

### **3. SOIL & MATERIAL SURVEY**

- Inventory of Quarry Sample (Typical Example of Investigation Result)
- Inventory of Sand Sample (Typical Example of Investigation Result)
- Inventory of Borrow Pit Sample (Typical Example of Investigation Result)
- Inventory of Cutting Area Sample (Typical Example of Investigation Result)
- Inventory of Water Sample (Typical Example of Investigation Result)

**DRAFT REPORT  
ON  
SOIL & MATERIAL INVESTIGATION  
FOR  
IMPROVEMENT & UPGRADATION OF  
KARARO-WAD (SECTION 96.0 km)  
NATIONAL HIGHWAY (N-25)  
BALUCHISTAN**

***FEBRUARY***

***2005.***

# SOILMAT LABORATORIES

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CLIENT: M/s Construction Project Consultants Inc. (CPC)  
 PROJECT: Upgradation and Improvement of National Highway (N-25) Kararo to Wad (Section 96 KM)

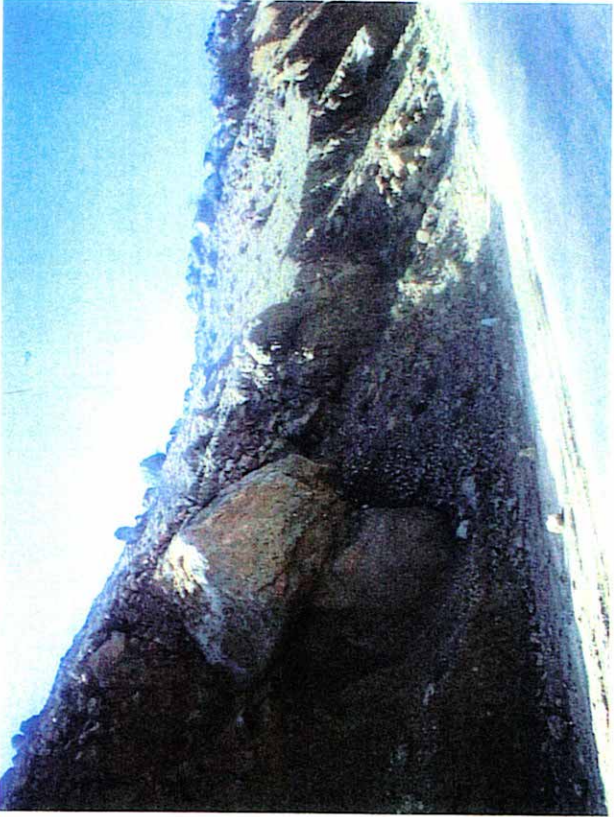
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## SUMMARY OF ROCK QUARRY SAMPLES

S.No.	SAMPLE MARK	SPECIFIC GRAVITY 2.4 FIVE	ABSORPTION % 3.0 Y. WK	L.A. ABRASION LOSS (500 Cycles) % 30.5 F	SOUNDNESS Na <sub>2</sub> SO <sub>4</sub> LOSS % 4.4	FLAKINESS (% As Conv.) 27.2	POTENTIAL REACTIVITY OF AGGREGATES (ASTM C 289)		REMARKS
							Sc	Rc	
01	Pit # 1 CH: 2+850 L/S	2.639	0.909	30.5	4.4	27.2	33.9	60.9	Innocuous
02	Pit # 2 CH: 3+500 R/S	2.681	0.743	22.2	2.1	16.7	34.6	62.2	Innocuous
03	Pit # 3 CH: 4+200 L/S	2.681	0.695	20.6	1.6	22.4	33.8	61.3	Innocuous
04	Pit # 4 CH: 48+775 R/S	2.688	0.639	17.6	2.2	17.6	35.1	63.0	Innocuous
05	Pit # 5 CH: 50+910 L/S	2.689	0.659	18.4	1.8	15.5	34.2	62.4	Innocuous
06	Pit # 6 CH: 68+510 R/S	2.669	0.812	21.9	2.2	19.4	34.4	62.2	Innocuous
07	Pit # 7 CH: 70+500 L/S	2.693	0.601	24.1	2.7	20.3	33.9	61.6	Innocuous
08	Pit # 8 CH: 71+200 L/S	2.685	0.666	22.6	1.7	21.6	34.1	63.1	Innocuous
09	Pit # 9 CH: 76+550 R/S	2.693	0.619	23.8	1.9	20.8	34.5	63.3	Innocuous
10	Pit # 10 CH: 80+300 L/S	2.688	0.674	24.4	2.5	19.8	35.1	63.6	Innocuous
11	Pit # 11 CH: 87+000 L/S	2.691	0.700	22.9	1.9	21.6	34.7	62.1	Innocuous
12	Pit # 12 CH: 93+300 R/S	2.704	0.602	20.1	2.1	22.6	34.0	62.0	Innocuous
13	Pit # 13 CH: 94+500 L/S	2.709	0.598	20.8	1.5	21.7	35.1	62.2	Innocuous

