

## **Appendix H. Laboratory Test Data**

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## **Appendix H-1 Unconfined Compressive Strength Test Data – Dam Site**

## Appendix H-1 Unconfined Compressive Strength Test Data – Dam Site

## Summary of Unconfined Compressive Strength Test Results

Axis No.	Abutment	Boring No.	Depth Range of Test Sample (ft)	Degree of Weathering	Unconfined Compressive Strength (psi)
2	Left	CB-1	126.8-127.3	slightly to moderately weathered	2667
		CB-1	140.7-141.5	fresh	12543
		CB-2	30.3-31.0	slightly weathered to fresh	24095
		CB-2	123.9-124.6	slightly weathered to fresh	18997
		CB-10	45.1-45.7	highly to moderately weathered	705
		CB-12	35.2-35.5	slightly weathered	1804
		CB-12	47.7-48.6	fresh	9360
		CB-17	8.0-9.2	moderately weathered	9004
		CB-20	16.8-17.9	slightly weathered	11480
		CB-20	24.7-25.6	slightly weathered	9889
		CB-20	63.3-64.4	slightly weathered	4457
	Right	CB-3	55.1-55.4	slightly weathered	6461
		CB-3	63.3-63.8	slightly weathered	10020
		CB-3	121.3-121.9	moderately weathered	1902
		CB-4	17.2-17.79	slightly weathered	26636
		CB-4	61.8-62.5	slightly weathered	17808
		CB-13	98.5-99.0	slightly weathered	18909
		CB-13	114.8-116.0	slightly weathered	35673
		CB-13	137.5-138.5	slightly weathered	18386
		CB-14	77.5-78.5	slightly to moderately weathered	5840
		CB-18	30.9-31.7	slightly weathered	7769
		CB-18	36.0-37.3	slightly weathered	8726
	CB-18	53.0-53.9	slightly weathered	17460	
		CB-15	24.0-24.7	slightly weathered	9509
		CB-15	56.2-57.2	slightly weathered	9233
		CB-15	67.1-68.3	slightly weathered	5102

## Summary of Unconfined Compressive Strength Test Results

Channel	CB-16	41.0-41.8	slightly weathered	15889
	CB-16	49.3-50.0	slightly weathered	11459
	CB-16	62.8-63.7	fresh	9630
	CB-16	88.7-90.1	slightly weathered to fresh	15284
	CB-16A	33.1-33.6	slightly weathered	20085
	CB-16A	37.9-39.1	slightly weathered	21853

**Compressive Strength of Intact Rock**  
ASTM D7012

DSA File #:                   

DSA Appl #:                   

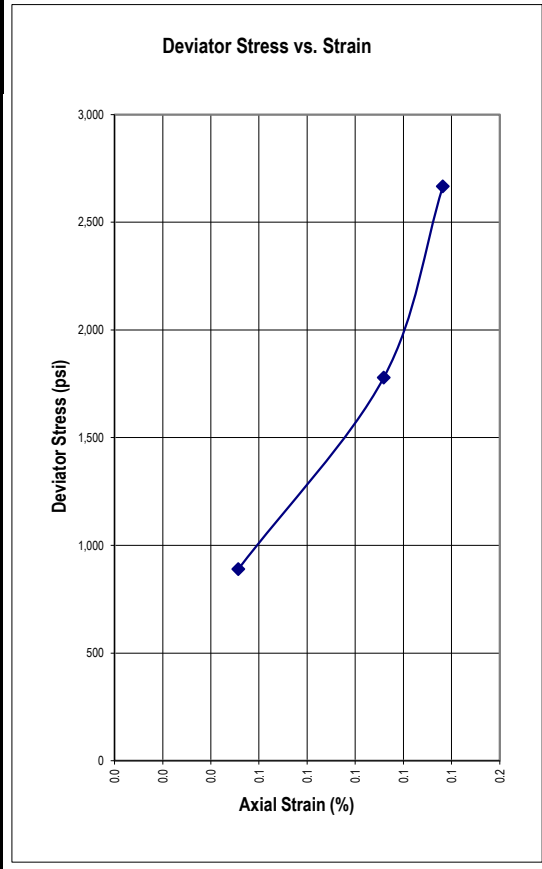
Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB-1 126.8-127.3</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DWP/CAJ</b>
Sample Location:					Check By:	<b>Draft</b>
					Lab No.:	<b>15-15-549</b>

Sample Data		
Tare Number	I.D.	JD
Tare Weight	(gm)	190.50
Wet Core + Tare	(gm)	958.70
Dry Core + Tare	(gm)	920.80
Weight of Water	(gm)	37.90
Dry Weight	(gm)	730.30
Moisture Content	(%)	5.19
Core Height	(in)	4.472
Sample Diameter	(in)	2.392
Wet Unit Weight	(pcf)	145.49
Dry Unit Weight	(pcf)	138.32
Specific Gravity	(g/cc)	2.72
Saturation	(%)	62.16
Strain Rate	psi/second	<b>28.99</b>
compression machine	D	15-08-029CT



**Compressive Strength = 2,666.7      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001 in/unit)	Percent (%)			
4	23	0.05	4.496	4000.00	889.66
45	50	0.11	4.499	8000.00	1778.25
92	61	0.14	4.500	12000.00	2666.71




## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:  

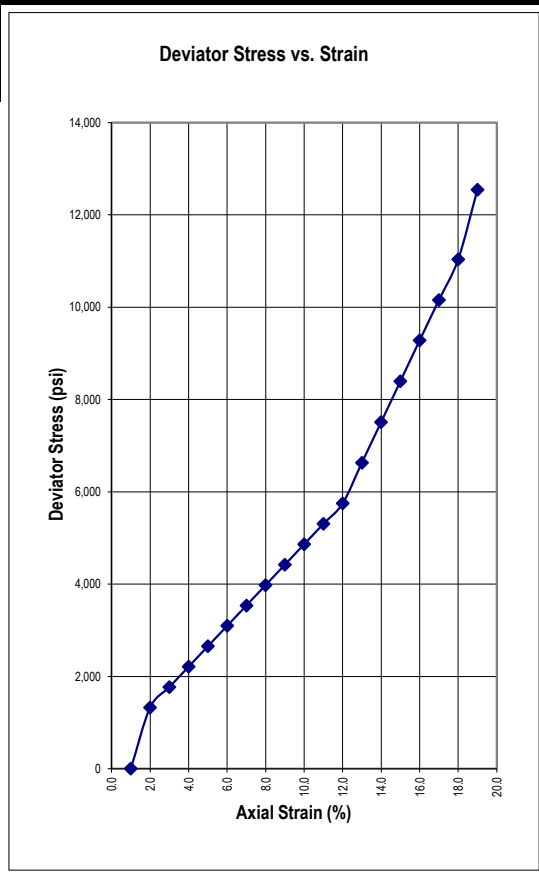
DSA Appl #:  

Project No.:	<b>4438-01</b>	Project Name:		Date:	<b>12/8/2015</b>
Sample No.:	<b>CB-1 140.7-141.5</b>	Boring/Trench No.:		Tested By:	<b>DWP/CAJ</b>
Soil Description:		Depth (ft.):		Check By:	<b>Draft</b>
Sample Location:				Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	BK	
Tare Weight	(gm)	319.10	
Wet Core + Tare	(gm)	1225.40	
Dry Core + Tare	(gm)	1222.60	
Weight of Water	(gm)	2.80	
Dry Weight	(gm)	903.50	
Moisture Content	(%)	0.31	
Core Height	(in)	4.578	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	166.56	
Dry Unit Weight	(pcf)	166.05	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	38.01	
Strain Rate	psi/second	<b>57.02</b>	
compression machine	D	15-08-029CT	

**Compressive Strength = 12,543.3      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
4	0			4000.00	
8	1	0.00	4.524	6000.00	1326.26
22	1	0.00	4.524	8000.00	1768.35
33	1	0.00	4.524	10000.00	2210.44
42	1	0.00	4.524	12000.00	2652.52
50	1	0.00	4.524	14000.00	3094.61
59	1	0.00	4.524	16000.00	3536.70
64	1	0.00	4.524	18000.00	3978.79
72	1	0.00	4.524	20000.00	4420.87
85	1	0.00	4.524	22000.00	4862.96
92	1	0.00	4.524	24000.00	5305.05
108	1	0.00	4.524	26000.00	5747.14
115	4	0.01	4.524	30000.00	6630.88
131	38	0.08	4.528	34000.00	7509.41
142	19	0.0415028	4.526	38000.00	8396.36
164	21	0.0458716	4.526	42000.00	9279.78
186	60	0.1310616	4.530	46000.00	10154.91
205	75	0.163827	4.531	50000.00	11034.32
220	85	0.1856706	4.532	56850.00	12543.28






## Compressive Strength of Intact Rock

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DSA File #:  

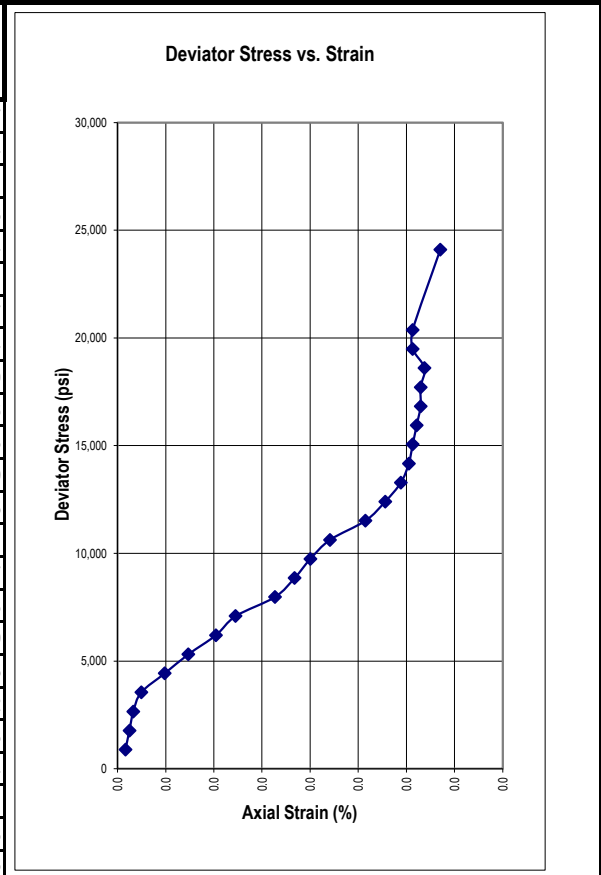
DSA Appl #:  

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB-2 30.3-31.0</b>	Boring/Trench No.:		Tested By:	<b>DWP/CAJ</b>	
Soil Description:					Check By:	<b>Draft</b>
Sample Location:					Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	F	
Tare Weight	(gm)	321.00	
Wet Core + Tare	(gm)	1227.60	
Dry Core + Tare	(gm)	1225.20	
Weight of Water	(gm)	2.40	
Dry Weight	(gm)	904.20	
Moisture Content	(%)	0.27	
Core Height	(in)	1223.200	
Sample Diameter	(in)	2.398	
Wet Unit Weight	(pcf)	0.62	
Dry Unit Weight	(pcf)	0.62	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	0.00	
Strain Rate	psi/second	<b>68.65</b>	
compression machine	D	15-08-029CT	

Compressive Strength = 24,094.5      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
10	2	0.00	4.516	4000.00	885.67
20	3	0.00	4.516	8000.00	1771.34
29	4	0.00	4.516	12000.00	2657.01
39	6	0.00	4.516	16000.00	3542.68
68	12	0.00	4.516	20000.00	4428.34
89	18	0.00	4.516	24000.00	5314.01
101	25	0.00	4.516	28000.00	6199.67
112	30	0.00	4.516	32000.00	7085.34
131	40	0.00	4.516	36000.00	7971.00
152	45	0.00	4.516	40000.00	8856.66
161	49	0.00	4.516	44000.00	9742.33
172	54	0.00	4.516	48000.00	10627.99
192	63	0.00	4.516	52000.00	11513.65
201	68	0.00	4.516	56000.00	12399.31
214	72	0.0005886	4.516	60000.00	13284.97
228	74	0.000605	4.516	64000.00	14170.63
254	75	0.0006131	4.516	68000.00	15056.29
264	76	0.0006213	4.516	72000.00	15941.95
273	77	0.0006295	4.516	76000.00	16827.62
284	77	0.0006295	4.516	80000.00	17713.28
310	78	0.0006377	4.516	84000.00	18598.94
328	75	0.0006131	4.516	88000.00	19484.61
340	75	0.0006131	4.516	92000.00	20370.28
351	82	0.0006704	4.516	108820.00	24094.48



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## Compressive Strength of Intact Rock

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DSA File #:                     

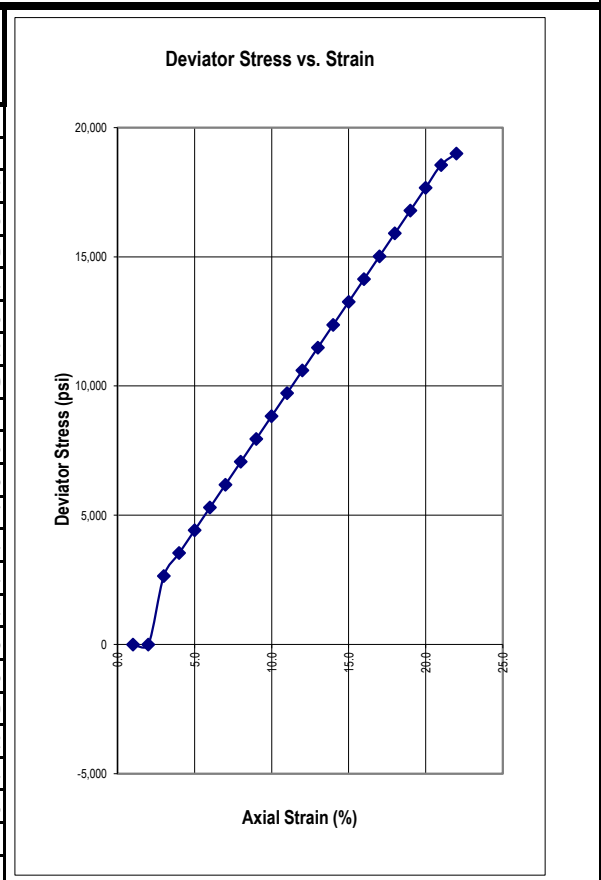
DSA Appl #:                     

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>
Sample No.:	<b>CB-2 123.9-124.6</b>	Boring/Trench No.:		Tested By:	<b>DWP/CAJ</b>
Soil Description:		Depth (ft.):		Check By:	<b>Draft</b>
Sample Location:				Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	LJ	
Tare Weight	(gm)	306.50	
Wet Core + Tare	(gm)	1249.20	
Dry Core + Tare	(gm)	1244.90	
Weight of Water	(gm)	4.30	
Dry Weight	(gm)	938.40	
Moisture Content	(%)	0.46	
Core Height	(in)	4.812	
Sample Diameter	(in)	2.401	
Wet Unit Weight	(pcf)	164.69	
Dry Unit Weight	(pcf)	163.94	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	35.28	
Strain Rate	psi/second	<b>46.36</b>	
compression machine	D	15-08-029CT	

**Compressive Strength = 18,997.2      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
4	0			4000.00	
36	0			8000.00	
61	1	0.00	4.528	12000.00	2650.32
82	1	0.00	4.528	16000.00	3533.76
101	1	0.00	4.528	20000.00	4417.20
122	1	0.00	4.528	24000.00	5300.64
135	1	0.00	4.528	28000.00	6184.08
153	1	0.00	4.528	32000.00	7067.52
169	2	0.00	4.528	36000.00	7950.96
181	2	0.00	4.528	40000.00	8834.40
200	2	0.00	4.528	44000.00	9717.84
219	2	0.00	4.528	48000.00	10601.28
235	2	0.00	4.528	52000.00	11484.72
255	3	0.01	4.528	56000.00	12368.16
272	3	0.0062344	4.528	60000.00	13251.60
289	3	0.0062344	4.528	64000.00	14135.04
307	3	0.0062344	4.528	68000.00	15018.48
326	3	0.0062344	4.528	72000.00	15901.92
345	2	0.0041563	4.528	76000.00	16785.36
370	2	0.0041563	4.528	80000.00	17668.80
383	2	0.0041563	4.528	84000.00	18552.24
405	4	0.0083126	4.528	86020.00	18997.18
				90020.00	
				94020.00	



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## Compressive Strength of Intact Rock

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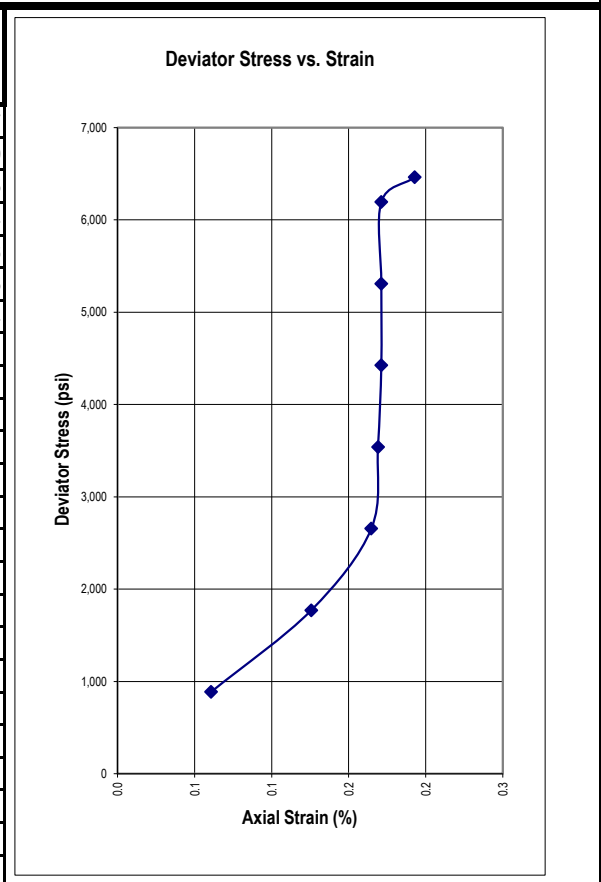
DSA File #:         

DSA Appl #:         

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB3 55.1-55.4</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DWP/CAJ</b>
Sample Location:					Check By:	<b>Draft</b>
					Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure	
Tare Number	I.D.	D		
Tare Weight	(gm)	316.70		
Wet Core + Tare	(gm)	1243.30		
Dry Core + Tare	(gm)	1231.10		
Weight of Water	(gm)	12.20		
Dry Weight	(gm)	914.40		
Moisture Content	(%)	1.33		
Core Height	(in)	4.614		
Sample Diameter	(in)	2.397		
Wet Unit Weight	(pcf)	169.39		
Dry Unit Weight	(pcf)	167.16		
Specific Gravity	(g/cc)	2.72		
Saturation	(%)	235.77		
Strain Rate	psi/second	<b>30.33</b>		
compression machine	D	15-08-029CT		
<b>Compressive Strength = 6,460.5      psi</b>				

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
14	28	0.06	4.515	4000.00	885.87
58	58	0.13	4.518	8000.00	1770.59
85	76	0.16	4.520	12000.00	2654.85
115	78	0.17	4.520	16000.00	3539.64
149	79	0.17	4.520	20000.00	4424.46
160	79	0.17	4.520	24000.00	5309.35
194	79	0.17	4.520	28000.00	6194.24
213	89	0.19	4.521	29210.00	6460.51



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## Compressive Strength of Intact Rock

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DSA File #:  

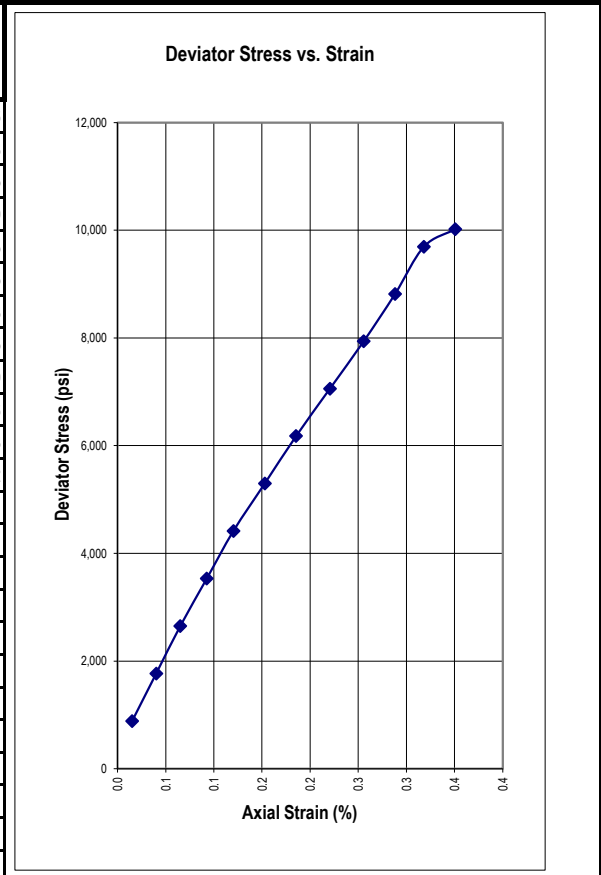
DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-3 63.3-63.8	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DWP/CAJ
Sample Location:					Check By:	Draft
					Lab No.:	15-15-549

Sample Data			Photo At Failure
Tare Number	I.D.	DE	
Tare Weight	(gm)	258.90	
Wet Core + Tare	(gm)	1067.50	
Dry Core + Tare	(gm)	1060.80	
Weight of Water	(gm)	6.70	
Dry Weight	(gm)	801.90	
Moisture Content	(%)	0.84	
Core Height	(in)	3.990	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	170.50	
Dry Unit Weight	(pcf)	169.09	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	603.75	
Strain Rate	psi/second	43.57	
compression machine	D	15-08-029CT	

Compressive Strength = 10,020.2      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
12	6	0.02	4.525	4000.00	884.06
45	16	0.04	4.526	8000.00	1767.68
69	26	0.07	4.527	12000.00	2650.85
89	37	0.09	4.528	16000.00	3533.50
107	48	0.12	4.529	20000.00	4415.65
128	61	0.15	4.531	24000.00	5297.05
145	74	0.19	4.532	28000.00	6177.88
163	88	0.22	4.534	32000.00	7057.95
179	102	0.26	4.535	36000.00	7937.40
199	115	0.29	4.537	40000.00	8816.46
218	127	0.32	4.538	44000.00	9695.18
230	140	0.35	4.540	45490.00	10020.22
				49490.00	
				53490.00	
				57490.00	
				61490.00	
				65490.00	
				69490.00	
				73490.00	
				77490.00	
				81490.00	
				85490.00	
				89490.00	
				93490.00	



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## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

