





























## MEMORIA DE SONDEOS

<b>PROYECTO:</b>	<b>ESTUDIO DE AMENAZA Y VULNERABILIDAD</b>		
<b>APIQUES/MUESTREO</b>	<b>S1 - S2</b>		
<b>LOCALIZACION:</b>	<b>MUNICIPIO DE CIE</b>		
<b>FECHA:</b>	<b>MARZO - ABRIL DE 2013</b>		
	<b>FECHA:</b>		
	inalterada		
	alterada		

SONDEO / APIQUE N°	MUESTRA N°	TIPO DE MUESTRA	PROF. (m)	COORDENADAS		PROPIEDADES FISICAS SUELOS						CORTE D	
				E	N	Wn (%)	LL	LP	IP	CLASIF (U.S.C.)	P.T.N° 200 %		φ
APIQUE 1	1		0,60	1,084,432	1,090,431	8,40							
	2		0,90	1,084,432	1,090,431	10,95	28,34	19,30	9,04	CL	3,199	13,279	
TRINCHERA	0		0,00	1,084,658	1,090,404	0,62							
	1		0,61	1,084,658	1,090,404	29,32							
	4		1,30	1,084,658	1,090,404	13,79							
	5		1,80	1,084,658	1,090,404	5,50							
	7		3,10	1,084,658	1,090,404	7,86							
	9		4,00	1,084,658	1,090,404	18,77							
	10		5,00	1,084,658	1,090,404	15,74							
	12		7,10	1,084,658	1,090,404	11,62							
	13		8,00	1,084,658	1,090,404	5,98							
	15		9,00	1,084,658	1,090,404	14,01							
	16		9,60	1,084,658	1,090,404	9,96							
	1		1,50	1,084,637	1,090,471	22,85							
	2		2,70	1,084,637	1,090,471	16,15	43,31	38,46	4,85	ML-OL	0,256	8,194	

SONDEO 1	3		3,80	1,084,637	1,090,471	10,34	41,23	26,67	14,56	ML-OL	0,445	
	4		4,75	1,084,637	1,090,471	14,25	38,92	37,04	1,88	ML	0,32	9,537
	5		5,65	1,084,637	1,090,471	8,82	38,68	24,00	14,68	CL	0,374	
	6		7,25	1,084,637	1,090,471	11,79						
	7		8,50	1,084,637	1,090,471	16,48	37,5	30,00	7,50	ML-OL	1,798	
	8		10,50	1,084,637	1,090,471	15,81						
SONDEO 2	1		1,80	1,084,422	1,090,367	20,12	43,55	18,75	24,80	CL	0,987	13,061
	2		3,00	1,084,422	1,090,367	17,82	48,96	41,94	7,02	ML-OL	1,582	
	3		4,50	1,084,422	1,090,367	21,20	45,41	32,14	13,27	ML-OL	2,205	
	4		5,80	1,084,422	1,090,367	19,11	37,99	15,07	22,92	CL	5,593	
	5		7,50	1,084,422	1,090,367	18,54	47,01	22,22	24,79	CL	6,334	
	6		9,75	1,084,422	1,090,367	20,89	40,16	19,61	20,55	CL		

COLOMBIA  
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L.S.R.

MUNICIPIO DE CIENEGA

CIENEGA

RESISTENCIA AL CORTE SUELOS

DIRECTO	$\lambda$ HUMEDO	$\lambda$ SECO	COMPRESION INCONFINADA		PENETROMETRO
C	Peso Unitario	Peso Unitario	qu	C	BOLSILLO Kg/cm <sup>2</sup>
					> 4,5
1,908	2,2611	1,9903	5,7087	2,85435	> 4,5
	3,2457	3,2248			> 4,5
					> 4,5
	2,9403	2,9212			> 4,5
	2,7213	2,7012			> 4,5
	2,4833	2,4733			> 4,5
	2,2277	2,2087			> 4,5
	2,4343	2,4247			> 4,5
	2,4588	2,4443			> 4,5
	0,0000	0,0000			> 4,5
	0,0000	0,0000			> 4,5
	2,3602	2,3513			> 4,5
					> 4,5
0,775	2,4976	2,0672	1,1689	0,58445	> 4,5

