National High Speed Rail Corporation Ltd.
Reg. No. 291002

Attachment No. 6 of Addendum No. 9

D_1. Shaft 3

National High Speed Rail Corporation Ltd. Reg. No. 291002

Summary of Fieldwork

S. No	BH. No.	Chainage	Depth of Borehole below existing GL (m)
1.	ABH3-1	16K250m	50.00
2.	ABH3-2	16k150m	17.00

Safe Bearing Capacity (SBC)

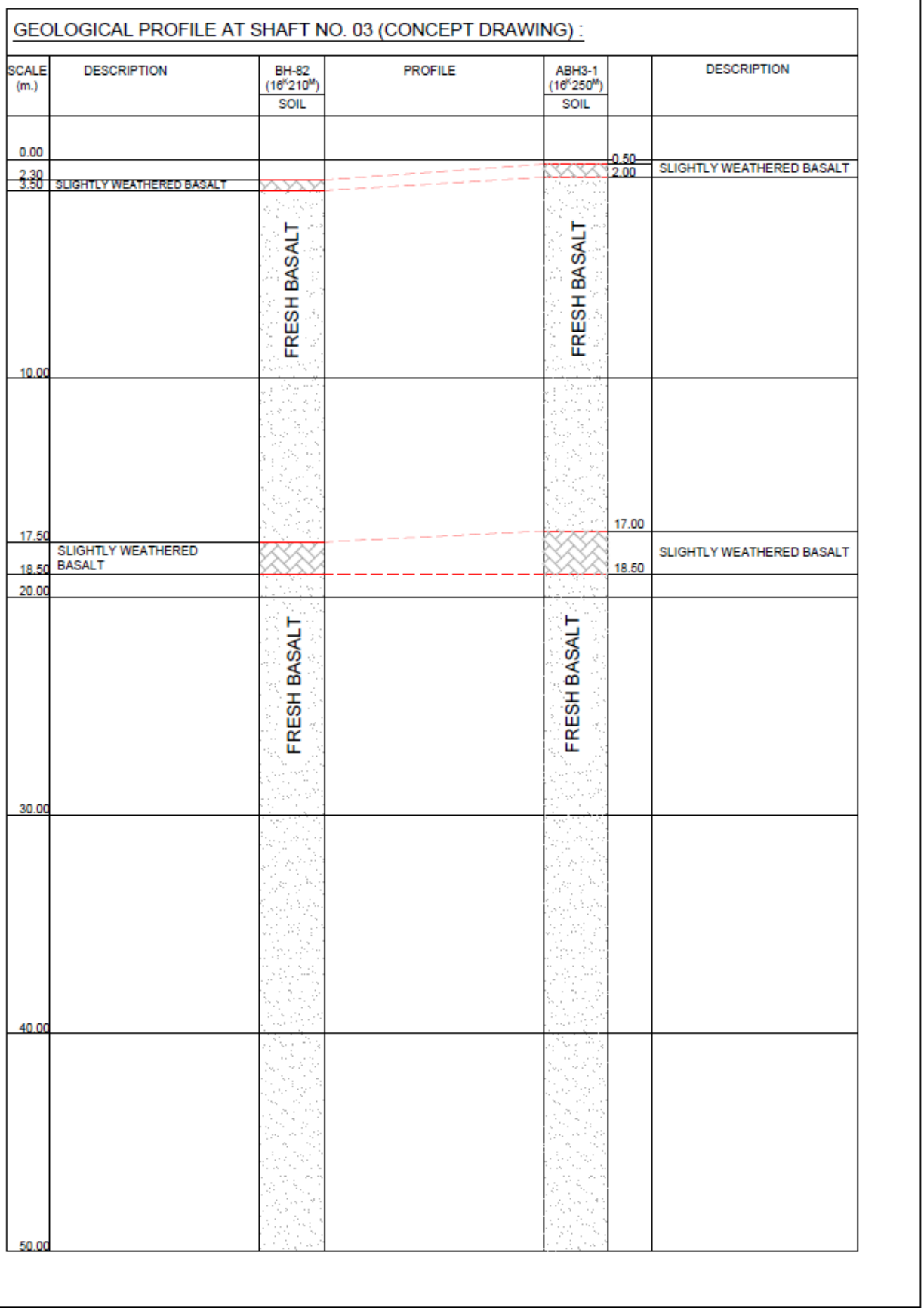
S No.	BH No.	Type of Strata	Founding Depth (m) BEGL	Allowable Safe Bearing Capacity, t/m^2
1.	ABH3-1	Fresh greyish brown BASALT with white filling materials.	9.50	300.0 by UCS of IS 12070
2.	ABH-3-2	Fresh greyish brown Amygdaloidal BASALT with white filling materials.	9.50	350.0 by UCS of IS 12070

National High Speed Rail Corporation Ltd. Reg. No. 291002

A. ABH3-1

National High Speed Rail Corporation Ltd. Reg. No. 291002

I. GEOLOGICAL PROFILE



II. BORELOG

BORE HOLE LOCATION: UCO Bank Plot, Ghansoli; **CHAINAGE:** $16^{K}250^{M}$
BORE HOLE NO. – ABH3-1(Shaft no. 3); **DEPTH-** 50 M

Client :- NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)	Boring No. : ABH3-1 (SHAFT NO. 3)
Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)	Sheet : 1 of 4
	Depth of Bore Hole : 50.00m BGL
CHAINAGE :-- 16^{K} 250^{M} (SHAFT NO. 3 ABH3-1)	Depth of Casing : 2.00 m BGL
CO-ORDINATE :-- N-2114570.919, E-290728.598 **R. L. : 8.50 M (GROUND ELEVATION)**	Date of Commencement : 08/02/2019
Depth of GWT : 1.50mtr	Date of Completion : 15/02/2019

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
0.00	0.00	100.00														
	0.50			Reddish residual soil		DS	0.00	0.50								
1.00	1.00			0.50 MTR TO 1.00MT R Fresh brownish hard amygdaloidal BASALT with		jointed	0.50	1.00						100	94	
2.00	2.00					CORE	1.00	2.00						66	58	1.5 M Water Table
3.00	3.50			From1.00 MTR TO 4.00MTR Slightly weathered brownish to grey hard BASALT		CORE	2.00	3.50						93	81	
4.00	4.00					CORE	3.50	5.00						95	80	
5.00	5.00			From4.00 MTR TO 6.50MTR Slightly weathered brownish to grey hard BASALT												
6.00	6.50					CORE	5.00	6.50						96	89	
7.00						CORE	6.50	8.00						95	91	
8.00	8.00			From 6.50 MTR TO 09.50MTR Fresh greyish brown BASALT with white infilling material												
9.00	9.50					CORE	8.00	9.50						98	87	PMT & PACKER TEST 10.00MTR
10.00	10.00					CORE	9.50	11.00						100	100	
11.00	11.00			From 9.50 MTR TO 12.50MTR Fresh greyish brown amygdaloidal BASALT with white infilling material												
12.00	12.50					CORE	11.00	12.50						98	87	
13.00						CORE	12.50	14.00						95	93	
14.00	14.00			From12.50 MTR TO15.50MTR Fresh greyish brown BASALT with white infilling material												
15.00						CORE	14.00	15.50						95	85	

DS : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

National High Speed Rail Corporation Ltd. Reg. No. 291002

Client :- **NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)**

Boring No. : ABH3-1 (SHAFT NO. 3)

Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)

Sheet : 2 of 4

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
15.00	15.00															
	15.50					CORE	14.00	15.50						95	85	
16.00				From15.50 MTR TO 17.00MTR Fresh greyish brown BASALT with white infilling material		CORE	15.50	17.00						96	90	
17.00	17.00															
18.00				From17.00 MTR TO 18.50MTR Slightly whered greyish brown fractured BASALT with white infilling material		CORE	17.00	18.50						97	43	
	18.50															
19.00				From18.50 MTR TO 20.00MTR Fresh greyish brown amygdaloidal BASALT with white infilling material		CORE	18.50	20.00						100	96	
20.00	20.00															
21.00				From 20.00 MTR TO 26.00MTR Fresh greyish brown BASALT with white infilling material		CORE	20.00	21.50						100	100	
	21.50															
22.00						CORE	21.50	23.00						100	100	
23.00	23.00															
24.00						CORE	23.00	24.50						99	99	PMT & PACKER TEST 25.00 MTR
	24.50															
25.00						CORE	24.50	26.00						100	100	
26.00	26.00															
27.00				From26.00 MTR TO 28.00MTR Fresh greyish brown BASALT with white infilling material		CORE	26.00	27.50						100	100	
	27.50															
28.00	28.00					CORE	27.50	29.00						100	100	
29.00	29.00			From28.00 MTR TO 30.50MTR Fresh greyish brown amygdaloidal BASALT with white infilling material												
30.00						CORE	29.00	30.50						100	96	

DS : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

Site - Incharge : --

Client Rept.

Drawn By : Sanjay M. Varadkar

National High Speed Rail Corporation Ltd. Reg. No. 291002

Client :- **NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)**

Boring No. : ABH3-1 (SHAFT NO. 3)

Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)

Sheet : 3 of 4

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
30.00	30.00															
	30.50					CORE	29.00	30.50						100	96	
31.00				From30.50 MTR TO 32.00MTR Fresh greyish brown BASALT with white infilling material		CORE	30.50	32.00						100	95	
32.00	32.00															
33.00				From32.00 MTR TO 35.00MTR Fresh greyish brown BASALT with white infilling material		CORE	32.00	33.50						100	100	
	33.50															
34.00						CORE	33.50	35.00						100	100	
35.00	35.00															
36.00				From35.00 MTR TO 37.00MTR Fresh greyish brown amygdaloidal BASALT with white infilling material		CORE	35.00	36.50						100	96	PACKER TEST
	36.50															
37.00	37.00					CORE	36.50	38.00						100	100	
38.00	38.00			From37.00 MTR TO 39.50MTR Fresh greyish brown BASALT with white infilling material												
39.00						CORE	38.00	39.50						99	82	
	39.50															
40.00				From39.50 MTR TO 45.50MTR Fresh greyish brown amygdaloidal BASALT with white infilling material		CORE	39.50	41.00						98	98	
41.00	41.00															
42.00						CORE	41.00	42.50						100	100	
	42.50															
43.00						CORE	42.50	44.00						99	99	PMT & PACKAR TEST 45.00 MTR
44.00	44.00															
						CORE	44.00	45.50						100	97	
45.00	45.00															

DS : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

Site - Incharge : --

Client Rept.

Drawn By : Sanjay M. Varadkar

National High Speed Rail Corporation Ltd. Reg. No. 291002

Client :- **NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)**

Boring No. : ABH3-1 (SHAFT NO. 3)

Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)

Sheet : 4 of 4

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
45.00	45.00															PMT & PACKER TEST 45.00 MTR
	45.50					CORE	44.00	45.50						100	97	
46.00				From45.50 MTR TO 50.00MTR Fresh greyish brown amygdaloidal BASALT with white infilling material		CORE	45.50	47.00						100	100	
47.00	47.00															
48.00	48.50					CORE	47.00	48.50						100	100	
49.00						CORE	48.50	50.00						100	100	
50.00	50.00															
51.00																
52.00																
53.00																
54.00																
55.00																
56.00																
57.00																
58.00																
59.00																
60.00																

DS : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

Site - Incharge : --

Client Rept.