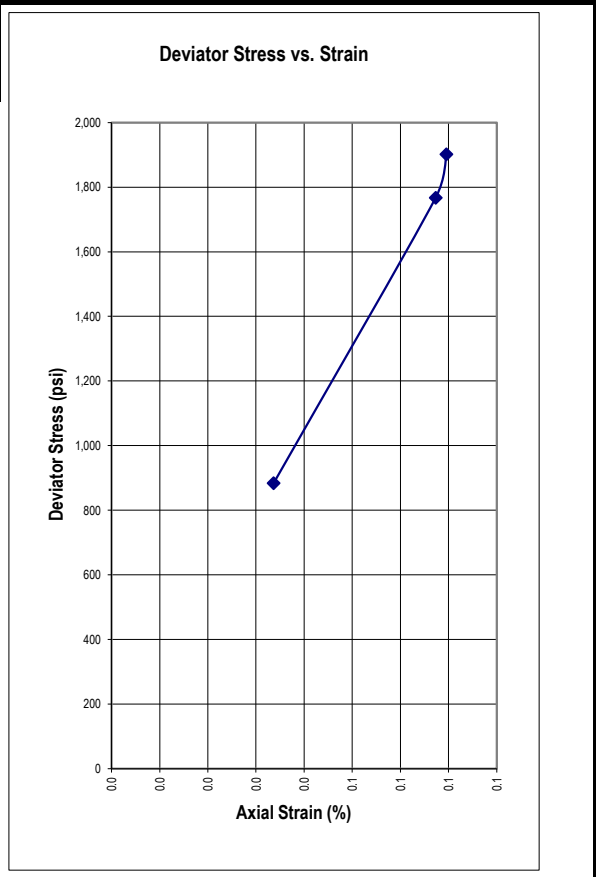
DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-3 121.3-121.9	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DWP/CAJ
Sample Location:					Check By:	Draft
					Lab No.:	15-15-549

Sample Data			Photo At Failure
Tare Number	I.D.	JF	
Tare Weight	(gm)	192.40	
Wet Core + Tare	(gm)	987.30	
Dry Core + Tare	(gm)	943.60	
Weight of Water	(gm)	43.70	
Dry Weight	(gm)	751.20	
Moisture Content	(%)	5.82	
Core Height	(in)	4.456	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	150.09	
Dry Unit Weight	(pcf)	141.84	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	80.46	
Strain Rate	psi/second	23.77	
compression machine	D	15-08-029CT	

Compressive Strength = 1,901.9 psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
20	15	0.03	4.525	4000.00	883.90
78	30	0.07	4.527	8000.00	1767.20
80	31	0.07	4.527	8610.00	1901.90




## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

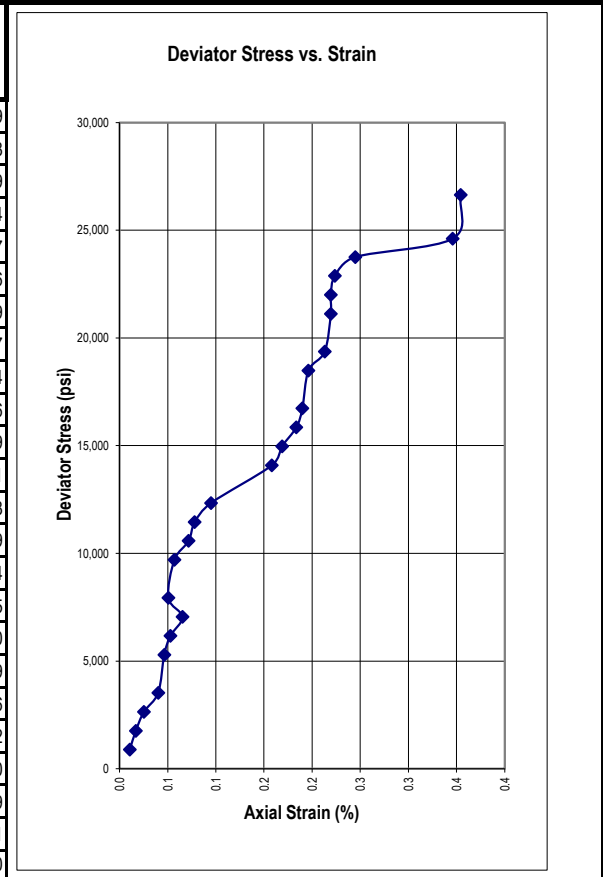
DSA Appl #:                     

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB-4 17.2-17.79</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DWP/CAJ</b>
Sample Location:					Check By:	<b>Draft</b>
					Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	B	
Tare Weight	(gm)	320.30	
Wet Core + Tare	(gm)	1205.90	
Dry Core + Tare	(gm)	1203.20	
Weight of Water	(gm)	2.70	
Dry Weight	(gm)	882.90	
Moisture Content	(%)	0.31	
Core Height	(in)	4.740	
Sample Diameter	(in)	2.403	
Wet Unit Weight	(pcf)	156.80	
Dry Unit Weight	(pcf)	156.32	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	9.70	
Strain Rate	psi/second	<b>65.77</b>	
compression machine	D	15-08-029CT	

**Compressive Strength = 26,636.1      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
19	5	0.01	4.536	4000.00	881.89
40	8	0.02	4.536	8000.00	1763.68
56	12	0.03	4.536	12000.00	2645.29
87	19	0.04	4.537	16000.00	3526.54
98	22	0.05	4.537	24000.00	5289.47
111	25	0.05	4.538	28000.00	6170.66
135	31	0.07	4.538	32000.00	7051.29
147	24	0.05	4.538	36000.00	7933.87
158	27	0.06	4.538	44000.00	9696.34
182	34	0.07	4.538	48000.00	10576.26
194	37	0.08	4.539	52000.00	11456.89
218	45	0.09	4.540	56000.00	12336.11
230	75	0.16	4.542	64000.00	14089.48
244	80	0.17	4.543	68000.00	14968.49
269	87	0.1835443	4.544	72000.00	15846.64
282	90	0.1898734	4.544	76000.00	16725.95
296	93	0.1962025	4.544	84000.00	18485.40
320	101	0.2130802	4.545	88000.00	19362.39
338	104	0.2194093	4.545	96000.00	21121.26
350	104	0.2194093	4.545	100000.00	22001.32
382	106	0.2236287	4.545	104000.00	22880.40
395	116	0.2447257	4.546	108000.00	23755.39
404	164	0.3459916	4.551	112000.00	24610.21
405	168	0.3544304	4.551	121230.00	26636.10



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## Compressive Strength of Intact Rock

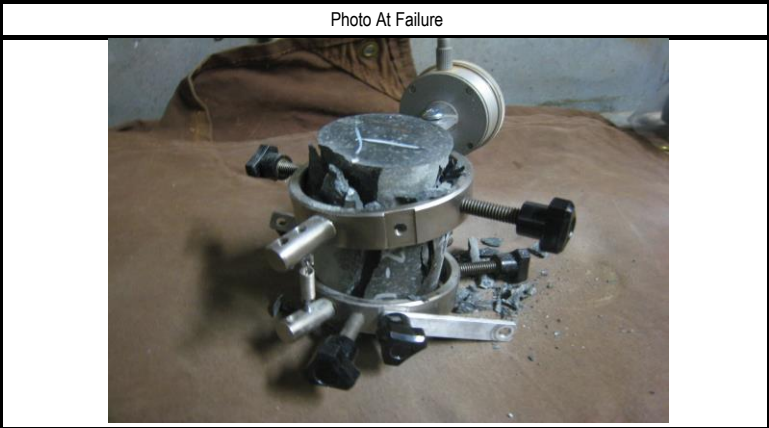
ASTM D7012

DSA File #:                     

DSA Appl #:                     

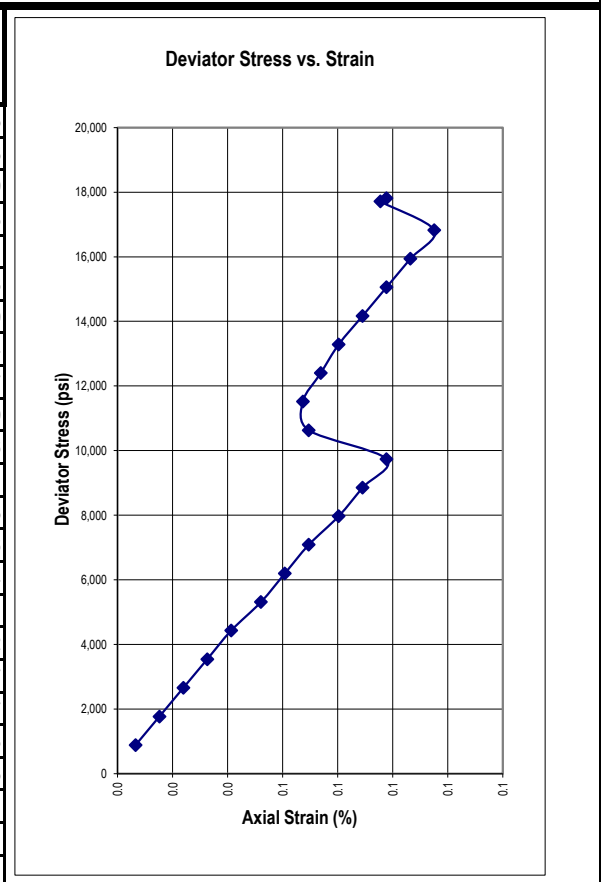
Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB-4 61.8-62.5</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DWP/CAJ</b>
Sample Location:					Check By:	<b>Draft</b>
					Lab No.:	<b>15-15-549</b>

Sample Data		
Tare Number	I.D.	JT
Tare Weight	(gm)	219.60
Wet Core + Tare	(gm)	1135.10
Dry Core + Tare	(gm)	1132.10
Weight of Water	(gm)	3.00
Dry Weight	(gm)	912.50
Moisture Content	(%)	0.33
Core Height	(in)	4.603
Sample Diameter	(in)	2.397
Wet Unit Weight	(pcf)	167.76
Dry Unit Weight	(pcf)	167.21
Specific Gravity	(g/cc)	2.72
Saturation	(%)	59.30
Strain Rate	psi/second	<b>56.36</b>
compression machine	D	15-08-029CT



**Compressive Strength = 17,808.3      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
14	3	0.01	4.513	4000.00	886.35
41	7	0.02	4.513	8000.00	1772.55
61	11	0.02	4.514	12000.00	2658.59
79	15	0.03	4.514	16000.00	3544.48
83	19	0.04	4.514	20000.00	4430.21
110	24	0.05	4.515	24000.00	5315.68
124	28	0.06	4.515	28000.00	6201.09
135	32	0.07	4.516	32000.00	7086.34
151	37	0.08	4.516	36000.00	7971.27
165	41	0.09	4.517	40000.00	8856.19
199	45	0.10	4.517	44000.00	9740.96
192	32	0.07	4.516	48000.00	10629.51
205	31	0.07	4.516	52000.00	11515.55
219	34	0.07	4.516	56000.00	12400.56
235	37	0.0803824	4.516	60000.00	13285.44
247	41	0.0890723	4.517	64000.00	14169.91
263	45	0.0977623	4.517	68000.00	15054.22
276	49	0.1064523	4.517	72000.00	15938.37
292	53	0.1151423	4.518	76000.00	16822.37
315	44	0.0955898	4.517	80000.00	17711.23
316	45	0.0977623	4.517	80440.00	17808.25
				84440.00	
				88440.00	
				92440.00	



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## Compressive Strength of Intact Rock

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DSA File #:  

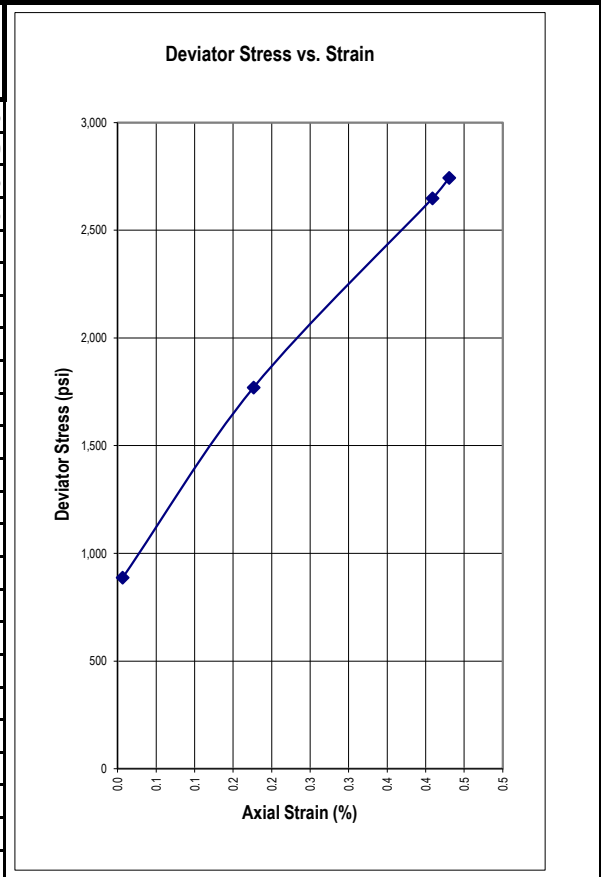
DSA Appl #:  

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>	
Sample No.:	<b>CB5 35.9-36.8</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DWP/CAJ</b>
Sample Location:					Check By:	<b>Draft</b>
					Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	J4	
Tare Weight	(gm)	228.80	
Wet Core + Tare	(gm)	1146.70	
Dry Core + Tare	(gm)	1120.70	
Weight of Water	(gm)	26.00	
Dry Weight	(gm)	891.90	
Moisture Content	(%)	2.92	
Core Height	(in)	4.646	
Sample Diameter	(in)	2.397	
Wet Unit Weight	(pcf)	166.64	
Dry Unit Weight	(pcf)	161.92	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	164.41	
Strain Rate	psi/second	<b>18.53</b>	
compression machine	D	15-08-029CT	

Compressive Strength = 2,742.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
54	3	0.01	4.513	4000.00	886.35
97	82	0.18	4.521	8000.00	1769.69
147	190	0.41	4.531	12000.00	2648.35
148	200	0.43	4.532	12430.00	2742.66






## Compressive Strength of Intact Rock

ASTM D7012

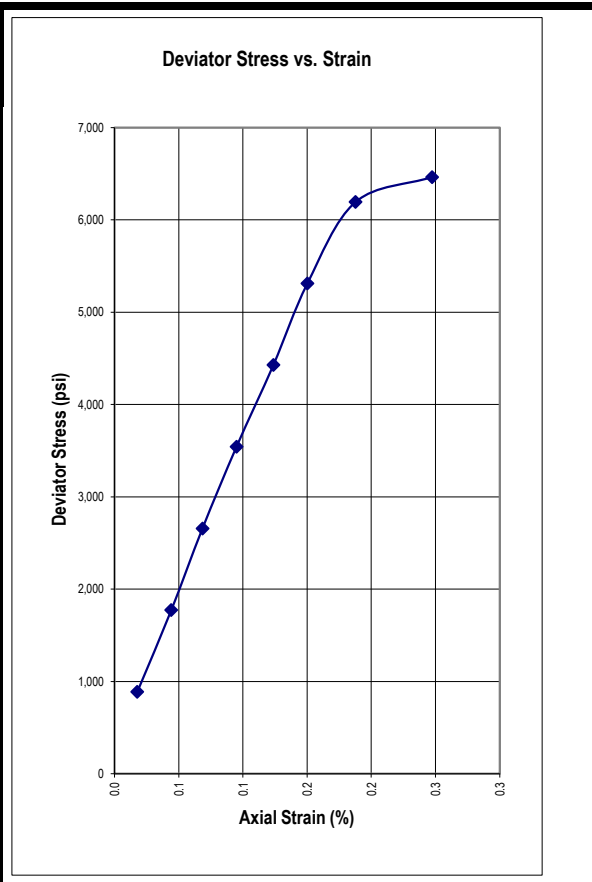
DSA File #:                     

DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-5 51.6-52.7	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DWP/CAJ
Sample Location:					Check By:	Draft
					Lab No.:	15-15-549

Sample Data			Photo At Failure	
Tare Number	I.D.	E		
Tare Weight	(gm)	322.80		
Wet Core + Tare	(gm)	1227.20		
Dry Core + Tare	(gm)	1215.80		
Weight of Water	(gm)	11.40		
Dry Weight	(gm)	893.00		
Moisture Content	(%)	1.28		
Core Height	(in)	4.527		
Sample Diameter	(in)	2.397		
Wet Unit Weight	(pcf)	168.50		
Dry Unit Weight	(pcf)	166.38		
Specific Gravity	(g/cc)	2.72		
Saturation	(%)	172.57		
Strain Rate	psi/second	41.20		
compression machine	D	15-08-029CT		
Compressive Strength = 6,463.6      psi				

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
15	8	0.02	4.513	4000.00	886.25
42	20	0.04	4.515	8000.00	1772.03
65	31	0.07	4.516	12000.00	2657.41
85	43	0.09	4.517	16000.00	3542.27
101	56	0.12	4.518	20000.00	4426.56
118	68	0.15	4.519	24000.00	5310.46
138	85	0.19	4.521	28000.00	6193.21
157	112	0.25	4.524	29240.00	6463.62



# Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

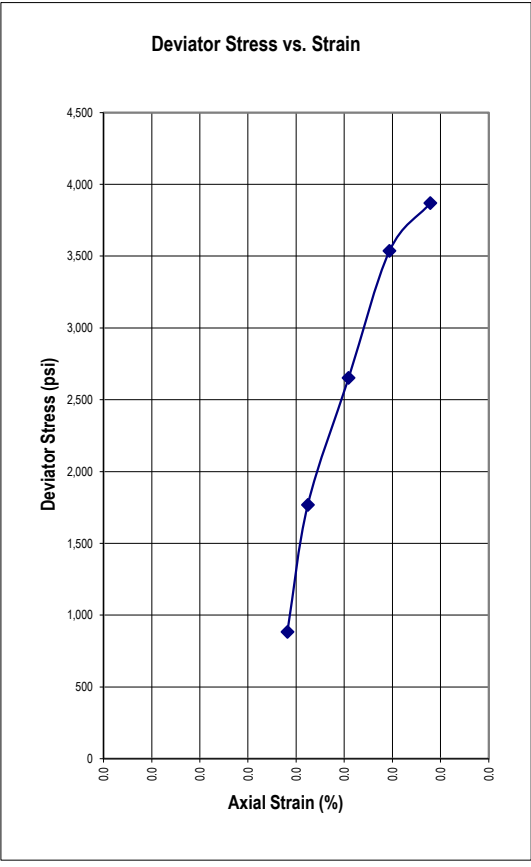
DSA Appl #:                     

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>
Sample No.:	<b>CB-5 69.8-71.0</b>	Boring/Trench No.:		Depth (ft.):	
Soil Description:				Tested By:	<b>DWP/CAJ</b>
Sample Location:				Check By:	<b>Draft</b>
				Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	IJ	
Tare Weight	(gm)	218.50	
Wet Core + Tare	(gm)	1206.90	
Dry Core + Tare	(gm)	1193.80	
Weight of Water	(gm)	13.10	
Dry Weight	(gm)	975.30	
Moisture Content	(%)	1.34	
Core Height	(in)	4.714	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	176.41	
Dry Unit Weight	(pcf)	174.07	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	-146.48	
Strain Rate	psi/second	<b>35.50</b>	
compression machine	D	15-08-029CT	

**Compressive Strength = 3,869.2 psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
8	9	0.02	4.525	4000.00	884.03
37	10	0.02	4.525	8000.00	1768.01
56	12	0.03	4.525	12000.00	2651.91
77	14	0.03	4.525	16000.00	3535.73
109	16	0.03	4.525	17510.00	3869.25




## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

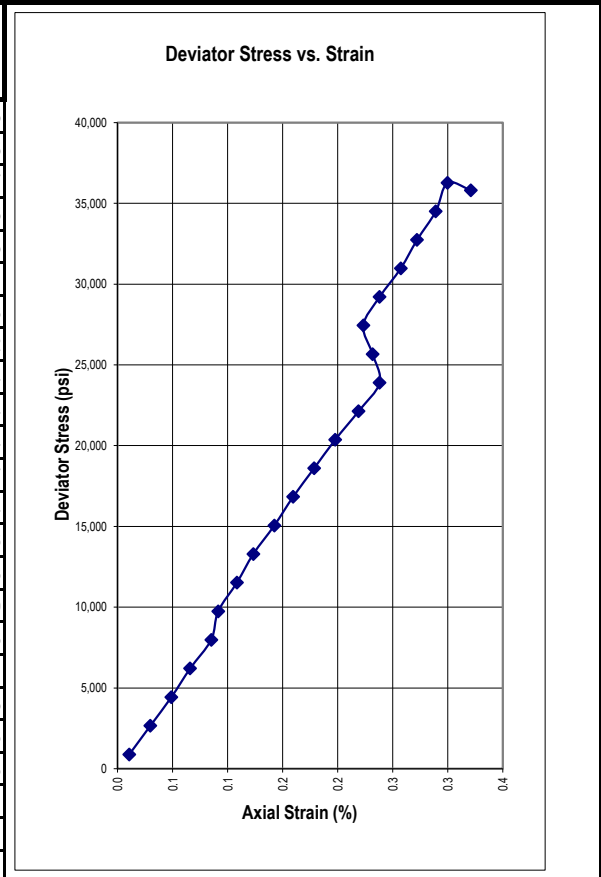
DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-6 44.0-45.0	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DWP/CAJ
Sample Location:					Check By:	Draft
					Lab No.:	15-15-549

Sample Data			Photo At Failure
Tare Number	I.D.	5	
Tare Weight	(gm)	117.40	
Wet Core + Tare	(gm)	944.40	
Dry Core + Tare	(gm)	940.40	
Weight of Water	(gm)	4.00	
Dry Weight	(gm)	823.00	
Moisture Content	(%)	0.49	
Core Height	(in)	4.702	
Sample Diameter	(in)	2.396	
Wet Unit Weight	(pcf)	148.47	
Dry Unit Weight	(pcf)	147.75	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	8.89	
Strain Rate	PSI/Second	67.16	
compression machine	D	15-08-029CT	

Compressive Strength = 36,264.0      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
36	5	0.01	4.509	4000.00	887.05
65	14	0.03	4.510	12000.00	2660.65
91	23	0.05	4.511	20000.00	4433.57
115	31	0.07	4.512	28000.00	6205.95
136	40	0.09	4.513	36000.00	7977.55
160	43	0.09	4.513	44000.00	9749.71
182	51	0.11	4.514	52000.00	11520.43
205	58	0.12	4.514	60000.00	13290.82
228	67	0.14	4.515	68000.00	15060.04
253	75	0.16	4.516	76000.00	16828.94
279	84	0.18	4.517	84000.00	18596.84
303	93	0.20	4.518	92000.00	20364.07
339	103	0.22	4.519	100000.00	22130.14
357	112	0.24	4.520	108000.00	23895.96
379	109	0.2318113	4.519	116000.00	25667.68
410	105	0.2233045	4.519	124000.00	27440.20
435	112	0.2381914	4.520	132000.00	29206.18
470	121	0.2573318	4.520	140000.00	30970.31
494	128	0.2722188	4.521	148000.00	32735.15
520	136	0.2892325	4.522	156000.00	34498.73
548	141	0.2998666	4.522	164000.00	36264.03
560	151	0.3211331	4.523	161970.00	35807.51