Handwritten note: Sand (<10%)

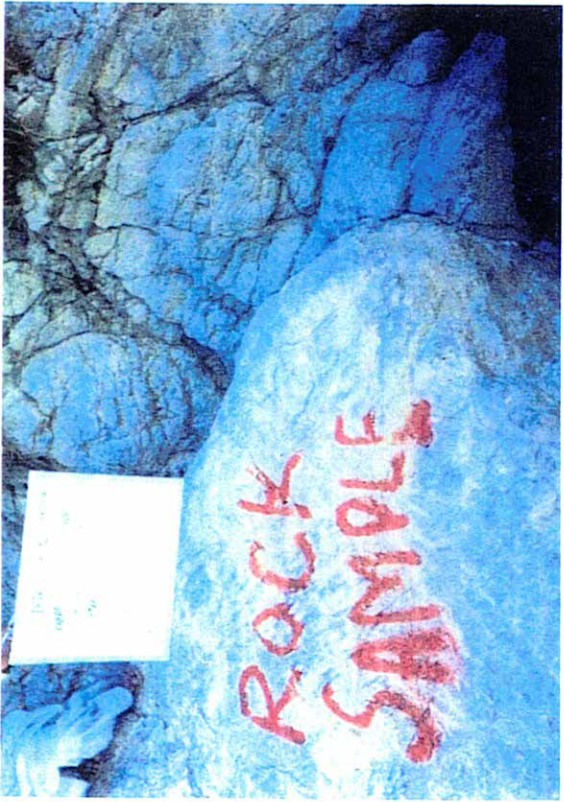
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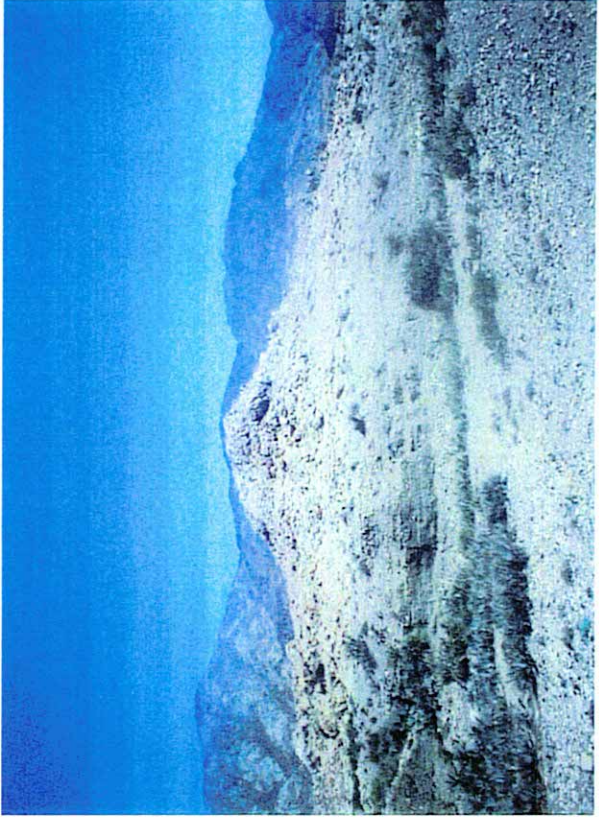
CH: 4+200 L/S (3)



CH: 50+910 L/S (5)



CH: 48+775 R/S (4)



CH: 68+510 R/S (6)

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## SUMMARY OF SAND QUARRY SAMPLES

