

MACTEC ENGINEERING AND CONSULTING, INC.
RALEIGH, NORTH CAROLINA

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS
Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 3/12/08

SAMPLE IDENTIFICATION: B-2170R SS-32

(A) Mass of oven-dried soil, grams:	76.13
(B) Mass of pycnometer filled with water at test temperature (T), grams:	656.68
(C) Mass of pycnometer, water and soil, grams:	704.23
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	22.5
(G) Specific Gravity at observed temperature: $A / [B - (C - A)]$	2.664
(F) <i>Correction factor:</i>	0.99945
(G x F) SPECIFIC GRAVITY @ 20°C:	2.662

MATERIAL TESTED:

☒ X
- # 4

☐
- # 10

PREPARATION METHOD:

☒ X
DRY

☐
WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100%

Clayey SAND (SC) - visual

EQUIPMENT USED

SCALES : 3.1.19

OVEN : 5.1.16

THERMOMETER : 5.1.01

PYCNOMETER : P-6

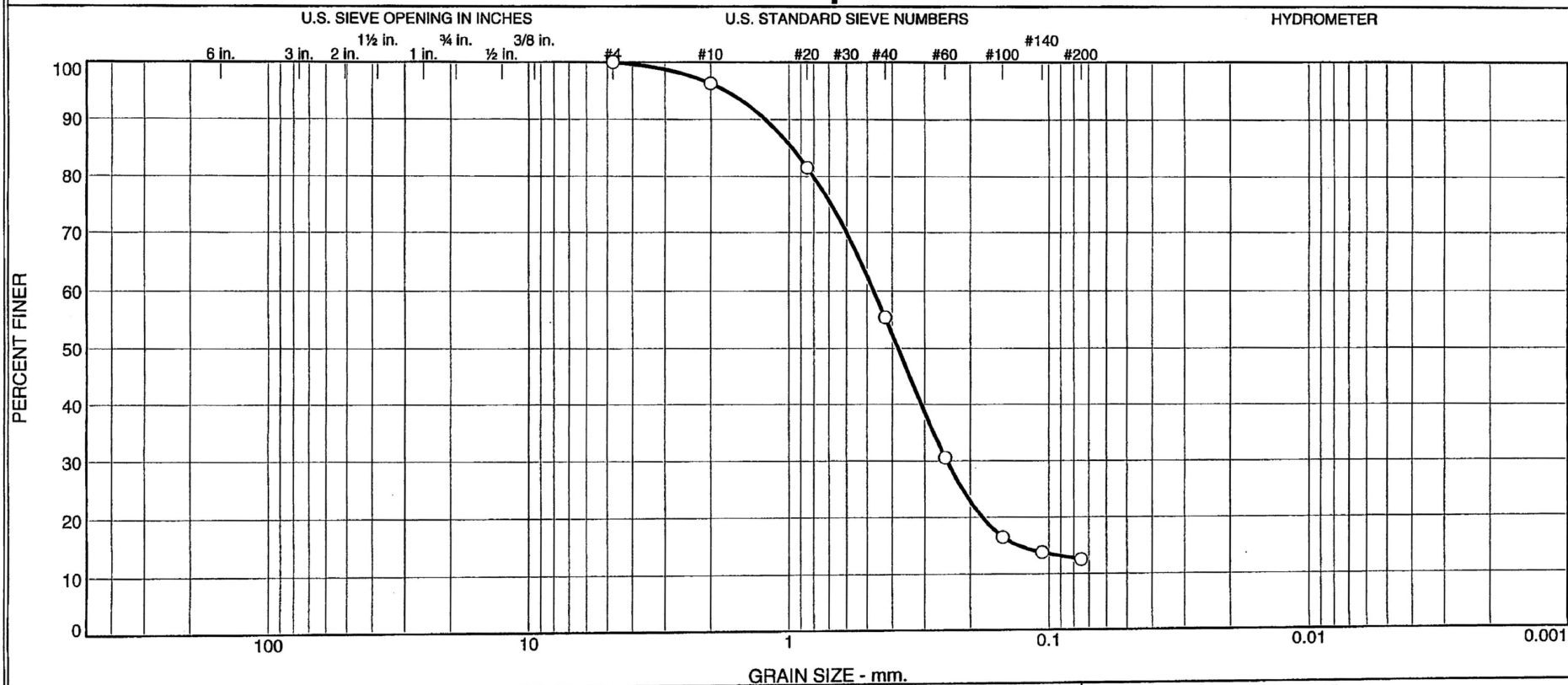
TESTED BY: CS

\\Test Reports\\Soils\\SPECIFIC GRAVITY(ref).xls

REVIEWED BY: Brian Johnson

DSC 3-13-08

Particle Size Distribution Report / ASTM D 6913-04e1



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	3.6	41.0	42.9	12.5	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring B-2170R	SS-33	193.5-195	1/5/08	SC	Light Gray Clayey SAND (Visual)	ND	ND	ND

Client Bechtel		MACTEC, Inc.	Raleigh, North Carolina	○ SIEVE ANALYSIS ONLY ND = Not determined
Project Exelon Texas COL (Victoria)				
Project No. 6468071777	Figure NA			

Tested By: CS

Checked By: LBJ

DSC 2-6-08

GRAIN SIZE DISTRIBUTION TEST DATA

2/6/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 193.5-195

Sample Number: SS-33

Material Description: Light Gray Clayey SAND (Visual)

Date: 1/5/08

Natural Moisture: ND

Liquid Limit: ND

Plastic Limit: ND

USCS Class.: SC

Testing Remarks: SIEVE ANALYSIS ONLY

ND = Not determined

Tested by: CS

Checked by: LBJ

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
238.98	0.00	0.00	#4	0.00	100.0
			#10	8.69	96.4
103.33	0.00	0.00	#20	15.88	81.6
			#40	43.89	55.4
			#60	70.56	30.6
			#100	85.65	16.5
			#140	88.53	13.8
			#200	89.89	12.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.6	41.0	42.9	87.5			12.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.1310	0.1803	0.2465	0.3794	0.4698	0.8053	0.9701	1.2296	1.7400

Fineness Modulus
1.88

MACTEC, Inc.

Tested By: CS **Checked By:** LBJ DSC 3-13-08

GRAIN SIZE DISTRIBUTION TEST DATA

3/12/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 208.5-210.0

Sample Number: SS-34

Material Description: Light Gray Fat CLAY with sand

Date: 1/6/08

Natural Moisture: 22.5

Liquid Limit: 53

Plastic Limit: 16

USCS Class.: CH

Testing Remarks: Specific Gravity = 2.724 (ASTM D 854-06)

Organic Content = 3.7% (ASTM D 2974-07)

Tested by: CS

Checked by: LBJ

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
229.05	0.00	0.00	#10	0.00	100.0
54.92	0.00	0.00	#20	0.04	99.9
			#40	0.15	99.7
			#60	0.81	98.5
			#100	3.42	93.8
			#140	7.75	85.9
			#200	12.66	76.9

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 54.92

Hygroscopic moisture correction:

Moist weight and tare = 27.42

Dry weight and tare = 27.34

Tare weight = 15.50

Hygroscopic moisture = 0.7%

Table of composite correction values:

Temp., deg. C: 12.8 27.3

Comp. corr.: -7.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.724

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	32.0	27.4	0.0131	33.0	10.9	0.0306	49.4
5.00	21.4	30.0	25.4	0.0131	31.0	11.2	0.0196	45.8
15.00	21.4	28.0	23.4	0.0131	29.0	11.5	0.0115	42.2
30.00	21.4	26.0	21.4	0.0131	27.0	11.9	0.0083	38.5
84.00	21.4	25.0	20.4	0.0131	26.0	12.0	0.0050	36.7
240.00	21.4	23.0	18.4	0.0131	24.0	12.4	0.0030	33.1
1440.00	21.2	21.0	16.3	0.0132	22.0	12.7	0.0012	29.4

MACTEC, Inc.

Fractional Components

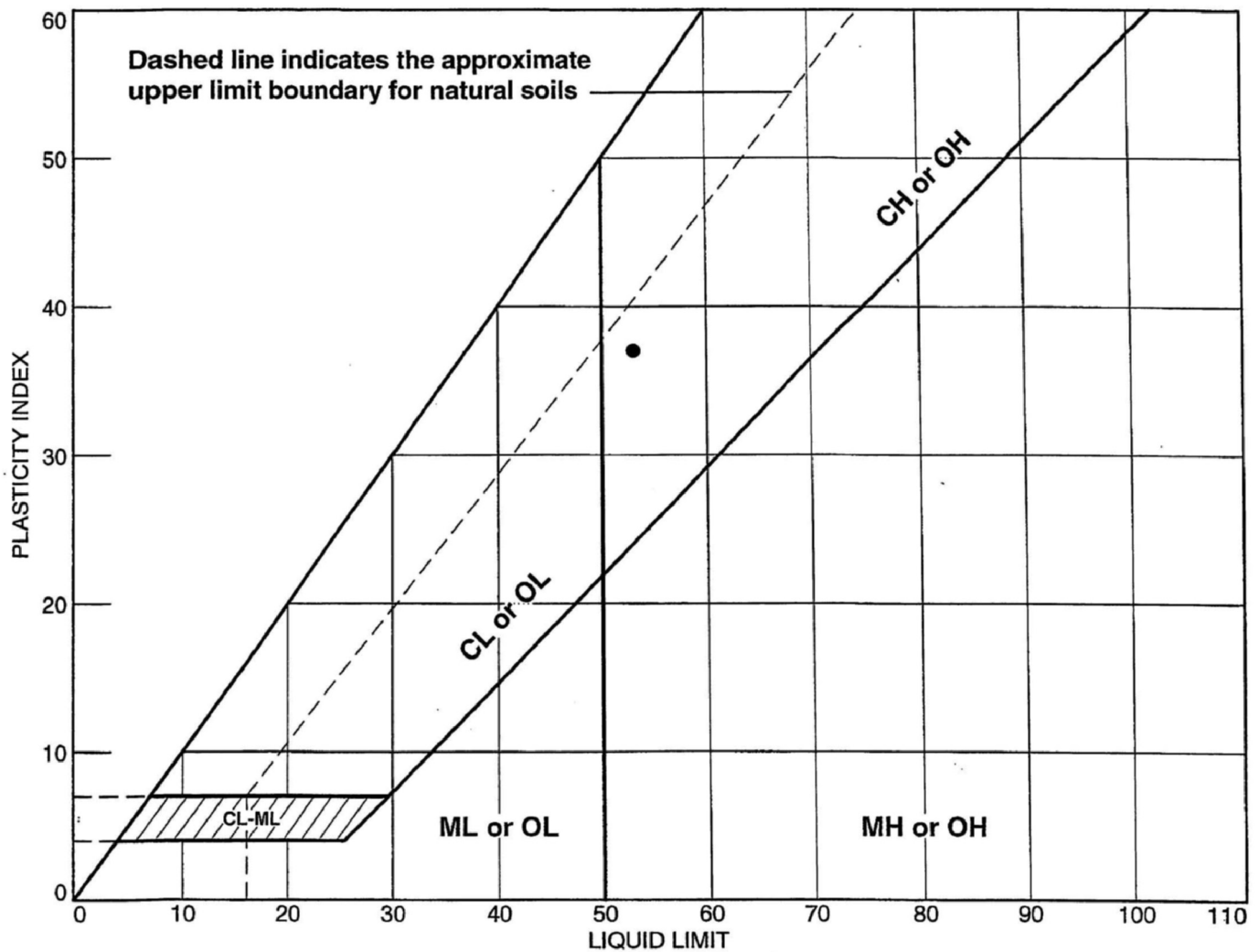
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	22.8	23.1	40.1	36.8	76.9

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0015	0.0316	0.0454	0.0837	0.1022	0.1254	0.1619

Fineness Modulus
0.07

MACTEC, Inc.

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring B-2170R	SS-34	208.5-210.0	22.5	16	53	37	CH

MACTEC, Inc.

Raleigh, North Carolina

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project No.: 6468071777

Figure NA

Tested By: CS

Checked By: LBJ KAW 1/26/08

LIQUID AND PLASTIC LIMIT TEST DATA

1/26/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 208.5-210.0

Sample Number: SS-34

Material Description: Light Gray Fat CLAY with sand

USCS: CH

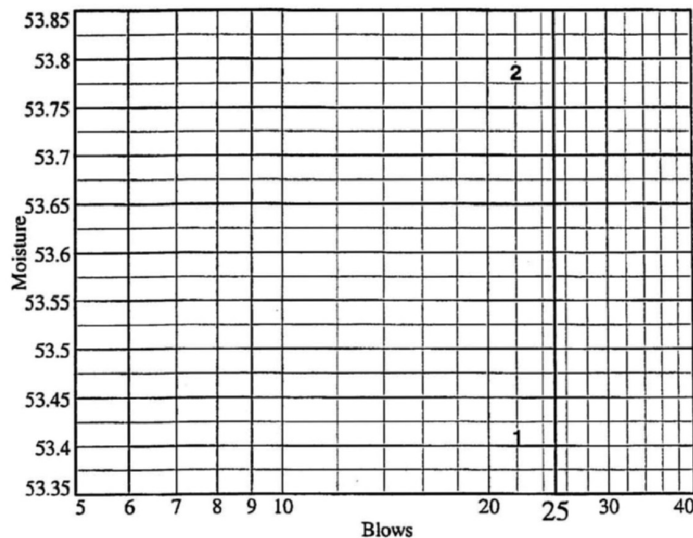
AASHTO: A-7-6(28)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.91	23.47				
Dry+Tare	21.62	20.70				
Tare	15.46	15.55				
# Blows	22	22				
Moisture	53.4	53.8				



Liquid Limit= 53
 Plastic Limit= 16
 Plasticity Index= 37
 Natural Moisture= 22.5
 Liquidity Index= 0.2

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	23.28	23.03		
Dry+Tare	22.21	22.00		
Tare	15.48	15.59		
Moisture	15.9	16.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
166.20	136.90	6.70	22.5

MACTEC, Inc.

MACTEC ENGINEERING AND CONSULTING, INC.
RALEIGH, NORTH CAROLINA

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS
Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 3/12/08

SAMPLE IDENTIFICATION: B-2170R SS-34

(A) Mass of oven-dried soil, grams:	50.07
(B) Mass of pycnometer filled with water at test temperature (T), grams:	655.54
(C) Mass of pycnometer, water and soil, grams:	687.24
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.1
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.726
(F) Correction factor:	0.99931
(G x F) SPECIFIC GRAVITY @ 20°C:	2.724

MATERIAL TESTED:

☒ X
- # 4

☐
- # 10

PREPARATION METHOD:

☒ X
DRY

☐
WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100%

Fat CLAY with sand (CH)

EQUIPMENT USED

SCALES : 3.1.19

OVEN : 5.1.16

THERMOMETER : 5.1.01

PYCNO METER : P-3

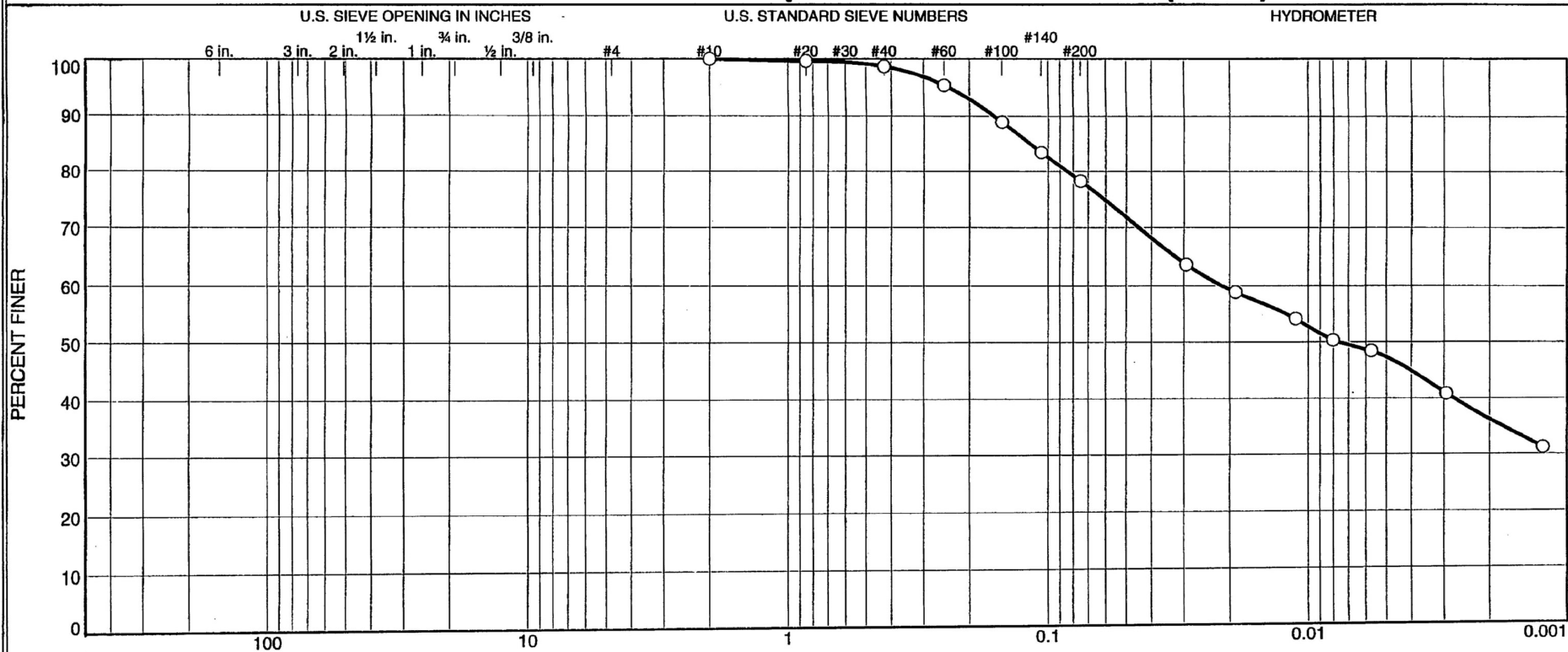
TESTED BY: CS

\\Test Reports\\Soils\\SPECIFIC GRAVITY(ref).xls

REVIEWED BY: Brian Johnson

DSC 3-13-08

Particle Size Distribution Report / ASTM D 422-63(2002)e1



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.3	20.4	30.9	47.4

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring B-2170R	SS-35	228.5-230.0	1/6/08	CH	Light Gray Fat CLAY with sand	20.5	53	21

Client Bechtel	MACTEC, Inc.	Raleigh, North Carolina	○ Specific Gravity is assumed
Project Exelon Texas COL (Victoria)			
Project No. 6468071777	Figure NA		

Tested By: CS

Checked By: LBJ KAW 1/26/08

GRAIN SIZE DISTRIBUTION TEST DATA

1/26/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 228.5-230.0

Sample Number: SS-35

Material Description: Light Gray Fat CLAY with sand

Date: 1/6/08

Natural Moisture: 20.5

Liquid Limit: 53

Plastic Limit: 21

USCS Class.: CH

Testing Remarks: Specific Gravity is assumed

Tested by: CS

Checked by: LBJ

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
256.43	0.00	0.00	#10	0.00	100.0
52.11	0.00	0.00	#20	0.20	99.6
			#40	0.68	98.7
			#60	2.41	95.4
			#100	5.75	89.0
			#140	8.62	83.5
			#200	11.32	78.3

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 52.11

Hygroscopic moisture correction:

Moist weight and tare = 28.56

Dry weight and tare = 28.49

Tare weight = 15.45

Hygroscopic moisture = 0.5%

Table of composite correction values:

Temp., deg. C: 12.8 27.3

Comp. corr.: -7.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	38.0	33.4	0.0132	39.0	9.9	0.0294	63.7
5.00	21.4	35.5	30.9	0.0132	36.5	10.3	0.0190	58.9
15.00	21.5	33.0	28.4	0.0132	34.0	10.7	0.0112	54.2
30.00	21.5	31.0	26.4	0.0132	32.0	11.0	0.0080	50.4
60.00	21.5	30.0	25.4	0.0132	31.0	11.2	0.0057	48.5
240.00	21.5	26.0	21.4	0.0132	27.0	11.9	0.0029	40.8
1440.00	21.4	21.0	16.4	0.0132	22.0	12.7	0.0012	31.2

MACTEC, Inc.

Fractional Components

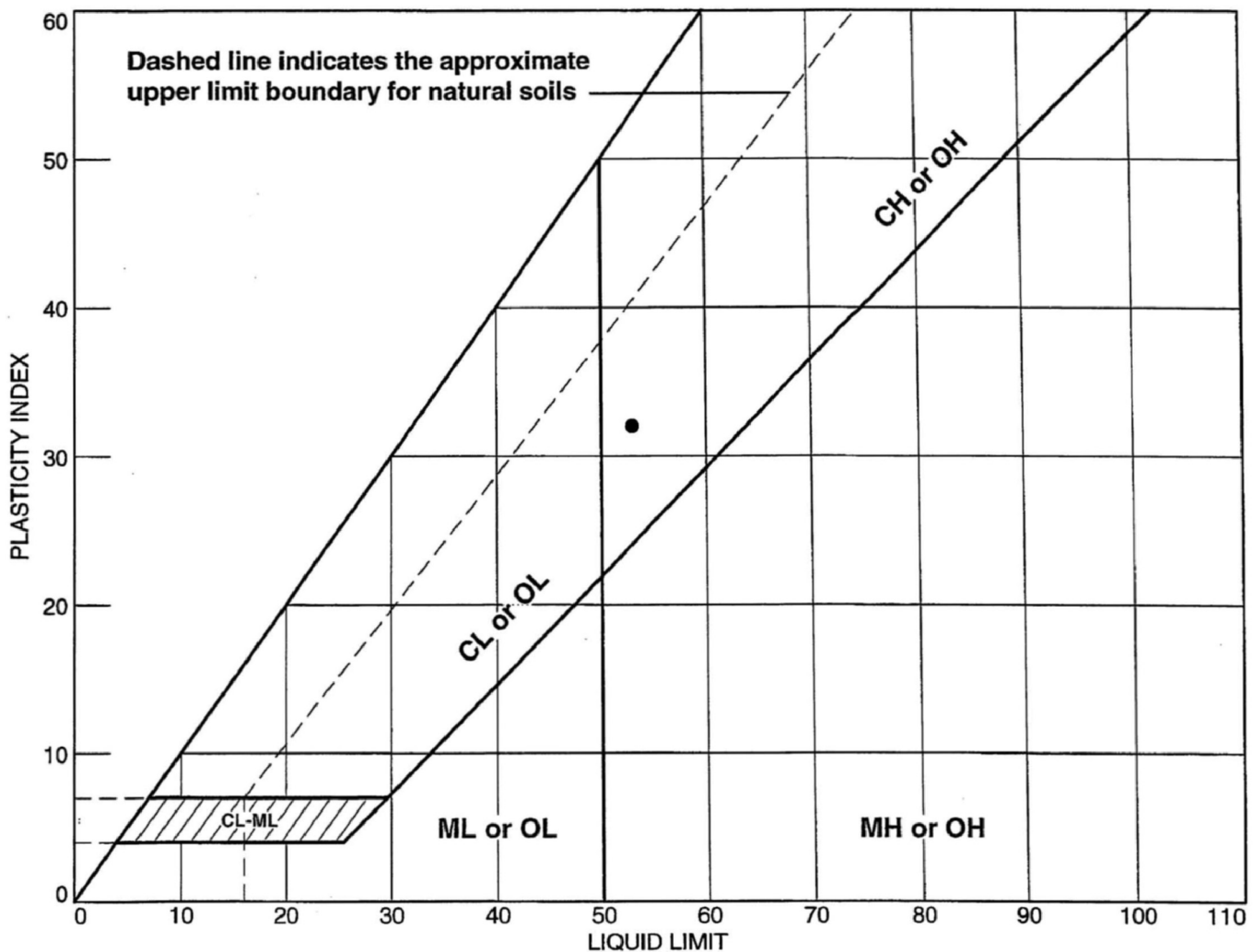
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.3	20.4	21.7	30.9	47.4	78.3

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
				0.0076	0.0213	0.0841	0.1169	0.1608	0.2405

Fineness Modulus
0.15

MACTEC, Inc.

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring B-2170R	SS-35	228.5-230.0	20.5	21	53	32	CH

MACTEC, Inc.

Raleigh, North Carolina

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project No.: 6468071777

Figure NA

Tested By: CS

Checked By: LBJ KAW 1/26/08

LIQUID AND PLASTIC LIMIT TEST DATA

1/26/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 228.5-230.0

Sample Number: SS-35

Material Description: Light Gray Fat CLAY with sand

USCS: CH

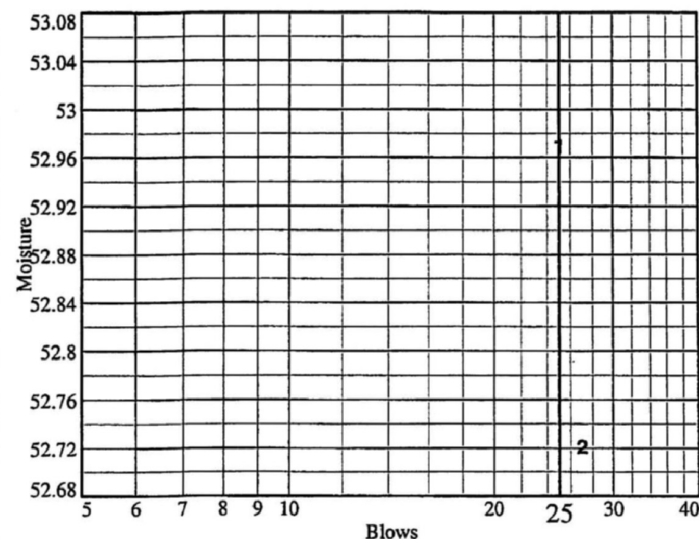
AASHTO: A-7-6(25)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.15	25.46				
Dry+Tare	21.85	22.07				
Tare	15.62	15.64				
# Blows	25	27				
Moisture	53.0	52.7				



Liquid Limit= 53
 Plastic Limit= 21
 Plasticity Index= 32
 Natural Moisture= 20.5
 Liquidity Index= 0.0

Plastic Limit Data

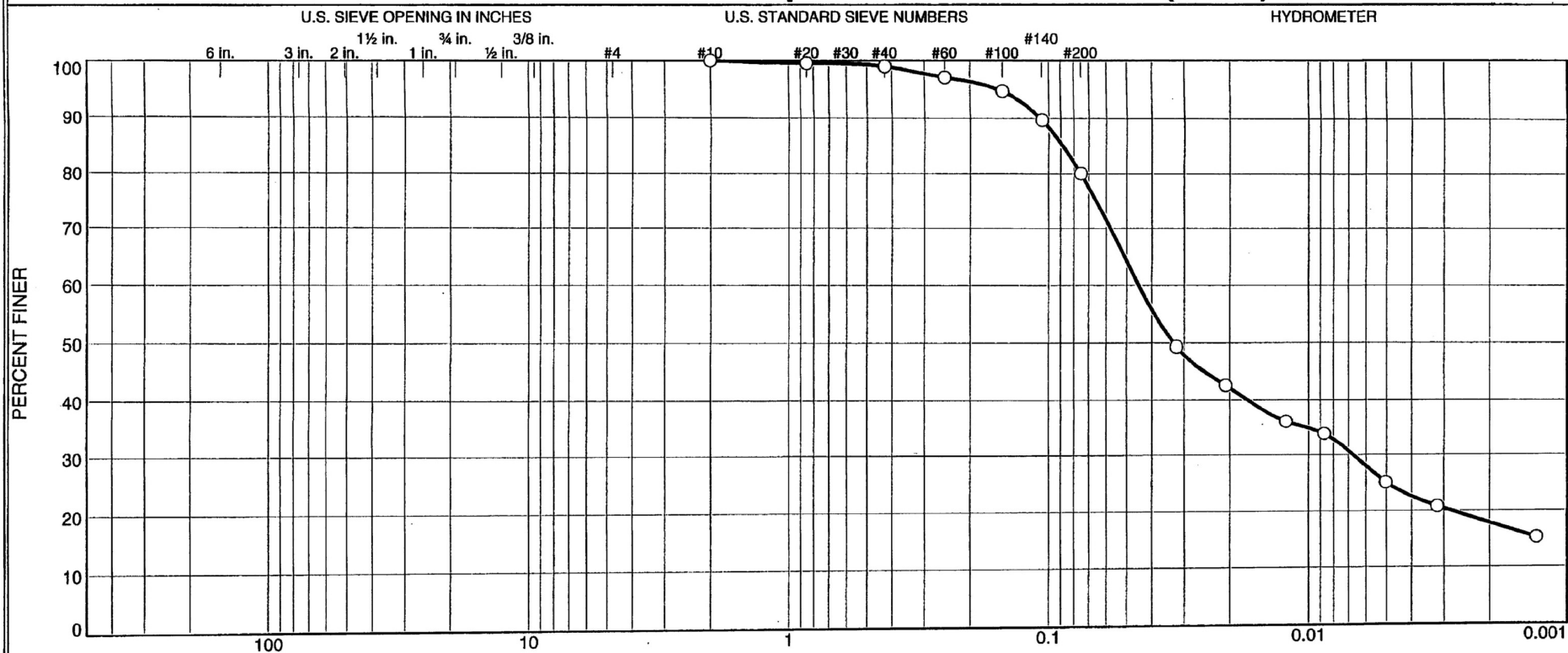
Run No.	1	2	3	4
Wet+Tare	22.45	22.98		
Dry+Tare	21.28	21.67		
Tare	15.63	15.48		
Moisture	20.7	21.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
124.50	104.50	6.80	20.5

MACTEC, Inc.

Particle Size Distribution Report / ASTM D 422-63(2002)e1



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
0.0	0.0	0.0	0.0	1.0	19.0	55.0		25.0		
Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description			NM %	LL	PL
Boring B-2170R	SS-36	248.5-250.0	1/6/08	CL	Light Greenish Gray Lean CLAY with sand			14.5	37	20

Client Bechtel

Project Exelon Texas COL (Victoria)

Project No. 6468071777

Figure NA

MACTEC, Inc.

Raleigh, North Carolina

Specific Gravity = 2.687 (ASTM D 854-06)
Organic Content = 3.5% (ASTM D 2974-07)

Tested By: CS

Checked By: LBJ

DSC 3-13-08

GRAIN SIZE DISTRIBUTION TEST DATA

3/12/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 248.5-250.0

Sample Number: SS-36

Material Description: Light Greenish Gray Lean CLAY with sand

Date: 1/6/08

Natural Moisture: 14.5

Liquid Limit: 37

Plastic Limit: 20

USCS Class.: CL

Testing Remarks: Specific Gravity = 2.687 (ASTM D 854-06)

Organic Content = 3.5% (ASTM D 2974-07)

Tested by: CS

Checked by: LBJ

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
236.05	0.00	0.00	#10	0.00	100.0
46.02	0.00	0.00	#20	0.22	99.5
			#40	0.47	99.0
			#60	1.35	97.1
			#100	2.43	94.7
			#140	4.74	89.7
			#200	9.20	80.0

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 46.02

Hygroscopic moisture correction:

Moist weight and tare = 27.81

Dry weight and tare = 27.53

Tare weight = 15.42

Hygroscopic moisture = 2.3%

Table of composite correction values:

Temp., deg. C: 12.8 27.3

Comp. corr.: -7.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.687

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	27.0	22.4	0.0133	28.0	11.7	0.0321	49.3
5.00	21.3	24.0	19.3	0.0133	25.0	12.2	0.0207	42.7
15.00	21.4	21.0	16.4	0.0133	22.0	12.7	0.0122	36.1
30.00	21.4	20.0	15.4	0.0133	21.0	12.9	0.0087	33.9
94.00	21.4	16.0	11.4	0.0133	17.0	13.5	0.0050	25.1
240.00	21.6	14.0	9.4	0.0132	15.0	13.8	0.0032	20.8
1440.00	21.5	11.5	6.9	0.0132	12.5	14.2	0.0013	15.2

MACTEC, Inc.

Fractional Components

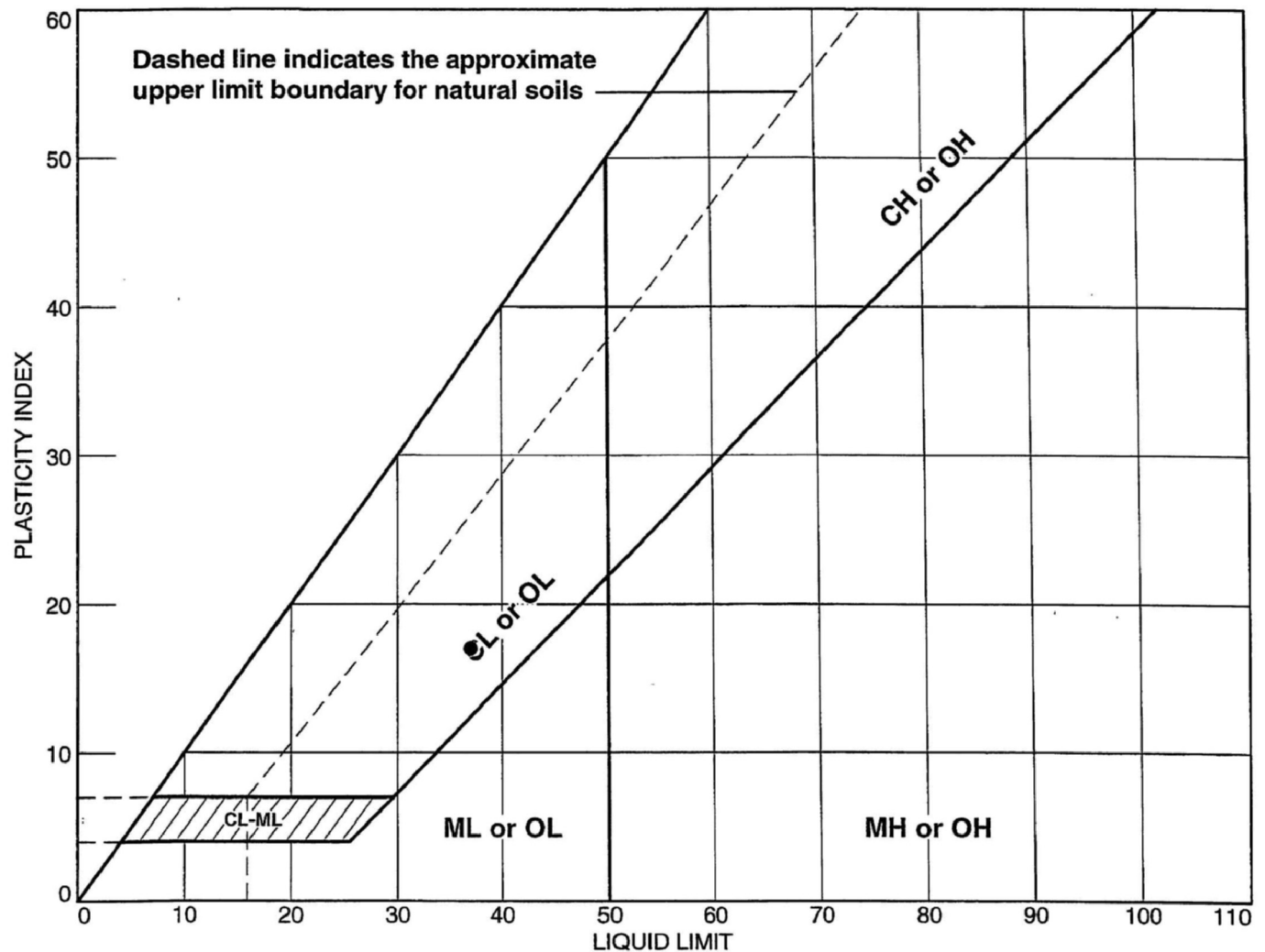
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.0	19.0	20.0	55.0	25.0	80.0

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0028	0.0067	0.0330	0.0449	0.0750	0.0878	0.1075	0.1551

Fineness Modulus
0.08

MACTEC, Inc.

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring B-2170R	SS-36	248.5-250.0	14.5	20	37	17	CL

MACTEC, Inc.

Raleigh, North Carolina

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project No.: 6468071777

Figure **NA**

Tested By: CS

Checked By: LBJ

KAW 1/26/08

LIQUID AND PLASTIC LIMIT TEST DATA

1/26/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Project Number: 6468071777

Location: Boring B-2170R

Depth: 248.5-250.0

Sample Number: SS-36

Material Description: Light Greenish Gray Lean CLAY with sand

USCS: CL

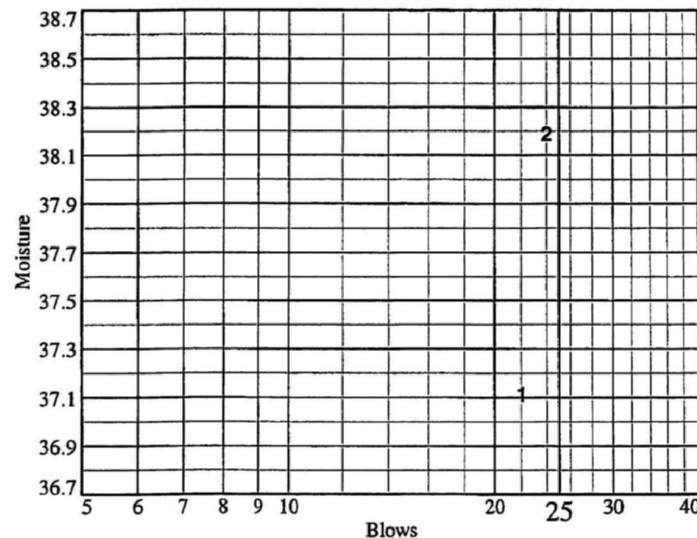
AASHTO: A-6(13)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.85	23.73				
Dry+Tare	21.56	21.45				
Tare	15.39	15.48				
# Blows	22	24				
Moisture	37.1	38.2				



Liquid Limit= 37
 Plastic Limit= 20
 Plasticity Index= 17
 Natural Moisture= 14.5
 Liquidity Index= -0.3

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	23.20	24.12		
Dry+Tare	21.92	22.70		
Tare	15.52	15.45		
Moisture	20.0	19.6		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
220.70	194.51	13.80	14.5

MACTEC, Inc.

MACTEC ENGINEERING AND CONSULTING, INC.
RALEIGH, NORTH CAROLINA

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS
Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 3/12/08

SAMPLE IDENTIFICATION: B-2170R SS-36

(A) Mass of oven-dried soil, grams:	49.98
(B) Mass of pycnometer filled with water at test temperature (T), grams:	656.74
(C) Mass of pycnometer, water and soil, grams:	688.13
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	22.0
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.689
(F) Correction factor:	0.99957
(G x F) SPECIFIC GRAVITY @ 20°C:	2.687

MATERIAL TESTED:

☒

- # 4

☐

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100%

Lean CLAY with sand (CL)

EQUIPMENT USED

SCALES : 3.1.19

OVEN : 5.1.16

THERMOMETER : 5.1.01

PYCNOMETER : P-6

TESTED BY: CS

\\Test Reports\\Soils\\SPECIFIC GRAVITY(ref).xls

REVIEWED BY: Brian Johnson

DSC 3-13-08