

(By facsimile)

Ref. No.: GSIDC/Engg/Works/877/5461

6 December 2017

To

The Executive Engineer,

Mormugao Port Trust Headland, Sada,

Goa- 403804

Sir.

Mormagae Port Tragray stading an angles. Calco of the Chief Engles.

100 Bo. 46 N

Rans 8 12

Sub.: Demolition of old existing jetty & Reconstruction of New Captain of Ports Jetty at Old Goa & Panaji. Reg. Soil Investigation data.

Ref.:

- 1. Letter no. CE/Works/IWAI/2017/5172 dated 15/11/2017.
- 2. Letter no. CP/HSO/245/5266 dated 22/11/2017.

With reference to above cited letter, please find enclosed herewith soil investigation data for Captain of Ports jetty at Panaji and Captain of Ports Jetty at Old Goa was submitted by Consultant, M/s. Daftary Descon Engineering Pvt. Ltd. for your further needful.

Thanking you,

Yours faithfully

(Sudesh Sangodkar) Dy. Manager (Civil)

Encl.: As above.

Copy to:

1. The Captain,
Captain of Ports Department,
Dayanand Bandodkar Road,
Panaji, Goa.



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JOB NO.G4.026: S.I. PROPOSED JETTIES AT PANAJI, BRITONA, OLD GOA. JAN. '07

REPORT

SOIL INVESTIGATION FOR PROPOSED EXPANSION OF CAPTAIN OF PORT JETTIES AT OLD GOA, BRITONA & PANAJI GOA.

CLIENT

M/S. CONSTRUMA CONSULTANCY PVT. LTD. 2ND FLOOR, PINKY PLAZA, 5TH ROAD KHAR (WEST), MUMBAI – 400052.

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(A) CHEMICAL ANALYSIS RESULTS OF SOIL SAMPLE

Sr.	ВН	Sample	Depth be	elow BL	BL Chemical analysis results				
No.	No.	No.	(m	1)	рН	Chloride as	Sulphate as		
			From	То		CI SO ₃ (%)			
1	1	1	1.60	2.20	6.80	0.23	0.85		

(B) CHEMICAL ANALYSIS RESULTS OF WATER SAMPLE

Sr.	BH	Sample	Depth below	Chemical analysis results				
No.	No.			рН	Chloride as Cl (mg/l)	Sulphate as SO ₄ (mg/l)		
						,		
1	River water		1.00	7.75	18410	2925		

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(A) CHEMICAL ANALYSIS RESULTS OF SOIL SAMPLE

Sr.	ВН	Sample	Depth be		Chemical analysis results				
No.	No.	No.	(n	n)	рН			Sulphate as	
	÷	1 -	From	То		(%)	SO ₃ (%)		
				-		(70)	(70)		
1	1	1	1.60	2.20	6.80	0.23	0.85		
			92						

(B) CHEMICAL ANALYSIS RESULTS OF WATER SAMPLE

Sr.	ВН	Sample			Chemical analysis results		
No.	No.	No.	water surface (m)	рН	Chloride as Cl (mg/l)	Sulphate as SO ₄ (mg/l)	
1	River water		1.00	7.75	18410	2925	

FIG. NO. : CHEMICAL ANALYSIS RESULTS OF SOIL & WATER SAMPLES



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REPORT

SCOPE OF WORK

Captain of Port had built jetties at Old Goa, Britona & Panaji long back which have gone weak due to time & use and are not adequate for today's demand. Hence, Captain of Ports have proposed for expansion of jetties at these locations. This expansion is being done by GSIDC. GSIDC has appointed Construma Consultancy Pvt. Ltd. as Consultants for this expansion work of jetties. Hence, it was decided to do the soil investigation to know the founding strata for foundation design of COP jetty at Old Goa, Britona & Panaji.

The soil investigation consisted of drilling two boreholes at each site from existing jetty top upto and into the rock including conducting necessary field standard penetration test, laboratory tests and submitting report alongwith foundation recommendations

2. DRILLING AND FIELD TESTS

Drilling rig was erected on top of existing jetty at Old Goa & Panaji. However, timber ballies temporary platform was done at Britona.

