

**ADDENDUM NO. 1  
CITY OF RATON  
JULY 5, 2017**

**TO: All Planholders**

**RE: Raton Municipal / Crews Field Airport  
Taxiway A Reconstruction  
A.I.P. 3-35-0033-17-2017; NMDOT AD RTN-13-01**

The following Addendum shall be incorporated into the Contract Documents for the above-referenced project.


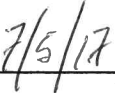
**A. CLARIFICATIONS**

1. The Geotechnical Investigation Report is attached hereto and made part of this Addendum.

All other provisions of the Contract Documents shall remain unchanged. This Addendum is hereby made a part of the Contract Documents to the same extent as those contained in the original documents and all itemized listings thereof.

Each Bidder shall acknowledge receipt of this Addendum on the Bid Proposal form in the space provided.

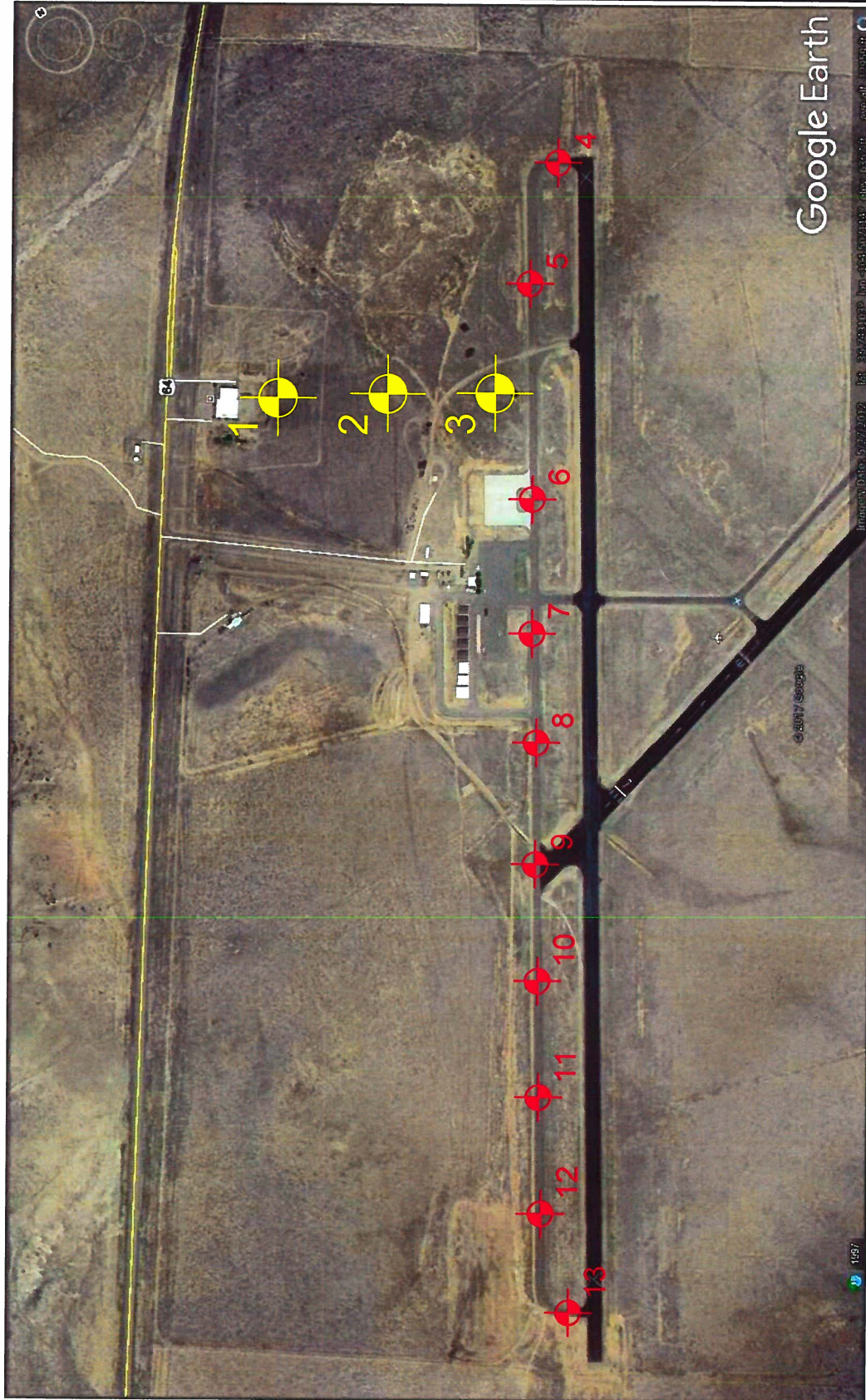
MOLZEN CORBIN

   
\_\_\_\_\_

Kent S. Freier, P.E.

Date

BORING LOCATION MAP



Taxiway A & D  
Raton Municipal Airport, New Mexico  
Job No. 1-70309

Figure 1



**GEOTECH**  
GEOTECHNICAL ENGINEERING  
AND MATERIAL TESTING



Project: Raton Municipal Airport Taxiway A & D  
 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B01

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
								20	40	60	80		
			SS	2-6-7 13	14			SANDY CLAY, medium plasticity, moderately firm to very soft, moist, brown					
			AC										
			SS	3-2-2 4	14								
5			SS	3-2-2 4	19								
								STOPPED AUGER AT 4' STOPPED SAMPLER AT 5.5'					
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17

LEGEND

- SS - Split Spoon
- AC - Auger Cuttings
- UD/SL - Undisturbed Sleeve
- AMSL - Above Mean Sea Level
- CS - Continuous Sampler
- UD - Undisturbed
- ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.





Project: Raton Municipal Airport Taxiway A & D  
 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B03

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE						
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft					
								20	40	60	80			
5			AC					CL	SANDY CLAY, medium plasticity, moderately firm, slightly moist, brown					
			SS	5-5-6 11	9									
			SS	7-10-15 25	16			ML	SANDY SILT, fine grained, low plasticity, firm, weakly cemented, moist, white/tan					
									STOPPED AUGER AT 4' STOPPED SAMPLER AT 5.5'					

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17

LEGEND

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Project: Raton Municipal Airport Taxiway A & D  
 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B04

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		16			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B05

During Drilling: None

After 24 Hours:

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 8" Bituminous Base Course or Millings				
			AC		24			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B06

During Drilling: None

After 24 Hours:

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE				
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft			
									20	40	60	80
							AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		16		CL	SANDY CLAY, medium plasticity, moist, brown				
5								STOPPED AUGER AT 4 FEET				
10												

LEGEND

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Project: Raton Municipal Airport Taxiway A & D  
 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B07

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE		N blows/ft			
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		14			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B08

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE				SUBSURFACE PROFILE		N blows/ft			
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	20	40	60	80
							AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		15		CL	SANDY CLAY, medium plasticity, moist, brown				
5								STOPPED AUGER AT 4 FEET				
10												

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B09

During Drilling: None

After 24 Hours:

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE				
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft			
									20	40	60	80
							AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		17		CL	SANDY CLAY, medium plasticity, moist, brown				
5								STOPPED AUGER AT 4 FEET				
10												

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B10

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		16			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B11

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		15			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS GROUNDWATER DEPTH

NO: B12 During Drilling: None After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		17			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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Project: Raton Municipal Airport Taxiway A & D  
 Date: 05/04/2017 Project No: 1-70309  
 Elevation: Type: 6.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: B13

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	SAMPLE					SUBSURFACE PROFILE					
			TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
								AC	5" Asphalt over 9" Bituminous Base Course or Millings				
			AC		15			CL	SANDY CLAY, medium plasticity, moist, brown				
5									STOPPED AUGER AT 4 FEET				
10													

LOG OF TEST BORING 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/28/17

LEGEND

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# SUMMARY OF LABORATORY RESULTS

TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(% MOIST)	LL	PI	SIEVE ANALYSIS PERCENT PASSING												
						NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"	
B01	1.0	CL	14.5	33	17	70	86	98	100									
B01	3.0		14.1															
B01	5.0	CL	19.2	31	15	77	91	99	100									
B02	3.0	CL	8.3	30	15	71	85	98	99	100								
B02	5.0		8.2															
B03	2.5	CL	8.7	29	13	76	87	97	99	100								
B03	5.0	ML	15.6	40	14	61	70	82	89	97	100							
B04	2.0		15.7															
B05	2.5		23.5															
B06	2.5		15.8															
B07	2.5		13.9															
B08	2.5		15.4															
B09	2.5		17.2															
B10	2.5		16.2															
B11	2.5		14.6															
B12	2.5		17.0															
B13	2.5		15.4															
Bulk 01	0-4	CL	14.5	31	15	59	77	95	100									
Bulk 02	0-4	CL	7.2	29	14	59	75	97	100									



