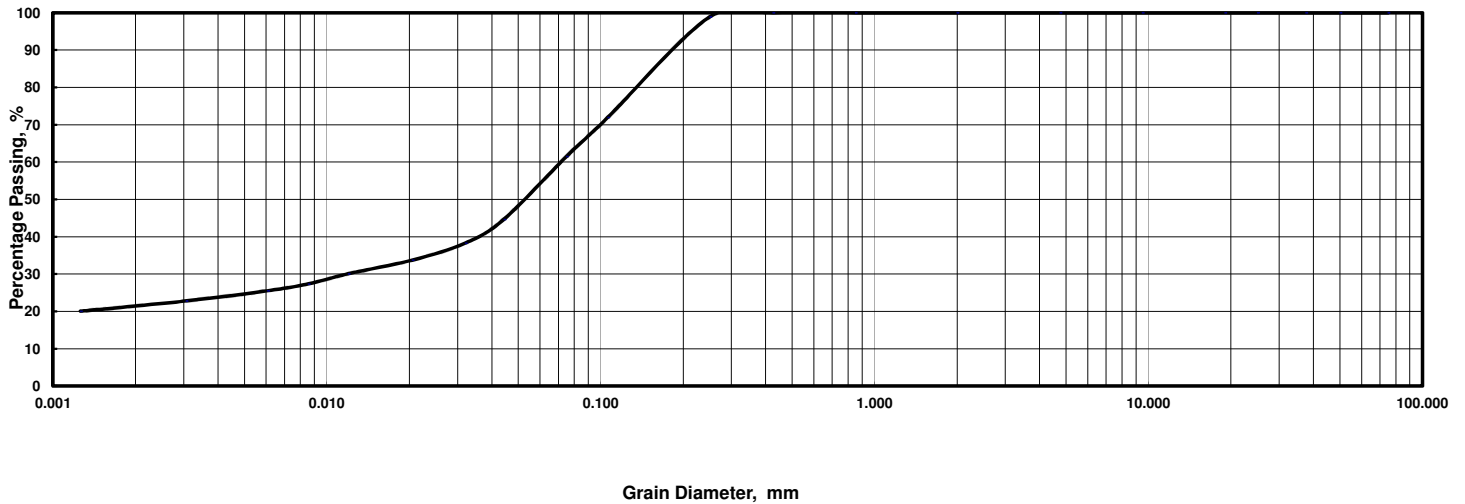
Sample No. : **LD2-12-1b D-5** Depth : **18.00-18.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.9	71.9	61.5
Hydro.	Dia., mm	0.044	0.032	0.021	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	44.7	38.3	33.7	30.1	27.4	25.5	22.8	20.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-5	Sample No.	LD2-12-1b D-5
Depth	18.00-18.90m	Depth	18.00-18.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.425 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.072 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	0.012 mm
0.425 - 0.075 mm	38.5 %	Dia. at 10%	- mm
0.075 - 0.005 mm	37.0 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	24.6 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	61.5 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_

Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 03.12.14

Tested By : Htin/Motiur

Checked by : A. B. Tan

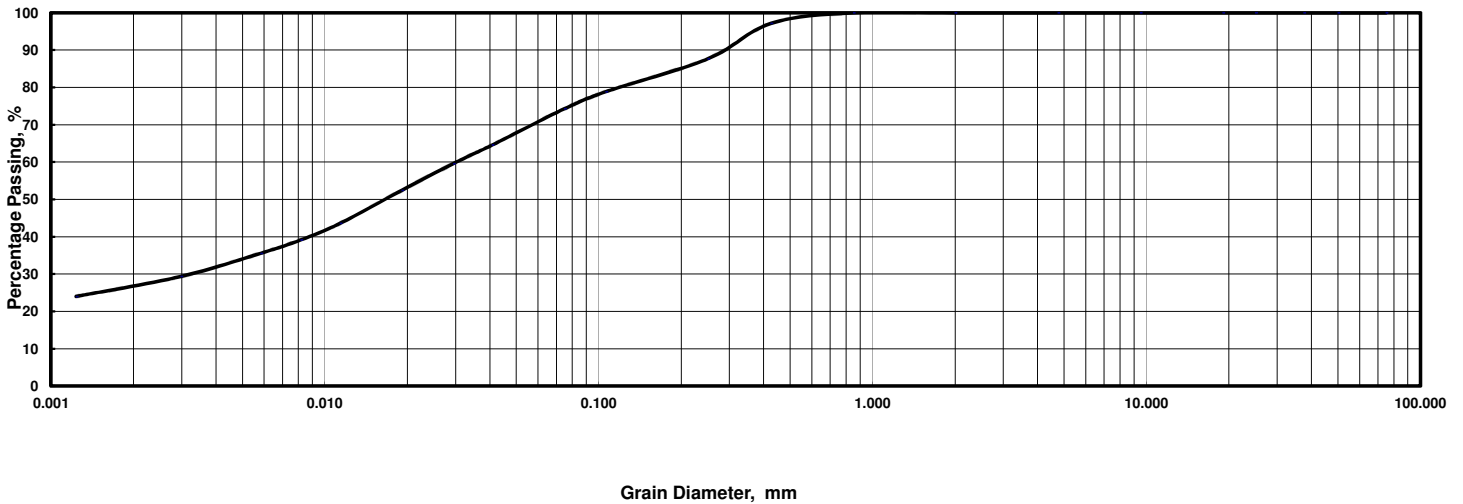
Sample No. : **LD2-12-1b D-6** Depth : **22.00-22.90m** ( \_\_\_\_\_ ) Specific Gravity : 2.73

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.1	87.6	78.8	74.3
Hydro.	Dia., mm	0.041	0.029	0.019	0.011	0.0082	0.0058	0.0030	0.0012							
	% Passing	64.6	59.6	52.5	43.6	39.1	35.6	29.3	24.0							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-12-1b D-6	Sample No.	LD2-12-1b D-6
Depth	22.00-22.90m	Depth	22.00-22.90m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.030 mm
2.00 - 0.425 mm	2.9 %	Dia. at 30%	0.0032 mm
0.425 - 0.075 mm	22.8 %	Dia. at 10%	- mm
0.075 - 0.005 mm	40.5 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	33.8 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	74.3 %		

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 11.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-12-1b		Sample No.:D-2		Depth :9.00-9.65m		
Specimen Condition : Undisturbed		Test Method : ASTM D7181-11				
Soil Description : Clayey Sand		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.67	1.67	1.67		
Saturation Stage	Saturated PWP, kPa	200	200	200		
	Final Cell Pressure, kPa	240	270	300		
	B-value	0.97	0.98	0.96		
Consolidation Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Initial PWP, kPa	227	254	283		
	Final PWP kPa	200	200	200		
Consolidation Parameter	Volume Change, %	0.14	1.49	0.72		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	45.20	52.27	51.42		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.03	0.21	0.07		
Compression Stage	Cell Pressure kPa	240	270	300		
	Back Pressure kPa	200	200	200		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ )f, kPa	127	205	286		
	Excess PWP at ( $\sigma_1 - \sigma_3$ )f kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ )f (%)	0.41	1.06	1.06		
	Strain at ( $\sigma_1 - \sigma_3$ )f (%)	13.65	12.50	14.79		
Shear Strength Parameters	In terms of Effective Stress	Mode of Failure				
	$\phi' = 36$ deg $c' = 0$ kPa	1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.67Mg/m <sup>3</sup>						

# Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

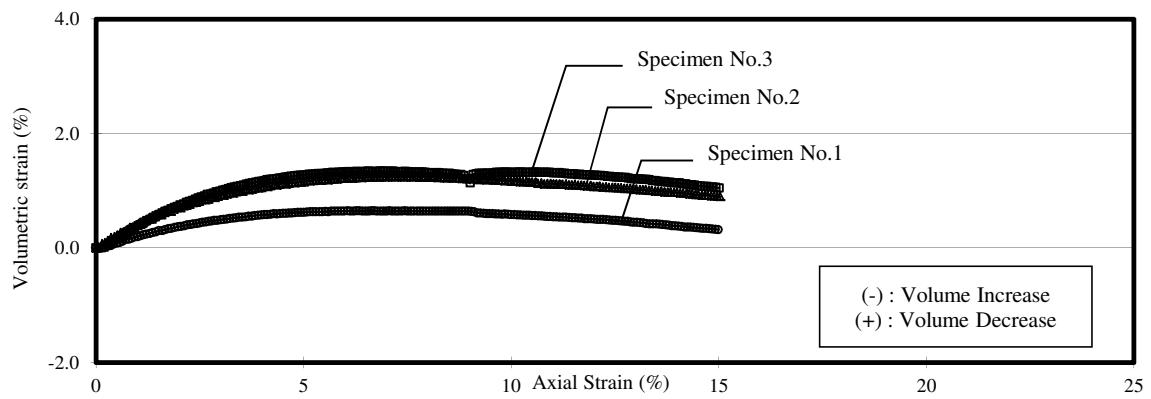
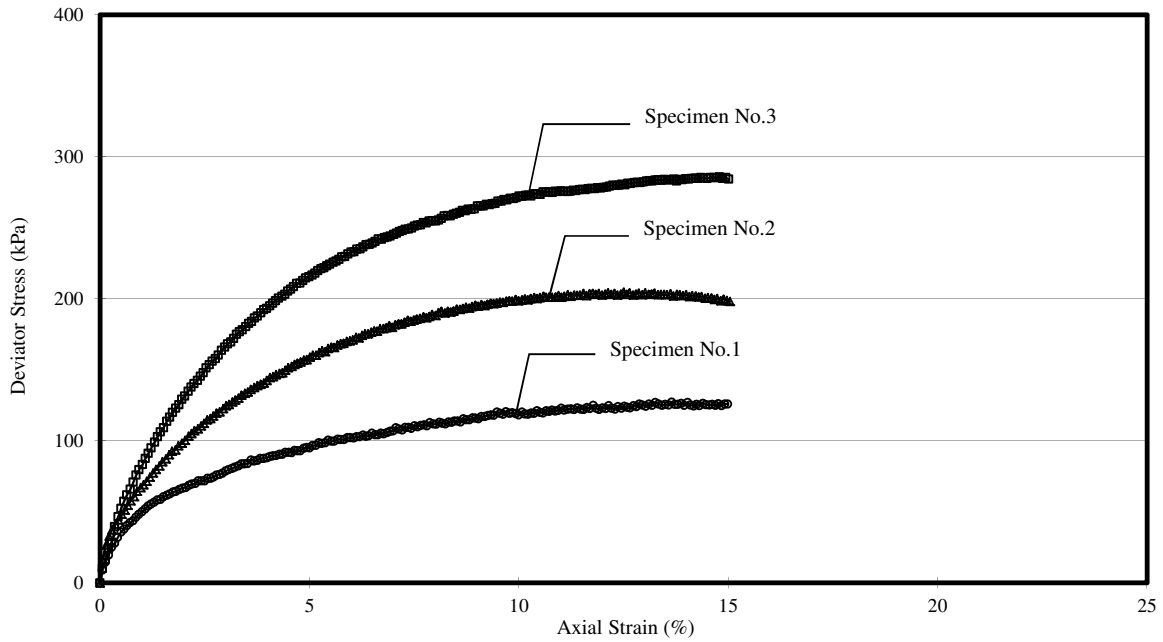
Project No.: S27-14