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## Compressive Strength of Intact Rock

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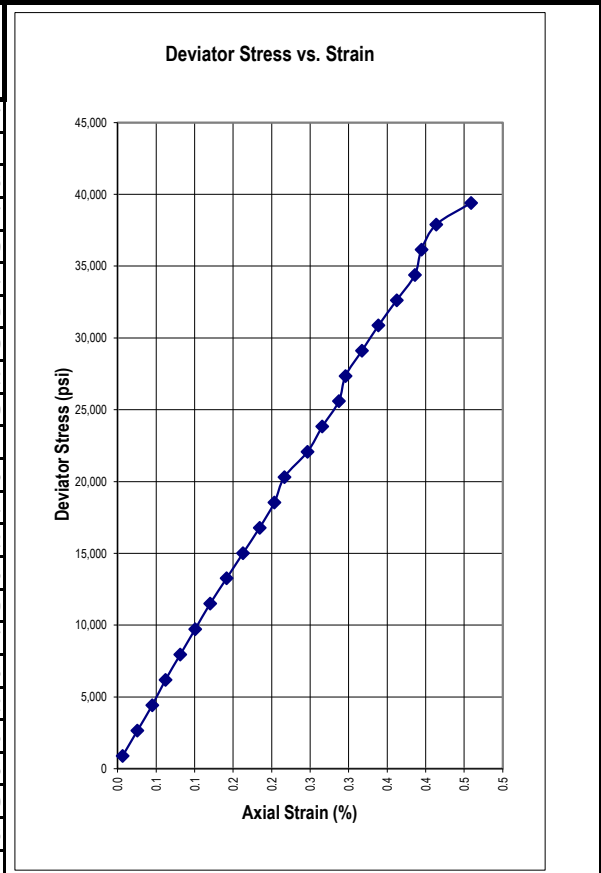
DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015
Sample No.:	CB-6 88.6-89.5	Boring/Trench No.:		Tested By:	DWP/CAJ
Soil Description:				Check By:	Draft
Sample Location:				Lab No.:	15-15-549

Sample Data			Photo At Failure
Tare Number	I.D.	EJ	
Tare Weight	(gm)	190.90	
Wet Core + Tare	(gm)	988.50	
Dry Core + Tare	(gm)	986.00	
Weight of Water	(gm)	2.50	
Dry Weight	(gm)	795.10	
Moisture Content	(%)	0.31	
Core Height	(in)	4.664	
Sample Diameter	(in)	2.399	
Wet Unit Weight	(pcf)	144.00	
Dry Unit Weight	(pcf)	143.55	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	4.69	
Strain Rate	psi/second	67.70	
compression machine	D	15-08-029CT	

Compressive Strength = 39,398.1      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
9	3	0.01	4.520	4000.00	884.87
53	12	0.03	4.521	12000.00	2654.11
79	21	0.05	4.522	20000.00	4422.66
106	29	0.06	4.523	28000.00	6190.67
129	38	0.08	4.524	36000.00	7957.89
150	47	0.10	4.525	44000.00	9724.44
171	56	0.12	4.526	52000.00	11490.30
197	66	0.14	4.527	60000.00	13255.19
217	76	0.16	4.528	68000.00	15019.32
244	86	0.18	4.528	76000.00	16782.69
265	95	0.20	4.529	84000.00	18545.71
291	101	0.22	4.530	92000.00	20309.35
315	115	0.25	4.531	100000.00	22068.74
340	124	0.27	4.532	108000.00	23829.62
366	134	0.287307	4.533	116000.00	25589.28
390	138	0.2958834	4.534	124000.00	27351.70
420	148	0.3173242	4.535	132000.00	29110.07
445	158	0.338765	4.535	140000.00	30867.68
472	169	0.3623499	4.537	148000.00	32623.82
500	180	0.3859348	4.538	156000.00	34379.13
532	184	0.3945111	4.538	164000.00	36139.05
565	193	0.4138079	4.539	172000.00	37894.59
591	214	0.4588336	4.541	178905.00	39398.06



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## Compressive Strength of Intact Rock

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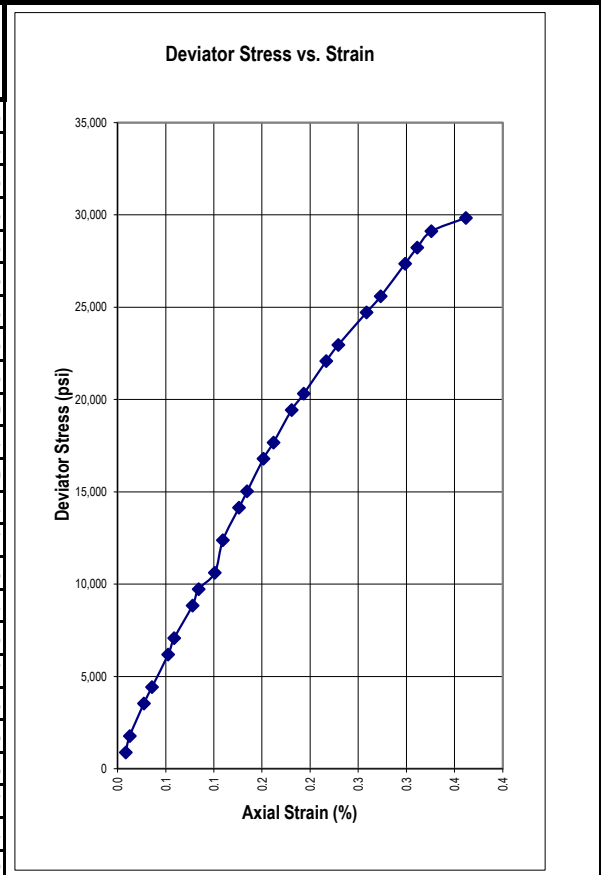
DSA Appl #: \_\_\_\_\_

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-8 23.9-24.9	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DWP/CAJ
Sample Location:					Check By:	Draft
					Lab No.:	15-15-549

Sample Data			Photo At Failure
Tare Number	I.D.	H	
Tare Weight	(gm)	330.90	
Wet Core + Tare	(gm)	1240.30	
Dry Core + Tare	(gm)	1237.10	
Weight of Water	(gm)	3.20	
Dry Weight	(gm)	906.20	
Moisture Content	(%)	0.35	
Core Height	(in)	4.755	
Sample Diameter	(in)	2.399	
Wet Unit Weight	(pcf)	161.04	
Dry Unit Weight	(pcf)	160.48	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	16.66	
Strain Rate	PSI/Second	81.08	
compression machine	D	15-08-029CT	

**Compressive Strength = 29,837.8 psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
5	4	0.01	4.521	4000.00	884.86
21	6	0.01	4.521	8000.00	1769.64
49	13	0.03	4.521	16000.00	3538.76
60	17	0.04	4.522	20000.00	4423.08
82	25	0.05	4.523	28000.00	6191.26
96	28	0.06	4.523	32000.00	7075.28
116	37	0.08	4.524	40000.00	8842.43
125	40	0.08	4.524	44000.00	9726.06
143	48	0.10	4.525	48000.00	10608.46
152	52	0.11	4.525	56000.00	12375.49
174	60	0.13	4.526	64000.00	14141.04
184	64	0.13	4.526	68000.00	15023.59
202	72	0.15	4.527	76000.00	16788.24
213	77	0.16	4.527	80000.00	17669.97
384	86	0.1808623	4.528	88000.00	19433.28
245	92	0.1934805	4.529	92000.00	20314.04
267	103	0.2166141	4.530	100000.00	22075.36
277	109	0.2292324	4.531	104000.00	22955.47
302	123	0.2586751	4.532	112000.00	24713.98
315	130	0.2733964	4.533	116000.00	25592.85
336	142	0.298633	4.534	124000.00	27350.95
347	148	0.3112513	4.534	128000.00	28229.67
361	155	0.3259727	4.535	132000.00	29107.54
368	172	0.3617245	4.537	135360.00	29837.76



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## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

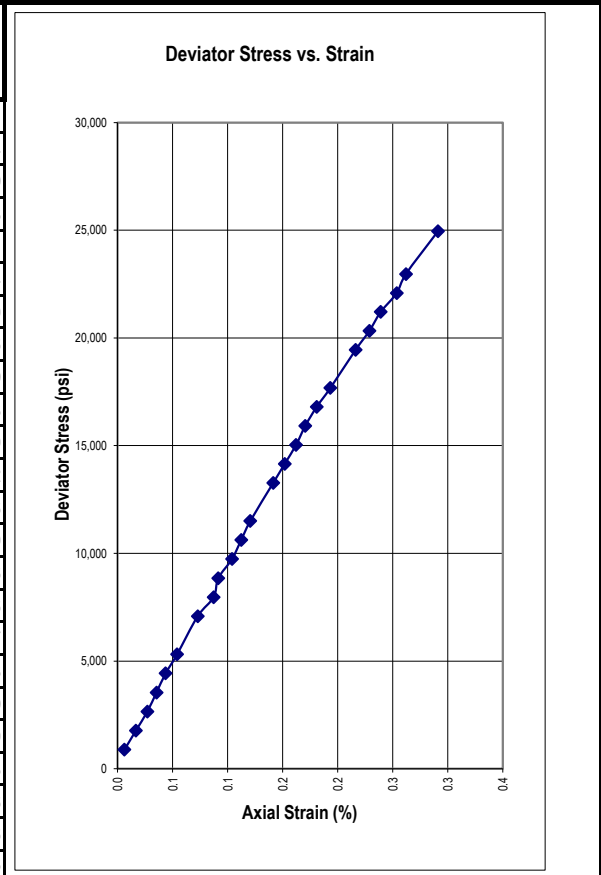
DSA Appl #:                     

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>12/8/2015</b>
Sample No.:	<b>CB-9 17.5-18.0</b>	Boring/Trench No.:		Tested By:	<b>DWP/CAJ</b>
Soil Description:		Depth (ft.):		Check By:	<b>Draft</b>
Sample Location:				Lab No.:	<b>15-15-549</b>

Sample Data			Photo At Failure
Tare Number	I.D.	CJ	
Tare Weight	(gm)	190.50	
Wet Core + Tare	(gm)	1106.00	
Dry Core + Tare	(gm)	1103.70	
Weight of Water	(gm)	2.300	
Dry Weight	(gm)	913.20	
Moisture Content	(%)	0.25	
Core Height	(in)	4.808	
Sample Diameter	(in)	2.398	
Wet Unit Weight	(pcf)	160.47	
Dry Unit Weight	(pcf)	160.07	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	11.35	
Strain Rate	PSI/Second	<b>77.01</b>	
compression machine	D	15-08-029CT	

Compressive Strength = 24,951.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
16	3	0.01	4.517	4000.00	885.61
50	8	0.02	4.517	8000.00	1771.04
67	13	0.03	4.518	12000.00	2656.29
80	17	0.04	4.518	16000.00	3541.43
91	21	0.04	4.518	20000.00	4426.41
101	26	0.05	4.519	24000.00	5311.14
121	35	0.07	4.520	32000.00	7080.20
136	42	0.09	4.520	36000.00	7964.06
147	44	0.09	4.520	40000.00	8848.59
151	50	0.10	4.521	44000.00	9732.23
161	54	0.11	4.521	48000.00	10616.10
171	58	0.12	4.522	52000.00	11499.82
191	68	0.14	4.523	60000.00	13266.26
210	73	0.15	4.523	64000.00	14149.20
219	78	0.1622296	4.524	68000.00	15031.96
229	82	0.1705491	4.524	72000.00	15914.86
240	87	0.1809484	4.525	76000.00	16797.27
260	93	0.1934276	4.525	80000.00	17679.13
269	104	0.2163062	4.526	88000.00	19442.59
279	110	0.2287854	4.527	92000.00	20323.80
291	115	0.2391847	4.527	96000.00	21205.23
302	122	0.2537438	4.528	100000.00	22085.56
313	126	0.2620632	4.528	104000.00	22967.06
324	140	0.2911814	4.530	113020.00	24951.73






## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

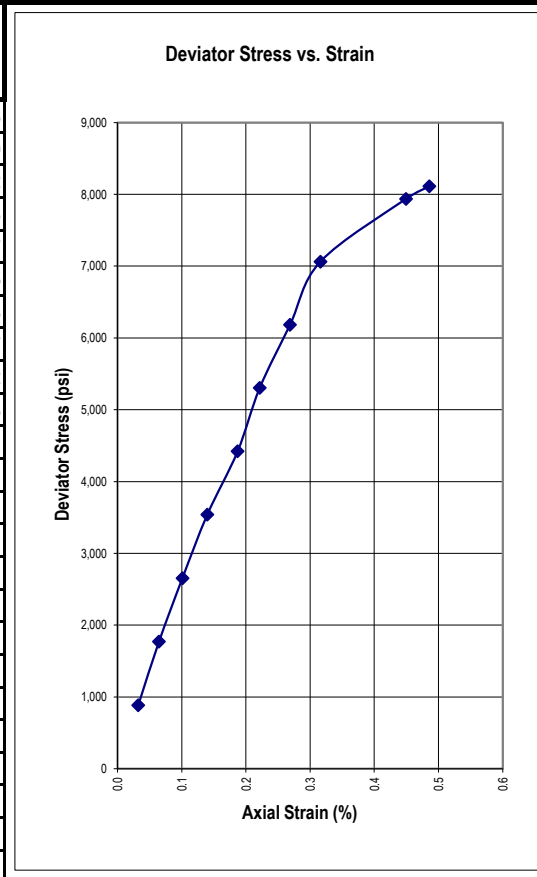
DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	12/8/2015	
Sample No.:	CB-9 62.5-63.1	Boring/Trench No.:		Tested By:	DWP/CAJ	
Soil Description:					Check By:	Draft
Sample Location:					Lab No.:	15-15-549

Sample Data			Photo At Failure	
Tare Number	I.D.	HJ		
Tare Weight	(gm)	190.60		
Wet Core + Tare	(gm)	1108.80		
Dry Core + Tare	(gm)	1097.80		
Weight of Water	(gm)	11.00		
Dry Weight	(gm)	907.20		
Moisture Content	(%)	1.21		
Core Height	(in)	4.652		
Sample Diameter	(in)	2.398		
Wet Unit Weight	(pcf)	166.34		
Dry Unit Weight	(pcf)	164.35		
Specific Gravity	(g/cc)	2.72		
Saturation	(%)	100.73		
Strain Rate	psi/second	46.36		
compression machine	D	15-08-029CT		

Compressive Strength = 8,113.0      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
6	15	0.03	4.518	4000.00	885.38
33	30	0.06	4.519	8000.00	1770.20
53	47	0.10	4.521	12000.00	2654.32
70	65	0.14	4.523	16000.00	3537.73
86	87	0.19	4.525	20000.00	4420.07
100	103	0.22	4.526	24000.00	5302.25
118	125	0.27	4.529	28000.00	6183.03
133	147	0.32	4.531	32000.00	7062.97
168	209	0.45	4.537	36000.00	7935.22
175	226	0.49	4.538	36820.00	8112.98
				40820.00	
				44820.00	
				48820.00	
				52820.00	
				56820.00	
				60820.00	
				64820.00	
				68820.00	
				72820.00	
				76820.00	
				80820.00	
				84820.00	
				88820.00	
				92820.00	



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## Compressive Strength of Intact Rock

ASTM D7012

**DSA File #:** [Blank]  
**DSA Appl #:** [Blank]

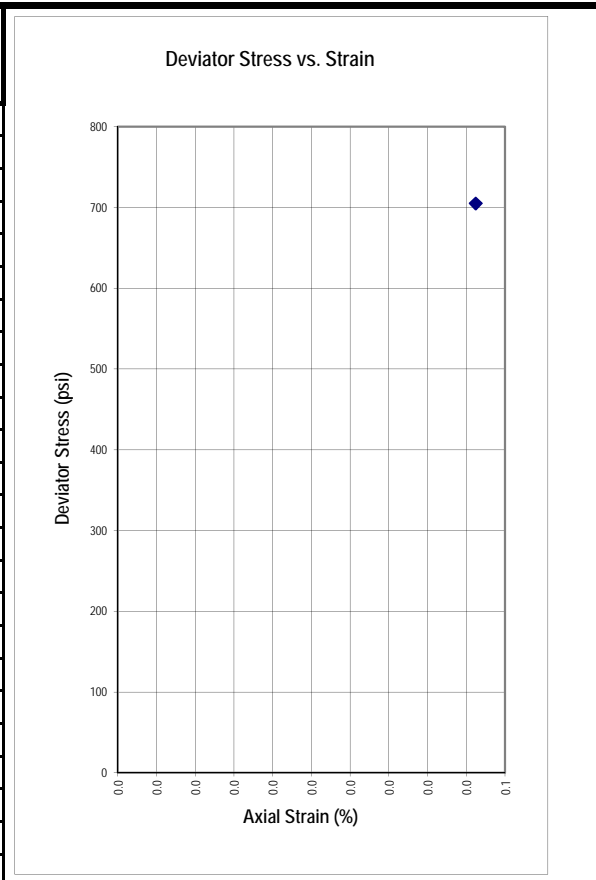
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-10, 45.1-45.7	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	20

Sample Data		
Tare Number	I.D.	JD
Tare Weight	(gm)	190.50
Wet Core + Tare	(gm)	956.68
Dry Core + Tare	(gm)	929.35
Weight of Water	(gm)	27.33
Dry Weight	(gm)	738.85
Moisture Content	(%)	3.70
Core Height	(in)	4.760
Sample Diameter	(in)	2.370
Wet Unit Weight	(pcf)	138.88
Dry Unit Weight	(pcf)	133.92
Specific Gravity	(g/cc)	2.72
Saturation	(%)	37.63
Strain Rate	psi/second	58.72
compression machine	ID	15-08-029CT



**Compressive Strength = 704.6 psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
12	22	0.05	4.414	3110.00	704.65






## Compressive Strength of Intact Rock

ASTM D7012

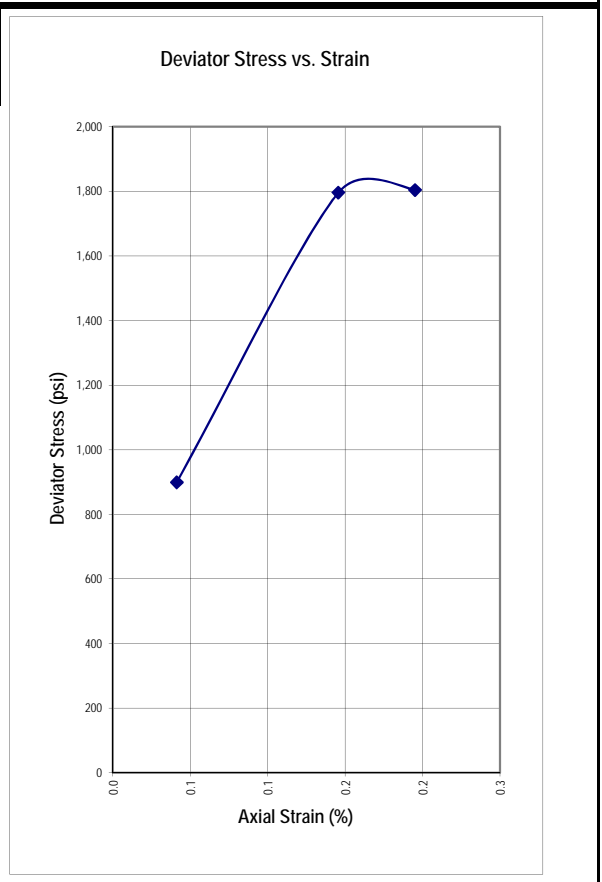
DSA File #:   
 DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB12, 35.2-35.5	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Note:	Height to diameter ratio corrected				Check By:	CRK
					Lab No.:	29

Sample Data			Photo At Failure
Tare Number	I.D.	JF	
Tare Weight	(gm)	192.40	
Wet Core + Tare	(gm)	903.50	
Dry Core + Tare	(gm)	891.50	
Weight of Water	(gm)	12.00	
Dry Weight	(gm)	699.10	
Moisture Content	(%)	1.72	
Core Height	(in)	3.640	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	167.14	
Dry Unit Weight	(pcf)	164.32	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	141.76	
Strain Rate	psi/second	26.53	
compression machine	ID	15-08-029CT	

Compressive Strength = 1,803.7     psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)		lbs	
6	15	0.04	4.451	4000.00	898.75
56	53	0.15	4.455	8000.00	1795.62
68	71	0.20	4.458	8040.00	1803.70




## Compressive Strength of Intact Rock

ASTM D7012

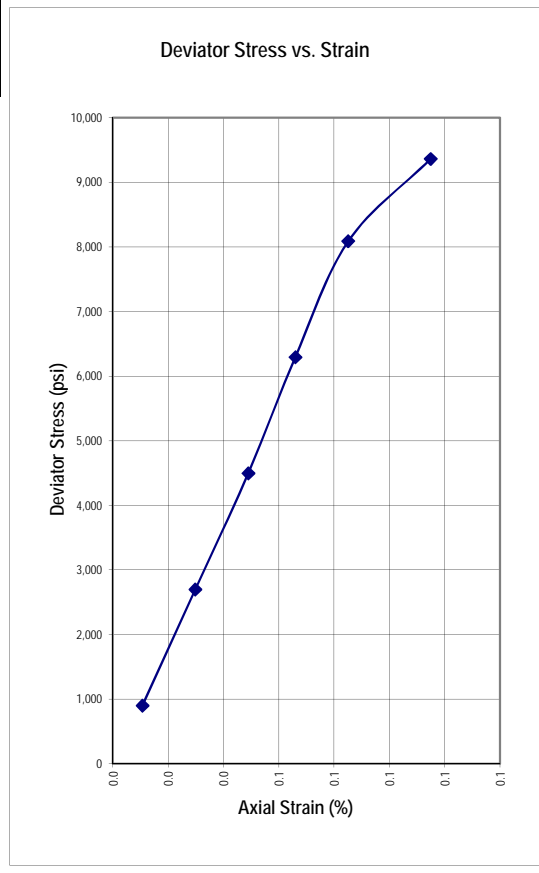
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DSA Appl #: [Blank]

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016
Sample No.:	CB-12, 47.7-48.6	Boring/Trench No.:		Tested By:	DCK
Soil Description:				Check By:	CRK
Sample Location:				Lab No.:	16

Sample Data			Photo At Failure
Tare Number	I.D.	H	
Tare Weight	(gm)	330.90	
Wet Core + Tare	(gm)	1245.60	
Dry Core + Tare	(gm)	1239.90	
Weight of Water	(gm)	5.70	
Dry Weight	(gm)	909.00	
Moisture Content	(%)	0.63	
Core Height	(in)	4.700	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	166.50	
Dry Unit Weight	(pcf)	165.47	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	66.22	
Strain Rate	PSI/Second	64.55	
compression machine	ID	15-08-029CT	<b>Compressive Strength = 9,360.3      psi</b>

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
36	5	0.01	4.449	4000.00	899.02
65	14	0.03	4.450	12000.00	2696.55
91	23	0.05	4.451	20000.00	4493.38
115	31	0.07	4.452	28000.00	6289.67
136	40	0.09	4.453	36000.00	8085.17
145	54	0.11	4.454	41690.00	9360.28