LL = LIQUID LIMIT  
PI = PLASTICITY INDEX  
NP = NON PLASTIC or NO VALUE

Project: Raton Municipal Airport Taxiway A & D  
Location: Raton, New Mexico  
Number: 1-70309



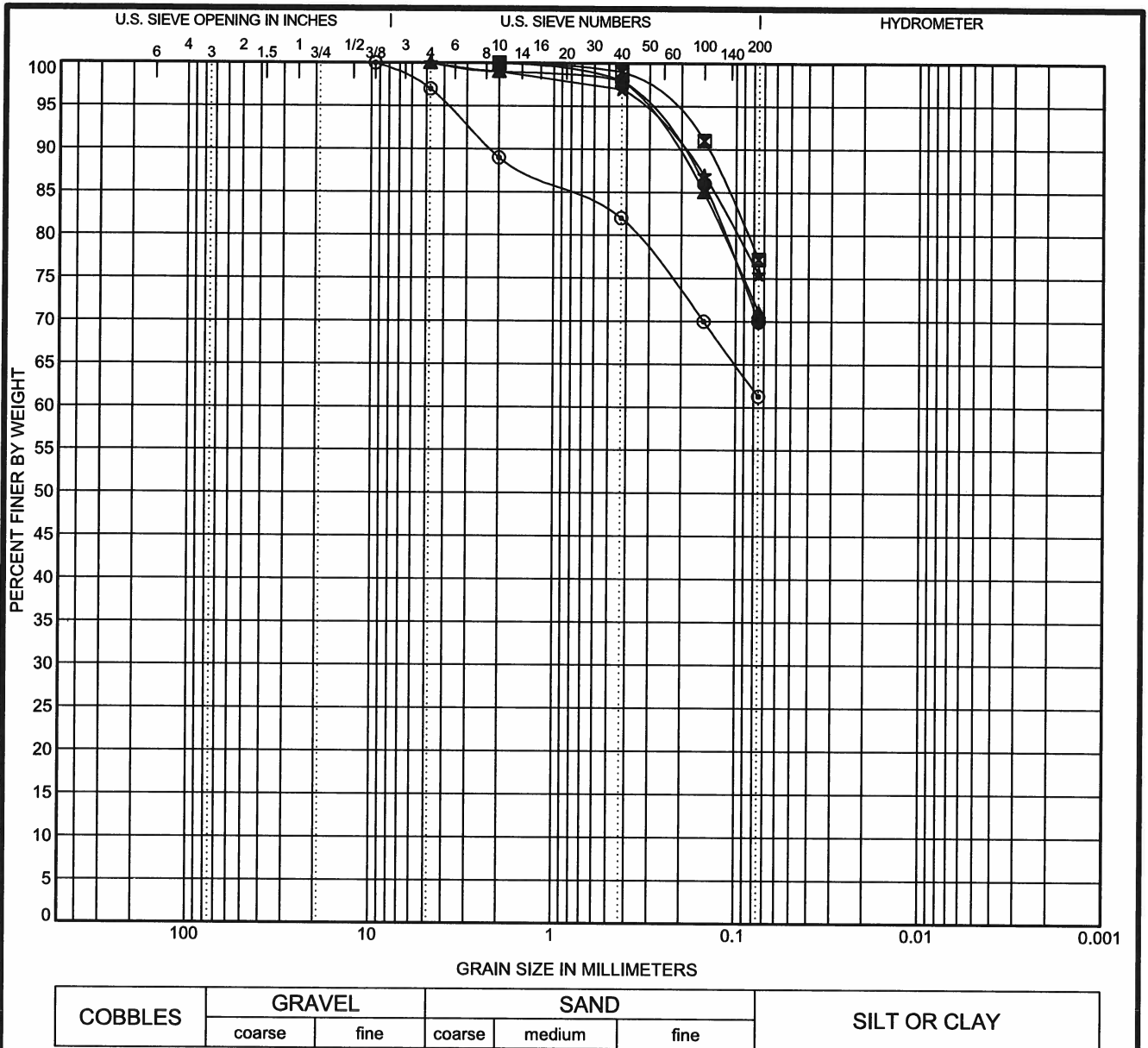
# SUMMARY OF LABORATORY RESULTS

TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(% MOIST)	LL	PI	SIEVE ANALYSIS PERCENT PASSING											
						NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
Bulk 03	0-4	CL	11.1	28	13	58	75	94	98	99	100						
Bulk 04-06	0-4	CL	14.6	32	17	56	71	88	94	97	100						
Bulk 07-09	0-4	CL	14.7	30	17	55	72	91	94	97	99	100					
Bulk 10-13	0-4	CL	16.8	35	18	56	72	91	95	97	99	100					

LL = LIQUID LIMIT  
 PI = PLASTICITY INDEX  
 NP = NON PLASTIC or NO VALUE



Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309



Specimen Identification		Classification					LL	PL	PI	Cc	Cu
●	B01 1.0	SANDY LEAN CLAY(CL)					33	16	17		
■	B01 5.0	LEAN CLAY with SAND(CL)					31	16	15		
▲	B02 3.0	LEAN CLAY with SAND(CL)					30	15	15		
★	B03 2.5	LEAN CLAY with SAND(CL)					29	16	13		
◎	B03 5.0	SANDY SILT(ML)					40	26	14		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	B01 1.0	2				0.0	30.0	70.0			
■	B01 5.0	2				0.0	22.8	77.2			
▲	B02 3.0	4.75				0.0	28.9	71.1			
★	B03 2.5	4.75				0.0	24.5	75.5			
◎	B03 5.0	9.5				3.0	35.7	61.3			

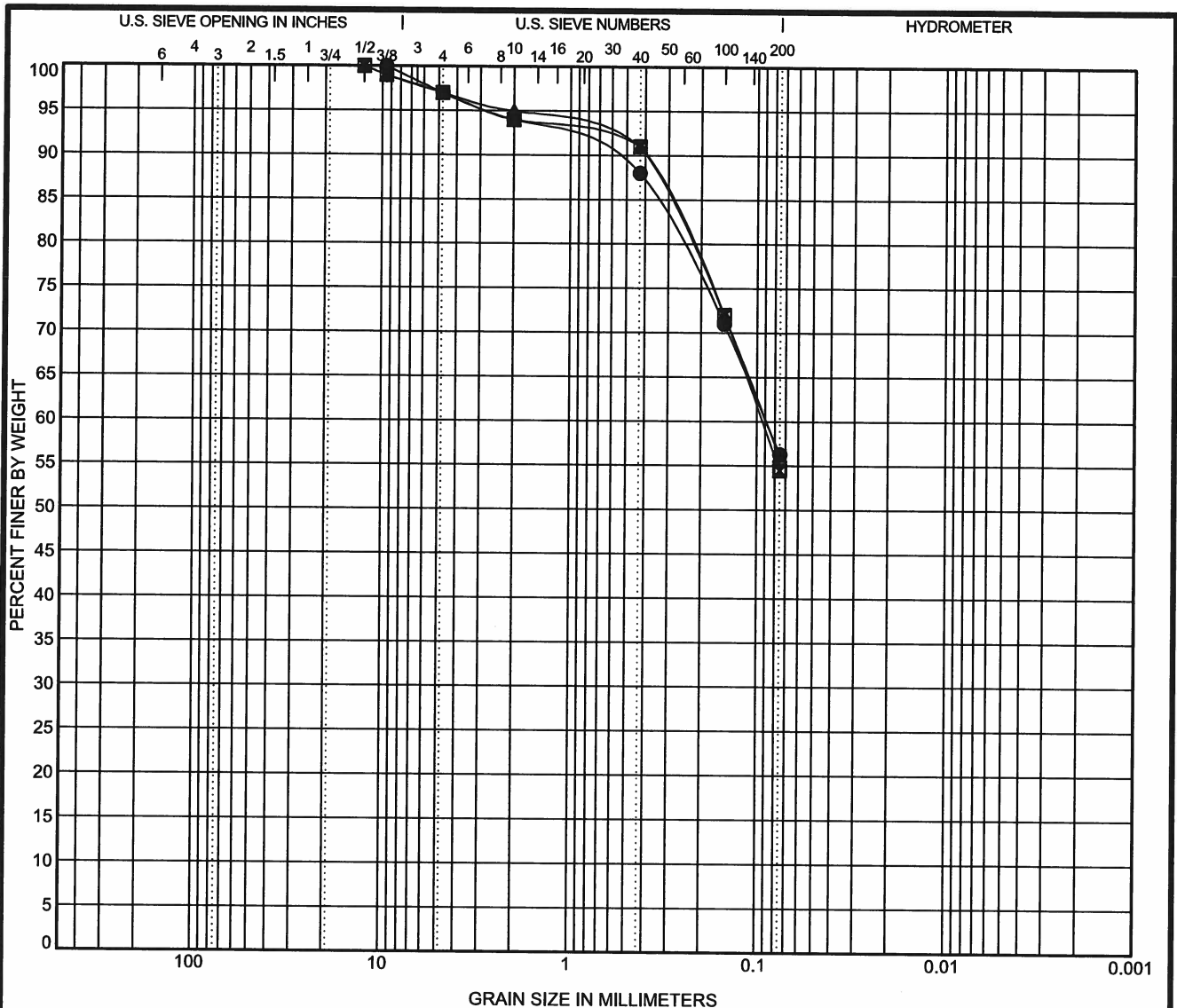
US GRAIN SIZE 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