S.No.	SAMPLE MARK	PASS % BY WEIGHT					SPECIFIC GRAVITY	ABSORPTION %	ORGANIC IMPURITIES %	SAND EQUIVALENT %	SOUNDNESS Na <sub>2</sub> SO <sub>4</sub> LOSS %	POTENTIAL REACTIVITY OF AGGREGATES (ASTM C 289)		REMARKS
		3/8"	# 4	# 16	# 50	# 100						Sc	Rc	
		100 95-100 45-80 10-30 2-10												
01	Pit # 1 CH: 4+900 L/S	100	78.8	36.9	21.3	16.4	2.714	1.136	0.17	41	3.1	19.3	34.2	Innocuous
02	Pit # 2 CH: 14+878 L/S	100	92.0	44.5	14.9	9.5	2.731	1.193	0.19	52	2.9	18.5	34.0	Innocuous
03	Pit # 3 CH: 17+884 L/S	100	92.8	42.3	16.2	8.9	2.753	1.164	0.21	64	3.0	19.6	34.5	Innocuous
04	Pit # 4 CH: 22+850 R/S	100	81.7	18.1	6.5	4.5	2.759	1.262	0.14	69	3.0	19.8	35.1	Innocuous
05	Pit # 5 CH: 36+210 L/S	100	86.4	42.2	10.4	4.5	2.766	1.116	0.15	65	3.1	19.2	34.9	Innocuous
06	Pit # 6 CH: 37+765 R/S	100	94.3	56.8	21.8	13.0	2.729	1.222	0.16	46	2.6	19.4	35.5	Innocuous
07	Pit # 7 CH: 41+350 L/S	100	89.0	48.4	22.5	11.1	2.731	1.206	0.12	54	2.8	22.1	36.2	Innocuous
08	Pit # 8 CH: BC 264/2 R/S	100	76.1	24.0	12.6	7.6	2.761	1.210	0.14	57	3.1	19.6	35.5	Innocuous
09	Pit # 9 CH: 48+775 R/S	100	86.3	32.9	9.8	5.9	2.763	1.163	0.12	58	3.0	19.2	34.9	Innocuous
10	Pit # 10 CH: 60+000 L/S	100	82.9	32.0	7.5	5.3	2.752	1.216	0.14	60	3.6	19.1	34.8	Innocuous
11	Pit # 11 CH: 64+438 L/S	100	97.8	35.4	8.8	3.6	2.774	1.101	0.16	69	3.8	19.4	35.5	Innocuous
12	Pit # 12 CH: 69+800 R/S	100	92.7	67.0	42.9	35.0	2.789	1.732	0.50	44	3.2	20.1	38.1	Innocuous
13	Pit # 13 CH: 96+000 R/S	100	96.0	80.8	21.7	4.7	2.475	1.207	0.02	82	3.4	11.5	13.4	Innocuous
14	Sample # 1 BC 323/1	100	99.9	91.5	21.9	12.5	2.724	1.515	0.04	69	2.2	11.9	14.2	Innocuous
15	Sample # 2 BP 29.5 km	100	100	99.5	88.3	38.6	2.819	1.729	0.09	39	12.6	16.5	40.0	Innocuous

Wholesale FM



CH: 64+438 L/S (11)



CH: 96+000 R/S (13)



CH: 69+800 R/S (12)

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## SUMMARY OF BORROW SAMPLES

S.No.	SAMPLE MARK	SOIL CLASS	ATTERBERG LIMIT		M.D.D gm/cc	O.M.C %	C.B.R VALUE				#4 SIEVE RETAINED	
			L.L	P.I			90%	95%	98%	100%	SP. GRAVITY	ABRASION %
01	Pit # 1 CH: -0+100 R/S	A-1-a	18,900	N P	2.289	7.0	66.8	79.8	89.0	96.1	2.662	0.720
02	Pit # 2 CH: 4+950 R/S	A-1-b	14,000	3.6	2.248	7.8	56.1	69.7	79.4	88.3	2.673	0.659
03	Pit # 3 CH: 7+500 L/S	A-1-b	7,500	3.2	2.236	8.2	46.6	59.9	68.6	75.4	2.658	0.693
04	Pit # 4 CH: 12+500 R/S	A-1-a	50,000	N P	2.274	7.4	68.7	80.8	89.1	95.3	2.656	0.732
05	Pit # 5 CH: 22+850 L/S	A-1-a	9,000	N P	2.283	5.9	71.1	82.1	89.9	95.9	2.687	0.664
06	Pit # 6 CH: 28+650 R/S	A-1-b	21,000	5.2	2.219	8.1	43.7	53.6	60.9	67.0	2.651	0.743
07	Pit # 7 CH: 44+500 L/S	A-1-a	50,000	N P	2.265	7.9	70.7	80.9	88.2	93.2	2.680	0.684
08	Pit # 8 CH: 48+700 R/S	A-2-4	12,500	6.4	2.176	9.8	40.5	50.7	58.3	64.7	2.643	0.821
09	Pit # 9 CH: 57+500 L/S	A-1-b	80,000	N P	2.256	8.3	66.3	76.4	83.8	89.8	2.666	0.684
10	Pit # 10 CH: 68+000 R/S	A-2-4	30,000	7.1	2.158	10.3	36.0	44.9	52.0	57.7	2.649	0.812
11	Pit # 11 CH: 80+257 L/S	A-4	80,000	9.8	1.965	12.2	22.9	33.8	39.5	44.5	2.661	0.739
12	Pit # 12 CH: 88+500 R/S	A-1-a	5,000	N P	2.265	8.4	70.4	81.3	89.4	95.2	2.689	0.626