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## Compressive Strength of Intact Rock

ASTM D7012

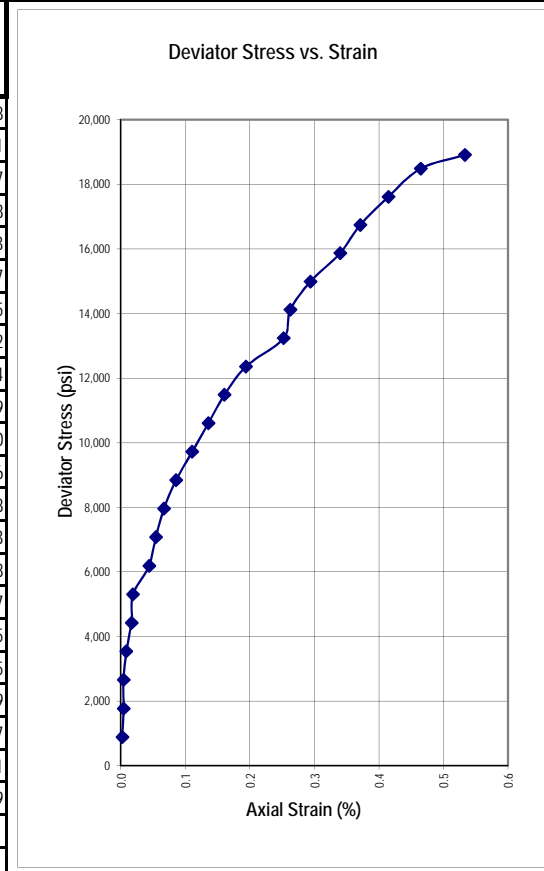
DSA File #:    
 DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-13, 98.5-99.0	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	25

Sample Data			Photo At Failure
Tare Number	I.D.	EJ	
Tare Weight	(gm)	190.90	
Wet Core + Tare	(gm)	989.30	
Dry Core + Tare	(gm)	983.60	
Weight of Water	(gm)	5.70	
Dry Weight	(gm)	792.70	
Moisture Content	(%)	0.72	
Core Height	(in)	4.800	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	139.94	
Dry Unit Weight	(pcf)	138.94	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	8.83	
Strain Rate	psi/second	46.23	
compression machine	ID	15-08-029CT	

Compressive Strength = 18,908.8      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
19	1	0.00	4.524	4000.00	884.18
39	2	0.00	4.524	8000.00	1768.31
55	2	0.00	4.524	12000.00	2652.47
86	4	0.01	4.524	16000.00	3536.48
86	8	0.02	4.525	20000.00	4420.23
95	9	0.02	4.525	24000.00	5304.17
103	21	0.04	4.526	28000.00	6186.65
122	26	0.05	4.526	32000.00	7069.72
138	32	0.07	4.527	36000.00	7952.44
146	41	0.09	4.528	40000.00	8834.39
158	53	0.11	4.529	44000.00	9715.40
176	65	0.14	4.530	48000.00	10595.96
188	77	0.16	4.531	52000.00	11476.08
201	93	0.19	4.533	56000.00	12354.73
235	121	0.2520833	4.535	60000.00	13229.48
266	126	0.2625	4.536	64000.00	14109.97
289	141	0.29375	4.537	68000.00	14987.15
315	163	0.3395833	4.539	72000.00	15861.45
336	178	0.3708333	4.541	76000.00	16737.39
361	199	0.4145833	4.543	80000.00	17610.57
391	223	0.4645833	4.545	84000.00	18481.81
409	256	0.5333333	4.548	86000.00	18908.79



## Compressive Strength of Intact Rock

ASTM D7012

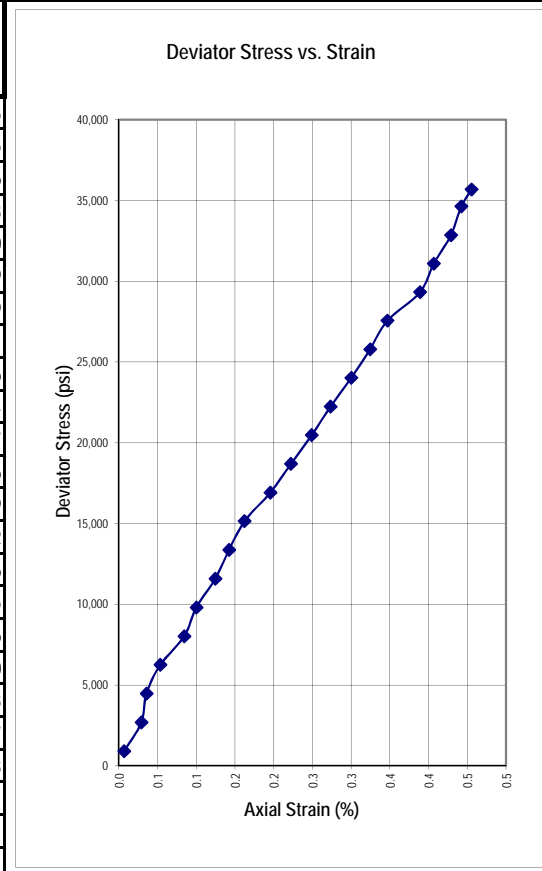
DSA File #:    
 DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/18/2016	
Sample No.:	CB-13, 114.8-116.0	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	22

Sample Data			Photo At Failure
Tare Number	I.D.	JD	
Tare Weight	(gm)	190.50	
Wet Core + Tare	(gm)	995.60	
Dry Core + Tare	(gm)	984.30	
Weight of Water	(gm)	11.30	
Dry Weight	(gm)	793.80	
Moisture Content	(%)	1.42	
Core Height	(in)	4.500	
Sample Diameter	(in)	2.390	
Wet Unit Weight	(pcf)	151.79	
Dry Unit Weight	(pcf)	149.66	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	28.87	
Strain Rate	psi/second	77.89	

Compressive Strength = 35,672.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
35	3	0.01	4.487	4000.00	891.55
48	13	0.03	4.488	12000.00	2674.05
55	16	0.04	4.488	20000.00	4456.46
61	24	0.05	4.489	28000.00	6237.93
73	38	0.08	4.490	36000.00	8017.70
82	45	0.10	4.491	44000.00	9797.89
122	56	0.12	4.492	52000.00	11576.49
136	64	0.14	4.493	60000.00	13355.11
151	73	0.16	4.494	68000.00	15132.76
188	88	0.20	4.495	76000.00	16907.44
201	100	0.22	4.496	84000.00	18682.17
215	112	0.25	4.497	92000.00	20455.96
252	123	0.27	4.499	100000.00	22229.29
266	135	0.30	4.500	108000.00	24001.22
302	146	0.3244444	4.501	116000.00	25772.76
330	156	0.3466667	4.502	124000.00	27544.05
374	175	0.3888889	4.504	132000.00	29308.66
382	183	0.4066667	4.505	140000.00	31079.40
421	193	0.4288889	4.506	148000.00	32848.03
446	199	0.4422222	4.506	156000.00	34618.97
458	205	0.4555556	4.507	160770.00	35672.73




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## Compressive Strength of Intact Rock

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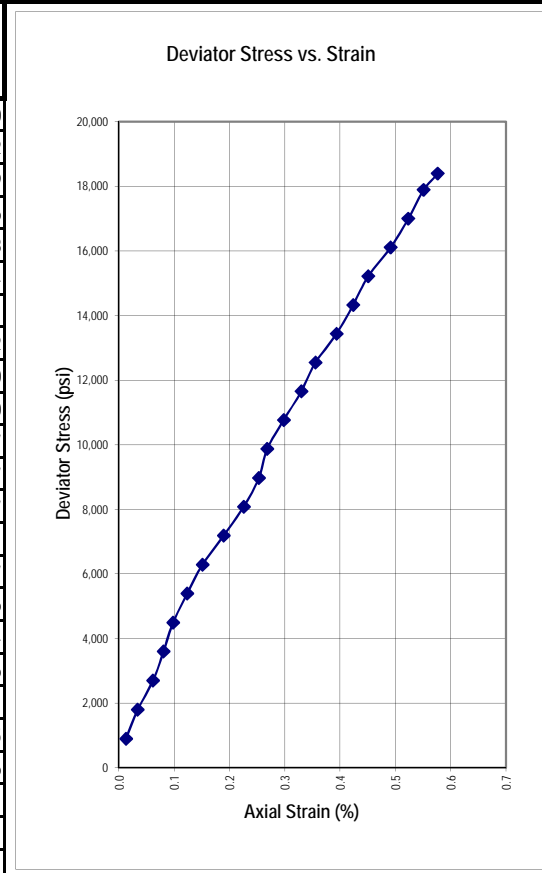
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 DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016
Sample No.:	CB-13, 137.5-138.5	Boring/Trench No.:		Tested By:	DCK
Soil Description:				Check By:	CRK
Sample Location:				Lab No.:	23

Sample Data			Photo At Failure
Tare Number	I.D.	IJ	
Tare Weight	(gm)	218.50	
Wet Core + Tare	(gm)	996.20	
Dry Core + Tare	(gm)	983.60	
Weight of Water	(gm)	12.60	
Dry Weight	(gm)	765.10	
Moisture Content	(%)	1.65	
Core Height	(in)	4.700	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	141.57	
Dry Unit Weight	(pcf)	139.27	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	20.48	
Strain Rate	psi/second	54.72	
compression machine	ID	15-08-029CT	

Compressive Strength = 18,386.0      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
8	6	0.01	4.449	4000.00	899.00
15	16	0.03	4.450	8000.00	1797.62
35	29	0.06	4.452	12000.00	2695.69
55	38	0.08	4.452	16000.00	3593.56
61	46	0.10	4.453	20000.00	4491.18
75	58	0.12	4.454	24000.00	5388.04
86	71	0.15	4.456	28000.00	6284.31
99	89	0.19	4.457	32000.00	7179.32
112	106	0.23	4.459	36000.00	8073.80
175	119	0.25	4.460	40000.00	8968.40
189	126	0.27	4.461	44000.00	9863.77
198	140	0.30	4.462	48000.00	10757.27
206	155	0.33	4.464	52000.00	11649.97
213	167	0.36	4.465	56000.00	12542.91
234	185	0.393617	4.466	60000.00	13433.67
254	199	0.4234043	4.468	64000.00	14324.96
269	212	0.4510638	4.469	68000.00	15216.04
284	231	0.4914894	4.471	72000.00	16104.56
301	246	0.5234043	4.472	76000.00	16993.81
322	259	0.5510638	4.473	80000.00	17883.25
336	271	0.5765957	4.475	82270.00	18385.96



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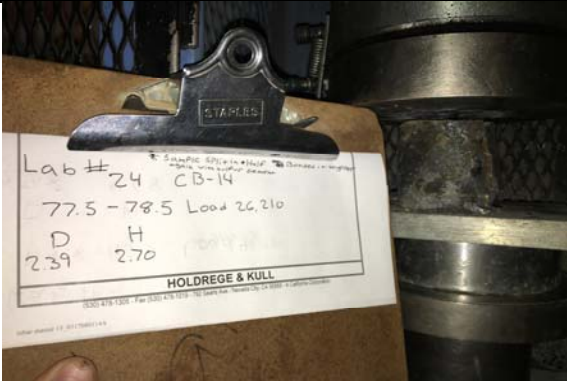
**Compressive Strength of Intact Rock**  
ASTM D7012

DSA File #:

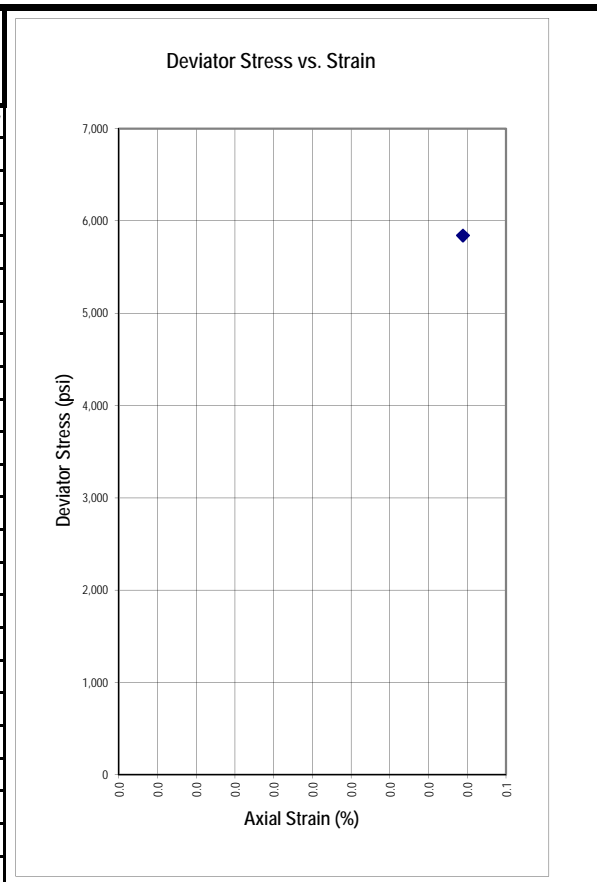
DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-14, 77.5-78.5	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Note:	Height to diameter ratio off. Correction made, UCS only, no strain				Check By:	CRK
					Lab No.:	24

Sample Data		
Tare Number	I.D.	HJ
Tare Weight	(gm)	190.60
Wet Core + Tare	(gm)	658.30
Dry Core + Tare	(gm)	642.30
Weight of Water	(gm)	16.00
Dry Weight	(gm)	451.70
Moisture Content	(%)	3.54
Core Height	(in)	2.700
Sample Diameter	(in)	2.390
Wet Unit Weight	(pcf)	146.96
Dry Unit Weight	(pcf)	141.93
Specific Gravity	(g/cc)	2.72
Saturation	(%)	49.20
Strain Rate	psi/second	
compression machine	ID	15-08-029CT

Photo At Failure

Compressive Strength = 5,839.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)		lbs	
	12	0.04	4.488	26210.00	5839.67



## Compressive Strength of Intact Rock

ASTM D7012

**DSA File #:**    
**DSA Appl #:**  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-15, 24.0-24.7	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	18

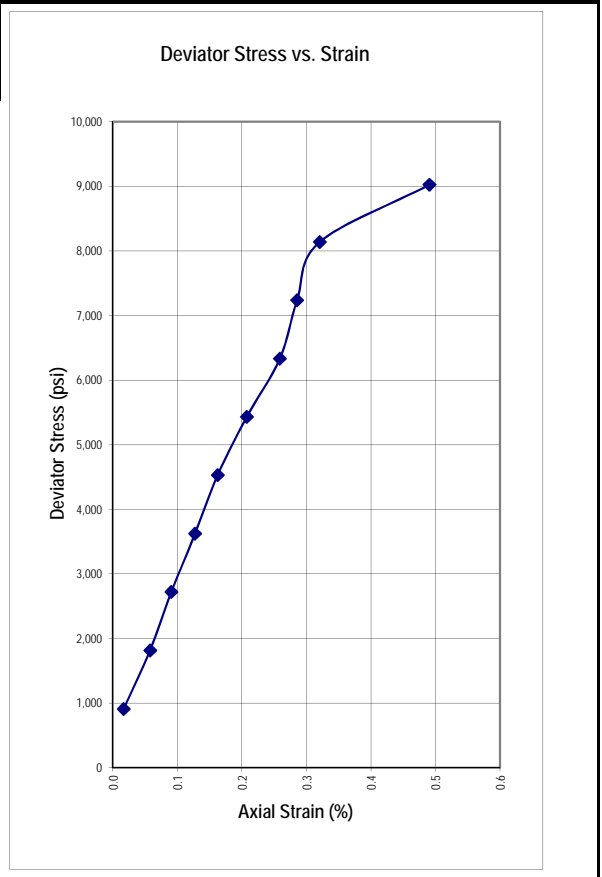
Sample Data		
Tare Number	I.D.	H
Tare Weight	(gm)	330.90
Wet Core + Tare	(gm)	1162.25
Dry Core + Tare	(gm)	1155.04
Weight of Water	(gm)	7.21
Dry Weight	(gm)	824.14
Moisture Content	(%)	0.87
Core Height	(in)	4.870
Sample Diameter	(in)	2.370
Wet Unit Weight	(pcf)	147.28
Dry Unit Weight	(pcf)	146.01
Specific Gravity	(g/cc)	2.72
Saturation	(%)	14.65
Strain Rate	psi/second	47.78
compression machine	ID	15-08-029CT

Photo At Failure



Compressive Strength = 9,509.0      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)		lbs	
32	8	0.02	4.412	4000.00	906.57
56	28	0.06	4.414	8000.00	1812.40
71	44	0.09	4.415	12000.00	2717.70
86	62	0.13	4.417	16000.00	3622.26
103	79	0.16	4.419	20000.00	4526.25
123	101	0.21	4.421	24000.00	5429.04
136	126	0.26	4.423	28000.00	6330.62
148	139	0.29	4.424	32000.00	7233.06
167	156	0.32	4.426	36000.00	8134.34
186	239	0.49	4.433	40000.00	9022.71
199	255	0.52	4.435	42170.00	9509.05



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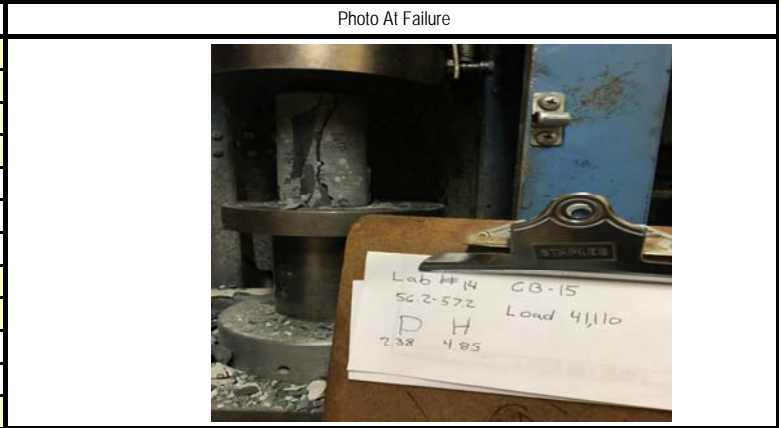
## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:   
 DSA Appl #:

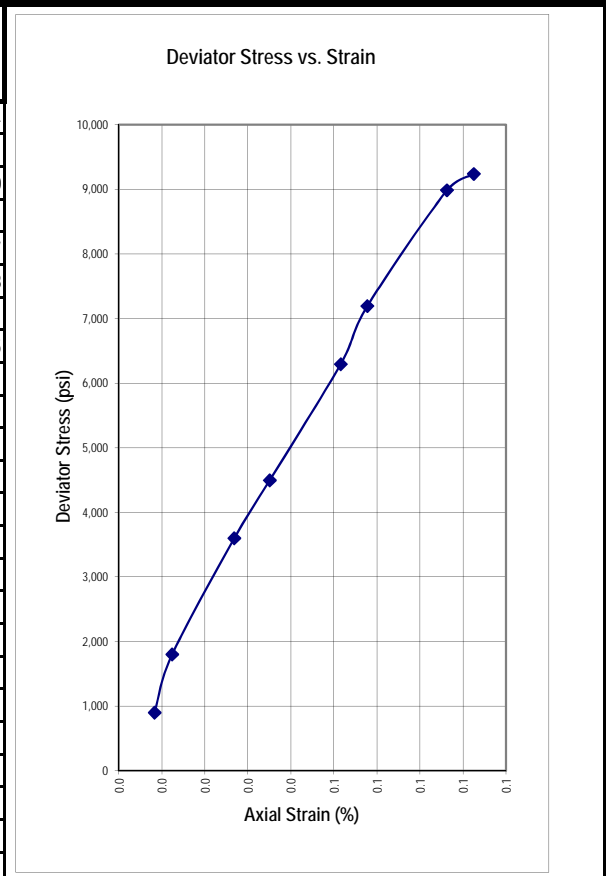
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-15, 56.2-57.2	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	14

Sample Data		
Tare Number	I.D.	IJ
Tare Weight	(gm)	218.50
Wet Core + Tare	(gm)	1200.23
Dry Core + Tare	(gm)	1186.89
Weight of Water	(gm)	13.34
Dry Weight	(gm)	968.39
Moisture Content	(%)	1.38
Core Height	(in)	4.850
Sample Diameter	(in)	2.380
Wet Unit Weight	(pcf)	173.18
Dry Unit Weight	(pcf)	170.83
Specific Gravity	(g/cc)	2.72
Saturation	(%)	-583.43
Strain Rate	PSI/Second	76.94
compression machine	ID	15-08-029CT



**Compressive Strength = 9,233.1      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
5	4	0.01	4.449	4000.00	899.04
26	6	0.01	4.449	8000.00	1798.01
49	13	0.03	4.450	16000.00	3595.50
63	17	0.04	4.450	20000.00	4494.01
86	25	0.05	4.451	28000.00	6290.57
98	28	0.06	4.451	32000.00	7188.78
115	37	0.08	4.452	40000.00	8984.31
120	40	0.08	4.452	41110.00	9233.05



**HOLDREG & KULL**

Copy of 4438-02 CRK(9-21-16) xlsCB-15 57 2




## Compressive Strength of Intact Rock

ASTM D7012

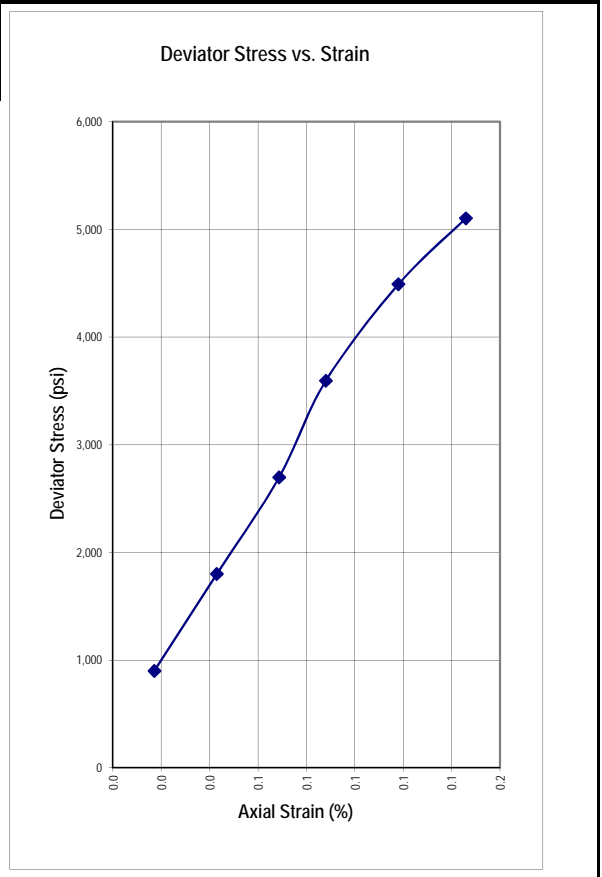
DSA File #:   
 DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-15, 67.1-68.3	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	19