**GRAIN SIZE DISTRIBUTION**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● Bulk 04-06 0-4	SANDY LEAN CLAY(CL)					32	15	17		
■ Bulk 07-09 0-4	SANDY LEAN CLAY(CL)					30	13	17		
▲ Bulk 10-13 0-4	SANDY LEAN CLAY(CL)					35	17	18		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● Bulk 04-06 0-4	9.5	0.089			3.0	40.7	56.3	
■ Bulk 07-09 0-4	12.5	0.093			3.0	42.5	54.5	
▲ Bulk 10-13 0-4	12.5	0.089			3.0	40.9	56.1	

US GRAIN SIZE 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



**GRAIN SIZE DISTRIBUTION**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309

# **CALIFORNIA BEARING RATIO TESTS**

**CALIFORNIA BEARING RATIO, CALCULATION SHEET**

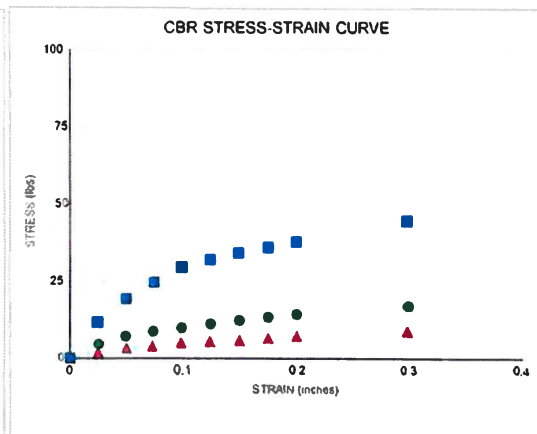
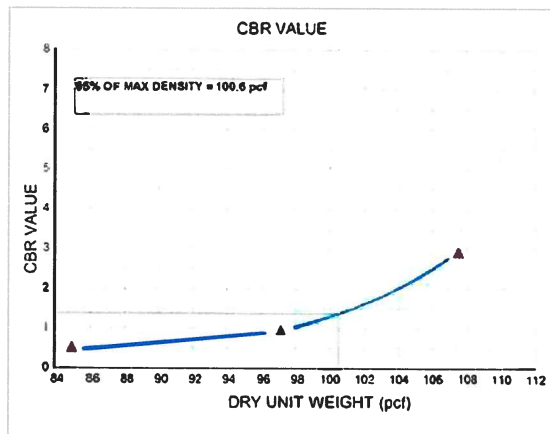
PROJECT: Raton Municipal Airport TW A & LOCATION: B-1, 0- 4'  
 D PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION: \_\_\_\_\_  
 MAXIMUM DRY DENSITY (ASTM D698): 105.9 pcf OPTIMUM MOISTURE CONTENT 17.7 %

The following calculations based on calibration of load cell #23976

MOLD #	<u>4</u>	MOLD #	<u>5</u>	MOLD #	<u>6</u>
# OF BLOWS	<u>10</u>	# OF BLOWS	<u>25</u>	# OF BLOWS	<u>56</u>
BEFORE SOAKING		BEFORE SOAKING		BEFORE SOAKING	
DRY DENSITY	<u>85.0</u>	DRY DENSITY	<u>97.2</u>	DRY DENSITY	<u>107.5</u>
% MOISTURE	<u>17.7</u>	% MOISTURE	<u>17.6</u>	% MOISTURE	<u>17.8</u>
AFTER SOAKING		AFTER SOAKING		AFTER SOAKING	
WET WEIGHT	<u>924.3</u>	WET WEIGHT	<u>950.3</u>	WET WEIGHT	<u>1413.8</u>
DRY WEIGHT	<u>738.6</u>	DRY WEIGHT	<u>784.4</u>	DRY WEIGHT	<u>1200.5</u>
% MOISTURE	<u>25.1</u>	% MOISTURE	<u>21.1</u>	% MOISTURE	<u>17.8</u>
SWELL/CONSOL.		SWELL/CONSOL.		SWELL/CONSOL.	
INIT. READING	<u>0.437</u>	INIT. READING	<u>0.473</u>	INIT. READING	<u>0.608</u>
FINAL READING	<u>0.445</u>	FINAL READING	<u>0.539</u>	FINAL READING	<u>0.664</u>
DIFF.	<u>+0.008"</u>	DIFF.	<u>+0.066"</u>	DIFF.	<u>+0.056"</u>

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	6	2.0	0.025	14	4.7	0.025	35	11.7
0.050	10	3.3	0.050	21	7.0	0.050	58	19.3
0.075	12	4.0	0.075	26	8.7	0.075	74	24.7
0.100	15	5.0	0.100	29	9.7	0.100	88	29.3
0.125	16	5.3	0.125	33	11.0	0.125	96	32.0
0.150	17	5.7	0.150	36	12.0	0.150	102	34.0
0.175	19	6.3	0.175	39	13.0	0.175	107	35.7
0.200	21	7.0	0.200	42	14.0	0.200	112	37.3
0.300	26	8.7	0.300	51	17.0	0.300	133	44.3
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

CBR @ 0.100	<u>0.5</u>	CBR @ 0.100	<u>1.0</u>	CBR @ 0.100	<u>2.9</u>
CBR @ 0.200	<u>0.5</u>	CBR @ 0.200	<u>0.9</u>	CBR @ 0.200	<u>2.5</u>



**CBR VALUE @ 95% = 1**

### CALIFORNIA BEARING RATIO, CALCULATION SHEET

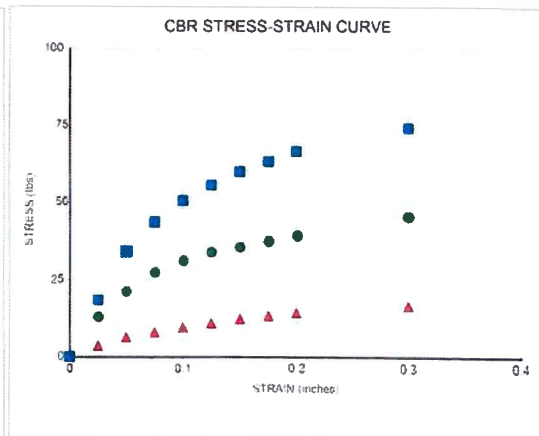
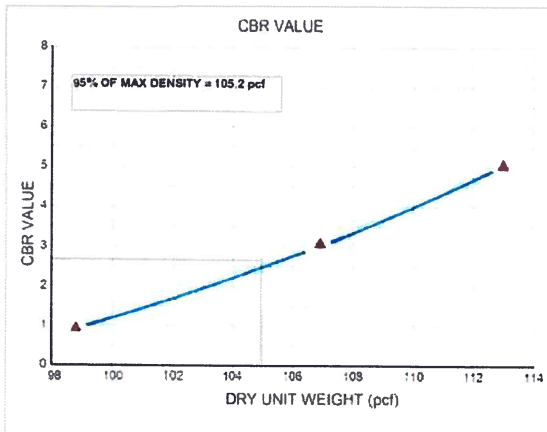
PROJECT: Raton Municipal Airport TW A & D LOCATION B-2, 0-4'  
 PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION: \_\_\_\_\_  
 MAXIMUM DRY DENSITY (ASTM D698): 110.7 pcf OPTIMUM MOISTURE CONTENT 15.0 %

The following calculations based on calibration of load cell #23976

MOLD #	1	MOLD #	2	MOLD #	3
# OF BLOWS	10	# OF BLOWS	25	# OF BLOWS	56
<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>	
DRY DENSITY	98.8	DRY DENSITY	106.9	DRY DENSITY	113.0
% MOISTURE	15.3	% MOISTURE	15.4	% MOISTURE	15.0
<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>	
WET WEIGHT	1954.8	WET WEIGHT	1074.3	WET WEIGHT	1171.0
DRY WEIGHT	1626.2	DRY WEIGHT	917.9	DRY WEIGHT	1013.1
% MOISTURE	20.2	% MOISTURE	17.0	% MOISTURE	15.6
<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>	
INIT. READING	0.294	INIT. READING	0.225	INIT. READING	0.293
FINAL READING	0.334	FINAL READING	0.264	FINAL READING	0.319
DIFF.	+0.04"	DIFF.	+0.039"	DIFF.	+0.065"