Drawn By : Sanjay M. Varadkar

III. LABORATORY TEST

Table 4: TEST RESULTS OF ROCK CORES

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)
Contractor:	M/s Amiand Consulting Pvt. Ltd.
Principle Client	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)
Date:	22/03/2019

ANNEXURE- 1A
TEST RESULTS OF ROCK CORES

S. No.	Bore Hole No.	Core No.	Depth, m		Diameter, cm	Height, cm	H: D (H/D)	Condition of Test (Soak/Unsoak)	Uniaxial Compressive Strength (IS: 9143: 1979)	Point load strength index (IS: 8764: 1998)	Porosity (IS 13030: 1991)	Dry Density (IS 13030: 1991)	Specific Gravity (IS 2720: Part 3: 1980)	Water Absorption (IS 1124: 1974)	Remarks
			From	To					kg/cm2	kg/cm2	%	g/cc		%	
1	ABH3-01	30A	9.50	11.00	5.18	11.18	2.16	Unsoak	664.32	-	0.49	2.80	2.83	0.21	
2	ABH3-01	71	24.50	26.00	5.30	11.12	2.10	Unsoak	878.89	-	1.25	2.77	2.81	0.50	
3	ABH3-01	88	33.50	35.00	5.23	11.41	2.18	Unsoak	1044.09	-	0.21	2.78	2.82	0.20	
4	ABH3-01	111A	44.00	45.50	5.27	11.23	2.13	Unsoak	1084.23	-	0.42	2.80	2.84	0.21	

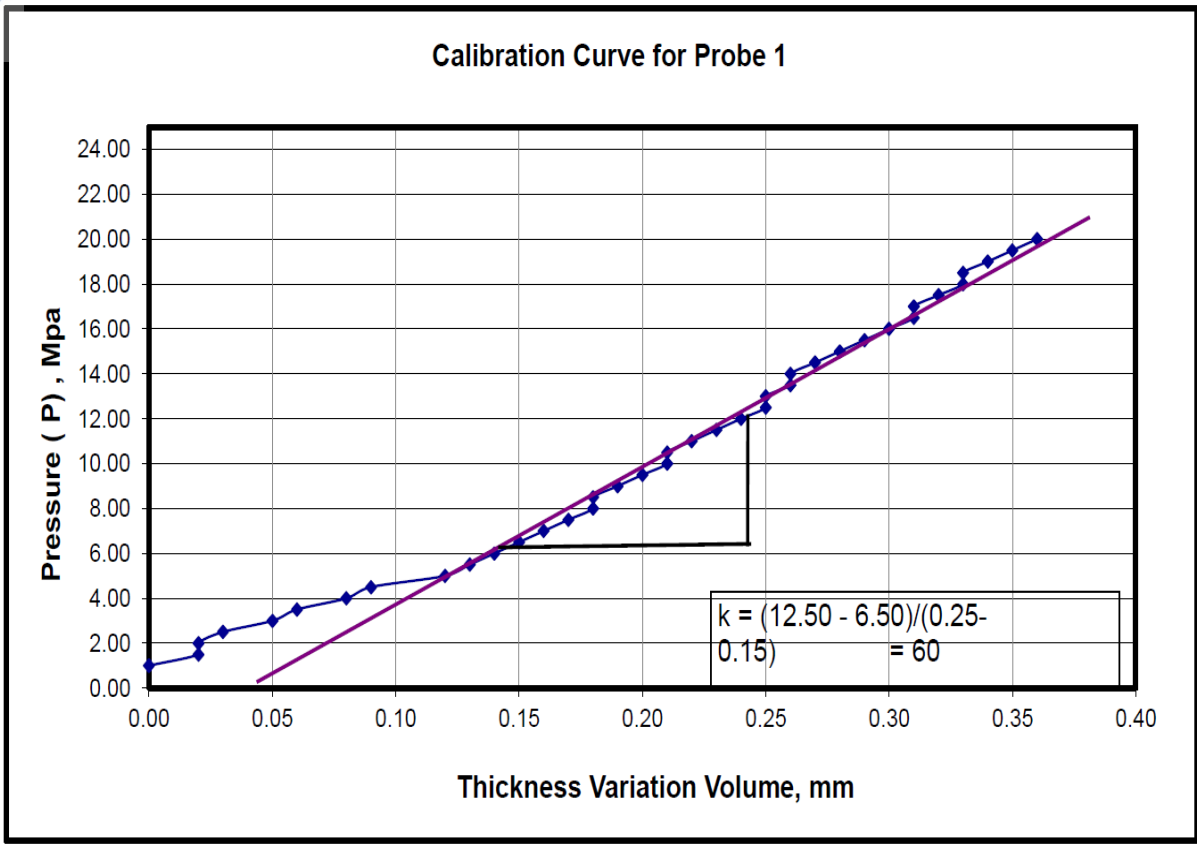
National High Speed Rail Corporation Ltd. Reg. No. 291002

(i) Calibration of Data Sheet

CALIBRATION DATA SHEET			
Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
Probe No.	1	**Date**	20-Feb-19

Sr. No.	Pressure P (MPa)	Displacement Rp (mm)	Pressure Variation P' = P - 1	Thickness Correction Volume R' = Rp - Rp1
1	0.00	-	-	-
2	0.50	-	-	-
3	1.00	1.07	0.00	0.00
4	1.50	1.09	0.50	0.02
5	2.00	1.09	1.00	0.02
6	2.50	1.10	1.50	0.03
7	3.00	1.12	2.00	0.05
8	3.50	1.13	2.50	0.06
9	4.00	1.15	3.00	0.08
10	4.50	1.16	3.50	0.09
11	5.00	1.19	4.00	0.12
12	5.50	1.20	4.50	0.13
13	6.00	1.21	5.00	0.14
14	6.50	1.22	5.50	0.15
15	7.00	1.23	6.00	0.16
16	7.50	1.24	6.50	0.17
17	8.00	1.25	7.00	0.18
18	8.50	1.25	7.50	0.18
19	9.00	1.26	8.00	0.19
20	9.50	1.27	8.50	0.20
21	10.00	1.28	9.00	0.21
22	10.50	1.28	9.50	0.21
23	11.00	1.29	10.00	0.22
24	11.50	1.30	10.50	0.23
25	12.00	1.31	11.00	0.24
26	12.50	1.32	11.50	0.25
27	13.00	1.32	12.00	0.25
28	13.50	1.33	12.50	0.26
29	14.00	1.33	13.00	0.26
30	14.50	1.34	13.50	0.27
31	15.00	1.35	14.00	0.28
32	15.50	1.36	14.50	0.29
33	16.00	1.37	15.00	0.30
34	16.50	1.38	15.50	0.31
35	17.00	1.38	16.00	0.31
36	17.50	1.39	16.50	0.32
37	18.00	1.40	17.00	0.33
38	18.50	1.40	17.50	0.33
39	19.00	1.41	18.00	0.34
40	19.50	1.42	18.50	0.35
41	20.00	1.43	19.00	0.36

National High Speed Rail Corporation Ltd. Reg. No. 291002



National High Speed Rail Corporation Ltd. Reg. No. 291002

(ii) Pressure-meter Test

TEST RESULT SUMMERY													
S. No.	Bore Hole No.	Depth (m)	Poisson's Ratio	ΔP = P2 - P1		ΔR = R2 - R1		K = (ΔP/ΔR)	Intermediate Radius	Modulus of Elasticity, E		Shear Modulus, G	Limit Pressure, P_l
				P2	P1	R2	R1			MPa	kg/cm²	kg/cm²	kg/cm²
1	ABH3-01	45.0	0.30	20.00	1.00	39.02	38.35	28.36	38.61	1423.38	1.42E+04	5.47E+03	200
2	ABH3-01	35.0	0.30	20.00	1.00	38.69	38.48	90.48	38.60	4540.10	4.54E+04	1.75E+04	200
3	ABH3-01	25.0	0.30	20.00	0.50	38.68	38.49	102.63	38.58	5147.38	5.15E+04	1.98E+04	200
4	ABH3-01	10.0	0.30	20.00	0.50	39.05	38.81	81.25	38.91	4109.87	4.11E+04	1.58E+04	200

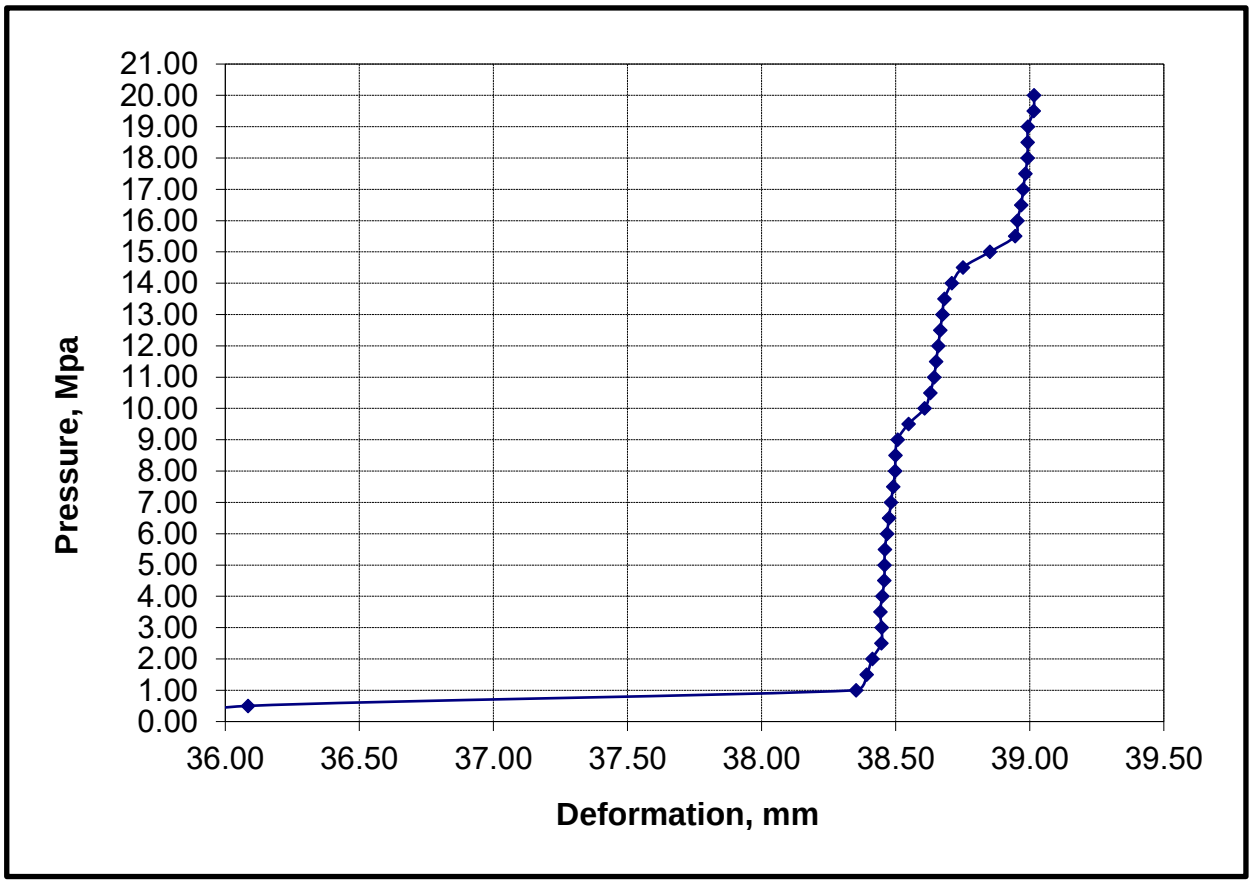
National High Speed Rail Corporation Ltd. Reg. No. 291002

