डेडीकेटेड फ्रेट कोरीडोर

DESIGN AND CONSTRUCTION OF CIVIL, STRUCTURES AND TRACK WORKS FOR DOUBLE LINE RAILWAY INVOLVING FORMATION IN EMBANKMENTS/CUTTINGS, BALLAST ON FORMATION, TRACK WORKS, BRIDGES, STRUCTURES, BUILDINGS, YARDS, INTEGRATION WITH IR EXISTING RAILWAY SYSTEM AND TESTING & COMMISSIONING ON DESIGN-BUILD LUMP SUM BASIS FOR MUGHALSARAI - NEW BHAUPUR SECTION OF EASTERN DEDICATED FREIGHT CORRIDOR

Contract Package: 202

ICB No. HQ/EN/EC/D-B/MUGHALSARAI - NEW BHAUPUR

PART - 4 - REFERENCE DOCUMENT

SECTIONAL DATA - VOLUME - 3

NEW KARCHANA TO NEW BHAUPUR

From Ch. 278155 to Ch. 507693

Geotech Data 2/3

Allahabad Detour
Bharwari Detour
Sirathu Detour
Khaga Detour
Fatehpur Detour
Kanpur Detour

EMPLOYER
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISES)
MINISTRY OF RAILWAYS
COUNTRY : INDIA

Allahabad Detour

Allahabad Detour
Bore Logs

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 57	SHEET NO. : 1 OF 2
LOCATION :	DATE : 10/11/08 to 10/11/08
CHAINAGE(km.) : 842/13-15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.80m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Stiff Silty Clay	1.50	SPT	6	7	9	11	16			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	8	11	13	16	24			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	10	13	18	20	31			
7.00				6.60									
				7.50	SPT	12	16	21	24	37			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	11	18	24	29	42			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 57		SHEET NO.	: 2 OF 2
LOCATION :		DATE	: 10/11/08 to 10/11/08
CHAINAGE(km.) : 842/13-15		METHOD	: ROTARY DRILLING
GROUND R. L. :		CASING	: 150mm Ø
GROUND W. T. : 6.80m			

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	16	22	27	34	49			
11.00	150 mm Ø		Hard Silty Clay	11.10									
12.00				12.00	SPT	14	21	29	36	50			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 58	SHEET NO. : 1 OF 2
LOCATION :	DATE : 10/10/08 to 10/10/08
CHAINAGE(km.) : 843/17-19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.30m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Stiff Silty Clay	1.50	SPT	9	8	9	11	17			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	8	9	10	15	19			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	7	10	11	16	21			
7.00				6.60									
				7.50	SPT	11	13	14	21	27			
8.00				8.10									
9.00				9.00	SPT	10	14	15	26	29			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1 BR. NO. 58	SHEET NO. : 2 OF 2
LOCATION :	DATE : 10/11/08 to 10/11/08
CHAINAGE(km.) : 843/17-19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**16**	**17**	**28**	**33**			
11.00	**150 mm Ø**		Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**12**	**15**	**18**	**30**	**33**			
13.00			**BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.**										

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 60	SHEET NO. : 1 OF 2
LOCATION :	DATE : 10/10/08 to 10/10/08
CHAINAGE(km.) : 844/25-27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 5.40m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Stiff Silty Clay	1.50	SPT	4	7	11	13	18			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	5	6	10	17	16			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	8	12	16	21	28			
7.00				6.60									
				7.50	SPT	9	14	17	26	31			
8.00				8.10									
9.00				9.00	SPT	12	16	20	29	26			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1 BR. NO. 60	SHEET NO. : 2 OF 2
LOCATION :	DATE : 10/11/08 to 10/11/08
CHAINAGE(km.) : 844/25-27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 5.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**21**	**27**	**35**	**48**			
11.00	**150 mm Ø**		Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**20**	**26**	**33**	**46**			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 63	SHEET NO. : 1 OF 2
LOCATION :	DATE : 8/10/08 to 9/10/08
CHAINAGE(km.) : 847/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.20m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Very Stiff Silty Clay	1.50	SPT	10	14	16	21	30			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	8	10	14	20	24			
5.00				5.10									
6.00				6.00	SPT	11	15	17	21	32			
7.00				6.60									
				7.50	SPT	12	13	20	24	33			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	15	18	24	35	42			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1 BR. NO. 63	SHEET NO. : 2 OF 2
LOCATION :	DATE : 8/11/08 to 9/11/08
CHAINAGE(km.) : 847/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**19**	**26**	**38**	**45**			
11.00	**150 mm Ø**		Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**16**	**20**	**28**	**39**	**48**			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 64	SHEET NO. : 1 OF 2
LOCATION :	DATE : 6/11/08 to 7/11/08
CHAINAGE(km.) : 849/13-15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.70m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Stiff Silty Clay	1.50	SPT	6	7	10	12	17			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	8	11	13	16	24			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	10	14	18	23	32			
7.00				6.60									
				7.50	SPT	12	16	22	30	38			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	12	18	24	23	42			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1 BR. NO. 64	SHEET NO. : 2 OF 2
LOCATION :	DATE : 6/11/08 to 7/11/08
CHAINAGE(km.) : 849/13-15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**19**	**27**	**29**	**46**			
11.00	**150 mm Ø**		Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**18**	**21**	**24**	**31**	**45**			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 65	SHEET NO. : 1 OF 2
LOCATION :	DATE : 6/11/08 to 8/11/08
CHAINAGE(km.) : 850/7-9	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.20m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Stiff Silty Clay	1.50	SPT	4	6	7	10	13			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	6	9	10	13	19			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	8	13	18	22	31			
7.00				6.60									
				7.50	SPT	10	18	25	28	43			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	14	24	29	34	53			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1 BR. NO. 65	SHEET NO. :	2 OF 2
LOCATION :		DATE :	6/11/08 to 8/11/08
CHAINAGE(km.) :	850/7-9	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm Ø
GROUND W. T. :	6.20m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**26**	**32**	**39**	**58**			
11.00	**150 mm Ø**		Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**23**	**42**	**48**	**65**			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 66		SHEET NO.	: 1 OF 2
LOCATION :		DATE	: 2/11/08 to 3/11/08
CHAINAGE(km.) : 852/13-15		METHOD	: ROTARY DRILLING
GROUND R. L. :		CASING	: 150mm Ø
GROUND W. T. : 5.40m			

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Very Stiff Silty Clay	1.50	SPT	8	12	17	21	29			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	10	13	18	24	31			
5.00				5.10									
6.00				6.00	SPT	9	14	19	27	33			
7.00			Hard Silty Clay	6.60									
				7.50	SPT	11	16	21	31	37			
8.00				8.10									
9.00				9.00	SPT	15	18	21	33	39			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1 BR. NO. 66	SHEET NO. :	2 OF 2
LOCATION :		DATE :	2/11/08 to 3/11/08
CHAINAGE(km.) :	852/13-15	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm Ø
GROUND W. T. :	5.40m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	20	25	39	45			
11.00	150 mm Ø		Hard Silty Clay	11.10									
12.00				12.00	SPT	17	21	26	40	47			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -------	Chkd. By : --	Prepd. By ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 67	SHEET NO. : 1 OF 2
LOCATION :	DATE : 2/11/08 to 3/11/08
CHAINAGE(km.) : 853/5-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.30m	

DEPTH (m.)	Ø BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00	150 mm Ø		Very Stiff Silty Clay	1.50	SPT	7	10	11	16	21			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	11	15	13	19	28			
5.00				5.10									
6.00				6.00	SPT	14	13	19	23	32			
7.00				6.60									
				7.50	SPT	18	20	22	26	42			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	16	18	20	27	38			
10.00				9.60									

SPT N = STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Checked. By : Prepd. By
Project ---------- ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. : 1 BR. NO. 67	SHEET NO. : 2 OF 2
LOCATION :	DATE : 2/11/08 to 3/11/08
CHAINAGE(km.) : 853/5-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm Ø
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
	150 mm Ø		Hard Silty Clay	10.50	SPT	20	23	26	30	49			
11.00				11.10									
12.00				12.00	SPT	21	25	28	35	53			
13.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00m BELOW G.L.

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -------
Chkd. By : --
Prepd. By ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 19/11/08 to 20/11/08
CHAINAGE(km.) : A 13	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	10	11	15	21			
				2.10									
2.00													
3.00				3.00	SPT	5	8	11	16	19			
				3.60									
4.00													
				4.50	SPT	7	10	14	21	24			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	10	12	14	18	26			
				6.60									
7.00													
				7.50	SPT	10	13	15	22	28			
				8.10									
8.00													
9.00				9.00	SPT	11	16	18	25	34			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	19/11/08 to 20/11/08
CHAINAGE(km.) :	A 13	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	6.80 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**18**	**21**	**29**	**39**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**16**	**17**	**24**	**31**	**41**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 19/12/08 to 20/12/08
CHAINAGE(km.) : A 14	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	9	13	18	23	31			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	9	14	18	26	32			
				3.60									
4.00													
				4.50	SPT	10	15	19	25	34			
				5.10									
5.00													
6.00				6.00	SPT	12	16	21	26	37			
				6.50									
7.00													
			Hard Silty Clay	7.50	SPT	13	17	24	28	41			
				8.10									
8.00													
9.00				9.00	SPT	15	21	27	31	48			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 19/12/08 to 20/12/08
CHAINAGE(km.) : A 14	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**20**	**24**	**30**	**44**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**17**	**24**	**29**	**37**	**53**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	6	7	10	13			
			Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	7	10	14	17			
				5.10									
5.00													
6.00				6.00	SPT	8	10	13	17	23			
				6.60									
			Very Stiff Silty Clay										
7.00													
				7.50	SPT	8	10	13	15	23			
				8.10									
8.00													
9.00				9.00	SPT	8	10	13	19	23			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	8	11	14	20	25			
				11.10.									
11.00			Very Stiff Silty Clay										
12.00				12.00	SPT	7	12	15	22	27			
				12.60									
13.00													
				13.50	SPT	9	13	17	24	30			
				14.10									
14.00													
15.00				15.00	SPT	10	16	18	26	34			
				15.60									
16.00													
				16.50	SPT	11	17	20	27	37			
				17.10									
17.00			Hard Silty Clay										
18.00				18.00	SPT	11	14	20	31	34			
				18.60									
19.00													
				19.50	SPT	9	15	21	29	36			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 15	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	10	18	23	31	41			
				21.60									
22.00													
				22.50	SPT	12	17	25	28	42			
				23.10									
23.00													
24.00				24.00	SPT	11	18	26	32	44			
				24.60									
			Hard Silty Clay										
25.00													
				25.50	SPT	13	20	26	37	47			
				26.10									
26.00													
27.00				27.00	SPT	16	24	28	39	52			
				27.60									
28.00													
				28.50	SPT	15	19	27	38	46			
				29.10									
29.00													
30.00				30.00	SPT	18	21	29	40	50			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 16	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	6	7	7	13			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	7	8	12	15			
				5.10									
5.00													
6.00				6.00	SPT	6	9	14	17	23			
				6.60									
7.00													
				7.50	SPT	7	10	13	16	23			
				8.10									
8.00													
			Very Stiff Silty Clay										
9.00				9.00	SPT	8	12	16	20	28			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 16	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	8	11	13	15	24			
				11.10.									
11.00			Very Stiff Silty Clay										
12.00				12.00	SPT	8	12	15	19	27			
				12.60									
13.00													
				13.50	SPT	10	14	18	21	32			
				14.10									
14.00			Dence Clayey Sand										
15.00				15.00	SPT	9	14	20	23	34			
				15.60									
16.00													
				16.50	SPT	9	16	21	30	37			
				17.10									
17.00													
18.00				18.00	SPT	8	11	14	20	25			
				18.60									
			Very Stiff Silty Clay										
19.00													
				19.50	SPT	9	15	16	31	31			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 18/11/08 to 20/11/08
CHAINAGE(km.) : A 16	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00			Very Stiff Silty Clay	21.00	SPT	10	13	17	22	30			
				21.60									
22.00				22.50	SPT	12	15	19	24	34			
			Hard Silty Clay	23.10									
23.00													
24.00				24.00	SPT	13	18	22	26	40			
				24.60									
25.00				25.50	SPT	14	17	25	31	42			
				26.10									
26.00													
27.00				27.00	SPT	16	16	23	30	39			
				27.60									
28.00				28.50	SPT	15	19	24	32	43			
				29.10									
29.00													
30.00				30.00	SPT	17	20	26	34	46			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 23/11/08 to 25/11/08
CHAINAGE(km.) : A 17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	5	8	11	13			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	8	11	15	19			
				5.10									
5.00													
6.00				6.00	SPT	7	9	11	17	20			
				6.60									
7.00													
			Very Stiff Silty Clay	7.50	SPT	6	9	12	14	21			
				8.10									
8.00													
9.00				9.00	SPT	8	14	18	22	32			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 23/11/08 to 25/11/08
CHAINAGE(km.) : A 17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	7	11	13	15	24			
				11.10.									
11.00													
12.00			Very Stiff Silty Clay	12.00	SPT	8	12	15	18	27			
				12.60									
13.00													
				13.50	SPT	9	13	17	20	30			
				14.10									
14.00													
15.00				15.00	SPT	12	17	22	35	39			
				15.60									
16.00													
				16.50	SPT	12	17	21	37	38			
				17.10									
17.00													
			Hard Silty Clay										
18.00				18.00	SPT	13	21	27	35	48			
				18.60									
19.00													
				19.50	SPT	11	20	24	34	44			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1	SHEET NO. :	3 OF 3
LOCATION :		DATE :	23/11/08 to 25/11/08
CHAINAGE(km.) :	A 17	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	7.00 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	16	23	26	36	49			
				21.60									
22.00				22.50	SPT	14	25	29	40	54			
				23.10									
23.00													
24.00				24.00	SPT	15	23	28	39	51			
				24.60									
25.00			Hard Silty Clay										
				25.50	SPT	16	24	31	38	55			
				26.10									
26.00													
27.00				27.00	SPT	19	26	31	42	57			
				27.60									
28.00													
				28.50	SPT	18	25	29	40	54			
				29.10									
29.00													
30.00				30.00	SPT	20	27	32	44	59			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project ----- | Chkd. By : -- | Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 23/11/08 to 25/11/08
CHAINAGE(km.) : A 18	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	5	8	11	13			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	8	12	14	20			
			Very Stiff Silty Clay	5.10									
5.00													
6.00				6.00	SPT								
				6.60									
7.00													
				7.50	SPT	6	7	12	14	19			
				8.10									
8.00													
9.00				9.00	UDS								
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 23/11/08 to 25/11/08
CHAINAGE(km.) : A 18	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	8	11	13	15	24			
				11.10.									
11.00													
12.00			Very Stiff Silty Clay	12.00	SPT	10	14	17	21	31			
				12.60									
13.00													
				13.50	SPT	11	13	24	29	37			
				14.10									
14.00													
15.00				15.00	SPT	11	17	26	31	43			
				15.60									
16.00													
				16.50	SPT	17	21	26	32	47			
				17.10									
17.00													
			Hard Silty Clay										
18.00				18.00	SPT	16	19	23	31	42			
				18.60									
19.00													
				19.50	SPT	18	20	26	33	46			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1	SHEET NO. :	3 OF 3
LOCATION :		DATE :	23/11/08 to 25/11/08
CHAINAGE(km.) :	A 18	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	7.20m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	19	23	24	32	47			
				21.60									
22.00													
				22.50	SPT	17	22	28	34	50			
				23.10									
23.00													
24.00				24.00	SPT	17	18	26	29	44			
				24.60									
25.00			Hard Silty Clay										
				25.50	SPT	21	26	31	39	57			
				26.10									
26.00													
27.00				27.00	SPT	20	27	32	41	59			
				27.60									
28.00													
				28.50	SPT	21	24	37	39	61			
				29.10									
29.00													
30.00				30.00	SPT	23	27	33	41	60			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 22/11/08 to 22/11/08
CHAINAGE(km.) : A 19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	6	7	10	13			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	3	6	8	11	14			
				5.10									
5.00													
6.00				6.00	SPT	5	7	10	14	17			
				6.60									
7.00			Very Stiff Silty Clay										
				7.50	SPT	6	7	8	12	15			
				8.10									
8.00													
9.00				9.00	SPT	7	9	11	15	20			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 22/11/08 to 22/11/08
CHAINAGE(km.) : A 19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**7**	**10**	**12**	**17**	**22**			
11.00			Very Stiff Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**10**	**14**	**18**	**25**	**32**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 24/11/08 to 24/11/08
CHAINAGE(km.) : A 20	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	6	7	9	13			
			Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	6	12	14	18			
				5.10									
5.00													
6.00				6.00	SPT								
				6.60									
7.00													
				7.50	SPT	10	13	16	20	29			
			Very Stiff Silty Clay	8.10									
8.00													
9.00				9.00	SPT	10	12	18	22	30			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 24/11/08 to 24/11/08
CHAINAGE(km.) : A 20	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**15**	**21**	**36**	**36**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**17**	**29**	**38**	**46**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 25/11/08 to 25/11/08
CHAINAGE(km.) : A 21	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	5	6	8	11			
			Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
			Very Stiff Silty Clay	4.50	SPT	7	9	13	17	22			
				5.10									
5.00													
6.00				6.00	SPT								
				6.60									
7.00													
				7.50	SPT	10	12	17	21	29			
				8.10									
8.00													
9.00				9.00	SPT	11	15	19	24	34			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 25/11/08 to 25/11/08
CHAINAGE(km.) : A 21	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**16**	**22**	**29**	**38**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**12**	**15**	**32**	**34**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 25/11/08 to 28/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
			Stiff Silty Clay	1.50	SPT	4	5	6	9	11			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	10	16	20			
				5.10									
5.00													
6.00				6.00	SPT	9	10	11	13	21			
				6.60									
7.00													
			Very Stiff Silty Clay	7.50	SPT	10	11	12	15	23			
				8.10									
8.00													
9.00				9.00	SPT	11	13	15	19	28			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 25/11/08 to 28/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	11	13	14	19	27			
11.00			Very Stiff Silty Clay	11.10.									
12.00				12.00	SPT	10	14	19	23	33			
13.00				12.60									
				13.50	SPT	11	17	23	25	40			
14.00				14.10									
15.00				15.00	SPT	12	16	21	27	37			
16.00				15.60									
				16.50	SPT	14	18	24	29	42			
17.00				17.10									
18.00			Hard Silty Clay	18.00	SPT	11	17	26	31	43			
19.00				18.60									
				19.50	SPT	13	19	21	28	40			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 25/11/08 to 28/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	14	20	24	29	44			
				21.60									
22.00													
				22.50	SPT	12	18	21	31	39			
				23.10									
23.00													
24.00				24.00	SPT	16	21	27	34	48			
				24.60									
25.00			Hard Silty Clay										
				25.50	SPT	15	22	23	30	45			
				26.10									
26.00													
27.00				27.00	SPT	18	24	27	37	51			
				27.60									
28.00													
				28.50	SPT	17	25	28	36	53			
				29.10									
29.00													
30.00				30.00	SPT	19	26	29	38	55			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 1 OF 3
LOCATION :	DATE : 25/11/08 to 27/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	8	10	13	18			
				2.10									
2.00													
3.00				3.00	SPT	4	5	6	12	11			
				3.60									
4.00													
				4.50	UDS								
				5.00									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	9	15	17	21	32			
				6.60									
7.00													
				7.50	SPT	11	14	17	22	31			
				8.10									
8.00													
9.00				9.00	SPT	11	14	17	25	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 2 OF 3
LOCATION :	DATE : 25/11/08 to 25/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	10	16	19	24	35			
11.00				11.10.									
12.00				12.00	SPT	9	16	21	25	37			
13.00				12.60									
				13.50	SPT	11	15	23	29	38			
14.00				14.10									
15.00			Hard Silty Clay	15.00	SPT	13	18	22	30	40			
16.00				15.60									
				16.50	SPT	14	19	22	34	41			
17.00				17.10									
18.00				18.00	SPT	17	18	24	31	42			
19.00				18.60									
				19.50	SPT	15	19	20	28	39			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 3 OF 3
LOCATION :	DATE : 25/11/08 to 27/11/08
CHAINAGE(km.) : A 22 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	16	21	26	34	47			
				21.60									
22.00													
				22.50	SPT	18	23	26	34	49			
				23.10									
23.00													
24.00				24.00	SPT	17	20	22	30	42			
				24.60									
25.00			Hard Silty Clay										
				25.50	SPT	19	23	25	32	48			
				26.10									
26.00													
27.00				27.00	SPT	17	22	23	30	45			
				27.60									
28.00													
				28.50	SPT	21	26	29	37	55			
				29.10									
29.00													
30.00				30.00	SPT	20	27	32	36	59			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 26/11/08 to 28/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	5	6	8	11			
			Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	9	10	13	19			
				5.10									
5.00													
6.00				6.00	SPT	8	12	11	16	23			
				6.60									
7.00													
				7.50	SPT	8	12	14	17	26			
			Very Stiff Silty Clay	8.10									
8.00													
9.00				9.00	UDS	12	14	18	22	32			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 26/11/08 to 28/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	10	16	19	23	35			
				11.10.									
11.00													
12.00				12.00	SPT	13	17	21	27	38			
				12.60									
13.00													
				13.50	SPT	11	18	27	34	45			
				14.10									
14.00													
15.00				15.00	SPT	13	15	16	27	31			
			Hard Silty Clay	15.60									
16.00													
				16.50	SPT	10	16	21	28	37			
				17.10									
17.00													
18.00				18.00	SPT	12	18	23	31	41			
				18.60									
19.00													
				19.50	SPT	14	17	25	33	42			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 26/11/08 to 28/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	12	18	23	31	41			
				21.60									
22.00													
				22.50	SPT	16	19	26	34	45			
				23.10									
23.00													
24.00				24.00	SPT	15	21	23	30	44			
				24.60									
			Hard Silty Clay										
25.00													
				25.50	SPT	18	23	26	34	49			
				26.10									
26.00													
27.00				27.00	SPT	19	25	28	36	53			
				27.60									
28.00													
				28.50	SPT	20	27	29	38	57			
				29.10									
29.00													
30.00				30.00	SPT	18	26	28	39	54			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 1 OF 3
LOCATION :	DATE : 28/11/08 to 30/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	8	12			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	14	18	24			
				5.10									
5.00													
6.00				6.00	UDS								
				6.50									
7.00			Stiff Silty Clay										
				7.50	SPT	8	12	16	19	28			
				8.10									
8.00													
9.00				9.00	SPT	10	14	18	22	32			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 2 OF 3
LOCATION :	DATE : 28/11/08 to 30/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	11	15	19	24	34			
				11.10.									
11.00													
12.00				12.00	UDS								
			Stiff Silty Clay	12.50									
13.00													
				13.50	SPT	10	16	20	26	36			
				14.10									
14.00													
15.00				15.00	SPT	12	14	21	28	35			
				15.60									
16.00													
				16.50	SPT	11	16	21	31	37			
				17.10									
17.00													
18.00			Stiff Silty Clay	18.00	UDS								
				18.50									
19.00													
				19.50	SPT	13	17	23	30	40			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 3 OF 3
LOCATION :	DATE : 28/11/08 to 30/11/08
CHAINAGE(km.) : A 23 Rewa Highway	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	14	18	23	31	41			
			Stiff Silty Clay	21.60									
22.00				22.50	SPT	16	20	24	33	44			
23.00				23.10									
24.00				24.00	SPT	17	21	27	35	48			
25.00				24.60									
				25.50	SPT	17	20	26	34	46			
26.00				26.10									
27.00				27.00	SPT	19	21	28	32	49			
			Stiff Silty Clay	27.60									
28.00				28.50	SPT	18	22	29	38	51			
29.00				29.10									
30.00				30.00	SPT	20	24	28	37	52			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Allahabad Bypass

BORE HOLE NO. :	1	SHEET NO. :	1 OF 2
LOCATION :		DATE :	28/11/08 to 29/11/08
CHAINAGE(km.) :	A 24	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	8.40 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	8	11	14			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	7	9	12	16			
				5.10									
5.00													
6.00				6.00	UDS	7	10	11	14	21			
				6.50									
7.00			Very Stiff Silty Clay										
				7.50	SPT	9	12	15	19	37			
				8.10									
8.00													
9.00				9.00	SPT	10	14	18	22	32			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 28/11/08 to 29/11/08
CHAINAGE(km.) : A 24	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**11**	**16**	**22**	**28**	**38**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**13**	**16**	**24**	**32**	**40**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 29/11/08 to 29/11/08
CHAINAGE(km.) : A 25	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.70 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	8	11	14	20	25			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	7	13	14	22	27			
				3.60									
4.00													
				4.50	SPT	9	12	16	24	28			
				5.10									
5.00													
6.00				6.00	SPT	12	13	17	28	30			
				6.60									
7.00													
				7.50	SPT	10	14	18	23	32			
				8.10									
8.00													
9.00				9.00	SPT	13	17	21	27	38			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 29/11/08 to 29/11/08
CHAINAGE(km.) : A 25	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.70 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**19**	**26**	**31**	**45**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**20**	**27**	**32**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 30/11/08 to 30/11/08
CHAINAGE(km.) : A 26	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Very Stiff Silty Clay	1.50	SPT	6	10	13	15	23			
2.00				2.10									
3.00				3.00	SPT	6	12	18	18	30			
4.00				3.60									
				4.50	SPT	8	12	14	21	26			
5.00				5.10									
6.00				6.00	SPT	11	14	17	25	31			
7.00			Hard Silty Clay	6.60									
				7.50	SPT	10	14	19	26	33			
8.00				8.10									
9.00				9.00	SPT	11	16	22	28	38			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 30/11/08 to 30/11/08
CHAINAGE(km.) : A 26	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**9**	**16**	**21**	**27**	**37**			
11.00			Stiff Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**18**	**22**	**30**	**40**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 30/11/08 to 30/11/08
CHAINAGE(km.) : A 27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Stiff Silty Clay	1.50	SPT	4	5	7	10	13			
2.00				2.10									
3.00				3.00	SPT	6	8	13	16	21			
4.00			Very Stiff Silty Clay	3.60									
				4.50	SPT	9	13	15	20	28			
5.00				5.10									
6.00				6.00	SPT	12	15	15	25	30			
7.00				6.60									
				7.50	SPT	10	14	18	23	32			
8.00				8.10									
9.00				9.00	SPT	9	16	21	27	37			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 30/11/08 to 30/11/08
CHAINAGE(km.) : A 27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**18**	**24**	**30**	**42**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**21**	**26**	**34**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 2/12/08 to 2/12/08
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	8	9	10	13	19			
				2.10									
2.00													
3.00				3.00	SPT	10	12	13	19	25			
				3.60									
4.00													
				4.50	SPT	9	12	15	21	27			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	10	13	16	25	29			
				6.60									
7.00													
				7.50	SPT	9	13	15	22	28			
				8.10									
8.00													
9.00				9.00	SPT	12	14	16	23	30			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 2/12/08 to 2/12/08
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	19	23	28	42			
				11.10.									
11.00													
12.00				12.00	SPT	15	20	25	30	45			
				12.60									
13.00													
				13.50	SPT	17	22	27	32	49			
				14.10									
14.00													
15.00			Hard Silty Clay	15.00	SPT	15	21	26	33	47			
				15.60									
16.00													
				16.50	SPT	16	22	29	36	51			
				17.10									
17.00													
18.00				18.00	SPT	18	24	30	38	54			
				18.60									
19.00													
				19.50	SPT	17	25	30	39	55			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 2/12/08 to 2/12/08
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	15	22	29	37	51			
				21.60									
22.00				22.50	SPT	18	24	30	38	54			
				23.10									
23.00													
24.00				24.00	SPT	14	19	26	32	45			
				24.60									
25.00				25.50	SPT	17	21	28	34	49			
			Hard Silty Clay	26.10									
26.00													
27.00				27.00	SPT	20	23	31	40	54			
				27.60									
28.00				28.50	SPT	17	24	32	38	56			
				29.10									
29.00													
30.00				30.00	SPT	16	26	34	42	60			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 1 OF 3
LOCATION :	DATE : ----------
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.3 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	8	9	12	17			
			Very Stiff Silty Clay	2.10									
2.00													
3.00				3.00	SPT	9	14	21	28	35			
				3.60									
4.00													
				4.50	SPT	12	18	25	31	43			
				5.10									
5.00													
6.00				6.00	SPT	13	19	23	35	42			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	13	19	23	32	42			
				8.10									
8.00													
9.00				9.00	SPT	11	21	26	33	47			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 2 OF 3
LOCATION :	DATE : ----------
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.3 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**20**	**24**	**31**	**44**			
				11.10.									
11.00													
12.00				**12.00**	**UDS**								
				12.50									
13.00													
				13.50	**SPT**	**14**	**22**	**28**	**36**	**50**			
				14.10									
14.00													
15.00			Hard Silty Clay	**15.00**	**SPT**	**13**	**21**	**27**	**35**	**48**			
				15.60									
16.00													
				16.50	**SPT**	**15**	**23**	**29**	**38**	**52**			
				17.10									
17.00													
18.00				**18.00**	**SPT**	**16**	**24**	**31**	**39**	**55**			
				18.60									
19.00													
				19.50	**SPT**	**17**	**26**	**31**	**40**	**57**			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 2	SHEET NO. : 3 OF 3
LOCATION :	DATE : ----------
CHAINAGE(km.) : A 28	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 7.3 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00			Hard Silty Clay	21.00	SPT	15	24	34	42	58			
				21.60									
22.00				22.50	SPT	20	26	34	42	60			
				23.10									
23.00													
24.00				24.00	SPT	19	27	31	39	58			
				24.60									
25.00				25.50	SPT	21	28	33	40	61			
				26.10									
26.00													
27.00				27.00	SPT	22	27	37	42	64			
				27.60									
28.00				28.50	SPT	21	29	34	43	63			
				29.10									
29.00													
30.00				30.00	SPT	23	29	38	44	67			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 1/12/08 to 1/12/08
CHAINAGE(km.) : A 29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
			Very Stiff Silty Clay	1.50	SPT	7	9	12	17	21			
				2.10									
2.00													
3.00				3.00	SPT	8	11	13	16	24			
				3.60									
4.00													
				4.50	SPT	9	12	14	20	26			
				5.10									
5.00													
6.00				6.00	SPT	14	16	19	34	35			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	13	18	27	34	45			
				8.10									
8.00													
9.00				9.00	SPT	14	16	20	30	36			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 1/12/08 to 1/12/08
CHAINAGE(km.) : A 29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**15**	**19**	**32**	**34**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**11**	**15**	**21**	**28**	**36**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 1/12/08 to 2/12/08
CHAINAGE(km.) : A 30	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	9	13	18	23	31			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	9	14	18	26	32			
				3.60									
4.00													
				4.50	SPT	10	15	19	25	34			
				5.10									
5.00													
6.00				6.00	SPT	12	16	21	26	37			
				6.50									
7.00													
			Hard Silty Clay	7.50	SPT	13	17	24	28	41			
				8.10									
8.00													
9.00				9.00	SPT	15	21	27	31	48			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Allahabad Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 1/12/08 to 2/12/08
CHAINAGE(km.) : A 30	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 8.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**20**	**24**	**30**	**44**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**17**	**24**	**29**	**37**	**53**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

Allahabad Detour
Chemical

CHEMICAL TEST RESULT OF SOIL SAMPLES.

SITE : **Geotechnical Investigation work for DFCCIL , Kanpur.**

LOCATION **ALLAHABAD BYPASS** **DATE**

SR NO.	BRIDGE NO	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
11	66	4.50 - 5.10	SPT - 2	7.82	0.011	0.019	
12	67	1.50 - 2.10	SPT - 1	8.03	0.013	0.021	
13	A13	1.50 - 2.10.	SPT - 1	7.69	0.014	0.018	
14	A14	4.50 - 5.10	SPT - 2	7.72	0.017	0.024	

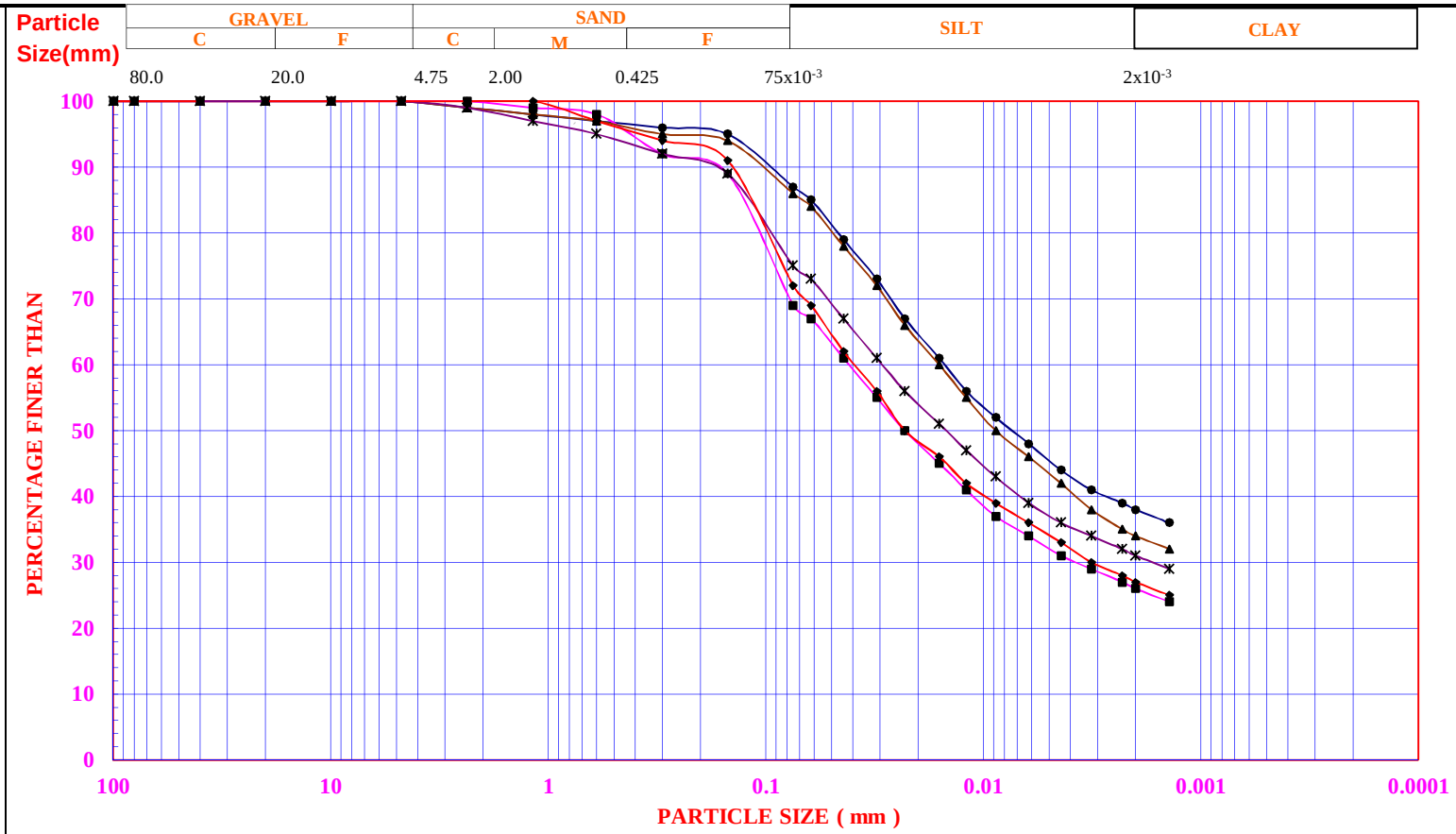
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD **Job No.** **8**

Allahabad Detour
GSA

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Bridge No.57) (Chainage No.842/13-15)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	57	1.50 - 2.10	CL	0	13	49	38	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	57	3.00 - 3.60	CL	0	31	43	26	-----	-----	-----	-----	-----	27	13	14	SPT 2
▲—▲	57	4.50 - 5.10	CL	0	14	52	34	-----	-----	-----	-----	-----	29	14	15	SPT 3
✳—✳	57	7.50 - 8.10	CL	0	25	44	31	-----	-----	-----	-----	-----	26	12	14	SPT 5
◆—◆	57	12.00 - 12.60	CL	0	28	45	27	-----	-----	-----	-----	-----	24	11	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	57	57	57	57	57
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	99.00	100.00	99.00	99.00	100.00
1.1800	98.00	99.00	98.00	97.00	100.00
0.6000	97.00	98.00	97.00	95.00	97.00
0.3000	96.00	92.00	95.00	92.00	94.00
0.1500	95.00	89.00	94.00	89.00	91.00
0.0750	87.00	69.00	86.00	75.00	72.00
0.0620	85.00	67.00	84.00	73.00	69.00
0.044	79.00	61.00	78.00	67.00	62.00
0.031	73.00	55.00	72.00	61.00	56.00
0.023	67.00	50.00	66.00	56.00	50.00
0.016	61.00	45.00	60.00	51.00	46.00
0.012	56.00	41.00	55.00	47.00	42.00
0.0088	52.00	37.00	50.00	43.00	39.00
0.0062	48.00	34.00	46.00	39.00	36.00
0.0044	44.00	31.00	42.00	36.00	33.00
0.0032	41.00	29.00	38.00	34.00	30.00
0.0023	39.00	27.00	35.00	32.00	28.00
0.002	38.00	26.00	34.00	31.00	27.00
0.0014	36.00	24.00	32.00	29.00	25.00

Y	0	13	49	38
Z	0	31	43	26
AA	0	14	52	34
AB	0	25	44	31
AC	0	28	45	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.57) (Chainage No.842/13-15) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
57	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	13	49	38	31	14	17	-----	-----	-----	-----	-----	-----	-----	-----	
57	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	31	43	26	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
57	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	14	52	34	29	14	15	-----	-----	-----	-----	-----	-----	-----	2.66	
57	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	25	44	31	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
57	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	28	45	27	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

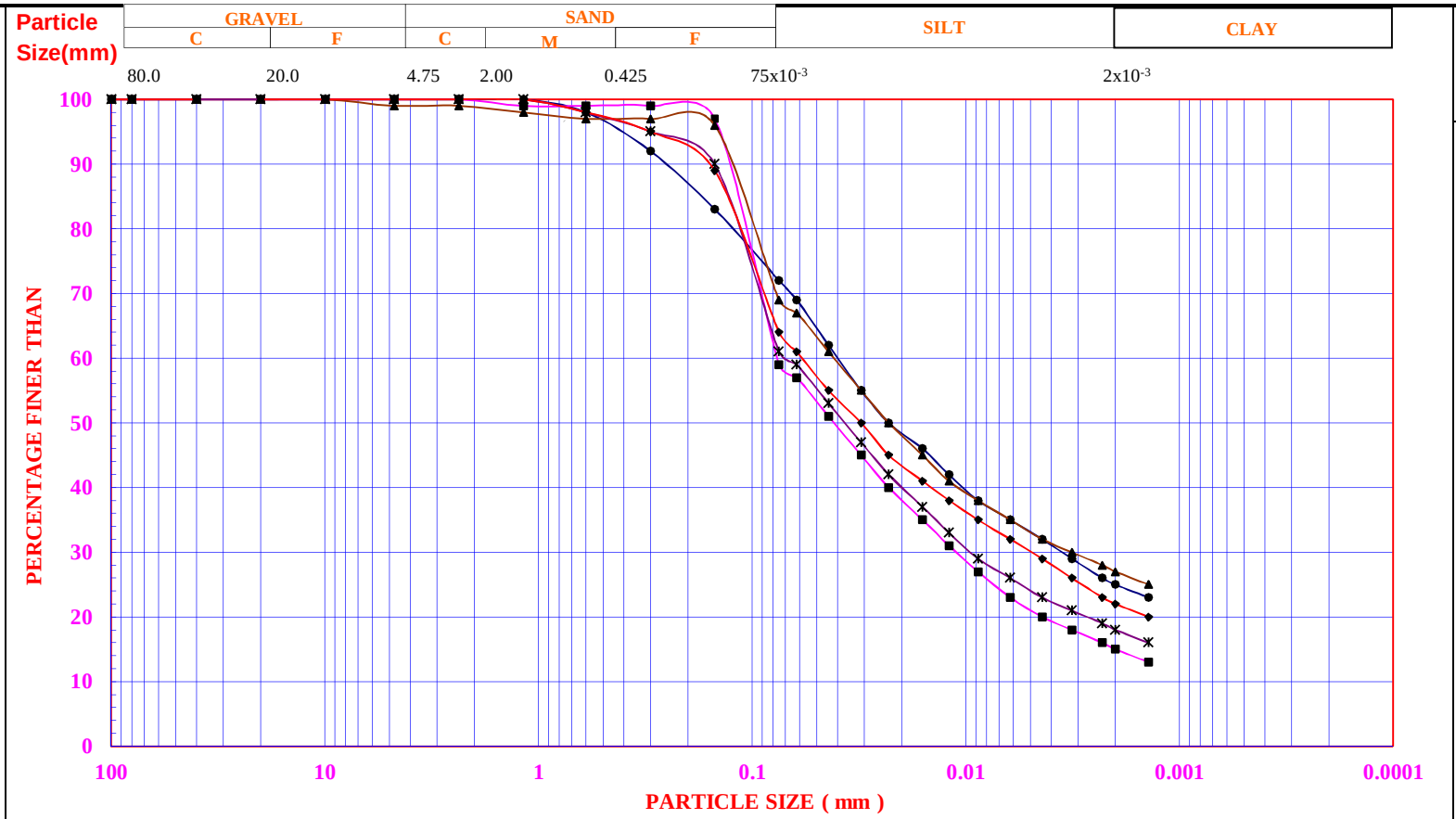
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. 851)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	851	1.50 - 2.10	CL	0	28	47	25	-----	-----	-----	-----	-----	27	13	14	SPT 1
■—■	851	3.00 - 3.60	CL	0	41	44	15	-----	-----	-----	-----	-----	29	12	17	SPT 2
▲—▲	851	4.50 - 5.10	CL	1	30	42	27	-----	-----	-----	-----	-----	28	13	15	SPT 3
✳—✳	851	7.50 - 8.10	CL	0	39	43	18	-----	-----	-----	-----	-----	26	9	17	SPT 5
◆—◆	851	12.00 - 12.60	CL	0	36	42	22	-----	-----	-----	-----	-----	23	10	13	SPT 8

Job No. : 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Ist SHEET

	851	851	851	851	851
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	99.00	100.00	100.00
2.3600	100.00	100.00	99.00	100.00	100.00
1.1800	100.00	99.00	98.00	100.00	100.00
0.6000	98.00	99.00	97.00	98.00	98.00
0.3000	92.00	99.00	97.00	95.00	95.00
0.1500	83.00	97.00	96.00	90.00	89.00
0.0750	72.00	59.00	69.00	61.00	64.00
0.0620	69.00	57.00	67.00	59.00	61.00
0.044	62.00	51.00	61.00	53.00	55.00
0.031	55.00	45.00	55.00	47.00	50.00
0.023	50.00	40.00	50.00	42.00	45.00
0.016	46.00	35.00	45.00	37.00	41.00
0.012	42.00	31.00	41.00	33.00	38.00
0.0088	38.00	27.00	38.00	29.00	35.00
0.0062	35.00	23.00	35.00	26.00	32.00
0.0044	32.00	20.00	32.00	23.00	29.00
0.0032	29.00	18.00	30.00	21.00	26.00
0.0023	26.00	16.00	28.00	19.00	23.00
0.002	25.00	15.00	27.00	18.00	22.00
0.0014	23.00	13.00	25.00	16.00	20.00

Y	0	28	47	25
Z	0	41	44	15
AA	1	30	42	27
AB	0	39	43	18
AC	0	36	42	22

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. 851) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
851	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	28	47	25	27	13	14	-----	-----	-----	-----	-----	-----	-----	2.66	
851	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	41	44	15	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
851	4.50 - 5.10	SPT 3	-----	-----	-----	CL	1	30	42	27	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
851	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	39	43	18	26	9	17	-----	-----	-----	-----	-----	-----	-----	-----	
851	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	36	42	22	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

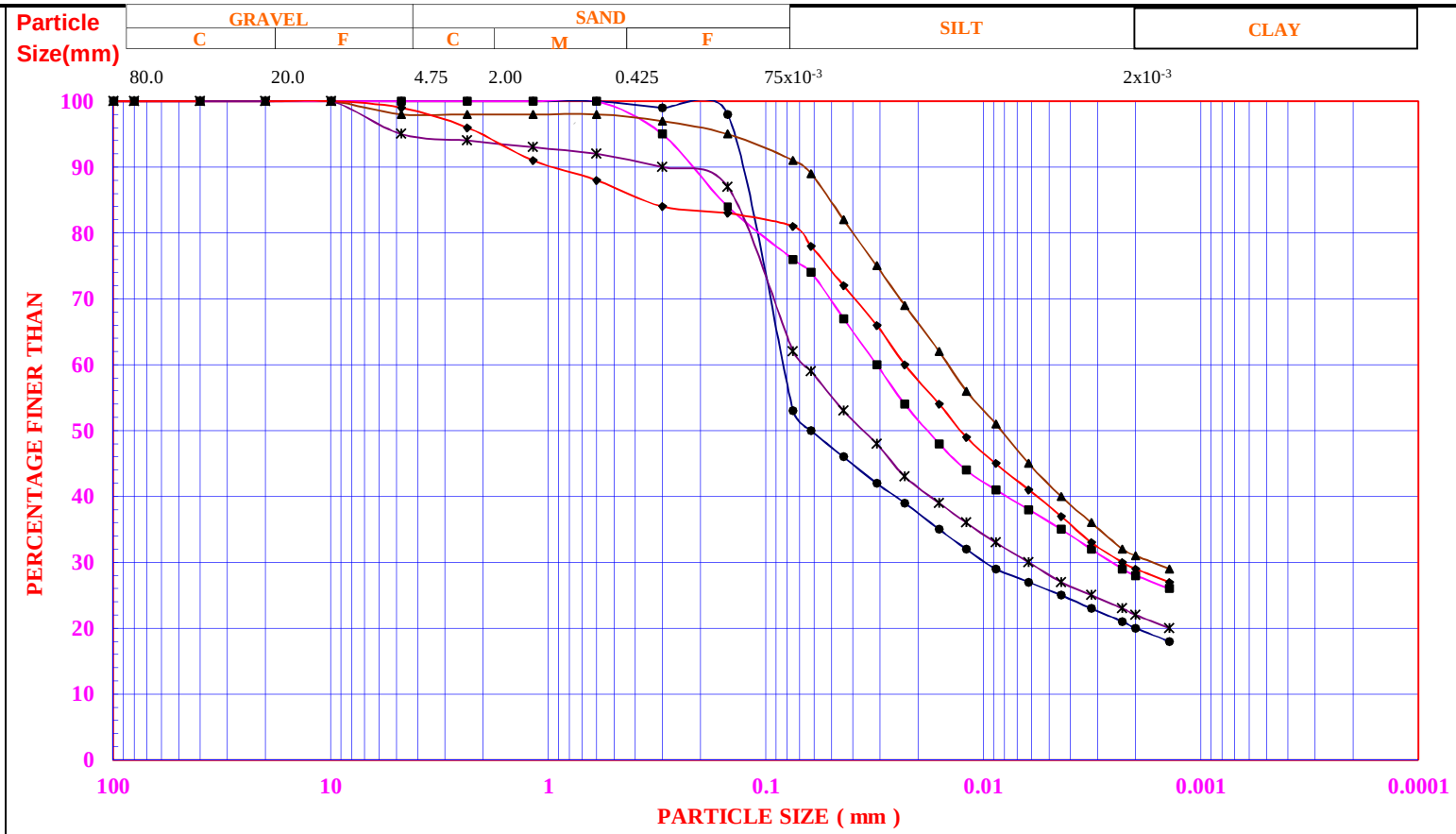
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Bridge No .66)** (CH :852/13-15)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	66	1.50 - 2.10	CL	0	47	33	20	-----	-----	-----	-----	-----	26	12	14	SPT 1
■—■	66	3.00 - 3.60	CL	0	24	48	28	-----	-----	-----	-----	-----	29	12	17	SPT 2
▲—▲	66	4.50 - 5.10	CL	2	7	60	31	-----	-----	-----	-----	-----	28	13	15	SPT 3
✳—✳	66	7.50 - 8.10	CL	5	33	40	22	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	66	12.00 - 12.60	CL	1	18	52	29	-----	-----	-----	-----	-----	24	12	12	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	66	66	66	66	66
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	98.00	95.00	99.00
2.3600	100.00	100.00	98.00	94.00	96.00
1.1800	100.00	100.00	98.00	93.00	91.00
0.6000	100.00	100.00	98.00	92.00	88.00
0.3000	99.00	95.00	97.00	90.00	84.00
0.1500	98.00	84.00	95.00	87.00	83.00
0.0750	53.00	76.00	91.00	62.00	81.00
0.0620	50.00	74.00	89.00	59.00	78.00
0.044	46.00	67.00	82.00	53.00	72.00
0.031	42.00	60.00	75.00	48.00	66.00
0.023	39.00	54.00	69.00	43.00	60.00
0.016	35.00	48.00	62.00	39.00	54.00
0.012	32.00	44.00	56.00	36.00	49.00
0.0088	29.00	41.00	51.00	33.00	45.00
0.0062	27.00	38.00	45.00	30.00	41.00
0.0044	25.00	35.00	40.00	27.00	37.00
0.0032	23.00	32.00	36.00	25.00	33.00
0.0023	21.00	29.00	32.00	23.00	30.00
0.002	20.00	28.00	31.00	22.00	29.00
0.0014	18.00	26.00	29.00	20.00	27.00

Y	0	47	33	20
Z	0	24	48	28
AA	2	7	60	31
AB	5	33	40	22
AC	1	18	52	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No .66) (CH :852/13-15) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
66	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	47	33	20	26	12	14	-----	-----	-----	-----	-----	-----	-----	2.65	
66	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	24	48	28	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
66	4.50 - 5.10	SPT 3	-----	-----	-----	CL	2	7	60	31	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
66	7.50 - 8.10	SPT 5	-----	-----	-----	CL	5	33	40	22	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
66	12.00 - 12.60	SPT 8	-----	-----	-----	CL	1	18	52	29	24	12	12	-----	-----	-----	-----	-----	-----	-----	-----	

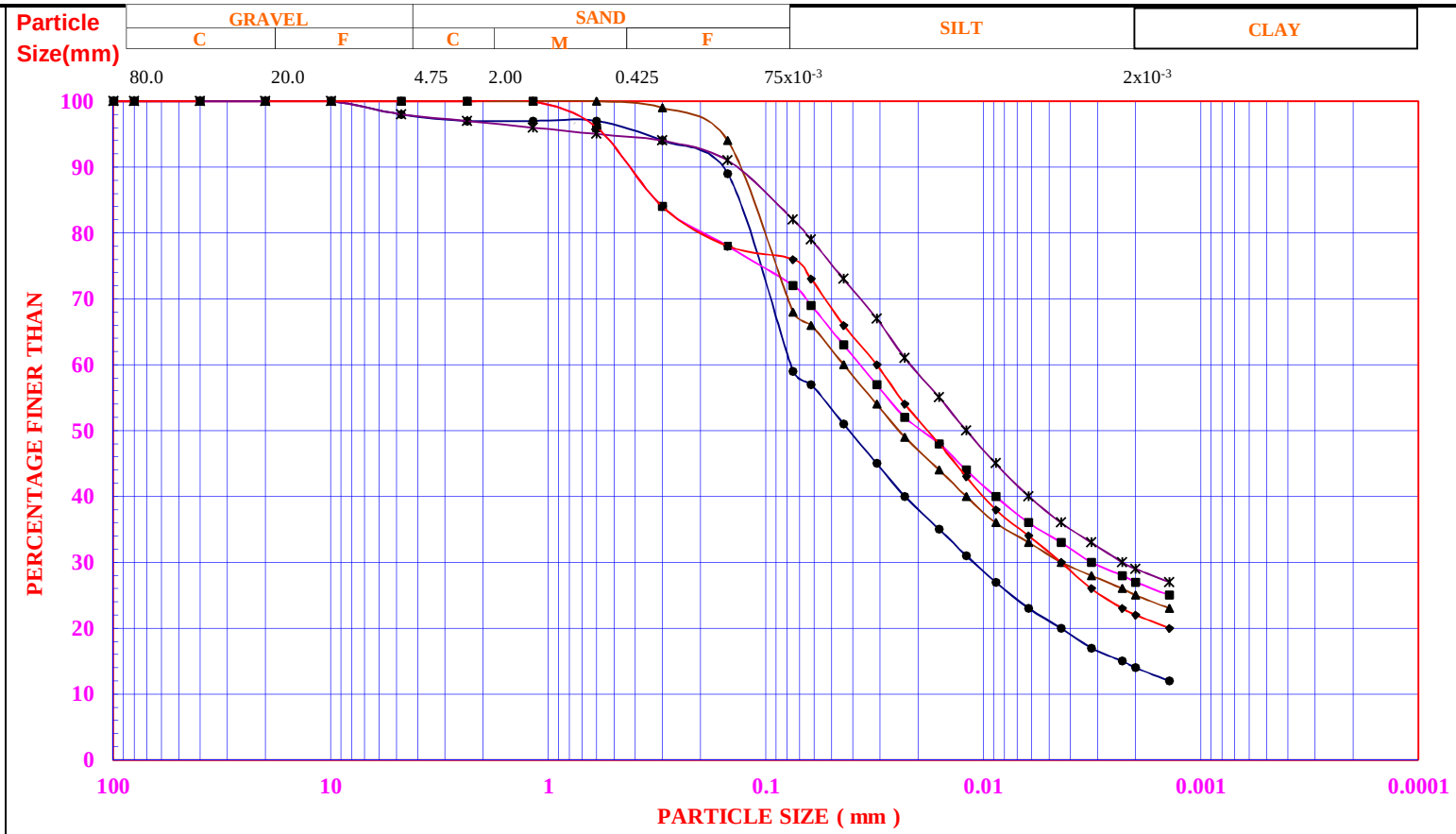
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Bridge No.67) **(Chainage No.853/5-7)**



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	67	1.50 - 2.10	CL	2	39	45	14	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	67	3.00 - 3.60	CL	0	28	45	27	-----	-----	-----	-----	-----	24	11	13	SPT 2
▲—▲	67	4.50 - 5.10	CL	0	32	43	25	-----	-----	-----	-----	-----	25	10	15	SPT 3
✳—✳	67	7.50 - 8.10	CL	2	16	53	29	-----	-----	-----	-----	-----	26	9	17	SPT 5
◆—◆	67	12.00 - 12.60	CL	0	24	54	22	-----	-----	-----	-----	-----	27	12	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	67	67	67	67	67
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	98.00	100.00
2.3600	97.00	100.00	100.00	97.00	100.00
1.1800	97.00	100.00	100.00	96.00	100.00
0.6000	97.00	96.00	100.00	95.00	96.00
0.3000	94.00	84.00	99.00	94.00	84.00
0.1500	89.00	78.00	94.00	91.00	78.00
0.0750	59.00	72.00	68.00	82.00	76.00
0.0620	57.00	69.00	66.00	79.00	73.00
0.044	51.00	63.00	60.00	73.00	66.00
0.031	45.00	57.00	54.00	67.00	60.00
0.023	40.00	52.00	49.00	61.00	54.00
0.016	35.00	48.00	44.00	55.00	48.00
0.012	31.00	44.00	40.00	50.00	43.00
0.0088	27.00	40.00	36.00	45.00	38.00
0.0062	23.00	36.00	33.00	40.00	34.00
0.0044	20.00	33.00	30.00	36.00	30.00
0.0032	17.00	30.00	28.00	33.00	26.00
0.0023	15.00	28.00	26.00	30.00	23.00
0.002	14.00	27.00	25.00	29.00	22.00
0.0014	12.00	25.00	23.00	27.00	20.00

Y	2	39	45	14
Z	0	28	45	27
AA	0	32	43	25
AB	2	16	53	29
AC	0	24	54	22

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.67) (Chainage No.853/5-7) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
67	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	39	45	14	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.65	
67	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	28	45	27	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
67	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	32	43	25	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	
67	7.50 - 8.10	SPT 5	-----	-----	-----	CL	2	16	53	29	26	9	17	-----	-----	-----	-----	-----	-----	-----	-----	
67	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	24	54	22	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

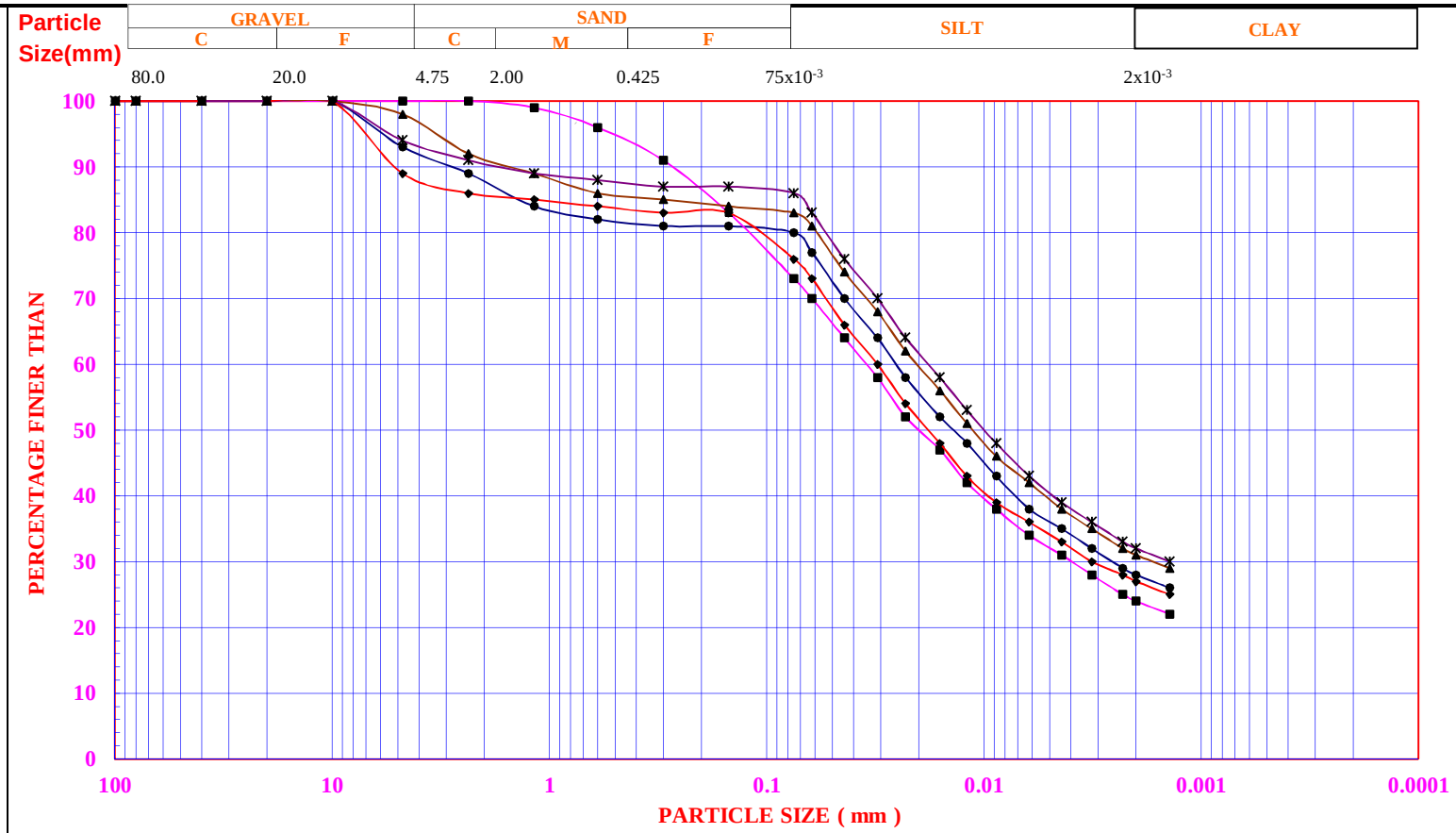
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Bridge No.58)** (CH :843/17-19)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	58	1.50 - 2.10	CL	7	13	52	28	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	58	3.00 - 3.60	CL	0	27	49	24	-----	-----	-----	-----	-----	27	12	15	SPT 2
▲—▲	58	4.50 - 5.10	CL	2	15	52	31	-----	-----	-----	-----	-----	24	10	14	SPT 3
✳—✳	58	7.50 - 8.10	CL	6	8	54	32	-----	-----	-----	-----	-----	25	12	13	SPT 5
◆—◆	58	12.00 - 12.60	CL	11	13	49	27	-----	-----	-----	-----	-----	27	12	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	58	58	58	58	58
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	93.00	100.00	98.00	94.00	89.00
2.3600	89.00	100.00	92.00	91.00	86.00
1.1800	84.00	99.00	89.00	89.00	85.00
0.6000	82.00	96.00	86.00	88.00	84.00
0.3000	81.00	91.00	85.00	87.00	83.00
0.1500	81.00	83.00	84.00	87.00	83.00
0.0750	80.00	73.00	83.00	86.00	76.00
0.0620	77.00	70.00	81.00	83.00	73.00
0.044	70.00	64.00	74.00	76.00	66.00
0.031	64.00	58.00	68.00	70.00	60.00
0.023	58.00	52.00	62.00	64.00	54.00
0.016	52.00	47.00	56.00	58.00	48.00
0.012	48.00	42.00	51.00	53.00	43.00
0.0088	43.00	38.00	46.00	48.00	39.00
0.0062	38.00	34.00	42.00	43.00	36.00
0.0044	35.00	31.00	38.00	39.00	33.00
0.0032	32.00	28.00	35.00	36.00	30.00
0.0023	29.00	25.00	32.00	33.00	28.00
0.002	28.00	24.00	31.00	32.00	27.00
0.0014	26.00	22.00	29.00	30.00	25.00

Y	7	13	52	28
Z	0	27	49	24
AA	2	15	52	31
AB	6	8	54	32
AC	11	13	49	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.58) (CH :843/17-19) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
58	1.50 - 2.10	SPT 1	-----	-----	-----	CL	7	13	52	28	28	11	17	-----	-----	-----	-----	-----	-----	-----	2.65	
58	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	27	49	24	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
58	4.50 - 5.10	SPT 3	-----	-----	-----	CL	2	15	52	31	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
58	7.50 - 8.10	SPT 5	-----	-----	-----	CL	6	8	54	32	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
58	12.00 - 12.60	SPT 8	-----	-----	-----	CL	11	13	49	27	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	

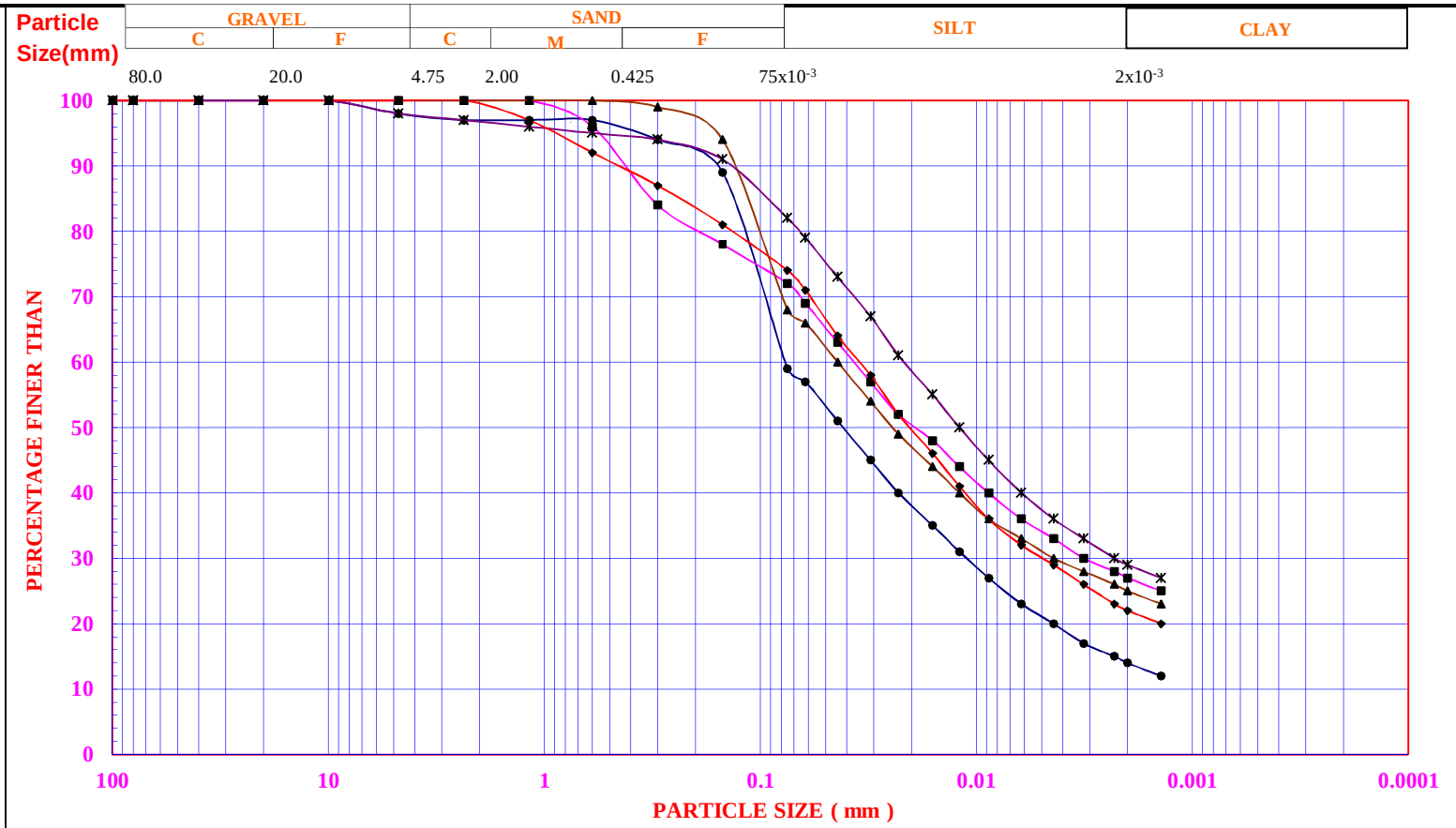
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Bridge No.60) **(Chainage No.844/25-27)**



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	60	1.50 - 2.10	CL	2	39	45	14	-----	-----	-----	-----	-----	24	10	14	SPT 1
■—■	60	3.00 - 3.60	CL	0	28	45	27	-----	-----	-----	-----	-----	26	11	15	SPT 2
▲—▲	60	4.50 - 5.10	CL	0	32	43	25	-----	-----	-----	-----	-----	29	12	17	SPT 3
✳—✳	60	7.50 - 8.10	CL	2	16	53	29	-----	-----	-----	-----	-----	27	13	14	SPT 5
◆—◆	60	12.00 - 12.60	CL	0	26	52	22	-----	-----	-----	-----	-----	23	10	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	60	60	60	60	60
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	98.00	100.00
2.3600	97.00	100.00	100.00	97.00	100.00
1.1800	97.00	100.00	100.00	96.00	97.00
0.6000	97.00	96.00	100.00	95.00	92.00
0.3000	94.00	84.00	99.00	94.00	87.00
0.1500	89.00	78.00	94.00	91.00	81.00
0.0750	59.00	72.00	68.00	82.00	74.00
0.0620	57.00	69.00	66.00	79.00	71.00
0.044	51.00	63.00	60.00	73.00	64.00
0.031	45.00	57.00	54.00	67.00	58.00
0.023	40.00	52.00	49.00	61.00	52.00
0.016	35.00	48.00	44.00	55.00	46.00
0.012	31.00	44.00	40.00	50.00	41.00
0.0088	27.00	40.00	36.00	45.00	36.00
0.0062	23.00	36.00	33.00	40.00	32.00
0.0044	20.00	33.00	30.00	36.00	29.00
0.0032	17.00	30.00	28.00	33.00	26.00
0.0023	15.00	28.00	26.00	30.00	23.00
0.002	14.00	27.00	25.00	29.00	22.00
0.0014	12.00	25.00	23.00	27.00	20.00

Y	2	39	45	14
Z	0	28	45	27
AA	0	32	43	25
AB	2	16	53	29
AC	0	26	52	22

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.60) (Chainage No.844/25-27) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
60	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	39	45	14	24	10	14	-----	-----	-----	-----	-----	-----	-----	2.65	
60	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	28	45	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
60	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	32	43	25	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
60	7.50 - 8.10	SPT 5	-----	-----	-----	CL	2	16	53	29	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
60	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	26	52	22	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

