GEOTECHNICAL INVESTIGATION REPORT

Consultant:

Loya associates
Consulting Engineers and Project Planners

In association with:

REC Republic Engineering Corporation (Pvt) Ltd.
Consulting Engineers, Planners & Architects

REPORT
ON TEST PIT INVESTIGATION
FOR REHABILITATION OF
EXIST LINK ROAD FROM KATHORE M9
TO NATIONAL HIGHWAY N5

Client	:	Loya Associates
Project No.	:	CES-16655
Date	:	Feb 04, 2017

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1. INTRODUCTION:

A program of Test Pit Investigation was undertaken to evaluate the Natural Subgrade material for Rehabilitation of Existing Link Road from Kathore M9 to National Highway N5 project to determine parameters for the rehabilitation of Existing Roads. Consolidated Engineering Services (Pvt) Ltd. Karachi carried out this program under an agreement with Loya Associates. The work has been executed in accordance with the scope of work, specifications and instructions provided by Loya Associates.

The field investigation was carried out in Jan 2017 and Laboratory testing was carried out in accordance with specifications.

This report presents the data of the field investigation and laboratory test results. Test Pit Logs were prepared on the basis of field investigations and laboratory test results. Test Pit Logs and Laboratory test results are presented in relevant section of the Report. The photographs of some of the excavated Test Pits are also included in Report. Based on analysis of the test results, design parameters are established and recommendations are presented.

2. PROGRAM OF INVESTIGATIONS:

The program of investigation consisted of excavation of 45 Nos Test Pits, and 5Nos Borrow Pits, Pit Logging and collection of Bulk samples for Laboratory testing. The program also included laboratory testing of Bulk samples collected during field investigation.

The details of the program of investigation executed for this project are presented in the following sections of the report.

2.1 Excavation of Test Pits and Sampling:

45 Pits and 5 Nos Borrow Pits were excavated upto 1.0m depth. The location of Test Pits shown in Fig-1.

The Natural Sub-grade layers, as revealed by excavation of Test Pits, were classified in accordance with AASHTO M-145 and Test Pits logs were prepared.

Representative bulk samples of Natural Subgrade materials were collected for onward transportation to laboratory for further testing. These samples, weighing over 50Kg, were preserved in appropriate bags.

2.2 Selection of Representative Samples:

The bulk samples collected from Test Pits were sorted out, based on visual classification, and representative sample were selected for laboratory testing.

2.3 Laboratory Testing:

The laboratory tests were conducted, on selected representative samples, to determine their physical and engineering characteristics. The laboratory tests included following:

- Gradation Analysis in accordance with AASHTO T-27 & T11.
- Plasticity Index Test in accordance with AASHTO T-89 & T-90.
- Classification in accordance with AASHTO M-145.
- Moisture Density Relation Test in accordance with AASHTO T-180.
- CBR Test in accordance with AASHTO T-193.

3. RESULTS OF INVESTIGATIONS:

The details of the Results of investigation and Recommendations are presented in the following sections of the report.

The Test Pit Logs are included in Appendix-1, while Laboratory Test Results and Summary of Laboratory Test Results are included in Appendix-2.

The results of investigation for existing Natural Subgrade are presented hereunder:

3.1. Classification of Natural Subgrade:

Based on investigation results, the existing Natural Subgrade Materials, as encountered at each location, have been classified, in accordance with AASHTO M-145, as presented in Test Pit Logs and Summary of the Test. The classification of Subgrade materials with their locations is presented hereunder:

Test Pit #	**AASHTO Soil Classification**
38 & 42	A-1-a
07, 14, 15, 19, 24, 30, 32, 35, 43, 44 & 45	A-1-b
02, 03, 04, 05, 06, 07, 08, 09, 25, 26, 28, 29, 30, 31, 32, 34, 37, 39 & 40	A-2-4
27 & 41	A-3
01, 10, 11, 12, 33 & 36	A-4
Borrow Pit #	**AASHTO Soil Classification**
2	A-1-a
4	A-1-b
1 & 3	A-2-4
5	A-4

3.2. Compaction Characteristics:

To determine compaction characteristics of Natural Subgrade, Moisture-Density Relation (Modified Method) Tests were conducted in the laboratory, in accordance with AASHTO T-180. Modified Proctor Tests were conducted on selected representative samples.

The test results and Summary of Test Results are included in Appendix-2. The following is the range of values for Modified Max. Dry Density and Optimum Moisture for various Natural Subgrade materials:

TEST PITS			
Material Designation	**AASHTO Classification**	**Modified Max. Dry Density (MDD) (gm/cc)**	**Optimum Moisture (%)**
Natural Subgrade	A–1–a	4.9	2.132
	A–1–b	5.2	2.055
	A–2–4	6.9	2.101
	A-3	9.4	1.804
	A-4	9.3	1.965
BORROW PITS			
Natural Subgrade	A-1-a	5.5	2.263
	A-1-b	6.2	2.219
	A-4	8.0	2.111

3.3 CBR:

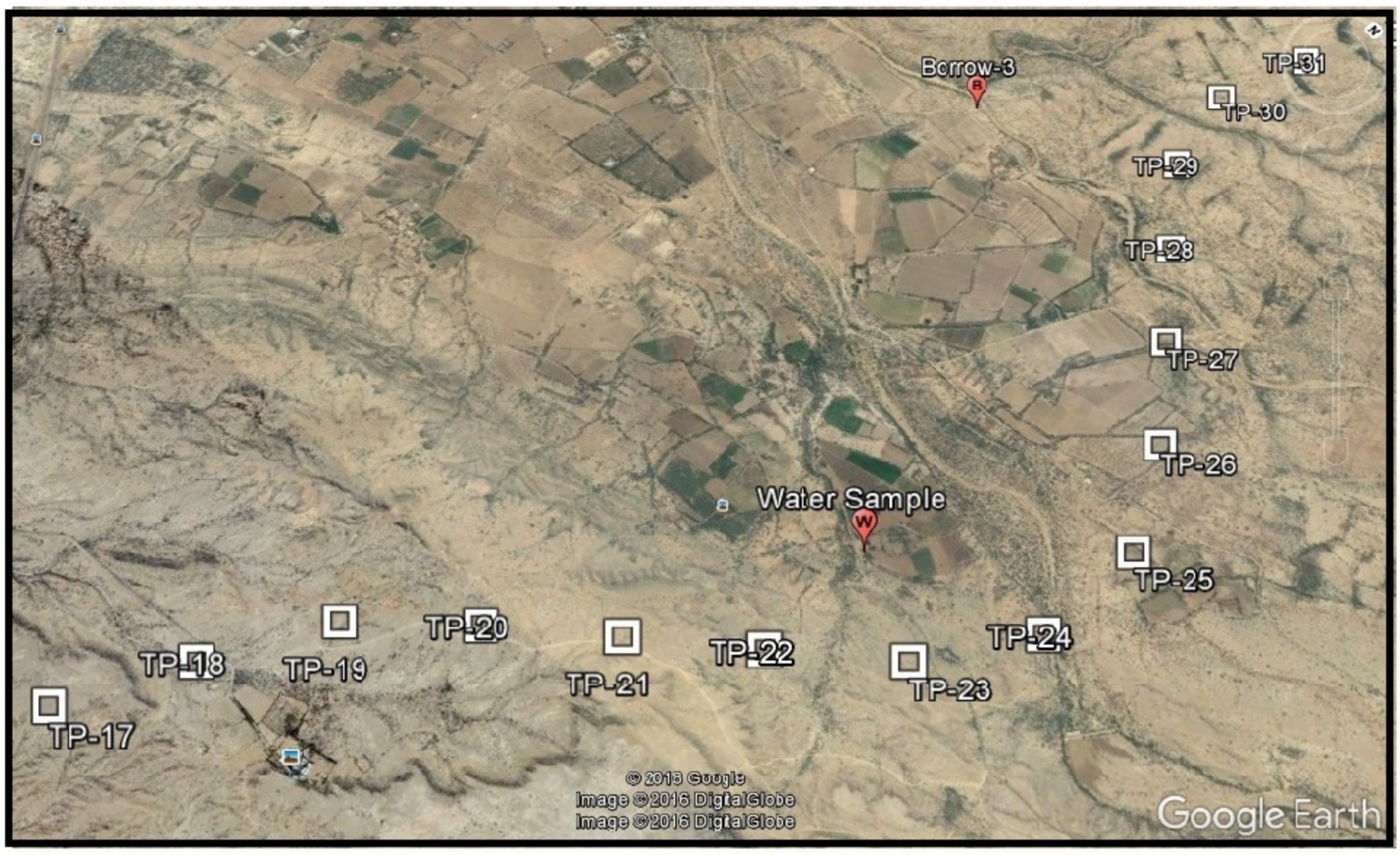
The CBR value of Natural Subgrade was determined by conducting laboratory tests on selected representative samples, in accordance with AASHTO T-193. Soaked CBR value was determined.

The test results and Summary of Laboratory test Results are included in Appendix-2.

The following is the range of values of CBR at 95% of MDD.

Test Pits		
Material Designation	**Description**	**at 95 % of MDD**
Natural Subgrade	A–1–a	84
	A-1-b	75
	A–2–4	29
	A-3	25
	A-4	6
Borrow Pits		
Material Designation	**Description**	**at 95 % of MDD**
Natural Subgrade	A-1-a	81
	A-1-b	55
	A-4	12