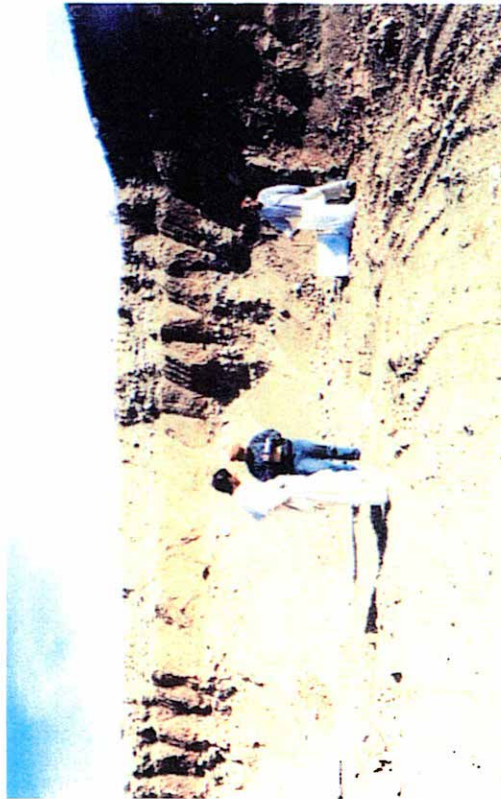
*Extra Sample*  
04+500 (R/S)



CH: 57+500 L/S (9)



CH: 81+500 L/S (11)



CH: 68+000 R/S (10)



CH: 88+500 R/S (12)



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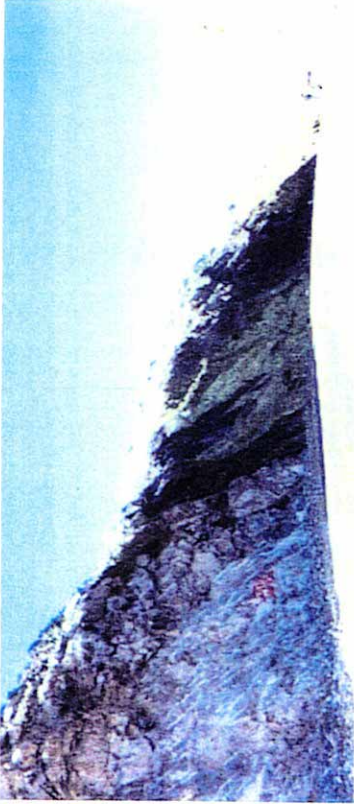
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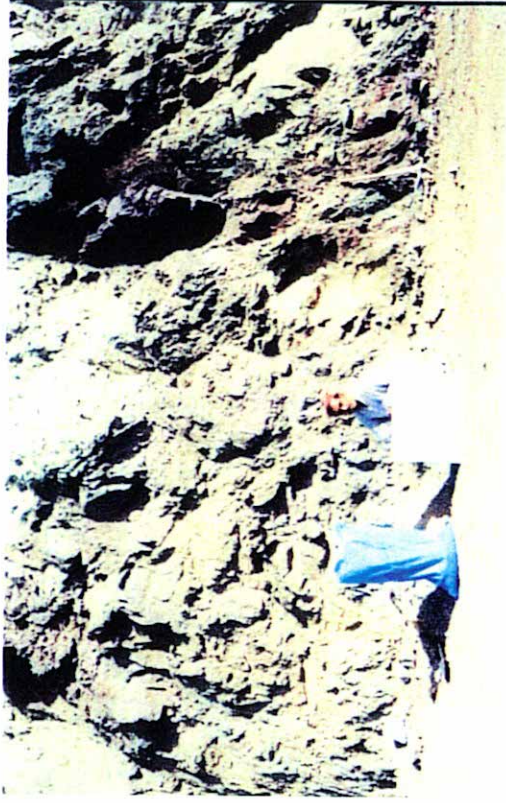
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## SUMMARY OF CUTTING SAMPLES