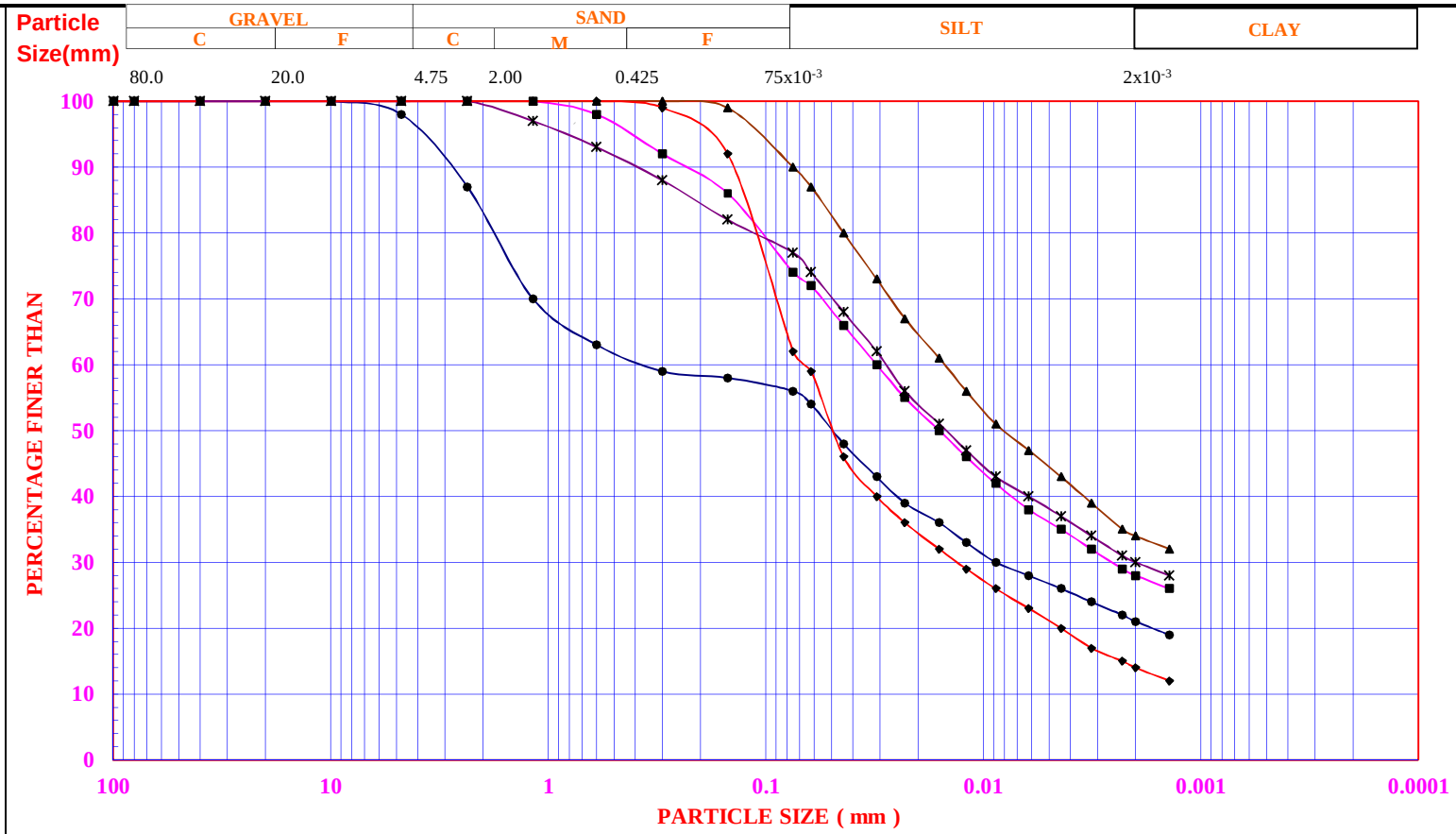
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No.845/25-27)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	845	1.50 - 2.10	CL	2	42	35	21	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	845	3.00 - 3.60	CL	0	26	46	28	-----	-----	-----	-----	-----	27	13	14	SPT 2
▲—▲	845	4.50 - 5.10	CL	0	10	56	34	-----	-----	-----	-----	-----	32	15	17	SPT 3
✳—✳	845	7.50 - 8.10	CL	0	23	47	30	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	845	12.00 - 12.60	CL	0	38	48	14	-----	-----	-----	-----	-----	23	10	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	845	845	845	845	845
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	100.00	100.00
2.3600	87.00	100.00	100.00	100.00	100.00
1.1800	70.00	100.00	100.00	97.00	100.00
0.6000	63.00	98.00	100.00	93.00	100.00
0.3000	59.00	92.00	100.00	88.00	99.00
0.1500	58.00	86.00	99.00	82.00	92.00
0.0750	56.00	74.00	90.00	77.00	62.00
0.0620	54.00	72.00	87.00	74.00	59.00
0.044	48.00	66.00	80.00	68.00	46.00
0.031	43.00	60.00	73.00	62.00	40.00
0.023	39.00	55.00	67.00	56.00	36.00
0.016	36.00	50.00	61.00	51.00	32.00
0.012	33.00	46.00	56.00	47.00	29.00
0.0088	30.00	42.00	51.00	43.00	26.00
0.0062	28.00	38.00	47.00	40.00	23.00
0.0044	26.00	35.00	43.00	37.00	20.00
0.0032	24.00	32.00	39.00	34.00	17.00
0.0023	22.00	29.00	35.00	31.00	15.00
0.002	21.00	28.00	34.00	30.00	14.00
0.0014	19.00	26.00	32.00	28.00	12.00

Y	2	42	35	21
Z	0	26	46	28
AA	0	10	56	34
AB	0	23	47	30
AC	0	38	48	14

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No.845/25-27) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
845	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	42	35	21	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
845	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	26	46	28	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
845	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	10	56	34	32	15	17	-----	-----	-----	-----	-----	-----	-----	2.65	
845	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	23	47	30	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
845	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	38	48	14	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

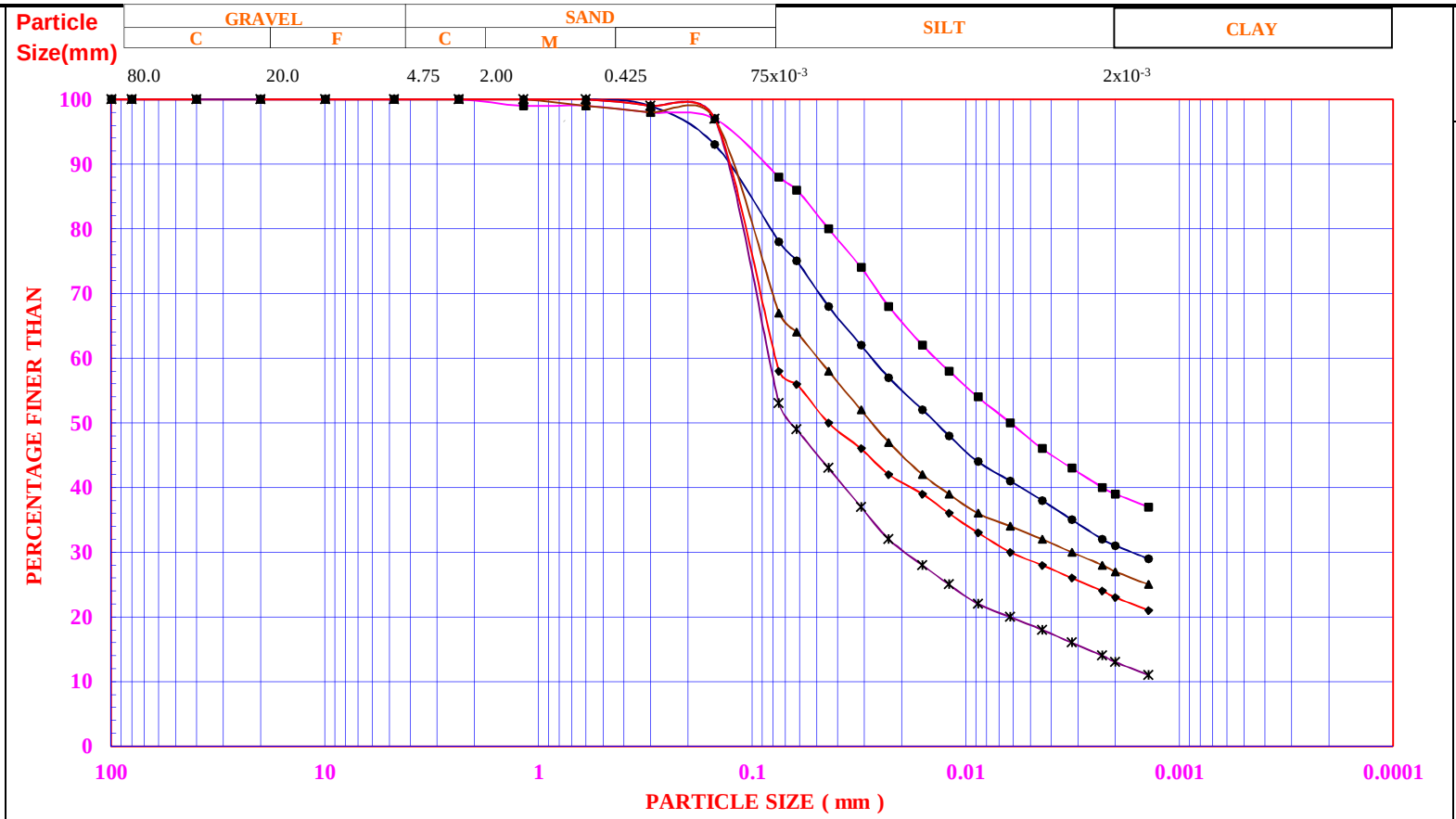
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. 846/25-27)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	846	1.50 - 2.10	CL	0	22	47	31	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	846	3.00 - 3.60	CL	0	12	49	39	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	846	4.50 - 5.10	CL	0	33	40	27	-----	-----	-----	-----	-----	27	10	17	SPT 3
✳—✳	846	7.50 - 8.10	CL	0	47	40	13	-----	-----	-----	-----	-----	22	9	13	SPT 5
◆—◆	846	12.00 - 12.60	CL	0	42	35	23	-----	-----	-----	-----	-----	25	11	14	SPT 8

Job No. : 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Ist SHEET

	846	846	846	846	846
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	99.00	100.00	100.00	100.00
0.6000	100.00	99.00	99.00	100.00	100.00
0.3000	99.00	98.00	98.00	99.00	99.00
0.1500	93.00	97.00	97.00	97.00	97.00
0.0750	78.00	88.00	67.00	53.00	58.00
0.0620	75.00	86.00	64.00	49.00	56.00
0.044	68.00	80.00	58.00	43.00	50.00
0.031	62.00	74.00	52.00	37.00	46.00
0.023	57.00	68.00	47.00	32.00	42.00
0.016	52.00	62.00	42.00	28.00	39.00
0.012	48.00	58.00	39.00	25.00	36.00
0.0088	44.00	54.00	36.00	22.00	33.00
0.0062	41.00	50.00	34.00	20.00	30.00
0.0044	38.00	46.00	32.00	18.00	28.00
0.0032	35.00	43.00	30.00	16.00	26.00
0.0023	32.00	40.00	28.00	14.00	24.00
0.002	31.00	39.00	27.00	13.00	23.00
0.0014	29.00	37.00	25.00	11.00	21.00

Y	0	22	47	31
Z	0	12	49	39
AA	0	33	40	27
AB	0	47	40	13
AC	0	42	35	23

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. 846/25-27) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
846	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	22	47	31	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
846	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	12	49	39	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
846	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	33	40	27	27	10	17	-----	-----	-----	-----	-----	-----	-----	2.66	
846	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	47	40	13	22	9	13	-----	-----	-----	-----	-----	-----	-----	-----	
846	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	42	35	23	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

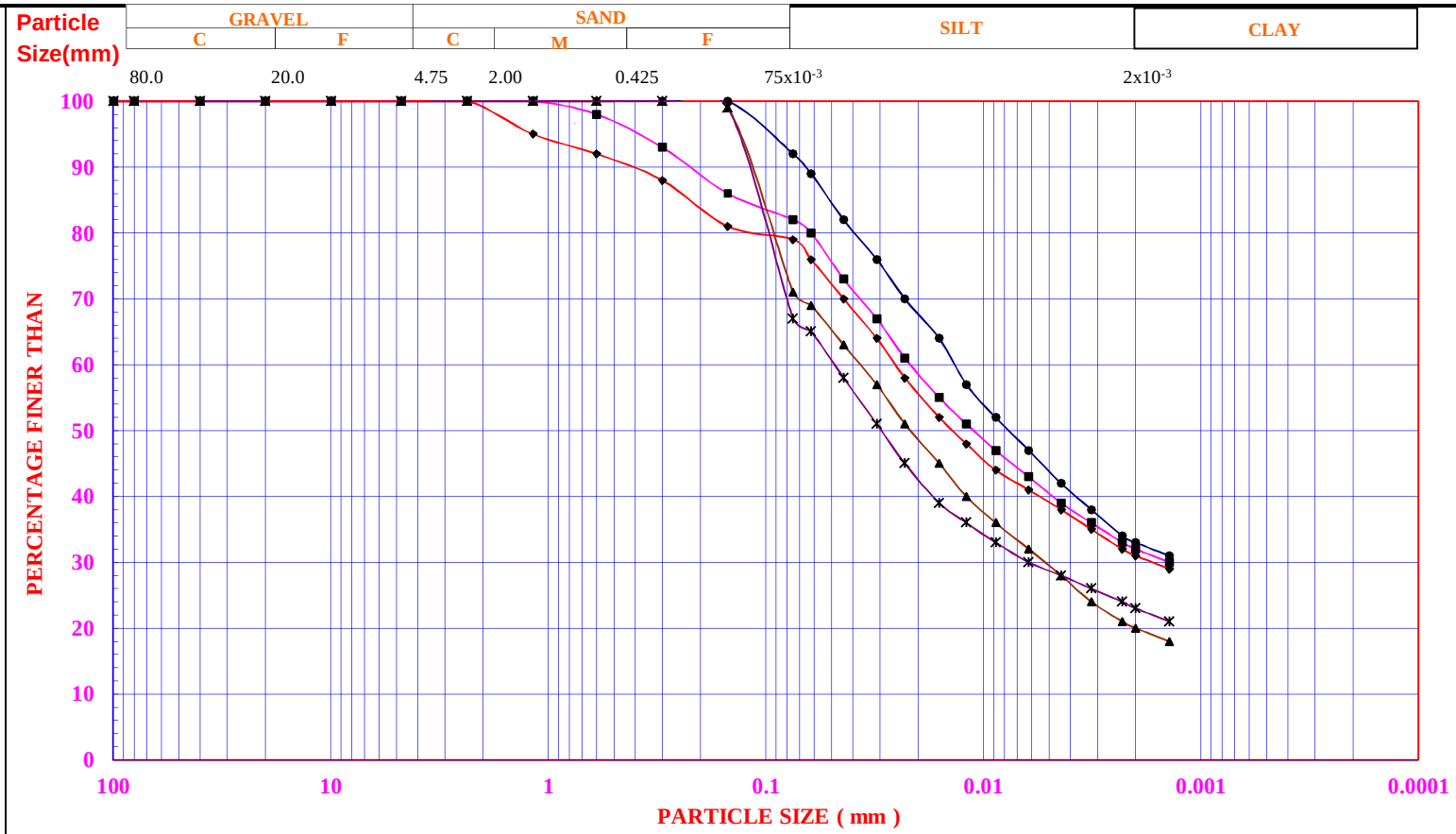
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Bridge No.63)** (CH :847/21-23)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	63	1.50 - 2.10	CL	0	8	59	33	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	63	3.00 - 3.60	CL	0	18	50	32	-----	-----	-----	-----	-----	25	10	15	SPT 2
▲—▲	63	4.50 - 5.10	CL	0	29	51	20	-----	-----	-----	-----	-----	24	11	13	SPT 3
✳—✳	63	7.50 - 8.10	CL	0	33	44	23	-----	-----	-----	-----	-----	29	14	15	SPT 5
◆—◆	63	12.00 - 12.60	CL	0	21	48	31	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	63	63	63	63	63
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	100.00	100.00	100.00	95.00
0.6000	100.00	98.00	100.00	100.00	92.00
0.3000	100.00	93.00	100.00	100.00	88.00
0.1500	100.00	86.00	99.00	99.00	81.00
0.0750	92.00	82.00	71.00	67.00	79.00
0.0620	89.00	80.00	69.00	65.00	76.00
0.044	82.00	73.00	63.00	58.00	70.00
0.031	76.00	67.00	57.00	51.00	64.00
0.023	70.00	61.00	51.00	45.00	58.00
0.016	64.00	55.00	45.00	39.00	52.00
0.012	57.00	51.00	40.00	36.00	48.00
0.0088	52.00	47.00	36.00	33.00	44.00
0.0062	47.00	43.00	32.00	30.00	41.00
0.0044	42.00	39.00	28.00	28.00	38.00
0.0032	38.00	36.00	24.00	26.00	35.00
0.0023	34.00	33.00	21.00	24.00	32.00
0.002	33.00	32.00	20.00	23.00	31.00
0.0014	31.00	30.00	18.00	21.00	29.00

Y	0	8	59	33
Z	0	18	50	32
AA	0	29	51	20
AB	0	33	44	23
AC	0	21	48	31

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.63) (CH :847/21-23) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
63	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	8	59	33	28	11	17	-----	-----	-----	-----	-----	-----	-----	2.65	
63	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	18	50	32	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	
63	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	29	51	20	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
63	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	33	44	23	29	14	15	-----	-----	-----	-----	-----	-----	-----	-----	
63	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	21	48	31	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

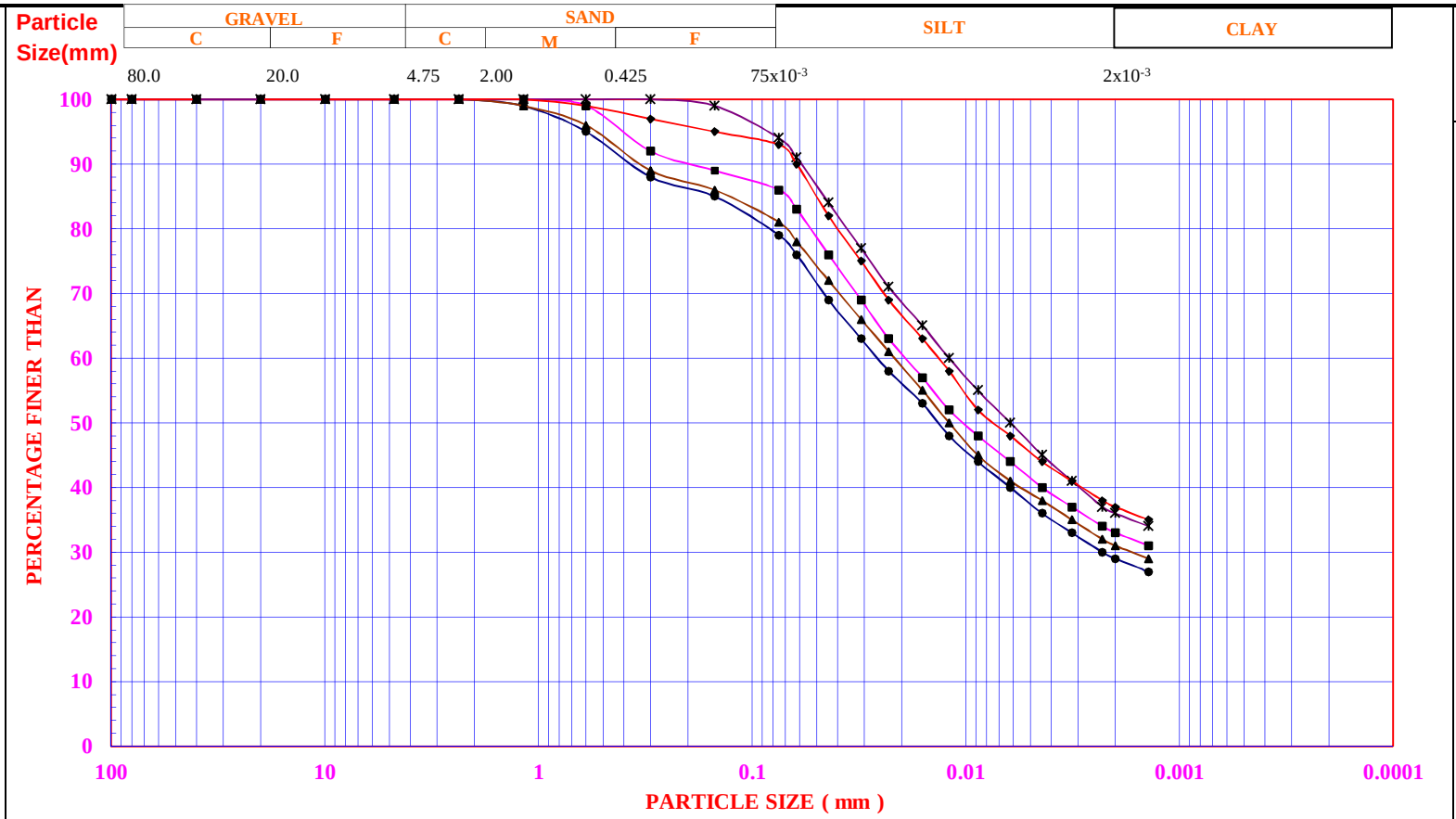
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No .848)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	848	1.50 - 2.10	CL	0	21	50	29	-----	-----	-----	-----	-----	25	12	13	SPT 1
■—■	848	3.00 - 3.60	CL	0	14	53	33	-----	-----	-----	-----	-----	28	11	17	SPT 2
▲—▲	848	4.50 - 5.10	CL	0	19	50	31	-----	-----	-----	-----	-----	27	12	15	SPT 3
✳—✳	848	7.50 - 8.10	CL	0	6	58	36	-----	-----	-----	-----	-----	26	13	13	SPT 5
◆—◆	848	12.00 - 12.60	CL	0	7	56	37	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	848	848	848	848	848
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	99.00	100.00	99.00	100.00	100.00
0.6000	95.00	99.00	96.00	100.00	99.00
0.3000	88.00	92.00	89.00	100.00	97.00
0.1500	85.00	89.00	86.00	99.00	95.00
0.0750	79.00	86.00	81.00	94.00	93.00
0.0620	76.00	83.00	78.00	91.00	90.00
0.044	69.00	76.00	72.00	84.00	82.00
0.031	63.00	69.00	66.00	77.00	75.00
0.023	58.00	63.00	61.00	71.00	69.00
0.016	53.00	57.00	55.00	65.00	63.00
0.012	48.00	52.00	50.00	60.00	58.00
0.0088	44.00	48.00	45.00	55.00	52.00
0.0062	40.00	44.00	41.00	50.00	48.00
0.0044	36.00	40.00	38.00	45.00	44.00
0.0032	33.00	37.00	35.00	41.00	41.00
0.0023	30.00	34.00	32.00	37.00	38.00
0.002	29.00	33.00	31.00	36.00	37.00
0.0014	27.00	31.00	29.00	34.00	35.00

Y	0	21	50	29
Z	0	14	53	33
AA	0	19	50	31
AB	0	6	58	36
AC	0	7	56	37

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No .848) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
848	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	50	29	25	12	13	-----	-----	-----	-----	-----	-----	-----	2.65	
848	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	14	53	33	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
848	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	19	50	31	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
848	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	6	58	36	26	13	13	-----	-----	-----	-----	-----	-----	-----	-----	
848	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	7	56	37	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

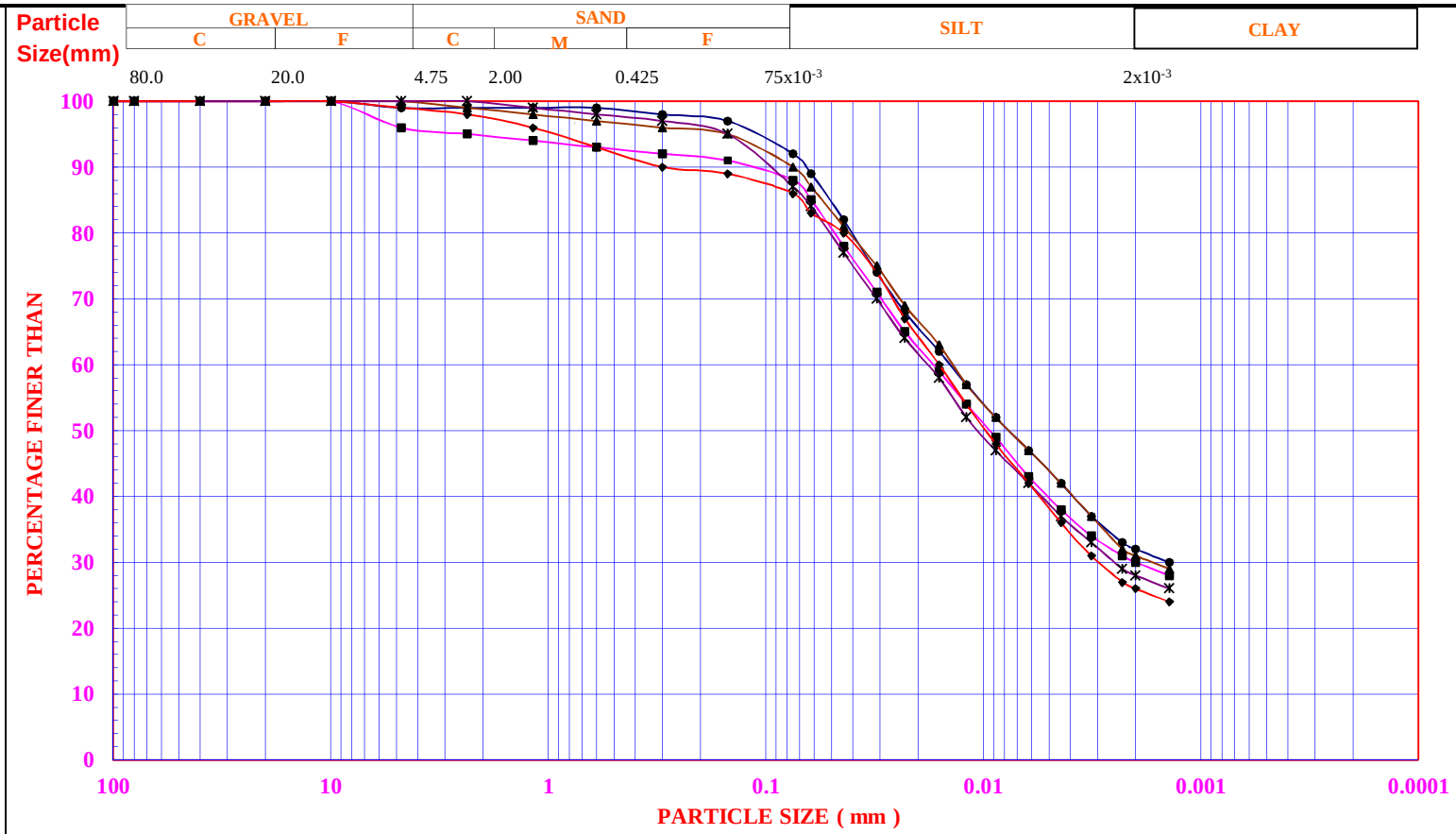
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Bridge No.64)** (CH :849/13-15)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	64	1.50 - 2.10	CL	1	7	60	32	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	64	3.00 - 3.60	CL	4	8	58	30	-----	-----	-----	-----	-----	28	13	15	SPT 2
▲—▲	64	4.50 - 5.10	CL	0	10	59	31	-----	-----	-----	-----	-----	26	12	14	SPT 3
✳—✳	64	7.50 - 8.10	CL	0	13	59	28	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	64	12.00 - 12.60	CL	1	13	60	26	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	64	64	64	64	64
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	96.00	100.00	100.00	99.00
2.3600	99.00	95.00	99.00	100.00	98.00
1.1800	99.00	94.00	98.00	99.00	96.00
0.6000	99.00	93.00	97.00	98.00	93.00
0.3000	98.00	92.00	96.00	97.00	90.00
0.1500	97.00	91.00	95.00	95.00	89.00
0.0750	92.00	88.00	90.00	87.00	86.00
0.0620	89.00	85.00	87.00	84.00	83.00
0.044	82.00	78.00	81.00	77.00	80.00
0.031	74.00	71.00	75.00	70.00	74.00
0.023	68.00	65.00	69.00	64.00	67.00
0.016	62.00	59.00	63.00	58.00	60.00
0.012	57.00	54.00	57.00	52.00	54.00
0.0088	52.00	49.00	52.00	47.00	48.00
0.0062	47.00	43.00	47.00	42.00	42.00
0.0044	42.00	38.00	42.00	37.00	36.00
0.0032	37.00	34.00	37.00	33.00	31.00
0.0023	33.00	31.00	32.00	29.00	27.00
0.002	32.00	30.00	31.00	28.00	26.00
0.0014	30.00	28.00	29.00	26.00	24.00

Y	1	7	60	32
Z	4	8	58	30
AA	0	10	59	31
AB	0	13	59	28
AC	1	13	60	26

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bridge No.64) (CH :849/13-15) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
64	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	7	60	32	31	14	17	-----	-----	-----	-----	-----	-----	-----	2.65	
64	3.00 - 3.60	SPT 2	-----	-----	-----	CL	4	8	58	30	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
64	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	10	59	31	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
64	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	13	59	28	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
64	12.00 - 12.60	SPT 8	-----	-----	-----	CL	1	13	60	26	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

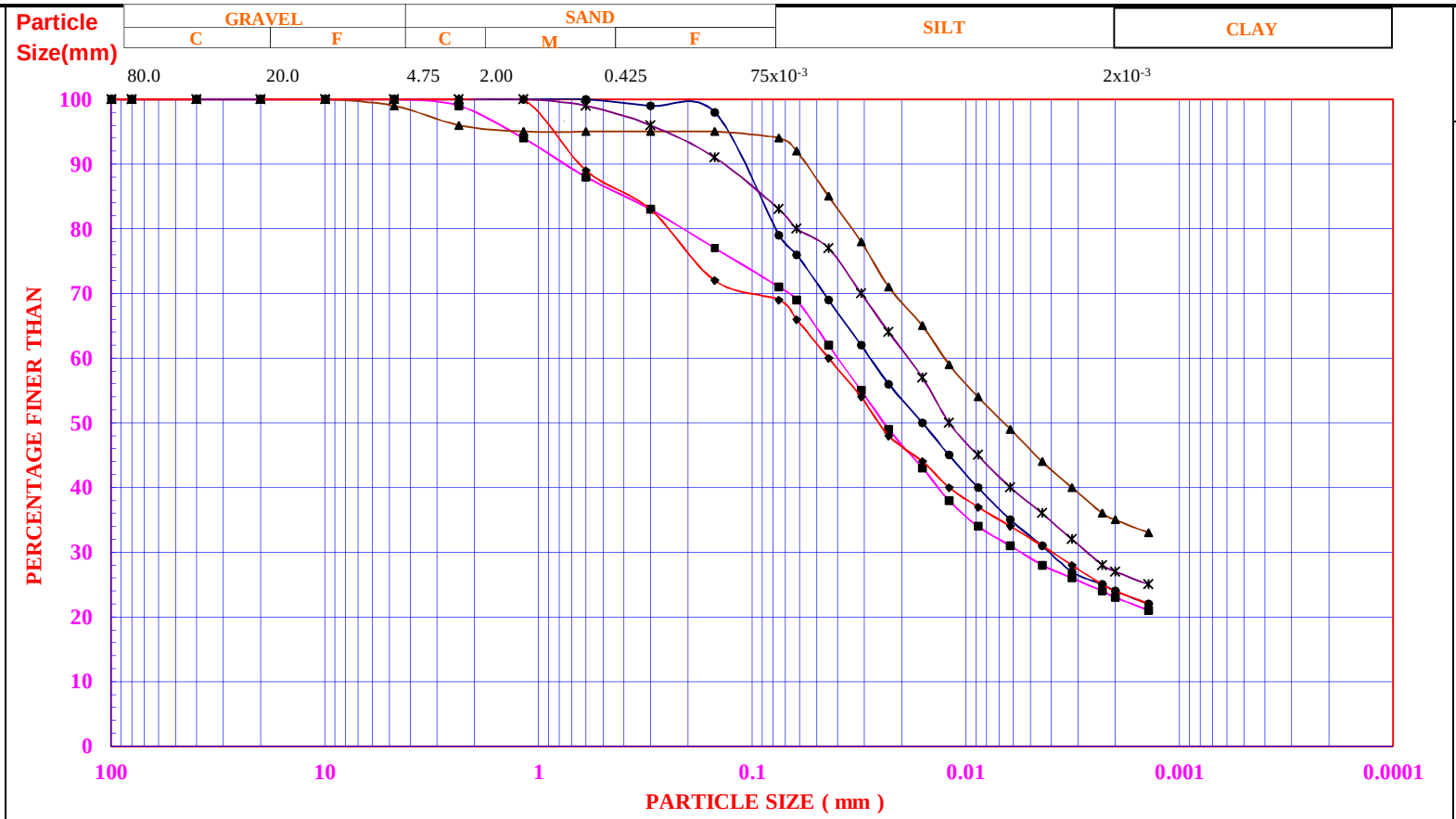
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :850/7-9)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	850/5-7	1.50 - 2.10	CL	0	21	55	24	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	850/5-7	3.00 - 3.50	CL	0	29	48	23	-----	-----	-----	-----	-----	25	10	15	UDS -1
▲—▲	850/5-7	4.50 - 5.10	CL	1	5	59	35	-----	-----	-----	-----	-----	29	12	17	SPT 2
✳—✳	850/5-7	7.50 - 8.10	CL	0	17	56	27	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	850/5-7	12.00 - 12.60	CL	0	31	45	24	-----	-----	-----	-----	-----	24	11	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	850/5-7	850/5-7	850/5-7	850/5-7	850/5-7
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	99.00	100.00	100.00
2.3600	100.00	99.00	96.00	100.00	100.00
1.1800	100.00	94.00	95.00	100.00	100.00
0.6000	100.00	88.00	95.00	99.00	89.00
0.3000	99.00	83.00	95.00	96.00	83.00
0.1500	98.00	77.00	95.00	91.00	72.00
0.0750	79.00	71.00	94.00	83.00	69.00
0.0620	76.00	69.00	92.00	80.00	66.00
0.044	69.00	62.00	85.00	77.00	60.00
0.031	62.00	55.00	78.00	70.00	54.00
0.023	56.00	49.00	71.00	64.00	48.00
0.016	50.00	43.00	65.00	57.00	44.00
0.012	45.00	38.00	59.00	50.00	40.00
0.0088	40.00	34.00	54.00	45.00	37.00
0.0062	35.00	31.00	49.00	40.00	34.00
0.0044	31.00	28.00	44.00	36.00	31.00
0.0032	27.00	26.00	40.00	32.00	28.00
0.0023	25.00	24.00	36.00	28.00	25.00
0.002	24.00	23.00	35.00	27.00	24.00
0.0014	22.00	21.00	33.00	25.00	22.00

Y	0	21	55	24
Z	0	29	48	23
AA	1	5	59	35
AB	0	17	56	27
AC	0	31	45	24

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :850/7-9) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
850/5-7	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	55	24	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
850/5-7	3.00 - 3.50	UDS -1	1.86	1.62	14.96	CL	0	29	48	23	25	10	15	UU	0.86	11	-----	-----	0.05	2.3	-----	
850/5-7	4.50 - 5.10	SPT 2	-----	-----	-----	CL	1	5	59	35	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.65	
850/5-7	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	17	56	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
850/5-7	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	31	45	24	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

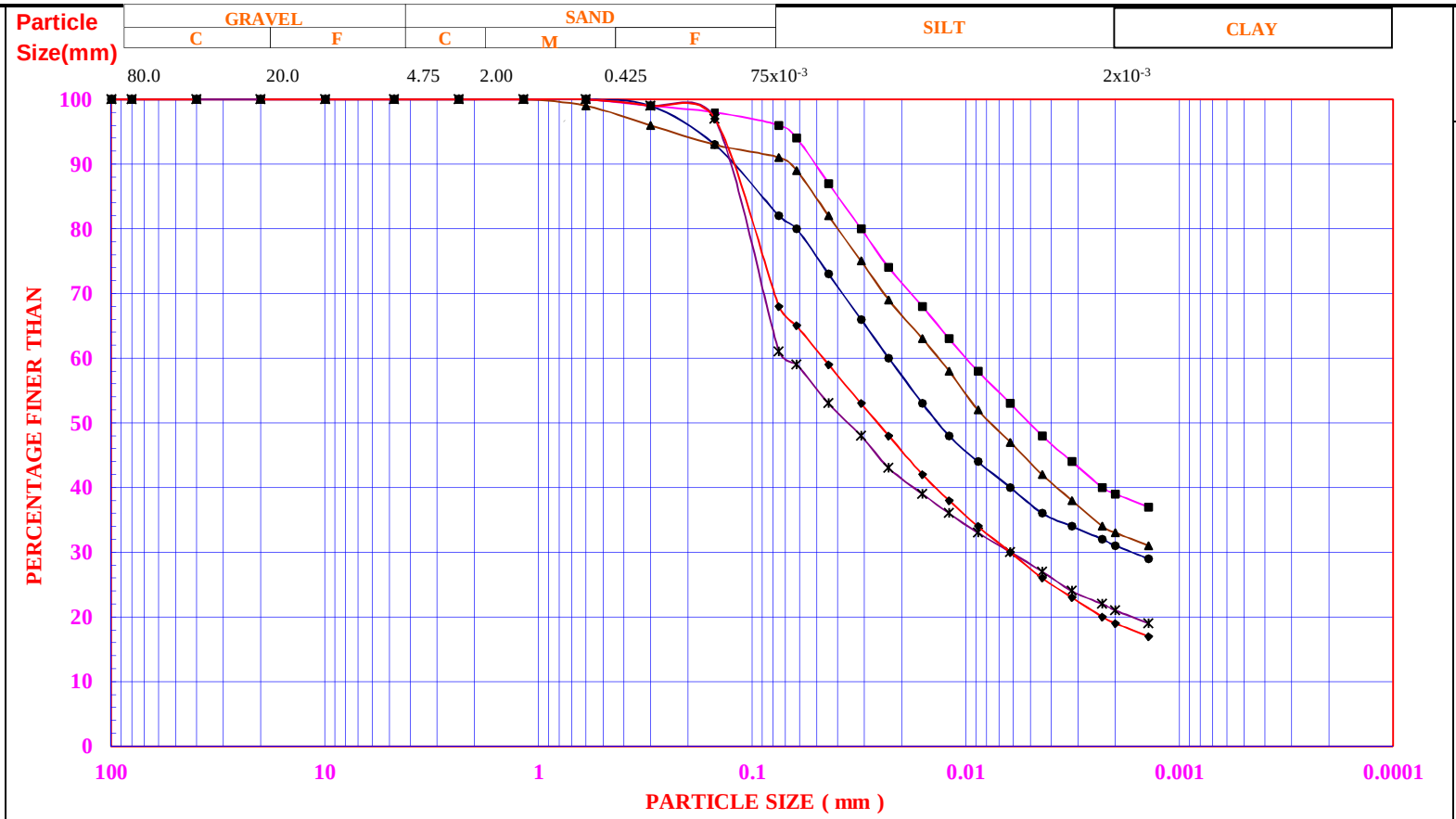
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. A13)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A13	1.50 - 2.10	CL	0	18	51	31	-----	-----	-----	-----	-----	23	9	14	SPT 1
■—■	A13	3.00 - 3.60	CL	0	4	57	39	-----	-----	-----	-----	-----	29	12	17	SPT 2
▲—▲	A13	4.50 - 5.10	CL	0	9	58	33	-----	-----	-----	-----	-----	26	11	15	SPT 3
✳—✳	A13	7.50 - 8.10	CL	0	39	40	21	-----	-----	-----	-----	-----	22	9	13	SPT 5
◆—◆	A13	12.00 - 12.60	CL	0	32	49	19	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A13	A13	A13	A13	A13
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	100.00	100.00	100.00	100.00
0.6000	100.00	100.00	99.00	100.00	100.00
0.3000	99.00	99.00	96.00	99.00	99.00
0.1500	93.00	98.00	93.00	97.00	97.00
0.0750	82.00	96.00	91.00	61.00	68.00
0.0620	80.00	94.00	89.00	59.00	65.00
0.044	73.00	87.00	82.00	53.00	59.00
0.031	66.00	80.00	75.00	48.00	53.00
0.023	60.00	74.00	69.00	43.00	48.00
0.016	53.00	68.00	63.00	39.00	42.00
0.012	48.00	63.00	58.00	36.00	38.00
0.0088	44.00	58.00	52.00	33.00	34.00
0.0062	40.00	53.00	47.00	30.00	30.00
0.0044	36.00	48.00	42.00	27.00	26.00
0.0032	34.00	44.00	38.00	24.00	23.00
0.0023	32.00	40.00	34.00	22.00	20.00
0.002	31.00	39.00	33.00	21.00	19.00
0.0014	29.00	37.00	31.00	19.00	17.00

Y	0	18	51	31
Z	0	4	57	39
AA	0	9	58	33
AB	0	39	40	21
AC	0	32	49	19

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. A13) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A13	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	18	51	31	23	9	14	-----	-----	-----	-----	-----	-----	-----	2.66	
A13	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	4	57	39	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
A13	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	9	58	33	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A13	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	39	40	21	22	9	13	-----	-----	-----	-----	-----	-----	-----	-----	
A13	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	32	49	19	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. A14) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A14	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	39	45	14	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A14	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	28	45	27	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
A14	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	32	43	25	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	
A14	7.50 - 8.10	SPT 5	-----	-----	-----	CL	2	16	53	29	26	9	17	-----	-----	-----	-----	-----	-----	-----	-----	
A14	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	24	54	22	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

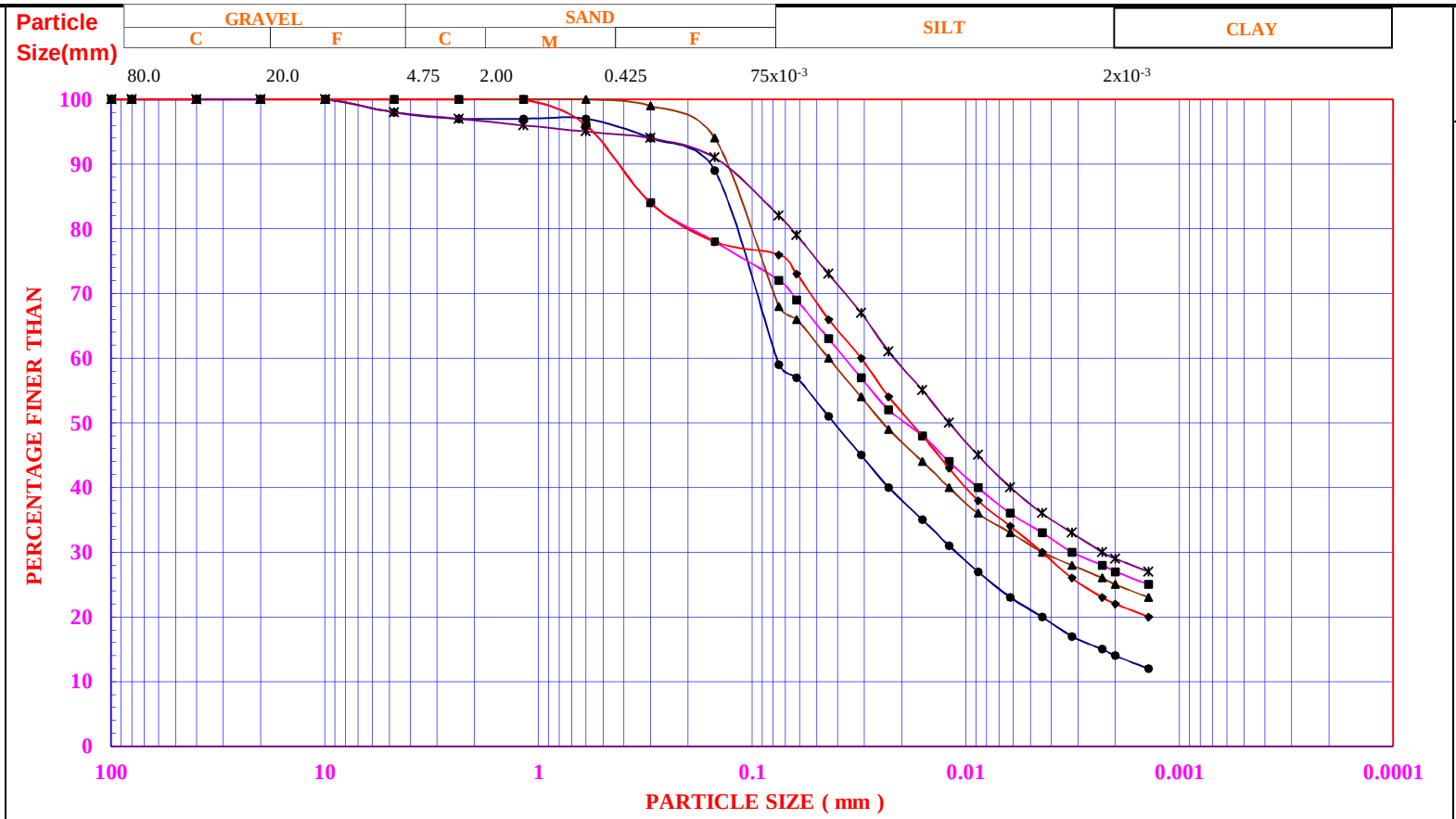
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. A14)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A14	1.50 - 2.10	CL	2	39	45	14	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	A14	3.00 - 3.60	CL	0	28	45	27	-----	-----	-----	-----	-----	24	11	13	SPT 2
▲—▲	A14	4.50 - 5.10	CL	0	32	43	25	-----	-----	-----	-----	-----	25	10	15	SPT 3
✳—✳	A14	7.50 - 8.10	CL	2	16	53	29	-----	-----	-----	-----	-----	26	9	17	SPT 5
◆—◆	A14	12.00 - 12.60	CL	0	24	54	22	-----	-----	-----	-----	-----	27	12	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

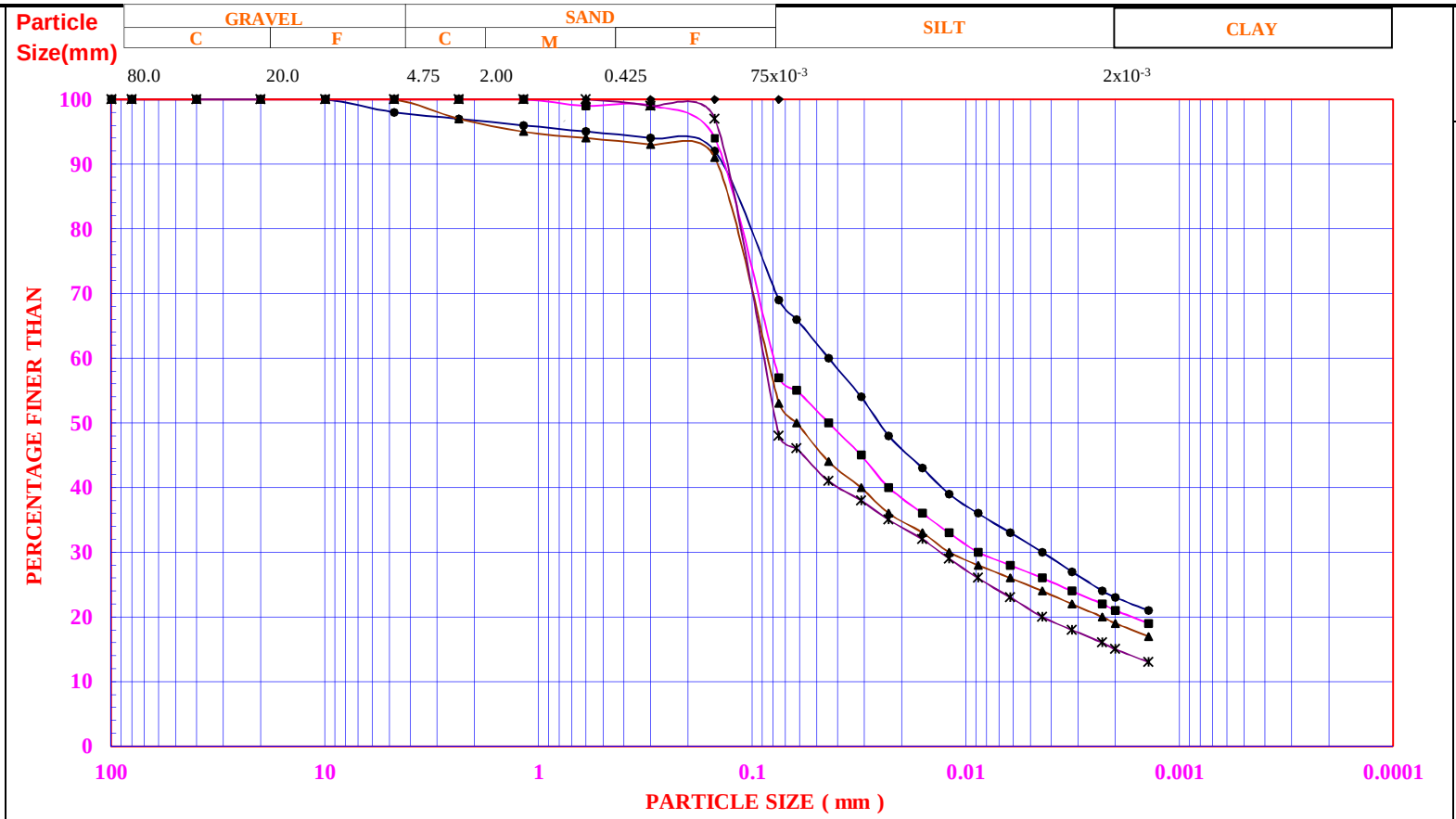
	A14	A14	A14	A14	A14
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	98.00	100.00
2.3600	97.00	100.00	100.00	97.00	100.00
1.1800	97.00	100.00	100.00	96.00	100.00
0.6000	97.00	96.00	100.00	95.00	96.00
0.3000	94.00	84.00	99.00	94.00	84.00
0.1500	89.00	78.00	94.00	91.00	78.00
0.0750	59.00	72.00	68.00	82.00	76.00
0.0620	57.00	69.00	66.00	79.00	73.00
0.044	51.00	63.00	60.00	73.00	66.00
0.031	45.00	57.00	54.00	67.00	60.00
0.023	40.00	52.00	49.00	61.00	54.00
0.016	35.00	48.00	44.00	55.00	48.00
0.012	31.00	44.00	40.00	50.00	43.00
0.0088	27.00	40.00	36.00	45.00	38.00
0.0062	23.00	36.00	33.00	40.00	34.00
0.0044	20.00	33.00	30.00	36.00	30.00
0.0032	17.00	30.00	28.00	33.00	26.00
0.0023	15.00	28.00	26.00	30.00	23.00
0.002	14.00	27.00	25.00	29.00	22.00
0.0014	12.00	25.00	23.00	27.00	20.00

Y	2	39	45	14
Z	0	28	45	27
AA	0	32	43	25
AB	2	16	53	29
AC	0	24	54	22

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 15)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 15	18.00 - 18.60	CL	2	29	46	23	-----	-----	-----	-----	-----	25	11	14	SPT 10
■—■	A 15	24.00 - 24.60	CL	0	43	36	21	-----	-----	-----	-----	-----	21	9	12	SPT 14
▲—▲	A 15	28.00 - 28.60	CL	0	47	34	19	-----	-----	-----	-----	-----	24	10	14	SPT 17
✳—✳	A 15	30.00 - 30.60	SC	0	52	33	15	-----	-----	-----	-----	-----	17	7	10	SPT 18
◆—◆																

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 15	A 15	A 15	A 15	0
	18.00 - 18.60	24.00 - 24.60	28.00 - 28.60	30.00 - 30.60	0.00
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	100.00	100.00
2.3600	97.00	100.00	97.00	100.00	100.00
1.1800	96.00	100.00	95.00	100.00	100.00
0.6000	95.00	99.00	94.00	100.00	100.00
0.3000	94.00	99.00	93.00	99.00	100.00
0.1500	92.00	94.00	91.00	97.00	100.00
0.0750	69.00	57.00	53.00	48.00	100.00
0.0620	66.00	55.00	50.00	46.00	
0.044	60.00	50.00	44.00	41.00	
0.031	54.00	45.00	40.00	38.00	
0.023	48.00	40.00	36.00	35.00	
0.016	43.00	36.00	33.00	32.00	
0.012	39.00	33.00	30.00	29.00	
0.0088	36.00	30.00	28.00	26.00	
0.0062	33.00	28.00	26.00	23.00	
0.0044	30.00	26.00	24.00	20.00	
0.0032	27.00	24.00	22.00	18.00	
0.0023	24.00	22.00	20.00	16.00	
0.002	23.00	21.00	19.00	15.00	
0.0014	21.00	19.00	17.00	13.00	

Y	2	29	46	23
Z	0	43	36	21
AA	0	47	34	19
AB	0	52	33	15
AC	0	0	100	100

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 15) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 15	18.00 - 18.60	SPT 10	-----	-----	-----	CL	2	29	46	23	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 15	24.00 - 24.60	SPT 14	-----	-----	-----	CL	0	43	36	21	21	9	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 15	28.00 - 28.60	SPT 17	-----	-----	-----	CL	0	47	34	19	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 15	30.00 - 30.60	SPT 18	-----	-----	-----	SC	0	52	33	15	17	7	10	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

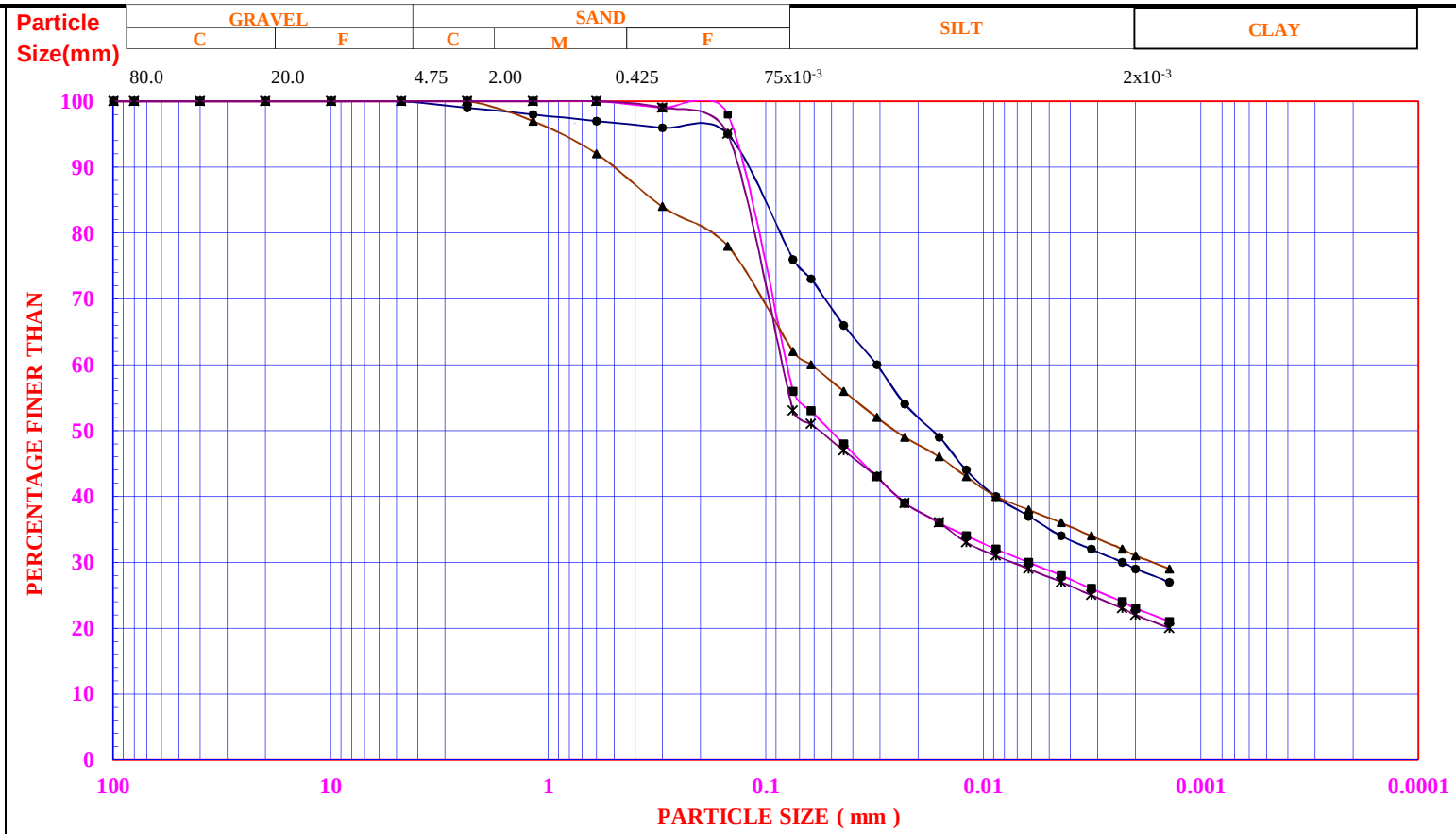
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH : A 16)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 16	16.50 - 17.10	CL	0	24	47	29	-----	-----	-----	-----	-----	31	14	17	SPT 9
■—■	A 16	21.00 - 21.60	CL	0	44	33	23	-----	-----	-----	-----	-----	24	13	11	SPT 12
▲—▲	A 16	25.50 - 26.10	CL	0	38	31	31	-----	-----	-----	-----	-----	27	12	15	SPT 15
✳—✳	A 16	30.00 - 30.60	CL	0	47	31	22	-----	-----	-----	-----	-----	26	12	14	SPT 18
◆—◆																

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 16	A 16	A 16	A 16	0
	16.50 - 17.10	21.00 - 21.60	25.50 - 26.10	30.00 - 30.60	0.00
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	
80.00	100.00	100.00	100.00	100.00	
40.00	100.00	100.00	100.00	100.00	
20.00	100.00	100.00	100.00	100.00	
10.00	100.00	100.00	100.00	100.00	
4.7500	100.00	100.00	100.00	100.00	
2.3600	99.00	100.00	100.00	100.00	
1.1800	98.00	100.00	97.00	100.00	
0.6000	97.00	100.00	92.00	100.00	
0.3000	96.00	99.00	84.00	99.00	
0.1500	95.00	98.00	78.00	95.00	
0.0750	76.00	56.00	62.00	53.00	
0.0620	73.00	53.00	60.00	51.00	
0.044	66.00	48.00	56.00	47.00	
0.031	60.00	43.00	52.00	43.00	
0.023	54.00	39.00	49.00	39.00	
0.016	49.00	36.00	46.00	36.00	
0.012	44.00	34.00	43.00	33.00	
0.0088	40.00	32.00	40.00	31.00	
0.0062	37.00	30.00	38.00	29.00	
0.0044	34.00	28.00	36.00	27.00	
0.0032	32.00	26.00	34.00	25.00	
0.0023	30.00	24.00	32.00	23.00	
0.002	29.00	23.00	31.00	22.00	
0.0014	27.00	21.00	29.00	20.00	

Y	0	24	47	29
Z	0	44	33	23
AA	0	38	31	31
AB	0	47	31	22
AC	0	0	0	100

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH : A 16) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 16	16.50 - 17.10	SPT 9	-----	-----	-----	CL	0	24	47	29	31	14	17	-----	-----	-----	-----	-----	-----	-----	2.66	
A 16	21.00 - 21.60	SPT 12	-----	-----	-----	CL	0	44	33	23	24	13	11	-----	-----	-----	-----	-----	-----	-----	-----	
A 16	25.50 - 26.10	SPT 15	-----	-----	-----	CL	0	38	31	31	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 16	30.00 - 30.60	SPT 18	-----	-----	-----	CL	0	47	31	22	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

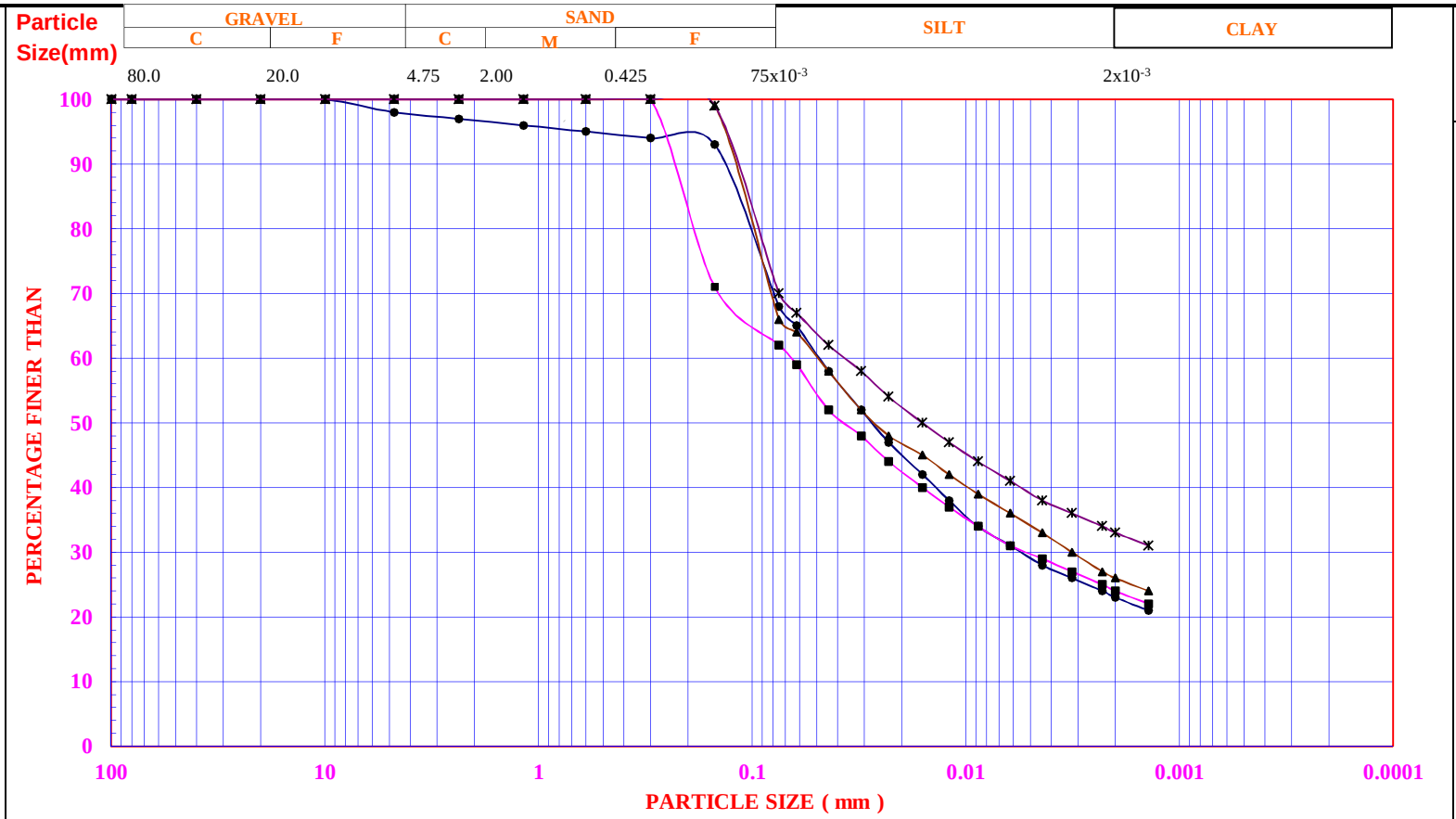
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH : A 17)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 17	16.50 - 17.10	CL	2	30	45	23	-----	-----	-----	-----	-----	21	10	11	SPT 9
■—■	A 17	21.00 - 21.60	CL	0	38	38	24	-----	-----	-----	-----	-----	26	12	14	SPT 12
▲—▲	A 17	25.50 - 26.10	CL	0	34	40	26	-----	-----	-----	-----	-----	24	11	13	SPT 15
✳—✳	A 17	30.00 - 30.60	CL	0	30	37	33	-----	-----	-----	-----	-----	27	13	14	SPT 18
◆—◆																

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 17	A 17	A 17	A 17	0
	16.50 - 17.10	21.00 - 21.60	25.50 - 26.10	30.00 - 30.60	0.00
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	
80.00	100.00	100.00	100.00	100.00	
40.00	100.00	100.00	100.00	100.00	
20.00	100.00	100.00	100.00	100.00	
10.00	100.00	100.00	100.00	100.00	
4.7500	98.00	100.00	100.00	100.00	
2.3600	97.00	100.00	100.00	100.00	
1.1800	96.00	100.00	100.00	100.00	
0.6000	95.00	100.00	100.00	100.00	
0.3000	94.00	100.00	100.00	100.00	
0.1500	93.00	71.00	99.00	99.00	
0.0750	68.00	62.00	66.00	70.00	
0.0620	65.00	59.00	64.00	67.00	
0.044	58.00	52.00	58.00	62.00	
0.031	52.00	48.00	52.00	58.00	
0.023	47.00	44.00	48.00	54.00	
0.016	42.00	40.00	45.00	50.00	
0.012	38.00	37.00	42.00	47.00	
0.0088	34.00	34.00	39.00	44.00	
0.0062	31.00	31.00	36.00	41.00	
0.0044	28.00	29.00	33.00	38.00	
0.0032	26.00	27.00	30.00	36.00	
0.0023	24.00	25.00	27.00	34.00	
0.002	23.00	24.00	26.00	33.00	
0.0014	21.00	22.00	24.00	31.00	

Y	2	30	45	23
Z	0	38	38	24
AA	0	34	40	26
AB	0	30	37	33
AC	0	0	0	100

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH : A 17) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 17	16.50 - 17.10	SPT 9	-----	-----	-----	CL	2	30	45	23	21	10	11	-----	-----	-----	-----	-----	-----	-----	-----	
A 17	21.00 - 21.60	SPT 12	-----	-----	-----	CL	0	38	38	24	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 17	25.50 - 26.10	SPT 15	-----	-----	-----	CL	0	34	40	26	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 17	30.00 - 30.60	SPT 18	-----	-----	-----	CL	0	30	37	33	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

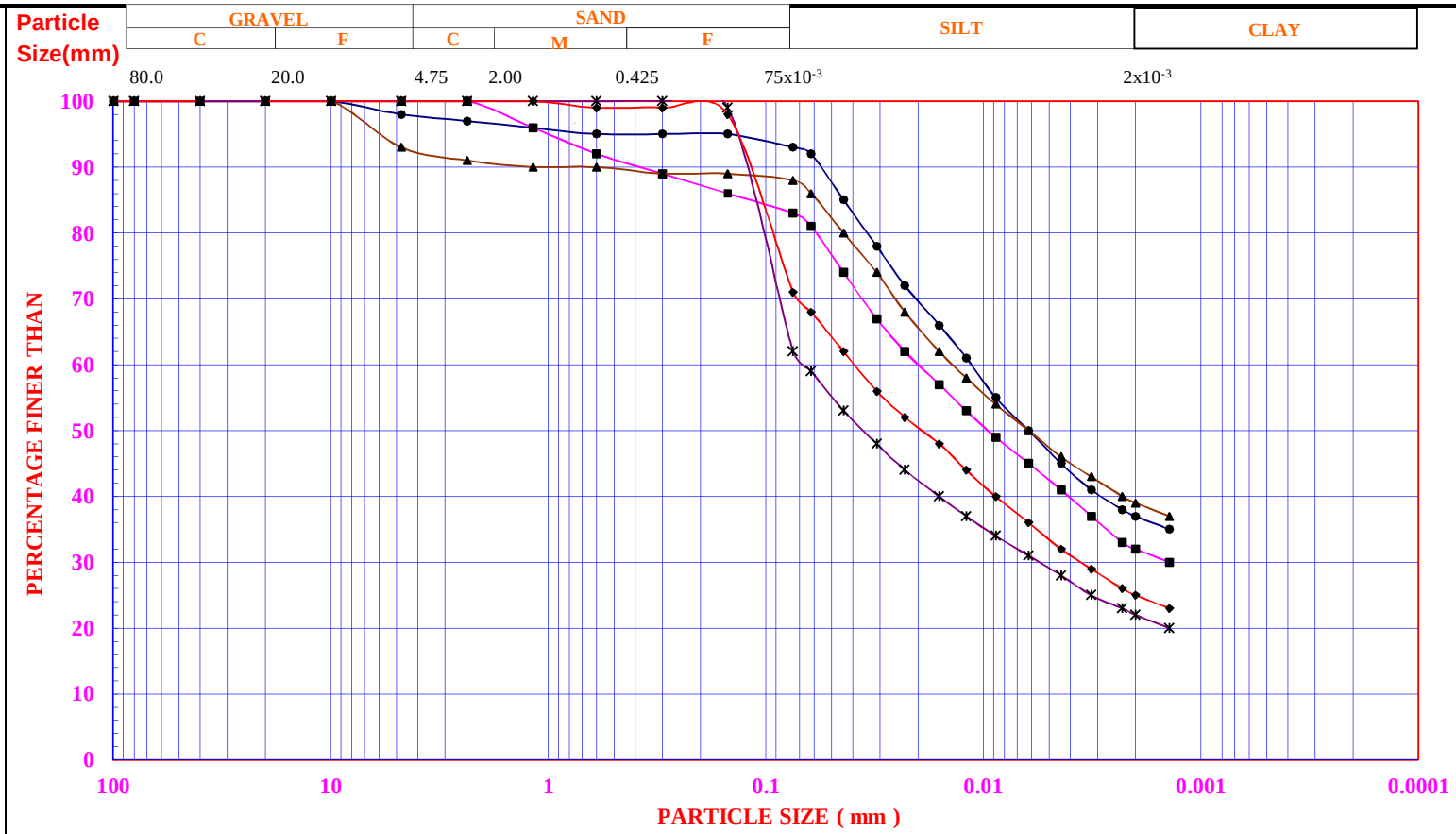
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 18)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 18	1.50 - 2.10	CL	2	5	56	37	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	A 18	3.00 - 3.50	CL	0	17	51	32	-----	-----	-----	-----	-----	24	11	13	UDS
▲—▲	A 18	6.00 - 6.60	CL	7	5	49	39	-----	-----	-----	-----	-----	21	9	12	SPT 3
✳—✳	A 18	9.00 - 9.60	CL	0	38	40	22	-----	-----	-----	-----	-----	25	11	14	SPT 5
◆—◆	A 18	10.50 - 11.10	CL	0	29	46	25	-----	-----	-----	-----	-----	22	10	12	SPT 6