Drilling was done by power operated rotary drilling rig with tungsten carbide and diamond bits. Depth of borehole at different sites is as under:

Site	BH no.	Depth below BL (m)
Site Old Goa Britona	BH1	23.88
	BH2	21.70
Britona	BH3	24.04
	BH4	24.08
Panaji	BH5	22.88
. arraji	BH6	25.66

Water was circulated by pressure pump. Drilling was done by NX tungsten carbide core bit in overburden and by diamond bit in rock. 100mm / NX size casing was used in the drill hole to prevent collapse.

Standard penetration tests and undisturbed sampling were conducted at regular intervals. Soil samples from the split spoon sampler were collected in plastic bags as representative disturbed samples for visual classification. Site layout plan showing location of borehole is placed at fig. No.2, 10 & 17 respectively for Old Goa, Britona & Panaji jetty site. Borehole log in standard proforma giving different soil strata metwith, SPT – N values, details of sampling done etc. are placed sitewise.

Standard penetration test results and rock core recovery details are tabulated separately in standard tabular proforma and placed sitewise.

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3. LABORATORY TESTS

Laboratory tests were conducted on the samples collected depending upon the nature of the soil. These include field density and natural moisture content, Atterberg's limits, mechanical analysis, specific gravity, box shear and their results are placed sitewise.

Rock crushing strength test was done on soaked rock core samples and results are placed sitewise

Chemical analysis was also done on one soil and one water sample from Old Goa site for pH, sulphate and chloride contents and their results are placed at fig no.9.

4. SOIL / ROCK STRATA

The soil & rock profile as revealed by boreholes drilled is generally as below:

Strata		Site								
χ.	Old G	oa	Brito	na	Pana	iji .				
,	Thickness	Av.	Thickness	Av.	Thickness	Av.				
	(m)	SPT-N	(m)	SPT-N	(m)	SPT-N				
a) Alluvial deposits Very soft,			2.30 to	01 to	9.0 to	<1 to				
grey, marine clayey silt	4.10	<1	3.60	07	12.0	18				
b) Insitu strata: Red, brown,						*				
lateritic clayey silt with	3.4 to	9 to	11.0 to	17 to	4.50 to	10 to				
gravels & fragments.	4.9	21	12.90	>50	6.0	>50				
c) Stiff to very stiff yellow,										
brown, grey, phyllitic clayey	ĮK.	13 to								
silt.	3.0	34	Nil		Nil					
d) Brown, grey clayey silt										
(derived from highly	8.08 to	24 to	3.55 to	24 to	2.50 to					
weathered rock)	8.77	>50	6.70	>50	5	>50				
e) Weathered soft rock.	Nil		0.87	>50	0.70 to	>50				
					4.60					
f) Hard rock	18.58		20.10		20.70					
	to		to		to					
	20.77		20.87		22.60					
	below		below		below					
	bed		bed		bed					

Details of strata is given in borehole logs of each site placed in annexure.

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5. FOUNDATION RECOMMENDATIONS

Since rock is available at reasonable depth, it is feasible to adopt R.C. cast insitu pile foundations for the jetty extension. The piles can be bored and socketed in the hard rock. Chiselling can be done to socket the piles in rock.

The vertical load carrying capacity of the pile can be limited to crushing strength of concrete with adequate factor of safety.

For a typical case of 1000mm dia., M-30 concrete pile socketed in rock, the safe load in pile can be taken as 470 MT. For other dias; safe load can be estimated accordingly.

The piles will of course have to be designed for other lateral and berthing loads.

For DAFTARY - DESCON ENGINEERING PVT. LTD.