Sample No.: D-2

Soil Type: Clayey Sand

Borehole No.: LD2-12-1b

Depth : 9.00-9.65m

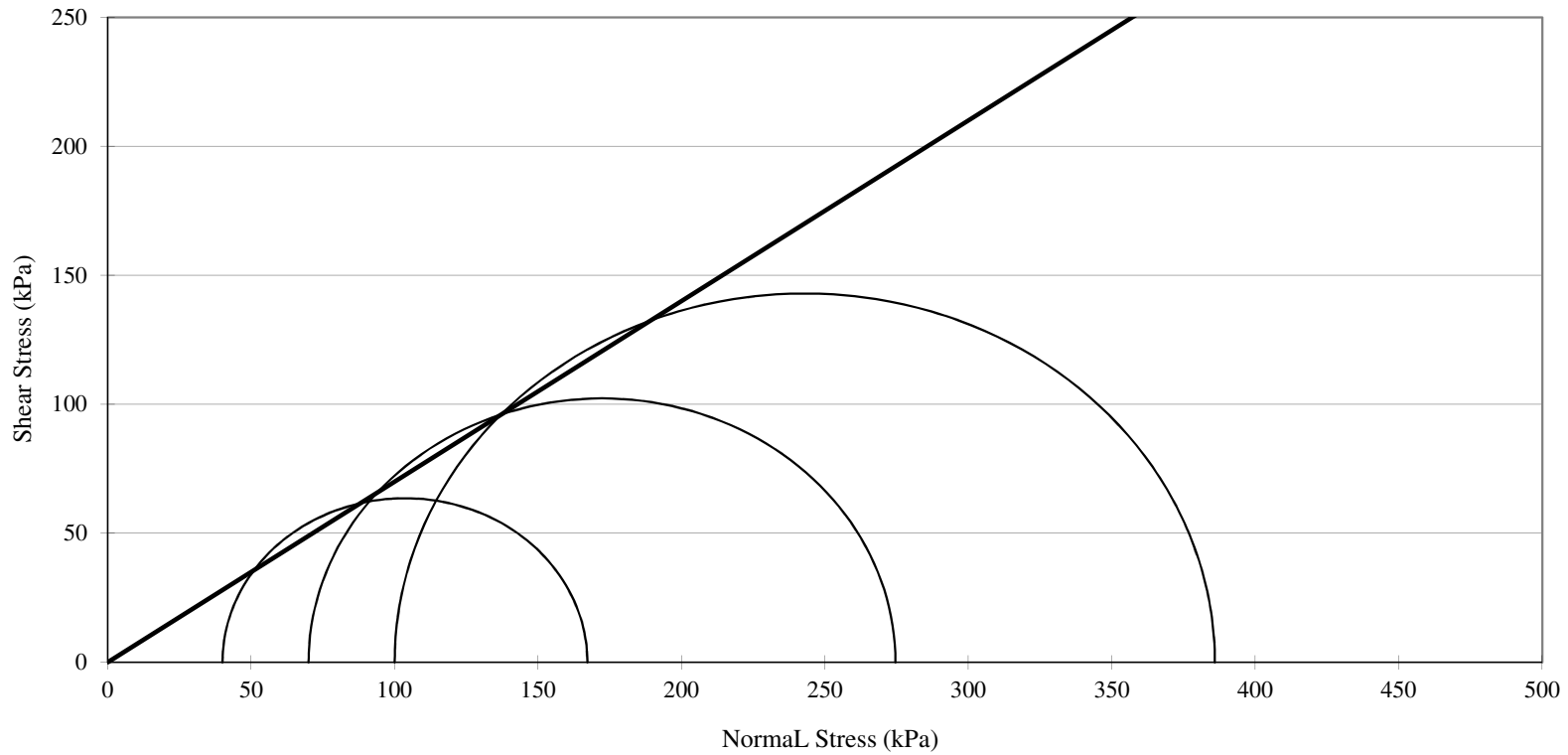


# Consolidated Drained Triaxial Compression Test

## - Mohr's Circle (In terms of Total Stress) -

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. :	<u>LD2-12-1b</u>	Soil Type:	<u>Clayey Sand</u>
Sample No. :	<u>D-2</u>	Depth :	<u>9.00-9.65m</u>
Angle of Internal Friction, $\phi$	<u>35</u>	deg	
Cohesion, $c$	<u>0</u>	kPa	



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

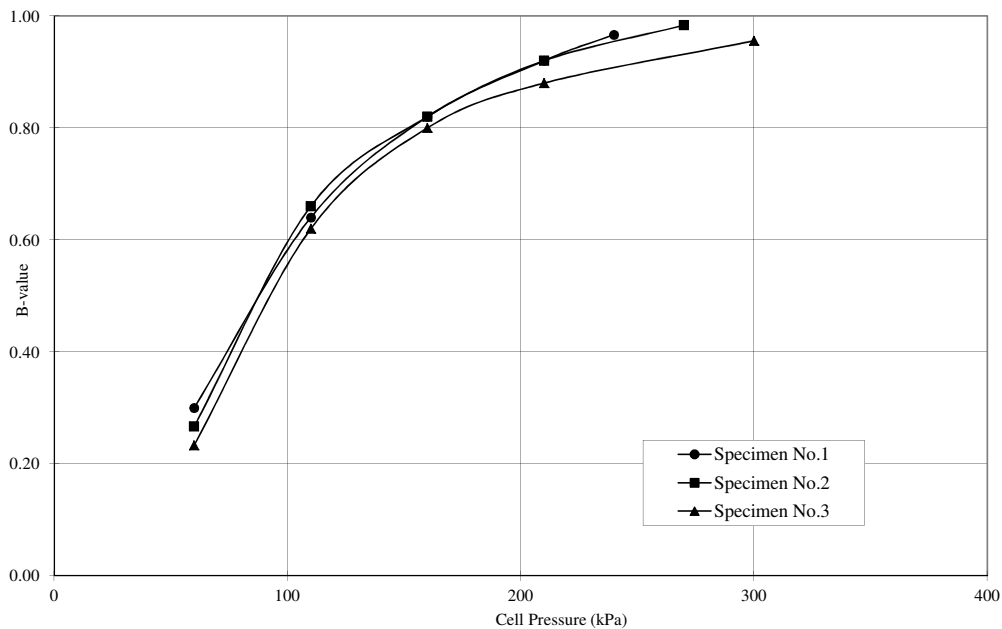
Borehole No.: LD2-12-1b

Sample No.: D-2

Depth : 9.00-9.65m

Soil Type: Clayey Sand

		Result of B-value Check					
		Specimen 1		Specimen 2		Specimen 3	
		Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60
	P.W.P (kPa)	20	29	20	28	20	27
	Back Pressure (kPa)	20		20		20	
	B-value	0.30		0.27		0.23	
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110
	P.W.P (kPa)	50	82	50	83	50	81
	Back Pressure (kPa)	50		50		50	
	B-value	0.64		0.66		0.62	
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160
	P.W.P (kPa)	100	141	100	141	100	140
	Back Pressure (kPa)	100		100		100	
	B-value	0.82		0.82		0.80	
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210
	P.W.P (kPa)	150	196	150	196	150	194
	Back Pressure (kPa)	150		150		150	
	B-value	0.92		0.92		0.88	
B-check Step.5	Cell Pressure (kPa)	210	240	210	270	210	300
	P.W.P (kPa)	200	229	200	259	200	286
	Back Pressure (kPa)	200		200		200	
	B-value	0.97		0.98		0.96	