FIG-1 LOCATION OF TEST PITS



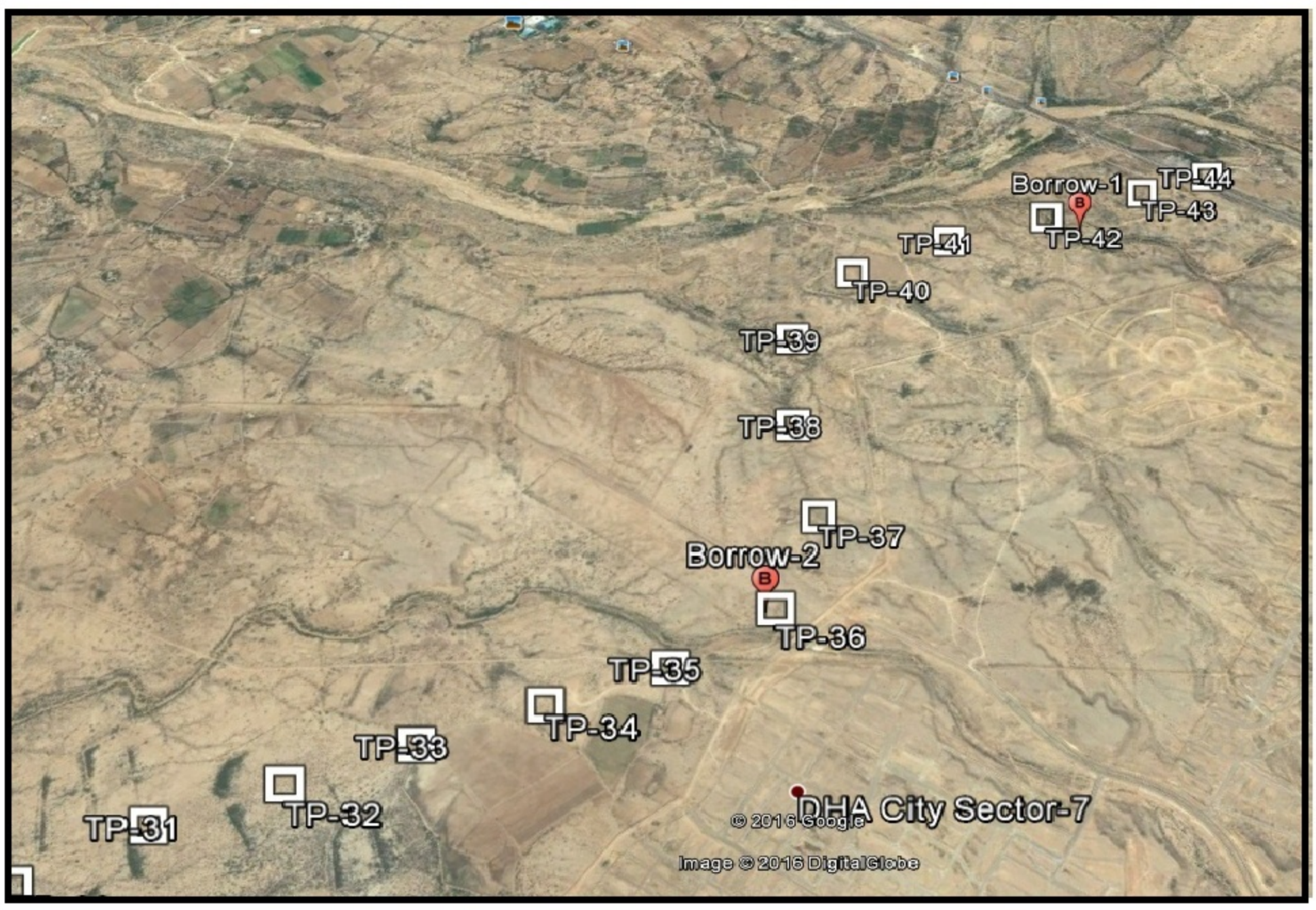
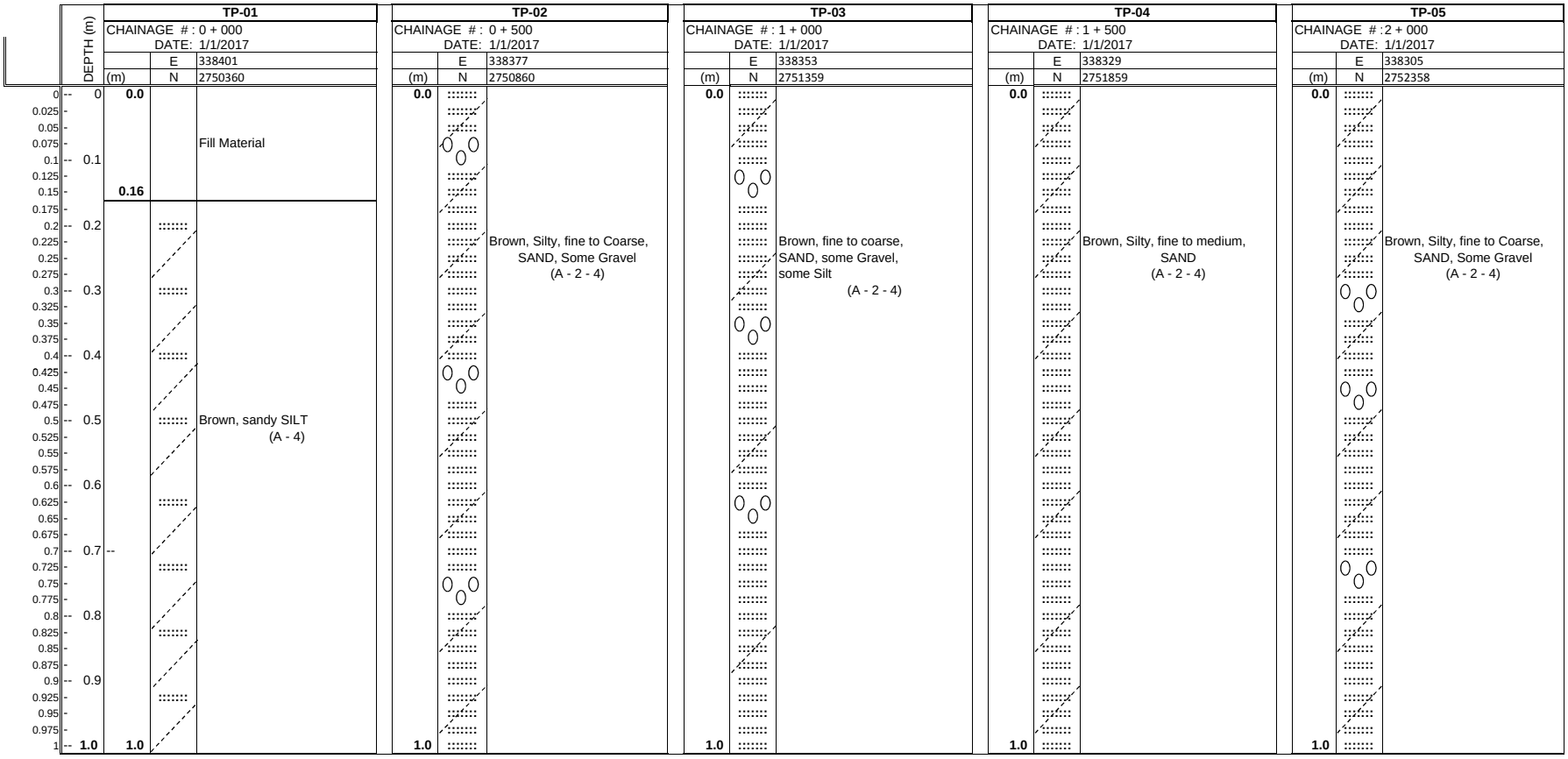


FIG-1: LOCATION OF TEST PITS

APPENDIX-1

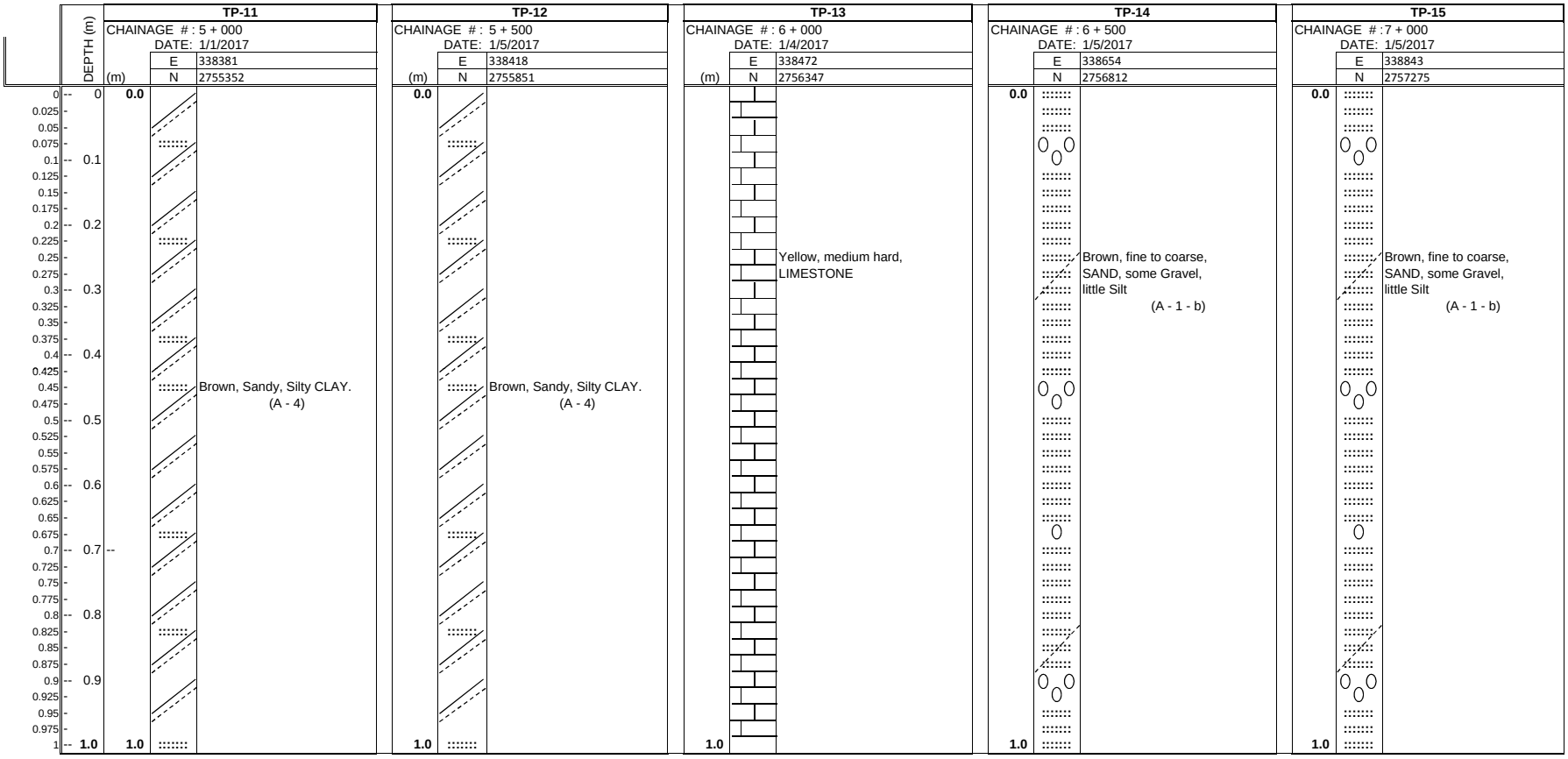
Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