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 18	A 18	A 18	A 18	A 18
	1.50 - 2.10	3.00 - 3.50	6.00 - 6.60	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	93.00	100.00	100.00
2.3600	97.00	100.00	91.00	100.00	100.00
1.1800	96.00	96.00	90.00	100.00	100.00
0.6000	95.00	92.00	90.00	100.00	99.00
0.3000	95.00	89.00	89.00	100.00	99.00
0.1500	95.00	86.00	89.00	99.00	98.00
0.0750	93.00	83.00	88.00	62.00	71.00
0.0620	92.00	81.00	86.00	59.00	68.00
0.044	85.00	74.00	80.00	53.00	62.00
0.031	78.00	67.00	74.00	48.00	56.00
0.023	72.00	62.00	68.00	44.00	52.00
0.016	66.00	57.00	62.00	40.00	48.00
0.012	61.00	53.00	58.00	37.00	44.00
0.0088	55.00	49.00	54.00	34.00	40.00
0.0062	50.00	45.00	50.00	31.00	36.00
0.0044	45.00	41.00	46.00	28.00	32.00
0.0032	41.00	37.00	43.00	25.00	29.00
0.0023	38.00	33.00	40.00	23.00	26.00
0.002	37.00	32.00	39.00	22.00	25.00
0.0014	35.00	30.00	37.00	20.00	23.00

Y	2	5	56	37
Z	0	17	51	32
AA	7	5	49	39
AB	0	38	40	22
AC	0	29	46	25

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 18) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 18	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	5	56	37	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.65	
A 18	3.00 - 3.50	UDS	1.90	1.64	15.97	CL	0	17	51	32	24	11	13	UU	0.72	11	-----	-----	0.03	2.1	-----	
A 18	6.00 - 6.60	SPT 3	-----	-----	-----	CL	7	5	49	39	21	9	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 18	9.00 - 9.60	SPT 5	-----	-----	-----	CL	0	38	40	22	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 18	10.50 - 11.10	SPT 6	-----	-----	-----	CL	0	29	46	25	22	10	12	-----	-----	-----	-----	-----	-----	-----	-----	

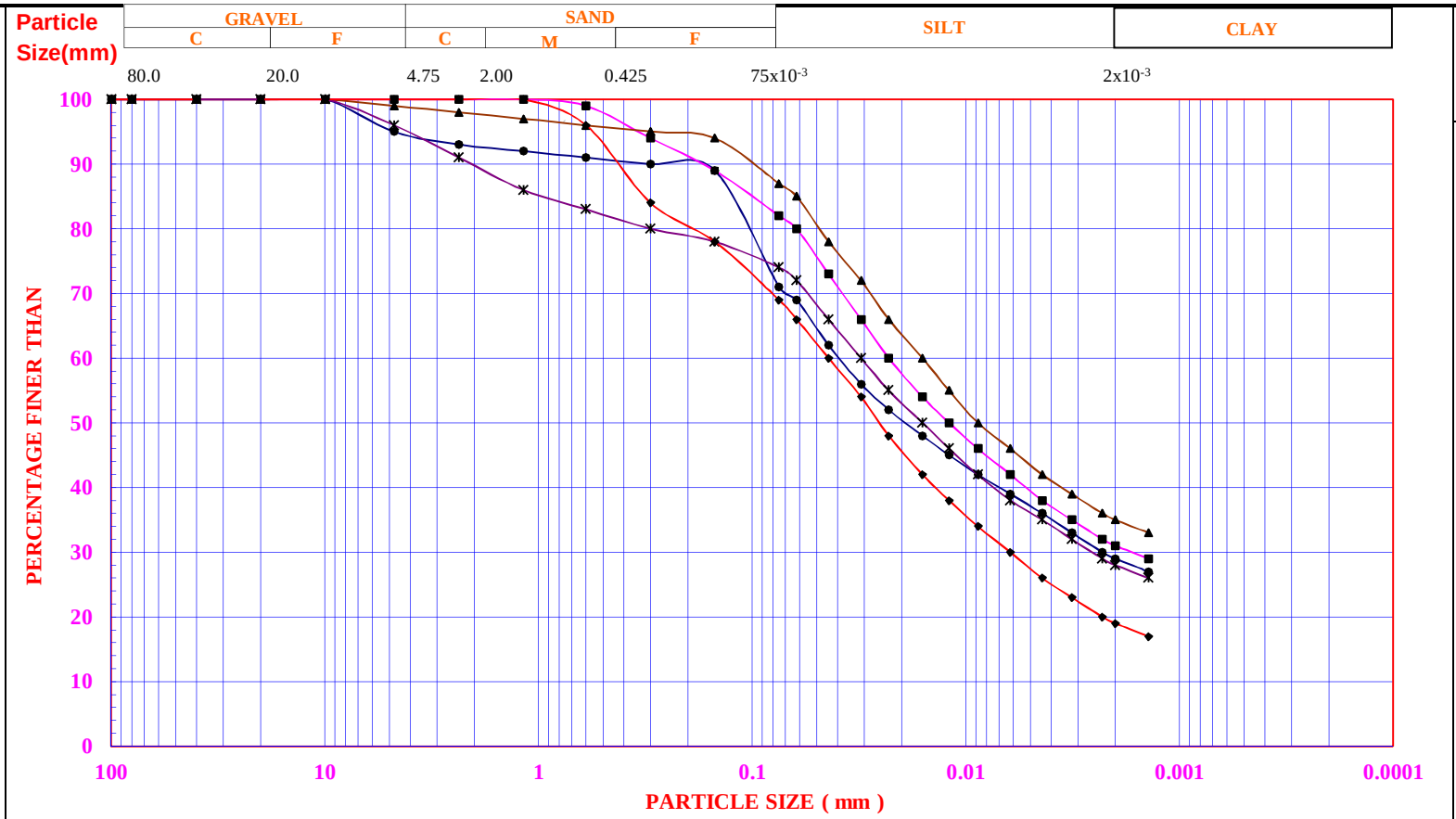
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. A19)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A19	1.50 - 2.10	CL	5	24	42	29	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	A19	3.00 - 3.50	CL	0	18	51	31	-----	-----	-----	-----	-----	23	9	14	UDS -1
▲—▲	A19	4.50 - 5.10	CL	1	12	52	35	-----	-----	-----	-----	-----	27	10	17	SPT 2
✳—✳	A19	7.50 - 8.10	CL	4	22	46	28	-----	-----	-----	-----	-----	24	9	15	SPT 4
◆—◆	A19	12.00 - 12.60	CL	0	31	50	19	-----	-----	-----	-----	-----	26	12	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A19	A19	A19	A19	A19
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	95.00	100.00	99.00	96.00	100.00
2.3600	93.00	100.00	98.00	91.00	100.00
1.1800	92.00	100.00	97.00	86.00	100.00
0.6000	91.00	99.00	96.00	83.00	96.00
0.3000	90.00	94.00	95.00	80.00	84.00
0.1500	89.00	89.00	94.00	78.00	78.00
0.0750	71.00	82.00	87.00	74.00	69.00
0.0620	69.00	80.00	85.00	72.00	66.00
0.044	62.00	73.00	78.00	66.00	60.00
0.031	56.00	66.00	72.00	60.00	54.00
0.023	52.00	60.00	66.00	55.00	48.00
0.016	48.00	54.00	60.00	50.00	42.00
0.012	45.00	50.00	55.00	46.00	38.00
0.0088	42.00	46.00	50.00	42.00	34.00
0.0062	39.00	42.00	46.00	38.00	30.00
0.0044	36.00	38.00	42.00	35.00	26.00
0.0032	33.00	35.00	39.00	32.00	23.00
0.0023	30.00	32.00	36.00	29.00	20.00
0.002	29.00	31.00	35.00	28.00	19.00
0.0014	27.00	29.00	33.00	26.00	17.00

Y	5	24	42	29
Z	0	18	51	31
AA	1	12	52	35
AB	4	22	46	28
AC	0	31	50	19

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. A19) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A19	1.50 - 2.10	SPT 1	-----	-----	-----	CL	5	24	42	29	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A19	3.00 - 3.50	UDS -1	1.87	1.62	15.57	CL	0	18	51	31	23	9	14	UU	1.23	8	-----	-----	0.04	2.3	-----	
A19	4.50 - 5.10	SPT 2	-----	-----	-----	CL	1	12	52	35	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
A19	7.50 - 8.10	SPT 4	-----	-----	-----	CL	4	22	46	28	24	9	15	-----	-----	-----	-----	-----	-----	-----	-----	
A19	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	31	50	19	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

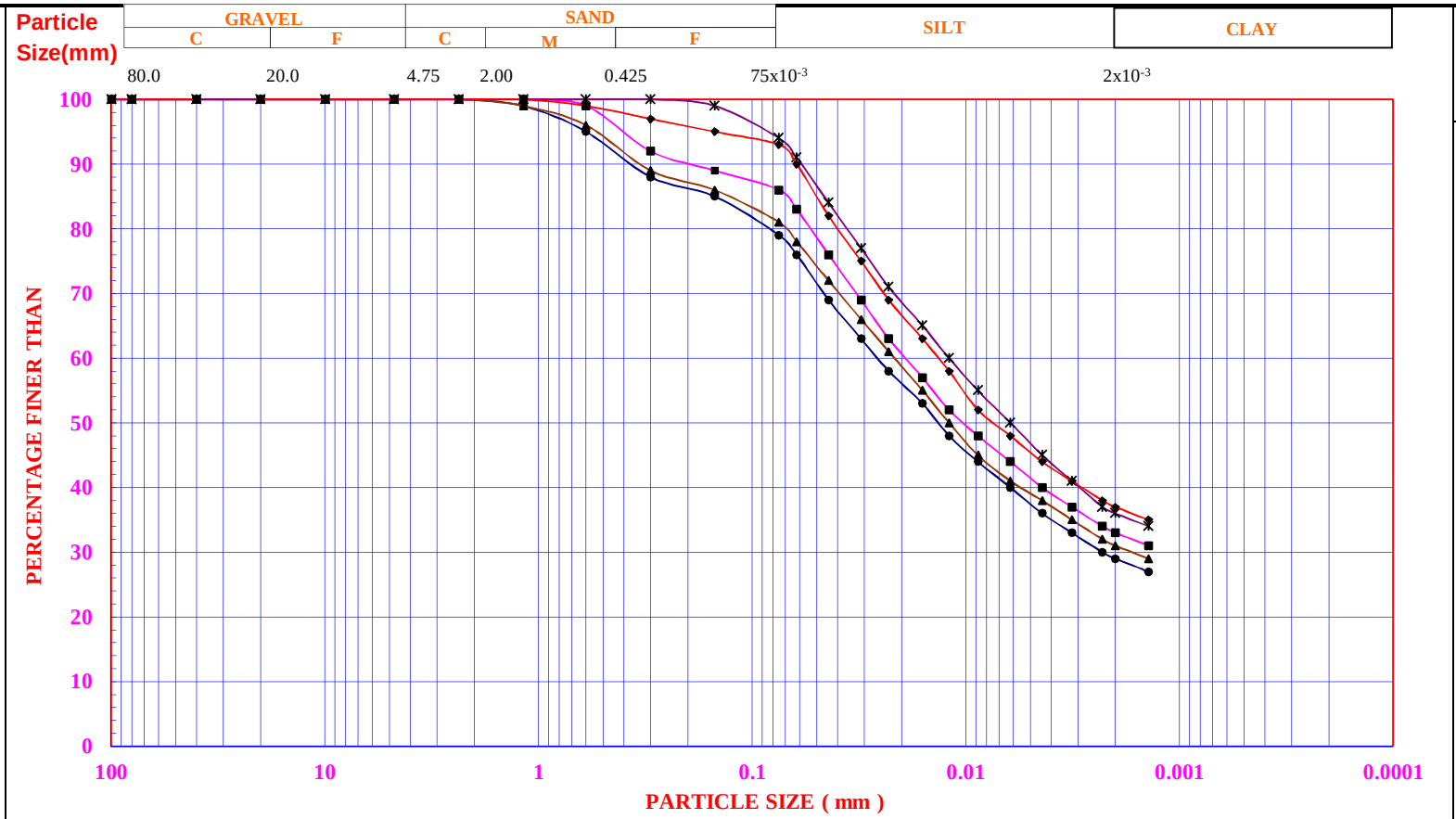
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Chainage No .A20)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A20	1.50 - 2.10	CL	0	21	50	29	-----	-----	-----	-----	-----	26	12	14	SPT 1
■—■	A20	3.00 - 3.50	CL	0	14	53	33	-----	-----	-----	-----	-----	28	11	17	UDS -1
▲—▲	A20	4.50 - 5.10	CL	0	19	50	31	-----	-----	-----	-----	-----	27	12	15	SPT 2
✳—✳	A20	7.50 - 8.10	CL	0	6	58	36	-----	-----	-----	-----	-----	26	13	13	SPT 4
◆—◆	A20	12.00 - 12.60	CL	0	7	56	37	-----	-----	-----	-----	-----	24	10	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A20	A20	A20	A20	A20
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	99.00	100.00	99.00	100.00	100.00
0.6000	95.00	99.00	96.00	100.00	99.00
0.3000	88.00	92.00	89.00	100.00	97.00
0.1500	85.00	89.00	86.00	99.00	95.00
0.0750	79.00	86.00	81.00	94.00	93.00
0.0620	76.00	83.00	78.00	91.00	90.00
0.044	69.00	76.00	72.00	84.00	82.00
0.031	63.00	69.00	66.00	77.00	75.00
0.023	58.00	63.00	61.00	71.00	69.00
0.016	53.00	57.00	55.00	65.00	63.00
0.012	48.00	52.00	50.00	60.00	58.00
0.0088	44.00	48.00	45.00	55.00	52.00
0.0062	40.00	44.00	41.00	50.00	48.00
0.0044	36.00	40.00	38.00	45.00	44.00
0.0032	33.00	37.00	35.00	41.00	41.00
0.0023	30.00	34.00	32.00	37.00	38.00
0.002	29.00	33.00	31.00	36.00	37.00
0.0014	27.00	31.00	29.00	34.00	35.00

Y	0	21	50	29
Z	0	14	53	33
AA	0	19	50	31
AB	0	6	58	36
AC	0	7	56	37

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No .A20) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A20	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	50	29	26	12	14	-----	-----	-----	-----	-----	-----	-----	2.66	
A20	3.00 - 3.50	UDS -1	1.88	1.62	15.87	CL	0	14	53	33	28	11	17	UU	0.96	7	-----	-----	0.05	2.3	-----	
A20	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	19	50	31	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
A20	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	6	58	36	26	13	13	-----	-----	-----	-----	-----	-----	-----	-----	
A20	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	7	56	37	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

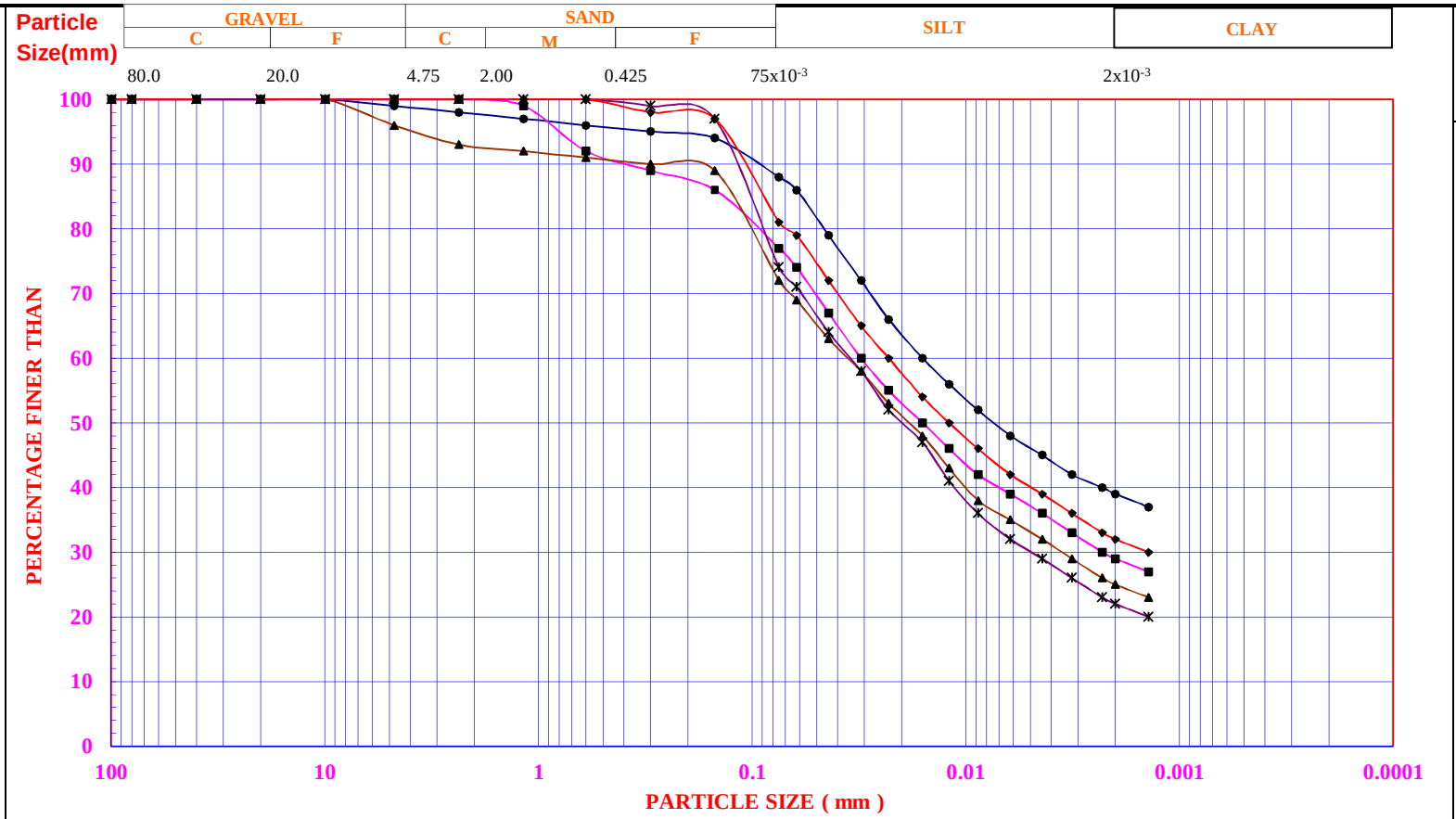
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Chainage No A 21)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A21	1.50 - 2.10	CL	1	11	49	39	-----	-----	-----	-----	-----	27	13	14	SPT 1
■—■	A21	3.00 - 3.50	CL	0	23	48	29	-----	-----	-----	-----	-----	29	14	15	UDS -1
▲—▲	A21	4.50 - 5.10	CL	4	24	47	25	-----	-----	-----	-----	-----	25	12	13	SPT 2
✳—✳	A21	7.50 - 8.10	CL	0	26	52	22	-----	-----	-----	-----	-----	28	13	15	SPT 5
◆—◆	A21	12.00 - 12.60	CL	0	19	49	32	-----	-----	-----	-----	-----	26	12	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A21	A21	A21	A21	A21
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	100.00	96.00	100.00	100.00
2.3600	98.00	100.00	93.00	100.00	100.00
1.1800	97.00	99.00	92.00	100.00	100.00
0.6000	96.00	92.00	91.00	100.00	100.00
0.3000	95.00	89.00	90.00	99.00	98.00
0.1500	94.00	86.00	89.00	97.00	97.00
0.0750	88.00	77.00	72.00	74.00	81.00
0.0620	86.00	74.00	69.00	71.00	79.00
0.044	79.00	67.00	63.00	64.00	72.00
0.031	72.00	60.00	58.00	58.00	65.00
0.023	66.00	55.00	53.00	52.00	60.00
0.016	60.00	50.00	48.00	47.00	54.00
0.012	56.00	46.00	43.00	41.00	50.00
0.0088	52.00	42.00	38.00	36.00	46.00
0.0062	48.00	39.00	35.00	32.00	42.00
0.0044	45.00	36.00	32.00	29.00	39.00
0.0032	42.00	33.00	29.00	26.00	36.00
0.0023	40.00	30.00	26.00	23.00	33.00
0.002	39.00	29.00	25.00	22.00	32.00
0.0014	37.00	27.00	23.00	20.00	30.00

Y	1	11	49	39
Z	0	23	48	29
AA	4	24	47	25
AB	0	26	52	22
AC	0	19	49	32

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No A 21) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A21	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	11	49	39	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
A21	3.00 - 3.50	UDS -1	1.90	1.64	15.71	CL	0	23	48	29	29	14	15	UU	0.78	11	-----	-----	0.06	2.3	-----	
A21	4.50 - 5.10	SPT 2	-----	-----	-----	CL	4	24	47	25	25	12	13	-----	-----	-----	-----	-----	-----	-----	2.66	
A21	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	26	52	22	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
A21	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	19	49	32	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

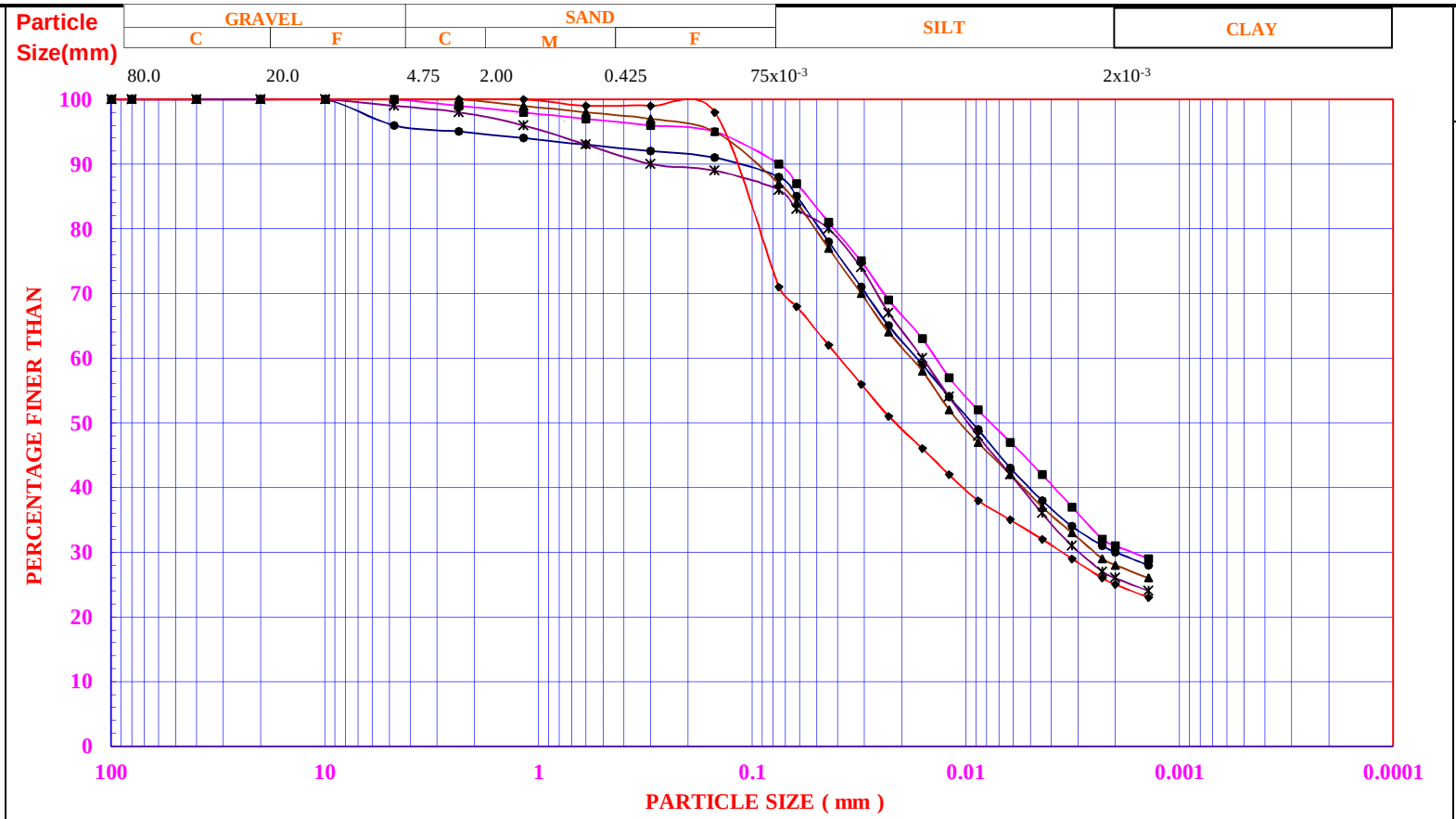
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 22/1)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 22/1	1.50 - 2.10	CL	4	8	58	30	-----	-----	-----	-----	-----	27	12	15	SPT 1
■—■	A 22/1	3.00 - 3.50	CL	0	10	59	31	-----	-----	-----	-----	-----	24	10	14	UDS
▲—▲	A 22/1	6.60 - 6.60	CL	0	13	59	28	-----	-----	-----	-----	-----	23	11	12	SPT 3
✳—✳	A 22/1	9.00 - 9.60	CL	1	13	60	26	-----	-----	-----	-----	-----	24	10	14	SPT 5
◆—◆	A 22/1	10.50 - 11.10	CL	0	29	46	25	-----	-----	-----	-----	-----	25	12	13	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 22/1	A 22/1	A 22/1	A 22/1	A 22/1
	1.50 - 2.10	3.00 - 3.50	6.60 - 6.60	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	96.00	100.00	100.00	99.00	100.00
2.3600	95.00	99.00	100.00	98.00	100.00
1.1800	94.00	98.00	99.00	96.00	100.00
0.6000	93.00	97.00	98.00	93.00	99.00
0.3000	92.00	96.00	97.00	90.00	99.00
0.1500	91.00	95.00	95.00	89.00	98.00
0.0750	88.00	90.00	87.00	86.00	71.00
0.0620	85.00	87.00	84.00	83.00	68.00
0.044	78.00	81.00	77.00	80.00	62.00
0.031	71.00	75.00	70.00	74.00	56.00
0.023	65.00	69.00	64.00	67.00	51.00
0.016	59.00	63.00	58.00	60.00	46.00
0.012	54.00	57.00	52.00	54.00	42.00
0.0088	49.00	52.00	47.00	48.00	38.00
0.0062	43.00	47.00	42.00	42.00	35.00
0.0044	38.00	42.00	37.00	36.00	32.00
0.0032	34.00	37.00	33.00	31.00	29.00
0.0023	31.00	32.00	29.00	27.00	26.00
0.002	30.00	31.00	28.00	26.00	25.00
0.0014	28.00	29.00	26.00	24.00	23.00

Y	4	8	58	30
Z	0	10	59	31
AA	0	13	59	28
AB	1	13	60	26
AC	0	29	46	25

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 22/1) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 22/1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	4	8	58	30	27	12	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A 22/1	3.00 - 3.50	UDS	1.88	1.63	15.37	CL	0	10	59	31	24	10	14	UU	0.96	11	-----	-----	0.04	2.2	-----	
A 22/1	6.60 - 6.60	SPT 3	-----	-----	-----	CL	0	13	59	28	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 22/1	9.00 - 9.60	SPT 5	-----	-----	-----	CL	1	13	60	26	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 22/1	10.50 - 11.10	SPT 7	-----	-----	-----	CL	0	29	46	25	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

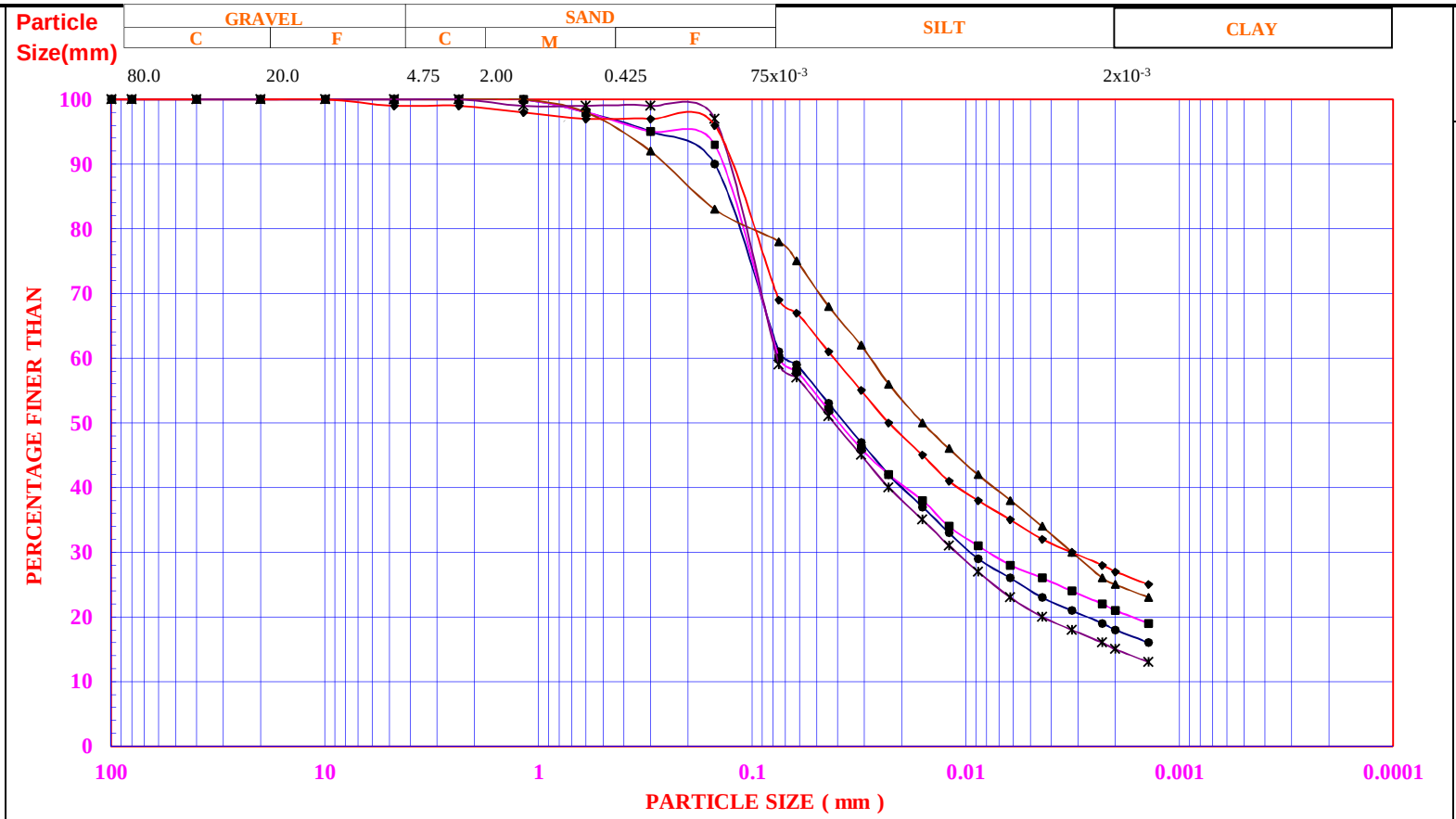
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 22/2)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 22/2	1.50 - 2.10	CL	0	39	43	18	-----	-----	-----	-----	-----	29	12	17	SPT 1
■—■	A 22/2	3.00 - 3.60	CL	0	40	39	21	-----	-----	-----	-----	-----	27	13	14	SPT 2
▲—▲	A 22/2	4.50 - 5.00	CL	0	22	53	25	-----	-----	-----	-----	-----	24	11	13	UDS
✳—✳	A 22/2	9.00 - 9.60	CL	0	41	44	15	-----	-----	-----	-----	-----	22	10	12	SPT 6
◆—◆	A 22/2	10.50 - 11.10	CL	1	30	42	27	-----	-----	-----	-----	-----	25	12	13	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 22/2	A 22/2	A 22/2	A 22/2	A 22/2
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.00	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	99.00
2.3600	100.00	100.00	100.00	100.00	99.00
1.1800	100.00	100.00	100.00	99.00	98.00
0.6000	98.00	98.00	98.00	99.00	97.00
0.3000	95.00	95.00	92.00	99.00	97.00
0.1500	90.00	93.00	83.00	97.00	96.00
0.0750	61.00	60.00	78.00	59.00	69.00
0.0620	59.00	58.00	75.00	57.00	67.00
0.044	53.00	52.00	68.00	51.00	61.00
0.031	47.00	46.00	62.00	45.00	55.00
0.023	42.00	42.00	56.00	40.00	50.00
0.016	37.00	38.00	50.00	35.00	45.00
0.012	33.00	34.00	46.00	31.00	41.00
0.0088	29.00	31.00	42.00	27.00	38.00
0.0062	26.00	28.00	38.00	23.00	35.00
0.0044	23.00	26.00	34.00	20.00	32.00
0.0032	21.00	24.00	30.00	18.00	30.00
0.0023	19.00	22.00	26.00	16.00	28.00
0.002	18.00	21.00	25.00	15.00	27.00
0.0014	16.00	19.00	23.00	13.00	25.00

Y	0	39	43	18
Z	0	40	39	21
AA	0	22	53	25
AB	0	41	44	15
AC	1	30	42	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 22/2) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 22/2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	39	43	18	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
A 22/2	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	40	39	21	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 22/2	4.50 - 5.00	UDS	1.89	1.63	15.84	CL	0	22	53	25	24	11	13	UU	0.89	12	-----	-----	0.05	2.1	2.66	
A 22/2	9.00 - 9.60	SPT 6	-----	-----	-----	CL	0	41	44	15	22	10	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 22/2	10.50 - 11.10	SPT 7	-----	-----	-----	CL	1	30	42	27	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

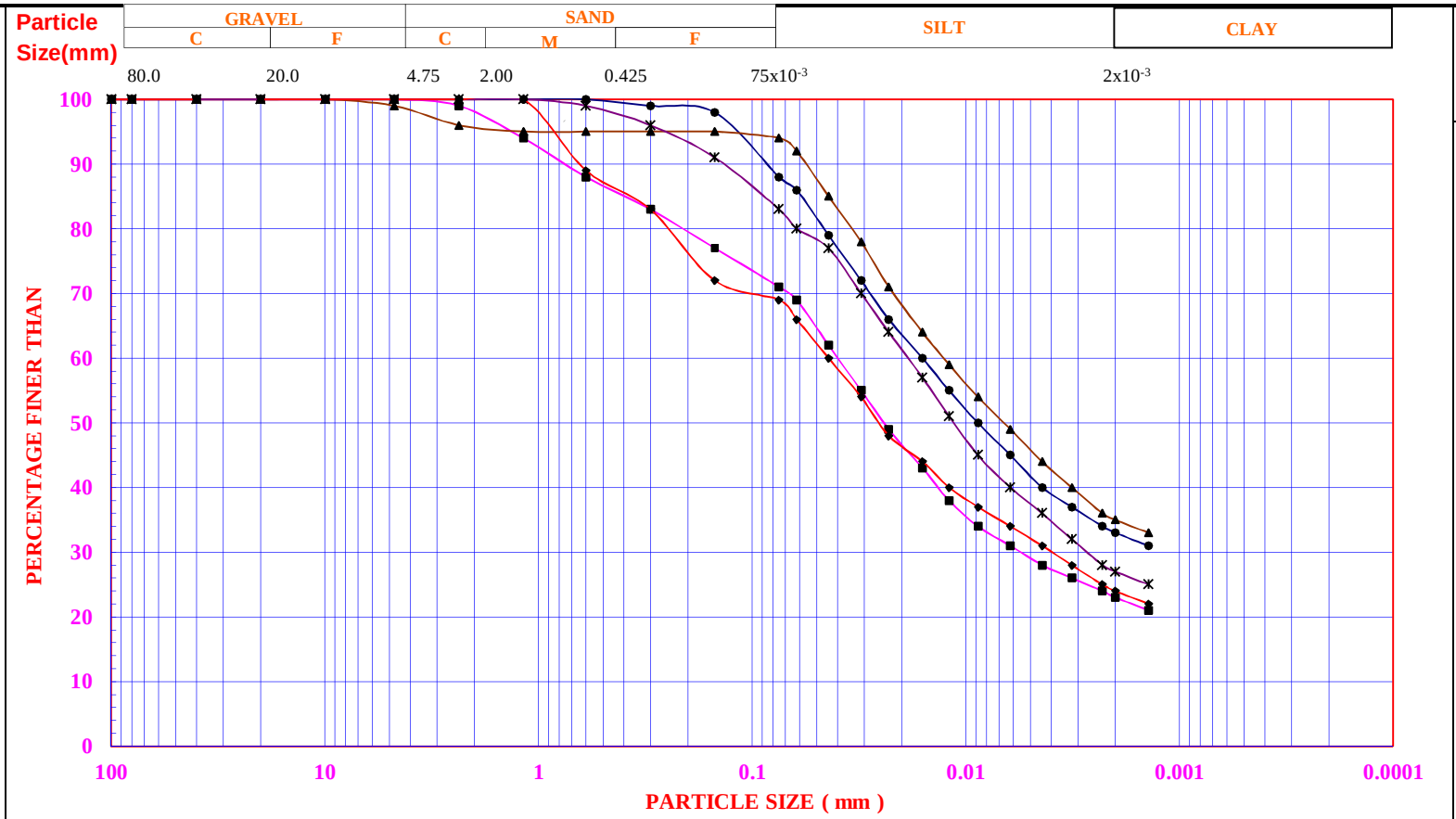
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 23/1)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 23/1	1.50 - 2.10	CL	0	12	55	33	-----	-----	-----	-----	-----	25	11	14	SPT 1
■—■	A 23/1	3.00 - 3.50	CL	0	29	48	23	-----	-----	-----	-----	-----	21	9	12	UDS
▲—▲	A 23/1	6.60 - 6.60	CL	1	5	59	35	-----	-----	-----	-----	-----	24	10	14	SPT 3
✳—✳	A 23/1	9.00 - 9.60	CL	0	17	56	27	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	A 23/1	10.50 - 11.10	CL	0	31	45	24	-----	-----	-----	-----	-----	25	12	13	SPT 6

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 23/1	A 23/1	A 23/1	A 23/1	A 23/1
	1.50 - 2.10	3.00 - 3.50	6.60 - 6.60	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	99.00	100.00	100.00
2.3600	100.00	99.00	96.00	100.00	100.00
1.1800	100.00	94.00	95.00	100.00	100.00
0.6000	100.00	88.00	95.00	99.00	89.00
0.3000	99.00	83.00	95.00	96.00	83.00
0.1500	98.00	77.00	95.00	91.00	72.00
0.0750	88.00	71.00	94.00	83.00	69.00
0.0620	86.00	69.00	92.00	80.00	66.00
0.044	79.00	62.00	85.00	77.00	60.00
0.031	72.00	55.00	78.00	70.00	54.00
0.023	66.00	49.00	71.00	64.00	48.00
0.016	60.00	43.00	64.00	57.00	44.00
0.012	55.00	38.00	59.00	51.00	40.00
0.0088	50.00	34.00	54.00	45.00	37.00
0.0062	45.00	31.00	49.00	40.00	34.00
0.0044	40.00	28.00	44.00	36.00	31.00
0.0032	37.00	26.00	40.00	32.00	28.00
0.0023	34.00	24.00	36.00	28.00	25.00
0.002	33.00	23.00	35.00	27.00	24.00
0.0014	31.00	21.00	33.00	25.00	22.00

Y	0	12	55	33
Z	0	29	48	23
AA	1	5	59	35
AB	0	17	56	27
AC	0	31	45	24

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 23/1) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 23/1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	12	55	33	25	11	14	-----	-----	-----	-----	-----	-----	-----	2.65	
A 23/1	3.00 - 3.50	UDS	1.87	1.61	15.89	CL	0	29	48	23	21	9	12	UU	0.78	12	-----	-----	0.04	2.1	-----	
A 23/1	6.60 - 6.60	SPT 3	-----	-----	-----	CL	1	5	59	35	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 23/1	9.00 - 9.60	SPT 5	-----	-----	-----	CL	0	17	56	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 23/1	10.50 - 11.10	SPT 6	-----	-----	-----	CL	0	31	45	24	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

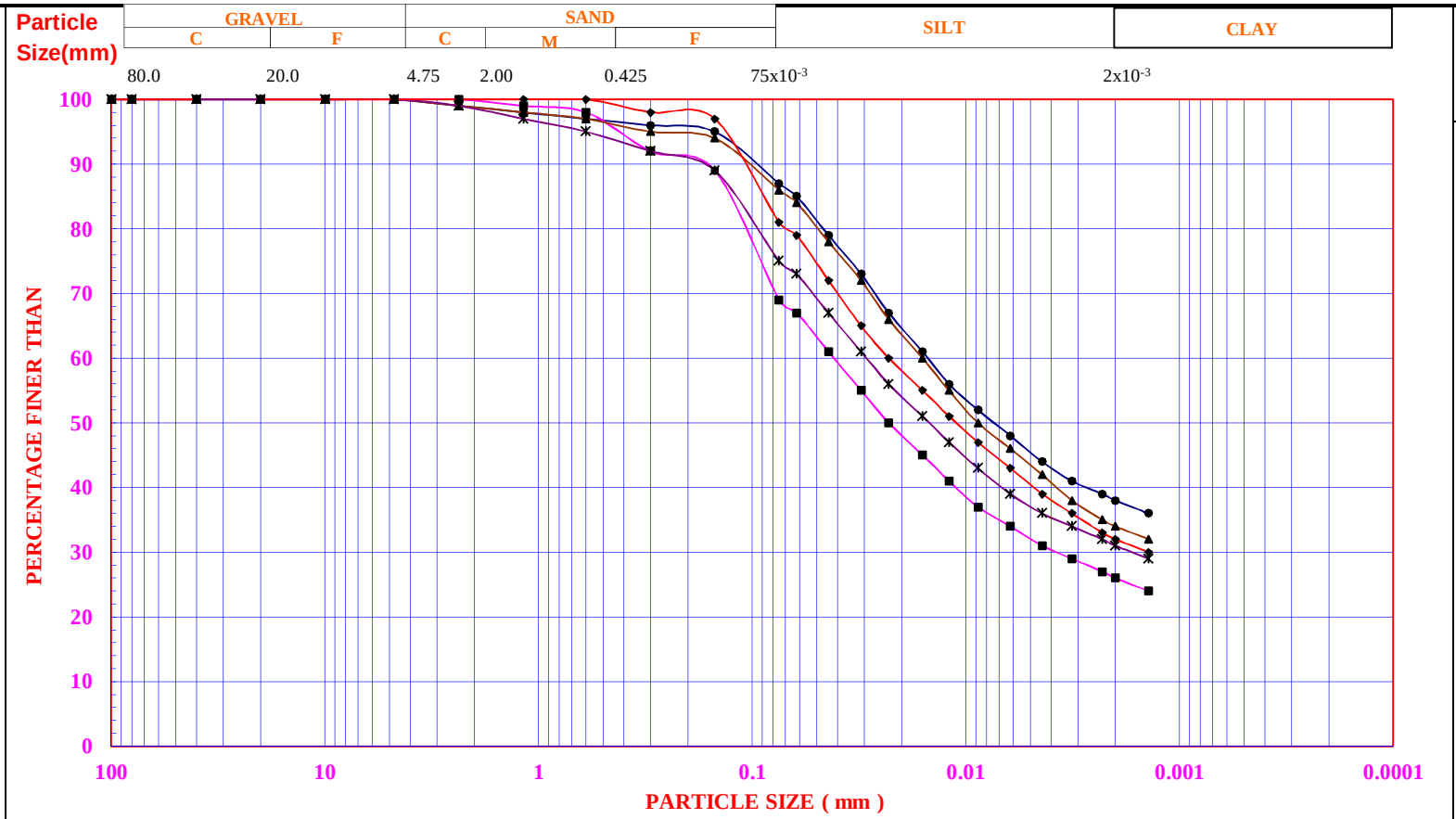
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 23/2)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 23/2	1.50 - 2.10	CL	0	13	49	38	-----	-----	-----	-----	-----	27	12	15	SPT 1
■—■	A 23/2	3.00 - 3.50	CL	0	31	43	26	-----	-----	-----	-----	-----	24	10	14	UDS
▲—▲	A 23/2	6.60 - 6.60	CL	0	14	52	34	-----	-----	-----	-----	-----	26	11	15	SPT 3
✳—✳	A 23/2	9.00 - 9.60	CL	0	25	44	31	-----	-----	-----	-----	-----	22	9	13	SPT 5
◆—◆	A 23/2	10.50 - 11.10	CL	0	19	49	32	-----	-----	-----	-----	-----	23	11	12	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 23/2	A 23/2	A 23/2	A 23/2	A 23/2
	1.50 - 2.10	3.00 - 3.50	6.60 - 6.60	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	99.00	100.00	99.00	99.00	100.00
1.1800	98.00	99.00	98.00	97.00	100.00
0.6000	97.00	98.00	97.00	95.00	100.00
0.3000	96.00	92.00	95.00	92.00	98.00
0.1500	95.00	89.00	94.00	89.00	97.00
0.0750	87.00	69.00	86.00	75.00	81.00
0.0620	85.00	67.00	84.00	73.00	79.00
0.044	79.00	61.00	78.00	67.00	72.00
0.031	73.00	55.00	72.00	61.00	65.00
0.023	67.00	50.00	66.00	56.00	60.00
0.016	61.00	45.00	60.00	51.00	55.00
0.012	56.00	41.00	55.00	47.00	51.00
0.0088	52.00	37.00	50.00	43.00	47.00
0.0062	48.00	34.00	46.00	39.00	43.00
0.0044	44.00	31.00	42.00	36.00	39.00
0.0032	41.00	29.00	38.00	34.00	36.00
0.0023	39.00	27.00	35.00	32.00	33.00
0.002	38.00	26.00	34.00	31.00	32.00
0.0014	36.00	24.00	32.00	29.00	30.00

Y	0	13	49	38
Z	0	31	43	26
AA	0	14	52	34
AB	0	25	44	31
AC	0	19	49	32

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 23/2) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 23/2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	13	49	38	27	12	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A 23/2	3.00 - 3.50	UDS	1.92	1.67	14.98	CL	0	31	43	26	24	10	14	UU	0.87	9	-----	-----	0.06	2.3	-----	
A 23/2	6.60 - 6.60	SPT 3	-----	-----	-----	CL	0	14	52	34	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 23/2	9.00 - 9.60	SPT 5	-----	-----	-----	CL	0	25	44	31	22	9	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 23/2	10.50 - 11.10	SPT 7	-----	-----	-----	CL	0	19	49	32	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

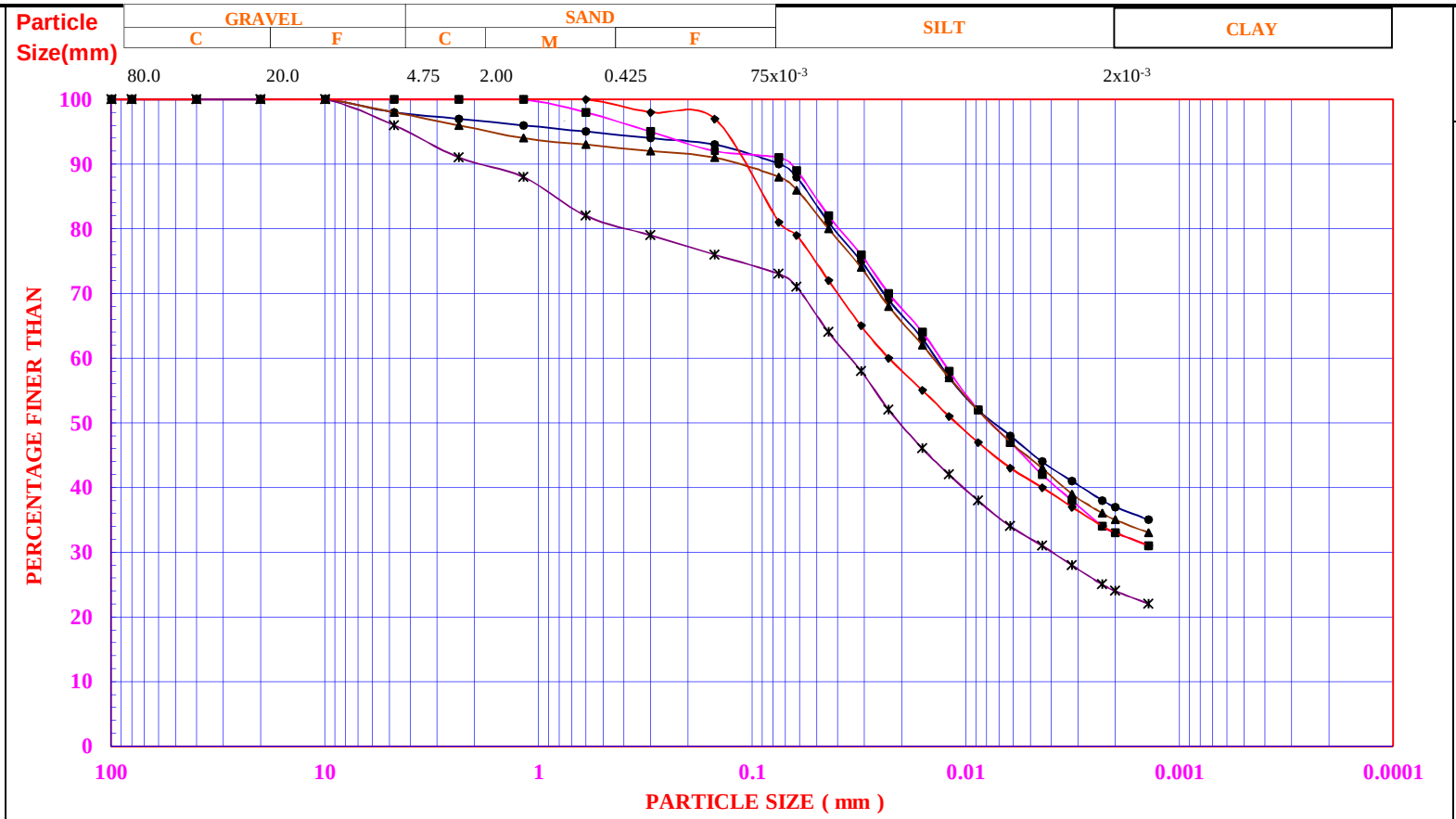
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No. A 24)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A24	1.50 - 2.10	CL	2	8	53	37	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	A24	3.00 - 3.50	CL	0	9	58	33	-----	-----	-----	-----	-----	31	14	17	UDS -1
▲—▲	A24	4.50 - 5.10	CL	2	10	53	35	-----	-----	-----	-----	-----	26	11	15	SPT 2
✳—✳	A24	7.50 - 8.10	CL	4	23	49	24	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	A24	12.00 - 12.60	CL	0	19	48	33	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A24	A24	A24	A24	A24
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	98.00	96.00	100.00
2.3600	97.00	100.00	96.00	91.00	100.00
1.1800	96.00	100.00	94.00	88.00	100.00
0.6000	95.00	98.00	93.00	82.00	100.00
0.3000	94.00	95.00	92.00	79.00	98.00
0.1500	93.00	92.00	91.00	76.00	97.00
0.0750	90.00	91.00	88.00	73.00	81.00
0.0620	88.00	89.00	86.00	71.00	79.00
0.044	81.00	82.00	80.00	64.00	72.00
0.031	75.00	76.00	74.00	58.00	65.00
0.023	69.00	70.00	68.00	52.00	60.00
0.016	63.00	64.00	62.00	46.00	55.00
0.012	57.00	58.00	57.00	42.00	51.00
0.0088	52.00	52.00	52.00	38.00	47.00
0.0062	48.00	47.00	47.00	34.00	43.00
0.0044	44.00	42.00	43.00	31.00	40.00
0.0032	41.00	38.00	39.00	28.00	37.00
0.0023	38.00	34.00	36.00	25.00	34.00
0.002	37.00	33.00	35.00	24.00	33.00
0.0014	35.00	31.00	33.00	22.00	31.00

Y	2	8	53	37
Z	0	9	58	33
AA	2	10	53	35
AB	4	23	49	24
AC	0	19	48	33

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. A 24) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A24	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	8	53	37	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
A24	3.00 - 3.50	UDS -1	1.86	1.62	14.93	CL	0	9	58	33	31	14	17	UU	1.02	7	-----	-----	0.03	2.4	-----	
A24	4.50 - 5.10	SPT 2	-----	-----	-----	CL	2	10	53	35	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A24	7.50 - 8.10	SPT 5	-----	-----	-----	CL	4	23	49	24	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
A24	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	19	48	33	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

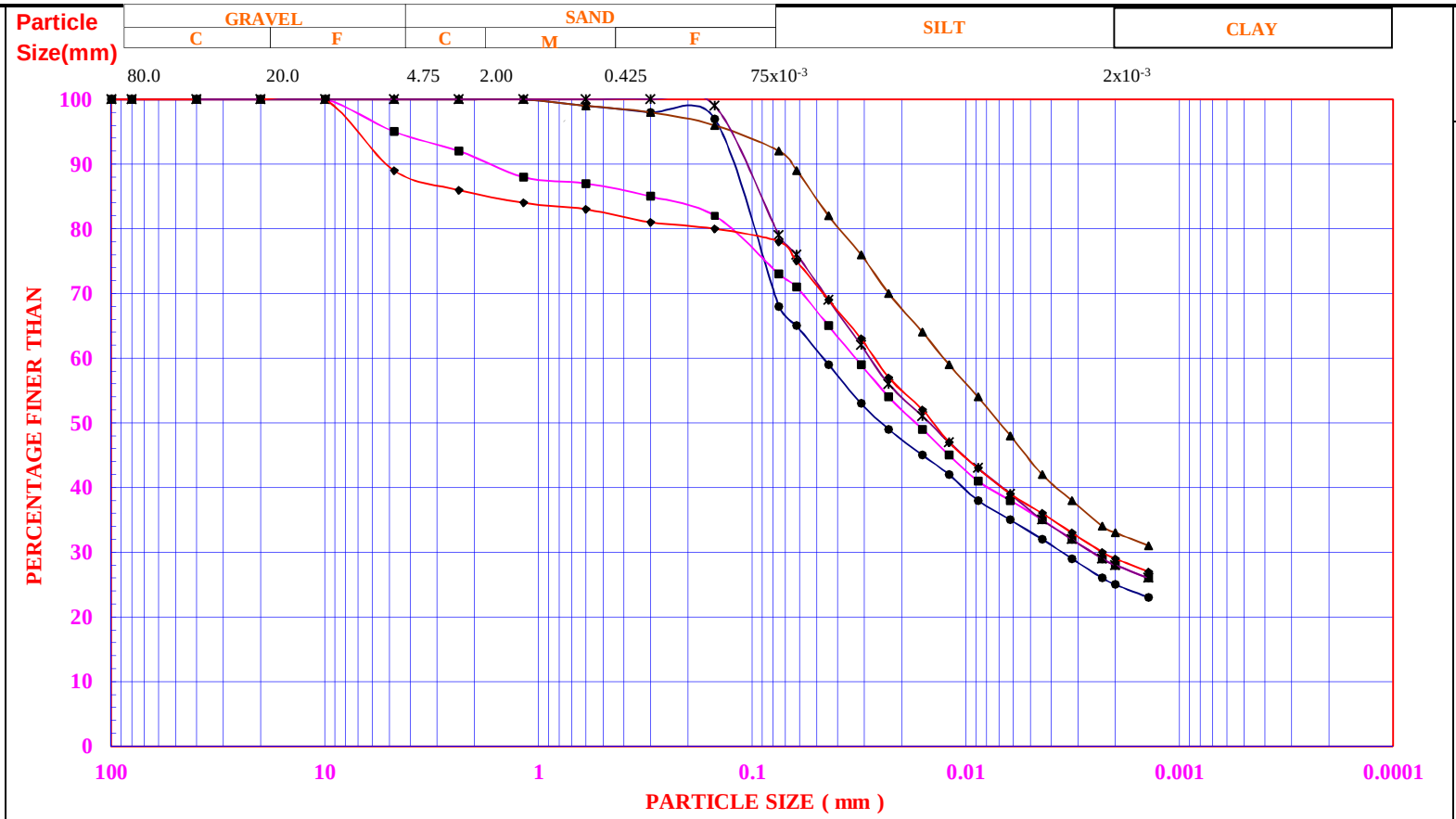
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A-25)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 25	1.50 - 2.10	CL	0	32	43	25	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	A 25	3.00 - 3.60	CL	5	22	45	28	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	A 25	4.50 - 5.10	CL	0	8	59	33	-----	-----	-----	-----	-----	29	14	15	SPT 3
✳—✳	A 25	7.50 - 8.10	CL	0	21	51	28	-----	-----	-----	-----	-----	25	11	14	SPT 5
◆—◆	A 25	12.00 - 12.60	CL	11	11	49	29	-----	-----	-----	-----	-----	23	10	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 25	A 25	A 25	A 25	A 25
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	95.00	100.00	100.00	89.00
2.3600	100.00	92.00	100.00	100.00	86.00
1.1800	100.00	88.00	100.00	100.00	84.00
0.6000	99.00	87.00	99.00	100.00	83.00
0.3000	98.00	85.00	98.00	100.00	81.00
0.1500	97.00	82.00	96.00	99.00	80.00
0.0750	68.00	73.00	92.00	79.00	78.00
0.0620	65.00	71.00	89.00	76.00	75.00
0.044	59.00	65.00	82.00	69.00	69.00
0.031	53.00	59.00	76.00	62.00	63.00
0.023	49.00	54.00	70.00	56.00	57.00
0.016	45.00	49.00	64.00	51.00	52.00
0.012	42.00	45.00	59.00	47.00	47.00
0.0088	38.00	41.00	54.00	43.00	43.00
0.0062	35.00	38.00	48.00	39.00	39.00
0.0044	32.00	35.00	42.00	35.00	36.00
0.0032	29.00	32.00	38.00	32.00	33.00
0.0023	26.00	29.00	34.00	29.00	30.00
0.002	25.00	28.00	33.00	28.00	29.00
0.0014	23.00	26.00	31.00	26.00	27.00

Y	0	32	43	25
Z	5	22	45	28
AA	0	8	59	33
AB	0	21	51	28
AC	11	11	49	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A-25) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 25	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	32	43	25	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
A 25	3.00 - 3.60	SPT 2	-----	-----	-----	CL	5	22	45	28	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 25	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	8	59	33	29	14	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 25	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	21	51	28	25	11	14	-----	-----	-----	-----	-----	-----	-----	2.65	
A 25	12.00 - 12.60	SPT 8	-----	-----	-----	CL	11	11	49	29	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

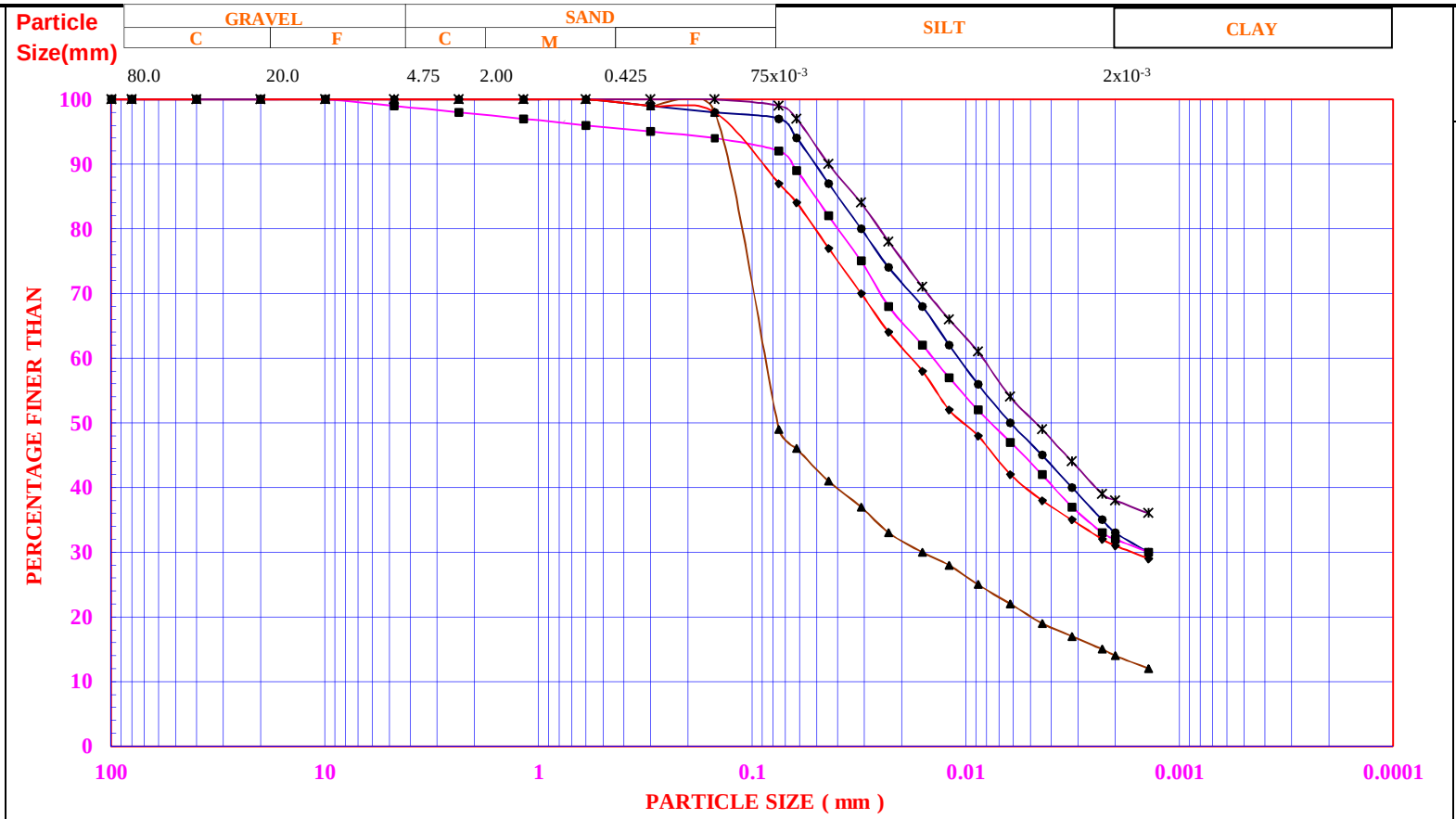
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No .A26)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A26	1.50 - 2.10	**CL**	0	3	64	33	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	A26	3.00 - 3.60	**CL**	1	7	60	32	-----	-----	-----	-----	-----	27	10	17	SPT 2
▲—▲	A26	4.50 - 5.10	**SC**	0	51	35	14	-----	-----	-----	-----	-----	19	8	11	SPT 3
✳—✳	A26	7.50 - 8.10	**CL**	0	1	61	38	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	A26	12.00 - 12.60	**CL**	0	13	56	31	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A26	A26	A26	A26	A26
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	99.00	100.00	100.00	100.00
2.3600	100.00	98.00	100.00	100.00	100.00
1.1800	100.00	97.00	100.00	100.00	100.00
0.6000	100.00	96.00	100.00	100.00	100.00
0.3000	99.00	95.00	99.00	100.00	99.00
0.1500	98.00	94.00	98.00	100.00	98.00
0.0750	97.00	92.00	49.00	99.00	87.00
0.0620	94.00	89.00	46.00	97.00	84.00
0.044	87.00	82.00	41.00	90.00	77.00
0.031	80.00	75.00	37.00	84.00	70.00
0.023	74.00	68.00	33.00	78.00	64.00
0.016	68.00	62.00	30.00	71.00	58.00
0.012	62.00	57.00	28.00	66.00	52.00
0.0088	56.00	52.00	25.00	61.00	48.00
0.0062	50.00	47.00	22.00	54.00	42.00
0.0044	45.00	42.00	19.00	49.00	38.00
0.0032	40.00	37.00	17.00	44.00	35.00
0.0023	35.00	33.00	15.00	39.00	32.00
0.002	33.00	32.00	14.00	38.00	31.00
0.0014	30.00	30.00	12.00	36.00	29.00

Y	0	3	64	33
Z	1	7	60	32
AA	0	51	35	14
AB	0	1	61	38
AC	0	13	56	31

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No .A26) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A26	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	3	64	33	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
A26	3.00 - 3.60	SPT 2	-----	-----	-----	CL	1	7	60	32	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
A26	4.50 - 5.10	SPT 3	-----	-----	-----	SC	0	51	35	14	19	8	11	-----	-----	-----	-----	-----	-----	-----	2.66	
A26	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	1	61	38	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A26	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	13	56	31	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