PRESSUREMETER DATA SHEET

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
BH No.	ABH3-01	**Date**	20-2-2019
Depth of test	45.0 M		

S. No.	Pressure P (MPa)	Displacement Display Value Rn (mm)	Inner Radius display value Ri = Rn + 23.5	Pressure Variation P' = P - 1	Thickness Correction Volume PG = P'/K	Reference Inner radius Rs = Ri - PG	Borehole radius R = (Rs2 + (S/3.14))1/2
1	0.00	-2.73	20.77	-1.00	-0.02	20.79	35.67
2	0.50	-2.02	21.48	-0.50	-0.01	21.49	36.08
3	1.00	1.61	25.11	0.00	0.00	25.11	38.35
4	1.50	1.68	25.18	0.50	0.01	25.17	38.39
5	2.00	1.72	25.22	1.00	0.02	25.20	38.41
6	2.50	1.78	25.28	1.50	0.03	25.26	38.45
7	3.00	1.79	25.29	2.00	0.03	25.26	38.45
8	3.50	1.79	25.29	2.50	0.04	25.25	38.44
9	4.00	1.81	25.31	3.00	0.05	25.26	38.45
10	4.50	1.83	25.33	3.50	0.06	25.27	38.46
11	5.00	1.84	25.34	4.00	0.07	25.27	38.46
12	5.50	1.85	25.35	4.50	0.08	25.28	38.46
13	6.00	1.87	25.37	5.00	0.08	25.29	38.47
14	6.50	1.89	25.39	5.50	0.09	25.30	38.47
15	7.00	1.91	25.41	6.00	0.10	25.31	38.48
16	7.50	1.93	25.43	6.50	0.11	25.32	38.49
17	8.00	1.95	25.45	7.00	0.12	25.33	38.50
18	8.50	1.96	25.46	7.50	0.13	25.34	38.50
19	9.00	1.98	25.48	8.00	0.13	25.35	38.51
20	9.50	2.05	25.55	8.50	0.14	25.41	38.55
21	10.00	2.15	25.65	9.00	0.15	25.50	38.61
22	10.50	2.19	25.69	9.50	0.16	25.53	38.63
23	11.00	2.22	25.72	10.00	0.17	25.55	38.64
24	11.50	2.24	25.74	10.50	0.18	25.57	38.65
25	12.00	2.26	25.76	11.00	0.18	25.58	38.66
26	12.50	2.28	25.78	11.50	0.19	25.59	38.67
27	13.00	2.30	25.80	12.00	0.20	25.60	38.67
28	13.50	2.32	25.82	12.50	0.21	25.61	38.68
29	14.00	2.37	25.87	13.00	0.22	25.65	38.71
30	14.50	2.44	25.94	13.50	0.23	25.72	38.75
31	15.00	2.60	26.10	14.00	0.23	25.87	38.85
32	15.50	2.75	26.25	14.50	0.24	26.01	38.95
33	16.00	2.77	26.27	15.00	0.25	26.02	38.95
34	16.50	2.80	26.30	15.50	0.26	26.04	38.97
35	17.00	2.82	26.32	16.00	0.27	26.05	38.98
36	17.50	2.84	26.34	16.50	0.28	26.07	38.98
37	18.00	2.86	26.36	17.00	0.28	26.08	38.99
38	18.50	2.87	26.37	17.50	0.29	26.08	38.99
39	19.00	2.88	26.38	18.00	0.30	26.08	38.99
40	19.50	2.92	26.42	18.50	0.31	26.11	39.01
41	20.00	2.93	26.43	19.00	0.32	26.11	39.02

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
Pressure Vs Deformation Curve For BH No	**ABH3-01**	**Depth**	**45 m BGL**



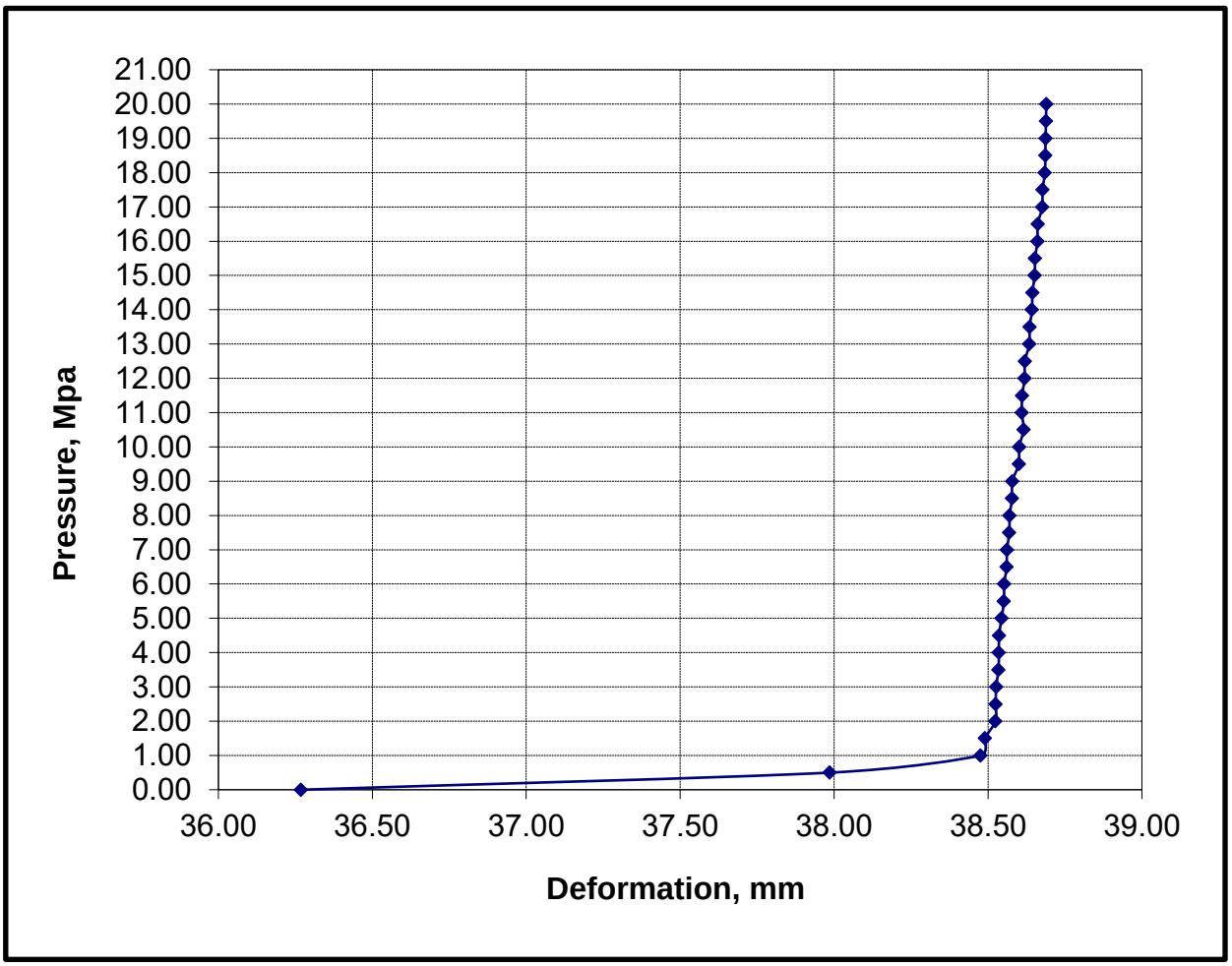
National High Speed Rail Corporation Ltd. Reg. No. 291002

PRESSUREMETER DATA SHEET

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
BH No.	ABH3-01	**Date**	20-2-2019
Depth of test	35.0 M		

S. No.	Pressure P (MPa)	Displacement Display Value Rn (mm)	Inner Radius display value Ri = Rn + 23.5	Pressure Variation P' = P - 1	Thickness Correction Volume PG = P'/K	Reference Inner radius Rs = Ri - PG	Borehole radius R = (Rs2 + (S/3.14))1/2
1	0.00	-1.72	21.78	-1.00	-0.02	21.80	36.27
2	0.50	1.04	24.54	-0.50	-0.01	24.55	37.99
3	1.00	1.80	25.30	0.00	0.00	25.30	38.48
4	1.50	1.83	25.33	0.50	0.01	25.32	38.49
5	2.00	1.89	25.39	1.00	0.02	25.37	38.52
6	2.50	1.90	25.40	1.50	0.03	25.38	38.53
7	3.00	1.91	25.41	2.00	0.03	25.38	38.53
8	3.50	1.93	25.43	2.50	0.04	25.39	38.53
9	4.00	1.94	25.44	3.00	0.05	25.39	38.54
10	4.50	1.95	25.45	3.50	0.06	25.39	38.54
11	5.00	1.97	25.47	4.00	0.07	25.40	38.54
12	5.50	1.99	25.49	4.50	0.08	25.42	38.55
13	6.00	2.00	25.50	5.00	0.08	25.42	38.55
14	6.50	2.02	25.52	5.50	0.09	25.43	38.56
15	7.00	2.03	25.53	6.00	0.10	25.43	38.56
16	7.50	2.05	25.55	6.50	0.11	25.44	38.57
17	8.00	2.06	25.56	7.00	0.12	25.44	38.57
18	8.50	2.08	25.58	7.50	0.13	25.46	38.58
19	9.00	2.09	25.59	8.00	0.13	25.46	38.58
20	9.50	2.13	25.63	8.50	0.14	25.49	38.60
21	10.00	2.14	25.64	9.00	0.15	25.49	38.60
22	10.50	2.17	25.67	9.50	0.16	25.51	38.62
23	11.00	2.17	25.67	10.00	0.17	25.50	38.61
24	11.50	2.18	25.68	10.50	0.18	25.51	38.61
25	12.00	2.20	25.70	11.00	0.18	25.52	38.62
26	12.50	2.21	25.71	11.50	0.19	25.52	38.62
27	13.00	2.24	25.74	12.00	0.20	25.54	38.63
28	13.50	2.25	25.75	12.50	0.21	25.54	38.64
29	14.00	2.27	25.77	13.00	0.22	25.55	38.64
30	14.50	2.28	25.78	13.50	0.23	25.56	38.64
31	15.00	2.30	25.80	14.00	0.23	25.57	38.65
32	15.50	2.31	25.81	14.50	0.24	25.57	38.65
33	16.00	2.33	25.83	15.00	0.25	25.58	38.66
34	16.50	2.34	25.84	15.50	0.26	25.58	38.66
35	17.00	2.37	25.87	16.00	0.27	25.60	38.68
36	17.50	2.38	25.88	16.50	0.28	25.61	38.68
37	18.00	2.40	25.90	17.00	0.28	25.62	38.68
38	18.50	2.41	25.91	17.50	0.29	25.62	38.69
39	19.00	2.42	25.92	18.00	0.30	25.62	38.69
40	19.50	2.43	25.93	18.50	0.31	25.62	38.69
41	20.00	2.44	25.94	19.00	0.32	25.62	38.69