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

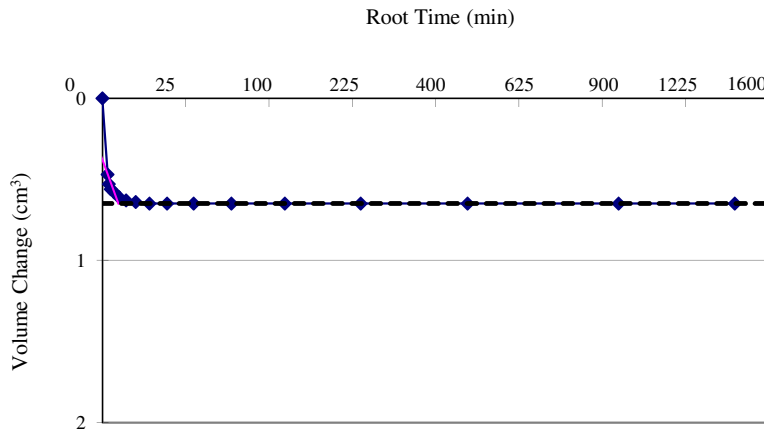
Project No.: S27-14

Sample No.: D-2

Soil Type: Clayey Sand

Borehole No.: LD2-12-1b

Depth : 9.00-9.65m



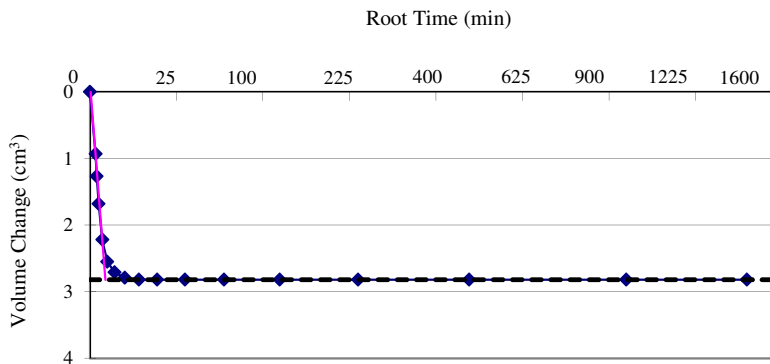
Specimen No.: 1

$p' = 40$  kPa

$t_{100} = 0.9$  min

$C_v = 45.20$  m<sup>2</sup>/year

$m_{vi} = 0.03$  m<sup>2</sup>/MN



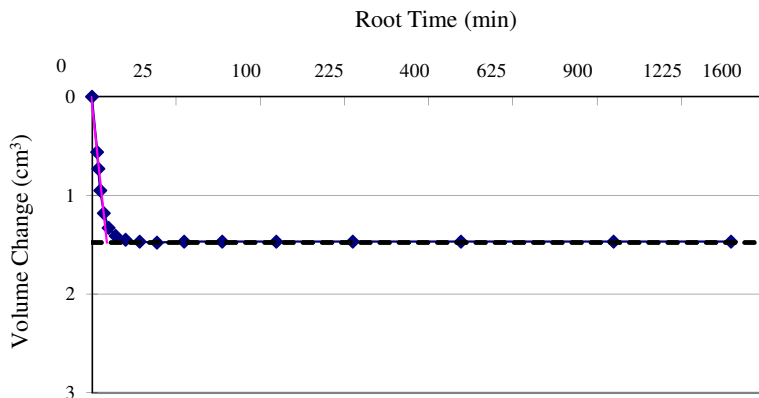
Specimen No.: 2

$p' = 70$  kPa

$t_{100} = 0.8$  min

$C_v = 52.27$  m<sup>2</sup>/year

$m_{vi} = 0.21$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa

$t_{100} = 0.8$  min

$C_v = 51.42$  m<sup>2</sup>/year

$m_{vi} = 0.07$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 8-Dec-14

Tested by : Perera/Bala

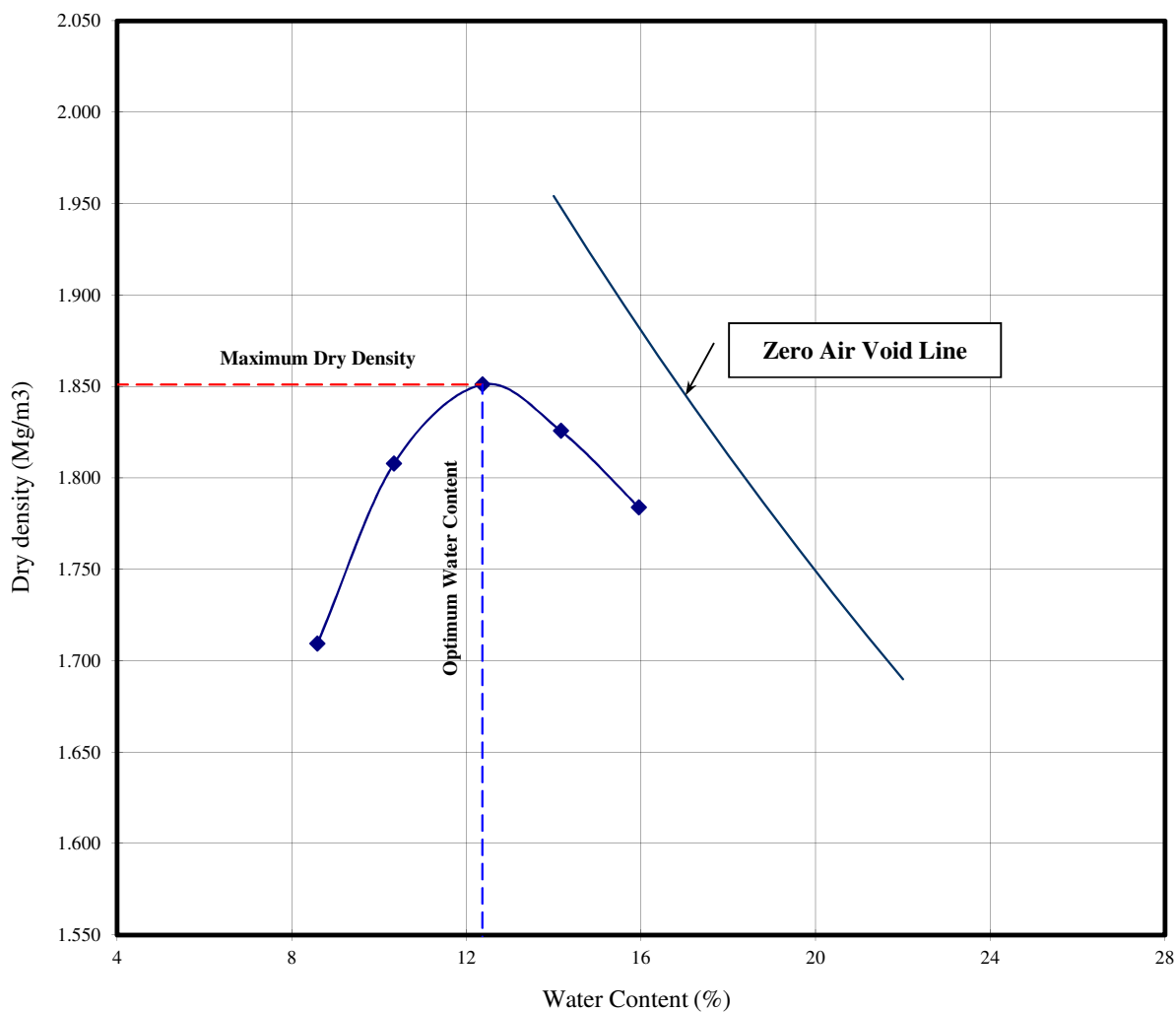
Sample No. : LD2-12-1b D-2(9.00-9.65m)

Ref. No. -

Soil Type :	Clayey Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.69		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	8.6	10.3	12.4	14.2	16.0			
Wet Density (Mg/m <sup>3</sup> )	1.856	1.995	2.080	2.084	2.068			
Dry Density (Mg/m <sup>3</sup> )	1.709	1.808	1.851	1.826	1.784			

Maximum Dry Density	1.851 Mg/m <sup>3</sup>
Optimum Water Content	12.4 %





23) LD2-13-1

**TABLE SUMMARY OF SOIL TEST**

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

Standard: **ASTM**

Borehole No.		LD2-13-1							
Sample No.		HP-1	HP-2	D-1	D-2	HP-3	D-3		
Sample Depth		2.00m ~2.80m	5.00m ~5.80m	8.00m ~8.85m	11.00m ~11.80m	14.00m ~14.70m	17.00m ~17.85m		
Condition of Sample		Undisturbed		Disturbed		Undisturbed	Disturbed		
Natural Water Content	%	51.3	30.8	30.3	25.4	27.0	28.6		
Specific Gravity		2.75	2.71	2.71	2.71	2.71	2.71		
Wet Density	Mg/m <sup>3</sup>	1.74	1.86	-	1.97	1.87	1.949		
Dry Density	Mg/m <sup>3</sup>	1.15	1.42	-	1.57	1.47	1.52		
Natural Void Ratio		1.40	0.91	-	0.73	0.84	0.79		
Degree of Saturation	%	100	92	-	94	87	98		
Atterberg Limits	Liquid Limit,	%	54	- * <sup>3</sup>	28	24	- * <sup>3</sup>	- * <sup>3</sup>	
	Plastic Limit,	%	27	- * <sup>3</sup>	16	17	- * <sup>3</sup>	- * <sup>3</sup>	
	Plasticity Index,	%	27	- * <sup>3</sup>	12	7	- * <sup>3</sup>	- * <sup>3</sup>	
Grain Size Analysis	Gravel,	%	0	0	0	0	0	0	
	Sand,	%	1	59	37	49	41	52	
	Silt,	%	42	15	33	25	37	23	
	Clay & Colloid,	%	57	26	30	26	22	25	
	Max. diameter,	mm	0.106	0.850	2.00	4.75	2.00	2.00	
	Diam. at 60%	mm	0.0057	0.13	0.063	0.11	0.077	0.10	
	Diam. at 10%	mm	-	-	-	-	-	-	
Visual soil description		Clay	Clayey Sand	Sandy Clay	Sandy Clay	Sandy Clay	Clayey Sand		
Unified soil classification		CL	-	CL	CL	-	-		
Triaxial compression test	Angle of Internal Friction (°)		-	-	-	-	-		
	Cohesion Intercept, kPa		-	-	-	-	-		
	Condition of drainage		-	-	-	-	-		
	Angle of Internal Friction * <sup>2</sup> (°)		-	-	-	39	-	-	
	Cohesion Intercept, kPa * <sup>2</sup>		-	-	-	0	-	-	
	Condition of drainage		-	-	-	CD* <sup>4</sup>	-	-	
Consolidation Test	Preconsolidation Pressure, kPa		-	-	-	-	-		
	Compression Index(Average)		-	-	-	-	-		
	Pressure Range for Compression Index(kPa)		-	-	-	-	-		
	Swell index		-	-	-	-	-	-	
Compaction Test * <sup>4</sup>	Maximum Dry Density, Mg/m <sup>3</sup>		-	-	-	1.63	-		
	Optimum Moisture Content, %		-	-	-	16.8	-		
Unconfined Compression Strength (kPa)		-	-	-	-	-	-		
Strain at failure (%)		-	-	-	-	-	-		

Remarks : Atterberg Limits was tested on material at natural state except those with \*1 which was tested on material passing through 0.425mm test sieve.