Manager

SARVESH SHENFY

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JOB NO. G4. 026: S.I. PROPOSED JETTIES AT PANAJI, BRITONA. B o A D E Our Lady of Bicholim(Dicholi) Ry/ Corjuern 3 Mapusa Lamgao A Miracles Church Aldona BICHOLIM 面人的門面 Mayem Bastora Aniuna Beach Sarvor Arpora De. OPaliem Bhagwan 🚹 🔥 🌹 Baga Matt Piligao Baga Beach Pomburpa d Shri Sapta Koteshwar Nagoa Temple 1 Porvorim C.O.P. Calangute Beach C.O.P. C.O.P. JETTY Mapu JETTY JETTY OLD GOA Piedade BRITONA PANAJI Marcela Candolim Beach 1-femple_ -BIRD Betim Cumbarjua Mandovi River MA Orgao Sinquerim Beach Reis Mago Len O Ribandar Old Goa Fort L Aguada Willi Corlini C PANAJI ISWADI Fort Aguada Bay Karmali B.S. LODOLUBE Carambolim Merces LINE Cruz Taleigao Dental Collec Boma Santana Church Caranzale Bambolim o Goa University 531 oa Medical Dona Paula Beach A Shri Mano Dona Paula College Pilar RAILV Vainguinim Beach Seminary kijua Cano Mahalsa Temple Mormugao Siridao Goa Velha Bay Siridao Beach Mercurim Agassaim Farr River Zuari Shri Nagesh Tem 口黑能让 San Jacinto Island Bandora a (Kortali) Cambariem Island Sancoale Chicalim Ramnath Temple (17A) Vasco da Gama Sanctuary 114 Fr. Jose Vaz 国人出人国 Dabolim R.S. Quelos (Kavl Dabolim MORMU G A 丁士 Z.Di Pequeno I. Consua Bogmalo Beach Issorcim Racaim Velsao and the same of th Sao Jorge Island Cansaulim R Lou Velsao Beach -Grande I. Ambor Majorda Beach Raia Majorda 6 R.S Nuver ARABIAN SEA

FIG. NO. 1 : GENERAL SITE LOCATIONS PLAN (NTS)

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9 Near Municipal Garden, Velhos Bldg; 2nd floor, Panaji, Goa. 403 001. GOA OFFICE JAN. 107 BOREHOLE LOCATIONS BH LEGEND EXISTING & PROPOSED PLAN OF COP @ OLD GOA FIG.NO. 2 : SITE LAYOUT PLAN SHOWING BOREHOLE LOCATIONS (NTS) EXISTING JETTY - ROAD -MANDOVI RIVER JOB NO.G4.026: S.I. PROPOSED COP JETTY AT OLD GOA, GOA. BH2 PROPOSED JETTY DAFTARY DESCON ENGINEERING PVT. LTD. _LMOORPHC RING

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JAN. '06

FIG NO.3: BOREHOLE LOG NO.1 (CORLIM SIDE)

Date Of Start

10/11/2006

Rotary Drilling

TC / diamond bit

Date Of Completion:

15/11/2006

Dia. Of Casing

100mm / NX

Borehole Coords

Refer site layout plan

Dia. Of Core

NX

Bed level

(-) 3.99m w.r.t. jetty top RL (+) 3.21m

O	Depth	Description	SPT		Sar	nples		Remarks
)Ę	below	2	N	No.	Type	Dept	h (m)	
Profile	BL (m)	ALLUVIAL DEPOSITS				From	То	
X	(111)	ALLOVIAL DEI GOTTO						
_	1							1
		Dark grey, very soft	<1	01	DP	01.50	02.10	
X		marine clayey silt with		32				
_	2.5	some broken shells pieces		*				
X		(CHICOL)	<1	02	DP	03.05	03.55	
X								
-		INSITU STRATA	09	03	DP	04.63	05.08	
Xo	5.0			04	UD	05.08	05.43	
0			y .					
		Maroon, orange, yellow,	19	05	DW	06.00	06.45	DP sample slipped.
X		brown, grey stiff to very		N. C.		T.		
Ď		stiff lateritic clayey silt with						,
1	7.5	quartzitic gravels &	21	06	DP	07.50	07.95	
X	\	fragments.						
Xo	:		10	0.7	DD	00.05	00.50	
		,	18	07	DP	09.05	09.50	
XX	10.0				A	*		01.4
_	10.0		34	08	DP	10.50	10.95	
XX		Yellow, brown, grey, very	04	00	DI	10.50	10.33	
		stiff phyllitic clayey silt.						
XX				09	UD	12.05	12.40	
XX	12.5							
V X		3.						
_			41	10	DP	13.50	13.95	
XX		Brown, grey, very stiff						3
		clayey silt (derived from						
XX	15.0	highly weathered rock)						
_								
X								

LEGEND

DP

Sample From SPT Tube

UD

Undisturbed Sample

DW

Wash Sample

CB

Core Barrel Sample

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JAN. '06

FIG NO.3: BOREHOLE LOG NO.1 (CORLIM SIDE) (CONTD.)