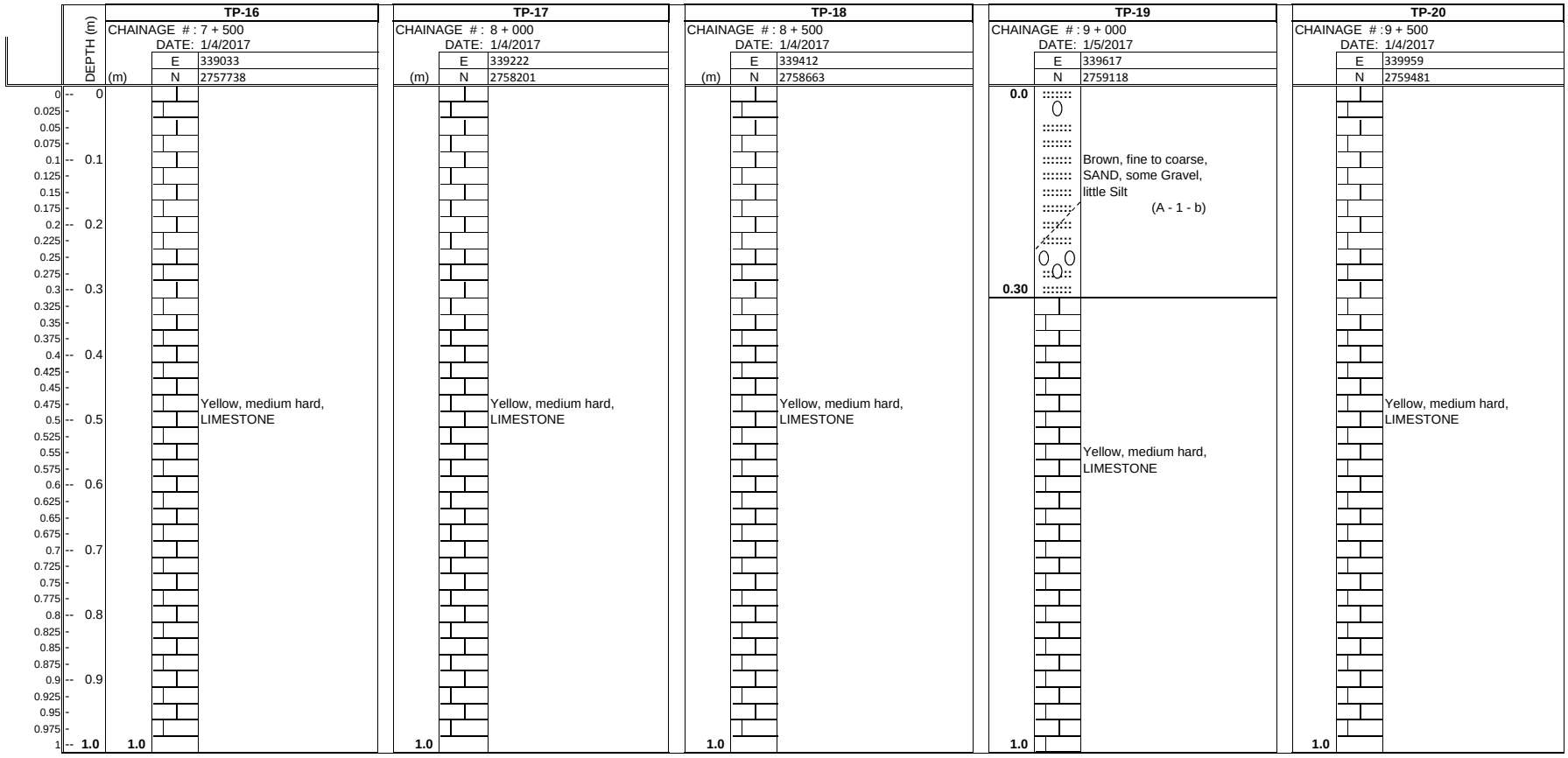
Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5

DEPTH (m)	TP-06	TP-07	TP-08	TP-09	TP-10
	CHAINAGE # : 2 + 500 DATE: 1/1/2017	CHAINAGE # : 3 + 000 DATE: 1/1/2017	CHAINAGE # : 3 + 500 DATE: 1/1/2017	CHAINAGE # : 4 + 000 DATE: 1/1/2017	CHAINAGE # : 4 + 500 DATE: 1/1/2017
	E 338281	E 338257	E 338270	E 338307	E 338344
(m)	N 2752858	N 2753357	N 2753856	N 2754355	N 2754853
0	0.0	0.0	0.0	0.0	0.0
0.1		Brown, Silty, fine to medium, SAND (A - 2 - 4)			
0.3		0.30	Brown, Silty, fine to Coarse, SAND, Some Gravel (A - 2 - 4)	Brown, Silty, fine to medium, SAND (A - 2 - 4)	Brown, Silty, fine SAND (A - 4)
0.4	Brown, Silty, fine to Coarse, SAND, Some Gravel (A - 2 - 4)				
0.7		Brown, , fine to coarse, SAND, some Gravel, little Clayey Silt (A - 1 - b)			
1.0	1.0	1.0	1.0	1.0	1.0

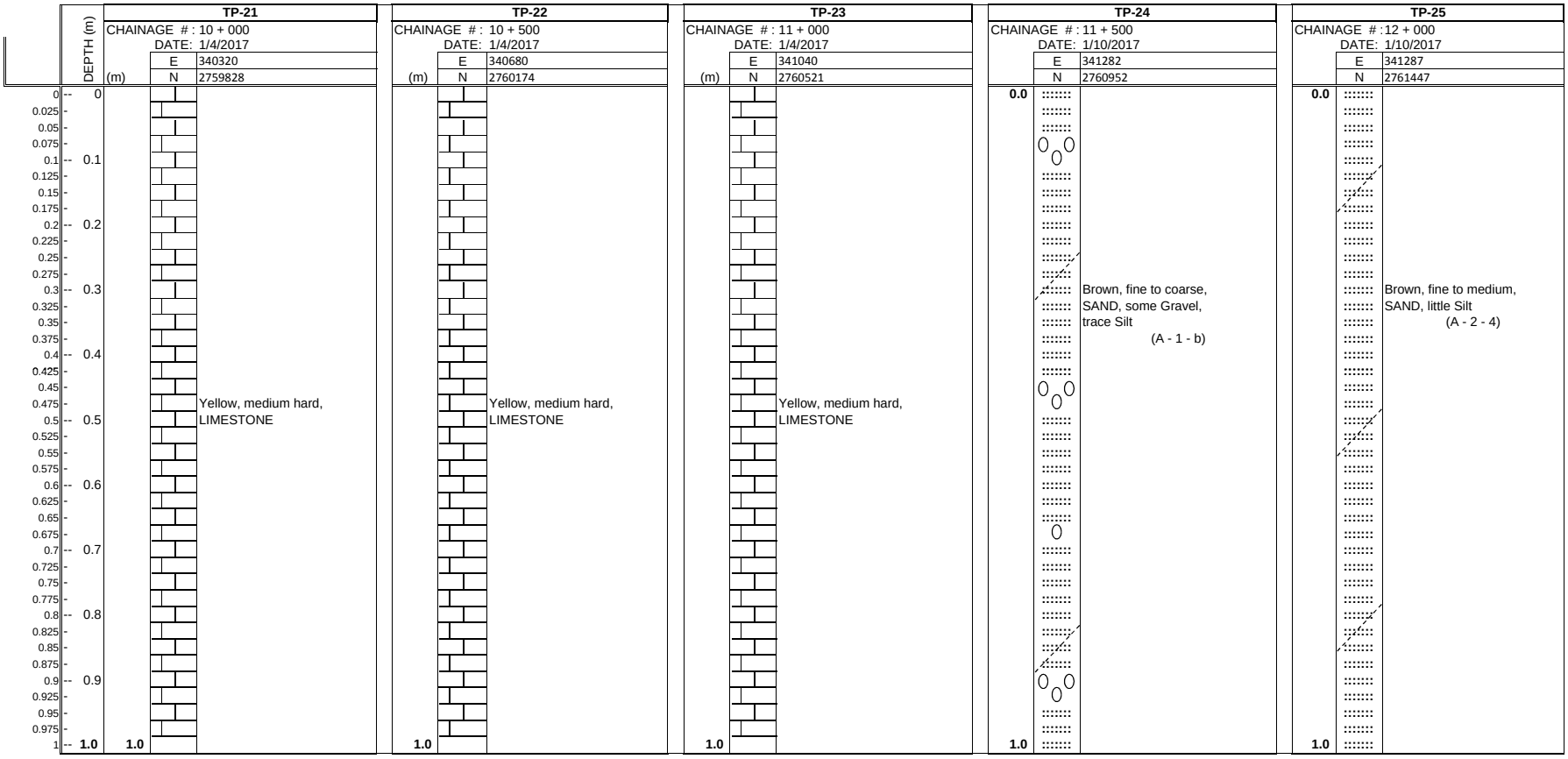
Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5