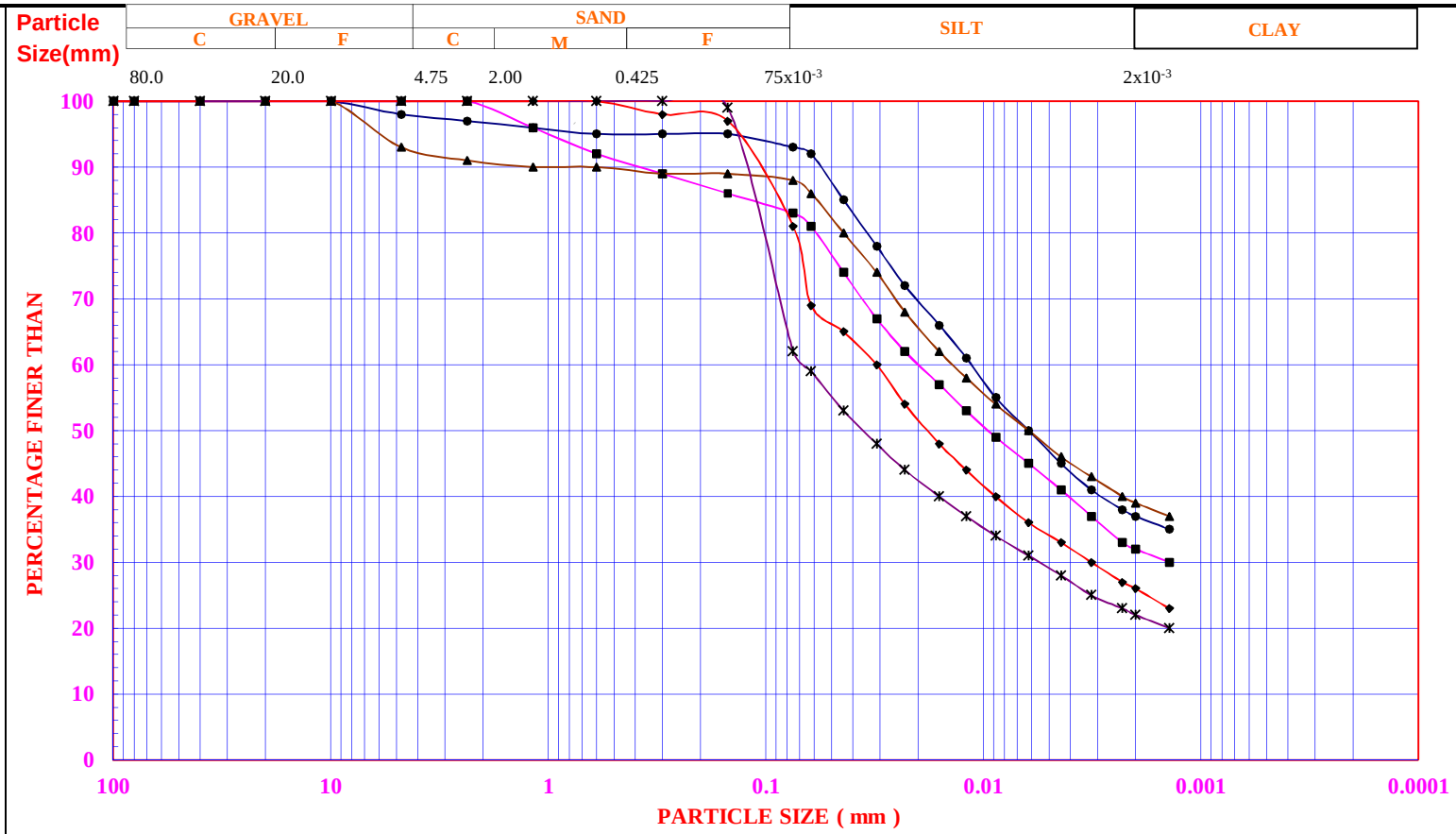
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Chainage No A 27)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 27	1.50 - 2.10	CL	2	5	56	37	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	A 27	3.00 - 3.60	CL	0	17	51	32	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	A 27	4.50 - 5.10	CL	7	5	49	39	-----	-----	-----	-----	-----	26	11	15	SPT 3
✳—✳	A 27	7.50 - 8.10	CL	0	38	40	22	-----	-----	-----	-----	-----	27	13	14	SPT 5
◆—◆	A 27	12.00 - 12.60	CL	0	19	55	26	-----	-----	-----	-----	-----	29	12	17	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 27	A 27	A 27	A 27	A 27
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	93.00	100.00	100.00
2.3600	97.00	100.00	91.00	100.00	100.00
1.1800	96.00	96.00	90.00	100.00	100.00
0.6000	95.00	92.00	90.00	100.00	100.00
0.3000	95.00	89.00	89.00	100.00	98.00
0.1500	95.00	86.00	89.00	99.00	97.00
0.0750	93.00	83.00	88.00	62.00	81.00
0.0620	92.00	81.00	86.00	59.00	69.00
0.044	85.00	74.00	80.00	53.00	65.00
0.031	78.00	67.00	74.00	48.00	60.00
0.023	72.00	62.00	68.00	44.00	54.00
0.016	66.00	57.00	62.00	40.00	48.00
0.012	61.00	53.00	58.00	37.00	44.00
0.0088	55.00	49.00	54.00	34.00	40.00
0.0062	50.00	45.00	50.00	31.00	36.00
0.0044	45.00	41.00	46.00	28.00	33.00
0.0032	41.00	37.00	43.00	25.00	30.00
0.0023	38.00	33.00	40.00	23.00	27.00
0.002	37.00	32.00	39.00	22.00	26.00
0.0014	35.00	30.00	37.00	20.00	23.00

Y	2	5	56	37
Z	0	17	51	32
AA	7	5	49	39
AB	0	38	40	22
AC	0	19	55	26

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Chainage No A 27) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 27	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	5	56	37	28	11	17	-----	-----	-----	-----	-----	-----	-----	2.65	
A 27	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	17	51	32	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 27	4.50 - 5.10	SPT 3	-----	-----	-----	CL	7	5	49	39	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 27	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	38	40	22	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 27	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	19	55	26	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	

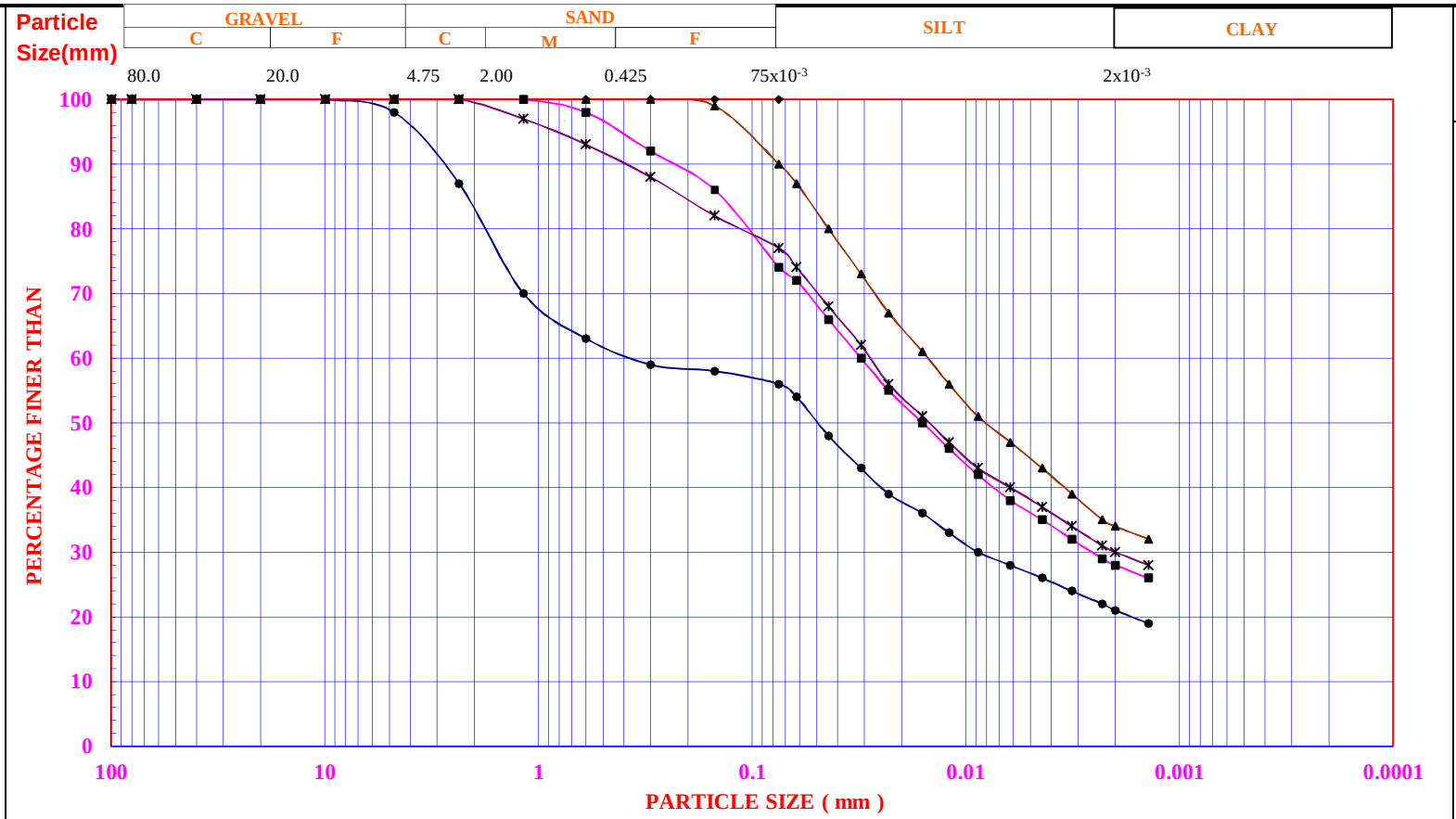
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 28/1)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 28/1	18.00 - 18.60	CL	2	42	35	21	-----	-----	-----	-----	-----	23	11	12	SPT 10
■—■	A 28/1	24.00 - 24.60	CL	0	26	46	28	-----	-----	-----	-----	-----	25	10	15	SPT 14
▲—▲	A 28/1	28.00 - 28.60	CL	0	10	56	34	-----	-----	-----	-----	-----	21	8	13	SPT 17
✳—✳	A 28/1	30.00 - 30.60	CL	0	23	47	30	-----	-----	-----	-----	-----	24	10	14	SPT 18
◆—◆																

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 28/1	A 28/1	A 28/1	A 28/1	0
	18.00 - 18.60	24.00 - 24.60	28.00 - 28.60	30.00 - 30.60	0.00
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	100.00	100.00
2.3600	87.00	100.00	100.00	100.00	100.00
1.1800	70.00	100.00	100.00	97.00	100.00
0.6000	63.00	98.00	100.00	93.00	100.00
0.3000	59.00	92.00	100.00	88.00	100.00
0.1500	58.00	86.00	99.00	82.00	100.00
0.0750	56.00	74.00	90.00	77.00	100.00
0.0620	54.00	72.00	87.00	74.00	
0.044	48.00	66.00	80.00	68.00	
0.031	43.00	60.00	73.00	62.00	
0.023	39.00	55.00	67.00	56.00	
0.016	36.00	50.00	61.00	51.00	
0.012	33.00	46.00	56.00	47.00	
0.0088	30.00	42.00	51.00	43.00	
0.0062	28.00	38.00	47.00	40.00	
0.0044	26.00	35.00	43.00	37.00	
0.0032	24.00	32.00	39.00	34.00	
0.0023	22.00	29.00	35.00	31.00	
0.002	21.00	28.00	34.00	30.00	
0.0014	19.00	26.00	32.00	28.00	

Y	2	42	35	21
Z	0	26	46	28
AA	0	10	56	34
AB	0	23	47	30
AC	0	0	100	100

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 28/1) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 28/1	18.00 - 18.60	SPT 10	-----	-----	-----	CL	2	42	35	21	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/1	24.00 - 24.60	SPT 14	-----	-----	-----	CL	0	26	46	28	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/1	28.00 - 28.60	SPT 17	-----	-----	-----	CL	0	10	56	34	21	8	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/1	30.00 - 30.60	SPT 18	-----	-----	-----	CL	0	23	47	30	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

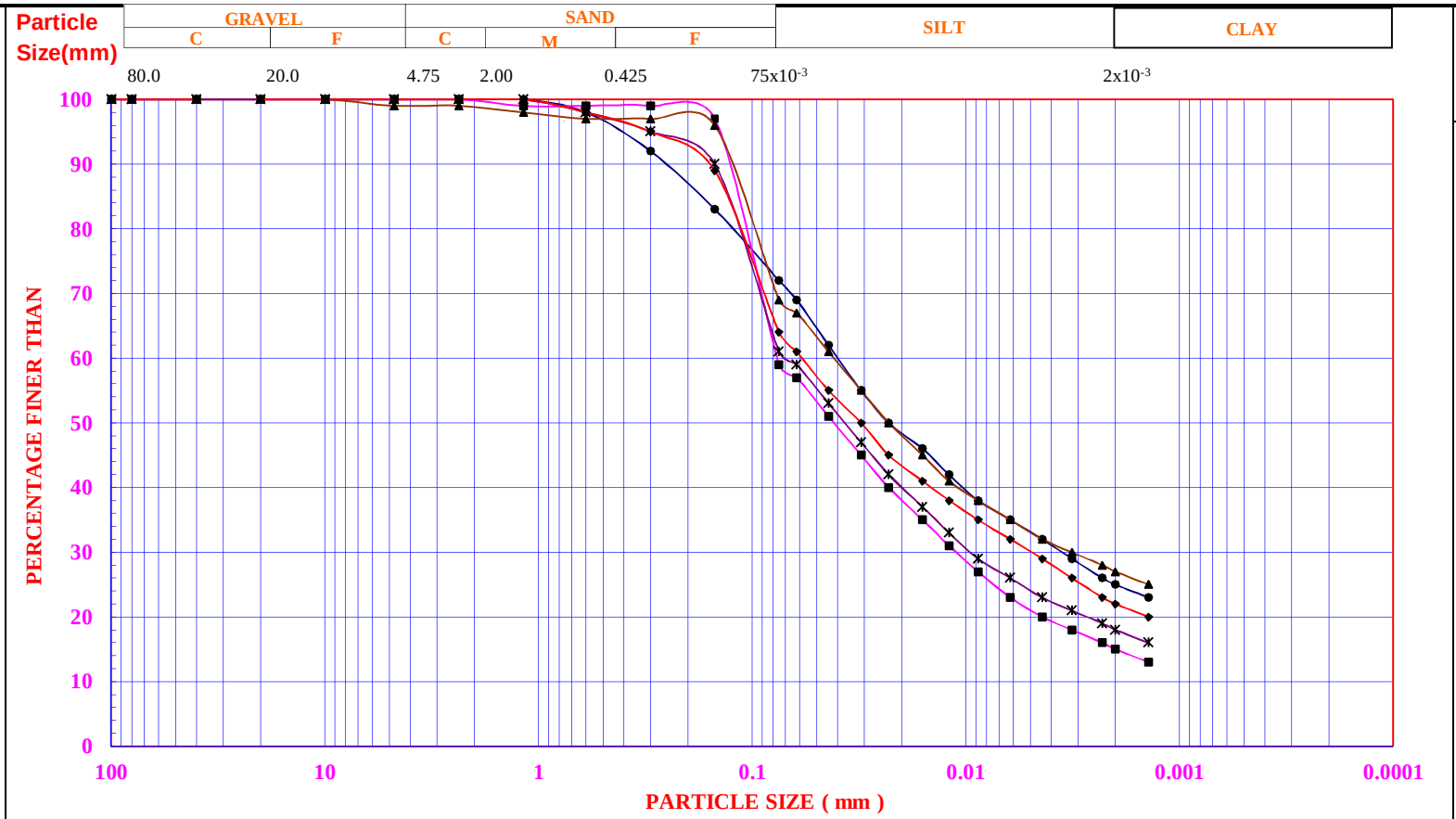
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (CH :A 28/2)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 28/2	1.50 - 2.10	CL	0	28	47	25	-----	-----	-----	-----	-----	29	12	17	SPT 1
■—■	A 28/2	3.00 - 3.60	CL	0	41	44	15	-----	-----	-----	-----	-----	24	10	14	SPT 2
▲—▲	A 28/2	6.00 - 6.60	CL	1	30	42	27	-----	-----	-----	-----	-----	26	11	15	SPT 4
✳—✳	A 28/2	9.00 - 9.60	CL	0	39	43	18	-----	-----	-----	-----	-----	22	9	13	SPT 6
◆—◆	A 28/2	10.50 - 11.10	CL	0	36	42	22	-----	-----	-----	-----	-----	25	11	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 28/2	A 28/2	A 28/2	A 28/2	A 28/2
	1.50 - 2.10	3.00 - 3.60	6.00 - 6.60	9.00 - 9.60	10.50 - 11.10
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	99.00	100.00	100.00
2.3600	100.00	100.00	99.00	100.00	100.00
1.1800	100.00	99.00	98.00	100.00	100.00
0.6000	98.00	99.00	97.00	98.00	98.00
0.3000	92.00	99.00	97.00	95.00	95.00
0.1500	83.00	97.00	96.00	90.00	89.00
0.0750	72.00	59.00	69.00	61.00	64.00
0.0620	69.00	57.00	67.00	59.00	61.00
0.044	62.00	51.00	61.00	53.00	55.00
0.031	55.00	45.00	55.00	47.00	50.00
0.023	50.00	40.00	50.00	42.00	45.00
0.016	46.00	35.00	45.00	37.00	41.00
0.012	42.00	31.00	41.00	33.00	38.00
0.0088	38.00	27.00	38.00	29.00	35.00
0.0062	35.00	23.00	35.00	26.00	32.00
0.0044	32.00	20.00	32.00	23.00	29.00
0.0032	29.00	18.00	30.00	21.00	26.00
0.0023	26.00	16.00	28.00	19.00	23.00
0.002	25.00	15.00	27.00	18.00	22.00
0.0014	23.00	13.00	25.00	16.00	20.00

Y	0	28	47	25
Z	0	41	44	15
AA	1	30	42	27
AB	0	39	43	18
AC	0	36	42	22

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (CH :A 28/2) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 28/2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	28	47	25	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.65	
A 28/2	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	41	44	15	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/2	6.00 - 6.60	SPT 4	-----	-----	-----	CL	1	30	42	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/2	9.00 - 9.60	SPT 6	-----	-----	-----	CL	0	39	43	18	22	9	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 28/2	10.50 - 11.10	SPT 7	-----	-----	-----	CL	0	36	42	22	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

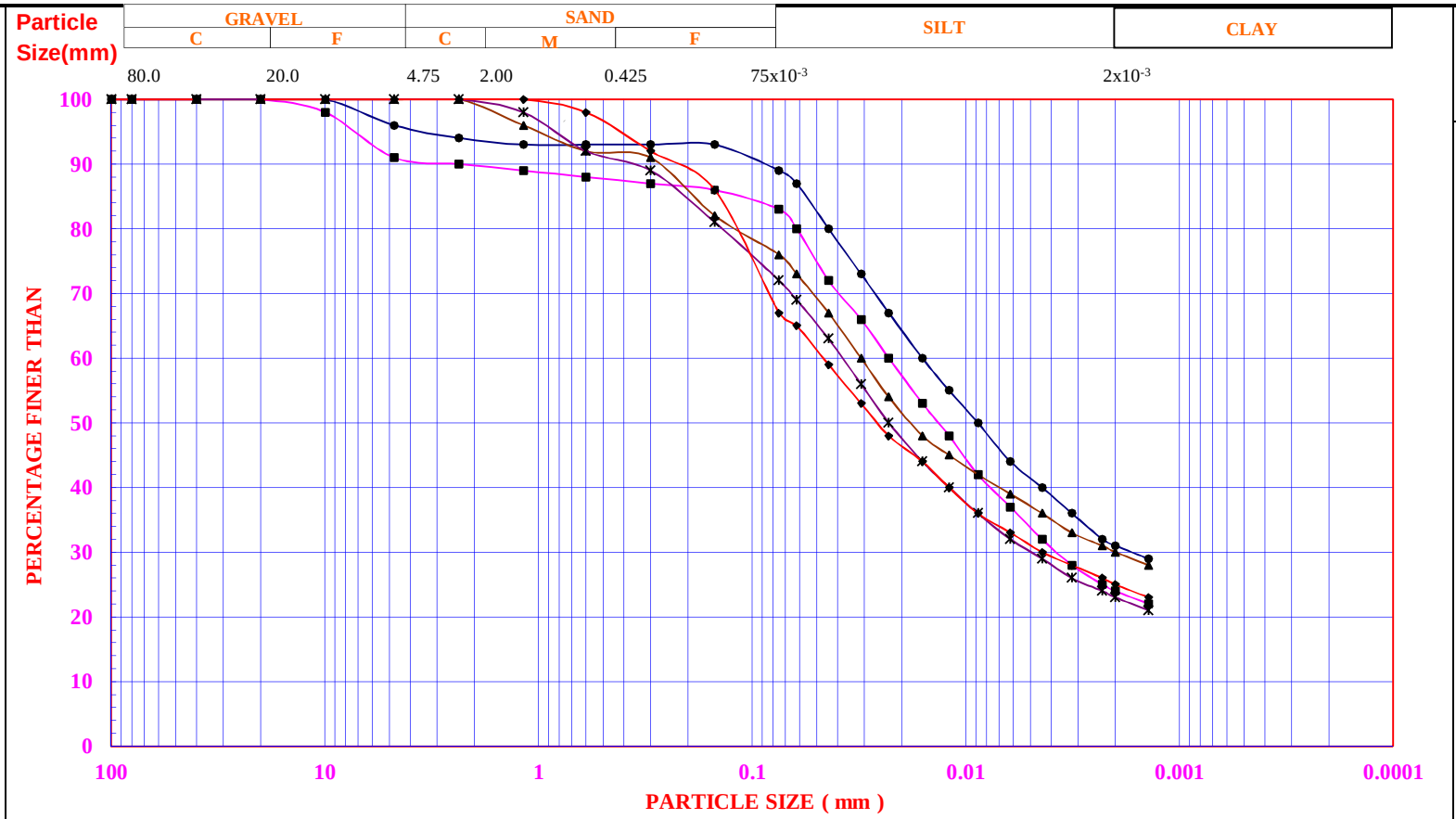
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Chainage No. A29)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
—●—●—	A29	1.50 - 2.10	CL	4	7	58	31	-----	-----	-----	-----	-----	25	12	13	SPT 1
—■—■—	A29	3.00 - 3.60	CL	9	8	59	24	-----	-----	-----	-----	-----	26	11	15	SPT 2
—▲—▲—	A29	4.50 - 5.10	CL	0	24	46	30	-----	-----	-----	-----	-----	29	12	17	SPT 3
—✳—✳—	A29	7.50 - 8.10	CL	0	28	49	23	-----	-----	-----	-----	-----	27	13	14	SPT 5
—◆—◆—	A29	12.00 - 12.60	CL	0	33	42	25	-----	-----	-----	-----	-----	23	10	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A29	A29	A29	A29	A29
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	98.00	100.00	100.00	100.00
4.7500	96.00	91.00	100.00	100.00	100.00
2.3600	94.00	90.00	100.00	100.00	100.00
1.1800	93.00	89.00	96.00	98.00	100.00
0.6000	93.00	88.00	92.00	92.00	98.00
0.3000	93.00	87.00	91.00	89.00	92.00
0.1500	93.00	86.00	82.00	81.00	86.00
0.0750	89.00	83.00	76.00	72.00	67.00
0.0620	87.00	80.00	73.00	69.00	65.00
0.044	80.00	72.00	67.00	63.00	59.00
0.031	73.00	66.00	60.00	56.00	53.00
0.023	67.00	60.00	54.00	50.00	48.00
0.016	60.00	53.00	48.00	44.00	44.00
0.012	55.00	48.00	45.00	40.00	40.00
0.0088	50.00	42.00	42.00	36.00	36.00
0.0062	44.00	37.00	39.00	32.00	33.00
0.0044	40.00	32.00	36.00	29.00	30.00
0.0032	36.00	28.00	33.00	26.00	28.00
0.0023	32.00	25.00	31.00	24.00	26.00
0.002	31.00	24.00	30.00	23.00	25.00
0.0014	29.00	22.00	28.00	21.00	23.00

Y	4	7	58	31
Z	9	8	59	24
AA	0	24	46	30
AB	0	28	49	23
AC	0	33	42	25

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No. A29) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A29	1.50 - 2.10	SPT 1	-----	-----	-----	CL	4	7	58	31	25	12	13	-----	-----	-----	-----	-----	-----	-----	2.66	
A29	3.00 - 3.60	SPT 2	-----	-----	-----	CL	9	8	59	24	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
A29	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	24	46	30	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
A29	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	28	49	23	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
A29	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	33	42	25	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

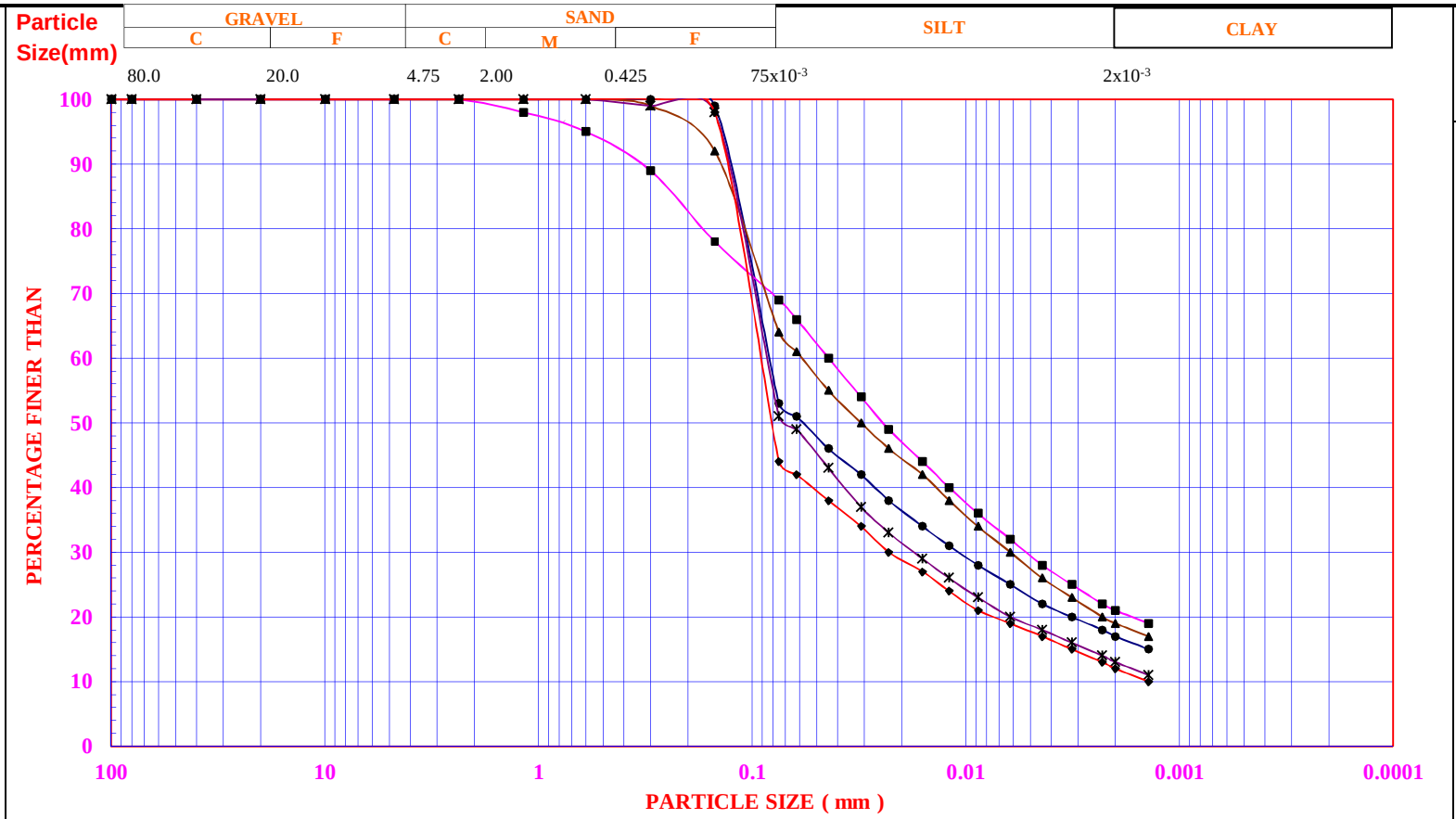
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Chainage No .A 30)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A 30	1.50 - 2.10	**CL**	0	47	36	17	-----	-----	-----	-----	-----	21	8	13	SPT 1
■—■	A 30	3.00 - 3.50	**CL**	0	31	48	21	-----	-----	-----	-----	-----	24	11	13	SPT 2
▲—▲	A 30	4.50 - 5.10	**CL**	0	36	45	19	-----	-----	-----	-----	-----	26	12	14	SPT 3
✳—✳	A 30	7.50 - 8.10	**CL**	0	49	38	13	-----	-----	-----	-----	-----	23	11	12	SPT 5
◆—◆	A 30	12.00 - 12.60	**SC**	0	56	32	12	-----	-----	-----	-----	-----	17	7	10	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A 30	A 30	A 30	A 30	A 30
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	98.00	100.00	100.00	100.00
0.6000	100.00	95.00	100.00	100.00	100.00
0.3000	100.00	89.00	99.00	99.00	100.00
0.1500	99.00	78.00	92.00	98.00	98.00
0.0750	53.00	69.00	64.00	51.00	44.00
0.0620	51.00	66.00	61.00	49.00	42.00
0.044	46.00	60.00	55.00	43.00	38.00
0.031	42.00	54.00	50.00	37.00	34.00
0.023	38.00	49.00	46.00	33.00	30.00
0.016	34.00	44.00	42.00	29.00	27.00
0.012	31.00	40.00	38.00	26.00	24.00
0.0088	28.00	36.00	34.00	23.00	21.00
0.0062	25.00	32.00	30.00	20.00	19.00
0.0044	22.00	28.00	26.00	18.00	17.00
0.0032	20.00	25.00	23.00	16.00	15.00
0.0023	18.00	22.00	20.00	14.00	13.00
0.002	17.00	21.00	19.00	13.00	12.00
0.0014	15.00	19.00	17.00	11.00	10.00

Y	0	47	36	17
Z	0	31	48	21
AA	0	36	45	19
AB	0	49	38	13
AC	0	56	32	12

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No .A 30) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A 30	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	47	36	17	21	8	13	-----	-----	-----	-----	-----	-----	-----	2.66	
A 30	3.00 - 3.50	SPT 2	-----	-----	-----	CL	0	31	48	21	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
A 30	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	36	45	19	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
A 30	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	49	38	13	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	
A 30	12.00 - 12.60	SPT 8	-----	-----	-----	SC	0	56	32	12	17	7	10	-----	-----	-----	-----	-----	-----	-----	-----	

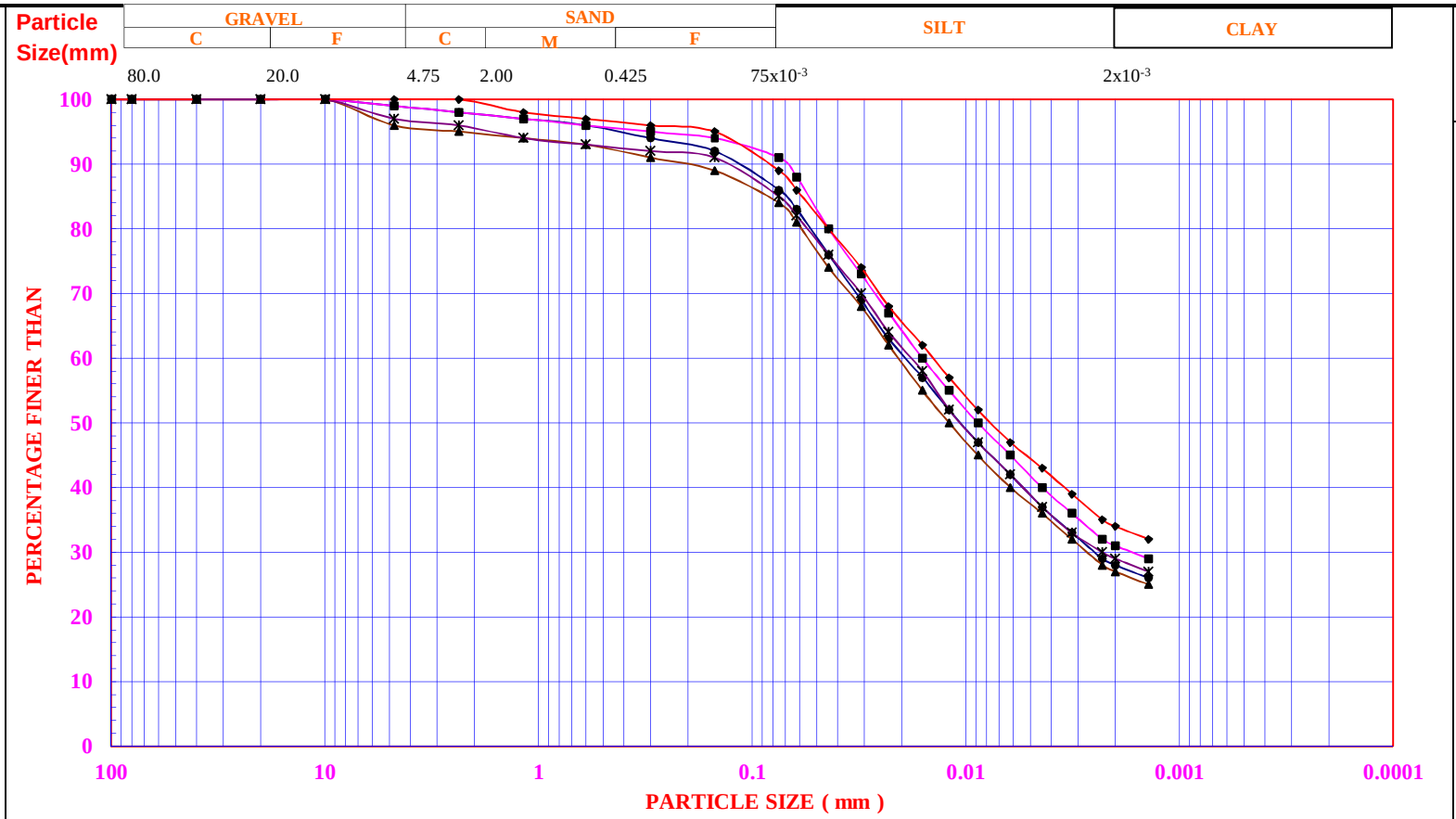
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass **(Bore Hole No .S1) (River)**



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S 1	1.50 - 2.10	CL	1	13	58	28	-----	-----	-----	-----	-----	29	12	17	SPT 1
■—■	S 1	3.00 - 3.60	CL	1	8	60	31	-----	-----	-----	-----	-----	26	11	15	SPT 2
▲—▲	S 1	4.50 - 5.10	CL	4	12	57	27	-----	-----	-----	-----	-----	27	13	14	SPT 3
✳—✳	S 1	7.50 - 8.10	CL	3	12	56	29	-----	-----	-----	-----	-----	24	11	13	SPT 5
◆—◆	S 1	12.00 - 12.60	CL	0	11	55	34	-----	-----	-----	-----	-----	25	10	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S 1	S 1	S 1	S 1	S 1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	99.00	96.00	97.00	100.00
2.3600	98.00	98.00	95.00	96.00	100.00
1.1800	97.00	97.00	94.00	94.00	98.00
0.6000	96.00	96.00	93.00	93.00	97.00
0.3000	94.00	95.00	91.00	92.00	96.00
0.1500	92.00	94.00	89.00	91.00	95.00
0.0750	86.00	91.00	84.00	85.00	89.00
0.0620	83.00	88.00	81.00	82.00	86.00
0.044	76.00	80.00	74.00	76.00	80.00
0.031	69.00	73.00	68.00	70.00	74.00
0.023	63.00	67.00	62.00	64.00	68.00
0.016	57.00	60.00	55.00	58.00	62.00
0.012	52.00	55.00	50.00	52.00	57.00
0.0088	47.00	50.00	45.00	47.00	52.00
0.0062	42.00	45.00	40.00	42.00	47.00
0.0044	37.00	40.00	36.00	37.00	43.00
0.0032	33.00	36.00	32.00	33.00	39.00
0.0023	29.00	32.00	28.00	30.00	35.00
0.002	28.00	31.00	27.00	29.00	34.00
0.0014	26.00	29.00	25.00	27.00	32.00

Y	1	13	58	28
Z	1	8	60	31
AA	4	12	57	27
AB	3	12	56	29
AC	0	11	55	34

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Bore Hole No .S1) (River) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S 1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	13	58	28	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.66	
S 1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	1	8	60	31	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	4.50 - 5.10	SPT 3	-----	-----	-----	CL	4	12	57	27	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	3	12	56	29	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	11	55	34	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	

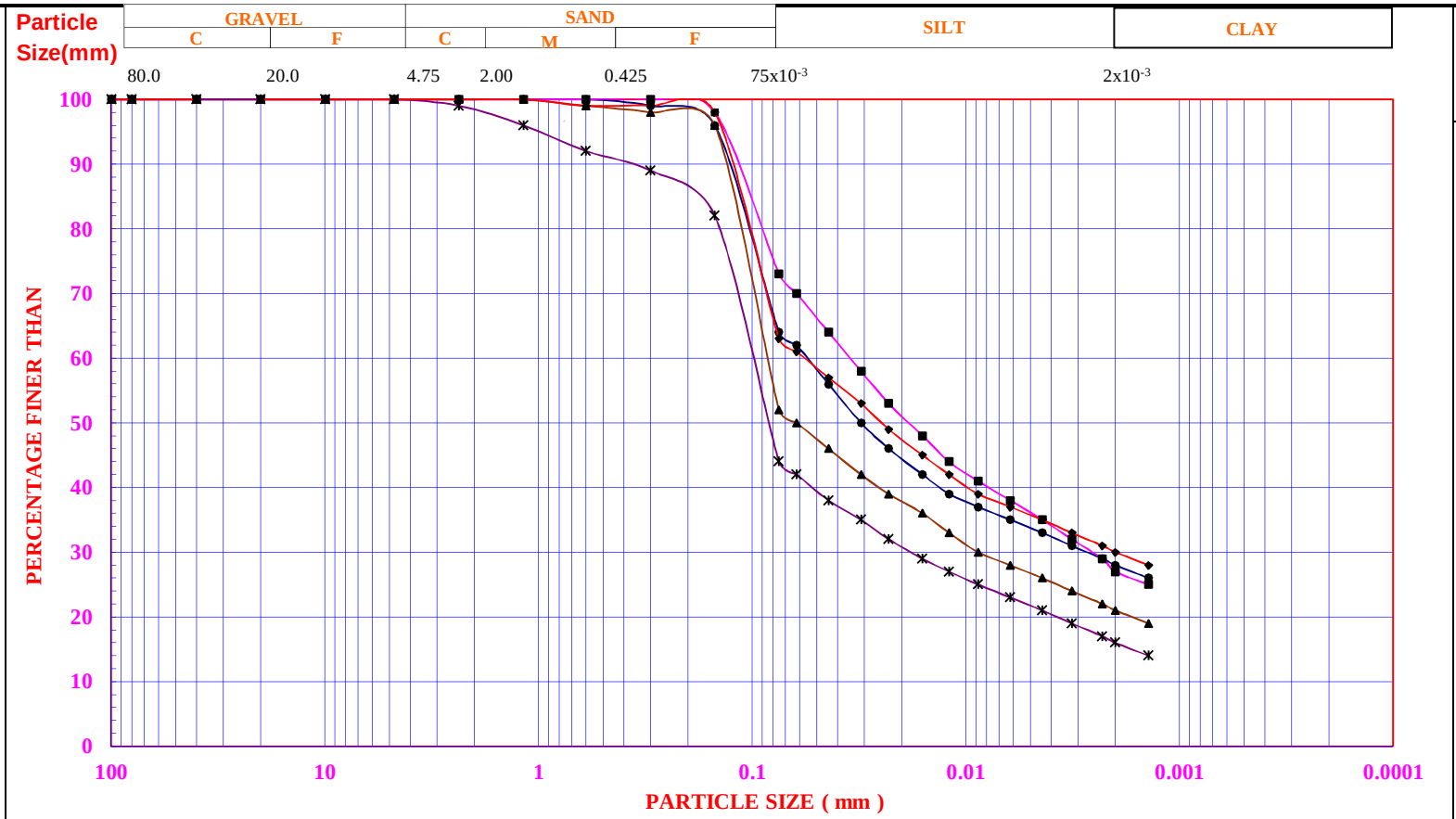
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Chainage No.S2) (River)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S2	1.50 - 2.10	CL	0	36	36	28	-----	-----	-----	-----	-----	23	10	13	SPT 1
■—■	S2	3.00 - 3.60	CL	0	27	46	27	-----	-----	-----	-----	-----	26	12	14	SPT 2
▲—▲	S2	4.50 - 5.10	CL	0	48	31	21	-----	-----	-----	-----	-----	29	11	18	SPT 3
✳—✳	S2	7.50 - 8.10	SC	0	56	28	16	-----	-----	-----	-----	-----	18	7	11	SPT 5
◆—◆	S2	12.00 - 12.60	CL	0	37	33	30	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S2	S2	S2	S2	S2
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	99.00	100.00
1.1800	100.00	100.00	100.00	96.00	100.00
0.6000	100.00	100.00	99.00	92.00	99.00
0.3000	99.00	100.00	98.00	89.00	99.00
0.1500	96.00	98.00	96.00	82.00	98.00
0.0750	64.00	73.00	52.00	44.00	63.00
0.0620	62.00	70.00	50.00	42.00	61.00
0.044	56.00	64.00	46.00	38.00	57.00
0.031	50.00	58.00	42.00	35.00	53.00
0.023	46.00	53.00	39.00	32.00	49.00
0.016	42.00	48.00	36.00	29.00	45.00
0.012	39.00	44.00	33.00	27.00	42.00
0.0088	37.00	41.00	30.00	25.00	39.00
0.0062	35.00	38.00	28.00	23.00	37.00
0.0044	33.00	35.00	26.00	21.00	35.00
0.0032	31.00	32.00	24.00	19.00	33.00
0.0023	29.00	29.00	22.00	17.00	31.00
0.002	28.00	27.00	21.00	16.00	30.00
0.0014	26.00	25.00	19.00	14.00	28.00

Y	0	36	36	28
Z	0	27	46	27
AA	0	48	31	21
AB	0	56	28	16
AC	0	37	33	30

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No.S2) (River) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	36	36	28	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	
S2	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	27	46	27	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
S2	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	48	31	21	29	11	18	-----	-----	-----	-----	-----	-----	-----	2.66	
S2	7.50 - 8.10	SPT 5	-----	-----	-----	SC	0	56	28	16	18	7	11	-----	-----	-----	-----	-----	-----	-----	-----	
S2	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	37	33	30	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

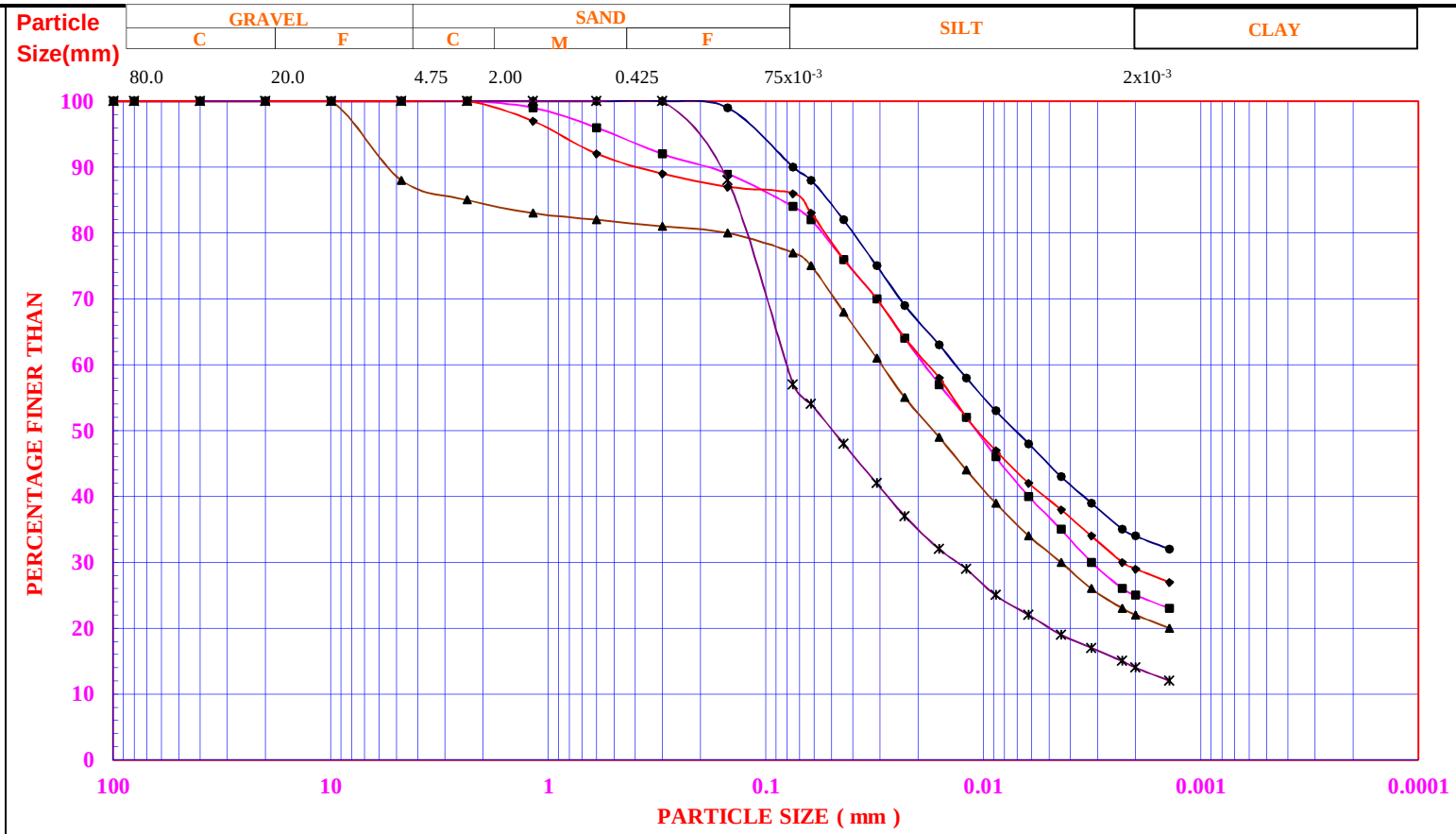
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Allahabad Bypass (Chainage No .S3) (River)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S3	1.50 - 2.10	CL	0	10	56	34	-----	-----	-----	-----	-----	24	10	14	SPT 1
■—■	S3	3.00 - 3.60	CL	0	16	59	25	-----	-----	-----	-----	-----	26	11	15	SPT 2
▲—▲	S3	4.50 - 5.10	CL	12	11	55	22	-----	-----	-----	-----	-----	27	10	17	SPT 3
✳—✳	S3	7.50 - 8.10	CL	0	43	43	14	-----	-----	-----	-----	-----	28	13	15	SPT 5
◆—◆	S3	12.00 - 12.60	CL	0	14	57	29	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S3	S3	S3	S3	S3
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	88.00	100.00	100.00
2.3600	100.00	100.00	85.00	100.00	100.00
1.1800	100.00	99.00	83.00	100.00	97.00
0.6000	100.00	96.00	82.00	100.00	92.00
0.3000	100.00	92.00	81.00	100.00	89.00
0.1500	99.00	89.00	80.00	88.00	87.00
0.0750	90.00	84.00	77.00	57.00	86.00
0.0620	88.00	82.00	75.00	54.00	83.00
0.044	82.00	76.00	68.00	48.00	76.00
0.031	75.00	70.00	61.00	42.00	70.00
0.023	69.00	64.00	55.00	37.00	64.00
0.016	63.00	57.00	49.00	32.00	58.00
0.012	58.00	52.00	44.00	29.00	52.00
0.0088	53.00	46.00	39.00	25.00	47.00
0.0062	48.00	40.00	34.00	22.00	42.00
0.0044	43.00	35.00	30.00	19.00	38.00
0.0032	39.00	30.00	26.00	17.00	34.00
0.0023	35.00	26.00	23.00	15.00	30.00
0.002	34.00	25.00	22.00	14.00	29.00
0.0014	32.00	23.00	20.00	12.00	27.00

Y	0	10	56	34
Z	0	16	59	25
AA	12	11	55	22
AB	0	43	43	14
AC	0	14	57	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Allahabad Bypass (Chainage No .S3) (River) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S3	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	10	56	34	24	10	14	-----	-----	-----	-----	-----	-----	-----	2.66	
S3	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	16	59	25	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
S3	4.50 - 5.10	SPT 3	-----	-----	-----	CL	12	11	55	22	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
S3	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	43	43	14	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
S3	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	14	57	29	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

Bharwari Detour

Bharwari Detour
Bore Logs

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 1(B1)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 25/10/08 to 26/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	9	13	17	22			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	7	11	13	18	24			
				3.60									
4.00													
				4.50	SPT	8	11	15	19	26			
				5.10									
5.00			Medium Clayey Sand										
6.00				6.00	SPT	7	12	18	22	30			
				6.60									
7.00													
				7.50	SPT	10	14	19	25	33			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	11	16	20	27	36			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 1(B1)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 25/10/08 to 26/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**17**	**21**	**28**	**38**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**12**	**18**	**23**	**31**	**41**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 2 (B2)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 25/10/08 to 26/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Very Stiff Silty Clay	1.50	SPT	9	10	13	21	23			
2.00				2.10									
3.00				3.00	SPT	10	13	14	24	27			
4.00				3.60									
				4.50	SPT	11	13	17	25	30			
5.00				5.10									
6.00				6.00	SPT	13	14	19	28	33			
7.00			Hard Silty Clay	6.60									
				7.50	SPT	12	15	20	26	35			
8.00				8.10									
9.00				9.00	SPT	14	16	22	33	38			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 2 (B2)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 25/10/08 to 26/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**10**	**25**	**38**	**35**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**17**	**21**	**28**	**39**	**49**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 3 (B3)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 26/10/08 to 27/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	9	13	19	22			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	9	13	13	22	36			
				3.60									
4.00													
				4.50	SPT	8	13	16	22	29			
				5.10									
5.00													
6.00				6.00	SPT	11	15	19	26	34			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	10	16	20	28	36			
				8.10									
8.00													
9.00				9.00	SPT	12	15	22	30	37			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 3 (B3)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 26/10/08 to 27/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**9**	**18**	**23**	**32**	**41**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**13**	**17**	**26**	**37**	**43**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 4 (B4)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 26/10/08 to 27/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	10	13	16	22	22			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	SPT	11	13	15	30	28			
				3.60									
4.00													
				4.50	SPT	9	14	18	26	32			
				5.10									
5.00													
6.00				6.00	SPT	13	17	21	28	38			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	12	15	19	29	34			
				8.10									
8.00													
9.00				9.00	SPT	11	16	21	30	37			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 4 (B4)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 26/10/08 to 27/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**17**	**24**	**32**	**41**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**19**	**26**	**37**	**45**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 5 (B5)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00				1.50	SPT	6	8	9	12	22			
2.00				2.10									
3.00				3.00	SPT	7	9	11	14	20			
4.00			Very Stiff Silty Clay	3.60									
				4.50	SPT	7	9	12	15	21			
5.00				5.10									
6.00				6.00	SPT	13	15	18	24	33			
7.00				6.60									
				7.50	SPT	17	19	21	29	40			
8.00				8.10									
9.00			Hard Silty Clay	9.00	SPT	15	20	24	33	44			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 5 (B5)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**18**	**21**	**22**	**30**	**43**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**20**	**24**	**22**	**33**	**46**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 6 (B6)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	8	12	16	19	28			
			Very Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS	12	14	17	24	31			
				3.50									
4.00													
				4.50	SPT	12	17	19	24	35			
				5.10									
5.00													
6.00				6.00	SPT	11	18	22	29	40			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	18	16	25	31	41			
				8.10									
8.00													
9.00				9.00	SPT	14	18	26	35	44			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 6 (B6)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**21**	**23**	**33**	**44**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**19**	**24**	**23**	**36**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 7 (B7)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	7	10	13	17			
2.00				2.10									
3.00				3.00	UDS	7	9	16	18	25			
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	10	13	15	17	28			
				5.10									
5.00													
6.00				6.00	SPT	13	15	16	19	31			
				6.60									
7.00													
				7.50	SPT	18	17	20	25	37			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	15	20	20	28	40			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 7 (B7)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 29/10/08 to 30/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**17**	**18**	**23**	**30**	**41**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**20**	**23**	**22**	**34**	**45**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----
Chkd. By : --
Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 8 (B8)	SHEET NO. : 1 OF 2
LOCATION :	DATE : 30/10/08 to 31/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	5	7	11	12			
2.00				2.10									
3.00				3.00	UDS								
			Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	9	11	14	18	25			
				5.10									
5.00													
6.00				6.00	SPT	12	10	13	19	23			
			Very Stiff Silty Clay	6.60									
7.00													
				7.50	SPT	15	16	14	23	30			
				8.10									
8.00													
9.00				9.00	SPT	19	17	19	24	36			
			Hard Silty Clay	9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Bharwari Bypass	
BORE HOLE NO. : 8 (B8)	SHEET NO. : 2 OF 2
LOCATION :	DATE : 30/10/08 to 31/10/08
CHAINAGE(km.) : B	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**23**	**20**	**21**	**29**	**41**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**25**	**24**	**23**	**33**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

Bharwari Detour
Chemical

CHEMICAL TEST RESULT OF SOIL SAMPLES.

SITE : **Geotechnical Investigation work for DFCCIL , Kanpur.**

LOCATION **BHARWARI BYPASS** **DATE**

SR NO.	BRIDGE NO	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
1	B1	1.50 - 2.10	SPT - 1	7.63	0.009	0.017	
2	B2	4.50 - 5.10	SPT - 2	7.84	0.012	0.021	
3	B3	1.50 - 2.10	SPT - 1	7.76	0.013	0.023	
4	B4	1.50 - 2.10	SPT - 1	7.81	0.010	0.014	
5	B5	4.50 - 5.10	SPT - 2	8.03	0.017	0.022	
6	B6	1.50 - 2.10	SPT - 1	7.89	0.011	0.019	
7	B7	7.50 - 8.10	SPT - 4	7.68	0.013	0.021	
8	B8	1.50 - 2.10	SPT - 1	7.73	0.009	0.015	

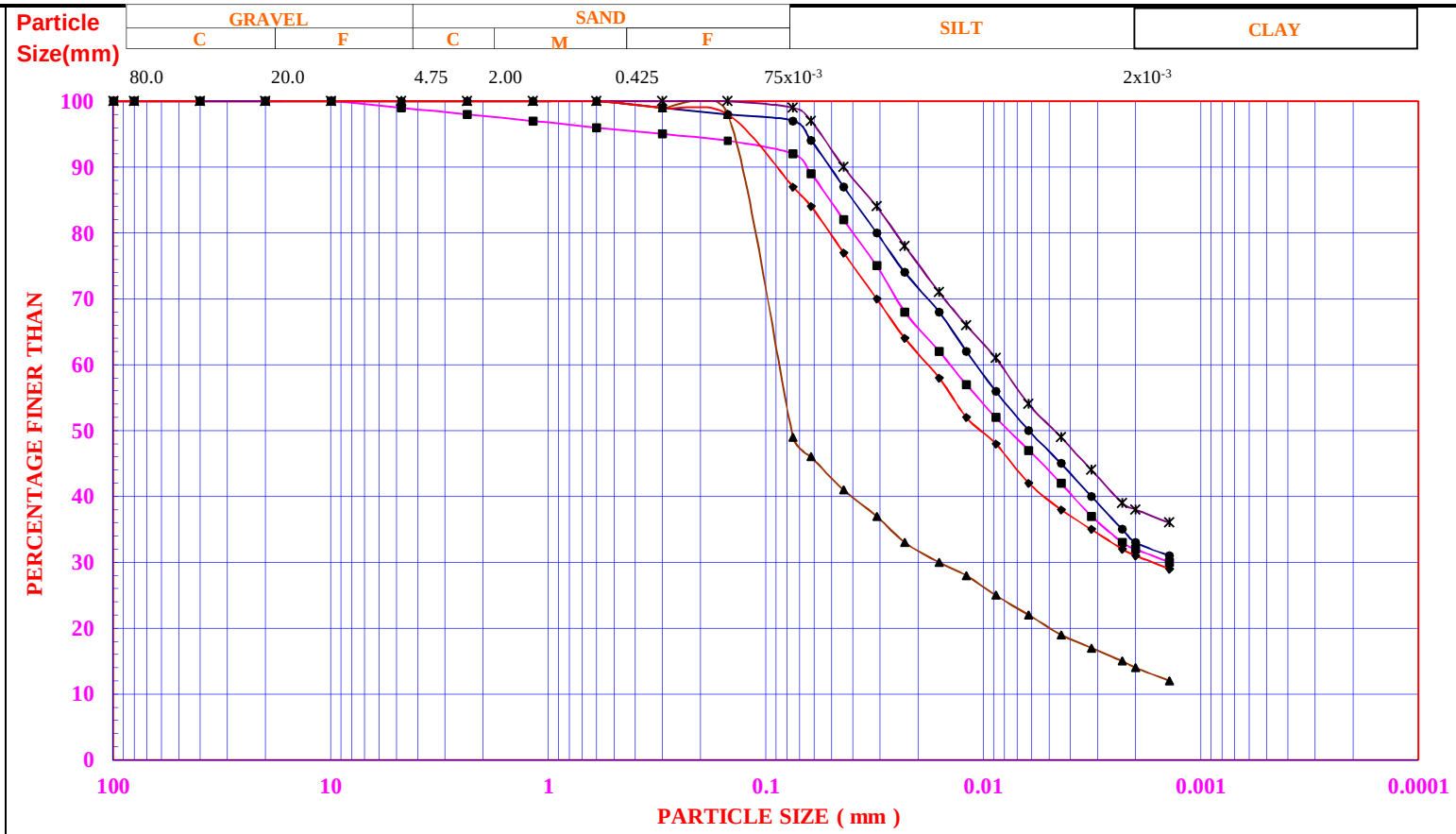
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD **Job No.** **8**

Bharwari Detour
GSA

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B1)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B1	1.50 - 2.10	**CL**	0	3	64	33	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	B1	3.00 - 3.60	**CL**	1	7	60	32	-----	-----	-----	-----	-----	27	10	17	SPT 2
▲—▲	B1	4.50 - 5.10	**SC**	0	51	35	14	-----	-----	-----	-----	-----	19	8	11	SPT 3
✳—✳	B1	7.50 - 8.10	**CL**	0	1	61	38	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	B1	12.00 - 12.60	**CL**	0	13	56	31	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B1	B1	B1	B1	B1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	99.00	100.00	100.00	100.00
2.3600	100.00	98.00	100.00	100.00	100.00
1.1800	100.00	97.00	100.00	100.00	100.00
0.6000	100.00	96.00	100.00	100.00	100.00
0.3000	99.00	95.00	99.00	100.00	99.00
0.1500	98.00	94.00	98.00	100.00	98.00
0.0750	97.00	92.00	49.00	99.00	87.00
0.0620	94.00	89.00	46.00	97.00	84.00
0.044	87.00	82.00	41.00	90.00	77.00
0.031	80.00	75.00	37.00	84.00	70.00
0.023	74.00	68.00	33.00	78.00	64.00
0.016	68.00	62.00	30.00	71.00	58.00
0.012	62.00	57.00	28.00	66.00	52.00
0.0088	56.00	52.00	25.00	61.00	48.00
0.0062	50.00	47.00	22.00	54.00	42.00
0.0044	45.00	42.00	19.00	49.00	38.00
0.0032	40.00	37.00	17.00	44.00	35.00
0.0023	35.00	33.00	15.00	39.00	32.00
0.002	33.00	32.00	14.00	38.00	31.00
0.0014	31.00	30.00	12.00	36.00	29.00

Y	0	3	64	33
Z	1	7	60	32
AA	0	51	35	14
AB	0	1	61	38
AC	0	13	56	31

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B1) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	3	64	33	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
B1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	1	7	60	32	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
B1	4.50 - 5.10	SPT 3	-----	-----	-----	SC	0	51	35	14	19	8	11	-----	-----	-----	-----	-----	-----	-----	2.66	
B1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	1	61	38	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
B1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	13	56	31	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

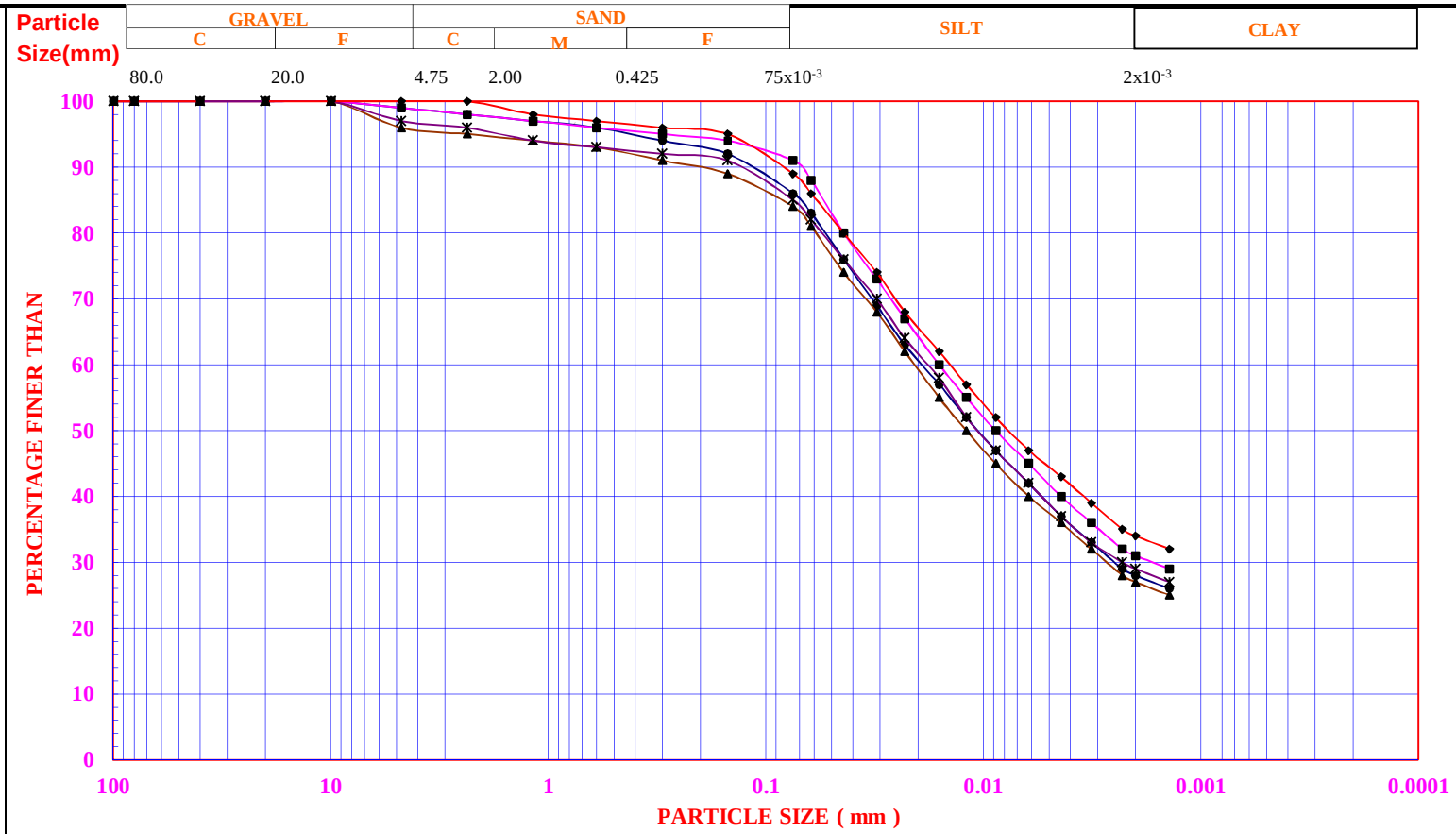
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B2)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B2	1.50 - 2.10	CL	1	13	58	28	-----	-----	-----	-----	-----	29	12	17	SPT 1
■—■	B2	3.00 - 3.60	CL	1	8	60	31	-----	-----	-----	-----	-----	26	11	15	SPT 2
▲—▲	B2	4.50 - 5.10	CL	4	12	57	27	-----	-----	-----	-----	-----	27	13	14	SPT 3
✳—✳	B2	7.50 - 8.10	CL	3	12	56	29	-----	-----	-----	-----	-----	24	11	13	SPT 5
◆—◆	B2	12.00 - 12.60	CL	0	11	55	34	-----	-----	-----	-----	-----	25	10	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B2	B2	B2	B2	B2
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	99.00	96.00	97.00	100.00
2.3600	98.00	98.00	95.00	96.00	100.00
1.1800	97.00	97.00	94.00	94.00	98.00
0.6000	96.00	96.00	93.00	93.00	97.00
0.3000	94.00	95.00	91.00	92.00	96.00
0.1500	92.00	94.00	89.00	91.00	95.00
0.0750	86.00	91.00	84.00	85.00	89.00
0.0620	83.00	88.00	81.00	82.00	86.00
0.044	76.00	80.00	74.00	76.00	80.00
0.031	69.00	73.00	68.00	70.00	74.00
0.023	63.00	67.00	62.00	64.00	68.00
0.016	57.00	60.00	55.00	58.00	62.00
0.012	52.00	55.00	50.00	52.00	57.00
0.0088	47.00	50.00	45.00	47.00	52.00
0.0062	42.00	45.00	40.00	42.00	47.00
0.0044	37.00	40.00	36.00	37.00	43.00
0.0032	33.00	36.00	32.00	33.00	39.00
0.0023	29.00	32.00	28.00	30.00	35.00
0.002	28.00	31.00	27.00	29.00	34.00
0.0014	26.00	29.00	25.00	27.00	32.00

Y	1	13	58	28
Z	1	8	60	31
AA	4	12	57	27
AB	3	12	56	29
AC	0	11	55	34

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B2) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	13	58	28	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.66	
B2	3.00 - 3.60	SPT 2	-----	-----	-----	CL	1	8	60	31	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
B2	4.50 - 5.10	SPT 3	-----	-----	-----	CL	4	12	57	27	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
B2	7.50 - 8.10	SPT 5	-----	-----	-----	CL	3	12	56	29	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
B2	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	11	55	34	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

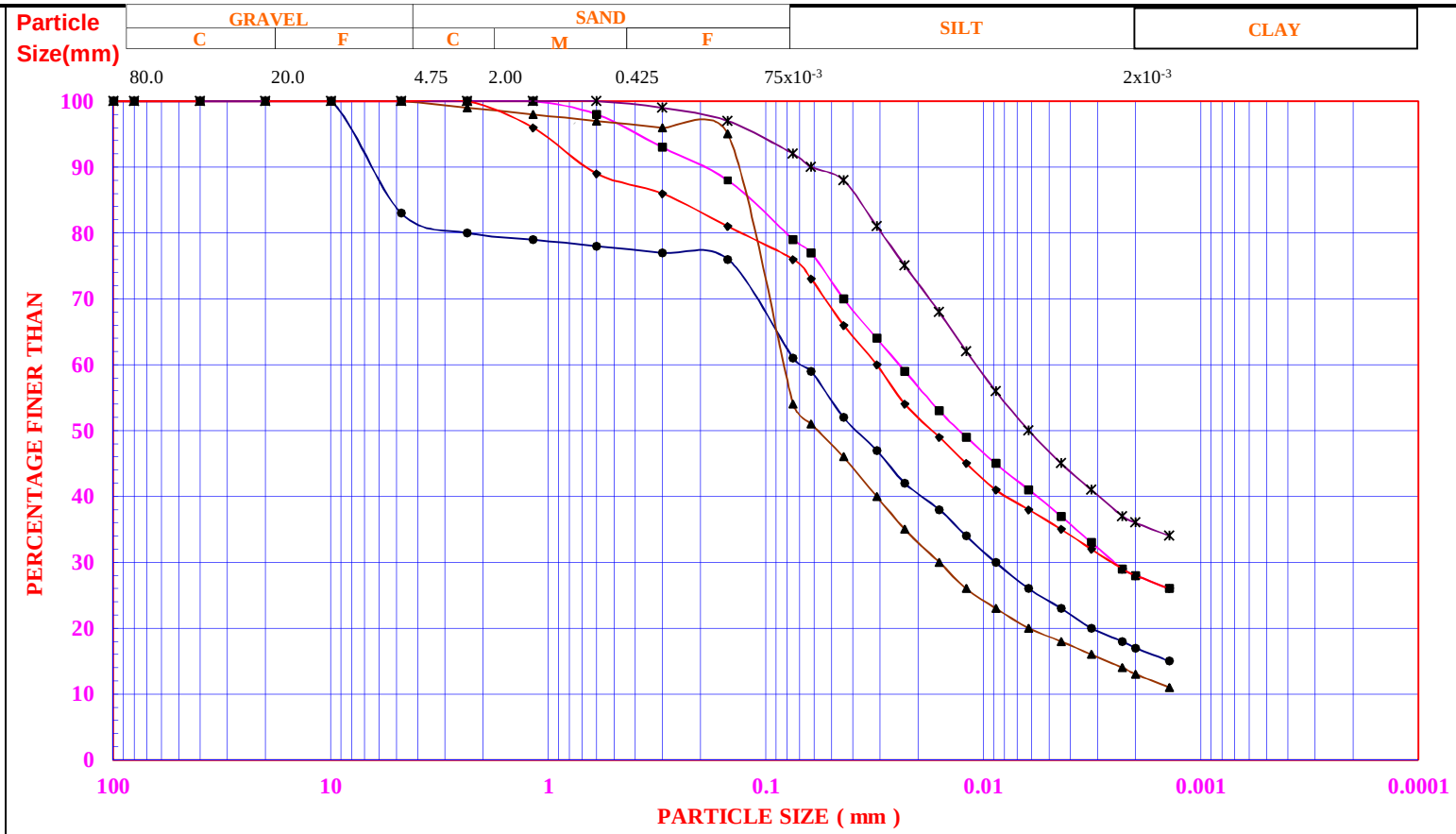
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B3)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B3	1.50 - 2.10	CL	17	22	44	17	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	B3	3.00 - 3.60	CL	0	21	51	28	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	B3	4.50 - 5.10	CL	0	46	41	13	-----	-----	-----	-----	-----	27	13	14	SPT 3
✳—✳	B3	7.50 - 8.10	CL	0	8	56	36	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	B3	12.00 - 12.60	CL	0	24	48	28	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B3	B3	B3	B3	B3
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	83.00	100.00	100.00	100.00	100.00
2.3600	80.00	100.00	99.00	100.00	100.00
1.1800	79.00	100.00	98.00	100.00	96.00
0.6000	78.00	98.00	97.00	100.00	89.00
0.3000	77.00	93.00	96.00	99.00	86.00
0.1500	76.00	88.00	95.00	97.00	81.00
0.0750	61.00	79.00	54.00	92.00	76.00
0.0620	59.00	77.00	51.00	90.00	73.00
0.044	52.00	70.00	46.00	88.00	66.00
0.031	47.00	64.00	40.00	81.00	60.00
0.023	42.00	59.00	35.00	75.00	54.00
0.016	38.00	53.00	30.00	68.00	49.00
0.012	34.00	49.00	26.00	62.00	45.00
0.0088	30.00	45.00	23.00	56.00	41.00
0.0062	26.00	41.00	20.00	50.00	38.00
0.0044	23.00	37.00	18.00	45.00	35.00
0.0032	20.00	33.00	16.00	41.00	32.00
0.0023	18.00	29.00	14.00	37.00	29.00
0.002	17.00	28.00	13.00	36.00	28.00
0.0014	15.00	26.00	11.00	34.00	26.00