Date Of Start

10/11/2006

Rotary Drilling

TC / diamond bit

Date Of Completion:

15/11/2006

Dia. Of Casing:

100mm / NX

Borehole Coords :

Refer site layout plan

Dia. Of Core

: NX

Bed level

(-) 3.99m w.r.t. jetty top RL (+) 3.21m

a	Depth	Description	SPT		Sar		Remarks	
III.	BL (m)	4	N	No.	Type	Dept	h (m)	
Profile						From	То	
XX			>50	11	DP	15.00	15.45	
			>50	12	DP	16.50	16.78	
XX		*					12.0	×
_	17.5	Brown, grey, very stiff						
V.		clayey silt (derived from	>50	13	DP	18.00	18.29	
ХX		highly weathered rock).				3.2		0 32
_								(b)
XX	20.0		>50	14	DP	20.05	20.12	
		HARD ROCK		15-20	СВ	20.77	21.10	
		Greyish, fine grained,		13-20	CD	20.11	21.10	
		compact, hard rock		21-23	СВ	22.10	23.35	
	22.5	having vertical & inclined		21-23	CD	22.10	25.55	
	22.5	joints & yielding very good		24-28	СВ	23.35	23.82	
		core recovery.		24-20	CD	23.33	23.02	
3/		core recovery.						Depth of water was
Y								5.90m on 14/11/06
	25.0			-				at 6.45 a.m. with
	20.0							tide level of
								(+)1.91m from tide
								table.
	27.5							
	27.5	1						
								-
	30.0							
							,	
		BOREHOLE DE	PTH E	BELOW	BL = 2	3.82M		

LEGEND

DP

Sample From SPT Tube

UD

DW

Wash Sample

CB

Undisturbed Sample Core Barrel Sample

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FIG NO.4: BOREHOLE LOG NO.2 (RIBANDER SIDE)

Date Of Start

18/11/2006

Rotary Drilling

TC / diamond bit

Date Of Completion:

25/11/2006

Dia. Of Casing :

100mm / NX

Borehole Coords

Refer site layout plan

Dia. Of Core

Bed level

(-) 3.44m w.r.t. jetty top RL (+) 3.21m

NX

O)	Depth	Description	SPT		Sar	· · · · · · · · · · · · · · · · · · ·	Remarks	
)ĮĮ	below		N	No.	Type	Dept	h (m)	
Profile	BL (m)	ALLUVIAL DEPOSITS				From	То	
×								
							11.7	
IX		Dark grey, very soft	<1	01	DP	01.60	02.20	· · · · · · · · · · · · · · · · · · ·
		marine clayey silt with			5 K			
_	2.5	some broken shells						
×,		(CHICOL)	<1	02	DW	03.05	03.55	DP sample slipped.
_		INSITU STRATA	18	03	DP	04.50	04.95	
.X.	5.0	Red, yellow, brown, grey,	10	03	DF	04.30	04.95	
-	0.0	stiff to very stiff lateritic			-			
		clayey silt with gravels &	16	04	DP	06.05	06.50	-
		fragments.	10	05	UD	06.55	06.90	,
0	- A			00	00	00.00	00.00	
· 0 · 0	7.5		13	06	DP	07.50	07.95	
-		Yellow, brown, grey, very						
XX	1	stiff phyllitic clayey silt with						
XX		some quartzitic fragments.	31	07	DP	09.00	09.45	
1		8.7						7 16
0	10.0			08	CB	09.45	10.50	
XX			26	09	СВ	10.50	10.95	
XX								
_		Brown, grey, very stiff	24	10	DP	12.05	12.50	
XX	12.5	clayey silt (derived from					2	
_		highly weathered rock).						
XX			47	11	DP	13.50	13.95	*
				12	UD	14.00	14.35	
Y	15.0							
XX	,,,,,							
_								
XX								

LEGEND

DP

Sample From SPT Tube

UD

Undisturbed Sample

DW

Wash Sample

CB

Core Barrel Sample

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FIG NO.4: BOREHOLE LOG NO.2 (RIBANDER SIDE) (CONTD.)