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	11	3.7	0.025	39	13.0	0.025	55	18.3
0.050	19	6.3	0.050	64	21.3	0.050	102	34.0
0.075	24	8.0	0.075	82	27.3	0.075	131	43.7
0.100	29	9.7	0.100	93	31.0	0.100	152	50.7
0.125	33	11.0	0.125	102	34.0	0.125	167	55.7
0.150	37	12.3	0.150	107	35.7	0.150	180	60.0
0.175	40	13.3	0.175	113	37.7	0.175	190	63.3
0.200	43	14.3	0.200	118	39.3	0.200	200	66.7
0.300	50	16.7	0.300	137	45.7	0.300	223	74.3
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

CBR @ 0.100	1.0	CBR @ 0.100	3.1	CBR @ 0.100	5.1
CBR @ 0.200	1.0	CBR @ 0.200	2.6	CBR @ 0.200	4.4



**CBR VALUE @ 95% = 3**

**CALIFORNIA BEARING RATIO, CALCULATION SHEET**

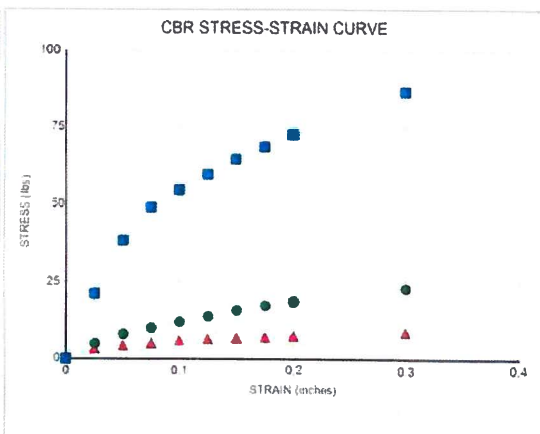
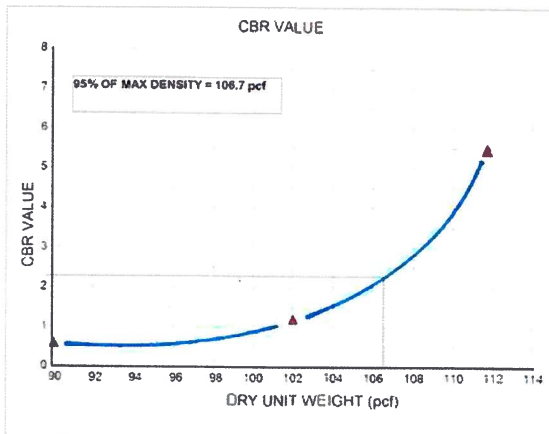
PROJECT: Raton Municipal Airport TW A & D LOCATION B-3, 0-4'  
 PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION:  
 MAXIMUM DRY DENSITY (ASTM D698): 112.2 pcf OPTIMUM MOISTURE CONTENT 13.3 %

The following calculations based on calibration of load cell #23976

MOLD #	<u>1</u>	MOLD #	<u>2</u>	MOLD #	<u>3</u>
# OF BLOWS	<u>10</u>	# OF BLOWS	<u>25</u>	# OF BLOWS	<u>56</u>
<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>	
DRY DENSITY	<u>90.1</u>	DRY DENSITY	<u>102.0</u>	DRY DENSITY	<u>111.7</u>
% MOISTURE	<u>15.1</u>	% MOISTURE	<u>14.6</u>	% MOISTURE	<u>15.3</u>
<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>	
WET WEIGHT	<u>1047.5</u>	WET WEIGHT	<u>967.9</u>	WET WEIGHT	<u>1384.9</u>
DRY WEIGHT	<u>841.2</u>	DRY WEIGHT	<u>816.6</u>	DRY WEIGHT	<u>1196.3</u>
% MOISTURE	<u>24.5</u>	% MOISTURE	<u>18.5</u>	% MOISTURE	<u>15.8</u>
<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>	
INIT. READING	<u>0.297</u>	INIT. READING	<u>0.221</u>	INIT. READING	<u>0.301</u>
FINAL READING	<u>0.332</u>	FINAL READING	<u>0.291</u>	FINAL READING	<u>0.339</u>
DIFF.	<u>+0.035"</u>	DIFF.	<u>+0.07"</u>	DIFF.	<u>+0.038"</u>

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	10	3.3	0.025	15	5.0	0.025	63	21.0
0.050	13	4.3	0.050	24	8.0	0.050	115	38.3
0.075	15	5.0	0.075	30	10.0	0.075	147	49.0
0.100	18	6.0	0.100	36	12.0	0.100	164	54.7
0.125	19	6.3	0.125	41	13.7	0.125	179	59.7
0.150	20	6.7	0.150	47	15.7	0.150	194	64.7
0.175	21	7.0	0.175	52	17.3	0.175	206	68.7
0.200	22	7.3	0.200	56	18.7	0.200	218	72.7
0.300	26	8.7	0.300	69	23.0	0.300	260	86.7
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

CBR @ 0.100	<u>0.6</u>	CBR @ 0.100	<u>1.2</u>	CBR @ 0.100	<u>5.5</u>
CBR @ 0.200	<u>0.5</u>	CBR @ 0.200	<u>1.2</u>	CBR @ 0.200	<u>4.8</u>



**CBR VALUE @ 95% = 2**



**CALIFORNIA BEARING RATIO, CALCULATION SHEET**

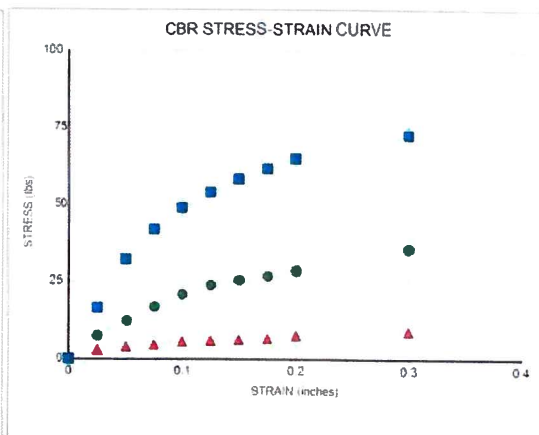
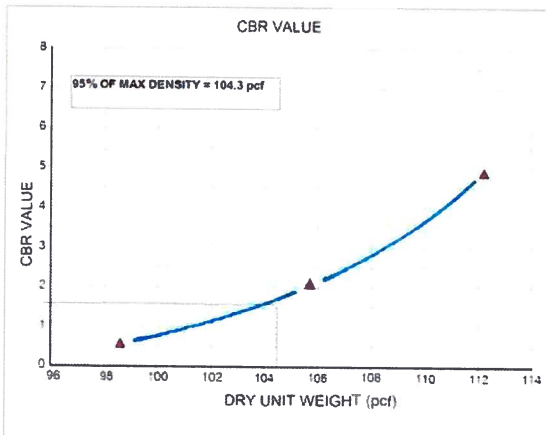
PROJECT: Raton Municipal Airport TW A & D LOCATION Composite from B-4,5,6, 0-4'  
 PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION:  
 MAXIMUM DRY DENSITY (ASTM D698): 109.8 pcf OPTIMUM MOISTURE CONTENT 14.8 %

The following calculations based on calibration of load cell #23976

MOLD #	1	MOLD #	2	MOLD #	3
# OF BLOWS	<u>10</u>	# OF BLOWS	<u>25</u>	# OF BLOWS	<u>56</u>
<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>	
DRY DENSITY	<u>98.6</u>	DRY DENSITY	<u>105.7</u>	DRY DENSITY	<u>112.2</u>
% MOISTURE	<u>15.2</u>	% MOISTURE	<u>15.0</u>	% MOISTURE	<u>14.7</u>
<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>	
WET WEIGHT	<u>1950.8</u>	WET WEIGHT	<u>977.9</u>	WET WEIGHT	<u>1280.4</u>
DRY WEIGHT	<u>1622.2</u>	DRY WEIGHT	<u>823.6</u>	DRY WEIGHT	<u>1104.3</u>
% MOISTURE	<u>20.3</u>	% MOISTURE	<u>18.7</u>	% MOISTURE	<u>15.9</u>
<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>	
INIT. READING	<u>0.291</u>	INIT. READING	<u>0.229</u>	INIT. READING	<u>0.309</u>
FINAL READING	<u>0.328</u>	FINAL READING	<u>0.269</u>	FINAL READING	<u>0.352</u>
DIFF.	<u>+0.037"</u>	DIFF.	<u>+0.04"</u>	DIFF.	<u>+0.043"</u>

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	9	3.0	0.025	23	7.7	0.025	50	16.7
0.050	12	4.0	0.050	37	12.3	0.050	97	32.3
0.075	14	4.7	0.075	51	17.0	0.075	126	42.0
0.100	17	5.7	0.100	63	21.0	0.100	147	49.0
0.125	18	6.0	0.125	72	24.0	0.125	162	54.0
0.150	19	6.3	0.150	77	25.7	0.150	175	58.3
0.175	20	6.7	0.175	81	27.0	0.175	185	61.7
0.200	23	7.7	0.200	86	28.7	0.200	195	65.0
0.300	27	9.0	0.300	108	36.0	0.300	218	72.7
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