Y	17	22	44	17
Z	0	21	51	28
AA	0	46	41	13
AB	0	8	56	36
AC	0	24	48	28

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B3) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B3	1.50 - 2.10	SPT 1	-----	-----	-----	CL	17	22	44	17	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.65	
B3	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	21	51	28	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
B3	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	46	41	13	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
B3	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	8	56	36	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
B3	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	24	48	28	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

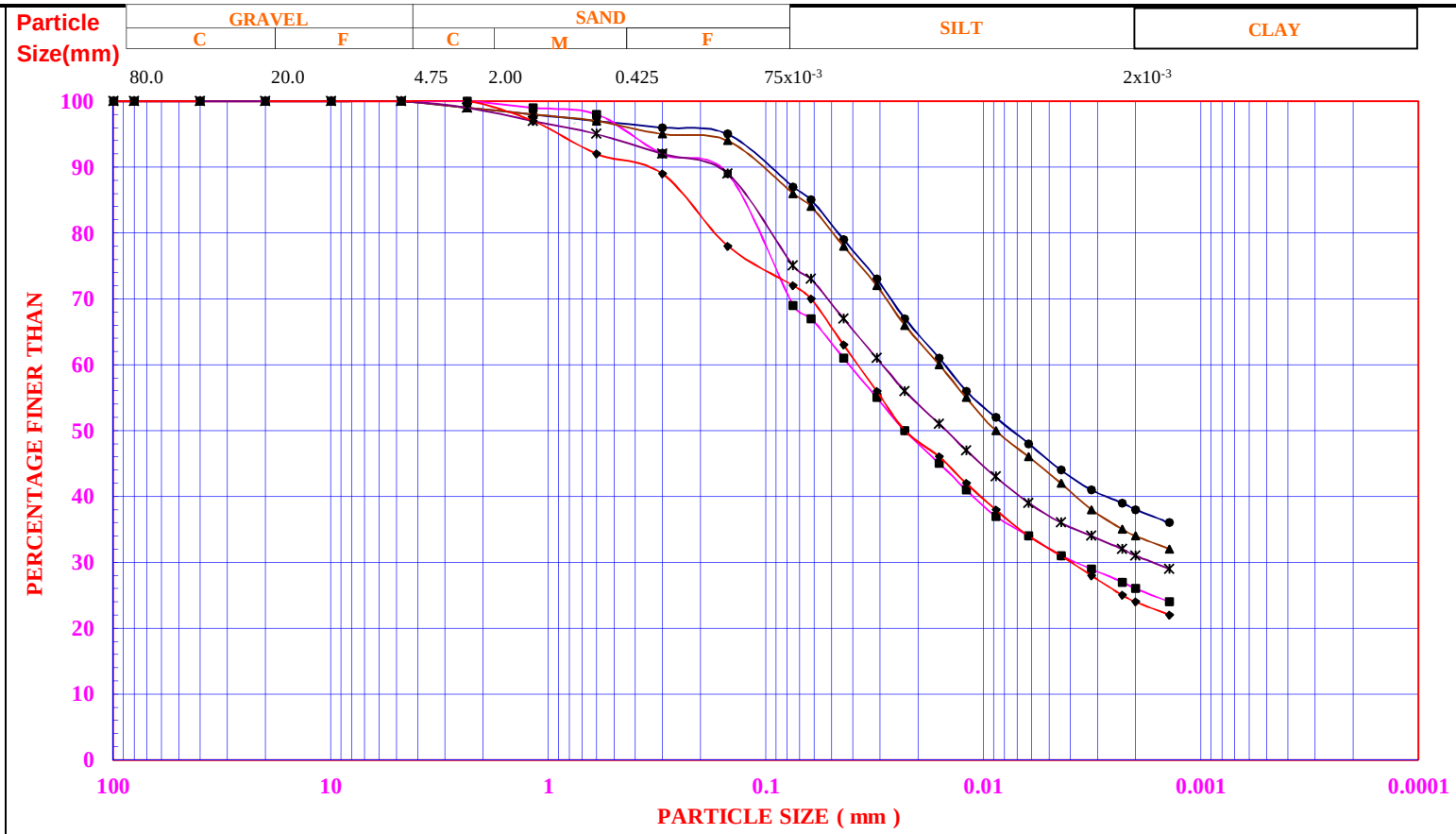
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B4)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B4	1.50 - 2.10	**CL**	0	13	49	38	-----	-----	-----	-----	-----	27	12	15	SPT 1
■—■	B4	3.00 - 3.60	**CL**	0	31	43	26	-----	-----	-----	-----	-----	25	11	14	SPT 2
▲—▲	B4	4.50 - 5.10	**CL**	0	14	52	34	-----	-----	-----	-----	-----	28	13	15	SPT 3
✳—✳	B4	7.50 - 8.10	**CL**	0	25	44	31	-----	-----	-----	-----	-----	24	11	13	SPT 5
◆—◆	B4	12.00 - 12.60	**CL**	0	28	48	24	-----	-----	-----	-----	-----	26	12	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B4	B4	B4	B4	B4
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	99.00	100.00	99.00	99.00	100.00
1.1800	98.00	99.00	98.00	97.00	97.00
0.6000	97.00	98.00	97.00	95.00	92.00
0.3000	96.00	92.00	95.00	92.00	89.00
0.1500	95.00	89.00	94.00	89.00	78.00
0.0750	87.00	69.00	86.00	75.00	72.00
0.0620	85.00	67.00	84.00	73.00	70.00
0.044	79.00	61.00	78.00	67.00	63.00
0.031	73.00	55.00	72.00	61.00	56.00
0.023	67.00	50.00	66.00	56.00	50.00
0.016	61.00	45.00	60.00	51.00	46.00
0.012	56.00	41.00	55.00	47.00	42.00
0.0088	52.00	37.00	50.00	43.00	38.00
0.0062	48.00	34.00	46.00	39.00	34.00
0.0044	44.00	31.00	42.00	36.00	31.00
0.0032	41.00	29.00	38.00	34.00	28.00
0.0023	39.00	27.00	35.00	32.00	25.00
0.002	38.00	26.00	34.00	31.00	24.00
0.0014	36.00	24.00	32.00	29.00	22.00

Y	0	13	49	38
Z	0	31	43	26
AA	0	14	52	34
AB	0	25	44	31
AC	0	28	48	24

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B4) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B4	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	13	49	38	27	12	15	-----	-----	-----	-----	-----	-----	-----	2.66	
B4	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	31	43	26	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
B4	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	14	52	34	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
B4	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	25	44	31	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
B4	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	28	48	24	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

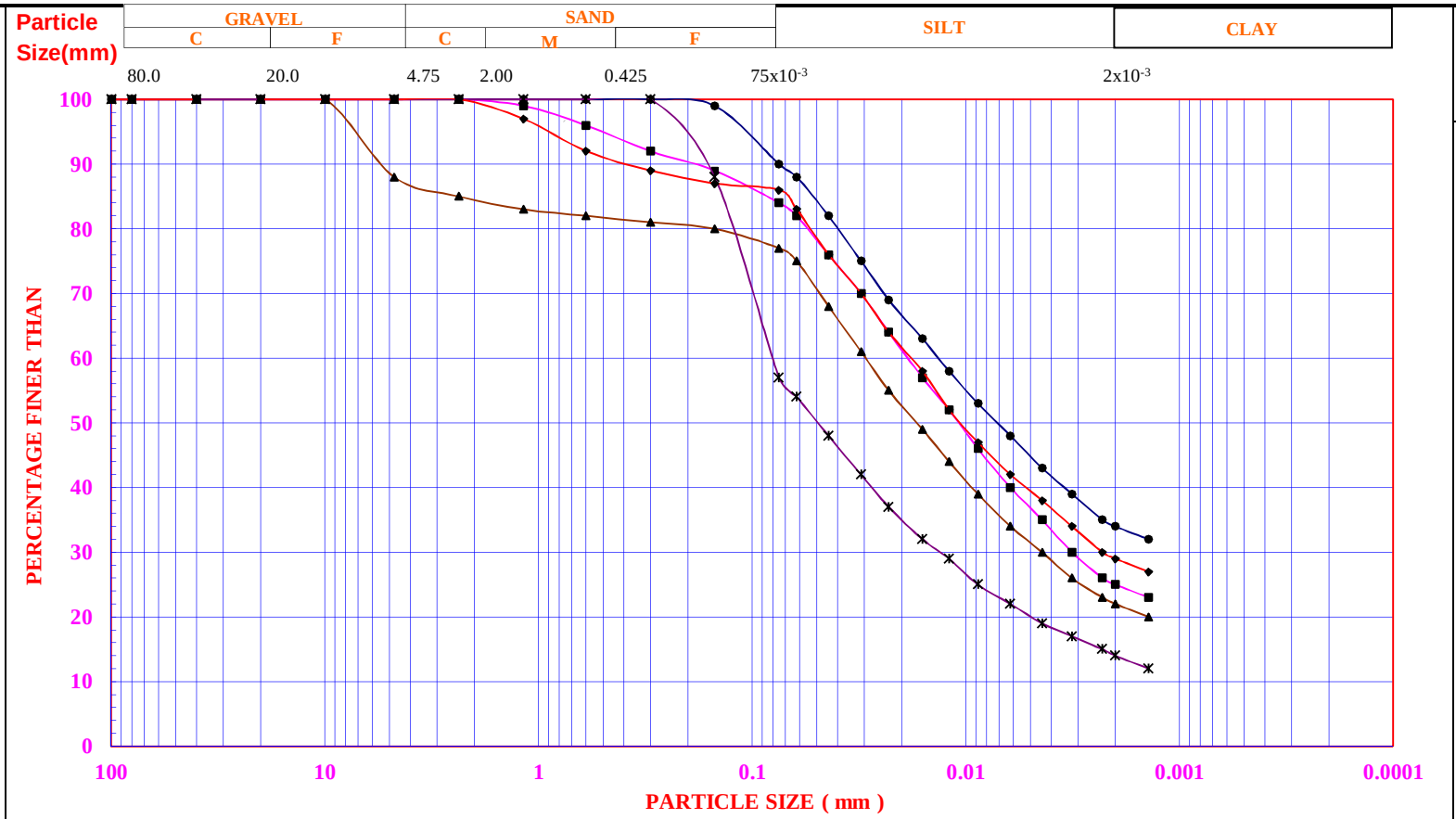
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B5)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B5	1.50 - 2.10	CL	0	10	56	34	-----	-----	-----	-----	-----	24	10	14	SPT 1
■—■	B5	3.00 - 3.60	CL	0	16	59	25	-----	-----	-----	-----	-----	26	11	15	SPT 2
▲—▲	B5	4.50 - 5.10	CL	12	11	55	22	-----	-----	-----	-----	-----	27	10	17	SPT 3
✳—✳	B5	7.50 - 8.10	CL	0	43	43	14	-----	-----	-----	-----	-----	28	13	15	SPT 5
◆—◆	B5	12.00 - 12.60	CL	0	14	57	29	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B5	B5	B5	B5	B5
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	88.00	100.00	100.00
2.3600	100.00	100.00	85.00	100.00	100.00
1.1800	100.00	99.00	83.00	100.00	97.00
0.6000	100.00	96.00	82.00	100.00	92.00
0.3000	100.00	92.00	81.00	100.00	89.00
0.1500	99.00	89.00	80.00	88.00	87.00
0.0750	90.00	84.00	77.00	57.00	86.00
0.0620	88.00	82.00	75.00	54.00	83.00
0.044	82.00	76.00	68.00	48.00	76.00
0.031	75.00	70.00	61.00	42.00	70.00
0.023	69.00	64.00	55.00	37.00	64.00
0.016	63.00	57.00	49.00	32.00	58.00
0.012	58.00	52.00	44.00	29.00	52.00
0.0088	53.00	46.00	39.00	25.00	47.00
0.0062	48.00	40.00	34.00	22.00	42.00
0.0044	43.00	35.00	30.00	19.00	38.00
0.0032	39.00	30.00	26.00	17.00	34.00
0.0023	35.00	26.00	23.00	15.00	30.00
0.002	34.00	25.00	22.00	14.00	29.00
0.0014	32.00	23.00	20.00	12.00	27.00

Y	0	10	56	34
Z	0	16	59	25
AA	12	11	55	22
AB	0	43	43	14
AC	0	14	57	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B5) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B5	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	10	56	34	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	
B5	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	16	59	25	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
B5	4.50 - 5.10	SPT 3	-----	-----	-----	CL	12	11	55	22	27	10	17	-----	-----	-----	-----	-----	-----	-----	2.66	
B5	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	43	43	14	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
B5	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	14	57	29	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

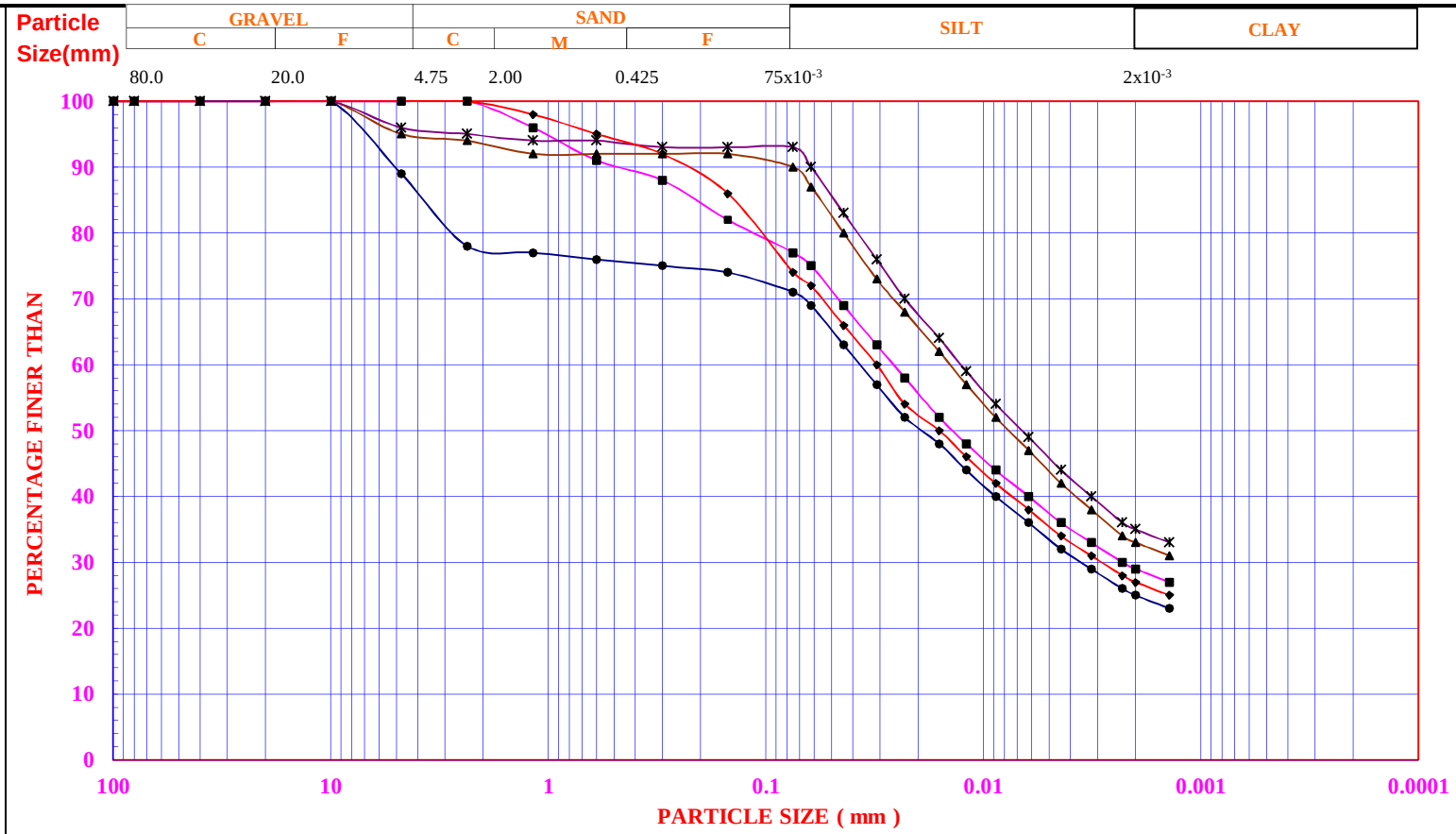
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B6)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B6	1.50 - 2.10	CL	11	18	46	25	-----	-----	-----	-----	-----	29	14	15	SPT 1
■—■	B6	3.00 - 3.60	CL	0	23	48	29	-----	-----	-----	-----	-----	26	12	14	SPT 2
▲—▲	B6	4.50 - 5.10	CL	5	5	57	33	-----	-----	-----	-----	-----	24	11	13	SPT 3
✳—✳	B6	7.50 - 8.10	CL	4	3	58	35	-----	-----	-----	-----	-----	27	13	14	SPT 5
◆—◆	B6	12.00 - 12.60	CL	0	26	47	27	-----	-----	-----	-----	-----	25	10	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B6	B6	B6	B6	B6
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	89.00	100.00	95.00	96.00	100.00
2.3600	78.00	100.00	94.00	95.00	100.00
1.1800	77.00	96.00	92.00	94.00	98.00
0.6000	76.00	91.00	92.00	94.00	95.00
0.3000	75.00	88.00	92.00	93.00	92.00
0.1500	74.00	82.00	92.00	93.00	86.00
0.0750	71.00	77.00	90.00	93.00	74.00
0.0620	69.00	75.00	87.00	90.00	72.00
0.044	63.00	69.00	80.00	83.00	66.00
0.031	57.00	63.00	73.00	76.00	60.00
0.023	52.00	58.00	68.00	70.00	54.00
0.016	48.00	52.00	62.00	64.00	50.00
0.012	44.00	48.00	57.00	59.00	46.00
0.0088	40.00	44.00	52.00	54.00	42.00
0.0062	36.00	40.00	47.00	49.00	38.00
0.0044	32.00	36.00	42.00	44.00	34.00
0.0032	29.00	33.00	38.00	40.00	31.00
0.0023	26.00	30.00	34.00	36.00	28.00
0.002	25.00	29.00	33.00	35.00	27.00
0.0014	23.00	27.00	31.00	33.00	25.00

Y	11	18	46	25
Z	0	23	48	29
AA	5	5	57	33
AB	4	3	58	35
AC	0	26	47	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B6) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B6	1.50 - 2.10	SPT 1	-----	-----	-----	CL	11	18	46	25	29	14	15	-----	-----	-----	-----	-----	-----	-----	2.65	
B6	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	23	48	29	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
B6	4.50 - 5.10	SPT 3	-----	-----	-----	CL	5	5	57	33	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
B6	7.50 - 8.10	SPT 5	-----	-----	-----	CL	4	3	58	35	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
B6	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	26	47	27	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	

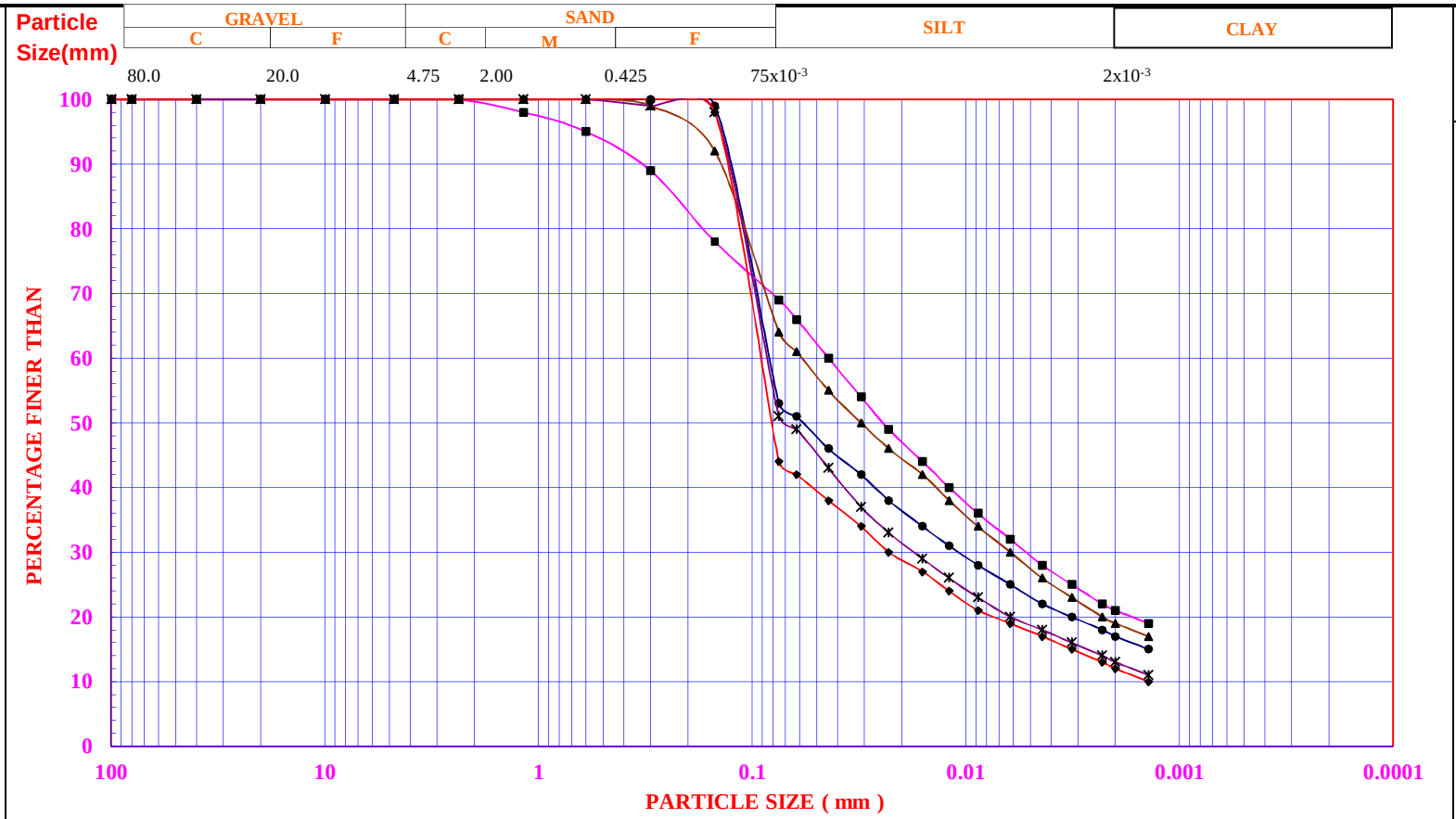
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B 7)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B7	1.50 - 2.10	**CL**	0	47	36	17	-----	-----	-----	-----	-----	21	8	13	SPT 1
■—■	B7	3.00 - 3.60	**CL**	0	31	48	21	-----	-----	-----	-----	-----	24	11	13	SPT 2
▲—▲	B7	4.50 - 5.10	**CL**	0	36	45	19	-----	-----	-----	-----	-----	26	12	14	SPT 3
✳—✳	B7	7.50 - 8.10	**CL**	0	49	38	13	-----	-----	-----	-----	-----	23	11	12	SPT 5
◆—◆	B7	12.00 - 12.60	**SC**	0	56	32	12	-----	-----	-----	-----	-----	17	7	10	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B7	B7	B7	B7	B7
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	98.00	100.00	100.00	100.00
0.6000	100.00	95.00	100.00	100.00	100.00
0.3000	100.00	89.00	99.00	99.00	100.00
0.1500	99.00	78.00	92.00	98.00	98.00
0.0750	53.00	69.00	64.00	51.00	44.00
0.0620	51.00	66.00	61.00	49.00	42.00
0.044	46.00	60.00	55.00	43.00	38.00
0.031	42.00	54.00	50.00	37.00	34.00
0.023	38.00	49.00	46.00	33.00	30.00
0.016	34.00	44.00	42.00	29.00	27.00
0.012	31.00	40.00	38.00	26.00	24.00
0.0088	28.00	36.00	34.00	23.00	21.00
0.0062	25.00	32.00	30.00	20.00	19.00
0.0044	22.00	28.00	26.00	18.00	17.00
0.0032	20.00	25.00	23.00	16.00	15.00
0.0023	18.00	22.00	20.00	14.00	13.00
0.002	17.00	21.00	19.00	13.00	12.00
0.0014	15.00	19.00	17.00	11.00	10.00

Y	0	47	36	17
Z	0	31	48	21
AA	0	36	45	19
AB	0	49	38	13
AC	0	56	32	12

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B 7) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B7	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	47	36	17	21	8	13	-----	-----	-----	-----	-----	-----	-----	2.65	
B7	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	31	48	21	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
B7	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	36	45	19	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
B7	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	49	38	13	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	
B7	12.00 - 12.60	SPT 8	-----	-----	-----	SC	0	56	32	12	17	7	10	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

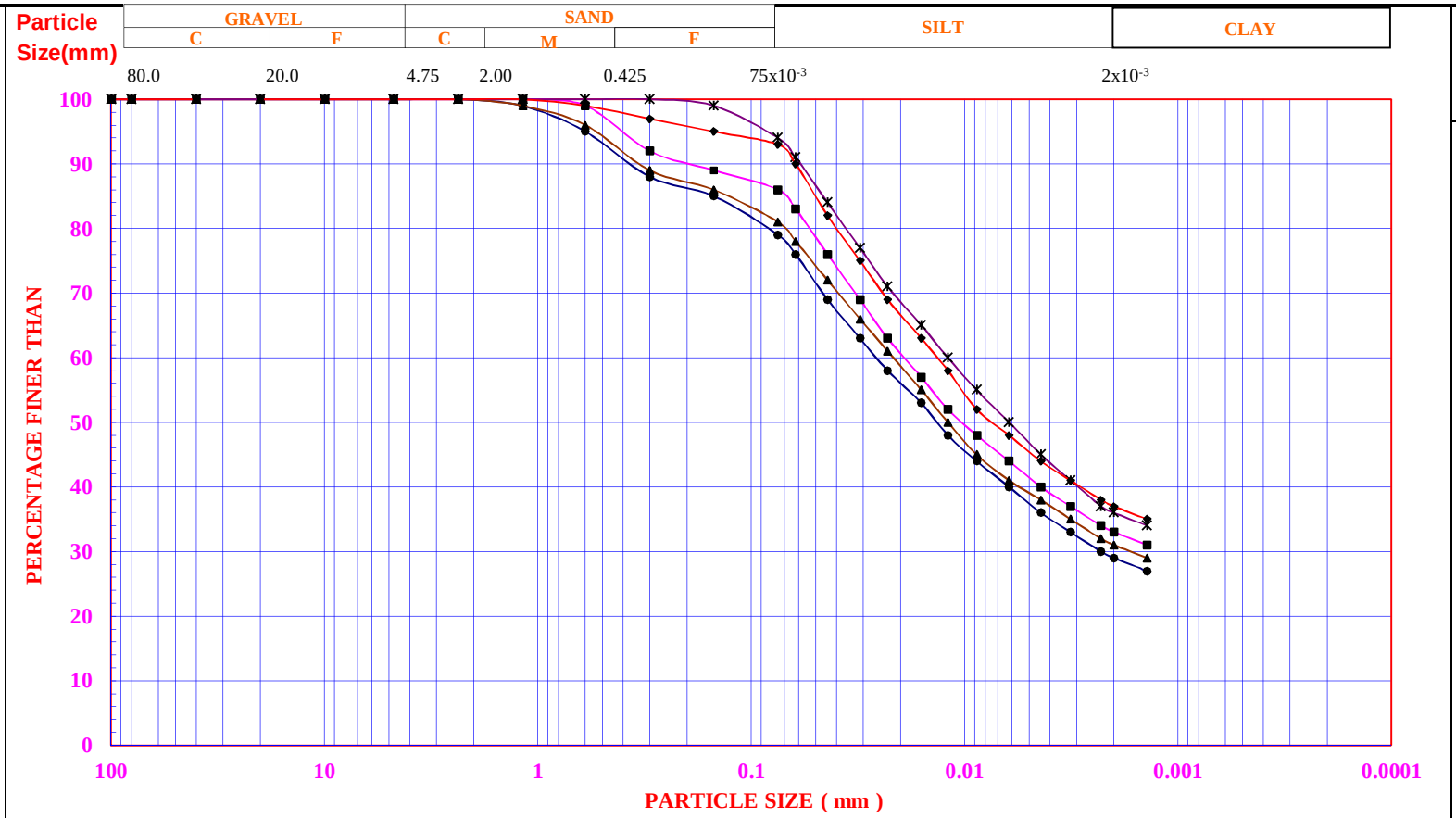
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Bharwari Bypass **(Bore Hole No .B 8)**



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	B8	1.50 - 2.10	CL	0	21	50	29	-----	-----	-----	-----	-----	26	12	14	SPT 1
■—■	B8	3.00 - 3.50	CL	0	14	53	33	-----	-----	-----	-----	-----	28	11	17	UDS -1
▲—▲	B8	4.50 - 5.10	CL	0	19	50	31	-----	-----	-----	-----	-----	27	12	15	SPT 2
✳—✳	B8	7.50 - 8.10	CL	0	6	58	36	-----	-----	-----	-----	-----	26	13	13	SPT 5
◆—◆	B8	12.00 - 12.60	CL	0	7	56	37	-----	-----	-----	-----	-----	24	10	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	B8	B8	B8	B8	B8
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	99.00	100.00	99.00	100.00	100.00
0.6000	95.00	99.00	96.00	100.00	99.00
0.3000	88.00	92.00	89.00	100.00	97.00
0.1500	85.00	89.00	86.00	99.00	95.00
0.0750	79.00	86.00	81.00	94.00	93.00
0.0620	76.00	83.00	78.00	91.00	90.00
0.044	69.00	76.00	72.00	84.00	82.00
0.031	63.00	69.00	66.00	77.00	75.00
0.023	58.00	63.00	61.00	71.00	69.00
0.016	53.00	57.00	55.00	65.00	63.00
0.012	48.00	52.00	50.00	60.00	58.00
0.0088	44.00	48.00	45.00	55.00	52.00
0.0062	40.00	44.00	41.00	50.00	48.00
0.0044	36.00	40.00	38.00	45.00	44.00
0.0032	33.00	37.00	35.00	41.00	41.00
0.0023	30.00	34.00	32.00	37.00	38.00
0.002	29.00	33.00	31.00	36.00	37.00
0.0014	27.00	31.00	29.00	34.00	35.00

Y	0	21	50	29
Z	0	14	53	33
AA	0	19	50	31
AB	0	6	58	36
AC	0	7	56	37

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Bharwari Bypass (Bore Hole No .B 8) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
B8	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	50	29	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
B8	3.00 - 3.50	UDS -1	1.86	1.62	14.83	CL	0	14	53	33	28	11	17	UU	0.92	11	-----	-----	0.05	2.3	-----	
B8	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	19	50	31	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
B8	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	6	58	36	26	13	13	-----	-----	-----	-----	-----	-----	-----	2.65	
B8	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	7	56	37	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

Sirathu Detour

Sirathu Detour
Bore Logs

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : 106	SHEET NO. : 1 OF 2
LOCATION :	DATE : 19/10/08 to 20/10/08
CHAINAGE(km.) : 884/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 3.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	10	11	14	21			
				2.10									
2.00													
3.00				3.00	SPT	9	11	13	17	24			
				3.60									
4.00			Very Stiff Silty Clay										
				4.50	SPT	9	10	9	13	19			
				5.10									
5.00													
6.00				6.00	SPT	11	13	14	19	27			
				6.60									
7.00													
				7.50	SPT	14	16	17	23	33			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	13	15	20	26	35			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : 106	SHEET NO. : 2 OF 2
LOCATION :	DATE : 19/10/08 to 20/10/08
CHAINAGE(km.) : 884/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 3.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**16**	**20**	**31**	**36**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**18**	**20**	**19**	**33**	**39**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : 107	SHEET NO. : 1 OF 2
LOCATION :	DATE : 19/10/08 to 20/10/08
CHAINAGE(km.) : 885/17-19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	7	7	11	14			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	11	13	17	24			
5.00				5.10									
6.00			Very Stiff Silty Clay	6.00	SPT	13	13	15	21	28			
7.00				6.60									
				7.50	SPT	12	15	15	23	30			
8.00				8.10									
9.00				9.00	SPT	15	18	21	26	39			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Sirathu Bypass

BORE HOLE NO. :	107	SHEET NO. :	2 OF 2
LOCATION :		DATE :	19/10/08 to 20/10/08
CHAINAGE(km.) :	885/17-19	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	5.50 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**16**	**22**	**30**	**38**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**17**	**18**	**23**	**33**	**41**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : S-1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 21/10/08 to 22/10/08
CHAINAGE(km.) : S	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	9	14	19	23	33			
			Hard Silty Clay	2.10									
2.00													
3.00				3.00	SPT	12	17	19	33	36			
				3.60									
4.00													
				4.50	SPT	6	11	15	21	26			
				5.10									
5.00													
6.00				6.00	SPT	8	10	17	25	27			
				6.60									
7.00			Very Stiff Silty Clay										
				7.50	SPT	7	12	18	26	30			
				8.10									
8.00													
9.00				9.00	SPT	10	16	21	28	37			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : S-1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 21/10/08 to 22/10/08
CHAINAGE(km.) : S	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**11**	**18**	**20**	**27**	**38**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**12**	**15**	**14**	**22**	**29**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : S-2	SHEET NO. : 1 OF 2
LOCATION :	DATE : 21/10/08 to 22/10/08
CHAINAGE(km.) : S	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 3.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
			Very Stiff Silty Clay	1.50	SPT	5	9	11	13	20			
				2.10									
2.00													
3.00				3.00	UDS	6	10	16	21	26			
				3.50									
4.00													
				4.50	SPT	11	13	16	20	29			
				5.10									
5.00													
6.00				6.00	SPT	10	15	16	26	31			
				6.60									
7.00													
				7.50	SPT	13	20	26	31	46			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	21	24	28	36	52			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : S-2	SHEET NO. : 2 OF 2
LOCATION :	DATE : 21/10/08 to 22/10/08
CHAINAGE(km.) : S	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 3.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**23**	**25**	**35**	**48**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**23**	**25**	**29**	**35**	**54**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Sirathu Bypass	
BORE HOLE NO. : S -3	SHEET NO. : 1 OF 2
LOCATION :	DATE : 22/10/08 to 23/10/08
CHAINAGE(km.) : S	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.70 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	10	16	21	26			
				2.10									
2.00													
3.00				3.00	SPT	5	9	11	13	20			
				3.60									
4.00													
			Very Stiff Silty Clay	4.50	SPT	8	11	18	23	29			
				5.10									
5.00													
6.00				6.00	SPT	7	10	17	22	27			
				6.60									
7.00													
				7.50	SPT	9	13	15	24	28			
				8.10									
8.00													
9.00				9.00	SPT	13	16	15	27	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation - Sirathu Bypass

BORE HOLE NO. :	S-3	SHEET NO. :	2 OF 2
LOCATION :		DATE :	22/10/08 to 23/10/08
CHAINAGE(km.) :	S	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	-------- m
GROUND W. T. :	4.70 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**17**	**19**	**33**	**36**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**16**	**24**	**36**	**40**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Chkd. By : Prepd. By:

Project----- -- ****

Sirathu Detour
Chemical

CHEMICAL TEST RESULT OF SOIL SAMPLES.

SITE : **Geotechnical Investigation work for DFCCIL , Kanpur.**

LOCATION **SIRATHU BYPASS** **DATE**

SR NO.	BRIDGE NO	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
1	879/21-23	4.50 - 5.10	SPT - 2	7.82	0.011	0.019	
2	880/17-19	1.50 - 2.10	SPT - 1	8.03	0.013	0.021	
3	884/15-17	1.50 - 2.10	SPT - 1	7.73	0.009	0.017	
4	885/17-19	4.50 - 5.10	SPT - 2	7.69	0.014	0.022	
5	S1	1.50 - 2.10	SPT - 1	7.81	0.008	0.014	
6	S2	4.50 - 5.10	SPT - 2	7.76	0.012	0.017	
7	S3	1.50 - 2.10	SPT - 1	8.02	0.009	0.013	

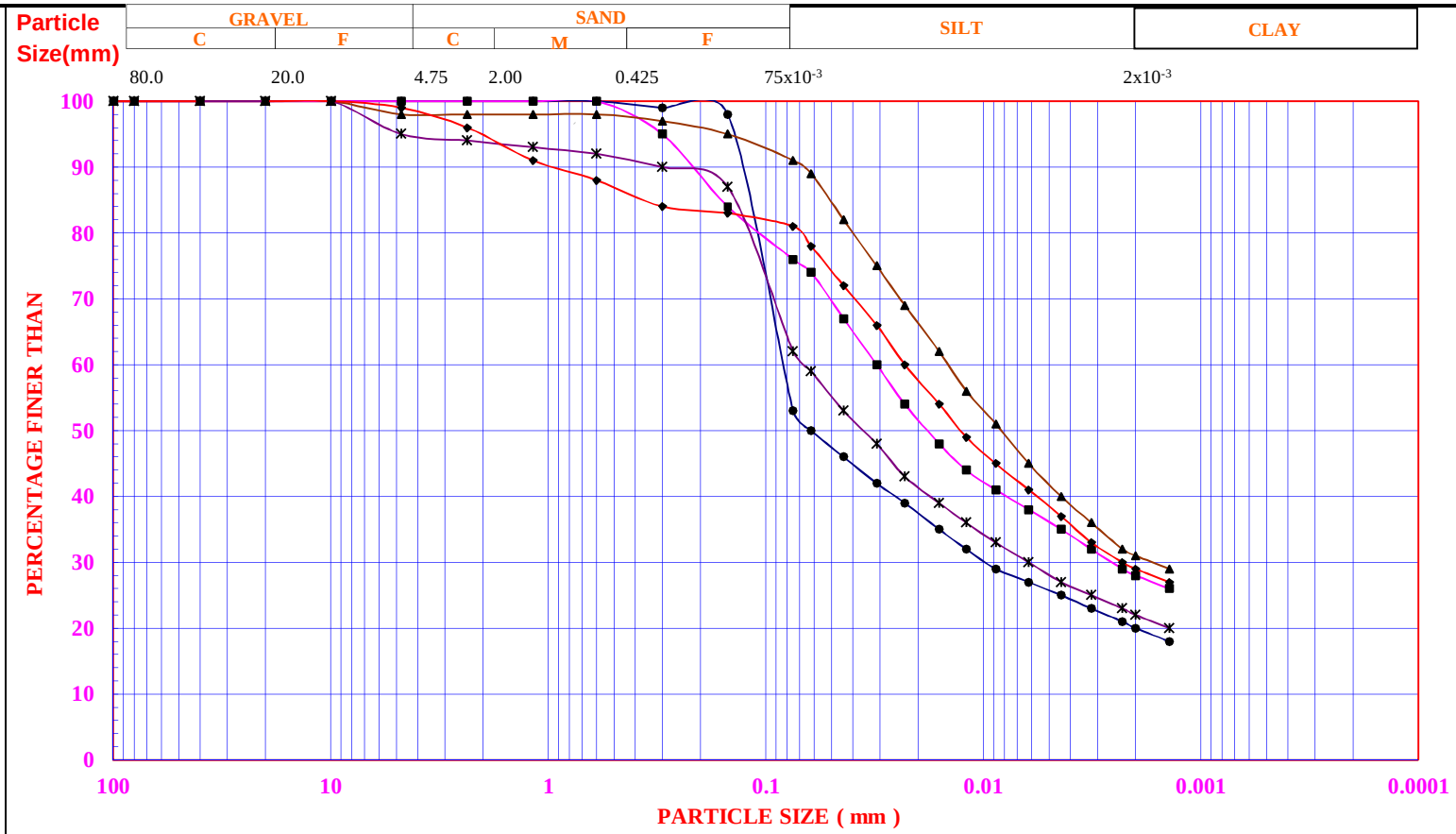
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD **Job No.** **8**

Sirathu Detour
GSA

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass **(Bore Hole No .1)** (CH :879/21-23)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	879	1.50 - 2.10	CL	0	47	33	20	-----	-----	-----	-----	-----	26	12	14	SPT 1
■—■	879	3.00 - 3.60	CL	0	24	48	28	-----	-----	-----	-----	-----	29	12	17	SPT 2
▲—▲	879	4.50 - 5.10	CL	2	7	60	31	-----	-----	-----	-----	-----	28	13	15	SPT 3
✳—✳	879	7.50 - 8.10	CL	5	33	40	22	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	879	12.00 - 12.60	CL	1	18	52	29	-----	-----	-----	-----	-----	24	12	12	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	879	879	879	879	879
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	98.00	95.00	99.00
2.3600	100.00	100.00	98.00	94.00	96.00
1.1800	100.00	100.00	98.00	93.00	91.00
0.6000	100.00	100.00	98.00	92.00	88.00
0.3000	99.00	95.00	97.00	90.00	84.00
0.1500	98.00	84.00	95.00	87.00	83.00
0.0750	53.00	76.00	91.00	62.00	81.00
0.0620	50.00	74.00	89.00	59.00	78.00
0.044	46.00	67.00	82.00	53.00	72.00
0.031	42.00	60.00	75.00	48.00	66.00
0.023	39.00	54.00	69.00	43.00	60.00
0.016	35.00	48.00	62.00	39.00	54.00
0.012	32.00	44.00	56.00	36.00	49.00
0.0088	29.00	41.00	51.00	33.00	45.00
0.0062	27.00	38.00	45.00	30.00	41.00
0.0044	25.00	35.00	40.00	27.00	37.00
0.0032	23.00	32.00	36.00	25.00	33.00
0.0023	21.00	29.00	32.00	23.00	30.00
0.002	20.00	28.00	31.00	22.00	29.00
0.0014	18.00	26.00	29.00	20.00	27.00

Y	0	47	33	20
Z	0	24	48	28
AA	2	7	60	31
AB	5	33	40	22
AC	1	18	52	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (Bore Hole No .1) (CH :879/21-23) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
879	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	47	33	20	26	12	14	-----	-----	-----	-----	-----	-----	-----	2.66	
879	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	24	48	28	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
879	4.50 - 5.10	SPT 3	-----	-----	-----	CL	2	7	60	31	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
879	7.50 - 8.10	SPT 5	-----	-----	-----	CL	5	33	40	22	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
879	12.00 - 12.60	SPT 8	-----	-----	-----	CL	1	18	52	29	24	12	12	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

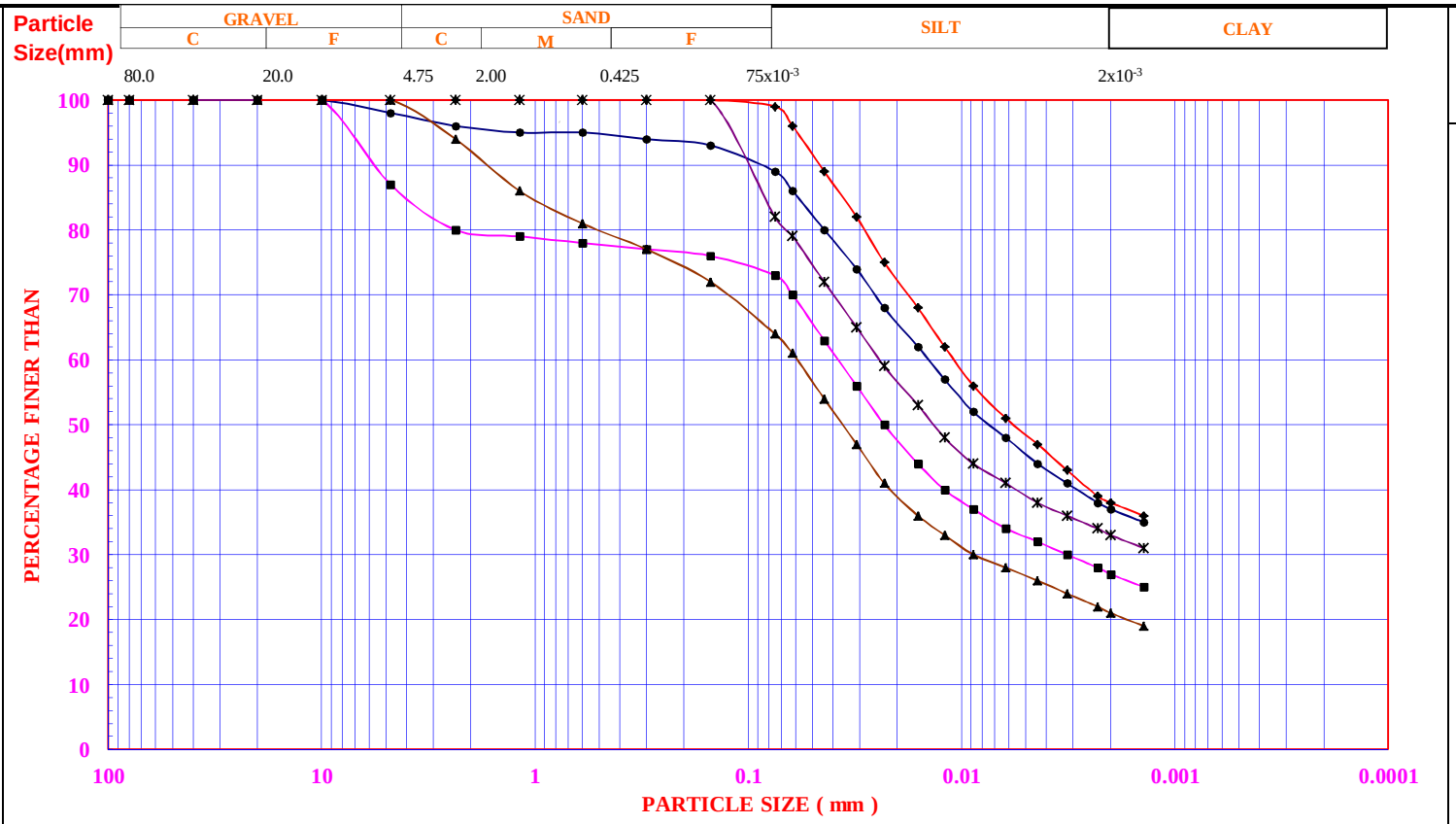
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass **(Bore Hole No .1)** (CH :880/17-19)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	880	1.50 - 2.10	CL	2	9	52	37	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	880	3.00 - 3.60	CL	13	14	46	27	-----	-----	-----	-----	-----	28	13	15	SPT 2
▲—▲	880	4.50 - 5.10	CL	0	36	43	21	-----	-----	-----	-----	-----	27	14	13	SPT 3
✳—✳	880	7.50 - 8.10	CL	0	18	49	33	-----	-----	-----	-----	-----	25	11	14	SPT 5
◆—◆	880	12.00 - 12.60	CL	0	1	61	38	-----	-----	-----	-----	-----	26	11	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	880	880	880	880	880
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	87.00	100.00	100.00	100.00
2.3600	96.00	80.00	94.00	100.00	100.00
1.1800	95.00	79.00	86.00	100.00	100.00
0.6000	95.00	78.00	81.00	100.00	100.00
0.3000	94.00	77.00	77.00	100.00	100.00
0.1500	93.00	76.00	72.00	100.00	100.00
0.0750	89.00	73.00	64.00	82.00	99.00
0.0620	86.00	70.00	61.00	79.00	96.00
0.044	80.00	63.00	54.00	72.00	89.00
0.031	74.00	56.00	47.00	65.00	82.00
0.023	68.00	50.00	41.00	59.00	75.00
0.016	62.00	44.00	36.00	53.00	68.00
0.012	57.00	40.00	33.00	48.00	62.00
0.0088	52.00	37.00	30.00	44.00	56.00
0.0062	48.00	34.00	28.00	41.00	51.00
0.0044	44.00	32.00	26.00	38.00	47.00
0.0032	41.00	30.00	24.00	36.00	43.00
0.0023	38.00	28.00	22.00	34.00	39.00
0.002	37.00	27.00	21.00	33.00	38.00
0.0014	35.00	25.00	19.00	31.00	36.00

Y	2	9	52	37
Z	13	14	46	27
AA	0	36	43	21
AB	0	18	49	33
AC	0	1	61	38

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (Bore Hole No .1) (CH :880/17-19) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, W %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
880	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	9	52	37	31	14	17	-----	-----	-----	-----	-----	-----	-----	2.65	
880	3.00 - 3.60	SPT 2	-----	-----	-----	CL	13	14	46	27	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
880	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	36	43	21	27	14	13	-----	-----	-----	-----	-----	-----	-----	-----	
880	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	18	49	33	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
880	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	1	61	38	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

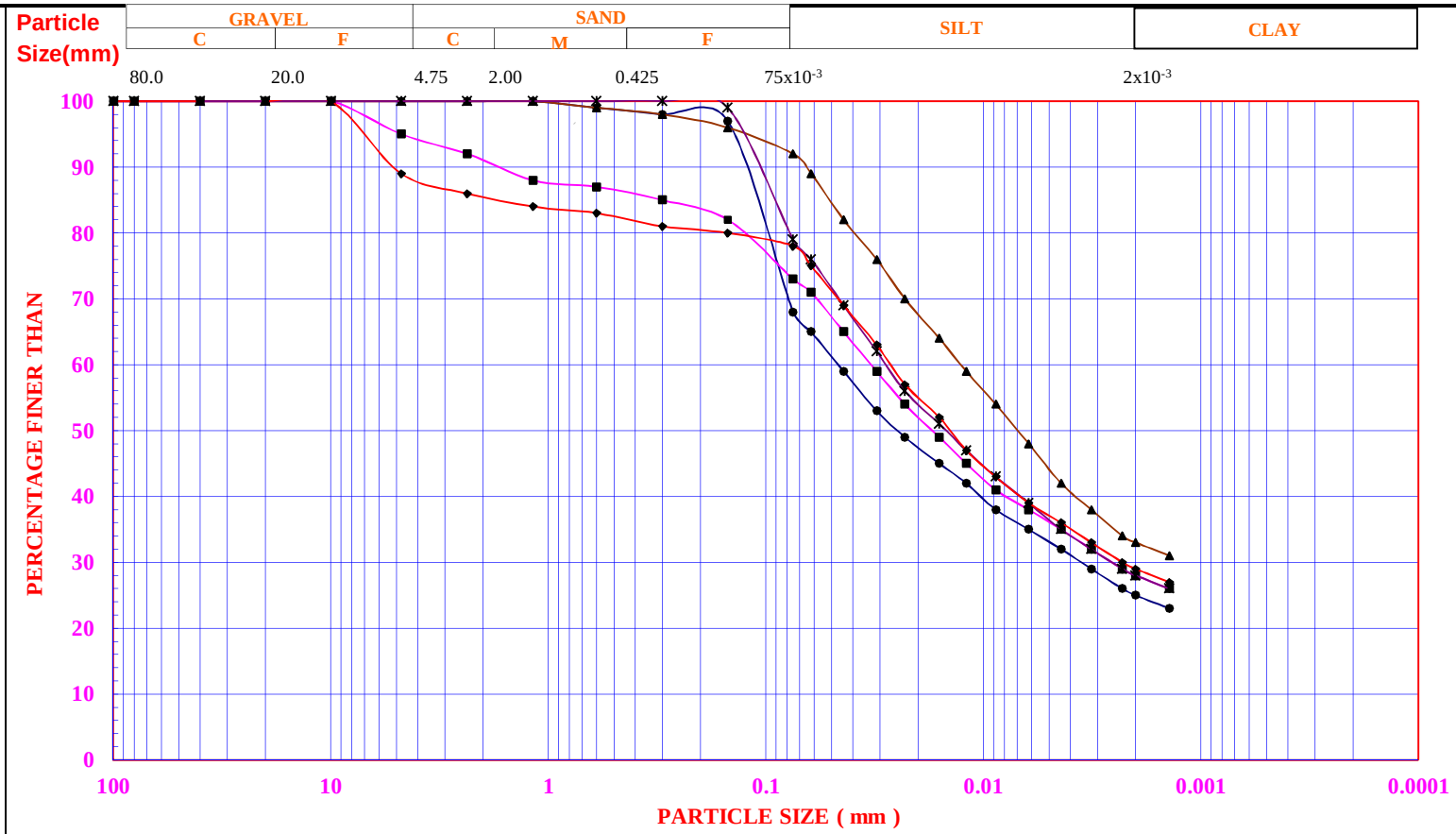
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass **(Bridge No.106)** (CH :884/15-17)



Symbol	Bridge No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	106	1.50 - 2.10	CL	0	32	43	25	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	106	3.00 - 3.60	CL	5	22	45	28	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	106	4.50 - 5.10	CL	0	8	59	33	-----	-----	-----	-----	-----	29	14	15	SPT 3
✳—✳	106	7.50 - 8.10	CL	0	21	51	28	-----	-----	-----	-----	-----	25	11	14	SPT 5
◆—◆	106	12.00 - 12.60	CL	11	11	49	29	-----	-----	-----	-----	-----	23	10	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	106	106	106	106	106
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	95.00	100.00	100.00	89.00
2.3600	100.00	92.00	100.00	100.00	86.00
1.1800	100.00	88.00	100.00	100.00	84.00
0.6000	99.00	87.00	99.00	100.00	83.00
0.3000	98.00	85.00	98.00	100.00	81.00
0.1500	97.00	82.00	96.00	99.00	80.00
0.0750	68.00	73.00	92.00	79.00	78.00
0.0620	65.00	71.00	89.00	76.00	75.00
0.044	59.00	65.00	82.00	69.00	69.00
0.031	53.00	59.00	76.00	62.00	63.00
0.023	49.00	54.00	70.00	56.00	57.00
0.016	45.00	49.00	64.00	51.00	52.00
0.012	42.00	45.00	59.00	47.00	47.00
0.0088	38.00	41.00	54.00	43.00	43.00
0.0062	35.00	38.00	48.00	39.00	39.00
0.0044	32.00	35.00	42.00	35.00	36.00
0.0032	29.00	32.00	38.00	32.00	33.00
0.0023	26.00	29.00	34.00	29.00	30.00
0.002	25.00	28.00	33.00	28.00	29.00
0.0014	23.00	26.00	31.00	26.00	27.00

Y	0	32	43	25
Z	5	22	45	28
AA	0	8	59	33
AB	0	21	51	28
AC	11	11	49	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (Bridge No.106) (CH :884/15-17) **DATE:**

Bridge No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
106	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	32	43	25	28	11	17	-----	-----	-----	-----	-----	-----	-----	2.66	
106	3.00 - 3.60	SPT 2	-----	-----	-----	CL	5	22	45	28	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
106	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	8	59	33	29	14	15	-----	-----	-----	-----	-----	-----	-----	-----	
106	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	21	51	28	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
106	12.00 - 12.60	SPT 8	-----	-----	-----	CL	11	11	49	29	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	

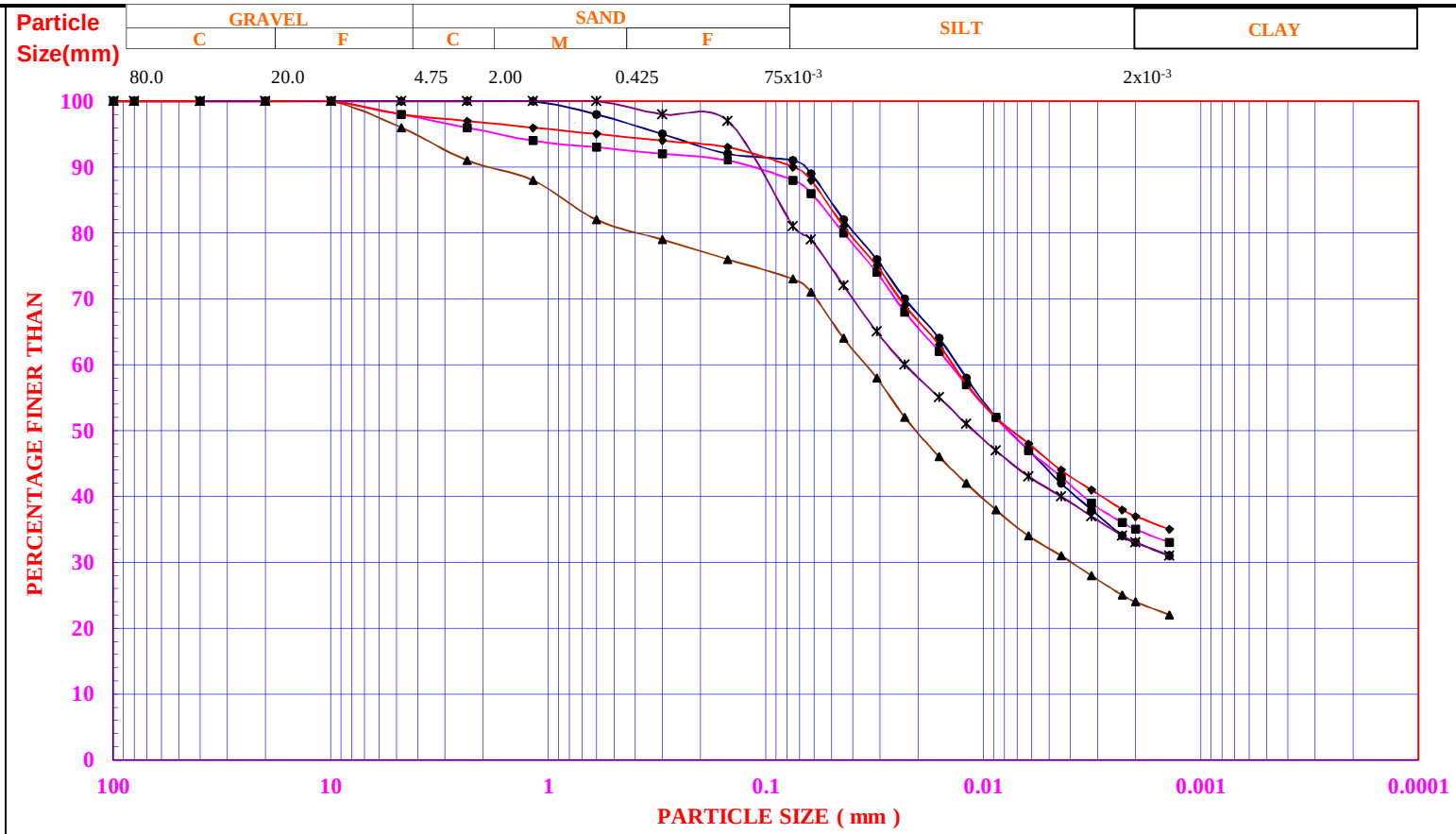
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass **(Bridge No.107)** (CH :885/17-19)



Symbol	Bridge No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	107	1.50 - 2.10	CL	0	9	58	33	-----	-----	-----	-----	-----	29	12	17	SPT 1
■—■	107	3.00 - 3.50	CL	2	10	53	35	-----	-----	-----	-----	-----	27	12	15	UDS -1
▲—▲	107	4.50 - 5.10	CL	4	23	49	24	-----	-----	-----	-----	-----	28	11	17	SPT 2
✳—✳	107	7.50 - 8.10	CL	0	19	48	33	-----	-----	-----	-----	-----	26	12	14	SPT 5
◆—◆	107	12.00 - 12.60	CL	2	8	53	37	-----	-----	-----	-----	-----	24	11	13	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	107	107	107	107	107
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	98.00	96.00	100.00	98.00
2.3600	100.00	96.00	91.00	100.00	97.00
1.1800	100.00	94.00	88.00	100.00	96.00
0.6000	98.00	93.00	82.00	100.00	95.00
0.3000	95.00	92.00	79.00	98.00	94.00
0.1500	92.00	91.00	76.00	97.00	93.00
0.0750	91.00	88.00	73.00	81.00	90.00
0.0620	89.00	86.00	71.00	79.00	88.00
0.044	82.00	80.00	64.00	72.00	81.00
0.031	76.00	74.00	58.00	65.00	75.00
0.023	70.00	68.00	52.00	60.00	69.00
0.016	64.00	62.00	46.00	55.00	63.00
0.012	58.00	57.00	42.00	51.00	57.00
0.0088	52.00	52.00	38.00	47.00	52.00
0.0062	47.00	47.00	34.00	43.00	48.00
0.0044	42.00	43.00	31.00	40.00	44.00
0.0032	38.00	39.00	28.00	37.00	41.00
0.0023	34.00	36.00	25.00	34.00	38.00
0.002	33.00	35.00	24.00	33.00	37.00
0.0014	31.00	33.00	22.00	31.00	35.00

Y	0	9	58	33
Z	2	10	53	35
AA	4	23	49	24
AB	0	19	48	33
AC	2	8	53	37

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (Bridge No.107) (CH :885/17-19) **DATE:**

Bridge No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
107	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	9	58	33	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.66	
107	3.00 - 3.50	UDS -1	1.89	1.63	15.92	CL	2	10	53	35	27	12	15	UU	0.86	11	-----	-----	0.03	2.1	-----	
107	4.50 - 5.10	SPT 2	-----	-----	-----	CL	4	23	49	24	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
107	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	19	48	33	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
107	12.00 - 12.60	SPT 7	-----	-----	-----	CL	2	8	53	37	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

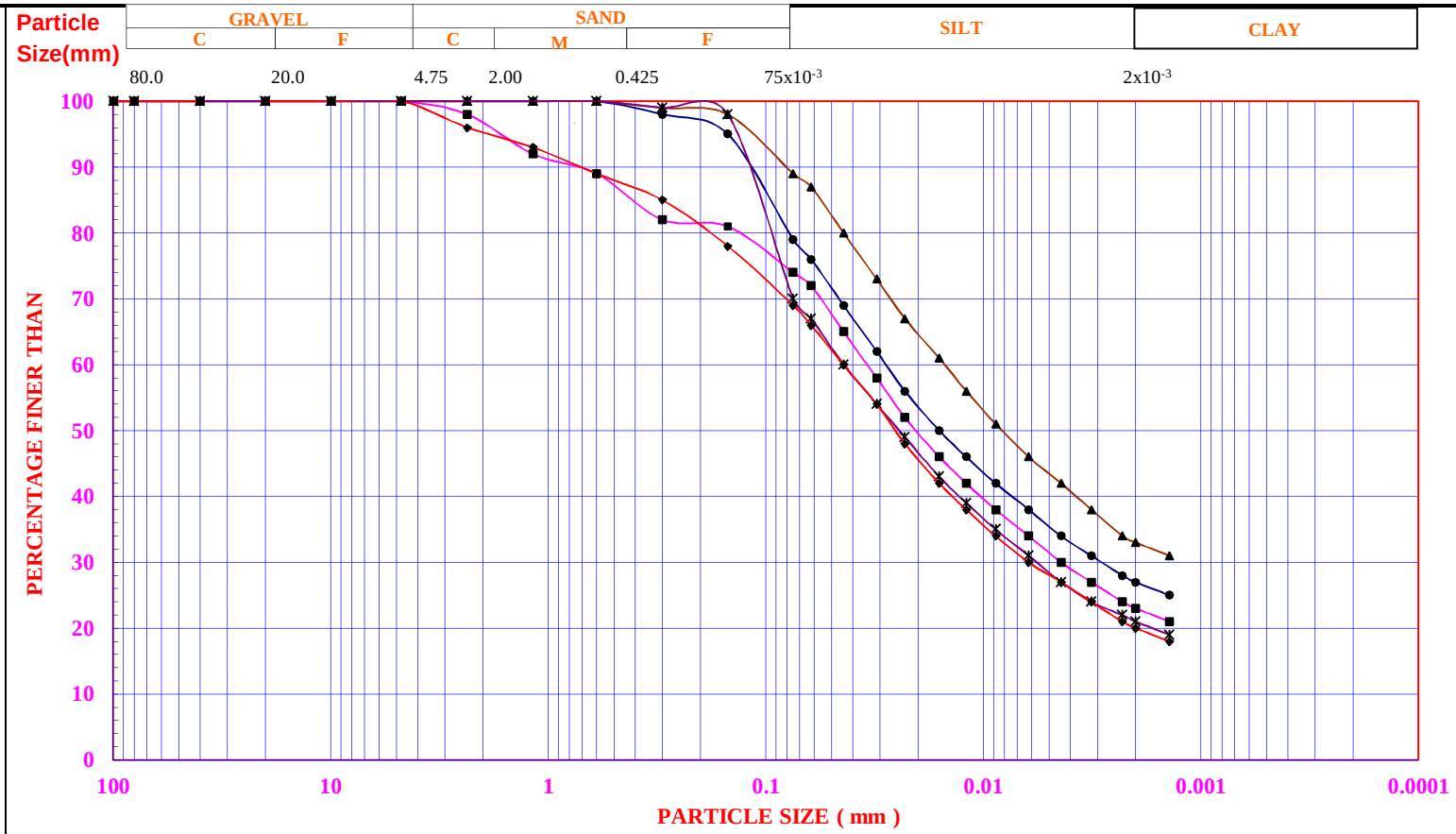
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass (CH :S 1)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S 1	1.50 - 2.10	CL	0	21	52	27	-----	-----	-----	-----	-----	25	11	14	SPT 1
■—■	S 1	3.00 - 3.60	CL	0	26	51	23	-----	-----	-----	-----	-----	28	13	15	SPT 2
▲—▲	S 1	4.50 - 5.10	CL	0	11	56	33	-----	-----	-----	-----	-----	26	12	14	SPT 3
✳—✳	S 1	7.50 - 8.10	CL	0	30	49	21	-----	-----	-----	-----	-----	27	13	14	SPT 5
◆—◆	S 1	12.00 - 12.60	CL	0	31	49	20	-----	-----	-----	-----	-----	26	11	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S 1	S 1	S 1	S 1	S 1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	98.00	100.00	100.00	96.00
1.1800	100.00	92.00	100.00	100.00	93.00
0.6000	100.00	89.00	100.00	100.00	89.00
0.3000	98.00	82.00	99.00	99.00	85.00
0.1500	95.00	81.00	98.00	98.00	78.00
0.0750	79.00	74.00	89.00	70.00	69.00
0.0620	76.00	72.00	87.00	67.00	66.00
0.044	69.00	65.00	80.00	60.00	60.00
0.031	62.00	58.00	73.00	54.00	54.00
0.023	56.00	52.00	67.00	49.00	48.00
0.016	50.00	46.00	61.00	43.00	42.00
0.012	46.00	42.00	56.00	39.00	38.00
0.0088	42.00	38.00	51.00	35.00	34.00
0.0062	38.00	34.00	46.00	31.00	30.00
0.0044	34.00	30.00	42.00	27.00	27.00
0.0032	31.00	27.00	38.00	24.00	24.00
0.0023	28.00	24.00	34.00	22.00	21.00
0.002	27.00	23.00	33.00	21.00	20.00
0.0014	25.00	21.00	31.00	19.00	18.00

Y	0	21	52	27
Z	0	26	51	23
AA	0	11	56	33
AB	0	30	49	21
AC	0	31	49	20

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (CH :S 1) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S 1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	52	27	25	11	14	-----	-----	-----	-----	-----	-----	-----	2.66	
S 1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	26	51	23	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	11	56	33	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	30	49	21	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
S 1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	31	49	20	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