Sample Data			Photo At Failure
Tare Number	I.D.	D	
Tare Weight	(gm)	316.70	
Wet Core + Tare	(gm)	1241.86	
Dry Core + Tare	(gm)	1234.20	
Weight of Water	(gm)	7.66	
Dry Weight	(gm)	917.50	
Moisture Content	(%)	0.83	
Core Height	(in)	4.660	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	169.85	
Dry Unit Weight	(pcf)	168.45	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	298.61	
Strain Rate	psi/second	168.37	
compression machine	ID		

Compressive Strength = 5,101.8      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
27	8	0.02	4.450	4000.00	898.96
50	20	0.04	4.451	8000.00	1797.46
65	32	0.07	4.452	12000.00	2695.50
88	41	0.09	4.453	16000.00	3593.30
121	55	0.12	4.454	20000.00	4490.28
135	68	0.15	4.455	22730.00	5101.78



## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                       
 DSA Appl #:                     

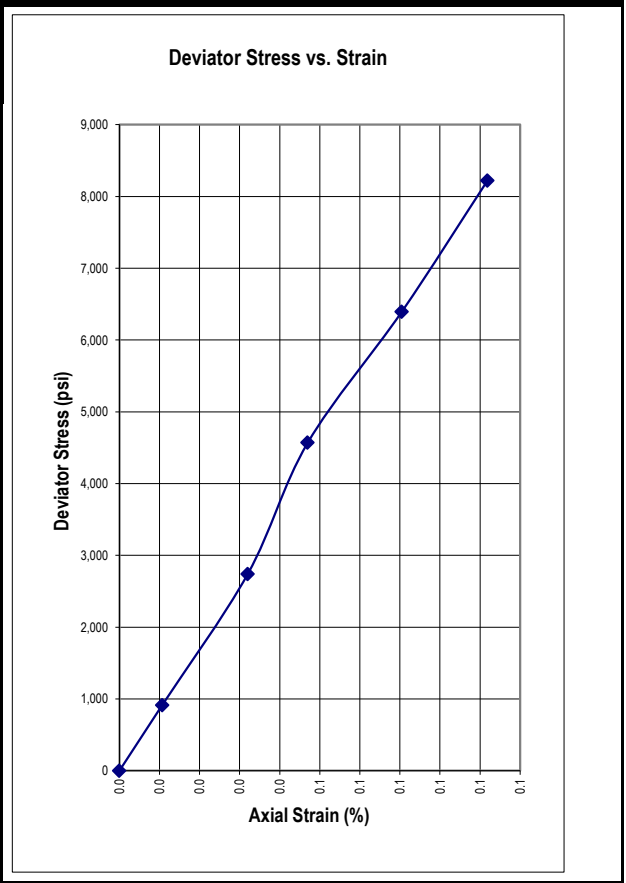
Project No.:	4438-02	Project Name:	NID Water Storage	Date:	12/6/2016	
Sample No.:	CB-16	Boring/Trench No.:	-	Depth (ft.):	41-41.8	
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	DRAFT
					Lab No.:	3

Sample Data		
Tare Number	I.D.	HJ
Tare Weight	(gm)	190.09
Wet Core + Tare	(gm)	1067.84
Dry Core + Tare	(gm)	1066.45
Weight of Water	(gm)	1.39
Dry Weight	(gm)	876.36
Moisture Content	(%)	0.16
Core Height	(in)	4.680
Sample Diameter	(in)	2.360
Wet Unit Weight	(pcf)	163.19
Dry Unit Weight	(pcf)	162.93
Specific Gravity	(g/cc)	2.72
Saturation	(%)	10.35
Strain Rate	psi/second	292.48
compression machine	ID	15-08-029CT

Photo At Failure

Compressive Strength = 15,888.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	4.375	0.00	0.00
22	5	0.01	4.375	4000.00	914.32
54	15	0.03	4.376	12000.00	2742.38
75	22	0.05	4.376	20000.00	4569.95
102	33	0.07	4.377	28000.00	6396.43
125	43	0.09	4.378	36000.00	8222.23
149	54	0.12	4.379	44000.00	10047.02
170	65	0.14	4.380	52000.00	11870.96
194	64	0.14	4.380	60000.00	13697.55
219	72	0.15	4.381	68000.00	15521.24
238	72	0.15	4.381	69610.00	15888.73



# **HOLDREG & KULL** CONSULTING ENGINEERS • GEOLOGISTS **Compressive Strength of Intact Rock** ASTM D7012

DSA File #:   
 DSA Appl #:

Project No.:	4438-02	Project Name:	NID Water Storage	Date:	12/6/2016	
Sample No.:	CB-16	Boring/Trench No.:	-	Depth (ft.):	49.3-50	
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	DRAFT
					Lab No.:	5

Sample Data		
Tare Number	I.D.	EJ
Tare Weight	(gm)	191.09
Wet Core + Tare	(gm)	1061.36
Dry Core + Tare	(gm)	1057.67
Weight of Water	(gm)	3.69
Dry Weight	(gm)	866.58
Moisture Content	(%)	0.43
Core Height	(in)	4.500
Sample Diameter	(in)	2.370
Wet Unit Weight	(pcf)	166.86
Dry Unit Weight	(pcf)	166.15
Specific Gravity	(g/cc)	2.72
Saturation	(%)	53.76
Strain Rate	psi/second	100.50
compression machine	ID	15-08-029CT

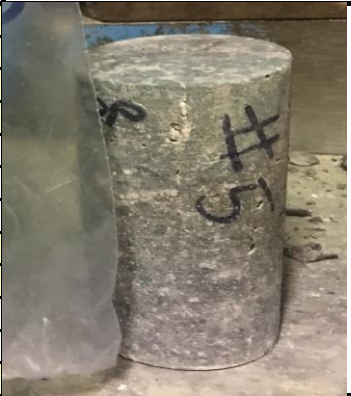

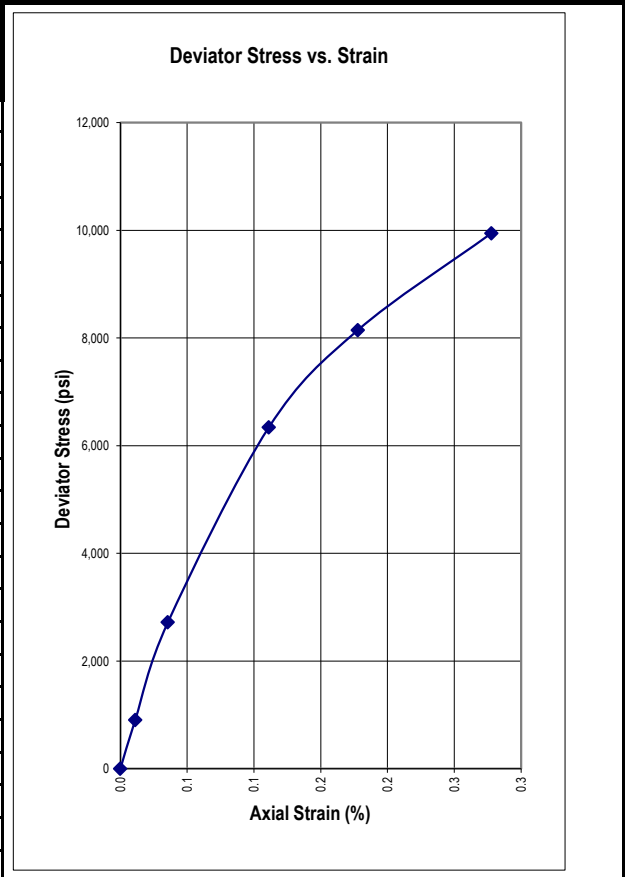


Photo At Failure



**Compressive Strength = 11,458.5      psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	0.000	0.00	0.00
12	5	0.01	4.412	4000.00	906.62
28	16	0.04	4.413	12000.00	2719.19
51	50	0.11	4.416	28000.00	6339.99
65	80	0.18	4.419	36000.00	8145.98
79	125	0.28	4.424	44000.00	9946.22
114	125	0.28	4.424	50690.00	11458.50



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# **HOLDREG & KULL** CONSULTING ENGINEERS • GEOLOGISTS **Compressive Strength of Intact Rock** ASTM D7012

DSA File #:   
 DSA Appl #:

Project No.:	<b>4438-02</b>	Project Name:	<b>NID Water Storage</b>		Date:	<b>12/6/2016</b>	
Sample No.:	<b>CB-16</b>	Boring/Trench No.:	-	Depth (ft.):	<b>62.8-63.7</b>	Tested By:	<b>DCK</b>
Soil Description:						Check By:	<b>DRAFT</b>
Sample Location:						Lab No.:	<b>6</b>

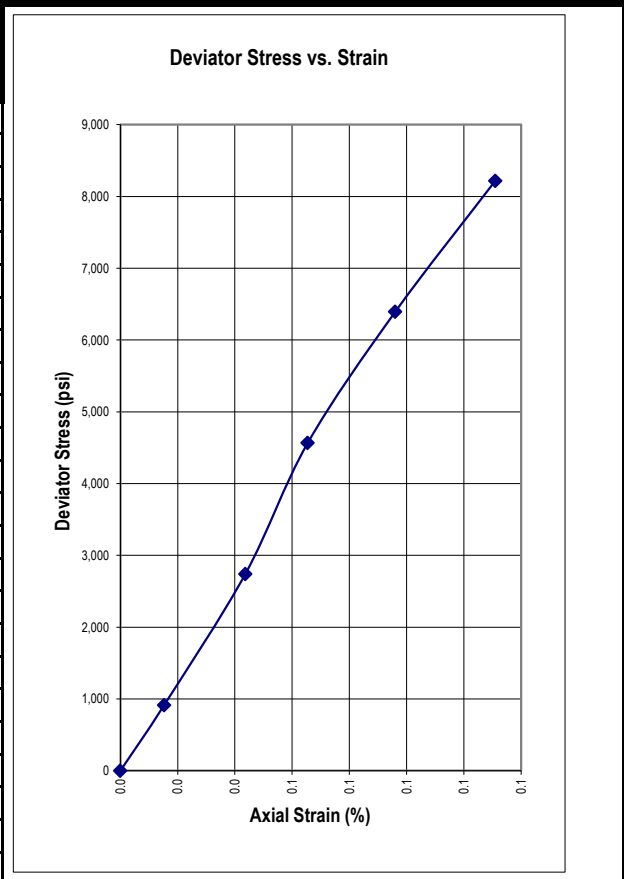
Sample Data		
Tare Number	I.D.	AJ
Tare Weight	(gm)	194.03
Wet Core + Tare	(gm)	1094.50
Dry Core + Tare	(gm)	1091.70
Weight of Water	(gm)	2.80
Dry Weight	(gm)	897.67
Moisture Content	(%)	0.31
Core Height	(in)	4.580
Sample Diameter	(in)	2.360
Wet Unit Weight	(pcf)	171.07
Dry Unit Weight	(pcf)	170.54
Specific Gravity	(g/cc)	2.80
Saturation	(%)	35.63
Strain Rate	psi/second	109.43
compression machine	ID	15-08-029CT

Photo At Failure



Compressive Strength = 9,629.9      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	0.000	0.00	0.00
14	7	0.02	4.375	4000.00	914.28
28	20	0.04	4.376	12000.00	2742.06
45	30	0.07	4.377	20000.00	4569.11
63	44	0.10	4.379	28000.00	6394.80
75	60	0.13	4.380	36000.00	8219.01
88	60	0.13	4.380	42180.00	9629.94



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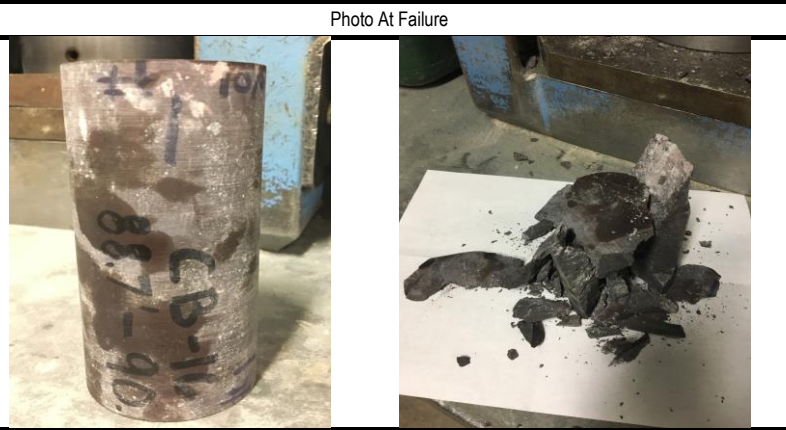
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**Compressive Strength of Intact Rock**  
 ASTM D7012

DSA File #:         
 DSA Appl #:       

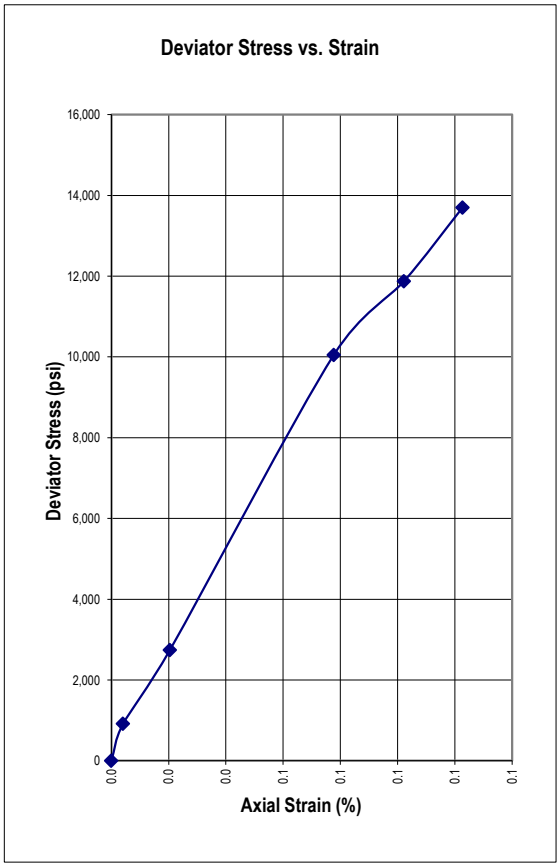
Project No.:	4438-02	Project Name:	NID Water Storage	Date:	12/6/2016	
Sample No.:	CB-16	Boring/Trench No.:	-	Depth (ft.):	88.7-90.1	
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	DRAFT
					Lab No.:	1

Sample Data		
Tare Number	I.D.	CJ
Tare Weight	(gm)	189.80
Wet Core + Tare	(gm)	1110.27
Dry Core + Tare	(gm)	1107.52
Weight of Water	(gm)	2.75
Dry Weight	(gm)	917.72
Moisture Content	(%)	0.30
Core Height	(in)	4.890
Sample Diameter	(in)	2.360
Wet Unit Weight	(pcf)	163.78
Dry Unit Weight	(pcf)	163.30
Specific Gravity	(g/cc)	2.72
Saturation	(%)	20.69
Strain Rate	psi/second	126.31
compression machine	ID	15-08-029CT



**Compressive Strength = 15,284.1      psi**

Elapsed Time (Seconds)	Strain		Area (in^2)	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	4.375	0.00	0
28	2	0.00	4.375	4000.00	914.38
40	10	0.02	4.375	12000.00	2742.70
66	38	0.08	4.378	44000.00	10050.81
95	50	0.10	4.379	52000.00	11875.32
108	60	0.12	4.380	60000.00	13699.48
121	60	0.12	4.380	66940.00	15284.06



## Compressive Strength of Intact Rock


ASTM D7012

DSA File #:                       
 DSA Appl #:                     

Project No.:	4438-02	Project Name:	NID Water Storage	Date:	12/6/2016	
Sample No.:	CB-16A	Boring/Trench No.:	-	Depth (ft.):	33.1-33.6	
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	DRAFT
					Lab No.:	4

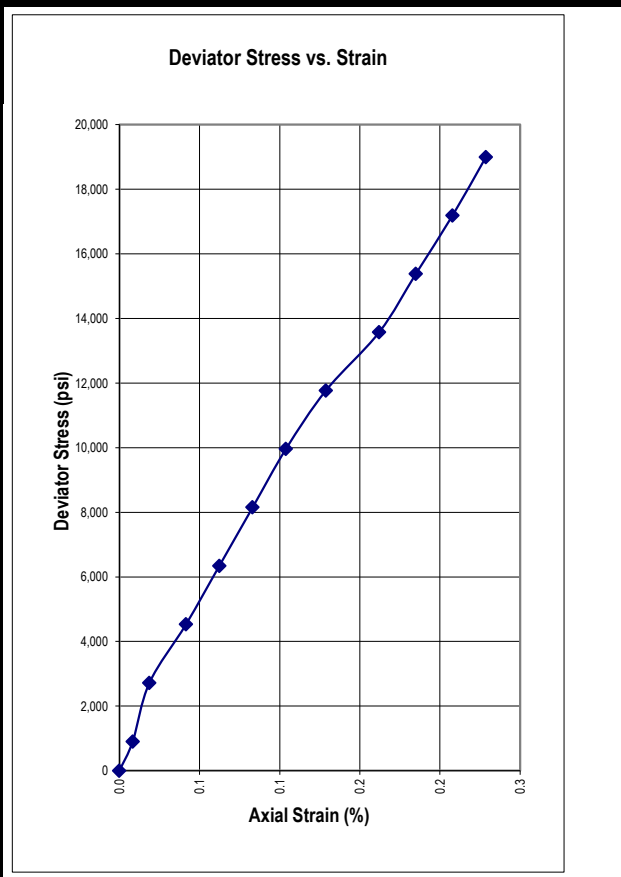
Sample Data		
Tare Number	I.D.	JDA
Tare Weight	(gm)	314.08
Wet Core + Tare	(gm)	1177.55
Dry Core + Tare	(gm)	1175.16
Weight of Water	(gm)	2.39
Dry Weight	(gm)	861.08
Moisture Content	(%)	0.28
Core Height	(in)	4.810
Sample Diameter	(in)	2.370
Wet Unit Weight	(pcf)	154.88
Dry Unit Weight	(pcf)	154.45
Specific Gravity	(g/cc)	2.72
Saturation	(%)	7.63
Strain Rate	psi/second	121.00
compression machine	ID	15-08-029CT

Photo At Failure



Compressive Strength = 20,085.4      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	0.000	0.00	0.00
30	4	0.01	4.412	4000.00	906.65
55	9	0.02	4.412	12000.00	2719.65
68	20	0.04	4.413	20000.00	4531.72
79	30	0.06	4.414	28000.00	6343.08
90	40	0.08	4.415	36000.00	8153.70
100	50	0.10	4.416	44000.00	9963.56
111	62	0.13	4.417	52000.00	11772.17
122	78	0.16	4.419	60000.00	13578.75
134	89	0.19	4.420	68000.00	15385.73
145	100	0.21	4.421	76000.00	17191.87
156	110	0.23	4.422	84000.00	18997.58
166	110	0.23	4.422	88810.00	20085.42





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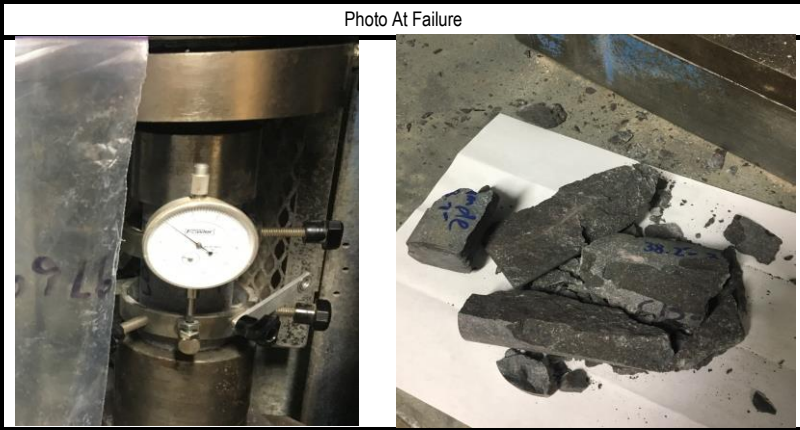
## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:   
 DSA Appl #:

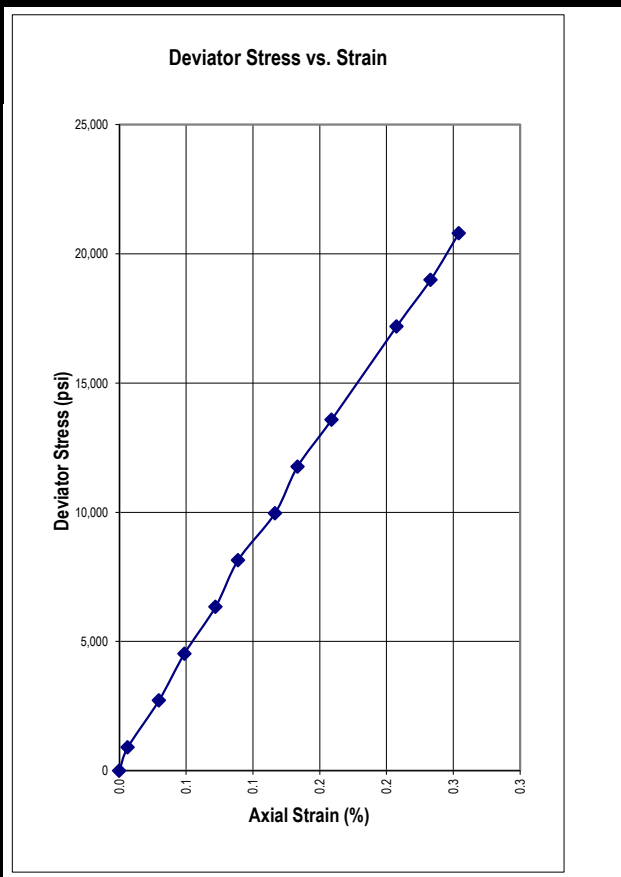
Project No.:	<b>4438-02</b>	Project Name:	<b>NID Water Storage</b>		Date:	<b>12/6/2016</b>	
Sample No.:	<b>CB-16A</b>	Boring/Trench No.:	<b>-</b>	Depth (ft.):	<b>37.9-39.1</b>	Tested By:	<b>DCK</b>
Soil Description:						Check By:	<b>DRAFT</b>
Sample Location:						Lab No.:	<b>2</b>

Sample Data		
Tare Number	I.D.	AA
Tare Weight	(gm)	226.74
Wet Core + Tare	(gm)	1143.26
Dry Core + Tare	(gm)	1142.16
Weight of Water	(gm)	1.10
Dry Weight	(gm)	915.42
Moisture Content	(%)	0.12
Core Height	(in)	4.720
Sample Diameter	(in)	2.370
Wet Unit Weight	(pcf)	167.53
Dry Unit Weight	(pcf)	167.33
Specific Gravity	(g/cc)	2.72
Saturation	(%)	22.83
Strain Rate	psi/second	80.64
compression machine	ID	15-08-029CT