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
Pressure Vs Deformation Curve For BH No	**ABH3-01**	**Depth**	**35 m BGL**



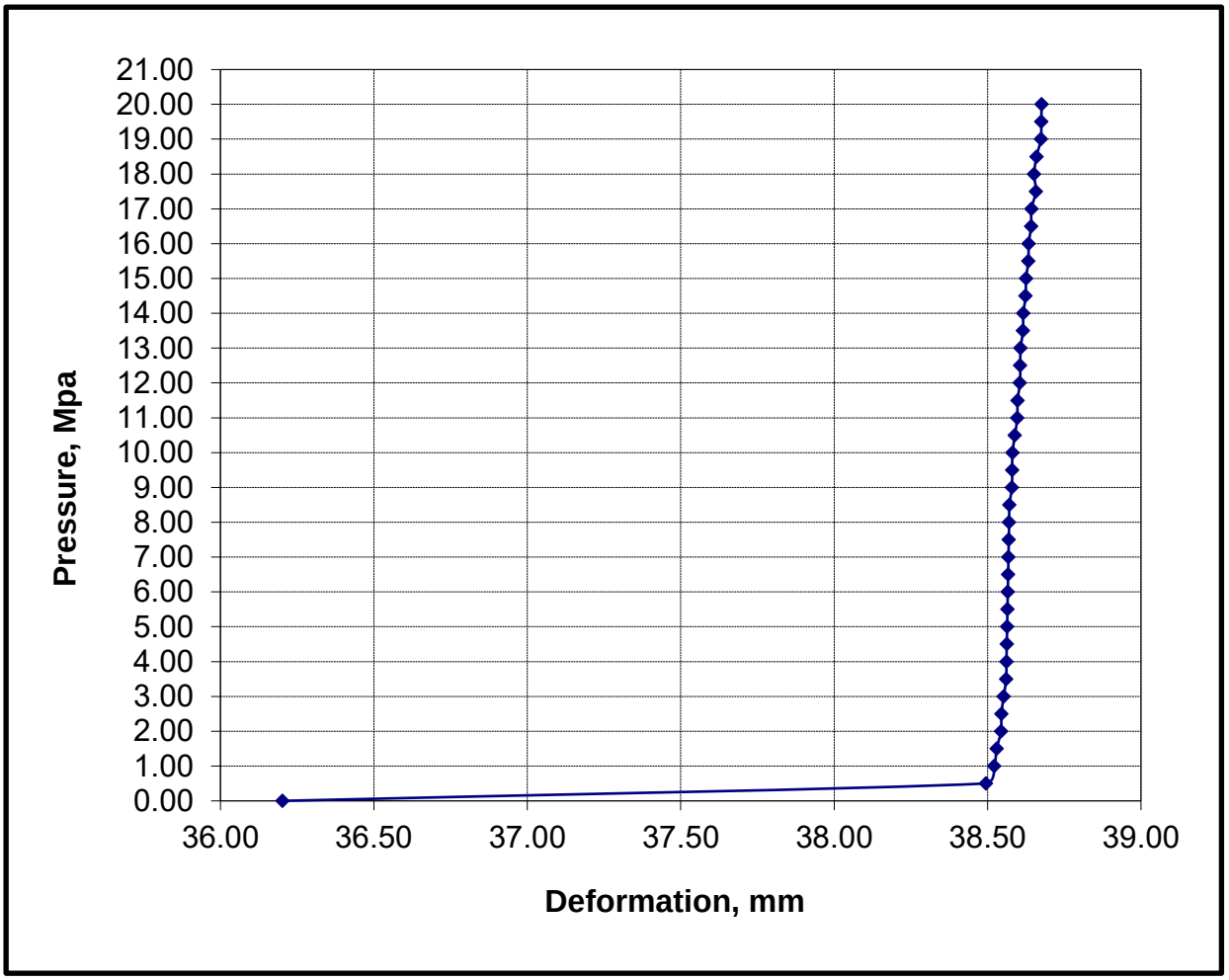
National High Speed Rail Corporation Ltd. Reg. No. 291002

PRESSUREMETER DATA SHEET

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
BH No.	ABH3-01	**Date**	20-2-2019
Depth of test	25.0 M		

S. No.	Pressure P (MPa)	Displacement Display Value Rn (mm)	Inner Radius display value Ri = Rn + 23.5	Pressure Variation P' = P - 1	Thickness Correction Volume PG = P'/K	Reference Inner radius Rs = Ri - PG	Borehole radius R = (Rs2 + (S/3.14))1/2
1	0.00	-1.83	21.67	-1.00	-0.02	21.69	36.20
2	0.50	1.82	25.32	-0.50	-0.01	25.33	38.49
3	1.00	1.87	25.37	0.00	0.00	25.37	38.52
4	1.50	1.89	25.39	0.50	0.01	25.38	38.53
5	2.00	1.92	25.42	1.00	0.02	25.40	38.54
6	2.50	1.93	25.43	1.50	0.03	25.41	38.55
7	3.00	1.95	25.45	2.00	0.03	25.42	38.55
8	3.50	1.97	25.47	2.50	0.04	25.43	38.56
9	4.00	1.98	25.48	3.00	0.05	25.43	38.56
10	4.50	1.99	25.49	3.50	0.06	25.43	38.56
11	5.00	2.00	25.50	4.00	0.07	25.43	38.56
12	5.50	2.01	25.51	4.50	0.08	25.44	38.56
13	6.00	2.02	25.52	5.00	0.08	25.44	38.57
14	6.50	2.03	25.53	5.50	0.09	25.44	38.57
15	7.00	2.04	25.54	6.00	0.10	25.44	38.57
16	7.50	2.05	25.55	6.50	0.11	25.44	38.57
17	8.00	2.06	25.56	7.00	0.12	25.44	38.57
18	8.50	2.07	25.57	7.50	0.13	25.45	38.57
19	9.00	2.09	25.59	8.00	0.13	25.46	38.58
20	9.50	2.10	25.60	8.50	0.14	25.46	38.58
21	10.00	2.11	25.61	9.00	0.15	25.46	38.58
22	10.50	2.13	25.63	9.50	0.16	25.47	38.59
23	11.00	2.15	25.65	10.00	0.17	25.48	38.60
24	11.50	2.16	25.66	10.50	0.18	25.49	38.60
25	12.00	2.18	25.68	11.00	0.18	25.50	38.61
26	12.50	2.19	25.69	11.50	0.19	25.50	38.61
27	13.00	2.20	25.70	12.00	0.20	25.50	38.61
28	13.50	2.22	25.72	12.50	0.21	25.51	38.62
29	14.00	2.23	25.73	13.00	0.22	25.51	38.62
30	14.50	2.25	25.75	13.50	0.23	25.53	38.62
31	15.00	2.26	25.76	14.00	0.23	25.53	38.63
32	15.50	2.28	25.78	14.50	0.24	25.54	38.63
33	16.00	2.29	25.79	15.00	0.25	25.54	38.63
34	16.50	2.31	25.81	15.50	0.26	25.55	38.64
35	17.00	2.32	25.82	16.00	0.27	25.55	38.64
36	17.50	2.35	25.85	16.50	0.28	25.58	38.66
37	18.00	2.35	25.85	17.00	0.28	25.57	38.65
38	18.50	2.37	25.87	17.50	0.29	25.58	38.66
39	19.00	2.40	25.90	18.00	0.30	25.60	38.67
40	19.50	2.41	25.91	18.50	0.31	25.60	38.68
41	20.00	2.42	25.92	19.00	0.32	25.60	38.68

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
Pressure Vs Deformation Curve For BH No	**ABH3-01**	**Depth**	**25 m BGL**



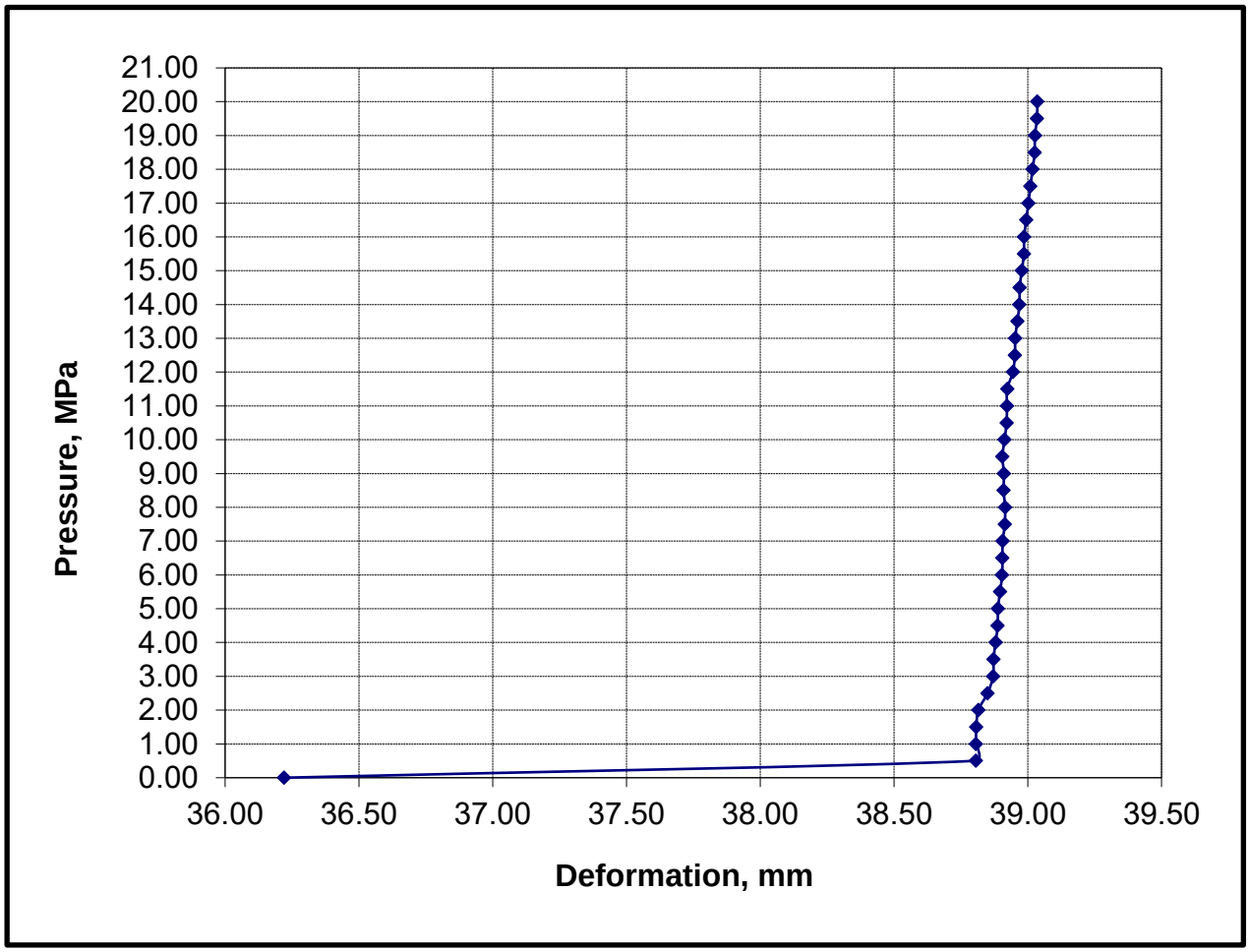
National High Speed Rail Corporation Ltd. Reg. No. 291002