CBR @ 0.100	<u>0.6</u>	CBR @ 0.100	<u>2.1</u>	CBR @ 0.100	<u>4.9</u>
CBR @ 0.200	<u>0.5</u>	CBR @ 0.200	<u>1.9</u>	CBR @ 0.200	<u>4.3</u>



**CBR VALUE @ 95% = 2**

### CALIFORNIA BEARING RATIO, CALCULATION SHEET

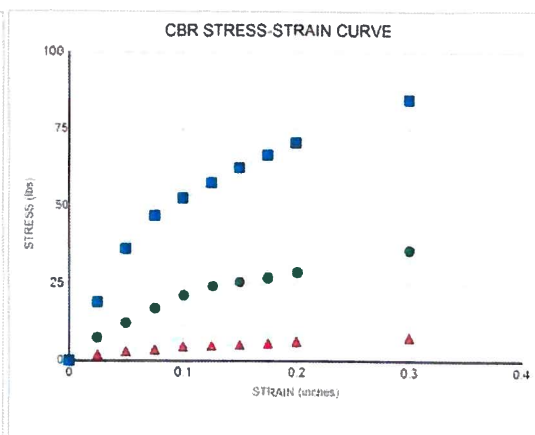
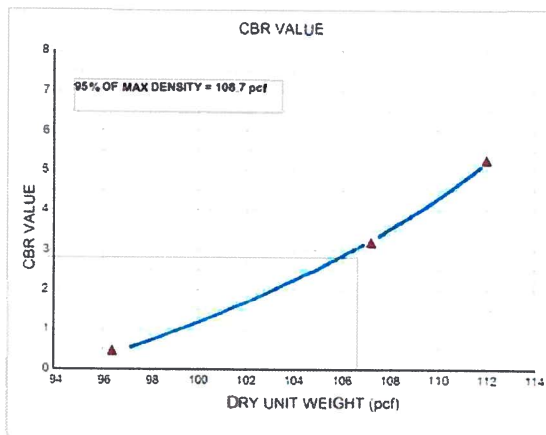
PROJECT: Raton Municipal Airport TW A & D LOCATION Composite from B-7,8,9 0-4'  
 PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION: \_\_\_\_\_  
 MAXIMUM DRY DENSITY (ASTM D698): 112.3 pcf OPTIMUM MOISTURE CONTENT 15.2 %

The following calculations based on calibration of load cell #23976

MOLD #	<u>4</u>	MOLD #	<u>5</u>	MOLD #	<u>6</u>
# OF BLOWS	<u>10</u>	# OF BLOWS	<u>25</u>	# OF BLOWS	<u>56</u>
<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>		<b>BEFORE SOAKING</b>	
DRY DENSITY	<u>96.4</u>	DRY DENSITY	<u>107.2</u>	DRY DENSITY	<u>112.0</u>
% MOISTURE	<u>14.8</u>	% MOISTURE	<u>15.1</u>	% MOISTURE	<u>15.6</u>
<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>		<b>AFTER SOAKING</b>	
WET WEIGHT	<u>1125.4</u>	WET WEIGHT	<u>1043.8</u>	WET WEIGHT	<u>1280.4</u>
DRY WEIGHT	<u>933.6</u>	DRY WEIGHT	<u>882.3</u>	DRY WEIGHT	<u>1104.3</u>
% MOISTURE	<u>20.5</u>	% MOISTURE	<u>18.3</u>	% MOISTURE	<u>15.9</u>
<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>		<b>SWELL/CONSOL.</b>	
INIT. READING	<u>0.288</u>	INIT. READING	<u>0.278</u>	INIT. READING	<u>0.309</u>
FINAL READING	<u>0.319</u>	FINAL READING	<u>0.320</u>	FINAL READING	<u>0.352</u>
DIFF.	<u>+0.031"</u>	DIFF.	<u>+0.042"</u>	DIFF.	<u>+0.043"</u>

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	6	2.0	0.025	23	7.7	0.025	57	19.0
0.050	9	3.0	0.050	37	12.3	0.050	109	36.3
0.075	11	3.7	0.075	51	17.0	0.075	141	47.0
0.100	14	4.7	0.100	63	21.0	0.100	158	52.7
0.125	15	5.0	0.125	72	24.0	0.125	173	57.7
0.150	16	5.3	0.150	77	25.7	0.150	188	62.7
0.175	17	5.7	0.175	81	27.0	0.175	200	66.7
0.200	19	6.3	0.200	86	28.7	0.200	212	70.7
0.300	23	7.7	0.300	108	36.0	0.300	254	84.7
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

CBR @ 0.100	<u>0.5</u>	CBR @ 0.100	<u>2.1</u>	CBR @ 0.100	<u>5.3</u>
CBR @ 0.200	<u>0.4</u>	CBR @ 0.200	<u>1.9</u>	CBR @ 0.200	<u>4.7</u>



**CBR VALUE @ 95% = 3**

**CALIFORNIA BEARING RATIO, CALCULATION SHEET**

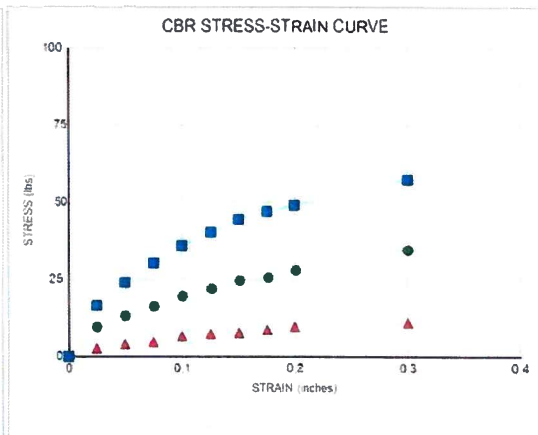
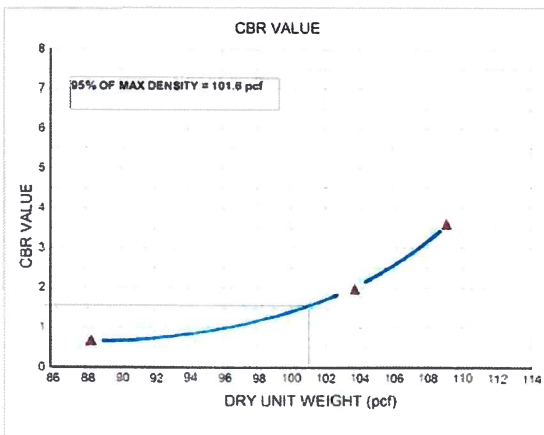
PROJECT: Raton Municipal Airport TW A & D LOCATION Composite from B-10,11,12,13 0-4'  
 PROJECT NO.: 170309 Sandy Clay (CL)  
 SOIL DESCRIPTION: \_\_\_\_\_  
 MAXIMUM DRY DENSITY (ASTM D698): 106.9 pcf OPTIMUM MOISTURE CONTENT 16.2 %

The following calculations based on calibration of load cell #23976

MOLD #	<u>4</u>	MOLD #	<u>5</u>	MOLD #	<u>6</u>
# OF BLOWS	<u>10</u>	# OF BLOWS	<u>25</u>	# OF BLOWS	<u>56</u>
BEFORE SOAKING		BEFORE SOAKING		BEFORE SOAKING	
DRY DENSITY	<u>88.3</u>	DRY DENSITY	<u>103.7</u>	DRY DENSITY	<u>109.1</u>
% MOISTURE	<u>15.9</u>	% MOISTURE	<u>16.1</u>	% MOISTURE	<u>16.0</u>
AFTER SOAKING		AFTER SOAKING		AFTER SOAKING	
WET WEIGHT	<u>1156.4</u>	WET WEIGHT	<u>996.2</u>	WET WEIGHT	<u>879.4</u>
DRY WEIGHT	<u>922.6</u>	DRY WEIGHT	<u>830.4</u>	DRY WEIGHT	<u>753.2</u>
% MOISTURE	<u>25.3</u>	% MOISTURE	<u>20.0</u>	% MOISTURE	<u>16.8</u>
SWELL/CONSOL.		SWELL/CONSOL.		SWELL/CONSOL.	
INIT. READING	<u>0.275</u>	INIT. READING	<u>0.387</u>	INIT. READING	<u>0.309</u>
FINAL READING	<u>0.311</u>	FINAL READING	<u>0.426</u>	FINAL READING	<u>0.352</u>
DIFF.	<u>+0.036"</u>	DIFF.	<u>+0.039"</u>	DIFF.	<u>+0.043"</u>