S.No.	SAMPLE MARK	SOIL CLASS	ATTERBERG LIMIT		M.D.D gm/cc	O.M.C %	C.B.R VALUE				#4 SIEVE RETAINED		ABRASION LOSS %	SOUNDNESS Na <sub>2</sub> SO <sub>4</sub> LOSS %	FLAKINESS %	POTENTIAL REACTIVITY OF AGGREGATES ASTM C 289				
			L.L	P.I			90%	95%	98%	100%	SP. GR.	ABSORPTION %				Sc	Rc	REMARKS		
01	Pit # 1 CH: 0+950 L/S	--	--	--	--	--	--	--	--	--	--	2.774	1.002	46.9	23.6	31.2	28.6	47.9	Innocuous	
02	Pit # 2 CH: 13+310 R/S	A-1-a	N/P		2.260	7.0	61.4	72.5	80.1	86.0		2.693	0.649	--	--	--	--	--	--	
03	Pit # 3 CH: 22+500 L/S	--	--	--	--	--	--	--	--	--	--	2.769	0.993	48.3	26.5	33.6	26.9	46.3	Innocuous	
04	Pit # 4 CH: 27+400 L/S	--	--	--	--	--	--	--	--	--	--	2.782	0.991	45.5	23.9	33.2	27.8	47.6	Innocuous	
05	Pit # 5 CH: 36+000 R/S	A-1-a	N/P		2.282	5.9	72.3	82.1	88.9	94.0		2.661	0.662	--	--	--	--	--	--	
06	Pit # 6 CH: 45+300 L/S	A-1-a	N/P		2.240	8.0	60.1	70.6	77.6	82.9		2.650	0.761	--	--	--	--	--	--	
07	Pit # 7 CH: 55+300 R/S	A-1-a	N/P		2.263	6.6	68.1	79.0	86.9	92.6		2.683	0.629	--	--	--	--	--	--	
08	Pit # 8 CH: 60+250 L/S	A-1-a	N/P		2.246	7.9	59.0	70.4	77.8	82.8		2.684	0.622	--	--	--	--	--	--	
09	Pit # 9 CH: 66+100 R/S	--	--	--	--	--	--	--	--	--	--	2.764	1.016	46.3	24.9	32.7	28.2	48.2	Innocuous	
10	Pit # 10 CH: 70+150 L/S	A-4	28.6	8.4	2.003	11.5	7.9	16.5	22.3	28.4		2.623	0.893	--	--	--	--	--	--	
11	Pit # 11 CH: 89+250 R/S	A-1-b	20.6	5.3	2.223	9.4	39.1	48.8	55.4	59.8		2.655	0.721	--	--	--	--	--	--	



CH: 36+000 R/S (5)



CH: 66+100 R/S (9)



CH: 45+300 L/S (6)



CH: 70+150 L/S (10)

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## SUMMARY OF WATER SAMPLES

S.No.	SAMPLE MARK	pH VALUE	CHLORIDE CONTENT ppm $\leq 1000$ ppm	SULPHATE CONTENT ppm $\leq 1300$ ppm	T.D.S. ppm $\frac{kg}{m^3}$
01	Perennial Stream CH: 5+000 L/S	7.78	165	240	900
02	Perennial Stream CH: 36+280 L/S	7.72	105	100	230
03	Hand Pump CH: 40+500 R/S	7.62	355	220	1100
04	Perennial Stream CH: 51+155 L/S	8.17	275	260	1200
05	Tube-well CH: 80+250 R/S	8.15	130	42	470
06	Tube-well CH: 96+000 L/S	8.19	135	26	490

0.3 kg/m<sup>3</sup>



CH: 5+000 L/S (1)



CH: 51+155 L/S (2)



CH: 80+250 L/S (3)



CH: 96+000 L/S (4)