Compressive Strength = 21,852.9 psi

Elapsed Time (Seconds)	Strain		Area (in^2)	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
0	0	0.00	4.412	0.00	0.00
21	3	0.01	4.412	4000.00	906.66
42	14	0.03	4.413	12000.00	2719.35
72	23	0.05	4.414	20000.00	4531.39
102	34	0.07	4.415	28000.00	6342.47
127	42	0.09	4.415	36000.00	8153.22
150	55	0.12	4.417	44000.00	9962.30
166	63	0.13	4.417	52000.00	11771.63
182	75	0.16	4.419	60000.00	13579.20
215	98	0.21	4.421	76000.00	17191.92
232	110	0.23	4.422	84000.00	18996.75
249	120	0.25	4.423	92000.00	20801.55
271	120	0.25	4.423	96650.00	21852.93



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## Compressive Strength of Intact Rock

ASTM D7012

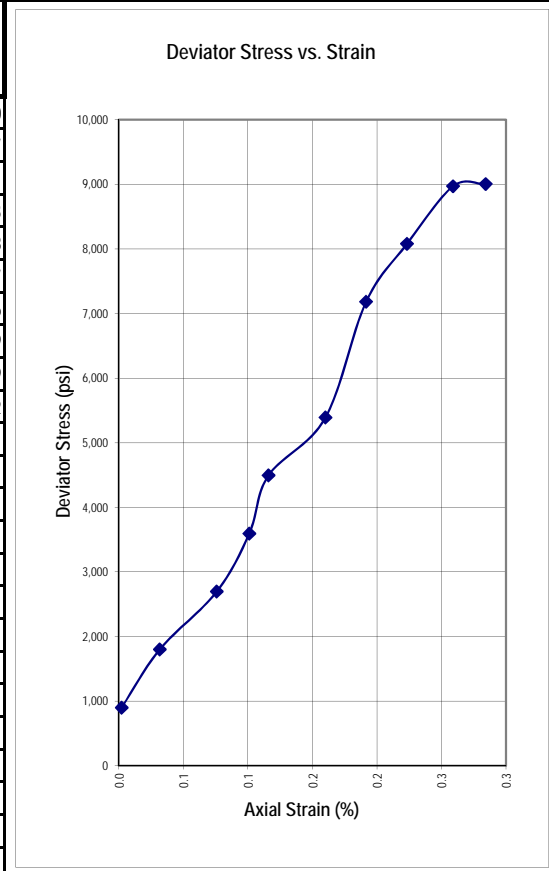
DSA File #:    
 DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-12, 8.0-9.2	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	17

Sample Data			Photo At Failure	
Tare Number	I.D.	F		
Tare Weight	(gm)	321.00		
Wet Core + Tare	(gm)	1239.10		
Dry Core + Tare	(gm)	1228.60		
Weight of Water	(gm)	10.500		
Dry Weight	(gm)	907.60		
Moisture Content	(%)	1.16		
Core Height	(in)	4.750		
Sample Diameter	(in)	2.380		
Wet Unit Weight	(pcf)	165.36		
Dry Unit Weight	(pcf)	163.47		
Specific Gravity	(g/cc)	2.72		
Saturation	(%)	82.23		
Strain Rate	PSI/Second	51.45		
compression machine	ID	15-08-029CT		

Compressive Strength = 9,003.7      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
12	1	0.00	4.449	4000.00	899.10
23	15	0.03	4.450	8000.00	1797.67
68	36	0.08	4.452	12000.00	2695.31
91	48	0.10	4.453	16000.00	3592.83
108	55	0.12	4.454	20000.00	4490.38
121	76	0.16	4.456	24000.00	5386.07
136	91	0.19	4.457	32000.00	7179.16
145	106	0.22	4.459	36000.00	8073.99
167	123	0.26	4.460	40000.00	8967.89
175	135	0.28	4.461	40170.00	9003.72






## Compressive Strength of Intact Rock

ASTM D7012

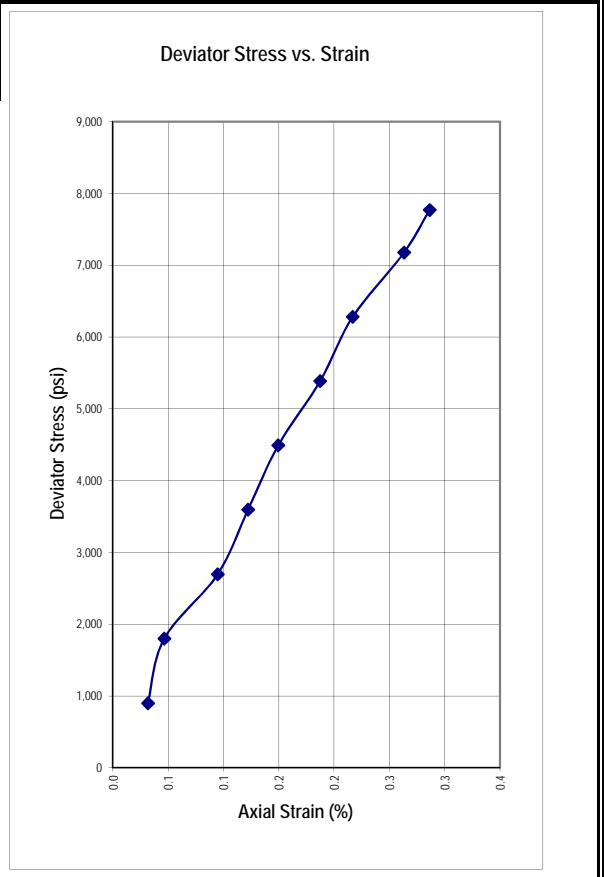
DSA File #:                       
 DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-18, 30.9-31.7	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	26

Sample Data			Photo At Failure
Tare Number	I.D.	F	
Tare Weight	(gm)	321.00	
Wet Core + Tare	(gm)	1224.20	
Dry Core + Tare	(gm)	1220.90	
Weight of Water	(gm)	3.30	
Dry Weight	(gm)	899.90	
Moisture Content	(%)	0.37	
Core Height	(in)	4.750	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	162.68	
Dry Unit Weight	(pcf)	162.09	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	21.15	
Strain Rate	psi/second	50.12	
compression machine	ID	15-08-029CT	

Compressive Strength = 7,768.5      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)		lbs	
6	15	0.03	4.450	4000.00	898.83
31	22	0.05	4.451	8000.00	1797.40
52	45	0.09	4.453	12000.00	2694.80
69	58	0.12	4.454	16000.00	3592.08
79	71	0.15	4.455	20000.00	4488.87
101	89	0.19	4.457	24000.00	5384.59
123	103	0.22	4.458	28000.00	6280.17
141	125	0.26	4.461	32000.00	7174.01
155	136	0.29	4.462	34660.00	7768.54




## Compressive Strength of Intact Rock

ASTM D7012

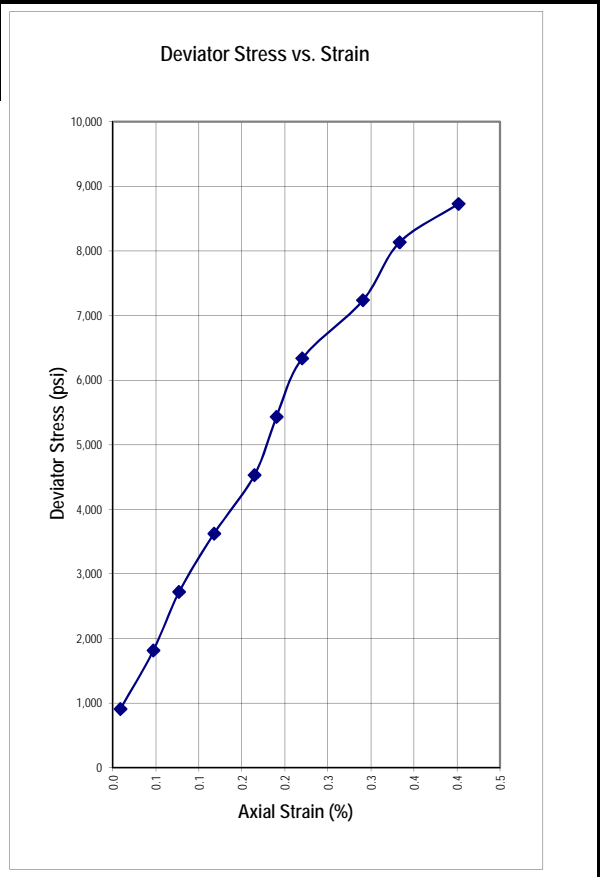
**DSA File #:** \_\_\_\_\_

**DSA Appl #:** \_\_\_\_\_

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/14/2016	
Sample No.:	CB-18, 36.0-37.3	Boring/Trench No.:		Tested By:	DCK	
Soil Description:					Check By:	CRK
Sample Location:					Lab No.:	28

Sample Data			Photo At Failure			
Tare Number	I.D.	D				
Tare Weight	(gm)	316.70				
Wet Core + Tare	(gm)	1227.80				
Dry Core + Tare	(gm)	1220.10				
Weight of Water	(gm)	7.70				
Dry Weight	(gm)	903.40				
Moisture Content	(%)	0.85				
Core Height	(in)	4.680				
Sample Diameter	(in)	2.370				
Wet Unit Weight	(pcf)	167.97				
Dry Unit Weight	(pcf)	166.55				
Specific Gravity	(g/cc)	2.72				
Saturation	(%)	121.35				
Strain Rate	psi/second	52.57			<b>Compressive Strength = 8,726.0      psi</b>	
compression machine	ID	15-08-029CT				

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)		lbs	
4	4	0.01	4.412	4000.00	906.64
12	22	0.05	4.414	8000.00	1812.59
35	36	0.08	4.415	12000.00	2718.07
45	55	0.12	4.417	16000.00	3622.62
69	77	0.16	4.419	20000.00	4526.14
89	89	0.19	4.420	24000.00	5429.98
102	103	0.22	4.421	28000.00	6333.07
125	136	0.29	4.424	32000.00	7232.68
146	156	0.33	4.426	36000.00	8133.28
166	188	0.40	4.429	38650.00	8725.99



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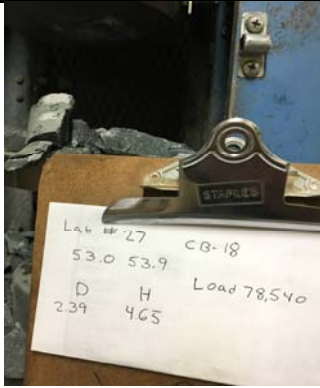
## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:  

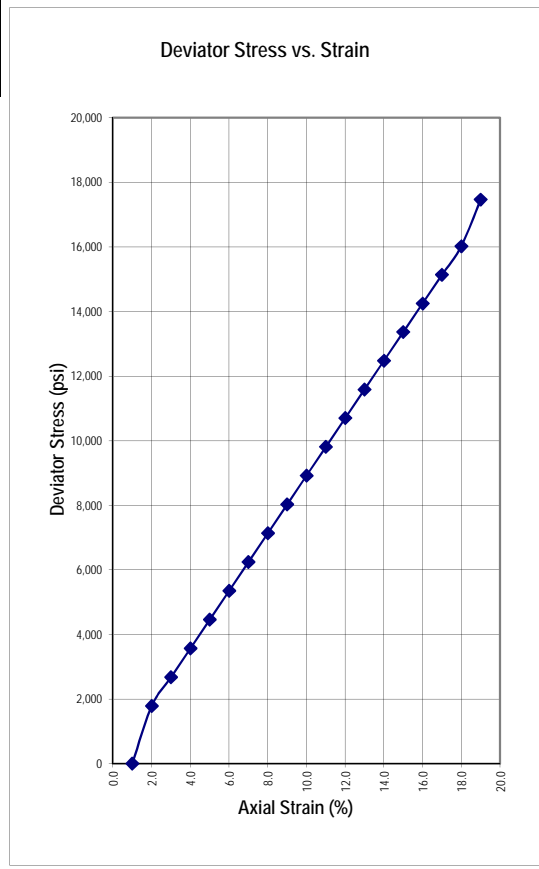
DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/14/2016	
Sample No.:	CB-18, 53.0-53.9	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Note:					Check By:	CRK
					Lab No.:	27

Sample Data			Photo At Failure
Tare Number	I.D.	BK	
Tare Weight	(gm)	319.10	
Wet Core + Tare	(gm)	1226.30	
Dry Core + Tare	(gm)	1223.80	
Weight of Water	(gm)	2.50	
Dry Weight	(gm)	904.70	
Moisture Content	(%)	0.28	
Core Height	(in)	4.650	
Sample Diameter	(in)	2.390	
Wet Unit Weight	(pcf)	165.52	
Dry Unit Weight	(pcf)	165.06	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	26.60	
Strain Rate	psi/second	55.25	
compression machine	ID	15-08-029CT	

Compressive Strength = 17,460.4      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
6	0			4000.00	
9	1	0.00	4.486	8000.00	1783.18
21	1	0.00	4.486	12000.00	2674.77
38	1	0.00	4.486	16000.00	3566.36
52	1	0.00	4.486	20000.00	4457.95
71	1	0.00	4.486	24000.00	5349.54
91	1	0.00	4.486	28000.00	6241.13
106	1	0.00	4.486	32000.00	7132.72
123	1	0.00	4.486	36000.00	8024.31
143	1	0.00	4.486	40000.00	8915.90
162	4	0.01	4.487	44000.00	9806.85
183	26	0.06	4.489	48000.00	10693.32
199	33	0.07	4.489	52000.00	11582.69
213	42	0.09	4.490	56000.00	12471.25
225	51	0.1096774	4.491	60000.00	13359.46
277	63	0.1354839	4.492	64000.00	14246.41
263	79	0.1698925	4.494	68000.00	15131.60
289	93	0.2	4.495	72000.00	16016.86
316	123	0.2645161	4.498	78540.00	17460.43




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## Compressive Strength of Intact Rock

ASTM D7012

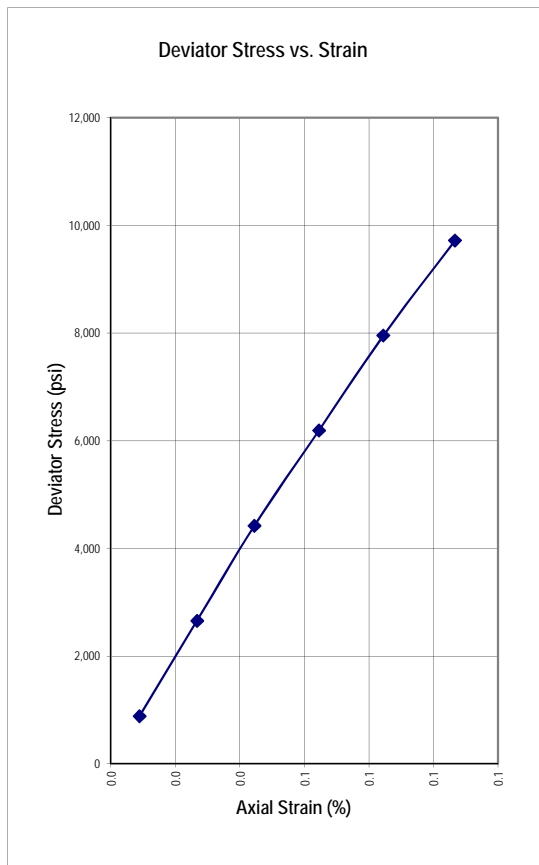
DSA File #:    
 DSA Appl #:  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-20, 16.8-17.9	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	15

Sample Data			Photo At Failure
Tare Number	I.D.	JF	
Tare Weight	(gm)	192.40	
Wet Core + Tare	(gm)	982.30	
Dry Core + Tare	(gm)	968.23	
Weight of Water	(gm)	14.07	
Dry Weight	(gm)	775.83	
Moisture Content	(%)	1.81	
Core Height	(in)	4.500	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	147.68	
Dry Unit Weight	(pcf)	145.05	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	29.00	
Strain Rate	psi/second	83.19	
compression machine	ID	15-08-029CT	

Compressive Strength = 11,480.0      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
20	4	0.01	4.524	4000.00	884.12
40	12	0.03	4.525	12000.00	2651.88
53	20	0.04	4.526	20000.00	4419.01
65	29	0.06	4.527	28000.00	6185.37
80	38	0.08	4.528	36000.00	7951.03
120	48	0.11	4.529	44000.00	9715.76
138	57	0.13	4.530	52000.00	11479.96




## Compressive Strength of Intact Rock

ASTM D7012

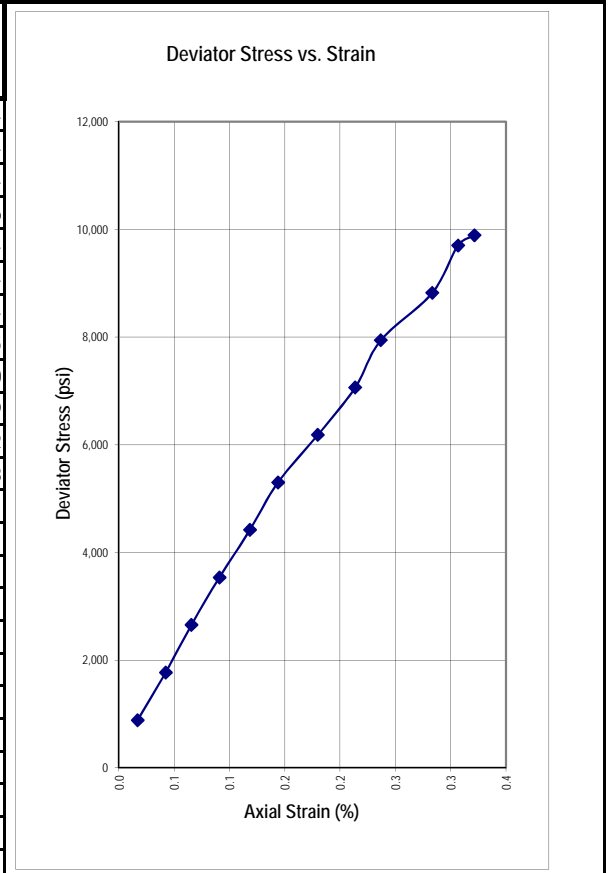
DSA File #:             
 DSA Appl #:           

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/14/2016
Sample No.:	CB-20, 24.7-25.6	Boring/Trench No.:		Depth (ft.):	
Soil Description:				Tested By:	DCK
Sample Location:				Check By:	CRK
				Lab No.:	12

Sample Data			Photo At Failure
Tare Number	I.D.	E	
Tare Weight	(gm)	322.80	
Wet Core + Tare	(gm)	1225.50	
Dry Core + Tare	(gm)	1218.20	
Weight of Water	(gm)	7.30	
Dry Weight	(gm)	895.40	
Moisture Content	(%)	0.82	
Core Height	(in)	4.730	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	160.57	
Dry Unit Weight	(pcf)	159.27	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	33.77	
Strain Rate	psi/second	44.96	
compression machine	ID	15-08-029CT	

Compressive Strength = 9,888.8      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
15	8	0.02	4.525	4000.00	884.04
42	20	0.04	4.526	8000.00	1767.64
65	31	0.07	4.527	12000.00	2650.84
85	43	0.09	4.528	16000.00	3533.56
101	56	0.12	4.529	20000.00	4415.74
118	68	0.14	4.530	24000.00	5297.54
138	85	0.18	4.532	28000.00	6178.24
157	101	0.21	4.534	32000.00	7058.45
171	112	0.24	4.535	36000.00	7938.90
192	134	0.28	4.537	40000.00	8816.89
213	145	0.31	4.538	44000.00	9696.32
229	152	0.32	4.538	44880.00	9888.78




## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:                     

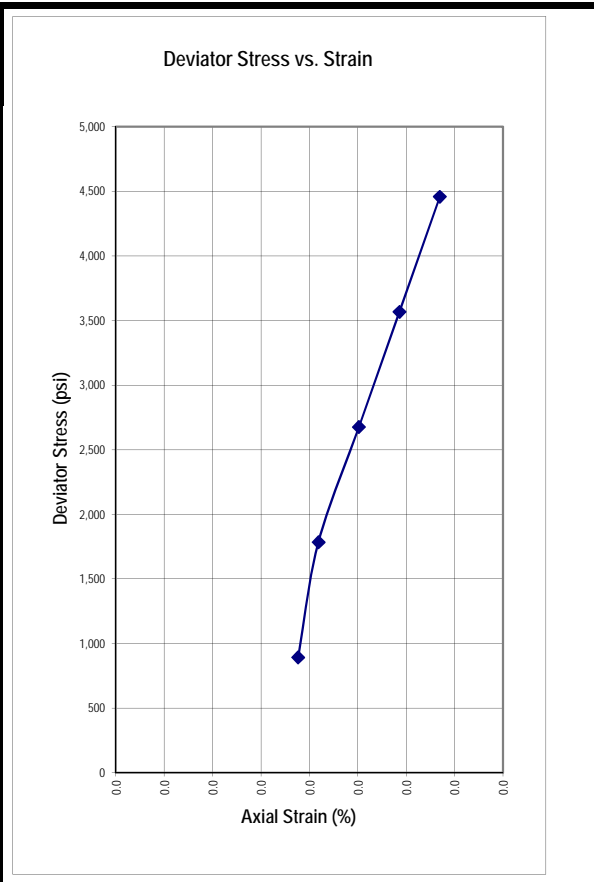
DSA Appl #:                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-20, 63.3-64.4	Boring/Trench No.:		Tested By:	DCK	
Soil Description:					Check By:	CRK
Sample Location:					Lab No.:	13

Sample Data			Photo At Failure
Tare Number	I.D.	IJ	
Tare Weight	(gm)	218.50	
Wet Core + Tare	(gm)	1125.60	
Dry Core + Tare	(gm)	1109.10	
Weight of Water	(gm)	16.50	
Dry Weight	(gm)	890.60	
Moisture Content	(%)	1.85	
Core Height	(in)	4.780	
Sample Diameter	(in)	2.390	
Wet Unit Weight	(pcf)	161.00	
Dry Unit Weight	(pcf)	158.07	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	68.34	
Strain Rate	psi/second		
compression machine	ID	15-08-029CT	

Compressive Strength = 4,456.6      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
8	9	0.02	4.487	4000.00	891.44
37	10	0.02	4.487	8000.00	1782.84
56	12	0.03	4.487	12000.00	2674.15
77	14	0.03	4.488	16000.00	3565.39
109	16	0.03	4.488	20000.00	4456.55



## **Appendix H-2 Unconfined Compressive Strength Test Data – Rock Borrow Areas**

## Appendix H-2 Unconfined Compressive Strength Test Data – Rock Borrow Areas



## Summary of Unconfined Compressive Strength Test Results

<b>Borrow Area</b>	<b>Boring No.</b>	<b>Depth Range of Test Sample (ft)</b>	<b>Degree of Weathering</b>	<b>Unconfined Compressive Strength (psi)</b>
South	CB-B1	22.4-23.2	slightly weathered	2157
	CB-B1	60.0-60.9	slightly weathered	8237
	CB-B1	79.0-80.1	slightly weathered to fresh	21806
	CB-B2	49.4-50.3	slightly weathered	22197
	CB-B2	69.3-70.0	slightly weathered to fresh	9496
	CB-B3	51.2-52.3	slightly weathered	6970
	CB-B4	45.8-46.6	slightly weathered	11211
	CB-B4	55.0-55.7	slightly weathered	21583
North	CB-B6	29.2-30.0	slightly weathered	11484
	CB-B6	48.6-49.4	slightly weathered	13745
	CB-B7	8.0-9.0	slightly weathered	8521
	CB-B7	19.5-20.2	slightly weathered	14638
	CB-B8	59.5-60.4	slightly weathered	54054
	CB-B8	66.3-67.0	slightly weathered	18444