STRAIN	READING	STRESS	STRAIN	READING	STRESS	STRAIN	READING	STRESS
0	0	0.0	0	0	0.0	0	0	0.0
0.025	8	2.7	0.025	29	9.7	0.025	50	16.7
0.050	12	4.0	0.050	40	13.3	0.050	72	24.0
0.075	14	4.7	0.075	49	16.3	0.075	91	30.3
0.100	20	6.7	0.100	59	19.7	0.100	108	36.0
0.125	22	7.3	0.125	66	22.0	0.125	121	40.3
0.150	23	7.7	0.150	74	24.7	0.150	133	44.3
0.175	26	8.7	0.175	77	25.7	0.175	141	47.0
0.200	29	9.7	0.200	84	28.0	0.200	147	49.0
0.300	33	11.0	0.300	104	34.7	0.300	172	57.3
0.400	0	0.0	0.400	0	0.0	0.400	0	0.0
0.500	0	0.0	0.500	0	0.0	0.500	0	0.0

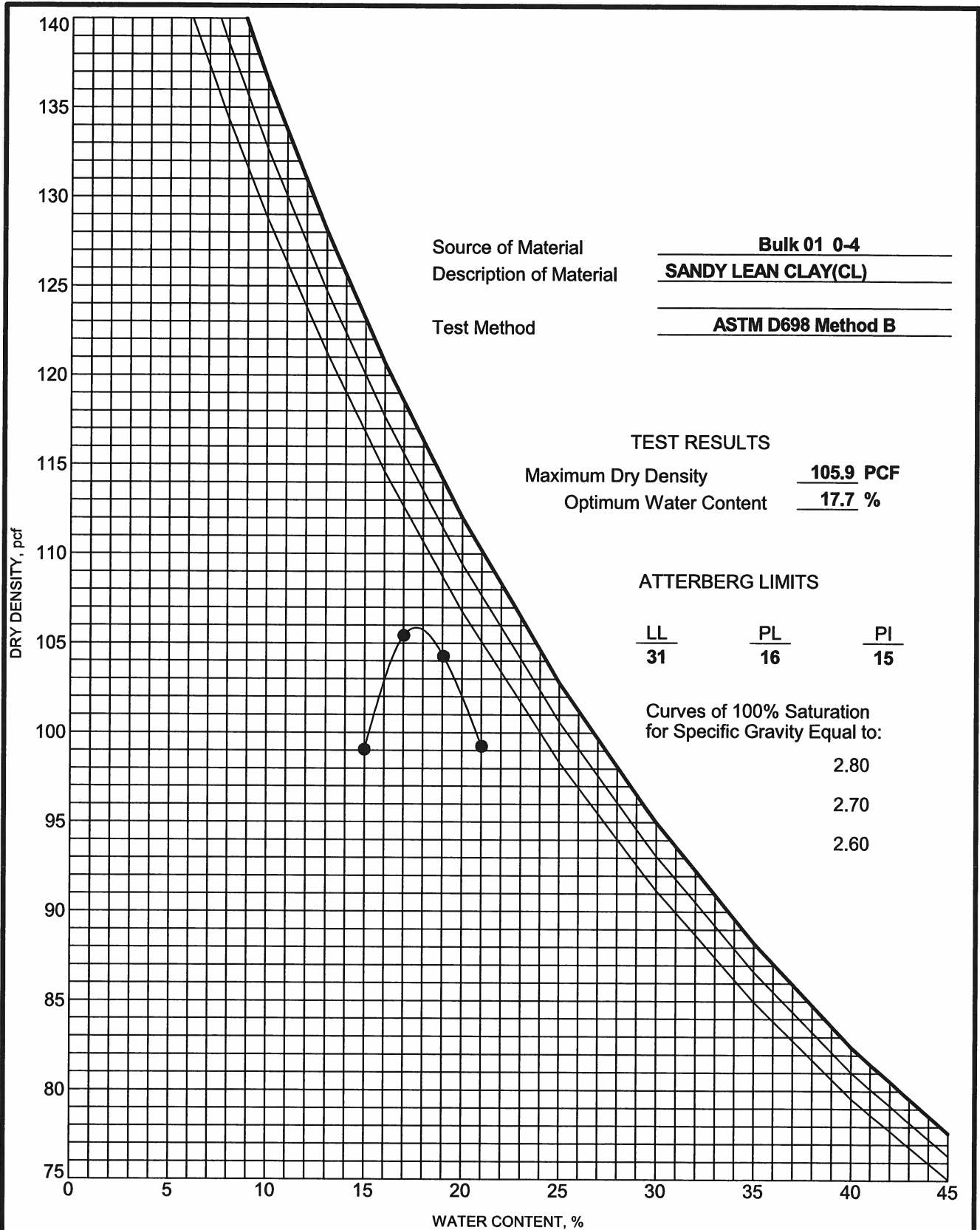
CBR @ 0.100	<u>0.7</u>	CBR @ 0.100	<u>2.0</u>	CBR @ 0.100	<u>3.6</u>
CBR @ 0.200	<u>0.6</u>	CBR @ 0.200	<u>1.9</u>	CBR @ 0.200	<u>3.3</u>



**CBR VALUE @ 95% = 2**

# **MOISTURE-DENSITY RELATIONSHIP TESTS**

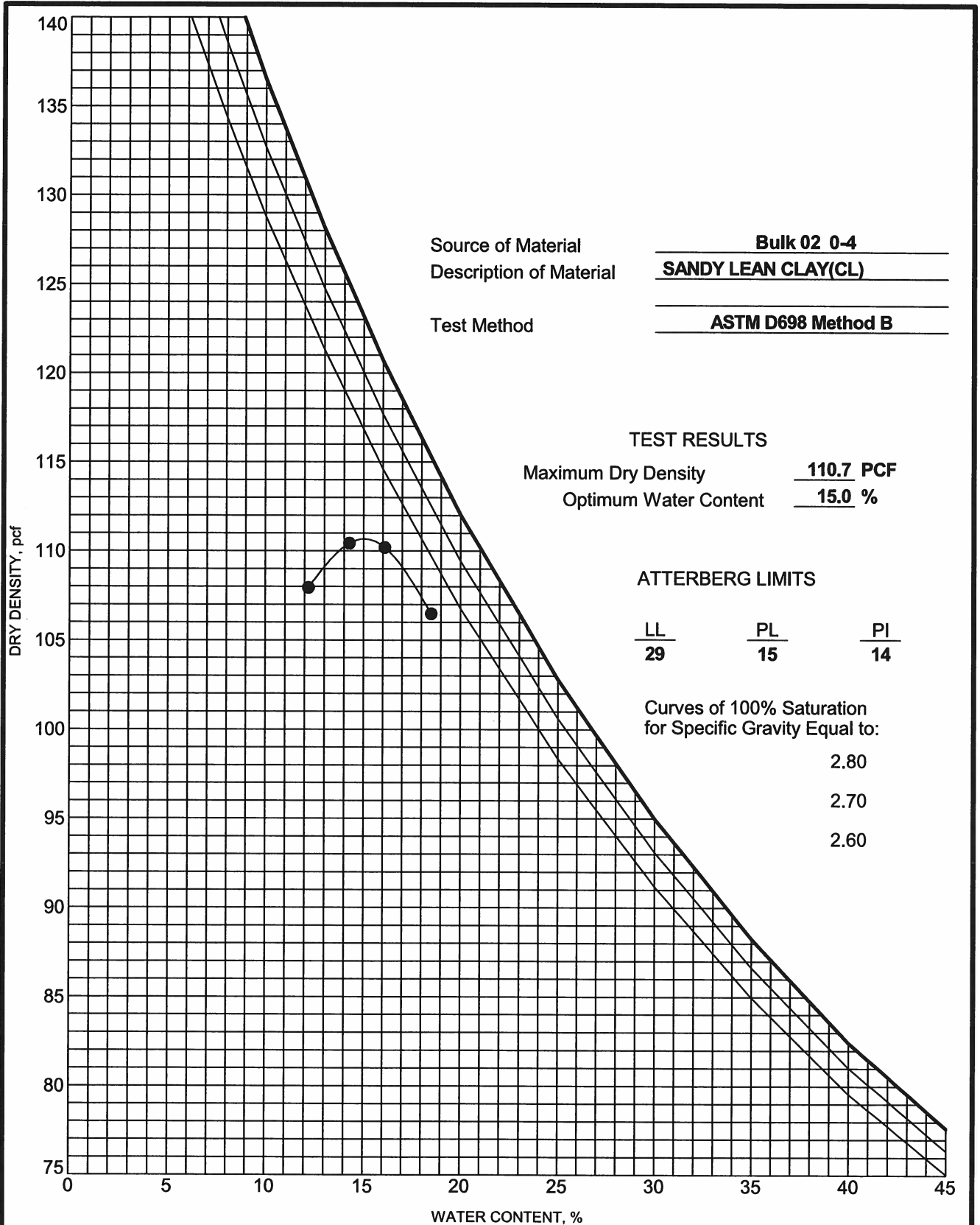
US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D  
Location: Raton, New Mexico  
Number: 1-70309