\*<sup>2</sup> : In terms of effective stress

\*<sup>3</sup> : Unable to test because sample contains lot of sand

\*<sup>4</sup> : Specimens are prepared at 90% of Maximum dry density

Checked by : A. B. Tan

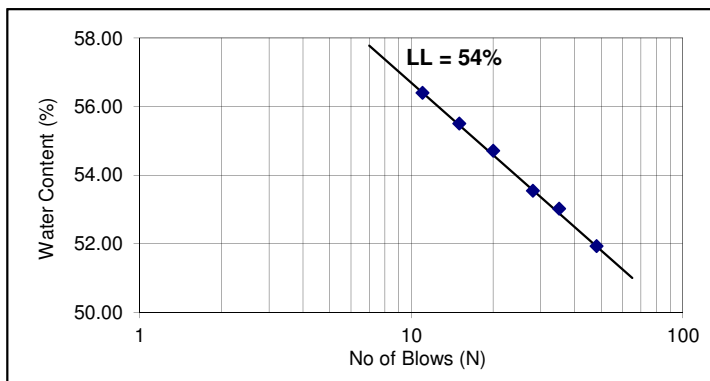
## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 03.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : LD2-13-1 HP-1 Depth : 2.00-2.80m

Remarks : Tested on material at natural state

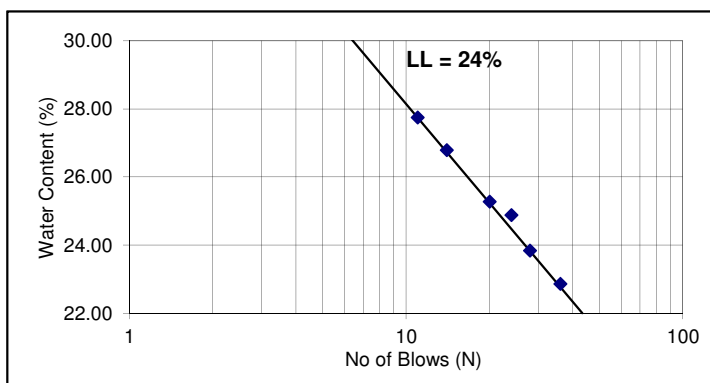
Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	48	51.93
2	35	53.02
3	28	53.54
4	20	54.71
5	15	55.50
6	11	56.40
<b>Liquid Limits %</b>		<b>54</b>
<b>Plastic Limits %</b>		<b>27</b>
<b>Plasticity Index</b>		<b>27</b>



Sample No. : LD2-13-1 D-2 Depth : 11.00-11.80m

Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	36	22.86
2	28	23.83
3	24	24.88
4	20	25.27
5	14	26.79
6	11	27.75
<b>Liquid Limits %</b>		<b>24</b>
<b>Plastic Limits %</b>		<b>17</b>
<b>Plasticity Index</b>		<b>7</b>

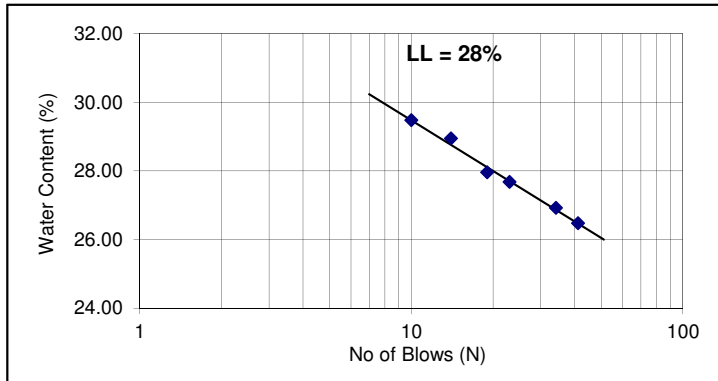


## ATTERBERG LIMITS DETERMINATION

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project Project No. : S27-14  
 Standard : ASTM D4318-10 Date of Testing : 11.12.14  
 Tested By : Vasantha Checked By : A. B. Tan

Sample No. : LD2-13-1 D-1 Depth : 8.00-8.85m  
 Remarks : Tested on material at natural state

Liquid Limits Test		
Test No.	Blows	W <sub>n</sub>
1	41	26.47
2	34	26.92
3	23	27.68
4	19	27.96
5	14	28.94
6	10	29.47
<b>Liquid Limits %</b>		<b>28</b>
<b>Plastic Limits %</b>		<b>16</b>
<b>Plasticity Index</b>		<b>12</b>



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 29.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

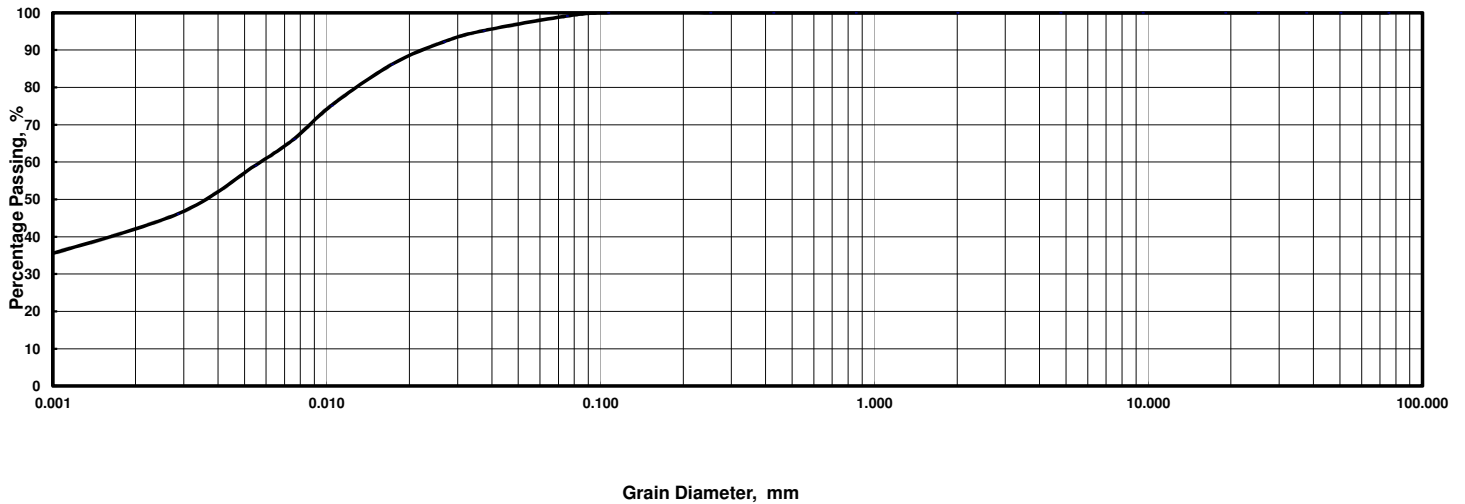
Sample No. : **LD2-13-1 HP-1** Depth : **2.00-2.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.75

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1
Hydro.	Dia., mm	0.037	0.027	0.017	0.010	0.0076	0.0055	0.0028	0.0009							
	% Passing	95.2	92.2	86.2	75.1	66.1	59.1	46.1	34.1							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL

Sample No.	LD2-13-1 HP-1	Sample No.	LD2-13-1 HP-1
Depth	2.00-2.80m	Depth	2.00-2.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.106 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.0057 mm
2.00 - 0.425 mm	0.0 %	Dia. at 30%	- mm
0.425 - 0.075 mm	0.9 %	Dia. at 10%	- mm
0.075 - 0.005 mm	42.3 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	56.8 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	99.1 %		



# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

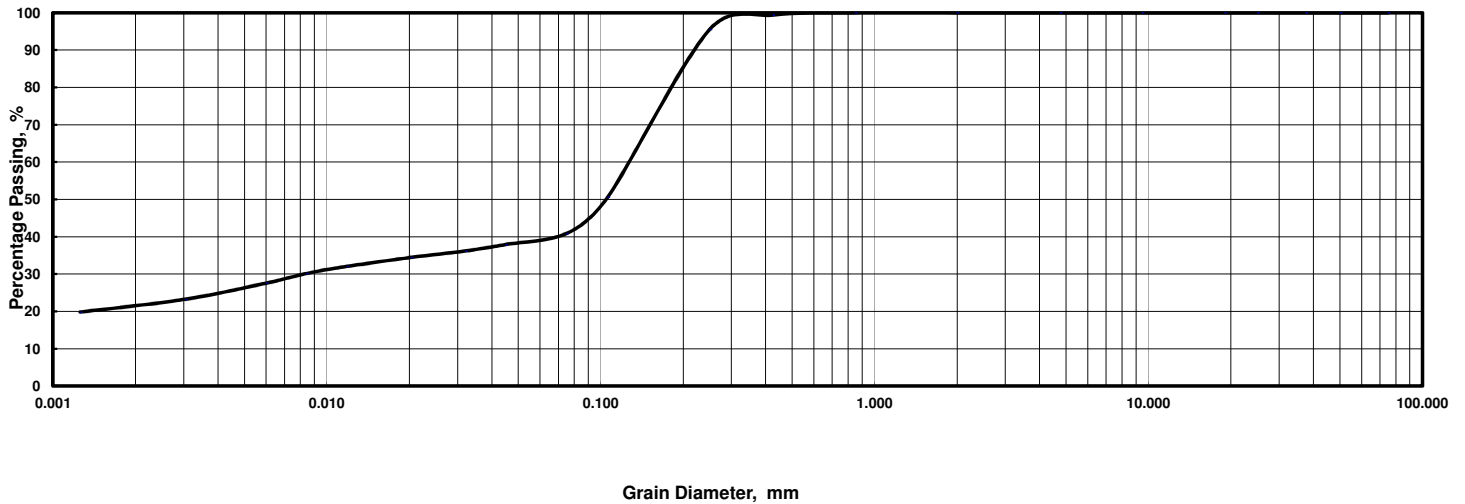
Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

Sample No. : <b>LD2-13-1 HP-2</b>		Depth : <b>5.00-5.80m</b> ( _____ )										Specific Gravity : <b>2.71</b>				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.4	95.5	50.6	40.9
Hydro.	Dia., mm	0.045	0.032	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	37.9	36.2	34.5	32.0	30.2	27.6	23.3	19.8							

Sample No. : _____		Depth : _____ ( _____ )										Specific Gravity : _____				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-13-1 HP-2	Sample No.	LD2-13-1 HP-2
Depth	5.00-5.80m	Depth	5.00-5.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	0.850 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.13 mm
2.00 - 0.425 mm	0.6 %	Dia. at 30%	0.0083 mm
0.425 - 0.075 mm	58.5 %	Dia. at 10%	- mm
0.075 - 0.005 mm	14.8 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	26.1 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	100.0 %		
75um Sieve Passing	40.9 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

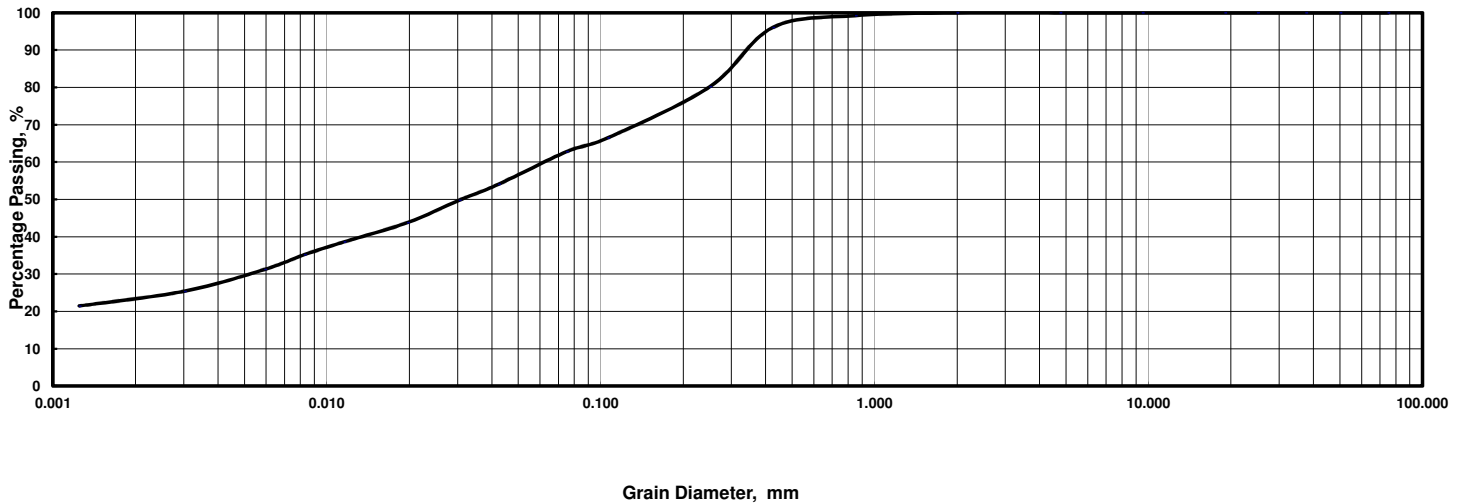
Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 09.12.14 Tested By : Htin/Motiur Checked by : A. B. Tan

Sample No. :	<b>LD2-13-1 D-1</b>		Depth :	<b>8.00-8.85m</b>		( _____ )	Specific Gravity :	2.71								
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	96.1	80.2	66.5	62.8
Hydro.	Dia., mm	0.042	0.030	0.020	0.012	0.0083	0.0059	0.0030	0.0012							
	% Passing	54.1	49.8	43.8	38.6	35.2	31.2	25.4	21.5							

Sample No. :			Depth :	( _____ )		Specific Gravity :		
Sieve	Dia., mm							
	% Passing							
Hydro.	Dia., mm							
	% Passing							

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-13-1 D-1		Sample No.	LD2-13-1 D-1	
Depth	8.00-8.85m		Depth	8.00-8.85m	
Larger than 4.75 mm	0.0	%	Max. Diameter	2.00	mm
4.75 - 2.00 mm	0.0	%	Dia. at 60%	0.063	mm
2.00 - 0.425 mm	3.9	%	Dia. at 30%	0.0051	mm
0.425 - 0.075 mm	33.3	%	Dia. at 10%	-	mm
0.075 - 0.005 mm	33.4	%	Coeff. of Uniformity	-	
Smaller than 0.005 mm	29.4	%	Coeff. of Curvature	-	
2000um Sieve Passing	100.0	%			
425um Sieve Passing	99.2	%			
75um Sieve Passing	62.8	%			

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

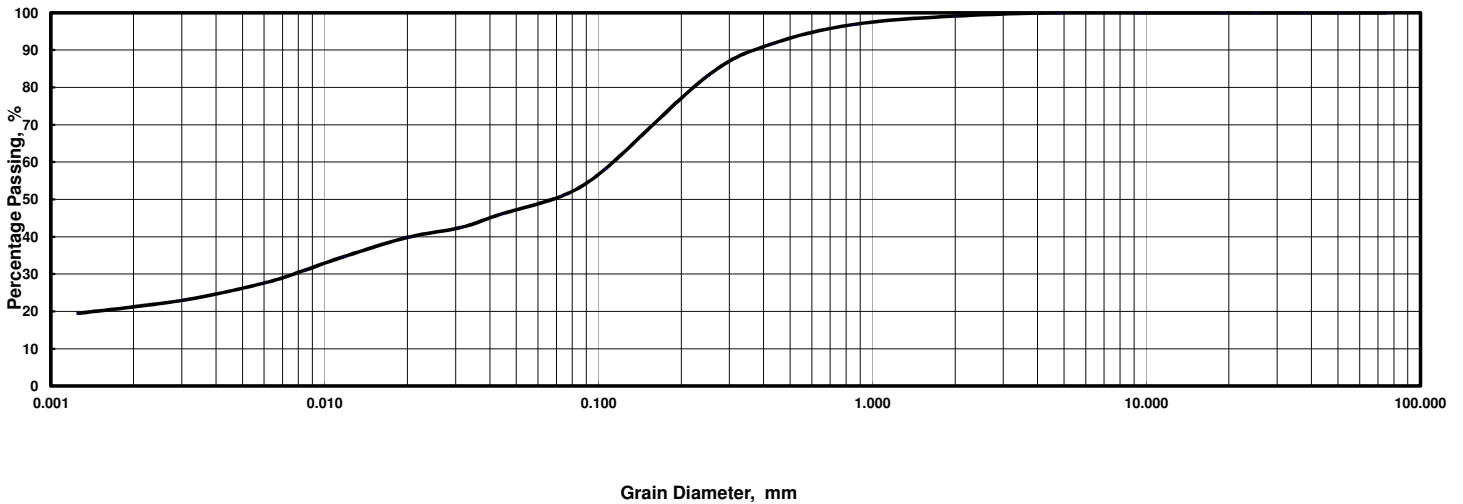
Sample No. : **LD2-13-1 D-2** Depth : **11.00-11.80m** ( \_\_\_\_\_ ) Specific Gravity : 2.71

Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	96.8	91.6	83.1	58.3	51.2
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0013							
	% Passing	46.0	42.5	39.8	34.7	31.0	27.6	23.0	19.5							

Sample No. : \_\_\_\_\_ Depth : \_\_\_\_\_ ( \_\_\_\_\_ ) Specific Gravity : \_\_\_\_\_

Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-13-1 D-2	Sample No.	LD2-13-1 D-2
Depth	11.00-11.80m	Depth	11.00-11.80m
Larger than 4.75 mm	0.0 %	Max. Diameter	4.75 mm
4.75 - 2.00 mm	0.9 %	Dia. at 60%	0.11 mm
2.00 - 0.425 mm	7.5 %	Dia. at 30%	0.0076 mm
0.425 - 0.075 mm	40.4 %	Dia. at 10%	- mm
0.075 - 0.005 mm	25.2 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	26.0 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	96.8 %		
75um Sieve Passing	51.2 %		