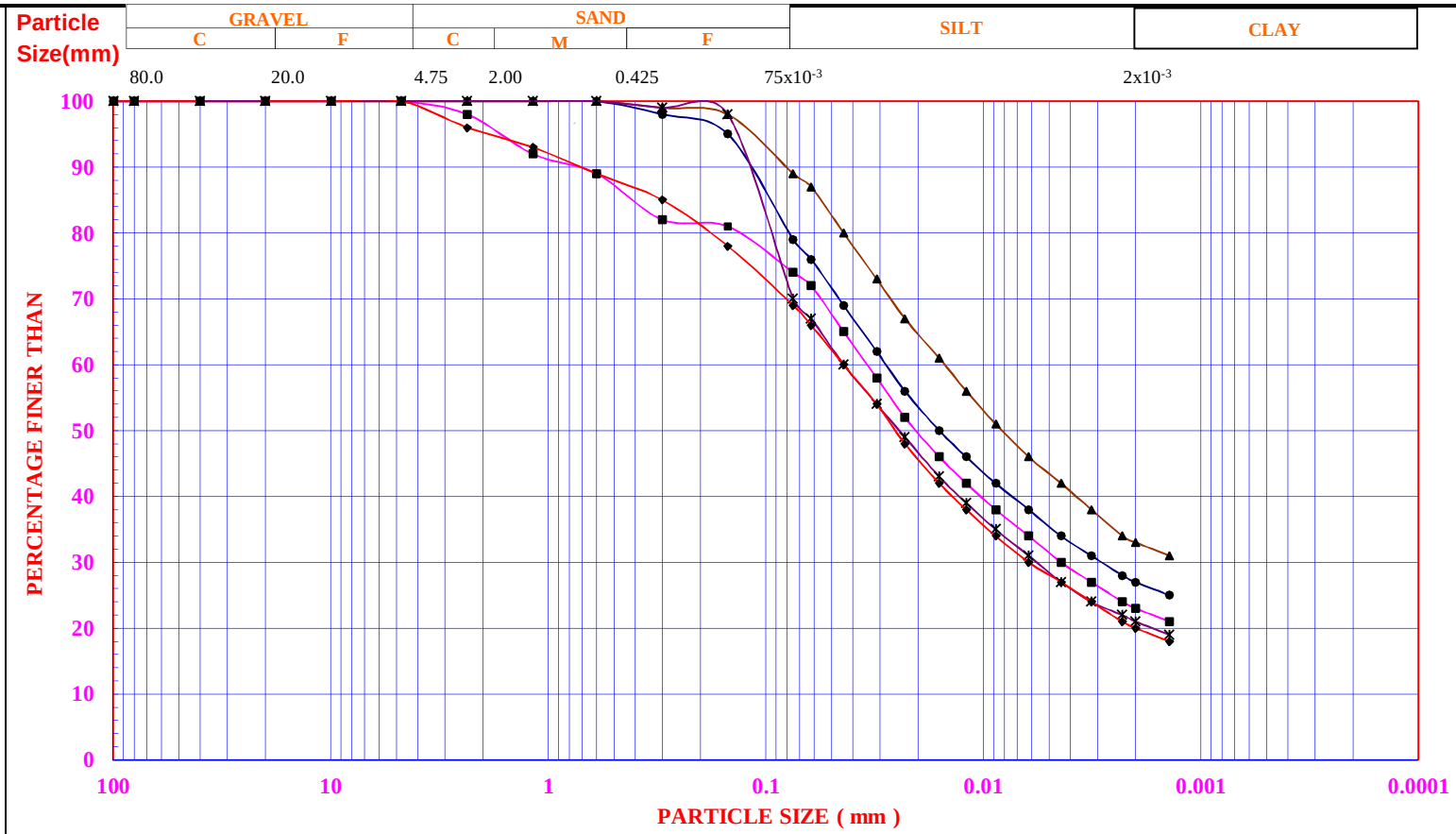
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass (CH :S 2)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S 2	1.50 - 2.10	CL	0	21	52	27	-----	-----	-----	-----	-----	29	14	15	SPT 1
■—■	S 2	3.00 - 3.60	CL	0	26	51	23	-----	-----	-----	-----	-----	26	12	14	SPT 2
▲—▲	S 2	4.50 - 5.10	CL	0	11	56	33	-----	-----	-----	-----	-----	27	14	13	SPT 3
✳—✳	S 2	7.50 - 8.10	CL	0	30	49	21	-----	-----	-----	-----	-----	24	13	11	SPT 5
◆—◆	S 2	12.00 - 12.60	CL	0	31	49	20	-----	-----	-----	-----	-----	26	11	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S 2	S 2	S 2	S 2	S 2
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	98.00	100.00	100.00	96.00
1.1800	100.00	92.00	100.00	100.00	93.00
0.6000	100.00	89.00	100.00	100.00	89.00
0.3000	98.00	82.00	99.00	99.00	85.00
0.1500	95.00	81.00	98.00	98.00	78.00
0.0750	79.00	74.00	89.00	70.00	69.00
0.0620	76.00	72.00	87.00	67.00	66.00
0.044	69.00	65.00	80.00	60.00	60.00
0.031	62.00	58.00	73.00	54.00	54.00
0.023	56.00	52.00	67.00	49.00	48.00
0.016	50.00	46.00	61.00	43.00	42.00
0.012	46.00	42.00	56.00	39.00	38.00
0.0088	42.00	38.00	51.00	35.00	34.00
0.0062	38.00	34.00	46.00	31.00	30.00
0.0044	34.00	30.00	42.00	27.00	27.00
0.0032	31.00	27.00	38.00	24.00	24.00
0.0023	28.00	24.00	34.00	22.00	21.00
0.002	27.00	23.00	33.00	21.00	20.00
0.0014	25.00	21.00	31.00	19.00	18.00

Y	0	21	52	27
Z	0	26	51	23
AA	0	11	56	33
AB	0	30	49	21
AC	0	31	49	20

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (CH :S 2) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S 2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	52	27	29	14	15	-----	-----	-----	-----	-----	-----	-----	2.66	
S 2	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	26	51	23	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
S 2	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	11	56	33	27	14	13	-----	-----	-----	-----	-----	-----	-----	-----	
S 2	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	30	49	21	24	13	11	-----	-----	-----	-----	-----	-----	-----	-----	
S 2	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	31	49	20	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

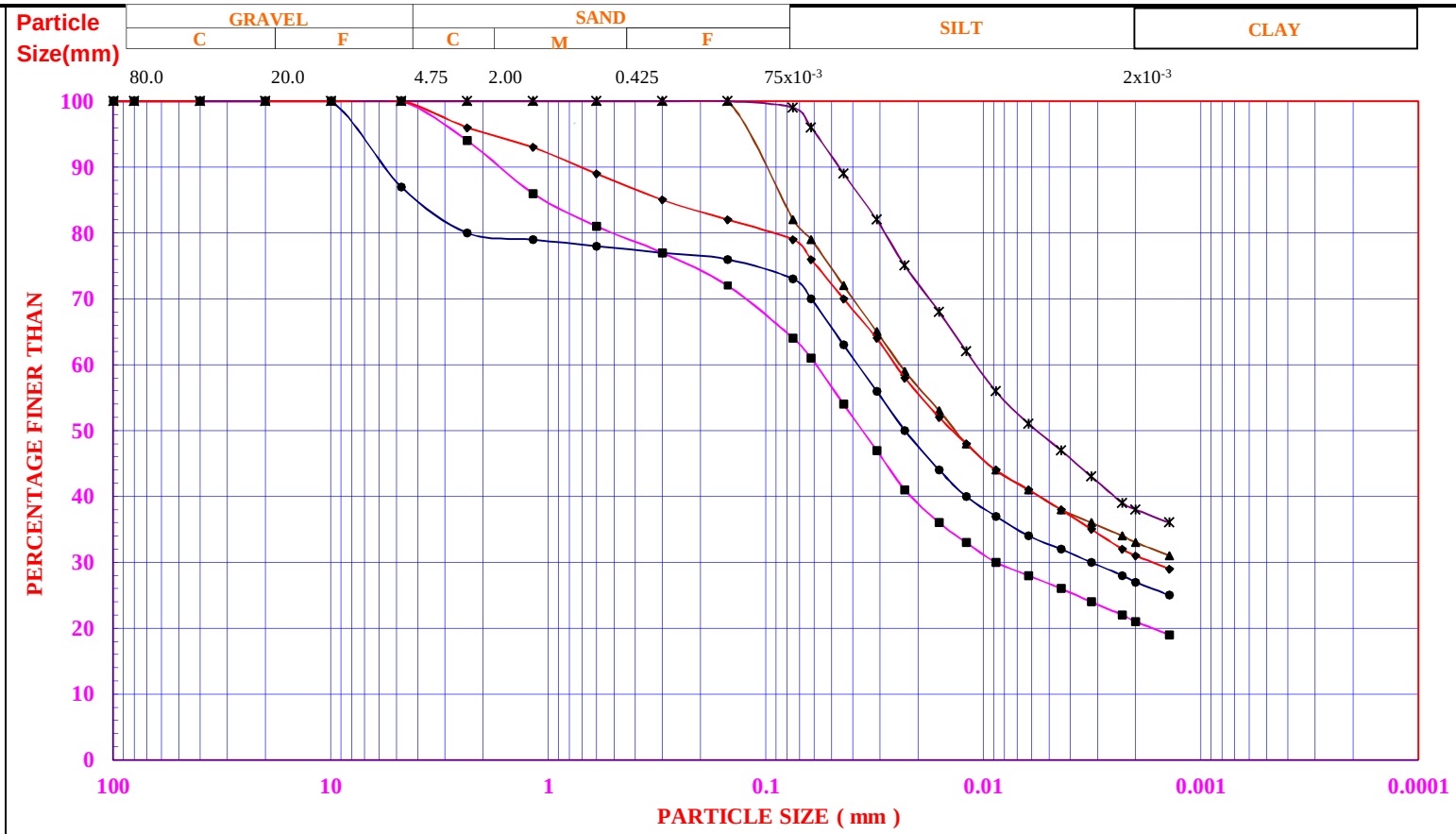
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Sirathu Bypass (CH :S 3)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	S 3	1.50 - 2.10	CL	13	14	46	27	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	S 3	3.00 - 3.60	CL	0	36	43	21	-----	-----	-----	-----	-----	29	12	17	SPT 2
▲—▲	S 3	4.50 - 5.10	CL	0	18	49	33	-----	-----	-----	-----	-----	27	13	14	SPT 3
✳—✳	S 3	7.50 - 8.10	CL	0	1	61	38	-----	-----	-----	-----	-----	31	14	17	SPT 5
◆—◆	S 3	12.00 - 12.60	CL	0	21	48	31	-----	-----	-----	-----	-----	28	13	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	S 3	S 3	S 3	S 3	S 3
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	87.00	100.00	100.00	100.00	100.00
2.3600	80.00	94.00	100.00	100.00	96.00
1.1800	79.00	86.00	100.00	100.00	93.00
0.6000	78.00	81.00	100.00	100.00	89.00
0.3000	77.00	77.00	100.00	100.00	85.00
0.1500	76.00	72.00	100.00	100.00	82.00
0.0750	73.00	64.00	82.00	99.00	79.00
0.0620	70.00	61.00	79.00	96.00	76.00
0.044	63.00	54.00	72.00	89.00	70.00
0.031	56.00	47.00	65.00	82.00	64.00
0.023	50.00	41.00	59.00	75.00	58.00
0.016	44.00	36.00	53.00	68.00	52.00
0.012	40.00	33.00	48.00	62.00	48.00
0.0088	37.00	30.00	44.00	56.00	44.00
0.0062	34.00	28.00	41.00	51.00	41.00
0.0044	32.00	26.00	38.00	47.00	38.00
0.0032	30.00	24.00	36.00	43.00	35.00
0.0023	28.00	22.00	34.00	39.00	32.00
0.002	27.00	21.00	33.00	38.00	31.00
0.0014	25.00	19.00	31.00	36.00	29.00

Y	13	14	46	27
Z	0	36	43	21
AA	0	18	49	33
AB	0	1	61	38
AC	0	21	48	31

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Sirathu Bypass (CH :S 3) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
S 3	1.50 - 2.10	SPT 1	-----	-----	-----	CL	13	14	46	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.65	
S 3	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	36	43	21	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
S 3	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	18	49	33	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
S 3	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	1	61	38	31	14	17	-----	-----	-----	-----	-----	-----	-----	-----	
S 3	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	21	48	31	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

Khaga Detour

Khaga Detour
Bore Logs

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : A - 1	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	8	11	14	21	25			
			Very Stiff Silty Clay	2.10									
2.00													
3.00				3.00	SPT	8	11	14	23	25			
				3.60									
4.00													
				4.50	SPT	7	12	15	20	27			
				5.10									
5.00													
6.00				6.00	SPT	10	14	15	24	29			
				6.60									
7.00													
				7.50	SPT	12	16	19	26	35			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	13	15	18	25	33			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : A - 1	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**17**	**17**	**27**	**34**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**13**	**16**	**20**	**33**	**36**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : A - 2	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.10 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	10	9	14	19			
				2.10									
2.00													
3.00				3.00	SPT	9	10	15	18	25			
				3.60									
4.00													
			Very Stiff Silty Clay	4.50	SPT	11	14	16	20	30			
				5.10									
5.00													
6.00				6.00	SPT	10	16	15	26	31			
				6.60									
7.00													
				7.50	SPT	12	15	15	27	30			
				8.10									
8.00													
9.00				9.00	SPT	11	17	16	31	33			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : A - 2	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.10 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**15**	**19**	**33**	**34**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**16**	**20**	**36**	**36**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 16/10/08 to 17/10/08
CHAINAGE(km.) : A - 3	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
			Very Stiff Silty Clay	1.50	SPT	8	12	16	21	28			
				2.10									
2.00													
3.00				3.00	SPT	8	12	17	24	29			
				3.60									
4.00													
				4.50	SPT	7	13	16	20	29			
				5.10									
5.00													
6.00				6.00	SPT	7	15	15	23	30			
				6.60									
7.00													
				7.50	SPT	9	14	18	26	32			
				8.10									
8.00													
9.00				9.00	SPT	11	15	20	27	35			
			Hard Silty Clay	9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 16/10/08 to 17/10/08
CHAINAGE(km.) : A - 3	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**10**	**15**	**19**	**30**	**34**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**13**	**17**	**20**	**31**	**37**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 128A	SHEET NO. : 1 OF 2
LOCATION :	DATE : 17/10/08 to 18/10/08
CHAINAGE(km.) : 905/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	11	14	20			
			Very Stiff Silty Clay	2.10									
2.00													
3.00				3.00	SPT	8	10	15	19	25			
				3.60									
4.00													
				4.50	SPT	11	15	14	23	29			
				5.10									
5.00													
6.00				6.00	SPT	13	13	18	24	31			
				6.60									
7.00													
				7.50	SPT	12	16	20	29	36			
				8.10									
8.00													
			Hard Silty Clay										
9.00				9.00	SPT	15	19	31	33	40			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 128A	SHEET NO. : 2 OF 2
LOCATION :	DATE : 17/10/08 to 18/10/08
CHAINAGE(km.) : 905/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**20**	**23**	**34**	**43**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**16**	**21**	**26**	**33**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 135	SHEET NO. : 1 OF 2
LOCATION :	DATE : 13/10/08 to 14/10/08
CHAINAGE(km.) : 909/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	8	11	16	19			
				2.10									
2.00													
3.00				3.00	SPT	8	9	11	18	20			
				3.60									
4.00													
				4.50	SPT	9	9	12	17	21			
			Very Stiff Silty Clay	5.10									
5.00													
6.00				6.00	SPT	13	15	15	21	30			
				6.60									
7.00													
				7.50	SPT	11	14	15	20	29			
				8.10									
8.00													
9.00				9.00	SPT	14	16	14	24	30			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 135	SHEET NO. : 2 OF 2
LOCATION :	DATE : 13/10/08 to 14/10/08
CHAINAGE(km.) : 909/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**15**	**17**	**28**	**32**			
11.00			Very Stiff Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**17**	**18**	**27**	**35**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 136	SHEET NO. : 1 OF 2
LOCATION :	DATE : 13/10/08 to 14/10/08
CHAINAGE(km.) : 910/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	8	11	14	19			
				2.10									
2.00													
3.00				3.00	SPT	7	9	11	16	20			
				3.60									
4.00													
				4.50	SPT	6	10	12	15	22			
				5.10									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	8	10	14	17	24			
				6.60									
7.00													
				7.50	SPT	9	11	16	21	27			
				8.10									
8.00													
9.00				9.00	SPT	11	14	17	20	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Khaga Bypass	
BORE HOLE NO. : 1 - 136	SHEET NO. : 2 OF 2
LOCATION :	DATE : 13/10/08 to 14/10/08
CHAINAGE(km.) : 910/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**15**	**18**	**22**	**33**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**13**	**17**	**20**	**28**	**37**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

Khaga Detour
Chemical

CHEMICAL TEST RESULT OF SOIL SAMPLES.

SITE : **Geotechnical Investigation work for DFCCIL , Kanpur.**

LOCATION **KHAGA BYPASS** **DATE**

SR NO.	BRIDGE NO	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
1	A1	1.50 - 2.10	SPT - 1	7.67	0.010	0.021	
2	A2	4.50 - 5.10	SPT - 3	7.78	0.007	0.017	
3	A3	1.50 - 2.10	SPT - 1	7.69	0.008	0.020	
4	905/15-17	7.50 - 8.10	SPT - 5	8.03	0.010	0.023	
5	906/5-7	1.50 - 2.10	SPT - 1	7.79	0.007	0.018	
6	909/21-23	7.50 - 8.10	SPT - 5	8.02	0.011	0.024	
7	910/15-17	1.50 - 2.10	SPT - 1	7.92	0.008	0.019	

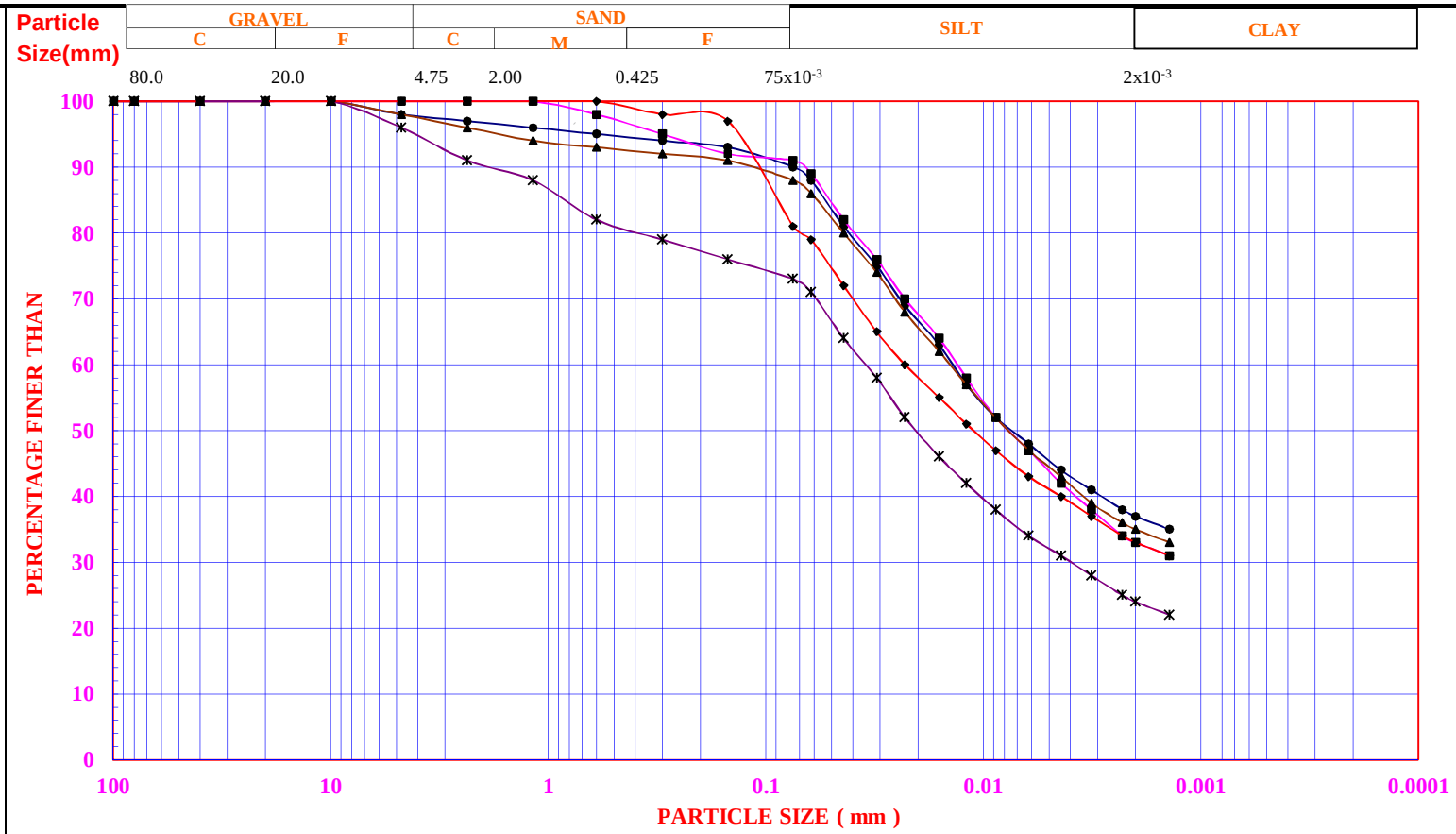
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD **Job No.** **8**

Khaga Detour
GSA

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bore Hole No 1)** (CH :A1)



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	1	1.50 - 2.10	CL	2	8	53	37	-----	-----	-----	-----	-----	28	13	15	SPT 1
■—■	1	3.00 - 3.60	CL	0	9	58	33	-----	-----	-----	-----	-----	31	14	17	SPT 2
▲—▲	1	4.50 - 5.10	CL	2	10	53	35	-----	-----	-----	-----	-----	26	11	15	SPT 3
✳—✳	1	7.50 - 8.10	CL	4	23	49	24	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	1	12.00 - 12.60	CL	0	19	48	33	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	1	1	1	1	1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	98.00	96.00	100.00
2.3600	97.00	100.00	96.00	91.00	100.00
1.1800	96.00	100.00	94.00	88.00	100.00
0.6000	95.00	98.00	93.00	82.00	100.00
0.3000	94.00	95.00	92.00	79.00	98.00
0.1500	93.00	92.00	91.00	76.00	97.00
0.0750	90.00	91.00	88.00	73.00	81.00
0.0620	88.00	89.00	86.00	71.00	79.00
0.044	81.00	82.00	80.00	64.00	72.00
0.031	75.00	76.00	74.00	58.00	65.00
0.023	69.00	70.00	68.00	52.00	60.00
0.016	63.00	64.00	62.00	46.00	55.00
0.012	57.00	58.00	57.00	42.00	51.00
0.0088	52.00	52.00	52.00	38.00	47.00
0.0062	48.00	47.00	47.00	34.00	43.00
0.0044	44.00	42.00	43.00	31.00	40.00
0.0032	41.00	38.00	39.00	28.00	37.00
0.0023	38.00	34.00	36.00	25.00	34.00
0.002	37.00	33.00	35.00	24.00	33.00
0.0014	35.00	31.00	33.00	22.00	31.00

Y	2	8	53	37
Z	0	9	58	33
AA	2	10	53	35
AB	4	23	49	24
AC	0	19	48	33

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bore Hole No 1) (CH :A1) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	8	53	37	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	9	58	33	31	14	17	-----	-----	-----	-----	-----	-----	-----	-----	
1	4.50 - 5.10	SPT 3	-----	-----	-----	CL	2	10	53	35	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.66	
1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	4	23	49	24	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	19	48	33	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

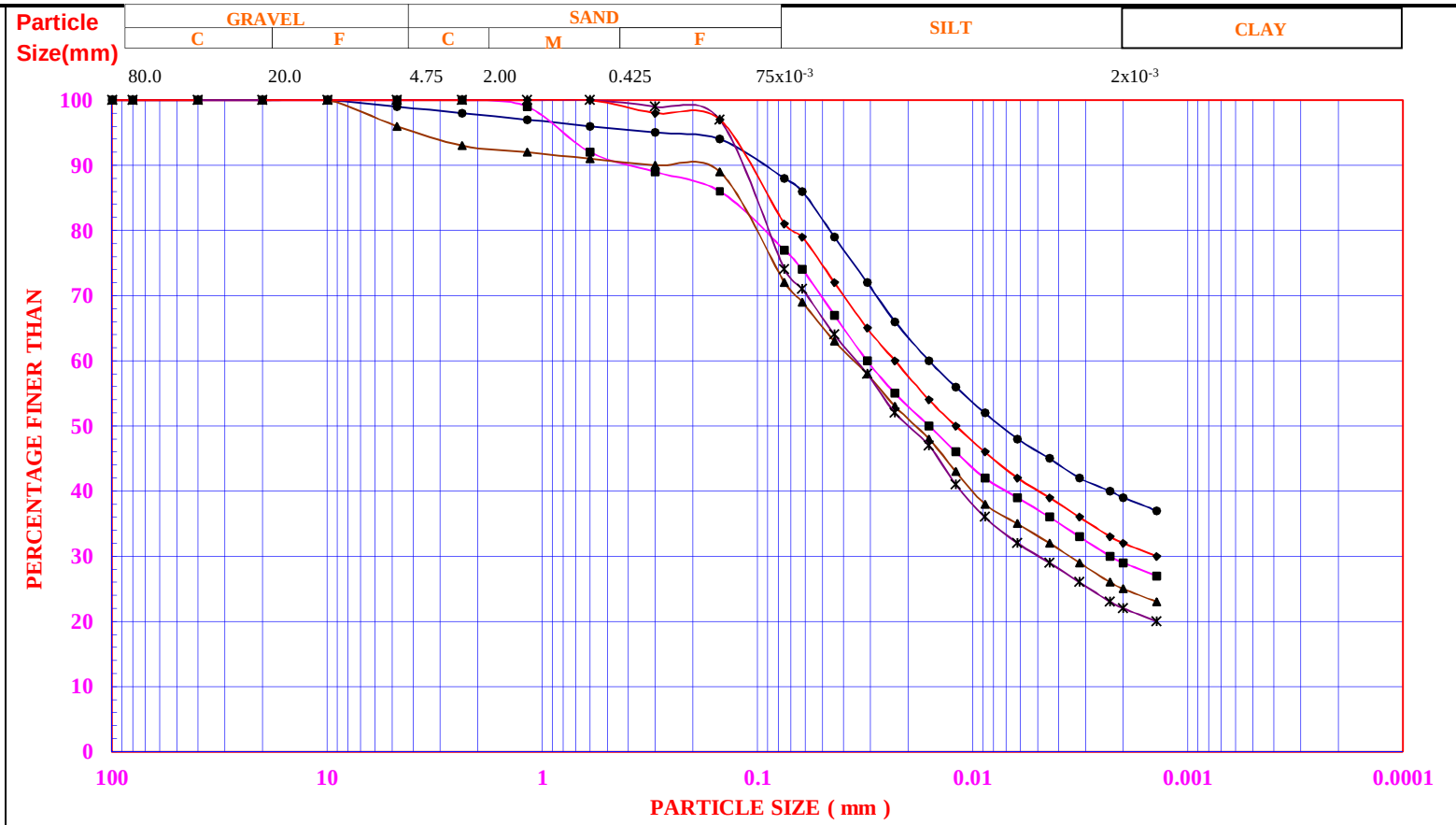
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bore Hole No 1)** (CH :A2)



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	1	1.50 - 2.10	CL	1	11	49	39	-----	-----	-----	-----	-----	27	13	14	SPT 1
■—■	1	3.00 - 3.60	CL	0	23	48	29	-----	-----	-----	-----	-----	29	14	15	SPT 2
▲—▲	1	4.50 - 5.10	CL	4	24	47	25	-----	-----	-----	-----	-----	25	12	13	SPT 3
✳—✳	1	7.50 - 8.10	CL	0	26	52	22	-----	-----	-----	-----	-----	28	13	15	SPT 5
◆—◆	1	12.00 - 12.60	CL	0	19	49	32	-----	-----	-----	-----	-----	26	12	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	1	1	1	1	1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	100.00	96.00	100.00	100.00
2.3600	98.00	100.00	93.00	100.00	100.00
1.1800	97.00	99.00	92.00	100.00	100.00
0.6000	96.00	92.00	91.00	100.00	100.00
0.3000	95.00	89.00	90.00	99.00	98.00
0.1500	94.00	86.00	89.00	97.00	97.00
0.0750	88.00	77.00	72.00	74.00	81.00
0.0620	86.00	74.00	69.00	71.00	79.00
0.044	79.00	67.00	63.00	64.00	72.00
0.031	72.00	60.00	58.00	58.00	65.00
0.023	66.00	55.00	53.00	52.00	60.00
0.016	60.00	50.00	48.00	47.00	54.00
0.012	56.00	46.00	43.00	41.00	50.00
0.0088	52.00	42.00	38.00	36.00	46.00
0.0062	48.00	39.00	35.00	32.00	42.00
0.0044	45.00	36.00	32.00	29.00	39.00
0.0032	42.00	33.00	29.00	26.00	36.00
0.0023	40.00	30.00	26.00	23.00	33.00
0.002	39.00	29.00	25.00	22.00	32.00
0.0014	37.00	27.00	23.00	20.00	30.00

Y	1	11	49	39
Z	0	23	48	29
AA	4	24	47	25
AB	0	26	52	22
AC	0	19	49	32

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bore Hole No 1) (CH :A2) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	11	49	39	27	13	14	-----	-----	-----	-----	-----	-----	-----	2..65	
1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	23	48	29	29	14	15	-----	-----	-----	-----	-----	-----	-----	-----	
1	4.50 - 5.10	SPT 3	-----	-----	-----	CL	4	24	47	25	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	26	52	22	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	19	49	32	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	

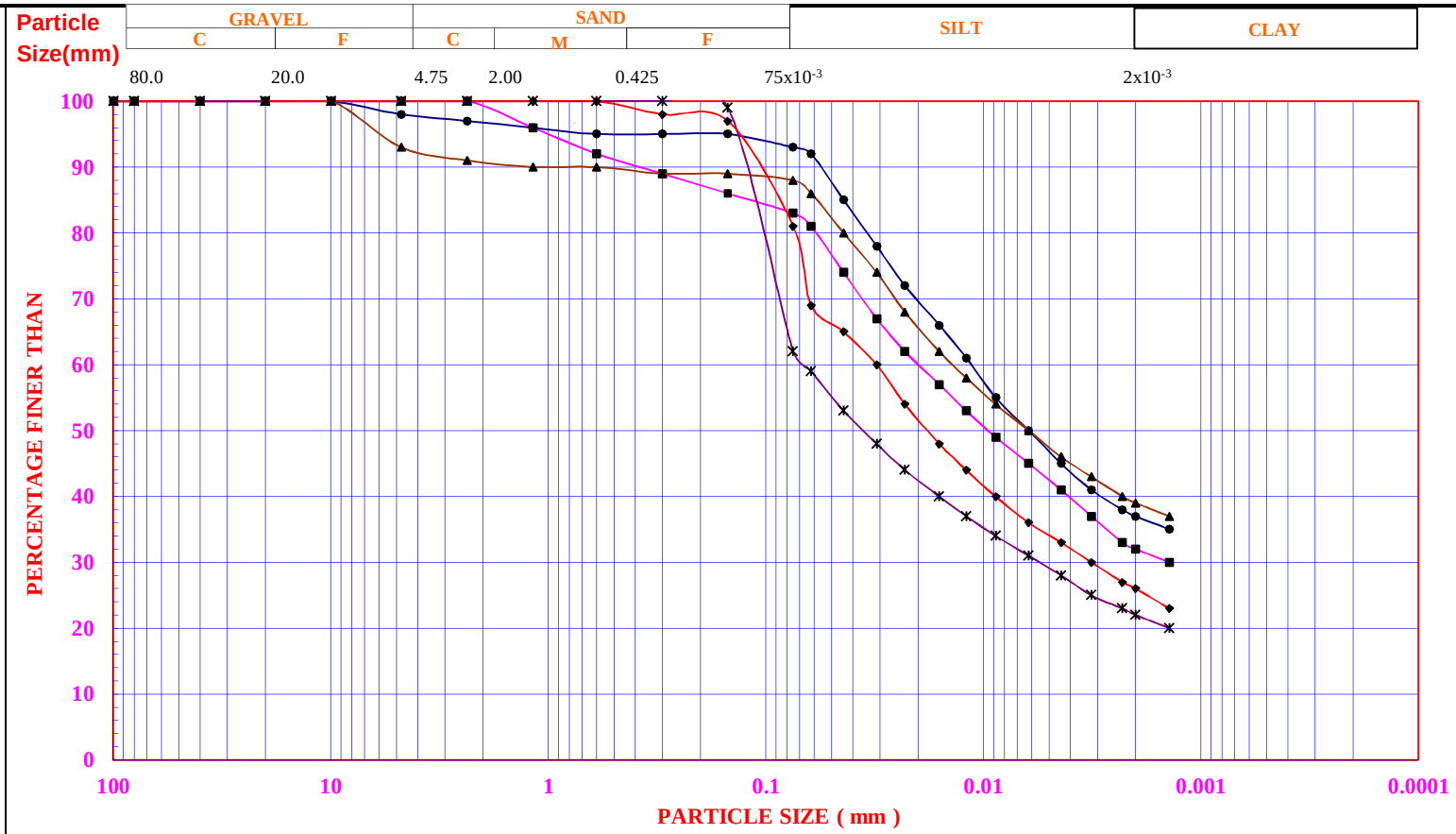
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bore Hole No.1)** (CH : A 3)



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	1	1.50 - 2.10	CL	2	5	56	37	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	1	3.00 - 3.60	CL	0	17	51	32	-----	-----	-----	-----	-----	25	12	13	SPT 2
▲—▲	1	4.50 - 5.10	CL	7	5	49	39	-----	-----	-----	-----	-----	26	11	15	SPT 3
✳—✳	1	7.50 - 8.10	CL	0	38	40	22	-----	-----	-----	-----	-----	27	13	14	SPT 5
◆—◆	1	12.00 - 12.60	CL	0	19	55	26	-----	-----	-----	-----	-----	29	12	17	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	1	1	1	1	1
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	93.00	100.00	100.00
2.3600	97.00	100.00	91.00	100.00	100.00
1.1800	96.00	96.00	90.00	100.00	100.00
0.6000	95.00	92.00	90.00	100.00	100.00
0.3000	95.00	89.00	89.00	100.00	98.00
0.1500	95.00	86.00	89.00	99.00	97.00
0.0750	93.00	83.00	88.00	62.00	81.00
0.0620	92.00	81.00	86.00	59.00	69.00
0.044	85.00	74.00	80.00	53.00	65.00
0.031	78.00	67.00	74.00	48.00	60.00
0.023	72.00	62.00	68.00	44.00	54.00
0.016	66.00	57.00	62.00	40.00	48.00
0.012	61.00	53.00	58.00	37.00	44.00
0.0088	55.00	49.00	54.00	34.00	40.00
0.0062	50.00	45.00	50.00	31.00	36.00
0.0044	45.00	41.00	46.00	28.00	33.00
0.0032	41.00	37.00	43.00	25.00	30.00
0.0023	38.00	33.00	40.00	23.00	27.00
0.002	37.00	32.00	39.00	22.00	26.00
0.0014	35.00	30.00	37.00	20.00	23.00

Y	2	5	56	37
Z	0	17	51	32
AA	7	5	49	39
AB	0	38	40	22
AC	0	19	55	26

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bore Hole No.1) (CH : A 3) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	5	56	37	28	11	17	-----	-----	-----	-----	-----	-----	-----	2.66	
1	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	17	51	32	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
1	4.50 - 5.10	SPT 3	-----	-----	-----	CL	7	5	49	39	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
1	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	38	40	22	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
1	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	19	55	26	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

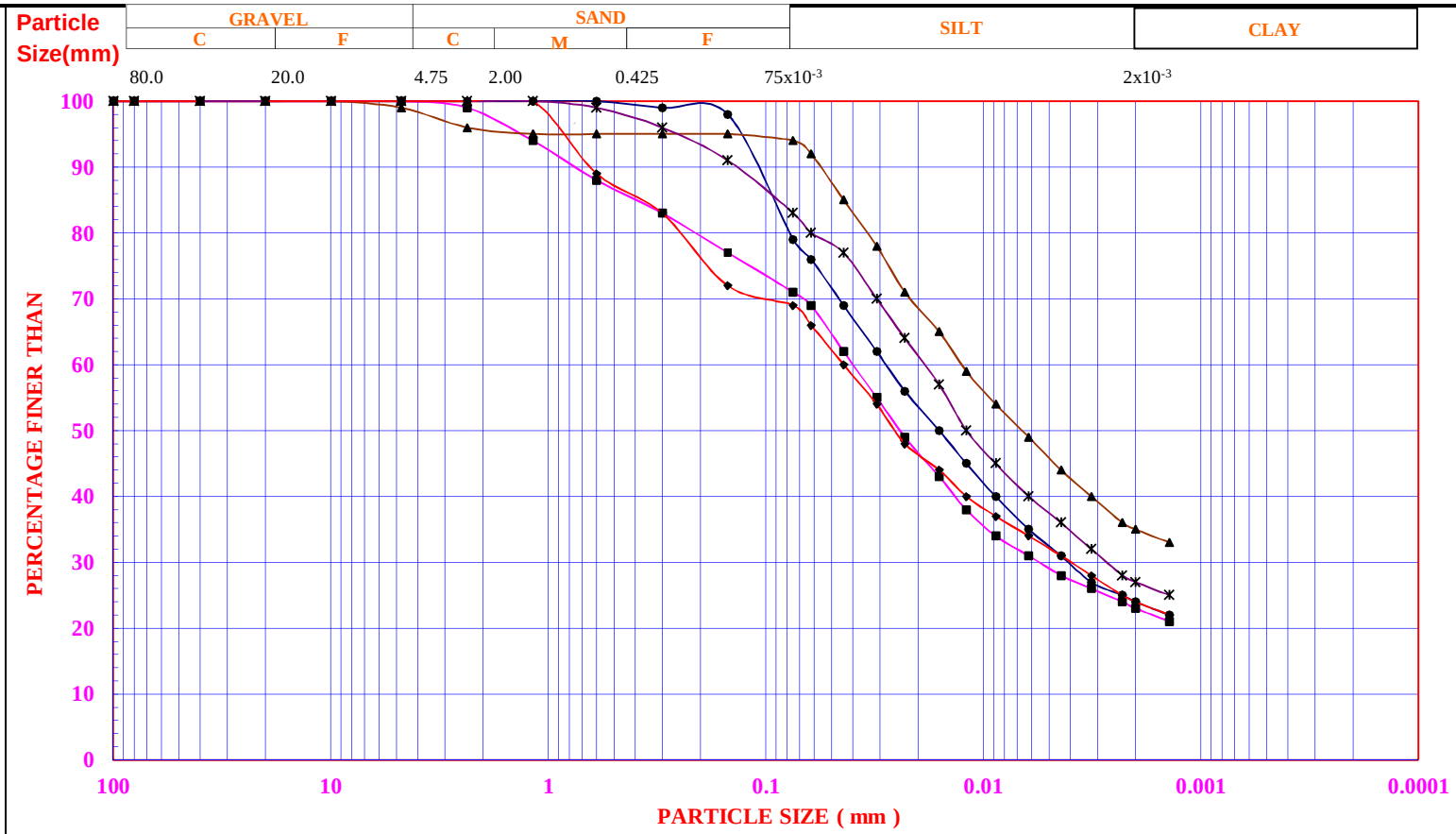
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bridge No.128 A)** (CH :905/15-17)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	128 A	1.50 - 2.10	**CL**	0	21	55	24	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	128 A	3.00 - 3.60	**CL**	0	29	48	23	-----	-----	-----	-----	-----	25	10	15	SPT 2
▲—▲	128 A	4.50 - 5.10	**CL**	1	5	59	35	-----	-----	-----	-----	-----	29	12	17	SPT 3
✳—✳	128 A	7.50 - 8.10	**CL**	0	17	56	27	-----	-----	-----	-----	-----	26	11	15	SPT 5
◆—◆	128 A	12.00 - 12.60	**CL**	0	31	45	24	-----	-----	-----	-----	-----	24	11	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	128 A	128 A	128 A	128 A	128 A
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	99.00	100.00	100.00
2.3600	100.00	99.00	96.00	100.00	100.00
1.1800	100.00	94.00	95.00	100.00	100.00
0.6000	100.00	88.00	95.00	99.00	89.00
0.3000	99.00	83.00	95.00	96.00	83.00
0.1500	98.00	77.00	95.00	91.00	72.00
0.0750	79.00	71.00	94.00	83.00	69.00
0.0620	76.00	69.00	92.00	80.00	66.00
0.044	69.00	62.00	85.00	77.00	60.00
0.031	62.00	55.00	78.00	70.00	54.00
0.023	56.00	49.00	71.00	64.00	48.00
0.016	50.00	43.00	65.00	57.00	44.00
0.012	45.00	38.00	59.00	50.00	40.00
0.0088	40.00	34.00	54.00	45.00	37.00
0.0062	35.00	31.00	49.00	40.00	34.00
0.0044	31.00	28.00	44.00	36.00	31.00
0.0032	27.00	26.00	40.00	32.00	28.00
0.0023	25.00	24.00	36.00	28.00	25.00
0.002	24.00	23.00	35.00	27.00	24.00
0.0014	22.00	21.00	33.00	25.00	22.00

Y	0	21	55	24
Z	0	29	48	23
AA	1	5	59	35
AB	0	17	56	27
AC	0	31	45	24

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bridge No.128 A) (CH :905/15-17) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
128 A	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	21	55	24	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
128 A	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	29	48	23	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	
128 A	4.50 - 5.10	SPT 3	-----	-----	-----	CL	1	5	59	35	29	12	17	-----	-----	-----	-----	-----	-----	-----	2.66	
128 A	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	17	56	27	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
128 A	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	31	45	24	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	

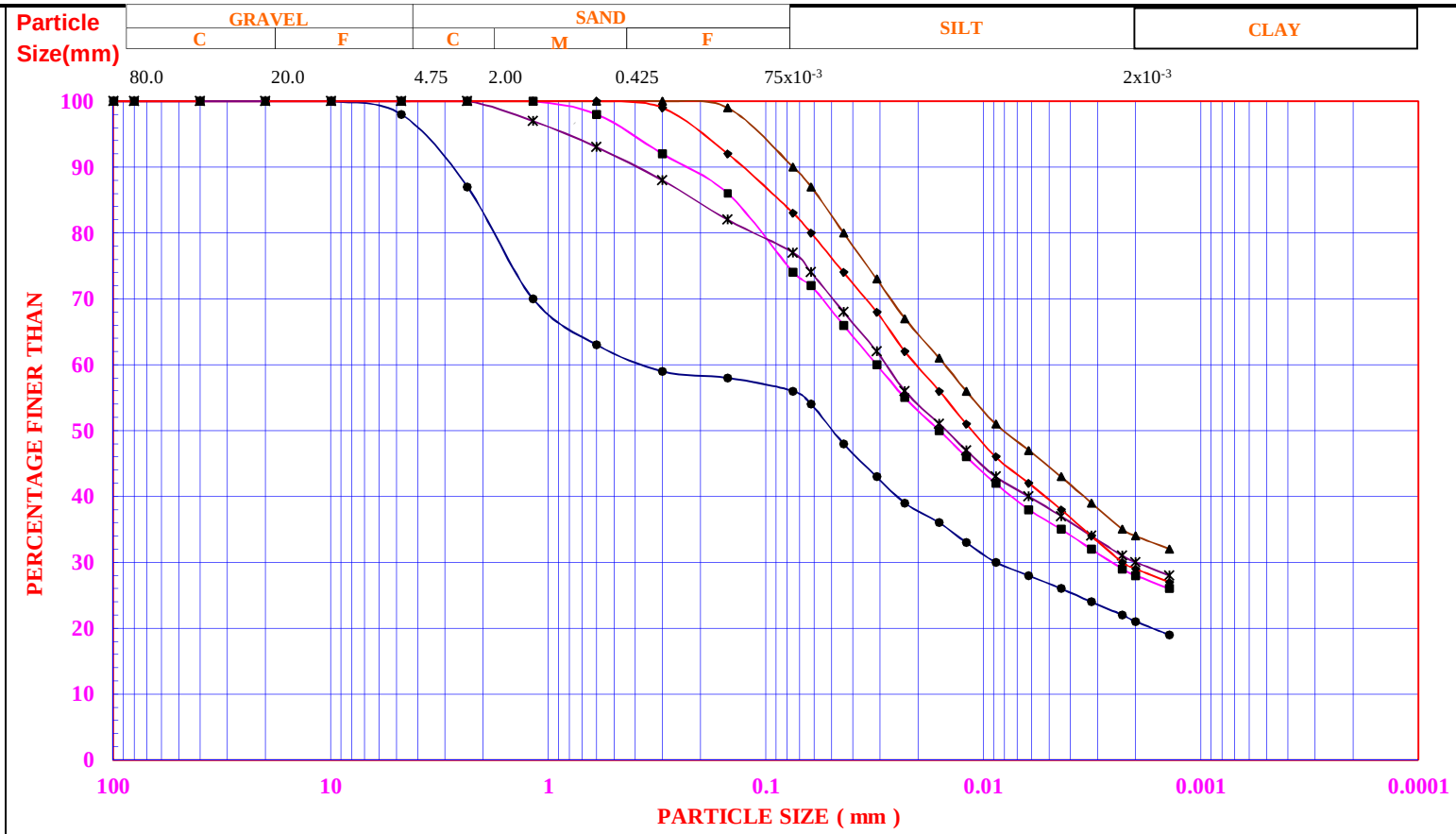
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bore Hole No A 4)** (CH :906/5-7)



Symbol	Bore Hole No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	A4	1.50 - 2.10	**CL**	2	42	35	21	-----	-----	-----	-----	-----	27	12	15	SPT 1
■—■	A4	3.00 - 3.60	**CL**	0	26	46	28	-----	-----	-----	-----	-----	26	13	13	SPT 2
▲—▲	A4	4.50 - 5.10	**CL**	0	10	56	34	-----	-----	-----	-----	-----	29	12	17	SPT 3
✳—✳	A4	7.50 - 8.10	**CL**	0	23	47	30	-----	-----	-----	-----	-----	25	10	15	SPT 5
◆—◆	A4	12.00 - 12.60	**CL**	0	17	54	29	-----	-----	-----	-----	-----	28	11	17	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	A4	A4	A4	A4	A4
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	100.00	100.00
2.3600	87.00	100.00	100.00	100.00	100.00
1.1800	70.00	100.00	100.00	97.00	100.00
0.6000	63.00	98.00	100.00	93.00	100.00
0.3000	59.00	92.00	100.00	88.00	99.00
0.1500	58.00	86.00	99.00	82.00	92.00
0.0750	56.00	74.00	90.00	77.00	83.00
0.0620	54.00	72.00	87.00	74.00	80.00
0.044	48.00	66.00	80.00	68.00	74.00
0.031	43.00	60.00	73.00	62.00	68.00
0.023	39.00	55.00	67.00	56.00	62.00
0.016	36.00	50.00	61.00	51.00	56.00
0.012	33.00	46.00	56.00	47.00	51.00
0.0088	30.00	42.00	51.00	43.00	46.00
0.0062	28.00	38.00	47.00	40.00	42.00
0.0044	26.00	35.00	43.00	37.00	38.00
0.0032	24.00	32.00	39.00	34.00	34.00
0.0023	22.00	29.00	35.00	31.00	30.00
0.002	21.00	28.00	34.00	30.00	29.00
0.0014	19.00	26.00	32.00	28.00	27.00

Y	2	42	35	21
Z	0	26	46	28
AA	0	10	56	34
AB	0	23	47	30
AC	0	17	54	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bore Hole No A 4) (CH :906/5-7) **DATE:**

Bore Hole No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
A4	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	42	35	21	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
A4	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	26	46	28	26	13	13	-----	-----	-----	-----	-----	-----	-----	-----	
A4	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	10	56	34	29	12	17	-----	-----	-----	-----	-----	-----	-----	-----	
A4	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	23	47	30	25	10	15	-----	-----	-----	-----	-----	-----	-----	2.66	
A4	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	17	54	29	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

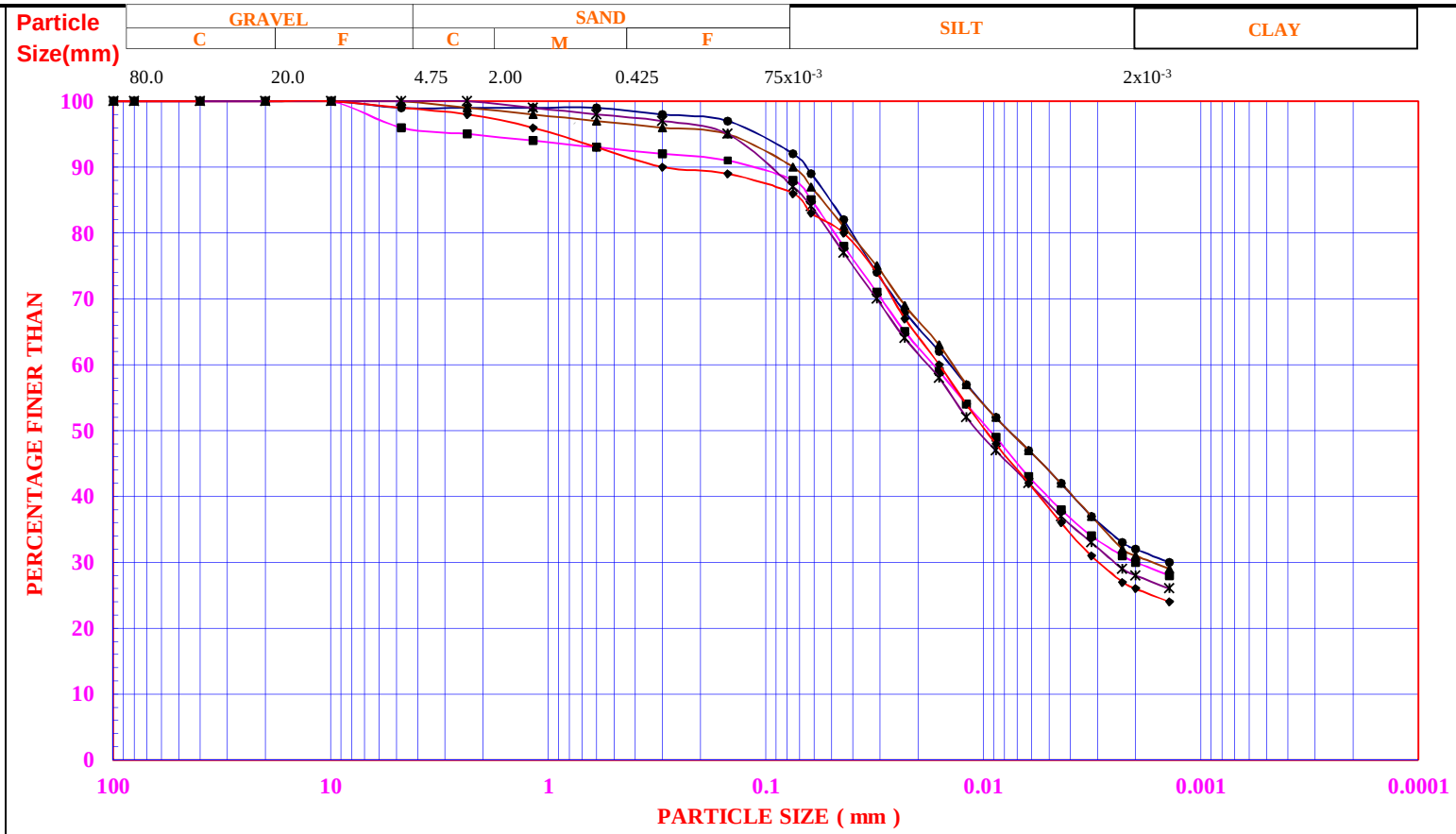
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bridge No.135)** (CH :909/21-23)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	135	1.50 - 2.10	CL	1	7	60	32	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	135	3.00 - 3.60	CL	4	8	58	30	-----	-----	-----	-----	-----	28	13	15	SPT 2
▲—▲	135	4.50 - 5.10	CL	0	10	59	31	-----	-----	-----	-----	-----	26	12	14	SPT 3
✳—✳	135	7.50 - 8.10	CL	0	13	59	28	-----	-----	-----	-----	-----	27	10	17	SPT 5
◆—◆	135	12.00 - 12.60	CL	1	13	60	26	-----	-----	-----	-----	-----	25	12	13	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	135	135	135	135	135
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	96.00	100.00	100.00	99.00
2.3600	99.00	95.00	99.00	100.00	98.00
1.1800	99.00	94.00	98.00	99.00	96.00
0.6000	99.00	93.00	97.00	98.00	93.00
0.3000	98.00	92.00	96.00	97.00	90.00
0.1500	97.00	91.00	95.00	95.00	89.00
0.0750	92.00	88.00	90.00	87.00	86.00
0.0620	89.00	85.00	87.00	84.00	83.00
0.044	82.00	78.00	81.00	77.00	80.00
0.031	74.00	71.00	75.00	70.00	74.00
0.023	68.00	65.00	69.00	64.00	67.00
0.016	62.00	59.00	63.00	58.00	60.00
0.012	57.00	54.00	57.00	52.00	54.00
0.0088	52.00	49.00	52.00	47.00	48.00
0.0062	47.00	43.00	47.00	42.00	42.00
0.0044	42.00	38.00	42.00	37.00	36.00
0.0032	37.00	34.00	37.00	33.00	31.00
0.0023	33.00	31.00	32.00	29.00	27.00
0.002	32.00	30.00	31.00	28.00	26.00
0.0014	30.00	28.00	29.00	26.00	24.00

Y	1	7	60	32
Z	4	8	58	30
AA	0	10	59	31
AB	0	13	59	28
AC	1	13	60	26

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bridge No.135) (CH :909/21-23) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
135	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	7	60	32	31	14	17	-----	-----	-----	-----	-----	-----	-----	2.65	
135	3.00 - 3.60	SPT 2	-----	-----	-----	CL	4	8	58	30	28	13	15	-----	-----	-----	-----	-----	-----	-----	-----	
135	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	10	59	31	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
135	7.50 - 8.10	SPT 5	-----	-----	-----	CL	0	13	59	28	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
135	12.00 - 12.60	SPT 8	-----	-----	-----	CL	1	13	60	26	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

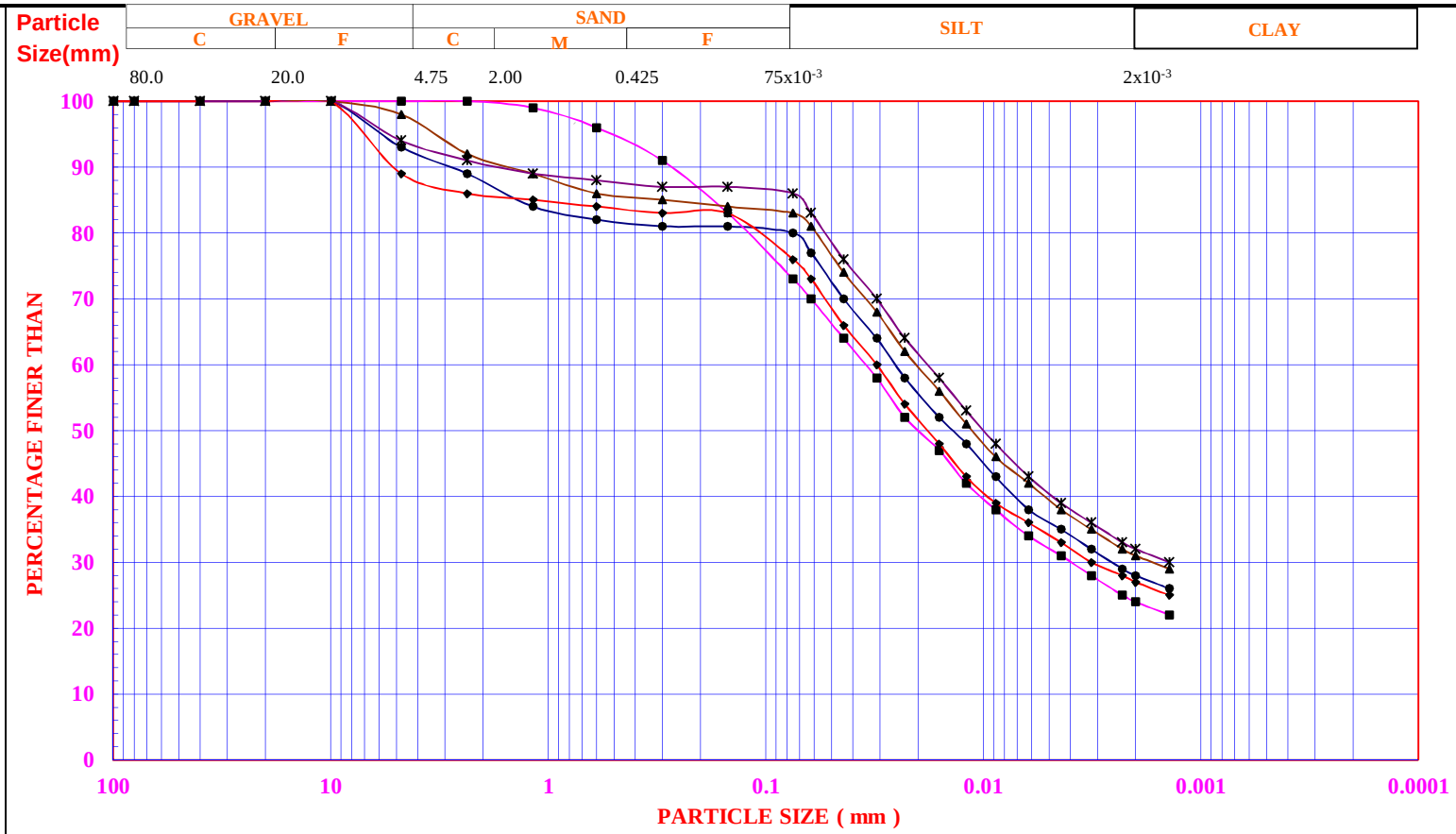
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Khaga Bypass **(Bridge No.136)** (CH :910/15-17)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	136	1.50 - 2.10	CL	7	13	52	28	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	136	3.00 - 3.60	CL	0	27	49	24	-----	-----	-----	-----	-----	27	12	15	SPT 2
▲—▲	136	4.50 - 5.10	CL	2	15	52	31	-----	-----	-----	-----	-----	24	10	14	SPT 3
✳—✳	136	7.50 - 8.10	CL	6	8	54	32	-----	-----	-----	-----	-----	25	12	13	SPT 5
◆—◆	136	12.00 - 12.60	CL	11	13	49	27	-----	-----	-----	-----	-----	27	12	15	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	136	136	136	136	136
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	93.00	100.00	98.00	94.00	89.00
2.3600	89.00	100.00	92.00	91.00	86.00
1.1800	84.00	99.00	89.00	89.00	85.00
0.6000	82.00	96.00	86.00	88.00	84.00
0.3000	81.00	91.00	85.00	87.00	83.00
0.1500	81.00	83.00	84.00	87.00	83.00
0.0750	80.00	73.00	83.00	86.00	76.00
0.0620	77.00	70.00	81.00	83.00	73.00
0.044	70.00	64.00	74.00	76.00	66.00
0.031	64.00	58.00	68.00	70.00	60.00
0.023	58.00	52.00	62.00	64.00	54.00
0.016	52.00	47.00	56.00	58.00	48.00
0.012	48.00	42.00	51.00	53.00	43.00
0.0088	43.00	38.00	46.00	48.00	39.00
0.0062	38.00	34.00	42.00	43.00	36.00
0.0044	35.00	31.00	38.00	39.00	33.00
0.0032	32.00	28.00	35.00	36.00	30.00
0.0023	29.00	25.00	32.00	33.00	28.00
0.002	28.00	24.00	31.00	32.00	27.00
0.0014	26.00	22.00	29.00	30.00	25.00

Y	7	13	52	28
Z	0	27	49	24
AA	2	15	52	31
AB	6	8	54	32
AC	11	13	49	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Khaga Bypass (Bridge No.136) (CH :910/15-17) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
136	1.50 - 2.10	SPT 1	-----	-----	-----	CL	7	13	52	28	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
136	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	27	49	24	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
136	4.50 - 5.10	SPT 3	-----	-----	-----	CL	2	15	52	31	24	10	14	-----	-----	-----	-----	-----	-----	-----	2.66	
136	7.50 - 8.10	SPT 5	-----	-----	-----	CL	6	8	54	32	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
136	12.00 - 12.60	SPT 8	-----	-----	-----	CL	11	13	49	27	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

Fatehpur Detour

Fatehpur Detour
Bore Logs

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 8/10/08 to 9/10/08
CHAINAGE(km.) : 944/A-1	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Stiff Silty Clay	1.50	SPT	4	5	7	10	12			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	6	8	11	13	19			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	7	11	13	16	24			
7.00				6.60									
				7.50	SPT	11	15	19	22	34			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	14	19	25	32	44			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 8/10/08 to 9/10/08
CHAINAGE(km.) : 944/A-1	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**21**	**27**	**37**	**48**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**15**	**22**	**31**	**40**	**53**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 9/10/08 to 10/10/08
CHAINAGE(km.) : 944/A-2	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	9	12			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	7	9	10	11	19			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	9	13	15	20	28			
				6.60									
7.00													
				7.50	SPT	11	14	19	24	33			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	14	19	25	34	44			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 9/10/08 to 10/10/08
CHAINAGE(km.) : 944/A-2	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**18**	**23**	**30**	**41**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**14**	**19**	**29**	**37**	**48**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 11/10/08 to 12/10/08
CHAINAGE(km.) : 944/A-3	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00				1.50	SPT	4	4	5	8	9			
2.00				2.10									
3.00				3.00	UDS								
4.00			Stiff Silty Clay	3.50									
				4.50	SPT	6	8	9	11	17			
5.00				5.10									
6.00			Stiff Silty Clay	6.00	SPT	8	11	15	18	26			
7.00				6.60									
				7.50	SPT	13	15	19	24	34			
8.00				8.10									
9.00			Hard Silty Clay	9.00	SPT	14	19	23	29	42			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 11/10/08 to 12/10/08
CHAINAGE(km.) : 944/A-3	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**18**	**22**	**33**	**40**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**14**	**19**	**27**	**35**	**46**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 12/10/08 to 13/10/08
CHAINAGE(km.) : 944/A-4	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00				1.50	SPT	6	8	9	11	17			
2.00				2.10									
3.00			Very Stiff Silty Clay	3.00	SPT	8	9	10	14	19			
4.00				3.60									
				4.50	SPT	6	9	13	16	21			
5.00				5.10									
6.00				6.00	SPT	9	15	17	20	32			
7.00				6.60									
				7.50	SPT	11	18	23	30	41			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	14	21	27	37	48			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 12/10/08 to 13/10/08
CHAINAGE(km.) : 944/A-4	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.90 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**23**	**31**	**39**	**54**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**14**	**19**	**26**	**34**	**45**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 14/10/08 to 14/10/08
CHAINAGE(km.) : 944/A-5	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	5	5	7	10			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	8	9	11	17			
				5.10									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	8	13	16	19	29			
				6.60									
7.00													
				7.50	SPT	11	18	24	29	42			
				8.10									
8.00													
			Hard Silty Clay										
9.00				9.00	SPT	14	19	29	34	48			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 14/10/08 to 14/10/08
CHAINAGE(km.) : 944/A-5	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.20 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**21**	**29**	**38**	**50**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**14**	**23**	**32**	**40**	**55**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : 944/A-6	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	4	6	7	10			
2.00				2.10									
3.00			Stiff Silty Clay	3.00	UDS								
4.00				3.50									
				4.50	SPT	6	7	9	11	16			
5.00				5.10									
6.00				6.00	SPT	9	12	14	16	26			
7.00			Very Stiff Silty Clay	6.60									
				7.50	SPT	9	14	18	20	32			
8.00				8.10									
9.00				9.00	SPT	11	16	21	25	37			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 15/10/08 to 16/10/08
CHAINAGE(km.) : 944/A-6	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 4.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**19**	**26**	**32**	**45**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**16**	**21**	**32**	**41**	**53**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 16/10/08 to 17/10/08
CHAINAGE(km.) : 944/A-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	8	8	9	11	17			
				2.10									
2.00													
3.00				3.00	SPT	9	10	10	15	20			
				3.60									
4.00			Very Stiff Silty Clay										
				4.50	SPT	9	10	13	16	23			
				5.10									
5.00													
6.00				6.00	SPT	10	13	16	20	29			
				6.60									
7.00													
				7.50	SPT	12	15	19	23	34			
				8.10									
8.00													
			Dence Clayey Sand										
9.00				9.00	SPT	14	18	23	29	41			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 16/10/08 to 17/10/08
CHAINAGE(km.) : 944/A-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.60 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**19**	**34**	**40**	**53**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**16**	**24**	**35**	**39**	**59**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 17/10/08 to 18/10/08
CHAINAGE(km.) : 944/A-8	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	9	12			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	6	9	10	13	19			
5.00				5.10									
6.00				6.00	SPT	9	12	14	19	26			
7.00			Very Stiff Silty Clay	6.60									
				7.50	SPT	11	14	18	23	32			
8.00				8.10									
9.00				9.00	SPT	13	19	26	34	45			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 17/10/08 to 18/10/08
CHAINAGE(km.) : 944/A-8	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.40 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**21**	**27**	**36**	**48**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**16**	**24**	**28**	**40**	**52**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 166	SHEET NO. : 1 OF 2
LOCATION :	DATE : 5/10/08 to 6/10/08
CHAINAGE(km.) : 945/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Stiff Silty Clay	1.50	SPT	4	6	8	10	14			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	7	9	10	12	19			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	7	7	14	21	21			
7.00				6.60									
				7.50	SPT	10	12	15	18	27			
8.00				8.10									
9.00				9.00	SPT	13	16	20	25	36			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 166	SHEET NO. : 2 OF 2
LOCATION :	DATE : 5/10/08 to 6/10/08
CHAINAGE(km.) : 945/15-17	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**12**	**15**	**24**	**30**	**39**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**14**	**18**	**23**	**33**	**41**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 168	SHEET NO. : 1 OF 2
LOCATION :	DATE : 1/10/08 to 2/10/08
CHAINAGE(km.) : 946/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Stiff Silty Clay	1.50	SPT	5	6	8	9	14			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	7	10	13	15	23			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	12	13	16	22	29			
7.00				6.60									
				7.50	SPT	10	14	18	30	32			
8.00				8.10									
9.00				9.00	SPT	16	21	27	35	48			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 168	SHEET NO. : 2 OF 2
LOCATION :	DATE : 1/10/08 to 2/10/08
CHAINAGE(km.) : 946/21-23	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**19**	**24**	**32**	**43**			
				11.10									
11.00			Hard Silty Clay										
12.00				**12.00**	**SPT**	**14**	**22**	**29**	**39**	**51**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 170	SHEET NO. : 1 OF 2
LOCATION :	DATE : 28/09/08 to 29/09/08
CHAINAGE(km.) : 947/25-27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	9	12			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	6	8	9	13	17			
5.00				5.10									
6.00				6.00	SPT	6	9	13	15	22			
7.00			Very Stiff Silty Clay	6.60									
				7.50	SPT	10	15	19	24	34			
8.00				8.10									
9.00			Hard Silty Clay	9.00	SPT	14	19	23	26	42			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Fatehputr Bypass	
BORE HOLE NO. : 170	SHEET NO. : 2 OF 2
LOCATION :	DATE : 28/09/08 to 29/09/08
CHAINAGE(km.) : 947/25-27	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : -------- m
GROUND W. T. : 6.30 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**21**	**27**	**36**	**48**			
11.00			Hard Silty Clay	**11.10**									
12.00				**12.00**	**SPT**	**15**	**19**	**25**	**35**	**44**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

Fatehpur Detour
Chemical

CHEMICAL TEST RESULT OF SOIL SAMPLES.