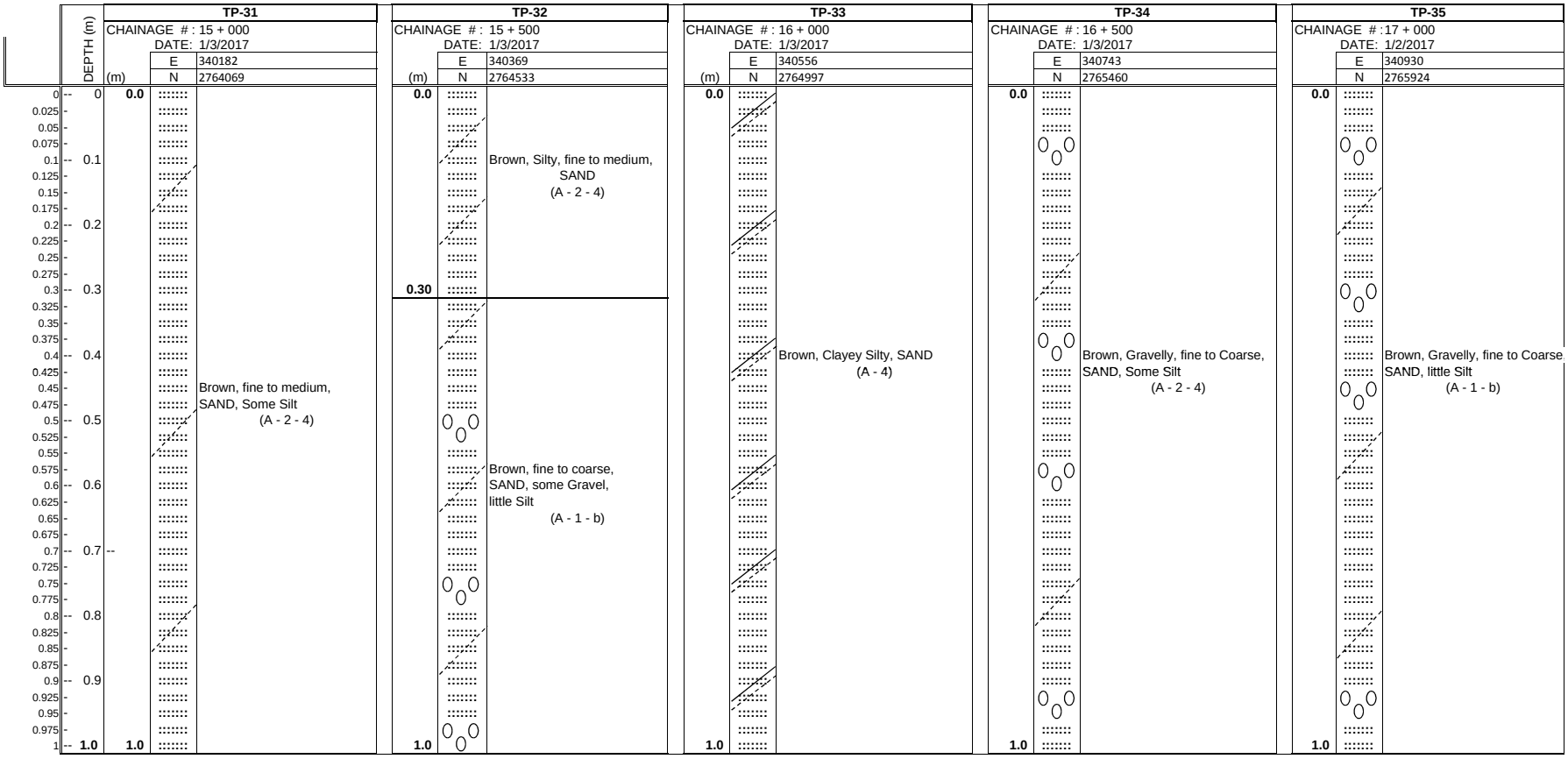


Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5

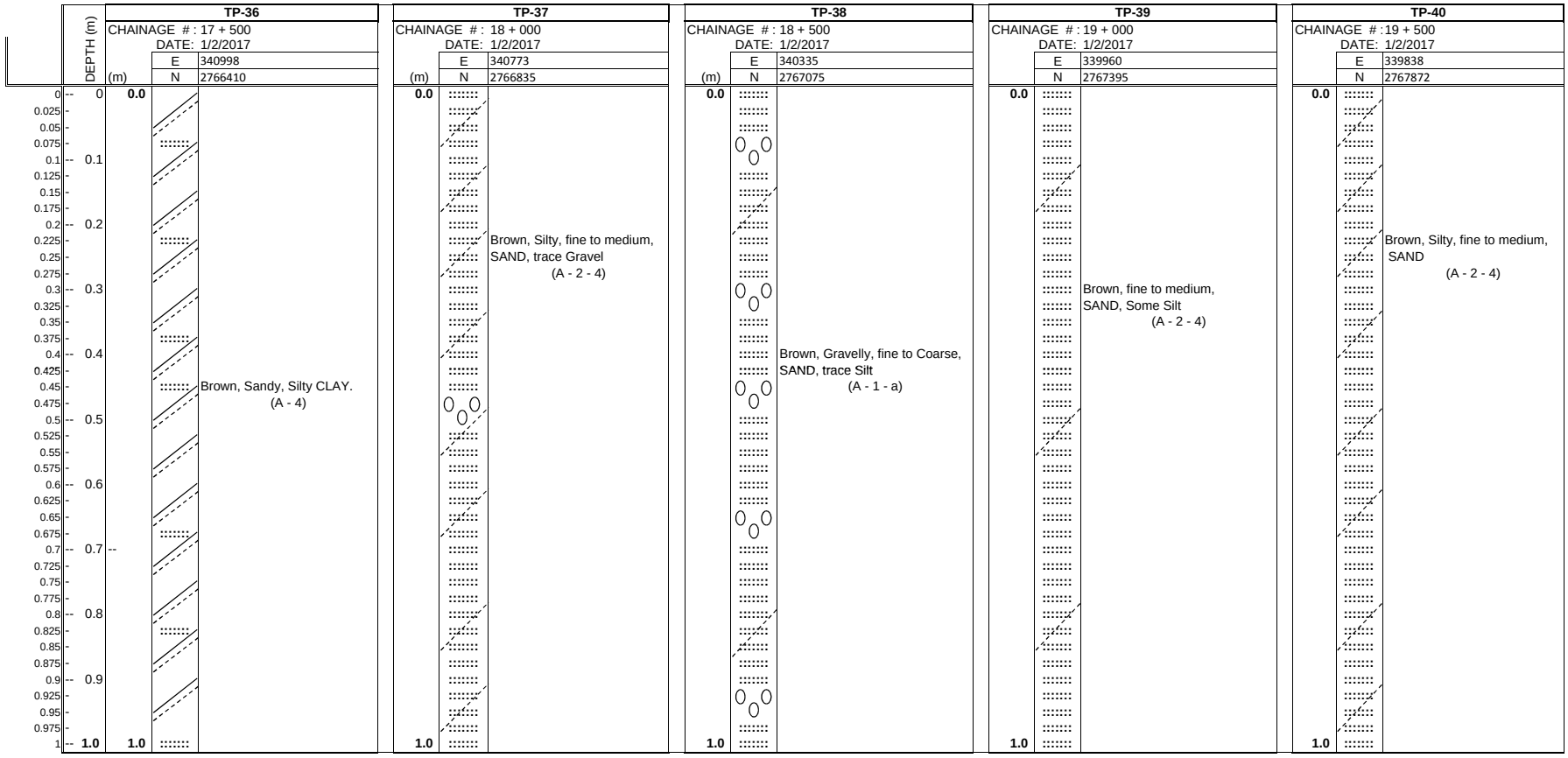
DEPTH (m)	TP-26	TP-27	TP-28	TP-29	TP-30
	CHAINAGE # : 12 + 500	CHAINAGE # : 13 + 000	CHAINAGE # : 13 + 500	CHAINAGE # : 14 + 000	CHAINAGE # : 14 + 500
	DATE: 1/10/2017	DATE: 1/10/2017	DATE: 1/10/2017	DATE: 1/10/2017	DATE: 1/3/2017
	E 341060	E 340767	E 340474	E 340188	E 340065
	(m) N 2761888	(m) N 2762293	(m) N 2762698	N 2763108	N 2763587
0	0.0	0.0	0.0	0.0	0.0
0.025					
0.05					
0.075					Brown, fine to medium,
0.1	0.1				SAND, Some Silt
0.125					(A - 2 - 4)
0.15					
0.175					
0.2	0.2				0.20
0.225					
0.25					
0.275					
0.3	0.3		Brown, fine SAND,	Brown, fine to medium,	Brown, fine to medium,
0.325			trace Silt	SAND, Some Silt	SAND, Some Silt
0.35			(A - 3)	(A - 2 - 4)	(A - 2 - 4)
0.375					
0.4	0.4				
0.425					
0.45					
0.475					
0.5	0.5				Brown, fine to coarse,
0.525					SAND, some Gravel,
0.55					trace Silt
0.575					(A - 1 - b)
0.6	0.6				
0.625					
0.65					
0.675					
0.7	0.7				
0.725					
0.75					
0.775					
0.8	0.8				
0.825					
0.85					
0.875					
0.9	0.9				
0.925					
0.95					
0.975					
1	1.0	1.0	1.0	1.0	1.0

Brown, , fine to medium, SAND, little Silt (A - 2 - 4)

Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



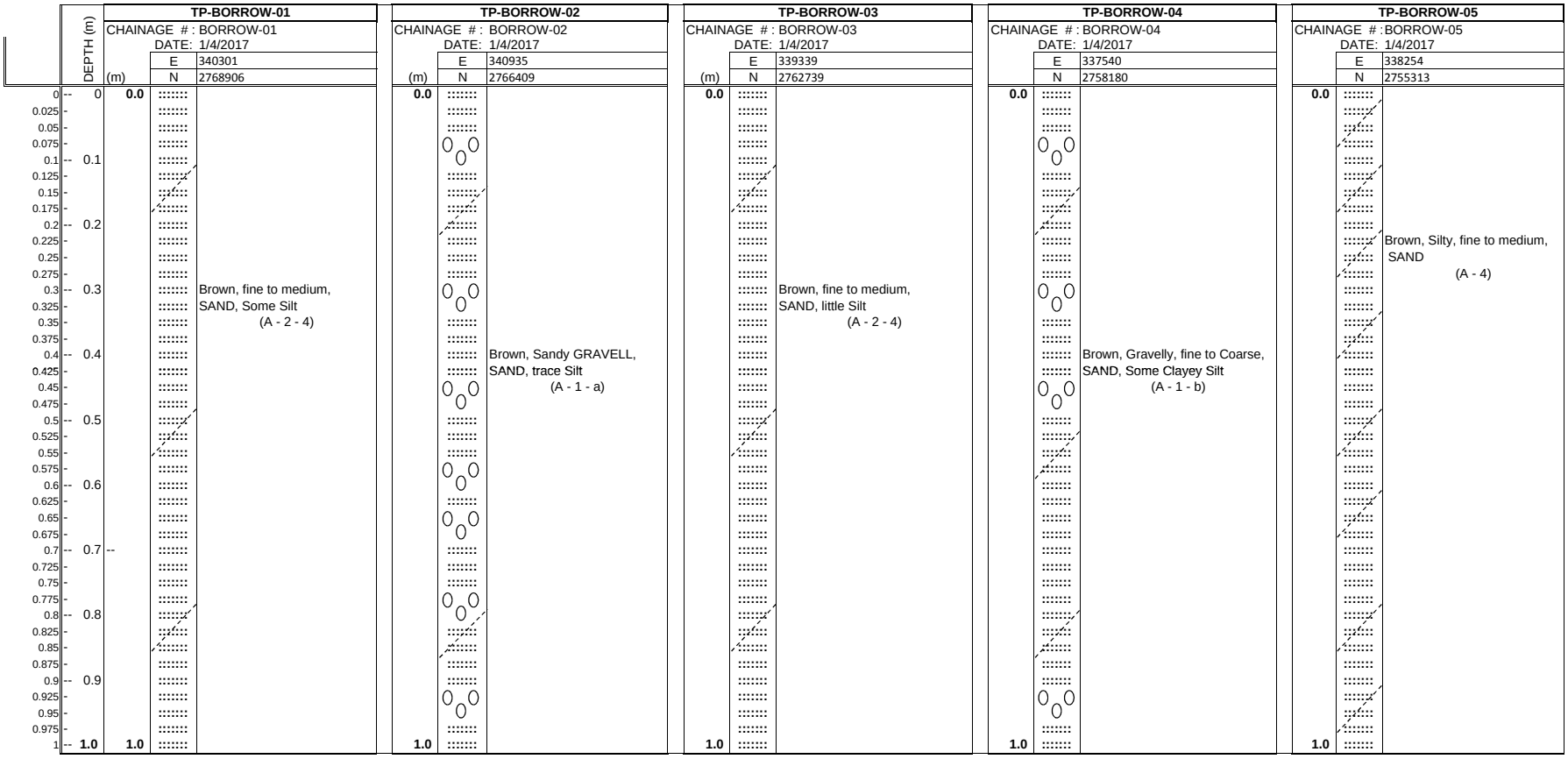
Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5

DEPTH (m)	TP-41	TP-42	TP-43	TP-44	TP-45
	CHAINAGE # : 20 + 000	CHAINAGE # : 20 + 500	CHAINAGE # : 21 + 000	CHAINAGE # : 21 + 347.03	CHAINAGE # :
	DATE: 1/2/2017	DATE: 1/2/2017	DATE: 1/2/2017	DATE: 12/31/2016	DATE: 1/10/2017
	E 339988	E 340183	E 340377	E 340512	E 338299
	N 2768345	N 2768806	N 2769267	N 2769586	N 2752566
0	0.0	0.0	0.0	0.0	0.0 Asphalt
0.1					0.14 Water Bound Maccadum (2 inch Down Limestone Crush)
0.2					0.24
0.3	Brown, fine SAND, trace Silt (A - 3)		Brown, fine to coarse, SAND, little Gravel, Some Silt (A - 1 - b)		
0.4		Brown, Sandy GRAVELL, SAND, trace Silt (A - 1 - a)		Brown, Gravelly, fine to Coarse, SAND, little Silt (A - 1 - b)	
0.5					
0.6					Brown, fine to coarse, SAND, Some Gravel, trace Silt (A - 1 - b)
0.7					
0.8					
0.9					
1	1.0	1.0	1.0	1.0	1.0

Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5



APPENDIX-2

CLIENT: **Loya Associates**

PROJECT: **Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5**

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT)

SIEVE ANALYSIS

S.NO.	TEST PIT #	CHAINAGE (Km)	Alignment Coordinates		SAMPLE #	DEPTH (ft)	3"	1.5"	3/4"	3/8"	#4	#10	#16	#40	#50	#100	#200	Atterberg Limits		AASHTO Soil Classification	M.D.D gm/cc	OMC %	CBR
			Easting	Northing			75 mm	38 mm	19 mm	9.5 mm	4.75 mm	2.00 mm	1.18 mm	0.425 mm	0.300 mm	0.150 mm	0.075 mm	LL	PI				@ 95 % MDD
1	**TP-1**	0+000	338401	2750360	BS-1	0.16 - 1.0				100	96	92	89	81	79	64	52	Non-Plastic		**A - 4**			
2	**TP-2**	0+500	338377	2750860	BS-1	0.0 - 1.0			100	92	72	65	60	57	50	47	33	Non-Plastic		**A - 2 - 4**			
3	**TP-3**	1+000	338353	2751359	BS-1	0.0 - 1.0	100	96	95	89	79	72	59	49	44	33	27	Non-Plastic		**A - 2 - 4**			
4	**TP-4**	1+500	338329	2751859	BS-1	0.0 - 1.0					100	97	92	66	62	38	30	Non-Plastic		**A - 2 - 4**	6.9	2.101	29
5	**TP-5**	2+000	338305	2752358	BS-1	0.0 - 1.0			100	85	78	72	67	61	55	48	30	Non-Plastic		**A - 2 - 4**			
6	**TP-6**	2+500	338281	2752858	BS-1	0.0 - 1.0			100	97	81	75	62	59	52	48	30	Non-Plastic		**A - 2 - 4**			
7	**TP-7**	3+000	338257	2753357	DS-1	0.0 - 0.30				100	99	94	90	76	59	32	17	Non-Plastic		**A - 2 - 4**			
8		3+000	338257	2753357	BS-1	0.30 - 1.0	100	97	94	87	77	55	46	36	35	25	19	18	5	**A - 1 - b**			
9	**TP-8**	3+500	338270	2753856	BS-1	0.60 - 1.0		100	91	75	71	65	61	54	47	44	28	Non-Plastic		**A - 2 - 4**			
10	**TP-9**	4+000	338307	2754355	BS-1	0.0 - 1.0					100	98	93	69	66	43	30	Non-Plastic		**A - 2 - 4**			
11	**TP-10**	4+500	338344	2754853	BS-1	0.0 - 1.0						100	97	86	85	59	37	Non-Plastic		**A - 4**			
12	**TP-11**	5+000	338381	2755352	BS-1	0.0 - 1.0							100	99	99	82	56	28	7	**A - 4**			
13	**TP-12**	5+500	338418	2755851	BS-1	0.0 - 1.0					100	98	97	91	89	69	54	26	6	**A - 4**			
14	**TP-13**	6+000	338472	2756347	From Top Yellow LIMESTONE Exposed																		
15	**TP-14**	6+500	338654	2756812	BS-1	0.0 - 1.0	100	99	99	94	77	64	57	42	40	23	13	Non-Plastic		**A - 1 - b**			
16	**TP-15**	7+000	338843	2757275	BS-1	0.0 - 1.0	100	98	91	84	67	50	42	29	27	22	17	Non-Plastic		**A - 1 - b**	5.2	2.055	75
17	**TP-16**	7+500	339033	2757738	From Top Yellow LIMESTONE Exposed																		
18	**TP-17**	8+000	339222	2758201	From Top Yellow LIMESTONE Exposed																		
19	**TP-18**	8+500	339412	2758663	From Top Yellow LIMESTONE Exposed																		
20	**TP-19**	9+000	339617	2759118	BS-1	0.0 - 0.30	100	94	87	82	69	52	44	33	31	23	18	Non-Plastic		**A - 1 - b**			

CLIENT: **Loya Associates**

PROJECT: **Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5**

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT)

SIEVE ANALYSIS

S.NO.	TEST PIT #	CHAINAGE (Km)	Alignment Coordinates		SAMPLE #	DEPTH (ft)	3"	1.5"	3/4"	3/8"	#4	#10	#16	#40	#50	#100	#200	Atterberg Limits		AASHTO Soil Classification	M.D.D gm/cc	OMC %	CBR
			Easting	Northing			75 mm	38 mm	19 mm	9.5 mm	4.75 mm	2.00 mm	1.18 mm	0.425 mm	0.300 mm	0.150 mm	0.075 mm	LL	PI				@ 95 % MDD
21	**TP-20**	9+500	339959	2759481	From Top Yellow LIMESTONE Exposed																		
22	**TP-21**	10+000	340320	2759828	From Top Yellow LIMESTONE Exposed																		
23	**TP-22**	10+500	340680	2760174	From Top Yellow LIMESTONE Exposed																		
24	**TP-23**	11+000	341040	2760521	From Top Yellow LIMESTONE Exposed																		
25	**TP-24**	11+500	341282	2760952	BS-1	0.0 - 1.0		100	98	93	77	53	40	18	15	5	3	Non-Plastic		**A - 1 - b**			
26	**TP-25**	12+000	341287	2761447	BS-1	0.0 - 1.0						100	97	87	84	27	19	Non-Plastic		**A - 2 - 4**			
27	**TP-26**	12+500	341060	2761888	BS-1	0.0 - 1.0						100	97	92	90	28	14	Non-Plastic		**A - 2 - 4**			
28	**TP-27**	13+000	340767	2762293	BS-1	0.0 - 1.0							100	88	86	16	9	Non-Plastic		**A - 3**	9.4	1.804	25
29	**TP-28**	13+500	340474	2762698	BS-1	0.0 - 1.0						100	95	81	74	32	23	Non-Plastic		**A - 2 - 4**			
30	**TP-29**	14+000	340188	2763108	BS-1	0.0 - 1.0						100	93	82	76	38	22	Non-Plastic		**A - 2 - 4**			
31	**TP-30**	14+500	340065	2763587	DS-1	0.0 - 0.20					100	97	95	85	82	46	26	Non-Plastic		**A - 2 - 4**			
32					BS-1	0.20 - 1.0			100	94	82	65	58	44	42	16	10	Non-Plastic		**A - 1 - b**			
33	**TP-31**	15+000	340182	2764069	BS-1	0.70 - 1.0					100	97	95	89	88	50	28	Non-Plastic		**A - 2 - 4**			
34	**TP-32**	15+500	340369	2764533	DS-1	0.0 - 0.30					100	94	90	82	80	50	35	Non-Plastic		**A - 2 - 4**			
35					BS-1	0.30 - 1.0		100	98	91	78	55	47	40	39	24	19	Non-Plastic		**A - 1 - b**			
36	**TP-33**	16+000	340556	2764997	BS-1	0.0 - 1.0						100	97	92	91	62	45	22	5	**A - 4**			
37	**TP-34**	16+500	340743	2765460	BS-1	0.0 - 1.0	10	86	76	69	65	62	59	52	50	29	20	Non-Plastic		**A - 2 - 4**			
38	**TP-35**	17+000	340930	2765924	BS-1	0.0 - 0.32	100	99	90	81	67	53	47	34	32	19	14	Non-Plastic		**A - 1 - b**			
39	**TP-36**	17+500	340998	2766410	BS-1	0.0 - 1.0		100	98	89	81	73	68	63	62	58	56	32	10	**A - 4**	9.3	1.965	6
40	**TP-37**	18+000	340773	2766835	BS-1	0.0 - 0.40				100	96	94	93	91	90	59	31	Non-Plastic		**A - 2 - 4**			

CLIENT: **Loya Associates**

PROJECT: **Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5**

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT)

SIEVE ANALYSIS

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			Easting	Northing			75 mm	38 mm	19 mm	9.5 mm	4.75 mm	2.00 mm	1.18 mm	0.425 mm	0.300 mm	0.150 mm	0.075 mm	LL	PI				@ 95 % MDD
41	**TP-38**	18+500	340335	2767075	BS-1	0.0 - 1.0	100	99	95	87	67	42	28	15	14	10	8	Non-Plastic		**A - 1 - a**	4.9	2.132	84
42	**TP-39**	19+000	339960	2767395	BS-1	0.0 - 1.0							100	91	89	43	22	Non-Plastic		**A - 2 - 4**			
43	**TP-40**	19+500	339838	2767872	BS-1	0.0 - 1.0							100	96	96	50	30	Non-Plastic		**A - 2 - 4**			
44	**TP-41**	20+000	339988	2768345	BS-1	0.60 - 1.0				100	96	92	90	83	80	35	10	Non-Plastic		**A - 3**			
45	**TP-42**	20+500	340183	2768806	BS-1	0.0 - 1.0	100	75	61	44	37	30	27	24	23	13	10	Non-Plastic		**A - 1 - a**			
46	**TP-43**	21+000	340377	2769267	BS-1	0.0 - 1.0		100	96	91	83	66	56	45	43	30	25	Non-Plastic		**A - 1 - b**			
47	**TP-44**	21+347.03	340512	2769586	BS-1	0.0 - 1.0	100	94	84	76	68	62	59	46	44	19	11	Non-Plastic		**A - 1 - b**			
48	**TP-45**		338299	2752566	BS-1	0.24 - 1.0		100	99	94	79	54	34	12	10	3	2	Non-Plastic		**A - 1 - b**			
Borrow																							
49	Borrow -01		340301	2768906	BS-1	0.0 - 1.0				100	99	96	94	85	82	34	20	Non-Plastic		**A - 2 - 4**			
50	Borrow -02		340935	2766409	BS-1	0.0 - 1.0		100	86	58	38	23	18	15	15	10	8	20	5	**A - 1 - a**	5.5	2.263	81
51	Borrow -03		339339	2762739	BS-1	0.0 - 1.0					100	97	94	82	79	30	17	Non-Plastic		**A - 2 - 4**			
52	Borrow -04		337540	2758180	BS-1	0.0 - 1.0		100	91	79	66	52	46	39	38	27	23	21	5	**A - 1 - b**	6.2	2.219	55
53	Borrow -05		338254	2755313	BS-1	0.0 - 1.0					100	97	95	85	83	51	43	Non-Plastic		**A - 4**	8.0	2.111	12
Water Sample																							
54	Water Sample	Tube Well	340599	2760740																			