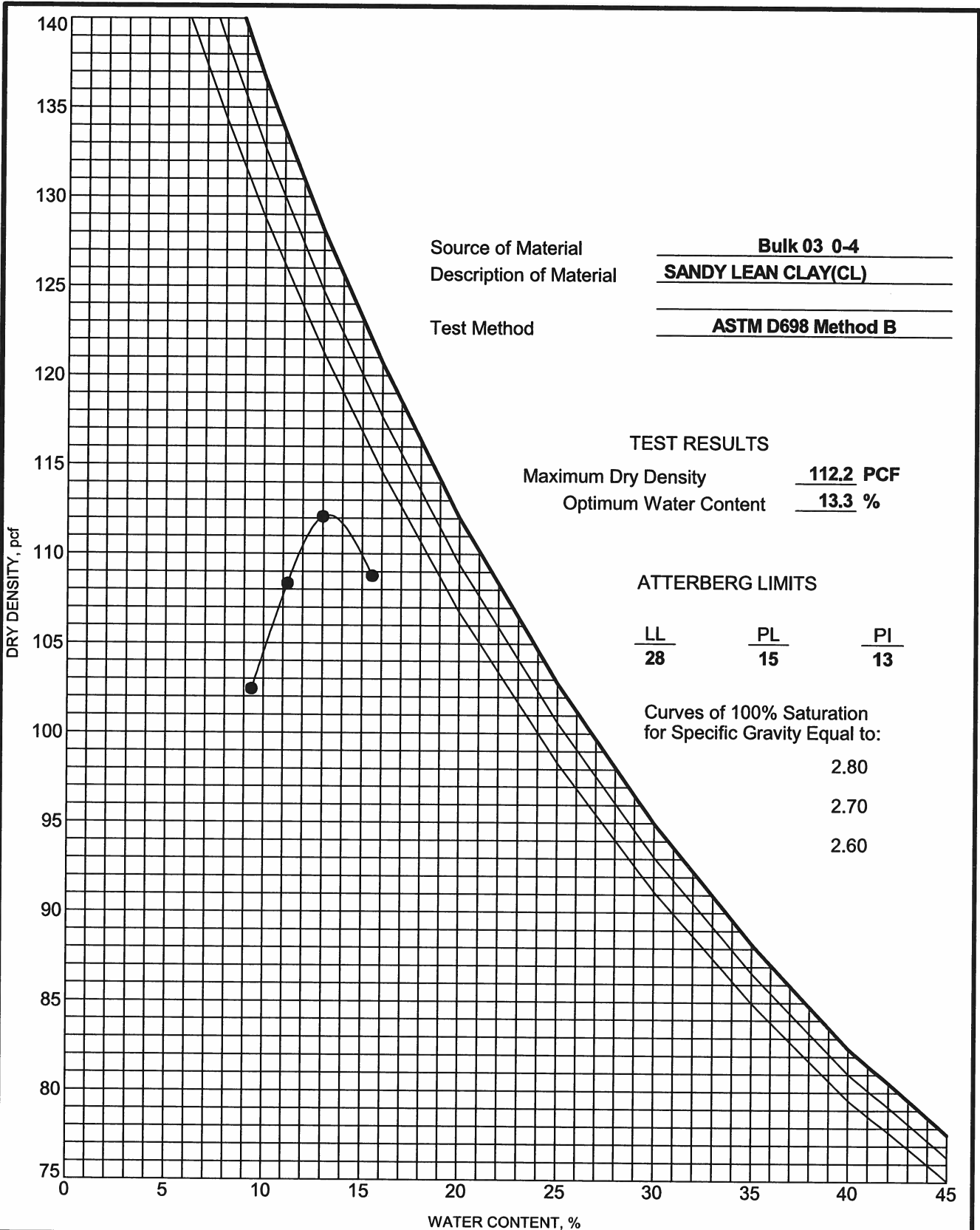
US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309

US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



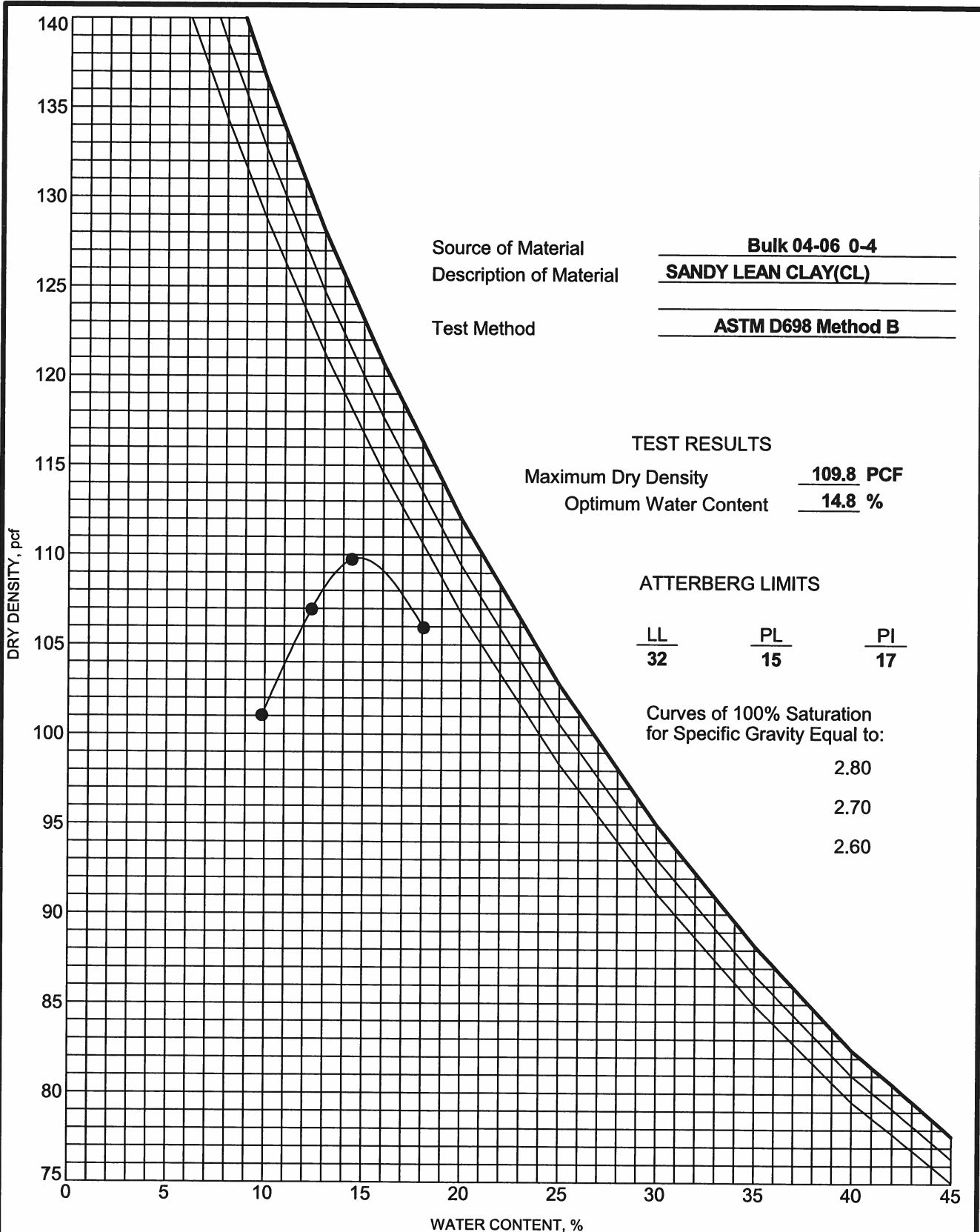
Source of Material Bulk 03 0-4  
 Description of Material SANDY LEAN CLAY (CL)  
 Test Method ASTM D698 Method B