# GRAIN SIZE DISTRIBUTION

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

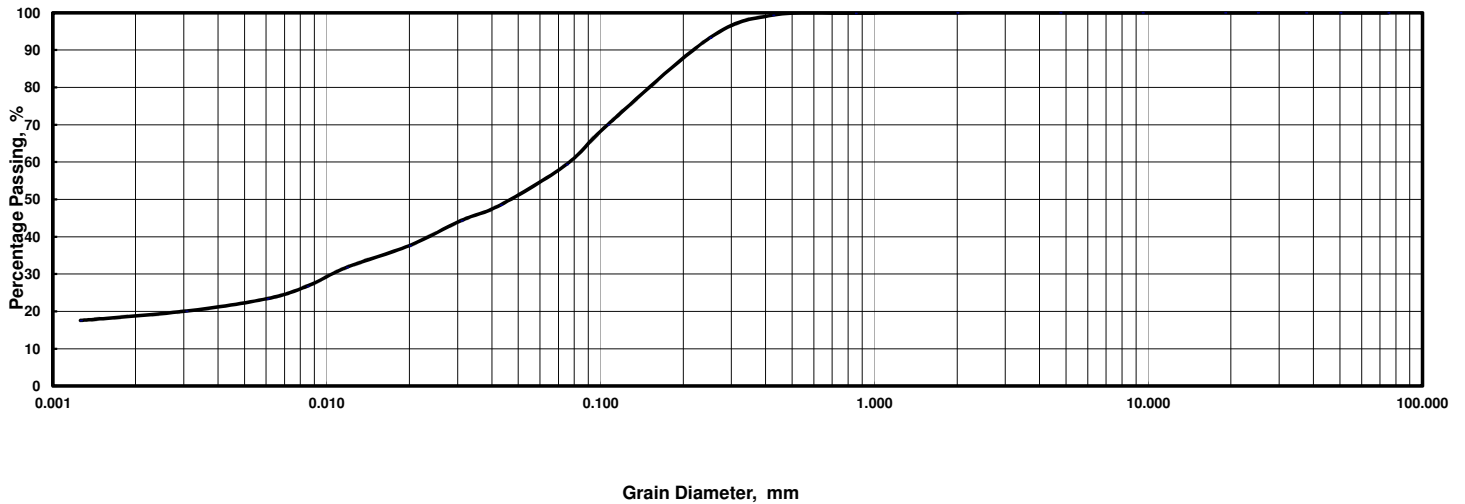
Location of Project : \_\_\_\_\_ Project No. : S27-14

Tested Method : ASTM D422-63 Date of Testing : 26.11.14 Tested By : Htin/Motiur Checked by : A. B. Tan

Sample No. : <b>LD2-13-1 HP-3</b>		Depth : <b>14.00-14.70m</b> ( _____ )										Specific Gravity : <b>2.71</b>				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.3	93.3	70.0	59.4
Hydro.	Dia., mm	0.043	0.031	0.020	0.012	0.0085	0.0061	0.0031	0.0013							
	% Passing	48.5	44.3	37.6	31.8	26.8	23.4	20.1	17.6							

Sample No. : _____		Depth : _____ ( _____ )										Specific Gravity : _____				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															

**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-13-1 HP-3	Sample No.	LD2-13-1 HP-3
Depth	14.00-14.70m	Depth	14.00-14.70m
Larger than 4.75 mm	0.0 %	Max. Diameter	2.000 mm
4.75 - 2.00 mm	0.0 %	Dia. at 60%	0.077 mm
2.00 - 0.425 mm	0.7 %	Dia. at 30%	0.011 mm
0.425 - 0.075 mm	40.0 %	Dia. at 10%	- mm
0.075 - 0.005 mm	37.1 %	Coeff. of Uniformity	-
Smaller than 0.005 mm	22.2 %	Coeff. of Curvature	-
2000um Sieve Passing	100.0 %		
425um Sieve Passing	99.9 %		
75um Sieve Passing	59.4 %		

# GRAIN SIZE DISTRIBUTION

Project : **Preparatory Survey on Matarbari USC Coral-fired Power Project**

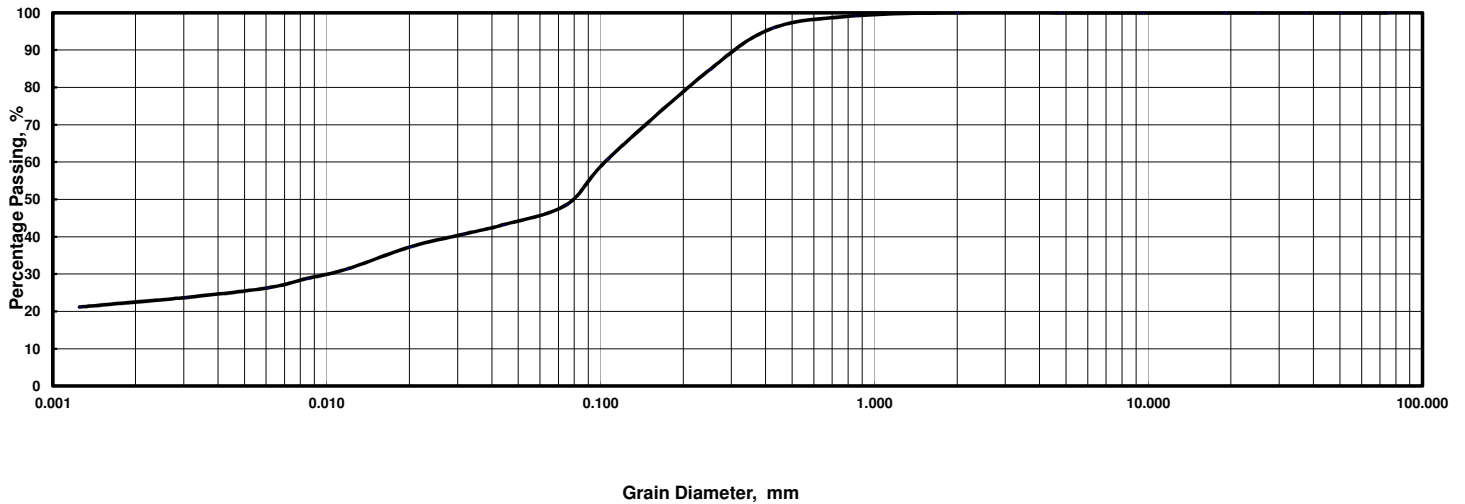
Location of Project : \_\_\_\_\_ Project No. : **S27-14**

Tested Method : **ASTM D422-63** Date of Testing : **28.11.14** Tested By : **Htin/Motiur** Checked by : **A. B. Tan**

Sample No. : <b>LD2-13-1 D-3</b>		Depth : <b>17.00-17.85m</b> ( _____ )										Specific Gravity : <b>2.71</b>				
Sieve	Dia., mm			75.0	50.0	37.5	25.0	19.0	9.50	4.75	2.00	0.850	0.425	0.250	0.106	0.075
	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	95.9	84.8	60.8	48.6
Hydro.	Dia., mm	0.044	0.031	0.020	0.012	0.0084	0.0060	0.0030	0.0012							
	% Passing	43.2	40.7	37.3	31.3	28.8	26.3	23.7	21.2							

Sample No. :		Depth :										Specific Gravity :				
Sieve	Dia., mm															
	% Passing															
Hydro.	Dia., mm															
	% Passing															


**Grain Size Distribution Curves**



	0.005	0.075	0.425	2.00	4.75	19.0	75.0
CLAY	SILT		FINE	MEDIUM	COARSE	FINE	COARSE
			SAND		GRAVEL		

Sample No.	LD2-13-1 D-3		Sample No.	LD2-13-1 D-3	
Depth	17.00-17.85m		Depth	17.00-17.85m	
Larger than 4.75 mm	0.0 %		Max. Diameter	2.00 mm	
4.75 - 2.00 mm	0.0 %		Dia. at 60%	0.10 mm	
2.00 - 0.425 mm	4.1 %		Dia. at 30%	0.0099 mm	
0.425 - 0.075 mm	47.3 %		Dia. at 10%	- mm	
0.075 - 0.005 mm	23.2 %		Coeff. of Uniformity	-	
Smaller than 0.005 mm	25.4 %		Coeff. of Curvature	-	
2000um Sieve Passing	100.0 %				
425um Sieve Passing	99.2 %				
75um Sieve Passing	48.6 %				

### Summary of Consolidated Drained Triaxial Compression Test

Project No.: S27-14		Project :Preparatory Survey on Matarbari USC Coral-fired Power Project				
Date Tested : 12.12.14		Tested by : Perera		Checked by : A. B. Tan		
Borehole No.: LD2-13-1		Sample No.:D-2		Depth : 11.00-11.80m		
Specimen Condition : Remoulded		Test Method : ASTM D7181-11				
Soil Description : Sandy Clay		Ave. Diameter : 50.0mm		Ave. Height : 100.0mm		
Specimen No.		1	2	3	4	
Initial Condition	Wet Density, Mg/m <sup>3</sup>	-	-	-		
	Water Content, %	-	-	-		
	Dry Density Mg/m <sup>3</sup>	1.46	1.46	1.46		
Saturation Stage	Saturated PWP, kPa	500	500	500		
	Final Cell Pressure, kPa	540	570	600		
	B-value	0.97	0.96	0.96		
Consolidation Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Initial PWP, kPa	529	558	587		
	Final PWP kPa	500	500	500		
Consolidation Parameter	Volume Change, %	0.24	0.10	0.23		
	Coefficient of Consolidation Cv, m <sup>2</sup> /year	1543	432	345		
	Coefficient of Volume Compressibility mvi, m <sup>2</sup> /MN	0.060	0.014	0.023		
Compression Stage	Cell Pressure kPa	540	570	600		
	Back Pressure kPa	500	500	500		
	Effective Cell Pressure kPa	40	70	100		
	Shearing Speed mm/min	0.015	0.015	0.015		
Failure Conditions	Peak Deviator Stress ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> , kPa	141	245	319		
	Excess PWP at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> kPa	N/A	N/A	N/A		
	Volumetric Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	-0.67	-0.30	-0.12		
	Strain at ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> (%)	9.82	9.97	10.54		
Shear Strength Parameters	$\phi_d = 39$ Degree $c_d = 0$ kPa	Mode of Failure				
		1	2	3	4	
						