CLIENT: Loya Associates

PROJECT: Rehabilitation of Bridge over Malir River on Exist Link Road From Kathore M9 to National Highway N5

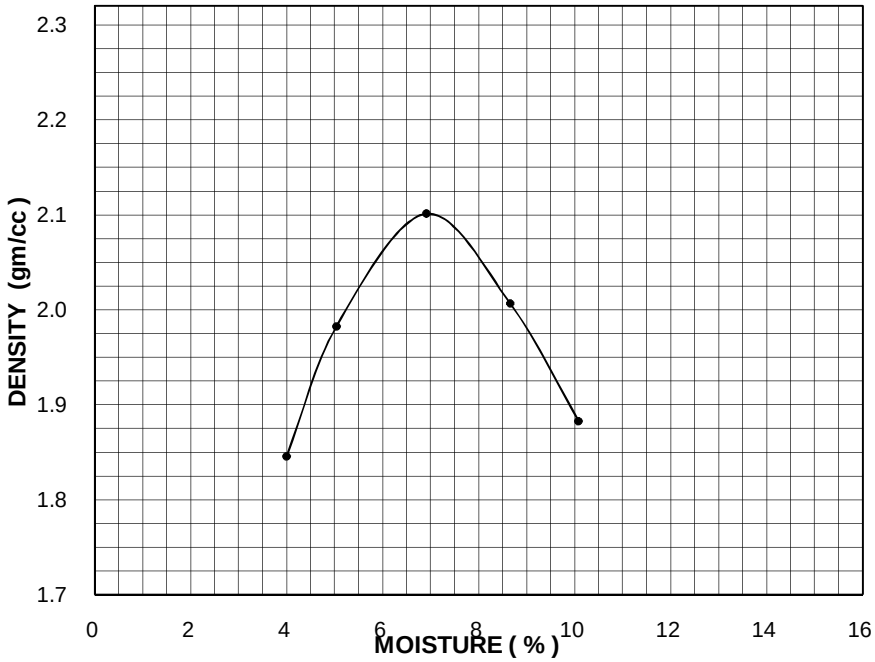
CHEMICAL TEST

S. NO.	LOCATION	SAMPLE	Alignment Coordinates		pH	SULPHATE CONTENT	CHLORIDE CONTENT	TOTAL DISOLVE SALTS (mg/ liter)
			Easting	Northing				
1	Tube Well of Farm House (Due to Sukkan Dam the water table was 30')	Water Sample	340599	2760740	7.5	123.45 mg/ liter	260 mg/ liter	1600.0

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION

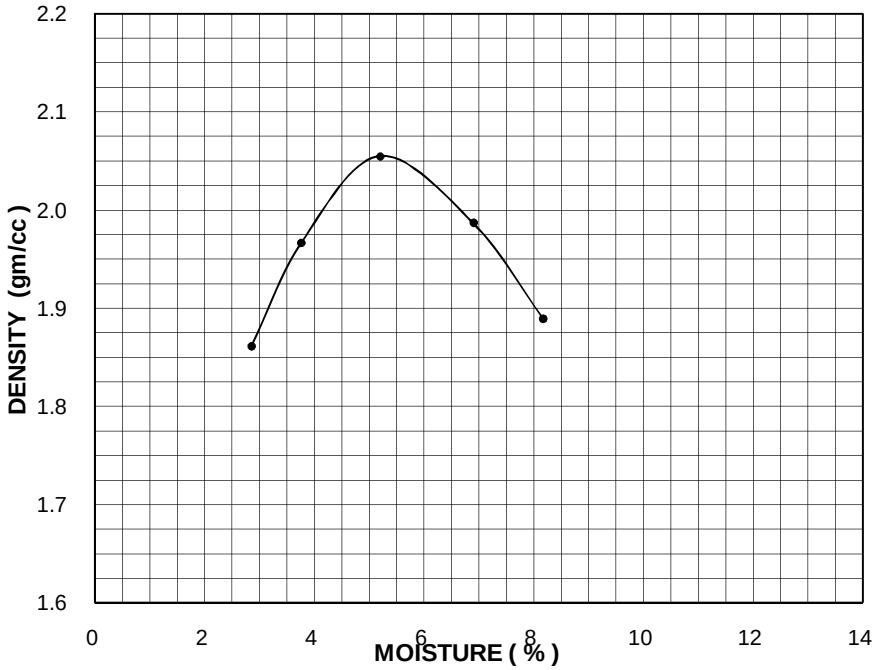


PIT No.	:	TP-04
SAMPLE :	:	BS-1
DEPTH (ft m	:	0 - 1.0
CHAINAGE	:	1 + 500
AASHTO CLASSIFICATION:		A-2-4
O.M.C	:	6.9 %
M.D.D	:	2.101 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-15