## Compressive Strength of Intact Rock

ASTM D7012

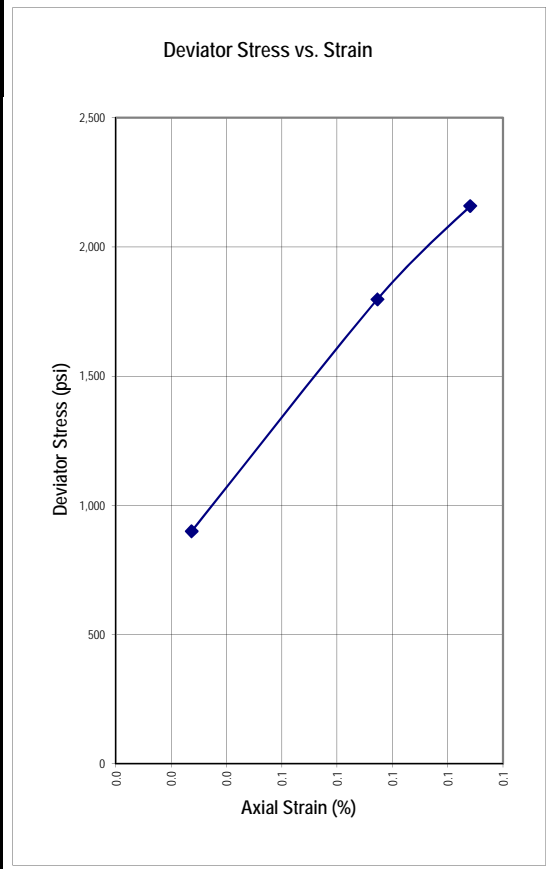
**DSA File #:**    
**DSA Appl #:**  

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016
Sample No.:	CB-B1, 22.4-23.2	Boring/Trench No.:		Depth (ft.):	
Soil Description:		Tested By:	DCK	Check By:	CRK
Sample Location:		Lab No.:	30		

Sample Data			Photo At Failure
Tare Number	I.D.	J4	
Tare Weight	(gm)	228.80	
Wet Core + Tare	(gm)	998.36	
Dry Core + Tare	(gm)	996.30	
Weight of Water	(gm)	2.06	
Dry Weight	(gm)	767.50	
Moisture Content	(%)	0.27	
Core Height	(in)	4.760	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	138.32	
Dry Unit Weight	(pcf)	137.95	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	3.17	
Strain Rate	psi/second	46.90	
compression machine	ID	15-08-029CT	

Compressive Strength = 2,157.4      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
5	13	0.03	4.450	4000.00	898.87
21	45	0.09	4.453	8000.00	1796.53
46	61	0.13	4.455	9610.00	2157.36




## Compressive Strength of Intact Rock

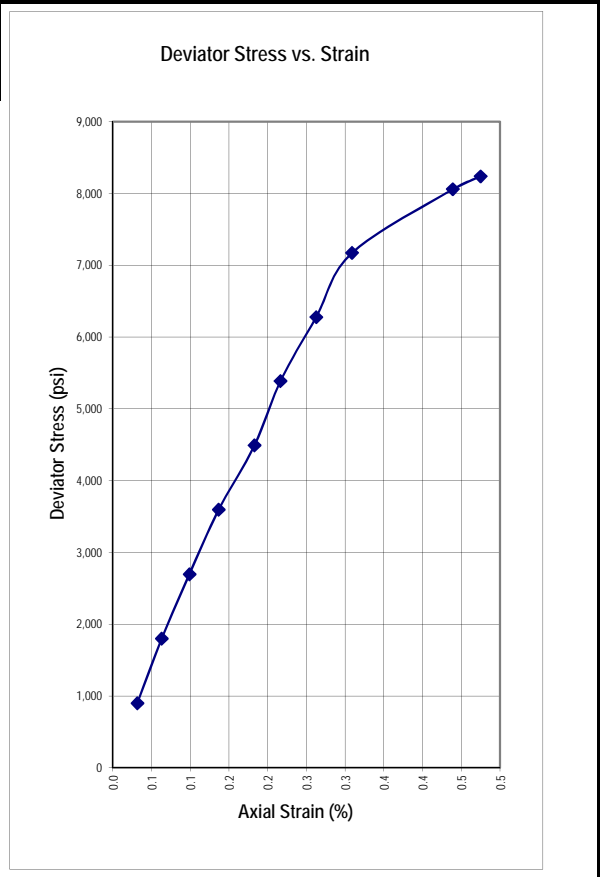
ASTM D7012

DSA File #:   
 DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-B1, 60.0-60.9	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	31

Sample Data			Photo At Failure		
Tare Number	I.D.	5			
Tare Weight	(gm)	117.40			
Wet Core + Tare	(gm)	1002.90			
Dry Core + Tare	(gm)	987.20			
Weight of Water	(gm)	15.70			
Dry Weight	(gm)	869.80			
Moisture Content	(%)	1.81			
Core Height	(in)	4.760			
Sample Diameter	(in)	2.380			
Wet Unit Weight	(pcf)	159.16			
Dry Unit Weight	(pcf)	156.33			
Specific Gravity	(g/cc)	2.72			
Saturation	(%)	57.31			
Strain Rate	psi/second	47.07			
compression machine	ID	15-08-029CT			
			Compressive Strength = 8,237.1    psi		

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
6	15	0.03	4.450	4000.00	898.83
33	30	0.06	4.452	8000.00	1797.10
53	47	0.10	4.453	12000.00	2694.69
70	65	0.14	4.455	16000.00	3591.56
86	87	0.18	4.457	20000.00	4487.37
100	103	0.22	4.458	24000.00	5383.03
118	125	0.26	4.461	28000.00	6277.29
133	147	0.31	4.463	32000.00	7170.72
168	209	0.44	4.468	36000.00	8056.52
175	226	0.47	4.470	36820.00	8237.08



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## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:   
 DSA Appl #:

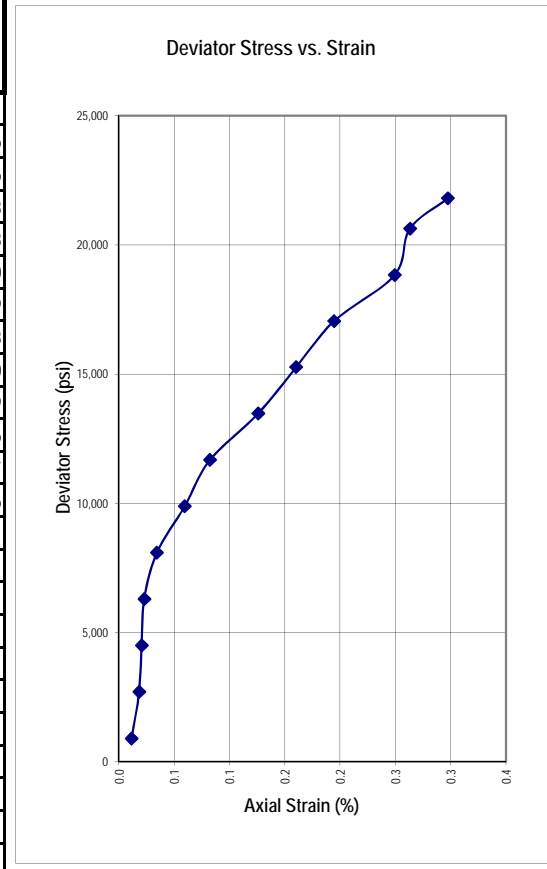
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-1, B-1 79.0-80.1	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	1

Sample Data		
Tare Number	I.D.	JF
Tare Weight	(gm)	192.40
Wet Core + Tare	(gm)	986.55
Dry Core + Tare	(gm)	980.60
Weight of Water	(gm)	5.95
Dry Weight	(gm)	788.20
Moisture Content	(%)	0.75
Core Height	(in)	4.370
Sample Diameter	(in)	2.380
Wet Unit Weight	(pcf)	155.48
Dry Unit Weight	(pcf)	154.31
Specific Gravity	(g/cc)	2.72
Saturation	(%)	20.55
Strain Rate	psi/second	49.67
compression machine	ID	15-08-029CT



Compressive Strength = 21,806.0     psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
35	5	0.01	4.449	4000.00	899.01
42	8	0.02	4.450	12000.00	2696.86
92	9	0.02	4.450	20000.00	4494.66
140	10	0.02	4.450	28000.00	6292.38
188	15	0.03	4.450	36000.00	8089.28
209	26	0.06	4.451	44000.00	9884.40
255	36	0.08	4.452	52000.00	11678.89
300	55	0.13	4.454	60000.00	13469.78
321	70	0.16	4.456	68000.00	15260.50
366	85	0.19	4.457	76000.00	17049.99
396	109	0.25	4.460	84000.00	18834.36
415	115	0.26	4.461	92000.00	20625.27
439	130	0.30	4.462	97300.00	21805.96



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## Compressive Strength of Intact Rock

ASTM D7012

DSA File #: \_\_\_\_\_

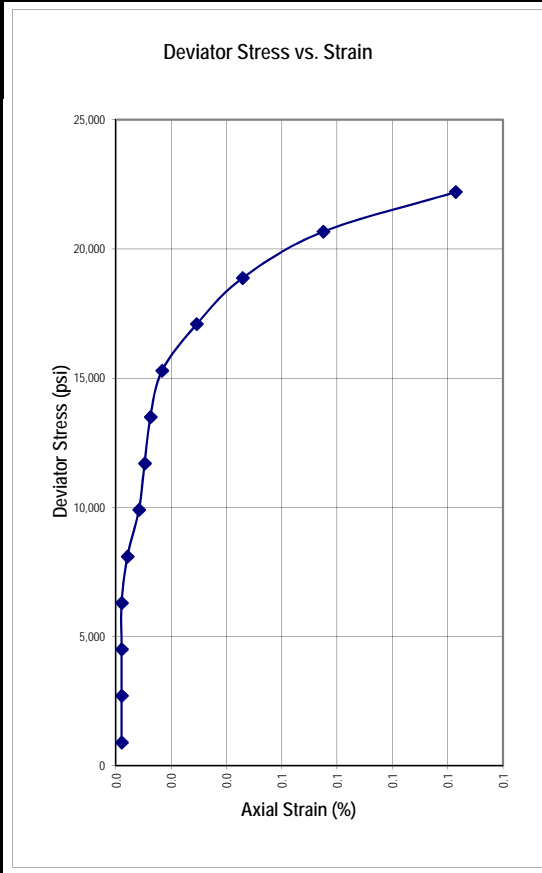
DSA Appl #: \_\_\_\_\_

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B2, 49.4-50.3	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	5

Sample Data			Photo At Failure
Tare Number	I.D.	AJ	
Tare Weight	(gm)	195.57	
Wet Core + Tare	(gm)	1129.23	
Dry Core + Tare	(gm)	1107.10	
Weight of Water	(gm)	22.13	
Dry Weight	(gm)	911.53	
Moisture Content	(%)	2.43	
Core Height	(in)	4.800	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	166.41	
Dry Unit Weight	(pcf)	162.47	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	147.82	
Strain Rate	psi/second	52.47	

Compressive Strength = 22,196.6     psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
4	1	0.00	4.449	4000.00	899.10
26	1	0.00	4.449	12000.00	2697.29
44	1	0.00	4.449	20000.00	4495.49
81	1	0.00	4.449	28000.00	6293.69
135	2	0.00	4.449	36000.00	8091.72
162	4	0.01	4.449	44000.00	9889.46
196	5	0.01	4.449	52000.00	11687.30
226	6	0.01	4.449	60000.00	13485.07
269	8	0.02	4.450	68000.00	15282.44
301	14	0.03	4.450	76000.00	17078.24
346	22	0.05	4.451	84000.00	18872.80
389	36	0.08	4.452	92000.00	20664.18
423	59	0.12	4.454	98870.00	22196.61



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## Compressive Strength of Intact Rock

ASTM D7012

**DSA File #:** \_\_\_\_\_  
**DSA Appl #:** \_\_\_\_\_

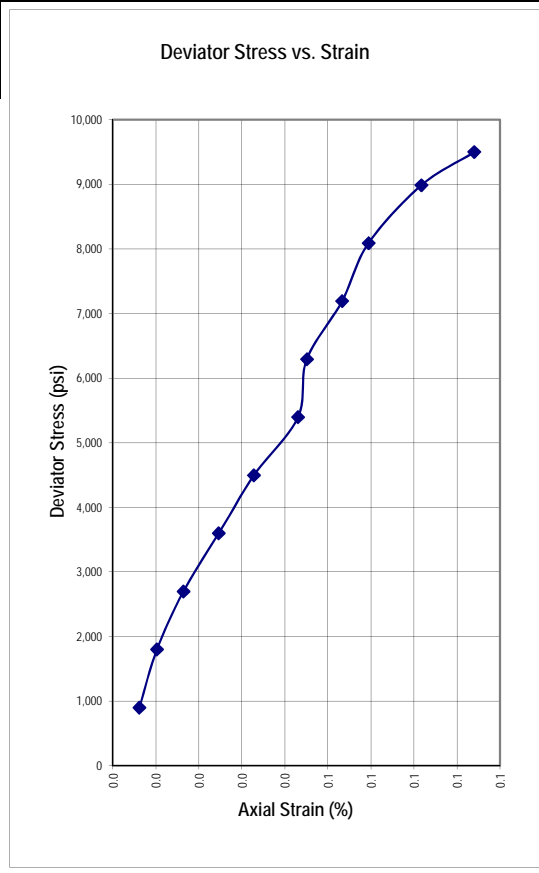
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016
Sample No.:	CB-B2, 69.3-70.0	Boring/Trench No.:		Tested By:	DCK
Soil Description:				Check By:	CRK
Sample Location:				Lab No.:	4

Sample Data		
Tare Number	I.D.	JD
Tare Weight	(gm)	192.27
Wet Core + Tare	(gm)	1130.00
Dry Core + Tare	(gm)	1129.20
Weight of Water	(gm)	0.80
Dry Weight	(gm)	936.93
Moisture Content	(%)	0.09
Core Height	(in)	4.880
Sample Diameter	(in)	2.380
Wet Unit Weight	(pcf)	164.40
Dry Unit Weight	(pcf)	164.26
Specific Gravity	(g/cc)	2.72
Saturation	(%)	6.98
Strain Rate	psi/second	69.82
compression machine	ID	15-08-029CT



Compressive Strength = 9,495.7      psi


Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
5	3	0.01	4.449	4000.00	899.06
16	5	0.01	4.449	8000.00	1798.05
31	8	0.02	4.450	12000.00	2696.91
42	12	0.02	4.450	16000.00	3595.58
58	16	0.03	4.450	20000.00	4494.11
71	21	0.04	4.451	24000.00	5392.38
82	22	0.05	4.451	28000.00	6290.98
95	26	0.05	4.451	32000.00	7189.10
108	29	0.06	4.451	36000.00	8087.24
121	35	0.07	4.452	40000.00	8984.72
136	41	0.08	4.453	42280.00	9495.68
				4000.00	
				8000.00	



**Compressive Strength of Intact Rock**  
ASTM D7012

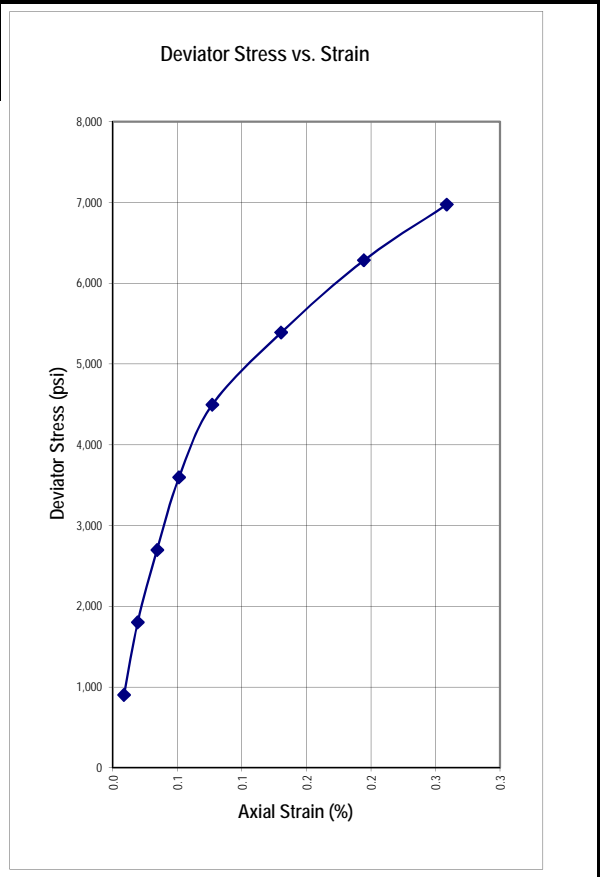
**DSA File #:**                       
**DSA Appl #:**                     

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B3, 51.2-52.3	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	3

Sample Data			Photo At Failure
Tare Number	I.D.	JT	
Tare Weight	(gm)	219.60	
Wet Core + Tare	(gm)	1053.50	
Dry Core + Tare	(gm)	1038.70	
Weight of Water	(gm)	14.80	
Dry Weight	(gm)	819.10	
Moisture Content	(%)	1.81	
Core Height	(in)	4.680	
Sample Diameter	(in)	2.380	
Wet Unit Weight	(pcf)	152.44	
Dry Unit Weight	(pcf)	149.74	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	36.82	
Strain Rate	psi/second	42.76	
compression machine	ID	15-08-029CT	

Compressive Strength = 6,970.3      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load lbs	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
5	4	0.01	4.449	4000.00	899.04
18	9	0.02	4.450	8000.00	1797.89
31	16	0.03	4.450	12000.00	2696.43
61	24	0.05	4.451	16000.00	3594.62
98	36	0.08	4.452	20000.00	4492.13
123	61	0.13	4.455	24000.00	5387.67
146	91	0.19	4.457	28000.00	6281.58
163	121	0.26	4.460	31090.00	6970.32



## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:    
 DSA Appl #:  

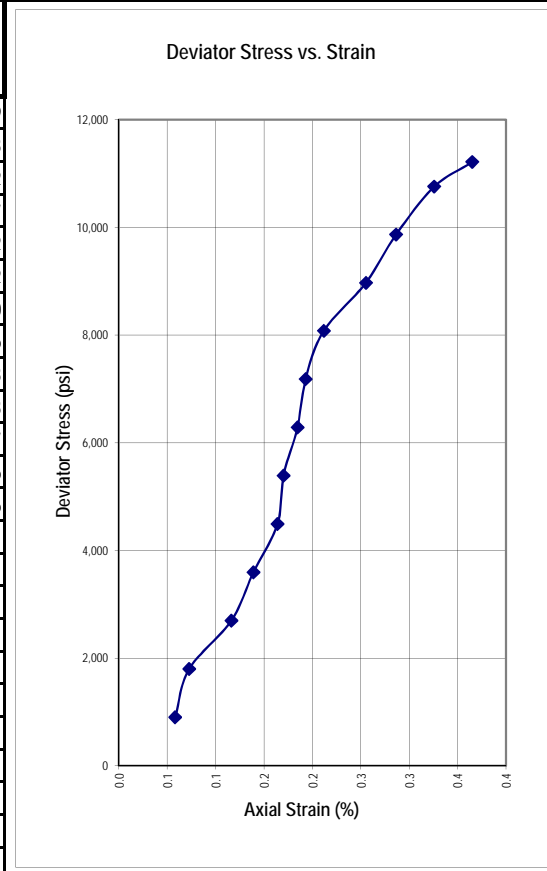
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B4, 45.8-46.6	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	6

Sample Data		
Tare Number	I.D.	JK
Tare Weight	(gm)	311.56
Wet Core + Tare	(gm)	1135.25
Dry Core + Tare	(gm)	1129.54
Weight of Water	(gm)	5.71
Dry Weight	(gm)	817.98
Moisture Content	(%)	0.70
Core Height	(in)	4.820
Sample Diameter	(in)	2.380
Wet Unit Weight	(pcf)	146.20
Dry Unit Weight	(pcf)	145.19
Specific Gravity	(g/cc)	2.72
Saturation	(%)	11.24
Strain Rate	psi/second	52.88
compression machine	ID	15-08-029CT



Compressive Strength = 11,211.4      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
14	28	0.06	4.451	4000.00	898.59
26	35	0.07	4.452	8000.00	1796.93
38	56	0.12	4.454	12000.00	2694.22
52	67	0.14	4.455	16000.00	3591.47
74	79	0.16	4.456	20000.00	4488.22
98	82	0.17	4.456	24000.00	5385.52
114	89	0.18	4.457	28000.00	6282.20
125	93	0.19	4.457	32000.00	7179.06
136	102	0.21	4.458	36000.00	8074.93
152	123	0.26	4.460	40000.00	8968.23
173	138	0.29	4.462	44000.00	9861.97
191	157	0.33	4.463	48000.00	10754.26
212	176	0.37	4.465	50060.00	11211.36



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## Compressive Strength of Intact Rock

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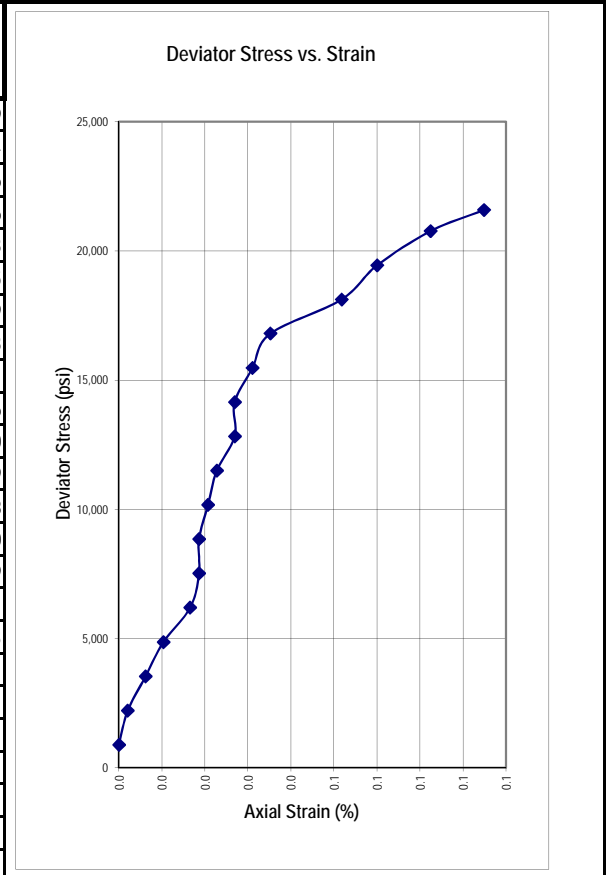
DSA File #:                       
 DSA Appl #:                     

Project No.:	4438-01	Project Name:		Date:	9/12/2016	
Sample No.:	CB-4-B4, 55.0-55.7	Boring/Trench No.:		Tested By:	DCK	
Soil Description:					Check By:	CRK
Sample Location:					Lab No.:	2

Sample Data			Photo At Failure
Tare Number	I.D.	CJ	
Tare Weight	(gm)	190.50	
Wet Core + Tare	(gm)	1105.30	
Dry Core + Tare	(gm)	1098.20	
Weight of Water	(gm)	7.10	
Dry Weight	(gm)	907.70	
Moisture Content	(%)	0.78	
Core Height	(in)	4.830	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	159.35	
Dry Unit Weight	(pcf)	158.11	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	28.96	
Strain Rate	psi/second	72.42	
compression machine	ID	15-08-029CT	

Compressive Strength = 21,582.5      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
3	1	0.00	4.524	4000.00	884.19
8	1	0.00	4.524	10000.00	2210.44
19	3	0.01	4.524	16000.00	3536.56
29	5	0.01	4.524	22000.00	4862.56
42	8	0.02	4.525	28000.00	6188.33
61	9	0.02	4.525	34000.00	7514.25
82	9	0.02	4.525	40000.00	8840.29
96	10	0.02	4.525	46000.00	10166.13
112	11	0.02	4.525	52000.00	11491.91
135	13	0.03	4.525	58000.00	12817.36
142	13	0.03	4.525	64000.00	14143.30
168	15	0.03	4.525	70000.00	15468.59
171	17	0.04	4.525	76000.00	16793.78
191	25	0.05	4.526	82000.00	18116.60
239	29	0.06	4.527	88000.00	19440.59
256	35	0.07	4.527	94000.00	20763.51
298	41	0.08	4.528	97720.00	21582.53




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## Compressive Strength of Intact Rock

ASTM D7012

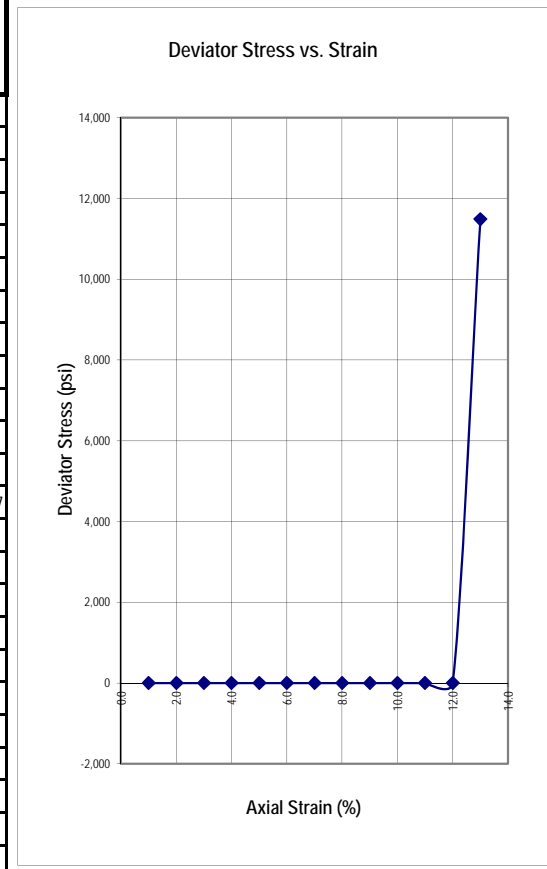
**DSA File #:**  
**DSA Appl #:**

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B6, 29.2-30.0	Boring/Trench No.:		Tested By:	DCK	
Soil Description:					Check By:	CRK
Note:	Strain was not accurate, so strain rate and estimated final strain is shown.				Lab No.:	10

Sample Data			Photo At Failure
Tare Number	I.D.	BA	 <p style="font-size: small;">Lab # 10 CB-B6 29.2 - 30.0 Load 51570 D 2.39 4.90</p>
Tare Weight	(gm)	320.80	
Wet Core + Tare	(gm)	1137.23	
Dry Core + Tare	(gm)	1101.35	
Weight of Water	(gm)	35.88	
Dry Weight	(gm)	780.55	
Moisture Content	(%)	4.60	
Core Height	(in)	4.900	
Sample Diameter	(in)	2.390	
Wet Unit Weight	(pcf)	141.36	
Dry Unit Weight	(pcf)	135.15	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	48.86	
Strain Rate	psi/second	54.17	
compression machine	ID	15-08-029CT	

Compressive Strength = 11,484.3      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
				4000.00	
				8000.00	
				12000.00	
				16000.00	
				20000.00	
				24000.00	
				28000.00	
				32000.00	
				36000.00	
				40000.00	
				44000.00	
				48000.00	
212	46	0.09	4.490	51570.00	11484.27



## Compressive Strength of Intact Rock

ASTM D7012

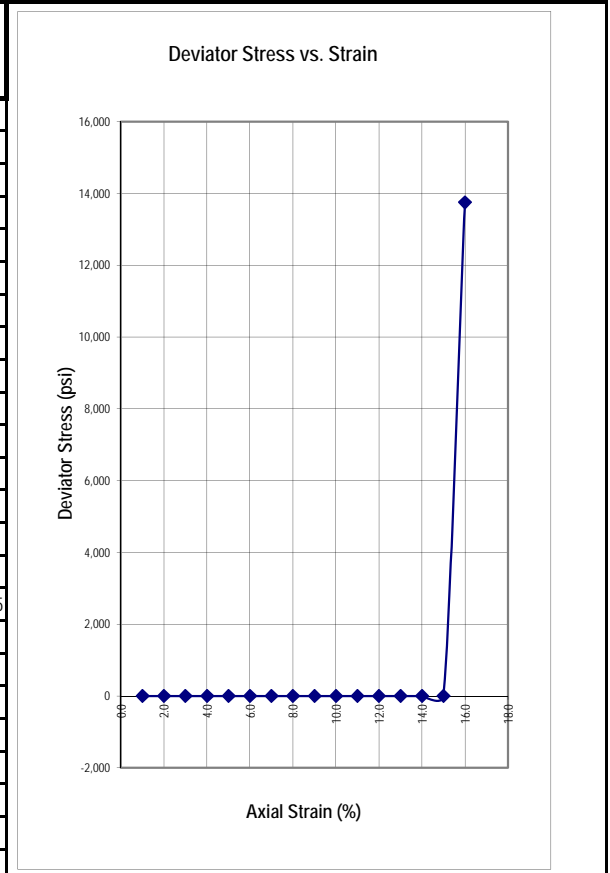
DSA File #:   
 DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B6, 48.6-49.4	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Note:	Strain was not accurate, so strain rate and estimated final strain is shown.				Check By:	CRK
					Lab No.:	9

Sample Data			Photo At Failure
Tare Number	I.D.	KLM	
Tare Weight	(gm)	253.11	
Wet Core + Tare	(gm)	1104.60	
Dry Core + Tare	(gm)	1101.23	
Weight of Water	(gm)	3.37	
Dry Weight	(gm)	848.12	
Moisture Content	(%)	0.40	
Core Height	(in)	4.820	
Sample Diameter	(in)	2.390	
Wet Unit Weight	(pcf)	149.88	
Dry Unit Weight	(pcf)	149.28	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	7.89	
Strain Rate	psi/second	53.69	
compression machine	ID	15-08-029CT	

Compressive Strength = 13,745.2      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
				4000.00	
				8000.00	
				12000.00	
				16000.00	
				20000.00	
				24000.00	
				28000.00	
				32000.00	
				36000.00	
				40000.00	
				44000.00	
				48000.00	
				52000.00	
				56000.00	
				60000.00	
256	43	0.0892116	4.490	61720.00	13745.25



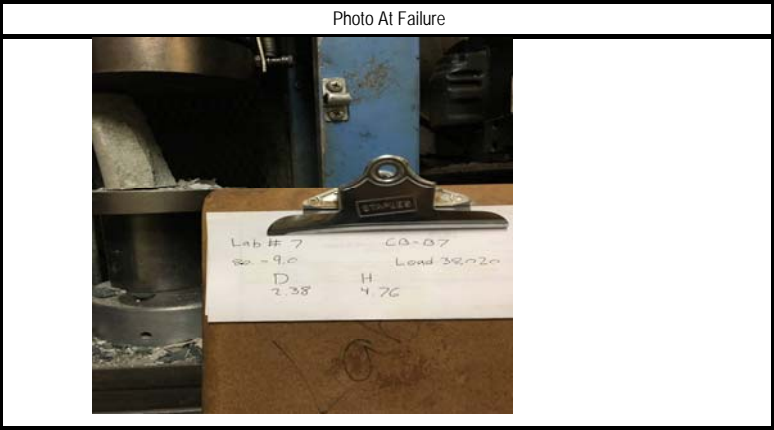
## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:    
 DSA Appl #:  

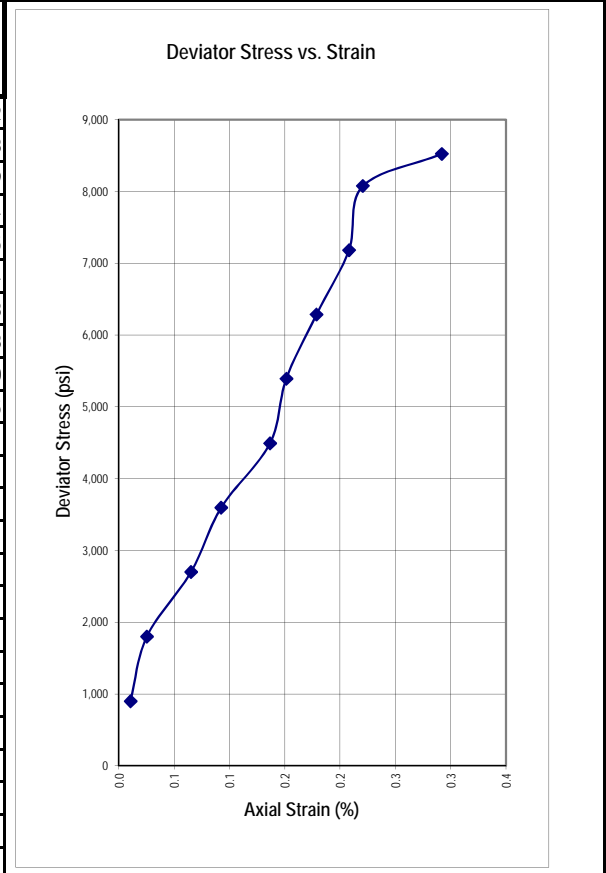
Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B7, 8.0-9.0	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Sample Location:					Check By:	CRK
					Lab No.:	7

Sample Data		
Tare Number	I.D.	KLM
Tare Weight	(gm)	253.11
Wet Core + Tare	(gm)	1036.85
Dry Core + Tare	(gm)	1025.23
Weight of Water	(gm)	11.62
Dry Weight	(gm)	772.12
Moisture Content	(%)	1.50
Core Height	(in)	4.760
Sample Diameter	(in)	2.380
Wet Unit Weight	(pcf)	140.87
Dry Unit Weight	(pcf)	138.78
Specific Gravity	(g/cc)	2.72
Saturation	(%)	18.35
Strain Rate	psi/second	38.56
Compression Machine	ID	15-08-029CT



**Compressive Strength = 8,521.2 psi**

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
20	5	0.01	4.449	4000.00	899.02
34	12	0.03	4.450	8000.00	1797.78
57	31	0.07	4.452	12000.00	2695.59
79	44	0.09	4.453	16000.00	3593.14
96	65	0.14	4.455	20000.00	4489.45
121	72	0.15	4.456	24000.00	5386.54
156	85	0.18	4.457	28000.00	6282.58
167	99	0.21	4.458	32000.00	7177.98
198	105	0.22	4.459	36000.00	8074.20
221	139	0.29	4.462	38020.00	8521.15



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## Compressive Strength of Intact Rock

ASTM D7012

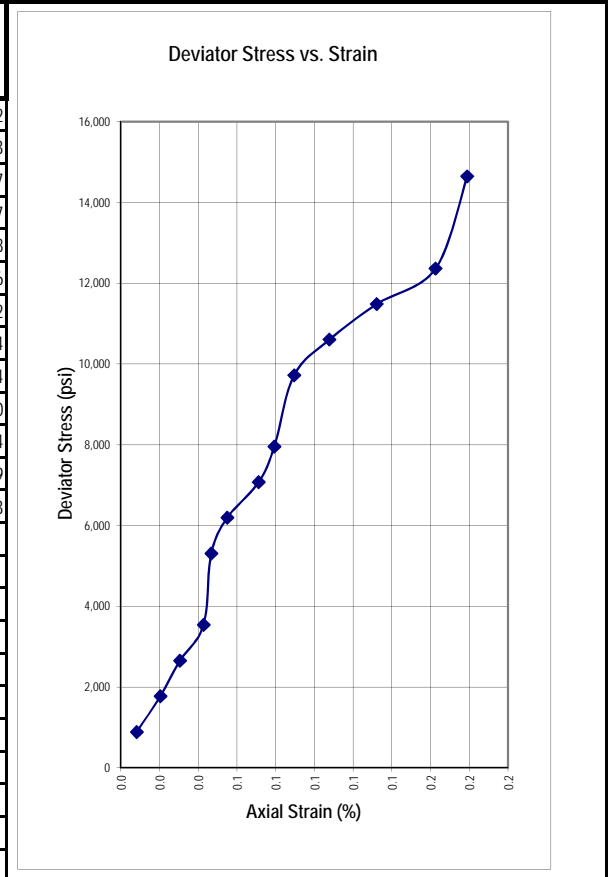
**DSA File #:**    
**DSA Appl #:**  

Project No.:	<b>4438-01</b>	Project Name:	<b>NID Water Storage</b>	Date:	<b>9/12/2016</b>	
Sample No.:	<b>CB-B7, 19.5-20.2</b>	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	<b>DCK</b>
Sample Location:					Check By:	<b>CRK</b>
					Lab No.:	<b>8</b>

Sample Data			Photo At Failure	
Tare Number	I.D.	E		
Tare Weight	(gm)	322.80		
Wet Core + Tare	(gm)	1227.31		
Dry Core + Tare	(gm)	1215.12		
Weight of Water	(gm)	12.19		
Dry Weight	(gm)	892.32		
Moisture Content	(%)	1.37		
Core Height	(in)	4.920		
Sample Diameter	(in)	2.400		
Wet Unit Weight	(pcf)	154.68		
Dry Unit Weight	(pcf)	152.59		
Specific Gravity	(g/cc)	2.72		
Saturation	(%)	33.09		
Strain Rate	psi/second	<b>43.44</b>		
compression machine	ID	15-08-029CT		

Compressive Strength = 14,638.1    psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
34	4	0.01	4.524	4000.00	884.12
66	10	0.02	4.525	8000.00	1768.03
89	15	0.03	4.525	12000.00	2651.77
116	21	0.04	4.526	16000.00	3535.27
132	23	0.05	4.526	24000.00	5302.68
155	27	0.05	4.526	28000.00	6185.96
179	35	0.07	4.527	32000.00	7068.52
205	39	0.08	4.527	36000.00	7951.44
223	44	0.09	4.528	44000.00	9717.44
251	53	0.11	4.529	48000.00	10598.90
276	65	0.13	4.530	52000.00	11479.34
325	80	0.16	4.531	56000.00	12358.59
337	88	0.18	4.532	66340.00	14638.13



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## Compressive Strength of Intact Rock

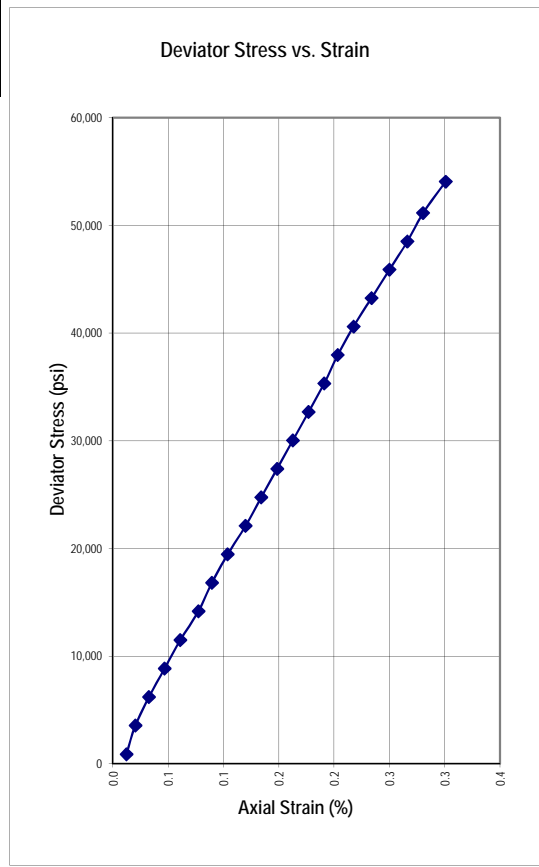
ASTM D7012

DSA File #:   
 DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/12/2016	
Sample No.:	CB-B8, 59.5-60.4	Boring/Trench No.:		Depth (ft.):		
Soil Description:					Tested By:	DCK
Note:	Sample exceeded 55,000 PSI, maximum of compression machine				Check By:	CRK
					Lab No.:	11

Sample Data			Photo At Failure
Tare Number	I.D.	E	Compressive Strength = 54,053.5    psi
Tare Weight	(gm)	322.80	
Wet Core + Tare	(gm)	1112.80	
Dry Core + Tare	(gm)	1102.40	
Weight of Water	(gm)	10.40	
Dry Weight	(gm)	779.60	
Moisture Content	(%)	1.33	
Core Height	(in)	4.920	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	135.09	
Dry Unit Weight	(pcf)	133.32	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	13.29	
Strain Rate	psi/second	44.64	
compression machine	ID	15-08-029CT	

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
32	6	0.01	4.524	4000.00	884.09
63	10	0.02	4.525	16000.00	3536.06
88	16	0.03	4.525	28000.00	6187.35
198	23	0.05	4.526	40000.00	8837.81
154	30	0.06	4.527	52000.00	11487.51
196	38	0.08	4.527	64000.00	14136.18
240	44	0.09	4.528	76000.00	16784.66
258	51	0.10	4.529	88000.00	19432.11
300	59	0.12	4.529	100000.00	22078.35
317	66	0.13	4.530	112000.00	24724.22
356	73	0.15	4.531	124000.00	27369.35
375	80	0.16	4.531	136000.00	30013.72
459	87	0.18	4.532	148000.00	32657.33
491	94	0.19	4.533	160000.00	35300.19
508	100	0.203252	4.533	172000.00	37943.07
550	107	0.2174797	4.534	184000.00	40584.47
568	115	0.2337398	4.534	196000.00	43224.24
610	123	0.25	4.535	208000.00	45863.15
630	131	0.2662602	4.536	220000.00	48501.19
670	138	0.2804878	4.537	232000.00	51139.42
720	148	0.300813	4.538	245270.00	54053.48



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## Compressive Strength of Intact Rock

ASTM D7012

DSA File #:

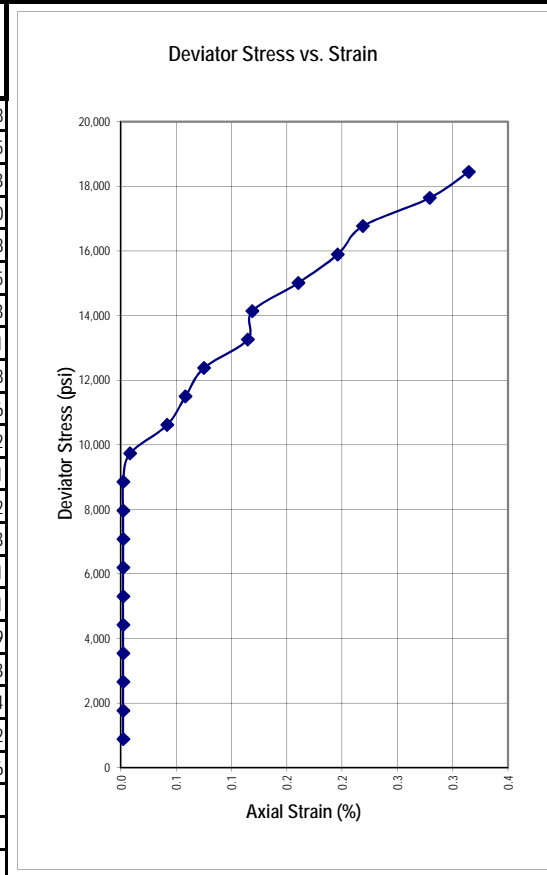
DSA Appl #:

Project No.:	4438-01	Project Name:	NID Water Storage	Date:	9/13/2016	
Sample No.:	CB-B8, 66.3-67.0	Boring/Trench No.:		Tested By:	DCK	
Soil Description:					Check By:	CRK
Sample Location:					Lab No.:	21

Sample Data			Photo At Failure
Tare Number	I.D.	BK	
Tare Weight	(gm)	319.10	
Wet Core + Tare	(gm)	1231.30	
Dry Core + Tare	(gm)	1222.90	
Weight of Water	(gm)	8.40	
Dry Weight	(gm)	903.80	
Moisture Content	(%)	0.93	
Core Height	(in)	4.800	
Sample Diameter	(in)	2.400	
Wet Unit Weight	(pcf)	159.89	
Dry Unit Weight	(pcf)	158.42	
Specific Gravity	(g/cc)	2.72	
Saturation	(%)	35.41	
Strain Rate	psi/second	74.67	
compression machine	ID	15-08-029CT	

Compressive Strength = 18,443.6      psi

Elapsed Time (Seconds)	Strain		Area (in <sup>2</sup> )	Load (lbs)	Deviator Stress (psi)
	Units (0.0001in/unit)	Percent (%)			
6	1	0.00	4.524	4000.00	884.18
9	1	0.00	4.524	8000.00	1768.35
21	1	0.00	4.524	12000.00	2652.53
34	1	0.00	4.524	16000.00	3536.70
40	1	0.00	4.524	20000.00	4420.88
50	1	0.00	4.524	24000.00	5305.05
58	1	0.00	4.524	28000.00	6189.23
68	1	0.00	4.524	32000.00	7073.41
79	1	0.00	4.524	36000.00	7957.58
88	1	0.00	4.524	40000.00	8841.76
102	4	0.01	4.524	44000.00	9725.32
117	20	0.04	4.526	48000.00	10605.91
135	28	0.06	4.527	52000.00	11487.82
151	36	0.08	4.527	56000.00	12369.43
168	55	0.1145833	4.529	60000.00	13247.71
192	57	0.11875	4.529	64000.00	14130.31
207	77	0.1604167	4.531	68000.00	15007.19
217	94	0.1958333	4.533	72000.00	15884.33
224	105	0.21875	4.534	76000.00	16762.94
236	134	0.2791667	4.537	80000.00	17634.52
247	151	0.3145833	4.538	83700.00	18443.56
				4000.00	



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