Remarks : Specimens are prepared at 90% of Maximum dry density (from compaction Test) = 1.46Mg/m <sup>3</sup>						

### Consolidated Drained Triaxial Compression Test

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

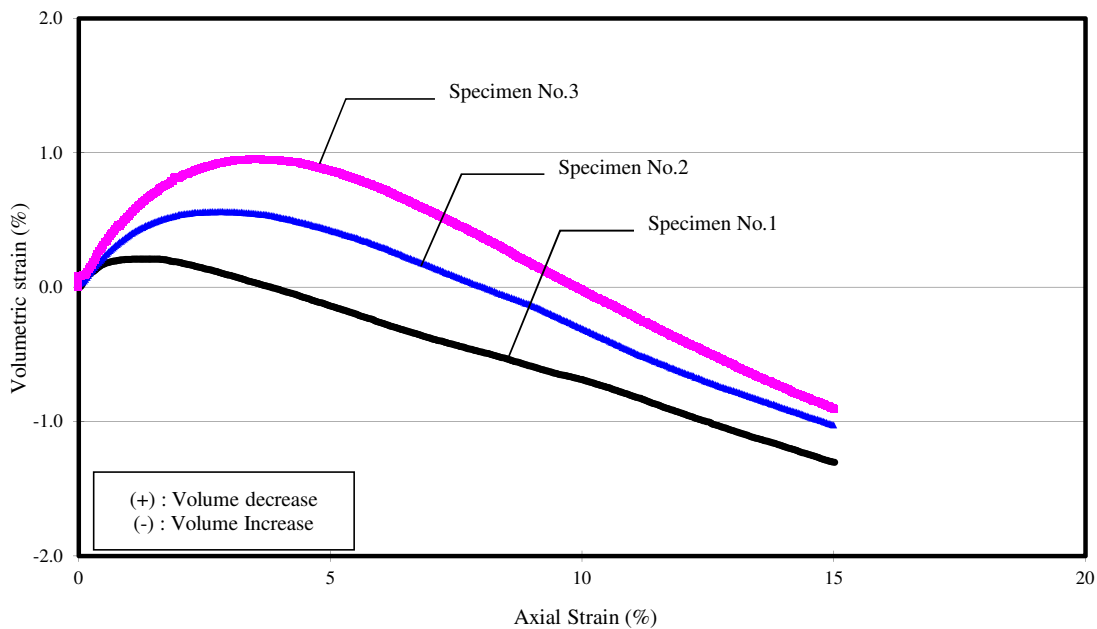
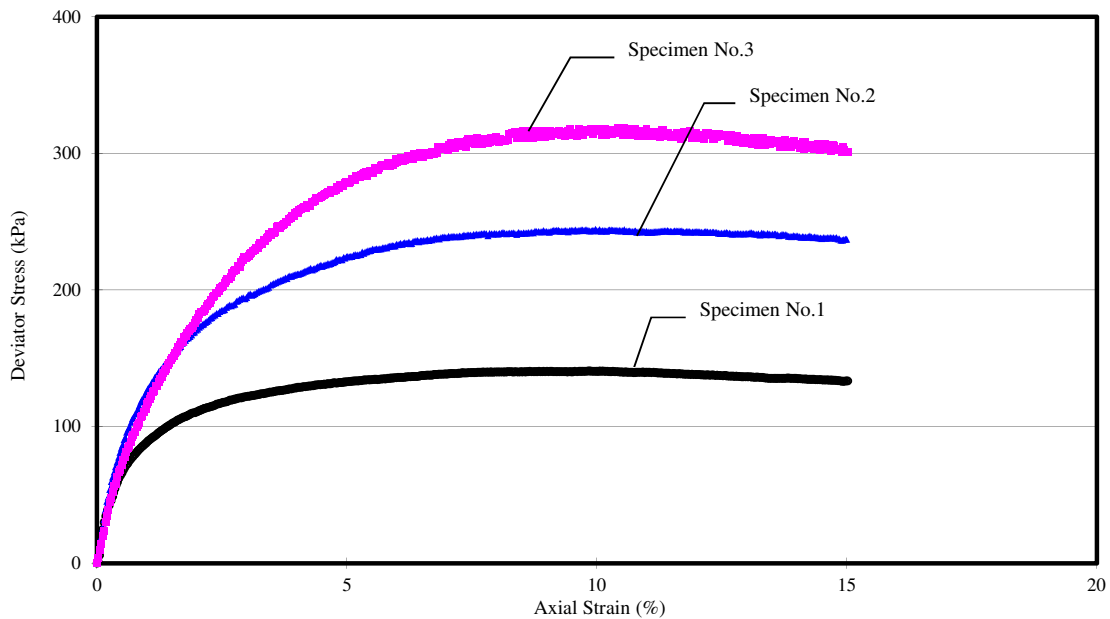
Project No.: S27-14

Sample No.: D-2

Soil Type: Sandy Clay

Borehole No.: LD2-13-1

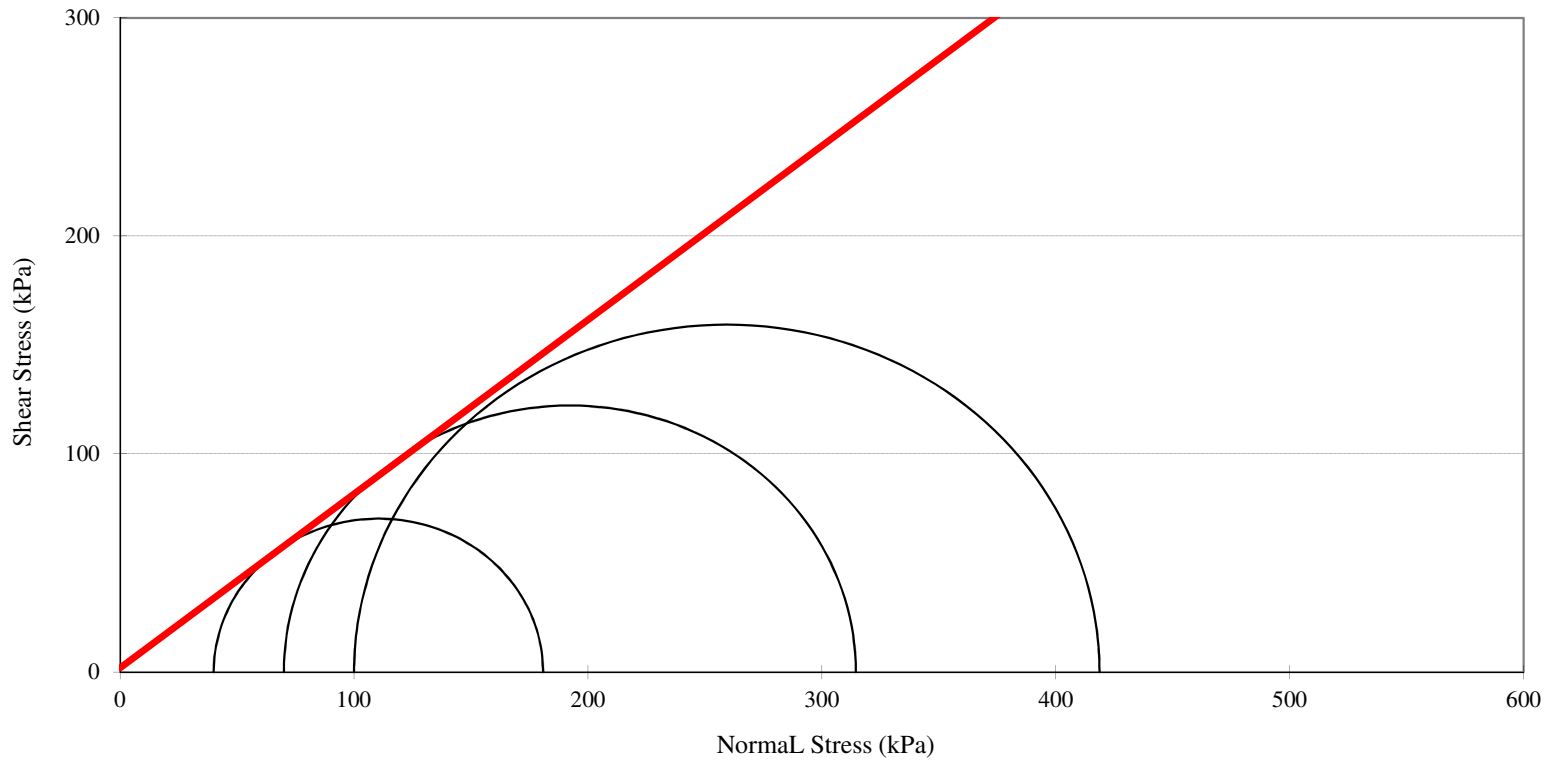
Depth : 11.00-11.80m



## Consolidated Drained Triaxial Compression Test With Pore water Pressure Measurement

- Mohr' s Circle (In terms of Total Stress at Peak Deviator Stress) -  
 Project : Preparatory Survey on Matarbari USC Coral-fired Power Project  
 Project No. : S27-14