PRESSUREMETER DATA SHEET

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
BH No.	ABH3-01	**Date**	20-2-2019
Depth of test	10.0 M		

S. No.	Pressure P (Mpa)	Displacement Display Value Rn (mm)	Inner Radius display value Ri = Rn + 23.5	Pressure Variation P' = P - 1	Thickness Correction Volume PG = P'/K	Reference Inner radius Rs = Ri - PG	Borehole radius R = (Rs2 + (S/3.14))1/2
1	0.00	-1.80	21.70	-1.00	-0.02	21.72	36.22
2	0.50	2.29	25.79	-0.50	-0.01	25.80	38.81
3	1.00	2.30	25.80	0.00	0.00	25.80	38.81
4	1.50	2.31	25.81	0.50	0.01	25.80	38.81
5	2.00	2.33	25.83	1.00	0.02	25.81	38.82
6	2.50	2.39	25.89	1.50	0.03	25.87	38.85
7	3.00	2.43	25.93	2.00	0.03	25.90	38.87
8	3.50	2.44	25.94	2.50	0.04	25.90	38.87
9	4.00	2.46	25.96	3.00	0.05	25.91	38.88
10	4.50	2.48	25.98	3.50	0.06	25.92	38.89
11	5.00	2.49	25.99	4.00	0.07	25.92	38.89
12	5.50	2.51	26.01	4.50	0.08	25.94	38.90
13	6.00	2.53	26.03	5.00	0.08	25.95	38.90
14	6.50	2.54	26.04	5.50	0.09	25.95	38.91
15	7.00	2.55	26.05	6.00	0.10	25.95	38.91
16	7.50	2.57	26.07	6.50	0.11	25.96	38.91
17	8.00	2.58	26.08	7.00	0.12	25.96	38.92
18	8.50	2.58	26.08	7.50	0.13	25.96	38.91
19	9.00	2.59	26.09	8.00	0.13	25.96	38.91
20	9.50	2.59	26.09	8.50	0.14	25.95	38.91
21	10.00	2.61	26.11	9.00	0.15	25.96	38.91
22	10.50	2.63	26.13	9.50	0.16	25.97	38.92
23	11.00	2.64	26.14	10.00	0.17	25.97	38.92
24	11.50	2.65	26.15	10.50	0.18	25.98	38.92
25	12.00	2.69	26.19	11.00	0.18	26.01	38.94
26	12.50	2.71	26.21	11.50	0.19	26.02	38.95
27	13.00	2.72	26.22	12.00	0.20	26.02	38.95
28	13.50	2.74	26.24	12.50	0.21	26.03	38.96
29	14.00	2.76	26.26	13.00	0.22	26.04	38.97
30	14.50	2.77	26.27	13.50	0.23	26.05	38.97
31	15.00	2.79	26.29	14.00	0.23	26.06	38.98
32	15.50	2.81	26.31	14.50	0.24	26.07	38.99
33	16.00	2.82	26.32	15.00	0.25	26.07	38.99
34	16.50	2.84	26.34	15.50	0.26	26.08	38.99
35	17.00	2.86	26.36	16.00	0.27	26.09	39.00
36	17.50	2.88	26.38	16.50	0.28	26.11	39.01
37	18.00	2.90	26.40	17.00	0.28	26.12	39.02
38	18.50	2.92	26.42	17.50	0.29	26.13	39.03
39	19.00	2.93	26.43	18.00	0.30	26.13	39.03
40	19.50	2.95	26.45	18.50	0.31	26.14	39.03
41	20.00	2.96	26.46	19.00	0.32	26.14	39.04

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)		
Contractor:	M/s. Amiand Consulting Pvt. Ltd.		
Principal Client:	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)		
Pressure Vs Deformation Curve For BH No	**ABH3-01**	**Depth**	**10 m BGL**



National High Speed Rail Corporation Ltd. Reg. No. 291002

(iii) Triaxial Test

Project:	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)
Client :	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)

TEST RESULTS OF ROCK CORES

Sr. No.	Bore Hole No.	Core No.	Depth, m		Diameter, cm	Height, cm	H : D (H/D)	Condition of Test (Soak/Unsoak)	Uniaxial Compressive Strength (IS : 9143: 1979)	Point load strength index (IS : 8764: 1998)	Porosity (IS 13030: 1991)	Dry Density (IS 13030: 1991)	Bulk Density (IS 13030: 1991)	Specific Gravity (IS 2720 : Part 3 : 1980)	Water Absorption (IS 1124: 1974)	Remarks
			From	To					kg/cm^2	kg/cm^2	%	g/cc	g/cc		%	
1	BH-1(ABH-3-1)	70	24.50	26.00	4.28	6.10	1.43	-	-	-	0.71	2.728	2.732	2.83	0.51	
2	BH-1(ABH-3-1)	88	33.50	35.00	4.20	7.21	1.72	-	-	-	0.71	2.739	2.741	2.84	0.22	
3	BH-1(ABH-3-1)	110	44.00	45.50	4.25	6.88	1.62	-	-	-	1.23	2.700	2.704	2.81	0.22	
4	BH-1(ABH-3-1)	29	9.50	11.000	5.19	7.61	1.47	-	-	-	1.95	2.735	2.743	2.79	0.78	

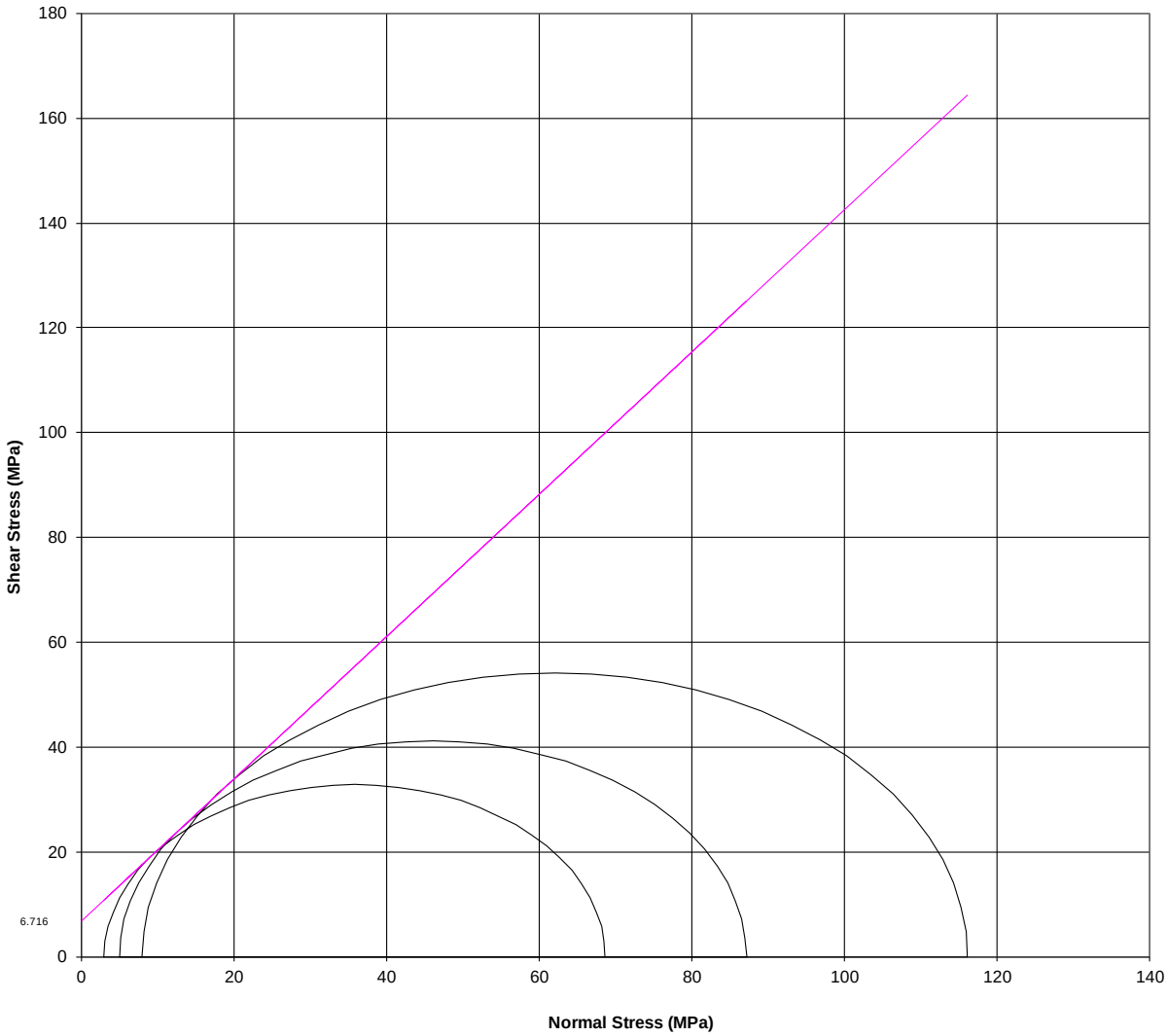
National High Speed Rail Corporation Ltd. Reg. No. 291002

Rock Triaxial Compressive Test (Bole: ABH-3-1; Depth = 9.50 M - 11.00 M)

Rock Triaxial Compression Test					
Labortory testing of core samples					Job No.
Test Depth (m)	9.50-11.00	BH. No.	ABH-3-1	Test Date	-
Test method :	IS:13047	Test Condition :	Dry	Nominal diameter	54 mm