SITE : **Geotechnical Investigation work for DFCCIL , Kanpur.**

LOCATION **FATEHPUR BYPASS** **DATE**

SR NO.	BRIDGE NO	DEPTH IN METERS	TYPE OF SAMPLE	pH ELECTROMETERICALLY	SULPHATE AS SO_3 %	CHLORIDE AS Cl %	REMARKS
1	938/11-13	1.50 - 2.10	SPT - 1	7.83	0.008	0.019	
2	944 A1	1.50 - 2.10	SPT - 1	7.67	0.010	0.021	
3	944 A2	4.50 - 5.10	SPT - 3	7.78	0.007	0.017	
4	944 A3	1.50 - 2.10	SPT - 1	7.69	0.011	0.020	
5	944 A4	7.50 - 8.10	SPT - 5	8.03	0.010	0.023	
6	944 A5	1.50 - 2.10	SPT - 1	7.79	0.007	0.018	
7	944 A6	1.50 - 2.10	SPT - 1	7.94	0.011	0.014	
8	944 A7	4.50 - 5.10	SPT - 3	8.01	0.012	0.022	
9	944 A8	1.50 - 2.10	SPT - 1	7.82	0.010	0.021	
10	165	1.50 - 2.10	SPT - 1	7.69	0.008	0.018	

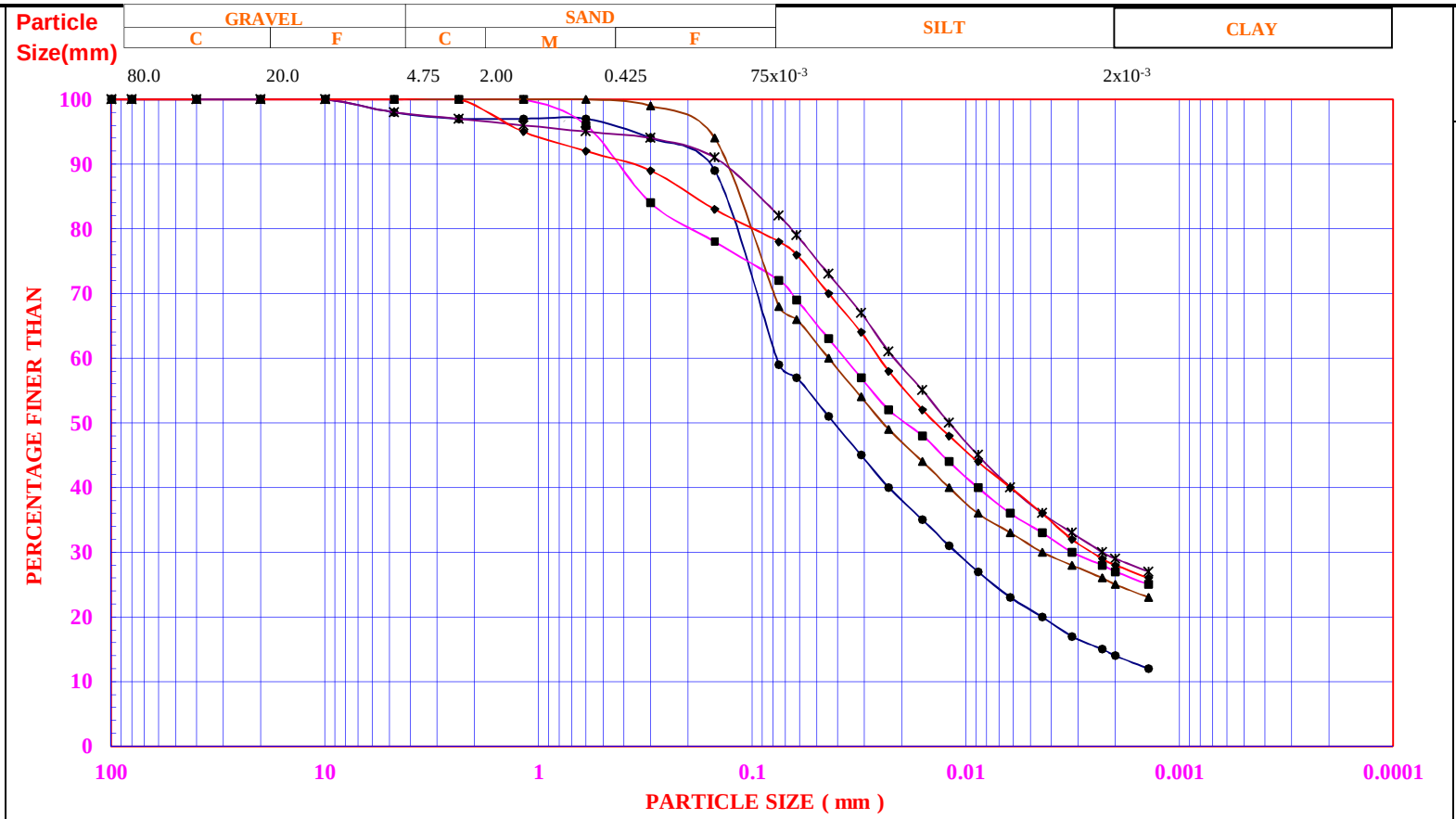
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD **Job No.** **8**

Fatehpur Detour
GSA

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.938/11-13)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	938	1.50 - 2.10	CL	2	39	45	14	-----	-----	-----	-----	-----	24	11	13	SPT 1
■—■	938	3.00 - 3.50	CL	0	28	45	27	-----	-----	-----	-----	-----	27	13	14	UDS -1
▲—▲	938	4.50 - 5.10	CL	0	32	43	25	-----	-----	-----	-----	-----	26	11	15	SPT 2
✳—✳	938	7.50 - 8.10	CL	2	16	53	29	-----	-----	-----	-----	-----	28	10	18	SPT 4
◆—◆	938	12.00 - 12.60	CL	0	22	50	28	-----	-----	-----	-----	-----	25	12	13	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	938	938	938	938	938
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	98.00	100.00	100.00	98.00	100.00
2.3600	97.00	100.00	100.00	97.00	100.00
1.1800	97.00	100.00	100.00	96.00	95.00
0.6000	97.00	96.00	100.00	95.00	92.00
0.3000	94.00	84.00	99.00	94.00	89.00
0.1500	89.00	78.00	94.00	91.00	83.00
0.0750	59.00	72.00	68.00	82.00	78.00
0.0620	57.00	69.00	66.00	79.00	76.00
0.044	51.00	63.00	60.00	73.00	70.00
0.031	45.00	57.00	54.00	67.00	64.00
0.023	40.00	52.00	49.00	61.00	58.00
0.016	35.00	48.00	44.00	55.00	52.00
0.012	31.00	44.00	40.00	50.00	48.00
0.0088	27.00	40.00	36.00	45.00	44.00
0.0062	23.00	36.00	33.00	40.00	40.00
0.0044	20.00	33.00	30.00	36.00	36.00
0.0032	17.00	30.00	28.00	33.00	32.00
0.0023	15.00	28.00	26.00	30.00	29.00
0.002	14.00	27.00	25.00	29.00	28.00
0.0014	12.00	25.00	23.00	27.00	26.00

Y	2	39	45	14
Z	0	28	45	27
AA	0	32	43	25
AB	2	16	53	29
AC	0	22	50	28

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.938/11-13) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
938	1.50 - 2.10	SPT 1	-----	-----	-----	CL	2	39	45	14	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
938	3.00 - 3.50	UDS -1	1.89	1.65	14.78	CL	0	28	45	27	27	13	14	UU	0.82	11	-----	-----	0.05	2.4	-----	
938	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	32	43	25	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.66	
938	7.50 - 8.10	SPT 4	-----	-----	-----	CL	2	16	53	29	28	10	18	-----	-----	-----	-----	-----	-----	-----	-----	
938	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	22	50	28	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

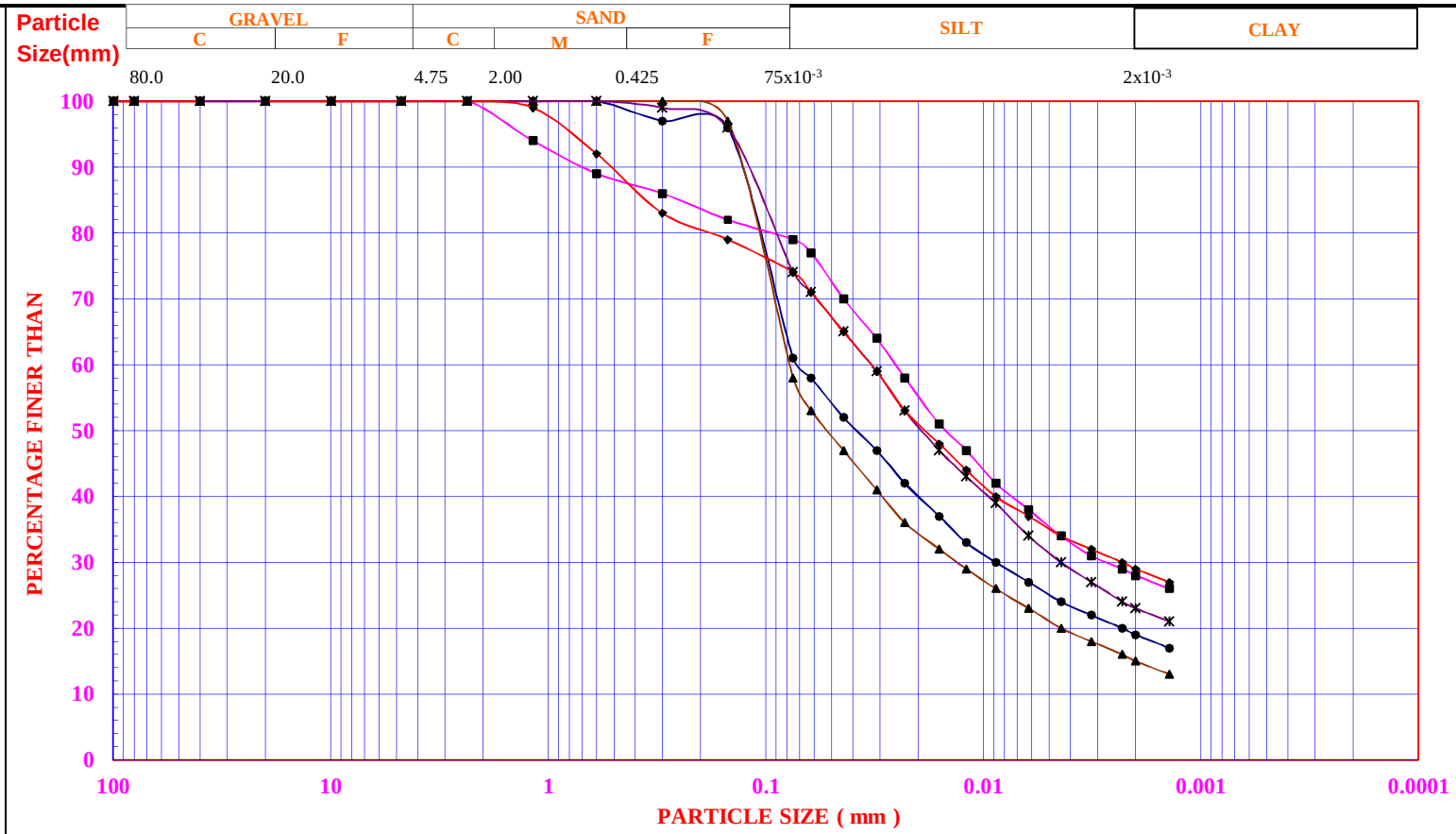
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Bridge No.165) (Chainage No.944/25-27)



Symbol	Bridge No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	165	1.50 - 2.10	CL	0	39	42	19	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	165	3.00 - 3.50	CL	0	21	51	28	-----	-----	-----	-----	-----	29	12	17	UDS -1
▲—▲	165	4.50 - 5.10	CL	0	42	43	15	-----	-----	-----	-----	-----	24	10	14	SPT 2
✳—✳	165	7.50 - 8.10	CL	0	26	51	23	-----	-----	-----	-----	-----	27	12	15	SPT 4
◆—◆	165	12.00 - 12.60	CL	0	26	45	29	-----	-----	-----	-----	-----	23	9	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	165	165	165	165	165
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	94.00	100.00	100.00	99.00
0.6000	100.00	89.00	100.00	100.00	92.00
0.3000	97.00	86.00	100.00	99.00	83.00
0.1500	96.00	82.00	97.00	96.00	79.00
0.0750	61.00	79.00	58.00	74.00	74.00
0.0620	58.00	77.00	53.00	71.00	71.00
0.044	52.00	70.00	47.00	65.00	65.00
0.031	47.00	64.00	41.00	59.00	59.00
0.023	42.00	58.00	36.00	53.00	53.00
0.016	37.00	51.00	32.00	47.00	48.00
0.012	33.00	47.00	29.00	43.00	44.00
0.0088	30.00	42.00	26.00	39.00	40.00
0.0062	27.00	38.00	23.00	34.00	37.00
0.0044	24.00	34.00	20.00	30.00	34.00
0.0032	22.00	31.00	18.00	27.00	32.00
0.0023	20.00	29.00	16.00	24.00	30.00
0.002	19.00	28.00	15.00	23.00	29.00
0.0014	17.00	26.00	13.00	21.00	27.00

Y	0	39	42	19
Z	0	21	51	28
AA	0	42	43	15
AB	0	26	51	23
AC	0	26	45	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Bridge No.165) (Chainage No.944/25-27) **DATE:**

Bridge No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
165	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	39	42	19	26	11	15	-----	-----	-----	-----	-----	-----	-----	-----	
165	3.00 - 3.50	UDS -1	1.88	1.63	15.06	CL	0	21	51	28	29	12	17	UU	1.21	8	-----	-----	0.04	2.1	-----	
165	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	42	43	15	24	10	14	-----	-----	-----	-----	-----	-----	-----	2.66	
165	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	26	51	23	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
165	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	26	45	29	23	9	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

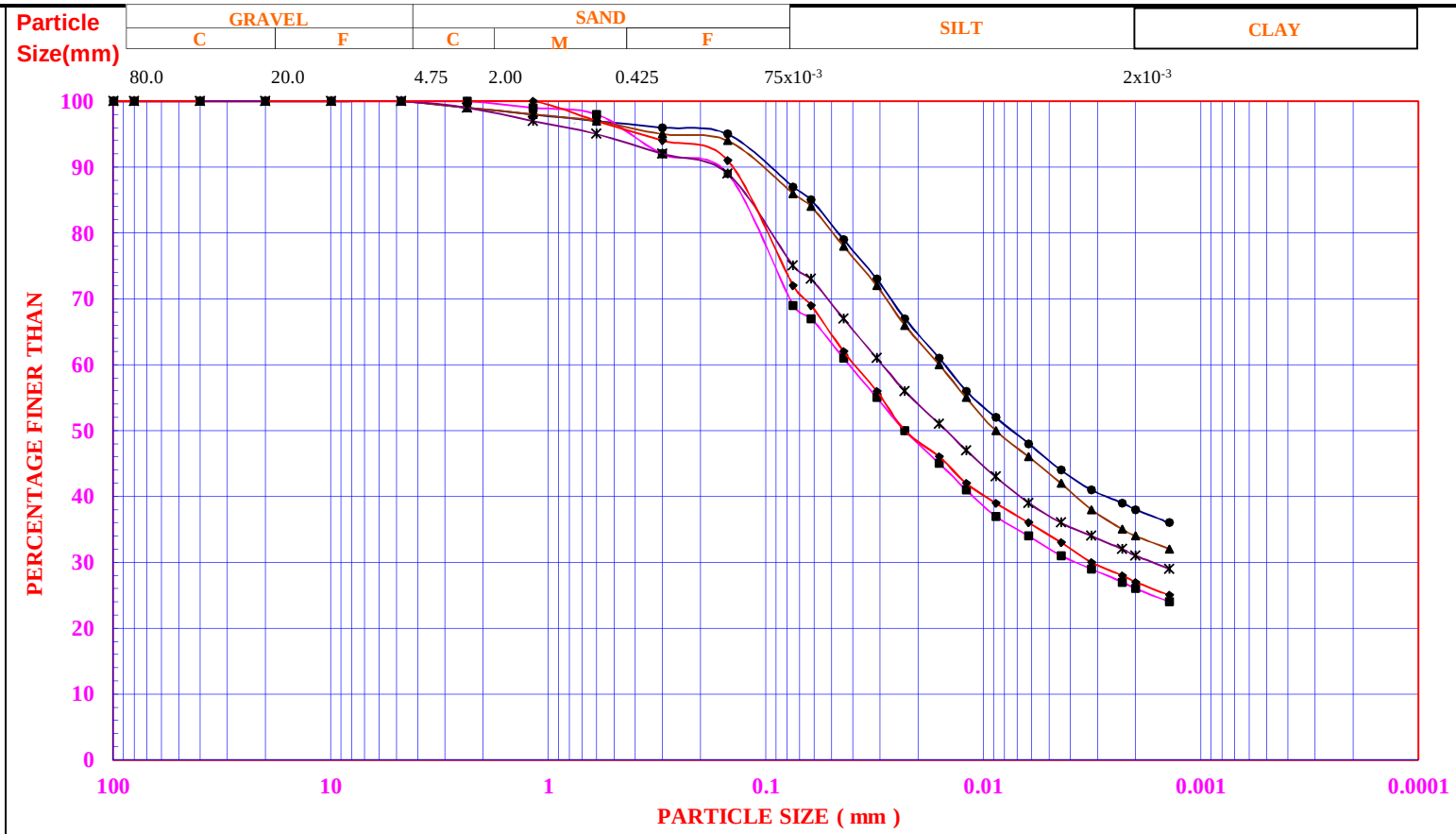
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A1)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A1	1.50 - 2.10	CL	0	13	49	38	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	944 A1	3.00 - 3.50	CL	0	31	43	26	-----	-----	-----	-----	-----	27	13	14	UDS -1
▲—▲	944 A1	4.50 - 5.10	CL	0	14	52	34	-----	-----	-----	-----	-----	29	14	15	SPT 2
✳—✳	944 A1	7.50 - 8.10	CL	0	25	44	31	-----	-----	-----	-----	-----	26	12	14	SPT 4
◆—◆	944 A1	12.00 - 12.60	CL	0	28	45	27	-----	-----	-----	-----	-----	24	11	13	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A1	944 A1	944 A1	944 A1	944 A1
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	99.00	100.00	99.00	99.00	100.00
1.1800	98.00	99.00	98.00	97.00	100.00
0.6000	97.00	98.00	97.00	95.00	97.00
0.3000	96.00	92.00	95.00	92.00	94.00
0.1500	95.00	89.00	94.00	89.00	91.00
0.0750	87.00	69.00	86.00	75.00	72.00
0.0620	85.00	67.00	84.00	73.00	69.00
0.044	79.00	61.00	78.00	67.00	62.00
0.031	73.00	55.00	72.00	61.00	56.00
0.023	67.00	50.00	66.00	56.00	50.00
0.016	61.00	45.00	60.00	51.00	46.00
0.012	56.00	41.00	55.00	47.00	42.00
0.0088	52.00	37.00	50.00	43.00	39.00
0.0062	48.00	34.00	46.00	39.00	36.00
0.0044	44.00	31.00	42.00	36.00	33.00
0.0032	41.00	29.00	38.00	34.00	30.00
0.0023	39.00	27.00	35.00	32.00	28.00
0.002	38.00	26.00	34.00	31.00	27.00
0.0014	36.00	24.00	32.00	29.00	25.00

Y	0	13	49	38
Z	0	31	43	26
AA	0	14	52	34
AB	0	25	44	31
AC	0	28	45	27

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A1) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A1	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	13	49	38	31	14	17	-----	-----	-----	-----	-----	-----	-----	-----	
944 A1	3.00 - 3.50	UDS -1	1.91	1.66	15.34	CL	0	31	43	26	27	13	14	UU	0.93	12	-----	-----	0.06	2.4	-----	
944 A1	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	14	52	34	29	14	15	-----	-----	-----	-----	-----	-----	-----	2.66	
944 A1	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	25	44	31	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
944 A1	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	28	45	27	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

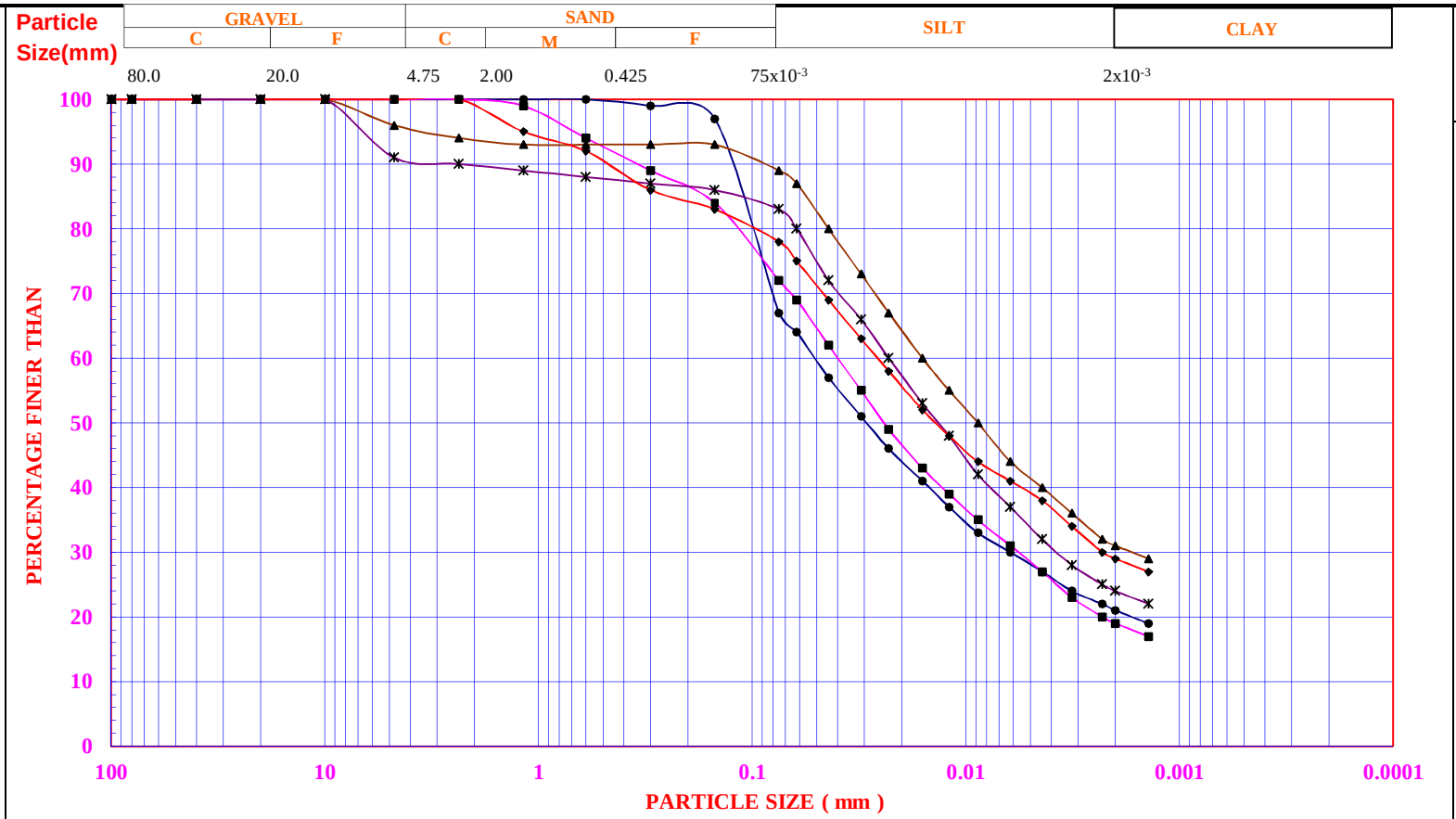
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A2)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A2	1.50 - 2.10	CL	0	33	46	21	-----	-----	-----	-----	-----	24	11	13	SPT 1
■—■	944 A2	3.00 - 3.50	CL	0	28	53	19	-----	-----	-----	-----	-----	26	12	14	UDS -1
▲—▲	944 A2	4.50 - 5.10	CL	4	7	58	31	-----	-----	-----	-----	-----	29	14	15	SPT 2
✳—✳	944 A2	7.50 - 8.10	CL	9	8	59	24	-----	-----	-----	-----	-----	27	10	17	SPT 4
◆—◆	944 A2	12.00 - 12.60	CL	0	22	49	29	-----	-----	-----	-----	-----	25	11	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A2	944 A2	944 A2	944 A2	944 A2
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	96.00	91.00	100.00
2.3600	100.00	100.00	94.00	90.00	100.00
1.1800	100.00	99.00	93.00	89.00	95.00
0.6000	100.00	94.00	93.00	88.00	92.00
0.3000	99.00	89.00	93.00	87.00	86.00
0.1500	97.00	84.00	93.00	86.00	83.00
0.0750	67.00	72.00	89.00	83.00	78.00
0.0620	64.00	69.00	87.00	80.00	75.00
0.044	57.00	62.00	80.00	72.00	69.00
0.031	51.00	55.00	73.00	66.00	63.00
0.023	46.00	49.00	67.00	60.00	58.00
0.016	41.00	43.00	60.00	53.00	52.00
0.012	37.00	39.00	55.00	48.00	48.00
0.0088	33.00	35.00	50.00	42.00	44.00
0.0062	30.00	31.00	44.00	37.00	41.00
0.0044	27.00	27.00	40.00	32.00	38.00
0.0032	24.00	23.00	36.00	28.00	34.00
0.0023	22.00	20.00	32.00	25.00	30.00
0.002	21.00	19.00	31.00	24.00	29.00
0.0014	19.00	17.00	29.00	22.00	27.00

Y	0	33	46	21
Z	0	28	53	19
AA	4	7	58	31
AB	9	8	59	24
AC	0	22	49	29

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A2) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A2	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	33	46	21	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
944 A2	3.00 - 3.50	UDS -1	1.89	1.64	15.37	CL	0	28	53	19	26	12	14	UU	0.94	11	-----	-----	0.03	2.1	-----	
944 A2	4.50 - 5.10	SPT 2	-----	-----	-----	CL	4	7	58	31	29	14	15	-----	-----	-----	-----	-----	-----	-----	2.66	
944 A2	7.50 - 8.10	SPT 4	-----	-----	-----	CL	9	8	59	24	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
944 A2	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	22	49	29	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

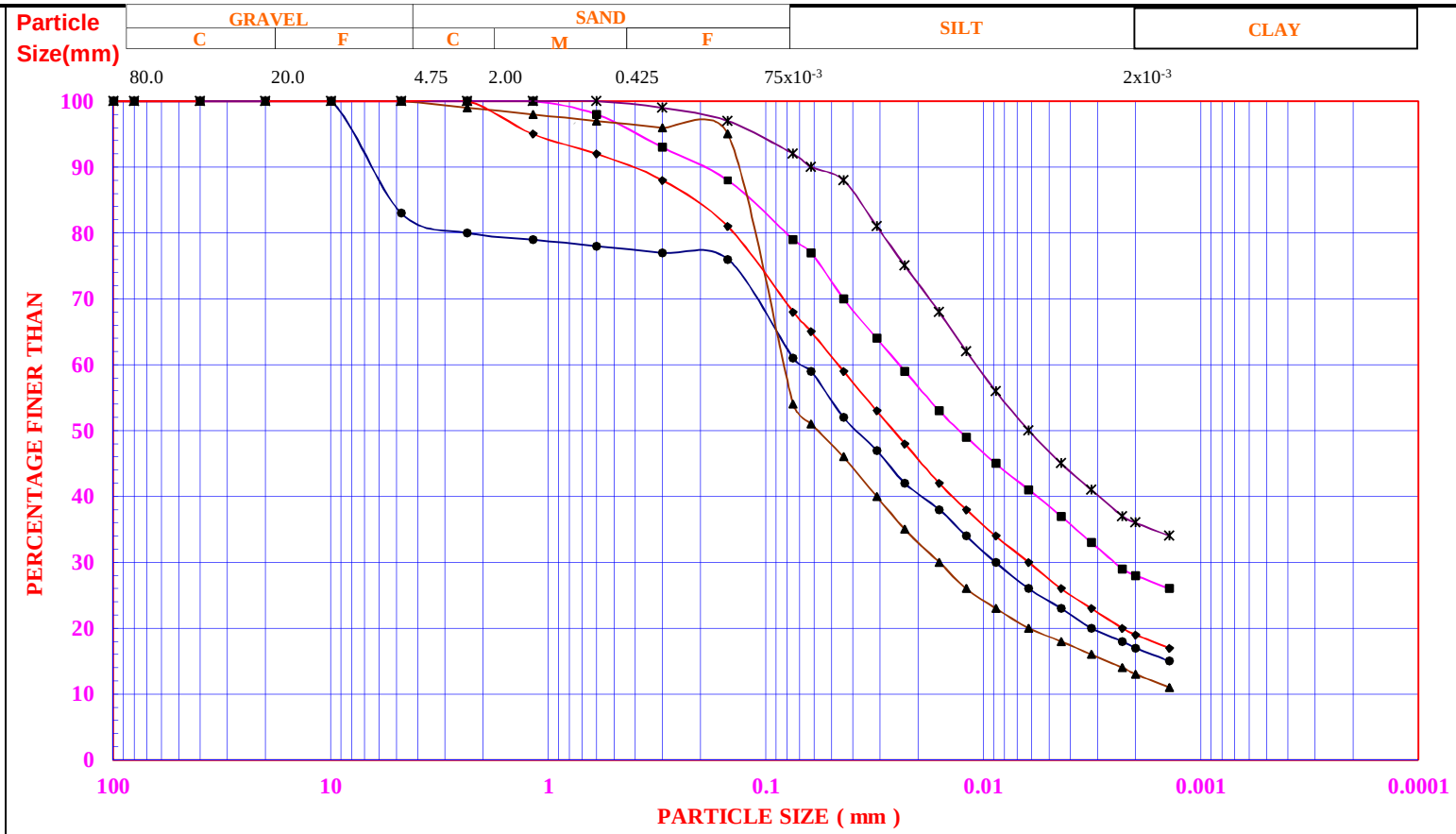
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A3)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A3	1.50 - 2.10	CL	17	22	44	17	-----	-----	-----	-----	-----	23	8	15	SPT 1
■—■	944 A3	3.00 - 3.50	CL	0	21	51	28	-----	-----	-----	-----	-----	26	12	14	UDS -1
▲—▲	944 A3	4.50 - 5.10	CL	0	46	41	13	-----	-----	-----	-----	-----	25	10	15	SPT 2
✳—✳	944 A3	7.50 - 8.10	CL	0	8	56	36	-----	-----	-----	-----	-----	29	11	18	SPT 4
◆—◆	944 A3	12.00 - 12.60	CL	0	32	49	19	-----	-----	-----	-----	-----	24	10	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A3	944 A3	944 A3	944 A3	944 A3
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	83.00	100.00	100.00	100.00	100.00
2.3600	80.00	100.00	99.00	100.00	100.00
1.1800	79.00	100.00	98.00	100.00	95.00
0.6000	78.00	98.00	97.00	100.00	92.00
0.3000	77.00	93.00	96.00	99.00	88.00
0.1500	76.00	88.00	95.00	97.00	81.00
0.0750	61.00	79.00	54.00	92.00	68.00
0.0620	59.00	77.00	51.00	90.00	65.00
0.044	52.00	70.00	46.00	88.00	59.00
0.031	47.00	64.00	40.00	81.00	53.00
0.023	42.00	59.00	35.00	75.00	48.00
0.016	38.00	53.00	30.00	68.00	42.00
0.012	34.00	49.00	26.00	62.00	38.00
0.0088	30.00	45.00	23.00	56.00	34.00
0.0062	26.00	41.00	20.00	50.00	30.00
0.0044	23.00	37.00	18.00	45.00	26.00
0.0032	20.00	33.00	16.00	41.00	23.00
0.0023	18.00	29.00	14.00	37.00	20.00
0.002	17.00	28.00	13.00	36.00	19.00
0.0014	15.00	26.00	11.00	34.00	17.00

Y	17	22	44	17
Z	0	21	51	28
AA	0	46	41	13
AB	0	8	56	36
AC	0	32	49	19

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A3) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A3	1.50 - 2.10	SPT 1	-----	-----	-----	CL	17	22	44	17	23	8	15	-----	-----	-----	-----	-----	-----	-----	-----	
944 A3	3.00 - 3.50	UDS -1	1.87	1.62	15.64	CL	0	21	51	28	26	12	14	UU	0.71	13	-----	-----	0.05	2.3	-----	
944 A3	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	46	41	13	25	10	15	-----	-----	-----	-----	-----	-----	-----	2.65	
944 A3	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	8	56	36	29	11	18	-----	-----	-----	-----	-----	-----	-----	-----	
944 A3	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	32	49	19	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

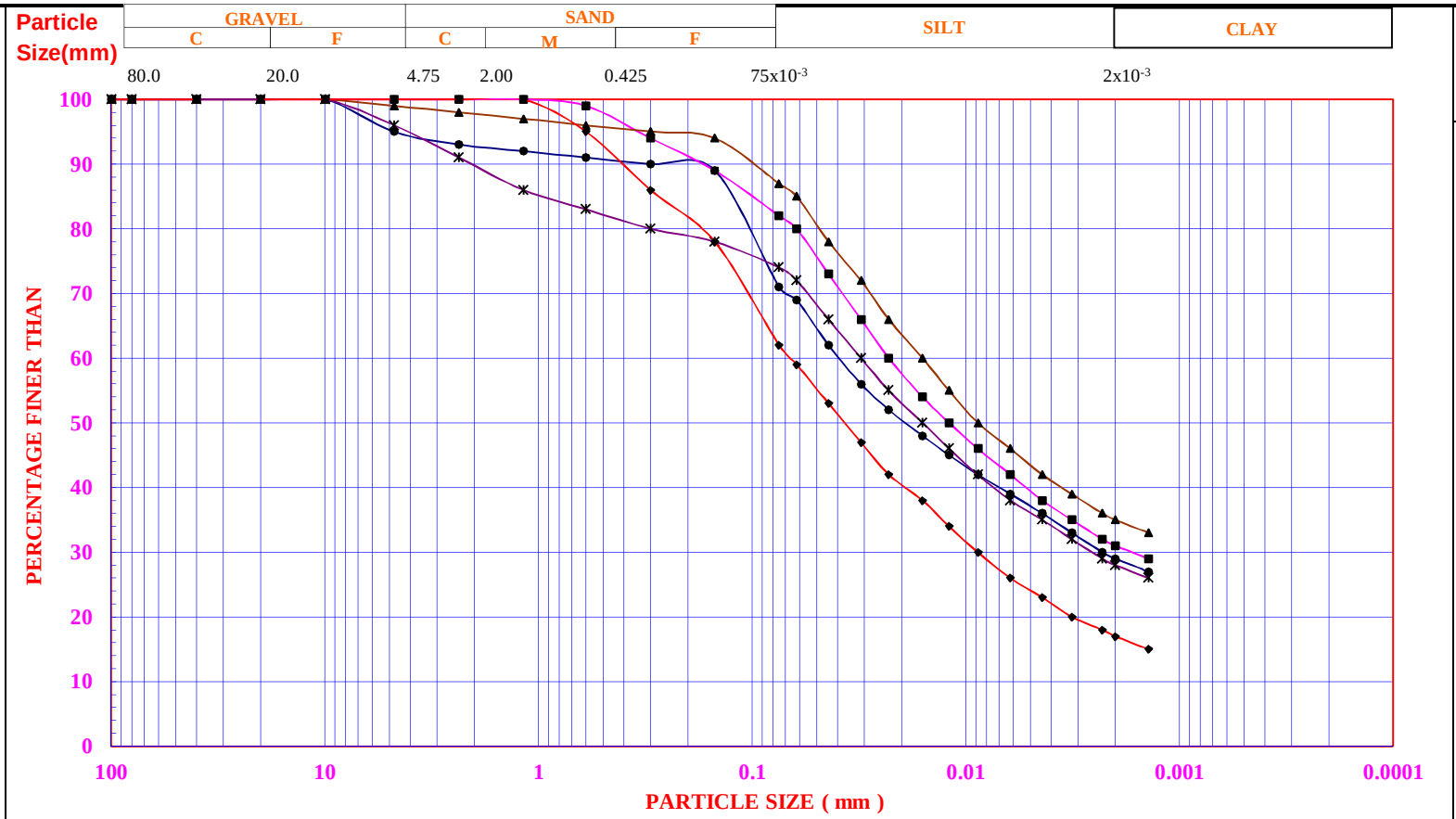
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A4)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A4	1.50 - 2.10	CL	5	24	42	29	-----	-----	-----	-----	-----	23	10	13	SPT 1
■—■	944 A4	3.00 - 3.60	CL	0	18	51	31	-----	-----	-----	-----	-----	25	11	14	SPT 2
▲—▲	944 A4	4.50 - 5.10	CL	1	12	52	35	-----	-----	-----	-----	-----	28	13	15	SPT 3
✳—✳	944 A4	7.50 - 8.10	CL	4	22	46	28	-----	-----	-----	-----	-----	24	11	13	SPT 5
◆—◆	944 A4	12.00 - 12.60	CL	0	38	45	17	-----	-----	-----	-----	-----	21	9	12	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A4	944 A4	944 A4	944 A4	944 A4
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	95.00	100.00	99.00	96.00	100.00
2.3600	93.00	100.00	98.00	91.00	100.00
1.1800	92.00	100.00	97.00	86.00	100.00
0.6000	91.00	99.00	96.00	83.00	95.00
0.3000	90.00	94.00	95.00	80.00	86.00
0.1500	89.00	89.00	94.00	78.00	78.00
0.0750	71.00	82.00	87.00	74.00	62.00
0.0620	69.00	80.00	85.00	72.00	59.00
0.044	62.00	73.00	78.00	66.00	53.00
0.031	56.00	66.00	72.00	60.00	47.00
0.023	52.00	60.00	66.00	55.00	42.00
0.016	48.00	54.00	60.00	50.00	38.00
0.012	45.00	50.00	55.00	46.00	34.00
0.0088	42.00	46.00	50.00	42.00	30.00
0.0062	39.00	42.00	46.00	38.00	26.00
0.0044	36.00	38.00	42.00	35.00	23.00
0.0032	33.00	35.00	39.00	32.00	20.00
0.0023	30.00	32.00	36.00	29.00	18.00
0.002	29.00	31.00	35.00	28.00	17.00
0.0014	27.00	29.00	33.00	26.00	15.00

Y	5	24	42	29
Z	0	18	51	31
AA	1	12	52	35
AB	4	22	46	28
AC	0	38	45	17

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A4) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A4	1.50 - 2.10	SPT 1	-----	-----	-----	CL	5	24	42	29	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	
944 A4	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	18	51	31	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	
944 A4	4.50 - 5.10	SPT 3	-----	-----	-----	CL	1	12	52	35	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.66	
944 A4	7.50 - 8.10	SPT 5	-----	-----	-----	CL	4	22	46	28	24	11	13	-----	-----	-----	-----	-----	-----	-----	-----	
944 A4	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	38	45	17	21	9	12	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

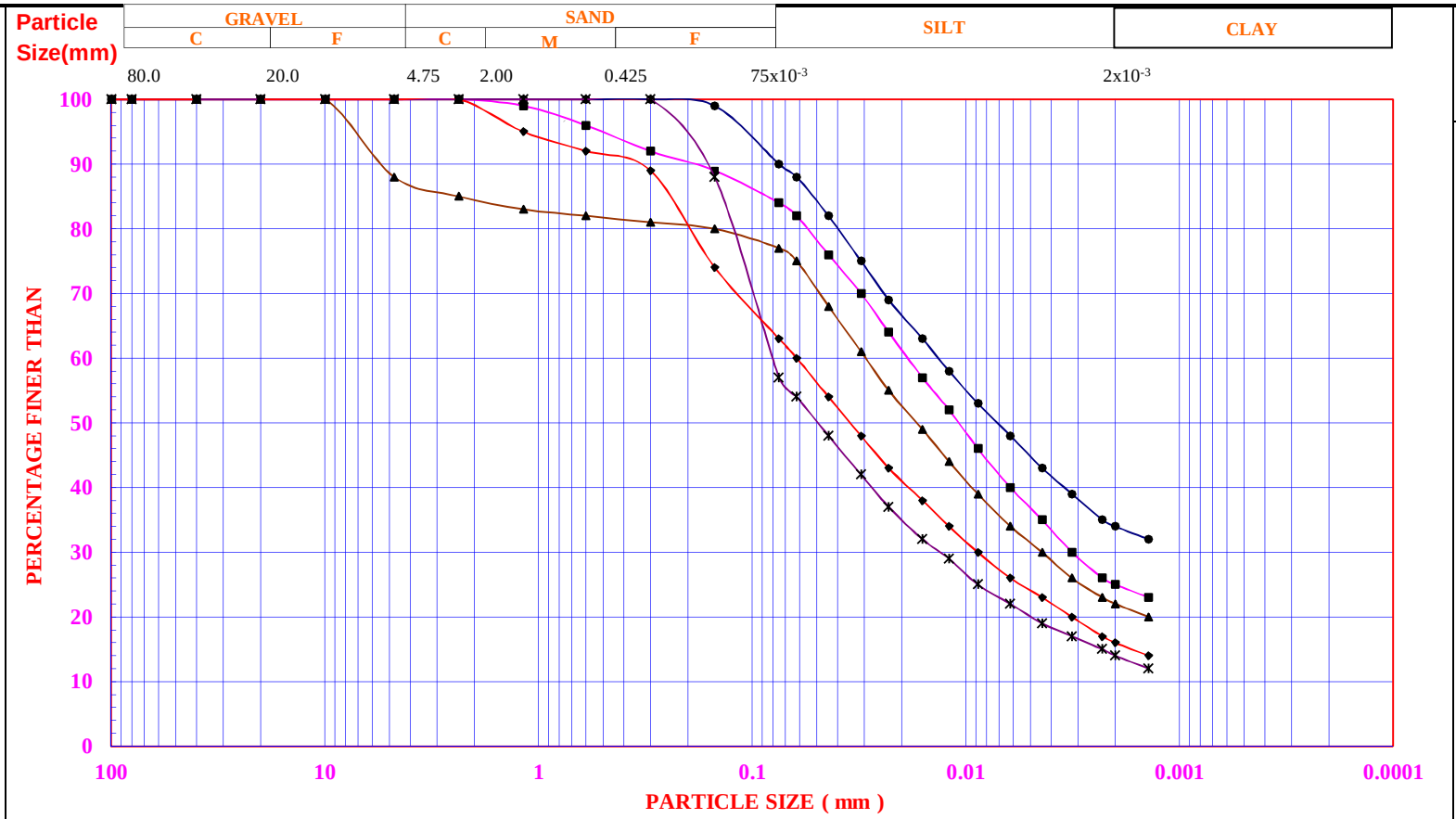
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A5)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A5	1.50 - 2.10	CL	0	10	56	34	-----	-----	-----	-----	-----	28	11	17	SPT 1
■—■	944 A5	3.00 - 3.50	CL	0	16	59	25	-----	-----	-----	-----	-----	26	10	16	UDS -1
▲—▲	944 A5	4.50 - 5.10	CL	12	11	55	22	-----	-----	-----	-----	-----	24	12	12	SPT 2
✳—✳	944 A5	7.50 - 8.10	CL	0	43	43	14	-----	-----	-----	-----	-----	27	10	17	SPT 4
◆—◆	944 A5	12.00 - 12.60	CL	0	37	47	16	-----	-----	-----	-----	-----	23	9	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A5	944 A5	944 A5	944 A5	944 A5
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	88.00	100.00	100.00
2.3600	100.00	100.00	85.00	100.00	100.00
1.1800	100.00	99.00	83.00	100.00	95.00
0.6000	100.00	96.00	82.00	100.00	92.00
0.3000	100.00	92.00	81.00	100.00	89.00
0.1500	99.00	89.00	80.00	88.00	74.00
0.0750	90.00	84.00	77.00	57.00	63.00
0.0620	88.00	82.00	75.00	54.00	60.00
0.044	82.00	76.00	68.00	48.00	54.00
0.031	75.00	70.00	61.00	42.00	48.00
0.023	69.00	64.00	55.00	37.00	43.00
0.016	63.00	57.00	49.00	32.00	38.00
0.012	58.00	52.00	44.00	29.00	34.00
0.0088	53.00	46.00	39.00	25.00	30.00
0.0062	48.00	40.00	34.00	22.00	26.00
0.0044	43.00	35.00	30.00	19.00	23.00
0.0032	39.00	30.00	26.00	17.00	20.00
0.0023	35.00	26.00	23.00	15.00	17.00
0.002	34.00	25.00	22.00	14.00	16.00
0.0014	32.00	23.00	20.00	12.00	14.00

Y	0	10	56	34
Z	0	16	59	25
AA	12	11	55	22
AB	0	43	43	14
AC	0	37	47	16

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A5) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A5	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	10	56	34	28	11	17	-----	-----	-----	-----	-----	-----	-----	-----	
944 A5	3.00 - 3.50	UDS -1	1.88	1.64	14.89	CL	0	16	59	25	26	10	16	UU	0.74	11	-----	-----	0.06	2.3	-----	
944 A5	4.50 - 5.10	SPT 2	-----	-----	-----	CL	12	11	55	22	24	12	12	-----	-----	-----	-----	-----	-----	-----	2.65	
944 A5	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	43	43	14	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
944 A5	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	37	47	16	23	9	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

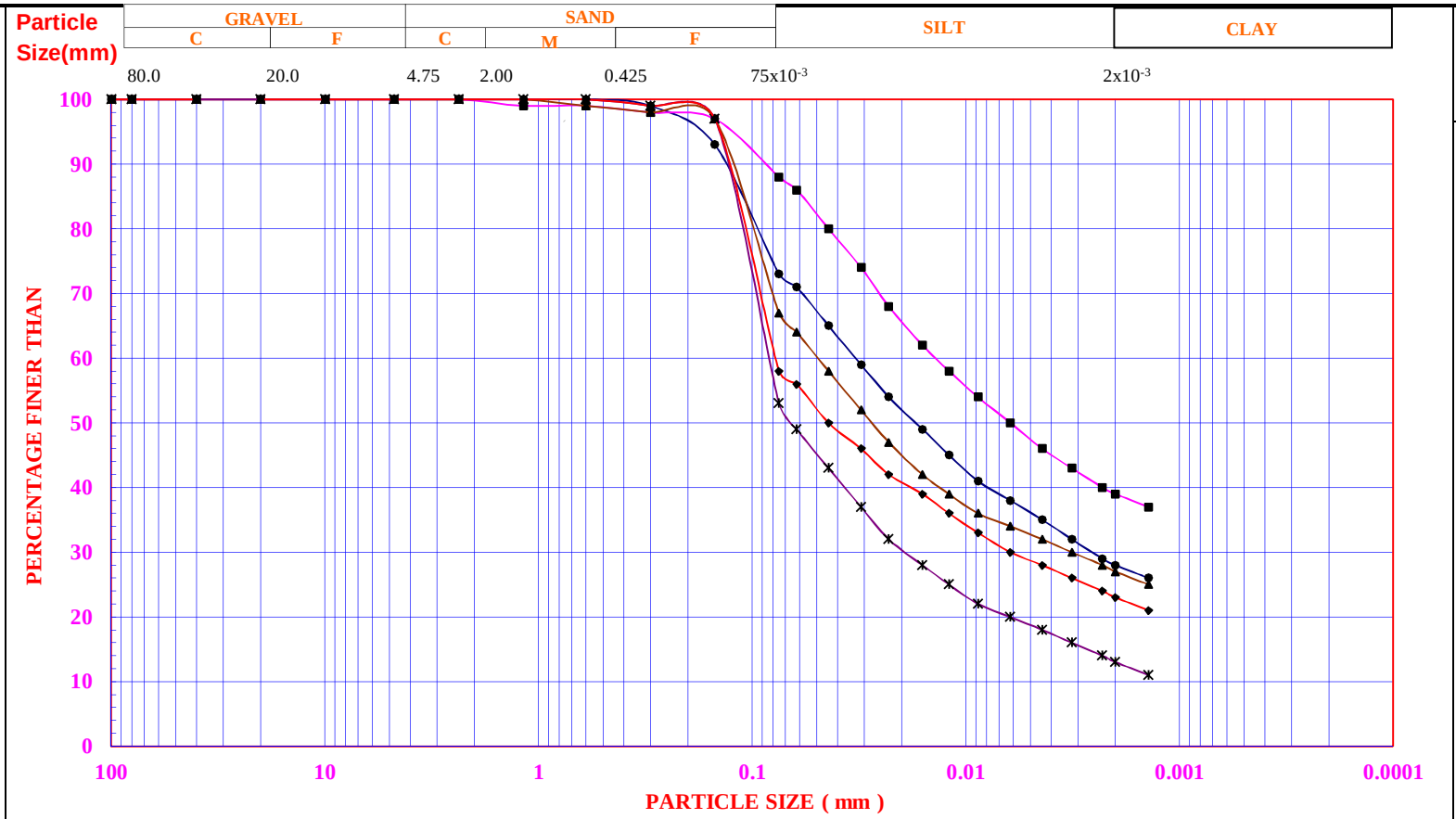
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A6)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A6	1.50 - 2.10	CL	0	27	45	28	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	944 A6	3.00 - 3.50	CL	0	12	49	39	-----	-----	-----	-----	-----	27	10	17	UDS -1
▲—▲	944 A6	4.50 - 5.10	CL	0	33	40	27	-----	-----	-----	-----	-----	25	12	13	SPT 2
✳—✳	944 A6	7.50 - 8.10	CL	0	47	40	13	-----	-----	-----	-----	-----	27	13	14	SPT 4
◆—◆	944 A6	12.00 - 12.60	CL	0	42	35	23	-----	-----	-----	-----	-----	24	9	15	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A6	944 A6	944 A6	944 A6	944 A6
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	100.00	100.00
1.1800	100.00	99.00	100.00	100.00	100.00
0.6000	100.00	99.00	99.00	100.00	100.00
0.3000	99.00	98.00	98.00	99.00	99.00
0.1500	93.00	97.00	97.00	97.00	97.00
0.0750	73.00	88.00	67.00	53.00	58.00
0.0620	71.00	86.00	64.00	49.00	56.00
0.044	65.00	80.00	58.00	43.00	50.00
0.031	59.00	74.00	52.00	37.00	46.00
0.023	54.00	68.00	47.00	32.00	42.00
0.016	49.00	62.00	42.00	28.00	39.00
0.012	45.00	58.00	39.00	25.00	36.00
0.0088	41.00	54.00	36.00	22.00	33.00
0.0062	38.00	50.00	34.00	20.00	30.00
0.0044	35.00	46.00	32.00	18.00	28.00
0.0032	32.00	43.00	30.00	16.00	26.00
0.0023	29.00	40.00	28.00	14.00	24.00
0.002	28.00	39.00	27.00	13.00	23.00
0.0014	26.00	37.00	25.00	11.00	21.00

Y	0	27	45	28
Z	0	12	49	39
AA	0	33	40	27
AB	0	47	40	13
AC	0	42	35	23

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A6) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A6	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	27	45	28	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.65	
944 A6	3.00 - 3.50	UDS -1	1.89	1.64	14.99	CL	0	12	49	39	27	10	17	UU	0.72	13	-----	-----	0.04	2.1	-----	
944 A6	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	33	40	27	25	12	13	-----	-----	-----	-----	-----	-----	-----	-----	
944 A6	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	47	40	13	27	13	14	-----	-----	-----	-----	-----	-----	-----	-----	
944 A6	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	42	35	23	24	9	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

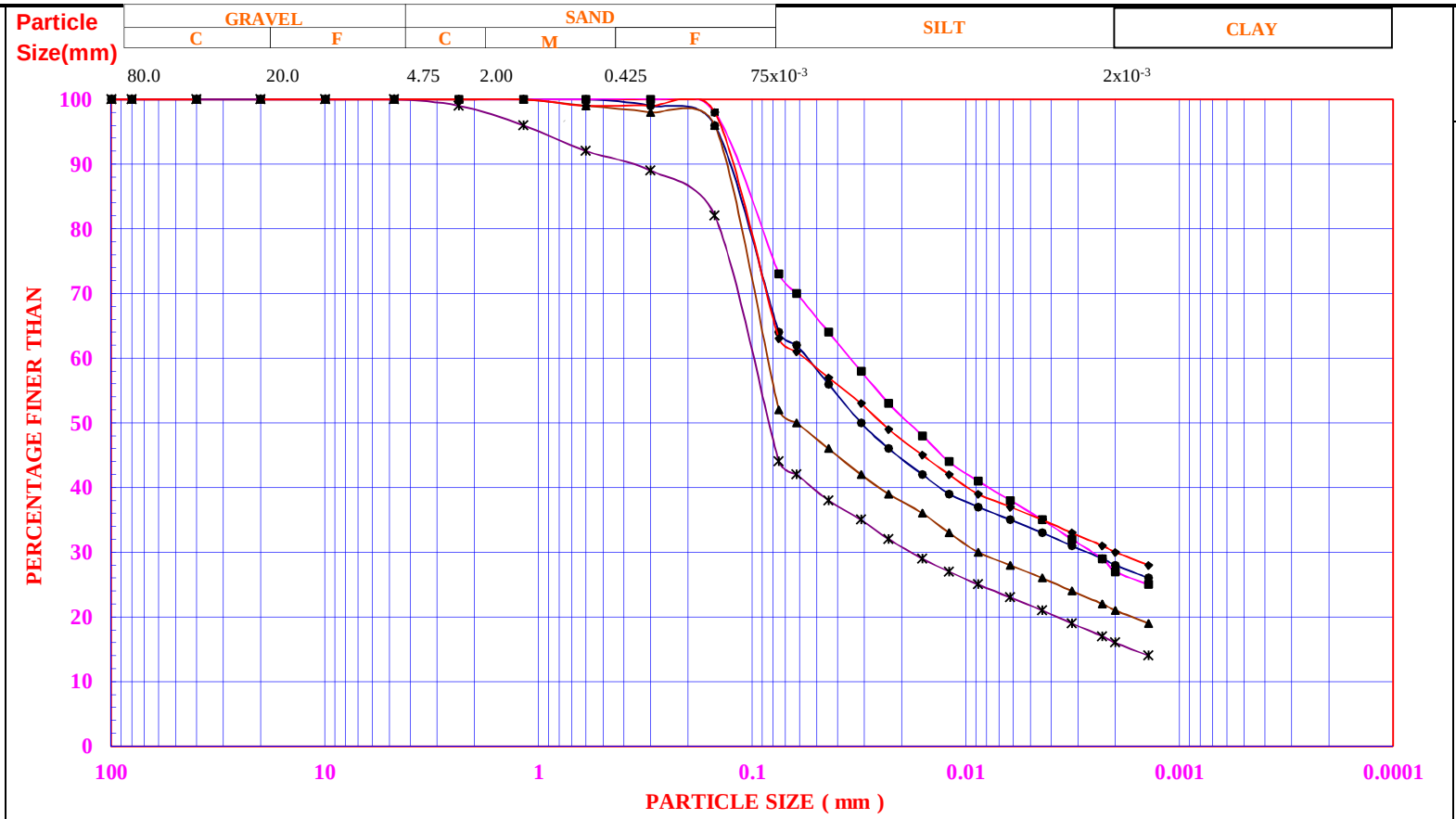
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A7)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A7	1.50 - 2.10	CL	0	36	36	28	-----	-----	-----	-----	-----	23	10	13	SPT 1
■—■	944 A7	3.00 - 3.60	CL	0	27	46	27	-----	-----	-----	-----	-----	26	12	14	SPT 2
▲—▲	944 A7	4.50 - 5.10	CL	0	48	31	21	-----	-----	-----	-----	-----	29	11	18	SPT 3
✳—✳	944 A7	7.50 - 8.10	SC	0	56	28	16	-----	-----	-----	-----	-----	17	7	10	SPT 5
◆—◆	944 A7	12.00 - 12.60	CL	0	37	33	30	-----	-----	-----	-----	-----	24	10	14	SPT 8

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A7	944 A7	944 A7	944 A7	944 A7
	1.50 - 2.10	3.00 - 3.60	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	100.00	100.00	100.00	100.00
2.3600	100.00	100.00	100.00	99.00	100.00
1.1800	100.00	100.00	100.00	96.00	100.00
0.6000	100.00	100.00	99.00	92.00	99.00
0.3000	99.00	100.00	98.00	89.00	99.00
0.1500	96.00	98.00	96.00	82.00	98.00
0.0750	64.00	73.00	52.00	44.00	63.00
0.0620	62.00	70.00	50.00	42.00	61.00
0.044	56.00	64.00	46.00	38.00	57.00
0.031	50.00	58.00	42.00	35.00	53.00
0.023	46.00	53.00	39.00	32.00	49.00
0.016	42.00	48.00	36.00	29.00	45.00
0.012	39.00	44.00	33.00	27.00	42.00
0.0088	37.00	41.00	30.00	25.00	39.00
0.0062	35.00	38.00	28.00	23.00	37.00
0.0044	33.00	35.00	26.00	21.00	35.00
0.0032	31.00	32.00	24.00	19.00	33.00
0.0023	29.00	29.00	22.00	17.00	31.00
0.002	28.00	27.00	21.00	16.00	30.00
0.0014	26.00	25.00	19.00	14.00	28.00

Y	0	36	36	28
Z	0	27	46	27
AA	0	48	31	21
AB	0	56	28	16
AC	0	37	33	30

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A7) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A7	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	36	36	28	23	10	13	-----	-----	-----	-----	-----	-----	-----	-----	
944 A7	3.00 - 3.60	SPT 2	-----	-----	-----	CL	0	27	46	27	26	12	14	-----	-----	-----	-----	-----	-----	-----	-----	
944 A7	4.50 - 5.10	SPT 3	-----	-----	-----	CL	0	48	31	21	29	11	18	-----	-----	-----	-----	-----	-----	-----	2.65	
944 A7	7.50 - 8.10	SPT 5	-----	-----	-----	SC	0	56	28	16	17	7	10	-----	-----	-----	-----	-----	-----	-----	-----	
944 A7	12.00 - 12.60	SPT 8	-----	-----	-----	CL	0	37	33	30	24	10	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

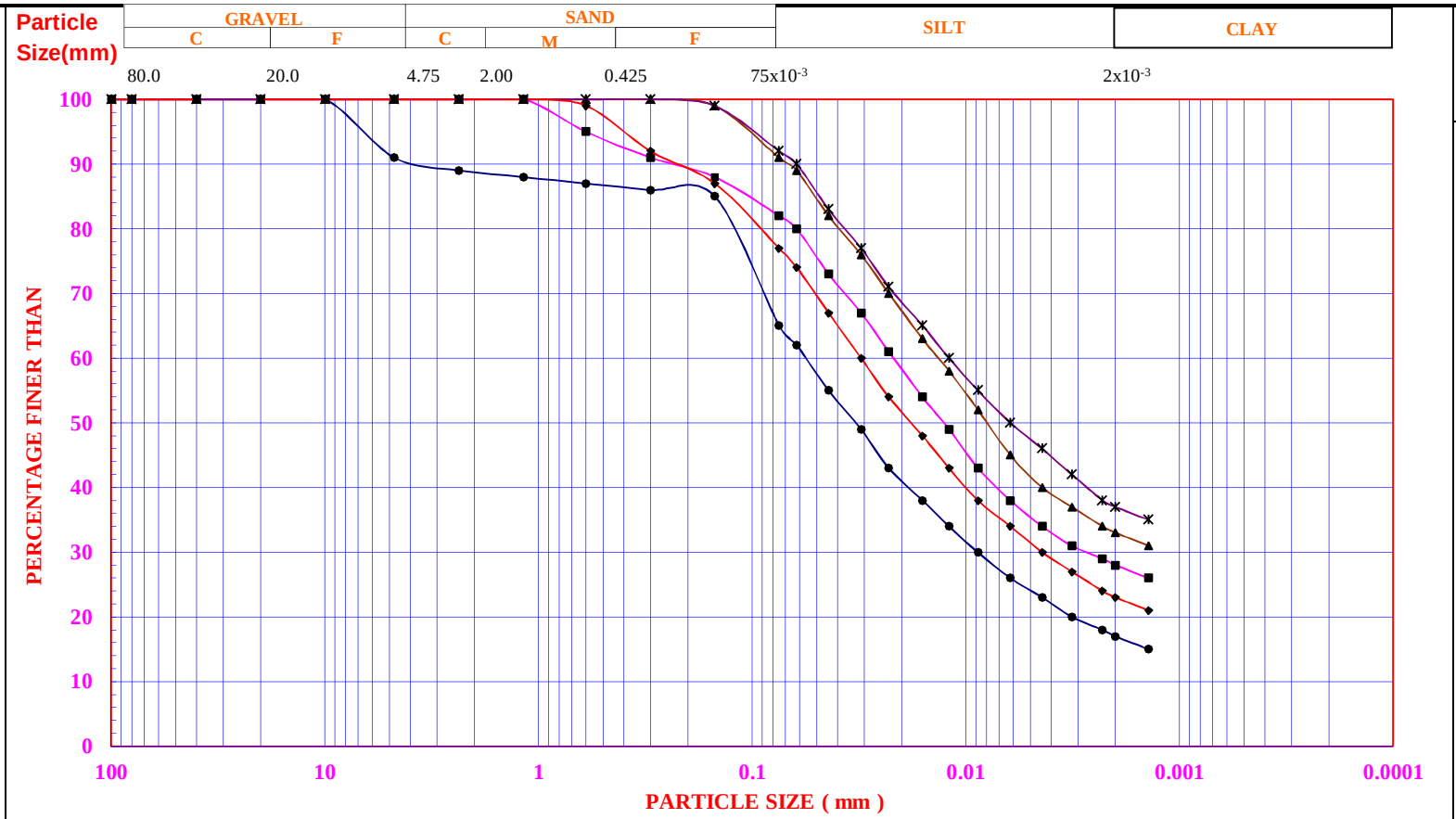
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Chainage No.944 A8)



Symbol	Chainage	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	944 A8	1.50 - 2.10	CL	9	26	48	17	-----	-----	-----	-----	-----	21	9	12	SPT 1
■—■	944 A8	3.00 - 3.50	CL	0	18	54	28	-----	-----	-----	-----	-----	24	11	13	UDS
▲—▲	944 A8	4.50 - 5.10	CL	0	9	58	33	-----	-----	-----	-----	-----	28	13	15	SPT 2
✳—✳	944 A8	7.50 - 8.10	CL	0	8	55	37	-----	-----	-----	-----	-----	27	10	17	SPT 4
◆—◆	944 A8	12.00 - 12.60	CL	0	23	54	23	-----	-----	-----	-----	-----	23	11	12	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	944 A8	944 A8	944 A8	944 A8	944 A8
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	91.00	100.00	100.00	100.00	100.00
2.3600	89.00	100.00	100.00	100.00	100.00
1.1800	88.00	100.00	100.00	100.00	100.00
0.6000	87.00	95.00	100.00	100.00	99.00
0.3000	86.00	91.00	100.00	100.00	92.00
0.1500	85.00	88.00	99.00	99.00	87.00
0.0750	65.00	82.00	91.00	92.00	77.00
0.0620	62.00	80.00	89.00	90.00	74.00
0.044	55.00	73.00	82.00	83.00	67.00
0.031	49.00	67.00	76.00	77.00	60.00
0.023	43.00	61.00	70.00	71.00	54.00
0.016	38.00	54.00	63.00	65.00	48.00
0.012	34.00	49.00	58.00	60.00	43.00
0.0088	30.00	43.00	52.00	55.00	38.00
0.0062	26.00	38.00	45.00	50.00	34.00
0.0044	23.00	34.00	40.00	46.00	30.00
0.0032	20.00	31.00	37.00	42.00	27.00
0.0023	18.00	29.00	34.00	38.00	24.00
0.002	17.00	28.00	33.00	37.00	23.00
0.0014	15.00	26.00	31.00	35.00	21.00

Y	9	26	48	17
Z	0	18	54	28
AA	0	9	58	33
AB	0	8	55	37
AC	0	23	54	23

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Chainage No.944 A8) **DATE:**

Chainage	Depth in m.	Sample Type UD / D	Density gm/ cm³		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm²	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
944 A8	1.50 - 2.10	SPT 1	-----	-----	-----	CL	9	26	48	17	21	9	12	-----	-----	-----	-----	-----	-----	-----	-----	
944 A8	3.00 - 3.50	UDS	1.87	1.62	15.21	CL	0	18	54	28	24	11	13	UU	1.17	8	-----	-----	0.03	2.4	-----	
944 A8	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	9	58	33	28	13	15	-----	-----	-----	-----	-----	-----	-----	2.66	
944 A8	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	8	55	37	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	
944 A8	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	23	54	23	23	11	12	-----	-----	-----	-----	-----	-----	-----	-----	

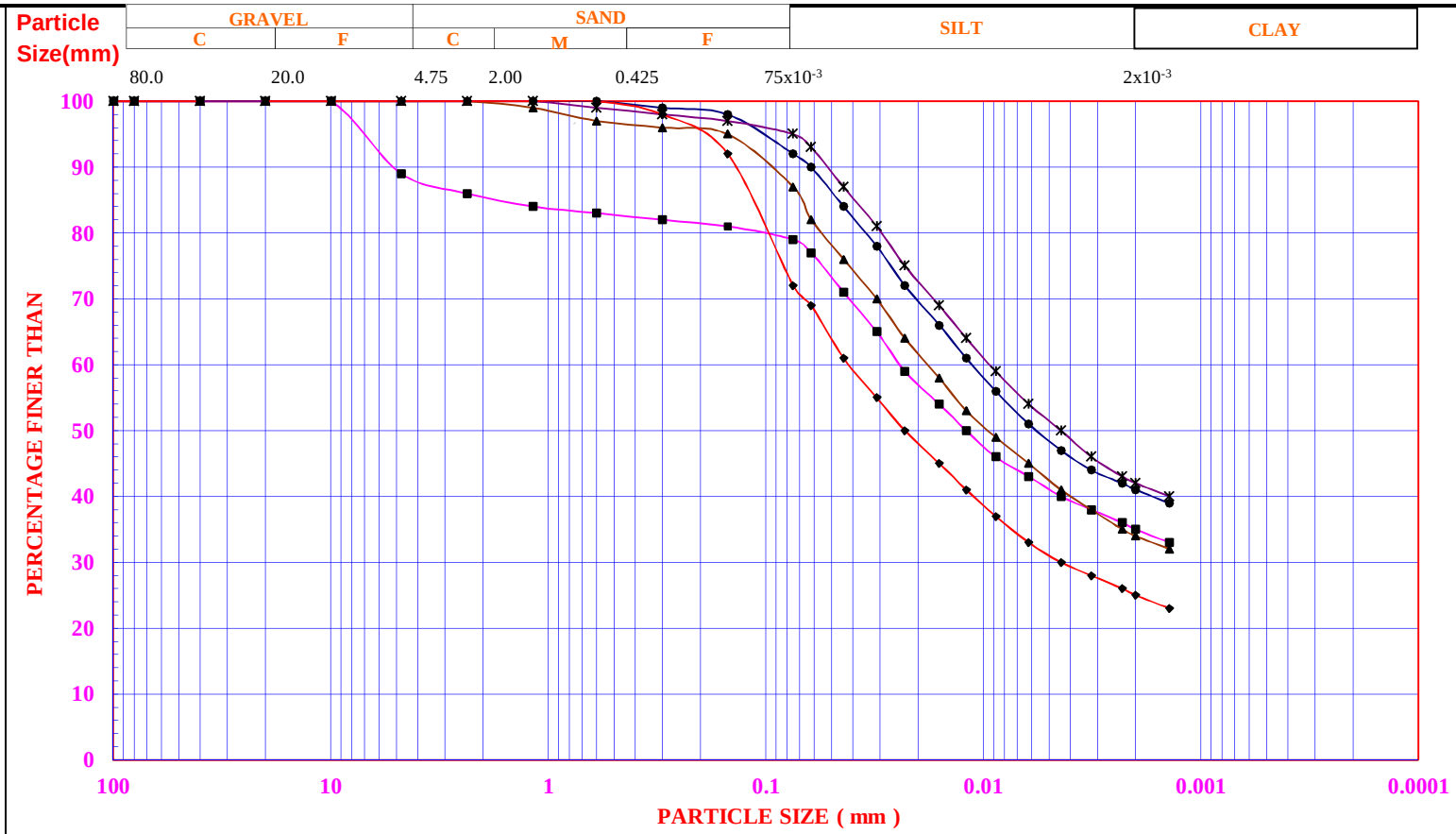
CHEM : Chemical Analysis	Tuu : Triaxial Test (Unconsolidated Undrained)	SP : Swelling Pressure or Swelling Potential Test	ϕ : Angle of Internal Friction
COMP : Compaction Test	Tcu : Triaxial Test (Consolidated Undrained)	SPT : Standard Penetration Test Sample	Cc : Undrained Cohesion
DS : Direct Shear	Tcd : Triaxial Test (Consolidated Drained)	UDS : Undisturbed Soil Sample	ϕ' : Effective Angle of Internal Friction
K : Permeability Test	NP : Non Plastic	VL : Laboratory Vane Shear Test	Cc' : Effective Cohesion
FSI : Free Swell Test	SL : Shrikage Limit Test	UC : Unconfined Compression Test	-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD. Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Bridge No.166) (Chainage No.945/15-17)