Borehole No. : LD2-13-1      Soil Type: Sandy Clay  
 Sample No. : D-2              Depth : 11.00-11.80m  
 Angle of Internal Friction,  $\phi_d$       39 deg  
 Cohesion,  $c_d$                       0 kPa





**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- B-value Check -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

Project No.: S27-14

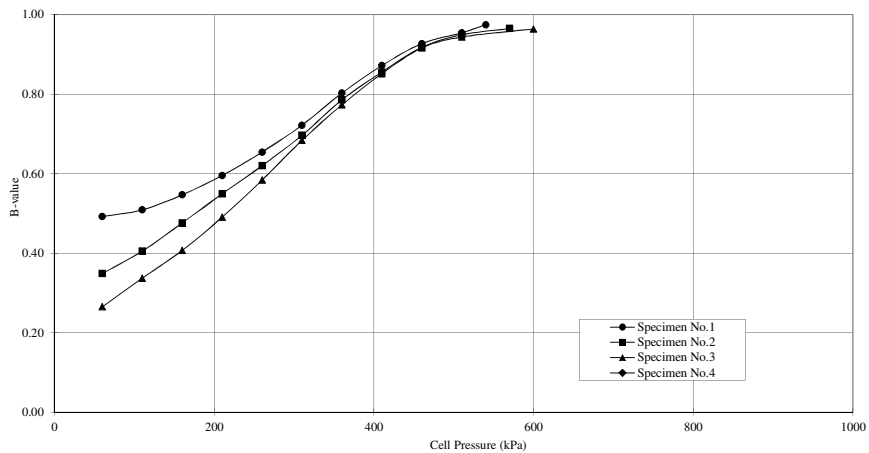
Borehole No.: LD2-13-1

Sample No.: D-2

Depth : 11.00-11.80m

Soil Type: Sandy Clay

		Result of B-value Check							
		Specimen 1		Specimen 2		Specimen 3		Specimen 4	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-check Step.1	Cell Pressure (kPa)	30	60	30	60	30	60		
	P.W.P (kPa)	20	34.8	20	30.5	20	28.0		
	Back Pressure (kPa)	20		20		20			
	B-value	0.49		0.35		0.27			
B-check Step.2	Cell Pressure (kPa)	60	110	60	110	60	110		
	P.W.P (kPa)	50	75.4	50	70.3	50	66.9		
	Back Pressure (kPa)	50		50		50			
	B-value	0.51		0.41		0.34			
B-check Step.3	Cell Pressure (kPa)	110	160	110	160	110	160		
	P.W.P (kPa)	100	127.3	100	123.8	100	120.3		
	Back Pressure (kPa)	100		100		100			
	B-value	0.55		0.48		0.41			
B-check Step.4	Cell Pressure (kPa)	160	210	160	210	160	210		
	P.W.P (kPa)	150	179.8	150	177.5	150	174.5		
	Back Pressure (kPa)	150		150		150			
	B-value	0.60		0.55		0.49			
B-check Step.5	Cell Pressure (kPa)	210	260	210	260	210	260		
	P.W.P (kPa)	200	232.7	200	231.0	200	229.2		
	Back Pressure (kPa)	200		200		200			
	B-value	0.65		0.62		0.58			
B-check Step.6	Cell Pressure (kPa)	260	310	260	310	260	310		
	P.W.P (kPa)	250	286.1	250	284.8	250	284.2		
	Back Pressure (kPa)	250		250		250			
	B-value	0.72		0.70		0.68			
B-check Step.7	Cell Pressure (kPa)	310	360	310	360	310	360		
	P.W.P (kPa)	300	340.1	300	339.3	300	338.7		
	Back Pressure (kPa)	300		300		300			
	B-value	0.80		0.79		0.77			
B-check Step.8	Cell Pressure (kPa)	360	410	360	410	360	410		
	P.W.P (kPa)	350	393.6	350	392.8	350	392.6		
	Back Pressure (kPa)	350		350		350			
	B-value	0.87		0.86		0.85			
B-check Step.9	Cell Pressure (kPa)	410	460	410	460	410	460		
	P.W.P (kPa)	400	446.3	400	445.9	400	445.8		
	Back Pressure (kPa)	400		400		400			
	B-value	0.93		0.92		0.92			
B-check Step.10	Cell Pressure (kPa)	460	510	460	510	460	510		
	P.W.P (kPa)	450	497.7	450	497.5	450	497.2		
	Back Pressure (kPa)	450		450		450			
	B-value	0.95		0.95		0.94			
B-check Step.11	Cell Pressure (kPa)	510	540	510	570	510	600		
	P.W.P (kPa)	500	529.2	500	557.9	500	586.7		
	Back Pressure (kPa)	500		500		500			
	B-value	0.97		0.96		0.96			



**Consolidated Drained Triaxial Compression Test  
With Porewater Pressure Measurement  
- Volume Change versus Root Time in Consolidation Stages -**

Project : Preparatory Survey on Matarbari USC Coral-fired Power Project

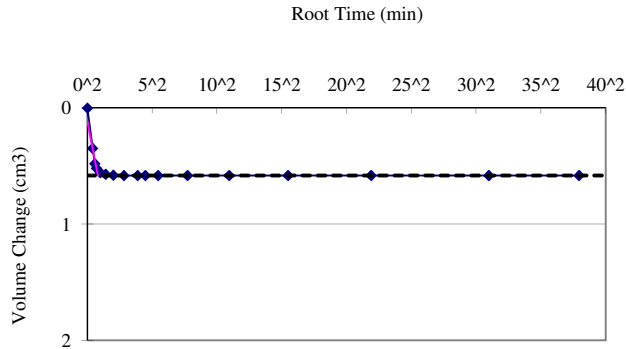
Project No.: S27-14

Borehole No.: LD2-13-1

Soil Type: Sandy Clay

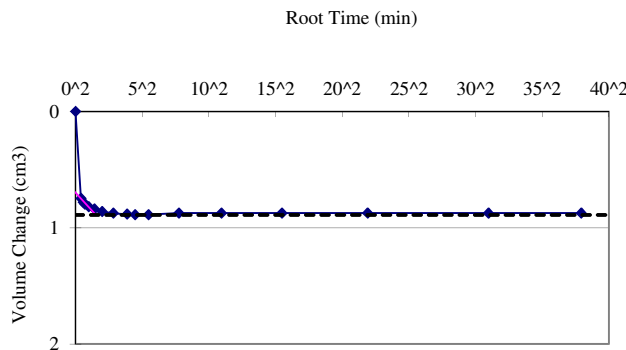
Sample No.: D-2

Depth : 11.00-11.80m



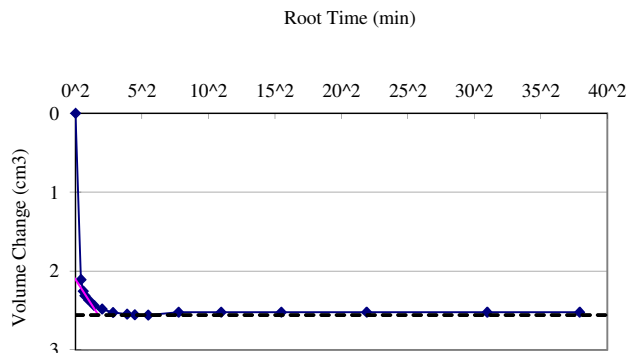
Specimen No.: 1

$p' = 40$  kPa  
 $t_{100} = 0.7$  min  
 $C_v = 1543$  m<sup>2</sup>/year  
 $m_{vi} = 0.060$  m<sup>2</sup>/MN



Specimen No.: 2

$p' = 70$  kPa  
 $t_{100} = 2.4$  min  
 $C_v = 432$  m<sup>2</sup>/year  
 $m_{vi} = 0.014$  m<sup>2</sup>/MN



Specimen No.: 3

$p' = 100$  kPa  
 $t_{100} = 3.0$  min  
 $C_v = 345$  m<sup>2</sup>/year  
 $m_{vi} = 0.023$  m<sup>2</sup>/MN

## RESULT OF COMPACTION TEST

Project Name : Preparatory Survey on Matarbari USC Coral-fired Power Project

Checked by : A. B. Tan

Project No. : S27-14

Site Location : Bangladesh

Sampling Date : -

Date of Testing : 8-Dec-14

Tested by : Perera/Bala

Sample No. : LD2-13-1 D-2(11.00-11.80m)

Ref. No. -

Soil Type :	Silty Sand	Mold	Standard : ASTM D698-07		Weight of Rammer :	2.5 kg
Specific Gravity :	2.74		Diameter :	10.11 cm	Drop Height :	30.5 cm
Natural Water Content :	N.A.		Height :	11.69 cm	No. of layers :	3
Water Content after Dried :	N.A.		Volume :	938 cm <sup>3</sup>	No. of blows / layers :	25

Specimen No.	1	2	3	4	5	6	7	8
Water Content (%)	9.5	11.3	13.5	15.7	18.1	20.8		
Wet Density (Mg/m <sup>3</sup> )	1.668	1.737	1.814	1.878	1.906	1.862		
Dry Density (Mg/m <sup>3</sup> )	1.524	1.561	1.598	1.622	1.614	1.541		

Maximum Dry Density	<b>1.625 Mg/m<sup>3</sup></b>
Optimum Water Content	<b>16.8 %</b>