Date Of Start

18/11/2006

Rotary Drilling

TC / diamond bit

Date Of Completion:

25/11/2006

Dia. Of Casing :

100mm / NX

Borehole Coords :

Refer site layout plan

Dia. Of Core

NX

Bed level

(-) 3.44m w.r.t. jetty top RL (+) 3.21m

(I)	Depth	Description	SPT		Sar	nples	2	Remarks
įįį	below	- >	N	No.	Type	Dept	h (m)	
Profile	BL					From	То	
	(m)		18	6				
XX		Brown, grey, very stiff	20	13	DP	15.05	15.50	
		clayey silt with white, grey			· ·		w	
· ·	1	hard quartzitic fragments.	>50	14	DP	16.50	16.78	,
XX		(derived from highly		15	CB	16.78	18.10	
_	17.5	weathered rock)						
x.x			>50	16	DP	18.10	18.22	
- x		HARD ROCK		17-27	СВ	18.58	19.80	
		Greyish, fine grained,						
		compact, hard rock			¥			
	20.0	having vertical & inclined		28-35	CB	19.80	21.44	
		joints & yielding very good						
		core recovery.						
				36-38	СВ	21.44	21.70	
20/2								*
	22.5							
								Depth of water was
						100		5.25m on 21/11/06 ⁻
	25.0				8			at 10.45 a.m. with
								tide level of
								(+)1.91m from tide
								table.
	27.5							
		V.						
		и						,
	30.0							
	-	BOREHOLE DE	PTHE	ELOW	BL = 2	1.70M		

LEGEND

Sample From SPT Tube DP

UD

Undisturbed Sample

DW

Wash Sample

CB

Core Barrel Sample

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FIG NO.5: STANDARD PENETRATION TEST RESULTS

1 1	FROM 01.50 03.05	TO 02.10	(CM)	the community parties and the community and processed to	SPT	REMARKS
1	03.05	02.10				
	The second secon		60	01	<1	
1		03.55	50	01	<1	
	04.63	05.08	15	07		
			15	05		
	Part of the second		15	04	09	
1	06.00	06.45	15	.11		
			15	09		
			15	10	19	3
1	07.50	07.95	15	13		
		9 , B	15	11		
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		15	10	21	
1	09.05	09.50	15	05	-	
		2	15	06		
				12	18	
1	10.50	10.95	15	09		
			15	12		
	/ /	×	15	22	34	
1	13.50	13.95	15	.08		
			15	14		
\			15	27	41	
1	15.00	15.45	15	12		
,			15	22		
			15	32	>50	**
1	16.50	16.78	15	19		
			13	50	>50	Rebound from
						32 nd blow.
1	18.00	18.29	15	22		
	,				>50	Rebound from
						31st blow.
1	20.05	20.12	07	50	>50	Rebound after
						6th blow.
2	01.60	02.20	60	1	<1	
			15	01		
				01	<1	
2	04.50	04.95				
_	000	1 1100				
					18	
	1 1 1 1 1 1	1 07.50 1 09.05 1 10.50 1 13.50 1 15.00 1 18.00 1 20.05 2 01.60 2 03.05	1 07.50 07.95 1 09.05 09.50 1 10.50 10.95 1 13.50 13.95 1 15.00 15.45 1 16.50 16.78 1 18.00 18.29 1 20.05 20.12 2 01.60 02.20 2 03.05 03.55	1 06.00 06.45 15 15 15 1 07.50 07.95 15 15 15 1 09.05 09.50 15 15 15 1 10.50 10.95 15 15 15 1 13.50 13.95 15 15 15 1 15.00 15.45 15 1 16.50 16.78 15 1 18.00 18.29 15 1 14 14 1 20.05 20.12 07 2 01.60 02.20 60 2 03.05 03.55 15 35	1 06.00 06.45 15 11 15 09 15 10 15 10 1 07.50 07.95 15 13 15 15 10 10 10 10 11 10 10 10 11 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10<	1 06.00 06.45 15 11 15 09 15 10 19 1 07.50 07.95 15 13 15 15 11 10 21 1 09.05 09.50 15 06 15 15 06 15 06 15 15 09 15 12 18 1 10.50 10.95 15 09 15 12 18 1 10.50 10.95 15 09 15 12 18 14 12 14 15 12 34 14 15 12 34 14 15 12 34 14 15 12 14 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 12 15 13 14 14 14 14 15