Symbol	Bridge No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	166	1.50 - 2.10	CL	0	8	51	41	-----	-----	-----	-----	-----	31	14	17	SPT 1
■—■	166	3.00 - 3.50	CL	11	10	44	35	-----	-----	-----	-----	-----	26	11	15	UDS -1
▲—▲	166	4.50 - 5.10	CL	0	13	53	34	-----	-----	-----	-----	-----	28	12	16	SPT 2
✳—✳	166	7.50 - 8.10	CL	0	5	53	42	-----	-----	-----	-----	-----	29	11	18	SPT 4
◆—◆	166	12.00 - 12.60	CL	0	28	47	25	-----	-----	-----	-----	-----	27	10	17	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	166	166	166	166	166
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	89.00	100.00	100.00	100.00
2.3600	100.00	86.00	100.00	100.00	100.00
1.1800	100.00	84.00	99.00	100.00	100.00
0.6000	100.00	83.00	97.00	99.00	100.00
0.3000	99.00	82.00	96.00	98.00	98.00
0.1500	98.00	81.00	95.00	97.00	92.00
0.0750	92.00	79.00	87.00	95.00	72.00
0.0620	90.00	77.00	82.00	93.00	69.00
0.044	84.00	71.00	76.00	87.00	61.00
0.031	78.00	65.00	70.00	81.00	55.00
0.023	72.00	59.00	64.00	75.00	50.00
0.016	66.00	54.00	58.00	69.00	45.00
0.012	61.00	50.00	53.00	64.00	41.00
0.0088	56.00	46.00	49.00	59.00	37.00
0.0062	51.00	43.00	45.00	54.00	33.00
0.0044	47.00	40.00	41.00	50.00	30.00
0.0032	44.00	38.00	38.00	46.00	28.00
0.0023	42.00	36.00	35.00	43.00	26.00
0.002	41.00	35.00	34.00	42.00	25.00
0.0014	39.00	33.00	32.00	40.00	23.00

Y	0	8	51	41
Z	11	10	44	35
AA	0	13	53	34
AB	0	5	53	42
AC	0	28	47	25

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Bridge No.166) (Chainage No.945/15-17) **DATE:**

Bridge No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
166	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	8	51	41	31	14	17	-----	-----	-----	-----	-----	-----	-----	-----	
166	3.00 - 3.50	UDS -1	1.87	1.62	15.23	CL	11	10	44	35	26	11	15	UU	1.4	8	-----	-----	0.05	2.3	-----	
166	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	13	53	34	28	12	16	-----	-----	-----	-----	-----	-----	-----	2.66	
166	7.50 - 8.10	SPT 4	-----	-----	-----	CL	0	5	53	42	29	11	18	-----	-----	-----	-----	-----	-----	-----	-----	
166	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	28	47	25	27	10	17	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

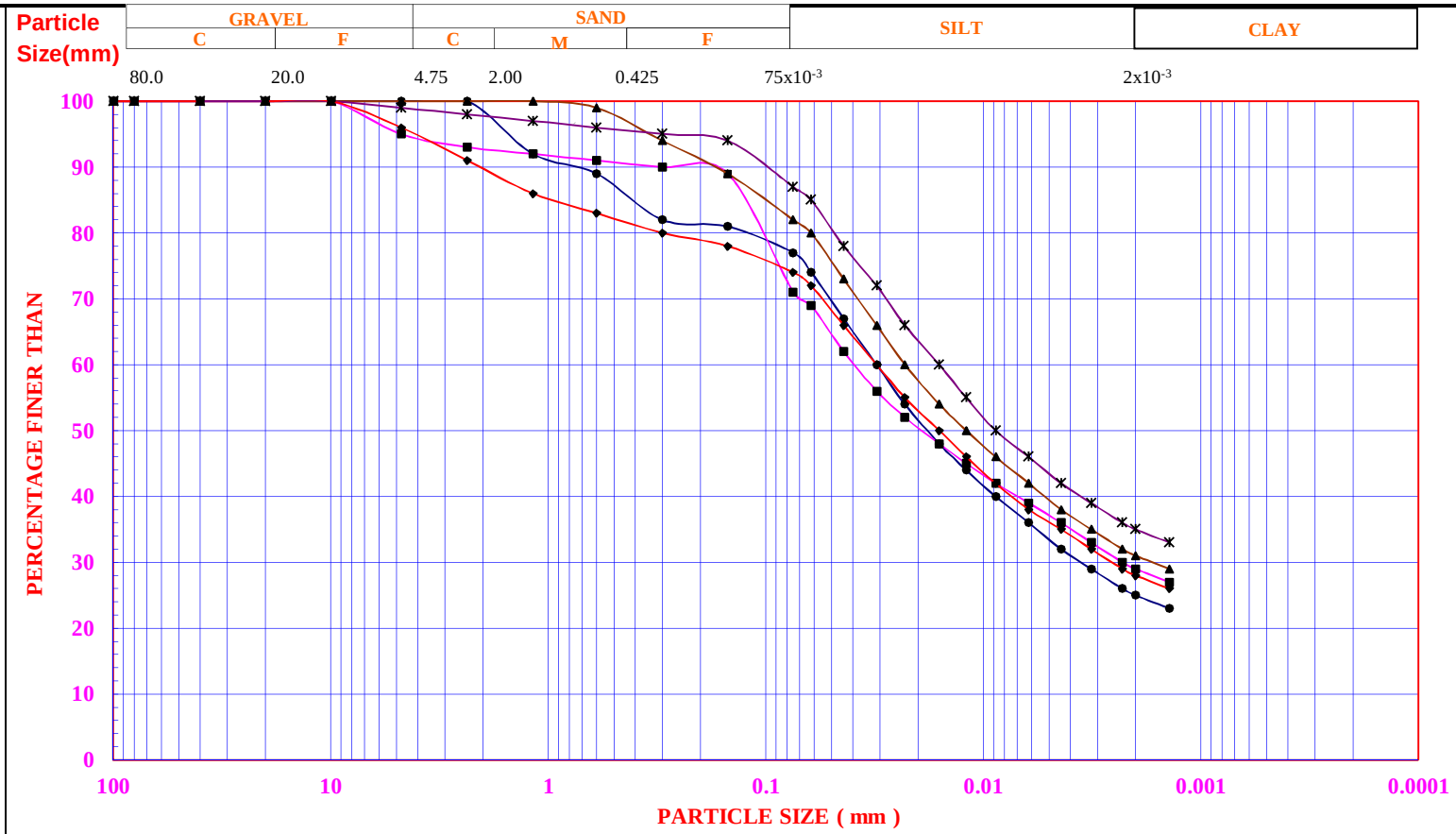
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Bridge No.168) (Chainage No.946/21-23)



Symbol	Bridge No	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	168	1.50 - 2.10	CL	0	23	52	25	-----	-----	-----	-----	-----	26	11	15	SPT 1
■—■	168	3.00 - 3.50	CL	5	24	42	29	-----	-----	-----	-----	-----	24	10	14	UDS -1
▲—▲	168	4.50 - 5.10	CL	0	18	51	31	-----	-----	-----	-----	-----	27	12	15	SPT 2
✳—✳	168	7.50 - 8.10	CL	1	12	52	35	-----	-----	-----	-----	-----	29	13	16	SPT 4
◆—◆	168	12.00 - 12.60	CL	4	22	46	28	-----	-----	-----	-----	-----	25	10	15	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	168	168	168	168	168
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	100.00	95.00	100.00	99.00	96.00
2.3600	100.00	93.00	100.00	98.00	91.00
1.1800	92.00	92.00	100.00	97.00	86.00
0.6000	89.00	91.00	99.00	96.00	83.00
0.3000	82.00	90.00	94.00	95.00	80.00
0.1500	81.00	89.00	89.00	94.00	78.00
0.0750	77.00	71.00	82.00	87.00	74.00
0.0620	74.00	69.00	80.00	85.00	72.00
0.044	67.00	62.00	73.00	78.00	66.00
0.031	60.00	56.00	66.00	72.00	60.00
0.023	54.00	52.00	60.00	66.00	55.00
0.016	48.00	48.00	54.00	60.00	50.00
0.012	44.00	45.00	50.00	55.00	46.00
0.0088	40.00	42.00	46.00	50.00	42.00
0.0062	36.00	39.00	42.00	46.00	38.00
0.0044	32.00	36.00	38.00	42.00	35.00
0.0032	29.00	33.00	35.00	39.00	32.00
0.0023	26.00	30.00	32.00	36.00	29.00
0.002	25.00	29.00	31.00	35.00	28.00
0.0014	23.00	27.00	29.00	33.00	26.00

Y	0	23	52	25
Z	5	24	42	29
AA	0	18	51	31
AB	1	12	52	35
AC	4	22	46	28

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Bridge No.168) (Chainage No.946/21-23) **DATE:**

Bridge No	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
168	1.50 - 2.10	SPT 1	-----	-----	-----	CL	0	23	52	25	26	11	15	-----	-----	-----	-----	-----	-----	-----	2.66	
168	3.00 - 3.50	UDS -1	1.89	1.64	15.23	CL	5	24	42	29	24	10	14	UU	1.28	6	-----	-----	0.03	2.4	-----	
168	4.50 - 5.10	SPT 2	-----	-----	-----	CL	0	18	51	31	27	12	15	-----	-----	-----	-----	-----	-----	-----	-----	
168	7.50 - 8.10	SPT 4	-----	-----	-----	CL	1	12	52	35	29	13	16	-----	-----	-----	-----	-----	-----	-----	-----	
168	12.00 - 12.60	SPT 7	-----	-----	-----	CL	4	22	46	28	25	10	15	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

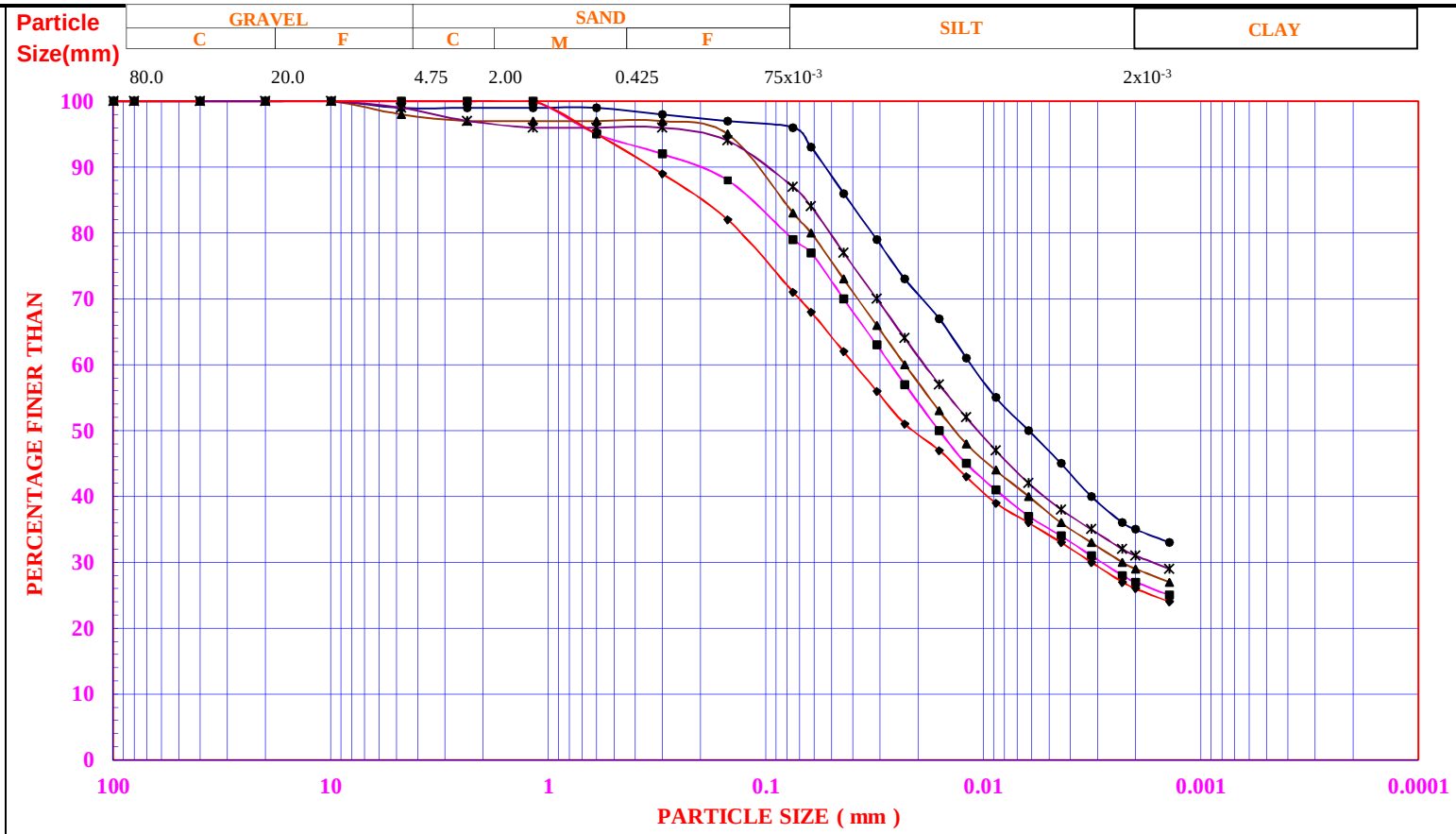
MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

GRAIN SIZE DISTRIBUTION ANALYSIS

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location Fatehpur Bypass (Bridge No.170) (Chainage No.947/25-27)



Symbol	Bridge No.	Depth in m.	Classifi--cation (IS)	Gravel %	Sand %	Silt %	Clay %	$\phi_{10\%}$ mm	$\phi_{30\%}$ mm	$\phi_{60\%}$ mm	Coeff. of Uniformity, $C_u = D_{60} / D_{10}$	Coeff. Of Curvature C_c $D_{30}^2/(D_{60}*D_{10})$	Liquid Limit, W_l	Plastic Limit, W_p	Plasticity Index, I_p	Remarks
●—●	170	1.50 - 2.10	CL	1	3	61	35	-----	-----	-----	-----	-----	32	15	17	SPT 1
■—■	170	3.00 - 3.50	CL	0	21	52	27	-----	-----	-----	-----	-----	26	11	15	UDS -1
▲—▲	170	4.50 - 5.10	CL	2	15	54	29	-----	-----	-----	-----	-----	29	13	16	SPT 2
✳—✳	170	7.50 - 8.10	CL	1	12	56	31	-----	-----	-----	-----	-----	28	10	18	SPT 4
◆—◆	170	12.00 - 12.60	CL	0	29	45	26	-----	-----	-----	-----	-----	25	11	14	SPT 7

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD.

Job No. : 8

Ist SHEET

	170	170	170	170	170
	1.50 - 2.10	3.00 - 3.50	4.50 - 5.10	7.50 - 8.10	12.00 - 12.60
	First Soil Sample	Second Soil Sample	Third Soil Sample	Four Soil Sample	Fifth Soil Sample
100.00	100.00	100.00	100.00	100.00	100.00
80.00	100.00	100.00	100.00	100.00	100.00
40.00	100.00	100.00	100.00	100.00	100.00
20.00	100.00	100.00	100.00	100.00	100.00
10.00	100.00	100.00	100.00	100.00	100.00
4.7500	99.00	100.00	98.00	99.00	100.00
2.3600	99.00	100.00	97.00	97.00	100.00
1.1800	99.00	100.00	97.00	96.00	100.00
0.6000	99.00	95.00	97.00	96.00	95.00
0.3000	98.00	92.00	97.00	96.00	89.00
0.1500	97.00	88.00	95.00	94.00	82.00
0.0750	96.00	79.00	83.00	87.00	71.00
0.0620	93.00	77.00	80.00	84.00	68.00
0.044	86.00	70.00	73.00	77.00	62.00
0.031	79.00	63.00	66.00	70.00	56.00
0.023	73.00	57.00	60.00	64.00	51.00
0.016	67.00	50.00	53.00	57.00	47.00
0.012	61.00	45.00	48.00	52.00	43.00
0.0088	55.00	41.00	44.00	47.00	39.00
0.0062	50.00	37.00	40.00	42.00	36.00
0.0044	45.00	34.00	36.00	38.00	33.00
0.0032	40.00	31.00	33.00	35.00	30.00
0.0023	36.00	28.00	30.00	32.00	27.00
0.002	35.00	27.00	29.00	31.00	26.00
0.0014	33.00	25.00	27.00	29.00	24.00

Y	1	3	61	35
Z	0	21	52	27
AA	2	15	54	29
AB	1	12	56	31
AC	0	29	45	26

SOIL TEST DATA SHEET

Project : Geotechnical Investigation work for DFCCIL , Kanpur.

Location : Fatehpur Bypass (Bridge No.170) (Chainage No.947/25-27) **DATE:**

Bridge No.	Depth in m.	Sample Type UD / D	Density gm/ cm^3		Natural Moisture Content, w %	Soil Classification (I.S)	Mechanical Analysis				Consistancy Limits			Direct Shear			Lab.CBR Test Unsoaked		Verical Consolidation		Specific Gravity	Remarks
			Wet Density	Dry Density			Gravel %	Sand %	Silt %	Clay %	Liquid %	Plastic %	Plasticity Index, I_p %	Type	Cohesion C_u kg/cm^2	Degree ϕ	Penetration at 2.5 mm in %	Penetration at 5 mm in %	Comp. Index C_{cv} (Lab)	Initial Void Ratio		
170	1.50 - 2.10	SPT 1	-----	-----	-----	CL	1	3	61	35	32	15	17	-----	-----	-----	-----	-----	-----	-----	-----	
170	3.00 - 3.50	UDS -1	1.88	1.63	15.49	CL	0	21	52	27	26	11	15	UU	1.28	9	0.04	2.3	-----	-----	-----	
170	4.50 - 5.10	SPT 2	-----	-----	-----	CL	2	15	54	29	29	13	16	-----	-----	-----	-----	-----	-----	-----	2.66	
170	7.50 - 8.10	SPT 4	-----	-----	-----	CL	1	12	56	31	28	10	18	-----	-----	-----	-----	-----	-----	-----	-----	
170	12.00 - 12.60	SPT 7	-----	-----	-----	CL	0	29	45	26	25	11	14	-----	-----	-----	-----	-----	-----	-----	-----	

CHEM : Chemical Analysis
COMP : Compaction Test
DS : Direct Shear
K : Permeability Test
FSI : Free Swell Test

Tuu : Triaxial Test (Unconsolidated Undrained)
Tcu : Triaxial Test (Consolidated Undrained)
Tcd : Triaxial Test (Consolidated Drained)
NP : Non Plastic
SL : Shrikage Limit Test

SP : Swelling Pressure or Swelling Potential Test
SPT : Standard Penetration Test Sample
UDS : Undisturbed Soil Sample
VL : Laboratory Vane Shear Test
UC : Unconfined Compression Test

ϕ : Angle of Internal Friction
Cc : Undrained Cohesion
ϕ' : Effective Angle of Internal Friction
Cc' : Effective Cohesion
-----> : Combined Silt + Clay

MONARCH SURVEYORS AND CONTRACTORS PVT.LTD.

Job No. : **8**

Kanpur Detour

Kanpur Detour
Bore Logs

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 217	SHEET NO. : 1 OF 2
LOCATION :	DATE : 05/08/08 to 06/08/0/8
CHAINAGE(km.) : 991/27-29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Very Stiff Silty Clay	1.50	SPT	11	13	16	19	29			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	17	19	23	36			
5.00			Hard Silty Clay	5.10									
6.00				6.00	SPT	13	16	21	24	37			
7.00				6.60									
				7.50	SPT	12	19	24	28	43			
8.00				8.10									
9.00				9.00	SPT	16	21	25	31	46			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 217	SHEET NO. : 2 OF 2
LOCATION :	DATE : 05/08/08 to 06/08/0/8
CHAINAGE(km.) : 991/27-29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**20**	**22**	**26**	**48**	**48**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**24**	**25**	**28**	**36**	**53**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 218	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 03/08/08 to 04/08/0/8**
CHAINAGE(km.) : 992/13-15	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 6.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	12	13	21			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
			Very Stiff Silty Clay	4.50	SPT	11	13	15	17	28			
5.00				5.10									
6.00				6.00	SPT	11	13	14	17	27			
7.00				6.60									
				7.50	SPT	12	16	21	24	37			
8.00				8.10									
			Hard Silty Clay										
9.00				9.00	SPT	14	17	19	26	36			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	218	SHEET NO. :	2 OF 2
LOCATION :		DATE :	03/08/08 to 04/08/0/8
CHAINAGE(km.) :	992/13-15	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	6.00 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**18**	**24**	**28**	**33**	**52**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**23**	**28**	**34**	**40**	**62**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 219	SHEET NO. : 1 OF 2
LOCATION :	DATE : 06/08/08 to 07/08/0/8
CHAINAGE(km.) : 993/19-21	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	13	16	22			
				2.10									
2.00													
3.00				3.00	UDS								
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	11	14	16	21	30			
				5.10									
5.00													
6.00				6.00	SPT	17	19	23	28	42			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	21	25	28	33	53			
				8.10									
8.00													
9.00				9.00	SPT	20	24	26	34	50			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	219	SHEET NO. :	2 OF 2
LOCATION :		DATE :	06/08/08 to 07/08/0/8
CHAINAGE(km.) :	993/19-21	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	6.50 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**26**	**27**	**30**	**53**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**18**	**25**	**30**	**36**	**55**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT :DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 220	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 04/08/08 to 05/08/0/8**
CHAINAGE(km.) : 994/29-1	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 5.80 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Very Stiff Silty Clay	1.50	SPT	9	11	13	16	24			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	13	17	21	26	38			
5.00			Hard Silty Clay	5.10									
6.00				6.00	SPT	17	19	23	28	42			
7.00				6.60									
				7.50	SPT	15	21	24	31	45			
8.00				8.10									
9.00				9.00	SPT	18	24	26	33	50			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	220	SHEET NO. :	2 OF 2
LOCATION :		DATE :	04/08/08 to 05/08/0/8
CHAINAGE(km.) :	994/29-1	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.80 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**20**	**25**	**27**	**35**	**52**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**20**	**25**	**31**	**38**	**56**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L. **MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE**	SCALE : 1: 50 Project-----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 221	SHEET NO. : 1 OF 2
LOCATION :	DATE : 06/08/08 to 07/08/0/8
CHAINAGE(km.) : 995/19-21	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.70 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	9	11	13	15	24			
				2.10									
2.00													
3.00				3.00	UDS								
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	13	14	17	19	31			
				5.10									
5.00													
6.00				6.00	SPT	14	17	18	21	35			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	17	21	23	26	44			
				8.10									
8.00													
9.00				9.00	SPT	15	20	26	30	46			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	221	SHEET NO. :	2 OF 2
LOCATION :		DATE :	06/08/08 to 07/08/0/8
CHAINAGE(km.) :	995/19-21	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	6.70 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**24**	**30**	**41**	**54**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**23**	**29**	**28**	**43**	**57**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 223	SHEET NO. : 1 OF 2
LOCATION :	DATE : 06/08/08 to 07/08/0/8
CHAINAGE(km.) : 996/27-29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			**Very Stiff Silty Clay**										
				1.50	SPT	7	13	15	19	28			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	15	21	26	36			
			Hard Silty Clay	5.10									
5.00													
6.00				6.00	SPT	13	16	24	27	40			
				6.60									
7.00													
				7.50	SPT	16	19	26	30	45			
				8.10									
8.00													
9.00				9.00	SPT	15	20	24	31	44			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 223	SHEET NO. : 2 OF 2
LOCATION :	DATE : 06/08/08 to 07/08/0/8
CHAINAGE(km.) : 996/27-29	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**21**	**26**	**34**	**47**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**21**	**24**	**28**	**33**	**52**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 224	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 07/08/08 to 07/08/0/8**
CHAINAGE(km.) : 997/11-13	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 4.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Very Stiff Silty Clay	1.50	SPT	11	13	16	18	29			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	14	16	21	29	37			
5.00			Hard Silty Clay	5.10									
6.00				6.00	SPT	19	23	25	28	48			
7.00				6.60									
				7.50	SPT	16	18	23	30	41			
8.00				8.10									
9.00				9.00	SPT	19	21	26	33	47			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	224	SHEET NO. :	2 OF 2
LOCATION :		DATE :	07/08/08 to 08/08/0/8
CHAINAGE(km.) :	997/11-13	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	4.50 m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**21**	**24**	**28**	**31**	**52**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**20**	**25**	**29**	**35**	**54**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 226	SHEET NO. : 1 OF 2
LOCATION :	DATE : 08/08/08 to 09/08/0/8
CHAINAGE(km.) : 998/5-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.00 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	10	15	18	23	33			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	11	14	20	26	34			
				5.10									
5.00			Hard Silty Clay										
6.00				6.00	SPT	15	17	21	25	38			
				6.60									
7.00													
				7.50	SPT	14	18	23	25	41			
				8.10									
8.00													
9.00				9.00	SPT	17	20	22	23	42			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 225	SHEET NO. : 2 OF 2
LOCATION :	DATE : 08/08/08 to 09/08/0/8
CHAINAGE(km.) : 998/5-7	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50 m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	16	21	26	33	47			
11.00			Hard Silty Clay	11.10									
12.00				12.00	SPT	19	23	29	36	52			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 228	SHEET NO. : 1 OF 2
LOCATION :	DATE : 09/08/08 to 10/08/0/8
CHAINAGE(km.) : 999/17-19	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	13	16	22			
				2.10									
2.00													
3.00				3.00	UDS								
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	11	16	15	20	31			
				5.10									
5.00													
6.00				6.00	SPT	14	18	20	26	38			
				6.60									
7.00													
				7.50	SPT	19	20	23	31	49			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	22	24	26	33	50			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation - Kanpur Bypass			
BORE HOLE NO. :	228	SHEET NO. :	2 OF 2
LOCATION :		DATE :	09/08/08 to 10/08/0/8
CHAINAGE(km.) :	999/17-19	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.50m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**21**	**23**	**28**	**30**	**51**			
				11.10									
11.00			**Hard Silty Clay**										
12.00				**12.00**	**SPT**	**24**	**26**	**31**	**36**	**57**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L. **MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE**	SCALE : 1: 50 Project-----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 09/08/08 to 10/08/0/8
CHAINAGE(km.) : 1000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	11	13	16	20	29			
				2.10									
2.00													
3.00			Very Stiff Silty Clay	3.00	UDS								
				3.50									
4.00													
				4.50	SPT	10	13	18	23	31			
				5.10									
5.00													
6.00				6.00	SPT	14	18	21	26	39			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	18	21	24	30	45			
				8.10									
8.00													
9.00				9.00	SPT	15	17	20	33	37			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation - Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	09/08/08 to 10/08/0/8
CHAINAGE(km.) :	1000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.80m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**24**	**26**	**32**	**50**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**22**	**24**	**29**	**34**	**53**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 1	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 10/08/08 to 11/08/0/8**
CHAINAGE(km.) : 2000	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	11	12	20			
2.00				2.10									
3.00				3.00	UDS								
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	9	11	13	14	24			
5.00				5.10									
6.00				6.00	SPT	13	15	18	21	33			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	12	13	15	18	28			
8.00				8.10									
9.00				9.00	SPT	13	16	18	23	39			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 10/08/08 to 11/08/0/8
CHAINAGE(km.) : 2000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**11**	**21**	**24**	**30**	**45**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**15**	**24**	**23**	**33**	**47**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 10/08/08 to 11/08/0/8
CHAINAGE(km.) : 3000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00				1.50	SPT	7	9	11	12	20			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	11	13	14	24			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	13	15	18	21	33			
7.00				6.60									
				7.50	SPT	12	15	19	18	34			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	13	16	18	23	34			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 10/08/08 to 11/08/0/8
CHAINAGE(km.) : 3000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**11**	**21**	**24**	**30**	**45**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**15**	**24**	**23**	**33**	**47**			
13.00	BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.												
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L. **MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE**	SCALE : 1: 50 Project-----	Chkd. By : --	Prepd. By: ****

CLIENT :DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 1	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 10/08/08 to 11/08/0/8**
CHAINAGE(km.) : 4000	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 6.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	11	12	20			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	11	13	14	24			
5.00				5.10									
6.00			Very Stiff Silty Clay	6.00	SPT	12	13	15	18	28			
7.00				6.60									
				7.50	SPT	13	16	18	28	34			
8.00				8.10									
9.00			Hard Silty Clay	9.00	SPT	13	16	18	23	34			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 10/08/08 to 11/08/0/8
CHAINAGE(km.) : 4000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**17**	**21**	**24**	**30**	**45**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**15**	**24**	**23**	**28**	**47**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 11/08/08 to 12/08/0/8
CHAINAGE(km.) : 5000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	7	7	9	14			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	8	12	14	18	26			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	11	16	18	24	34			
7.00				6.60									
				7.50	SPT	10	16	20	27	36			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	13	19	18	30	37			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 11/08/08 to 12/08/0/8
CHAINAGE(km.) : 5000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**20**	**23**	**33**	**43**			
				11.10									
11.00			**Hard Silty Clay**										
12.00				**12.00**	**SPT**	**19**	**21**	**26**	**35**	**47**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : DFCCIL	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO.: 1	**SHEET NO. : 1 OF 2**
LOCATION :	**DATE : 11/08/08 to 12/08/0/8**
CHAINAGE(km.) : 6000	**METHOD : ROTARY DRILLING**
GROUND R. L. :	**CASING : 150mm**
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	10	11	13	14			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	11	13	16	20	29			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	14	16	19	23	35			
7.00			Hard Silty Clay	6.60									
				7.50	SPT	13	19	20	26	39			
8.00				8.10									
9.00				9.00	SPT	16	20	23	30	43			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 11/08/08 to 12/08/0/8
CHAINAGE(km.) : 6000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**26**	**21**	**33**	**47**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**20**	**24**	**30**	**41**	**54**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 12/08/08 to 13/08/0/8
CHAINAGE(km.) : 7000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	8	10	15			
				2.10									
2.00													
			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	13	18	23			
				5.10									
5.00													
6.00				6.00	SPT	11	13	19	23	32			
				6.60									
			Very Stiff Silty Clay										
7.00													
				7.50	SPT	13	16	19	23	35			
				8.10									
8.00													
			Hard Silty Clay										
9.00				9.00	SPT	15	21	20	28	41			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 12/08/08 to 13/08/0/8
CHAINAGE(km.) : 7000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	19	25	30	44			
11.00			Hard Silty Clay	11.10									
12.00				12.00	SPT	20	24	26	33	50			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 13/08/08 to 14/08/0/8
CHAINAGE(km.) : 8000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	9	10	10	19			
2.00				2.10									
3.00				3.00	UDS								
			Very Stiff Silty Clay	3.50									
4.00													
				4.50	SPT	10	13	12	16	25			
				5.10									
5.00													
6.00				6.00	SPT	9	13	14	18	27			
				6.60									
7.00													
				7.50	SPT	11	16	15	20	31			
				8.10									
8.00													
9.00				9.00	SPT	16	18	19	25	37			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 13/08/08 to 14/08/0/8
CHAINAGE(km.) : 8000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**18**	**19**	**25**	**37**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**15**	**17**	**20**	**30**	**37**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 13/08/08 to 14/08/0/8
CHAINAGE(km.) : 9000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	5	7	9	12			
				2.10									
2.00													
3.00			Stiff Silty Clay	3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	10	13	15	23			
				5.10									
5.00													
6.00				6.00	SPT	13	14	13	19	27			
				6.60									
7.00													
			Very Stiff Silty Clay	7.50	SPT	12	14	16	23	30			
				8.10									
8.00													
9.00				9.00	SPT	16	15	17	25	32			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 13/08/08 to 14/08/0/8
CHAINAGE(km.) : 9000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**18**	**21**	**28**	**39**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**16**	**15**	**23**	**30**	**38**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 06/10/08 to 06/10/8
CHAINAGE(km.) : 10000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	9	14	16			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	11	14	16	25			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	10	12	15	24	27			
				6.60									
7.00													
				7.50	SPT	9	14	14	25	28			
				8.10									
8.00													
9.00				9.00	SPT	13	16	15	20	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 06/10/08 to 06/10/0/8
CHAINAGE(km.) : 10000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**15**	**17**	**33**	**32**			
11.00			**Very Stiff Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**17**	**16**	**19**	**36**	**35**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 06/10/08 to 06/10/8
CHAINAGE(km.) : 11000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	8	11	14	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
			Very Stiff Silty Clay	4.50	SPT	6	7	13	21	20			
				5.10									
5.00													
6.00				6.00	SPT	6	9	15	20	24			
				6.60									
7.00													
				7.50	SPT	10	13	16	26	29			
				8.10									
8.00													
9.00				9.00	SPT	10	14	17	24	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 06/10/08 to 06/10/0/8
CHAINAGE(km.) : 11000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**11**	**15**	**17**	**28**	**32**			
11.00			**Very Stiff Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**10**	**16**	**19**	**27**	**35**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 04/10/08 to 05/10/8
CHAINAGE(km.) : 12000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.00m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	13	19	22			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	10	11	20	21			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	10	13	15	23	28			
				6.60									
7.00													
				7.50	SPT	12	14	13	22	27			
				8.10									
8.00													
9.00				9.00	SPT	10	13	16	24	29			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 04/10/08 to 05/10/0/8
CHAINAGE(km.) : 12000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.00m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	15	15	14	29	29			
11.00			Very Stiff Silty Clay	11.10									
12.00				12.00	SPT	15	18	20	36	38			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 04/10/08 to 04/10/8
CHAINAGE(km.) : 13000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	9	11	14	20			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	7	10	17	21	27			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	6	10	14	22	24			
				6.60									
7.00													
				7.50	SPT	6	8	13	20	21			
				8.10									
8.00													
9.00				9.00	SPT	7	9	13	22	22			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 04/10/08 to 04/10/0/8
CHAINAGE(km.) : 13000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**8**	**10**	**16**	**23**	**26**			
				11.10									
11.00			**Very Stiff Silty Clay**										
12.00				**12.00**	**SPT**	**9**	**12**	**18**	**25**	**30**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 03/10/08 to 03/10/08
CHAINAGE(km.) : 14000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.00m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	5	7	11	12			
				2.10									
2.00													
			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	5	8	12	13			
				5.10									
5.00													
6.00				6.00	SPT	6	7	9	15	16			
				6.60									
7.00													
				7.50	SPT	5	8	10	17	18			
				8.10									
8.00			Very Stiff Silty Clay										
9.00				9.00	SPT	8	10	16	21	26			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 03/10/08 to 03/10/0/8
CHAINAGE(km.) : 14000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.00m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**7**	**11**	**17**	**23**	**28**			
11.00			**Very Stiff Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**9**	**12**	**18**	**24**	**30**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 03/10/08 to 04/10/8
CHAINAGE(km.) : 15000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	11	13	26	24			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	10	13	25	23			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	7	13	15	28	28			
7.00				6.60									
				7.50	SPT	10	16	15	30	31			
8.00				8.10									
9.00				9.00	SPT	12	15	17	28	32			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 03/10/08 to 04/10/0/8
CHAINAGE(km.) : 15000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	10	14	20	29	34			
11.00			Hard Silty Clay	11.10									
12.00				12.00	SPT	15	17	21	30	38			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 22/08/08 to 26/08/0/8
CHAINAGE(km.) : 16000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00				1.50	SPT	4	6	6	10	12			
2.00				2.10									
3.00				3.00	UDS								
4.00			Stiff Silty Clay	3.50									
				4.50	SPT	4	8	8	10	16			
5.00				5.10									
6.00				6.00	SPT	5	7	9	11	16			
7.00				6.60									
				7.50	SPT	6	7	11	15	18			
8.00				8.10									
9.00			Very Stiff Silty Clay	9.00	UDS								
10.00				9.50									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 22/08/08 to 26/08/0/8
CHAINAGE(km.) : 16000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	6	8	12	17	20			
				11.10									
11.00			Very Stiff Silty Clay										
12.00				12.00	SPT	10	23	28	31	51			
				12.60									
13.00													
				13.50	SPT	10	20	23	28	43			
				14.10									
14.00			Hard Silty Clay										
15.00				15.00	SPT	11	21	22	29	43			
				15.60									
16.00													
				16.50	SPT	11	23	24	29	47			
				17.10									
17.00													
18.00				18.00	SPT	12	24	25	30	49			
				18.60									
19.00													
				19.50	SPT	12	23	28	35	51			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 1 OF 3
LOCATION :	DATE : 23/08/08 to 27/08/0/8
CHAINAGE(km.) : 16000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	4	8	7	12			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
			Stiff Silty Clay	4.50	SPT	4	4	9	15	13			
				5.10									
5.00													
6.00				6.00	SPT	4	5	9	14	14			
				6.60									
7.00													
				7.50	SPT	6	9	11	17	20			
				8.10									
8.00													
9.00			Very Stiff Silty Clay	9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 2 OF 3
LOCATION :	DATE : 22/08/08 to 26/08/0/8
CHAINAGE(km.) : 16000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	5	7	9	13	16			
11.00				11.10									
12.00				12.00	SPT	7	9	11	16	20			
			Very Stiff Silty Clay	12.60									
13.00				13.50	SPT	7	10	12	16	22			
14.00				14.10									
15.00				15.00	SPT	10	14	16	20	30			
16.00				15.60									
				16.50	SPT	12	15	18	23	33			
17.00				17.10									
			Hard Silty Clay										
18.00				18.00	SPT	13	16	20	25	36			
19.00				18.60									
				19.50	SPT	16	19	25	29	44			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 3 OF 3
LOCATION :	DATE : 22/08/08 to 26/08/0/8
CHAINAGE(km.) : 16000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	15	21	24	29	45			
				21.60									
22.00				22.50	SPT	15	23	26	30	49			
				23.10									
23.00													
24.00				24.00	SPT	18	29	30	34	59			
				24.60									
25.00			Hard Silty Clay										
				25.50	SPT	18	30	32	-	62			
				25.95									
26.00													
27.00				27.00	SPT	17	28	31	-	59			
				27.45									
28.00				28.50	SPT	19	26	32	37	58			
				29.10									
29.00													
30.00				30.00	SPT	17	28	34	39	62			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 4
LOCATION :	DATE : 16/08/08 to 21/08/0/8
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	9	10	13	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
			Very Stiff Silty Clay	4.50	SPT	7	9	13	17	22			
				5.10									
5.00													
6.00				6.00	SPT	11	15	17	21	32			
				6.60									
7.00													
				7.50	SPT	7	10	14	19	24			
				8.10									
8.00													
9.00				9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 4
LOCATION :	DATE : 16/08/08 to 21/08/0/8
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	13	16	20	23	36			
11.00				11.10									
12.00				12.00	SPT	14	19	21	25	40			
13.00			Hard Silty Clay	12.60									
				13.50	SPT	10	13	17	22	30			
14.00				14.10									
15.00				15.00	SPT	11	15	20	26	35			
16.00				15.60									
				16.50	SPT	10	13	16	24	29			
17.00				17.10									
18.00				18.00	SPT	9	14	15	20	29			
19.00			Very Stiff Silty Clay	18.60									
				19.50	SPT	13	17	16	23	33			
20.00			Hard Silty Clay	20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 4
LOCATION :	DATE : 16/08/08 to 21/08/0/8
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00			Hard Silty Clay	21.00	SPT	14	16	19	25	35			
				21.60									
22.00				22.50	SPT	11	15	17	20	32			
23.00			Very Stiff Silty Clay	23.10									
24.00				24.00	SPT	13	14	19	23	33			
25.00			Hard Silty Clay	24.60									
				25.50	SPT	14	16	17	20	33			
26.00				26.10									
27.00				27.00	SPT	10	15	16	19	31			
28.00			Very Stiff Silty Clay	27.60									
				28.50	SPT	15	15	17	20	32			
29.00			Hard Silty Clay	29.10									
30.00				30.00	SPT	17	19	20	23	39			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 4 OF 4
LOCATION :	DATE : 16/08/08 to 21/08/0/8
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
31.00													
				31.50	SPT	14	20	21	26	41			
				32.10									
32.00													
			Hard Silty Clay										
33.00				33.00	SPT	16	26	30	41	56			
				33.60									
34.00													
				34.50	SPT	15	25	33	43	58			
				35.10									
35.00													
26.00	BORE HOLE TERMINATED AT A DEPTH OF 35.10 m B.G.L.												
27.00													
28.00													
29.00													
30.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 34.50 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project ----- | Chkd. By : -- | Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 1 OF 3
LOCATION :	DATE : 17/108/08 to 19/8/08
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	11	13	15	24			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	16	21	26			
			Very Stiff Silty Clay	5.10									
5.00													
6.00				6.00	SPT	7	9	18	24	27			
				6.60									
7.00													
				7.50	SPT	8	11	20	27	31			
				8.10									
8.00													
9.00				9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 2 OF 3
LOCATION :	DATE : 17/108/08 to 19/8/08
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	10	13	18	29	31			
11.00			Very Stiff Silty Clay	11.10									
12.00				12.00	SPT	11	15	20	33	35			
13.00				12.60									
				13.50	SPT	10	16	21	34	37			
14.00				14.10									
15.00				15.00	SPT	9	15	23	30	38			
16.00			Hard Silty Clay	15.60									
				16.50	SPT	13	16	19	28	35			
17.00				17.10									
18.00				18.00	SPT	17	15	23	31	38			
19.00				18.60									
				19.50	SPT	15	16	20	32	36			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2	SHEET NO. : 3 OF 3
LOCATION :	DATE : 17/108/08 to 19/8/08
CHAINAGE(km.) : 17000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.30m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	14	17	22	33	39			
22.00				21.60									
				22.50	SPT	16	18	23	35	41			
23.00				23.10									
24.00				24.00	SPT	17	19	24	34	43			
25.00				24.60									
			Hard Silty Clay	25.50	SPT	15	20	24	38	44			
26.0				26.10									
27.00				27.00	SPT	17	19	26	40	45			
28.00				27.60									
				28.50	SPT	16	20	23	39	43			
29.00				29.10									
30.00				30.00	SPT	18	21	26	40	47			
				30.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 18/08/08 to 19/08/0/8
CHAINAGE(km.) : 18000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.00m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	11	13	18			
				2.10									
2.00													
3.00			Very Stiff Silty Clay	3.00	UDS								
				3.50									
4.00													
				4.50	SPT	11	14	18	20	32			
				5.10									
5.00													
6.00				6.00	SPT	9	13	19	23	32			
				6.60									
7.00													
				7.50	SPT	14	17	21	25	38			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	17	20	21	24	41			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Etawah Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	18/08/08 to 19/08/0/8
CHAINAGE(km.) :	18000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	3.00m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**23**	**25**	**27**	**48**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**17**	**21**	**29**	**30**	**50**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 3
LOCATION :	DATE : 27/08/08 to 31/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	6	7	9	13			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	9	10	13	19			
				5.10									
5.00													
6.00				6.00	SPT	10	13	16	20	29			
			Very Stiff Silty Clay	6.60									
7.00													
				7.50	SPT	10	12	15	21	27			
				8.10									
8.00													
9.00				9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 3
LOCATION :	DATE : 27/08/08 to 31/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	17	20	24	37			
				11.10									
11.00													
12.00				12.00	SPT	14	19	21	27	40			
				12.60									
13.00													
				13.50	SPT	16	22	25	30	47			
				14.10									
14.00			Hard Silty Clay										
15.00				15.00	SPT	14	20	24	32	44			
				15.60									
16.00													
				16.50	SPT	18	25	29	32	54			
				17.10									
17.00													
18.00				18.00	SPT	16	22	26	32	48			
				18.60									
19.00													
				19.50	SPT	14	18	23	27	41			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 27/08/08 to 31/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	16	21	28	32	49			
				21.60									
22.00													
				22.50	SPT	20	26	29	34	55			
				23.10									
23.00													
24.00			Hard Silty Clay	24.00	SPT	14	24	29	30	53			
				24.60									
25.00													
				25.50	SPT	19	26	29	35	55			
				26.10									
26.00													
27.00				27.00	SPT	11	27	31	37	58			
				27.60									
28.00													
				28.50	SPT	16	22	27	32	49			
				29.10									
29.00													
30.00				30.00	SPT	18	25	31	38	56			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 1 OF 3
LOCATION :	DATE : 28/08/08 to 30/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.75m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	6	8	11	14			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	11	13	15	24			
				5.10									
5.00													
6.00				6.00	SPT	6	9	12	16	21			
				6.60									
7.00			Very Stiff Silty Clay										
				7.50	SPT	10	14	17	20	31			
				8.10									
8.00													
9.00				9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 2 OF 3
LOCATION :	DATE : 28/08/08 to 30/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.75m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	21	26	33	47			
				11.10									
11.00													
12.00				12.00	SPT	14	21	27	37	48			
				12.60									
13.00													
				13.50	SPT	14	22	28	36	50			
				14.10									
14.00													
15.00				15.00	SPT	15	22	29	37	51			
				15.60									
16.00			Hard Silty Clay										
				16.50	SPT	13	23	29	38	52			
				17.10									
17.00													
18.00				18.00	SPT	12	21	23	37	44			
				18.60									
19.00													
				19.50	SPT	14	22	24	28	46			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 3 OF 3
LOCATION :	DATE : 28/08/08 to 30/08/0/8
CHAINAGE(km.) : 19000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.75m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	17	21	20	26	41			
				21.60									
22.00													
				22.50	SPT	15	20	24	30	44			
				23.10									
23.00													
24.00				24.00	SPT	19	21	25	34	46			
				24.60									
			Hard Silty Clay										
25.00													
				25.50	SPT	20	24	23	36	47			
				26.10									
26.00													
27.00				27.00	SPT	25	24	27	40	51			
				27.60									
28.00													
				28.50	SPT	24	26	24	39	50			
				29.10									
29.00													
30.00				30.00	SPT	23	25	26	41	51			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 25/08/08 to 26/08/0/8
CHAINAGE(km.) : 20000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	8	12			
				2.10									
2.00													
			Stifff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	7	9	11	16			
				5.10									
5.00													
6.00				6.00	SPT	9	11	14	17	25			
				6.60									
			Very Stiff Silty Clay										
7.00													
				7.50	SPT	12	14	17	21	31			
				8.10									
8.00													
9.00				9.00	SPT	12	17	21	25	38			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 25/08/08 to 26/08/0/8
CHAINAGE(km.) : 20000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**20**	**24**	**27**	**44**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**19**	**22**	**27**	**31**	**49**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 28/08/08 to 29/08/0/8
CHAINAGE(km.) : 21000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	6	9	11	15			
			Very Stiff Silty Clay	2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	11	13	17	24			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	8	12	15	20	27			
				6.60									
7.00													
				7.50	SPT	11	16	20	24	36			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	11	19	24	30	43			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - KAnpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 28/08/08 to 29/08/0/8
CHAINAGE(km.) : 21000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**10**	**17**	**20**	**30**	**37**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**14**	**18**	**22**	**33**	**40**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 03/09/08 to 03/09/0/8
CHAINAGE(km.) : 22000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	11	14	18	25			
				2.10									
2.00													
			Very Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	10	13	16	21	29			
				5.10									
5.00													
6.00				6.00	SPT	9	15	14	20	29			
				6.60									
7.00													
				7.50	SPT	11	14	19	23	33			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	16	19	21	26	40			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation - Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	03/08/08 to 03/08/0/8
CHAINAGE(km.) :	22000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.10m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**20**	**18**	**25**	**38**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**18**	**24**	**26**	**33**	**50**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 01/09/08 to 02/09/0/8
CHAINAGE(km.) : 23000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	11	14	16	25			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00			Very Stiff Silty Clay										
				4.50	SPT	10	13	15	20	28			
				5.10									
5.00													
6.00				6.00	SPT	10	14	16	23	30			
				6.60									
7.00													
				7.50	SPT	13	16	18	26	34			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	15	17	20	28	37			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 01/08/08 to 02/08/0/8
CHAINAGE(km.) : 23000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**16**	**18**	**26**	**34**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**17**	**20**	**21**	**29**	**41**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 01/09/08 to 02/09/0/8
CHAINAGE(km.) : 24000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	9	10	14	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	11	17	20	28			
				5.10									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	10	13	16	21	29			
				6.60									
7.00													
				7.50	SPT	13	15	17	24	32			
				8.10									
8.00													
9.00				9.00	SPT	12	18	21	26	39			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	01/08/08 to 02/08/0/8
CHAINAGE(km.) :	24000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	6.10m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**17**	**15**	**23**	**28**	**38**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**16**	**20**	**21**	**33**	**41**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 03/09/08 to 04/09/0/8
CHAINAGE(km.) : 25000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	8	9	11	17			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00			Very Stiff Silty Clay										
				4.50	SPT	11	13	16	20	29			
				5.10									
5.00													
6.00				6.00	SPT	15	18	20	24	38			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	14	20	22	28	42			
				8.10									
8.00													
9.00				9.00	SPT	18	22	26	30	48			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 03/08/08 to 04/08/0/8
CHAINAGE(km.) : 25000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**20**	**24**	**25**	**33**	**49**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**23**	**26**	**28**	**36**	**54**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 1 OF 3
LOCATION :	DATE : 06/09/08 to 09/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	10	13	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	5	8	10	14	18			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	10	12	16	20	28			
				6.60									
7.00													
				7.50	SPT	9	13	15	21	28			
				8.10									
8.00													
9.00				9.00	UDS								
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 2 OF 3
LOCATION :	DATE : 06/09/08 to 09/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	15	18	21	26	39			
				11.10									
11.00													
12.00				12.00	SPT	13	16	20	25	36			
				12.60									
13.00													
				13.50	SPT	11	16	23	28	39			
				14.10									
14.00													
15.00			Hard Silty Clay	15.00	SPT	14	15	21	26	37			
				15.60									
16.00													
				16.50	SPT	17	15	23	30	38			
				17.10									
17.00													
18.00				18.00	SPT	16	19	21	33	40			
				18.60									
19.00													
				19.50	SPT	15	17	20	36	37			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 2 OF 3
LOCATION :	DATE : 06/09/08 to 09/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	15	18	21	26	39			
				11.10									
11.00													
12.00				12.00	SPT	13	16	20	25	36			
				12.60									
13.00													
				13.50	SPT	11	16	23	28	39			
				14.10									
14.00													
15.00			Hard Silty Clay	15.00	SPT	14	15	21	26	37			
				15.60									
16.00													
				16.50	SPT	17	15	23	30	38			
				17.10									
17.00													
18.00				18.00	SPT	16	19	21	33	40			
				18.60									
19.00													
				19.50	SPT	15	17	20	36	37			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 1 OF 3
LOCATION :	DATE : 06/09/08 to 11/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	7	9	13	16			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	11	15	16	20	31			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	10	14	16	21	30			
				6.60									
7.00													
				7.50	SPT	13	16	17	26	33			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	UDS								
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 2 OF 3
LOCATION :	DATE : 06/09/08 to 11/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	14	16	20	25	36			
				11.10									
11.00													
12.00				12.00	SPT	17	15	19	31	34			
				12.60									
13.00													
				13.50	SPT	15	18	23	30	41			
				14.10									
14.00													
15.00			Hard Silty Clay	15.00	SPT	14	18	21	33	39			
				15.60									
16.00													
				16.50	SPT	17	20	23	36	43			
				17.10									
17.00													
18.00				18.00	SPT	21	23	22	35	45			
				18.60									
19.00													
				19.50	SPT	19	21	26	37	47			
				20.10									
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 3 OF 3
LOCATION :	DATE : 06/09/08 to 11/09/0/8
CHAINAGE(km.) : 26000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	21	23	26	40	49			
				21.60									
22.00													
				22.50	SPT	20	24	31	43	55			
				23.10									
23.00													
24.00				24.00	SPT	22	26	25	39	51			
				24.60									
			Hard Silty Clay										
25.00													
				25.50	SPT	19	24	29	40	53			
				26.10									
26.00													
27.00				27.00	SPT	14	20	21	29	41			
				27.60									
28.00													
				28.50	SPT	21	26	25	33	51			
				29.10									
29.00													
30.00				30.00	SPT	20	28	26	35	54			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 05/09/08 to 06/09/0/8
CHAINAGE(km.) : 27000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	8	10	14			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	8	10	12	18			
				5.10									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	9	13	15	20	28			
				6.60									
7.00													
				7.50	SPT	11	16	21	24	37			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	10	19	23	27	42			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 05/08/08 to 06/08/0/8
CHAINAGE(km.) : 27000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**18**	**25**	**31**	**43**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**16**	**21**	**27**	**34**	**48**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 07/09/08 to 08/09/0/8
CHAINAGE(km.) : 28000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	8	11	15			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	13	16	23			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	11	18	21	24	39			
				6.60									
7.00													
				7.50	SPT	14	19	23	29	42			
			Hard Silty Clay	8.10									
8.00													
9.00				9.00	SPT	18	23	26	33	49			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 07/08/08 to 09/08/0/8
CHAINAGE(km.) : 28000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**16**	**24**	**28**	**39**	**52**			
11.00				**11.10**									
12.00				**12.00**	**SPT**	**14**	**19**	**25**	**31**	**44**			
13.00													
14.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 09/09/08 to 10/09/0/8
CHAINAGE(km.) : 29000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.60m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	9	11	16			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	7	10	13	16	23			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	11	14	17	23	31			
				6.60									
7.00													
				7.50	SPT	14	19	23	28	42			
				8.10									
8.00			Hard Silty Clay										
9.00				9.00	SPT	19	23	27	33	50			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	09/08/08 to 10/08/0/8
CHAINAGE(km.) :	29000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.60m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**18**	**23**	**31**	**37**	**54**			
11.00				**11.10**									
12.00				**12.00**	**SPT**	**21**	**28**	**34**	**42**	**62**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 11/09/08 to 12/09/0/8
CHAINAGE(km.) : 30000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.90m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	6	9	11	15			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	10	13	15	23			
				5.10									
5.00													
			Very Stiff Silty Clay										
6.00				6.00	SPT	14	15	19	22	34			
				6.60									
7.00			Hard Silty Clay										
				7.50	SPT	7	15	17	19	32			
				8.10									
8.00													
			Very Stiff Silty Clay										
9.00				9.00	SPT	11	13	17	20	30			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -KAnpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	11/08/08 to 12/08/0/8
CHAINAGE(km.) :	30000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.90m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**18**	**21**	**26**	**39**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**18**	**19**	**23**	**25**	**42**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 11/09/08 to 12/09/0/8
CHAINAGE(km.) : 31000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	10	13	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	6	7	11	15	18			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	9	11	10	14	21			
				6.60									
7.00													
				7.50	SPT	10	13	12	19	25			
				8.10									
8.00													
9.00				9.00	SPT	11	14	17	20	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 11/08/08 to 12/08/0/8
CHAINAGE(km.) : 31000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.10m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
			Very Stiff Silty Clay	**10.50**	**SPT**	**9**	**13**	**15**	**21**	**28**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**11**	**14**	**19**	**25**	**33**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 12/09/08 to 13/09/0/8
CHAINAGE(km.) : 32000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	10	14	19			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00			Very Stiff Silty Clay										
				4.50	SPT	11	14	15	19	29			
				5.10									
5.00													
6.00				6.00	SPT	10	16	19	25	35			
				6.60									
7.00													
			Hard Silty Clay	7.50	SPT	13	15	21	26	36			
				8.10									
8.00													
9.00				9.00	SPT	12	18	20	26	38			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 12/08/08 to 13/08/0/8
CHAINAGE(km.) : 32000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.70m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**15**	**19**	**21**	**30**	**40**			
11.00				**11.10**									
12.00				**12.00**	**SPT**	**18**	**21**	**26**	**35**	**47**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 13/09/08 to 14/09/0/8
CHAINAGE(km.) : 33000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	7	7	11	14			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	10	13	15	23			
				5.10									
5.00													
6.00			Very Stiff Silty Clay	6.00	SPT	13	12	16	20	28			
				6.60									
7.00													
				7.50	SPT	13	15	14	21	29			
				8.10									
8.00													
9.00			Hard Silty Clay	9.00	SPT	15	16	19	23	35			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Etawah Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 13/08/08 to 14/08/0/8
CHAINAGE(km.) : 33000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 6.20m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**17**	**20**	**33**	**37**			
11.00				**11.10**									
12.00				**12.00**	**SPT**	**18**	**19**	**23**	**35**	**42**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 1 OF 3
LOCATION :	DATE : 13/09/08 to 23/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	3	6	10	16	16			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	9	11	23	20			
				5.10									
5.00													
6.00				6.00	SPT	11	10	14	20	24			
				6.60									
7.00													
			Very Stiff Silty Clay	7.50	SPT	12	15	15	25	30			
				8.10									
8.00													
9.00				9.00	UDS								
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 2 OF 3
LOCATION :	DATE : 18/09/08 to 23/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
			Very Stiff Silty Clay	**10.50**	**SPT**	**16**	**18**	**17**	**28**	**35**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**14**	**13**	**19**	**27**	**32**			
13.00			**Very Stiff Silty Clay**	**12.60**									
				13.50	**SPT**	**16**	**14**	**21**	**31**	**35**			
14.00			**Hard Silty Clay**	**14.10**									
15.00				**15.00**	**SPT**	**18**	**19**	**22**	**35**	**41**			
16.00				**15.60**									
				16.50	**SPT**	**15**	**20**	**18**	**33**	**38**			
17.00				**17.10**									
18.00				**18.00**	**SPT**	**18**	**21**	**19**	**36**	**40**			
19.00				**18.60**									
				19.50	**SPT**	**19**	**20**	**24**	**35**	**44**			
20.00				**20.10**									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 3 OF 3
LOCATION :	DATE : 18/09/08 to 23/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	21	22	24	36	46			
				21.60									
22.00													
				22.50	SPT	20	21	23	34	44			
				23.10									
23.00													
24.00				24.00	SPT	22	24	26	33	50			
				24.60									
			Hard Silty Clay										
25.00													
				25.50	SPT	21	23	25	34	48			
				26.10									
26.00													
27.00				27.00	SPT	25	26	24	31	50			
				27.60									
28.00													
				28.50	SPT	24	23	25	33	48			
				29.10									
29.00													
30.00				30.00	SPT	21	24	30	36	54			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1A	SHEET NO. : 1 OF 4
LOCATION :	DATE : 18/09/08 to 23/09/08
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
31.00				31.50	SPT	23	26	29	35	54			
				32.10									
32.00			Hard Silty Clay										
				33.00	SPT	25	26	27	37	53			
				33.60									
33.00													
34.00				34..50	SPT	27	25	30	36	55			
				35.10									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 1 OF 3
LOCATION :	DATE : 13/09/08 to 16/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	11	10	13	21			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	9	10	14	19			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	11	14	15	19	29			
				6.60									
7.00													
				7.50	SPT	10	15	17	21	32			
				8.10									
8.00													
9.00				9.00	UDS								
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 2 OF 3
LOCATION :	DATE : 13/09/08 to 16/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	12	16	15	24	31			
11.00			Very Stiff Silty Clay	11.10									
12.00				12.00	SPT	15	18	20	26	38			
13.00				12.60									
				13.50	SPT	14	15	23	28	38			
14.00				14.10									
15.00			Hard Silty Clay	15.00	SPT	17	19	20	30	39			
16.00				15.60									
				16.50	SPT	16	20	21	33	41			
17.00				17.10									
18.00				18.00	SPT	14	18	20	36	38			
19.00				18.60									
				19.50	SPT	17	19	21	40	40			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 2B	SHEET NO. : 3 OF 3
LOCATION :	DATE : 13/09/08 to 16/09/0/8
CHAINAGE(km.) : 34000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 1.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00				21.00	SPT	16	20	23	37	43			
				21.60									
22.00													
				22.50	SPT	14	16	15	29	31			
				23.10									
23.00													
24.00				24.00	SPT	16	20	23	36	43			
			Hard Silty Clay	24.60									
25.00													
				25.50	SPT	19	26	24	40	50			
				26.10									
26.00													
27.00				27.00	SPT	20	25	28	39	53			
				27.60									
28.00													
				28.50	SPT	17	24	28	40	52			
				29.10									
29.00													
30.00				30.00	SPT	19	25	29	41	54			

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 15/09/08 to 16/09/0/8
CHAINAGE(km.) : 35000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	4	9	13	13			
2.00			Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	9	13	15	19	28			
5.00				5.10									
6.00				6.00	SPT	12	12	17	20	29			
7.00			Very Stiff Silty Clay	6.60									
				7.50	SPT	13	16	15	21	31			
8.00				8.10									
9.00				9.00	SPT	12	15	19	24	34			
10.00			Hard Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	15/08/08 to 16/08/0/8
CHAINAGE(km.) :	35000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.40m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**14**	**17**	**18**	**26**	**35**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**16**	**18**	**21**	**30**	**39**			
13.00			BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.										
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Project----- Chkd. By : -- Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 19/09/08 to 21/09/08
CHAINAGE(km.) : 36000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	7	9	13	16	22			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	11	10	15	20	25			
				5.10									
5.00			Very Stiff Silty Clay										
6.00				6.00	SPT	10	13	13	23	26			
				6.60									
7.00													
				7.50	SPT	9	12	16	21	28			
				8.10									
8.00													
9.00				9.00	UDS								
				9.50									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 3 OF 3
LOCATION :	DATE : 19/09/08 to 21/09/08
CHAINAGE(km.) : 36000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	11	13	15	24	28			
11.00			Very Stiff Silty Clay	11.10									
12.00				12.00	SPT	15	19	21	25	40			
13.00				12.60									
				13.50	SPT	13	19	28	30	47			
14.00				14.10									
15.00				15.00	SPT	15	17	20	26	37			
16.00			Hard Silty Clay	15.60									
				16.50	SPT	19	23	29	33	52			
17.00				17.10									
18.00				18.00	SPT	18	21	26	37	47			
19.00				18.60									
				19.50	SPT	14	19	24	30	43			
20.00				20.10									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 30.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project -----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 4
LOCATION :	DATE : 19/09/08 to 21/09/08
CHAINAGE(km.) : 36000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
21.00			Hard Silty Clay	21.00	SPT	16	21	29	39	50			
22.00				21.60									
				22.50	SPT	13	17	29	42	46			
23.00				23.10									
24.00				24.00	SPT	18	23	28	36	51			
				24.60									

SPT N =STANDARD PENETRATION TEST VALUE
CR = CORE RECOVERY
RQD = ROCK QUALITY DESIGNATION
DS = DISTURBED SOIL SAMPLE
UDS = UNDISTURBED SOIL SAMPLE
VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 23/09/08 to 24/09/08
CHAINAGE(km.) : 38000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	7	10	13	17			
				2.10									
2.00			Very Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	9	11	15	19	26			
				5.10									
5.00													
6.00				6.00	SPT	8	10	13	16	23			
				6.60									
7.00													
				7.50	SPT	11	13	16	20	29			
				8.10									
8.00													
9.00				9.00	SPT	14	18	23	23	41			
				9.60									
			Hard Silty Clay										
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 23/09/08 to 24/090/8
CHAINAGE(km.) : 38000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.40m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**16**	**21**	**28**	**37**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**14**	**19**	**23**	**30**	**42**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 22/09/08 to 22/09/08
CHAINAGE(km.) : 39000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.60m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00			Stiff Silty Clay	1.50	SPT	4	6	6	9	12			
2.00				2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	6	9	11	13	20			
5.00			Very Stiff Silty Clay	5.10									
6.00				6.00	SPT	8	11	15	19	26			
7.00				6.60									
				7.50	SPT	9	15	19	23	34			
8.00			Hard Silty Clay	8.10									
9.00				9.00	SPT	13	19	23	29	42			
10.00				9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation -Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 2 OF 2
LOCATION :	DATE : 22/09/08 to 22/090/8
CHAINAGE(km.) : 39000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.60m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**19**	**21**	**26**	**37**	**47**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**14**	**19**	**28**	**32**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 22/09/08 to 22/09/08
CHAINAGE(km.) : 40000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.60m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	6	6	8	12			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
			Stiff Silty Clay										
4.00													
				4.50	SPT	5	7	7	11	14			
				5.10									
5.00													
6.00				6.00	SPT	6	8	10	13	18			
				6.60									
7.00													
			Very Stiff Silty Clay	7.50	SPT	9	11	15	18	26			
				8.10									
8.00													
9.00				9.00	SPT	11	13	18	22	31			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	22/09/08 to 22/090/8
CHAINAGE(km.) :	40000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	4.60m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**13**	**18**	**20**	**24**	**38**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**12**	**15**	**19**	**23**	**34**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 24/09/08 to 25/09/08
CHAINAGE(km.) : 41000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.80m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	8	10	12	18			
				2.10									
2.00													
			Very Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	8	11	16	19	27			
				5.10									
5.00													
6.00				6.00	SPT	11	16	21	29	37			
				6.60									
7.00													
				7.50	SPT	14	19	21	29	42			
				8.10									
8.00													
			Hard Silty Clay										
9.00				9.00	SPT	18	23	29	37	52			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	24/09/08 to 25/090/8
CHAINAGE(km.) :	41000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.80m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**18**	**29**	**33**	**-**	**62**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**14**	**21**	**26**	**32**	**47**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
--

Prepd. By:
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CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 25/09/08 to 26/09/08
CHAINAGE(km.) : 42000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 3.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	5	8	10	12	18			
2.00			Very Stiff Silty Clay	2.10									
3.00				3.00	UDS								
4.00				3.50									
				4.50	SPT	4	6	9	10	15			
5.00				5.10									
6.00			Stiff Silty Clay	6.00	SPT	5	7	8	11	15			
7.00				6.60									
				7.50	SPT	6	9	10	18	19			
8.00				8.10									
9.00				9.00	SPT	5	7	10	13	17			
10.00			Very Stiff Silty Clay	9.60									

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	25/09/08 to 26/090/8
CHAINAGE(km.) :	42000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	3.50m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	SPT	6	9	10	13	19			
				11.10									
11.00			Very Stiff Silty Clay										
12.00			Hard Silty Clay	12.00	SPT	11	14	19	20	33			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By : --

Prepd. By: ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 07/09/08 to 07/09/08
CHAINAGE(km.) : 43000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 5.60m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	6	10	17	27	27			
				2.10									
2.00													
3.00				3.00	UDS								
				3.50									
			Very Stiff Silty Clay										
4.00													
				4.50	SPT	8	12	15	27	27			
				5.10									
5.00													
6.00				6.00	SPT	7	12	16	22	28			
				6.60									
7.00													
				7.50	SPT	9	17	20	26	37			
				8.10									
8.00													
			Hard Silty Clay										
9.00				9.00	SPT	10	14	19	24	33			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**

PROJECT : Geotechnical Investigation -Kanpur Bypass

BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	07/09/08 to 07/090/8
CHAINAGE(km.) :	43000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	5.60m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
				10.50	**SPT**	**10**	**14**	**18**	**24**	**32**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**12**	**16**	**20**	**26**	**36**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE

CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50 Chkd. By : Prepd. By:

Project----- -- ****

CLIENT : **DFCCIL**	
PROJECT : Geotechnical Investigation - Kanpur Bypass	
BORE HOLE NO. : 1	SHEET NO. : 1 OF 2
LOCATION :	DATE : 26/09/08 to 27/09/08
CHAINAGE(km.) : 44000	METHOD : ROTARY DRILLING
GROUND R. L. :	CASING : 150mm
GROUND W. T. : 4.50m	

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
1.00													
				1.50	SPT	4	4	6	10	10			
				2.10									
2.00			Stiff Silty Clay										
3.00				3.00	UDS								
				3.50									
4.00													
				4.50	SPT	4	7	6	6	13			
				5.10									
5.00													
6.00				6.00	SPT	6	8	11	13	19			
				6.60									
7.00													
				7.50	SPT	6	10	13	16	23			
				8.10									
8.00			Very Stiff Silty Clay										
9.00				9.00	SPT	9	11	17	23	28			
				9.60									
10.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE	SCALE : 1: 50 Project -----	Chkd. By : --	Prepd. By: ****

CLIENT : **DFCCIL**			
PROJECT : Geotechnical Investigation -Kanpur Bypass			
BORE HOLE NO. :	1	SHEET NO. :	2 OF 2
LOCATION :		DATE :	26/09/08 to 27/090/8
CHAINAGE(km.) :	44000	METHOD :	ROTARY DRILLING
GROUND R. L. :		CASING :	150mm
GROUND W. T. :	4.50m		

DEPTH (m.)	DIA. OF BORE HOLE	LOG.	STRATA DESCRIPTION	SAMPLE DEPTH (m)	SAMPLE TYPE	BLOWS/15cm 15	30	45	60	SPT N	C R %	RQD %	OTHER TESTS
			Very Stiff Silty Clay	**10.50**	**SPT**	**11**	**15**	**19**	**27**	**34**			
11.00			**Hard Silty Clay**	**11.10**									
12.00				**12.00**	**SPT**	**10**	**14**	**21**	**32**	**35**			
13.00													
14.00													
15.00													
16.00													
17.00													
18.00													
19.00													
20.00													

SPT N =STANDARD PENETRATION TEST VALUE RQD = ROCK QUALITY DESIGNATION UDS = UNDISTURBED SOIL SAMPLE
CR = CORE RECOVERY DS = DISTURBED SOIL SAMPLE VST = VANE SHEAR TEST

REMARK---BORE HOLE TERMINATED AT A DEPTH OF 12.00 m B.G.L.

MONARCH SURVEYORS AND CONTRACTORS PVT. LTD., PUNE

SCALE : 1: 50
Project-----

Chkd. By :
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Prepd. By:
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