Specimen Details					
Specimen 1		Specimen 2		Specimen 3	
Sample ID.	29A	Sample ID.	29B	Sample ID.	29C
Bulk Density (g/cc)	2.71	Bulk Density (g/cc)	2.67	Bulk Density (g/cc)	2.71
Confining Pressure (MPa)	3.0	Confining Pressure (MPa)	5.0	Confining Pressure (MPa)	8.0
Shear strength (MPa) C_u	32.8	Shear strength (MPa) C_u	41.1	Shear strength (MPa) C_u	54.1
Measured deviator stress Mpa	65.7	Measured deviator stress Mpa	82.2	Measured deviator stress Mpa	108.6
Cohesion, c (Mpa)		**6.7**	**Internal friction angle, ϕ (degree)**		**53.6**

Mohr Circle Plot



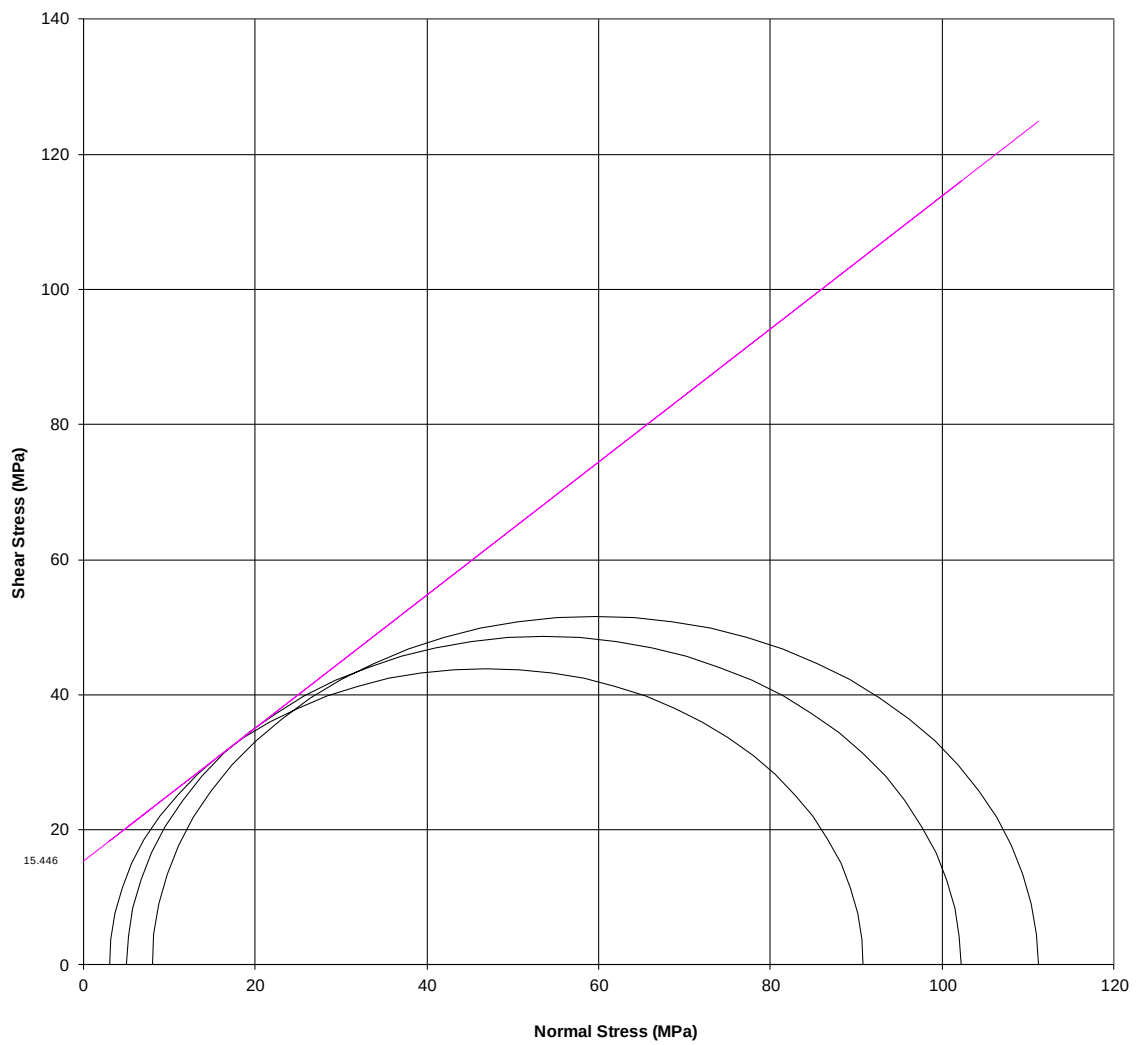
National High Speed Rail Corporation Ltd. Reg. No. 291002

Rock Triaxial Compressive Test (Bole: ABH-3-1; Depth = 24.50- 26.0 M)

Rock Triaxial Compression Test					
Labortory testing of core samples					Job No.
Test Depth (m)	24.50-26.00	BH. No.	ABH-3-1	Test Date	-
Test method :	IS:13047	Test Condition :	Dry	Nominal diameter	54 mm

Specimen Details					
Specimen 1		Specimen 2		Specimen 3	
Sample ID.	70A	Sample ID.	70B	Sample ID.	70C
Bulk Density (g/cc)	2.75	Bulk Density (g/cc)	2.75	Bulk Density (g/cc)	2.74
Confining Pressure (MPa)	3.0	Confining Pressure (MPa)	5.0	Confining Pressure (MPa)	8.0
Shear strength (MPa) C_u	43.9	Shear strength (MPa) C_u	48.6	Shear strength (MPa) C_u	51.6
Measured deviator stress Mpa	87.8	Measured deviator stress Mpa	97.2	Measured deviator stress Mpa	103.2
Cohesion, c (Mpa)		**15.4**	**Internal friction angle, ϕ (degree)**		**44.5**

Mohr Circle Plot



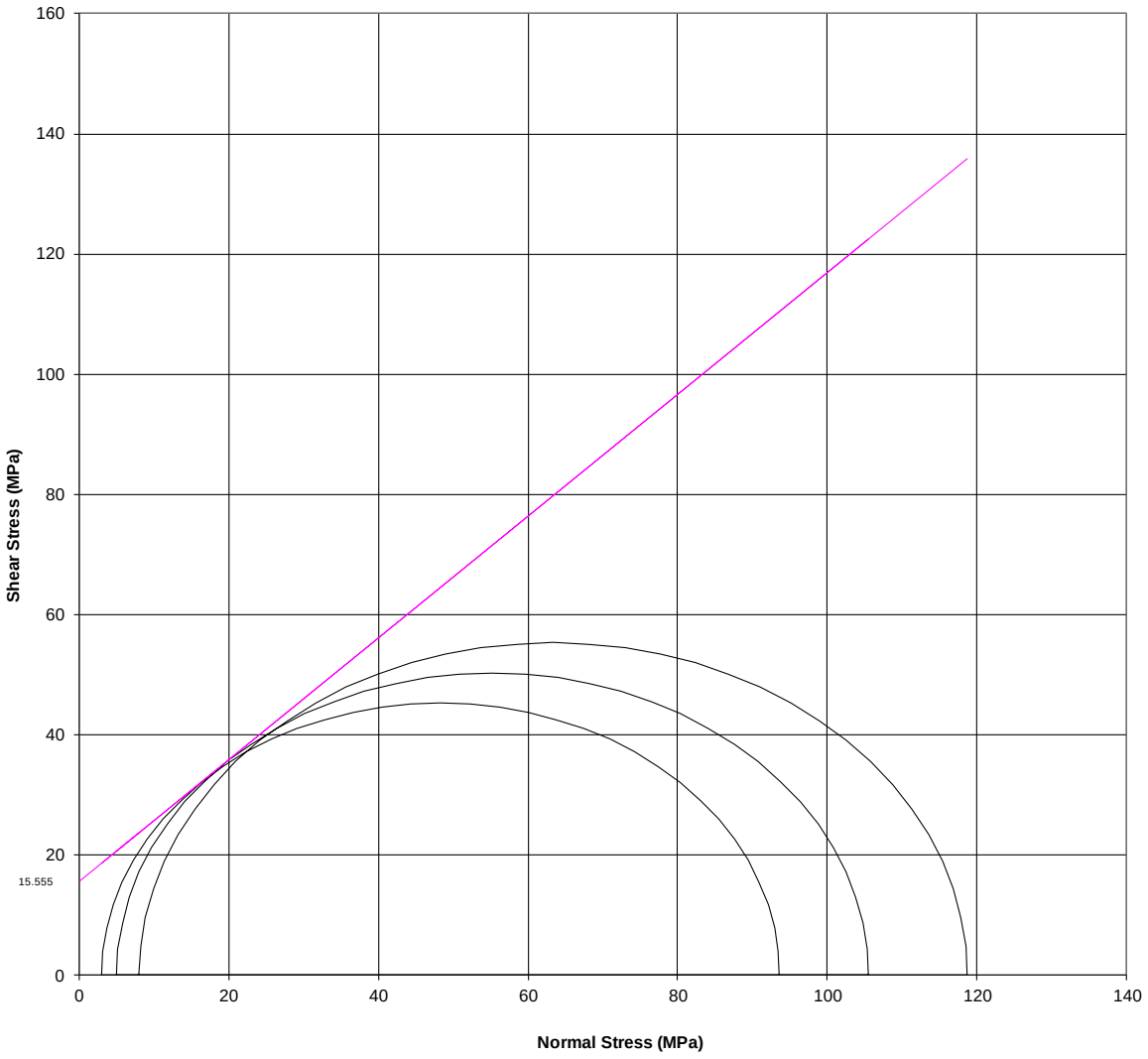
National High Speed Rail Corporation Ltd. Reg. No. 291002

Rock Triaxial Compressive Test (Bole: ABH-3-1; Depth = 33.50- 35.0 M)

Rock Triaxial Compression Test					
Labortory testing of core samples					Job No.
Test Depth (m)	33.50-35.00	BH. No.	ABH-3-1	Test Date	-
Test method :	IS:13047	Test Condition :	Dry	Nominal diameter	54 mm

Specimen Details					
Specimen 1		Specimen 2		Specimen 3	
Sample ID.	88A	Sample ID.	88B	Sample ID.	88C
Bulk Density (g/cc)	2.74	Bulk Density (g/cc)	2.76	Bulk Density (g/cc)	2.74
Confining Pressure (MPa)	3.0	Confining Pressure (MPa)	5.0	Confining Pressure (MPa)	8.0
Shear strength (MPa) C_u	45.3	Shear strength (MPa) C_u	50.2	Shear strength (MPa) C_u	55.3
Measured deviator stress Mpa	90.6	Measured deviator stress Mpa	100.5	Measured deviator stress Mpa	110.7
Cohesion, c (Mpa)		**15.6**	**Internal friction angle, ϕ (degree)**		**45.4**

Mohr Circle Plot



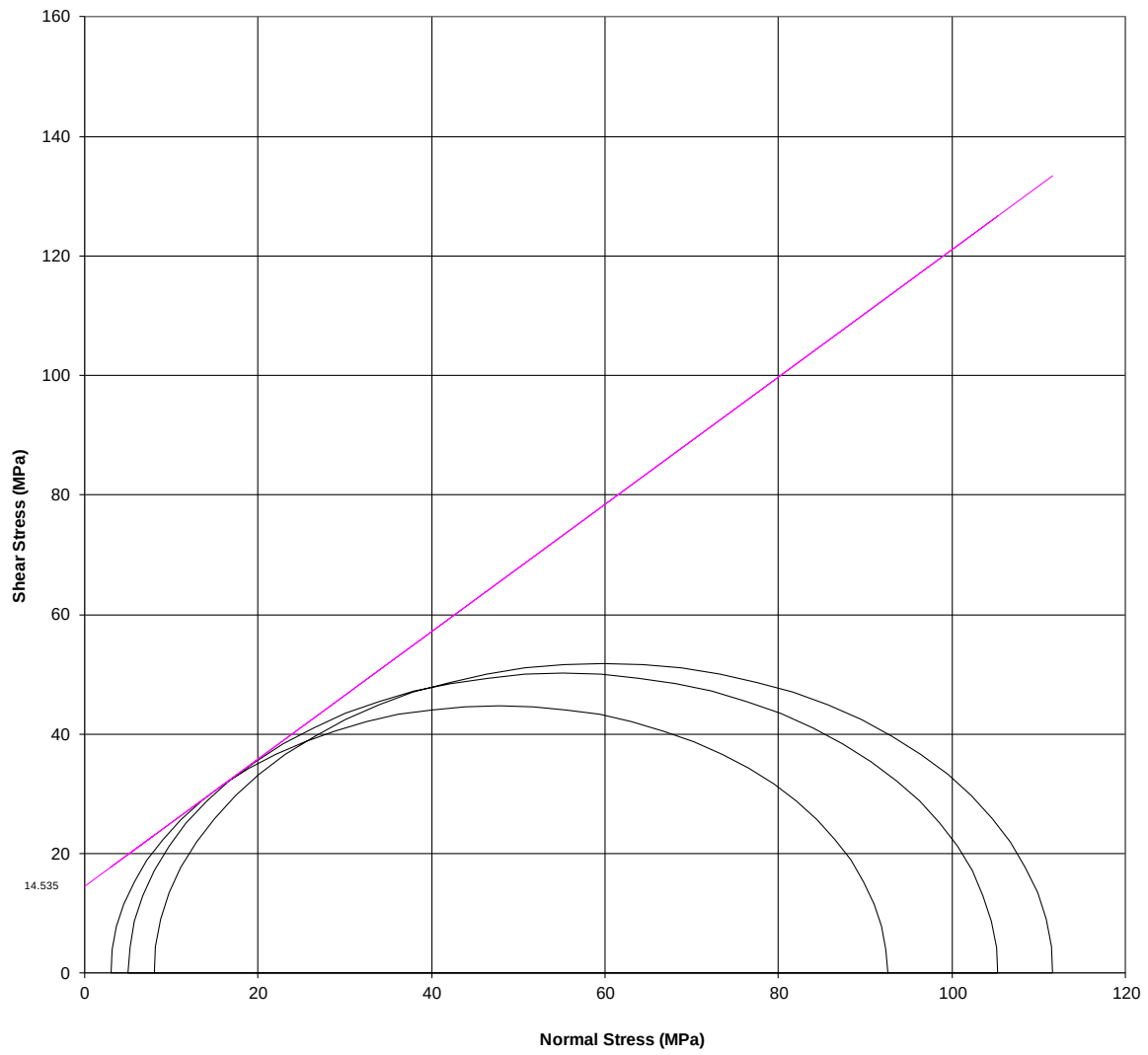
National High Speed Rail Corporation Ltd. Reg. No. 291002

Rock Triaxial Compressive Test (Bole: ABH-3-1; Depth = 44.00- 45.50 M)

Rock Triaxial Compression Test					
Labortory testing of core samples					Job No.
Test Depth (m)	44.00-45.50	BH. No.	ABH-3-1	Test Date	-
Test method :	IS:13047	Test Condition :	Dry	Nominal diameter	54 mm

Specimen Details					
Specimen 1		Specimen 2		Specimen 3	
Sample ID.	110A	Sample ID.	110B	Sample ID.	110C
Bulk Density (g/cc)	2.71	Bulk Density (g/cc)	2.70	Bulk Density (g/cc)	2.69
Confining Pressure (MPa)	3.0	Confining Pressure (MPa)	5.0	Confining Pressure (MPa)	8.0
Shear strength (MPa) C_u	44.8	Shear strength (MPa) C_u	50.1	Shear strength (MPa) C_u	51.8
Measured deviator stress Mpa	89.5	Measured deviator stress Mpa	100.3	Measured deviator stress Mpa	103.6
Cohesion, c (Mpa)		**14.5**	**Internal friction angle, ϕ (degree)**		**46.8**

Mohr Circle Plot



(iv) Packer Permeability Test

(Refer: - I.S CODE - 5529 PART - 2 – 2006)

Project: Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)

Client: NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED

SRGeo

PACKER PERMEABILITY TEST

Chainage :	16[K]250[m]	Date	22-Feb-19
Borehole No.:	ABH-3-1	Type of Drilling:	Rotary Drilling
		Diameter of Hole :	Nx
Ground water table	1.50 m	Total depth of hole:	50.00 m
		Depth tested from.:	10.00 to 46.50

Test No.	Test Section From	Test Section To	Test Section Length	Water Pressure at collar (H_1)	H_2	Meter Reading of water Intake: Initial Reading	Reading after 5 min	Reading after 10 min	Reading after 15 min	Water Intake: First 5 Min	Second 5 Min	Third 5 Min	Effective Water Pressure	Average of last two readings	Permeability
	m	m	m	kg/cm²	m	Litre	Litre	Litre	Litre	Lit/min	Lit/min	Lit/min	kg/cm²	Lit/min	Lugeons
	Height of the water swivel:				*1.05*	*m*									
1	10.00	11.50	1.5	1.0	1.50	21.20	22.50	23.80	24.70	0.26	0.26	0.18	1.26	0.22	1.17
	10.00	11.50	1.5	1.5	1.50	26.00	27.20	28.10	29.50	0.24	0.18	0.28	1.76	0.23	0.87
	10.00	11.50	1.5	2.0	1.50	31.50	32.30	33.20	34.70	0.16	0.18	0.30	2.26	0.24	0.71
	10.00	11.50	1.5	1.5	1.50	35.50	36.00	36.70	37.20	0.10	0.14	0.10	1.76	0.12	0.46
	10.00	11.50	1.5	1.0	1.50	38.00	38.50	39.20	39.70	0.10	0.14	0.10	1.26	0.12	0.64
	Height of the water swivel:				*0.70*	*m*									
2	25.00	26.50	1.5	1.0	1.50	41.00	41.70	42.50	43.10	0.14	0.16	0.12	1.22	0.14	0.77
	25.00	26.50	1.5	1.5	1.50	44.70	45.50	46.80	48.00	0.16	0.26	0.24	1.72	0.25	0.97
	25.00	26.50	1.5	2.0	1.50	49.00	49.70	51.20	53.00	0.14	0.30	0.36	2.22	0.33	0.99
	25.00	26.50	1.5	1.5	1.50	54.50	55.70	55.90	56.30	0.24	0.04	0.08	1.72	0.06	0.23
	25.00	26.50	1.5	1.0	1.50	57.00	57.50	58.20	59.00	0.10	0.14	0.16	1.22	0.15	0.82
	Height of the water swivel:				*0.80*	*m*									
3	35.00	36.50	1.5	1.0	1.50	63.70	64.10	64.90	65.30	0.08	0.16	0.08	1.23	0.12	0.65
	35.00	36.50	1.5	1.5	1.50	66.80	69.50	69.90	70.20	0.54	0.08	0.06	1.73	0.07	0.27
	35.00	36.50	1.5	2.0	1.50	73.00	73.40	73.90	74.80	0.08	0.10	0.18	2.23	0.14	0.42
	35.00	36.50	1.5	1.5	1.50	76.10	76.50	77.10	77.50	0.08	0.12	0.08	1.73	0.10	0.39
	35.00	36.50	1.5	1.0	1.50	78.80	79.40	79.80	80.10	0.12	0.08	0.06	1.23	0.07	0.38
	Height of the water swivel:				*0.75*	*m*									
4	45.00	46.50	1.5	1.0	1.50	91.20	91.70	92.30	93.10	0.10	0.12	0.16	1.23	0.14	0.76
	45.00	46.50	1.5	1.5	1.50	94.20	94.60	95.20	95.40	0.08	0.12	0.04	1.73	0.08	0.31
	45.00	46.50	1.5	2.0	1.50	97.00	97.60	98.10	98.80	0.12	0.10	0.14	2.23	0.12	0.36
	45.00	46.50	1.5	1.5	1.50	98.90	99.10	99.30	99.70	0.04	0.04	0.08	1.73	0.06	0.23
	45.00	46.50	1.5	1.0	1.50	101.00	101.20	101.30	101.50	0.04	0.02	0.04	1.23	0.03	0.16

National High Speed Rail Corporation Ltd. Reg. No. 291002

Project: Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)

Client: NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)

SRGeo

PACKER PERMEABILITY TEST

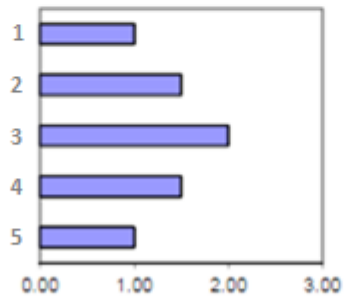
Chainage : $16^{K}250^{m}$

Borehole No.: ABH-3-1

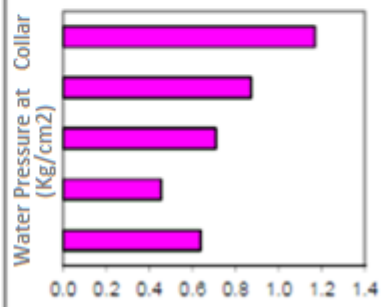
Test From	10.00 m
Test To	11.50 m
Section Length	1.50 m

Water Press at collar Kg/cm²	Permeability Lugeons
1.00	1.17
1.50	0.87
2.00	0.71
1.50	0.46
1.00	0.64