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

CHAINAGE : 7 + 000

AASHTO CLASSIFICATION: A-1-b

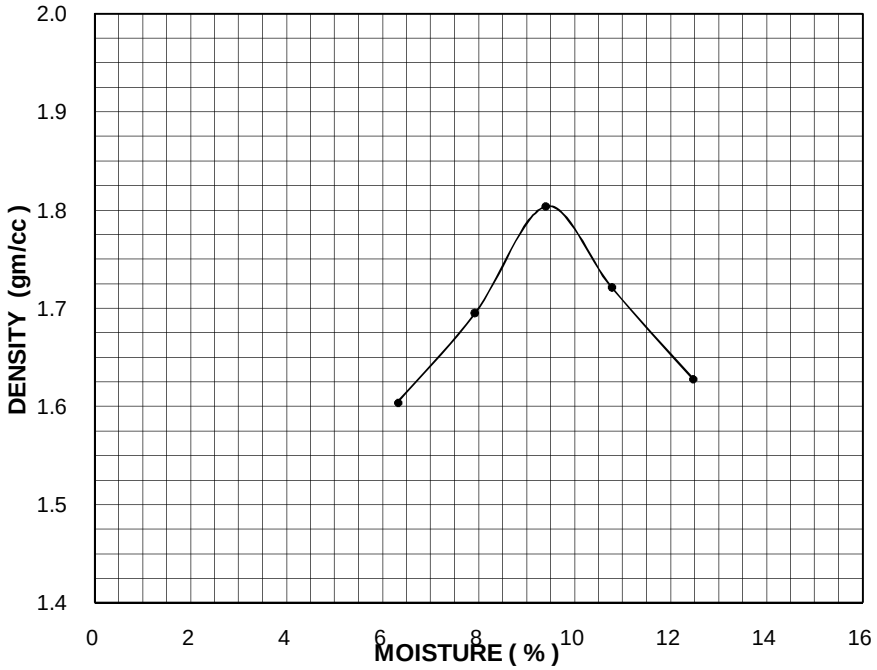
O.M.C : 5.2 %

M.D.D : 2.055 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-27

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

CHAINAGE : 13 + 000

AASHTO CLASSIFICATION: A-3

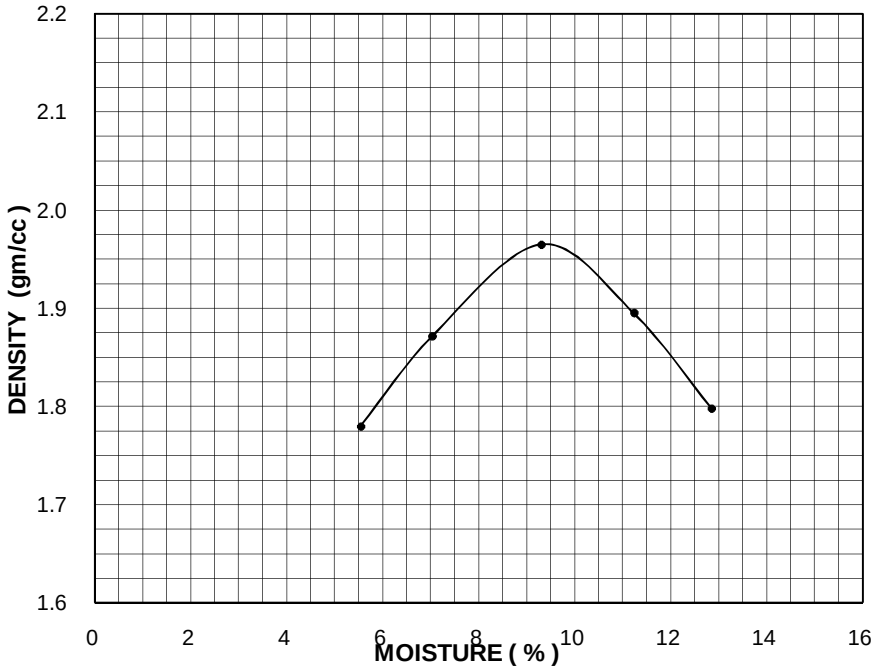
O.M.C : 9.4 %

M.D.D : 1.804 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-36

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

CHAINAGE : 17 + 500

AASHTO CLASSIFICATION: A-4

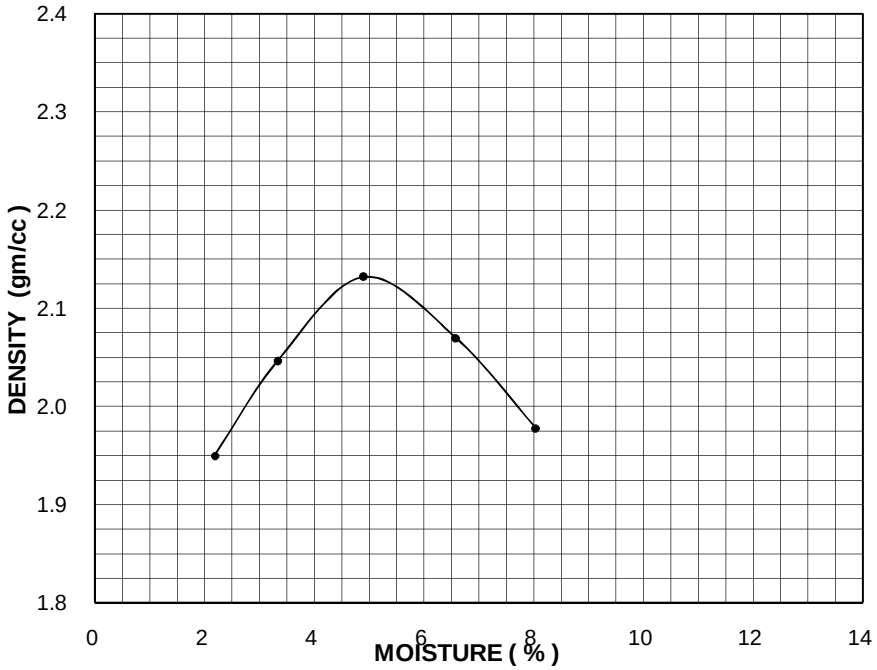
O.M.C : 9.3 %

M.D.D : 1.965 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-38

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

CHAINAGE : 18 + 500

AASHTO CLASSIFICATION: A-1-a

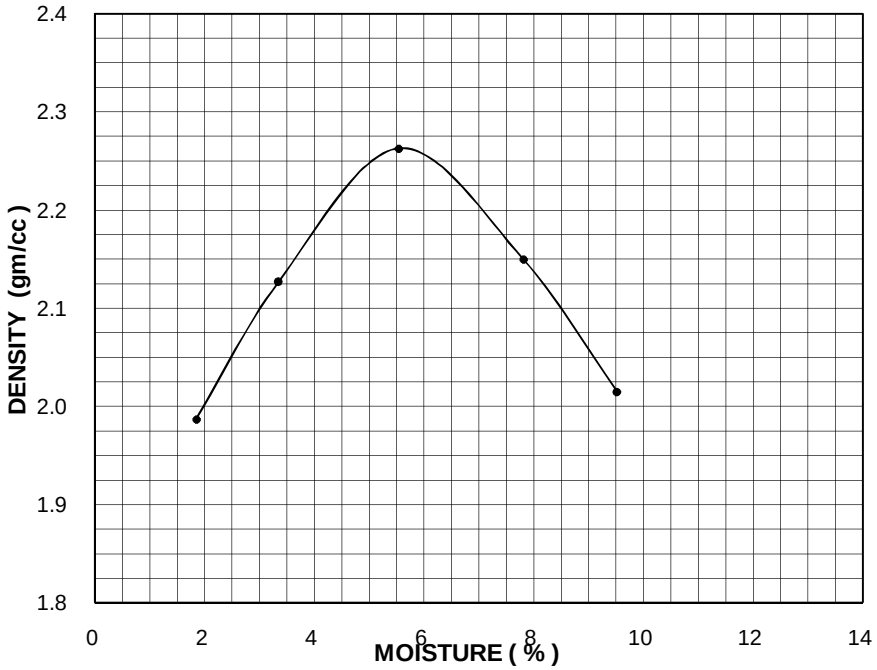
O.M.C : 4.9 %

M.D.D : 2.132 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-Borrow-02

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

AASHTO CLASSIFICATION: A-1-a

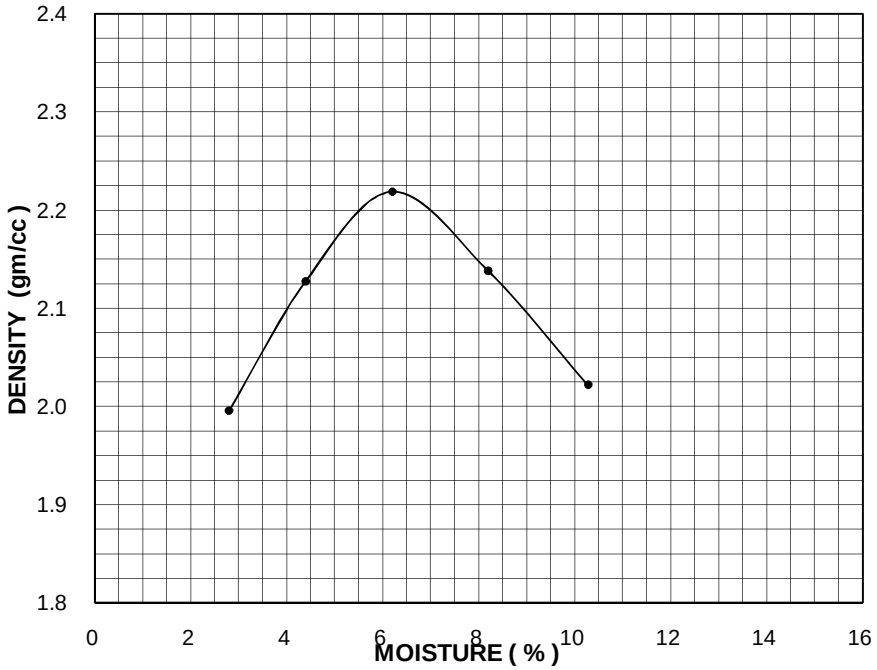
O.M.C : 5.5 %

M.D.D : 2.263 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-Borrow-04

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

AASHTO CLASSIFICATION: A-1-b

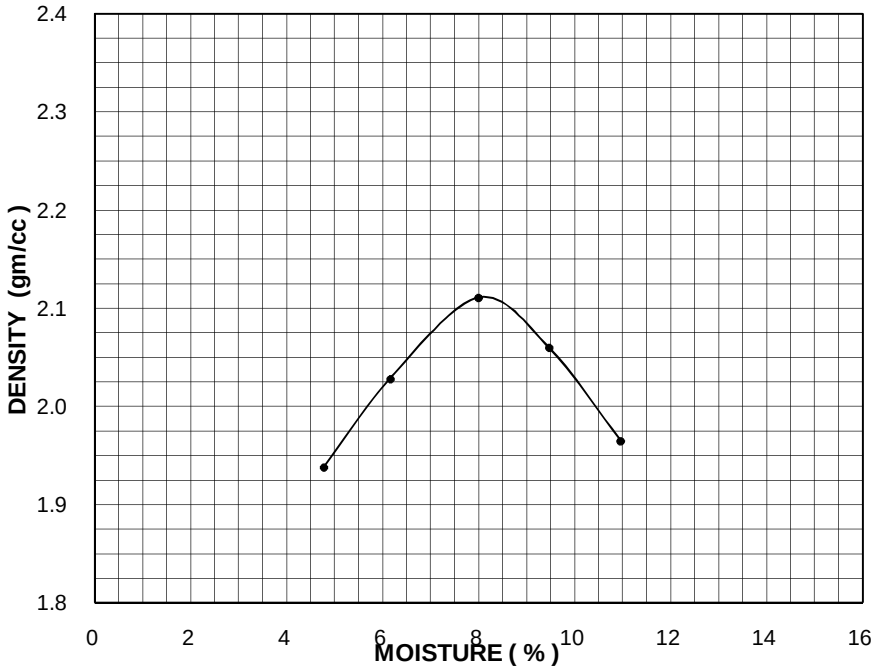
O.M.C : 6.2 %

M.D.D : 2.219 gm/cc

L.R.# 02/ 17
DATE: 25-01-2017

CLIENT: **Loya Associates.**
PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

MODIFIED AASHTO COMPACTION



PIT No. : TP-Borrow-05

SAMPLE : : BS-1

DEPTH (ft m : 0 - 1.0

AASHTO CLASSIFICATION: A-4

O.M.C : 8.0 %

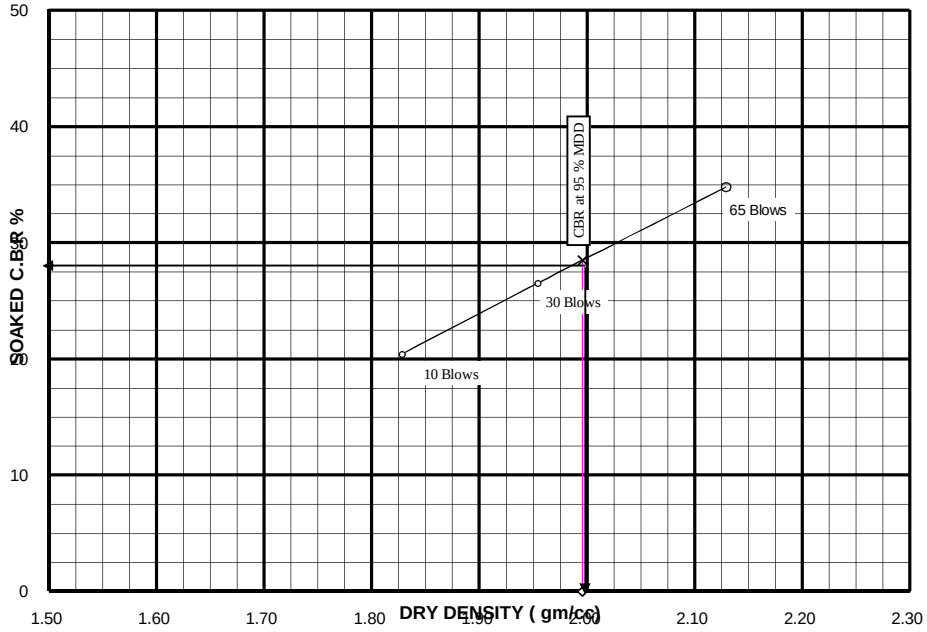
M.D.D : 2.111 gm/cc

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	20	27	35
Density gm/cc	1.828	1.954	2.129

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-04

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

CHAINAGE : 1 + 500

AASHTO CLASSIFICATION: A-2-4

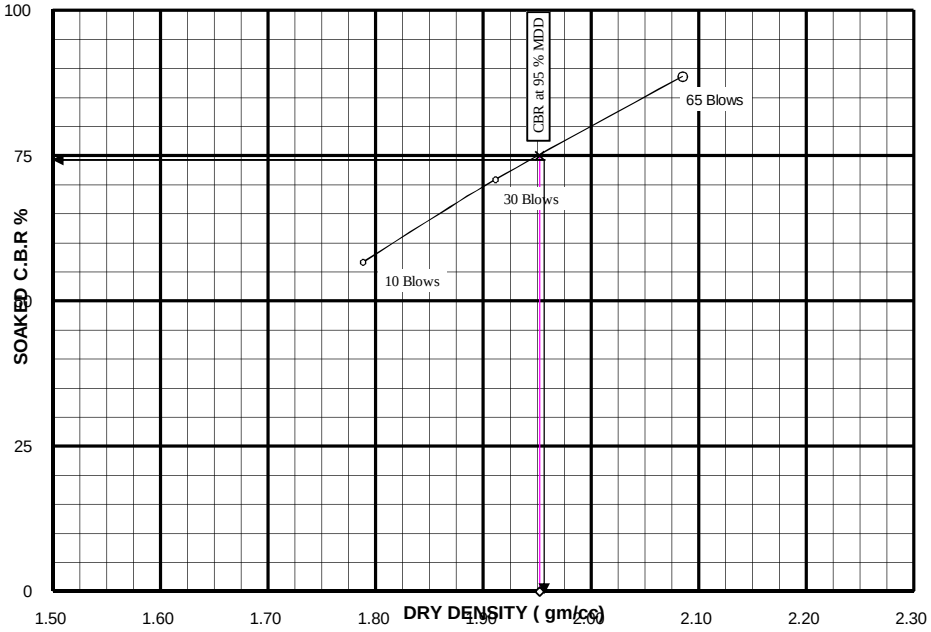
CBR at 95% MDD : 29 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	57	71	89
Density gm/cc	1.788	1.911	2.085

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-15

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

CHAINAGE : 7 + 000

AASHTO CLASSIFICATION: A-1-b

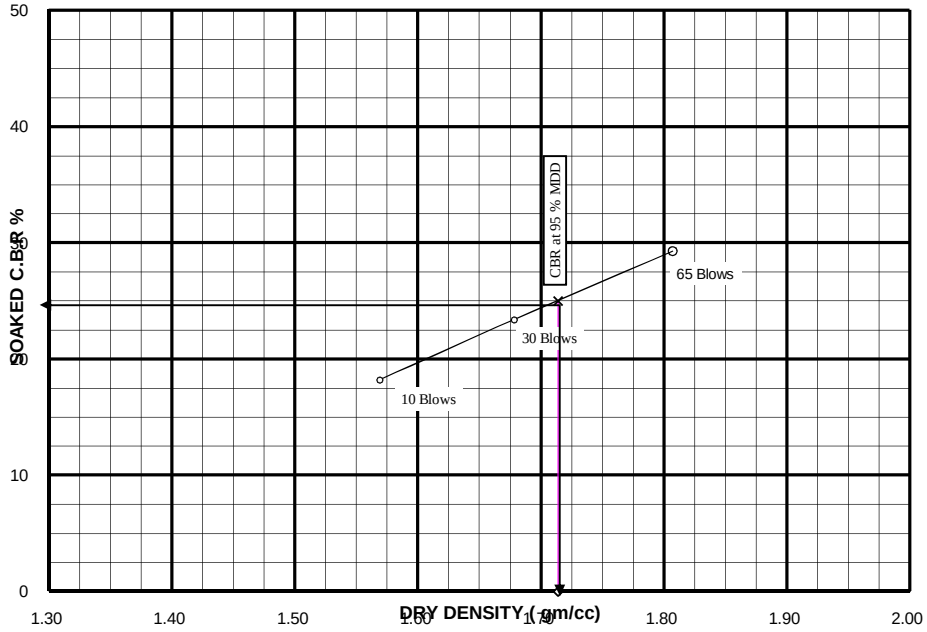
CBR at 95% MDD : 75 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	18	23	29
Density gm/cc	1.569	1.678	1.807

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-27

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

CHAINAGE : 13 + 000

AASHTO CLASSIFICATION: A-3

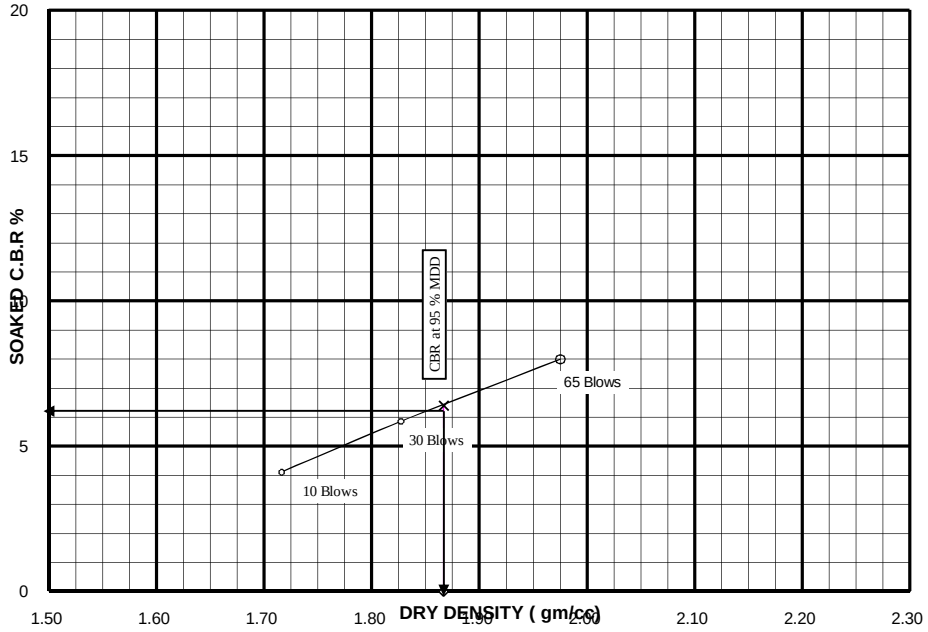
CBR at 95% MDD : 25 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	4	6	8
Density gm/cc	1.716	1.827	1.975

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-36

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

CHAINAGE : 17 + 500

AASHTO CLASSIFICATION: A-4

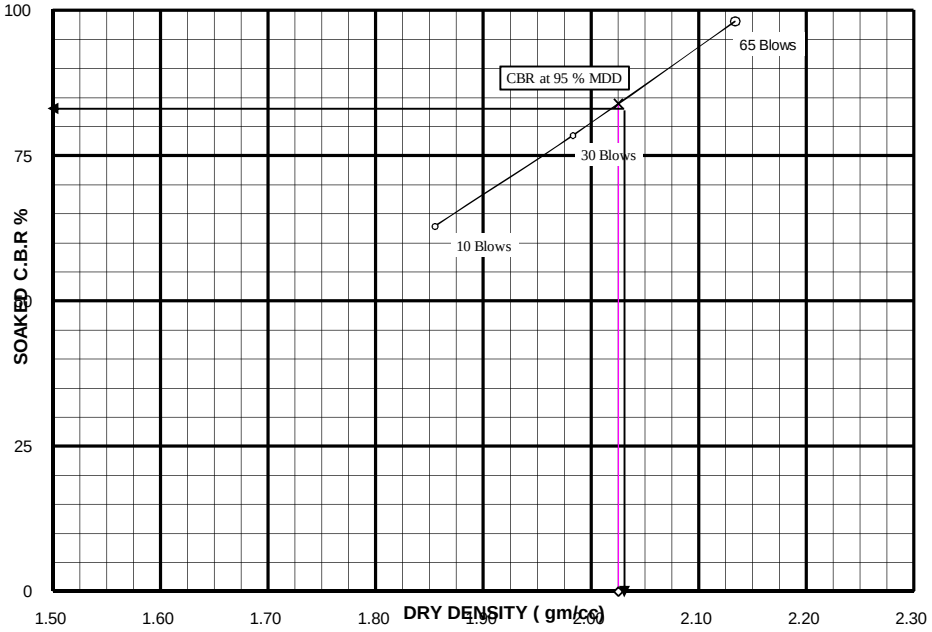
CBR at 95% MDD : 6 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	63	79	98
Density gm/cc	1.855	1.983	2.134

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-38

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

CHAINAGE : 18 + 500

AASHTO CLASSIFICATION: A-1-a

CBR at 95% MDD : 84 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	61	76	95
Density gm/cc	1.969	2.105	2.282

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE

PIT No. : TP-Borrow-02

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

AASHTO CLASSIFICATION: A-1-a

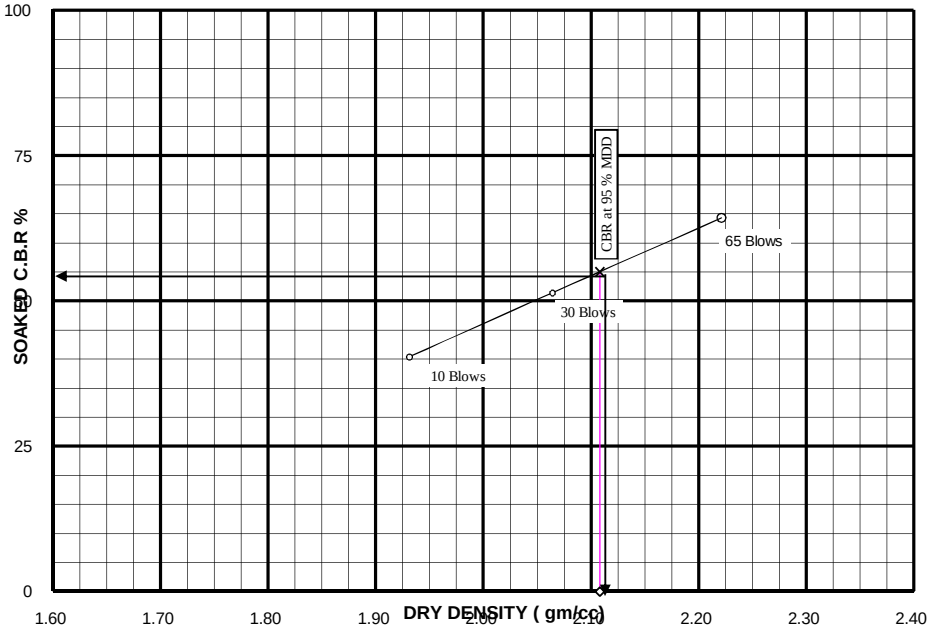
CBR at 95% MDD : 81 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	40	51	64
Density gm/cc	1.931	2.064	2.221

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-Borrow-04

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

AASHTO CLASSIFICATION: A-1-b

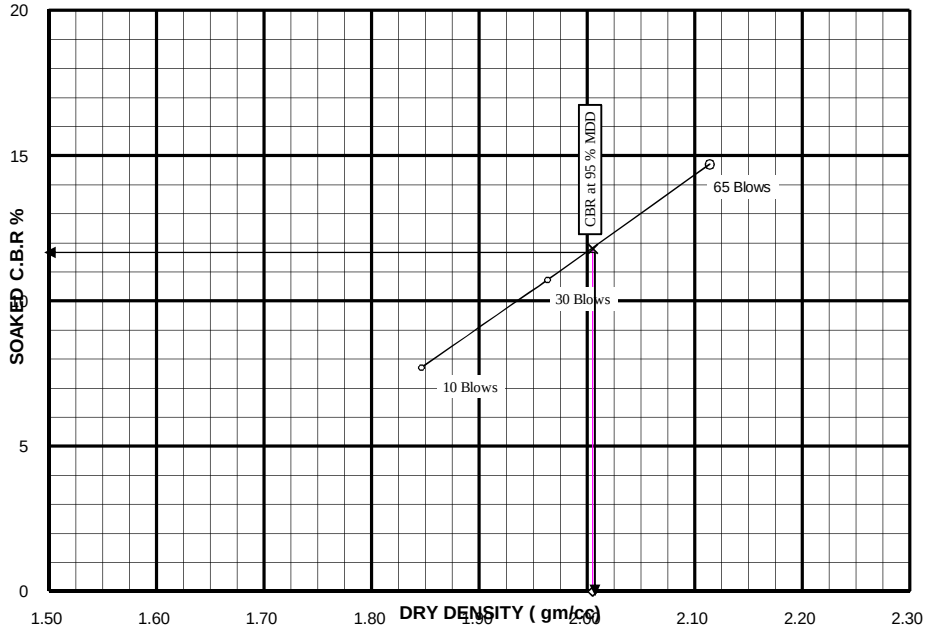
CBR at 95% MDD : 55 %

L.R # 02/ 17
Date: 31-01-2017

PROJECT: **Rehabilitation of Bridge over Malir River On Exist Link Road From Kathore M9 to National Highway N5.**

Blows	10	30	65
C.B.R %	8	11	15
Density gm/cc	1.846	1.963	2.114

THREE POINT C.B.R
DRY DENSITY VS CBR CURVE



PIT No. : TP-Borrow-05

SAMPLE : : BS-1

DEPTH (ft m) : 0 - 1.0

AASHTO CLASSIFICATION: A-4

CBR at 95% MDD : 12 %

PHOTOS


MATONSI LINK ROAD
TP – 34
Date:3.1.2017


MATONSI LINK ROAD
TP – 45


MATONSI LINK ROAD
TP – 14
Date:3.1.2017


MATONSI LINK ROAD