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FIG NO.5: STANDARD PENETRATION TEST RESULTS

SR.	BH.	DEPT	H (M)	PENETRATION	CORRESPONDING	SPT	REMARKS
NO.	NO.	BELOW GL		(CM)	NO. OF BLOWS	N	•
04		FROM	ТО		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
01	1	01.50	02.10	60	01	<1	
02	1\	03.05	03.55	50	01	<1	
03	1	04.63	05.08	15	07		
				15	05		
0.4	4	0000		15	04	09	
04	1	06.00	06.45	15	,11		
		*		15	09		
				15	10	19	
05	1	07.50	07.95	15	13		
			# * x	15	11		
				15	10	21	
06	1	09.05	09.50	15	05		
				15	06	1	
				15	12	18	
07	1	10.50	10.95	15	09	1	
Silve		* ***		15	12		
gil v j				15	22	34	
08	1	13.50	13.95	15	08		
				15	14		
				15	27	41	
09	1\	15.00	15.45	15	12		
				15	22		
				15	32	>50	** **
10	1	16.50	16.78	15	19		
				13	50	>50	Rebound from
						100	32 nd blow.
11	1	18.00	18.29	15	22		OZ DIOW.
		10.00	10.20	14	50	>50	Rebound from
		\\			30	730	31st blow.
12	1	20.05	20.12	07	50	>50	Rebound after
1 Aun	•	20.00	20.12	01	30	750	6th blow.
13	2	01.60	02.20	60	1	<1	o" blow.
14	2	03.05	03.55	15	01		
1-T		00.00	00.00	35		<1	
15	2	04.50	04.95		01	< 1	
10		04.50	04.95	15	04		
100				15	07	10	
				15	11	18	

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FIG NO.5: STANDARD PENETRATION TEST RESULTS (CONTD.)

SR. NO.	NO. NO. BELOW GL		PENETRATION (CM)	CORRESPONDING NO. OF BLOWS	SPT N	REMARKS	
BEC		FROM	TO				
16	2	06.05	06.50	15	05		
				15	12		
				15	04	16,	
17	2	07.50	07.95	15	0,5		
		* * * * * * * * * * * * * * * * * * *		15	05		
				15	08	13	
18	2	09.00	09.45	15	04		
A STATE OF				15	12		
				15	19	31	
19	2	10.50	10.95	15	08		
				15	10	2	
			1	15	16	26	-
20	2	12.05	12.50	15	12		
			(A)	15	10		
				15	14	24	
21	2	13.50	13.95	15	06		
				15	18		-
				15	29	47	
22	2	15.05	15.50	15	03		
		8 2		15	06		
				15	14	20	
23	2	16.50	16.78	15	14		
				13	50	>50	Rebound after
							33 rd blow.
24	2	18.10	18.22	12	50	>50	Rebound after
							13 th blow.

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FIG NO.6 : ROCK CORE RECOVERY DETAILS

BH. SAMPLE NO.		DEPT	H (M)	DRILLING	CORE	CORE	DOD	
NO.	FROM	ТО	FROM	ТО	RUN (M)	RECOVERED (M)	RECOVERED (%)	R.Q.D.
1	15	20	20.77	22.10	1.33	1.33	100.00	74.43
1	21	23	22.10	23.35	1.25	1.25	100.00	93.60
1	24	28	23.35	23.82	0.47	0.37	78.72	Nil
2	17	27	18.58	19.80	1.22	1.15	94.26	23.77
2	28	35	19.80	21.44	1.64	1.63	99.39	80.50
2	36	38	21.44	21.70	0.26	0.26	100.00	57.69