Test Pressure



Luegeon Pattern



Flow Type	Void Filling	Permeability	0.46 Luegeons

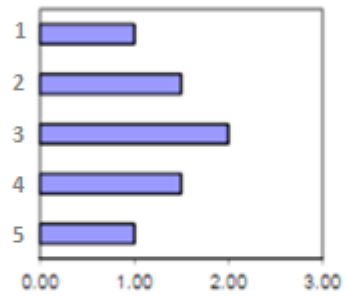
Chainage : $16^{K}250^{m}$

Borehole No.: ABH-3-1

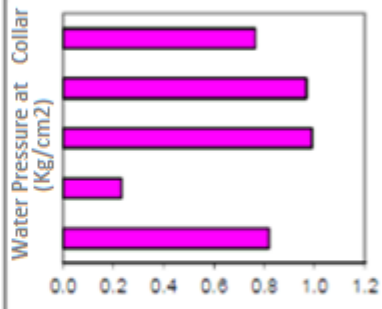
Test From	25.00 m
Test To	26.50 m
Section Length	1.50 m

Water Press at collar Kg/cm²	Permeability Lugeons
1.00	0.77
1.50	0.97
2.00	0.99
1.50	0.23
1.00	0.82

Test Pressure



Luegeon Pattern



Flow Type	Dilation	Permeability	0.82 Luegeons

National High Speed Rail Corporation Ltd. Reg. No. 291002

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Client: NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)

SRGeo

PACKER PERMEABILITY TEST

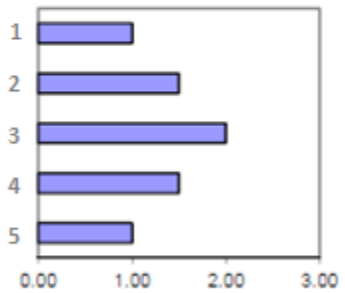
Chainage : $16^{K}250^{m}$

Borehole No.: ABH-3-1

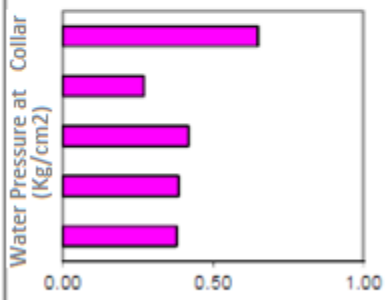
Test From	35.00 m
Test To	36.50 m
Section Length	1.50 m

Water Press at collar Kg/cm²	Permeability Lugeons
1.00	0.65
1.50	0.27
2.00	0.42
1.50	0.39
1.00	0.38

Test Pressure



Luegeon Pattern



Flow Type	Laminar Flow	Permeability	0.42 Luegeons

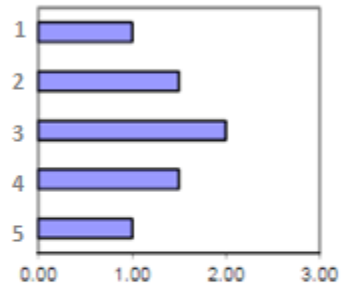
Chainage : $16^{K}250^{m}$

Borehole No.: ABH-3-1

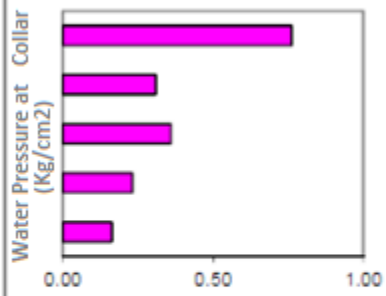
Test From	45.00 m
Test To	46.50 m
Section Length	1.50 m

Water Press at collar Kg/cm²	Permeability Lugeons
1.00	0.76
1.50	0.31
2.00	0.36
1.50	0.23
1.00	0.16

Test Pressure



Luegeon Pattern



Flow Type	Void Filling	Permeability	0.16 Luegeons

S & R Geotechniques Pvt. Ltd. Navi Mumbai

National High Speed Rail Corporation Ltd. Reg. No. 2910

(v) Slake Durability Index

INDIAN MATERIAL RESEARCH CENTER

IMRC

Expert Analyst for Geotechnical/Geological Investigation (Land and Marine), Surveying work, Concrete, Asphalt, Reinfocement, Cements, NDT and Other Engineering Material

Email: imrc.analysis@yahoo.in

Plot No.G-75/76, Sector-12, Kharghar Navi Mumbai - 410210. Mob.09819961252

Cert. No.: TC/8232

QCI

Government Approved Lab as per ISO/IEC 17025
by National Accreditation Board for Testing and Calibration Laboratories (NABL)
(A Constituent Board of Quality Council of India)

TEST REPORT

Test Report No. & date	:	**IMRC/TR/190504001-1 to 4** **08/05/2019**
Name of Customer & Address	:	AMIAND CONSULTING PVT. LTD.
Name & Address of project	:	Geotechnical Investigation work for Preparatory work for the NATM Portal of the C-2 for Mumbai Ahmadabad High Speed Railway Project.
Name of Contractor/Consultant	:	ASSOCIATE DRILLING SERVICES
Customer reference No.	:	Letter dated 04/05/2019
Nature/Source of the sample	:	Rock Core
Quantity	:	4 No. (Approx 2 Kg each)
Condition of sample	:	Acceptable
Test method followed	:	IS 10050 1981 Reaffirmed 2001
Date of receipt of sample	:	04/05/2019
Date of start of analysis	:	05/05/2019
Date of completion of analysis	:	07/05/2019

ROCK SLAKE DURABILITY INDEX

Sr. No.	Job Id	Sample Description	Sample No.	Slake Durability Index (Id) %
1	190504001-1	BH-3/1 Depth-14.00-15.50 m	45	97.69
2	190504001-2	BH-3/1 Depth-24.50-26.00 m	69,24	98.60
3	190504001-3	BH-3/1 Depth-33.50-35.00 m	50	98.72
4	190504001-4	BH-3/1 Depth-44.00-46.50 m	44	98.63

Note : This certificate is valid at the time and under conditions specified herein.
This certificate refers only to the sample submitted for testing.
Report on tests samples will be preserved with us for two years from the date of testing.
Any correction invalidates this certificate.
This report shall not be reproduced except in full without written approval from **M/s. Indian Material Research Center.**

----------END OF REPORT----------

FORMAT NO. : IMRC/FM/047/001/001/005
REVISON NO. : 00

Authorised Signatory
Sachin Shinde
(Technical Director)

INDIAN MATERIAL RESEARCH CENTER IMRC

National High Speed Rail Corporation Ltd.
Reg. No. 291002

B. ABH3-2

I. BORELOG

BORE HOLE LOCATION: UCO Bank Plot, Ghansoli;
BORE HOLE NO. – ABH3-2; DEPTH- 17 M;

Client :- **NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)**	Boring No. : ABH3-2
Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)	Sheet : 1 of 2
	Depth of Bore Hole : 17.00m BGL
CHAINAGE :-- 16^{K} 150^{M}	Depth of Casing : 7.50 m BGL
CO-ORDINATE :-- N-2114578.935, E-290624.048 R. L. : 7.550mtr (GROUND ELEVATION)	Date of Commencement : 27/02/2019
Depth of GWT : 5.00mtr	Date of Completion : 02/03/2019

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
0.00	0.00	100.00														
1.00	1.50			From1.00 MTR TO 01.50MTR Back filling material			0.00	1.50								
2.00	2.00			From1.50 MTR TO 03.00MTR Brownish sandy CLAY												
3.00	3.00								10	--	--	--	N			
4.00	4.00			From3.00 MTR TO 4.00MTR Completely weathered Basalt		SPT1	3.00	3.10	51	--	--	--	R	40	NIL	
5.00	5.00			From 4.0 MTR TO 6.50MTR Completely weathered yellowish brown Basalt		CORE	4.00	5.00						45	NIL	
6.00	6.50					CORE	5.00	6.50						45	NIL	
7.00	8.00			From 6.50 MTR TO 8.00MTR Slightly weathered greyish brown fractured BASALT with white infilling material		CORE	6.50	8.00						85	40	
				8.00 MTR to 8.40 MTR fracture zone												
9.00	9.50			From 8.40 MTR TO 17.00MTR Fresh Basalt		CORE	8.00	9.50						95	69	
10.00	11.00					CORE	9.50	11.00						95	94	
12.00	12.50			Fresh greyish brown amygdaloidal BASALT with white infilling material		CORE	11.00	12.50						99	99	
13.00	14.00					CORE	12.50	14.00						100	100	
15.00						CORE	14.00	15.50						100	100	

D : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

Site - Incharge---	Client Rept.	Drawn By : Sanjay M. Varadkar

National High Speed Rail Corporation Ltd. Reg. No. 291002

Client :- **NATIONAL HIGH SPEED RAIL CORPORATION LTD. (NHSRCL)**

Boring No. : ABH3-2

Project :- GEOTECHNICAL & GEOPHYSICAL INVESTIGATION FOR C-2 PACKAGE OF MUMBAI - AHMEDABAD HIGH SPEED RAIL PROJECT (SAWALI)

Sheet : 2 of 2

Scale	Depth m	R.L. m	Log	Description	Sample No.	Type	Depth m From	Depth m To	SPT 'N' Value 15	30	45	60	N	CR %	RQD %	Remarks / Other Tests
15.00	15.00			Fresh greyish brown amygdaloidal BASALT with white infilling material												
	15.50					CORE	14.00	15.50						100	100	
16.00						CORE	15.50	17.00						100	100	
17.00	17.00															
18.00																
19.00																
20.00																
21.00																
22.00																
23.00																
24.00																
25.00																
26.00																
27.00																
28.00																
29.00																
30.00																

D : Disturbed Sample
UDS : Undisturbed Sample
SPT : Standard Penetration Test
WS : Wash Sample

CR : Core Recovery
RQD : Rock Quality Designation
PR : Rate of Penetration
VST : Vane Shear Test

K : Permeability Test
PT : Packer Permeability Test
BP : Broken Pieces

Site - Incharge : --

Client Rept.

Drawn By : Sanjay M. Varadkar

II. LABORATORY TEST

Project	Geotechnical & Geophysical Investigation for C-2 Package of Mumbai – Ahmedabad High Speed Rail Project (Sawali)
Contractor	M/s Amiand Consulting Pvt. Ltd.
Principle Client	NATIONAL HIGH-SPEED RAIL CORPORATION LIMITED (NHSRCL)
Date	02/04/2019

ANNEXURE- 1A
TEST RESULTS OF ROCK CORES

S. No.	Bore Hole No.	Core No.	Depth, m		Diameter, cm	Height, cm	H: D (H/D)	Condition of Test (Soak/Unsoak)	Uniaxial Compressive Strength (IS: 9143: 1979)	Point load strength index (IS: 8764: 1998)	Porosity (IS 13030: 1991)	Dry Density (IS 13030: 1991)	Specific Gravity (IS 2720: Part 3: 1980)	Water Absorption (IS 1124: 1974)	Remarks
			From	To					kg/cm2	kg/cm2	%	g/cc		%	
1	ABH-3-2	30	9.50	11.0	5.24	10.94	2.09	Unsoak	780.66	-	-	-	-	-	
2	ABH-3-2	42	15.5	17.0	5.25	10.87	2.07	Unsoak	1077.97	-	-	-	-	-	