	2,6544	2,2159	0,9772	0,4886	> 4,5
1,280	2,7452	2,3399	0,9779	0,48895	3,0
	2,5432	2,19	0,9919	0,49595	2,75
					3,0
	2,1275	1,7904	0,5200	0,2600	4,0
					> 4,5
0,493	2,0894	1,7308	2,4473	1,22365	> 4,5
	1,9641	1,5998	1,6923	0,84615	> 4,5
	1,9521	1,6076	1,8306	0,9153	> 4,5
	1,9653	1,6297	1,6783	0,83915	3,0
	2,2488	1,8041	2,5783	1,28915	2,75
					3,0

**MEMORIA DE ANALISIS DE**

<b>PROYECTO:</b>	ESTUDIO DE AMENAZA Y VULNERABILIDAD		
<b>APIQUES/MUESTREO</b>	TRINCHERA		
<b>LOCALIZACION:</b>	MUNICIPIO		
<b>FECHA:</b>	MARZO - ABRIL DE 2013		



DESCRIPCION	MUESTRA N°	TIPO DE MUESTRA	ALTURA M.S.N.M	COORDENADAS		PROPIEDADES FISICAS RC				
				E	N	W %	S %	n %	e	y (KN/m³)
ARENISCA	M0		2342	1,084,658	1,090,404	0,639	19,5728	21,7443	0,0423	32,4575
ARENISCA	M3		2342	1,084,658	1,090,404	0,808	21,4796	11,0266	0,0267	29,0904
ARENISCA	M4		2342	1,084,658	1,090,404	0,639	19,5728	18,6466	0,0252	29,4025
ARENISCA	M5		2342	1,084,658	1,090,404	0,778	26,0317	19,0275	0,0233	27,2131
ARENISCA	M6		2342	1,084,658	1,090,404	0,403	13,5737	12,8189	0,0121	24,8332
ARENISCA	M7		2342	1,084,658	1,090,404	0,860	22,2826	9,5147	0,0213	22,2771
ARENISCA	M8		2342	1,084,658	1,090,404	0,418	18,7967	8,0233	0,0106	24,3428
ARENISCA	M9		2342	1,084,658	1,090,404	0,565	21,5538	7,6329	0,0161	24,5879
ARENISCA	M10		2342	1,084,658	1,090,404	0,237	9,7162	7,7485	0,0056	21,6882
ARENISCA	M11		2342	1,084,658	1,090,404	0,640	21,7111	7,6145	0,0146	21,5727
ARENISCA	M12		2342	1,084,658	1,090,404	0,555	15,5968	11,5985	0,0187	26,5064
ARENISCA	M13		2342	1,084,658	1,090,404	0,345	10,5315	10,4416	0,0090	22,9409
ARENISCA	M14		2342	1,084,658	1,090,404	0,376	17,2199	10,4832	0,0101	23,6025
ARENISCA	M16		2342	1,084,658	1,090,404	1,409	20,8764	21,6525	0,0471	23,8963
ARENISCA	M11-11		2277	1,084,379	1,090,400	1,071	29,6769	10,9892	0,0398	32,2054
ARENISCA	M12-12		2285	1,084,329	1,090,429	0,899	21,4796	11,3810	0,0273	27,0446
ARENISCA	M13-14		2274	1,084,540	1,090,173	0,702	19,5728	20,0476	0,0296	27,8811

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L.S.R.

**ROCAS**

DAD MUNICIPIO DE CIENEGA

1 - M11-M12-M13

) DE CIENEGA

ROCAS		RESISTENCIA AL CORTE ROCAS					
		CARGA PUNTUAL		COMPRESION SIMPLE			ANGULO
yd (KN/m³)	ysat (KN/m³)	σc1	σc2	σci	Ei	Resist	REPOSO
		MPa	Kgf/cm2	(MPa)	(MPa)	(KN)	φ
32,2483	34,3923	8,400	84,000				34,520
28,8568	29,9440	16,308	163,078				35,000
29,2123	31,0509	12,310	123,099				
27,0116	28,8877	11,556	115,560				34,760
24,7331	25,9970	12,671	126,709				
22,0872	23,0254	21,613	216,130				39,010
24,2469	25,0380	10,834	108,340				34,940
24,4425	25,1951	12,630	126,300				
21,6373	22,4013	15,954	159,540				
21,4395	22,1903	23,121	231,210				
26,3644	27,5080	13,654	136,540				34,960
22,8615	23,8911	14,046	140,460				
23,5127	24,5464	17,802	178,020				
23,5759	25,7108	17,342	173,420				33,136
31,8645	32,9480	27,747	277,470	8,850	3012,380	145,900	33,320
26,8065	27,9286	47,821	478,212	7,780	3104,730	126,900	35,340
27,6796	29,6563	41,809	418,085	8,230	3012,380	134,900	34,128