	· · · /- ·		:	;		17	-				> /							
					,				1									
	X X S													1				
s Bldg. Garden	× × ×					r .									1			
New Velho's Municipal Ga PANAJI-GOA,	~				1								1		1			
N P	;		19.5	-	2								1			2 <u>2 -</u>		
LT3	BOX SHEAR (Consolidated Quick)	: 89.		}	22.5		21.5		, 22,0				1					
T RESULTS		. Cq.	1800		2400		2050		2250				1					
OF LABORATORY TEST	Specific	Gravity	2,68		2.73		2.70		2,71				1			to us		
ABORATO	1	30 E %								••) } 		••			
E 0F L/	181		Combined — 69.5		72.0		73.5		76.5		1		1					
TABLE			Con	1							1 1 1 1 1 3 1 1) 					
F16.7	Mechanical		28.5		21.5		26.5		ω υ			••	•• . - - -					
	Je G	above:	2,0	-	6.5	••	0.0	••	5,0	•			 •• 					1
		% . I . G.	8				ω. 1.			••	••] 		1	••		1 1
GOA.	g Lim		26.2.6			**	1 1)		1))))) 1 1 1			1 1 1 1
GOA,	:		33.0, 26	1			36.5 28.4						1 1 1 1 1		1			1 1 1
Ltd. JETTY AT OLD GOA,		int :			•••	**			,		samples.		1 1 1' 1		1			
f. TTY A	Sity & Content	.Content	27.8		18		23.4		16.5				1 1 1 1	1	1 1 1 1) 	2 2 2 1 1 1	1
	Den	: Bulk : Dry :Moistur :Density:Density:Content : gm/cc : gm/cc :	1.49		1.61	7	15		1.61		remoulded		1) 1 1 1		1	
n Engineering Pvt. PROPOSED COP	Field Den Moisture	Bulk : ensity:D gm/cc :	1.82		1.91		1.86		1.88		on re	. **	••.	 	1	••	 	1 1 1 1 1
on Engi			1		i		1 1			4.0	done on		1 1 1 1		1		1	1 1 1 1
ry Description	-	· · · · · · ·	5.43		12.40		. 6.90		14.35		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	,			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1 1 1 1 1	1 1 1 1 1
Daftary Description of the Control o	Depth	E 00 XE	5.08	1 1 1 1	12,05,12,40		6.55	14 TV	14:00 14.35		Shear tests		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	1		1	1 1 1 1
经 /		9	~	1	-	~	2	••	2						1 1 1 1			1 1 1 1
. Job.		0 2	-		2	**	<i>w</i>	\	. 4		No te		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1		1	-

DAFTARY DESCON ENGINEERING PVT. LTD.

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(pay	Corrected	Strength	(Kg/cm^2)		698.97		764.50	
Results (Soa	<u>ا</u> اــ	۵			2.0		2.0	
Rock Crushing Results (Soaked)	Actual Crushing	onengui	(Kg/cm²)		698.97		764.50	0
	Load	משומת	(Kg.)		16000		17500	
Length	(L)			(cm)	10.8		10.8	
Dia.	(D)	A)	2	(cm)	5.4	,	5.4	
low GL	То		(m) ·		22.10		21.44	
Depth Below GL	From		(m)		20.77		19.80	
Sample	o N				16		32	
BH.	O				_		2	
Sr.	No.				~		2	

FIG. NO.8 : ROCK CRUSHING STRENGTH TEST RESULTS (SOAKED)

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(A) CHEMICAL ANALYSIS RESULTS OF SOIL SAMPLE

Sr.	BH	Sample	Depth be	elow BL	Chemical analysis results					
No. No.		No.	(m)		рН	Chloride as	Sulphate as			
			From	То		CI (%)	SO ₃ (%)			
-11-1										
1	1	1	1.60	2.20	6.80	0.23	0.85			

(B) CHEMICAL ANALYSIS RESULTS OF WATER SAMPLE

BH	Sample	Depth below	Chemical analysis results						
No.	No.	water surface	рН	Chloride as	Sulphate as SO ₄				
		(m)		(mg/l)	(mg/l)				
River water		1.00	7.75	18410	2925				
	No.	No. No.	No. No. water surface (m)	No. No. water surface pH (m)	No. No. water surface pH Chloride as CI (mg/l) River				

FIG. NO.9 : CHEMICAL ANALYSIS RESULTS OF SOIL & WATER SAMPLES