**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309

US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17

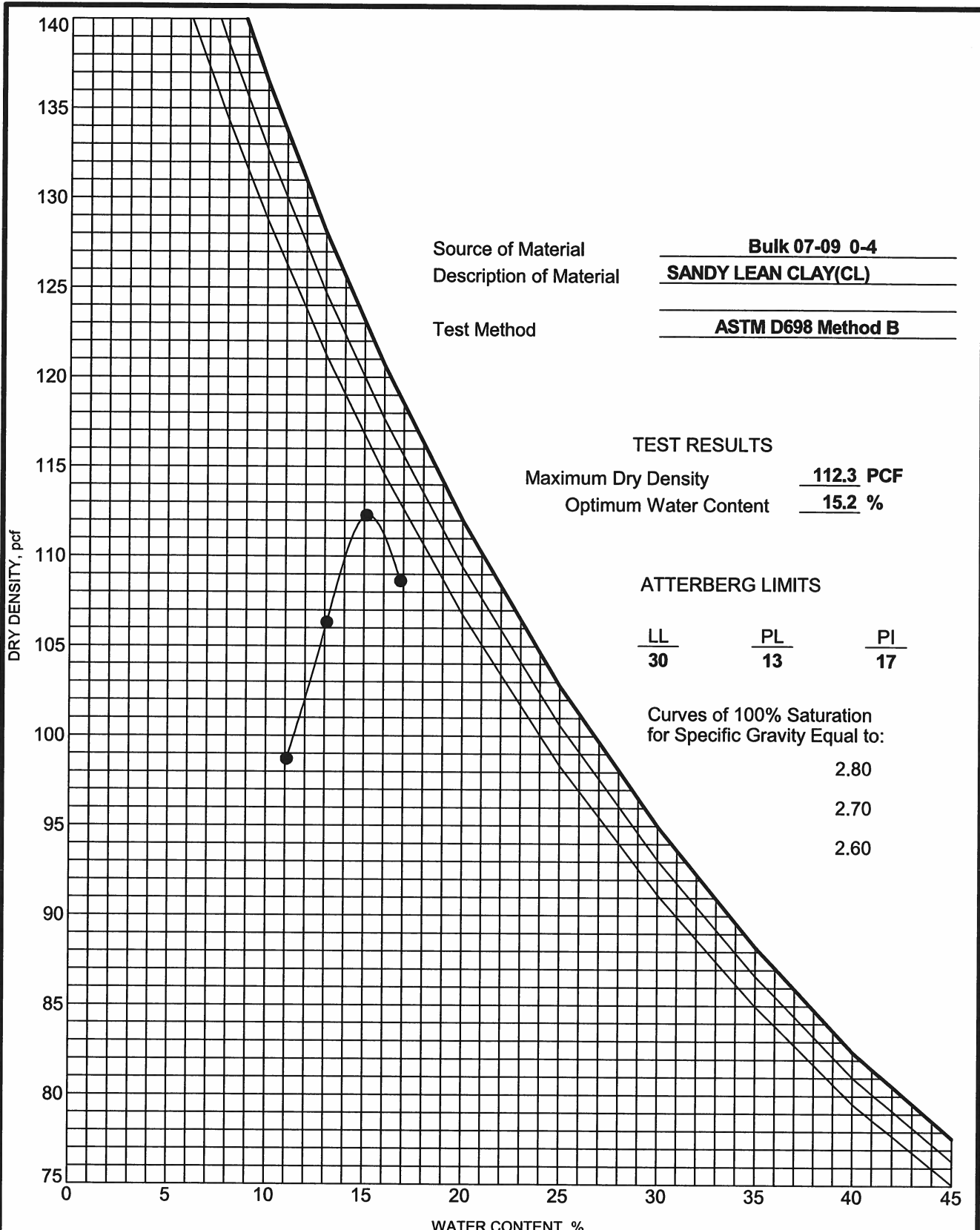


**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309



US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



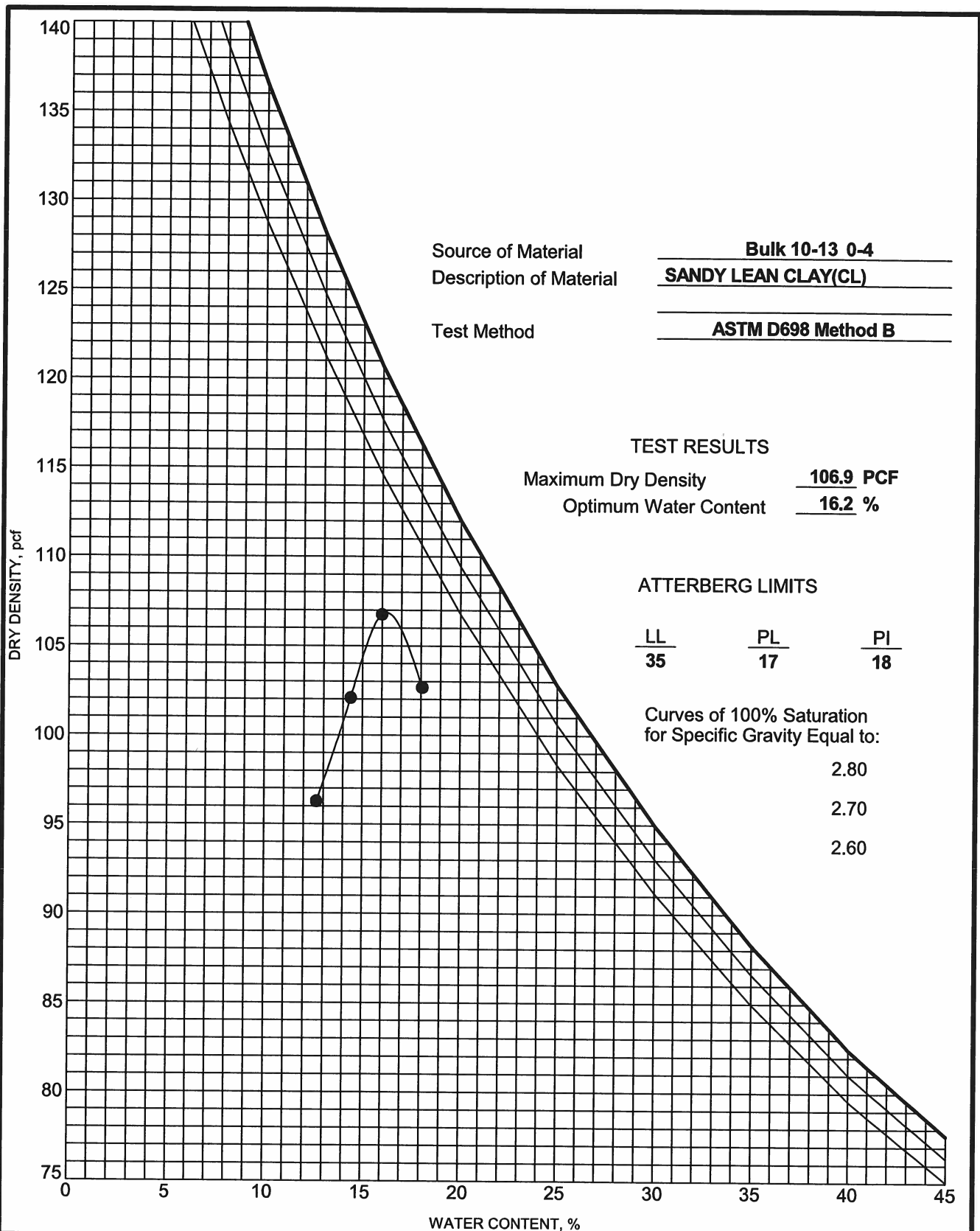
**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D

Location: Raton, New Mexico

Number: 1-70309

US COMPACTION 1-70309 RATON MUNICIPAL AIRPORT.GPJ GEO TEST.GDT 6/22/17



Source of Material Bulk 10-13 0-4  
 Description of Material SANDY LEAN CLAY (CL)  
 Test Method ASTM D698 Method B

**TEST RESULTS**  
 Maximum Dry Density 106.9 PCF  
 Optimum Water Content 16.2 %

**ATTERBERG LIMITS**

LL	PL	PI
35	17	18

Curves of 100% Saturation  
 for Specific Gravity Equal to:

- 2.80
- 2.70
- 2.60



**MOISTURE-DENSITY RELATIONSHIP**

Project: Raton Municipal Airport Taxiway A & D  
 Location: Raton, New Mexico  
 Number: 1-70309

# **SOLUBLE SULFATE TESTS**

**Hall Environmental Analysis Laboratory, Inc.**

**Analytical Report**

Lab Order: 1705596

Date Reported: 5/15/2017

**CLIENT:** Geo-Test, Inc  
**Project:** Raton Airport

**Lab Order:** 1705596

**Lab ID:** 1705596-001 **Collection Date:** 5/10/2017 8:00:00 AM  
**Client Sample ID:** B-1 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
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<b>EPA METHOD 300.0: ANIONS</b>							Analyst: MRA
Sulfate	ND	7.5		mg/Kg	5	5/12/2017 10:14:20 PM	31716

**Lab ID:** 1705596-002 **Collection Date:** 5/10/2017 8:00:00 AM  
**Client Sample ID:** B-2 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
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<b>EPA METHOD 300.0: ANIONS</b>							Analyst: MRA
Sulfate	51	7.5		mg/Kg	5	5/12/2017 10:39:09 PM	31716

**Lab ID:** 1705596-003 **Collection Date:** 5/10/2017 8:00:00 AM  
**Client Sample ID:** B-3 **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
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<b>EPA METHOD 300.0: ANIONS</b>							Analyst: MRA
Sulfate	ND	7.5		mg/Kg	5	5/12/2017 11:03:58 PM	31716

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	R RPD outside accepted recovery limits	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified