

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	17.0	12.3	0.0128	17.0	13.5	0.0333	21.4
5.00	23.3	16.0	11.3	0.0128	16.0	13.7	0.0212	19.6
15.00	23.3	15.0	10.3	0.0128	15.0	13.8	0.0123	17.9
30.00	23.3	14.5	9.8	0.0128	14.5	13.9	0.0087	17.0
60.00	23.3	14.0	9.3	0.0128	14.0	14.0	0.0062	16.2
257.00	22.8	13.5	8.7	0.0129	13.5	14.1	0.0030	15.1
4138.00	21.7	13.0	7.9	0.0131	13.0	14.2	0.0008	13.7

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES =

% GRAVEL =

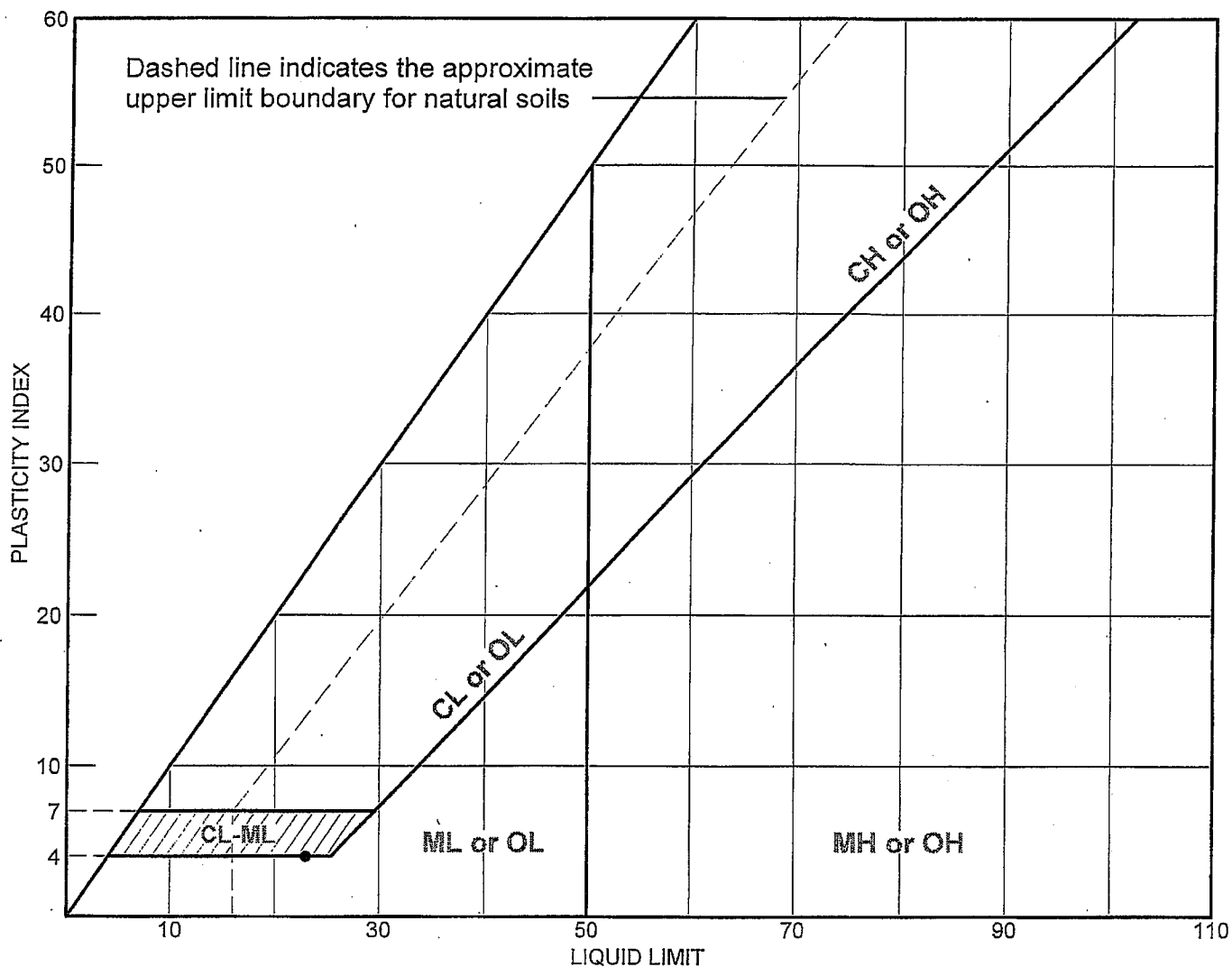
% SAND = 62.5 (% coarse = 0.0 % medium = 0.1 % fine = 62.4)

% SILT = 21.7 % CLAY = 15.8 (% CLAY COLLOIDS = 14.0)

D₈₅= 0.17 D₆₀= 0.12 D₅₀= 0.10

D₃₀= 0.06 D₁₅= 0.00

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	B-2359UD	UD-11	77-78.7 Ft	19.4	19	23	4	SC-SM

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project No.: 6468-07-1777

Lab No. 8366

LIQUID AND PLASTIC LIMIT TEST DATA

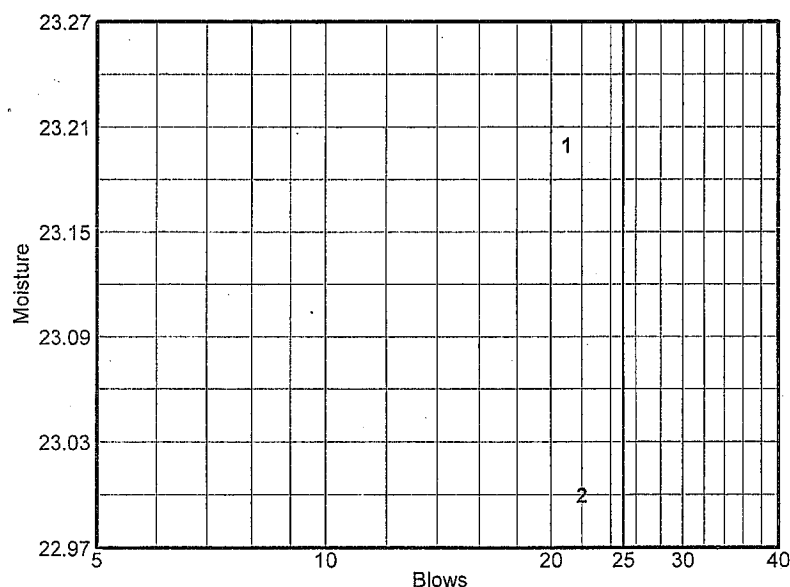
Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
 Sample No.: UD-11
 Elev. or Depth: 77-78.7 Ft Sample Length(in./cm.): ID#8366
 Location: B-2359UD
 Description: Light Gray Silty, Clayey SAND
 Water Content: 19.4 USCS: SC-SM AASHTO:

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	36.14	37.91				
Dry+Tare	33.18	34.80				
Tare	20.42	21.28				
# Blows	21	22				
Moisture	23.2	23.0				



Liquid Limit= 23
 Plastic Limit= 19
 Plasticity Index= 4

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	28.06	29.96		
Dry+Tare	26.80	28.40		
Tare	20.06	20.09		
Moisture	18.7	18.8		

MACTEC ENGINEERING AND CONSULTING, INC.

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-2359UD, UD-11 @ 77-78.7 Ft.

(A) Mass of oven-dried soil, grams:	37.64
(B) Mass of pycnometer filled with water at test temperature (T), grams:	366.00
(C) Mass of pycnometer, water and soil, grams:	389.83
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.3
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.726
(F) Correction factor:	0.99926
(G x F) SPECIFIC GRAVITY @ 20°C:	2.724

MATERIAL TESTED:

☐

- # 4

☒

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Silty Clayey SAND (SC-SM)

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNO METER : 2193

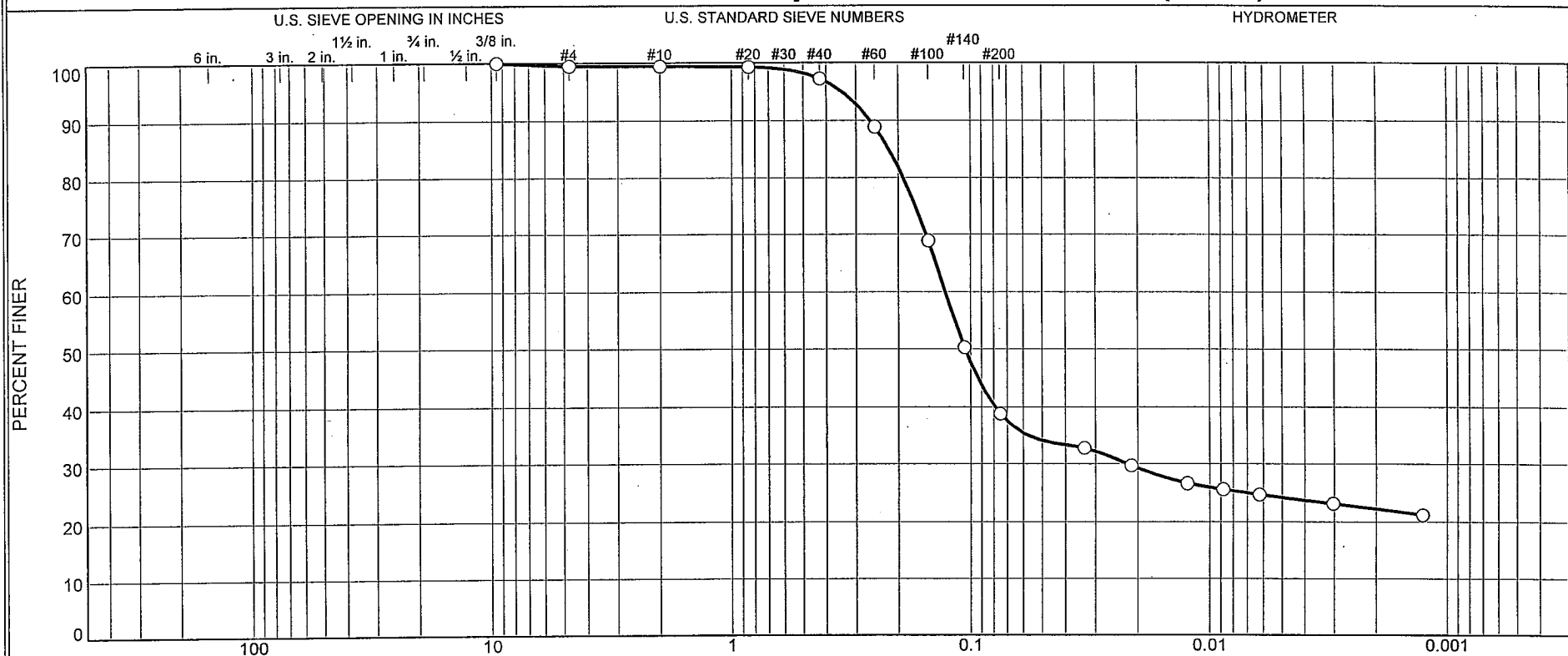
TESTED BY: EH

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

REVIEWED BY: Harry Johnson

KAW 4.15.08

Particle Size Distribution Report / ASTM D422-63(2002)e1



GRAIN SIZE DISTRIBUTION TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reserv^{oir})

Project Number: 6468071777

Location: Boring B-2359UD

Depth: 80.0-81.7

Sample Number: UD-12

Material Description: Pale Brown Clayey SAND

Date: 1/29/08

Natural Moisture: 18.2

Liquid Limit: 26

Plastic Limit: 14

USCS Class.: SC

Testing Remarks: Specific Gravity = 2.661 (ASTM D 854-06)

NM obtained from consolidation test specimen

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
208.28	0.00	0.00	3/8"	0.00	100.0
			#4	1.13	99.5
			#10	1.21	99.4
49.60	0.00	0.00	#20	0.08	99.3
			#40	1.09	97.2
			#60	5.23	88.9
			#100	15.23	68.9
			#140	24.51	50.3
			#200	30.25	38.8

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 99.4

Weight of hydrometer sample = 49.60

Hygroscopic moisture correction:

Moist weight and tare = 28.07

Dry weight and tare = 27.79

Tare weight = 15.42

Hygroscopic moisture = 2.3%

Table of composite correction values:

Temp., deg. C: 11.3 29.5

Comp. corr.: -8.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.661

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	22.3	21.0	16.0	0.0132	22.0	12.7	0.0333	32.8
5.00	22.3	19.5	14.5	0.0132	20.5	12.9	0.0213	29.7
15.00	22.3	18.0	13.0	0.0132	19.0	13.2	0.0124	26.6
30.00	22.3	17.5	12.5	0.0132	18.5	13.3	0.0088	25.6
60.00	22.5	17.0	12.1	0.0132	18.0	13.3	0.0062	24.7
250.00	23.4	16.0	11.3	0.0130	17.0	13.5	0.0030	23.2
1440.00	23.6	15.0	10.4	0.0130	16.0	13.7	0.0013	21.2

MACTEC, Inc.

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	0.1	2.2	58.4	60.7	14.6	24.2	38.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0222	0.1053	0.1276	0.1908	0.2189	0.2608	0.3420

Fineness Modulus
0.41

MACTEC, Inc.

Dashed line indicates the approximate upper limit boundary for natural soils

CH or OH

CL or OL

ML or OL

MH or OH

CL-ML

PLASTICITY INDEX

LIQUID LIMIT

DCN# EXE812

LIQUID AND PLASTIC LIMIT TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2359UD

Depth: 80.0-81.7

Sample Number: UD-12

Material Description: Pale Brown Clayey SAND

USCS: SC

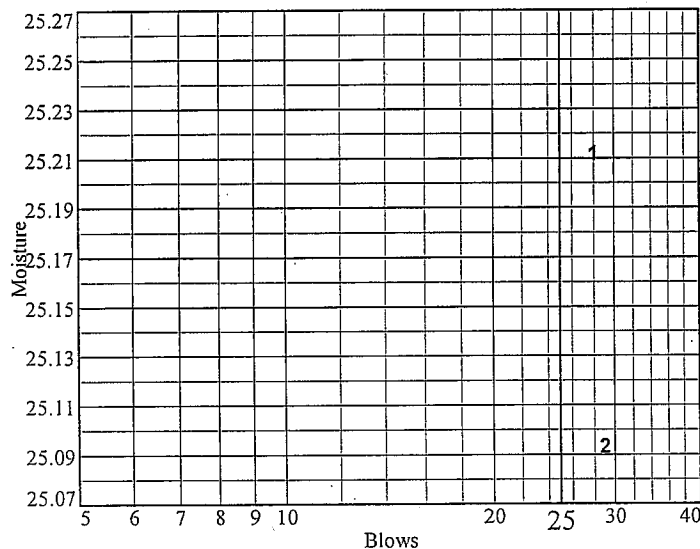
AASHTO: A-6(1)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.74	25.53				
Dry+Tare	23.66	23.52				
Tare	15.41	15.51				
# Blows	28	29				
Moisture	25.2	25.1				



Liquid Limit= 26
 Plastic Limit= 14
 Plasticity Index= 12
 Natural Moisture= 18.2
 Liquidity Index= 0.3

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.77	17.14			
Dry+Tare	21.90	16.38			
Tare	15.63	11.08			
Moisture	13.9	14.3			

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: 4/25/08

SAMPLE IDENTIFICATION: B-2359UD UD-12

(A) Mass of oven-dried soil, grams:	75.02
(B) Mass of pycnometer filled with water at test temperature (T), grams:	655.75
(C) Mass of pycnometer, water and soil, grams:	702.59
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	21.3
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.662
(F)	Correction factor: 0.99972
(G x F)	SPECIFIC GRAVITY @ 20°C: 2.661

MATERIAL TESTED:

☒

- # 4

☐

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Clayey SAND (SC)

EQUIPMENT USED

SCALES : 3.1.99

OVEN : 5.1.16

THERMOMETER : 5.1.01

PYCNO METER : P-3

TESTED BY: CS

REVIEWED BY: Brian Johnson

KAW 5/8/08

Client Bechtel		MACTEC ENGINEERING AND CONSULTING, INC.	☐ Tested by: EH Reviewed by: HJ HS
Project Exelon Texas COL (Victoria)			Sieve Analysis Only NM value from average of strength tests performed. Specific Gravity = 2.74 (ASTM D 854-06) ND = Not Determined
Project No. 6468-07-1777	Lab No. 8367		

KAW 4.15-08

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
Sample No.: UD-14
Elev. or Depth: 88-90.5 Ft Sample Length(in./cm.): ID#8367
Location: B-2359UD
Description: Pale Brown Sandy SILT (Visual)
Date: 1/30/08 PL: ND LL: ND PI: ND
USCS Classification: ML AASHTO Classification:
Testing Remarks: Tested by: EH Reviewed by: HJ

Sieve Analysis Only
NM value from average of strength tests performed.
Specific Gravity = 2.74 (ASTM D 854-06)
ND = Not Determined

Mechanical Analysis Data

	Initial	
Dry sample and tare=	209.52	
Tare =	86.95	
Dry sample weight =	122.57	
Tare for cumulative weight retained=	.00	
Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.34	99.7
# 20	0.59	99.5
# 40	2.00	98.4
# 60	22.09	82.0
# 100	43.63	64.4
# 140	51.78	57.8
# 200	55.78	54.5

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = % GRAVEL =
% SAND = 45.5 (% coarse = 0.3 % medium = 1.3 % fine = 43.9)
% FINES = 54.5

D₈₅= 0.27 D₆₀= 0.12

MACTEC ENGINEERING AND CONSULTING, INC.

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: 4/8/08

SAMPLE IDENTIFICATION: B-2359UD, UD-14 @ 88-90.5 Ft.

(A) Mass of oven-dried soil, grams:	40.91
(B) Mass of pycnometer filled with water at test temperature (T), grams:	346.75
(C) Mass of pycnometer, water and soil, grams:	372.73
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.3
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.740
(F)	Correction factor: 0.99926
(G x F)	SPECIFIC GRAVITY @ 20°C: 2.738

MATERIAL TESTED:

☐

- # 4

☒

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Sandy SILT (ML) - Visual

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNO METER : 2197

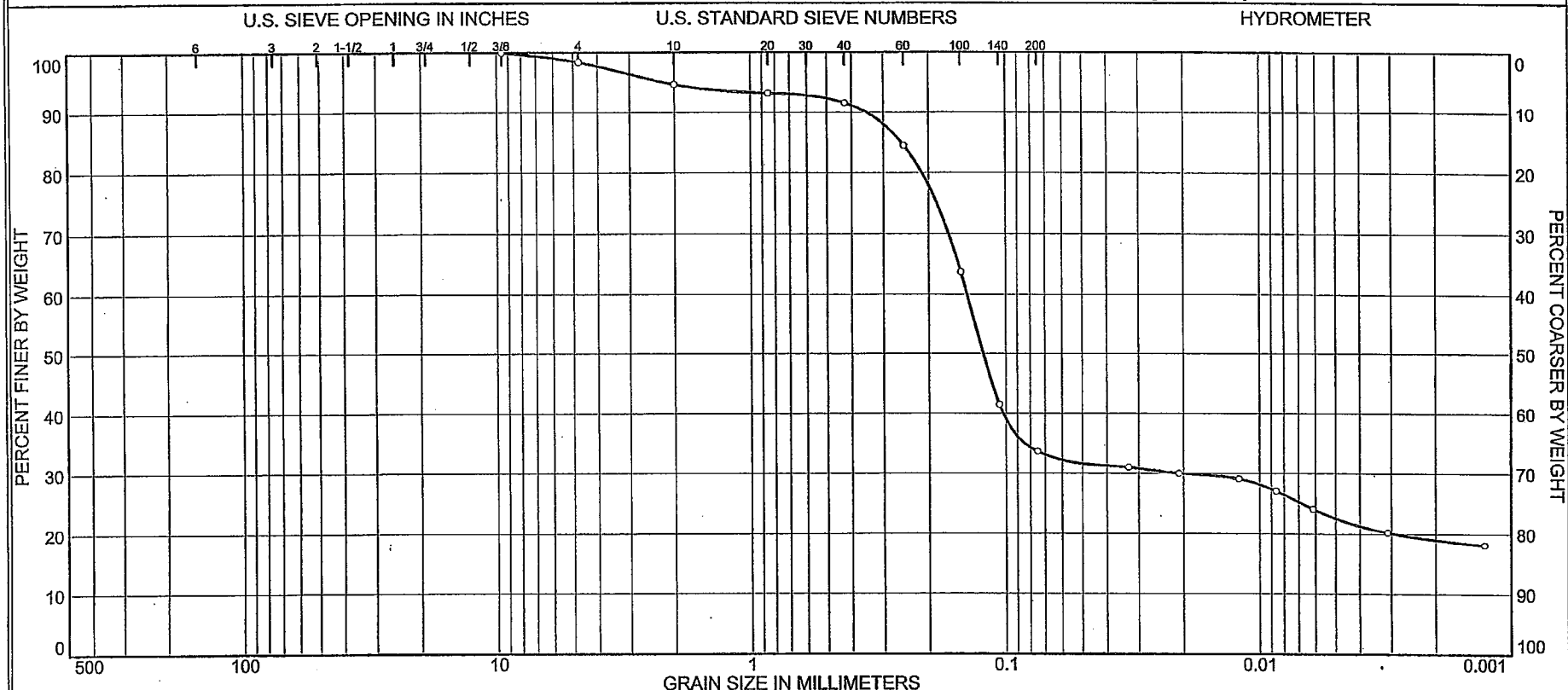
TESTED BY: EH

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

REVIEWED BY: Harry Johnson

KAW4.15.08

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



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	1.6	3.7	3.1	58.0	11.0	22.6

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
B-2359UD	UD-17	110-111.7 Ft	1/30/08	SM	Pale Brown, Mottled Yellowish Brown Silty SAND	17.4	21	18

Client Bechtel

Project Exelon Texas COL (Victoria)

Project No. 6468-07-1777

Lab No. 8368

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: HJ

NM value from first strength test performed.
Specific Gravity = 2.71 (ASTM D 854-06)

KAW 4.15.08

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
Sample No.: UD-17
Elev. or Depth: 110-111.7 Ft Sample Length(in./cm.): ID#8368
Location: B-2359UD
Description: Pale Brown, Mottled Yellowish Brown Silty SAND
Date: 1/30/08 PL: 18 LL: 21 PI: 3
USCS Classification: SM AASHTO Classification:
Testing Remarks: Tested by: EH Reviewed by: HJ

NM value from first strength test performed.
Specific Gravity = 2.71 (ASTM D 854-06)

Mechanical Analysis Data

	Initial	
Dry sample and tare=	161.23	
Tare =	110.92	
Dry sample weight =	50.31	
Tare for cumulative weight retained=	.00	
Sieve	Cumul. Wt. retained	Percent finer
.375 inch	0.00	100.0
# 4	0.78	98.4
# 10	2.69	94.7
# 20	3.40	93.2
# 40	4.24	91.6
# 60	7.80	84.5
# 100	18.25	63.7
# 140	29.44	41.5
# 200	33.41	33.6

Hydrometer Analysis Data

Separation sieve is #200
Percent -#200 based upon complete sample= 33.6
Weight of hydrometer sample: 16.90
Calculated biased weight= 50.30
Automatic temperature correction
Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
Specific gravity of solids= 2.706
Specific gravity correction factor= 0.988
Hydrometer type: 152H
Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.1	20.5	15.8	0.0129	20.5	12.9	0.0329	31.0
5.00	23.1	20.0	15.3	0.0129	20.0	13.0	0.0208	30.0
15.00	23.1	19.5	14.8	0.0129	19.5	13.1	0.0121	29.1
30.00	23.1	18.5	13.8	0.0129	18.5	13.3	0.0086	27.1
60.00	23.1	17.0	12.3	0.0129	17.0	13.5	0.0061	24.1
240.00	23.1	15.0	10.3	0.0129	15.0	13.8	0.0031	20.2
1440.00	22.8	14.0	9.2	0.0130	14.0	14.0	0.0013	18.1

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = 1.6 (% coarse = % fine = 1.6)

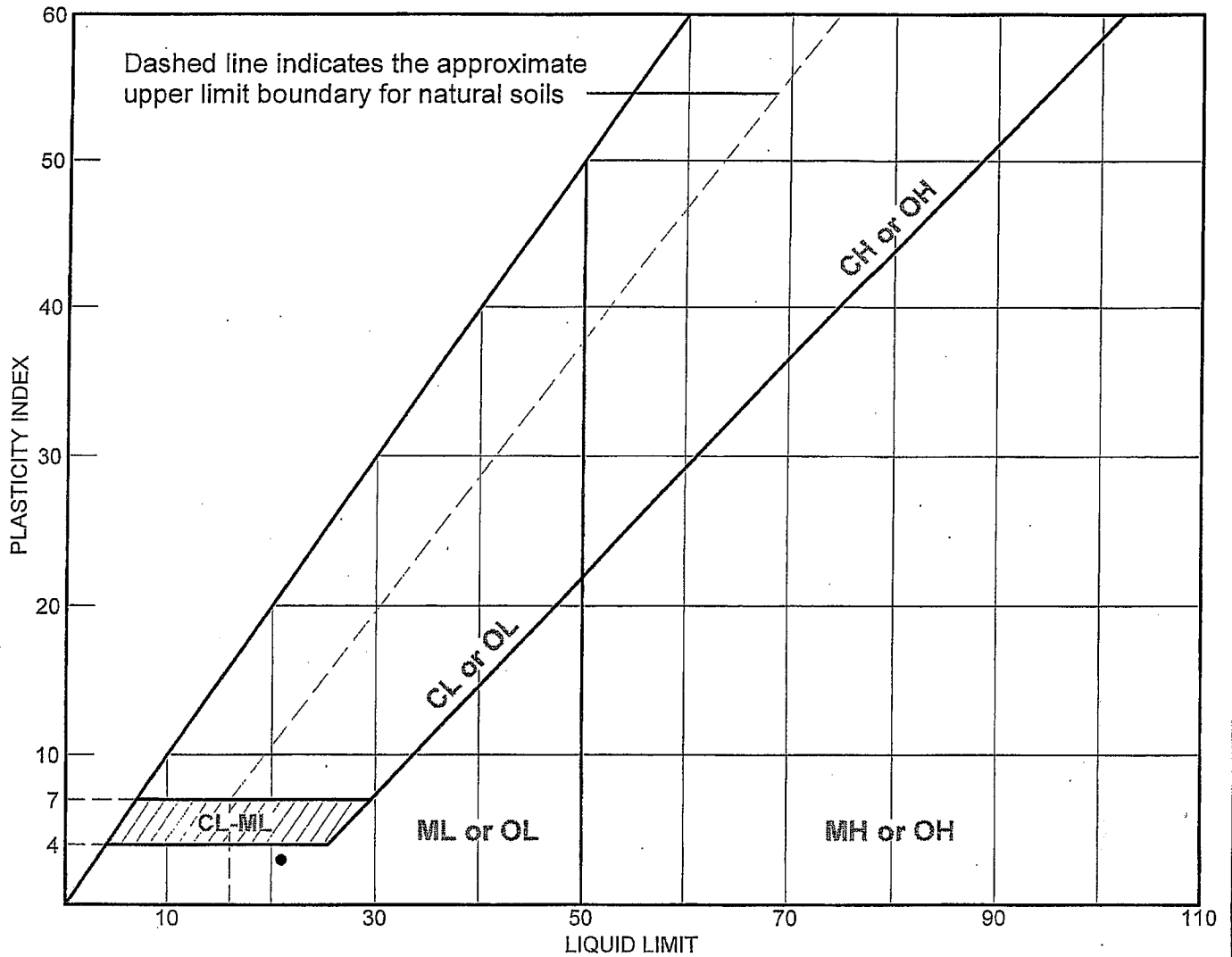
% SAND = 64.8 (% coarse = 3.7 % medium = 3.1 % fine = 58.0)

% SILT = 11.0 % CLAY = 22.6

D₈₅= 0.26 D₆₀= 0.14 D₅₀= 0.12

D₃₀= 0.02

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	B-2359UD	UD-17	110-111.7 Ft	17.4	18	21	3	SM

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project No.: 6468-07-1777

Lab No. 8368

LIQUID AND PLASTIC LIMIT TEST DATA

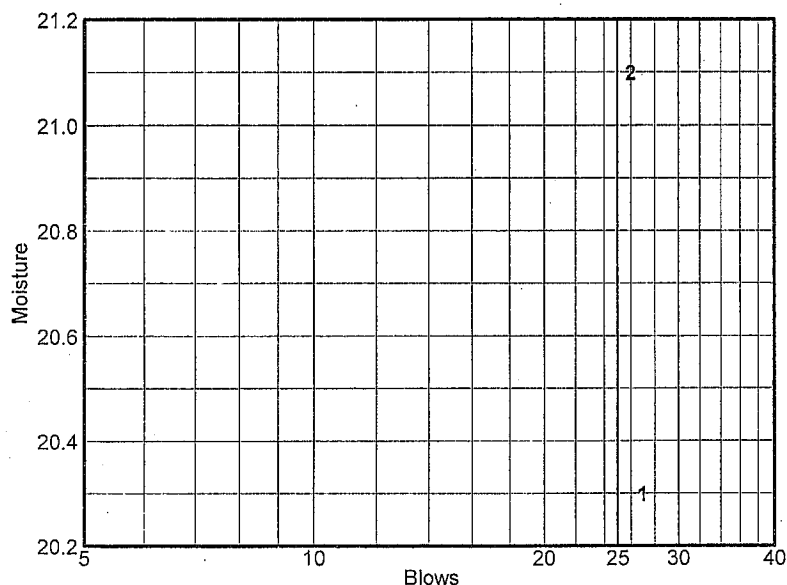
Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
 Sample No.: UD-17
 Elev. or Depth: 110-111.7 Ft Sample Length(in./cm.): ID#8368
 Location: B-2359UD
 Description: Pale Brown, Mottled Yellowish Brown Silty SAND
 Water Content: 17.4 USCS: SM AASHTO:

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	35.39	35.57				
Dry+Tare	32.81	32.84				
Tare	20.12	19.90				
# Blows	27	26				
Moisture	20.3	21.1				



Liquid Limit= 21
 Plastic Limit= 18
 Plasticity Index= 3

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	27.55	27.09		
Dry+Tare	26.60	26.08		
Tare	21.32	20.32		
Moisture	18.0	17.5		

MACTEC ENGINEERING AND CONSULTING, INC.

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: 3/19/08

SAMPLE IDENTIFICATION: B-2359UD, UD-17 @ 110-111.7 Ft.

(A) Mass of oven-dried soil, grams:	37.25
(B) Mass of pycnometer filled with water at test temperature (T), grams:	341.15
(C) Mass of pycnometer, water and soil, grams:	364.64
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	24.2
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.707
(F) Correction factor:	0.99904
(G x F) SPECIFIC GRAVITY @ 20°C:	2.705

MATERIAL TESTED:

☐

- # 4

☒

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 98

Silty SAND (SM)

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNO METER : 2055

TESTED BY: EH

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

REVIEWED BY: Harry Johnson

KAW 4-15-08

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
Sample No.: UD-18
Elev. or Depth: 112-113.1 Ft Sample Length(in./cm.): ID#8369
Location: B-2359UD
Description: Yellowish Brown Clayey SAND
Date: 1/31/08 PL: 15 LL: 27 PI: 12
USCS Classification: SC AASHTO Classification:
Testing Remarks: Tested by: EH Reviewed by: HJ

NM value from first strength test performed.
Specific Gravity = 2.77 (ASTM D 854-06)

Mechanical Analysis Data

Sieve	Cumul. Wt. retained	Percent finer
Dry sample and tare=	Initial 77.95	
Tare =	16.54	
Dry sample weight =	61.41	
Tare for cumulative weight retained=	.00	
# 4	0.00	100.0
# 10	0.00	100.0
# 20	0.26	99.6
# 40	9.23	85.0
# 60	41.04	33.2
# 100	48.43	21.1
# 140	49.66	19.1
# 200	50.19	18.3

Hydrometer Analysis Data

Separation sieve is #200
Percent -#200 based upon complete sample= 18.3
Weight of hydrometer sample: 11.22
Calculated biased weight= 61.31
Automatic temperature correction
Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
Specific gravity of solids= 2.766
Specific gravity correction factor= 0.975
Hydrometer type: 152H
Effective depth L= 16.294964 -- 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	16.0	11.3	0.0127	16.0	13.7	0.0331	18.0
5.00	23.3	16.0	11.3	0.0127	16.0	13.7	0.0209	18.0
15.00	23.3	16.0	11.3	0.0127	16.0	13.7	0.0121	18.0
30.00	23.3	16.0	11.3	0.0127	16.0	13.7	0.0086	18.0
60.00	23.3	15.5	10.8	0.0127	15.5	13.8	0.0061	17.2
260.00	22.8	15.0	10.2	0.0127	15.0	13.8	0.0029	16.2
4140.00	21.7	15.0	9.9	0.0129	15.0	13.8	0.0007	15.8

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL =

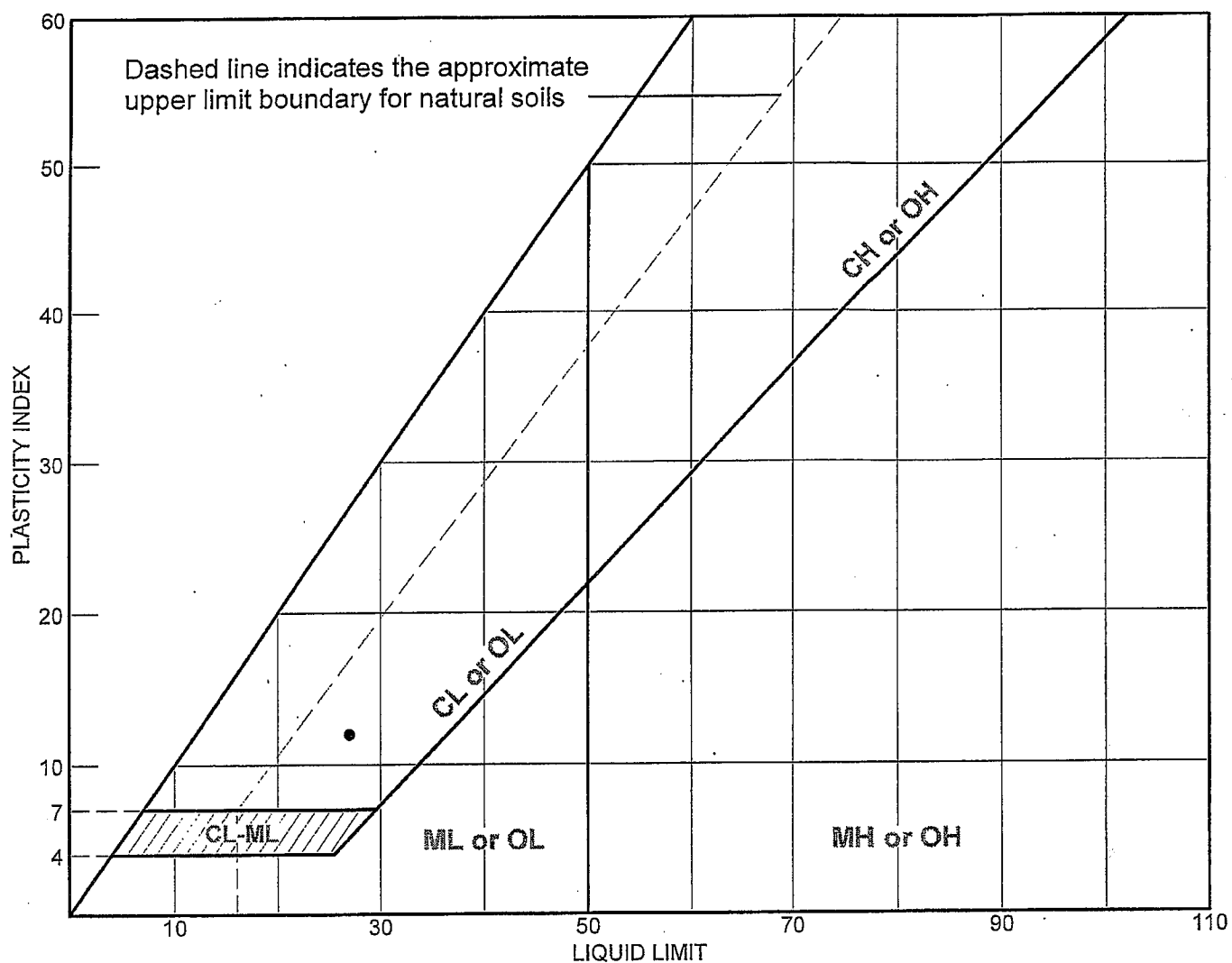
% SAND = 81.7 (% coarse = 0.0 % medium = 15.0 % fine = 66.7)

% SILT = 1.5 % CLAY = 16.8 (% CLAY COLLOIDS = 15.8)

D₈₅= 0.43 D₆₀= 0.34 D₅₀= 0.31

D₃₀= 0.24

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	B-2359UD	UD-18	112-113.1 Ft	25.5	15	27	12	SC

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project No.: 6468-07-1777

Lab No. 8369

LIQUID AND PLASTIC LIMIT TEST DATA

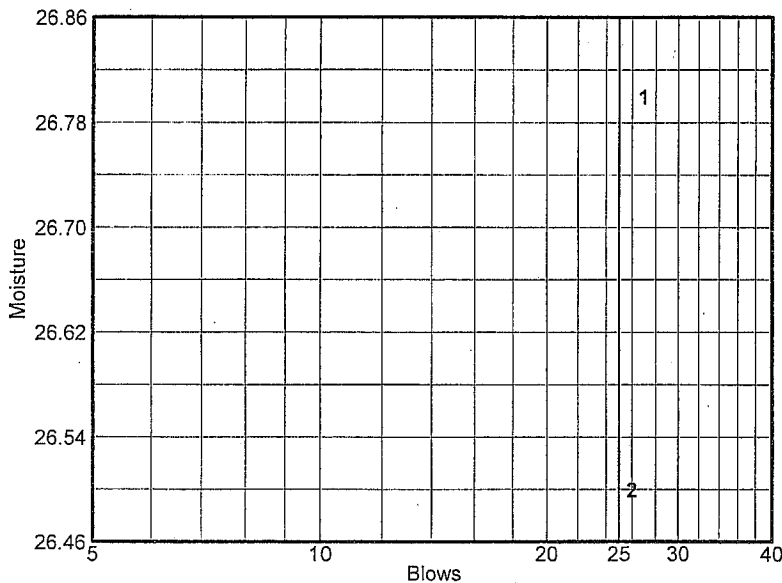
Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project Number: 6468-07-1777

Sample Data

Source: B-2359UD
 Sample No.: UD-18
 Elev. or Depth: 112-113.1 Ft Sample Length(in./cm.): ID#8369
 Location: B-2359UD
 Description: Yellowish Brown Clayey SAND
 Water Content: 25.5 USCS: SC AASHTO:

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	35.43	32.66				
Dry+Tare	32.27	30.07				
Tare	20.47	20.30				
# Blows	27	26				
Moisture	26.8	26.5				



Liquid Limit= 27
 Plastic Limit= 15
 Plasticity Index= 12

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	29.55	29.28			
Dry+Tare	28.36	28.02			
Tare	20.59	19.94			
Moisture	15.3	15.6			

MACTEC ENGINEERING AND CONSULTING, INC.

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: 3/19/08

SAMPLE IDENTIFICATION: B-2359UD, UD-18 @ 112-113.1 Ft.

(A) Mass of oven-dried soil, grams:	37.42
(B) Mass of pycnometer filled with water at test temperature (T), grams:	366.20
(C) Mass of pycnometer, water and soil, grams:	390.10
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.3
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.768
(F) Correction factor:	0.99926
(G x F) SPECIFIC GRAVITY @ 20°C:	2.766

MATERIAL TESTED:

☐

- # 4

☒

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Clayey SAND (SC)

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNOMETER : 2192

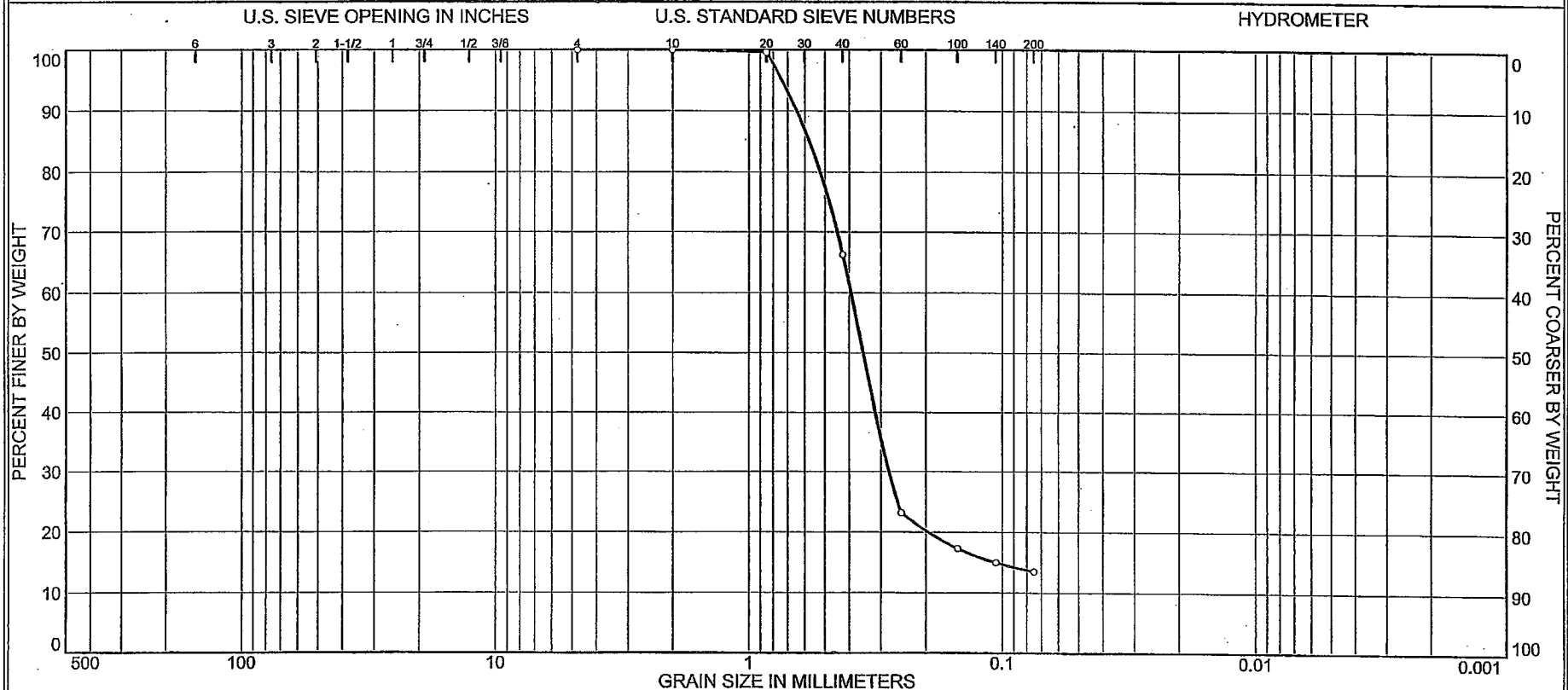
TESTED BY: EH

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

REVIEWED BY: Harry Johnson

KAW 4.15.08

Particle Size Distribution Report ASTM D6913-04 e1



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	33.7	52.8	13.5	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
B-2359UD	UD-19	114-116.6 Ft	1/31/08	SM	Light Gray Silty SAND (Visual)	17.3	ND	ND

Client Bechtel
 Project Exelon Texas COL (Victoria)
 Project No. 6468-07-1777 Lab No. 8370

**MACTEC ENGINEERING
 AND
 CONSULTING, INC.**

Tested by: EH Reviewed by: HJ

Sieve Analysis Only
 NM value from average of strength tests performed.
 Specific Gravity = 2.70 (ASTM D 854-06)
 ND = Not Determined

KAW 4-15-08

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Project Number: 6468-07-1777

Source: B-2359UD
Sample No.: UD-19
Elev. or Depth: 114-116.6 Ft Sample Length(in./cm.): ID#8370
Location: B-2359UD
Description: Light Gray Silty SAND (Visual)
Date: 1/31/08 PL: ND LL: ND PI: ND
USCS Classification: SM AASHTO Classification:
Testing Remarks: Tested by: EH Reviewed by: HJ

Mechanical Analysis Data

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.00	100.0
# 20	0.84	99.6
# 40	68.44	66.3
# 60	155.91	23.1
# 100	167.79	17.3
# 140	172.49	15.0
# 200	175.57	13.5

```
Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES =          % GRAVEL =
% SAND = 86.5      (% coarse = 0.0      % medium = 33.7      % fine = 52.8)
% FINES = 13.5
```

D85= 0.57 D60= 0.39 D50= 0.35
D30= 0.28 D15= 0.11

MACTEC ENGINEERING AND CONSULTING, INC.

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: 4/7/08

SAMPLE IDENTIFICATION: B-2359UD, UD-19 @ 114-116.6 Ft.

(A) Mass of oven-dried soil, grams:	37.58
(B) Mass of pycnometer filled with water at test temperature (T), grams:	363.70
(C) Mass of pycnometer, water and soil, grams:	387.36
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.1
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.700
(F) Correction factor:	0.99931
(G x F) SPECIFIC GRAVITY @ 20°C:	2.698

MATERIAL TESTED:

☐
- # 4

☒
- # 10

PREPARATION METHOD:

☒
DRY

☐
WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Silty SAND (SM) - Visual

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNO METER : 2184

TESTED BY: EH

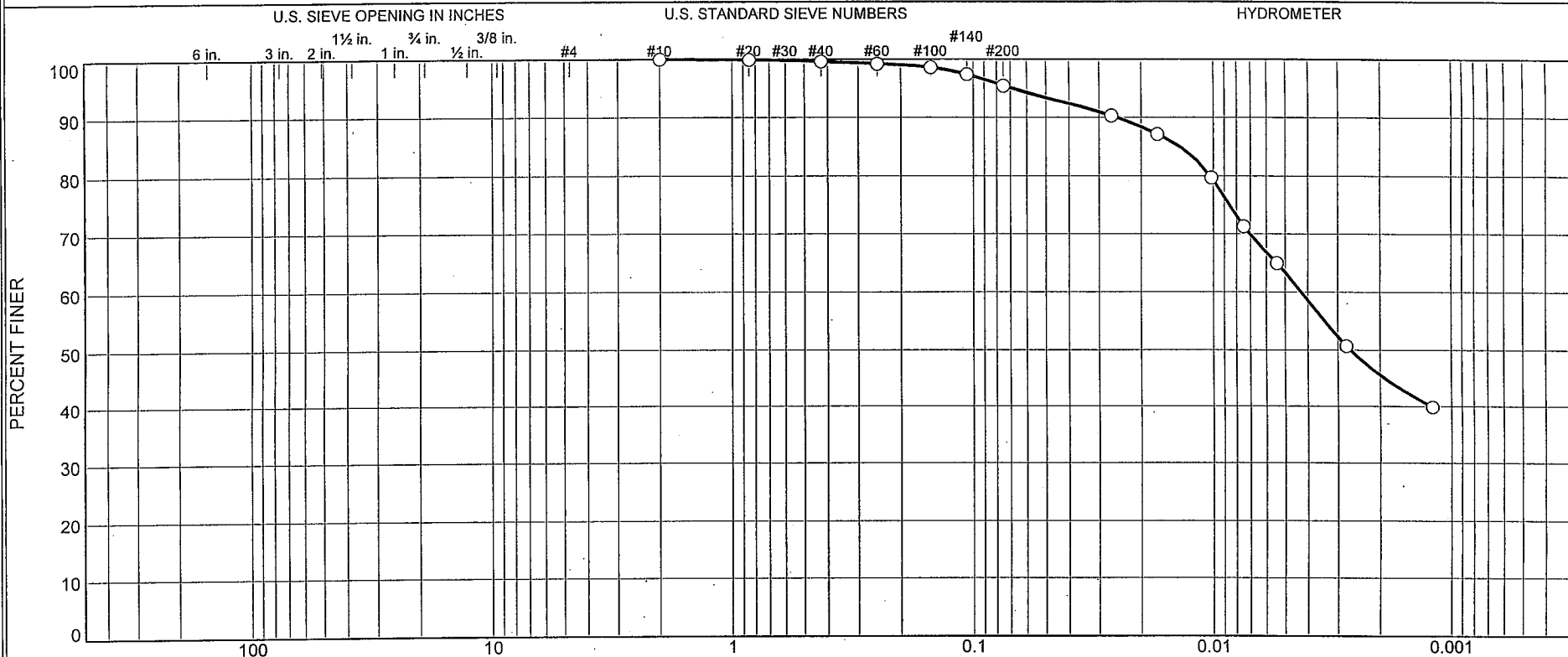
\\Test Reports\\Soils\\SPECIFIC GRAVITY(ref).xls

REVIEWED BY: Harry Johnson



KAW 4.15.08

Particle Size Distribution Report / ASTM D422-63(2002)e1



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	4.2	32.0	63.4

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring B-2359UD	UD-20	120.0-121.7	1/31/08	CH	Light Gray Fat CLAY	34.0	51	15

Client Bechtel

Project Exelon Texas COL (Victoria Reservoir)

Project No. 6468071777

Figure *NA*
MACTEC, Inc.
Raleigh, North Carolina

 Specific Gravity = 2.721 (ASTM D854-06)
 NM obtained from consolidation test specimen

Kaw 5/8/08
Tested By: CSChecked By: LBJ

GRAIN SIZE DISTRIBUTION TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2359UD

Depth: 120.0-121.7

Sample Number: UD-20

Material Description: Light Gray Fat CLAY

Date: 1/31/08

Natural Moisture: 34.0

Liquid Limit: 51

Plastic Limit: 15

USCS Class.: CH

Testing Remarks: Specific Gravity = 2.721 (ASTM D854-06)

NM obtained from consolidation test specimen

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
171.38	0.00	0.00	#10	0.00	100.0
48.73	0.00	0.00	#20	0.04	99.9
			#40	0.18	99.6
			#60	0.38	99.2
			#100	0.68	98.6
			#140	1.27	97.4
			#200	2.24	95.4

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 48.73

Hygroscopic moisture correction:

Moist weight and tare = 28.86

Dry weight and tare = 28.31

Tare weight = 15.62

Hygroscopic moisture = 4.3%

Table of composite correction values:

Temp., deg. C: 11.3 29.5

Comp. corr.: -8.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.721

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	21.6	48.0	42.8	0.0131	49.0	8.3	0.0266	90.3
5.00	21.6	46.5	41.3	0.0131	47.5	8.5	0.0171	87.1
15.00	21.6	43.0	37.8	0.0131	44.0	9.1	0.0102	79.7
30.00	21.6	39.0	33.8	0.0131	40.0	9.7	0.0075	71.3
60.00	21.6	36.0	30.8	0.0131	37.0	10.2	0.0054	65.0
250.00	22.4	29.0	24.0	0.0130	30.0	11.4	0.0028	50.7
1440.00	21.9	24.0	18.9	0.0131	25.0	12.2	0.0012	39.9

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	0.4	4.2	4.6	32.0	63.4	95.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0027	0.0043	0.0103	0.0138	0.0254	0.0698

Fineness Modulus
0.02

MACTEC, Inc.

DCN# EXE812

LIQUID AND PLASTIC LIMIT TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2359UD

Depth: 120.0-121.7

Sample Number: UD-20

Material Description: Light Gray Fat CLAY

USCS: CH

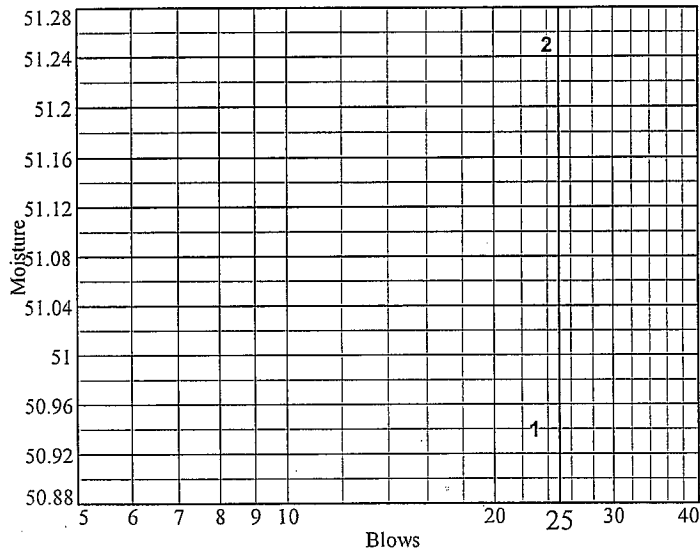
AASHTO: A-7-6(36)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.47	25.46				
Dry+Tare	20.76	22.18				
Tare	15.44	15.78				
# Blows	23	24				
Moisture	50.9	51.3				



Liquid Limit= 51
 Plastic Limit= 15
 Plasticity Index= 36
 Natural Moisture= 34.0
 Liquidity Index= 0.5

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21.65	17.32			
Dry+Tare	20.87	16.53			
Tare	15.55	11.24			
Moisture	14.7	14.9			

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: 4/17/08

SAMPLE IDENTIFICATION: B-2359UD, UD-20

(A) Mass of oven-dried soil, grams:	51.09
(B) Mass of pycnometer filled with water at test temperature (T), grams:	655.71
(C) Mass of pycnometer, water and soil, grams:	688.03
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	21.6
(G) Specific Gravity at observed temperature: $A / [B - (C - A)]$	2.722
(F) <i>Correction factor:</i>	0.99966
(G x F) SPECIFIC GRAVITY @ 20°C:	2.721

MATERIAL TESTED:

☒ - # 4

☐ - # 10

PREPARATION METHOD:

☒ DRY

☐ WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Fat CLAY (CH)

EQUIPMENT USED

SCALES : 3.1.99

OVEN : 5.1.16

THERMOMETER : 5.1.01

PYCNO METER : P-3

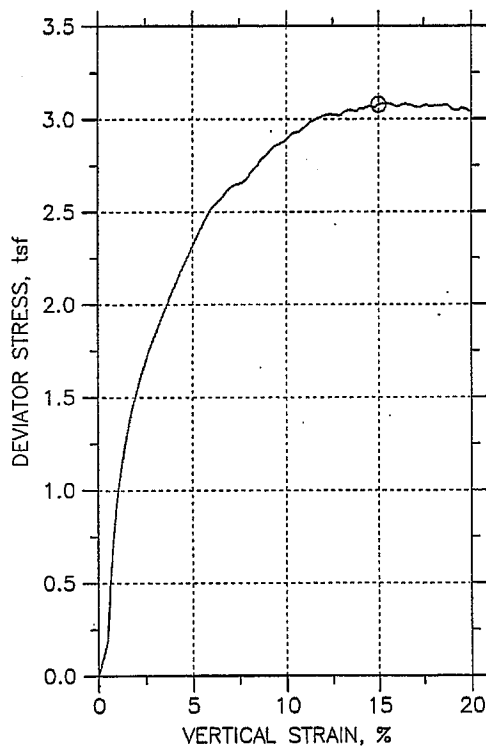
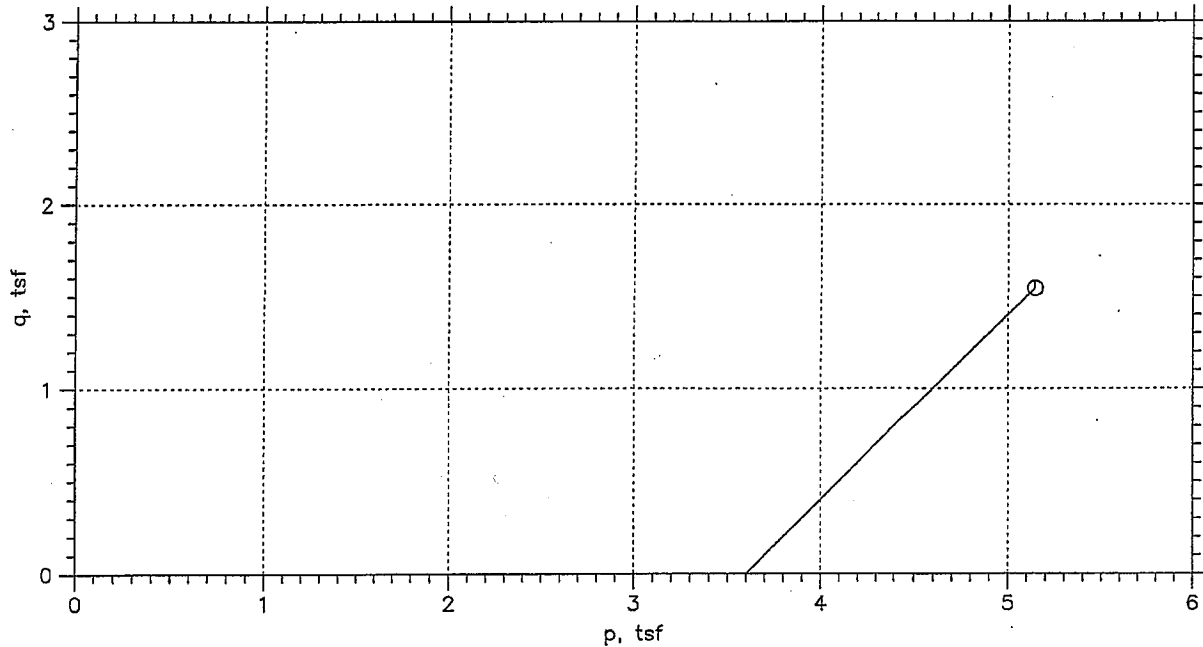
TESTED BY: CS

REVIEWED BY: Brian Johnson

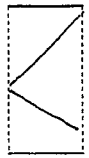
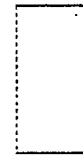
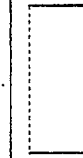
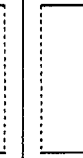
KAW 5/8/08

Unconsolidated Undrained Triaxial Compression Tests

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-11			
Test No.	8576			
Depth	69.5-71.5			
Tested by	BM			
Test Date	4/07/08			
Checked by	HJ			
Check Date	4/15/08			
Diameter, in	2.867			
Height, in	5.996			
Water Content, %	18.5			
Dry Density, pcf	101.			
Saturation, %	73.3			
Void Ratio	0.693			
Confining Stress, tsf	3.6			
Undrained Strength, tsf	1.538			
Max. Dev. Stress, tsf	3.077			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.74			
Liquid Limit	59			
Plastic Limit	25			
Plasticity Index	34			

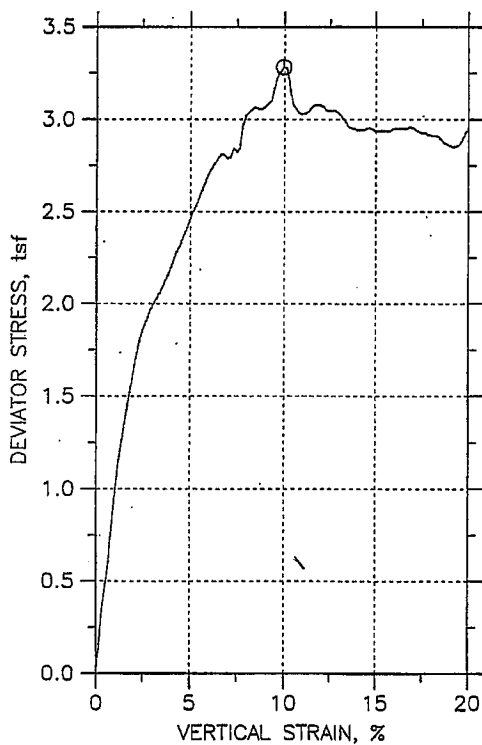
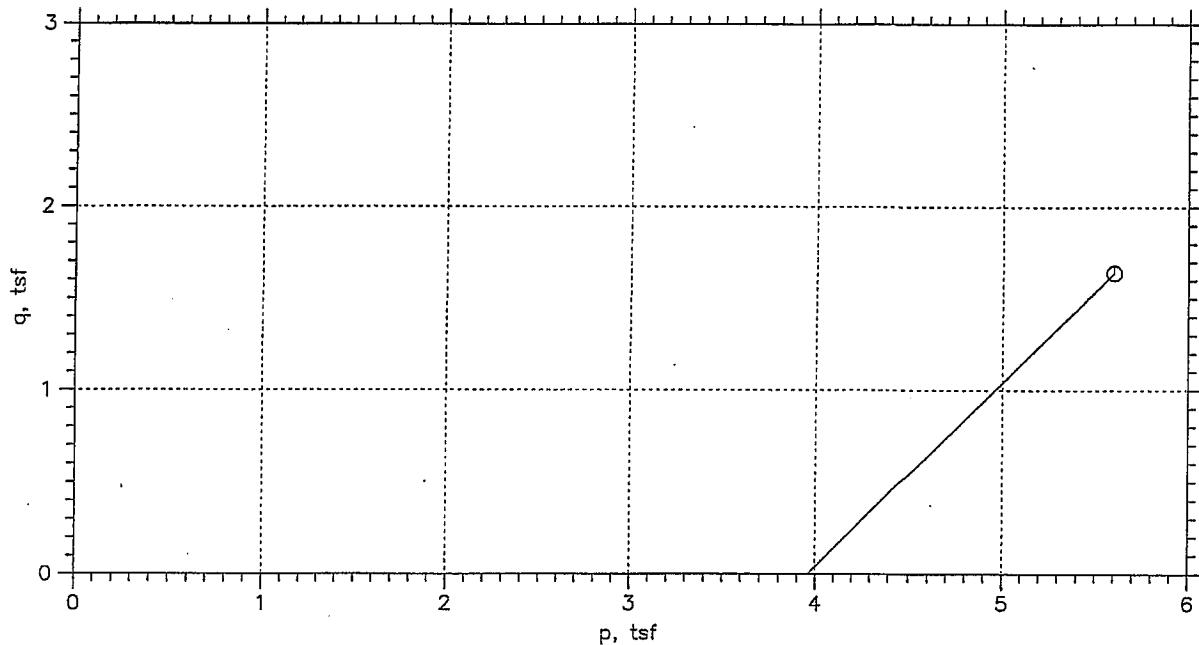
	Project: Exelon Texas COL Victoria				
	Location: B-2302UD UD-11				
	Project No.: 6468071777				
	Boring No.: B-2302UD				
	Sample Type: Undisturbed				
Description: Light Gray Mottled Light Yellowish Brown Fat CLAY (CH)					
Remarks: ASTM D2850-03a. Membrane correction not applied.					

Phase calculations based on start and end of test.

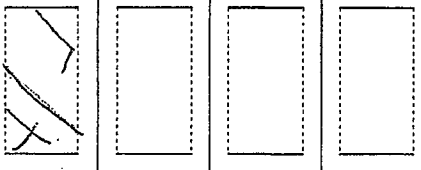
KAW 4-15-08

Tue, 15-APR-2008 13:55:43

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-7			
Test No.	8349			
Depth	73.5-75.5'			
Tested by	BM			
Test Date	2/27/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.856			
Height, in	5.612			
Water Content, %	27.6			
Dry Density, pcf	92.34			
Saturation, %	87.1			
Void Ratio	0.879			
Confining Stress, tsf	3.96			
Undrained Strength, tsf	1.641			
Max. Dev. Stress, tsf	3.282			
Strain at Failure, %	9.96			
Strain Rate, %/min	1			
Measured Specific Gravity	2.78			
Liquid Limit	69			
Plastic Limit	34			
Plasticity Index	35			

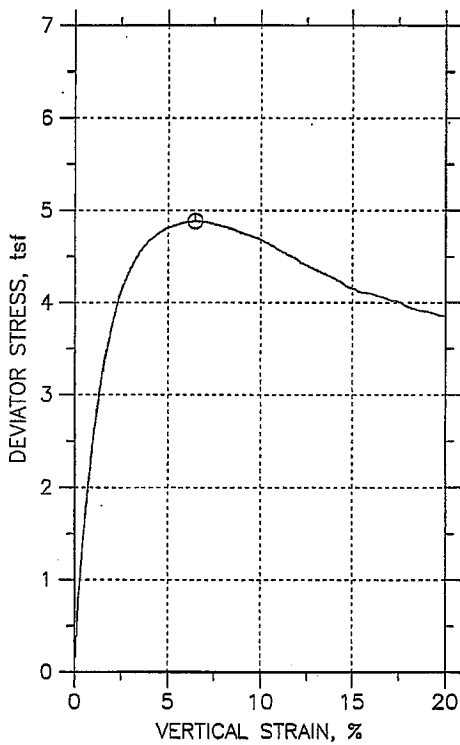
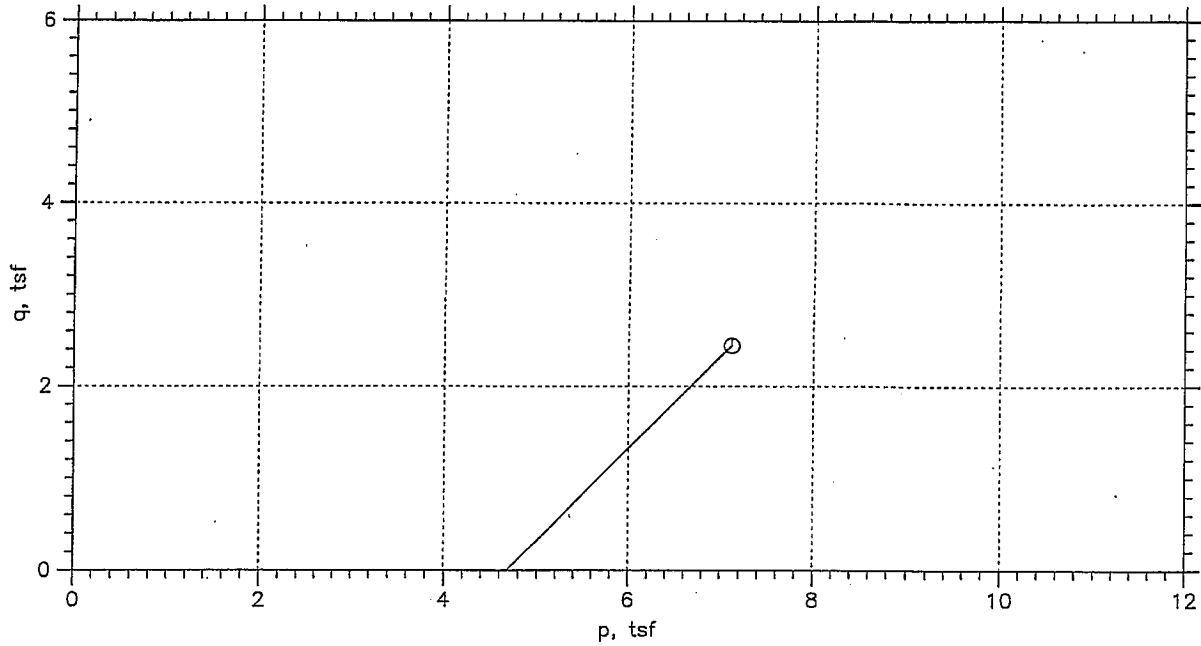
	Project: Exelon Texas COL Victoria	
	Location: B-2304UD UD-7	
	Project No.: 6468071777	
	Boring No.: B-2304UD	
	Sample Type: Undisturbed	
	Description: Mottled Brownish Yellow and Pale Yellow Elastic SILT (MH)	
	Remarks: ASTM D2850-03a. Membrane correction not applied.	

Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 16:40:20

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-9			
Test No.	8350			
Depth	98.5-101.0'			
Tested by	BM			
Test Date	2/27/08			
Checked by	HJ			
Check Date	7/14/08			
Diameter, in	2.846			
Height, in	5.973			
Water Content, %	22.8			
Dry Density, pcf	101.5			
Saturation, %	91.0			
Void Ratio	0.685			
Confining Stress, tsf	4.68			
Undrained Strength, tsf	2.441			
Max. Dev. Stress, tsf	4.883			
Strain at Failure, %	6.48			
Strain Rate, %/min	1			
Measured Specific Gravity	2.74			
Liquid Limit	62			
Plastic Limit	25			
Plasticity Index	37			

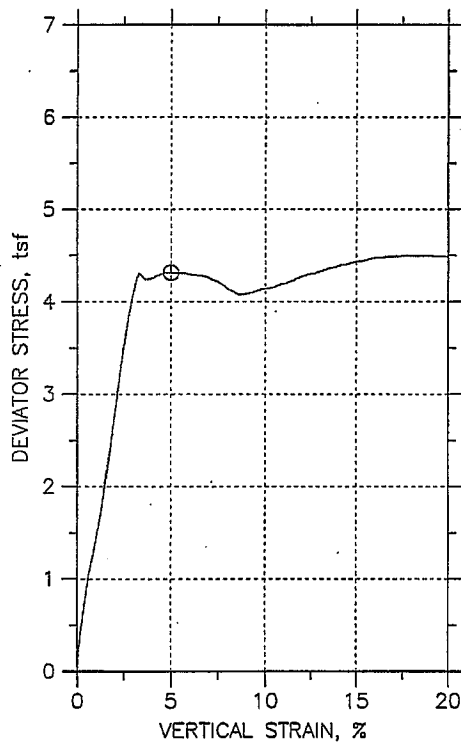
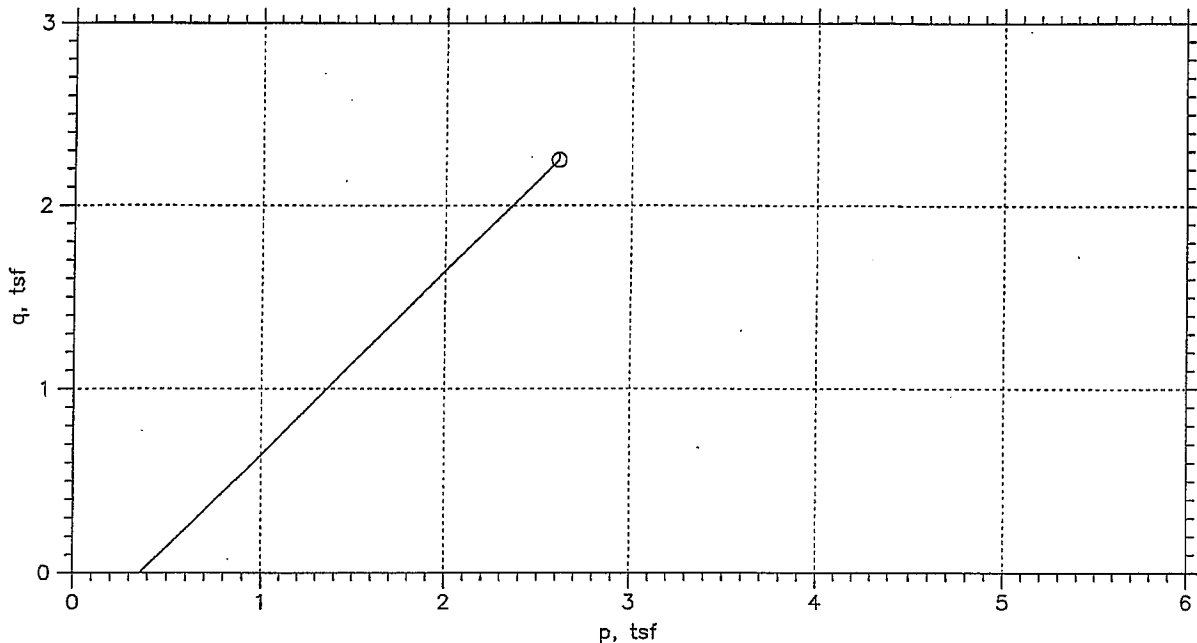
MACTEC	Project: Exelon Texas COL Victoria					
	Location: B-2304UD UD-9					
	Project No.: 6468071777					
	Boring No.: B-2304UD					
	Sample Type: Undisturbed					
	Description: Mottled Pale Yellow and Yellow Fat CLAY with Sand (CH)					
Remarks: ASTM D2850-03a. Membrane correction not applied.						

Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 15:25:26

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-2			
Test No.	8352			
Depth	5.5-7.5'			
Tested by	BM			
Test Date	2/28/08			
Checked by	HJ <i>HJ</i>			
Check Date	4/14/08			
Diameter, in	2.863			
Height, in	5.991			
Water Content, %	13.7			
Dry Density, pcf	117.1			
Saturation, %	82.4			
Void Ratio	0.456			
Confining Stress, tsf	0.36			
Undrained Strength, tsf	2.155			
Max. Dev. Stress, tsf	4.311			
Strain at Failure, %	5			
Strain Rate, %/min	1			
Measured Specific Gravity	2.73			
Liquid Limit	37			
Plastic Limit	16			
Plasticity Index	21			

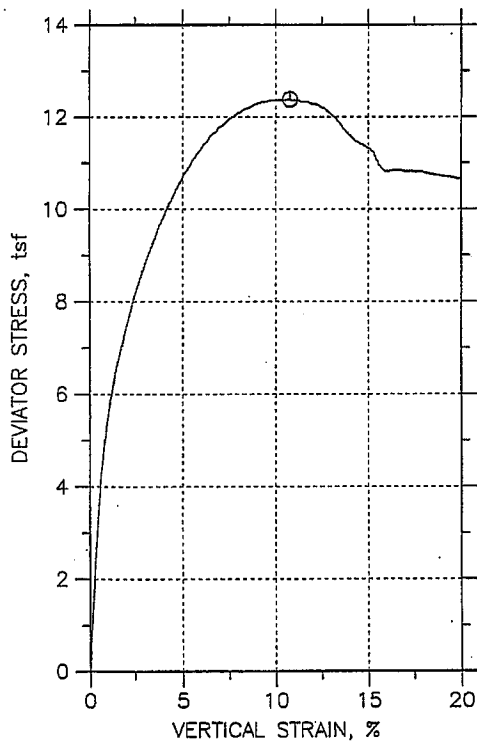
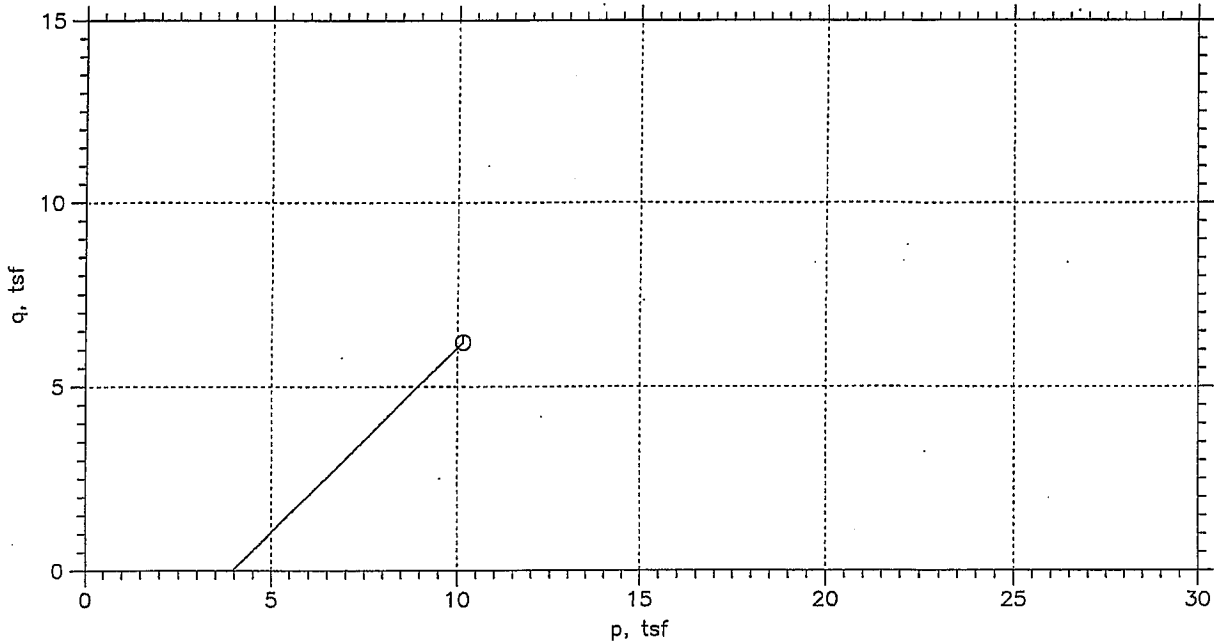
MACTEC	Project: Exelon Texas COL Victoria				
	Location: B-2319UD UD-2				
	Project No.: 6468071777				
	Boring No.: B-2319UD				
	Sample Type: Undisturbed				
	Description: Grayish Brown Clayey SAND (SC)				
	Remarks: ASTM D2850-03a. Membrane correction not applied.				

Phase calculations based on start and end of test.

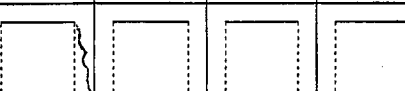
KAW 4.15.08

Mon, 14-APR-2008 15:30:35

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-8			
Test No.	8356			
Depth	75-77'			
Tested by	BM			
Test Date	2/27/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.817			
Height, in	5.99			
Water Content, %	24.6			
Dry Density, pcf	98.71			
Saturation, %	92.4			
Void Ratio	0.727			
Confining Stress, tsf	3.96			
Undrained Strength, tsf	6.188			
Max. Dev. Stress, tsf	12.38			
Strain at Failure, %	10.8			
Strain Rate, %/min	1			
Measured Specific Gravity	2.73			
Liquid Limit	NP			
Plastic Limit	NP			
Plasticity Index	NP			

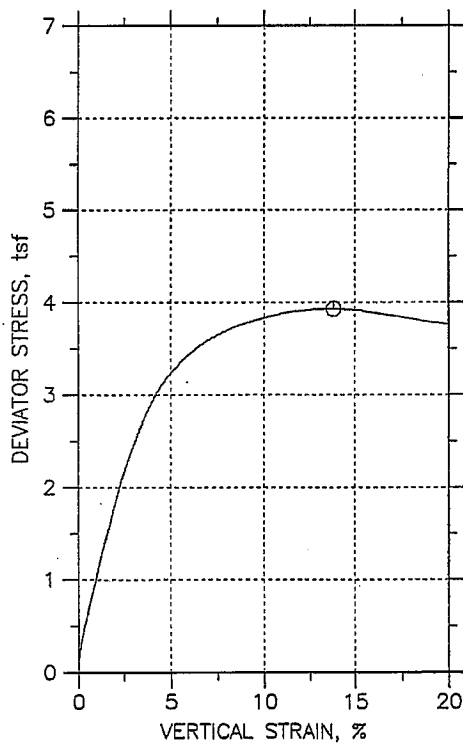
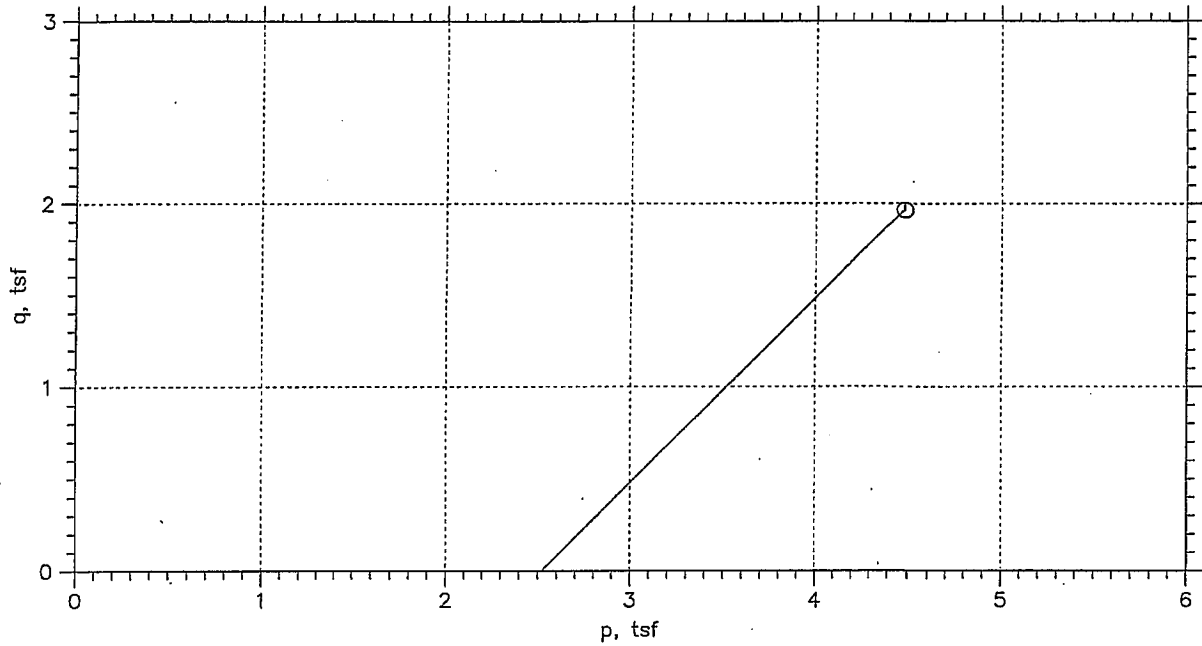
	Project: Exelon Texas COL Victoria	
	Location: B-2319UD UD-8	
	Project No.: 6468071777	
	Boring No.: B-2319UD	
	Sample Type: Undisturbed	
	Description: Light Gray Poorly Graded SAND with Silt (SP-SM)	
Remarks: ASTM D2850-03a. Membrane correction not applied.		

Phase calculations based on start and end of test.

KAW 4-15-08

Mon, 14-APR-2008 15:31:32

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-7			
Test No.	8358			
Depth	38.5-40.2			
Tested by	BM			
Test Date	4/07/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.872			
Height, in	5.855			
Water Content, %	14.8			
Dry Density, pcf	106.6			
Saturation, %	65.4			
Void Ratio	0.628			
Confining Stress, tsf	2.52			
Undrained Strength, tsf	1.964			
Max. Dev. Stress, tsf	3.928			
Strain at Failure, %	13.8			
Strain Rate, %/min	1			
Measured Specific Gravity	2.78			
Liquid Limit	60			
Plastic Limit	23			
Plasticity Index	37			

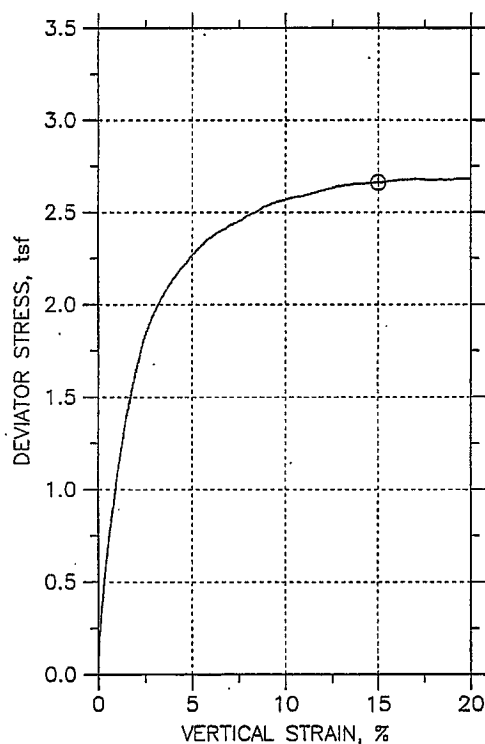
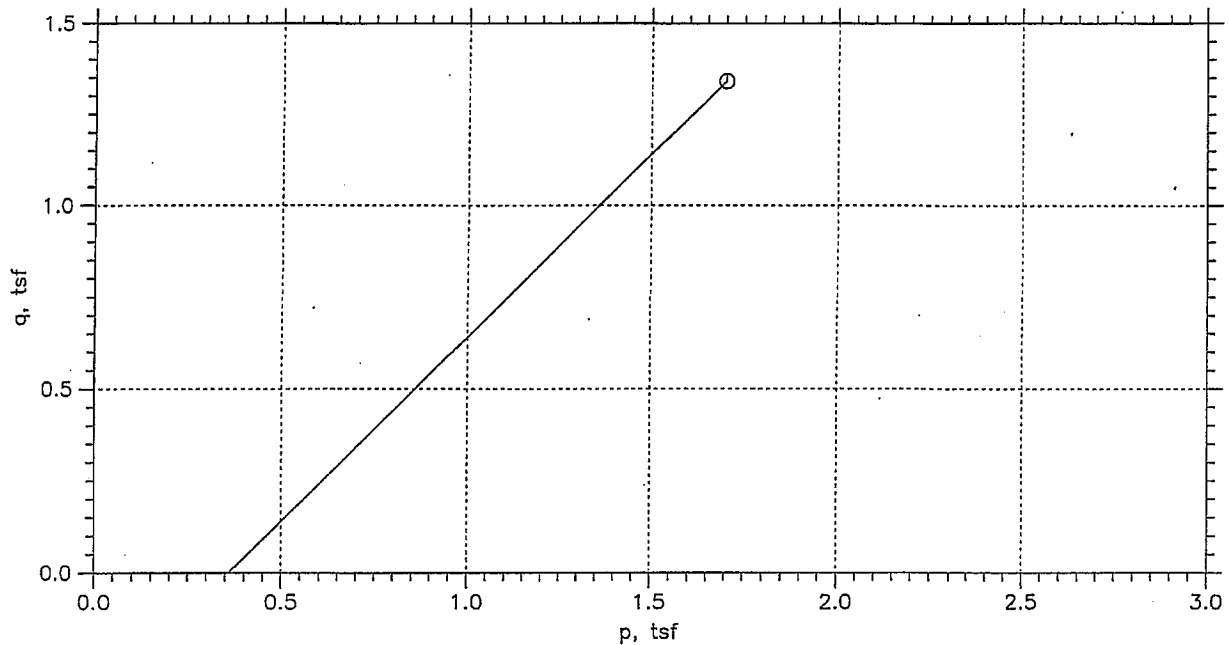
MACTEC	Project: Exelon Texas COL Victoria				
	Location: B-2321UD UD-7				
	Project No.: 6468071777				
	Boring No.: B-2321UD				
	Sample Type: Undisturbed				
Description: Very Pale Brown Mottled Brownish Yellow Fat CLAY (CH)					
Remarks: ASTM D2850-03a. Membrane correction not applied.					

Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 15:41:24

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-1			
Test No.	8361			
Depth	3.5-5.2'			
Tested by	BM			
Test Date	2/28/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.85			
Height, in	5.964			
Water Content, %	18.3			
Dry Density, pcf	110.8			
Saturation, %	95.0			
Void Ratio	0.522			
Confining Stress, tsf	0.36			
Undrained Strength, tsf	1.33			
Max. Dev. Stress, tsf	2.66			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.7			
Liquid Limit	46			
Plastic Limit	19			
Plasticity Index	27			

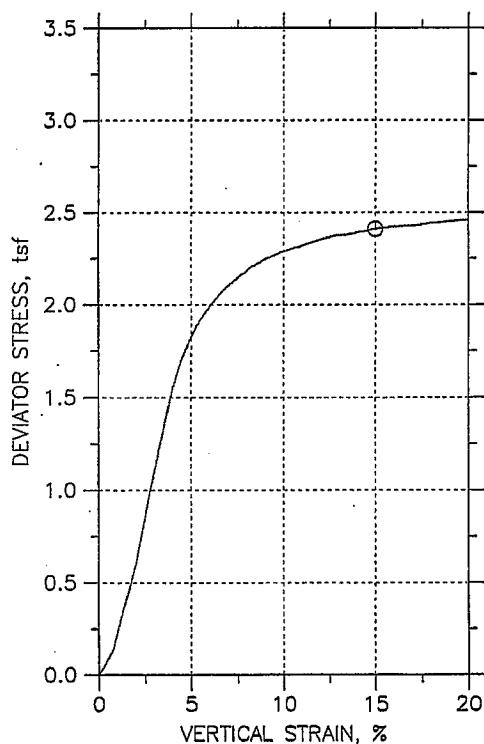
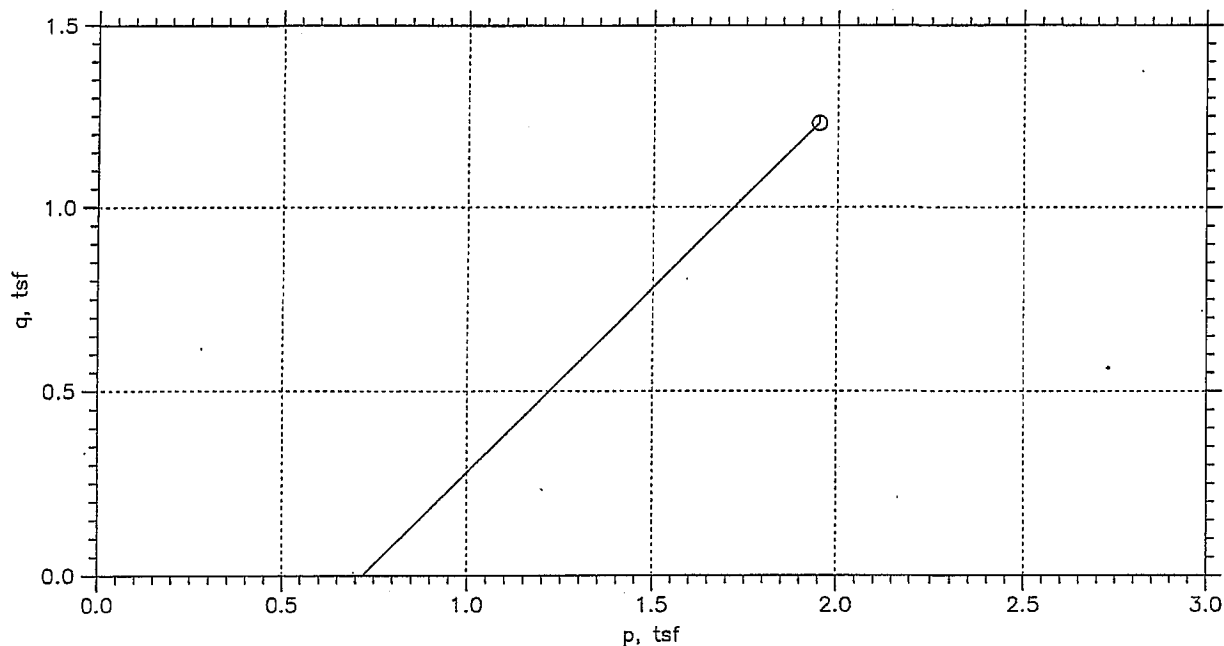
MACTEC	Project: Exelon Texas COL Victoria				
	Location: B-2352UD UD-1				
	Project No.: 6468071777				
	Boring No.: B-2352UD				
	Sample Type: Undisturbed				
	Description: Pale Brown Sandy Lean CLAY (CL)				
	Remarks: ASTM D2850-03a. Membrane correction not applied.				

Phase calculations based on start and end of test.

KAW 4-15-08

Mon, 14-APR-2008 15:32:56

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-3			
Test No.	8362			
Depth	11.5-13.2'			
Tested by	BM			
Test Date	2/28/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.845			
Height, in	5.996			
Water Content, %	18.6			
Dry Density, pcf	108.7			
Saturation, %	90.6			
Void Ratio	0.556			
Confining Stress, tsf	0.72			
Undrained Strength, tsf	1.205			
Max. Dev. Stress, tsf	2.41			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.71			
Liquid Limit	39			
Plastic Limit	18			
Plasticity Index	21			

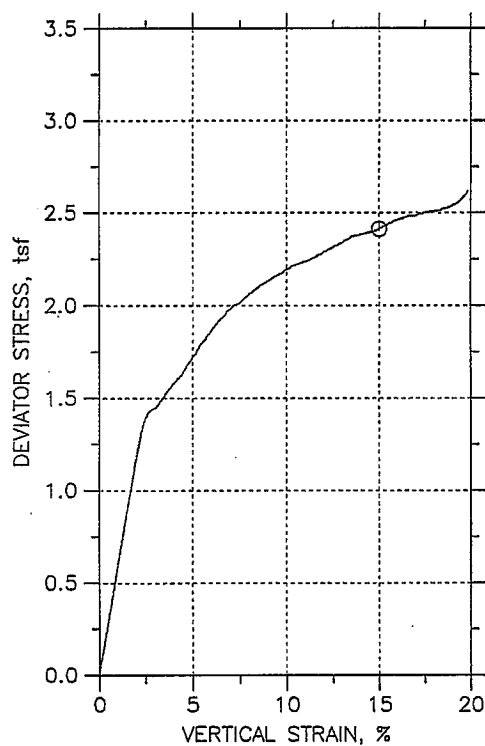
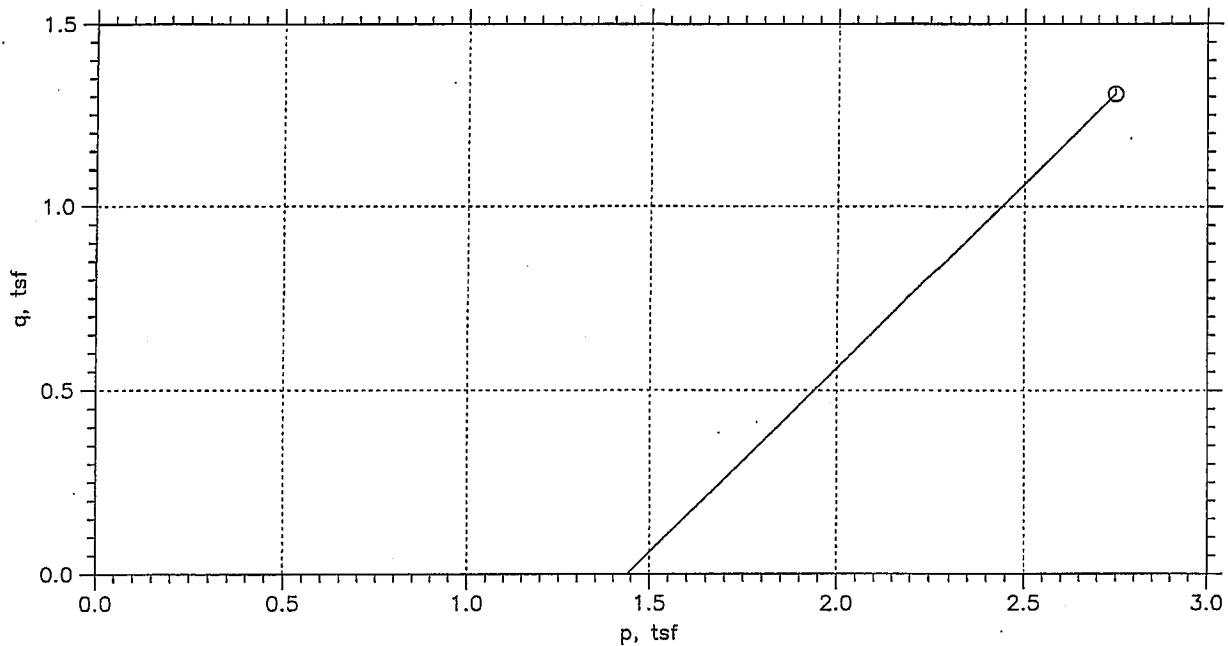
MACTEC	Project: Exelon Texas COL Victoria				
	Location: B-2352UD UD-3				
	Project No.: 6468071777				
	Boring No.: B-2352UD				
	Sample Type: Undisturbed				
	Description: Yellowish Brown Lean CLAY (CL)				
Remarks: ASTM D2850-03a. Membrane correction not applied.					

Phase calculations based on start and end of test.

KAW 4-15-08

Mon, 14-APR-2008 15:33:39

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-5			
Test No.	8363			
Depth	24-25.7'			
Tested by	BM			
Test Date	3/12/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.859			
Height, in	6.002			
Water Content, %	22.7			
Dry Density, pcf	100.7			
Saturation, %	92.7			
Void Ratio	0.655			
Confining Stress, tsf	1.44			
Undrained Strength, tsf	1.206			
Max. Dev. Stress, tsf	2.411			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.67			
Liquid Limit	67			
Plastic Limit	29			
Plasticity Index	38			

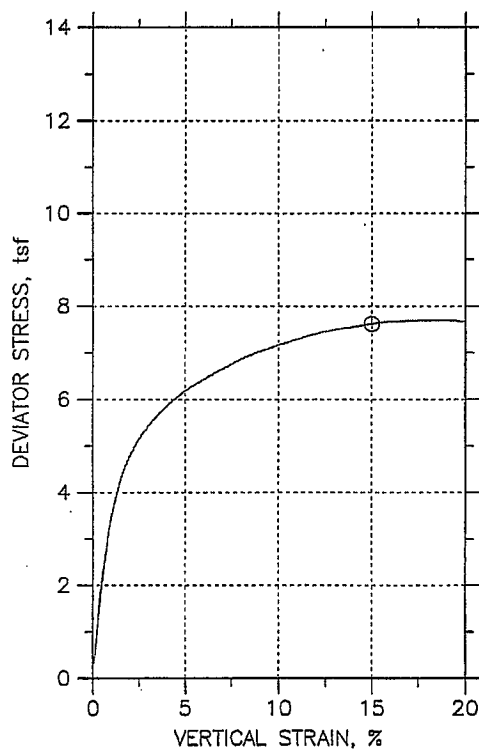
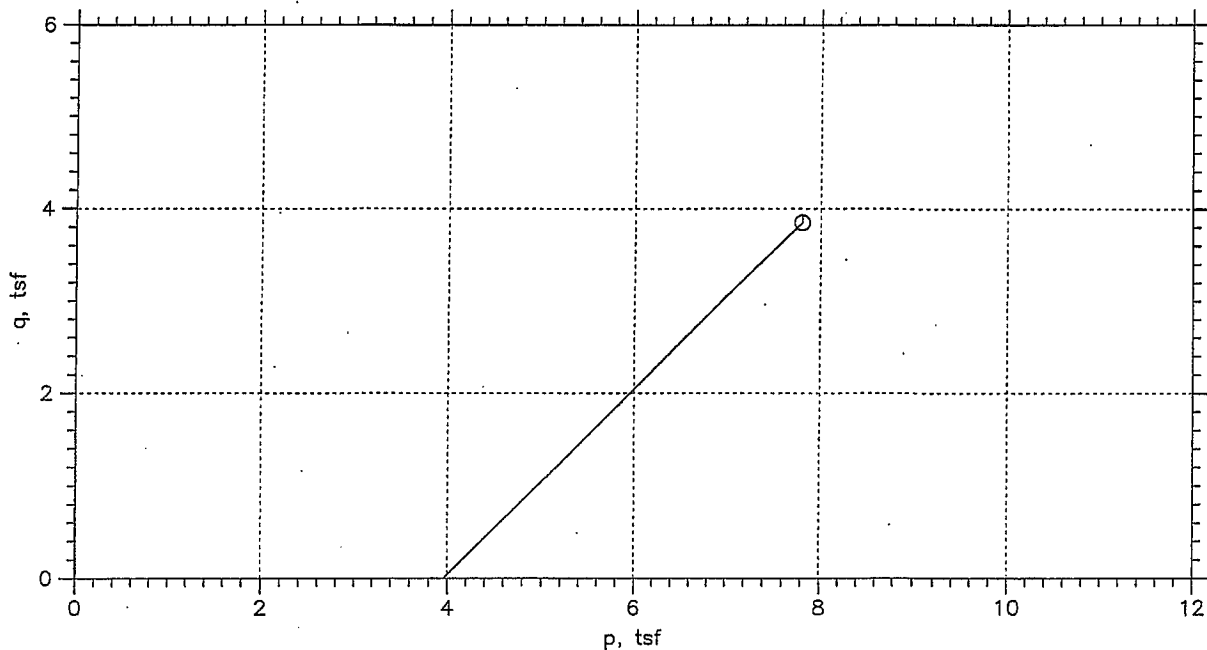
MACTEC	Project: Exelon Texas COL Victoria			
	Location: B-2352UD UD-5			
	Project No.: 6468071777			
	Boring No.: B-2352UD			
	Sample Type: Undisturbed			
Description: Brownish Yellow Fat CLAY (CH)				
Remarks: ASTM D2850-03a. Membrane correction not applied.				

Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 15:35:01

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-11			
Test No.	8368			
Depth	77-78.7'			
Tested by	BM			
Test Date	3/10/08			
Checked by	HJ			
Check Date	4/14/08			
Diameter, in	2.841			
Height, in	5.97			
Water Content, %	19.9			
Dry Density, pcf	101.9			
Saturation, %	81.4			
Void Ratio	0.666			
Confining Stress, tsf	3.96			
Undrained Strength, tsf	3.807			
Max. Dev. Stress, tsf	7.614			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.72			
Liquid Limit	23			
Plastic Limit	19			
Plasticity Index	4			

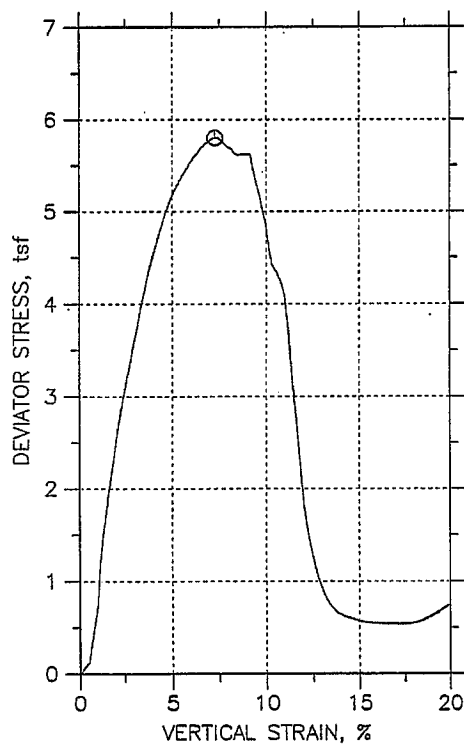
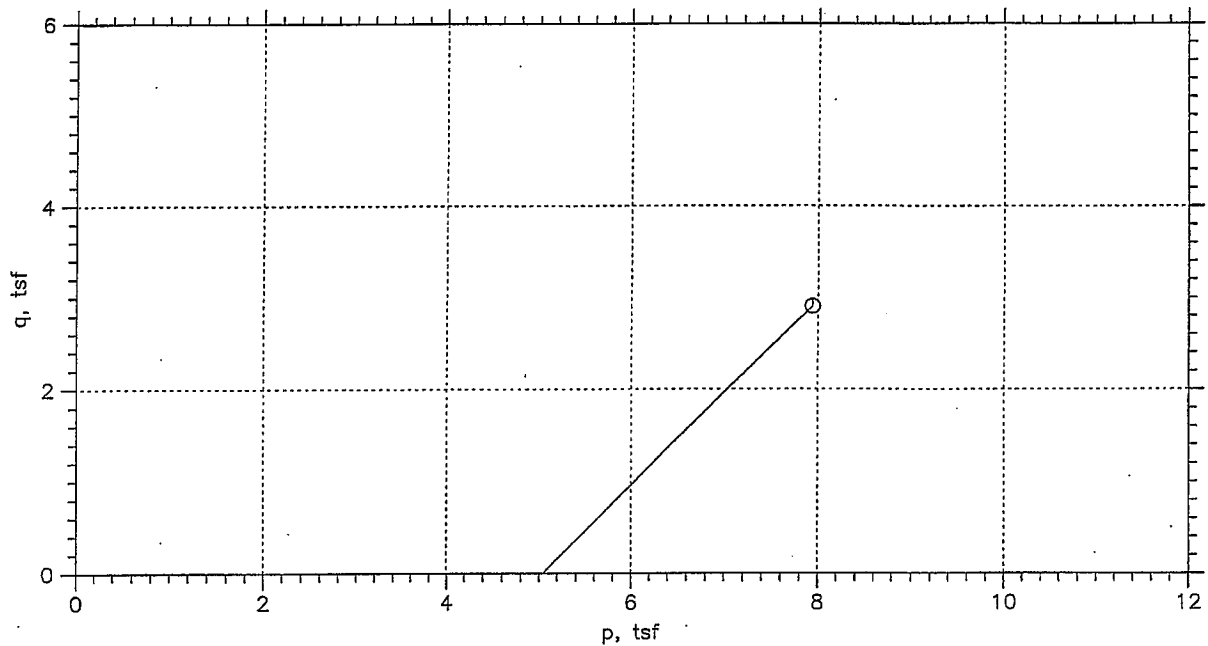
	Project: Exelon Texas COL Victoria				
	Location: B-2359UD UD-11				
	Project No.: 6468071777				
	Boring No.: B-2359UD				
	Sample Type: Undisturbed				
	Description: Light Gray Silty Clayey SAND (SC-SM)				
	Remarks: ASTM D2850-03a. Membrane correction not applied.				

Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 15:35:42

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊙			
Sample No.	UD-17			
Test No.	8368			
Depth	10-111.7'			
Tested by	BM			
Test Date	3/12/08			
Checked by	HJ <i>HJ</i>			
Check Date	4/14/08			
Diameter, in	2.861			
Height, in	5.598			
Water Content, %	17.4			
Dry Density, pcf	106.9			
Saturation, %	80.9			
Void Ratio	0.583			
Confining Stress, tsf	5.04			
Undrained Strength, tsf	2.901			
Max. Dev. Stress, tsf	5.801			
Strain at Failure, %	7.28			
Strain Rate, %/min	1			
Measured Specific Gravity	2.71			
Liquid Limit	21			
Plastic Limit	18			
Plasticity Index	3			

MACTEC	Project: Exelon Texas COL Victoria				
	Location: B-2359UD UD-17				
	Project No.: 6468071777				
	Boring No.: B-2359UD				
	Sample Type: Undisturbed				
Description: Pale Brown Mottled Yellowish Brown Silty SAND (SM)					
Remarks: ASTM D2850-03a. Membrane correction not applied.					

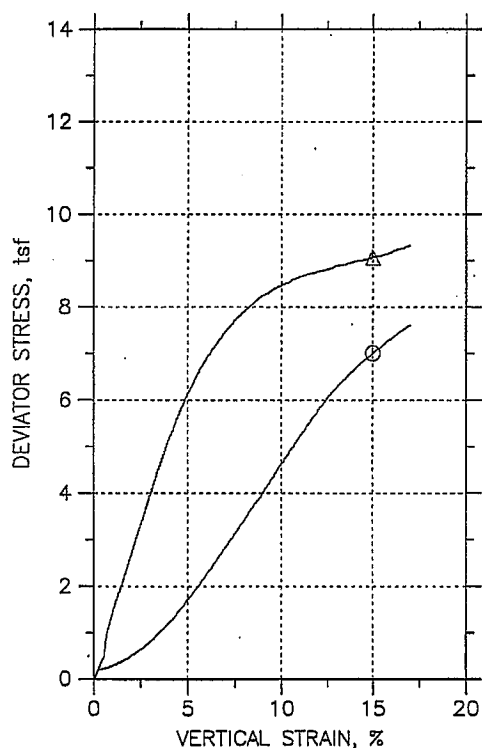
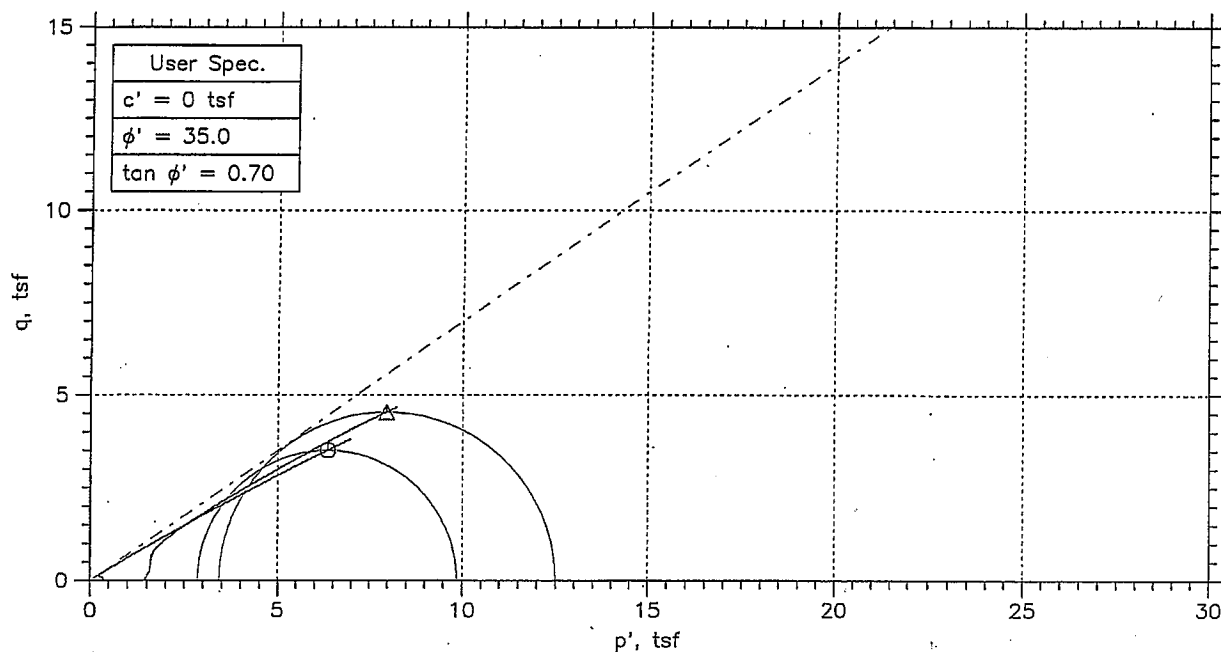
Phase calculations based on start and end of test.

KAW 4.15.08

Mon, 14-APR-2008 15:36:23

Consolidated Undrained Triaxial Compression Reports

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	Δ		
Sample No.	UD-3	UD-3		
Test No.	8343.1	8343.2		
Depth	13.5-16.0	13.5-16 Ft		
Initial	Diameter, in	2.868	2.854	
	Height, in	5.997	5.997	
	Water Content, %	17.7	17.1	
	Dry Density, pcf	99.26	107.2	
	Saturation, %	69.7	82.7	
Before Shear	Void Ratio	0.679	0.553	
	Water Content, %	24.4	18.9	
	Dry Density, pcf	101.	110.6	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.651	0.505	
	Back Press., tsf	10.08	3.6	
	Ver. Eff. Cons. Stress, tsf	.3604	1.44	
	Shear Strength, tsf	3.501	4.533	
	Strain at Failure, %	15	15	
	Strain Rate, %/min	0.05	0.05	
	B-Value	0.96	0.98	
	Measured Specific Gravity	2.67	2.67	
	Liquid Limit	NP	NP	
	Plastic Limit	NP	NP	

	Project: Exelon Texas COL Victoria	
	Location: B-2302UD, UD-3	
	Project No.: 6468071777	
	Boring No.: B-2302UD	
	Sample Type: Undisturbed	
	Description: Pale Yellow Silty SAND (SM)	
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.	

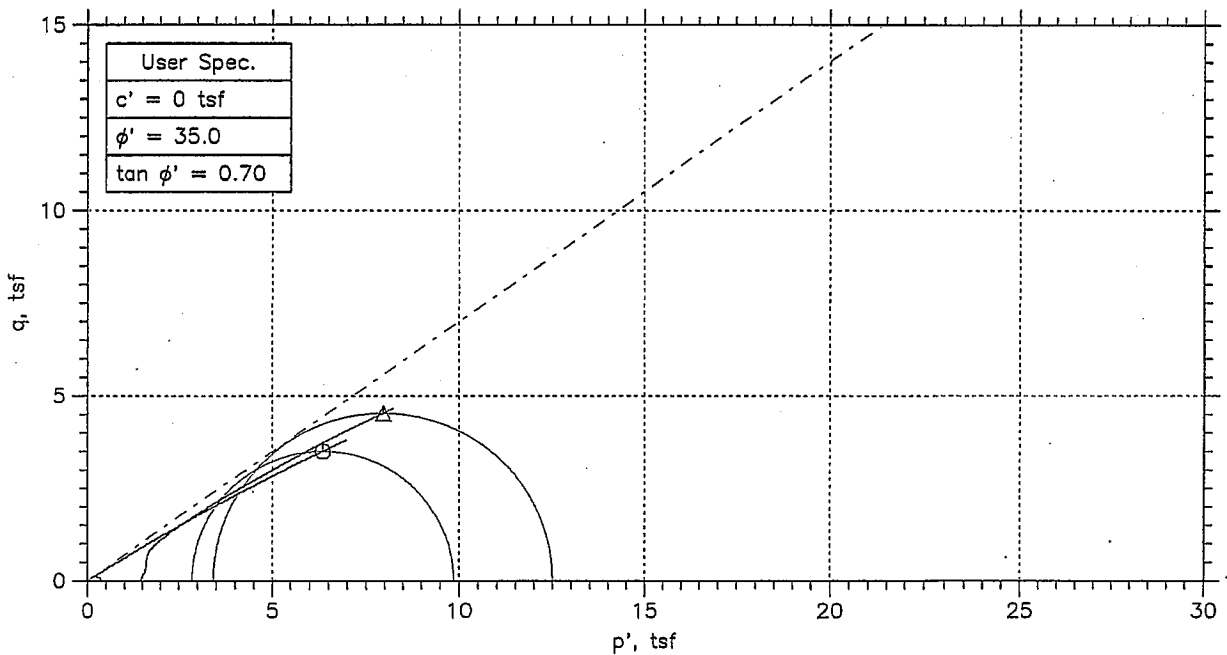
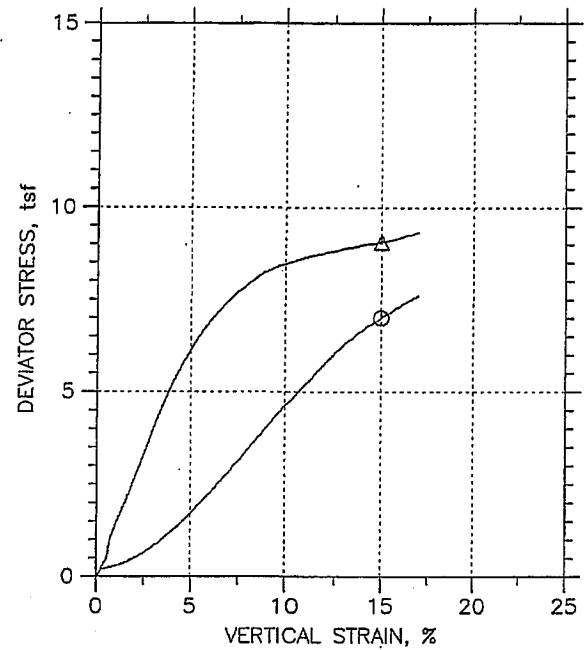
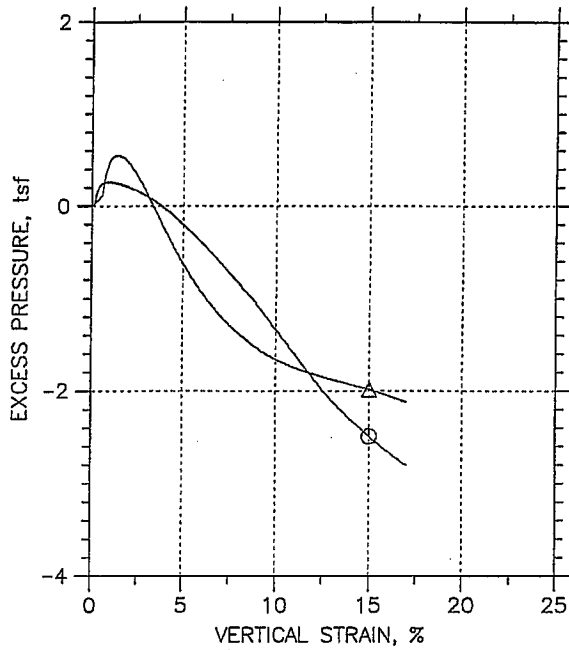
Tue, 15-APR-2008 13:55:33

Phase calculations based on start and end of test.

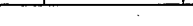
* Saturation is set to 100% for phase calculations.

KAW 4-15-08

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

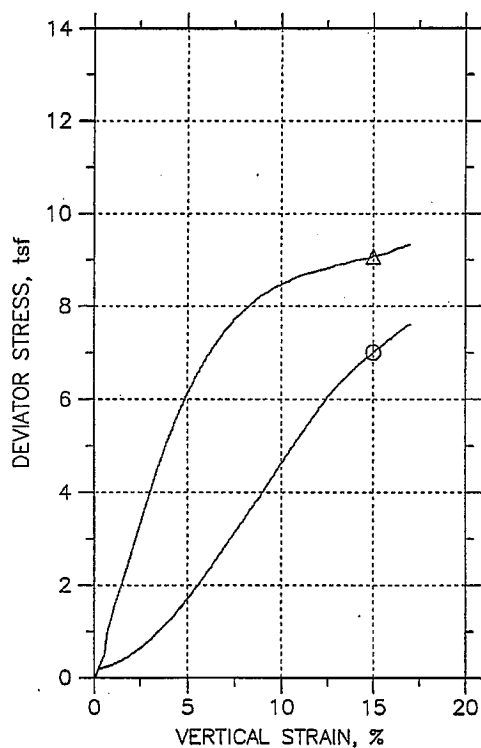
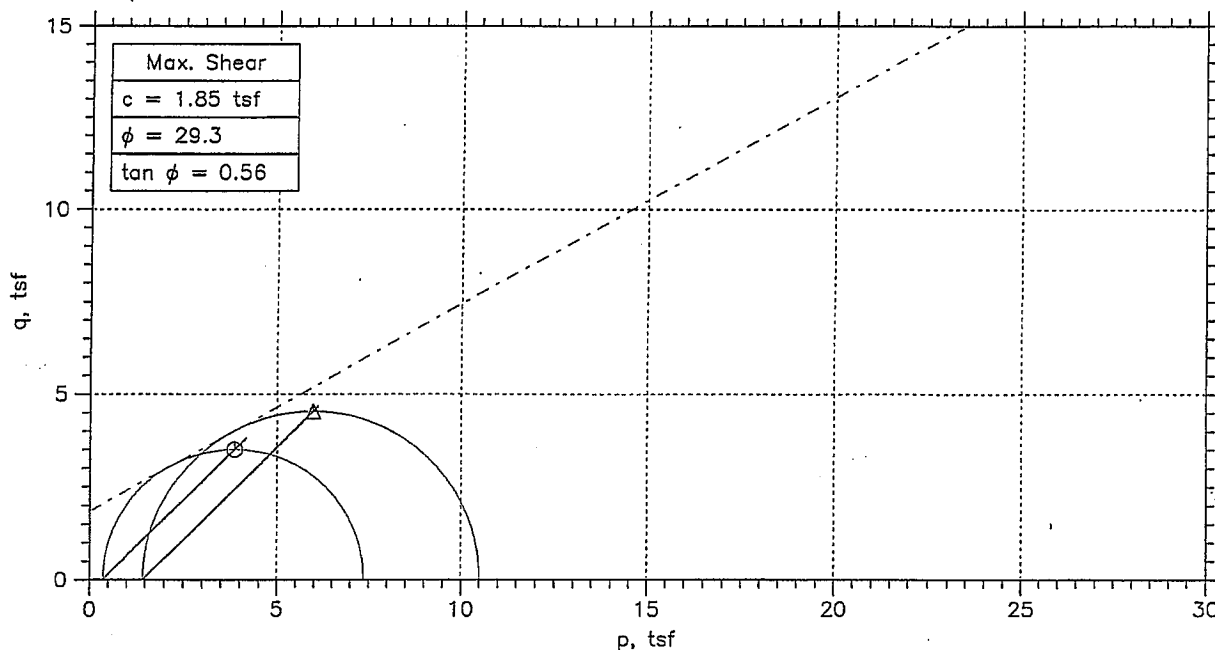


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-3	8343.1	13.5-16.0 F	HJ	4/3/08	JW		8343.1_2546.dat
△	UD-3	8343.2	13.5-16 Ft	HJ	4/3/08	JW	4/15/08	8343.2a_2580.dat

			
	Project: Exelon Texas COL Victoria		
	Location: B-2302UD, UD-3		Project No.: 6468071777
	Boring No.: B-2302UD		Sample Type: Undisturbed
	Description: Pale Yellow Silty SAND (SM)		
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.		

Tue, 15-APR-2008 13:55:33

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	Δ		
Sample No.	UD-3	UD-3		
Test No.	8343.1	8343.2		
Depth	13.5-16.0	13.5-16 F		
Initial	Diameter, in	2.868	2.854	
	Height, in	5.997	5.997	
	Water Content, %	17.7	17.1	
	Dry Density, pcf	99.26	107.2	
	Saturation, %	69.7	82.7	
	Void Ratio	0.679	0.553	
Before Shear	Water Content, %	24.4	18.9	
	Dry Density, pcf	101.	110.6	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.651	0.505	
	Back Press., tsf	10.08	3.6	
Ver. Eff. Cons. Stress, tsf		.3604	1.44	
Shear Strength, tsf		3.501	4.533	
Strain at Failure, %		15	15	
Strain Rate, %/min		0.05	0.05	
B-Value		0.96	0.98	
Measured Specific Gravity		2.67	2.67	
Liquid Limit		NP	NP	
Plastic Limit		NP	NP	

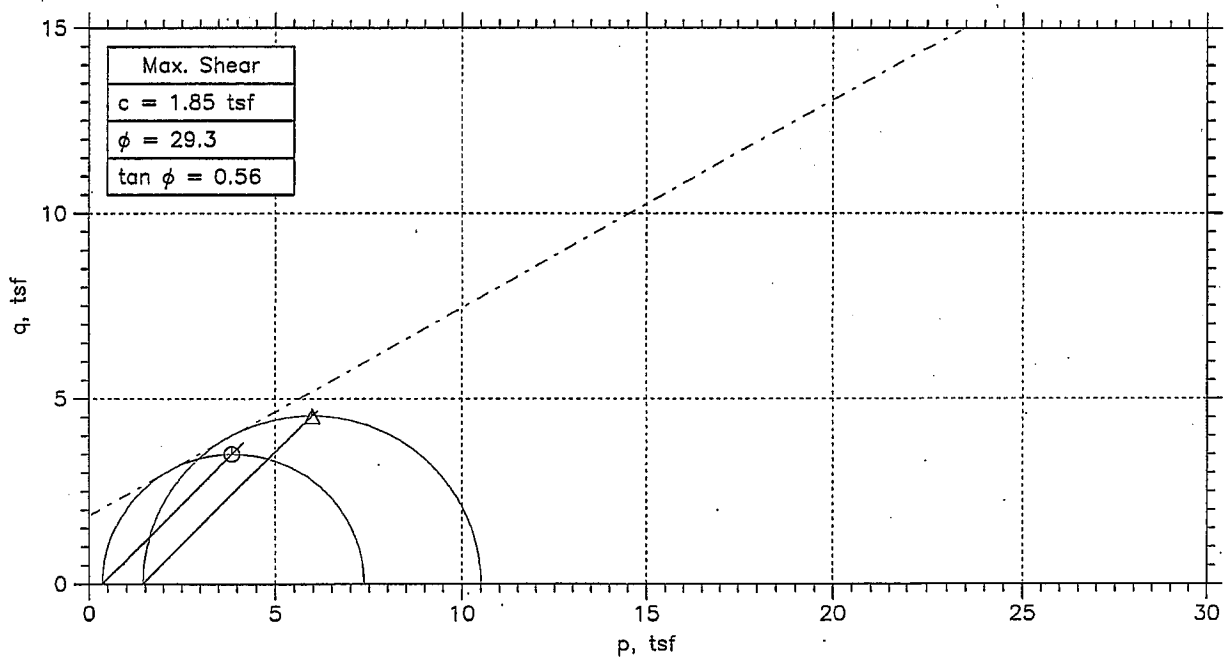
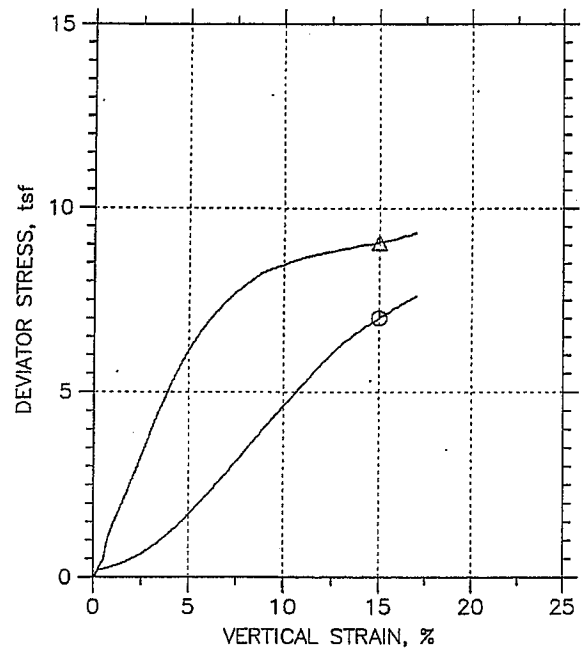
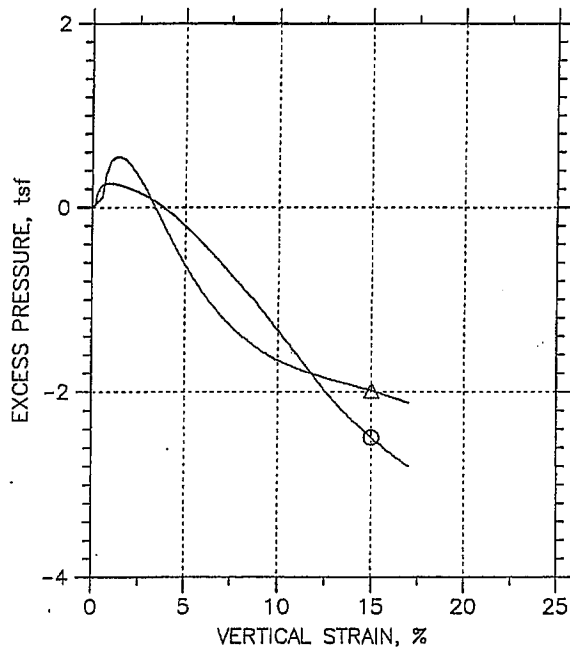
	Project: Exelon Texas COL Victoria	
	Location: B-2302UD, UD-3	
	Project No.: 6468071777	
	Boring No.: B-2302UD	
	Sample Type: Undisturbed	
	Description: Pale Yellow Silty SAND (SM)	
Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

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CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

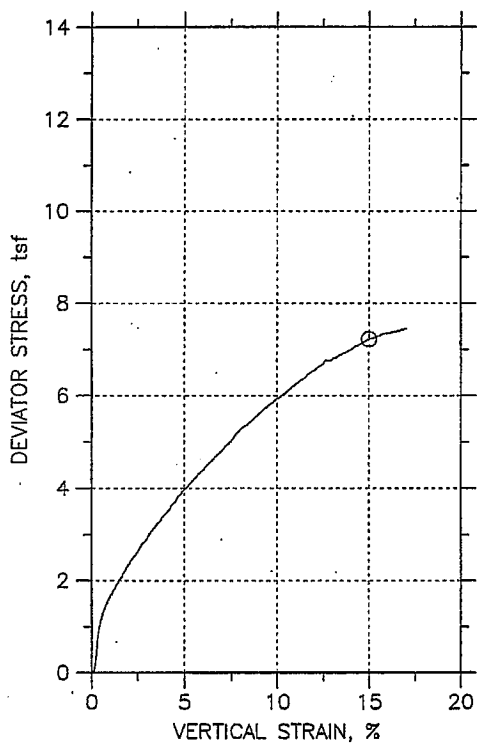
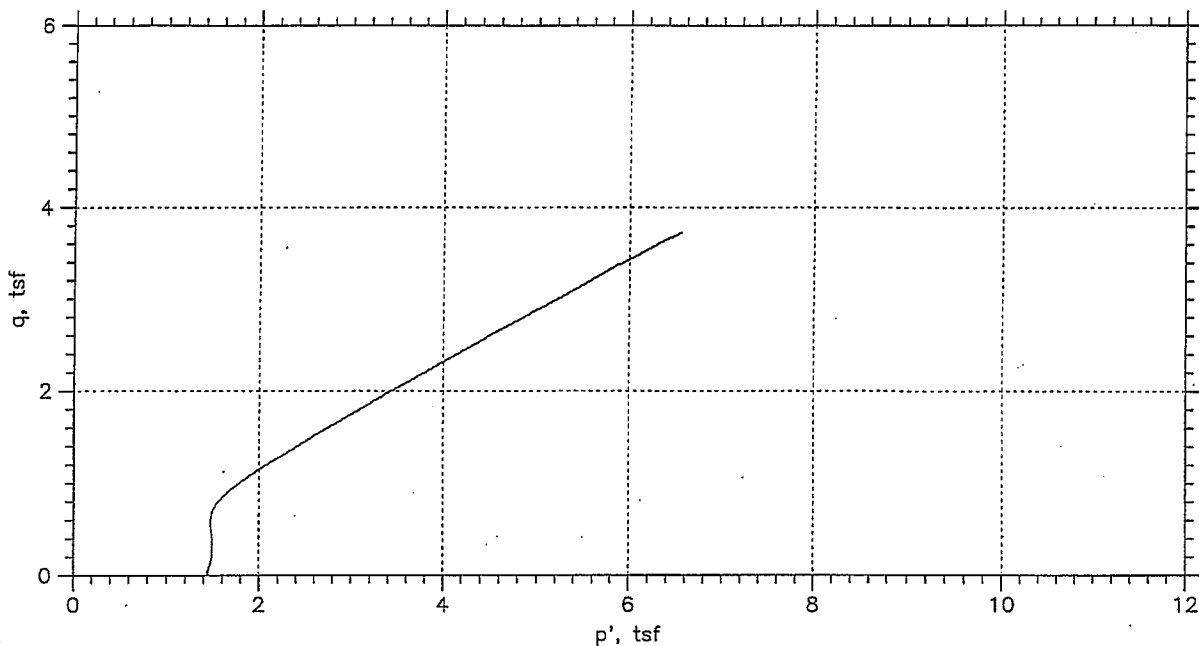


Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
UD-3	8343.1	13.5-16.0 F	HJ	4/3/08	JW	5/20	8343.1_2546.dat
UD-3	8343.2	13.5-16 Ft	HJ	4/3/08	JW	4/15/08	8343.2a_2580.dat

	Project: Exelon Texas COL Victoria		Location: B-2302UD, UD-3	Project No.: 6468071777
	Boring No.: B-2302UD		Sample Type: Undisturbed	
	Description: Pale Yellow Silty SAND (SM)			
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.			

Tue, 15-APR-2008 13:55:54

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙			
Sample No.	UD-7			
Test No.	8344.1			
Depth	59-60.2 Ft			
Initial	Diameter, in	2.854		
	Height, in	6.004		
	Water Content, %	20.1		
	Dry Density, pcf	106.4		
	Saturation, %	92.4		
Before Shear	Void Ratio	0.59		
	Water Content, %	21.1		
	Dry Density, pcf	107.7		
	Saturation*, %	100.0		
	Void Ratio	0.571		
	Back Press., tsf	5.759		
	Ver. Eff. Cons. Stress, tsf	1.439		
	Shear Strength, tsf	3.611		
	Strain at Failure, %	15		
	Strain Rate, %/min	0.05		
	B-Value	0.96		
	Measured Specific Gravity	2.71		
	Liquid Limit	22		
	Plastic Limit	16		

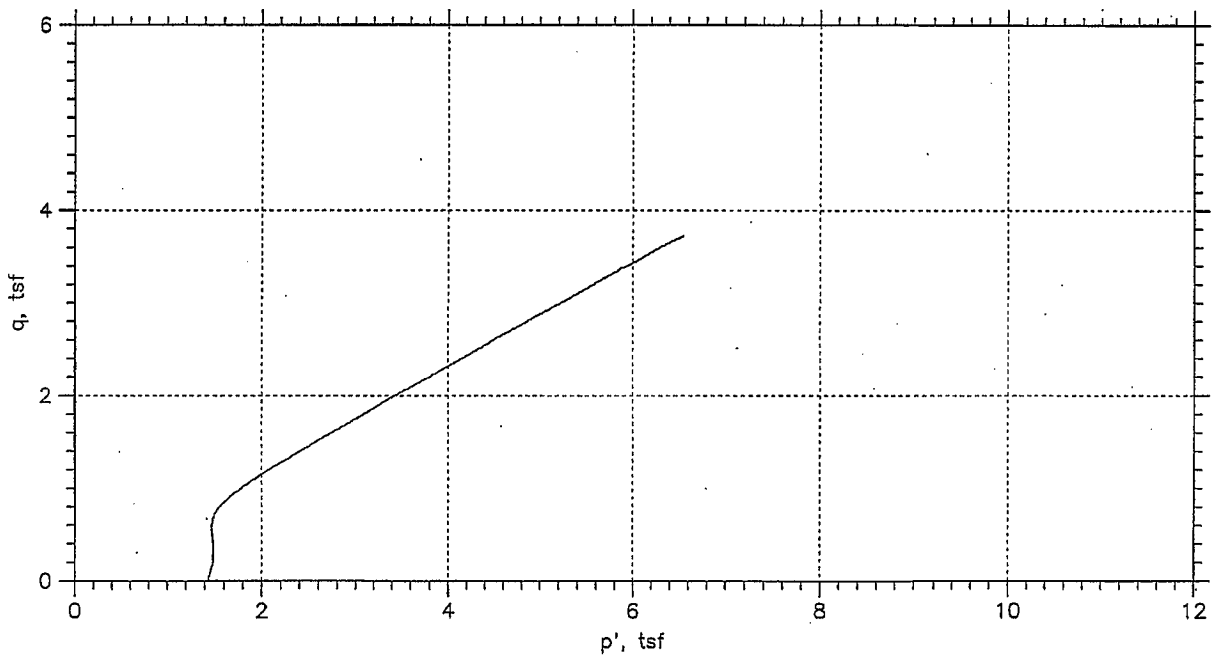
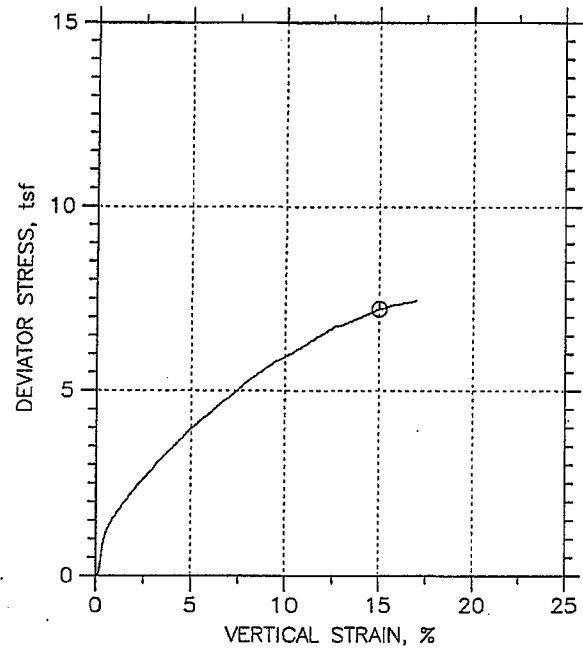
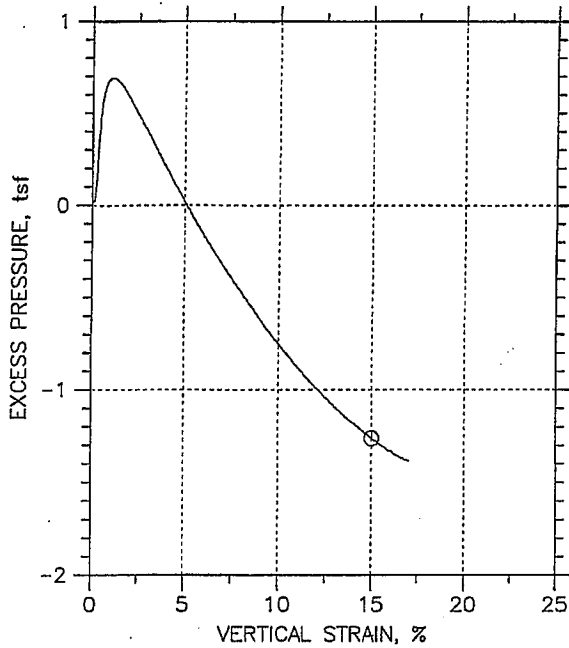
MACTEC	Project: Exelon Texas COL Victoria	(1)			
	Location: B-2302UD, UD-7				
	Project No.: 6468071777				
	Boring No.: B-2302UD				
	Sample Type: Undisturbed				
	Description: Light Gray Silty, Clayey SAND (SC-SM)				
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.				

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Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

KAW 4-15-08

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

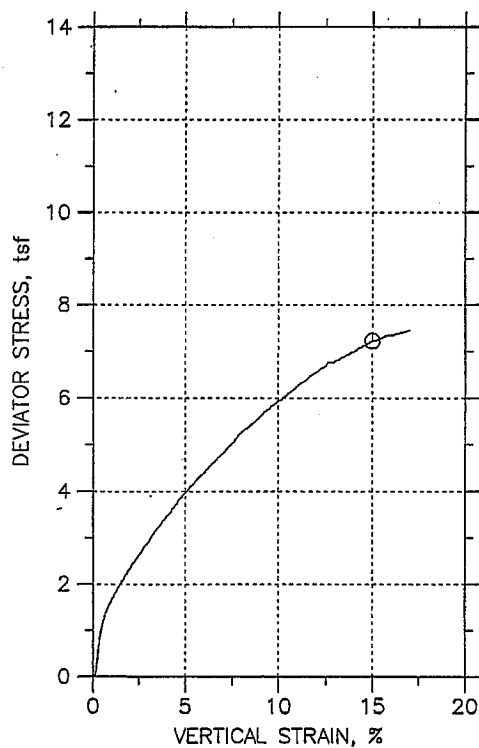
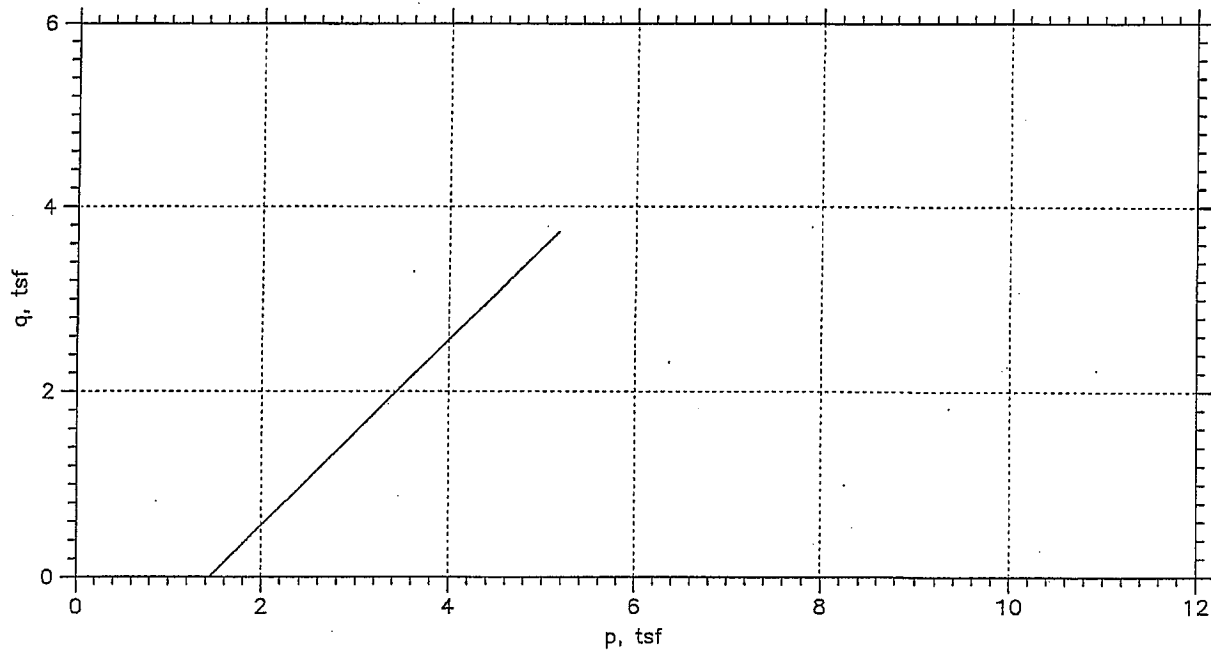


Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙ UD-7	8344.1	59-60.2 Ft	HJ	4/4/08	JW	4/15/08	8344.1_2582.dat

	Project: Exelon Texas COL Victoria		Location: B-2302UD, UD-7	Project No.: 6468071777
	Boring No.: B-2302UD		Sample Type: Undisturbed	
	Description: Light Gray Silty, Clayey SAND (SC-SM)			
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.			

Tue, 15-APR-2008 16:22:32

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Ø			
Sample No.	UD-7			
Test No.	8344.1			
Depth	59-60.2 Ft			
Initial	Diameter, in	2.854		
	Height, in	6.004		
	Water Content, %	20.1		
	Dry Density, pcf	106.4		
	Saturation, %	92.4		
Before Shear	Void Ratio	0.59		
	Water Content, %	21.1		
	Dry Density, pcf	107.7		
	Saturation*, %	100.0		
	Void Ratio	0.571		
	Back Press., tsf	5.759		
	Ver. Eff. Cons. Stress, tsf	1.439		
	Shear Strength, tsf	3.611		
	Strain at Failure, %	15		
	Strain Rate, %/min	0.05		
	B-Value	0.96		
	Measured Specific Gravity	2.71		
	Liquid Limit	22		
	Plastic Limit	16		

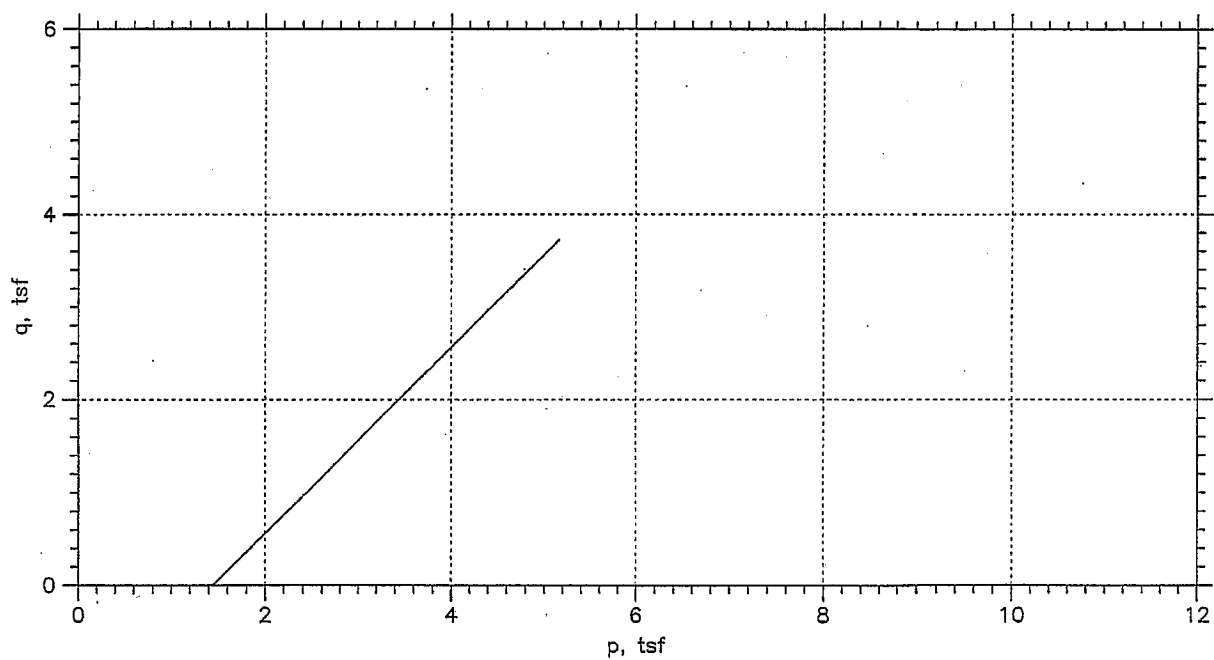
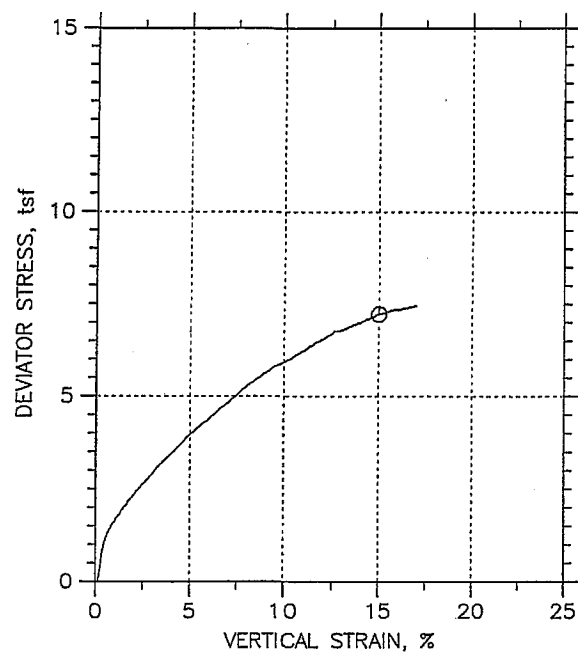
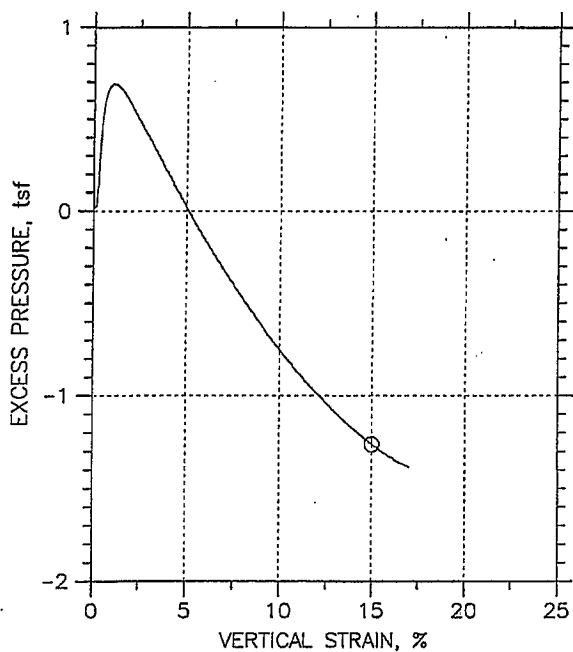
MACTEC	Project: Exelon Texas COL Victoria	(1)			
	Location: B-2302UD, UD-7				
	Project No.: 6468071777				
	Boring No.: B-2302UD				
	Sample Type: Undisturbed				
	Description: Light Gray Silty, Clayey SAND (SC-SM)				
Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.					

Phase calculations based on start and end of test.

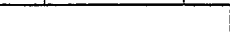
* Saturation is set to 100% for phase calculations.

Tue, 15-APR-2008 16:22:40

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-7	8344.1	59-60.2 Ft	HJ	4/4/08	JW	<i>SW</i> 4/15/08	8344.1_2582.dat

			
	Project: Exelon Texas COL Victoria	Location: B-2302UD, UD-7	Project No.: 6468071777
	Boring No.: B-2302UD	Sample Type: Undisturbed	
	Description: Light Gray Silty, Clayey SAND (SC-SM)		
	Remarks: ASTM D4767-04. Wet method was followed for specimen saturation.		

Tue, 15-APR-2008 16:22:40

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-4 File Name: 2304UD_UD8
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 8.64, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma'_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =	
Sample No.: UD8	Compostite No.:	☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =	
Depth (ft): 83.5-85.5	Specimen No.: c	☐ Kneading	Undercompaction: U_{hi} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	$\pm$ Opt. =	

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☒ Strain	☐ Stress
		☐ Constant Cell Pressure	☐ Cyclic (Hz)
		☐ Variable Cell Pressure	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	1114	4115	4027	4000
Mass Moist Soil + Cont. (g)	77.74	68.22	87.68	143.08
Mass Dry Soil + Container (g)	67.02	59.45	73.69	115.34
Mass Container (g)	31.72	30.27	30.13	30.16
Water Content, $W_{o,n}$ (%)	30.37	30.05	32.12	32.57
Avg. Initial WC, $W_{o,avg}$ (%)	30.85	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		444.57	450.72
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		444.57	450.72
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	100.000	1 T 50.90	61.00		For
1 15.12	-1.52	2 M 50.75	60.20		Wedge
2 15.19	-2.52	3 B 50.80	60.10		Failure
3 15.19	-2.18	1' T 51.40			$= d_{max}$
4 15.11	-2.84	2' M 51.40			$= d_{min}$
5 15.12	-3.04	3' B			$= \Delta d$
Avg. 115.15	97.58	Avg. 50.82	56.82	xxxxx	

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	20.28
Pi Tape: ☒ Dia	V_o (cm ³)	233.53
Calipers: ☐ Ht.; ☐ Dia	$A_{atb,m} = \pi (D'_{at})^2/400$ (cm ²)	25.10
Dial Comparator ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d)d_{max}\pi/400$ (cm ²)	NA
Remarks: ID# PI-002	$D'_{at} = (D_T + 2D_M + D_B)/4$ (mm)	56.53

Photo Taken. Failure Mode: NA - Not Applicable
 Failure Sketch:
 Failure Mode: ☐ Bulge ☒ Wedge ☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)
 Other Remarks: GB - Gage Block
 LL=61 PL=26 PI=35
 Final Visual Classification: Mottled Brownish Yellow and Pale Yellow Fat CLAY (CH)

Estimated Initial Unit Weight	
Total, γ_{to} (lb/ft ³) = 118.84	Dry, $\gamma_{d,o}$ (lb/ft ³) = 90.83
Membrane / Filter Paper / Apparatus	
Membrane (mm):	Top Bottom
Number: 1	Thickness: 0.51 0.71
Single; ☒ Double	0.54 0.67
Circumference ($C_{m,o}$)	146.0 147.0
Total Thickness	Dia. ($C_{m,o}/\pi$)
Average: 0.30	46.63
Filter Paper: Top + Bottom: ☐ Yes; ☒ No	
Filter Strips: ☒ Yes; ☐ No	Number = 8
Type of Filter Strips: ☐ Vertical: 1/4 in. & Whatman #54	
☒ Spiral: 1/4 in. & Whatman #1	
Apparatus: Mass Top Cap, M_{tc} = 65.8 g, 0.15 lbf	
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf	
Top Cap Attached: ☒ Yes; ☐ No; ☒ 1/2; ☐ 3/4; ☐ External ☒ Internal	
Top Cap - Rotation: ☒ Fixed, <1°; ☐ Limited, <5°; ☐ Unlimited, >5°	
With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap	
☐ Internal LVDT Jacket	

Trimmed / Reconstituted By: TP Set Up By: TP Taken Down By: AW
 Date: 3/27/2008 Date: 3/27/2008 Date: 4/14/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WED

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-4

File Name: 2304UD_UD8c

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☒ Assumed

Boring No.: B-2304UD

Sample No.: UD8

Specimen No.: c

Depth (ft): 83.5-85.5

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed";

☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	29.81
W_c 30.37	30.05	32.12	30.85	29.81	30.76	Initial, $M_{d,o}$	342.48
S_o 96.5	96.0	99.2	97.3	95.6	97.1	Final, $M_{d,at}$	340.00
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	342.48
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.07	-0.80		1.40	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	0.31	-9.58	NA	12.51	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.42	-4.84		8.52	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				1.47	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.42	-4.84		6.51	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	110.04	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 45$ min
Back Pressure, $U_{b,n}$ (psi)	50.27	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.51	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	8.66	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	11.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures					
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required	
$\Delta V_c = 1.25$	$\Delta V_c = -1.50$	$\Delta V_c = 3.41$	& corr. for ΔH_{td} $\Delta V_c =$	G_s for $S_c = 100$ %:	2.770

At Final Test Stress/Stage - Consolidation Conclusions					
$\Delta H_{c,f}$ (mm) = 0.54	$\Delta V_{c,f}$ (cm^3) = 1.25	Back Cal. G_s for $S=100\%$ = 2.770	Normalized	Ht. Ch. (%) = -0.51	
$\epsilon_{ac,c}$ (%) = 0.47	$\epsilon_{vc,f}$ (%) = 0.54		Diff. in:	Vol. Ch. (%) =	

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight (pcf)		Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:					Total	Dry					
Initial:	115.15	233.53	20.28	29.81	118.84	91.55	95.6	0.845	0.4379	0.458	98.0
After to 1st σ'_c	114.61	232.28	20.27	31.60	121.13	92.04	102.6	0.835	0.4668	0.455	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,c} + \rho_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-4 File Name: 2304UD_UD8
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2304UD</u>	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt.(lb)=	No. Layers =	
Sample No.: <u>UD8</u>	Composite No.: <u></u>	☐ Pluviated:	Tamper Force (lb)=	Drop (in.) =	
Depth (ft): <u>83.5-85.5</u>	Specimen No.: <u>c</u>	☐ Kneading	Undercompaction: U_{nl} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	± Opt. =	

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.)= <u>NA</u>
			45° stress path	Remarks:	
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☒ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Strain <u>Other</u> :

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight (pcf)		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
Condition:					Total	Dry			
Initial:	115.15	233.53	20.28	29.81	118.84	91.55	95.63	0.84	98.0
After to 1st σ'_c	114.61	232.28	20.27	31.60	121.13	92.04	102.59	0.83	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Consolidation Stress Summary and Loading Summary					
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c	%	0.465	NA	NA	NA
Vol. Strain during Consol., ϵ_v	%	0.535	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	8.659	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	8.616	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.995			
Induced OCR	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	17.275			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	8.630			
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>46.63</u> mm	
Thickness:	<u>0.30</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.338	25.10
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	Type Strips: <u>Spiral #1</u>
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Brownish Yellow and Pale Yellow Fat CLAY (CH)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	2.10	1.950	8.271	2.287	10.221	6.320
	Max Obliquity	4.91	1.922	7.939	2.592	9.862	6.017
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 8.89E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2304UD
Sample No.: UD8
Specimen No.: c

Depth (ft.): 83.5-85.5
Stage No.: 1

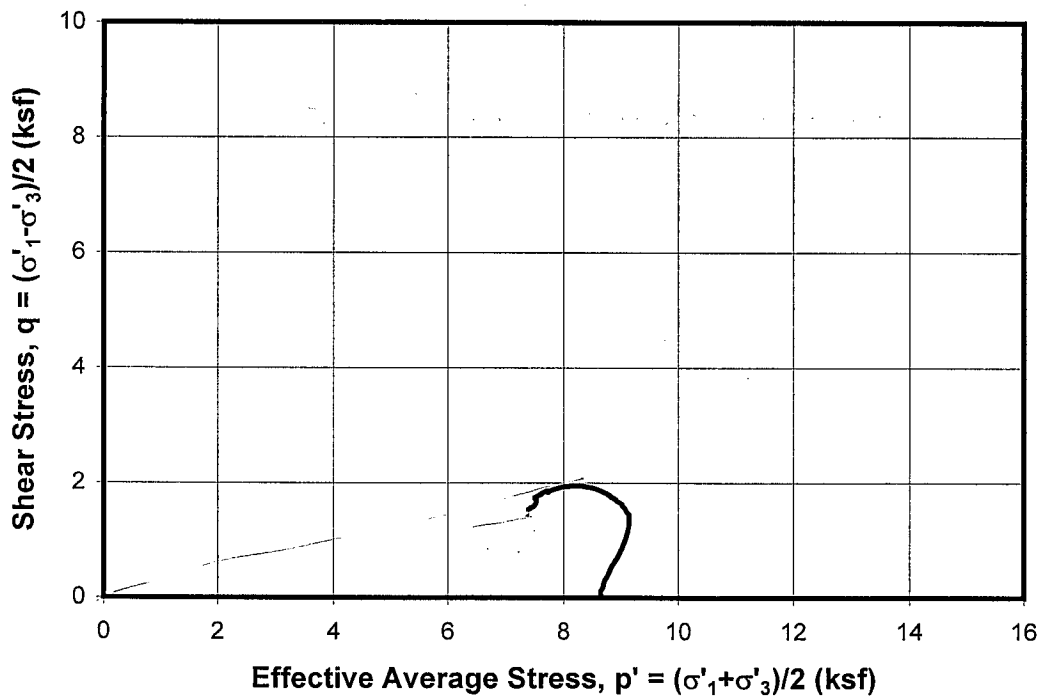
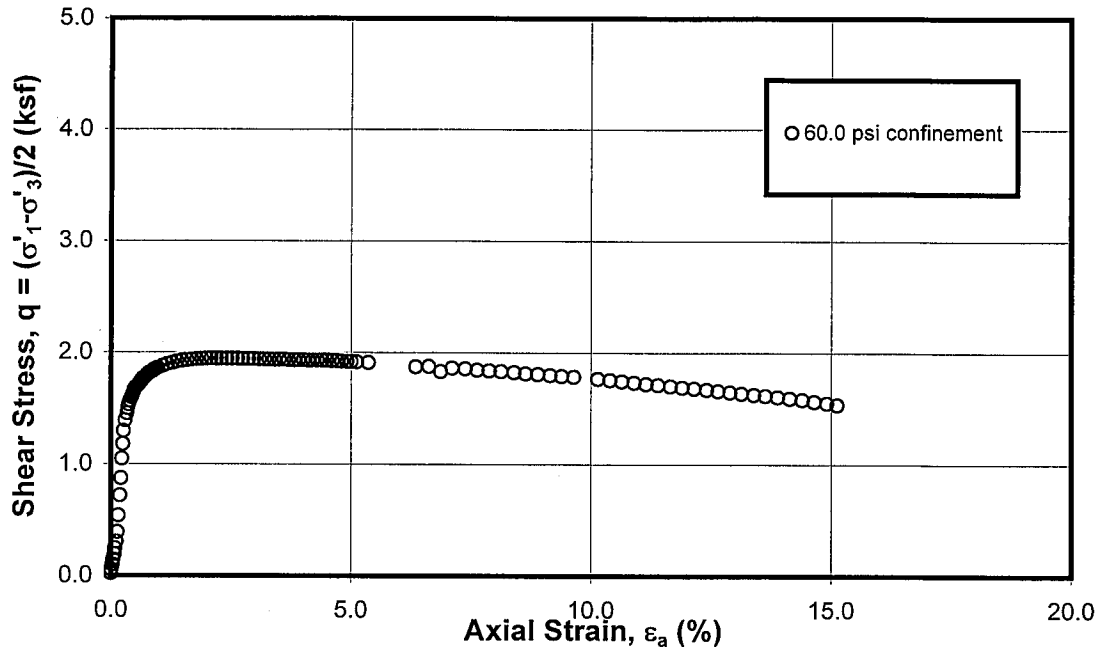
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.022	8.637	0.000	0.000	1.005	0.000	-	-
3.0	0.008	0.057	8.649	0.021	0.000	1.013	0.333	844.3	580.9
6.0	0.035	0.100	8.639	0.064	0.000	1.023	0.487	444.3	524.9
9.0	0.048	0.145	8.659	0.091	0.000	1.034	0.411	519.3	550.8
12.0	0.074	0.193	8.690	0.117	0.000	1.045	0.346	466.0	559.6
15.0	0.088	0.245	8.693	0.165	0.000	1.058	0.376	511.1	642.4
18.0	0.111	0.307	8.720	0.196	0.000	1.073	0.355	516.0	610.9
21.0	0.135	0.391	8.769	0.231	0.000	1.093	0.321	547.1	1076.3
24.0	0.156	0.541	8.829	0.321	0.000	1.131	0.315	668.0	1307.7
27.0	0.187	0.722	8.946	0.389	0.000	1.175	0.280	749.0	1257.3
30.0	0.210	0.876	9.017	0.464	0.000	1.215	0.278	815.4	1794.5
33.0	0.225	1.050	9.086	0.571	0.000	1.261	0.282	913.3	1718.7
36.0	0.247	1.180	9.118	0.666	0.000	1.297	0.292	939.3	1532.3
39.0	0.259	1.298	9.140	0.765	0.000	1.331	0.303	984.4	1191.0
42.0	0.295	1.393	9.140	0.863	0.000	1.360	0.317	929.4	424.7
45.1	0.334	1.454	9.138	0.928	0.000	1.379	0.325	859.1	482.1
48.1	0.348	1.500	9.091	1.018	0.000	1.395	0.347	850.4	485.7
51.1	0.369	1.535	9.077	1.065	0.000	1.407	0.355	819.5	287.5
54.1	0.396	1.569	9.051	1.124	0.000	1.419	0.366	780.6	213.2
57.1	0.428	1.597	9.021	1.186	0.000	1.430	0.378	736.2	226.7
60.1	0.448	1.624	9.010	1.226	0.000	1.440	0.384	715.8	233.8
63.1	0.471	1.646	8.983	1.279	0.000	1.449	0.394	690.3	268.9
66.1	0.482	1.665	8.955	1.318	0.000	1.457	0.403	682.4	236.5
69.1	0.510	1.683	8.927	1.365	0.000	1.465	0.413	651.5	110.5
72.1	0.544	1.699	8.913	1.396	0.000	1.471	0.418	616.8	103.1
75.1	0.573	1.716	8.902	1.427	0.000	1.477	0.422	591.2	104.3
78.1	0.599	1.728	8.873	1.462	0.000	1.484	0.431	569.6	128.5
81.1	0.620	1.745	8.858	1.499	0.000	1.491	0.436	555.7	121.4
84.1	0.645	1.755	8.826	1.533	0.000	1.497	0.446	537.2	111.7
87.1	0.666	1.770	8.815	1.562	0.000	1.502	0.449	525.2	104.4
90.1	0.692	1.779	8.806	1.582	0.000	1.506	0.452	507.5	63.2
93.1	0.722	1.787	8.787	1.608	0.000	1.511	0.458	489.0	76.7
96.1	0.744	1.798	8.779	1.630	0.000	1.515	0.460	477.5	91.4
99.1	0.766	1.807	8.754	1.657	0.000	1.520	0.467	466.5	87.6
102.1	0.790	1.818	8.746	1.684	0.000	1.525	0.470	454.6	61.0
105.1	0.819	1.823	8.731	1.707	0.000	1.528	0.474	439.9	41.3
108.1	0.845	1.829	8.707	1.732	0.000	1.532	0.481	427.9	46.4
111.1	0.880	1.837	8.701	1.746	0.000	1.535	0.483	412.7	115.4

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
114.1	0.889	1.846	8.687	1.774	0.000	1.540	0.486	410.3	109.8
117.1	0.916	1.851	8.677	1.786	0.000	1.542	0.489	399.4	42.3
120.1	0.948	1.859	8.655	1.809	0.000	1.547	0.495	387.7	39.9
123.1	0.978	1.863	8.643	1.829	0.000	1.550	0.498	376.6	34.1
135.1	1.074	1.882	8.601	1.890	0.000	1.560	0.510	346.4	35.1
147.1	1.175	1.897	8.557	1.955	0.000	1.570	0.521	319.4	25.5
159.1	1.281	1.908	8.519	2.002	0.000	1.577	0.531	294.5	23.4
171.1	1.384	1.922	8.484	2.051	0.000	1.586	0.540	274.7	19.5
183.1	1.481	1.928	8.439	2.095	0.000	1.592	0.552	257.3	11.2
195.1	1.590	1.933	8.392	2.153	0.000	1.599	0.564	240.5	10.3
207.1	1.693	1.938	8.371	2.168	0.000	1.603	0.569	226.5	8.4
219.1	1.791	1.942	8.341	2.209	0.000	1.607	0.577	214.5	6.2
231.1	1.897	1.945	8.318	2.238	0.000	1.610	0.583	202.8	4.3
243.1	2.001	1.946	8.288	2.270	0.000	1.614	0.591	192.4	5.6
255.1	2.095	1.950	8.271	2.287	0.000	1.617	0.595	184.1	1.7
267.1	2.210	1.947	8.248	2.303	0.000	1.618	0.601	174.3	-2.6
279.1	2.312	1.947	8.220	2.338	0.000	1.621	0.608	166.5	0.3
291.1	2.426	1.948	8.205	2.357	0.000	1.623	0.612	158.8	0.5
303.1	2.540	1.948	8.176	2.377	0.000	1.625	0.620	151.6	-1.1
315.1	2.654	1.947	8.159	2.393	0.000	1.627	0.624	145.0	-3.1
327.1	2.757	1.945	8.165	2.395	0.000	1.625	0.623	139.5	-3.0
339.1	2.882	1.943	8.136	2.411	0.000	1.628	0.630	133.3	-0.4
351.1	2.986	1.944	8.122	2.419	0.000	1.629	0.634	128.8	-1.5
363.1	3.097	1.941	8.129	2.431	0.000	1.628	0.632	124.0	-3.4
375.1	3.206	1.940	8.113	2.437	0.000	1.629	0.637	119.7	-1.5
387.1	3.300	1.940	8.095	2.444	0.000	1.630	0.641	116.3	-2.2
399.1	3.410	1.938	8.086	2.457	0.000	1.630	0.644	112.4	-1.8
411.1	3.510	1.938	8.077	2.465	0.000	1.631	0.646	109.2	3.0
423.1	3.611	1.941	8.068	2.475	0.000	1.633	0.648	106.3	-1.6
435.1	3.704	1.936	8.057	2.492	0.000	1.633	0.652	103.4	-5.8
447.1	3.818	1.935	8.042	2.495	0.000	1.634	0.655	100.2	-0.5
459.1	3.911	1.936	8.045	2.507	0.000	1.634	0.655	97.9	0.5
471.1	4.007	1.935	8.031	2.511	0.000	1.635	0.658	95.5	-1.9
483.1	4.101	1.934	8.033	2.516	0.000	1.634	0.658	93.3	-2.3
495.1	4.205	1.933	8.004	2.542	0.000	1.637	0.666	90.9	-1.7
507.1	4.303	1.932	8.001	2.540	0.000	1.637	0.667	88.8	-1.2
519.1	4.396	1.932	7.985	2.552	0.000	1.638	0.671	86.9	-0.9
531.1	4.499	1.931	7.989	2.549	0.000	1.638	0.670	84.9	-4.5
543.1	4.608	1.927	7.972	2.560	0.000	1.638	0.675	82.7	-5.1
555.2	4.707	1.926	7.969	2.571	0.000	1.637	0.675	80.9	-2.9
567.2	4.805	1.924	7.963	2.576	0.000	1.637	0.677	79.2	-3.5
579.2	4.910	1.922	7.939	2.592	0.000	1.639	0.684	77.4	-3.6
591.2	5.001	1.921	7.937	2.591	0.000	1.639	0.684	76.0	-4.1

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
603.2	5.110	1.918	7.933	2.592	0.000	1.638	0.686	74.2	-5.0
633.2	5.358	1.912	7.924	2.608	0.000	1.636	0.689	70.6	-1665.0
753.2	6.354	1.875	7.795	2.694	0.000	1.633	0.727	58.3	1332.4
783.2	6.633	1.877	7.789	2.700	0.000	1.635	0.729	55.9	-16.6
813.2	6.886	1.833	7.729	2.713	0.000	1.622	0.751	52.6	-4.5
843.2	7.125	1.864	7.725	2.747	0.000	1.636	0.748	51.7	10.9
873.2	7.398	1.858	7.692	2.784	0.000	1.637	0.757	49.7	-6.1
903.2	7.645	1.848	7.694	2.762	0.000	1.632	0.758	47.8	-6.9
933.2	7.894	1.841	7.668	2.792	0.000	1.632	0.766	46.1	-5.1
963.2	8.135	1.836	7.649	2.795	0.000	1.632	0.773	44.6	-5.8
993.2	8.401	1.826	7.638	2.800	0.000	1.629	0.777	43.0	-8.0
1023.2	8.643	1.815	7.619	2.803	0.000	1.626	0.784	41.5	-7.4
1053.2	8.897	1.808	7.621	2.797	0.000	1.622	0.784	40.2	-6.0
1083.2	9.149	1.800	7.597	2.810	0.000	1.621	0.792	38.9	-6.0
1113.2	9.392	1.793	7.596	2.811	0.000	1.618	0.794	37.7	-5.9
1143.2	9.645	1.786	7.576	2.826	0.000	1.617	0.801	36.6	-543.0
1203.2	10.144	1.769	7.543	2.841	0.000	1.613	0.813	34.5	517.4
1233.2	10.398	1.758	7.522	2.852	0.000	1.610	0.821	33.4	-9.1
1263.2	10.647	1.746	7.501	2.853	0.000	1.607	0.829	32.4	-9.2
1293.2	10.898	1.735	7.520	2.832	0.000	1.600	0.826	31.4	-9.0
1323.2	11.144	1.724	7.500	2.829	0.000	1.597	0.834	30.6	-8.0
1353.2	11.394	1.715	7.521	2.805	0.000	1.591	0.829	29.7	-7.7
1383.2	11.655	1.704	7.533	2.786	0.000	1.585	0.828	28.9	-9.2
1413.2	11.898	1.692	7.531	2.784	0.000	1.580	0.831	28.1	-8.6
1443.2	12.145	1.683	7.534	2.767	0.000	1.575	0.832	27.4	-8.1
1473.2	12.406	1.671	7.526	2.762	0.000	1.571	0.837	26.6	-9.3
1503.2	12.651	1.660	7.525	2.752	0.000	1.566	0.840	25.9	-8.9
1533.2	12.900	1.649	7.519	2.751	0.000	1.562	0.843	25.2	-8.3
1563.2	13.143	1.639	7.516	2.742	0.000	1.558	0.846	24.6	-8.6
1593.2	13.401	1.628	7.501	2.736	0.000	1.554	0.854	24.0	-8.2
1623.2	13.646	1.619	7.500	2.733	0.000	1.550	0.856	23.4	-8.5
1653.2	13.899	1.606	7.493	2.728	0.000	1.546	0.861	22.8	-9.4
1683.2	14.148	1.595	7.480	2.721	0.000	1.542	0.868	22.2	-9.4
1713.2	14.402	1.583	7.467	2.733	0.000	1.538	0.875	21.7	-10.9
1743.2	14.648	1.568	7.417	2.762	0.000	1.536	0.895	21.1	-11.6
1773.2	14.909	1.553	7.418	2.753	0.000	1.530	0.898	20.5	-12.2
1800.7	15.120	1.539	7.386	2.769	0.000	1.526	0.912	20.1	-13.4



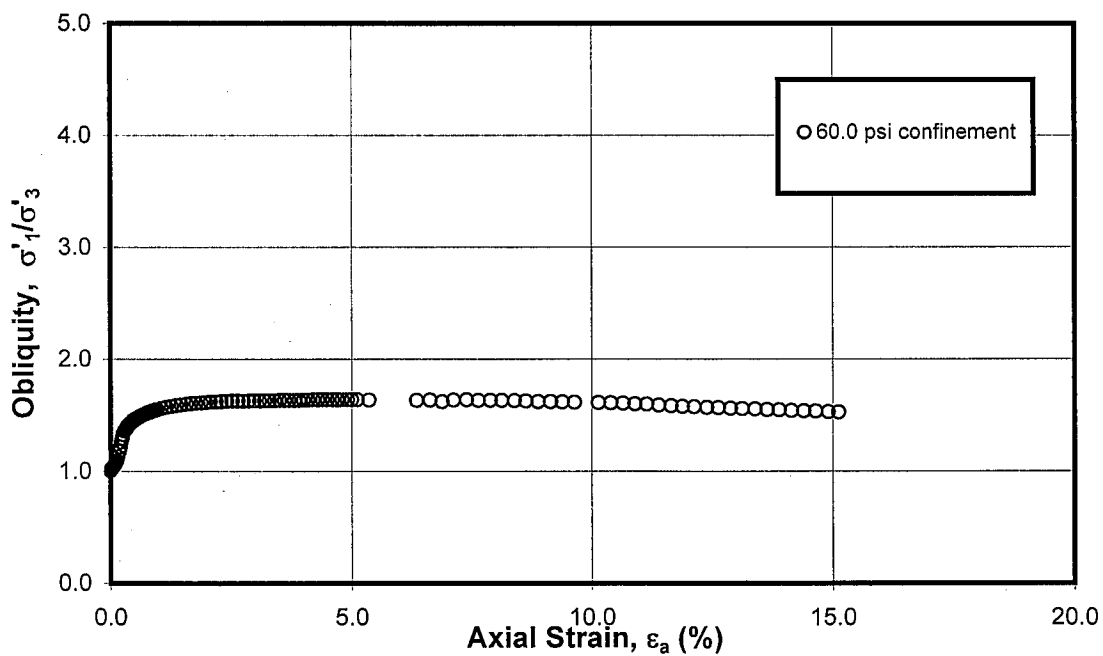
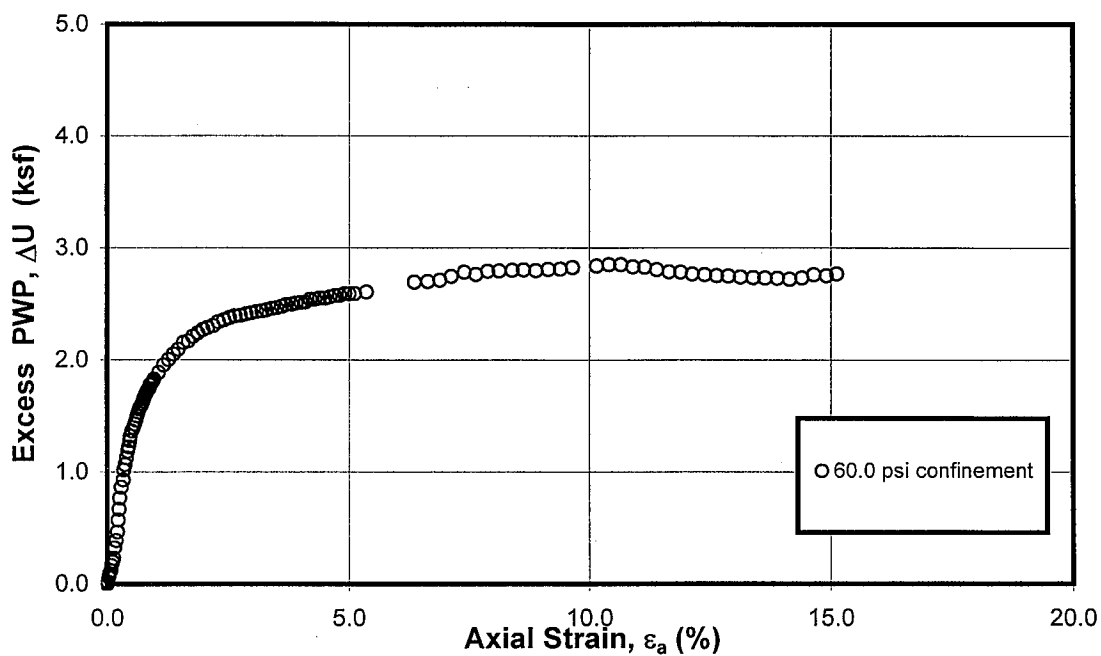
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD8c - Depth: 83.5-85.5 ft

Boring B-2304UD

Reviewed By: WFD



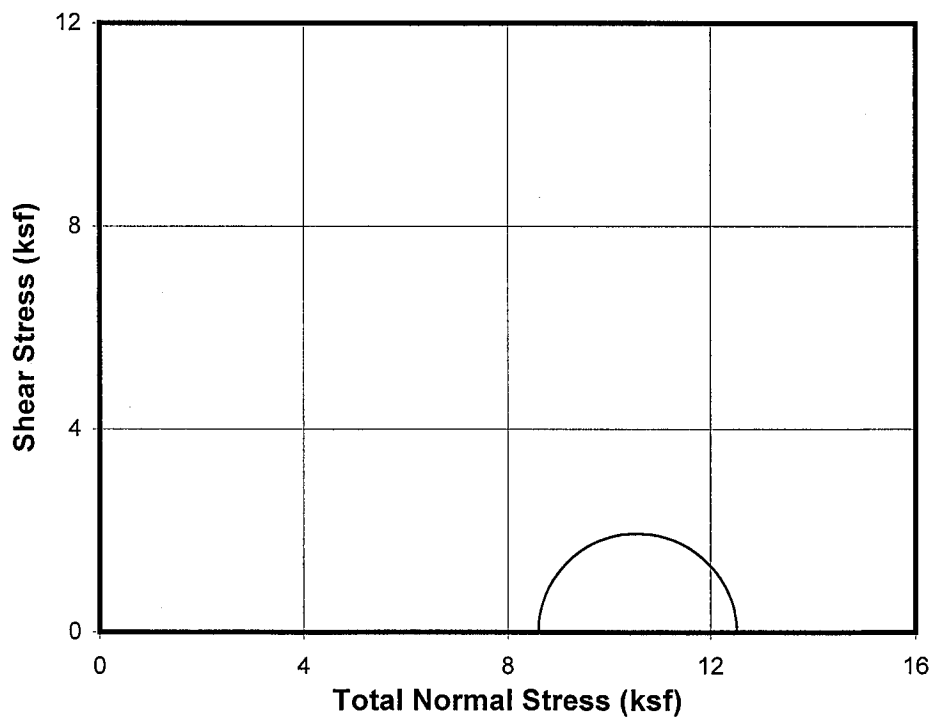
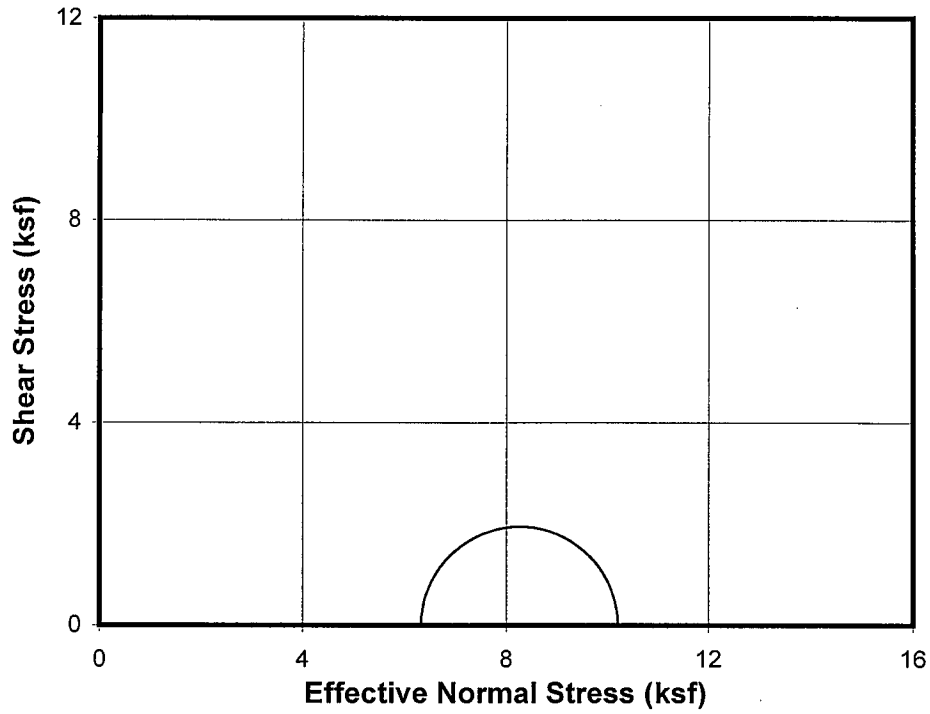
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD8c - Depth: 83.5-85.5 ft

Boring B-2304UD

Reviewed By: *WIA*



UNDRAINED TRIAXIAL COMPRESSION TEST
 Isotropically Consolidated- Mohr's Circles
 Sample: UD8c - Depth: 83.5-85.5 ft
 Boring B-2304UD

Reviewed By: WLD

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: File Name: B-2304UD_UD11d
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 10.08 , & ksf
 Project Name: Exelon (Victoria) $k (\sigma'_{h,c} / \sigma'_{v,c}) = 1.00$ Induced OCR = 1.00 $K_{ua} (\sigma_{d,ua} / 2\sigma'_{v,c}) = NA$

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =	
Sample No.: UD11	Compostite No.:	☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =	
Depth (ft): 111.0-113.0	Specimen No.: D	☐ Kneading	Undercompaction: U_{hi} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	$\pm$ Opt. =	

Type	☒ Isotropic	☐ K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = ? Value
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☒ Strain	☐ Stress
		☐ Constant Cell Pressure	☐ Cyclic (Hz)
		☐ Variable Cell Pressure	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	997	584	715	5065
Mass Moist Soil + Cont. (g)	111.67	107.65	104.58	113.04
Mass Dry Soil + Container (g)	92.20	90.05	88.10	98.18
Mass Container (g)	31.59	31.74	32.04	31.14
Water Content, $W_{o,n}$ (%)	32.12	30.18	29.40	22.17
Avg. Initial WC, $W_{o,avg}$ (%)	30.57	Final ($W_{at,i}$)	☒ Slice ;	Whole Spec.

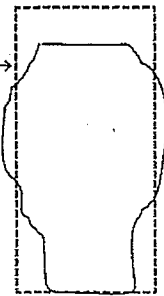
See attached data sheet(s) for additional water contents

SOIL MASSES:	Initial	Final
Moist + Tare (etc.) (g)	459.98	452.88
Tare (etc.) (g)	0.00	0.00
Mass Moist Spec., M_n (g)	459.98	452.88
Excess Dry Soil (soil not included in final mass measurement)		
Container No		
Mass Dry Soil + Cont. (g)		
Mass Container (g)		
Mass Excess Dry Soil, $M_{d,es}$ (g)	0.00	

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB	100.000	87.000	1 T	50.90	55.50
1	15.44	8.64	2 M	51.00	60.50
2	15.43	8.59	3 B	50.90	51.50
3	15.42	7.98	1 T		$= d_{max}$
4	15.41	8.62	2 M		$= d_{min}$
5	15.40	9.28	3 B		$= \Delta d$
Avg.	115.42	95.62	Avg.	50.93	55.83

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	20.37
PI Tape: ☒ Dia	V_o (cm ³)	235.17
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{al})^2 / 400$ (cm ²)	25.52
Dial Comparator: ☒ Ht.; ☐ Dia	$A_{eff,m} = (D_{min}^2 - 2\Delta d) d_{max} / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{al} = (D_1 + 2D_M + D_2) / 4$ (mm)	57.00

Photo Taken: ☐ Failure Mode: NA - Not Applicable

Failure Sketch: 

$\epsilon_a = 20\%$

☐ Bulge

☒ Wedge

☐ Parabolic

Wedge/Bulge Ht. = NA (mm)

Other Remarks: LL= 77 PL= 19 PI= 58

Final Visual Classification: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Estimated Initial Unit Weight	
Total, γ_{to} (lb/ft ³) = 122.11	Dry, $\gamma_{d,o}$ (lb/ft ³) = 93.52
Membrane / Filter Paper / Apparatus	
Membrane (mm):	Top Bottom
Number: 1	Thickness: 0.60 0.69
Single; ☒ Double	0.60 0.71
Circumference ($C_{rm,o}$)	148.0 148.0
Average:	0.33 47.11
Filter Paper: Top + Bottom:	Yes; ☒ No
Filter Strips: ☒ Yes; ☐ No	Number = 8
Type of Filter Strips	Vertical: 1/4 in. & Whatman #54
☒ Spiral: 1/4 in. & Whatman #1	
Apparatus:	Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =	NA g, NA lbf
Top Cap Attached:	Piston Dia. (in.)
Yes; ☒ No; ☒ 1/2; ☐ 3/4;	Load Cell:
Top Cap - Rotation:	Fixed, <1°; Limited, <5°; ☒ Unlimited, >5°
With:	Frictionless End Caps; Lat. Movement Top Cap
	Internal LVDT Jacket

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP
 Date: 5/16/2008 Date: 5/16/2008 Date: 6/2/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: *WFA*

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.:

File Name: B-2304UD_UD11d

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☐ Assumed

Boring No.: B-2304UD

Sample No.: UD11

Specimen No.: D

Depth (ft): 111.0-113.0

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed"; ☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	30.57
W_c 32.12	30.18	29.40	30.57	30.57	24.08	Initial, $M_{d,o}$	352.29
S_o 105.2	102.2	100.9	102.8	102.8	91.1	Final, $M_{d,at}$	370.71
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	370.71
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							
						452.88	

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	0.04	0.27		3.01	NA	NA	NA
Sum of changes in burette readings, $\Delta b_{r,n}$ (+ out) (- in)	3.82	10.30		39.92	NA	NA	NA
Theoretical $\Delta V_{cl,n} = (3V_o \times \Delta H_{c,n} / H_o)$	0.25	1.68		18.38	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				2.17	NA	NA	NA
Corrected $\Delta V_{cl,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	0.25	1.68		15.92	NA	NA	NA

Summary For Test Stages					Number of Test Stages = 1 $t_{50} = 340$ min	
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4		
Cell Pressure, $\sigma_{c,n}$ (psi)	119.83	NA	NA	NA		
Back Pressure, $U_{b,n}$ (psi)	49.65	NA	NA	NA		
Axial Force Reading, $P_{r,n}$ (lbf)	2.00	NA	NA	NA		
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	10.20	NA	NA	NA		
t_c , ON or in ☒ days ☐ hrs	5.00	NA	NA	NA		

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required
$\Delta V_c = 17.85$	$\Delta V_c = 15.81$	$\Delta V_c = 7.10$	& corr. for ΔH_{td} $\Delta V_c =$	G_s for $S_c = 100$ %: 2.751

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 3.32	$\Delta V_{c,f}$ (cm^3) = 17.85	Back Cal. G_s for $S=100$ % = 2.751	Normalized	Ht. Ch. (%) = -1.04
$\epsilon_{ac,c}$ (%) = 2.88	$\epsilon_{vc,f}$ (%) = 7.59		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio	Volumetric Water Content	Porosity	Skempton B parameter % (6)
Condition:	(mm)	(cm^3)	(cm^2)	(%)	(pcf)	(pcf)	(%)	e		n	
Initial:	115.42	235.17	20.37	24.08	122.11	98.41	91.1	0.716	0.3803	0.417	96.0
After to 1st σ'_c	112.10	217.32	19.39	22.17	130.10	106.49	102.5	0.586	0.3788	0.369	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + \rho_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night; WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: WED

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: File Name: B-2304UD_UD11d
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer = <u> </u>
Boring No.: <u>B-2304UD</u>	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt.(lb) = <u> </u>	No. Layers = <u> </u>
Sample No.: <u>UD11</u>	Composite No.: <u> </u>	☐ Pluviated:		Tamper Force (lb) = <u> </u>	Drop (in.) = <u> </u>
Depth (ft): <u>111.0-113.0</u>	Specimen No.: <u>D</u>	☐ Kneading		Undercompaction: U_m (%) = <u> </u>	Dia. (in.) = <u> </u>
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort = <u> </u>	% Comp. = <u> </u> ± Opt. = <u> </u>

Type	☒ Isotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, ϵ_a (rate) (%/hr.) ≠ Value	
Consolidation	☐ Anisotropic	☐ 45° stress path	Remarks: <u> </u>		
Loading	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☐ Stress
Conditions	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Other: <u> </u>

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf) Dry (pcf)		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
Condition: Initial:	115.42	235.17	20.37	24.08	122.11	98.41	91.12	0.72	96.0
After to 1st σ'_c	112.10	217.32	19.39	22.17	130.10	106.49	102.52	0.59	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	2.878	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	7.590	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	10.196	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	10.133	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.994			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	20.328			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	10.154			
Undr. Ambient Shear Stress, $\bar{\sigma}_a$:	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>47.11</u> mm	
Thickness:	<u>0.33</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.479	25.52
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	Type Strips: <u>Spiral #1</u>
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	1.85	2.366	4.511	7.989	6.877	2.146
	Max Obliquity	2.98	2.124	3.741	8.511	5.865	1.616
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 1.18E-03

STAGE 1

Project: 0411-08-1686
Test Type: CJU Triaxial

Boring No.: B-2304UD
Sample No.: UD11
Specimen No.: D

Depth (ft.): 111.0-113.0
Stage No.: 1

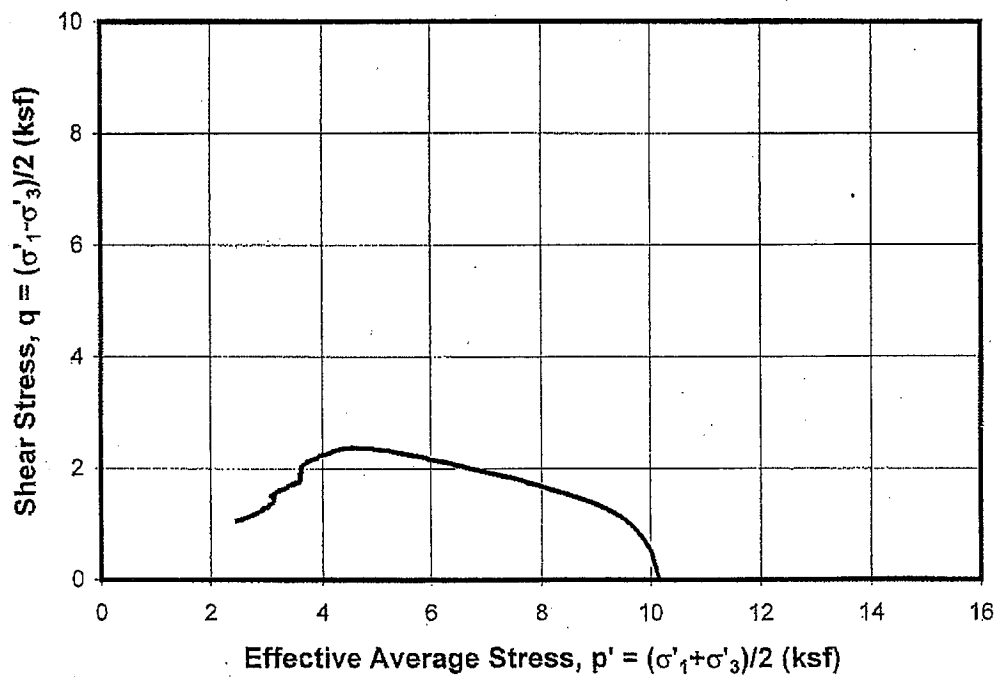
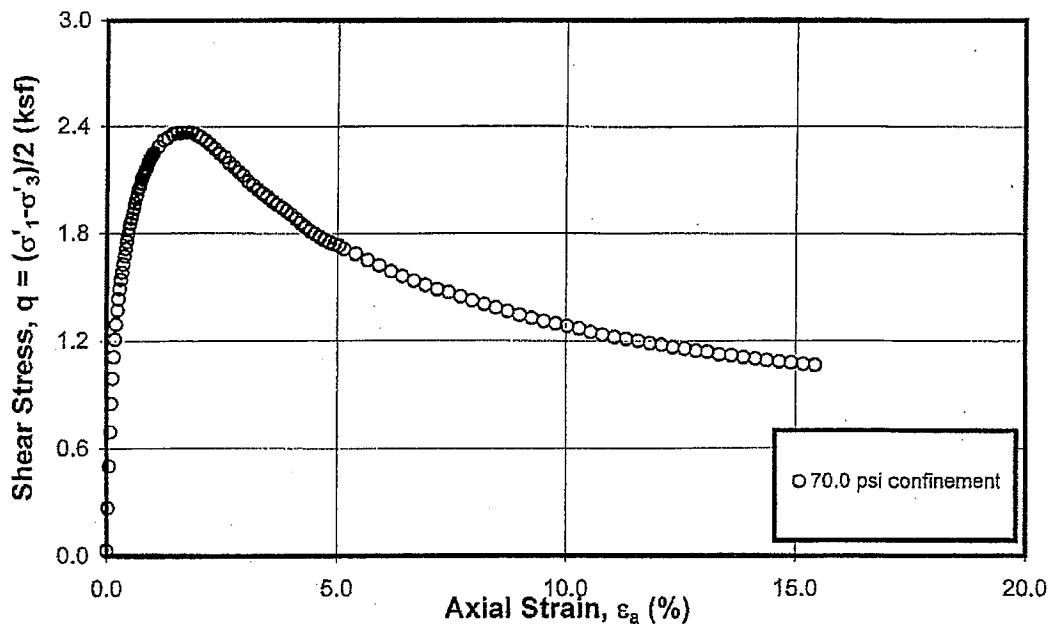
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.032	10.164	0.000	0.000	1.006	0.000	-	-
15.0	0.026	0.270	10.082	0.320	0.000	1.055	0.672	1850.5	1833.1
30.0	0.051	0.503	10.022	0.616	0.000	1.106	0.650	1833.1	1648.4
45.0	0.077	0.693	9.898	0.927	0.000	1.151	0.701	1715.8	1354.4
60.0	0.103	0.851	9.779	1.202	0.000	1.191	0.735	1593.8	1159.3
75.0	0.129	0.992	9.647	1.480	0.000	1.229	0.770	1493.3	1014.1
90.0	0.154	1.112	9.486	1.760	0.000	1.266	0.814	1400.6	846.1
105.0	0.180	1.209	9.324	2.020	0.000	1.298	0.857	1308.4	702.1
120.0	0.206	1.293	9.151	2.275	0.000	1.329	0.902	1226.0	627.2
135.0	0.231	1.370	8.991	2.514	0.000	1.360	0.938	1157.0	551.0
150.0	0.257	1.434	8.804	2.779	0.000	1.389	0.985	1091.0	468.0
165.0	0.283	1.491	8.622	2.993	0.000	1.418	1.028	1031.7	416.3
180.0	0.309	1.541	8.487	3.189	0.000	1.444	1.055	978.6	358.9
195.0	0.334	1.583	8.325	3.396	0.000	1.470	1.093	928.2	335.2
210.0	0.360	1.627	8.167	3.595	0.000	1.498	1.126	886.7	356.7
225.0	0.386	1.675	8.042	3.771	0.000	1.526	1.146	852.1	340.8
240.0	0.411	1.715	7.911	3.947	0.000	1.554	1.169	818.4	310.1
255.0	0.437	1.754	7.751	4.126	0.000	1.585	1.200	788.3	307.1
270.0	0.463	1.794	7.639	4.291	0.000	1.614	1.216	761.6	295.8
285.0	0.489	1.830	7.506	4.461	0.000	1.645	1.239	736.5	244.1
300.1	0.514	1.857	7.371	4.615	0.000	1.674	1.265	709.9	207.4
315.1	0.540	1.884	7.236	4.781	0.000	1.704	1.290	686.1	220.9
330.1	0.566	1.914	7.113	4.930	0.000	1.736	1.311	665.4	216.3
345.1	0.591	1.939	6.990	5.084	0.000	1.768	1.332	645.2	214.2
360.1	0.617	1.969	6.881	5.221	0.000	1.802	1.347	627.8	214.5
375.1	0.643	1.995	6.759	5.361	0.000	1.837	1.367	610.8	186.9
390.1	0.668	2.017	6.668	5.485	0.000	1.867	1.381	593.9	211.3
405.1	0.694	2.049	6.577	5.605	0.000	1.905	1.389	581.2	172.2
420.1	0.720	2.061	6.471	5.722	0.000	1.935	1.410	563.8	149.4
435.1	0.746	2.087	6.387	5.835	0.000	1.971	1.419	551.4	171.6
450.1	0.771	2.105	6.313	5.928	0.000	2.001	1.429	537.6	131.6
465.1	0.797	2.121	6.226	6.031	0.000	2.034	1.442	524.3	121.6
480.1	0.823	2.136	6.143	6.134	0.000	2.067	1.455	511.6	133.3
495.1	0.848	2.155	6.048	6.239	0.000	2.107	1.469	500.6	115.0
510.1	0.874	2.166	5.987	6.313	0.000	2.134	1.478	488.3	145.1
525.1	0.900	2.193	5.906	6.418	0.000	2.181	1.485	480.3	153.3
540.1	0.926	2.205	5.857	6.481	0.000	2.208	1.491	469.7	101.0
555.1	0.951	2.219	5.790	6.560	0.000	2.242	1.500	459.8	95.8

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm^3)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
570.1	0.977	2.230	5.735	6.633	0.000	2.273	1.507	450.0	90.8
585.1	1.003	2.242	5.658	6.716	0.000	2.313	1.519	440.9	76.4
600.1	1.028	2.250	5.616	6.772	0.000	2.336	1.525	431.3	64.8
660.1	1.131	2.286	5.413	7.013	0.000	2.462	1.554	398.5	70.2
720.1	1.234	2.322	5.233	7.225	0.000	2.595	1.577	371.1	49.6
780.1	1.337	2.337	5.069	7.399	0.000	2.711	1.605	344.9	32.1
840.1	1.440	2.355	4.934	7.555	0.000	2.826	1.626	322.7	24.8
900.1	1.543	2.362	4.811	7.692	0.000	2.929	1.648	302.2	9.4
960.1	1.645	2.364	4.694	7.810	0.000	3.030	1.672	283.5	2.3
1020.1	1.748	2.365	4.617	7.883	0.000	3.100	1.689	266.9	1.0
1080.1	1.851	2.366	4.511	7.989	0.000	3.205	1.711	252.2	-8.8
1140.1	1.954	2.356	4.390	8.110	0.000	3.317	1.742	237.9	-25.1
1200.1	2.057	2.340	4.312	8.170	0.000	3.373	1.768	224.4	-33.9
1260.1	2.160	2.321	4.253	8.206	0.000	3.402	1.791	212.0	-40.9
1320.1	2.263	2.298	4.175	8.256	0.000	3.448	1.821	200.3	-44.6
1380.1	2.365	2.275	4.134	8.272	0.000	3.448	1.844	189.7	-46.9
1440.1	2.468	2.249	4.059	8.329	0.000	3.486	1.876	179.7	-45.5
1500.1	2.571	2.228	3.955	8.398	0.000	3.582	1.913	170.9	-51.7
1560.1	2.674	2.196	3.923	8.404	0.000	3.543	1.942	161.9	-55.5
1620.1	2.777	2.171	3.869	8.451	0.000	3.558	1.971	154.1	-49.0
1680.1	2.880	2.146	3.792	8.486	0.000	3.606	2.007	146.8	-45.6
1740.1	2.982	2.124	3.741	8.511	0.000	3.628	2.035	140.3	-53.8
1800.1	3.085	2.091	3.710	8.530	0.000	3.582	2.067	133.5	-53.6
1860.1	3.188	2.069	3.664	8.547	0.000	3.595	2.095	127.8	-44.1
1920.1	3.291	2.045	3.638	8.546	0.000	3.568	2.121	122.4	-43.4
1980.1	3.394	2.024	3.620	8.536	0.000	3.537	2.142	117.4	-40.6
2040.1	3.497	2.003	3.614	8.520	0.000	3.487	2.161	112.8	-42.1
2100.1	3.599	1.981	3.614	8.505	0.000	3.427	2.180	108.3	-41.3
2160.1	3.702	1.961	3.609	8.492	0.000	3.380	2.199	104.2	-37.3
2220.1	3.805	1.943	3.626	8.450	0.000	3.308	2.210	100.4	-33.0
2280.1	3.908	1.927	3.635	8.429	0.000	3.257	2.222	97.0	-35.3
2340.1	4.011	1.906	3.621	8.434	0.000	3.224	2.245	93.5	-43.7
2400.1	4.114	1.882	3.583	8.430	0.000	3.214	2.278	90.0	-46.6
2460.1	4.216	1.858	3.580	8.390	0.000	3.159	2.302	86.7	-45.9
2520.1	4.319	1.835	3.603	8.370	0.000	3.076	2.319	83.5	-43.4
2580.1	4.422	1.814	3.590	8.358	0.000	3.042	2.344	80.6	-36.8
2640.1	4.525	1.797	3.583	8.346	0.000	3.013	2.364	78.0	-33.0
2700.1	4.628	1.780	3.607	8.312	0.000	2.948	2.375	75.6	-32.8
2760.1	4.731	1.763	3.600	8.298	0.000	2.920	2.395	73.2	-28.9
2820.1	4.833	1.750	3.587	8.304	0.000	2.906	2.414	71.1	-22.1
2880.1	4.936	1.741	3.532	8.335	0.000	2.943	2.440	69.2	-16.8
2940.1	5.039	1.733	3.480	8.378	0.000	2.984	2.465	67.5	-25.8
3000.1	5.142	1.714	3.474	8.373	0.000	2.948	2.488	65.4	-29.3

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
3150.1	5.399	1.686	3.387	8.425	0.000	2.981	2.549	61.3	-24.8
3300.1	5.656	1.650	3.372	8.417	0.000	2.918	2.598	57.2	-25.0
3450.1	5.913	1.621	3.263	8.497	0.000	2.975	2.671	53.8	-24.3
3600.1	6.170	1.588	3.204	8.524	0.000	2.966	2.736	50.4	-23.7
3750.1	6.427	1.560	3.173	8.525	0.000	2.935	2.787	47.6	-20.7
3900.1	6.685	1.535	3.132	8.542	0.000	2.921	2.839	45.0	-19.4
4050.1	6.942	1.510	3.088	8.554	0.000	2.915	2.893	42.6	-18.4
4200.1	7.199	1.487	3.157	8.453	0.000	2.782	2.907	40.4	-15.1
4350.1	7.456	1.472	3.137	8.476	0.000	2.768	2.940	38.6	-15.3
4500.1	7.713	1.448	3.124	8.460	0.000	2.728	2.985	36.7	-17.9
4650.1	7.970	1.426	3.131	8.429	0.000	2.672	3.023	35.0	-16.7
4800.1	8.227	1.405	3.134	8.406	0.000	2.625	3.059	33.4	-15.5
4950.1	8.484	1.386	3.125	8.397	0.000	2.594	3.099	31.9	-15.7
5100.1	8.741	1.365	3.091	8.418	0.000	2.581	3.153	30.5	-15.8
5250.1	8.998	1.345	3.061	8.418	0.000	2.568	3.204	29.2	-14.3
5400.1	9.256	1.328	3.041	8.419	0.000	2.550	3.247	28.0	-13.5
5550.1	9.513	1.311	3.036	8.417	0.000	2.519	3.287	26.9	-12.1
5700.1	9.770	1.297	2.998	8.438	0.000	2.525	3.332	25.9	-10.6
5850.1	10.027	1.283	2.955	8.462	0.000	2.536	3.380	25.0	-10.6
6000.1	10.284	1.270	2.928	8.480	0.000	2.532	3.422	24.1	-13.1
6150.1	10.541	1.250	2.942	8.451	0.000	2.477	3.465	23.1	-13.5
6300.1	10.798	1.235	2.897	8.472	0.000	2.486	3.519	22.3	-10.1
6450.2	11.055	1.224	2.884	8.475	0.000	2.474	3.553	21.6	-8.8
6600.2	11.312	1.212	2.868	8.476	0.000	2.465	3.589	20.9	-8.3
6750.2	11.569	1.202	2.843	8.495	0.000	2.466	3.626	20.2	-9.0
6900.2	11.826	1.189	2.821	8.504	0.000	2.458	3.671	19.6	-8.9
7050.2	12.084	1.180	2.790	8.527	0.000	2.465	3.712	19.0	-8.6
7200.2	12.341	1.167	2.757	8.555	0.000	2.469	3.762	18.4	-8.4
7350.2	12.598	1.158	2.755	8.541	0.000	2.450	3.789	17.9	-8.0
7500.2	12.855	1.147	2.737	8.548	0.000	2.442	3.831	17.3	-7.1
7650.2	13.112	1.140	2.706	8.571	0.000	2.455	3.865	16.9	-8.6
7800.2	13.369	1.124	2.662	8.596	0.000	2.462	3.932	16.3	-8.0
7950.2	13.626	1.119	2.638	8.621	0.000	2.475	3.960	16.0	-5.9
8100.2	13.883	1.109	2.616	8.630	0.000	2.472	4.002	15.5	-6.7
8250.2	14.140	1.102	2.604	8.637	0.000	2.468	4.031	15.1	-6.7
8400.2	14.397	1.092	2.560	8.668	0.000	2.488	4.086	14.7	-6.1
8550.2	14.655	1.086	2.556	8.674	0.000	2.478	4.107	14.4	-4.4
8700.2	14.912	1.081	2.505	8.712	0.000	2.517	4.151	14.1	-5.8
8850.2	15.169	1.071	2.476	8.731	0.000	2.525	4.197	13.7	-5.3
9000.2	15.426	1.067	2.459	8.767	0.000	2.533	4.221	13.4	-27.1
9003.4	15.431	1.066	2.461	8.750	0.000	2.528	4.225	13.4	-50.8



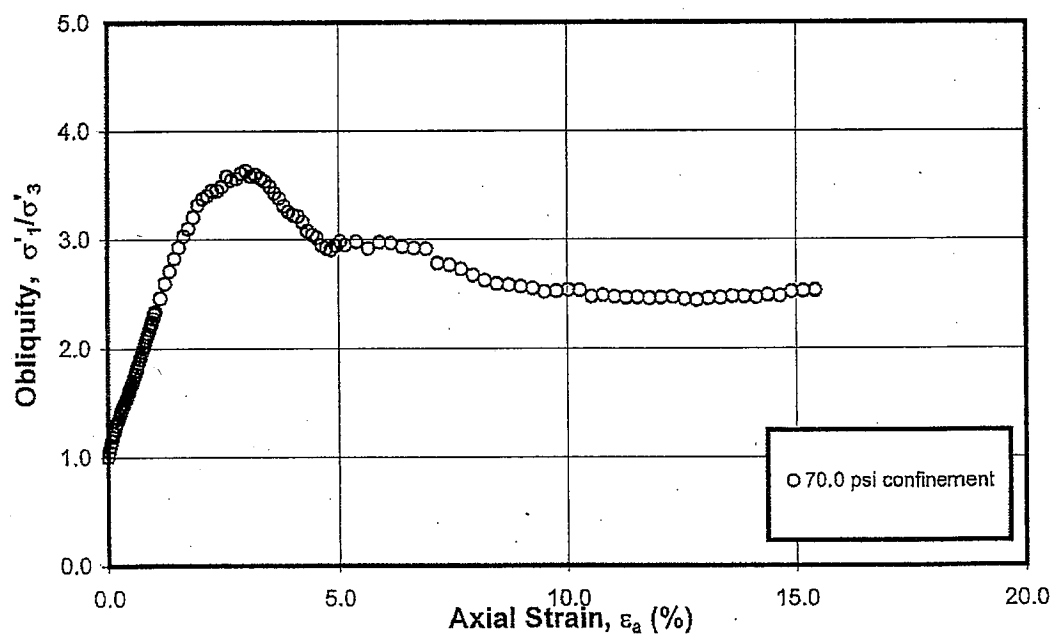
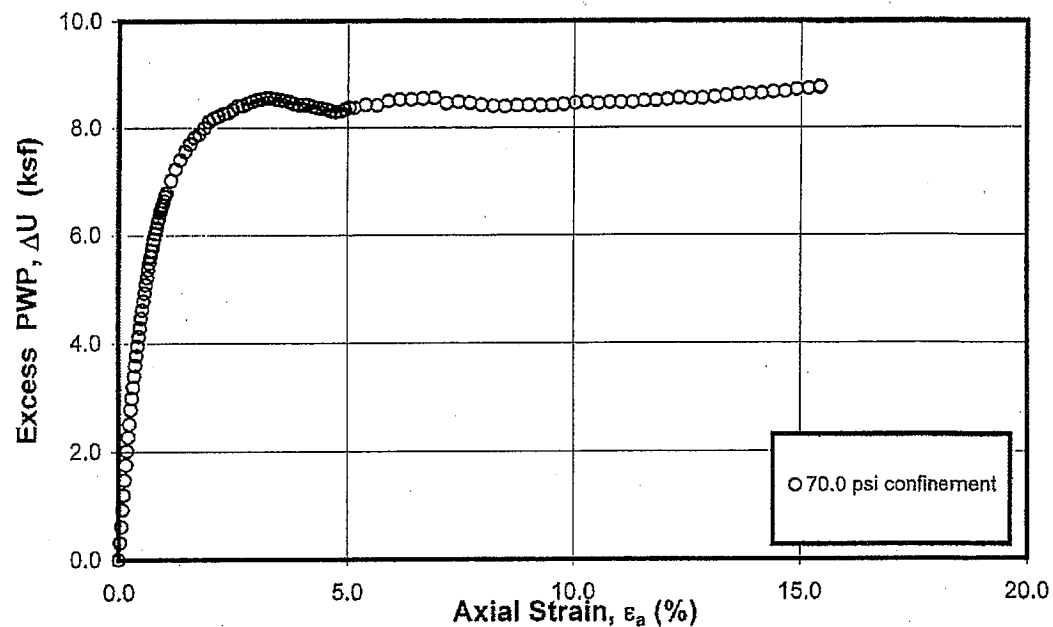
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD11D - Depth: 111.0-113.0 ft

Boring B-2304UD

Reviewed By: WLD



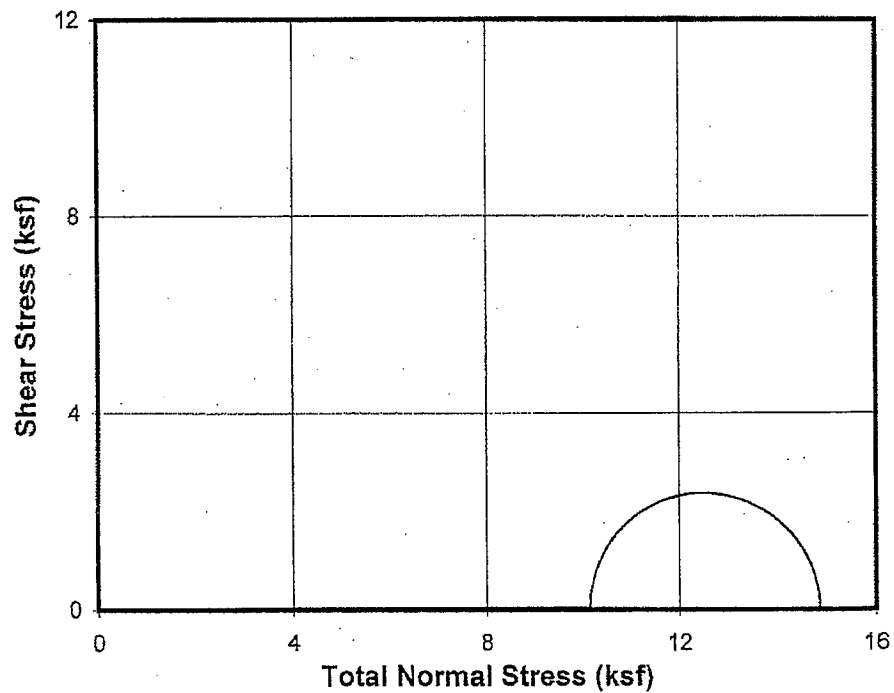
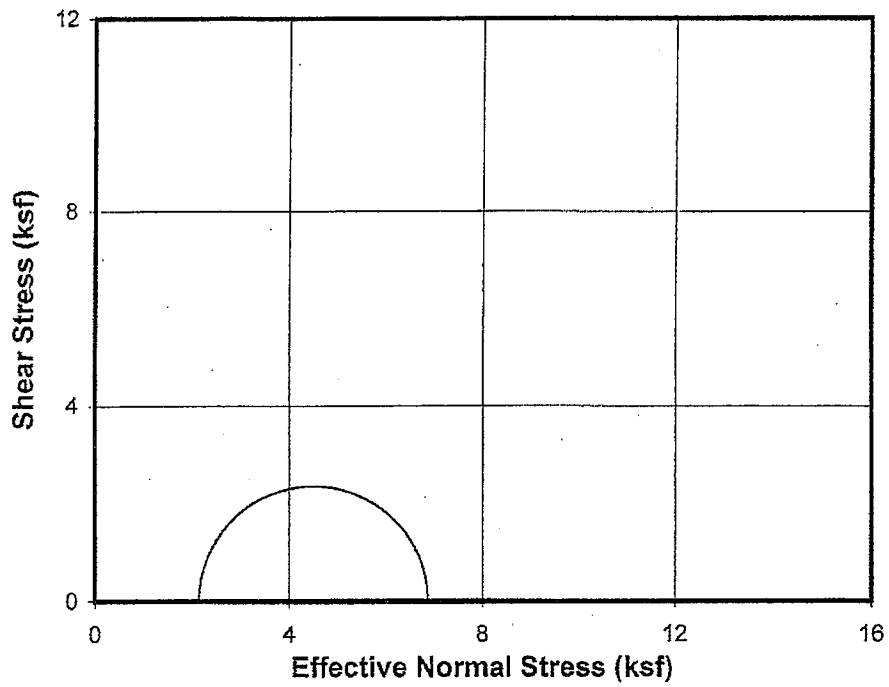
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD11D - Depth: 111.0-113.0 ft

Boring B-2304UD

Reviewed By: WFK



UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated- Mohr's Circles

Sample: UD11D - Depth: 111.0-113.0 ft

Boring B-2304UD

Reviewed By: WLR

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-6 File Name: 2304UD_UD1
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 10.80 , NA , NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma'_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =	
Sample No.: UD13	Composite No.:	☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =	
Depth (ft): 121.0-123.0	Specimen No.: c	☐ Kneading	Undercompaction: U_{hi} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	$\pm$ Opt. =	

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp.
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext.
☐ Strain	☐ Stress	☒ Constant Cell Pressure	☐ Cyclic (Hz)
☐ Stress Path	☐ Variable Cell Pressure	Rate: 0.1;	1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	990	5018	2033A	4145
Mass Moist Soil + Cont. (g)	81.49	81.39	81.38	133.74
Mass Dry Soil + Container (g)	72.88	72.72	72.61	116.18
Mass Container (g)	32.30	31.32	30.66	29.98
Water Content, $W_{o,n}$ (%)	21.22	20.94	20.91	20.37
Avg. Initial WC, $W_{o,avg}$ (%)	21.02	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		484.65	490.47
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		484.65	490.47
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, M_{des} (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	92.000	1 T	50.10	53.50	For
1 15.33	4.23	2 M	50.10	51.60	Wedge
2 15.35	5.26	3 B	50.10	52.00	Failure
3 15.27	5.30	1 T		60.10	= d_{max}
4 15.23	5.15	2 M		60.80	= d_{min}
5 15.25	5.20	3 B			= Δd
Avg. 115.29	97.03	Avg. 50.10	55.60	xxxxx	

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	19.71
Pi Tape: ☒ Dia	V_o (cm ³)	227.27
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	24.43
Dial Comparator ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	55.77

Photo Taken. Failure Mode: NA - Not Applicable
 Failure Sketch:
 $\epsilon_a = 20\%$
☐ Bulge
☒ Wedge
☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)
 Other Remarks: LL=62 PL=18 PI=44
 Final Visual Classification: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Trimmed / Reconstituted By: AW Date: 3/24/2008
 Prelim. Calc. By: TP Final Calc. By: TP
 See more detailed sketch on attached sheet. Remarks:

Estimated Initial Unit Weight			
Total, γ_{to} (lb/ft ³) =	133.13	Dry, $\gamma_{d,o}$ (lb/ft ³) =	110.00
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.70	0.58
= 1	Single; ☒ Double	0.69	0.57
Circumference ($C_{rm,o}$)		149.0	150.0
Average:		0.32	47.59
Filter Paper: Top + Bottom:		Yes; ☒ No	
Filter Strips: ☒ Yes; ☐ No		Number =	8
Type of Filter Strips		Vertical: 1/4 in. & Whatman #54	
☒ Spiral: 1/4 in. & Whatman #1			
Apparatus: Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf			
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf			
Top Cap Attached:	Piston Dia. (in.)	Load Cell:	
☐ Yes; ☒ No;	☒ 1/2; ☐ 3/4;	☐ External	☒ Internal
Top Cap - Rotation	Fixed, <1°; ☒ Limited, <5°;	Unlimited, >5°	
With:	Frictionless End Caps;	Lat. Movement Top Cap	
	Internal LVDT Jacket		

Top Cap Attached: ☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4; ☐ External; ☒ Internal
 Top Cap - Rotation: Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°
 With: Frictionless End Caps; Internal LVDT Jacket
 Lat. Movement Top Cap
 Final Visual Classification: Mottled Pale Yellow and Yellow Fat CLAY (CH)
 Trimmed / Reconstituted By: AW Date: 3/24/2008 Set Up By: TP Taken Down By: AW
 Date: 3/24/2008 Date: 4/14/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WLD
 See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-6

File Name: 2304UD_UD13c

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☒ Assumed

Boring No.: B-2304UD

Sample No.: UD13

Specimen No.: c

Depth (ft): 121.0-123.0

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	21.02
W_o 21.22	20.94	20.91	21.02	21.02	18.94	Initial, $M_{d,o}$	400.47
S_o 106.9	106.2	106.1	106.4	106.4	100.9	Final, $M_{d,at}$	407.46
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	407.46
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	0.66	0.98		1.43	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	0.18			15.49	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	3.91	5.78		8.44	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				1.84	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	0.18	-9.31		4.49	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	164.84	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 200$ min
Back Pressure, $U_{b,n}$ (psi)	89.97	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	2.00	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	10.83	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	12.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required
$\Delta V_c = -4.64$	$\Delta V_c = -6.52$	$\Delta V_c = 3.47$	& corr. for ΔH_{td} $\Delta V_c =$	G_s for $S_c = 100$ %: 2.744

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 3.07	$\Delta V_{c,f}$ (cm^3) = -4.64	Back Cal. G_s for $S=100\%$ = 2.744	Normalized	Ht. Ch. (%) = 0.73
$\epsilon_{acc,c}$ (%) = 2.66	$\epsilon_{vc,f}$ (%) = -2.04		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:											
Initial:	115.29	227.27	19.71	18.94	133.13	111.92	100.9	0.509	0.3402	0.337	94.0
After to 1st σ'_c	112.22	231.91	20.67	20.37	132.03	109.68	102.3	0.540	0.3586	0.351	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-6 File Name: 2304UD_UD1:
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer = <u> </u>
Boring No.: <u>B-2304UD</u>		☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lbf) = <u> </u>	No. Layers = <u> </u>
Sample No.: <u>UD13</u>		Compostite No.: <u> </u>	☐ Pluviated:	Tamper Force (lbf) = <u> </u>	Drop (in.) = <u> </u>
Depth (ft): <u>121.0-123.0</u>		Specimen No.: <u>c</u>	☐ Kneading	Undercompaction: U_{nl} (%) = <u> </u>	Dia. (in.) = <u> </u>
☐ Spec. Selection by X-ray;		☐ Geomarine Sample		Ref. Effort = <u> </u>	% Comp. = <u> </u> $\pm$ Opt. = <u> </u>

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = <u>NA</u>
45° stress path Remarks: <u> </u>					
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☒ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Strain <u>Other:</u>

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
					Total (pcf)	Dry (pcf)			
Condition:									
Initial:	115.29	227.27	19.71	18.94	133.13	111.92	100.87	0.51	94.0
After to 1st σ'_c	112.22	231.91	20.67	20.37	132.03	109.68	102.29	0.54	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c	%	2.659	NA	NA	NA
Vol. Strain during Consol., ϵ_v	%	-2.042	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	10.826	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	10.796	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.997			
Induced OCR	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	21.622			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	10.806			
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>47.59</u> mm	
Thickness:	<u>0.32</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.351	24.43
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	Type Strips: <u>Spiral #1</u>
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ'_1 (ksf)	σ'_3 (ksf)
1st	Max Shear Stress	4.65	4.118	10.813	4.101	14.931	6.694
	Max Obliquity	4.01	4.106	10.777	4.115	14.883	6.672
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 2.00E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

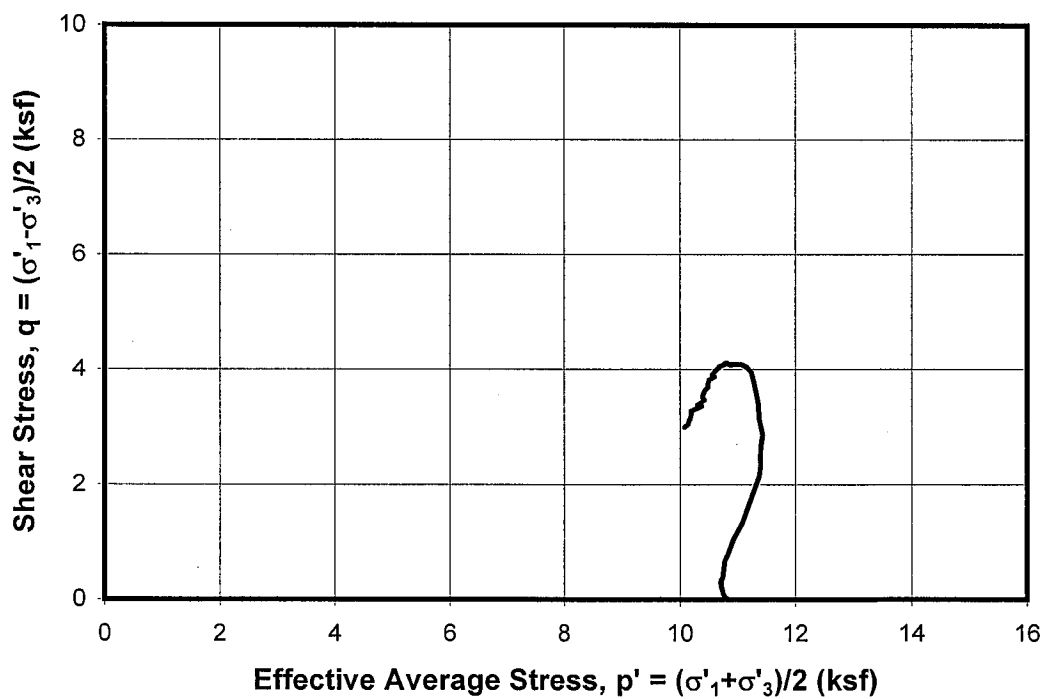
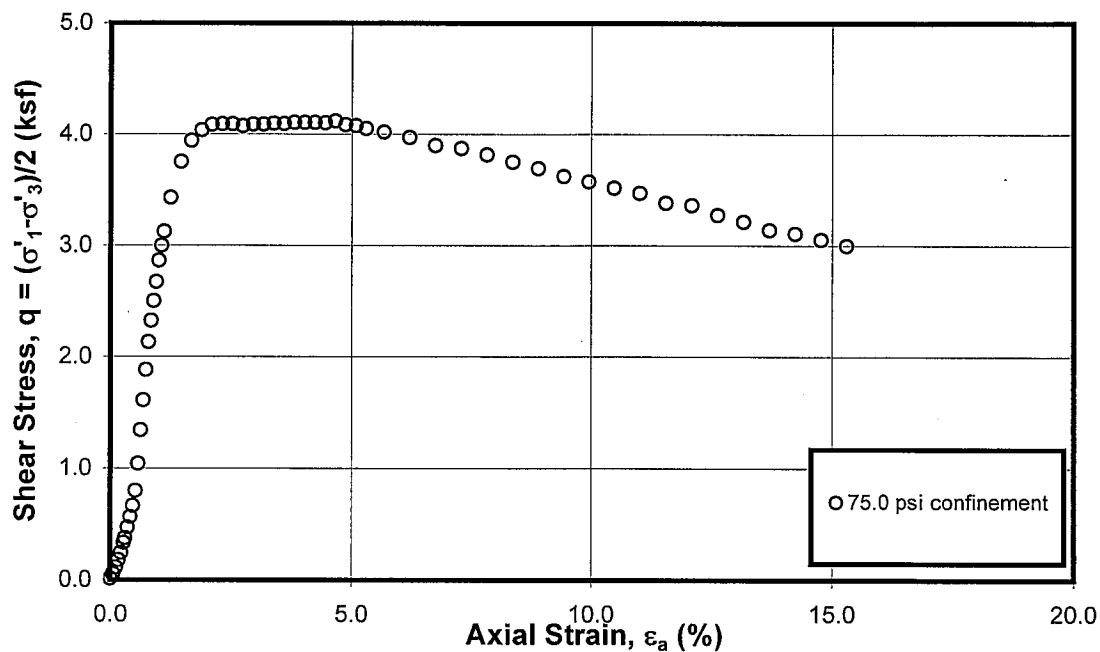
Boring No.: B-2304UD
Sample No.: UD13
Specimen No.: c

Depth (ft.): 121.0-123.0
Stage No.: 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, Δu (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.015	10.811	0.000	0.000	1.003	0.000	-	-
30.0	0.053	0.057	10.772	0.073	0.000	1.011	0.971	156.3	229.4
60.0	0.107	0.114	10.741	0.162	0.000	1.021	0.857	184.2	167.3
90.0	0.160	0.179	10.728	0.255	0.000	1.034	0.754	204.3	269.1
120.0	0.214	0.245	10.710	0.319	0.000	1.047	0.720	214.5	327.6
149.4	0.266	0.335	10.712	0.409	0.000	1.064	0.655	240.0	-30637.3
159.5	0.293	0.378	10.737	0.433	0.000	1.073	0.602	248.0	397.4
179.5	0.346	0.471	10.749	0.513	0.000	1.092	0.569	263.3	290.5
199.5	0.400	0.567	10.759	0.592	0.000	1.111	0.547	275.8	406.5
219.5	0.453	0.665	10.770	0.681	0.000	1.132	0.531	286.6	384.0
239.5	0.507	0.801	10.832	0.769	0.000	1.160	0.487	310.1	659.0
259.5	0.561	1.045	10.921	0.911	0.000	1.212	0.446	367.3	1122.2
279.5	0.614	1.344	11.084	1.052	0.000	1.276	0.398	432.9	1065.0
299.5	0.668	1.614	11.177	1.223	0.000	1.337	0.385	478.9	1039.0
319.5	0.721	1.885	11.277	1.397	0.000	1.401	0.375	518.5	939.2
339.6	0.775	2.134	11.366	1.556	0.000	1.462	0.369	547.0	788.2
359.6	0.828	2.326	11.394	1.728	0.000	1.513	0.374	557.9	734.7
379.6	0.882	2.501	11.388	1.895	0.000	1.563	0.384	563.8	656.8
399.6	0.935	2.674	11.403	2.064	0.000	1.613	0.389	568.5	654.2
419.6	0.989	2.864	11.429	2.230	0.000	1.669	0.392	576.3	684.7
439.6	1.042	3.000	11.404	2.386	0.000	1.714	0.401	572.8	418.9
459.6	1.096	3.125	11.376	2.535	0.000	1.757	0.409	567.6	466.0
509.6	1.230	3.432	11.349	2.874	0.000	1.867	0.421	555.7	392.8
589.6	1.444	3.753	11.284	3.251	0.000	1.997	0.437	517.9	220.3
669.6	1.658	3.943	11.240	3.494	0.000	2.081	0.445	473.9	136.5
749.6	1.872	4.037	11.157	3.673	0.000	2.134	0.457	429.8	67.2
829.6	2.086	4.086	11.064	3.817	0.000	2.171	0.469	390.3	30.0
909.7	2.300	4.091	10.969	3.904	0.000	2.189	0.481	354.4	-7.2
989.7	2.514	4.091	10.940	3.939	0.000	2.195	0.484	324.3	1.3
1069.7	2.728	4.073	10.872	3.999	0.000	2.198	0.492	297.5	-7.4
1149.7	2.942	4.088	10.871	4.005	0.000	2.205	0.493	276.9	4.3
1229.7	3.156	4.088	10.856	4.019	0.000	2.208	0.495	258.1	-7.1
1309.7	3.370	4.096	10.826	4.040	0.000	2.217	0.498	242.2	6.9
1389.7	3.584	4.095	10.800	4.083	0.000	2.221	0.501	227.7	5.4
1469.7	3.798	4.104	10.807	4.088	0.000	2.224	0.500	215.3	-3.1
1549.7	4.012	4.106	10.777	4.115	0.000	2.231	0.504	203.9	15.4
1629.7	4.226	4.106	10.797	4.106	0.000	2.227	0.502	193.6	-9.3
1709.7	4.440	4.102	10.785	4.105	0.000	2.228	0.503	184.1	4.9

STAGE 1

[illegible]



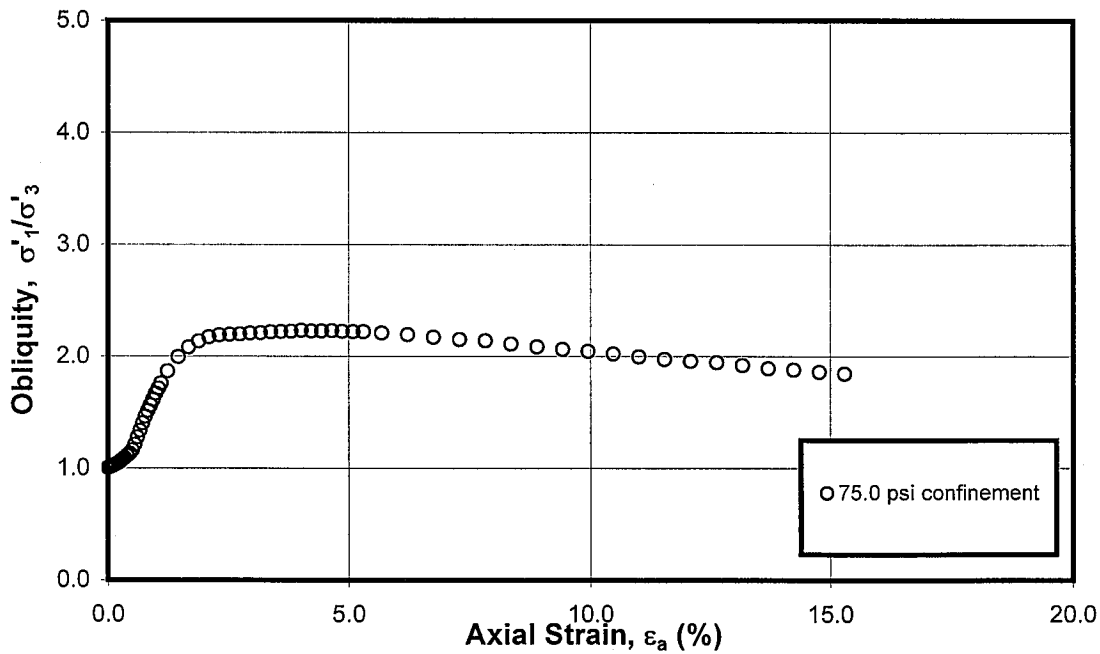
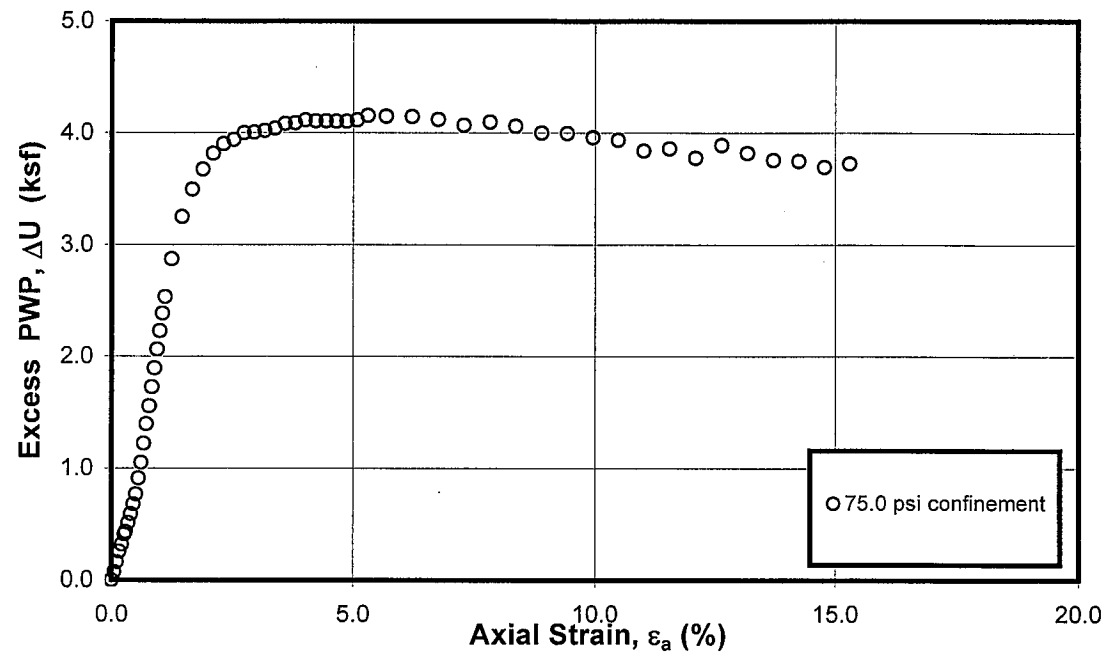
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD13c - Depth: 121.0-123.0 ft

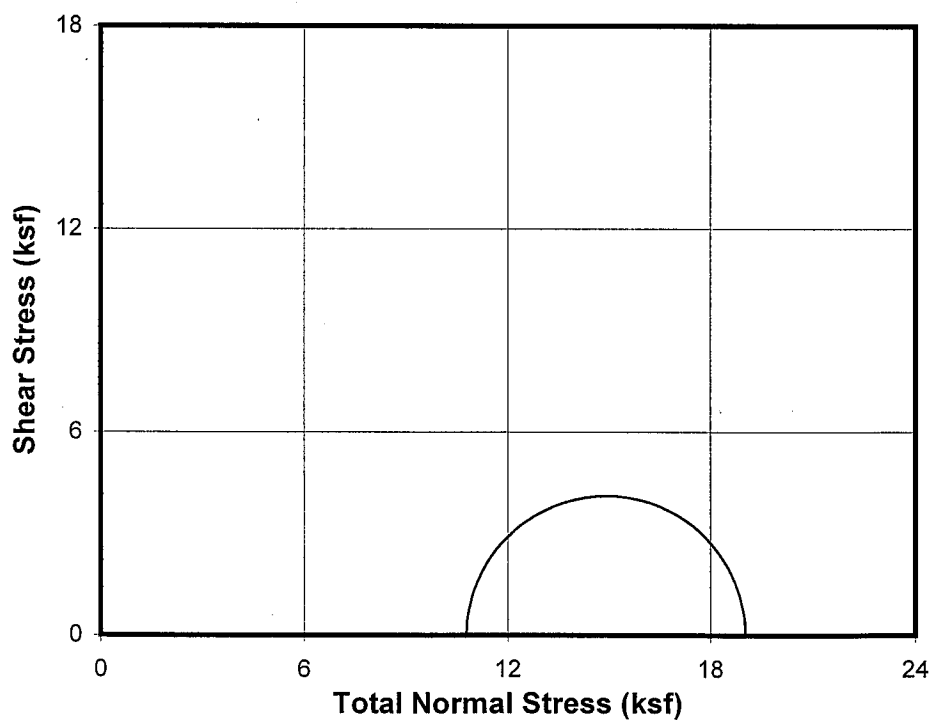
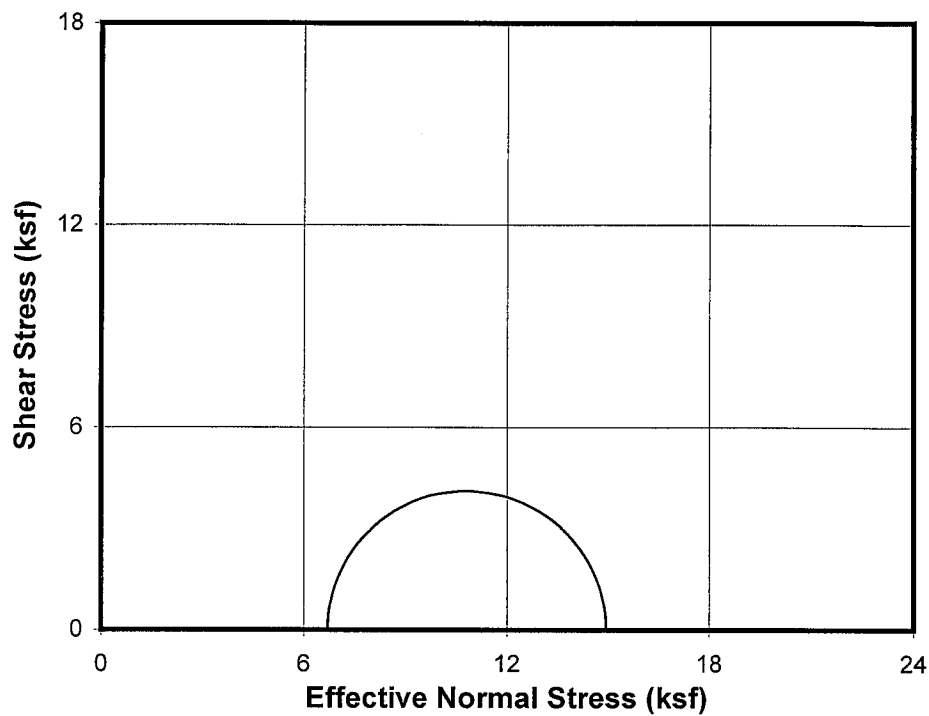
Boring B-2304UD

Reviewed By: *WZD*



UNDRAINED TRIAXIAL COMPRESSION TEST
Isotropically Consolidated
Sample: UD13c - Depth: 121.0-123.0 ft
Boring B-2304UD

Reviewed By: *WLD*



UNDRAINED TRIAXIAL COMPRESSION TEST
Isotropically Consolidated- Mohr's Circles
Sample: UD13c - Depth: 121.0-123.0 ft
Boring B-2304UD

Reviewed By: *WLD*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX 4 File Name: 2319UD_UD4
 Task No.: NA Test Stress(es): σ'_c or $\sigma'_{v,c}$ = 2.88 , NA , NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma'_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD4	Compostite No.:	☐ Pluviated:		Tamper Force (lb) =	Drop (in.) =
Depth (ft): 25.0-27.0	Specimen No.: c	☐ Kneading		Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☒ Strain	☐ Stress
		☐ Constant Cell Pressure	☐ Cyclic (Hz)
		☐ Variable Cell Pressure	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	4130	50.37	C31	4243
Mass Moist Soil + Cont. (g)	93.74	87.88	94.77	77.72
Mass Dry Soil + Container (g)	82.50	78.21	82.94	68.58
Mass Container (g)	30.02	30.83	29.90	30.66
Water Content, $W_{o,n}$ (%)	21.42	20.41	22.30	24.10
Avg. Initial WC, $W_{o,avg}$ (%)	21.38	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		463.32	468.46
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		463.32	468.46
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	100.000	1 T	51.00	57.70	For
1 10.80	-3.90	2 M	51.00	58.30	Wedge
2 10.81	-3.90	3 B	51.00	53.20	Failure
3 10.76	-3.88	1 T			$= d_{max}$
4 10.82	-3.97	2 M			$= d_{min}$
5 10.83	-3.97	3 B			$= \Delta d$
Avg. 110.80	96.08	Avg. 51.00	56.40	xxxxx	

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	20.43
Pi Tape: ☒ Dia	V_o (cm ³)	226.35
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	25.41
Dial Comparator ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	56.88

Estimated Initial Unit Weight		
Total, γ_{to} (lb/ft ³) =	127.78	Dry, $\gamma_{d,o}$ (lb/ft ³) = 105.28

Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.64	0.72
= 1	Single; ☒ Double	0.63	0.71
Circumference ($C_{rm,o}$)		150.0	151.0
Total Thickness		Dia. ($C_{rm,o} / \pi$)	
Average:		0.34	47.91

Filter Paper: Top + Bottom:	☐ Yes ; ☒ No
Filter Strips:	☒ Yes ; ☐ No Number = 8
Type of Filter Strips	☐ Vertical: 1/4 in. & Whatman #54
	☒ Spiral: 1/4 in. & Whatman #1

Apparatus:	Mass Top Cap, M_{tc} = 65.8 g, 0.15 lbf
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =	NA g, NA lbf

Top Cap Attached:	Piston Dia. (in.)	Load Cell:
☒ Yes; ☐ No;	☒ 1/2; ☐ 3/4;	☐ External ☒ Internal
Top Cap - Rotation	☒ Fixed, <1°;	Limited, <5°; Unlimited, >5°
With:	Frictionless End Caps;	Lat. Movement Top Cap
	Internal LVDT Jacket	

Photo Taken. Failure Sketch

$\epsilon_a =$ 20% →

Failure Mode: NA - Not Applicable

☒ Bulge GB - Gage Block

☒ Wedge Other Remarks:

☐ Parabolic LL=61 PL=16 PI=45

Wedge/Bulge Ht. = NA (mm)

Final Visual Classification: Light Yellowish Brown Fat CLAY with Sand (CH)

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP
 Date: 3/21/2008 Date: 3/21/2008 Date: 3/27/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WFD

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686 Cell No.: TRX 4 File Name: 2319UD_UD4c
 Task Number: NA Specific Gravity: 2.720 ☒ Measured; ☒ Assumed
 Boring No.: B-2319UD Sample No.: UD4 Specimen No.: c Depth (ft): 25.0-27.0
 Type Test: CIU Triaxial Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	21.38
W_c 21.42	20.41	22.30	21.38	21.38	22.74	Initial, $M_{d,o}$	381.71
S_o 95.4	93.0	97.5	95.3	95.3	98.5	Final, $M_{d,at}$	377.48
Measured final mass of moist soil, $M_{t,at}$ (g)					468.46	Selected, M_d	381.71
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)					468.46		

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.10	-0.60		0.80	NA	NA	NA
Sum of changes in burette readings, $\Delta b_{r,n}$ (+ out) (- in)	-0.06	-10.96	NA	4.90	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.61	-3.68		4.89	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				1.00	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.61	-3.68		4.90	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	89.98	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 104$ min
Back Pressure, $U_{b,n}$ (psi)	70.31	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	2.00	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	2.92	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	2.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes $\Delta V_c = 0.61$	By Saturation = 100 % $\Delta V_c = -1.14$	By Change in Mass (5) $\Delta V_c = 5.86$	For Diff. in Meas. Vol. ($V_o - V_{at}$) & corr. for ΔH_{td} $\Delta V_c =$	For Selected ΔV_c , required G_s for $S_c = 100$ %: 2.754

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 0.10	$\Delta V_{c,f}$ (cm^3) = 0.61	Back Cal. G_s for $S=100\%$ = 2.754	Normalized	Ht. Ch. (%) = 0.69
$\epsilon_{ac,c}$ (%) = 0.09	$\epsilon_{vc,f}$ (%) = 0.27		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.720$ Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	Void Ratio	Volumetric Water Content	Porosity	Skempton B parameter % (6)
Condition:	(mm)	(cm^3)	(cm^2)	(%)	Total (pcf)	Dry (pcf)	(%)	e		n	
Initial:	110.80	226.35	20.43	21.38	127.78	105.28	95.3	0.610	0.3612	0.379	95.0
After to 1st σ'_c	110.71	225.74	20.39	22.73	129.55	105.56	102.0	0.606	0.3850	0.377	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

- Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.
 (2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).
 (3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).
 (4) Stresses are corrected for membrane. (5) $\sim M_{t,o} - (M_{t,at,c} + \rho_{water} \times \Delta V_{in, column 1 \& 2})$
 (6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content Remarks: Wet Method used in the Saturation Stage

Calculated By: TP Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX 4 File Name: 2319UD_UD4
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =	
Sample No.: UD4	Compostite No.:	☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =	
Depth (ft): 25.0-27.0	Specimen No.: c	☐ Kneading	Undercompaction: U_{ni} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	± Opt. =	

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = NA
			45° stress path	Remarks:	
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☒ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: 0.1;
					Stress 1; Strain Other:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B para-meter % (1)	Unit for Stresses: (ksf)
Condition:					Total (pcf)	Dry (pcf)				
Initial:	110.80	226.35	20.43	21.38	127.78	105.28	95.31	0.61	95.0	
After to 1st σ'_c	110.71	225.74	20.39	22.73	129.55	105.56	102.04	0.61		
Consol.: to 2nd σ'_c										
to 3rd σ'_c										
to 4th σ'_c										

Consolidation Stress Summary and Loading Summary						
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage	
Axial Strain during Consol., ϵ_c	%	0.089	NA	NA	NA	
Vol. Strain during Consol., ϵ_v	%	0.269	NA	NA	NA	
Effective Vertical Stress, σ'_v	(ksf)	2.924	NA	NA	NA	
Effective Horizontal Stress, σ'_h	(ksf)	2.883	NA	NA	NA	
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.986				
Induced OCR	-	1.00	NA	NA	NA	
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	5.807				
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	2.897				
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA	NA	
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA	

Membrane Correction		
Type:	Bulge	
Modulus:	150.0 psi	
Diameter:	47.91 mm	
Thickness:	0.34 mm	
Area Correction		
Type:	Bulge	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.409	25.41
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	None	Type Strips: Serial #1
Strips:	8	
Force:	0.000 lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Light Yellowish Brown Fat CLAY with Sand (CH)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	13.84	1.868	4.890	-0.127	6.758	3.022
	Max Obliquity	6.06	1.645	3.960	0.573	5.605	2.315
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 3.85E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2319UD
Sample No.: UD4
Specimen No.: c

Depth (ft.): 25.0-27.0
Stage No.: 1

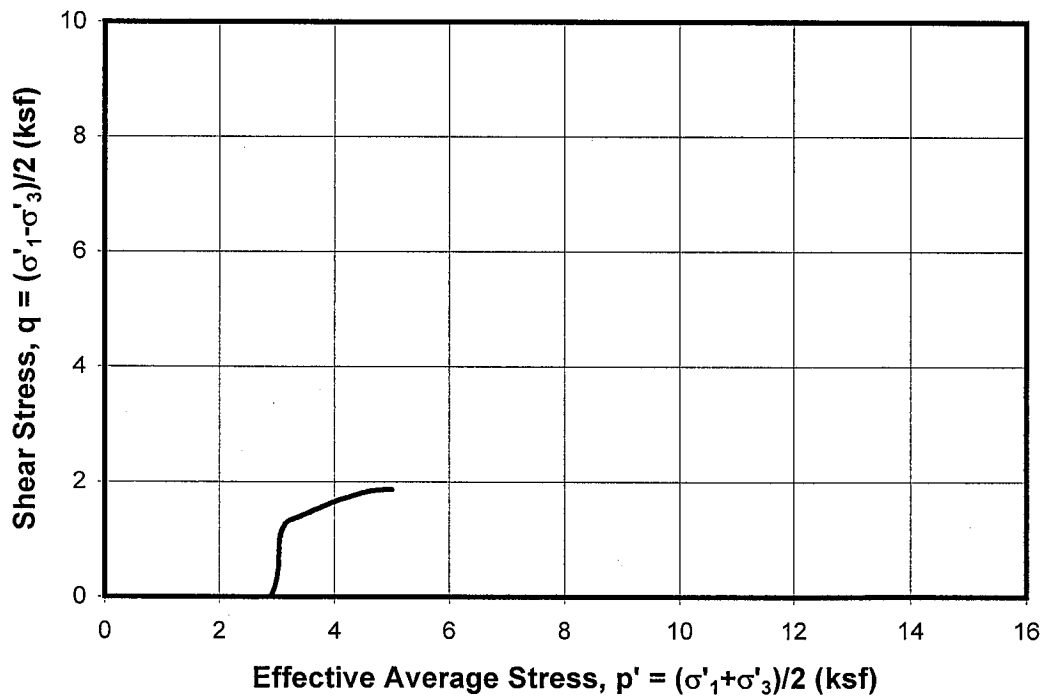
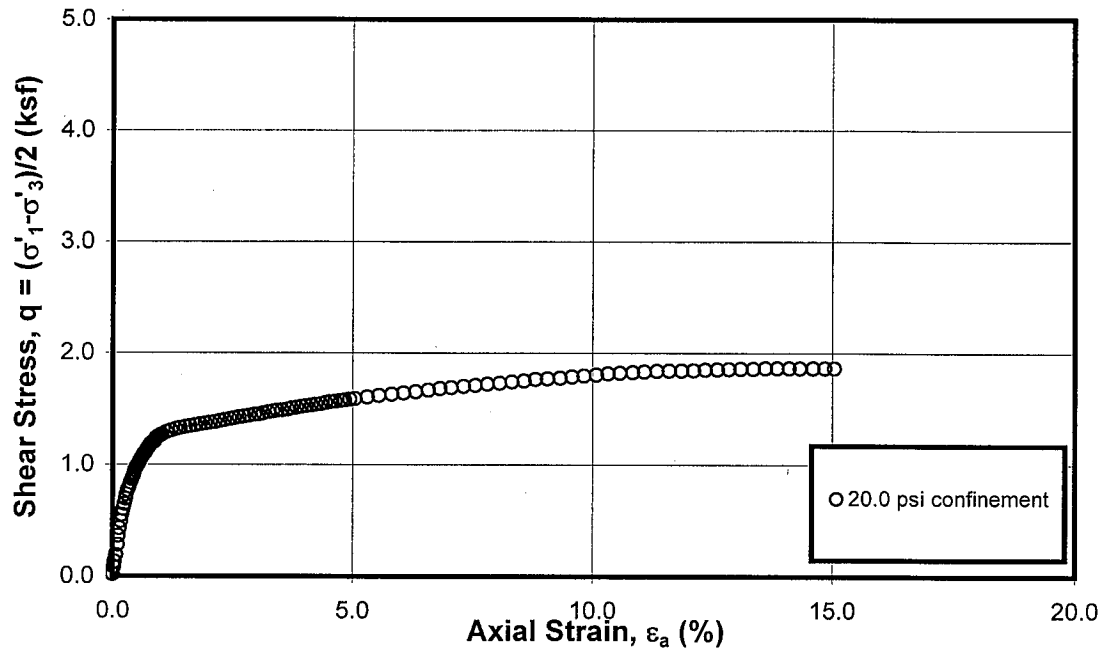
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.021	2.904	0.000	0.000	1.014	0.000	-	-
6.5	0.024	0.085	2.938	0.037	0.000	1.059	0.230	529.7	514.2
13.1	0.042	0.130	2.952	0.069	0.000	1.092	0.281	516.3	487.9
19.6	0.068	0.192	2.973	0.110	0.000	1.138	0.299	501.4	512.2
26.1	0.102	0.284	2.999	0.169	0.000	1.209	0.319	516.4	859.9
32.6	0.115	0.364	3.016	0.228	0.000	1.274	0.336	593.9	923.2
39.2	0.136	0.432	3.021	0.298	0.000	1.334	0.358	605.9	547.6
45.7	0.165	0.494	3.032	0.349	0.000	1.389	0.364	573.2	474.1
52.2	0.187	0.553	3.041	0.398	0.000	1.444	0.371	567.7	453.8
58.7	0.214	0.603	3.040	0.452	0.000	1.495	0.383	544.5	374.7
65.3	0.239	0.649	3.031	0.497	0.000	1.545	0.399	526.0	354.9
71.8	0.265	0.694	3.036	0.539	0.000	1.592	0.402	508.0	393.5
78.3	0.282	0.733	3.042	0.581	0.000	1.634	0.403	504.1	367.2
84.9	0.309	0.771	3.047	0.610	0.000	1.677	0.404	485.6	254.6
91.4	0.339	0.804	3.036	0.652	0.000	1.721	0.416	461.9	242.4
97.9	0.366	0.839	3.050	0.668	0.000	1.759	0.410	447.5	236.4
104.4	0.394	0.869	3.042	0.710	0.000	1.800	0.418	430.4	201.1
111.0	0.422	0.896	3.049	0.740	0.000	1.832	0.417	414.7	232.0
117.5	0.442	0.923	3.047	0.757	0.000	1.870	0.420	408.1	420.2
124.0	0.451	0.948	3.051	0.783	0.000	1.902	0.420	411.2	368.6
130.5	0.481	0.973	3.056	0.801	0.000	1.935	0.420	396.2	141.6
137.1	0.516	0.994	3.055	0.829	0.000	1.964	0.422	377.0	148.3
143.6	0.540	1.015	3.051	0.846	0.000	1.997	0.426	368.5	198.8
150.1	0.559	1.036	3.060	0.857	0.000	2.023	0.423	363.2	170.2
156.6	0.594	1.057	3.076	0.873	0.000	2.048	0.417	349.1	139.6
163.2	0.618	1.076	3.065	0.896	0.000	2.082	0.423	341.6	158.1
169.7	0.638	1.092	3.063	0.911	0.000	2.108	0.425	336.0	134.2
176.2	0.665	1.107	3.069	0.916	0.000	2.128	0.424	326.5	119.4
182.7	0.696	1.127	3.092	0.922	0.000	2.148	0.415	317.9	137.2
189.3	0.719	1.144	3.088	0.941	0.000	2.176	0.418	312.3	141.4
195.8	0.740	1.158	3.087	0.956	0.000	2.201	0.420	307.5	125.8
202.3	0.767	1.173	3.109	0.958	0.000	2.212	0.411	300.6	135.5
208.8	0.781	1.185	3.111	0.969	0.000	2.231	0.411	297.9	111.6
215.4	0.821	1.198	3.110	0.979	0.000	2.253	0.412	286.7	55.1
221.9	0.862	1.207	3.117	0.975	0.000	2.264	0.410	275.2	125.0
228.4	0.873	1.218	3.125	0.981	0.000	2.278	0.408	274.3	205.2
234.9	0.887	1.232	3.138	0.984	0.000	2.293	0.403	273.3	142.8
241.5	0.903	1.239	3.135	0.993	0.000	2.307	0.405	269.7	77.1

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
248.0	0.937	1.251	3.143	0.989	0.000	2.323	0.403	262.8	52.7
254.5	0.973	1.257	3.148	0.995	0.000	2.329	0.401	254.0	64.2
261.1	0.993	1.267	3.156	1.001	0.000	2.341	0.399	250.9	65.6
267.6	1.015	1.270	3.150	1.005	0.000	2.352	0.402	246.3	38.1
293.7	1.113	1.291	3.177	0.999	0.000	2.370	0.393	228.2	36.5
319.8	1.209	1.306	3.185	1.001	0.000	2.390	0.391	212.5	29.1
345.8	1.311	1.320	3.208	0.993	0.000	2.398	0.383	198.2	24.9
371.9	1.397	1.329	3.227	0.985	0.000	2.401	0.376	187.3	18.8
398.0	1.506	1.338	3.249	0.979	0.000	2.400	0.369	174.9	15.6
424.1	1.605	1.346	3.265	0.961	0.000	2.402	0.364	165.1	15.0
450.2	1.717	1.354	3.284	0.960	0.000	2.403	0.357	155.2	18.1
476.3	1.814	1.364	3.308	0.938	0.000	2.404	0.350	148.1	15.6
502.4	1.927	1.369	3.334	0.926	0.000	2.394	0.341	140.0	13.8
528.5	2.024	1.378	3.343	0.918	0.000	2.403	0.338	134.2	15.3
554.6	2.124	1.384	3.370	0.905	0.000	2.395	0.329	128.4	12.7
580.7	2.226	1.391	3.379	0.896	0.000	2.400	0.327	123.1	15.8
606.8	2.326	1.400	3.415	0.876	0.000	2.390	0.315	118.6	16.5
632.9	2.433	1.408	3.421	0.874	0.000	2.399	0.313	114.0	16.8
658.9	2.525	1.417	3.437	0.865	0.000	2.403	0.309	110.6	18.6
685.0	2.628	1.426	3.458	0.855	0.000	2.404	0.303	107.0	16.1
711.1	2.724	1.433	3.481	0.836	0.000	2.399	0.295	103.7	13.1
737.2	2.834	1.440	3.493	0.833	0.000	2.403	0.292	100.1	14.6
763.3	2.946	1.449	3.514	0.819	0.000	2.404	0.287	97.0	12.6
789.4	3.036	1.453	3.538	0.806	0.000	2.394	0.279	94.4	13.9
815.5	3.124	1.462	3.544	0.801	0.000	2.404	0.278	92.2	19.2
841.6	3.238	1.473	3.575	0.789	0.000	2.401	0.269	89.7	14.0
867.7	3.332	1.477	3.578	0.782	0.000	2.405	0.268	87.4	14.4
893.8	3.424	1.486	3.610	0.774	0.000	2.399	0.259	85.6	14.5
919.9	3.528	1.491	3.601	0.779	0.000	2.412	0.263	83.3	9.6
946.0	3.643	1.496	3.629	0.759	0.000	2.403	0.254	81.0	15.7
972.0	3.731	1.506	3.636	0.753	0.000	2.414	0.254	79.6	17.1
998.1	3.837	1.513	3.656	0.747	0.000	2.411	0.248	77.8	14.8
1024.2	3.936	1.521	3.677	0.732	0.000	2.411	0.242	76.2	13.7
1050.3	4.038	1.526	3.695	0.722	0.000	2.408	0.237	74.6	12.2
1076.4	4.141	1.534	3.710	0.708	0.000	2.409	0.233	73.1	13.8
1102.5	4.246	1.541	3.733	0.691	0.000	2.406	0.227	71.6	11.3
1128.6	4.343	1.545	3.740	0.690	0.000	2.408	0.225	70.2	14.8
1154.7	4.444	1.556	3.758	0.681	0.000	2.413	0.222	69.1	18.2
1180.8	4.544	1.563	3.778	0.675	0.000	2.412	0.217	67.9	11.7
1206.9	4.637	1.567	3.781	0.674	0.000	2.416	0.216	66.7	10.2
1233.0	4.750	1.574	3.799	0.662	0.000	2.415	0.212	65.4	10.3
1259.1	4.834	1.577	3.816	0.649	0.000	2.410	0.207	64.4	12.2
1285.1	4.937	1.586	3.829	0.644	0.000	2.414	0.204	63.4	13.8

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
1311.2	5.043	1.592	3.844	0.637	0.000	2.413	0.201	62.3	11.1
1376.5	5.296	1.606	3.872	0.623	0.000	2.417	0.194	59.9	11.6
1441.7	5.539	1.621	3.917	0.596	0.000	2.412	0.183	57.8	10.3
1506.9	5.807	1.632	3.928	0.592	0.000	2.421	0.182	55.5	9.5
1572.1	6.057	1.645	3.960	0.573	0.000	2.422	0.175	53.6	9.6
1637.3	6.305	1.656	4.005	0.543	0.000	2.410	0.163	51.9	9.2
1702.6	6.568	1.669	4.033	0.520	0.000	2.412	0.157	50.2	11.2
1767.8	6.813	1.684	4.075	0.496	0.000	2.409	0.148	48.8	9.2
1833.0	7.044	1.691	4.095	0.487	0.000	2.407	0.143	47.4	7.5
1898.2	7.306	1.703	4.130	0.456	0.000	2.403	0.136	46.0	7.8
1963.5	7.554	1.711	4.168	0.429	0.000	2.393	0.126	44.8	8.2
2028.7	7.806	1.723	4.203	0.404	0.000	2.390	0.119	43.6	8.8
2093.9	8.064	1.734	4.248	0.376	0.000	2.379	0.108	42.5	8.3
2159.1	8.323	1.745	4.262	0.371	0.000	2.387	0.106	41.4	7.5
2224.3	8.577	1.753	4.300	0.339	0.000	2.376	0.097	40.4	8.5
2289.6	8.821	1.766	4.330	0.324	0.000	2.378	0.091	39.6	7.9
2354.8	9.065	1.772	4.362	0.296	0.000	2.368	0.083	38.6	5.3
2420.0	9.328	1.779	4.394	0.276	0.000	2.361	0.076	37.7	6.7
2485.2	9.573	1.789	4.415	0.269	0.000	2.363	0.073	36.9	7.7
2550.5	9.825	1.799	4.447	0.247	0.000	2.358	0.066	36.2	7.4
2615.7	10.077	1.808	4.470	0.232	0.000	2.358	0.062	35.5	7.6
2680.9	10.319	1.817	4.513	0.197	0.000	2.348	0.052	34.8	6.2
2746.1	10.567	1.823	4.544	0.173	0.000	2.340	0.045	34.1	4.9
2811.3	10.829	1.830	4.571	0.145	0.000	2.335	0.039	33.4	4.4
2876.6	11.075	1.834	4.601	0.128	0.000	2.326	0.032	32.7	4.1
2941.8	11.333	1.840	4.623	0.103	0.000	2.323	0.027	32.1	4.2
3007.0	11.590	1.845	4.651	0.084	0.000	2.315	0.021	31.5	1.3
3072.2	11.849	1.844	4.666	0.060	0.000	2.307	0.017	30.8	0.8
3137.5	12.098	1.847	4.697	0.043	0.000	2.296	0.009	30.2	4.0
3202.7	12.336	1.853	4.718	0.024	0.000	2.294	0.005	29.7	3.8
3267.9	12.588	1.856	4.763	-0.010	0.000	2.277	-0.007	29.2	2.3
3333.1	12.829	1.859	4.778	-0.031	0.000	2.274	-0.010	28.7	2.1
3398.4	13.077	1.861	4.818	-0.064	0.000	2.259	-0.020	28.1	1.2
3463.6	13.338	1.862	4.839	-0.083	0.000	2.251	-0.026	27.6	2.1
3528.8	13.594	1.866	4.874	-0.114	0.000	2.241	-0.034	27.2	2.3
3594.0	13.841	1.868	4.890	-0.127	0.000	2.236	-0.038	26.7	0.0
3659.3	14.095	1.866	4.909	-0.152	0.000	2.227	-0.043	26.2	0.0
3724.5	14.322	1.868	4.942	-0.180	0.000	2.215	-0.052	25.8	0.2
3789.7	14.591	1.867	4.962	-0.202	0.000	2.206	-0.058	25.3	0.1
3854.9	14.841	1.868	4.975	-0.219	0.000	2.202	-0.061	24.9	0.1
3910.9	15.043	1.867	4.994	-0.231	0.000	2.194	-0.066	24.5	-0.7



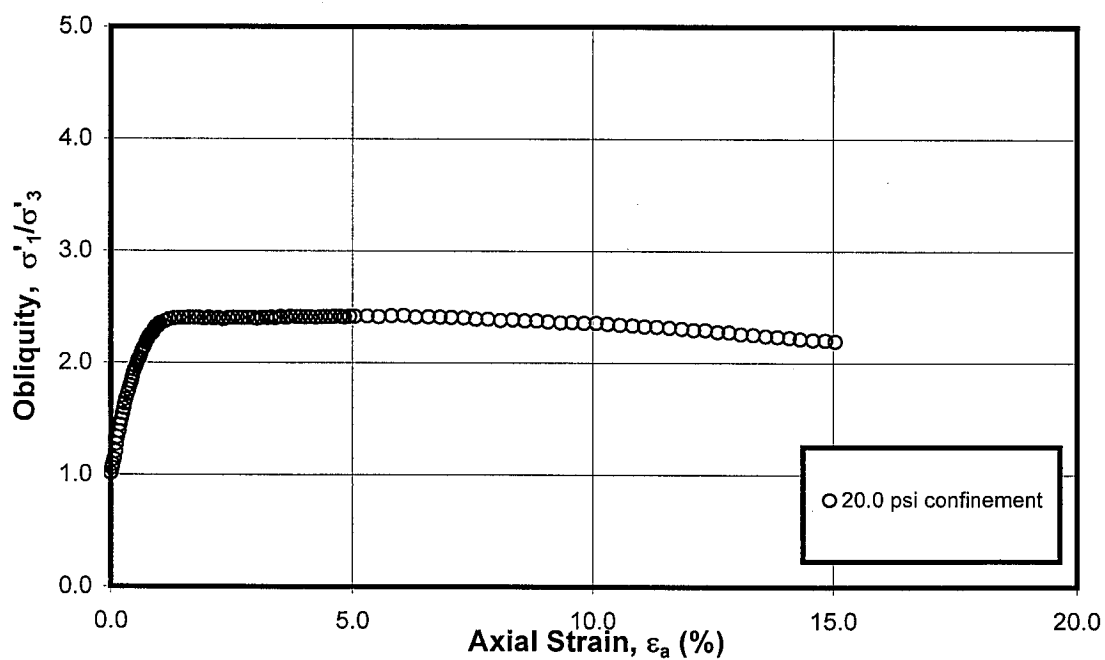
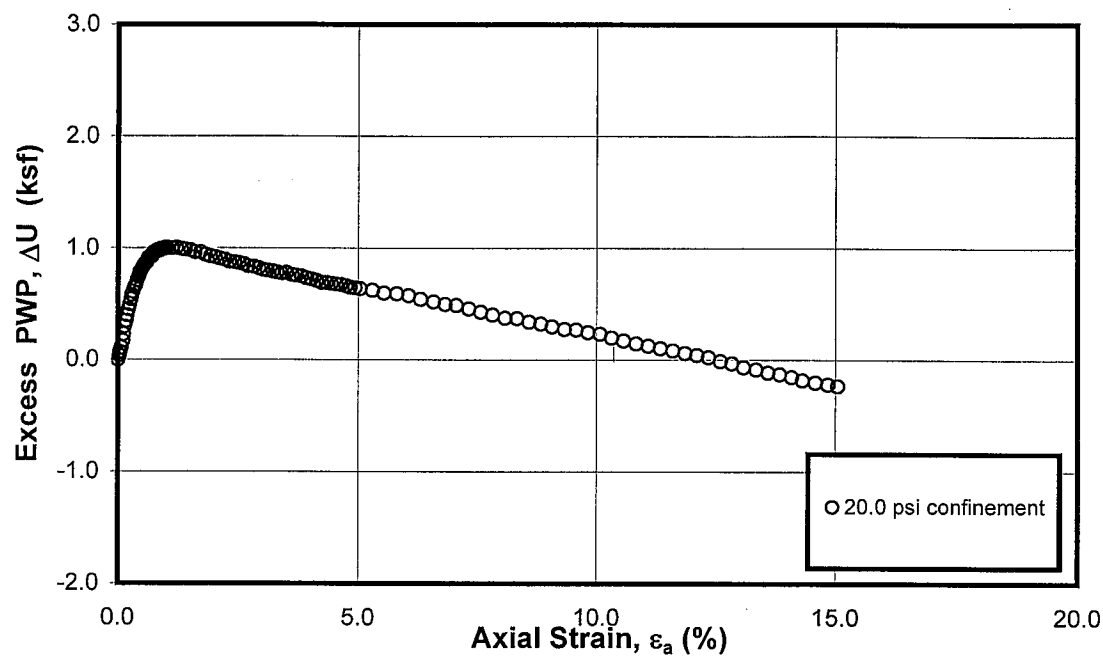
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD4c - Depth: 25.0-27.0 ft

Boring B-2319UD

Reviewed By: WFD



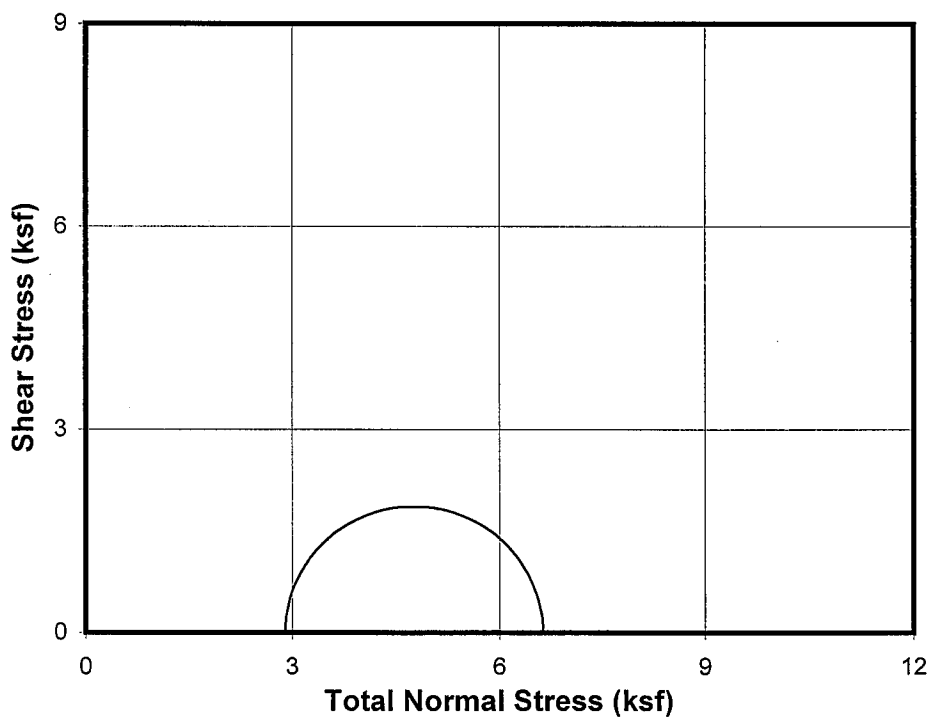
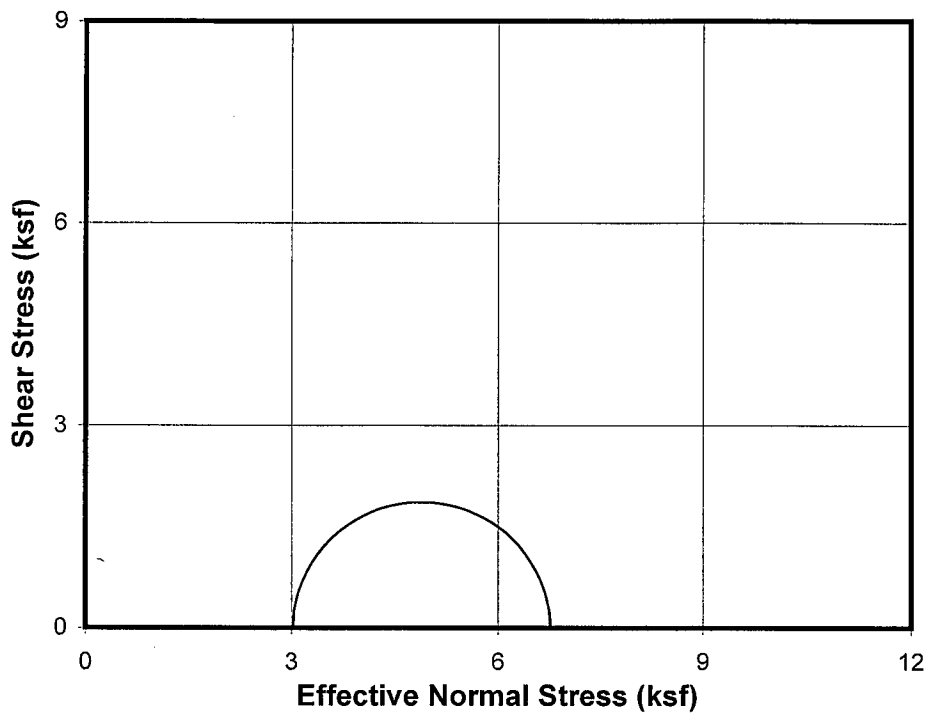
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD4c - Depth: 25.0-27.0 ft

Boring B-2319UD

Reviewed By: *WLD*



UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated- Mohr's Circles

Sample: UD4c - Depth: 25.0-27.0 ft

Boring B-2319UD

Reviewed By: *WLD*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: File Name: B-2319UD_UD7d
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 7.20 , & ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.660 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD7	Compostite No.:	Pluviated:		Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 65.0-67.0	Specimen No.: D	Kneading		Undercompaction: U_{hi} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

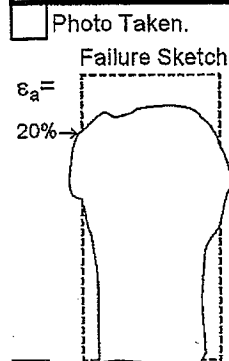
Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = ? Value
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☒ Strain	☐ Stress
		Stress Path	☒ Constant Cell Pressure
			☐ Cyclic (Hz)
			Rate: 0.1; 1; Other:
			☐ Variable Cell Pressure

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	999	1146	821	6004
Mass Moist Soil + Cont. (g)	113.84	91.95	119.44	109.48
Mass Dry Soil + Container (g)	99.70	81.58	104.52	95.96
Mass Container (g)	32.12	33.23	32.28	31.86
Water Content, $W_{o,n}$ (%)	20.92	21.45	20.65	21.09
Avg. Initial WC, $W_{o,avg}$ (%)	21.01	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		466.86	470.86
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		466.86	470.86
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, M_{des} (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB	100.000	100.000	1 T	50.60	59.75
1	15.50	-2.01	2 M	50.70	52.57
2	15.45	-2.19	3 B	50.60	51.00
3	15.38	-2.24	1 T		
4	15.55	-1.94	2 M		
5	15.47	-1.90	3 B		
Avg	115.47	97.94	Avg.	50.63	54.44

Measuring Devices:		$A_o = \pi D^2 / 400$ (cm ²)	20.14
PI Tape: ☒ Dia		V_o (cm ³)	232.50
Calipers: ☐ HI.; ☐ Dia		$A_{atb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	22.88
Dial Comparator: ☒ HI.; ☐ Dia		$A_{atb,m} = (d_{min} - 2\Delta d) d_{max} / 400$ (cm ²)	NA
Remarks: ID# PI-002		$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	53.97



Failure Mode: NA - Not Applicable

☒ Bulge GB - Gage Block

☐ Wedge Other Remarks:

☐ Parabolic LL = 39 PL = 17 PI = 22

Wedge/Bulge Ht. =

NA (mm)

Estimated Initial Unit Weight		Total, $\gamma_{t,o}$ (lb/ft ³) = 125.35	Dry, $\gamma_{d,o}$ (lb/ft ³) = 103.59
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.57	0.68
= 1	Single; ☒ Double	0.57	0.69
Circumference ($C_{rm,o}$)		148.0	148.0
Total Thickness		Dia. ($C_{rm,o} / \pi$)	
Average:		0.31	47.11
Filter Paper: Top + Bottom: ☐ Yes; ☒ No			
Filter Strips: ☒ Yes; ☐ No Number = 8			
Type of Filter Strips ☐ Vertical: 1/4 in. & Whatman #54			
☒ Spiral: 1/4 in. & Whatman #1			
Apparatus: Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf			
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf			
Top Cap Attached:		Piston Dia. (in.)	Load Cell:
☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4;			External ☒ Internal
Top Cap - Rotation		Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°	
With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap			
☐ Internal LVDT Jacket			

Final Visual Classification: Light Yellowish Brown Sandy Lean CLAY (CL)

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP

Date: 5/16/2008 Date: 5/16/2008 Date: 5/30/2008

Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WJR

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686 Cell No.: File Name: B-2319UD_UD7d
 Task Number: NA Specific Gravity: 2.660 ☒ Measured; ☐ Assumed
 Boring No.: B-2319UD Sample No.: UD7 Specimen No.: D Depth (ft): 65.0-67.0
 Type Test: CIU Triaxial Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bo}$	Initial Selected WC, w_o (%)	21.01
W_c 20.92	21.45	20.65	21.01	21.01	20.06	Initial, $M_{d,o}$	385.80
S_o 92.9	94.2	92.3	93.1	93.1	90.8	Final, $M_{d,al}$	388.84
Measured final mass of moist soil, $M_{t,al}$ (g)					470.86	Selected, M_d	385.80
Final mass of moist soil corrected for excess dry soil, $M_{t,al,c}$ (g)					470.86		

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	0.03	-0.02		0.36	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	2.01			3.75	NA	NA	NA
Theoretical $\Delta V_{d,n} = (3V_o \times \Delta H_{c,n} / H_o)$	0.15	-0.11		2.18	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{l,n}$				1.72	NA	NA	NA
Corrected $\Delta V_{d,n} = F_v \times \Delta V_{l,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	0.15	-0.11		3.75	NA	NA	NA

Summary For Test Stages					Number of Test Stages = 1 $t_{50} = 14$ min
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	120.04	NA	NA	NA	
Back Pressure, $U_{b,n}$ (psi)	69.58	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	2.23	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	7.33	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	1.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_c - V_{al}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:
$\Delta V_c = 3.79$	$\Delta V_c = 1.99$	$\Delta V_c = 6.45$	& corr. for ΔH_{ld} $\Delta V_c =$	2.693

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 0.37	$\Delta V_{c,f}$ (cm^3) = 3.79	Back Cal. G_s for $S=100\%$ = 2.693	Normalized	Ht. Ch. (%) = -1.00
$\epsilon_{ac,c}$ (%) = 0.32	$\epsilon_{vc,f}$ (%) = 1.63		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.660$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:											
Initial:	115.47	232.50	20.14	21.01	125.35	103.59	93.1	0.600	0.3492	0.375	95.0
After to 1st σ'_c	115.10	228.71	19.87	22.05	128.52	105.30	102.1	0.574	0.3725	0.365	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.
 (2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).
 (3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).
 (4) Stresses are corrected for membrane. (5) $\sim M_{t,c} - (M_{t,al,c} + p_{water} \times \Delta V_{in, column 1 \& 2})$
 (6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night; WC - Water Content Remarks: Wet Method used in the Saturation Stage

Calculated By: TP Reviewed By: WED

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: File Name: B-2319UD_UD7d
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
☐ Reconstituted				☐ Impact/Rammer	Rammer Wgt.(lb)=
Boring No.: B-2319UD				☐ Pluviated:	No. Layers =
Sample No.: UD7 Composite No.:				☐ Kneading	Tamper Force (lb)=
Depth (ft): 65.0-67.0 Specimen No.: D				☐ Undercompaction: U_{nj} (%) =	Drop (in.) =
☐ Spec. Selection by X-ray; ☐ Geomarine Sample				Ref. Effort =	Dia. (in.) =
				% Comp. =	± Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) =	Value
☐ 45° stress path				Remarks:		
Loading Conditions	☒ Static	☐ Post Cyclic	☒ Undrained	☐ Drained	☒ Comp. Ext.	☐ Strain Stress Path
				☒ Constant Cell pressure	☐ Cyclic (Hz)	☐ Stress Strain
				☐ Variable Cell pressure	Rate: 0.1;	1; Other:

Specific Gravity: $G_s = 2.660$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
					Total (pcf)	Dry (pcf)			
Condition: Initial:	115.47	232.50	20.14	21.01	125.35	103.59	93.10	0.60	95.0
After to 1st σ'_c	115.10	228.71	19.87	22.05	128.52	105.30	102.14	0.57	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	0.319	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	1.630	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	7.331	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	7.286	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.994			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	14.617			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	7.301			
Undr. Ambient Shear Stress, $\tau_{a,ua}$:	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type: Bulge		
Modulus: 150.0		psi
Diameter: 47.11		mm
Thickness: 0.31		mm
Area Correction		
Type: Bulge		
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	0.862	22.88
2nd		
3rd		
4th		
Filter Paper Correction		
Type: None	Type Strips: Sprial #1	
Strips: 8		
Force: 0.000	lb/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Light Yellowish Brown Sandy Lean CLAY (CL)

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	15.01	5.390	11.195	1.429	16.585	5.806
	Max Obliquity	2.73	4.694	9.397	2.558	14.090	4.703
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 2.86E-02

STAGE 1

Project: 0411-08-1686 Boring No.: B-2319UD Depth (ft.): 65.0-67.0
 Test Type: CIU Triaxial Sample No.: UD7 Stage No.: 1
 Specimen No.: D

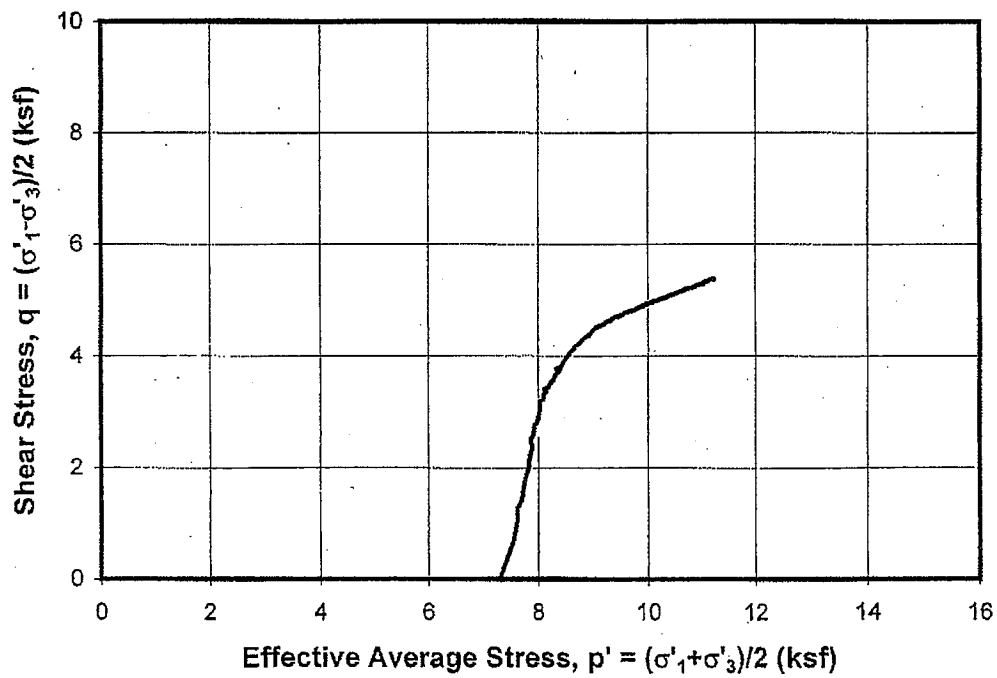
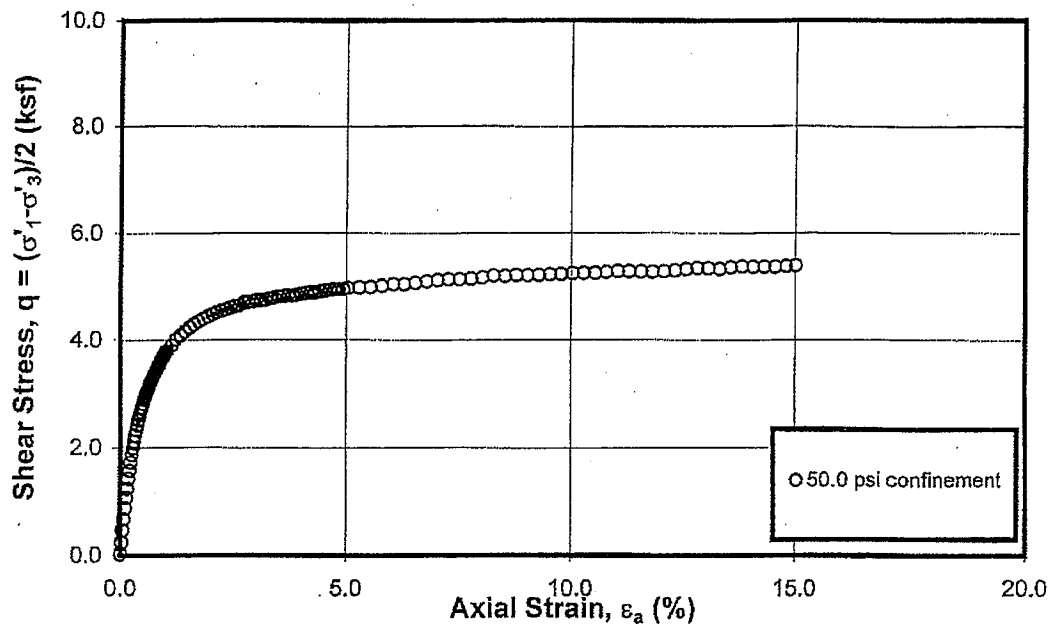
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3	A_f	E_s (ksf)	E_T (ksf)
0.0	0.000	0.023	7.309	0.000	0.000	1.006	0.000	-	-
0.9	0.025	0.242	7.390	0.113	0.000	1.068	0.314	1749.1	1766.2
1.8	0.050	0.467	7.474	0.253	0.000	1.133	0.315	1766.3	1712.6
2.7	0.075	0.674	7.550	0.398	0.000	1.196	0.315	1724.9	1640.5
3.6	0.101	0.879	7.590	0.553	0.000	1.262	0.336	1703.5	1595.1
4.4	0.126	1.074	7.630	0.706	0.000	1.328	0.347	1673.1	1447.4
5.3	0.151	1.243	7.619	0.846	0.000	1.390	0.373	1618.2	1404.3
6.2	0.176	1.427	7.708	0.979	0.000	1.454	0.358	1596.3	1334.9
7.1	0.201	1.578	7.730	1.112	0.000	1.513	0.365	1547.4	1217.1
8.0	0.226	1.733	7.757	1.233	0.000	1.575	0.369	1512.1	1164.5
8.9	0.251	1.871	7.789	1.353	0.000	1.632	0.370	1470.9	1058.7
9.8	0.276	1.998	7.829	1.455	0.000	1.685	0.368	1429.8	982.3
10.6	0.301	2.117	7.837	1.553	0.000	1.740	0.374	1389.6	928.8
11.5	0.326	2.231	7.856	1.647	0.000	1.793	0.376	1352.8	873.5
12.4	0.351	2.335	7.887	1.728	0.000	1.841	0.375	1316.3	743.7
13.3	0.376	2.417	7.882	1.803	0.000	1.884	0.380	1271.9	701.4
14.2	0.401	2.510	7.864	1.874	0.000	1.938	0.388	1239.6	713.5
15.1	0.427	2.596	7.917	1.945	0.000	1.976	0.382	1206.1	628.2
15.9	0.452	2.669	7.933	2.004	0.000	2.014	0.382	1171.4	612.1
16.8	0.477	2.750	7.931	2.064	0.000	2.061	0.386	1143.6	590.8
17.7	0.502	2.817	7.981	2.113	0.000	2.091	0.380	1113.3	561.0
18.6	0.527	2.890	8.005	2.152	0.000	2.130	0.379	1088.1	507.2
19.5	0.552	2.945	8.016	2.206	0.000	2.161	0.379	1058.2	473.2
20.4	0.577	3.009	8.028	2.254	0.000	2.199	0.380	1034.6	480.7
21.2	0.602	3.065	8.043	2.293	0.000	2.231	0.379	1010.0	421.3
22.1	0.628	3.115	8.037	2.330	0.000	2.266	0.382	985.5	462.7
23.0	0.652	3.181	8.030	2.364	0.000	2.312	0.386	968.1	424.8
23.9	0.678	3.221	8.088	2.396	0.000	2.324	0.378	944.1	362.7
24.8	0.703	3.272	8.103	2.437	0.000	2.355	0.378	924.8	383.3
25.7	0.728	3.317	8.108	2.460	0.000	2.385	0.379	905.5	365.4
26.6	0.753	3.364	8.161	2.482	0.000	2.402	0.372	887.5	328.4
27.4	0.778	3.400	8.116	2.511	0.000	2.442	0.381	868.3	336.5
28.3	0.803	3.448	8.191	2.523	0.000	2.454	0.371	853.1	388.6
29.2	0.828	3.497	8.222	2.539	0.000	2.481	0.369	839.1	321.0
30.1	0.853	3.529	8.245	2.550	0.000	2.497	0.367	821.8	333.5
31.0	0.878	3.581	8.295	2.566	0.000	2.519	0.361	810.2	370.9
31.9	0.903	3.622	8.302	2.587	0.000	2.548	0.362	796.7	321.3
32.7	0.929	3.662	8.324	2.605	0.000	2.571	0.360	783.8	335.1

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
33.6	0.954	3.706	8.362	2.630	0.000	2.592	0.357	772.4	305.0
34.5	0.979	3.738	8.393	2.635	0.000	2.606	0.354	759.2	237.7
35.4	1.004	3.766	8.339	2.649	0.000	2.647	0.362	745.7	233.1
36.3	1.029	3.797	8.417	2.661	0.000	2.644	0.353	733.5	225.9
39.8	1.129	3.899	8.478	2.694	0.000	2.703	0.349	686.5	210.6
43.4	1.229	4.008	8.556	2.716	0.000	2.762	0.343	648.4	185.2
46.9	1.329	4.084	8.629	2.719	0.000	2.797	0.337	611.0	148.0
50.4	1.430	4.156	8.683	2.739	0.000	2.836	0.334	578.2	146.5
53.9	1.530	4.231	8.766	2.737	0.000	2.865	0.327	550.2	136.5
57.5	1.630	4.293	8.841	2.733	0.000	2.888	0.321	524.0	115.7
61.0	1.730	4.347	8.898	2.725	0.000	2.910	0.316	499.9	96.1
64.5	1.830	4.389	8.963	2.712	0.000	2.919	0.311	477.1	91.7
68.1	1.930	4.438	8.997	2.696	0.000	2.947	0.309	457.5	86.4
71.6	2.030	4.475	9.031	2.686	0.000	2.965	0.307	438.6	72.8
75.1	2.131	4.511	9.070	2.676	0.000	2.979	0.304	421.4	66.3
78.7	2.231	4.542	9.146	2.651	0.000	2.973	0.297	405.2	59.2
82.2	2.331	4.570	9.216	2.632	0.000	2.968	0.290	390.2	56.0
85.7	2.431	4.598	9.233	2.618	0.000	2.984	0.290	376.4	60.1
89.2	2.531	4.631	9.306	2.591	0.000	2.981	0.283	364.1	43.6
92.8	2.631	4.642	9.330	2.579	0.000	2.980	0.281	351.1	63.0
96.3	2.731	4.694	9.397	2.558	0.000	2.996	0.276	342.0	57.0
99.8	2.831	4.699	9.420	2.532	0.000	2.991	0.274	330.3	19.3
103.4	2.932	4.713	9.472	2.514	0.000	2.981	0.269	320.0	36.4
106.9	3.032	4.735	9.525	2.495	0.000	2.977	0.265	310.9	22.9
110.4	3.132	4.736	9.538	2.474	0.000	2.972	0.263	301.0	9.8
114.0	3.232	4.745	9.551	2.452	0.000	2.975	0.263	292.2	39.2
117.5	3.332	4.775	9.585	2.442	0.000	2.986	0.261	285.3	38.2
121.0	3.432	4.783	9.628	2.420	0.000	2.975	0.256	277.4	32.1
124.6	3.532	4.807	9.693	2.391	0.000	2.968	0.251	270.9	28.8
128.1	3.633	4.812	9.725	2.375	0.000	2.959	0.248	263.7	15.4
131.6	3.733	4.823	9.751	2.362	0.000	2.957	0.246	257.2	12.0
135.1	3.833	4.824	9.774	2.340	0.000	2.949	0.243	250.5	17.8
138.7	3.933	4.841	9.778	2.325	0.000	2.961	0.244	245.0	36.2
142.2	4.033	4.860	9.835	2.304	0.000	2.954	0.239	239.9	35.0
145.7	4.133	4.876	9.879	2.283	0.000	2.949	0.235	234.8	34.1
149.3	4.233	4.895	9.893	2.260	0.000	2.959	0.235	230.2	14.1
152.8	4.333	4.890	9.904	2.257	0.000	2.950	0.233	224.6	9.7
156.3	4.434	4.904	9.941	2.233	0.000	2.948	0.230	220.2	33.4
159.9	4.534	4.923	9.984	2.230	0.000	2.946	0.227	216.2	30.9
163.4	4.634	4.935	9.976	2.204	0.000	2.958	0.229	212.0	27.2
166.9	4.734	4.950	10.053	2.168	0.000	2.940	0.221	208.2	14.4
170.4	4.834	4.950	10.053	2.159	0.000	2.940	0.222	203.8	-1.1
174.0	4.934	4.949	10.088	2.148	0.000	2.926	0.218	199.7	24.0

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
177.5	5.034	4.974	10.070	2.137	0.000	2.952	0.221	196.7	28.4
186.3	5.285	4.984	10.162	2.095	0.000	2.925	0.212	187.7	7.2
195.2	5.535	4.992	10.175	2.072	0.000	2.926	0.212	179.6	13.1
204.0	5.785	5.016	10.232	2.039	0.000	2.924	0.207	172.6	19.4
212.8	6.035	5.040	10.321	2.006	0.000	2.909	0.200	166.3	10.6
221.6	6.286	5.043	10.333	1.974	0.000	2.906	0.199	159.7	10.3
230.4	6.536	5.066	10.382	1.953	0.000	2.906	0.195	154.3	20.7
239.3	6.786	5.095	10.444	1.926	0.000	2.905	0.191	149.5	20.0
248.1	7.036	5.116	10.506	1.897	0.000	2.898	0.186	144.8	16.6
256.9	7.287	5.136	10.541	1.861	0.000	2.901	0.184	140.4	6.6
265.7	7.537	5.133	10.552	1.840	0.000	2.894	0.183	135.6	4.5
274.6	7.787	5.147	10.604	1.811	0.000	2.887	0.178	131.6	13.9
283.4	8.037	5.168	10.650	1.798	0.000	2.885	0.175	128.0	22.4
292.2	8.288	5.204	10.719	1.760	0.000	2.887	0.171	125.0	12.9
301.0	8.538	5.200	10.730	1.742	0.000	2.881	0.170	121.3	4.4
309.9	8.788	5.215	10.770	1.717	0.000	2.877	0.167	118.2	4.4
318.7	9.039	5.211	10.792	1.694	0.000	2.867	0.164	114.8	0.8
327.5	9.289	5.217	10.812	1.687	0.000	2.865	0.163	111.8	6.9
336.3	9.539	5.228	10.832	1.671	0.000	2.866	0.162	109.1	6.5
345.1	9.789	5.233	10.837	1.653	0.000	2.868	0.161	106.5	7.2
354.0	10.040	5.246	10.883	1.646	0.000	2.861	0.158	104.1	7.6
362.8	10.290	5.252	10.889	1.634	0.000	2.863	0.158	101.6	2.4
371.6	10.540	5.252	10.864	1.628	0.000	2.872	0.160	99.2	7.9
380.4	10.790	5.272	10.927	1.608	0.000	2.864	0.155	97.3	14.6
389.3	11.040	5.289	10.974	1.592	0.000	2.860	0.152	95.4	5.8
398.1	11.291	5.286	10.975	1.588	0.000	2.858	0.152	93.2	-2.8
406.9	11.541	5.281	10.974	1.579	0.000	2.855	0.151	91.1	-3.6
415.7	11.791	5.277	10.983	1.573	0.000	2.850	0.150	89.1	0.5
424.6	12.042	5.283	11.019	1.550	0.000	2.842	0.147	87.4	8.5
433.4	12.292	5.298	11.011	1.546	0.000	2.855	0.149	85.8	15.9
442.2	12.542	5.322	11.042	1.540	0.000	2.861	0.148	84.5	18.1
451.0	12.792	5.344	11.101	1.520	0.000	2.856	0.144	83.2	6.4
459.9	13.043	5.338	11.080	1.520	0.000	2.860	0.145	81.5	-4.8
468.7	13.293	5.332	11.096	1.509	0.000	2.850	0.143	79.9	7.1
477.5	13.543	5.356	11.144	1.507	0.000	2.851	0.140	78.8	17.1
486.3	13.793	5.374	11.146	1.486	0.000	2.862	0.142	77.6	5.3
495.1	14.044	5.369	11.171	1.469	0.000	2.851	0.139	76.1	-1.6
504.0	14.294	5.370	11.187	1.475	0.000	2.847	0.137	74.8	-0.2
512.8	14.544	5.369	11.204	1.448	0.000	2.840	0.136	73.5	3.4
521.6	14.795	5.379	11.235	1.439	0.000	2.837	0.133	72.4	8.9
529.4	15.014	5.390	11.195	1.429	0.000	2.857	0.138	71.5	9.6



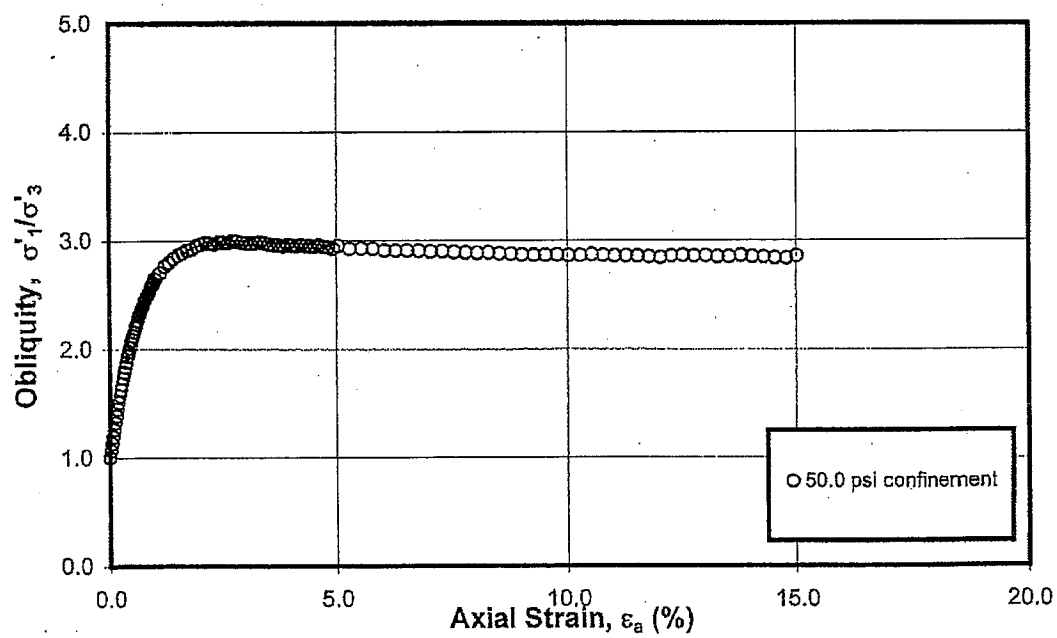
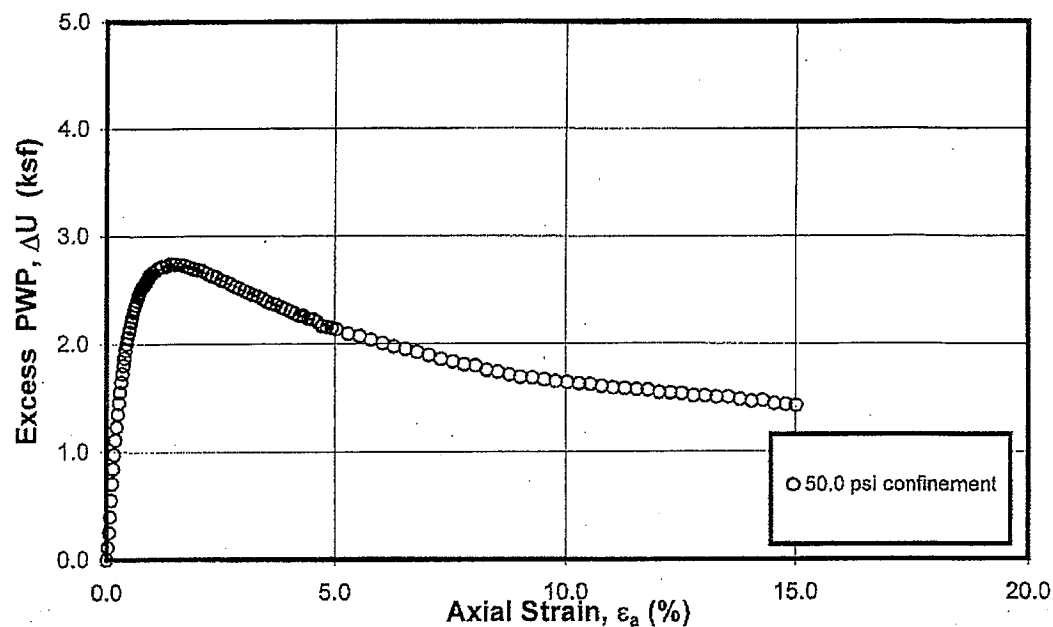
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD7D - Depth: 65.0-67.0 ft

Boring B-2319UD

Reviewed By: WFA



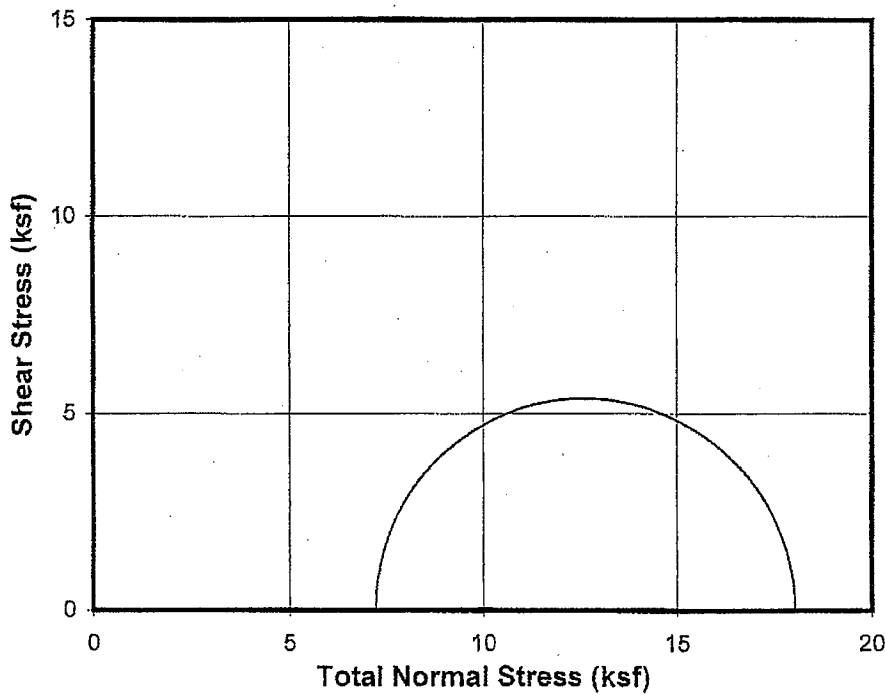
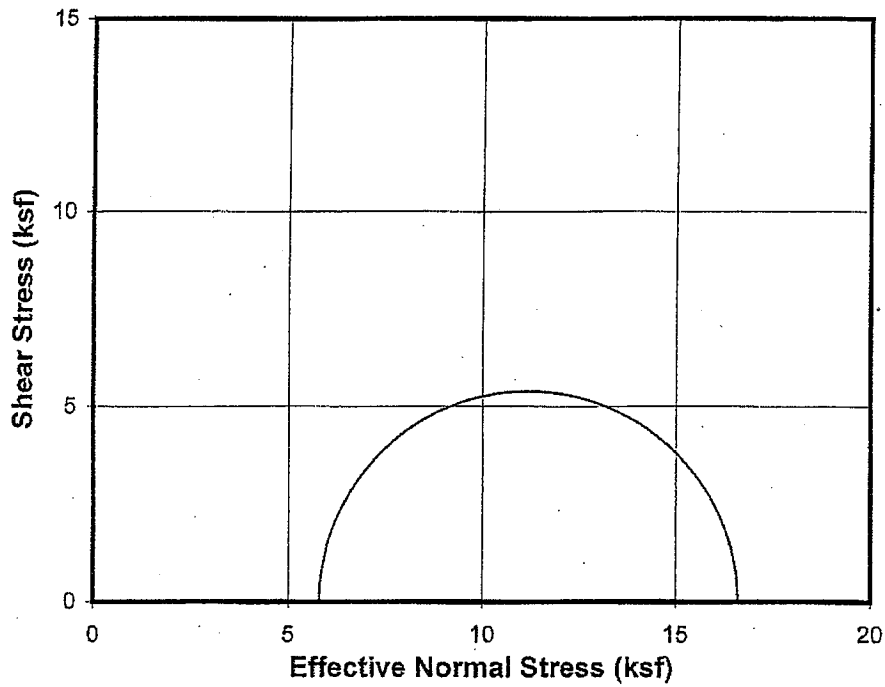
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD7D - Depth: 65.0-67.0 ft

Boring B-2319UD

Reviewed By: WLD



UNDRAINED TRIAXIAL COMPRESSION TEST
Isotropically Consolidated- Mohr's Circles
Sample: UD7D - Depth: 65.0-67.0 ft
Boring B-2319UD

Reviewed By: WFO

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-5 File Name: 2321UD_UD3
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 1.44, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k (\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua} (\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD3	Compostite No.:	☐ Pluviated:		Tamper Force (lb) =	Drop (in.) =
Depth (ft): 10.0-11.7	Specimen No.: c	☐ Kneading		Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	☐ K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	☐ 45° stress path	Remarks:
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.
	☐ Post Cyclic	☐ Drained	☐ Ext.
		☐ Strain	☐ Stress
		☒ Constant Cell Pressure	☐ Cyclic (Hz)
		☐ Variable Cell Pressure	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	C25	123	163	4245
Mass Moist Soil + Cont. (g)	92.10	93.66	92.86	128.12
Mass Dry Soil + Container (g)	82.30	83.99	82.74	112.72
Mass Container (g)	30.08	30.95	30.47	30.20
Water Content, $W_{o,n}$ (%)	18.77	18.23	19.36	18.66
Avg. Initial WC, $W_{o,avg}$ (%)	18.79	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		449.16	456.64
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_h (g)		449.16	456.64
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)		Final (D_{at})	
GB 100.000	100.000	1 T	51.00	59.10	For
1 4.72	-9.62	2 M	51.00	60.00	Wedge
2 4.75	-9.60	3 B	51.00	58.50	Failure
3 4.73	-9.73	1 T		57.10	= d_{max}
4 4.72	-10.01	2 M		52.60	= d_{min}
5 4.80	-9.85	3 B			= Δd
Avg. 104.74	90.24	Avg.	51.00	57.46	xxxxx

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	20.43
Pi Tape: ☒ Dia	V_o (cm ³)	213.97
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	25.63
Dial Comparator: ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	57.13

☐ Photo Taken.

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=51 PL=16 PI=35

☒ Bulge
☐ Wedge
☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)

Failure Sketch
 $\epsilon_a = 20\%$

Trimmed / Reconstituted By: AW
 Date: 3/21/2008
 Prelim. Calc. By: TP
 Remarks:

☐ See more detailed sketch on attached sheet.

Estimated Initial Unit Weight			
Total, $\gamma_{t,o}$ (lb/ft ³) =	131.05	Dry, $\gamma_{d,o}$ (lb/ft ³) =	110.32
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.66	0.83
= 1	Single; ☒ Double	0.71	0.85
Circumference ($C_{rm,o}$)		152.0	152.0
Total Thickness		Dia. ($C_{rm,o} / \pi$)	
Average:		0.38	48.38

Filter Paper: Top + Bottom: ☐ Yes; ☒ No
 Filter Strips: ☒ Yes; ☐ No Number = 8
 Type of Filter Strips: ☐ Vertical: 1/4 in. & Whatman #54
☒ Spiral: 1/4 in. & Whatman #1

Apparatus: Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf
 Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf

Top Cap Attached: ☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4; ☐ External; ☒ Internal
 Top Cap - Rotation: ☐ Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°
 With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap
☐ Internal LVDT Jacket

Final Visual Classification: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Set Up By: TP
 Date: 3/21/2008
 Final Calc. By: TP
 Reviewed By: WLD

Taken Down By: AW
 Date: 3/24/2008

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-5

File Name: 2321UD_UD3c

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD3

Specimen No.: c

Depth (ft): 10.0-11.7

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed";

☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	18.79
W_c 18.77	18.23	19.36	18.79	18.79	16.72	Initial, $M_{d,o}$	378.11
S_o 95.9	94.4	97.5	95.9	95.9	89.9	Final, $M_{d,at}$	384.82
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	384.82
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	0.03	0.09		0.36	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	0.97	-9.59	NA	2.21	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	0.17	0.56		2.18	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				1.01	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	0.97	-3.56		2.21	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	79.90	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 1.8$ min
Back Pressure, $U_{b,n}$ (psi)	69.59	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	0.97	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	1.48	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	1.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures					
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:	
$\Delta V_c = -0.38$	$\Delta V_c = -0.23$	$\Delta V_c = 2.09$	& corr. for ΔH_{td} $\Delta V_c =$	2.707	

At Final Test Stress/Stage - Consolidation Conclusions					
$\Delta H_{c,f}$ (mm) = 0.47	$\Delta V_{c,f}$ (cm^3) = -0.38	Back Cal. G_s for $S=100\%$ = 2.707	Normalized	Ht. Ch. (%) = 0.37	
$\epsilon_{ac,c}$ (%) = 0.45	$\epsilon_{vc,f}$ (%) = -0.18		Diff. in:	Vol. Ch. (%) =	

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:											
Initial:	104.74	213.97	20.43	16.72	131.05	112.27	89.9	0.504	0.3012	0.335	95.0
After to 1st σ'_c	104.27	214.35	20.56	18.66	132.99	112.07	99.8	0.507	0.3356	0.336	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-5 File Name: 2321UD_UD3
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2321UD</u>		☐ Reconstituted		Impact/Rammer	Rammer Wgt.(lbf)= No. Layers =
Sample No.: <u>UD3</u>		Compostite No.:		Pluviated:	Tamper Force (lbf)= Drop (in.) =
Depth (ft): <u>10.0-11.7</u>		Specimen No.: <u>c</u>		Kneading	Undercompaction: U_{nl} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample		Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.)= <u>NA</u>
Remarks:					
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☒ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Strain Other:

Specific Gravity: $G_s = 2.710$ Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	Void Ratio	Skempton B para-meter % (1)
	(mm)	(cm ³)	(cm ²)	(%)	Total (pcf)	Dry (pcf)	(%)	e	
Condition: Initial:	104.74	213.97	20.43	16.72	131.05	112.27	89.86	0.50	95.0
After to 1st σ'_c	104.27	214.35	20.56	18.66	132.99	112.07	99.77	0.51	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	0.453	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	-0.178	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	1.485	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	1.451	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.977			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	2.936			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	1.462			
Undr. Ambient Shear Stress, τ_{ua} :	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type: <u>Bulge</u>		
Modulus: <u>150.0</u> psi		
Diameter: <u>48.38</u> mm		
Thickness: <u>0.38</u> mm		
Area Correction		
Type: <u>Bulge</u>		
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.468	25.63
2nd		
3rd		
4th		
Filter Paper Correction		
Type: <u>None</u> Type Strips: <u>Spiral #1</u>		
Strips: <u>8</u>		
Force: <u>0.000</u> lbf/strip		

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	15.02	1.958	3.798	-0.392	5.756	1.840
	Max Obliquity	2.33	1.278	2.003	0.720	3.281	0.725
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 0.033

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2321UD
Sample No.: UD3
Specimen No.: c

Depth (ft.): 10.0-11.7
Stage No.: 1

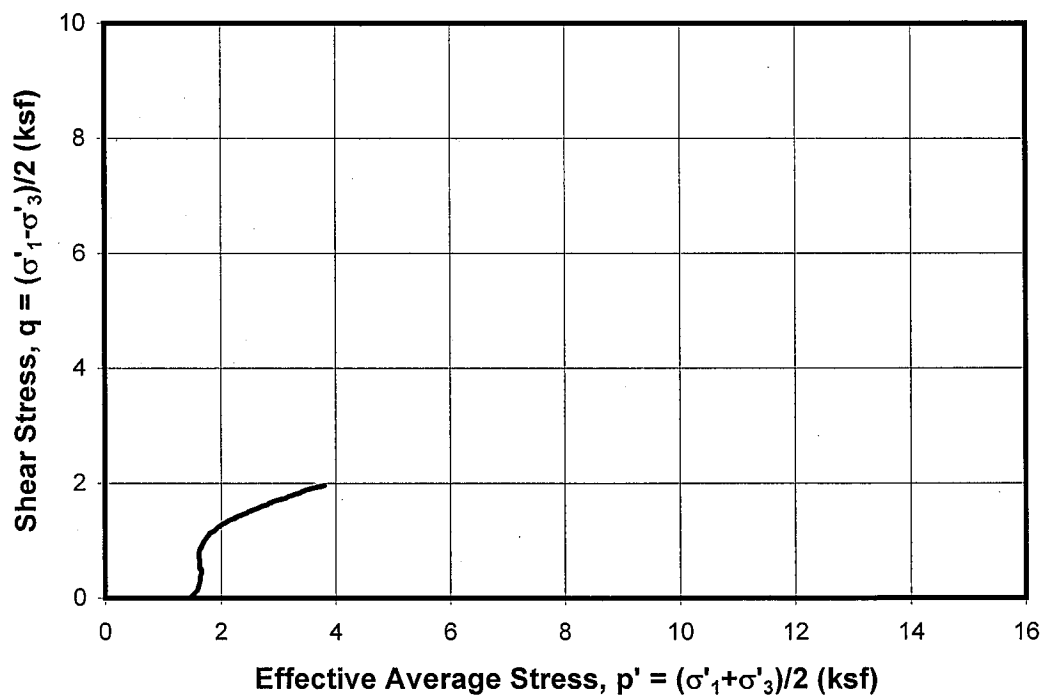
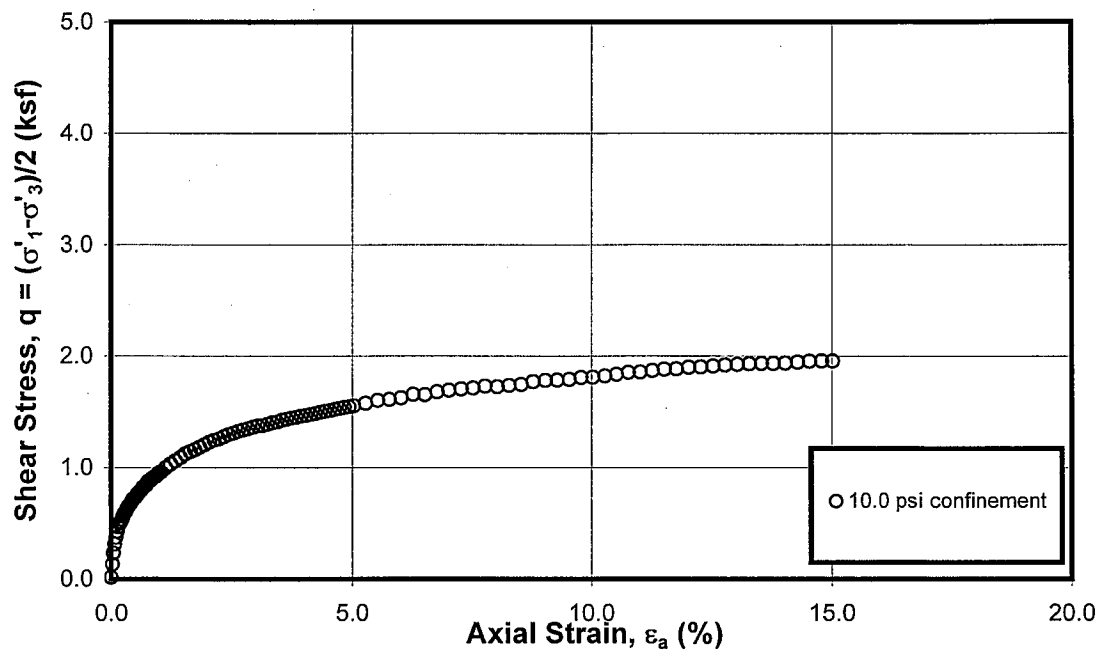
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.017	1.468	0.000	0.000	1.023	0.000	-	-
0.8	0.025	0.134	1.587	0.001	0.000	1.184	-0.010	935.9	870.4
1.5	0.050	0.235	1.612	0.072	0.000	1.341	0.170	870.3	715.8
2.3	0.075	0.313	1.636	0.132	0.000	1.474	0.217	789.0	551.3
3.0	0.100	0.374	1.637	0.179	0.000	1.591	0.263	710.3	459.6
3.8	0.125	0.429	1.653	0.225	0.000	1.701	0.276	657.3	386.3
4.5	0.150	0.470	1.656	0.265	0.000	1.792	0.292	602.9	295.7
5.3	0.175	0.503	1.654	0.301	0.000	1.873	0.309	554.1	169.2
6.0	0.200	0.512	1.622	0.340	0.000	1.923	0.344	494.4	143.9
6.8	0.225	0.539	1.624	0.364	0.000	1.992	0.350	463.0	201.8
7.5	0.250	0.563	1.627	0.392	0.000	2.057	0.354	435.9	200.6
8.3	0.275	0.589	1.619	0.416	0.000	2.143	0.368	415.3	167.7
9.0	0.300	0.605	1.631	0.434	0.000	2.178	0.361	391.3	155.1
9.8	0.325	0.628	1.628	0.452	0.000	2.255	0.369	375.3	160.7
10.5	0.350	0.645	1.628	0.470	0.000	2.311	0.372	358.4	127.1
11.3	0.375	0.659	1.625	0.490	0.000	2.366	0.378	342.2	123.8
12.0	0.400	0.676	1.619	0.511	0.000	2.433	0.386	329.1	150.0
12.8	0.425	0.697	1.616	0.532	0.000	2.516	0.391	319.7	149.7
13.5	0.451	0.713	1.609	0.553	0.000	2.593	0.399	309.0	102.1
14.3	0.476	0.723	1.620	0.566	0.000	2.611	0.392	296.6	77.0
15.0	0.501	0.733	1.615	0.584	0.000	2.662	0.398	285.8	103.0
15.8	0.526	0.748	1.615	0.589	0.000	2.728	0.400	278.2	117.8
16.5	0.551	0.762	1.618	0.605	0.000	2.781	0.400	270.6	106.5
17.3	0.576	0.775	1.619	0.615	0.000	2.837	0.400	263.2	104.8
18.0	0.601	0.788	1.613	0.627	0.000	2.912	0.406	256.8	100.5
18.8	0.626	0.800	1.619	0.634	0.000	2.954	0.404	250.3	103.7
19.5	0.651	0.814	1.619	0.641	0.000	3.022	0.405	245.0	104.0
20.3	0.676	0.826	1.622	0.653	0.000	3.077	0.405	239.4	81.5
21.0	0.701	0.835	1.625	0.664	0.000	3.113	0.404	233.3	74.1
21.8	0.726	0.845	1.627	0.668	0.000	3.161	0.404	228.1	104.8
22.5	0.751	0.861	1.632	0.676	0.000	3.233	0.403	224.7	126.3
23.3	0.776	0.876	1.649	0.683	0.000	3.268	0.395	221.5	77.4
24.0	0.801	0.880	1.644	0.685	0.000	3.304	0.398	215.5	54.7
24.8	0.826	0.890	1.652	0.687	0.000	3.336	0.395	211.4	77.8
25.5	0.851	0.900	1.660	0.687	0.000	3.366	0.391	207.4	73.1
26.3	0.876	0.908	1.655	0.699	0.000	3.432	0.395	203.5	69.0
27.0	0.901	0.917	1.669	0.703	0.000	3.439	0.388	199.8	61.3
27.8	0.926	0.924	1.663	0.709	0.000	3.500	0.393	195.8	72.6

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
28.5	0.952	0.935	1.672	0.717	0.000	3.538	0.389	193.0	92.1
29.3	0.977	0.947	1.673	0.722	0.000	3.608	0.390	190.4	73.5
30.0	1.002	0.954	1.683	0.718	0.000	3.615	0.385	187.1	56.6
30.8	1.027	0.961	1.688	0.719	0.000	3.643	0.383	183.9	66.6
33.8	1.127	0.998	1.709	0.740	0.000	3.809	0.377	174.2	69.7
36.8	1.227	1.031	1.734	0.758	0.000	3.933	0.369	165.3	63.0
39.8	1.327	1.062	1.752	0.765	0.000	4.076	0.364	157.5	57.9
42.8	1.427	1.089	1.781	0.761	0.000	4.143	0.354	150.2	62.2
45.8	1.527	1.124	1.798	0.771	0.000	4.334	0.351	145.0	53.4
48.8	1.627	1.142	1.825	0.763	0.000	4.345	0.341	138.3	38.2
51.8	1.727	1.162	1.866	0.745	0.000	4.302	0.326	132.6	40.8
54.8	1.827	1.183	1.890	0.742	0.000	4.345	0.319	127.6	43.2
57.8	1.927	1.205	1.908	0.743	0.000	4.430	0.315	123.3	45.4
60.8	2.028	1.228	1.930	0.751	0.000	4.504	0.310	119.5	40.5
63.8	2.127	1.246	1.952	0.740	0.000	4.525	0.303	115.5	29.9
66.8	2.228	1.258	1.984	0.723	0.000	4.470	0.292	111.5	32.4
69.8	2.328	1.278	2.003	0.720	0.000	4.528	0.288	108.4	38.6
72.8	2.428	1.297	2.038	0.704	0.000	4.498	0.277	105.5	30.5
75.8	2.528	1.309	2.071	0.691	0.000	4.433	0.267	102.2	29.4
78.8	2.628	1.326	2.095	0.682	0.000	4.453	0.261	99.7	28.8
81.8	2.728	1.337	2.105	0.675	0.000	4.487	0.259	96.8	22.1
84.8	2.828	1.349	2.134	0.665	0.000	4.432	0.250	94.2	24.8
87.8	2.928	1.362	2.156	0.653	0.000	4.431	0.244	91.9	26.8
90.8	3.028	1.375	2.179	0.642	0.000	4.421	0.238	89.7	16.6
93.8	3.128	1.379	2.203	0.631	0.000	4.345	0.230	87.1	15.0
96.8	3.228	1.390	2.241	0.604	0.000	4.270	0.219	85.1	24.5
99.8	3.328	1.403	2.241	0.596	0.000	4.352	0.221	83.3	20.0
102.8	3.428	1.410	2.277	0.582	0.000	4.254	0.210	81.3	21.9
105.8	3.529	1.425	2.284	0.580	0.000	4.319	0.210	79.8	23.5
108.8	3.629	1.434	2.310	0.569	0.000	4.273	0.203	78.1	19.9
111.8	3.729	1.445	2.343	0.553	0.000	4.219	0.194	76.6	19.1
114.8	3.829	1.453	2.361	0.542	0.000	4.200	0.189	75.0	17.6
117.8	3.929	1.463	2.392	0.526	0.000	4.149	0.181	73.6	15.0
120.8	4.029	1.468	2.415	0.503	0.000	4.099	0.174	72.0	15.3
123.8	4.129	1.478	2.429	0.499	0.000	4.109	0.171	70.8	19.3
126.8	4.229	1.487	2.458	0.492	0.000	4.064	0.163	69.5	20.6
129.8	4.329	1.499	2.469	0.482	0.000	4.091	0.162	68.5	19.5
132.8	4.429	1.507	2.474	0.473	0.000	4.117	0.162	67.3	14.5
135.8	4.529	1.513	2.522	0.448	0.000	4.001	0.148	66.1	17.5
138.8	4.629	1.524	2.525	0.447	0.000	4.048	0.150	65.1	19.4
141.8	4.729	1.533	2.544	0.434	0.000	4.031	0.145	64.1	16.5
144.8	4.830	1.541	2.563	0.429	0.000	4.015	0.141	63.1	13.5
147.8	4.930	1.546	2.592	0.409	0.000	3.958	0.133	62.0	14.9

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
150.8	5.030	1.556	2.604	0.398	0.000	3.969	0.131	61.2	18.5
158.3	5.280	1.578	2.658	0.376	0.000	3.921	0.119	59.1	19.7
165.8	5.530	1.605	2.705	0.343	0.000	3.918	0.111	57.4	13.4
173.3	5.780	1.611	2.741	0.319	0.000	3.853	0.101	55.2	8.6
180.8	6.030	1.627	2.793	0.282	0.000	3.789	0.088	53.4	19.2
188.3	6.280	1.659	2.835	0.270	0.000	3.823	0.084	52.3	11.9
195.8	6.531	1.656	2.855	0.250	0.000	3.764	0.077	50.2	8.4
203.3	6.781	1.680	2.897	0.227	0.000	3.762	0.071	49.1	15.2
210.8	7.031	1.694	2.935	0.200	0.000	3.731	0.063	47.7	11.1
218.3	7.281	1.708	2.978	0.176	0.000	3.690	0.054	46.5	8.9
225.8	7.531	1.717	3.020	0.149	0.000	3.634	0.043	45.1	9.9
233.3	7.781	1.733	3.063	0.131	0.000	3.605	0.035	44.1	4.4
240.8	8.032	1.728	3.064	0.113	0.000	3.585	0.033	42.6	2.4
248.3	8.282	1.739	3.104	0.091	0.000	3.548	0.025	41.6	7.7
255.8	8.532	1.747	3.141	0.056	0.000	3.506	0.016	40.6	13.1
263.3	8.782	1.772	3.163	0.053	0.000	3.546	0.017	40.0	14.5
270.8	9.032	1.783	3.207	0.034	0.000	3.503	0.008	39.1	6.5
278.3	9.282	1.788	3.231	0.011	0.000	3.478	0.002	38.2	4.2
285.8	9.532	1.794	3.250	-0.007	0.000	3.463	-0.001	37.3	8.5
293.3	9.782	1.809	3.278	-0.019	0.000	3.463	-0.005	36.6	8.1
300.8	10.033	1.814	3.301	-0.039	0.000	3.439	-0.010	35.8	6.5
308.3	10.283	1.825	3.355	-0.065	0.000	3.386	-0.022	35.2	9.7
315.8	10.533	1.838	3.383	-0.077	0.000	3.379	-0.026	34.6	11.8
323.3	10.783	1.855	3.398	-0.096	0.000	3.405	-0.025	34.1	7.9
330.8	11.033	1.858	3.417	-0.111	0.000	3.383	-0.029	33.4	6.7
338.3	11.284	1.872	3.452	-0.127	0.000	3.368	-0.035	32.9	10.6
345.8	11.534	1.884	3.473	-0.138	0.000	3.373	-0.037	32.4	5.9
353.3	11.784	1.886	3.516	-0.167	0.000	3.315	-0.048	31.7	6.8
360.8	12.034	1.901	3.545	-0.178	0.000	3.313	-0.051	31.3	7.3
368.3	12.284	1.904	3.564	-0.201	0.000	3.295	-0.055	30.7	4.3
375.8	12.534	1.912	3.589	-0.225	0.000	3.279	-0.060	30.2	6.7
383.3	12.785	1.921	3.616	-0.234	0.000	3.267	-0.064	29.8	5.7
390.8	13.035	1.926	3.644	-0.254	0.000	3.242	-0.070	29.3	4.3
398.3	13.285	1.932	3.671	-0.274	0.000	3.222	-0.075	28.8	4.2
405.8	13.535	1.937	3.661	-0.289	0.000	3.247	-0.071	28.4	1.7
413.3	13.785	1.936	3.696	-0.306	0.000	3.200	-0.080	27.8	0.9
420.8	14.035	1.939	3.727	-0.332	0.000	3.169	-0.088	27.4	4.0
428.3	14.285	1.946	3.751	-0.342	0.000	3.157	-0.092	27.0	6.2
435.8	14.535	1.954	3.779	-0.358	0.000	3.142	-0.096	26.7	4.5
443.3	14.786	1.957	3.791	-0.373	0.000	3.135	-0.099	26.2	1.4
450.2	15.015	1.958	3.798	-0.392	0.000	3.128	-0.100	25.9	0.5



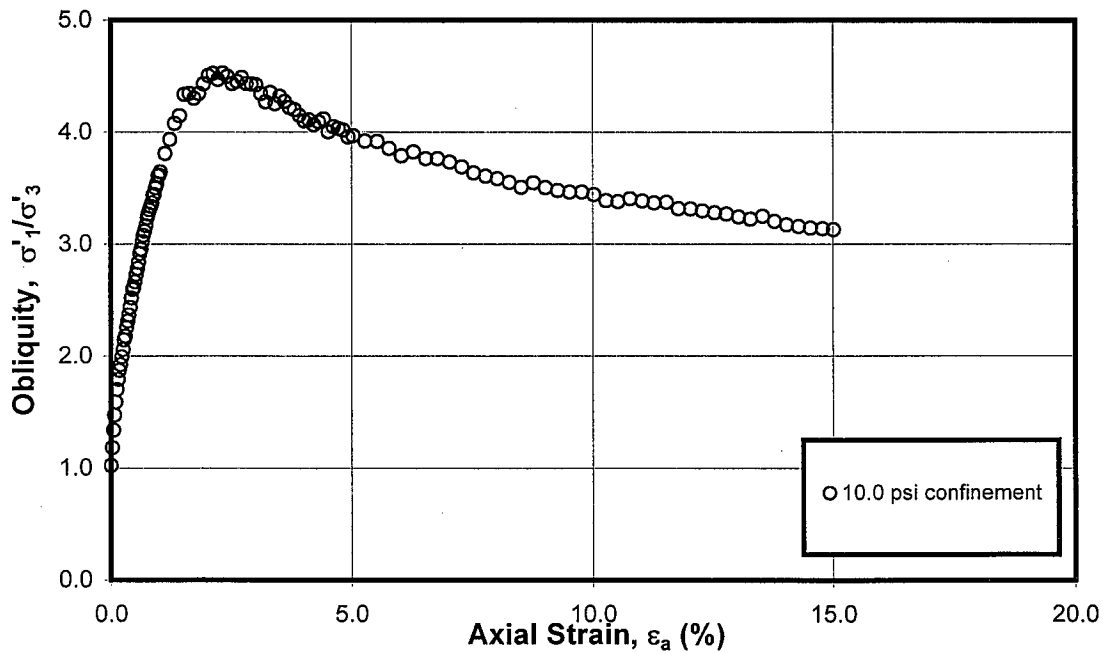
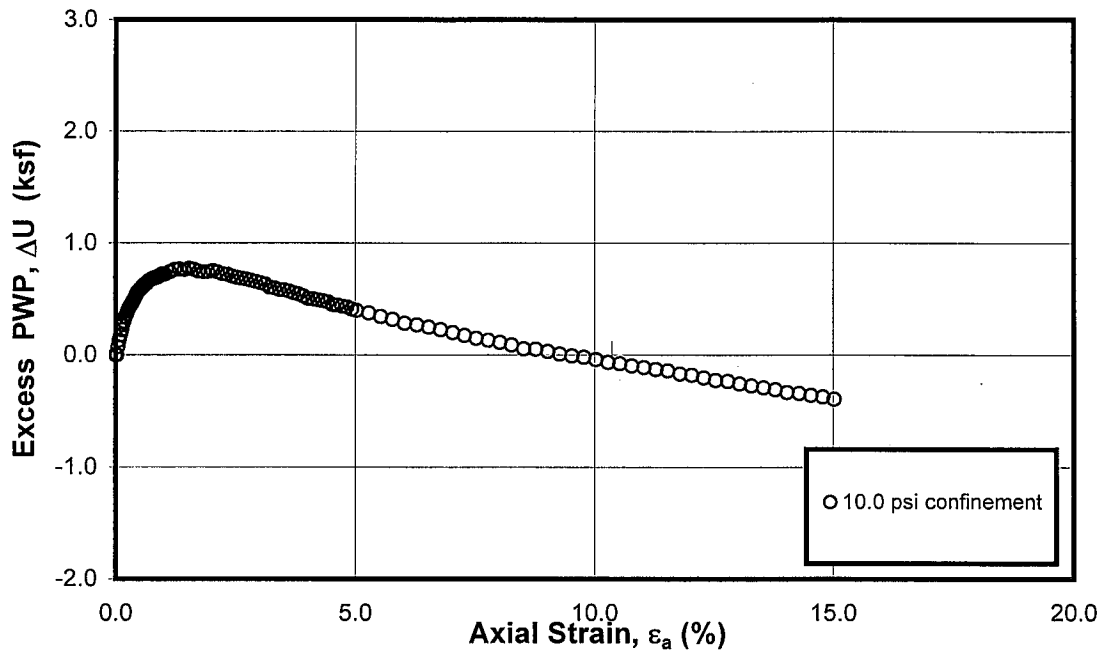
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD3c - Depth: 10.0-11.7 ft

Boring B-2321UD

Reviewed By: *WLD*



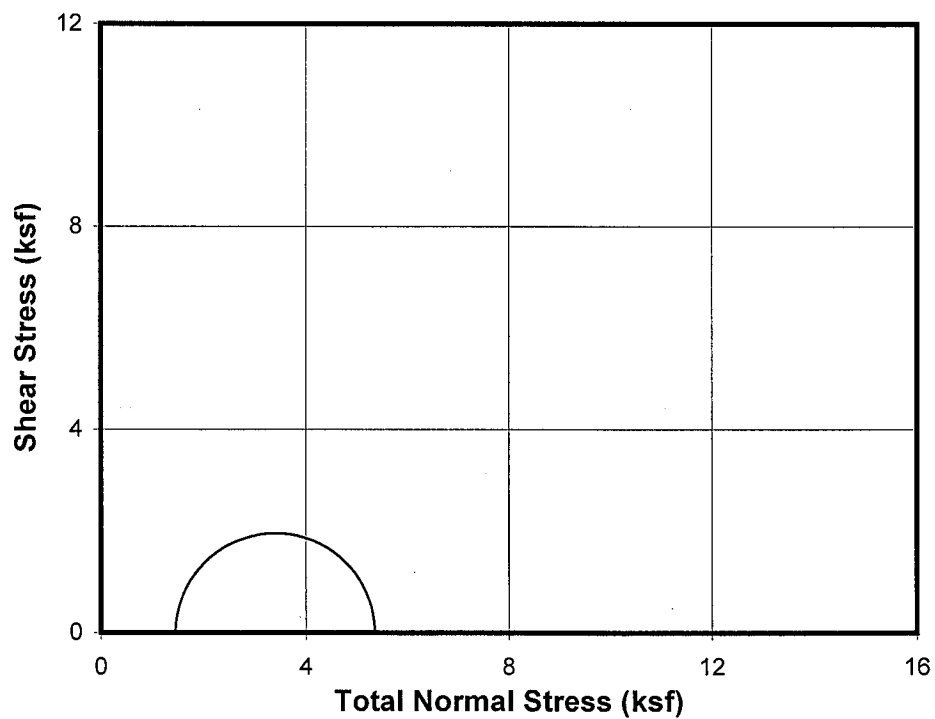
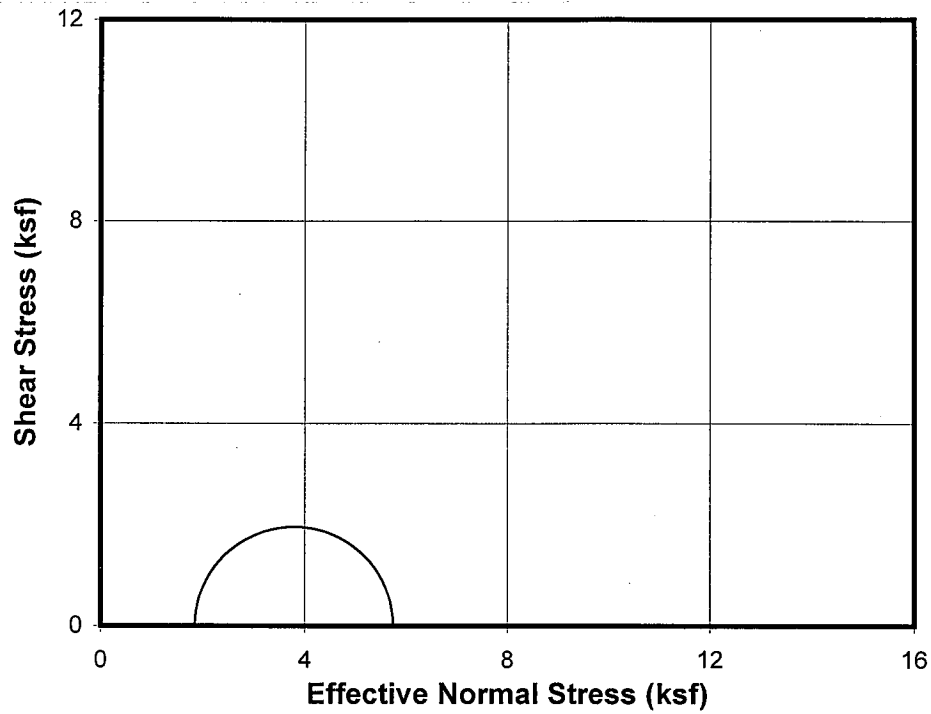
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD3c - Depth: 10.0-11.7 ft

Boring B-2321UD

Reviewed By: WFR



UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated- Mohr's Circles

Sample: UD3c - Depth: 10.0-11.7 ft

Boring B-2321UD

Reviewed By: *WFD*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-5 File Name: 2321UD_UD5
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 2.16 , NA , NA & NA ksf
 Project Name: Exelon (Victoria) $k (\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua} (\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: NEEDS TO BE RETESTED

Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer	☐ Pluviated:	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD5	Composited No.:	☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 17.0-18.7	Specimen No.: c				Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	☐ Anisotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation			45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp.	☒ Strain
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress
				☒ Constant Cell Pressure
				☐ Variable Cell Pressure
				Cyclic (Hz)
				Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	4100	5099	908	D2
Mass Moist Soil + Cont. (g)	82.43	82.64	82.76	132.74
Mass Dry Soil + Container (g)	74.13	74.45	74.73	114.81
Mass Container (g)	30.40	30.67	31.94	30.05
Water Content, $W_{o,n}$ (%)	18.98	18.71	18.77	21.15
Avg. Initial WC, $W_{o,avg}$ (%)	18.82	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		446.22	452.71
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		446.22	452.71
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height			Dia., X indicates with membrane		
Initial (H_o)	Final (H_{at})		Initial (D_o)	Final (D_{at})	
GB 100.000	100.000	1 T	50.75	53.00	For
1 15.43	-0.95	2 M	50.80	53.60	Wedge
2 15.44	-0.70	3 B	50.80	57.00	Failure
3 15.54	-0.81	1 T		56.60	= d_{max}
4 15.53	-0.52	2 M		54.80	= d_{min}
5 15.47	-1.24	3 B			= Δd
Avg. 115.48	99.16	Avg.	50.78	55.00	xxxxx

Measuring Devices:		$A_o = \pi D^2 / 400$ (cm ²)	20.26
Pi Tape: ☒ Dia		V_o (cm ³)	233.91
Calipers: ☐ Ht.; ☐ Dia		$A_{atb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	23.56
Dial Comparator: ☒ Ht.; ☐ Dia		$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002		$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	54.77

Photo Taken. ☐

Failure Sketch

$\epsilon_a =$ 20% →

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=40 PL=15 PI=25

☒ Bulge
☐ Wedge
☐ Parabolic

Wedge/Bulge Ht. = NA (mm)

Final Visual Classification: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Estimated Initial Unit Weight			
Total, $\gamma_{t,o}$ (lb/ft ³) =	119.09	Dry, $\gamma_{d,o}$ (lb/ft ³) =	100.23
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.70	0.58
= 1	Single; ☒ Double	0.69	0.57
Circumference ($C_{rm,o}$)		149.0	150.0
Average:		Total Thickness	Dia. ($C_{rm,o} / \pi$)
		0.32	47.59

Filter Paper: Top + Bottom: ☐ Yes; ☒ No

Filter Strips: ☒ Yes; ☐ No Number = 8

Type of Filter Strips ☐ Vertical: 1/4 in. & Whatman #54
☒ Spiral: 1/4 in. & Whatman #1

Apparatus: Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf

Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf

Top Cap Attached: ☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4; ☐ External; ☒ Internal

Top Cap - Rotation: ☐ Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°

With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap

☐ Internal LVDT Jacket

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP

Date: 3/24/2008 Date: 3/25/2008 Date: 3/13/2008

Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WEP

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-5

File Name: 2321UD_UD5c

Task Number: NA

Specific Gravity: 2.720

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD5

Specimen No.: c

Depth (ft): 17.0-18.7

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	18.22
W_c 18.98	18.71	18.77	18.82	18.22	19.42	Initial, $M_{d,o}$	377.45
S_o 74.5	73.8	73.9	74.1	72.6	75.5	Final, $M_{d,at}$	373.67
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	373.67
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	0.09	0.04		0.42	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	4.07			15.19	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	0.52	0.26		2.55	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				5.97	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	0.52	0.26		15.19	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	104.98	NA	NA	NA	Number of Test Stages = 1
Back Pressure, $U_{b,n}$ (psi)	89.47	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.09	NA	NA	NA	$t_{50} = \min$ t_{50} was not calculated
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	2.19	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	12.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required
$\Delta V_c = 15.97$	$\Delta V_c = 17.10$	$\Delta V_c = 7.08$	& corr. for ΔH_{td} $\Delta V_c =$	G_s for $S_c = 100$ %: 2.698

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 0.55	$\Delta V_{c,f}$ (cm^3) = 15.97	Back Cal. G_s for $S=100\%$ = 2.698	Normalized	Ht. Ch. (%) = 0.58
$\epsilon_{ac,c}$ (%) = 0.48	$\epsilon_{vc,f}$ (%) = 6.83		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:					Total (pcf)	Dry (pcf)					
Initial:	115.48	233.91	20.26	19.42	119.09	99.73	75.5	0.700	0.3107	0.412	96.0
After to 1st σ'_c	114.93	217.94	18.96	21.15	129.68	107.04	98.6	0.584	0.3633	0.369	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-5 File Name: 2321UD_UD5
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =	
Sample No.: UD5	Composite No.:	☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =	
Depth (ft): 17.0-18.7	Specimen No.: c	☐ Kneading	Undercompaction: U_{ni} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	± Opt. =	

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = NA
			45° stress path	Remarks:	
Loading Conditions	☒ Static	☒ Undrained	☒ Comp.	☒ Strain	☒ Stress
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress Path	☐ Variable Cell pressure
				☐ Constant Cell pressure	☐ Cyclic (Hz)
					Rate: 0.1; 1; Other:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	Void Ratio e	Skempton B parameter % (1)	Unit for Stresses: (ksf)
Condition:										
Initial:	115.48	233.91	20.26	19.42	119.09	99.73	75.47	0.70	96.0	
After to 1st σ'_c	114.93	217.94	18.96	21.15	129.68	107.04	98.57	0.58		
Consol.: to 2nd σ'_c										
to 3rd σ'_c										
to 4th σ'_c										

Consolidation Stress Summary and Loading Summary					
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., $\epsilon_{c,c}$	%	0.475	NA	NA	NA
Vol. Strain during Consol., $\epsilon_{c,v}$	%	6.827	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	2.193	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	2.157	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.983			
Induced OCR	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	4.350			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	2.169			
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA

Membrane Correction		
Type:	Bulge	
Modulus:	150.0 psi	
Diameter:	47.59 mm	
Thickness:	0.32 mm	
Area Correction		
Type:	Bulge	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	0.980	23.56
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	None	
Type Strips:	Spiral #1	
Strips:	8	
Force:	0.000 lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	1.43	2.298	3.369	1.099	5.668	1.071
	Max Obliquity	11.42	0.889	1.205	1.863	2.095	0.316
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 2.50E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2321UD
Sample No.: UD5
Specimen No.: c

Depth (ft.): 17.0-18.7
Stage No.: 1

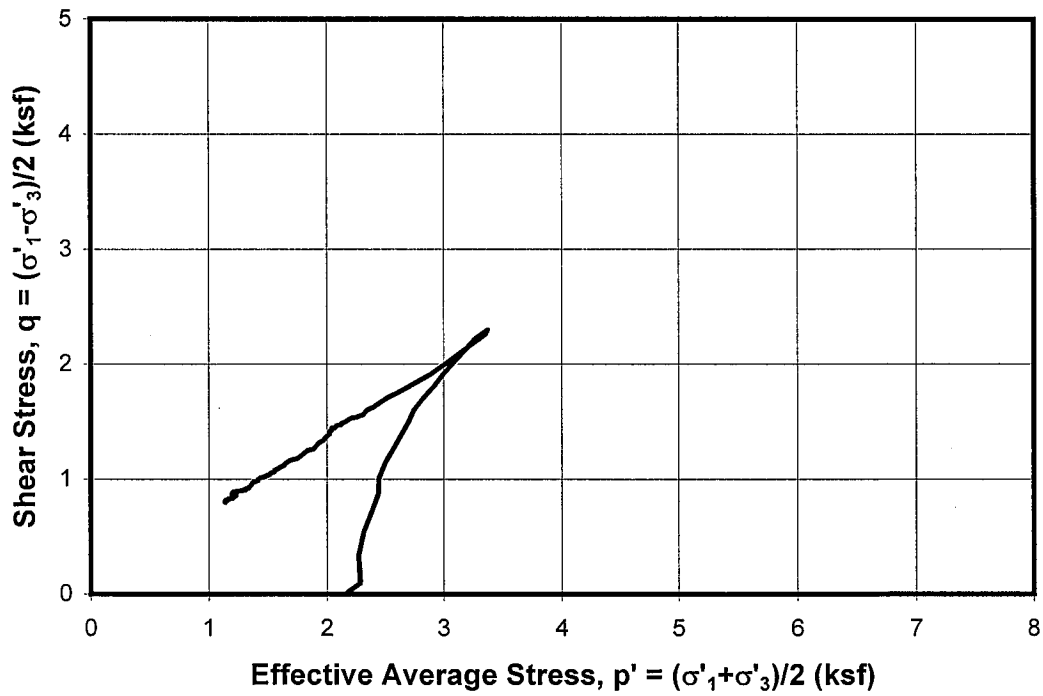
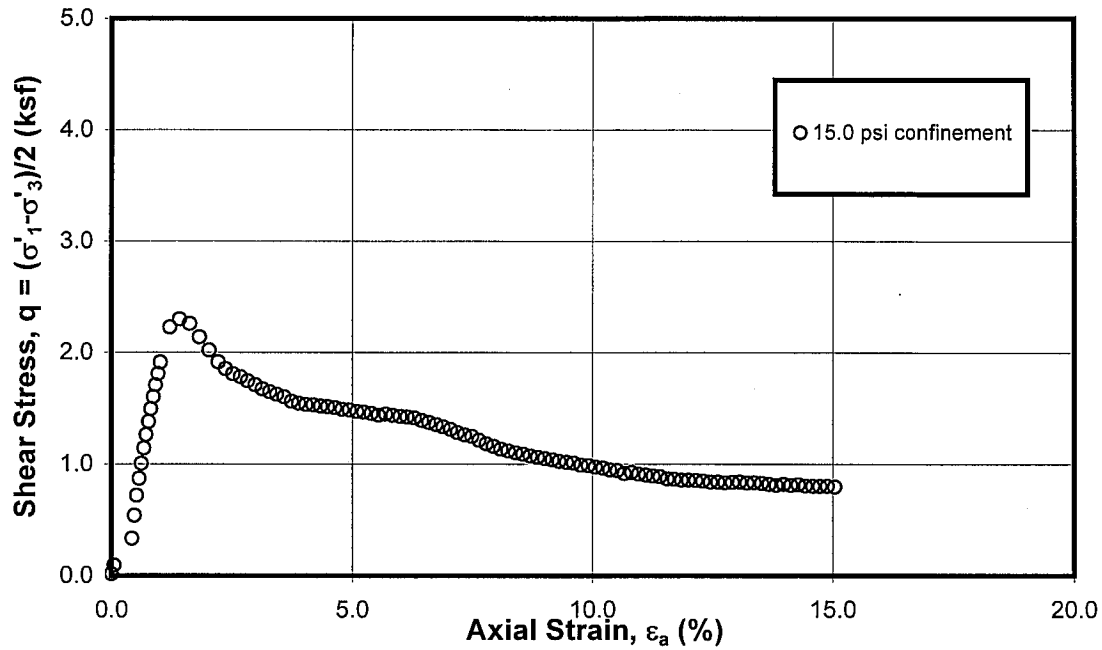
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.018	2.175	0.000	0.000	1.017	0.000	-	-
20.0	0.051	0.093	2.282	-0.013	0.000	1.085	-0.213	296.4	49.1
170.1	0.428	0.336	2.268	0.247	0.000	1.347	0.354	148.4	899.0
190.1	0.478	0.541	2.313	0.399	0.000	1.610	0.368	218.7	796.1
210.1	0.528	0.720	2.384	0.514	0.000	1.866	0.351	265.8	623.9
230.1	0.579	0.871	2.439	0.623	0.000	2.111	0.345	294.8	562.1
250.1	0.629	1.006	2.444	0.732	0.000	2.400	0.364	314.2	549.4
270.1	0.679	1.144	2.497	0.816	0.000	2.690	0.357	331.5	501.5
290.1	0.729	1.263	2.567	0.877	0.000	2.937	0.343	341.3	504.1
310.1	0.780	1.380	2.631	0.930	0.000	3.206	0.333	349.4	464.6
330.1	0.830	1.496	2.698	0.977	0.000	3.489	0.323	356.1	442.5
350.1	0.880	1.604	2.748	1.023	0.000	3.806	0.319	360.4	417.8
370.1	0.930	1.709	2.830	1.059	0.000	4.050	0.306	363.5	421.5
390.1	0.981	1.809	2.920	1.073	0.000	4.260	0.292	365.3	395.3
410.2	1.031	1.912	2.994	1.091	0.000	4.533	0.284	367.3	358.3
490.1	1.232	2.228	3.271	1.135	0.000	5.270	0.252	358.7	238.8
570.1	1.433	2.298	3.369	1.099	0.000	5.292	0.238	318.2	-25.0
650.1	1.634	2.258	3.351	1.089	0.000	5.134	0.238	274.2	-114.0
730.1	1.835	2.138	3.192	1.122	0.000	5.058	0.260	231.0	-96.6
810.1	2.036	2.022	3.043	1.154	0.000	4.960	0.284	196.8	-123.0
885.1	2.225	1.914	2.892	1.201	0.000	4.917	0.311	170.5	-92.0
945.1	2.375	1.856	2.788	1.250	0.000	4.982	0.333	154.8	-74.0
1005.1	2.526	1.810	2.706	1.277	0.000	5.038	0.352	141.8	-41.8
1065.1	2.677	1.784	2.663	1.296	0.000	5.059	0.362	131.9	-47.7
1125.1	2.828	1.747	2.596	1.324	0.000	5.119	0.378	122.3	-46.2
1185.0	2.978	1.713	2.523	1.360	0.000	5.228	0.397	113.8	-50.5
1245.0	3.129	1.676	2.469	1.383	0.000	5.224	0.411	106.0	-42.3
1305.0	3.280	1.650	2.431	1.396	0.000	5.229	0.422	99.5	-29.1
1365.0	3.431	1.626	2.397	1.416	0.000	5.221	0.431	93.8	-31.7
1425.0	3.581	1.602	2.345	1.435	0.000	5.317	0.446	88.5	-28.4
1485.0	3.732	1.563	2.309	1.439	0.000	5.195	0.457	82.8	-35.3
1545.0	3.883	1.547	2.268	1.457	0.000	5.289	0.470	78.7	-5.4
1605.0	4.034	1.535	2.242	1.469	0.000	5.343	0.478	75.2	-18.7
1665.0	4.184	1.534	2.220	1.487	0.000	5.466	0.485	72.4	-26.9
1725.0	4.335	1.520	2.186	1.510	0.000	5.563	0.496	69.3	-3.8
1785.0	4.486	1.514	2.183	1.513	0.000	5.526	0.497	66.7	-25.7
1845.0	4.637	1.507	2.167	1.518	0.000	5.560	0.503	64.2	-5.1
1905.0	4.787	1.491	2.145	1.524	0.000	5.564	0.510	61.5	-17.1

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
1965.0	4.938	1.488	2.128	1.537	0.000	5.648	0.516	59.5	-14.9
2025.0	5.089	1.474	2.120	1.540	0.000	5.559	0.519	57.2	-3.2
2085.0	5.240	1.466	2.080	1.553	0.000	5.779	0.533	55.3	-15.2
2145.0	5.390	1.455	2.074	1.549	0.000	5.697	0.535	53.3	-10.1
2204.9	5.541	1.442	2.060	1.563	0.000	5.665	0.540	51.4	2.1
2264.9	5.692	1.449	2.046	1.575	0.000	5.860	0.545	50.3	-17.9
2324.9	5.843	1.437	2.040	1.574	0.000	5.758	0.548	48.6	1.9
2384.9	5.993	1.430	2.037	1.566	0.000	5.711	0.549	47.1	-21.7
2444.9	6.144	1.425	2.038	1.569	0.000	5.642	0.549	45.8	-17.1
2504.9	6.295	1.414	2.026	1.565	0.000	5.616	0.553	44.3	-15.4
2564.9	6.446	1.393	2.023	1.553	0.000	5.424	0.555	42.7	-25.5
2624.9	6.596	1.375	2.003	1.546	0.000	5.376	0.563	41.1	-19.8
2684.9	6.747	1.354	1.983	1.549	0.000	5.302	0.572	39.6	-21.0
2744.9	6.898	1.336	1.971	1.551	0.000	5.212	0.578	38.2	-31.3
2804.9	7.049	1.312	1.928	1.563	0.000	5.254	0.595	36.7	-39.6
2864.9	7.200	1.283	1.903	1.562	0.000	5.135	0.608	35.1	-28.4
2924.9	7.350	1.264	1.886	1.559	0.000	5.059	0.616	33.9	-28.7
2984.9	7.501	1.249	1.835	1.588	0.000	5.266	0.638	32.8	-32.7
3044.9	7.652	1.216	1.794	1.605	0.000	5.201	0.659	31.3	-38.6
3104.9	7.803	1.182	1.754	1.616	0.000	5.138	0.681	29.8	-34.8
3164.8	7.953	1.161	1.685	1.660	0.000	5.433	0.714	28.7	-41.0
3224.8	8.104	1.136	1.644	1.665	0.000	5.464	0.738	27.6	-23.8
3284.8	8.255	1.120	1.637	1.670	0.000	5.342	0.744	26.7	-13.5
3344.8	8.406	1.103	1.596	1.681	0.000	5.467	0.767	25.8	-24.4
3404.8	8.556	1.093	1.589	1.689	0.000	5.405	0.773	25.1	-22.2
3464.8	8.707	1.075	1.554	1.705	0.000	5.491	0.794	24.3	-13.2
3524.8	8.858	1.062	1.550	1.694	0.000	5.353	0.799	23.6	-37.4
3584.8	9.009	1.052	1.521	1.703	0.000	5.485	0.816	23.0	3.7
3644.8	9.159	1.042	1.512	1.709	0.000	5.432	0.824	22.3	-14.4
3704.8	9.310	1.027	1.478	1.725	0.000	5.556	0.845	21.7	-18.2
3764.8	9.461	1.019	1.460	1.739	0.000	5.617	0.857	21.2	-9.2
3824.8	9.612	1.013	1.437	1.753	0.000	5.778	0.871	20.7	-17.8
3884.8	9.762	0.993	1.412	1.763	0.000	5.747	0.891	20.0	-2.7
3944.8	9.913	0.989	1.413	1.764	0.000	5.660	0.892	19.6	-27.5
4004.8	10.064	0.974	1.377	1.773	0.000	5.837	0.918	19.0	-13.3
4064.8	10.215	0.967	1.368	1.777	0.000	5.823	0.926	18.6	-15.9
4124.7	10.365	0.950	1.357	1.768	0.000	5.662	0.939	18.0	-14.9
4184.7	10.516	0.943	1.350	1.769	0.000	5.628	0.946	17.6	-6.6
4244.7	10.667	0.919	1.332	1.768	0.000	5.452	0.968	16.9	-13.2
4304.7	10.818	0.926	1.337	1.779	0.000	5.502	0.961	16.8	-17.7
4364.7	10.968	0.911	1.298	1.787	0.000	5.716	0.991	16.3	-10.1
4424.7	11.119	0.905	1.308	1.775	0.000	5.489	0.989	15.9	-14.4
4484.7	11.270	0.896	1.240	1.827	0.000	6.217	1.033	15.6	-19.3

STAGE 1

[illegible]



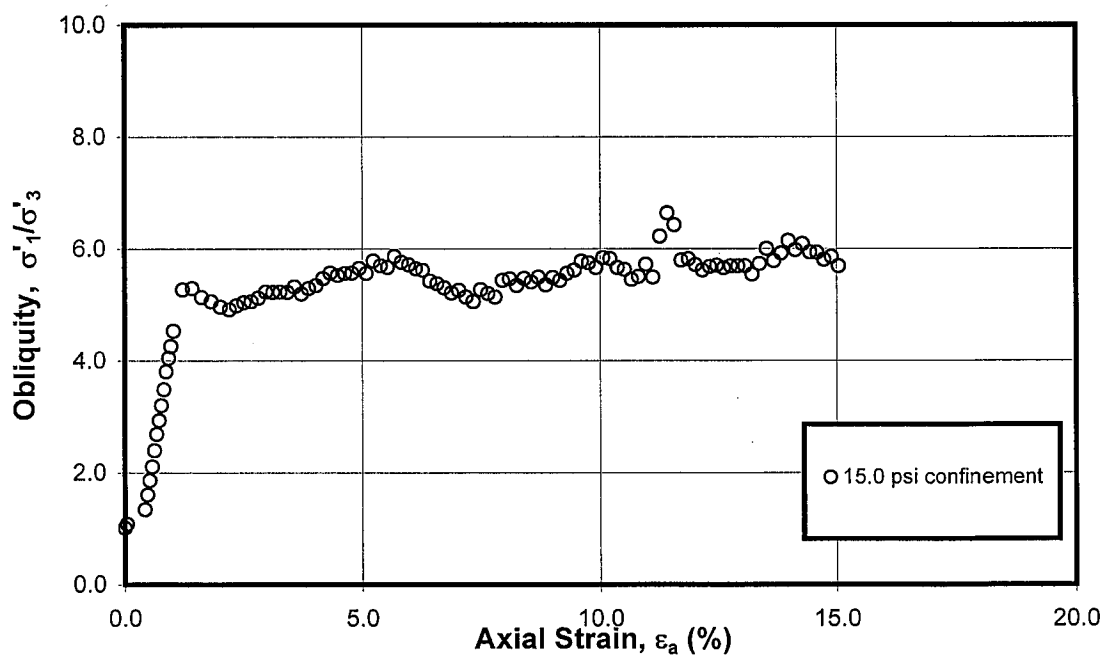
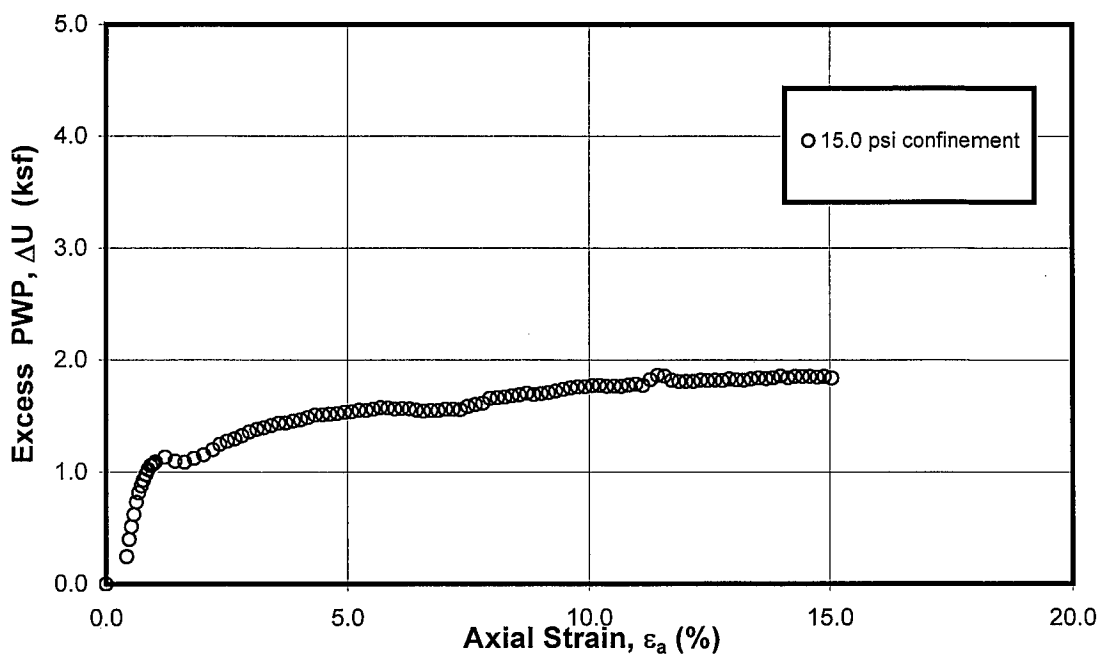
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD5c - Depth: 17.0-18.7 ft

Boring B-2321UD

Reviewed By: WEP



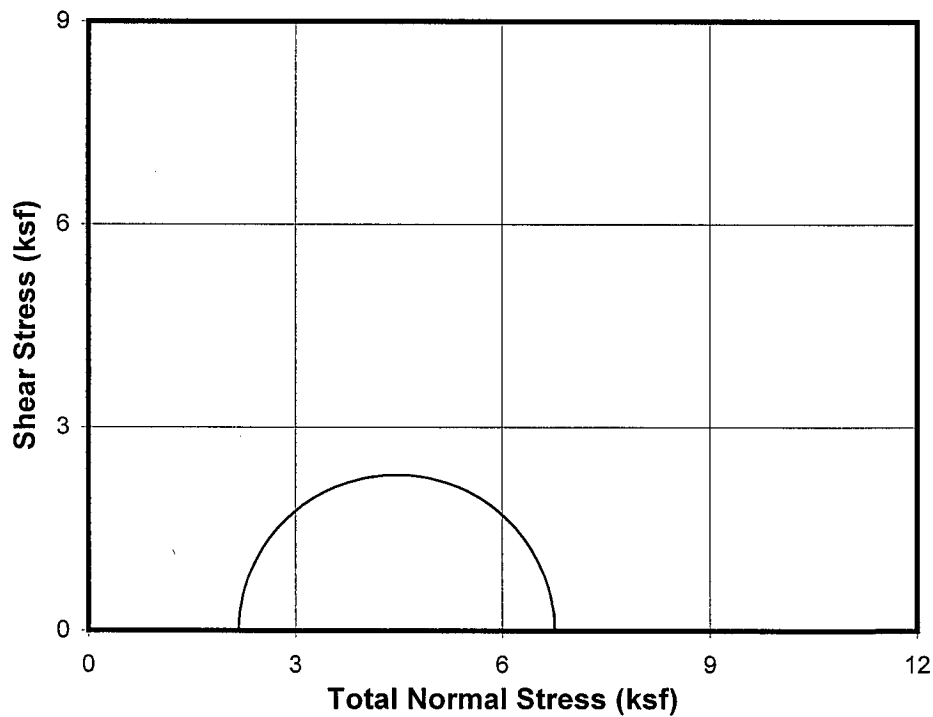
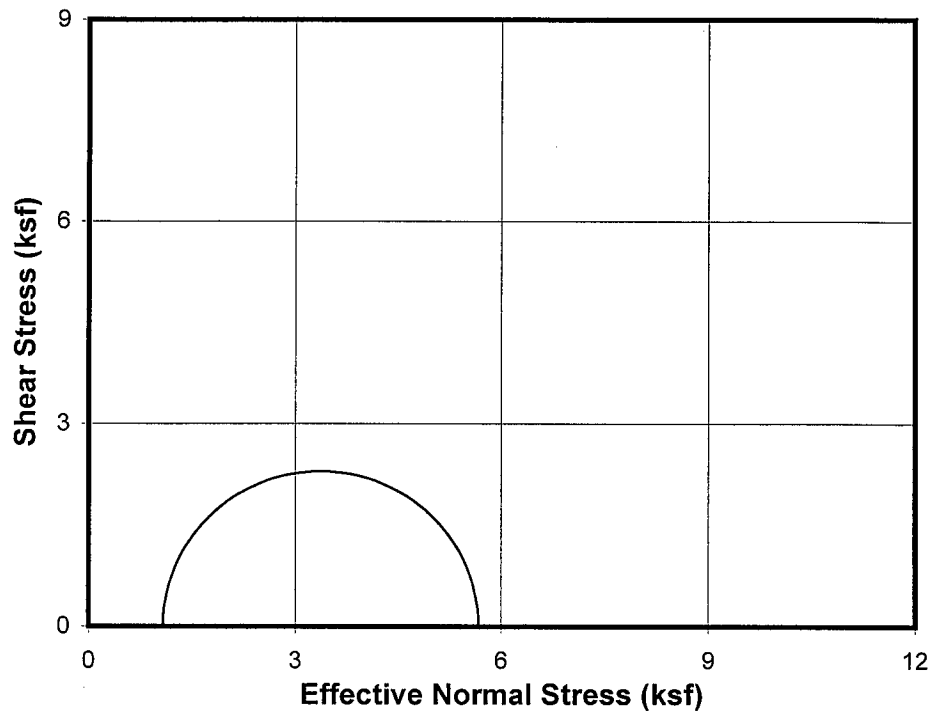
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD5c - Depth: 17.0-18.7 ft

Boring B-2321UD

Reviewed By: WLD



UNDRAINED TRIAXIAL COMPRESSION TEST
Isotropically Consolidated- Mohr's Circles
Sample: UD5c - Depth: 17.0-18.7 ft
Boring B-2321UD

Reviewed By: WLD

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-8 File Name: 2321UD_UD9
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 6.48, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.680 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted			Impact/Rammer	Rammer Wgt. (lbf) = No. Layers =
Sample No.: UD9	Compostite No.:			Pluviated:	Tamper Force (lbf) = Drop (in.) =
Depth (ft): 58.5-61.0	Specimen No.: c			Kneading	Undercompaction: U_{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp.
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext.
☒ Strain	☐ Stress	☒ Constant Cell Pressure	☐ Cyclic (Hz)
☐ Stress Path	☐ Variable Cell Pressure	Rate: 0.1;	1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	C4	4241	5065	622
Mass Moist Soil + Cont. (g)	87.51	89.59	88.96	122.06
Mass Dry Soil + Container (g)	78.37	79.72	79.26	107.17
Mass Container (g)	32.33	30.22	31.00	32.07
Water Content, $W_{o,n}$ (%)	19.85	19.94	20.10	19.83
Avg. Initial WC, $W_{o,avg}$ (%)	19.96	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		459.56	461.35
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		459.56	461.35
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

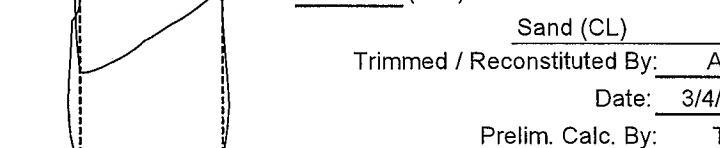
Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	100.000	1 T	51.00	58.20	For
1 9.88	-5.94	2 M	51.00	58.00	Wedge
2 9.85	-6.16	3 B	51.00	57.50	Failure
3 9.87	-6.00	1 T		52.60	= d_{max}
4 9.81	-5.90	2 M		52.00	= d_{min}
5 9.91	-5.88	3 B			= Δd
Avg. 109.86	94.02	Avg. 51.00	55.66	xxxxx	

Measuring Devices:		$A_o = \pi D^2 / 400$ (cm ²)	20.43
Pi Tape: ☒ Dia		V_o (cm ³)	224.43
Calipers: ☐ Ht.; ☐ Dia		$A_{atb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	24.17
Dial Comparator: ☒ Ht.; ☐ Dia		$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002		$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	55.47

☐ Photo Taken.

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=49 PL=14 PI=35

☒ Bulge
☐ Wedge
☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)



☐ See more detailed sketch on attached sheet. Remarks:

Estimated Initial Unit Weight			
Total, $\gamma_{t,o}$ (lb/ft ³) =	127.83	Dry, $\gamma_{d,o}$ (lb/ft ³) =	106.56

Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.72	0.61
= 1	Single; ☒ Double	0.73	0.60
Circumference ($C_{rm,o}$)		148.0	148.0
Total Thickness		Dia. ($C_{rm,o} / \pi$)	
Average:		0.33	47.11

Filter Paper: Top + Bottom: ☐ Yes; ☒ No
 Filter Strips: ☒ Yes; ☐ No Number = 8
 Type of Filter Strips: ☐ Vertical: 1/4 in. & Whatman #54
☒ Spiral: 1/4 in. & Whatman #1

Apparatus:	Mass Top Cap, M_{tc} =	53.4 g, 0.12 lbf
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =	NA g, NA lbf	

Top Cap Attached: ☐ Yes; ☒ No; ☒ 1/2; ☐ 3/4; ☐ External; ☒ Internal
 Top Cap - Rotation: ☐ Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°
 With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap
☐ Internal LVDT Jacket

Final Visual Classification: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with Sand (CL)

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP
 Date: 3/4/2008 Date: 3/4/2008 Date: 4/7/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WIP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-8

File Name: 2321UD_UD9c

Task Number: NA

Specific Gravity: 2.680

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD9

Specimen No.: c

Depth (ft): 58.5-61.0

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed";

☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	19.96
W_c 19.85	19.94	20.10	19.96	19.96	19.36	Initial, $M_{d,o}$	383.09
S_o 94.0	94.3	94.7	94.3	94.3	92.8	Final, $M_{d,at}$	385.01
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	385.01
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.06	-0.41		1.61	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	-0.41	-10.56	NA	8.09	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.39	-2.52		9.85	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				0.82	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.39	-2.52		8.09	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	135.28	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 190$ min
Back Pressure, $U_{b,n}$ (psi)	90.19	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.50	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	6.52	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	4.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:
$\Delta V_c = 5.18$	$\Delta V_c = 4.04$	$\Delta V_c = 9.16$	& corr. for ΔH_{td} $\Delta V_c =$	2.701

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 1.13	$\Delta V_{c,f}$ (cm^3) = 5.18	Back Cal. G_s for $S=100\%$ = 2.701	Normalized	Ht. Ch. (%) = 0.07
$\epsilon_{ac,c}$ (%) = 1.03	$\epsilon_{vc,f}$ (%) = 2.31		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight (pcf)		Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n
Condition:					Total	Dry				
Initial:	109.86	224.43	20.43	19.36	127.83	107.09	92.7	0.560	0.3327	0.359
After to 1st σ'_c	108.73	219.25	20.16	19.83	131.36	109.62	101.5	0.524	0.3488	0.344
Consol.: to 2nd σ'_c										
to 3rd σ'_c										
to 4th σ'_c										

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-8 File Name: -2321UD_UD9
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2321UD</u>	☐ Reconstituted			Impact/Rammer	Rammer Wgt.(lbf)= No. Layers =
Sample No.: <u>UD9</u>	Compostite No.:			Pluviated:	Tamper Force (lbf)= Drop (in.) =
Depth (ft): <u>58.5-61.0</u>	Specimen No.: <u>c</u>			Kneading	Undercompaction: U_{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray; ☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.)= <u>NA</u>
45° stress path Remarks:					
Loading Conditions	☒ Static	☐ Post Cyclic	☒ Undrained	☒ Comp.	☒ Strain
		☐ Drained	☐ Ext.	☐ Stress	☒ Constant Cell pressure
				☐ Stress Path	☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Strain Other:

Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)
					Total (pcf)	Dry (pcf)			
Condition:									
Initial:	109.86	224.43	20.43	19.36	127.83	107.09	92.74	0.56	90.0
After to 1st σ'_c	108.73	219.25	20.16	19.83	131.36	109.62	101.50	0.52	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	1.031	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	2.308	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	6.516	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	6.470	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.993			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	12.985			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	6.485			
Undr. Ambient Shear Stress, τ_{ua} :	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type:	<u>Bulge</u>	
Modulus:	<u>150.0</u> psi	
Diameter:	<u>47.11</u> mm	
Thickness:	<u>0.33</u> mm	
Area Correction		
Type:	<u>Bulge</u>	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.138	24.17
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	<u>None</u>	Type Strips: <u>Spiral #1</u>
Strips:	<u>8</u>	
Force:	<u>0.000</u> lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with

Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	5.71	3.126	7.757	1.848	10.883	4.632
	Max Obliquity	3.78	2.999	7.240	2.227	10.239	4.241
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Strain Rate (%/min) = 2.11E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2321UD
Sample No.: UD9
Specimen No.: c

Depth (ft.): 58.5-61.0
Stage No.: 1

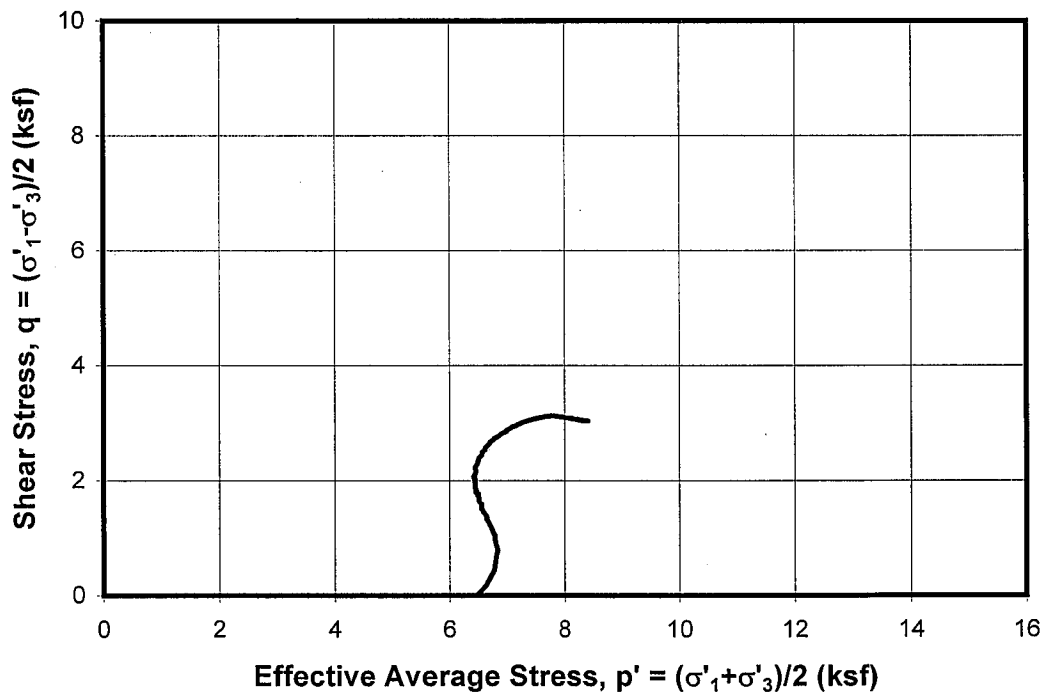
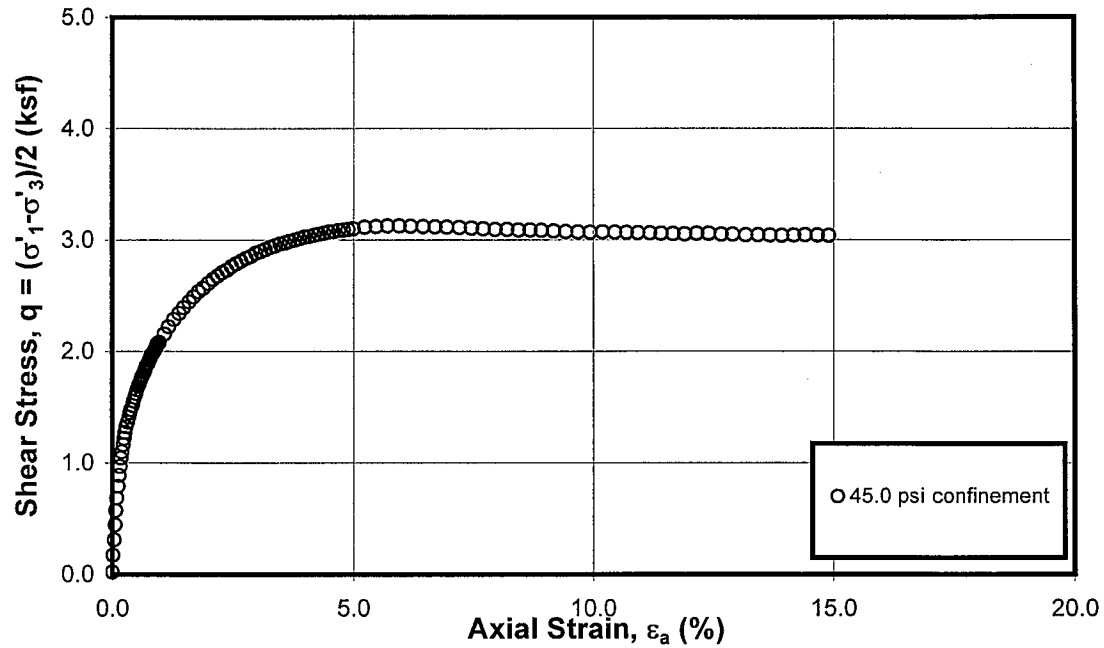
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.023	6.493	0.000	0.000	1.007	0.000	-	-
10.7	0.017	0.176	6.627	0.018	0.000	1.054	0.059	1837.8	1515.4
21.5	0.039	0.311	6.702	0.082	0.000	1.097	0.136	1466.1	1312.6
32.2	0.058	0.446	6.776	0.154	0.000	1.141	0.165	1455.1	1492.3
42.9	0.075	0.574	6.792	0.259	0.000	1.185	0.229	1476.7	1323.0
53.6	0.095	0.686	6.810	0.356	0.000	1.224	0.260	1394.4	973.5
64.3	0.120	0.791	6.837	0.428	0.000	1.262	0.276	1283.4	913.9
75.0	0.140	0.889	6.802	0.562	0.000	1.301	0.321	1238.9	901.6
85.8	0.159	0.969	6.786	0.660	0.000	1.333	0.345	1188.9	757.3
96.5	0.181	1.043	6.786	0.731	0.000	1.363	0.356	1129.2	595.1
107.2	0.204	1.101	6.752	0.830	0.000	1.390	0.380	1058.6	532.9
117.9	0.226	1.163	6.731	0.912	0.000	1.418	0.396	1010.1	526.3
128.6	0.250	1.222	6.700	0.992	0.000	1.446	0.413	959.8	530.8
139.3	0.268	1.274	6.675	1.069	0.000	1.472	0.427	933.3	552.1
150.0	0.287	1.325	6.642	1.151	0.000	1.498	0.443	906.8	390.2
160.8	0.320	1.365	6.645	1.197	0.000	1.517	0.443	839.3	272.1
171.5	0.349	1.409	6.621	1.272	0.000	1.541	0.454	793.8	343.3
182.2	0.370	1.449	6.589	1.332	0.000	1.564	0.466	771.3	383.2
192.9	0.387	1.482	6.574	1.378	0.000	1.582	0.472	753.5	287.7
203.6	0.422	1.516	6.547	1.443	0.000	1.603	0.482	708.0	274.6
214.3	0.443	1.554	6.556	1.475	0.000	1.621	0.479	690.7	326.4
225.1	0.467	1.590	6.551	1.522	0.000	1.641	0.481	670.7	279.8
235.8	0.493	1.623	6.521	1.578	0.000	1.663	0.491	649.2	257.7
246.5	0.518	1.655	6.506	1.624	0.000	1.682	0.496	630.4	246.6
257.2	0.544	1.686	6.512	1.651	0.000	1.699	0.494	611.6	229.6
267.9	0.568	1.713	6.500	1.695	0.000	1.716	0.498	595.0	214.7
278.6	0.595	1.741	6.482	1.731	0.000	1.734	0.503	577.1	241.8
289.4	0.616	1.770	6.500	1.750	0.000	1.748	0.498	567.0	212.7
300.1	0.645	1.791	6.454	1.809	0.000	1.768	0.511	548.6	188.2
310.8	0.666	1.816	6.469	1.814	0.000	1.780	0.507	538.1	218.6
321.5	0.691	1.841	6.457	1.849	0.000	1.798	0.510	526.4	268.0
332.2	0.707	1.868	6.448	1.882	0.000	1.816	0.512	521.8	227.8
342.9	0.746	1.893	6.441	1.926	0.000	1.833	0.514	501.1	176.0
353.6	0.769	1.918	6.437	1.966	0.000	1.849	0.515	493.1	199.2
364.4	0.794	1.940	6.444	1.962	0.000	1.862	0.513	482.8	216.3
375.1	0.811	1.962	6.437	1.994	0.000	1.877	0.514	478.1	184.5
385.8	0.848	1.983	6.447	2.007	0.000	1.888	0.512	462.3	139.3
396.5	0.874	2.004	6.445	2.028	0.000	1.903	0.512	453.6	166.2

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
407.2	0.895	2.022	6.431	2.063	0.000	1.917	0.515	446.6	168.9
417.9	0.919	2.042	6.443	2.083	0.000	1.928	0.512	439.6	229.1
428.7	0.933	2.063	6.412	2.107	0.000	1.949	0.520	437.2	190.9
439.4	0.972	2.082	6.431	2.127	0.000	1.958	0.515	423.5	116.5
482.2	1.080	2.156	6.455	2.172	0.000	2.003	0.509	394.9	138.2
525.1	1.172	2.220	6.440	2.255	0.000	2.052	0.512	374.9	134.3
567.9	1.276	2.287	6.478	2.279	0.000	2.091	0.503	354.8	115.4
610.8	1.381	2.340	6.498	2.321	0.000	2.126	0.499	335.7	104.0
653.7	1.480	2.393	6.509	2.356	0.000	2.163	0.497	320.3	99.5
696.5	1.591	2.444	6.558	2.379	0.000	2.188	0.486	304.5	94.0
739.4	1.686	2.489	6.564	2.398	0.000	2.222	0.486	292.6	94.3
782.2	1.787	2.537	6.614	2.402	0.000	2.244	0.476	281.4	82.2
825.1	1.876	2.568	6.617	2.427	0.000	2.269	0.476	271.3	75.6
868.0	1.982	2.611	6.666	2.416	0.000	2.288	0.467	261.2	77.4
910.8	2.083	2.648	6.693	2.429	0.000	2.310	0.462	252.1	65.4
953.7	2.177	2.675	6.711	2.438	0.000	2.326	0.459	243.6	62.5
996.5	2.274	2.708	6.760	2.426	0.000	2.337	0.450	236.2	56.6
1039.4	2.371	2.730	6.777	2.433	0.000	2.349	0.447	228.3	57.1
1082.3	2.467	2.763	6.838	2.407	0.000	2.356	0.437	222.2	57.9
1125.1	2.567	2.786	6.866	2.392	0.000	2.366	0.432	215.3	47.1
1168.0	2.668	2.810	6.894	2.391	0.000	2.377	0.428	209.0	47.9
1210.8	2.773	2.836	6.937	2.389	0.000	2.383	0.421	202.9	41.8
1253.7	2.875	2.854	6.980	2.359	0.000	2.383	0.414	196.9	44.9
1296.5	2.972	2.880	7.000	2.361	0.000	2.398	0.411	192.3	41.6
1339.4	3.072	2.895	7.031	2.339	0.000	2.400	0.406	187.0	32.5
1382.3	3.170	2.912	7.058	2.336	0.000	2.405	0.402	182.3	38.8
1425.1	3.273	2.934	7.090	2.313	0.000	2.412	0.397	177.9	34.0
1468.0	3.372	2.947	7.124	2.297	0.000	2.411	0.392	173.4	30.7
1510.8	3.472	2.964	7.167	2.267	0.000	2.411	0.385	169.4	26.0
1553.7	3.574	2.973	7.178	2.275	0.000	2.414	0.384	165.1	23.2
1596.6	3.668	2.987	7.215	2.235	0.000	2.413	0.378	161.6	26.4
1639.4	3.776	2.999	7.240	2.227	0.000	2.415	0.374	157.6	23.3
1682.3	3.876	3.011	7.274	2.214	0.000	2.413	0.369	154.2	24.0
1725.1	3.979	3.024	7.301	2.194	0.000	2.414	0.365	150.8	18.2
1768.0	4.079	3.030	7.334	2.166	0.000	2.408	0.360	147.4	18.6
1810.8	4.183	3.043	7.352	2.156	0.000	2.412	0.358	144.4	21.6
1853.7	4.279	3.051	7.395	2.132	0.000	2.405	0.351	141.6	16.9
1896.6	4.381	3.060	7.429	2.096	0.000	2.400	0.346	138.6	17.9
1939.4	4.484	3.070	7.448	2.094	0.000	2.402	0.343	135.9	13.6
1982.3	4.585	3.073	7.477	2.074	0.000	2.396	0.339	133.1	14.6
2025.1	4.688	3.085	7.519	2.040	0.000	2.391	0.332	130.6	13.1
2068.0	4.791	3.087	7.531	2.041	0.000	2.389	0.331	127.9	8.8
2110.9	4.885	3.093	7.547	2.027	0.000	2.389	0.328	125.7	11.7

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
2153.7	4.990	3.099	7.596	1.969	0.000	2.378	0.321	123.3	10.7
2260.9	5.230	3.112	7.656	1.931	0.000	2.370	0.312	118.1	8.4
2368.0	5.471	3.119	7.708	1.881	0.000	2.359	0.304	113.2	5.6
2475.2	5.711	3.126	7.757	1.848	0.000	2.350	0.296	108.7	2.0
2582.3	5.961	3.123	7.776	1.822	0.000	2.343	0.293	104.0	-1.4
2689.4	6.198	3.122	7.823	1.767	0.000	2.328	0.285	100.0	-1.9
2796.6	6.460	3.119	7.863	1.727	0.000	2.315	0.279	95.8	-2.5
2903.7	6.716	3.116	7.902	1.692	0.000	2.302	0.272	92.1	-2.2
3010.9	6.963	3.113	7.912	1.667	0.000	2.297	0.270	88.8	-2.4
3118.0	7.222	3.109	7.968	1.619	0.000	2.280	0.261	85.5	-3.4
3225.2	7.469	3.105	7.987	1.595	0.000	2.272	0.258	82.5	-4.7
3332.3	7.714	3.098	8.008	1.563	0.000	2.262	0.254	79.7	-4.7
3439.5	7.957	3.093	8.033	1.540	0.000	2.252	0.249	77.2	-2.3
3546.6	8.203	3.092	8.071	1.499	0.000	2.242	0.243	74.8	-2.8
3653.7	8.445	3.086	8.096	1.462	0.000	2.232	0.238	72.6	-1.4
3760.9	8.686	3.089	8.125	1.437	0.000	2.227	0.234	70.6	-1.0
3868.0	8.924	3.084	8.100	1.449	0.000	2.230	0.237	68.6	-4.3
3975.2	9.175	3.078	8.111	1.427	0.000	2.223	0.235	66.6	-3.8
4082.3	9.432	3.075	8.144	1.394	0.000	2.213	0.229	64.7	-3.6
4189.5	9.681	3.069	8.167	1.380	0.000	2.204	0.225	62.9	-2.6
4296.6	9.935	3.068	8.158	1.382	0.000	2.205	0.226	61.3	0.9
4403.8	10.195	3.071	8.196	1.351	0.000	2.199	0.221	59.8	0.1
4510.9	10.457	3.068	8.236	1.323	0.000	2.187	0.214	58.2	-2.6
4618.1	10.706	3.065	8.216	1.313	0.000	2.190	0.217	56.8	-2.4
4725.2	10.946	3.062	8.236	1.304	0.000	2.184	0.213	55.5	-2.5
4832.3	11.199	3.059	8.254	1.289	0.000	2.177	0.210	54.2	-2.7
4939.5	11.431	3.056	8.243	1.288	0.000	2.178	0.211	53.1	-2.2
5046.6	11.684	3.053	8.266	1.278	0.000	2.171	0.207	51.9	-1.8
5153.8	11.924	3.052	8.288	1.258	0.000	2.165	0.204	50.8	0.8
5260.9	12.169	3.055	8.308	1.223	0.000	2.163	0.201	49.8	1.4
5368.1	12.419	3.055	8.312	1.217	0.000	2.162	0.200	48.8	-2.5
5475.2	12.674	3.049	8.304	1.222	0.000	2.160	0.201	47.7	-2.4
5582.4	12.911	3.049	8.296	1.226	0.000	2.162	0.202	46.9	-3.0
5689.5	13.183	3.041	8.299	1.215	0.000	2.157	0.201	45.8	-2.3
5796.6	13.440	3.042	8.343	1.174	0.000	2.148	0.194	44.9	-0.8
5903.8	13.687	3.039	8.362	1.155	0.000	2.142	0.190	44.1	-2.4
6010.9	13.932	3.036	8.386	1.129	0.000	2.135	0.186	43.3	0.1
6118.1	14.177	3.039	8.401	1.109	0.000	2.133	0.184	42.5	1.7
6225.2	14.412	3.040	8.391	1.123	0.000	2.136	0.185	41.9	-0.4
6332.4	14.671	3.038	8.407	1.110	0.000	2.132	0.183	41.1	-1.3
6431.9	14.900	3.037	8.414	1.116	0.000	2.130	0.181	40.5	-0.3



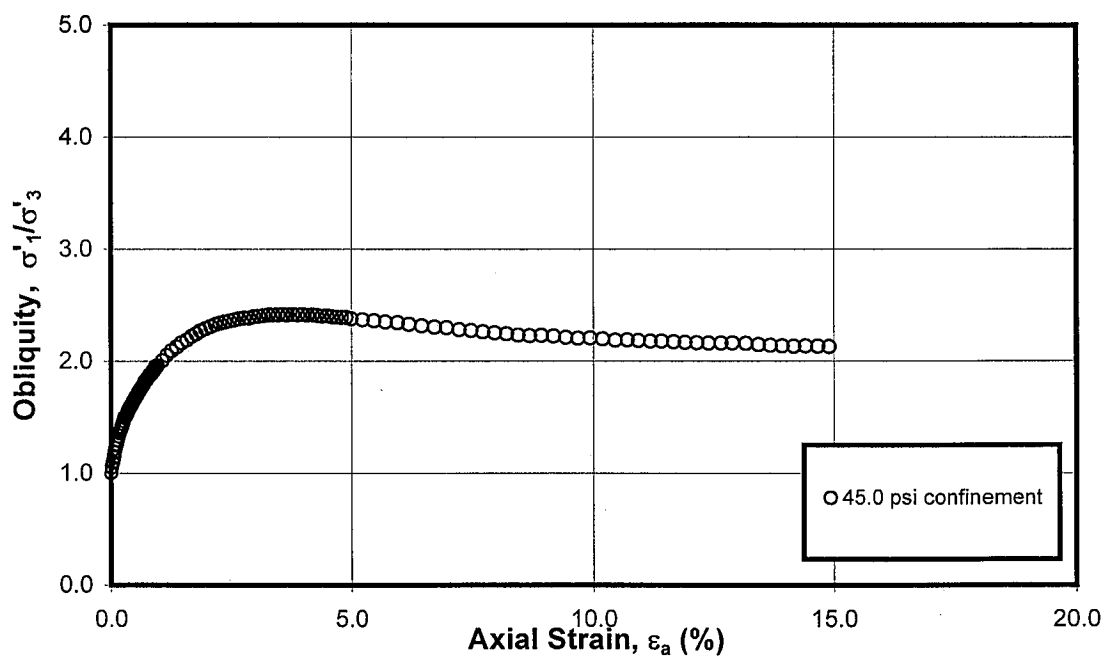
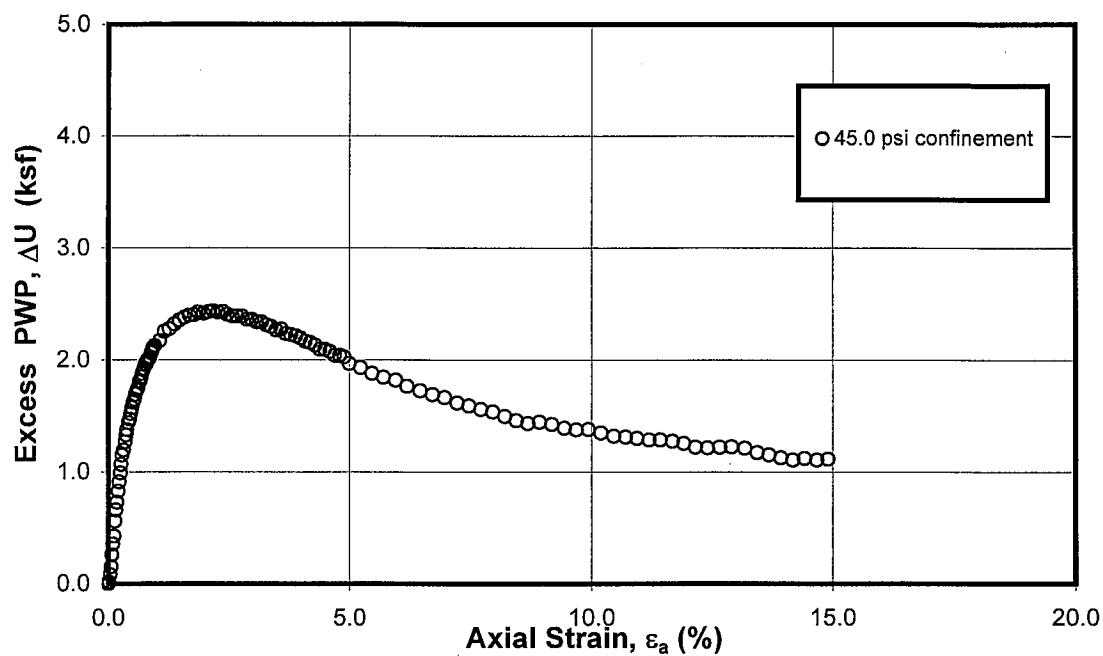
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WLD*



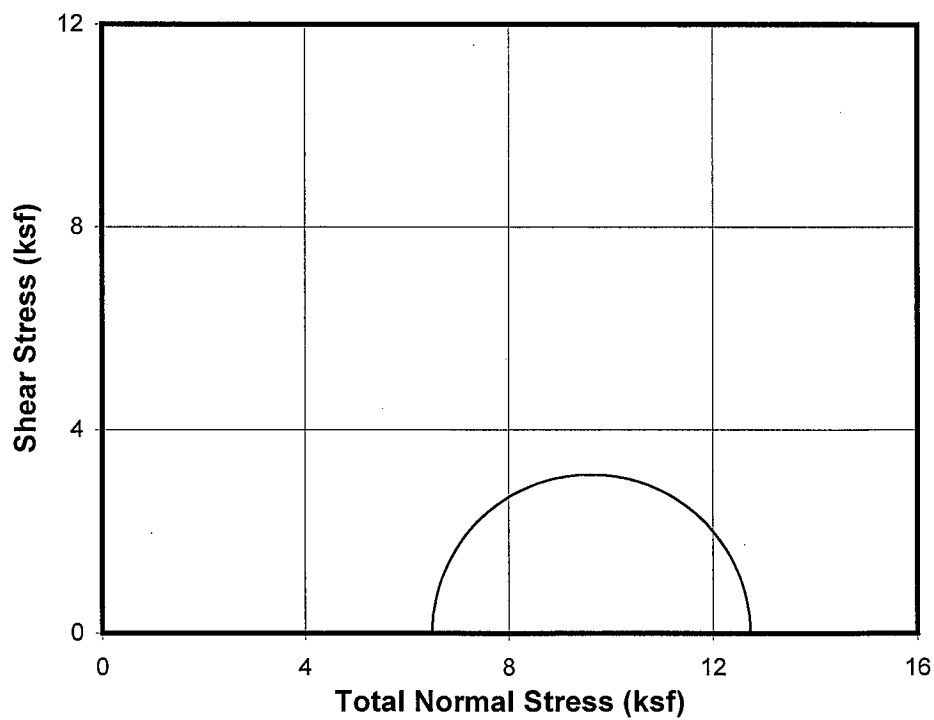
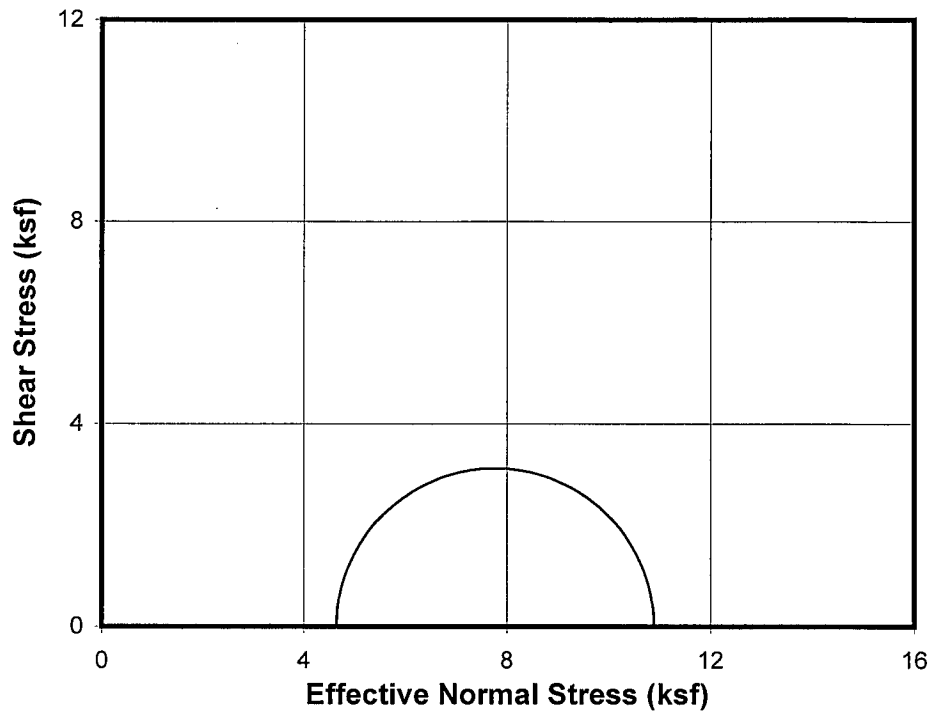
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WLD*



UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated- Mohr's Circles

Sample: UD9c - Depth: 58.5-61.0 ft

Boring B-2321UD

Reviewed By: *WFR*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-7 File Name: 2321UD_UD1
 Task No.: NA Test Stress(es), $\sigma'_{v,c}$ or $\sigma'_{v,c} = 11.52$, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k (\sigma'_{h,c} / \sigma'_{v,c}) = 1.00$ Induced OCR = 1.00 $K_{ua} (\sigma'_{d,ua} / 2\sigma'_{v,c}) = NA$

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ Reconstituted	☐ Impact/Rammer	☐ Pluviated:	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD15	Compostite No.:	☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 130.5-132.5	Specimen No.: c		Ref. Effort =	% Comp. =	$\pm$ Opt. =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				

Type	☒ Isotropic	K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp. ☒ Strain ☐ Stress ☒ Constant Cell Pressure
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext. ☐ Stress Path ☐ Variable Cell Pressure
			Cyclic (Hz) Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	137	581	5001	609
Mass Moist Soil + Cont. (g)	62.28	62.96	82.50	116.21
Mass Dry Soil + Container (g)	56.89	57.40	74.14	101.00
Mass Container (g)	30.03	31.64	30.72	31.63
Water Content, $W_{o,n}$ (%)	20.07	21.58	19.25	21.93
Avg. Initial WC, $W_{o,avg}$ (%)	20.30	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		483.35	489.84
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		483.35	489.84
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)		Final (D_{at})	
GB 100.000	100.000	1 T	51.00	57.70	For
1 15.27	-0.89	2 M	50.90	57.80	Wedge
2 15.24	-1.55	3 B	50.90	58.90	Failure
3 15.24	-2.14	1 T		54.40	= d_{max}
4 15.30	-2.85	2 M		51.70	= d_{min}
5 15.27	-1.30	3 B			= Δd
Avg. 115.26	98.25	Avg. 50.93		56.10	xxxxx
Measuring Devices:		$A_o = \pi D^2/400$ (cm ²)		20.37	
Pi Tape: ☒ Dia		V_o (cm ³)		234.85	
Calipers: ☐ Ht.; ☐ Dia		$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)		24.38	
Dial Comparator: ☒ Ht.; ☐ Dia		$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)		NA	
Remarks: ID# PI-002		$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)		55.71	

Estimated Initial Unit Weight			
Total, γ_{to} (lb/ft ³) =	128.49	Dry, $\gamma_{d,o}$ (lb/ft ³) =	106.80
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.57	0.69
= 1	Single; ☒ Double	0.58	0.69
Circumference ($C_{rm,o}$)		150.0	150.0
Average:		Total Thickness	Dia. ($C_{rm,o} / \pi$)
		0.32	47.75
Filter Paper: Top + Bottom:		☐ Yes ; ☒ No	
Filter Strips: ☒ Yes ; ☐ No		Number =	8
Type of Filter Strips ☐ Vertical: ¼ in. & Whatman #54		☒ Spiral: ¼ in. & Whatman #1	
Apparatus: Mass Top Cap, M_{tc} =		53.4 g,	0.12 lbf
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) =		NA g,	NA lbf
Top Cap Attached:		Piston Dia. (in.)	Load Cell:
☐ Yes; ☒ No; ☒ ½; ☐ ¾;			External ☐ Internal ☒
Top Cap - Rotation		Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°	
With: ☐ Frictionless End Caps;		Lat. Movement Top Cap	
☐ Internal LVDT Jacket			

☐ Photo Taken.

Failure Mode: NA - Not Applicable

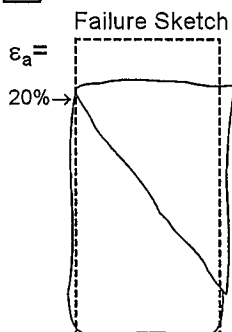
☐ Bulge GB - Gage Block

☒ Wedge Other Remarks:

☐ Parabolic LL=61 PL=17 PI=44

Wedge/Bulge Ht. = NA (mm)

Final Visual Classification: Pale Yellow Fat CLAY with Sand (CH)



Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: AW
 Date: 3/24/2008 Date: 3/24/2008 Date: 4/14/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: *WFR*

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-7

File Name: 2321UD_UD15c

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☒ Assumed

Boring No.: B-2321UD

Sample No.: UD15

Specimen No.: c

Depth (ft): 130.5-132.5

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed"; ☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	20.30
W_o 20.07	21.58	19.25	20.30	20.30	20.31	Initial, $M_{d,o}$	401.79
S_o 94.1	97.8	92.0	94.7	94.7	94.7	Final, $M_{d,at}$	401.75
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	401.79
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.02	-0.12		0.80	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	0.31	-8.22	NA	25.72	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.09	-0.72		4.89	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				5.26	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.00	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.09	-8.22		8.72	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	129.87	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 160$ min
Back Pressure, $U_{b,n}$ (psi)	49.72	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.51	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	11.49	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	14.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures				
By Selected Volumes $\Delta V_c =$ 0.41	By Saturation = 100 % $\Delta V_c =$ -1.89	By Change in Mass (5) $\Delta V_c =$ 1.72	For Diff. in Meas. Vol. ($V_o - V_{at}$) & corr. for ΔH_{td} $\Delta V_c =$	For Selected ΔV_c , required G_s for $S_c = 100\%$: 2.753

At Final Test Stress/Stage - Consolidation Conclusions				
$\Delta H_{c,f}$ (mm) = 0.67	$\Delta V_{c,f}$ (cm^3) = 0.41	Back Cal. G_s for $S=100\%$ = 2.753	Normalized	Ht. Ch. (%) = -0.06
$\epsilon_{ac,c}$ (%) = 0.58	$\epsilon_{vc,f}$ (%) = 0.17		Diff. in:	Vol. Ch. (%) =

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio	Volumetric Water Content	Porosity	Skempton B parameter % (6)
Condition:					Total (pcf)	Dry (pcf)		e		n	
Initial:	115.26	234.85	20.37	20.30	128.49	106.80	94.6	0.581	0.3479	0.368	95.0
After to 1st σ'_c	114.60	234.44	20.46	21.91	130.44	106.99	102.7	0.579	0.3762	0.366	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-7 File Name: 2321UD_UD15c
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: <u>B-2321UD</u>	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lbf) =	No. Layers =
Sample No.: <u>UD15</u>	Compostite No.:	☐ Pluviated:		Tamper Force (lbf) =	Drop (in.) =
Depth (ft): <u>130.5-132.5</u>	Specimen No.: <u>c</u>	☐ Kneading		Undercompaction: U_{nl} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = <u>NA</u>
			☐ 45° stress path	Remarks:	
Loading Conditions	☒ Static	☐ Post Cyclic	☒ Undrained	☒ Comp.	☐ Strain
			☐ Drained	☐ Ext.	☐ Stress
				☐ Stress Path	☒ Constant Cell pressure
					☐ Variable Cell pressure
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Stress <u>1</u> ; Strain <u>Other</u> :

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B parameter % (1)
Condition:					Total (pcf)	Dry (pcf)			
Initial:	115.26	234.85	20.37	20.30	128.49	106.80	94.64	0.58	95.0
After to 1st σ'_c	114.60	234.44	20.46	21.91	130.44	106.99	102.66	0.58	
Consol.: to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Consolidation Stress Summary and Loading Summary					
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c	%	0.579	NA	NA	NA
Vol. Strain during Consol., ϵ_v	%	0.175	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	11.492	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	11.438	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.995			
Induced OCR	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	22.930			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	11.456			
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA

Membrane Correction		
Type:	Bulge	
Modulus:	150.0 psi	
Diameter:	47.75 mm	
Thickness:	0.32 mm	
Area Correction		
Type:	Bulge	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.157	24.38
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	None	
Type Strips:	Spiral #1	
Strips:	8	
Force:	0.000 lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Pale Yellow Fat CLAY with Sand (CH)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	2.21	3.352	4.728	10.053	8.079	1.376
	Max Obliquity	2.21	3.352	4.728	10.053	8.079	1.376
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Stain Rate (%/min) = 2.50E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2321UD
Sample No.: UD15
Specimen No.: c

Depth (ft.): 130.5-132.5
Stage No.: 1

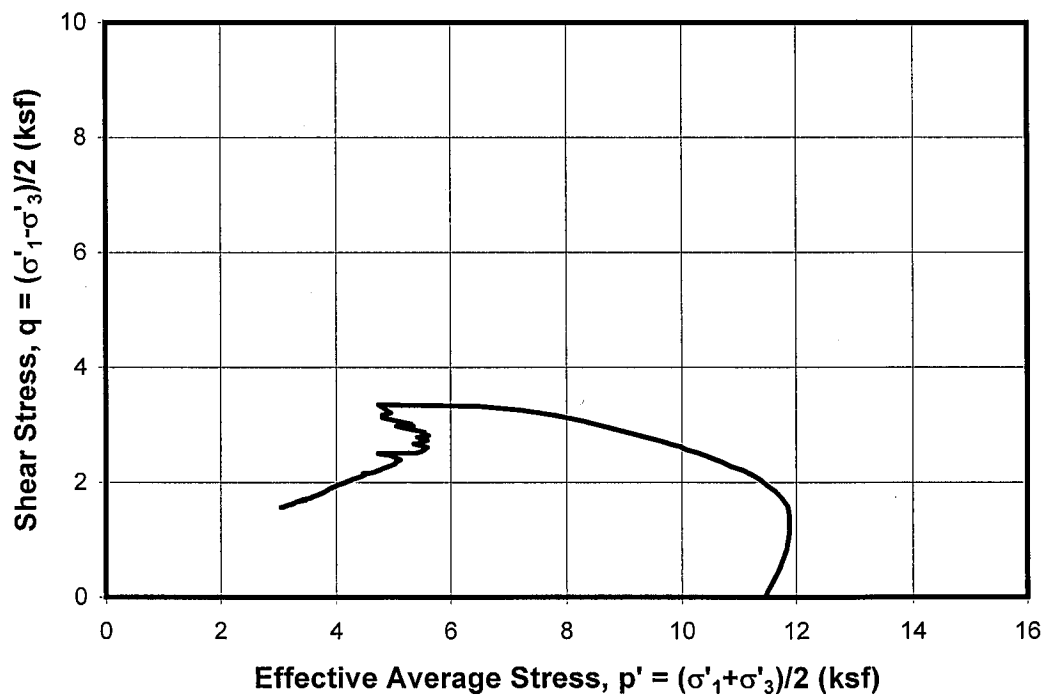
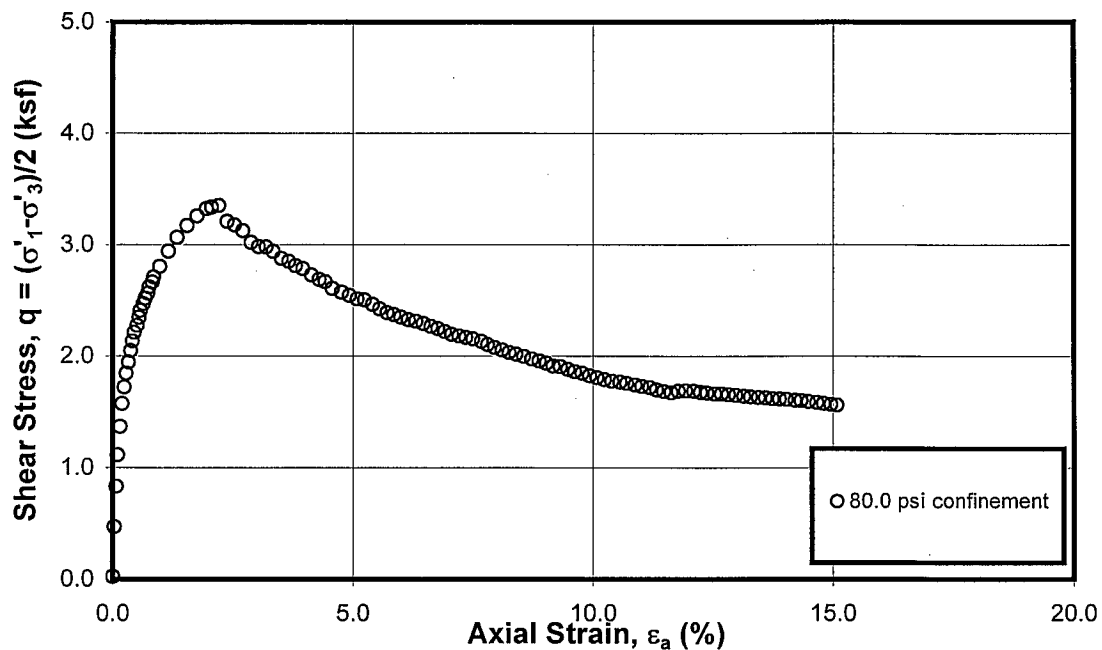
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_r -	E_s (ksf)	E_r (ksf)
0.0	0.000	0.027	11.465	0.000	0.000	1.005	0.000	-	-
20.0	0.032	0.473	11.698	0.214	0.000	1.084	0.239	2775.0	2428.4
40.0	0.074	0.835	11.831	0.439	0.000	1.152	0.274	2190.3	2049.7
60.0	0.102	1.116	11.874	0.676	0.000	1.207	0.312	2135.7	1272.9
80.0	0.152	1.368	11.882	0.920	0.000	1.260	0.344	1769.2	1222.1
100.0	0.191	1.576	11.851	1.163	0.000	1.307	0.375	1622.4	917.6
120.0	0.237	1.724	11.749	1.413	0.000	1.344	0.416	1429.3	601.3
140.0	0.283	1.847	11.628	1.653	0.000	1.378	0.455	1284.8	507.4
160.0	0.325	1.947	11.489	1.888	0.000	1.408	0.494	1182.4	370.3
180.1	0.377	2.051	11.361	2.124	0.000	1.441	0.526	1073.9	681.4
200.1	0.411	2.137	11.215	2.361	0.000	1.471	0.559	1027.1	357.1
220.1	0.446	2.212	11.055	2.594	0.000	1.500	0.594	980.6	401.2
240.1	0.505	2.277	10.855	2.857	0.000	1.531	0.635	891.0	314.8
260.1	0.546	2.346	10.717	3.062	0.000	1.560	0.661	849.1	349.6
280.1	0.576	2.409	10.554	3.285	0.000	1.592	0.691	826.7	318.2
300.1	0.636	2.469	10.401	3.495	0.000	1.623	0.718	768.1	-2842.9
320.1	0.672	2.519	10.256	3.695	0.000	1.651	0.743	741.8	219.0
340.1	0.728	2.564	10.092	3.909	0.000	1.681	0.770	697.5	256.1
360.1	0.756	2.623	9.964	4.097	0.000	1.715	0.789	687.2	288.2
380.1	0.820	2.664	9.806	4.300	0.000	1.746	0.815	643.6	298.0
400.1	0.851	2.710	9.672	4.469	0.000	1.779	0.834	630.6	147.2
450.1	0.974	2.805	9.306	4.930	0.000	1.863	0.888	570.8	174.0
530.1	1.153	2.941	8.772	5.608	0.000	2.009	0.962	505.6	145.4
610.1	1.335	3.066	8.298	6.217	0.000	2.172	1.021	455.4	120.4
690.1	1.541	3.171	7.792	6.813	0.000	2.372	1.084	408.0	83.3
770.1	1.750	3.258	7.216	7.479	0.000	2.646	1.158	369.3	72.6
850.1	1.943	3.322	6.506	8.253	0.000	3.086	1.253	339.2	49.4
893.1	2.052	3.337	5.861	8.919	0.000	3.643	1.346	322.6	20.8
953.1	2.207	3.352	4.728	10.053	0.000	5.870	1.513	301.3	-2.9
1013.1	2.378	3.207	4.947	9.693	0.000	4.686	1.525	267.5	-80.8
1073.1	2.533	3.176	4.799	9.815	0.000	4.912	1.558	248.6	-151.6
1133.1	2.705	3.123	4.800	9.759	0.000	4.727	1.576	229.0	-28.2
1193.1	2.878	3.019	5.290	9.167	0.000	3.659	1.532	208.0	-151.2
1253.1	3.031	2.981	5.343	9.087	0.000	3.525	1.536	194.9	-29.1
1313.1	3.194	2.978	5.039	9.380	0.000	3.889	1.589	184.8	-25.7
1373.1	3.341	2.939	5.209	9.172	0.000	3.589	1.574	174.3	-38.3
1433.1	3.516	2.875	5.528	8.778	0.000	3.168	1.542	162.0	-45.7
1493.1	3.666	2.849	5.521	8.768	0.000	3.132	1.553	154.0	-55.3
1553.1	3.810	2.811	5.609	8.640	0.000	3.009	1.552	146.2	-23.1
1613.1	3.962	2.785	5.404	8.821	0.000	3.127	1.599	139.2	-64.1
1673.1	4.141	2.728	5.588	8.568	0.000	2.908	1.588	130.5	-48.3
1733.1	4.301	2.687	5.458	8.664	0.000	2.939	1.629	123.7	-32.7

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm^3)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
1793.1	4.434	2.667	5.345	8.761	0.000	2.993	1.659	119.1	-70.1
1853.1	4.580	2.606	5.588	8.459	0.000	2.748	1.639	112.6	-54.6
1913.1	4.762	2.572	5.536	8.468	0.000	2.735	1.665	106.9	-36.9
1973.1	4.925	2.544	5.488	8.492	0.000	2.728	1.687	102.2	-39.8
2033.1	5.086	2.513	5.404	8.551	0.000	2.739	1.719	97.8	-34.0
2093.1	5.241	2.506	4.722	9.211	0.000	3.261	1.860	94.6	-31.0
2153.1	5.406	2.465	4.954	8.954	0.000	2.980	1.835	90.2	-56.6
2213.1	5.550	2.424	5.033	8.826	0.000	2.858	1.842	86.4	-41.5
2273.1	5.706	2.389	5.113	8.712	0.000	2.755	1.844	82.8	-38.4
2333.1	5.846	2.372	5.073	8.740	0.000	2.756	1.863	80.2	-28.5
2393.1	5.996	2.349	5.030	8.757	0.000	2.752	1.886	77.5	-25.2
2453.1	6.149	2.326	5.020	8.731	0.000	2.726	1.902	74.8	-26.0
2513.1	6.300	2.312	4.997	8.753	0.000	2.721	1.915	72.5	-20.5
2573.1	6.454	2.293	4.947	8.784	0.000	2.729	1.938	70.2	-30.8
2633.1	6.615	2.267	4.883	8.819	0.000	2.733	1.969	67.7	-30.9
2693.1	6.761	2.246	4.816	8.860	0.000	2.748	1.998	65.6	-40.2
2753.1	6.903	2.221	4.760	8.902	0.000	2.750	2.027	63.6	-26.7
2813.1	7.050	2.196	4.692	8.936	0.000	2.760	2.061	61.6	-20.9
2873.1	7.201	2.182	4.669	8.948	0.000	2.755	2.076	59.9	-20.3
2933.1	7.353	2.167	4.593	9.014	0.000	2.786	2.106	58.2	-17.7
2993.1	7.499	2.156	4.459	9.128	0.000	2.872	2.145	56.8	-21.1
3053.1	7.677	2.133	4.500	9.065	0.000	2.803	2.153	54.9	-40.3
3113.1	7.811	2.105	4.431	9.108	0.000	2.810	2.192	53.2	-35.2
3173.1	7.959	2.077	4.355	9.152	0.000	2.824	2.234	51.5	-42.3
3233.2	8.122	2.054	4.277	9.203	0.000	2.849	2.273	49.9	-18.5
3293.2	8.264	2.034	4.234	9.236	0.000	2.848	2.301	48.6	-23.1
3353.2	8.412	2.018	4.202	9.257	0.000	2.848	2.323	47.4	-33.7
3413.2	8.571	2.000	4.159	9.284	0.000	2.852	2.352	46.0	-18.4
3473.2	8.741	1.977	4.085	9.330	0.000	2.875	2.392	44.6	-30.8
3533.2	8.893	1.958	4.042	9.353	0.000	2.880	2.421	43.4	-33.4
3593.2	9.040	1.939	3.990	9.382	0.000	2.891	2.454	42.3	-26.6
3653.2	9.183	1.913	3.940	9.406	0.000	2.889	2.494	41.1	-25.1
3713.2	9.327	1.905	3.914	9.439	0.000	2.897	2.510	40.3	-19.2
3773.2	9.480	1.883	3.865	9.456	0.000	2.899	2.548	39.2	-27.9
3833.2	9.625	1.864	3.844	9.456	0.000	2.883	2.574	38.2	-26.3
3893.2	9.775	1.849	3.817	9.474	0.000	2.879	2.598	37.3	-23.5
3953.2	9.928	1.825	3.784	9.491	0.000	2.864	2.635	36.2	-24.1
4013.2	10.085	1.810	3.746	9.515	0.000	2.870	2.664	35.4	-24.5
4073.2	10.237	1.792	3.694	9.534	0.000	2.885	2.701	34.5	-15.0
4133.2	10.389	1.777	3.666	9.549	0.000	2.881	2.728	33.7	-18.3
4193.2	10.557	1.769	3.643	9.558	0.000	2.888	2.745	33.0	-14.5
4253.2	10.700	1.760	3.608	9.590	0.000	2.904	2.767	32.4	-12.8
4313.2	10.869	1.744	3.564	9.620	0.000	2.917	2.800	31.6	-15.3
4373.2	11.015	1.732	3.564	9.619	0.000	2.892	2.816	31.0	-16.3
4433.2	11.180	1.722	3.514	9.645	0.000	2.922	2.845	30.3	-13.5
4493.2	11.321	1.702	3.434	9.698	0.000	2.966	2.897	29.6	-28.6
4553.2	11.469	1.687	3.389	9.747	0.000	2.983	2.932	29.0	-26.9
4613.2	11.620	1.674	3.350	9.757	0.000	2.998	2.963	28.4	-3.4
4673.2	11.770	1.691	3.465	9.657	0.000	2.905	2.904	28.3	25.3
4733.2	11.922	1.693	3.452	9.684	0.000	2.924	2.905	27.9	-4.5

STAGE 1

[illegible]



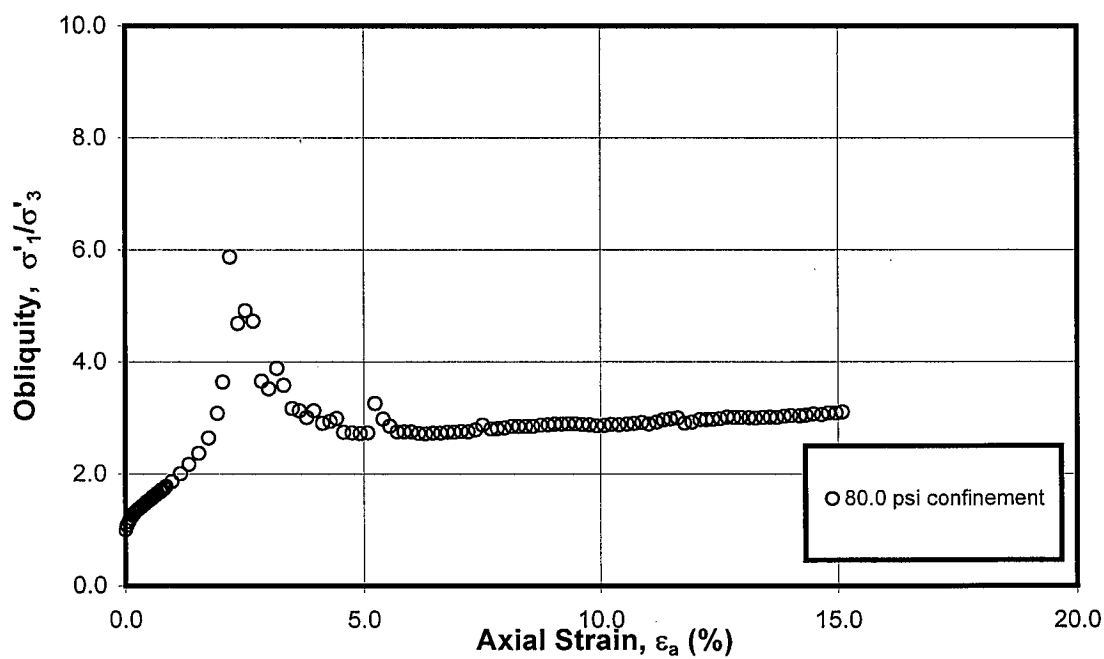
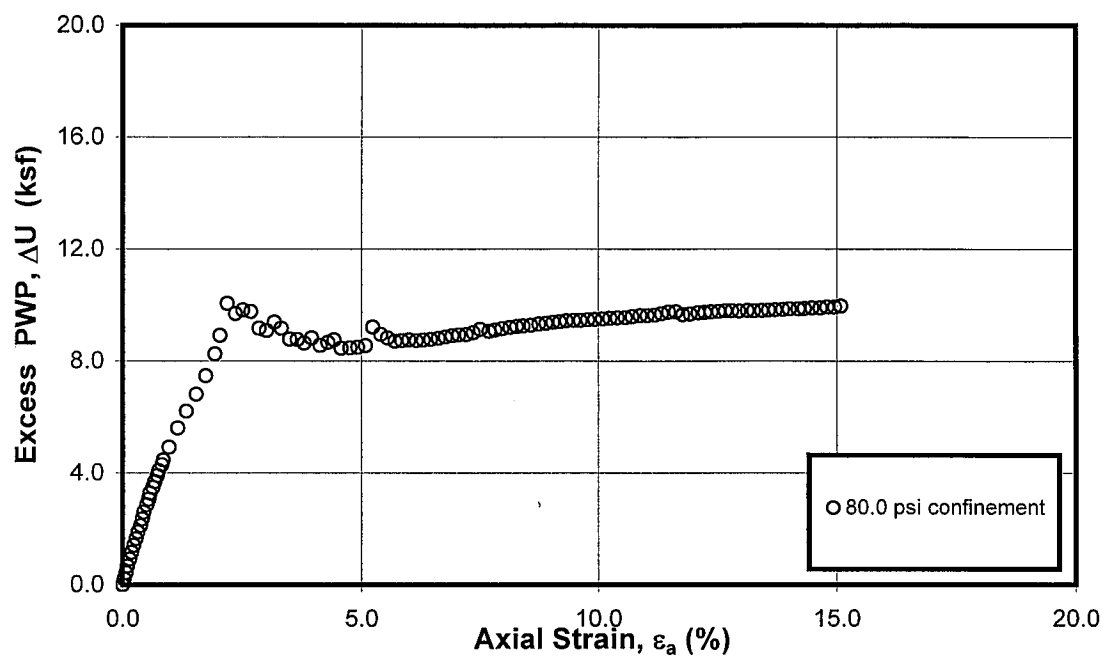
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD15c - Depth: 130.5-132.5 ft

Boring B-2321UD

Reviewed By: WLD



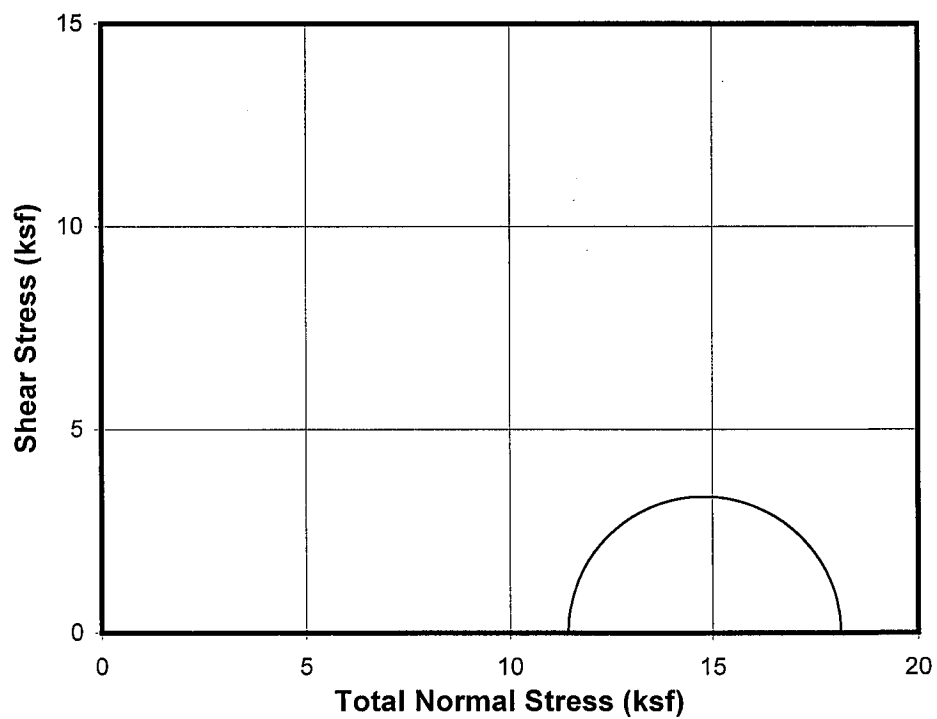
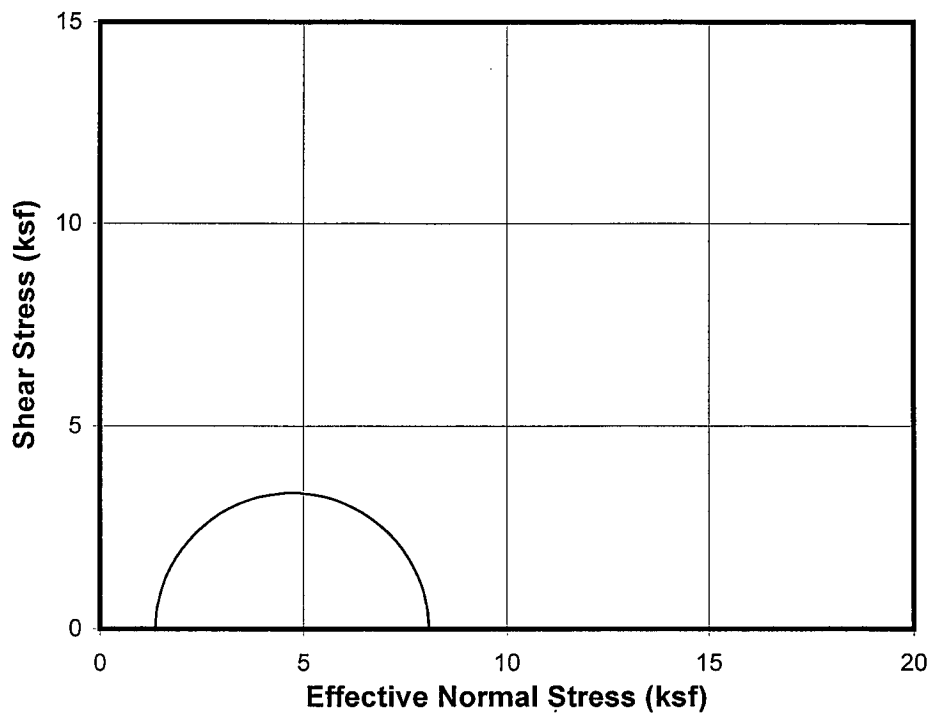
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD15c - Depth: 130.5-132.5 ft

Boring B-2321UD

Reviewed By: *WFD*



UNDRAINED TRIAXIAL COMPRESSION TEST
 Isotropically Consolidated- Mohr's Circles
 Sample: UD15c - Depth: 130.5-132.5 ft
 Boring B-2321UD

Reviewed By: *WPA*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-7 File Name: 2359UD_UD5
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 5.04 , NA , NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2359UD	☐ Reconstituted	☐ Impact/Rammer	Rammer Wgt.(lbf)=	No. Layers =	
Sample No.: UD5	Compostite No.:	☐ Pluviated:	Tamper Force (lbf)=	Drop (in.) =	
Depth (ft): 40.0-41.7	Specimen No.: c	☐ Kneading	Undercompaction: U_{ni} (%) =	Dia. (in.) =	
☐ Spec. Selection by X-ray;	☐ Geomarine Sample	Ref. Effort =	% Comp. =	$\pm$ Opt. =	

Type	☒ Isotropic	☐ K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp.
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext.
☒ Strain	☐ Stress	☒ Constant Cell Pressure	☐ Cyclic (Hz)
☐ Stress Path	☐ Variable Cell Pressure	Rate: 0.1;	1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	4022	4146	587	4003
Mass Moist Soil + Cont. (g)	75.06	90.34	80.69	149.61
Mass Dry Soil + Container (g)	66.96	79.80	71.62	127.21
Mass Container (g)	30.12	30.34	31.53	30.36
Water Content, $W_{o,n}$ (%)	21.99	21.31	22.62	23.13
Avg. Initial WC, $W_{o,avg}$ (%)	21.97	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		477.28	485.45
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_n (g)		477.28	485.45
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, M_{des} (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	100.000	1 T 51.10	57.80		For
1 15.55	-0.34	2 M 51.00	59.00		Wedge
2 15.51	-0.69	3 B 51.00	58.50		Failure
3 15.50	0.27	1 T	52.50		= d_{max}
4 15.56	-0.19	2 M	52.30		= d_{min}
5 15.49	0.10	3 B			= Δd
Avg. 115.52	99.83	Avg. 51.03	56.02	xxxxx	

Measuring Devices:	$A_o = \pi D^2/400$ (cm ²)	20.45
Pi Tape: ☒ Dia	V_o (cm ³)	236.30
Calipers: ☐ Ht.; ☐ Dia	$A_{alb,m} = \pi (D^*_{at})^2 / 400$ (cm ²)	24.55
Dial Comparator ☒ Ht.; ☐ Dia	$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002	$D^*_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	55.91

Photo Taken. Failure Sketch

$\epsilon_a =$ 20%

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=65 PL=18 PI=47

☐ Bulge
☒ Wedge
☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)

Final Visual Classification: Pale Brown Fat CLAY (CH)

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) = 126.09	Dry, $\gamma_{d,o}$ (lb/ft ³) = 103.38
Membrane / Filter Paper / Apparatus	
Membrane (mm):	Top Bottom
Number: 1	Thickness: 0.77 0.63
Single; ☒ Double	0.78 0.64
Circumference ($C_{rm,o}$)	148.0 149.0
Total Thickness	Dia. ($C_{rm,o} / \pi$)
Average: 0.35	47.27
Filter Paper: Top + Bottom: Yes; ☒ No	
Filter Strips: ☒ Yes; ☐ No	Number = 8
Type of Filter Strips: ☐ Vertical: 1/4 in. & Whatman #54	
☒ Spiral: 1/4 in. & Whatman #1	
Apparatus: Mass Top Cap, M_{tc} = 53.4 g, 0.12 lbf	
Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf	
Top Cap Attached: Yes; ☒ No; ☒ 1/2; ☐ 3/4; ☐ External ☒ Internal	
Top Cap - Rotation: Fixed, <1°; ☒ Limited, <5°; ☐ Unlimited, >5°	
With: Frictionless End Caps; Lat. Movement Top Cap	
Internal LVDT Jacket	

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: AW
 Date: 3/21/2008 Date: 3/21/2008 Date: 4/1/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: WEP

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686 Cell No.: TRX-7 File Name: 2359UD_UD5c
 Task Number: NA Specific Gravity: 2.710 ☒ Measured; ☒ Assumed
 Boring No.: B-2359UD Sample No.: UD5 Specimen No.: c Depth (ft): 40.0-41.7
 Type Test: CIU Triaxial Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)	21.97
W_c 21.99	21.31	22.62	21.97	21.97	21.06	Initial, $M_{d,o}$	391.31
S_o 94.0	92.4	95.5	94.0	94.0	91.8	Final, $M_{d,at}$	394.26
Measured final mass of moist soil, $M_{t,at}$ (g)						Selected, M_d	394.26
Final mass of moist soil corrected for excess dry soil, $M_{t,c}$ (g)							

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.08	-1.10		1.34	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	-0.17	-16.71	NA	7.77	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.51	-6.75		16.27	NA	NA	NA (2)
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				8.23	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	0.94	NA	NA	NA
Selected $\Delta V_{c,n}$	-0.51	-6.75		0.00	NA	NA	NA (3)

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	124.80	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 220$ min
Back Pressure, $U_{b,n}$ (psi)	89.62	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	2.00	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	5.02	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	3.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures					
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:	
$\Delta V_c = 0.51$	$\Delta V_c = -0.80$	$\Delta V_c = 8.67$	& corr. for ΔH_{td} $\Delta V_c =$	2.735	

At Final Test Stress/Stage - Consolidation Conclusions					
$\Delta H_{c,f}$ (mm) = 0.16	$\Delta V_{c,f}$ (cm^3) = 0.51	Back Cal. G_s for $S=100\%$ = 2.735	Normalized	Ht. Ch. (%) = 0.64	
$\epsilon_{ac,c}$ (%) = 0.14	$\epsilon_{vc,f}$ (%) = 0.22		Diff. in:	Vol. Ch. (%) =	

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.710$ Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	Void Ratio	Volumetric Water Content	Porosity	Skempton B parameter % (6)
Condition:	(mm)	(cm^3)	(cm^2)	(%)	Total (pcf)	Dry (pcf)	(%)	e		n	
Initial:	115.52	236.30	20.45	21.06	126.09	104.16	91.8	0.621	0.3519	0.383	90.0
After to 1st σ'_c	115.36	235.79	20.44	23.13	128.53	104.38	101.4	0.618	0.3874	0.382	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

- Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.
 (2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).
 (3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).
 (4) Stresses are corrected for membrane. (5) $\sim M_{t,o} - (M_{t,c} + \rho_{water} \times \Delta V_{in, column 1 \& 2})$
 (6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content Remarks: Wet Method used in the Saturation Stage

Calculated By: TP Reviewed By: *HP*

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-7 File Name: 2359UD_UD5
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2359UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD5	Composite No.:	☐ Pluviated:		Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 40.0-41.7	Specimen No.: c	☐ Kneading		Undercompaction: U_{nl} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation	☒ Isotropic	☐ Anisotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = NA
			45° stress path	Remarks:	
Loading Conditions	☒ Static	☐ Post Cyclic	☒ Undrained	☒ Comp.	☒ Strain
		☐ Drained	☐ Ext.	☐ Stress Path	☒ Constant Cell pressure
					Variable Cell pressure
					Cyclic (Hz) Rate: 0.1;
					Stress 1; Other:

Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	Void Ratio e	Skempton B para- meter % (1)	Unit for Stresses: (ksf)
Condition:					Total (pcf)	Dry (pcf)				
Initial:	115.52	236.30	20.45	21.06	126.09	104.16	91.83	0.62	90.0	
After to 1st σ'_c	115.36	235.79	20.44	23.13	128.53	104.38	101.44	0.62		
Consol.: to 2nd σ'_c										
to 3rd σ'_c										
to 4th σ'_c										

Consolidation Stress Summary and Loading Summary					
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., ϵ_c :	%	0.136	NA	NA	NA
Vol. Strain during Consol., ϵ_v :	%	0.216	NA	NA	NA
Effective Vertical Stress, σ'_v :	(ksf)	5.019	NA	NA	NA
Effective Horizontal Stress, σ'_h :	(ksf)	4.949	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v):	-	0.986			
Induced OCR:	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$:	(ksf)	9.968			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$:	(ksf)	4.972			
Undr. Ambient Shear Stress, τ_{ua} :	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$:	%	NA	NA	NA	NA

Membrane Correction		
Type: Bulge		
Modulus: 150.0	psi	
Diameter: 47.27	mm	
Thickness: 0.35	mm	
Area Correction		
Type: Bulge		
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	1.184	24.55
2nd		
3rd		
4th		
Filter Paper Correction		
Type: None	Type Strips: Serial #1	
Strips: 8		
Force: 0.000	lbf/strip	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Pale Brown Fat CLAY (CH)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ'_1 (ksf)	σ'_3 (ksf)
1st	Max Shear Stress	7.85	2.428	6.496	0.885	8.923	4.068
	Max Obliquity	5.37	2.335	6.033	1.258	8.368	3.697
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Strain Rate (%/min) = 1.82E-03

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2359UD
Sample No.: UD5
Specimen No.: c

Depth (ft.): 40.0-41.7
Stage No.: 1

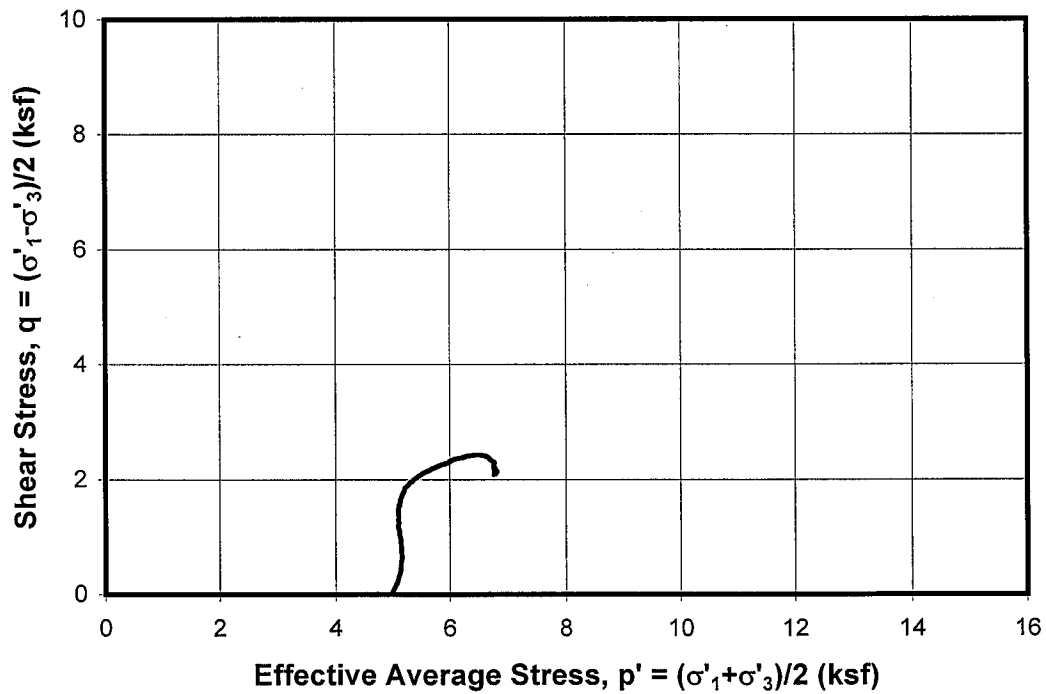
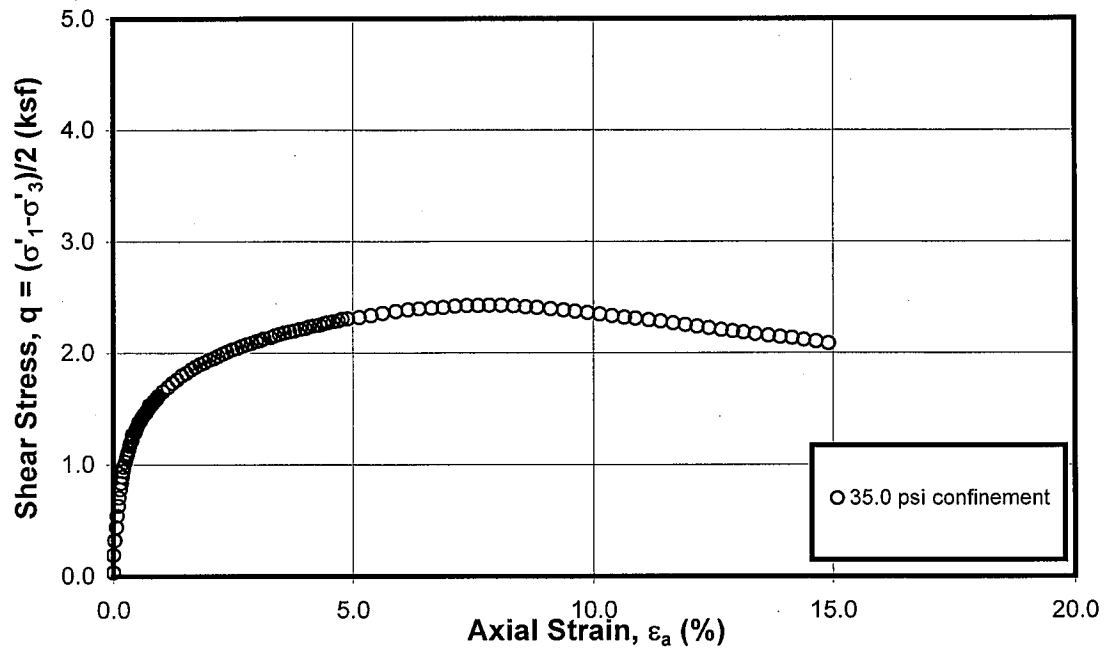
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, Δu (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.035	4.984	0.000	0.000	1.014	0.000	-	-
13.6	0.002	0.193	5.069	0.074	0.000	1.079	0.230	15008.0	7996.7
27.3	0.028	0.322	5.107	0.164	0.000	1.134	0.286	2031.1	901.0
40.9	0.057	0.439	5.137	0.252	0.000	1.187	0.311	1418.3	956.5
54.6	0.076	0.542	5.139	0.352	0.000	1.236	0.348	1338.3	888.3
68.2	0.102	0.632	5.155	0.429	0.000	1.280	0.357	1168.4	1072.4
81.8	0.113	0.708	5.153	0.505	0.000	1.318	0.374	1195.4	1023.9
95.5	0.137	0.779	5.152	0.581	0.000	1.356	0.387	1085.8	531.3
109.1	0.162	0.839	5.144	0.640	0.000	1.390	0.401	992.7	601.9
122.7	0.178	0.895	5.136	0.706	0.000	1.422	0.411	969.1	576.9
136.4	0.199	0.942	5.140	0.751	0.000	1.449	0.414	910.0	616.2
150.0	0.209	0.982	5.126	0.806	0.000	1.474	0.425	905.0	519.2
163.7	0.245	1.024	5.117	0.858	0.000	1.501	0.433	806.1	266.2
177.3	0.275	1.068	5.116	0.904	0.000	1.528	0.436	751.4	330.8
190.9	0.293	1.101	5.111	0.943	0.000	1.549	0.441	727.6	315.9
204.6	0.318	1.135	5.107	0.976	0.000	1.571	0.444	691.3	324.9
218.2	0.335	1.167	5.091	1.027	0.000	1.595	0.453	675.8	329.1
231.8	0.355	1.194	5.094	1.048	0.000	1.613	0.453	653.3	222.7
245.5	0.384	1.219	5.098	1.069	0.000	1.629	0.452	616.5	289.5
259.1	0.397	1.245	5.109	1.097	0.000	1.645	0.448	609.9	-415.0
272.8	0.393	1.268	5.094	1.126	0.000	1.663	0.455	627.3	-586.6
286.4	0.458	1.289	5.097	1.144	0.000	1.677	0.455	548.2	408.4
300.0	0.465	1.318	5.094	1.173	0.000	1.698	0.457	551.5	444.1
313.7	0.498	1.340	5.102	1.190	0.000	1.712	0.455	524.5	169.7
327.3	0.516	1.358	5.099	1.220	0.000	1.726	0.456	513.4	244.7
340.9	0.531	1.380	5.096	1.238	0.000	1.743	0.458	506.8	185.5
354.6	0.576	1.399	5.086	1.255	0.000	1.759	0.462	473.7	178.6
368.2	0.590	1.419	5.103	1.268	0.000	1.770	0.457	468.9	194.2
381.9	0.614	1.432	5.098	1.292	0.000	1.782	0.459	454.9	120.7
395.5	0.637	1.447	5.096	1.294	0.000	1.793	0.460	443.3	102.7
409.1	0.679	1.463	5.093	1.312	0.000	1.806	0.462	420.9	140.6
422.8	0.696	1.480	5.093	1.341	0.000	1.820	0.462	415.6	163.9
436.4	0.725	1.499	5.089	1.359	0.000	1.835	0.464	403.8	119.1
450.0	0.754	1.515	5.098	1.359	0.000	1.846	0.461	392.7	-193.9
463.7	0.747	1.532	5.107	1.378	0.000	1.857	0.459	400.8	-234.9
477.3	0.799	1.540	5.118	1.378	0.000	1.861	0.456	377.0	69.5
491.0	0.823	1.553	5.101	1.392	0.000	1.876	0.461	369.0	130.9
504.6	0.839	1.566	5.115	1.403	0.000	1.883	0.457	364.8	100.6

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm^3)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
518.2	0.872	1.574	5.116	1.405	0.000	1.888	0.457	353.1	76.9
531.9	0.893	1.585	5.118	1.423	0.000	1.897	0.457	347.1	142.0
545.5	0.915	1.604	5.131	1.422	0.000	1.910	0.453	343.2	126.5
559.1	0.943	1.615	5.126	1.441	0.000	1.920	0.455	335.2	80.1
613.7	1.038	1.655	5.131	1.466	0.000	1.952	0.455	312.2	81.4
668.2	1.142	1.696	5.149	1.497	0.000	1.982	0.450	290.9	78.2
722.8	1.236	1.732	5.164	1.518	0.000	2.010	0.447	274.6	70.4
777.3	1.327	1.761	5.174	1.537	0.000	2.032	0.445	260.1	67.4
831.9	1.427	1.797	5.194	1.556	0.000	2.058	0.440	246.9	58.8
886.4	1.529	1.820	5.202	1.571	0.000	2.077	0.439	233.5	54.1
941.0	1.631	1.852	5.214	1.582	0.000	2.102	0.437	222.8	57.6
995.5	1.718	1.875	5.237	1.589	0.000	2.116	0.431	214.2	51.3
1050.1	1.813	1.899	5.263	1.598	0.000	2.129	0.425	205.6	42.7
1104.6	1.909	1.916	5.279	1.589	0.000	2.139	0.422	197.0	40.9
1159.2	2.007	1.938	5.290	1.597	0.000	2.157	0.420	189.7	37.6
1213.7	2.104	1.952	5.320	1.586	0.000	2.159	0.412	182.3	37.9
1268.3	2.191	1.973	5.353	1.573	0.000	2.168	0.405	176.9	44.9
1322.8	2.289	1.994	5.357	1.589	0.000	2.186	0.405	171.2	39.6
1377.3	2.378	2.010	5.379	1.577	0.000	2.193	0.400	166.1	34.1
1431.9	2.494	2.029	5.413	1.560	0.000	2.199	0.392	159.9	30.3
1486.4	2.592	2.043	5.429	1.561	0.000	2.206	0.389	154.9	32.3
1541.0	2.695	2.061	5.454	1.548	0.000	2.215	0.384	150.4	33.2
1595.5	2.793	2.076	5.481	1.543	0.000	2.219	0.378	146.1	26.2
1650.1	2.893	2.087	5.500	1.539	0.000	2.223	0.374	141.9	25.8
1704.6	3.000	2.103	5.521	1.529	0.000	2.230	0.370	137.9	26.6
1759.2	3.089	2.113	5.538	1.519	0.000	2.234	0.367	134.6	36.0
1813.7	3.163	2.131	5.579	1.500	0.000	2.236	0.358	132.6	30.9
1868.3	3.292	2.140	5.605	1.478	0.000	2.235	0.353	127.9	24.2
1922.8	3.386	2.156	5.644	1.470	0.000	2.236	0.344	125.3	28.1
1977.4	3.482	2.166	5.661	1.450	0.000	2.240	0.341	122.4	24.0
2031.9	3.592	2.181	5.677	1.453	0.000	2.248	0.338	119.5	21.7
2086.5	3.698	2.190	5.698	1.446	0.000	2.248	0.334	116.5	17.2
2141.0	3.794	2.198	5.722	1.426	0.000	2.248	0.329	114.1	21.9
2195.6	3.909	2.213	5.754	1.414	0.000	2.250	0.323	111.5	17.6
2250.1	4.018	2.218	5.767	1.400	0.000	2.250	0.321	108.7	24.1
2304.6	4.103	2.235	5.799	1.389	0.000	2.254	0.315	107.2	28.3
2359.2	4.202	2.244	5.827	1.370	0.000	2.252	0.309	105.1	15.4
2413.7	4.312	2.251	5.843	1.356	0.000	2.253	0.306	102.8	20.4
2468.3	4.401	2.263	5.863	1.351	0.000	2.257	0.303	101.3	24.4
2522.8	4.484	2.272	5.908	1.320	0.000	2.250	0.294	99.8	20.2
2577.4	4.591	2.282	5.926	1.311	0.000	2.253	0.291	97.9	15.3
2631.9	4.697	2.288	5.962	1.286	0.000	2.246	0.283	95.9	23.5
2686.5	4.780	2.303	6.000	1.258	0.000	2.246	0.276	94.9	21.6

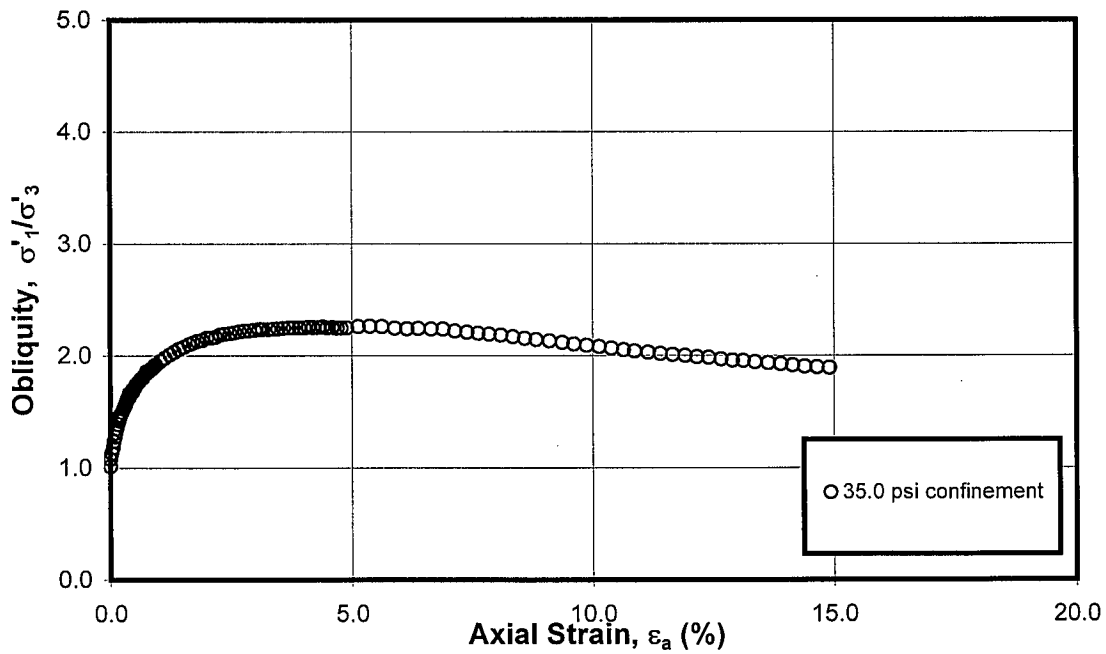
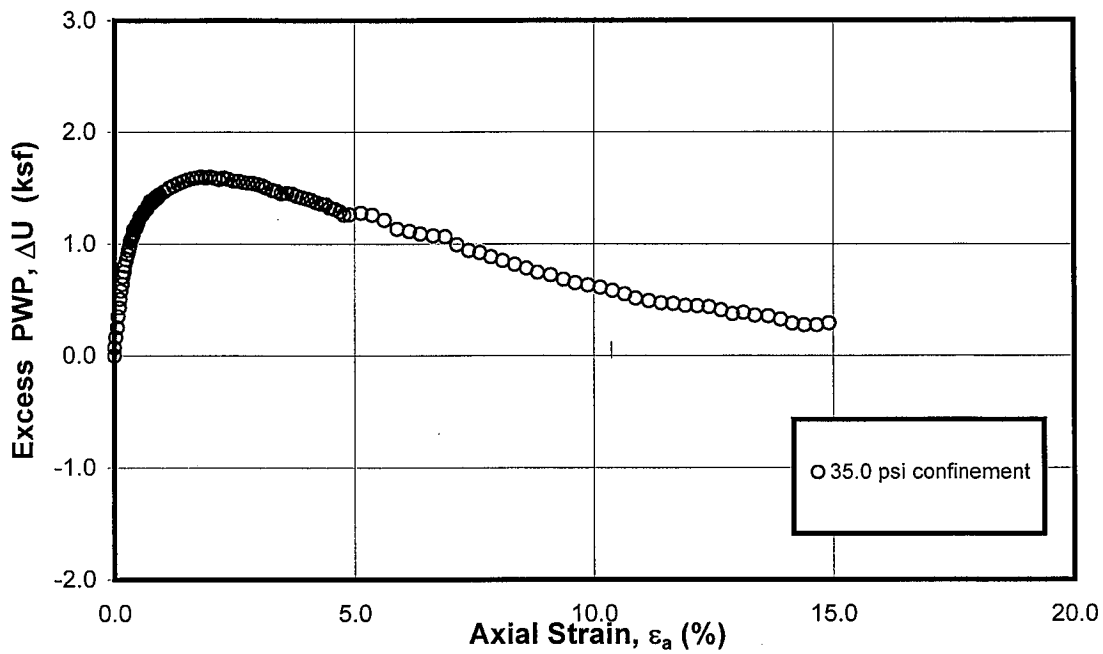
STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, Δu (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
2741.0	4.892	2.307	5.997	1.262	0.000	2.250	0.277	92.9	8.1
2877.4	5.135	2.318	5.992	1.276	0.000	2.262	0.279	88.9	11.9
3013.8	5.370	2.335	6.033	1.258	0.000	2.263	0.272	85.7	15.9
3150.1	5.615	2.356	6.096	1.211	0.000	2.260	0.261	82.7	14.9
3286.5	5.884	2.374	6.182	1.134	0.000	2.246	0.244	79.5	11.9
3422.9	6.140	2.388	6.233	1.112	0.000	2.242	0.234	76.6	9.1
3559.2	6.372	2.396	6.253	1.091	0.000	2.242	0.231	74.1	5.9
3695.6	6.636	2.402	6.282	1.073	0.000	2.238	0.226	71.3	4.3
3831.9	6.885	2.407	6.297	1.063	0.000	2.237	0.223	68.9	6.5
3968.3	7.131	2.418	6.376	0.993	0.000	2.222	0.208	66.8	6.6
4104.7	7.381	2.423	6.432	0.943	0.000	2.209	0.197	64.7	2.9
4241.0	7.616	2.425	6.460	0.921	0.000	2.202	0.191	62.8	1.9
4377.4	7.853	2.428	6.496	0.885	0.000	2.194	0.184	60.9	1.0
4513.8	8.097	2.427	6.532	0.850	0.000	2.183	0.176	59.1	-2.6
4650.1	8.354	2.421	6.559	0.815	0.000	2.170	0.170	57.1	-5.4
4786.5	8.599	2.414	6.588	0.781	0.000	2.156	0.163	55.3	-5.9
4922.9	8.835	2.407	6.614	0.746	0.000	2.144	0.156	53.7	-7.1
5059.2	9.114	2.395	6.629	0.724	0.000	2.131	0.152	51.8	-7.7
5195.6	9.382	2.386	6.655	0.681	0.000	2.117	0.144	50.1	-9.0
5332.0	9.624	2.372	6.671	0.652	0.000	2.104	0.139	48.6	-10.3
5468.3	9.883	2.360	6.683	0.630	0.000	2.092	0.135	47.1	-10.0
5604.7	10.134	2.347	6.687	0.612	0.000	2.082	0.132	45.6	-10.9
5741.1	10.390	2.332	6.709	0.582	0.000	2.066	0.125	44.2	-11.2
5877.4	10.644	2.318	6.726	0.552	0.000	2.052	0.119	42.9	-9.5
6013.8	10.872	2.309	6.750	0.513	0.000	2.040	0.112	41.8	-8.9
6150.2	11.152	2.296	6.757	0.492	0.000	2.029	0.108	40.5	-9.7
6286.5	11.402	2.284	6.766	0.473	0.000	2.019	0.104	39.4	-11.0
6422.9	11.659	2.268	6.758	0.465	0.000	2.010	0.103	38.3	-12.1
6559.3	11.916	2.253	6.754	0.448	0.000	2.001	0.101	37.2	-12.3
6695.6	12.160	2.237	6.752	0.446	0.000	1.991	0.099	36.2	-11.9
6832.0	12.410	2.223	6.742	0.437	0.000	1.984	0.098	35.3	-11.5
6968.4	12.668	2.208	6.762	0.409	0.000	1.970	0.091	34.3	-11.5
7104.7	12.908	2.194	6.779	0.373	0.000	1.957	0.084	33.5	-10.5
7241.1	13.138	2.183	6.752	0.387	0.000	1.956	0.089	32.7	-10.3
7377.5	13.383	2.170	6.760	0.360	0.000	1.945	0.084	31.9	-10.8
7513.8	13.657	2.155	6.755	0.355	0.000	1.937	0.082	31.1	-9.4
7650.2	13.909	2.145	6.769	0.327	0.000	1.928	0.077	30.3	-7.8
7786.5	14.153	2.136	6.807	0.288	0.000	1.915	0.066	29.7	-11.1
7922.9	14.402	2.118	6.800	0.275	0.000	1.905	0.064	28.9	-12.8
8059.3	14.657	2.104	6.783	0.276	0.000	1.899	0.065	28.2	-12.3
8183.9	14.908	2.087	6.755	0.291	0.000	1.894	0.069	27.5	-13.5



UNDRAINED TRIAXIAL COMPRESSION TEST
 Isotropically Consolidated
 Sample: UD5c - Depth: 40.0-41.70 ft
 Boring B-2359UD

Reviewed By: WED



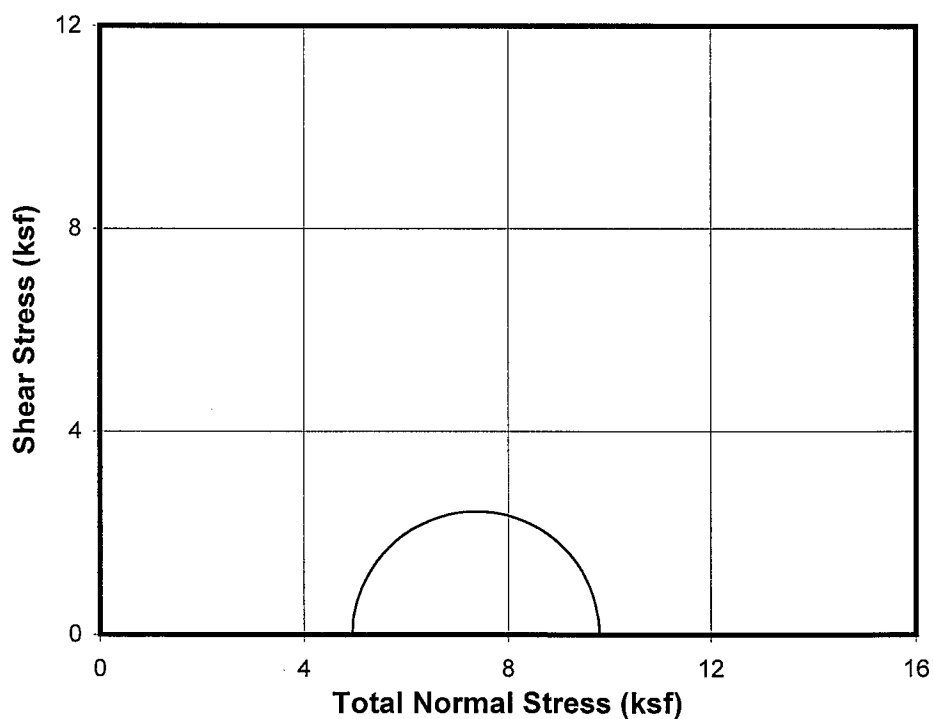
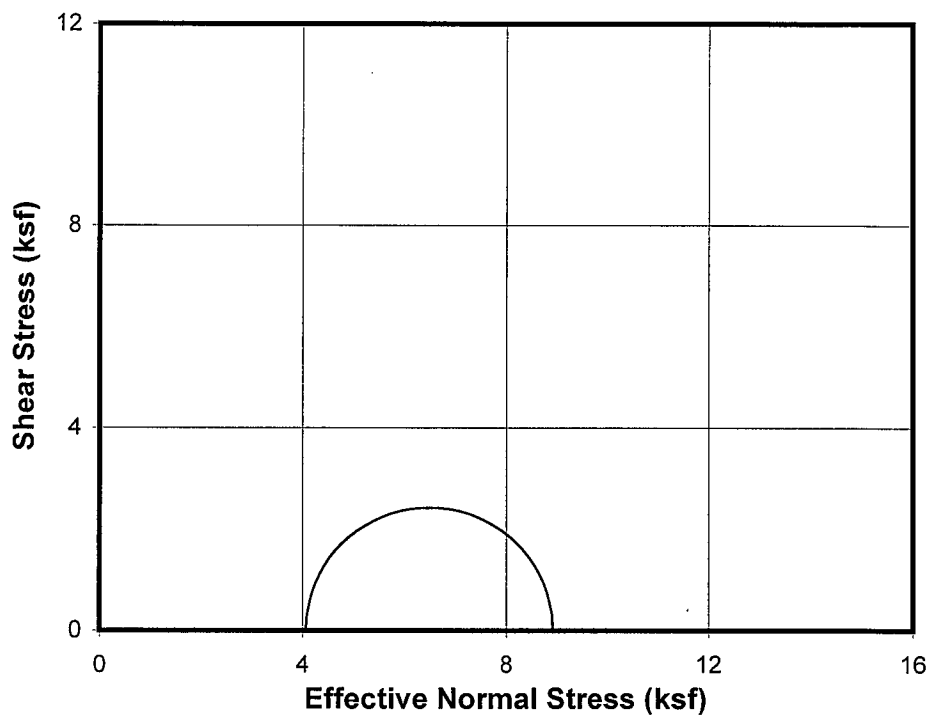
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD5c - Depth: 40.0-41.70 ft

Boring B-2359UD

Reviewed By: *WTR*



UNDRAINED TRIAXIAL COMPRESSION TEST
 Isotropically Consolidated- Mohr's Circles
 Sample: UD5c - Depth: 40.0-41.70 ft
 Boring B-2359UD

Reviewed By: *WLD*

TRIAXIAL TEST (ASTM D 4767-04): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: CIU Triaxial Cell No.: TRX-2 File Name: 2359UD_UD1
 Task No.: NA Test Stress(es), σ'_c or $\sigma'_{v,c}$ = 7.20, NA, NA & NA ksf
 Project Name: Exelon (Victoria) $k(\sigma'_{h,c} / \sigma'_{v,c})$ = 1.00 Induced OCR = 1.00 $K_{ua}(\sigma_{d,ua} / 2\sigma'_{v,c})$ = NA

Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2359UD	☐ Reconstituted			Impact/Rammer	Rammer Wgt. (lbf) = No. Layers =
Sample No.: UD10	Compostite No.:			Pluviated:	Tamper Force (lbf) = Drop (in.) =
Depth (ft): 70.0-71.7	Specimen No.: c			Kneading	Undercompaction: U_{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	☐ K_o stress path	☒ Used automated system: Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/h) = NA
Consolidation:	☐ Anisotropic	☐ 45° stress path	Remarks:
Loading	☒ Static	☒ Undrained	☒ Comp. ☒ Strain ☐ Stress ☒ Constant Cell Pressure
Conditions:	☐ Post Cyclic	☐ Drained	☐ Ext. ☐ Stress Path ☐ Variable Cell Pressure
			Cyclic (Hz) Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	
Container No	4016	851	968	1102
Mass Moist Soil + Cont. (g)	80.34	76.52	73.54	102.01
Mass Dry Soil + Container (g)	73.13	70.20	67.66	91.64
Mass Container (g)	30.16	31.86	31.91	31.49
Water Content, $W_{o,n}$ (%)	16.78	16.48	16.45	17.24
Avg. Initial WC, $W_{o,avg}$ (%)	16.57	Final (W_{at});	☒ Slice ;	Whole Spec.
See attached data sheet(s) for additional water contents				

SOIL MASSES:		Initial	Final
Moist + Tare (etc.) (g)		501.30	505.52
Tare (etc.) (g)		0.00	0.00
Mass Moist Spec., M_h (g)		501.30	505.52
Excess Dry Soil (soil not included in final mass measurement)			
Container No			
Mass Dry Soil + Cont. (g)			
Mass Container (g)			
Mass Excess Dry Soil, $M_{d,es}$ (g)			0.00

Specimen Dimensions, (mm)					
Height		Dia., X indicates with membrane			
Initial (H_o)	Final (H_{at})	Initial (D_o)	Final (D_{at})		
GB 100.000	100.000	1 T	51.00	58.30	For
1 14.99	-0.81	2 M	51.00	52.90	Wedge
2 15.07	-0.76	3 B	51.10	51.70	Failure
3 15.11	-1.12	1' T			= d_{max}
4 15.08	-0.86	2' M			= d_{min}
5 15.12	-0.68	3' B			= Δd
Avg. 115.07	99.15	Avg. 51.03	54.30	xxxxx	

Measuring Devices:		$A_o = \pi D^2/400$ (cm ²)	20.45
Pi Tape: ☒ Dia		V_o (cm ³)	235.38
Calipers: ☐ Ht.; ☐ Dia		$A_{atb,m} = \pi (D'_{at})^2 / 400$ (cm ²)	22.86
Dial Comparator: ☒ Ht.; ☐ Dia		$A_{atw,m} = (d_{min} - 2\Delta d) d_{max} \pi / 400$ (cm ²)	NA
Remarks: ID# PI-002		$D'_{at} = (D_T + 2D_M + D_B) / 4$ (mm)	53.95

☐ Photo Taken.

Failure Mode: NA - Not Applicable
 GB - Gage Block
 Other Remarks: LL=95 PL=34 PI=61

Failure Sketch

$\epsilon_a =$ 20% →

☒ Bulge
☐ Wedge
☐ Parabolic
 Wedge/Bulge Ht. = NA (mm)

Final Visual Classification: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

Estimated Initial Unit Weight			
Total, γ_{to} (lb/ft ³) =	132.95	Dry, $\gamma_{d,o}$ (lb/ft ³) =	114.06
Membrane / Filter Paper / Apparatus			
Membrane (mm):		Top	Bottom
Number:	Thickness:	0.72	0.61
= 1	Single; ☒ Double	0.73	0.60
Circumference ($C_{rm,o}$)		148.0	149.0
		Total Thickness	Dia. ($C_{rm,o} / \pi$)
Average:		0.33	47.27

Filter Paper: Top + Bottom: ☐ Yes; ☒ No
 Filter Strips: ☒ Yes; ☐ No Number = 8
 Type of Filter Strips ☐ Vertical: ¼ in. & Whatman #54
☒ Spiral: ¼ in. & Whatman #1

Apparatus: Mass Top Cap, M_{tc} = 65.6 g, 0.14 lbf
 Mass Displ. System, M_{ds} (cap, dial, piston, etc.) = NA g, NA lbf

Top Cap Attached: ☒ Yes; ☐ No; ☒ ½; ☐ ¾; ☐ External ☒ Internal
 Top Cap - Rotation ☒ Fixed, <1°; ☐ Limited, <5°; ☐ Unlimited, >5°
 With: ☐ Frictionless End Caps; ☐ Lat. Movement Top Cap
☐ Internal LVDT Jacket

Trimmed / Reconstituted By: AW Set Up By: TP Taken Down By: TP
 Date: 3/24/2008 Date: 3/24/2008 Date: 3/28/2008
 Prelim. Calc. By: TP Final Calc. By: TP Reviewed By: *WED*

☐ See more detailed sketch on attached sheet. Remarks:

MULTISTAGE TRIAXIAL TEST: Specimen Calculations & Summary(1)

Project Number: 0411-08-1686

Cell No.: TRX-2

File Name: 2359UD_UD10c

Task Number: NA

Specific Gravity: 2.720

☒ Measured; ☒ Assumed

Boring No.: B-2359UD

Sample No.: UD10

Specimen No.: c

Depth (ft): 70.0-71.7

Type Test: CIU Triaxial

Specimen: ☒ "Undisturbed";

☐ Reconstituted;

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm

Initial Water Contents (WC), (W_o) over Saturation, (S_o), in (%):						Calculated Mass of Dry Soil (g)	
	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal., $W_{o,bc}$	Initial Selected WC, w_o (%)
W_o	16.78	16.48	16.45	16.57	16.57	16.26	16.57
S_o	93.4	92.4	92.3	92.7	92.7	91.7	Initial, $M_{d,o}$
Measured final mass of moist soil, $M_{t,at}$ (g)						505.52	430.04
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						505.52	Final, $M_{d,at}$
							431.18
							Selected, M_d
							431.18

Consolidation Data	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Changes in Height (mm) and Volume (cm^3) Within Given Consolidation Stages/Columns	At Initial Seating Stress	During Back-Pressuring	1st Consol. Increment (1)	Column 2 or 3 to 1st Test Stage (1)	Column 4 to 2nd Test Stage	Column 5 to 3rd Test Stage	Column 6 to 4th Test Stage
Sign Convention: (+) Deformation in compression or Flow out of spec.; (-) Deformation in extension (swell) or Flow into spec.							
Change in Height, $\Delta H_{c,n}$	-0.11	-0.05		0.84	NA	NA	NA
Sum of changes in (+ out) burette readings, $\Delta b_{r,n}$ (- in)	3.15	-6.42	NA	6.69	NA	NA	NA
Theoretical $\Delta V_{ct,n} = (3V_o \times \Delta H_{c,n} / H_o)$	-0.65	-0.33		15.63	NA	NA	NA
Vol. Factor, $F_v = \Delta b_{r,n} / \Delta V_{t,n}$				5.13	NA	NA	NA
Corrected $\Delta V_{ct,n} = F_v \times \Delta V_{t,n}$			NA	1.31	NA	NA	NA
Selected $\Delta V_{c,n}$	3.15	-6.42		0.00	NA	NA	NA

Summary For Test Stages					
Test Stage:	1st = 1	2nd = 2	3rd = 3	4th = 4	
Cell Pressure, $\sigma_{c,n}$ (psi)	100.01	NA	NA	NA	Number of Test Stages = 1 $t_{50} = 30$ min
Back Pressure, $U_{b,n}$ (psi)	50.23	NA	NA	NA	
Axial Force Reading, $P_{r,n}$ (lbf)	1.71	NA	NA	NA	
Eff. Consol. Stress (σ'_c or $\sigma'_{v,c}$) (4), (ksf)	7.24	NA	NA	NA	
t_c , ON or in ☒ days ☐ hrs	1.00	NA	NA	NA	

At Final Test Stress/Stage - Summary of Calculation of ΔV_c (cm^3) by Different Procedures					
By Selected Volumes	By Saturation = 100 %	By Change in Mass (5)	For Diff. in Meas. Vol. ($V_o - V_{at}$)	For Selected ΔV_c , required G_s for $S_c = 100$ %:	
$\Delta V_c = 3.42$	$\Delta V_c = 2.10$	$\Delta V_c = 2.18$	& corr. for ΔH_{td} $\Delta V_c =$	2.743	

At Final Test Stress/Stage - Consolidation Conclusions					
$\Delta H_{c,f}$ (mm) = 0.68	$\Delta V_{c,f}$ (cm^3) = 3.42	Back Cal. G_s for $S=100\%$ = 2.743	Normalized	Ht. Ch. (%) = 0.33	
$\epsilon_{ac,c}$ (%) = 0.59	$\epsilon_{vc,f}$ (%) = 1.45		Diff. in:	Vol. Ch. (%) =	

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm^3)	Area (cm^2)	Water Content (%)	Unit Weight (pcf)		Saturation (%)	Void Ratio e	Volumetric Water Content	Porosity n	Skempton B parameter % (6)
Condition:					Total	Dry					
Initial:	115.07	235.38	20.45	16.26	132.95	114.36	91.7	0.482	0.2984	0.325	97.0
After to 1st σ'_c	114.40	231.96	20.28	17.24	136.05	116.04	101.8	0.461	0.3210	0.315	
Consol.: to 2nd σ'_c											
to 3rd σ'_c											
to 4th σ'_c											

Notes: (1) If the consol. stress in the 1st consol. increment & 1st test stage are equal, log the data in Column 4.

(2) The height changes occurring within each shearing and unloading stage (1 - 4) are recorded in these rows (after Column 3).

(3) The volume changes occurring within each shearing and unloading stage (1 - 4) are calculated/recorded in these rows (after Column 3).

(4) Stresses are corrected for membrane.

(5) $\sim M_{t,o} - (M_{t,at,c} + P_{water} \times \Delta V_{in, column 1 \& 2})$

(6) Initial value is after back pressuring

NA - Not Applicable ON - Over Night WC - Water Content

Remarks: Wet Method used in the Saturation Stage

Calculated By: TP

Reviewed By: HP

MULTISTAGE TRIAXIAL TEST: Specimen Calculations Summary(2)

Project Number: 0411-08-1686 Test Type: CIU Triaxial App. No.: TRX-2 File Name: 2359UD_UD10
 Project Name: Exelon (Victoria) Task No.: NA Test No.: 0 Test Series for: 0

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2359UD	☐ Reconstituted	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD10	Compostite No.:	☐ Pluviated:		Tamper Force (lb) =	Drop (in.) =
Depth (ft): 70.0-71.7	Specimen No.: c	☐ Kneading		Undercompaction: U_{nl} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ Isotropic	☐ K_0 stress path	☒ Used automated system	Drained Axial Strain Rate, $\epsilon_{a,rate}$ (%/hr.) = NA
Consolidation	☐ Anisotropic	45° stress path	Remarks:	
Loading Conditions:	☒ Static	☒ Undrained	☒ Comp.	☒ Strain
	☐ Post Cyclic	☐ Drained	☐ Ext.	☐ Stress
			☒ Constant Cell pressure	☐ Cyclic (Hz)
			☐ Variable Cell pressure	Rate: 0.1; 1; Other:

Specific Gravity: $G_s = 2.720$ Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	Void Ratio	Skempton B parameter % (1)
	(mm)	(cm ³)	(cm ²)	(%)	Total (pcf)	Dry (pcf)	(%)	e	
Initial:	115.07	235.38	20.45	16.26	132.95	114.36	91.72	0.48	97.0
After to 1st σ'_c	114.40	231.96	20.28	17.24	136.05	116.04	101.78	0.46	
Consol. to 2nd σ'_c									
to 3rd σ'_c									
to 4th σ'_c									

Unit for Stresses: (ksf)

Consolidation Stress Summary and Loading Summary					
Item	Unit	1st Stage	2nd Stage	3rd Stage	4th Stage
Axial Strain during Consol., $\epsilon_{\sigma'_c}$	%	0.587	NA	NA	NA
Vol. Strain during Consol., $\epsilon_{\sigma'_c}$	%	1.453	NA	NA	NA
Effective Vertical Stress, σ'_v	(ksf)	7.239	NA	NA	NA
Effective Horizontal Stress, σ'_h	(ksf)	7.173	NA	NA	NA
Consol. Stress Ratio, k (σ'_h / σ'_v)	-	0.991			
Induced OCR	-	1.00	NA	NA	NA
Eff. Average Stress, $(\sigma'_v + \sigma'_h)/2$	(ksf)	14.412			
Eff. Mean Stress, $(\sigma'_v + 2\sigma'_h)/3$	(ksf)	7.195			
Undr. Ambient Shear Stress, $\bar{\sigma}_{sa}$	(ksf)	NA	NA	NA	NA
Undr. Ambient Shear Strain, $\epsilon_{a,ua}$	%	NA	NA	NA	NA

Membrane Correction		
Type:	Bulge	
Modulus:	150.0	psi
Diameter:	47.27	mm
Thickness:	0.33	mm
Area Correction		
Type:	Bulge	
Stage	Area Corr. Const.:	Final Area (cm ²):
1st	0.770	22.86
2nd		
3rd		
4th		
Filter Paper Correction		
Type:	None	Type Strips: Serial #1
Strips:	8	
Force:	0.000	lb/strip

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

(1) Initial B is after saturation

NA - Not Applicable

Final Visual Description and Remarks: Mottled Light Gray and Yellowish Brown Fat CLAY (CH)

Loading Summary							
Stage	Stress Status	ϵ_a (%)	q (ksf)	p' (ksf)	ΔU (ksf)	σ_1' (ksf)	σ_3' (ksf)
1st	Max Shear Stress	14.98	6.057	12.204	1.034	18.261	6.147
	Max Obliquity	2.62	5.183	9.703	2.658	14.886	4.521
2nd	Max Shear Stress						
	Max Obliquity						
3rd	Max Shear Stress						
	Max Obliquity						
4th	Max Shear Stress						
	Max Obliquity						

Remarks: Strain Rate (%/min) = 0.0133

STAGE 1

Project: 0411-08-1686
Test Type: CIU Triaxial

Boring No.: B-2359UD
Sample No.: UD10
Specimen No.: c

Depth (ft.): 70.0-71.7
Stage No.: 1

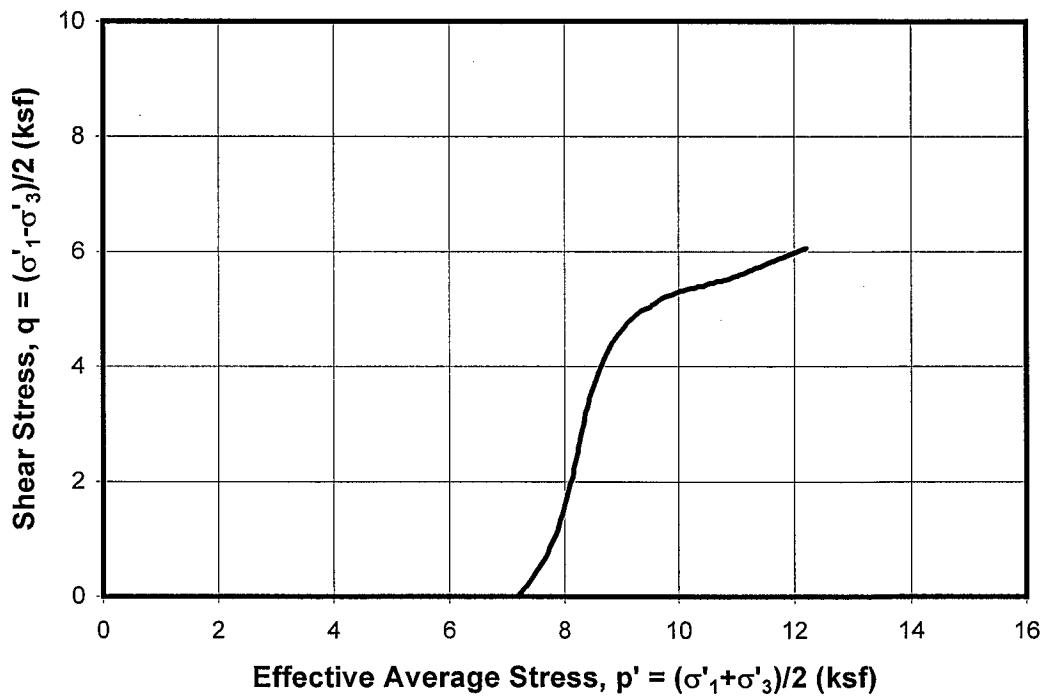
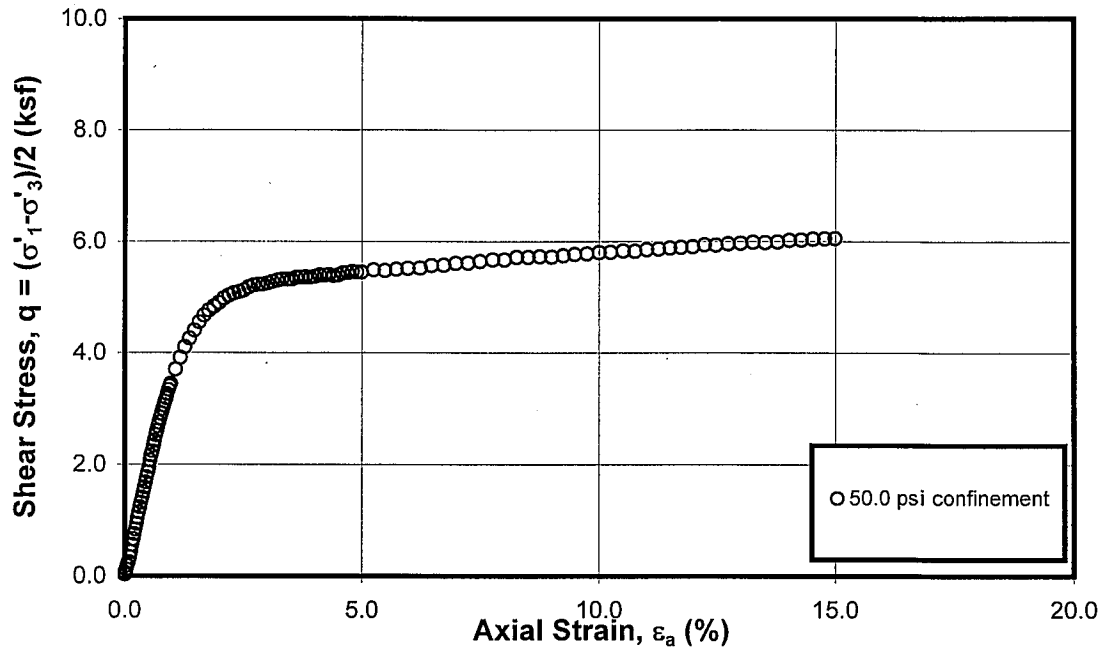
Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, Δu (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
0.0	0.000	0.033	7.206	0.000	0.000	1.009	0.000	-	-
3.0	0.005	0.065	7.237	0.005	0.000	1.018	0.012	1282.3	844.4
6.0	0.033	0.122	7.276	0.015	0.000	1.034	0.109	536.5	499.4
9.0	0.056	0.189	7.343	0.030	0.000	1.053	0.061	559.1	581.0
12.0	0.079	0.256	7.391	0.051	0.000	1.072	0.085	562.2	581.5
15.0	0.108	0.341	7.449	0.073	0.000	1.096	0.105	570.5	681.7
18.0	0.132	0.432	7.508	0.104	0.000	1.122	0.122	606.3	877.8
21.0	0.158	0.564	7.597	0.142	0.000	1.160	0.132	670.3	908.0
24.0	0.183	0.667	7.660	0.188	0.000	1.191	0.142	691.9	833.5
27.0	0.206	0.763	7.712	0.236	0.000	1.219	0.153	708.0	814.8
30.0	0.226	0.843	7.734	0.282	0.000	1.245	0.174	715.6	847.8
33.0	0.249	0.944	7.786	0.336	0.000	1.276	0.182	732.4	885.1
36.0	0.274	1.053	7.839	0.392	0.000	1.310	0.190	744.8	818.6
39.0	0.299	1.149	7.879	0.453	0.000	1.342	0.199	746.9	734.0
42.0	0.324	1.238	7.901	0.518	0.000	1.372	0.212	743.1	729.3
45.0	0.346	1.320	7.920	0.576	0.000	1.400	0.223	744.2	739.6
48.0	0.372	1.412	7.954	0.639	0.000	1.432	0.229	742.4	750.6
51.0	0.398	1.514	7.985	0.706	0.000	1.468	0.237	745.1	732.1
54.0	0.422	1.596	8.004	0.768	0.000	1.498	0.245	741.5	718.6
57.0	0.446	1.689	8.033	0.833	0.000	1.532	0.250	742.2	774.9
60.0	0.468	1.776	8.054	0.901	0.000	1.566	0.257	744.7	725.7
63.0	0.495	1.864	8.075	0.970	0.000	1.600	0.263	739.9	732.9
66.0	0.519	1.963	8.097	1.043	0.000	1.640	0.269	743.1	885.5
69.0	0.543	2.077	8.145	1.115	0.000	1.684	0.270	752.7	890.3
72.0	0.565	2.168	8.159	1.186	0.000	1.724	0.277	755.3	707.5
75.0	0.589	2.240	8.164	1.253	0.000	1.756	0.283	748.9	704.8
78.1	0.614	2.340	8.190	1.326	0.000	1.800	0.287	751.4	811.8
81.1	0.637	2.432	8.213	1.395	0.000	1.841	0.290	753.5	771.9
84.1	0.662	2.526	8.243	1.467	0.000	1.884	0.292	752.7	699.0
87.1	0.686	2.603	8.242	1.531	0.000	1.923	0.298	749.8	666.3
90.1	0.711	2.687	8.268	1.594	0.000	1.963	0.300	746.9	614.3
93.1	0.735	2.756	8.276	1.656	0.000	1.999	0.303	740.7	587.1
96.1	0.762	2.837	8.295	1.720	0.000	2.040	0.306	736.2	665.9
99.1	0.784	2.918	8.313	1.780	0.000	2.082	0.308	735.7	654.0
102.1	0.810	2.995	8.335	1.839	0.000	2.122	0.309	731.0	561.8
105.1	0.837	3.067	8.349	1.894	0.000	2.161	0.312	724.7	509.3
108.1	0.861	3.125	8.357	1.948	0.000	2.195	0.314	718.0	485.7
111.1	0.886	3.186	8.361	2.006	0.000	2.231	0.317	711.5	580.8

STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
114.1	0.910	3.265	8.393	2.059	0.000	2.273	0.316	710.5	628.7
117.1	0.935	3.340	8.416	2.106	0.000	2.316	0.317	707.0	544.4
120.1	0.961	3.406	8.432	2.154	0.000	2.355	0.318	701.6	421.8
123.1	0.985	3.446	8.430	2.196	0.000	2.383	0.321	692.9	423.8
135.1	1.086	3.703	8.525	2.358	0.000	2.536	0.320	675.9	472.3
147.1	1.185	3.918	8.608	2.490	0.000	2.671	0.320	655.7	408.7
159.1	1.282	4.104	8.682	2.598	0.000	2.793	0.319	635.0	346.0
171.1	1.383	4.260	8.755	2.682	0.000	2.895	0.317	611.3	291.6
183.1	1.486	4.401	8.829	2.747	0.000	2.988	0.314	587.9	286.8
195.1	1.587	4.552	8.937	2.794	0.000	3.076	0.309	569.6	263.8
207.1	1.690	4.669	9.034	2.819	0.000	3.140	0.303	548.7	209.3
219.1	1.790	4.765	9.107	2.834	0.000	3.195	0.299	528.6	158.3
231.1	1.895	4.831	9.185	2.830	0.000	3.219	0.294	506.4	130.4
243.1	2.000	4.902	9.260	2.821	0.000	3.249	0.289	486.9	142.7
255.1	2.102	4.979	9.352	2.808	0.000	3.277	0.283	470.5	125.4
267.1	2.203	5.030	9.499	2.716	0.000	3.251	0.271	453.5	92.0
279.1	2.307	5.073	9.537	2.712	0.000	3.273	0.269	436.9	59.9
291.1	2.410	5.092	9.585	2.698	0.000	3.267	0.265	419.8	50.0
303.1	2.513	5.125	9.622	2.679	0.000	3.279	0.263	405.2	88.1
315.1	2.616	5.183	9.703	2.658	0.000	3.293	0.258	393.7	87.1
327.1	2.717	5.214	9.764	2.630	0.000	3.292	0.253	381.4	45.4
339.1	2.817	5.228	9.807	2.600	0.000	3.284	0.250	368.9	20.0
351.1	2.917	5.234	9.841	2.570	0.000	3.272	0.247	356.6	19.9
363.1	3.018	5.248	9.894	2.538	0.000	3.259	0.242	345.6	42.4
375.1	3.119	5.277	9.949	2.510	0.000	3.259	0.238	336.2	52.3
387.1	3.220	5.301	10.000	2.480	0.000	3.256	0.235	327.2	42.3
399.1	3.317	5.319	10.047	2.448	0.000	3.250	0.231	318.7	14.2
411.1	3.419	5.315	10.077	2.423	0.000	3.232	0.228	308.9	1.8
423.1	3.517	5.320	10.090	2.393	0.000	3.231	0.227	300.7	37.0
435.1	3.616	5.351	10.169	2.363	0.000	3.221	0.221	294.2	36.8
447.1	3.712	5.356	10.203	2.330	0.000	3.210	0.218	286.8	14.4
459.1	3.810	5.365	10.231	2.311	0.000	3.205	0.216	279.9	-1.6
471.1	3.906	5.355	10.254	2.277	0.000	3.186	0.214	272.5	4.8
483.1	4.004	5.370	10.297	2.252	0.000	3.180	0.210	266.6	44.3
495.1	4.106	5.400	10.335	2.236	0.000	3.188	0.208	261.4	22.0
507.1	4.206	5.393	10.367	2.206	0.000	3.168	0.205	254.8	5.7
519.1	4.303	5.405	10.400	2.183	0.000	3.164	0.203	249.7	-6.9
531.1	4.400	5.386	10.400	2.163	0.000	3.148	0.202	243.3	-8.7
543.1	4.498	5.397	10.434	2.138	0.000	3.143	0.199	238.5	48.4
555.1	4.596	5.434	10.489	2.122	0.000	3.150	0.196	235.0	43.2
567.1	4.699	5.439	10.518	2.099	0.000	3.142	0.194	230.1	25.2
579.1	4.799	5.459	10.560	2.075	0.000	3.140	0.191	226.1	11.5
591.1	4.896	5.451	10.575	2.056	0.000	3.128	0.189	221.3	-10.0

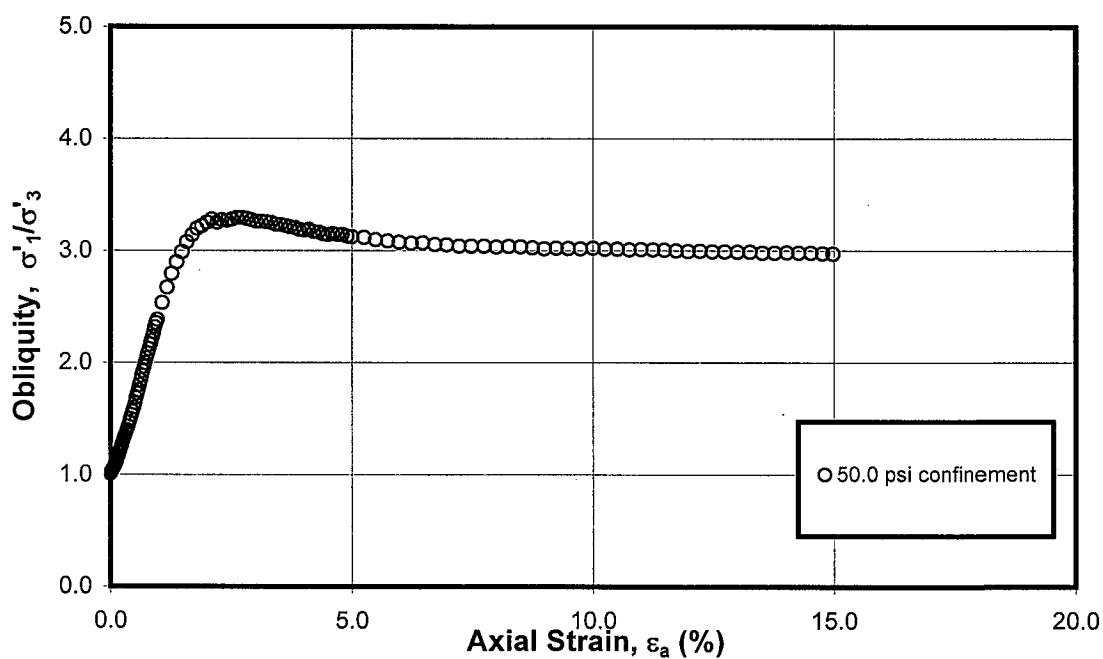
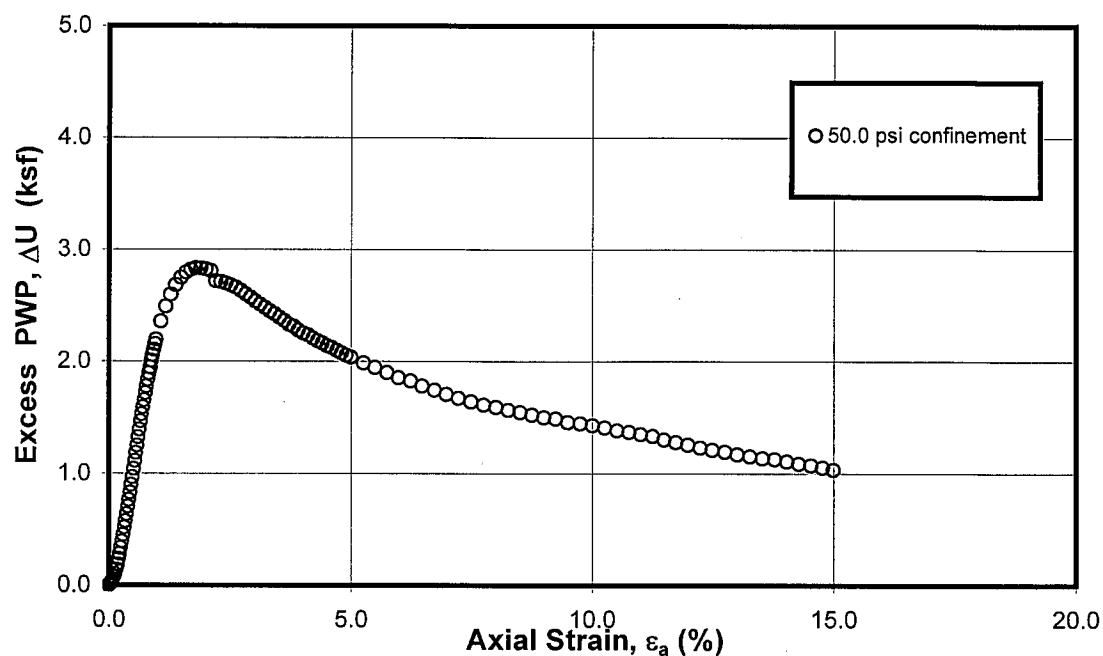
STAGE 1

Elapsed Time (min)	Axial Strain ϵ_a (%)	q (ksf)	p' (ksf)	Excess PWP, ΔU (ksf)	Volume Change (cm ³)	Obliquity σ'_1/σ'_3 -	A_f -	E_s (ksf)	E_T (ksf)
603.1	4.996	5.449	10.588	2.037	0.000	3.121	0.188	216.8	13.0
633.1	5.252	5.488	10.677	1.988	0.000	3.115	0.182	207.7	11.7
663.1	5.494	5.480	10.712	1.948	0.000	3.094	0.178	198.3	4.6
693.1	5.742	5.499	10.777	1.901	0.000	3.084	0.173	190.4	15.9
723.1	5.982	5.519	10.841	1.855	0.000	3.074	0.169	183.4	8.8
753.1	6.237	5.521	10.871	1.828	0.000	3.064	0.166	176.0	20.9
783.1	6.475	5.568	10.954	1.781	0.000	3.068	0.161	171.0	21.5
813.1	6.733	5.572	11.004	1.744	0.000	3.052	0.157	164.5	15.5
843.1	6.980	5.607	11.074	1.708	0.000	3.051	0.153	159.7	16.6
873.1	7.237	5.613	11.120	1.672	0.000	3.039	0.149	154.2	14.6
903.1	7.490	5.644	11.177	1.643	0.000	3.040	0.146	149.8	22.3
933.1	7.752	5.671	11.236	1.614	0.000	3.038	0.143	145.4	10.5
963.1	8.002	5.671	11.258	1.593	0.000	3.030	0.141	140.9	18.1
993.1	8.259	5.717	11.330	1.567	0.000	3.037	0.137	137.6	17.8
1023.1	8.505	5.717	11.345	1.547	0.000	3.032	0.136	133.7	4.6
1053.1	8.749	5.729	11.384	1.524	0.000	3.026	0.133	130.2	3.3
1083.2	8.999	5.725	11.403	1.502	0.000	3.016	0.131	126.5	8.0
1113.2	9.244	5.748	11.438	1.490	0.000	3.020	0.130	123.7	18.8
1143.2	9.491	5.771	11.491	1.459	0.000	3.018	0.127	120.9	13.4
1173.2	9.746	5.782	11.513	1.447	0.000	3.017	0.125	118.0	13.5
1203.2	10.001	5.806	11.551	1.431	0.000	3.021	0.124	115.4	11.3
1233.2	10.251	5.810	11.580	1.410	0.000	3.014	0.121	112.7	10.0
1263.2	10.509	5.831	11.626	1.385	0.000	3.013	0.119	110.3	6.8
1293.2	10.765	5.828	11.636	1.372	0.000	3.007	0.118	107.7	10.0
1323.2	11.012	5.856	11.684	1.352	0.000	3.010	0.115	105.8	14.7
1353.2	11.261	5.864	11.710	1.333	0.000	3.006	0.114	103.6	10.7
1383.2	11.505	5.882	11.751	1.304	0.000	3.005	0.112	101.7	11.7
1413.2	11.748	5.893	11.788	1.280	0.000	2.999	0.109	99.8	10.6
1443.2	11.997	5.908	11.839	1.257	0.000	2.992	0.106	97.9	19.4
1473.2	12.246	5.941	11.896	1.233	0.000	2.995	0.103	96.5	10.9
1503.2	12.494	5.935	11.901	1.212	0.000	2.990	0.102	94.5	7.4
1533.2	12.751	5.960	11.949	1.194	0.000	2.991	0.100	93.0	13.8
1563.2	13.007	5.971	11.980	1.172	0.000	2.987	0.098	91.3	11.0
1593.2	13.266	5.989	12.017	1.154	0.000	2.987	0.096	89.8	4.5
1623.2	13.523	5.983	12.028	1.138	0.000	2.979	0.095	88.0	1.6
1653.2	13.777	5.993	12.045	1.127	0.000	2.980	0.094	86.5	14.2
1683.2	14.028	6.018	12.093	1.109	0.000	2.982	0.092	85.3	13.6
1713.2	14.277	6.027	12.120	1.090	0.000	2.978	0.090	84.0	9.1
1743.2	14.527	6.041	12.150	1.074	0.000	2.978	0.089	82.7	9.2
1773.2	14.768	6.049	12.179	1.054	0.000	2.974	0.087	81.5	7.1
1799.7	14.985	6.057	12.204	1.034	0.000	2.971	0.085	80.4	7.5



UNDRAINED TRIAXIAL COMPRESSION TEST
 Isotropically Consolidated
 Sample: UD10c - Depth: 70.0-71.7 ft
 Boring B-2359UD

Reviewed By: *[Signature]*



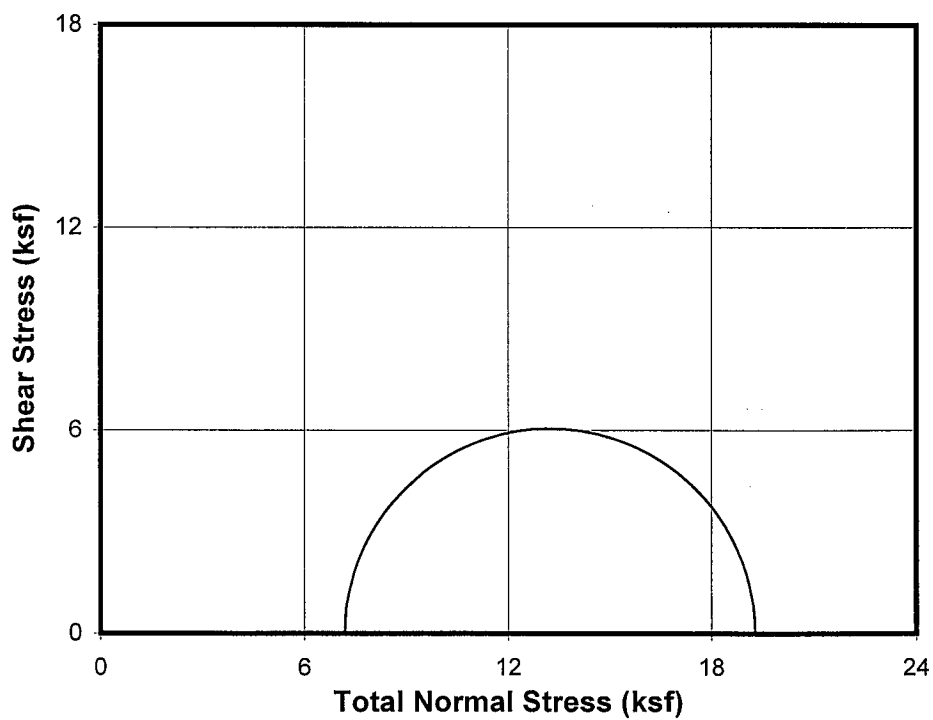
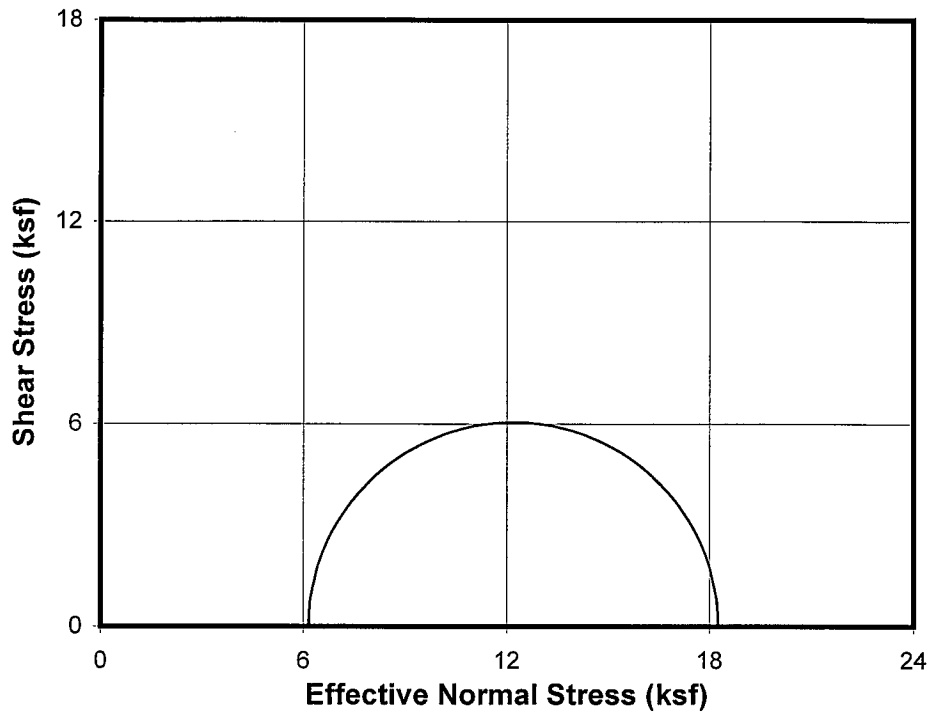
UNDRAINED TRIAXIAL COMPRESSION TEST

Isotropically Consolidated

Sample: UD10c - Depth: 70.0-71.7 ft

Boring B-2359UD

Reviewed By: *WEP*



UNDRAINED TRIAXIAL COMPRESSION TEST

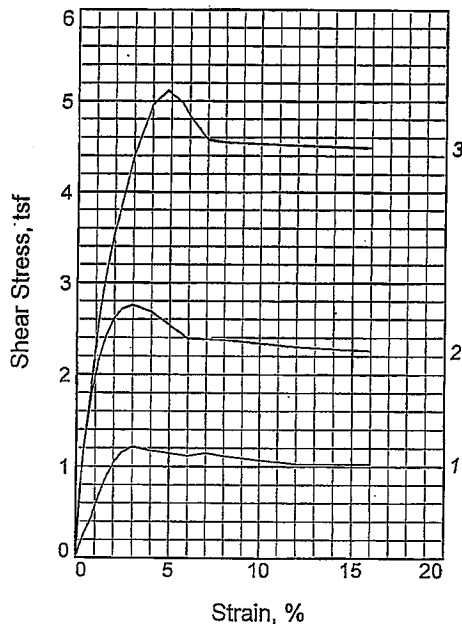
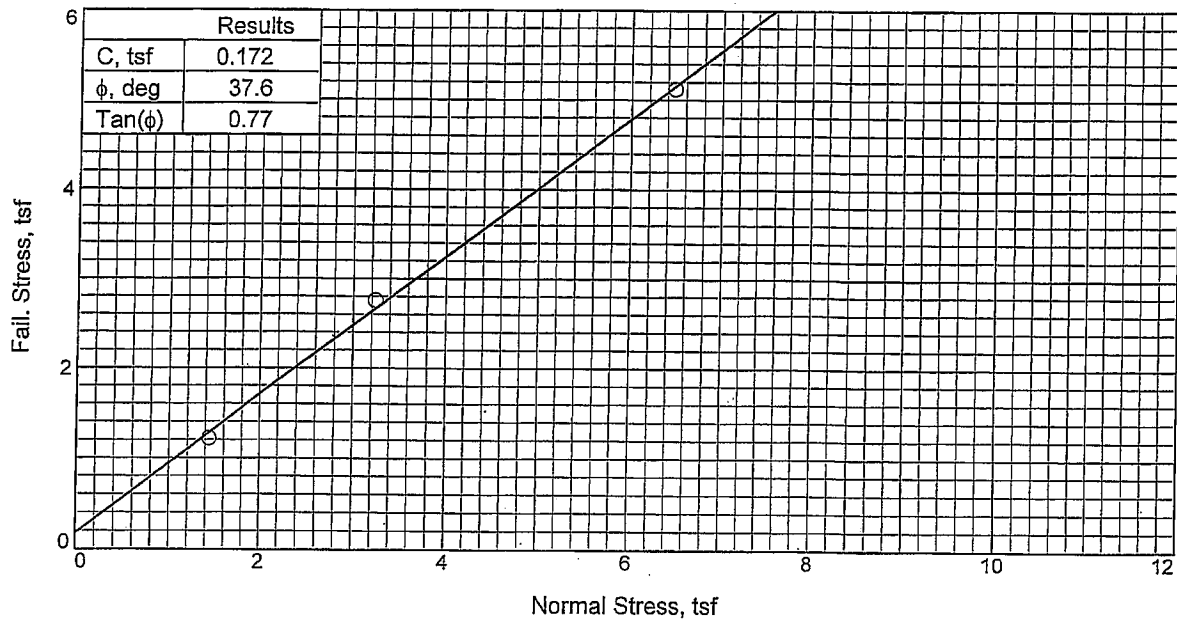
Isotropically Consolidated- Mohr's Circles

Sample: UD10c - Depth: 70.0-71.7 ft

Boring B-2359UD

Reviewed By: WFR

Direct Shear Tests



Sample No.		1	2	3
Initial	Water Content, %	21.6	21.8	20.1
	Dry Density, pcf	100.4	102.5	105.3
	Saturation, %	86.8	92.3	91.8
	Void Ratio	0.6663	0.6324	0.5882
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.01	1.01
At Test	Water Content, %	23.0	22.6	17.6
	Dry Density, pcf	103.7	104.4	113.8
	Saturation, %	100.6	100.6	100.0
	Void Ratio	0.6134	0.6019	0.4705
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.98	1.00	0.94
Normal Stress, tsf		1.440	3.240	6.480
Fail. Stress, tsf		1.217	2.758	5.119
Strain, %		3.0	3.0	4.8
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Very Pale Brown Poorly Graded
 SAND with Silt (SP-SM) Visual
 LL= ND PL= ND PI= ND
Specific Gravity= 2.68
Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to
 perform the test. Samples sheared to the
 limitation of the machine.
Lab No. 8345

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Location: B-2302UD
Sample Number: UD-9 **Depth:** 63.5-66 Ft
Proj. No.: 6468-07-1777 **Date:** 2/6/08
DIRECT SHEAR TEST REPORT
MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

4115708

KAW 4-15-08

DIRECT SHEAR TEST

4/15/2008

Date: 2/6/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2302UD
 Depth: 63.5-66 Ft Sample Number: UD-9
 Description: Very Pale Brown Poorly Graded SAND with Silt (SP-SM) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.68

LL=ND

PL= ND

PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	112.990		164.920
Moisture content: Dry soil+tare, gms.	94.380		135.580
Moisture content: Tare, gms.	8.180		8.160
Moisture, %	21.6	23.0	23.0
Moist specimen weight, gms.	158.6		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.98	
Net decrease in height, in.		0.03	
Wet Density, pcf	122.1	127.6	
Dry density, pcf	100.4	103.7	
Void ratio	0.6663	0.6134	
Saturation, %	86.8	100.6	

Test Readings for Specimen No. 1

Normal stress = 1.44 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 1.217 tsf at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	10.00	10.0	0.2	0.147
2	0.0100	17.00	17.0	0.4	0.249
3	0.0200	30.00	30.0	0.8	0.440
4	0.0300	46.00	46.0	1.2	0.675
5	0.0400	60.00	60.0	1.6	0.880
6	0.0500	71.00	71.0	2.0	1.041
7	0.0600	78.00	78.0	2.4	1.144
8	0.0750	83.00	83.0	3.0	1.217
9	0.0900	81.00	81.0	3.6	1.188
10	0.1000	80.00	80.0	4.0	1.173
11	0.1500	76.00	76.0	6.0	1.115
12	0.1750	78.00	78.0	7.0	1.144

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.2000	76.00	76.0	8.0	1.115
14	0.3000	70.00	70.0	12.0	1.027
15	0.4000	70.00	70.0	16.0	1.027

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	155.750		169.330
Moisture content: Dry soil+tare, gms.	129.360		139.660
Moisture content: Tare, gms.	8.220		8.300
Moisture, %	21.8	22.6	22.6
Moist specimen weight, gms.	163.2		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	1.00	
Net decrease in height, in.		0.02	
Wet Density, pcf	124.8	128.0	
Dry density, pcf	102.5	104.4	
Void ratio	0.6324	0.6019	
Saturation, %	92.3	100.6	

Test Readings for Specimen No. 2

Normal stress = 3.24 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 2.758 tsf at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	54.00	54.0	0.2	0.792
2	0.0100	80.00	80.0	0.4	1.173
3	0.0200	122.00	122.0	0.8	1.789
4	0.0300	148.00	148.0	1.2	2.171
5	0.0400	166.00	166.0	1.6	2.435
6	0.0500	178.00	178.0	2.0	2.611
7	0.0600	185.00	185.0	2.4	2.714
8	0.0750	188.00	188.0	3.0	2.758
9	0.0900	185.00	185.0	3.6	2.714
10	0.1000	183.00	183.0	4.0	2.684
11	0.1500	163.00	163.0	6.0	2.391
12	0.2000	162.00	162.0	8.0	2.376
13	0.3000	157.00	157.0	12.0	2.303
14	0.4000	154.00	154.0	16.0	2.259

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	122.680		164.790
Moisture content: Dry soil+tare, gms.	103.480		141.390
Moisture content: Tare, gms.	8.170		8.160
Moisture, %	20.1	17.6	17.6
Moist specimen weight, gms.	165.0		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.94	
Net decrease in height, in.		0.07	
Wet Density, pcf	126.6	133.8	
Dry density, pcf	105.3	113.8	
Void ratio	0.5882	0.4705	
Saturation, %	91.8	100.0	

Test Readings for Specimen No. 3

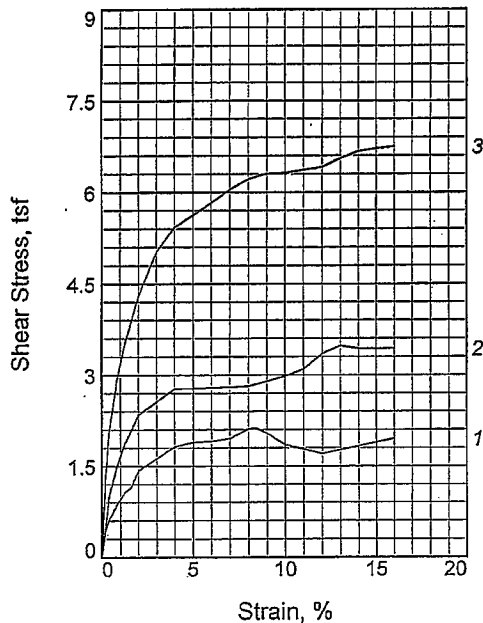
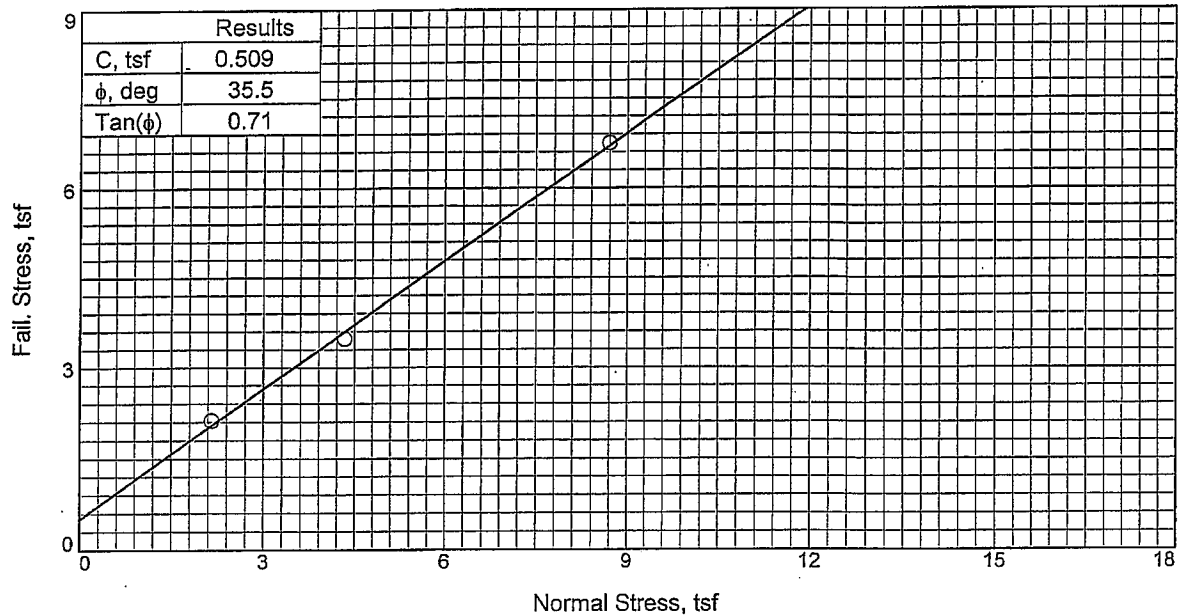
Normal stress = 6.48 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 5.119 tsf at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	46.00	46.0	0.2	0.675
2	0.0100	80.00	80.0	0.4	1.173
3	0.0200	130.00	130.0	0.8	1.907
4	0.0300	178.00	178.0	1.2	2.611
5	0.0400	214.00	214.0	1.6	3.139
6	0.0500	242.00	242.0	2.0	3.550
7	0.0750	300.00	300.0	3.0	4.400
8	0.1000	338.00	338.0	4.0	4.958
9	0.1200	349.00	349.0	4.8	5.119
10	0.1400	340.00	340.0	5.6	4.987
11	0.1500	330.00	330.0	6.0	4.840
12	0.1750	312.00	312.0	7.0	4.576
13	0.2000	310.00	310.0	8.0	4.547
14	0.3000	308.00	308.0	12.0	4.518
15	0.4000	306.00	306.0	16.0	4.488

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Sample No.		1	2	3
Initial	Water Content, %	18.7	17.4	17.2
	Dry Density, pcf	107.5	110.7	112.3
	Saturation, %	88.2	89.4	92.2
	Void Ratio	0.5734	0.5281	0.5065
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.01	1.01
At Test	Water Content, %	18.5	15.9	15.2
	Dry Density, pcf	112.3	118.1	119.5
	Saturation, %	99.1	99.5	99.3
	Void Ratio	0.5064	0.4327	0.4155
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.97	0.95	0.95
Normal Stress, tsf		2.160	4.330	8.700
Fail. Stress, tsf		2.127	3.476	6.747
Strain, %		8.4	13.0	16.0
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Yellow Silty SAND (SM) Visual
 LL= ND PL= ND PI= ND
Specific Gravity= 2.71
Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.
Lab No. 8347

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Location: B-2302UD
Sample Number: UD-14 **Depth:** 108.5-111 Ft
 Proj. No.: 6468-07-1777 **Date:** 2/7/08
DIRECT SHEAR TEST REPORT
MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

4/15/08

KAW 445.08

DIRECT SHEAR TEST

4/15/2008

Date: 2/7/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2302UD
 Depth: 108.5-111 Ft Sample Number: UD-14
 Description: Yellow Silty SAND (SM) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.71 LL=ND PL= ND PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	149.560		167.150
Moisture content: Dry soil+tare, gms.	126.690		141.680
Moisture content: Tare, gms.	4.190		4.200
Moisture, %	18.7	18.5	18.5
Moist specimen weight, gms.	166.1		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.97	
Net decrease in height, in.		0.04	
Wet Density, pcf	127.6	133.1	
Dry density, pcf	107.5	112.3	
Void ratio	0.5734	0.5064	
Saturation, %	88.2	99.1	

Test Readings for Specimen No. 1

Normal stress = 2.16 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 2.127 tsf at reading no. 12

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	30.00	30.0	0.2	0.440
2	0.0100	42.00	42.0	0.4	0.616
3	0.0200	58.00	58.0	0.8	0.851
4	0.0300	71.00	71.0	1.2	1.041
5	0.0400	79.00	79.0	1.6	1.159
6	0.0500	97.00	97.0	2.0	1.423
7	0.1000	124.00	124.0	4.0	1.819
8	0.1250	129.00	129.0	5.0	1.892
9	0.1500	130.00	130.0	6.0	1.907
10	0.1750	133.00	133.0	7.0	1.951
11	0.2000	144.00	144.0	8.0	2.112
12	0.2100	145.00	145.0	8.4	2.127

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.2250	139.00	139.0	9.0	2.039
14	0.2500	126.00	126.0	10.0	1.848
15	0.3000	116.00	116.0	12.0	1.701
16	0.4000	133.00	133.0	16.0	1.951

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	131.100		166.350
Moisture content: Dry soil+tare, gms.	112.280		144.120
Moisture content: Tare, gms.	4.230		4.250
Moisture, %	17.4	15.9	15.9
Moist specimen weight, gms.	168.9		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	130.0	136.9	
Dry density, pcf	110.7	118.1	
Void ratio	0.5281	0.4327	
Saturation, %	89.4	99.5	

Test Readings for Specimen No. 2

Normal stress = 4.33 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 3.476 tsf at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	34.00	34.0	0.2	0.499
2	0.0100	68.00	68.0	0.4	0.997
3	0.0200	100.00	100.0	0.8	1.467
4	0.0300	124.00	124.0	1.2	1.819
5	0.0400	142.00	142.0	1.6	2.083
6	0.0500	160.00	160.0	2.0	2.347
7	0.1000	189.00	189.0	4.0	2.772
8	0.1500	190.00	190.0	6.0	2.787
9	0.2000	192.00	192.0	8.0	2.816
10	0.2500	203.00	203.0	10.0	2.978
11	0.2750	211.00	211.0	11.0	3.095
12	0.3000	228.00	228.0	12.0	3.344
13	0.3250	237.00	237.0	13.0	3.476
14	0.3500	234.00	234.0	14.0	3.432
15	0.3750	234.00	234.0	15.0	3.432
16	0.4000	234.00	234.0	16.0	3.432

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	135.940		172.220
Moisture content: Dry soil+tare, gms.	116.570		150.030
Moisture content: Tare, gms.	4.210		4.260
Moisture, %	17.2	15.2	15.2
Moist specimen weight, gms.	171.2		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	131.7	137.7	
Dry density, pcf	112.3	119.5	
Void ratio	0.5065	0.4155	
Saturation, %	92.2	99.3	

Test Readings for Specimen No. 3

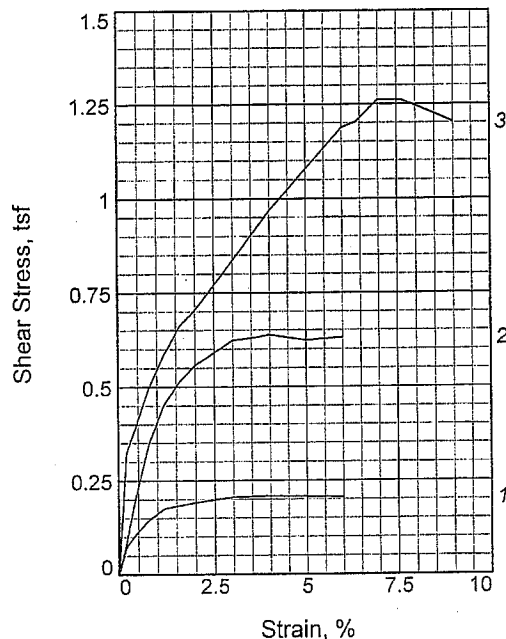
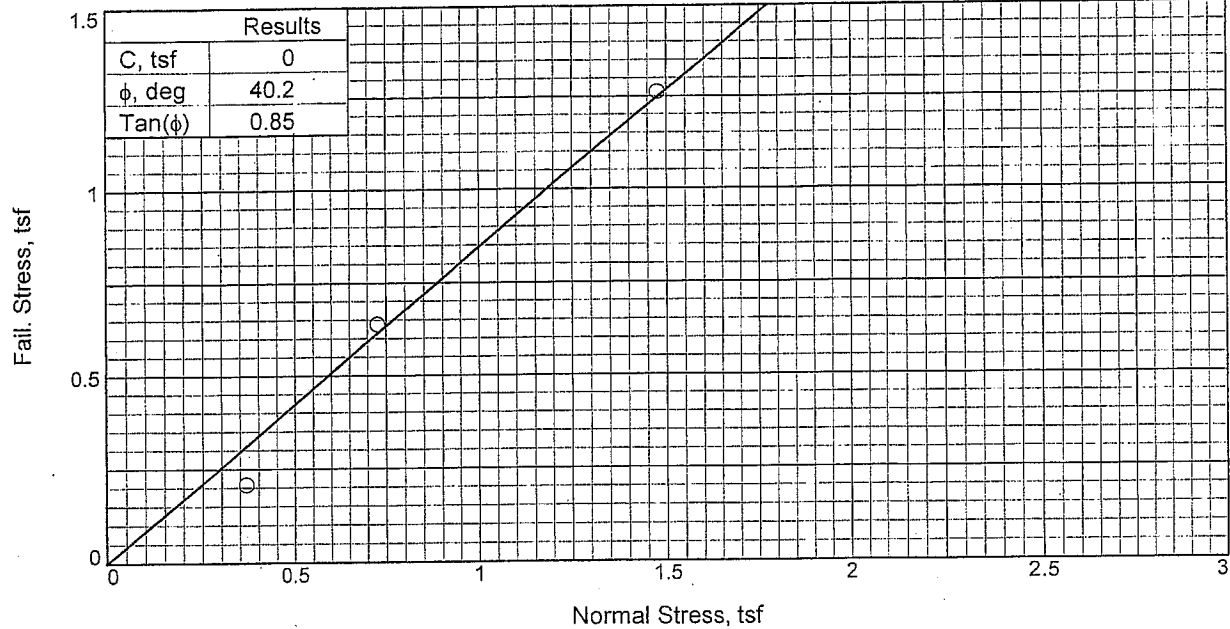
Normal stress = 8.7 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 6.747 tsf at reading no. 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	92.00	92.0	0.2	1.349
2	0.0100	140.00	140.0	0.4	2.053
3	0.0200	196.00	196.0	0.8	2.875
4	0.0300	234.00	234.0	1.2	3.432
5	0.0400	264.00	264.0	1.6	3.872
6	0.0500	292.00	292.0	2.0	4.283
7	0.0750	342.00	342.0	3.0	5.016
8	0.1000	370.00	370.0	4.0	5.427
9	0.1500	397.00	397.0	6.0	5.823
10	0.1750	412.00	412.0	7.0	6.043
11	0.2000	424.00	424.0	8.0	6.219
12	0.2250	430.00	430.0	9.0	6.307
13	0.2500	431.00	431.0	10.0	6.322
14	0.3000	437.00	437.0	12.0	6.410
15	0.3250	447.00	447.0	13.0	6.556
16	0.3500	455.00	455.0	14.0	6.674
17	0.3750	458.00	458.0	15.0	6.718
18	0.4000	460.00	460.0	16.0	6.747

MACTEC Engineering and Consulting, Inc.



Sample No.		1	2	3
Initial	Water Content, %	13.9	11.3	10.4
	Dry Density, pcf	97.3	101.9	96.6
	Saturation, %	50.4	45.4	37.0
	Void Ratio	0.7581	0.6794	0.7708
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.01	1.01
At Test	Water Content, %	24.8	21.5	16.3
	Dry Density, pcf	101.6	106.3	103.8
	Saturation, %	99.7	96.8	69.1
	Void Ratio	0.6828	0.6095	0.6476
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.96	0.97	0.94
Normal Stress, tsf		0.367	0.727	1.476
Fail. Stress, tsf		0.208	0.638	1.261
Strain, %		4.0	4.0	7.0
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed

Description: Light Yellowish Brown Sandy SILT
(ML) Visual

LL= ND PL= ND PI= ND

Specific Gravity= 2.74

Remarks: ASTM D3080-04. ND=not determined.

Lever arm Mechanical shear device was used to perform the test. Sample sheared to the limitation of the machine.

Lab No. 8348

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2304UD

Sample Number: UD-2

Depth: 11-13.3 Ft

Proj. No.: 6468-07-1777

Date: 1/30/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

Remarks: Some of the data points measured are not shown to allow for plotting of failure plane. Unexpected increase in stress beyond 7% strain. Failure stresses have been chosen from within a range of 7% strain.
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DCN# EXE812

7/16/08

KAW 7/16/08

DIRECT SHEAR TEST

7/16/2008

Date: 1/30/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2304UD
 Depth: 11-13.3 Ft Sample Number: UD-2
 Description: Light Yellowish Brown Sandy SILT (ML) Visual
 Remarks: ASTM D3080-04. ND=not determined.
 Lever arm Mechanical shear device was used to perform the test. Sample sheared to the limitation of the machine.
 Type of Sample: Undisturbed
 Specific Gravity=2.74 LL= ND PL= ND PI= ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	115.590		156.330
Moisture content: Dry soil+tare, gms.	102.470		126.870
Moisture content: Tare, gms.	8.340		8.290
Moisture, %	13.9	24.8	24.8
Moist specimen weight, gms.	143.3		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.00	0.96	
Net decrease in height, in.		0.04	
Wet Density, pcf	110.9	126.9	
Dry density, pcf	97.3	101.6	
Void ratio	0.7581	0.6828	
Saturation, %	50.4	99.7	

Test Readings for Specimen No. 1

Normal stress = .367 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 0.208 tsf at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	5.00	5.0	0.2	0.073
2	0.0100	7.00	7.0	0.4	0.103
3	0.0200	10.00	10.0	0.8	0.147
4	0.0300	12.00	12.0	1.2	0.176
5	0.0400	12.50	12.5	1.6	0.183
6	0.0500	13.00	13.0	2.0	0.191
7	0.0750	14.00	14.0	3.0	0.205
8	0.1000	14.20	14.2	4.0	0.208
9	0.1500	14.00	14.0	6.0	0.205

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	139.110		165.700
Moisture content: Dry soil+tare, gms.	125.860		137.830
Moisture content: Tare, gms.	8.200		8.360
Moisture, %	11.3	21.5	21.5
Moist specimen weight, gms.	147.4		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.97	
Net decrease in height, in.		0.04	
Wet Density, pcf	113.3	129.2	
Dry density, pcf	101.9	106.3	
Void ratio	0.6794	0.6095	
Saturation, %	45.4	96.8	

Test Readings for Specimen No. 2

Normal stress = .727 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 0.638 tsf at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	6.00	6.0	0.2	0.088
2	0.0100	13.00	13.0	0.4	0.191
3	0.0200	24.00	24.0	0.8	0.352
4	0.0300	31.00	31.0	1.2	0.455
5	0.0400	35.00	35.0	1.6	0.513
6	0.0500	38.00	38.0	2.0	0.557
7	0.0750	42.50	42.5	3.0	0.623
8	0.0900	43.00	43.0	3.6	0.631
9	0.1000	43.50	43.5	4.0	0.638
10	0.1250	42.50	42.5	5.0	0.623
11	0.1500	43.00	43.0	6.0	0.631

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	115.800		159.250
Moisture content: Dry soil+tare, gms.	105.660		138.060
Moisture content: Tare, gms.	8.370		8.260
Moisture, %	10.4	16.3	16.3
Moist specimen weight, gms.	138.3		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.94	
Net decrease in height, in.		0.07	
Wet Density, pcf	106.7	120.8	
Dry density, pcf	96.6	103.8	
Void ratio	0.7708	0.6476	
Saturation, %	37.0	69.1	

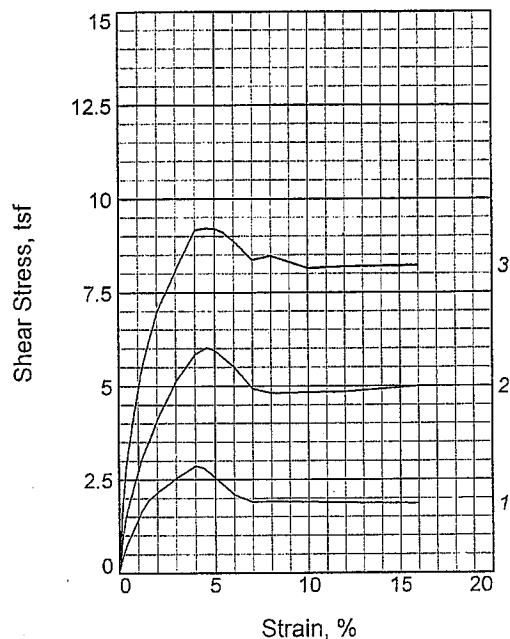
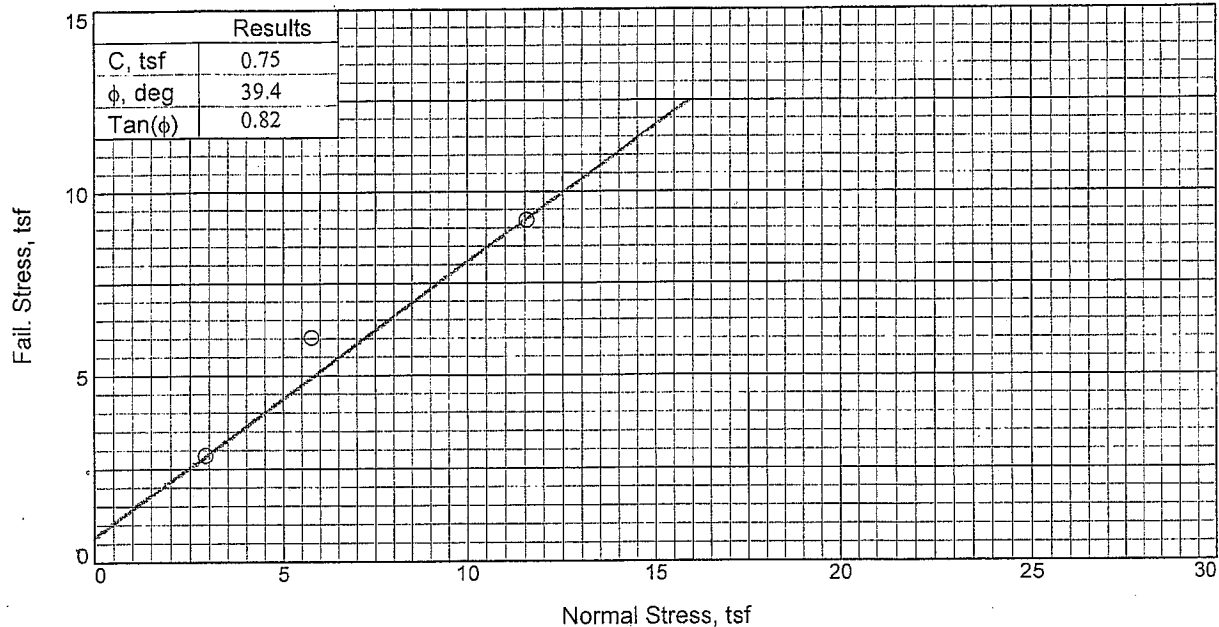
Test Readings for Specimen No. 3

Normal stress = 1.476 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 1.261 tsf at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	22.00	22.0	0.2	0.323
2	0.0100	26.00	26.0	0.4	0.381
3	0.0200	34.00	34.0	0.8	0.499
4	0.0300	40.00	40.0	1.2	0.587
5	0.0400	45.00	45.0	1.6	0.660
6	0.0500	48.00	48.0	2.0	0.704
7	0.1000	66.00	66.0	4.0	0.968
8	0.1500	81.00	81.0	6.0	1.188
9	0.1600	82.00	82.0	6.4	1.203
10	0.1750	86.00	86.0	7.0	1.261
11	0.1900	86.00	86.0	7.6	1.261
12	0.2000	85.00	85.0	8.0	1.247
13	0.2250	82.00	82.0	9.0	1.203



Sample No.		1	2	3
Initial	Water Content, %	19.0	16.6	18.0
	Dry Density, pcf	96.6	99.8	101.1
	Saturation, %	69.8	65.8	73.7
	Void Ratio	0.7311	0.6767	0.6553
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.01	1.01
At Test	Water Content, %	23.1	21.5	20.6
	Dry Density, pcf	101.6	106.2	107.2
	Saturation, %	95.6	100.2	98.8
	Void Ratio	0.6470	0.5758	0.5601
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.96	0.95	0.95
Normal Stress, tsf		2.910	5.770	11.550
Fail. Stress, tsf		2.860	6.028	9.211
Strain, %		4.0	4.6	4.6
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed

Description: Pale Brown Poorly Graded SAND
with Silt (SP-SM) Visual

LL= 1ND **PL=** ND **PI=** ND

Specific Gravity= 2.68

Remarks: ASTM D 3080-04. ND=Not Determined.

Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Lab No. 8351

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2304UD

Sample Number: UD-15

Depth: 141-143.5 Ft

Proj. No.: 6468-07-1777

Date: 2/2/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

7/16/08

KAW 7/16/08

DIRECT SHEAR TEST

7/16/2008

Date: 2/2/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2304UD
 Depth: 141-143.5 Ft Sample Number: UD-15
 Description: Pale Brown Poorly Graded SAND with Silt (SP-SM) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.68

LL=ND

PL= ND

PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	113.440		162.050
Moisture content: Dry soil+tare, gms.	95.960		132.450
Moisture content: Tare, gms.	4.200		4.230
Moisture, %	19.0	23.1	23.1
Moist specimen weight, gms.	149.5		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.96	
Net decrease in height, in.		0.05	
Wet Density, pcf	115.1	125.0	
Dry density, pcf	96.6	101.6	
Void ratio	0.7311	0.6470	
Saturation, %	69.8	95.6	

Test Readings for Specimen No. 1

Normal stress = 2.91 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 2.860 tsf at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	30.00	30.0	0.2	0.440
2	0.0100	50.00	50.0	0.4	0.733
3	0.0200	82.00	82.0	0.8	1.203
4	0.0300	112.00	112.0	1.2	1.643
5	0.0400	134.00	134.0	1.6	1.965
6	0.0500	146.00	146.0	2.0	2.141
7	0.0750	172.00	172.0	3.0	2.523
8	0.1000	195.00	195.0	4.0	2.860
9	0.1100	192.00	192.0	4.4	2.816
10	0.1250	174.00	174.0	5.0	2.552
11	0.1500	143.00	143.0	6.0	2.097
12	0.1750	129.00	129.0	7.0	1.892

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.2000	130.00	130.0	8.0	1.907
14	0.3000	128.00	128.0	12.0	1.877
15	0.4000	126.00	126.0	16.0	1.848

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	106.090		156.830
Moisture content: Dry soil+tare, gms.	91.580		129.790
Moisture content: Tare, gms.	4.220		4.200
Moisture, %	16.6	21.5	21.5
Moist specimen weight, gms.	152.0		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	116.4	129.0	
Dry density, pcf	99.8	106.2	
Void ratio	0.6767	0.5758	
Saturation, %	65.8	100.2	

Test Readings for Specimen No. 2

Normal stress = 5.77 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 6.028 tsf at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	68.00	68.0	0.2	0.997
2	0.0100	108.00	108.0	0.4	1.584
3	0.0200	160.00	160.0	0.8	2.347
4	0.0300	206.00	206.0	1.2	3.022
5	0.0400	240.00	240.0	1.6	3.520
6	0.0500	278.00	278.0	2.0	4.078
7	0.0750	348.00	348.0	3.0	5.104
8	0.1000	398.00	398.0	4.0	5.838
9	0.1150	411.00	411.0	4.6	6.028
10	0.1250	405.00	405.0	5.0	5.940
11	0.1500	376.00	376.0	6.0	5.515
12	0.1750	336.00	336.0	7.0	4.928
13	0.2000	328.00	328.0	8.0	4.811
14	0.3000	330.00	330.0	12.0	4.840
15	0.4000	340.00	340.0	16.0	4.987

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	129.690		157.580
Moisture content: Dry soil+tare, gms.	110.530		131.330
Moisture content: Tare, gms.	4.220		4.190
Moisture, %	18.0	20.6	20.6
Moist specimen weight, gms.	155.0		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	119.3	129.4	
Dry density, pcf	101.1	107.2	
Void ratio	0.6553	0.5601	
Saturation, %	73.7	98.8	

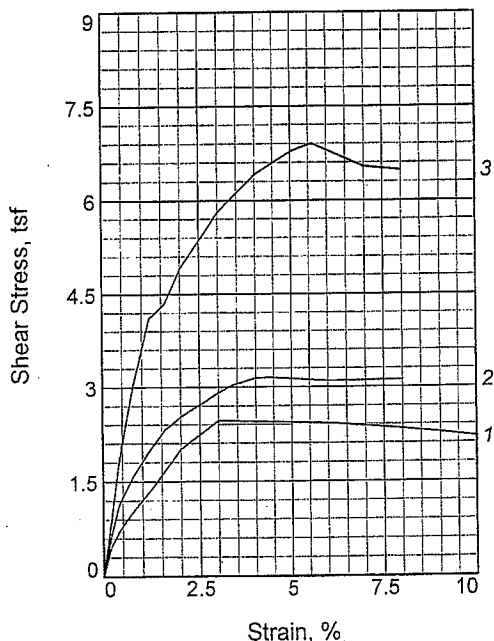
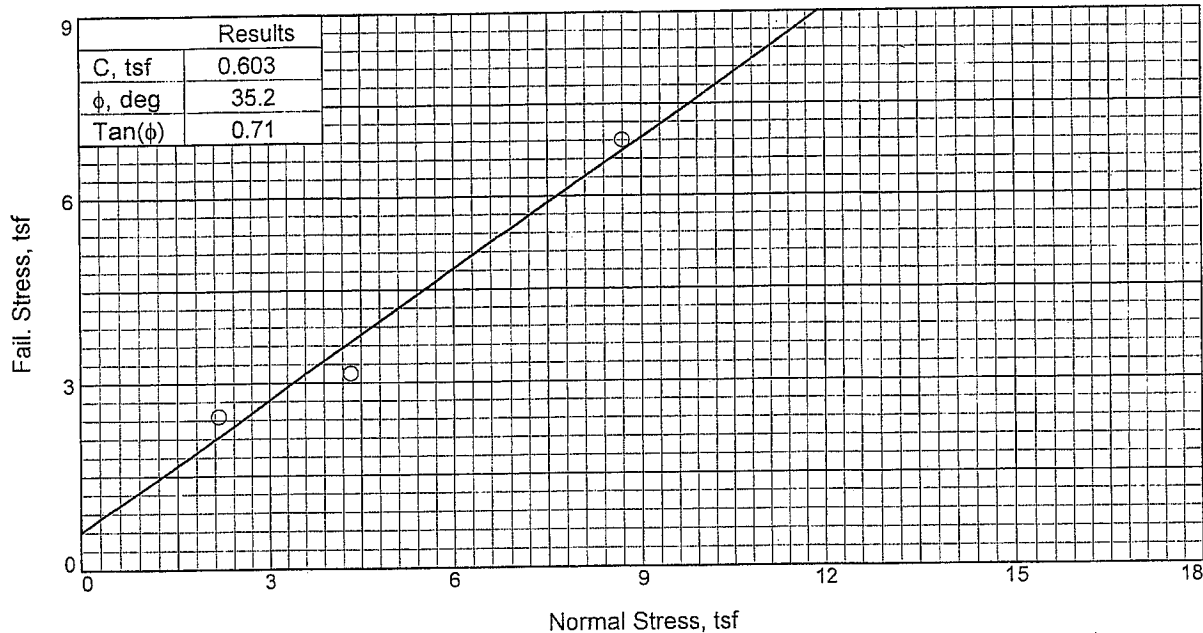
Test Readings for Specimen No. 3

Normal stress = 11.55 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 9.211 tsf at reading no. 8

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	128.00	128.0	0.2	1.877
2	0.0100	200.00	200.0	0.4	2.934
3	0.0200	292.00	292.0	0.8	4.283
4	0.0300	366.00	366.0	1.2	5.368
5	0.0400	422.00	422.0	1.6	6.190
6	0.0500	474.00	474.0	2.0	6.952
7	0.1000	625.00	625.0	4.0	9.167
8	0.1150	628.00	628.0	4.6	9.211
9	0.1250	627.00	627.0	5.0	9.197
10	0.1350	622.00	622.0	5.4	9.123
11	0.1500	605.00	605.0	6.0	8.874
12	0.1750	570.00	570.0	7.0	8.361
13	0.2000	578.00	578.0	8.0	8.478
14	0.2500	555.00	555.0	10.0	8.141
15	0.3000	558.00	558.0	12.0	8.185
16	0.4000	560.00	560.0	16.0	8.214



Sample No.		1	2	3
Initial	Water Content, %	24.0	22.7	21.4
	Dry Density, pcf	98.2	99.4	106.2
	Saturation, %	91.1	88.6	98.8
	Void Ratio	0.7094	0.6902	0.5818
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.01	1.01
At Test	Water Content, %	22.8	21.7	17.4
	Dry Density, pcf	104.0	105.9	114.2
	Saturation, %	99.8	99.8	99.5
	Void Ratio	0.6150	0.5850	0.4710
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.96	0.95	0.94
Normal Stress, tsf		2.160	4.330	8.700
Fail. Stress, tsf		2.464	3.154	6.908
Strain, %		3.0	4.4	5.6
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed

Description: Light Yellowish Brown Poorly Graded SAND with Silt (SP-SM)) Visual

LL= ND PL= ND PI= ND

Specific Gravity= 2.69

Remarks: ASTM D 3080-04. ND=Not Determined.

Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Lab No. 8359

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2321UD

Sample Number: UD-12

Depth: 93-95.7 Ft

Proj. No.: 6468-07-1777

Date: 2/4/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

7/16/08

KAW 7/16/08

Remarks: Some of the data points measured are not shown to allow for plotting of failure plane. Unexpected increase in stress beyond 7% strain. Failure stresses have been chosen from within a range of 7% strain.

DIRECT SHEAR TEST

7/16/2008

Date: 2/4/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2321UD
 Depth: 93-95.7 Ft Sample Number: UD-12
 Description: Light Yellowish Brown Poorly Graded SAND with Silt (SP-SM)) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.
 Type of Sample: Undisturbed
 Specific Gravity=2.69 LL= ND PL= ND PI= ND

Parameters for Specimen No. 1			
Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	170.400		161.340
Moisture content: Dry soil+tare, gms.	138.230		132.160
Moisture content: Tare, gms.	4.260		4.220
Moisture, %	24.0	22.8	22.8
Moist specimen weight, gms.	159.2		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.96	
Net decrease in height, in.		0.06	
Wet Density, pcf	121.8	127.7	
Dry density, pcf	98.2	104.0	
Void ratio	0.7094	0.6150	
Saturation, %	91.1	99.8	

Test Readings for Specimen No. 1					
Normal stress = 2.16 tsf					
Strain rate, in./min. = 0.01					
Fail. Stress = 2.464 tsf at reading no. 7					

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	32.00	32.0	0.2	0.469
2	0.0100	48.00	48.0	0.4	0.704
3	0.0200	72.00	72.0	0.8	1.056
4	0.0300	92.00	92.0	1.2	1.349
5	0.0400	114.00	114.0	1.6	1.672
6	0.0500	137.00	137.0	2.0	2.009
7	0.0750	168.00	168.0	3.0	2.464
8	0.1500	165.00	165.0	6.0	2.420
9	0.2000	159.00	159.0	8.0	2.332
10	0.2500	150.00	150.0	10.0	2.200

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	165.130		159.170
Moisture content: Dry soil+tare, gms.	135.330		131.530
Moisture content: Tare, gms.	4.210		4.220
Moisture, %	22.7	21.7	21.7
Moist specimen weight, gms.	159.0		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	121.9	129.0	
Dry density, pcf	99.4	105.9	
Void ratio	0.6902	0.5850	
Saturation, %	88.6	99.8	

Test Readings for Specimen No. 2

Normal stress = 4.33 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 3.154 tsf at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	44.00	44.0	0.2	0.645
2	0.0100	76.00	76.0	0.4	1.115
3	0.0200	110.00	110.0	0.8	1.613
4	0.0300	136.00	136.0	1.2	1.995
5	0.0400	158.00	158.0	1.6	2.317
6	0.0500	172.00	172.0	2.0	2.523
7	0.0750	198.00	198.0	3.0	2.904
8	0.0850	207.00	207.0	3.4	3.036
9	0.1000	214.00	214.0	4.0	3.139
10	0.1100	215.00	215.0	4.4	3.154
11	0.1500	211.00	211.0	6.0	3.095
12	0.2000	212.00	212.0	8.0	3.110

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	119.100		170.470
Moisture content: Dry soil+tare, gms.	98.880		145.790
Moisture content: Tare, gms.	4.210		4.200
Moisture, %	21.4	17.4	17.4
Moist specimen weight, gms.	168.3		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.94	
Net decrease in height, in.		0.07	
Wet Density, pcf	128.8	134.1	
Dry density, pcf	106.2	114.2	
Void ratio	0.5818	0.4710	
Saturation, %	98.8	99.5	

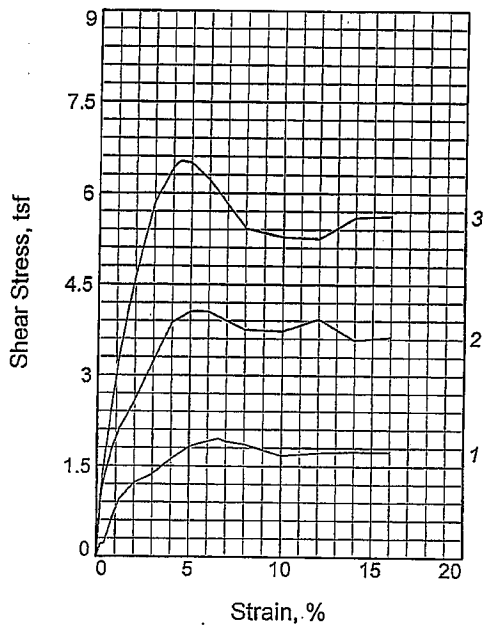
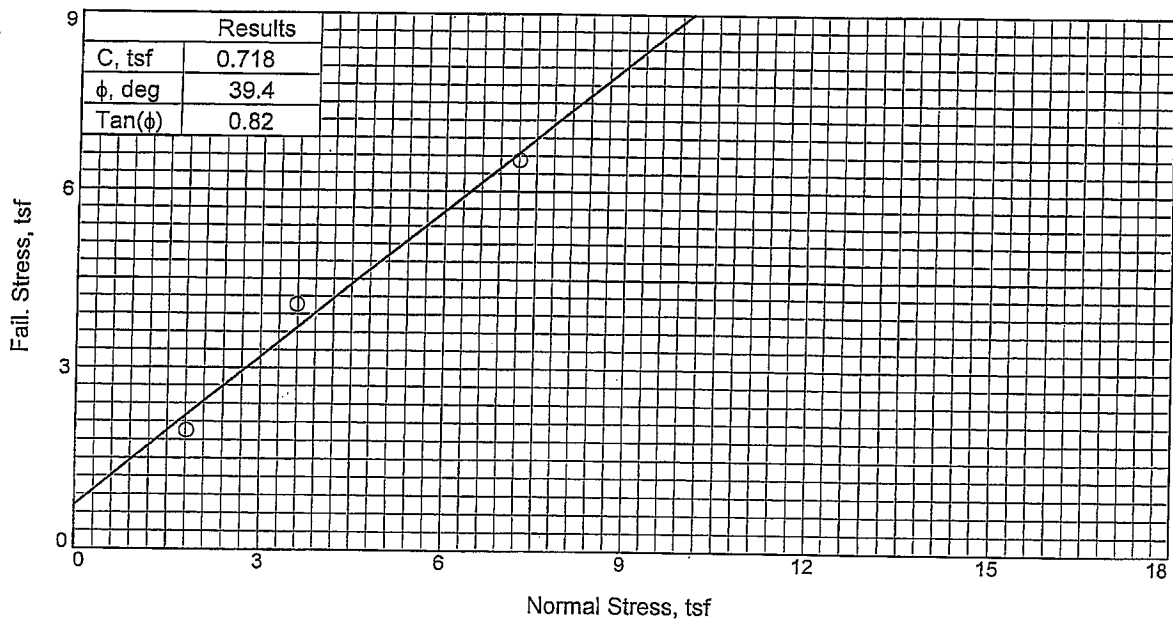
Test Readings for Specimen No. 3

Normal stress = 8.7 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 6.908 tsf at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	60.00	60.0	0.2	0.880
2	0.0100	120.00	120.0	0.4	1.760
3	0.0200	210.00	210.0	0.8	3.080
4	0.0300	280.00	280.0	1.2	4.107
5	0.0400	296.00	296.0	1.6	4.342
6	0.0500	334.00	334.0	2.0	4.899
7	0.0750	396.00	396.0	3.0	5.808
8	0.1000	437.00	437.0	4.0	6.410
9	0.1250	462.00	462.0	5.0	6.776
10	0.1400	471.00	471.0	5.6	6.908
11	0.1750	446.00	446.0	7.0	6.542
12	0.2000	442.00	442.0	8.0	6.483



Sample No.		1	2	3
Initial	Water Content, %	16.4	14.2	12.5
	Dry Density, pcf	106.9	107.6	107.5
	Saturation, %	77.9	68.7	60.3
	Void Ratio	0.5655	0.5554	0.5557
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.02	1.01	1.01
At Test	Water Content, %	17.5	16.6	17.2
	Dry Density, pcf	113.2	115.7	113.1
	Saturation, %	98.2	99.8	96.0
	Void Ratio	0.4783	0.4459	0.4787
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.97	0.94	0.96
Normal Stress, tsf		1.820	3.590	7.220
Fail. Stress, tsf		1.951	4.063	6.527
Strain, %		6.6	5.4	4.4
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Light Gray Silty SAND (SM) Visual

LL= ND PL= ND PI= ND
Specific Gravity= 2.68

Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Lab No. 8365

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2352UD

Sample Number: UD-8

Depth: 68-69.35 Ft

Proj. No.: 6468-07-1777

Date: 2/1/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

945708

KAW 4.15.08

DIRECT SHEAR TEST

4/15/2008

Date: 2/1/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2352UD
 Depth: 68-69.35 Ft Sample Number: UD-8
 Description: Light Gray Silty SAND (SM) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.68

LL=ND

PL= ND

PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	243.560		167.960
Moisture content: Dry soil+tare, gms.	229.370		143.540
Moisture content: Tare, gms.	143.070		4.220
Moisture, %	16.4	17.5	17.5
Moist specimen weight, gms.	164.1		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.02	0.97	
Net decrease in height, in.		0.06	
Wet Density, pcf	124.4	133.0	
Dry density, pcf	106.9	113.2	
Void ratio	0.5655	0.4783	
Saturation, %	77.9	98.2	

Test Readings for Specimen No. 1

Normal stress = 1.82 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 1.951 tsf at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	14.00	14.0	0.2	0.205
2	0.0100	15.00	15.0	0.4	0.220
3	0.0200	42.00	42.0	0.8	0.616
4	0.0300	64.00	64.0	1.2	0.939
5	0.0400	74.00	74.0	1.6	1.085
6	0.0500	83.00	83.0	2.0	1.217
7	0.0750	93.00	93.0	3.0	1.364
8	0.1000	110.00	110.0	4.0	1.613
9	0.1250	124.00	124.0	5.0	1.819
10	0.1400	128.00	128.0	5.6	1.877
11	0.1650	133.00	133.0	6.6	1.951
12	0.1750	130.00	130.0	7.0	1.907

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.2000	127.00	127.0	8.0	1.863
14	0.2500	114.00	114.0	10.0	1.672
15	0.3000	117.00	117.0	12.0	1.716
16	0.3500	119.00	119.0	14.0	1.745
17	0.4000	118.00	118.0	16.0	1.731

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	147.510		163.120
Moisture content: Dry soil+tare, gms.	131.210		140.490
Moisture content: Tare, gms.	16.750		4.210
Moisture, %	14.2	16.6	16.6
Moist specimen weight, gms.	159.7		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.94	
Net decrease in height, in.		0.07	
Wet Density, pcf	122.9	134.9	
Dry density, pcf	107.6	115.7	
Void ratio	0.5554	0.4459	
Saturation, %	68.7	99.8	

Test Readings for Specimen No. 2

Normal stress = 3.59 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 4.063 tsf at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	66.00	66.0	0.2	0.968
2	0.0100	90.00	90.0	0.4	1.320
3	0.0200	122.00	122.0	0.8	1.789
4	0.0300	145.00	145.0	1.2	2.127
5	0.0400	160.00	160.0	1.6	2.347
6	0.0500	176.00	176.0	2.0	2.582
7	0.0750	220.00	220.0	3.0	3.227
8	0.1000	264.00	264.0	4.0	3.872
9	0.1250	276.00	276.0	5.0	4.048
10	0.1350	277.00	277.0	5.4	4.063
11	0.1500	276.00	276.0	6.0	4.048
12	0.1750	266.00	266.0	7.0	3.902
13	0.2000	256.00	256.0	8.0	3.755
14	0.2500	254.00	254.0	10.0	3.726
15	0.3000	268.00	268.0	12.0	3.931
16	0.3500	244.00	244.0	14.0	3.579
17	0.4000	248.00	248.0	16.0	3.638

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	124.500		163.700
Moisture content: Dry soil+tare, gms.	112.420		140.350
Moisture content: Tare, gms.	15.750		4.200
Moisture, %	12.5	17.2	17.2
Moist specimen weight, gms.	157.4		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.96	
Net decrease in height, in.		0.05	
Wet Density, pcf	121.0	132.6	
Dry density, pcf	107.5	113.1	
Void ratio	0.5557	0.4787	
Saturation, %	60.3	96.0	

Test Readings for Specimen No. 3

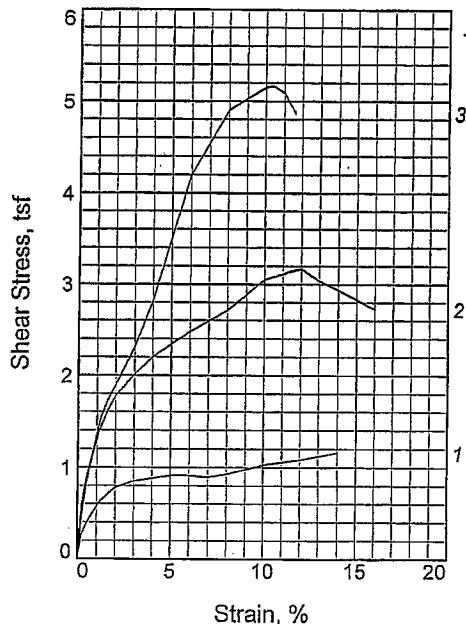
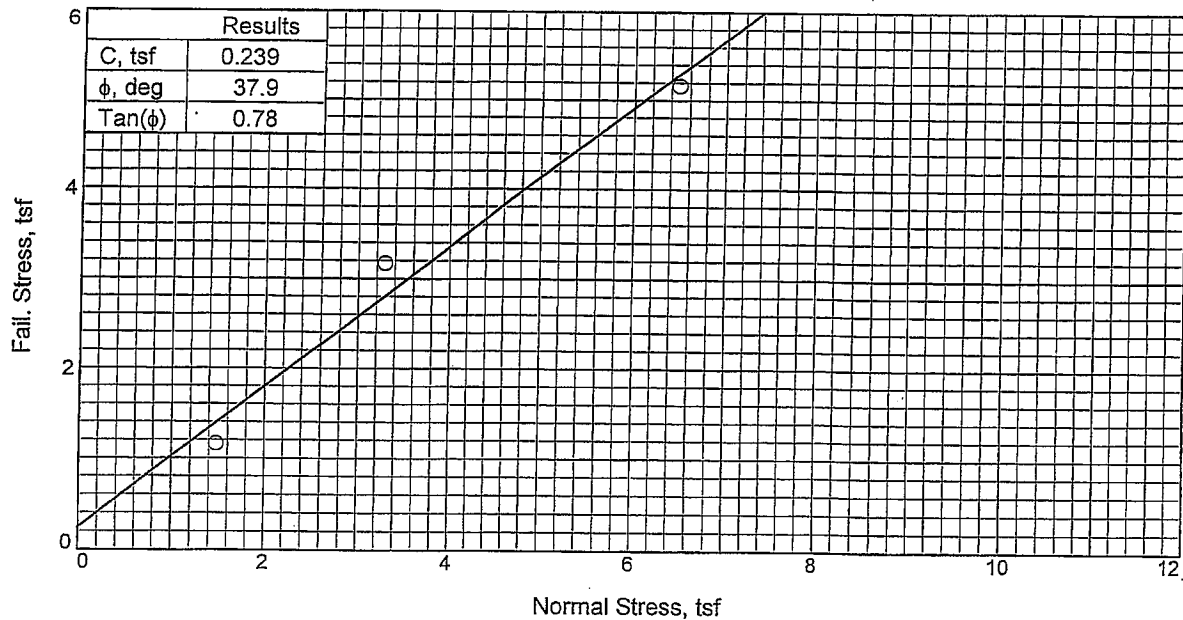
Normal stress = 7.22 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 6.527 tsf at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	74.00	74.0	0.2	1.085
2	0.0100	110.00	110.0	0.4	1.613
3	0.0200	174.00	174.0	0.8	2.552
4	0.0300	230.00	230.0	1.2	3.374
5	0.0400	276.00	276.0	1.6	4.048
6	0.0500	315.00	315.0	2.0	4.620
7	0.0750	398.00	398.0	3.0	5.838
8	0.1000	438.00	438.0	4.0	6.424
9	0.1100	445.00	445.0	4.4	6.527
10	0.1250	443.00	443.0	5.0	6.498
11	0.1500	424.00	424.0	6.0	6.219
12	0.2000	370.00	370.0	8.0	5.427
13	0.2500	360.00	360.0	10.0	5.280
14	0.3000	358.00	358.0	12.0	5.251
15	0.3500	382.00	382.0	14.0	5.603
16	0.4000	384.00	384.0	16.0	5.632

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Sample No.		1	2	3
Initial	Water Content, %	17.0	14.2	11.8
	Dry Density, pcf	106.5	114.3	104.5
	Saturation, %	81.5	84.3	53.6
	Void Ratio	0.5528	0.4478	0.5832
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.01
At Test	Water Content, %	17.4	12.7	17.0
	Dry Density, pcf	113.1	123.6	114.0
	Saturation, %	99.6	99.1	99.5
	Void Ratio	0.4632	0.3383	0.4516
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.95	0.93	0.93
Normal Stress, tsf		1.480	3.290	6.490
Fail. Stress, tsf		1.159	3.168	5.163
Strain, %		14.0	12.0	10.4
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Light Gray Sandy SILT (ML) Visual

LL= ND PL= ND PI= ND

Specific Gravity= 2.65

Remarks: ASTM D 3080-04. ND=Not Determined.

Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Lab No. 8559

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2359UD

Sample Number: UD-7

Depth: 55-56.7 Ft

Proj. No.: 6468-07-1777

Date: 1/29/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

Handwritten signature and date: 4/15/08

KAW 4.15.08

DIRECT SHEAR TEST

4/15/2008

Date: 1/29/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2359UD
 Depth: 55-56.7 Ft Sample Number: UD-7
 Description: Light Gray Sandy SILT (ML) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to
 perform the test. Samples sheared to the
 limitation of the machine.
 Type of Sample: Undisturbed
 Specific Gravity=2.65 LL=ND PL= ND PI=ND

Parameters for Specimen No. 1			
Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	120.500		160.400
Moisture content: Dry soil+tare, gms.	103.600		137.250
Moisture content: Tare, gms.	4.230		4.210
Moisture, %	17.0	17.4	17.4
Moist specimen weight, gms.	161.4		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.00	0.95	
Net decrease in height, in.		0.06	
Wet Density, pcf	124.7	132.7	
Dry density, pcf	106.5	113.1	
Void ratio	0.5528	0.4632	
Saturation, %	81.5	99.6	

Test Readings for Specimen No. 1					
Normal stress = 1.48 tsf					
Strain rate, in./min. = 0.01					
Fail. Stress = 1.159 tsf at reading no. 15					

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	18.00	18.0	0.2	0.264
2	0.0100	25.00	25.0	0.4	0.367
3	0.0200	35.00	35.0	0.8	0.513
4	0.0300	43.00	43.0	1.2	0.631
5	0.0400	48.00	48.0	1.6	0.704
6	0.0500	53.00	53.0	2.0	0.777
7	0.0750	58.00	58.0	3.0	0.851
8	0.1000	60.00	60.0	4.0	0.880
9	0.1250	62.00	62.0	5.0	0.909
10	0.1500	62.00	62.0	6.0	0.909
11	0.1750	61.00	61.0	7.0	0.895

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
12	0.2000	63.00	63.0	8.0	0.924
13	0.2500	70.00	70.0	10.0	1.027
14	0.3000	74.00	74.0	12.0	1.085
15	0.3500	79.00	79.0	14.0	1.159

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	132.210		166.470
Moisture content: Dry soil+tare, gms.	116.270		148.250
Moisture content: Tare, gms.	4.300		4.220
Moisture, %	14.2	12.7	12.7
Moist specimen weight, gms.	169.0		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.00	0.93	
Net decrease in height, in.		0.08	
Wet Density, pcf	130.5	139.3	
Dry density, pcf	114.3	123.6	
Void ratio	0.4478	0.3383	
Saturation, %	84.3	99.1	

Test Readings for Specimen No. 2

Normal stress = 3.29 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 3.168 tsf at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	40.00	40.0	0.2	0.587
2	0.0100	58.00	58.0	0.4	0.851
3	0.0200	79.00	79.0	0.8	1.159
4	0.0300	97.00	97.0	1.2	1.423
5	0.0400	110.00	110.0	1.6	1.613
6	0.0500	121.00	121.0	2.0	1.775
7	0.0750	137.00	137.0	3.0	2.009
8	0.1000	150.00	150.0	4.0	2.200
9	0.1500	169.00	169.0	6.0	2.479
10	0.2000	185.00	185.0	8.0	2.714
11	0.2500	208.00	208.0	10.0	3.051
12	0.2850	214.00	214.0	11.4	3.139
13	0.3000	216.00	216.0	12.0	3.168
14	0.3250	207.00	207.0	13.0	3.036
15	0.4000	186.00	186.0	16.0	2.728

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	110.930		155.700
Moisture content: Dry soil+tare, gms.	99.680		133.730
Moisture content: Tare, gms.	4.240		4.190
Moisture, %	11.8	17.0	17.0
Moist specimen weight, gms.	152.1		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.93	
Net decrease in height, in.		0.08	
Wet Density, pcf	116.8	133.3	
Dry density, pcf	104.5	114.0	
Void ratio	0.5832	0.4516	
Saturation, %	53.6	99.5	

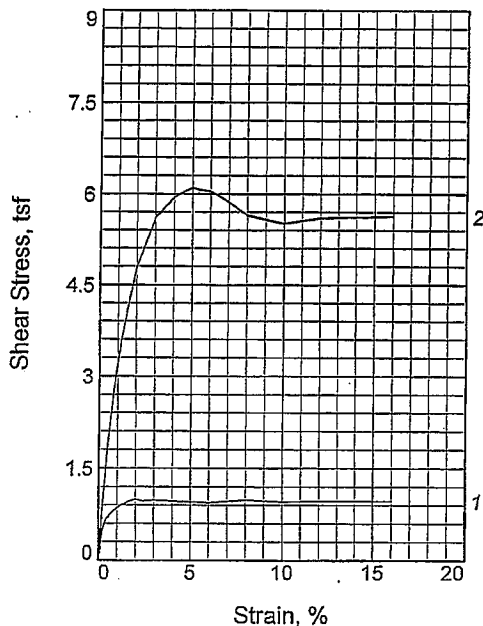
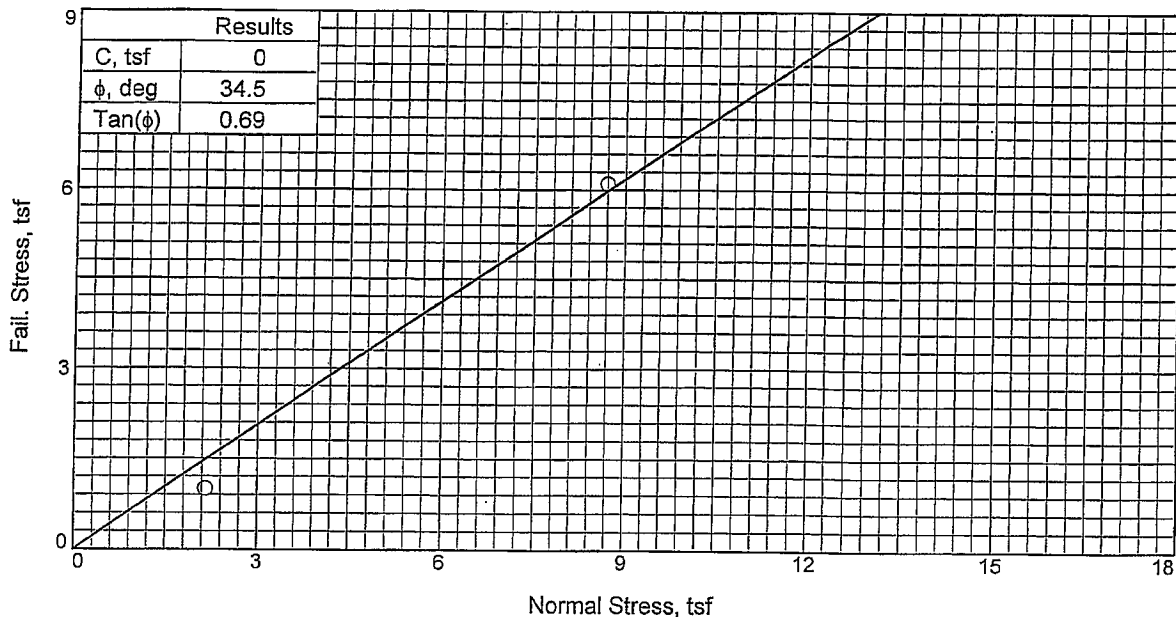
Test Readings for Specimen No. 3

Normal stress = 6.49 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 5.163 tsf at reading no. 13

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	32.00	32.0	0.2	0.469
2	0.0100	52.00	52.0	0.4	0.763
3	0.0200	80.00	80.0	0.8	1.173
4	0.0300	104.00	104.0	1.2	1.525
5	0.0400	118.00	118.0	1.6	1.731
6	0.0500	129.00	129.0	2.0	1.892
7	0.0750	157.00	157.0	3.0	2.303
8	0.1000	192.00	192.0	4.0	2.816
9	0.1500	286.00	286.0	6.0	4.195
10	0.2000	334.00	334.0	8.0	4.899
11	0.2250	343.00	343.0	9.0	5.031
12	0.2500	351.00	351.0	10.0	5.148
13	0.2600	352.00	352.0	10.4	5.163
14	0.2750	347.00	347.0	11.0	5.090
15	0.2900	332.00	332.0	11.6	4.870



Sample No.		1	2
Initial	Water Content, %	31.4	19.2
	Dry Density, pcf	89.9	103.3
	Saturation, %	95.2	80.4
	Void Ratio	0.9029	0.6554
	Diameter, in.	2.50	2.50
	Height, in.	1.01	1.01
At Test	Water Content, %	26.2	21.3
	Dry Density, pcf	99.6	108.0
	Saturation, %	100.0	100.0
	Void Ratio	0.7174	0.5832
	Diameter, in.	2.50	2.50
	Height, in.	0.91	0.96
Normal Stress, tsf		2.160	8.700
Fail. Stress, tsf		0.997	6.102
Strain, %		2.0	5.0
Ult. Stress, tsf			
Strain, %			
Strain rate, in./min.		0.01	0.01

Sample Type: Undisturbed
Description: Pale Brown Sandy SILT (ML) Visual
 LL= ND PL= ND PI= ND
Specific Gravity= 2.74
Remarks: ASTM D 3080-04.
 ND=Not Determined. Lever arm mechanical shear device was used to perform the test.
 Samples sheared to the limitation of the machine.
Lab No. 8367

Client: Bechtel
Project: Exelon Texas COL (Victoria)
Location: B-2359UD
Sample Number: UD-14 **Depth:** 88-90.5 Ft
Proj. No.: 6468-07-1777 **Date:** 1/30/08
DIRECT SHEAR TEST REPORT
MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

KAW 4.15.08

4/15/08

DIRECT SHEAR TEST

4/15/2008

Date: 1/30/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2359UD
 Depth: 88-90.5 Ft Sample Number: UD-14
 Description: Pale Brown Sandy SILT (ML) Visual
 Remarks: ASTM D 3080-04.

ND=Not Determined. Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.74 LL=ND PL= ND PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	113.900		151.850
Moisture content: Dry soil+tare, gms.	87.720		121.210
Moisture content: Tare, gms.	4.220		4.220
Moisture, %	31.4	26.2	26.2
Moist specimen weight, gms.	152.9		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.91	
Net decrease in height, in.		0.10	
Wet Density, pcf	118.1	125.7	
Dry density, pcf	89.9	99.6	
Void ratio	0.9029	0.7174	
Saturation, %	95.2	100.0	

Test Readings for Specimen No. 1

Normal stress = 2.16 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 0.997 tsf at reading no. 6

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	34.00	34.0	0.2	0.499
2	0.0100	46.00	46.0	0.4	0.675
3	0.0200	55.00	55.0	0.8	0.807
4	0.0300	61.00	61.0	1.2	0.895
5	0.0400	65.00	65.0	1.6	0.953
6	0.0500	68.00	68.0	2.0	0.997
7	0.0600	66.00	66.0	2.4	0.968
8	0.0750	67.00	67.0	3.0	0.983
9	0.1000	66.00	66.0	4.0	0.968
10	0.1500	64.00	64.0	6.0	0.939
11	0.2000	67.00	67.0	8.0	0.983
12	0.2500	65.00	65.0	10.0	0.953

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.3000	66.00	66.0	12.0	0.968
14	0.4000	66.00	66.0	16.0	0.968

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	136.460		164.000
Moisture content: Dry soil+tare, gms.	115.120		135.960
Moisture content: Tare, gms.	4.210		4.230
Moisture, %	19.2	21.3	21.3
Moist specimen weight, gms.	160.1		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.96	
Net decrease in height, in.		0.04	
Wet Density, pcf	123.2	131.0	
Dry density, pcf	103.3	108.0	
Void ratio	0.6554	0.5832	
Saturation, %	80.4	100.0	

Test Readings for Specimen No. 2

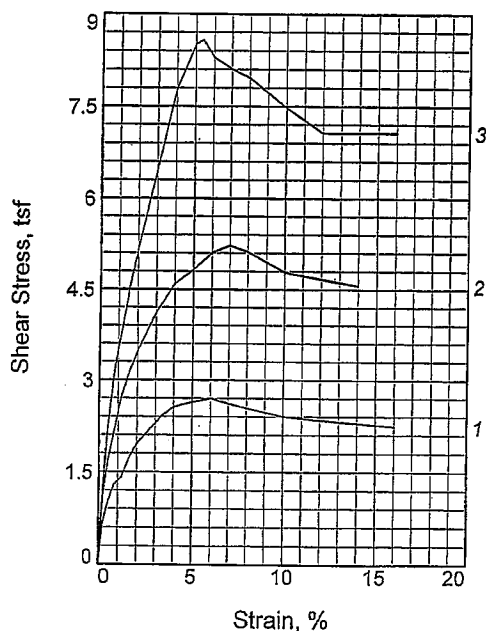
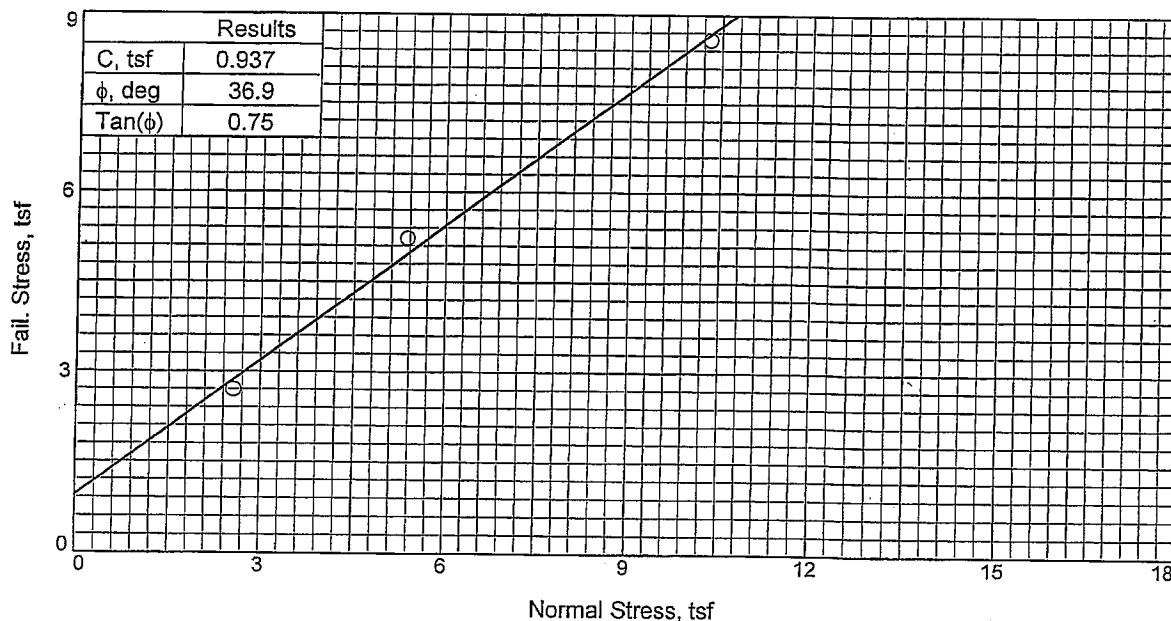
Normal stress = 8.7 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 6.102 tsf at reading no. 10

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	62.00	62.0	0.2	0.909
2	0.0100	110.00	110.0	0.4	1.613
3	0.0200	188.00	188.0	0.8	2.758
4	0.0300	244.00	244.0	1.2	3.579
5	0.0400	288.00	288.0	1.6	4.224
6	0.0500	326.00	326.0	2.0	4.782
7	0.0750	382.00	382.0	3.0	5.603
8	0.1000	405.00	405.0	4.0	5.940
9	0.1150	412.00	412.0	4.6	6.043
10	0.1250	416.00	416.0	5.0	6.102
11	0.1350	414.00	414.0	5.4	6.072
12	0.1500	412.00	412.0	6.0	6.043
13	0.1750	400.00	400.0	7.0	5.867
14	0.2000	385.00	385.0	8.0	5.647
15	0.2500	376.00	376.0	10.0	5.515
16	0.3000	382.00	382.0	12.0	5.603
17	0.4000	384.00	384.0	16.0	5.632

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Sample No.		1	2	3
Initial	Water Content, %	17.6	20.1	14.3
	Dry Density, pcf	102.6	103.5	110.9
	Saturation, %	73.7	86.1	74.3
	Void Ratio	0.6434	0.6292	0.5200
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.02	1.01
At Test	Water Content, %	20.9	19.7	15.0
	Dry Density, pcf	107.5	109.7	119.8
	Saturation, %	99.2	99.2	99.6
	Void Ratio	0.5685	0.5365	0.4066
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.96	0.96	0.93
Normal Stress, tsf		2.570	5.360	10.310
Fail. Stress, tsf		2.699	5.222	8.581
Strain, %		6.0	7.0	5.4
Ult. Stress, tsf				
Strain, %				
Strain rate, in./min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Light Gray Silty SAND (SM) Visual

LL= ND PL= ND PI= ND

Specific Gravity= 2.70

Remarks: ASTM D 3080-04. ND=Not Determined.

Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Lab No. 8370

Client: Bechtel

Project: Exelon Texas COL (Victoria)

Location: B-2359UD

Sample Number: UD-19

Depth: 114-116.6 Ft

Proj. No.: 6468-07-1777

Date: 1/31/08

DIRECT SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: BM

Checked By: HJ

HJ
4/15/08

KAW 4-15-08

DIRECT SHEAR TEST

4/15/2008

Date: 1/31/08
 Client: Bechtel
 Project: Exelon Texas COL (Victoria)
 Project No.: 6468-07-1777
 Location: B-2359UD
 Depth: 114-116.6 Ft Sample Number: UD-19
 Description: Light Gray Silty SAND (SM) Visual
 Remarks: ASTM D 3080-04. ND=Not Determined.
 Lever arm mechanical shear device was used to perform the test. Samples sheared to the limitation of the machine.

Type of Sample: Undisturbed

Specific Gravity=2.70

LL=ND

PL= ND

PI=ND

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	82.510		162.480
Moisture content: Dry soil+tare, gms.	70.810		135.140
Moisture content: Tare, gms.	4.180		4.200
Moisture, %	17.6	20.9	20.9
Moist specimen weight, gms.	156.9		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.96	
Net decrease in height, in.		0.05	
Wet Density, pcf	120.6	129.9	
Dry density, pcf	102.6	107.5	
Void ratio	0.6434	0.5685	
Saturation, %	73.7	99.2	

Test Readings for Specimen No. 1

Normal stress = 2.57 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 2.699 tsf at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	44.00	44.0	0.2	0.645
2	0.0100	64.00	64.0	0.4	0.939
3	0.0200	88.00	88.0	0.8	1.291
4	0.0300	96.00	96.0	1.2	1.408
5	0.0400	117.00	117.0	1.6	1.716
6	0.0500	133.00	133.0	2.0	1.951
7	0.0750	156.00	156.0	3.0	2.288
8	0.0850	165.00	165.0	3.4	2.420
9	0.1000	174.00	174.0	4.0	2.552
10	0.1150	178.00	178.0	4.6	2.611
11	0.1500	184.00	184.0	6.0	2.699
12	0.2000	173.00	173.0	8.0	2.538

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Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.2500	164.00	164.0	10.0	2.406
14	0.3000	160.00	160.0	12.0	2.347
15	0.4000	153.00	153.0	16.0	2.244

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	139.300		162.340
Moisture content: Dry soil+tare, gms.	116.740		136.310
Moisture content: Tare, gms.	4.320		4.250
Moisture, %	20.1	19.7	19.7
Moist specimen weight, gms.	163.3		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.02	0.96	
Net decrease in height, in.		0.06	
Wet Density, pcf	124.2	131.3	
Dry density, pcf	103.5	109.7	
Void ratio	0.6292	0.5365	
Saturation, %	86.1	99.2	

Test Readings for Specimen No. 2

Normal stress = 5.36 tsf

Strain rate, in./min. = 0.01

Fail. Stress = 5.222 tsf at reading no. 11

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	74.00	74.0	0.2	1.085
2	0.0100	106.00	106.0	0.4	1.555
3	0.0200	148.00	148.0	0.8	2.171
4	0.0300	186.00	186.0	1.2	2.728
5	0.0400	214.00	214.0	1.6	3.139
6	0.0500	236.00	236.0	2.0	3.462
7	0.0750	280.00	280.0	3.0	4.107
8	0.1000	313.00	313.0	4.0	4.591
9	0.1250	329.00	329.0	5.0	4.826
10	0.1500	348.00	348.0	6.0	5.104
11	0.1750	356.00	356.0	7.0	5.222
12	0.2000	349.00	349.0	8.0	5.119
13	0.2500	326.00	326.0	10.0	4.782
14	0.3500	311.00	311.0	14.0	4.562

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Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	137.200		161.370
Moisture content: Dry soil+tare, gms.	120.560		140.870
Moisture content: Tare, gms.	4.220		4.210
Moisture, %	14.3	15.0	15.0
Moist specimen weight, gms.	164.3		
Diameter, in.	2.50	2.50	
Area, in. ²	4.91	4.91	
Height, in.	1.01	0.93	
Net decrease in height, in.		0.07	
Wet Density, pcf	126.8	137.8	
Dry density, pcf	110.9	119.8	
Void ratio	0.5200	0.4066	
Saturation, %	74.3	99.6	

Test Readings for Specimen No. 3

Normal stress = 10.31 tsf

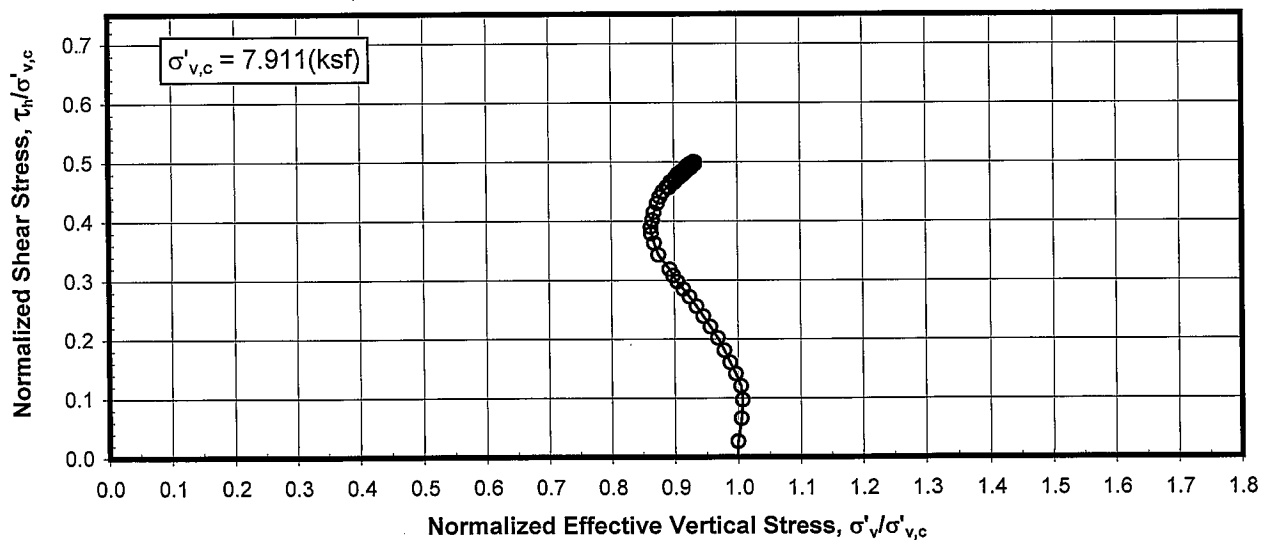
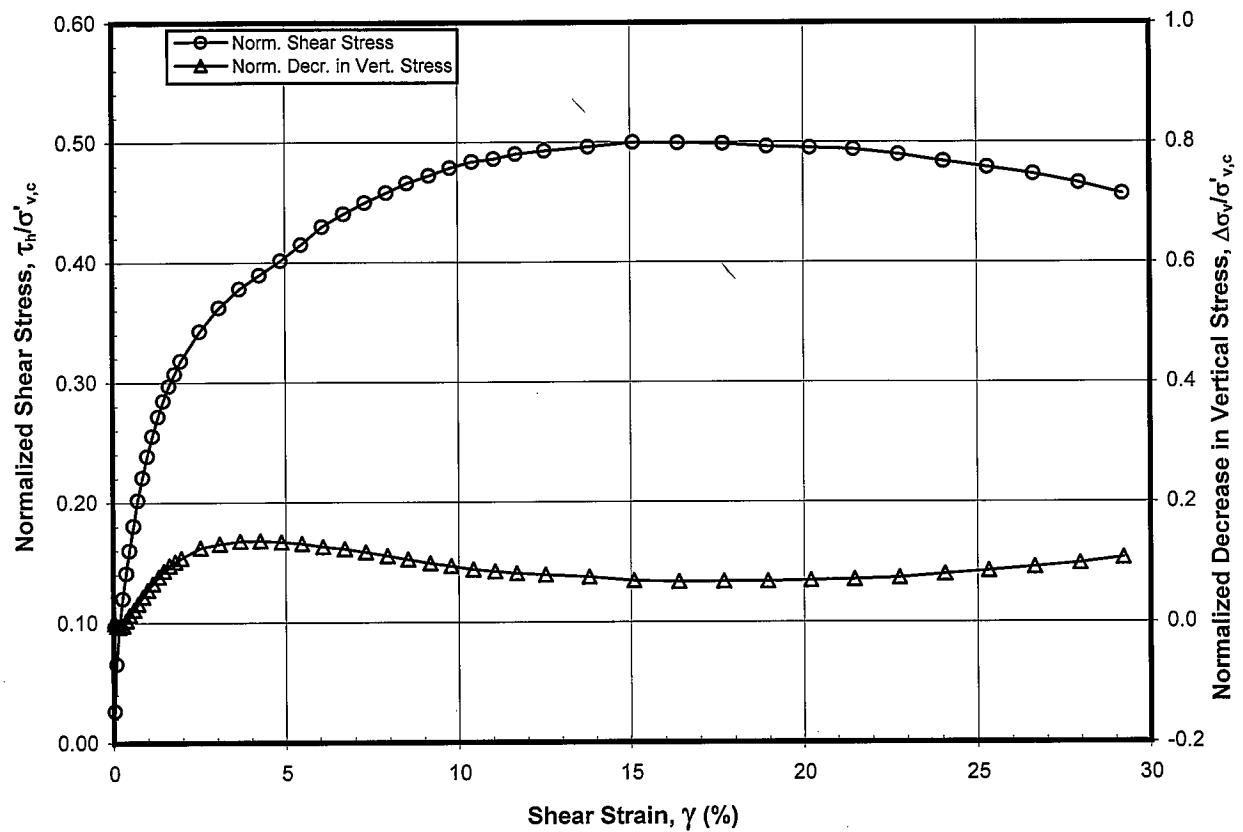
Strain rate, in./min. = 0.01

Fail. Stress = 8.581 tsf at reading no. 9

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	85.00	85.0	0.2	1.247
2	0.0100	140.00	140.0	0.4	2.053
3	0.0200	216.00	216.0	0.8	3.168
4	0.0300	260.00	260.0	1.2	3.814
5	0.0400	312.00	312.0	1.6	4.576
6	0.0500	352.00	352.0	2.0	5.163
7	0.1000	530.00	530.0	4.0	7.774
8	0.1250	580.00	580.0	5.0	8.507
9	0.1350	585.00	585.0	5.4	8.581
10	0.1500	566.00	566.0	6.0	8.302
11	0.1750	553.00	553.0	7.0	8.111
12	0.2000	543.00	543.0	8.0	7.965
13	0.2500	510.00	510.0	10.0	7.481
14	0.3000	482.00	482.0	12.0	7.070
15	0.4000	482.00	482.0	16.0	7.070

MACTEC Engineering and Consulting, Inc.

Direct Simple Shear Tests – Undisturbed Samples



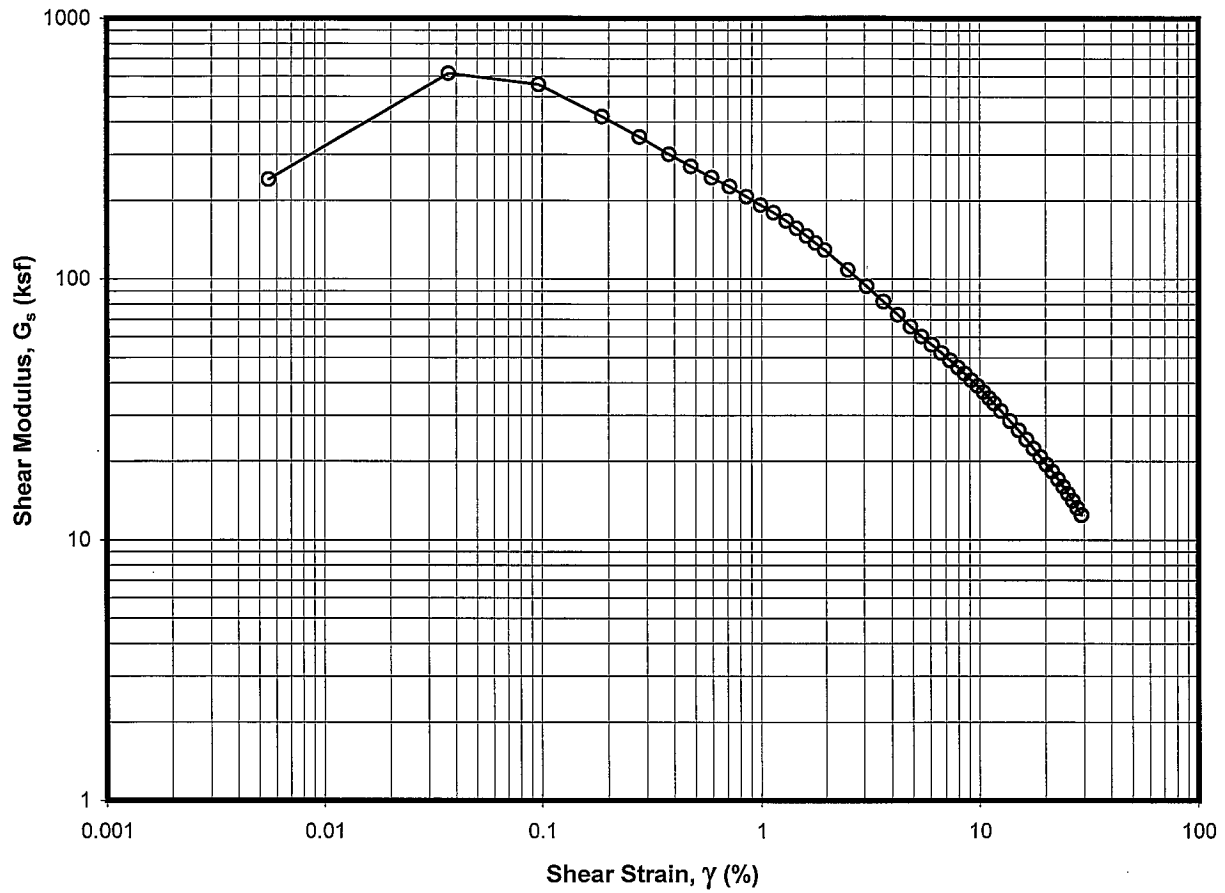
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD12B - Depth: 78.5 - 80.5 ft

Boring B-2302UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD12B - Depth: 78.5 - 80.5 ft

Boring B-2302UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: B-2302_UD12b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 7.92 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: _____ Specific Gravity: 2.680 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer = _____
Boring No.: <u>B-2302UD</u>	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) = _____ No. Layers = _____
Sample No.: <u>UD12</u>	Composite No.: _____			Pluviated:	Tamper Force (lb) = _____ Drop (in.) = _____
Depth (ft): <u>78.5 - 80.5</u>	Specimen No.: <u>B</u>			Kneading	Undercompaction: U_{ri} (%) = _____ Dia. (in.) = _____
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort = _____ % Comp. = _____ $\pm$ Opt. = _____

Type Consolidation:	☒ K_o at:	☒ Incremental	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS		90° Stress Path	Remarks: _____
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: <u>0.1</u> ; ☐ Strain ☐ Stress

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	D-11	124	4096	1144	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	315.59	133.23	
Mass Moist Soil + Cont. (g)	65.62	132.21	64.89	81.23	Mass Tare (g)	186.86	5.04	
Mass Dry Soil + Container (g)	59.79	113.41	59.19	72.06	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	128.73	128.19	
Mass Container (g)	30.24	30.51	30.62	32.41	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	19.73	22.68	19.95	23.13	Container No.			
Avg. Initial WC, $W_{o,avg}$ (%)	20.79	Final W_{at} : ☒ Slice ;	Whole Spec.		Mass Dry Soil + Container (g)			
See attached data sheet(s) for additional water contents					Mass Container (g)			
					Mass Excess Dry Soil (g)	0.00		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.55	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.69
Remarks: _____			
Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.600	1-T NA		
2 18.550	2-M NA		
3 18.570	3-B NA		
4 18.500	1'-T NA	For Free Standing	
5 18.550	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.550	Avg	V_{tr} (cm ³):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	124.24
Dry, $\gamma_{d,o}$ (lb/ft ³) =	102.86

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Meas.	Corr.	Area, $A_{c,n}$ (cm ²) (in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. <u>7</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.69</u>			= <u>67.34</u>
☐ Single	Bottom: <u>0.72</u>			Corr. for mem.
☒ Double	Membr. Thick. = <u>0.35</u>			= <u>66.630</u>
Area Ring with mem., A_o (cm ²) =		<u>34.87</u>	; (in ²) = <u>5.405</u>	
Mass Top Cap, etc., M_{tc} =		<u>527.2</u> g,	<u>1.16</u> lbf	
Data corr. for M_{tc} : ☒ Yes;		☐ No	Plattens with Pins: ☐ Yes; ☒ No	

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Light Gray Fat CLAY with sand (CH)

Other Remarks: _____

Trim./ Recon. By: HC
 Date: 3/31/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 3/31/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 4/2/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks: _____

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: 7G File Name: B-2302_UD12b
 Task Number: NA Specific Gravity: 2.680 ☒ Measured; ☐ Assumed
 Type Test: SDSS Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary												
Test Stage:		Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = NA (%/hr or)						
Nominal Vertical Stress, σ_v' (ksf)		NA	7.92	NA		Cyclic Rate (Hz):			0.1;		1;	Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)		NA	NA	NA		During/End of Loading					Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)		NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)					NA	NA
Nominal OCR		NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)					NA	NA
t_c , (ON,days,hrs)		NA	0.92 days	NA		Post Cy.Displ. Reset to Null Position:					Yes;	No
	Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA											

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):					
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal.
W_o 19.73	22.68	19.95	20.79	20.79	23.65
S_o 86.8	93.6	87.3	89.3	89.3	95.7
Measured final mass of moist soil, $M_{t,at}$ (g)					128.19
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)					128.19

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	20.79
Initial, $M_{d,o}$	106.57
Final, $M_{d,at}$	104.11
Selected, M_d	105.34

Initial Back Cal. Specific Gravity (TS):	
Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary			
Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{vc,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	7.920	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.579		
Total Equip. Comp., $\Sigma \Delta d_{atc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.579		
ΔV_n using A_o - spec. (cm ³)	2.02		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.02		
ΔV_n using burette meas. (cm ³)	-1.00		
Selected ΔV_n (cm ³)	2.02	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, W_{atc} (%)			NA

Calculation of ΔV_c by Different Procedures			
By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	2.02	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	0.54
ΔV_c (cm ³)	2.02	By Saturation = 100% and Spec. Unloaded to 0 Stress	
ΔV_c (cm ³)	2.02	ΔV_c (cm ³)	NA

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	22.07
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	2.02	ΔH_c (mm) =	0.579	$\varepsilon_{a,c}$ (%) =	3.12	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.66	H_c (mm) =	17.971	$\varepsilon_{v,c}$ (%) =	3.13	$\varepsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.550	64.69	34.87	22.2	124.2	101.7	92.6	0.646
After to $\sigma'_{v,c}$	17.971	62.66	34.87	22.1	128.1	104.9	100.0	0.594
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume. Calculated By: LF
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable Reviewed By: HP
 3 - Uses measured value at appropriate stress level (NA for rings).
 Remarks: 195 for max stress = 9.5 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: B-2302_UD12b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =
Boring No.: B-2302UD	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lbf) = No. Layers =
Sample No.: UD12	Composite No.:			Pluviated:	Tamper Force (lbf) = Drop (in.) =
Depth (ft): 78.5 - 80.5	Specimen No.: B			Kneading	Undercompaction: U_{nl} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort = % Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental CRS	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water With - Bath	☒ Cyclic (Hz) Rate: 0.1; ☐ Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition:					Total	Dry		PI		
Initial	18.55	64.69	34.87	22.20	124.2	101.7	92.6	64	83	0.646
After to $\sigma'_{v,c}$	17.97	62.66	34.87	22.07	128.1	104.9	100.0	21	NA	0.594
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	43	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	☒ Static Strain Rate = 4.7 %/hr.					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	7.911	NA	Cyclic Rate (Hz):	0.1;	1;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	3.12	NA	Change in Height, $\Delta H_{L,n}$ (mm):		NA	NA		
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA	Change in Vol., $\Delta V_{L,n}$ (cm ³):		NA	NA		
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No		
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA	Number of Loading Cycles, N =		NA			
Undr. Ambient Shear Stress, $\tau_{h,ub}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %			
Undr. Ambient Shear Strain, ϵ_{ub}	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vcy,r} =$		NA (ksf)			

Weight Top Cap, etc., M_{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 7.911 (ksf)
Data corr. for M_{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☐ Yes ☒ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

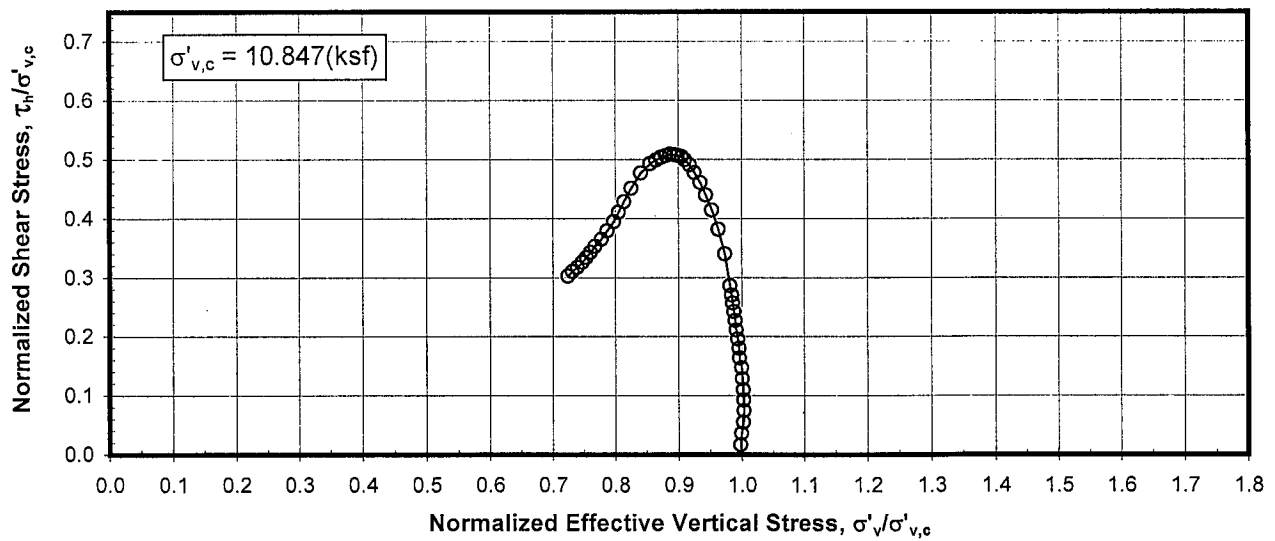
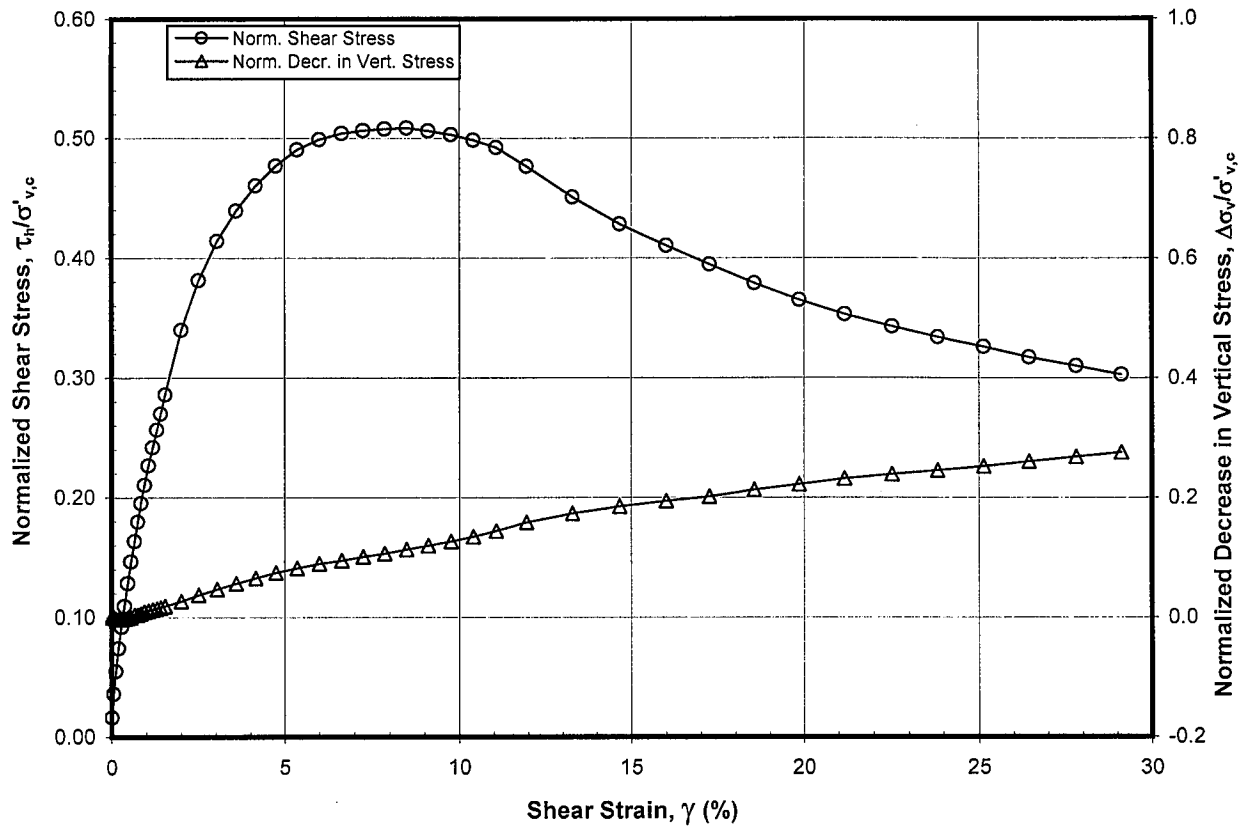
Final Visual Description and Remarks: Light Gray Fat CLAY with sand (CH)

Loading Summary						
	τ_h (ksf)	γ (%)	σ'_v (ksf)	τ_h / σ'_v -	$\Delta \sigma'_v / \sigma'_{v,c}$ -	$c_u / \sigma'_{v,c}$ -
at Peak Shear Stress	3.954	15.10	7.367	0.537	0.069	0.500
at Maximum Strain	3.614	29.22	7.063	0.512	0.107	-

Boring No.: B-2302UD

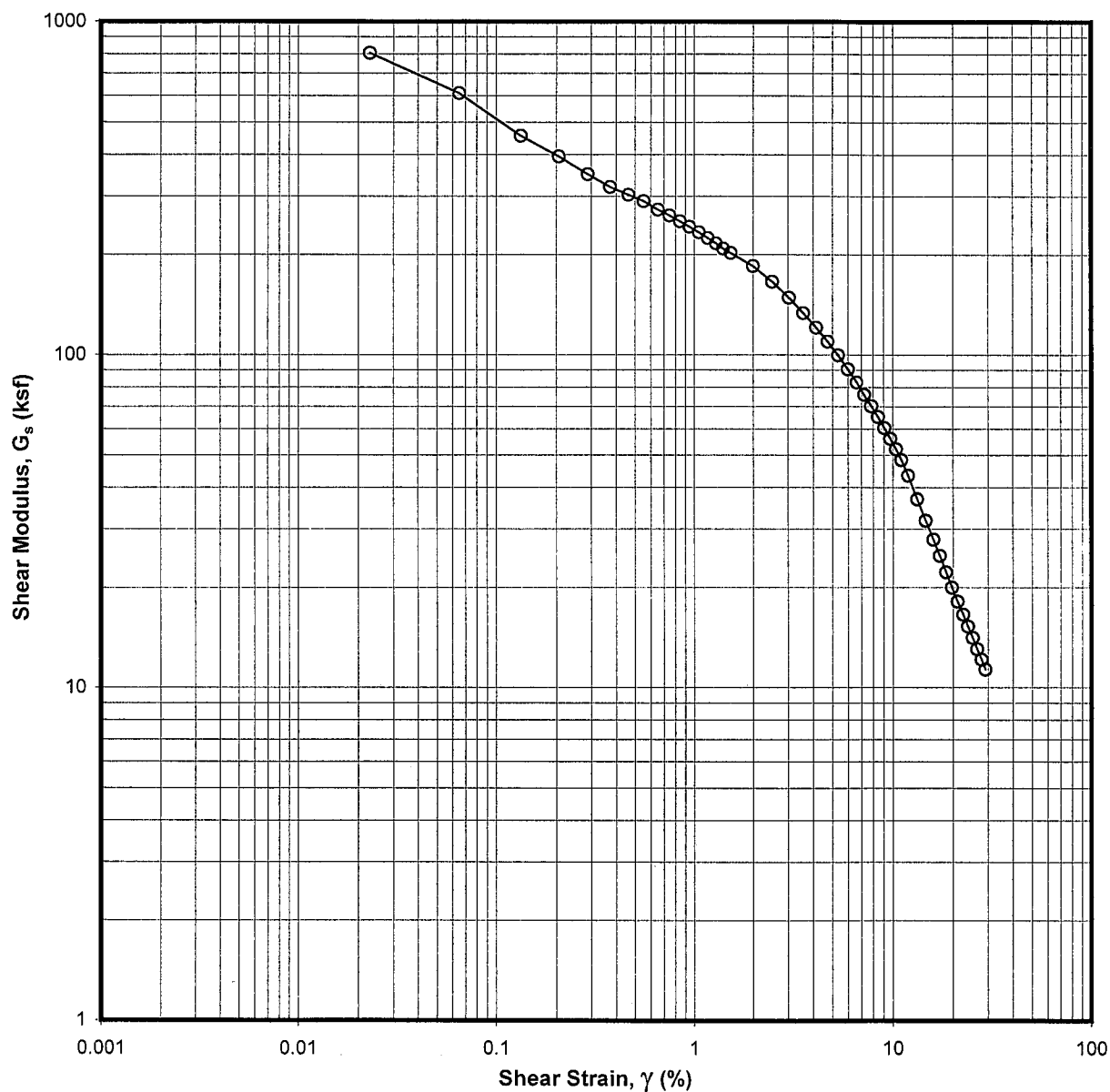
Sample No.: UD12B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{bss} (°)
0.0	0.00	-0.019	7.911	0.000	-	-	-0.002	1.000	0.000	-0.14
2.6	0.01	-0.006	7.895	0.015	240.713	460.524	-0.001	0.998	0.002	-0.04
5.1	0.04	0.208	7.907	0.004	614.626	600.674	0.026	1.000	0.000	1.50
7.6	0.10	0.518	7.949	-0.038	556.815	398.029	0.065	1.005	-0.005	3.73
10.2	0.19	0.768	7.965	-0.054	420.055	239.934	0.097	1.007	-0.007	5.51
12.7	0.28	0.951	7.947	-0.037	350.485	185.289	0.120	1.005	-0.005	6.82
15.3	0.38	1.117	7.880	0.031	301.336	159.483	0.141	0.996	0.004	8.07
17.9	0.48	1.268	7.812	0.099	270.757	146.089	0.160	0.987	0.013	9.22
20.4	0.59	1.430	7.741	0.170	244.757	137.708	0.181	0.979	0.021	10.47
23.0	0.71	1.597	7.659	0.252	226.149	121.852	0.202	0.968	0.032	11.78
25.5	0.85	1.747	7.567	0.344	206.794	105.454	0.221	0.957	0.043	13.00
28.0	0.99	1.889	7.478	0.432	192.452	97.161	0.239	0.945	0.055	14.18
30.6	1.14	2.022	7.395	0.516	179.413	84.367	0.256	0.935	0.065	15.29
33.1	1.30	2.149	7.306	0.604	166.665	72.834	0.272	0.924	0.076	16.39
35.7	1.45	2.253	7.231	0.680	156.244	62.769	0.285	0.914	0.086	17.30
38.2	1.62	2.350	7.156	0.755	146.095	53.810	0.297	0.905	0.095	18.18
40.8	1.78	2.431	7.106	0.804	137.287	48.660	0.307	0.898	0.102	18.88
43.3	1.96	2.516	7.060	0.851	129.137	41.263	0.318	0.892	0.108	19.61
51.0	2.52	2.710	6.925	0.985	108.273	31.558	0.343	0.875	0.125	21.37
58.6	3.08	2.867	6.873	1.037	93.813	24.520	0.362	0.869	0.131	22.64
66.3	3.67	2.991	6.836	1.074	82.022	18.165	0.378	0.864	0.136	23.63
73.9	4.25	3.081	6.834	1.077	72.936	15.447	0.389	0.864	0.136	24.26
81.5	4.87	3.175	6.851	1.060	65.645	16.329	0.401	0.866	0.134	24.87
89.2	5.47	3.280	6.872	1.038	60.271	18.338	0.415	0.869	0.131	25.52
96.8	6.09	3.400	6.911	0.999	56.140	16.460	0.430	0.874	0.126	26.20
104.4	6.71	3.484	6.943	0.968	52.187	12.907	0.440	0.878	0.122	26.65
112.1	7.32	3.558	6.985	0.926	48.898	11.406	0.450	0.883	0.117	27.00
119.7	7.93	3.623	7.035	0.875	45.916	10.656	0.458	0.889	0.111	27.25
127.4	8.52	3.687	7.083	0.828	43.483	9.334	0.466	0.895	0.105	27.50
135.0	9.16	3.737	7.133	0.777	41.001	7.995	0.472	0.902	0.098	27.65
142.6	9.77	3.787	7.171	0.739	38.947	7.215	0.479	0.907	0.093	27.84
150.3	10.42	3.827	7.217	0.694	36.927	4.770	0.484	0.912	0.088	27.94
157.9	11.04	3.847	7.242	0.669	35.026	4.024	0.486	0.915	0.085	27.98
165.5	11.68	3.878	7.266	0.644	33.375	3.699	0.490	0.919	0.081	28.09
175.7	12.52	3.900	7.287	0.624	31.302	2.211	0.493	0.921	0.079	28.16
191.0	13.79	3.923	7.319	0.592	28.584	2.077	0.496	0.925	0.075	28.19
206.3	15.10	3.954	7.367	0.544	26.307	1.024	0.500	0.931	0.069	28.22
221.5	16.39	3.950	7.381	0.530	24.222	-0.286	0.499	0.933	0.067	28.16
236.8	17.68	3.946	7.378	0.532	22.430	-0.931	0.499	0.933	0.067	28.14
252.1	18.95	3.927	7.377	0.533	20.823	-1.144	0.496	0.933	0.067	28.02
267.3	20.21	3.917	7.362	0.548	19.477	-0.775	0.495	0.931	0.069	28.02
282.6	21.48	3.907	7.352	0.559	18.276	-1.706	0.494	0.929	0.071	27.99
297.9	22.78	3.873	7.331	0.579	17.081	-2.980	0.490	0.927	0.073	27.85
313.1	24.07	3.830	7.280	0.631	15.989	-3.286	0.484	0.920	0.080	27.75
328.4	25.33	3.789	7.239	0.671	15.035	-3.237	0.479	0.915	0.085	27.63
343.7	26.65	3.746	7.186	0.725	14.127	-3.890	0.474	0.908	0.092	27.53
359.0	27.97	3.687	7.135	0.776	13.250	-5.154	0.466	0.902	0.098	27.33
374.2	29.22	3.614	7.063	0.848	12.436	-5.793	0.457	0.893	0.107	27.10



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-16B - Depth: 120.5 - 122.5 ft
 Boring B-2302UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-16B - Depth: 120.5 - 122.5 ft

Boring B-2302UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2302_UD16b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 10.80 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assign. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2302UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-16	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 120.5 - 122.5	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		CRS			90° Stress Path	Remarks:
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
Conditions:	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)				
Container No.	957	4155	5059	4200	Mass Moist Soil + Tare (g)	314.75	131.08
Mass Moist Soil + Cont. (g)	63.58	136.82	63.41	71.37	Mass Tare (g)	186.86	4.36
Mass Dry Soil + Container (g)	57.34	115.41	56.75	62.69	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	127.89	126.72
Mass Container (g)	32.13	29.96	30.58	30.22	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	24.75	25.06	25.45	26.73	Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	25.09	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Dry Soil + Container (g)		
See attached data sheet(s) for additional water contents					Mass Container (g)		
					Mass Excess Dry Soil (g)		
					0.00		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGL Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.55	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.69
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.560	1-T NA		
2 18.510	2-M NA		
3 18.560	3-B NA		
4 18.560	1'-T NA	For Free Standing	
5 18.550	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.550	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	123.43
Dry, $\gamma_{d,o}$ (lb/ft ³) =	98.67

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 5	ID, Rings (mm)			
Thickness (mm):	Top: 0.67			= 67.30
☐ Single	Bottom: 0.67			Corr. for mem.
☒ Double	Membr. Thick. = 0.34			= 66.630
Area Ring with mem., A_o (cm ²) =		34.87	; (in ²) = 5.405	
Mass Top Cap, etc., M_{tc} =		528.0 g,	1.16	lbf
Data corr. for M_{tc} : ☒ Yes;		☐ No	Plattens with Pins: ☐ Yes; ☒ No	

Final Visual Description: Very Pale Brown Fat CLAY (CH)

Other Remarks:

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/30/2008

Date: 3/31/2008

Date: 4/2/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP *HP*

Specimen Take Down: ☒ Spec. removed right after shearing

☐ Spec. unloaded to zero stress with access to water

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: 5G File Name: B-2302_UD16b
 Task Number: NA Specific Gravity: 2.720 ☒ Measured; ☐ Assumed
 Type Test: SDSS Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	10.8	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	1.25 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	24.75	25.06	25.45	25.09	25.09	27.90
S_o	94.4	95.0	95.8	95.1	95.1	100.3
Measured final mass of moist soil, $M_{t,at}$ (g)						126.72
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						126.72

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	25.09
Initial, $M_{d,o}$	102.24
Final, $M_{d,at}$	99.99
Selected, M_d	101.12

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	10.800	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.755		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.755		
ΔV_n using A_o - spec. (cm ³)	2.63		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.63		
ΔV_n using burette meas. (cm ³)	0.90		
Selected ΔV_n (cm ³)	2.63	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$
2.63	
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.17
2.63	
By Cal. Ht. & Init. Spec. Area	By Saturation = 100% and Spec. Unloaded to 0 Stress
ΔV_c (cm ³)	ΔV_c (cm ³)
2.63	NA

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	24.49
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) =	2.64	ΔH_c (mm) =	0.755	$\epsilon_{a,c}$ (%) =	4.07	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.05	H_c (mm) =	17.795	$\epsilon_{v,c}$ (%) =	4.08	$\epsilon_{ac,max}$ (%) =	NA
Conclusions	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.550	64.69	34.87	26.5	123.4	97.6	97.7	0.740
After to $\sigma'_{v,c}$	17.795	62.05	34.87	24.5	126.7	101.7	100.0	0.669
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
 3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF
 Reviewed By: HP

Remarks: t95 for max stress = 263.5 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2302_UD16b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2302UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt.(lb)=	No. Layers =
Sample No.: UD-16	Composite No.:			☐ Pluviated:	Tamper Force (lb)=	Drop (in.) =
Depth (ft): 120.5 - 122.5	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort=	% Comp. = ± Opt.=

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Dynamic	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL PL PI	-200 %	Void Ratio, e
					Total (pcf)	Dry (pcf)				
Condition: Initial	18.55	64.69	34.87	26.47	123.4	97.6	97.7	76	87.1	0.740
After to σ' _{v,c}	17.80	62.05	34.87	24.49	126.7	101.7	100.0	16	NA	0.669
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	60	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.6 %/hr.				
Vert. Consol. Stress, σ'_{vc}	(ksf)	NA	10.847	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., ϵ_{ac}	%	NA	4.07	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, τ_{hc}	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, τ_{hc} / σ'_{vc}	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., ϵ_{hc}	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 10.847 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

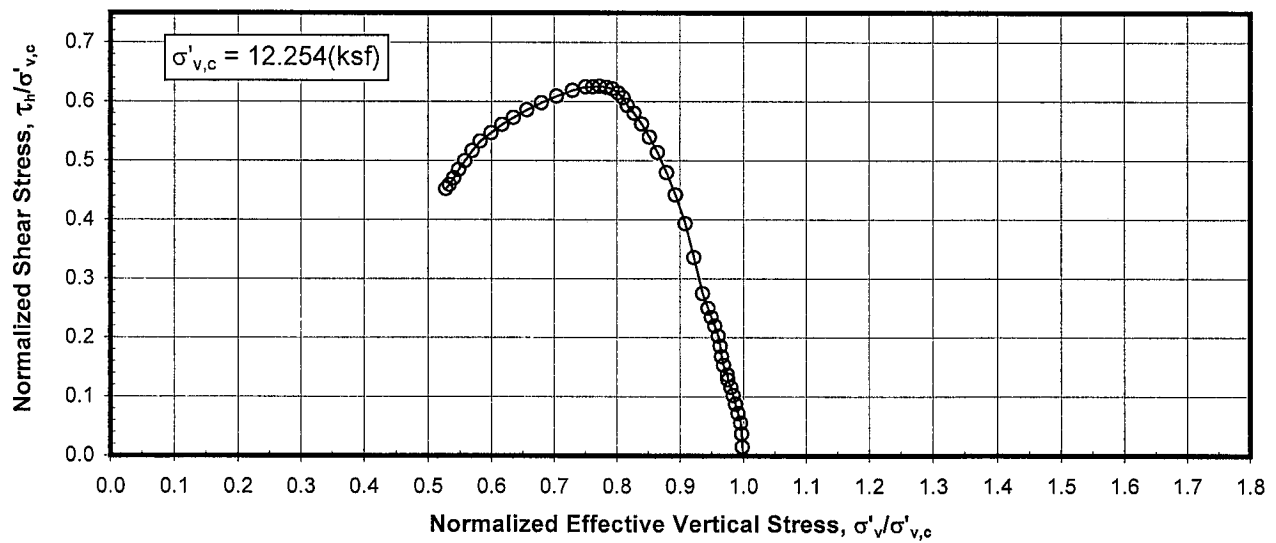
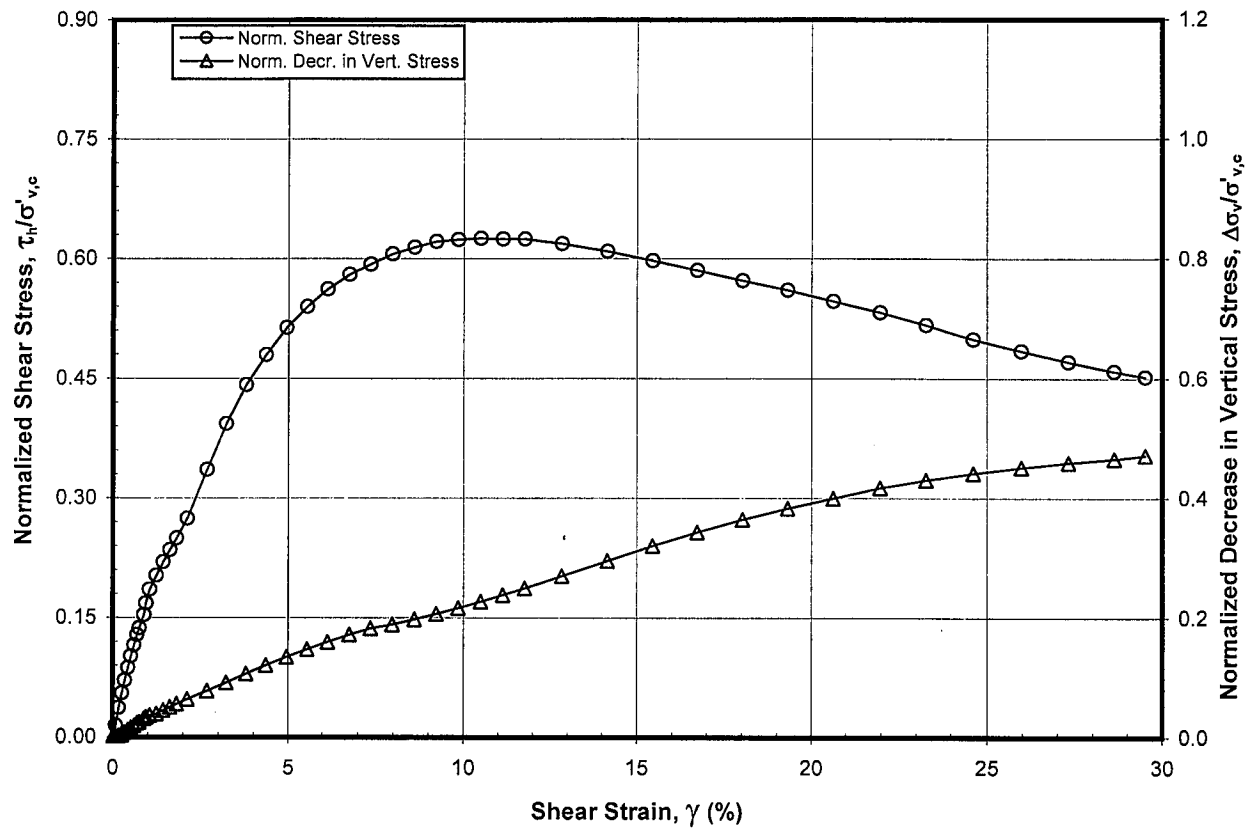
Final Visual Description and Remarks: Very Pale Brown Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	c _v /σ' _{v,c} -
at Peak Shear Stress	5.517	8.49	9.620	0.573	0.113	0.509
at Maximum Strain	3.284	29.13	7.857	0.418	0.276	-

Boring No.: B-2302UD

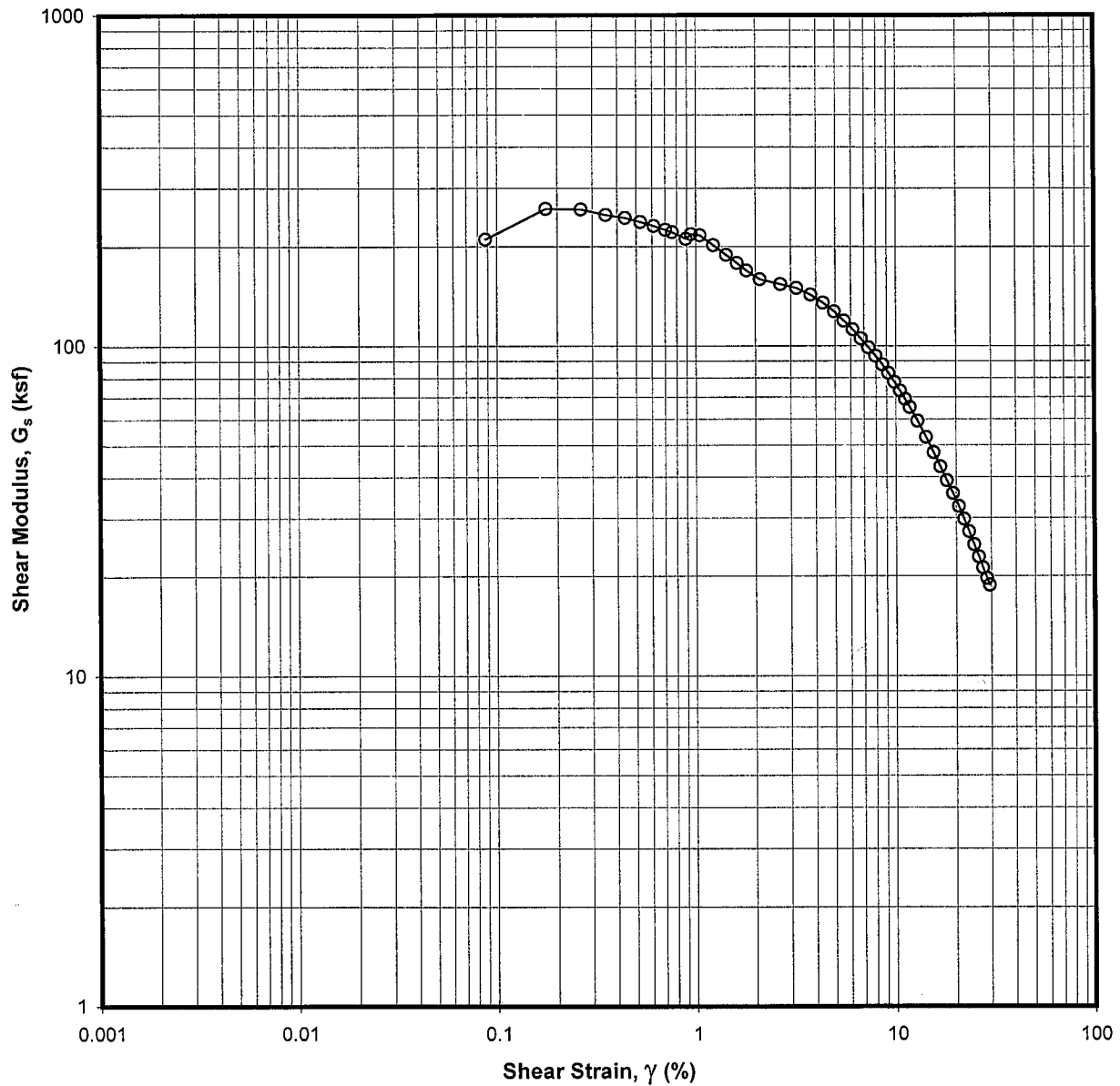
Sample No.: UD-16B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.009	10.847	0.000	-	-	-0.001	1.000	0.000	-0.05
2.6	0.02	0.175	10.826	0.022	804.616	654.828	0.016	0.998	0.002	0.93
5.1	0.07	0.390	10.841	0.006	610.045	404.559	0.036	0.999	0.001	2.06
7.7	0.13	0.595	10.874	-0.026	454.306	294.045	0.055	1.002	-0.002	3.13
10.3	0.21	0.804	10.882	-0.035	393.721	259.564	0.074	1.003	-0.003	4.23
12.9	0.29	0.998	10.879	-0.032	348.404	227.022	0.092	1.003	-0.003	5.24
15.4	0.37	1.186	10.875	-0.027	318.828	225.913	0.109	1.003	-0.003	6.22
18.0	0.46	1.393	10.859	-0.011	302.311	226.262	0.128	1.001	-0.001	7.31
20.6	0.55	1.590	10.847	0.000	288.949	201.612	0.147	1.000	0.000	8.34
23.2	0.65	1.775	10.805	0.042	272.662	184.884	0.164	0.996	0.004	9.33
25.7	0.75	1.949	10.802	0.045	261.844	179.093	0.180	0.996	0.004	10.23
28.3	0.85	2.119	10.779	0.069	251.358	167.635	0.195	0.994	0.006	11.12
30.9	0.95	2.283	10.751	0.096	242.051	160.592	0.210	0.991	0.009	11.99
33.4	1.06	2.459	10.735	0.112	233.194	149.977	0.227	0.990	0.010	12.90
36.0	1.18	2.625	10.711	0.136	224.089	137.943	0.242	0.987	0.013	13.77
38.6	1.29	2.783	10.692	0.155	215.899	129.551	0.257	0.986	0.014	14.59
41.2	1.41	2.929	10.674	0.173	208.380	128.958	0.270	0.984	0.016	15.34
43.7	1.54	3.100	10.649	0.198	202.026	129.714	0.286	0.982	0.018	16.23
51.4	2.00	3.686	10.560	0.287	184.656	108.390	0.340	0.974	0.026	19.24
59.2	2.50	4.137	10.446	0.401	165.703	78.266	0.381	0.963	0.037	21.60
66.9	3.03	4.491	10.340	0.508	148.304	58.349	0.414	0.953	0.047	23.48
74.6	3.58	4.765	10.235	0.612	133.335	45.330	0.439	0.944	0.056	24.96
82.3	4.15	4.995	10.140	0.707	120.607	35.475	0.460	0.935	0.065	26.22
90.0	4.74	5.174	10.042	0.805	109.415	26.998	0.477	0.926	0.074	27.26
97.7	5.36	5.320	9.957	0.890	99.481	18.997	0.490	0.918	0.082	28.11
105.4	6.00	5.414	9.876	0.971	90.327	11.539	0.499	0.910	0.090	28.73
113.1	6.64	5.468	9.823	1.024	82.525	6.456	0.504	0.906	0.094	29.10
120.9	7.25	5.495	9.751	1.096	75.883	3.252	0.507	0.899	0.101	29.40
128.6	7.86	5.508	9.691	1.156	70.186	1.796	0.508	0.893	0.107	29.61
136.3	8.49	5.517	9.620	1.227	65.080	-1.412	0.509	0.887	0.113	29.83
144.0	9.12	5.490	9.549	1.299	60.329	-4.633	0.506	0.880	0.120	29.90
151.7	9.76	5.458	9.472	1.375	56.007	-6.482	0.503	0.873	0.127	29.95
159.4	10.41	5.406	9.385	1.462	52.032	-9.040	0.498	0.865	0.135	29.94
167.1	11.06	5.340	9.283	1.564	48.344	-14.645	0.492	0.856	0.144	29.91
177.4	11.94	5.172	9.128	1.719	43.375	-20.097	0.477	0.842	0.158	29.53
192.8	13.29	4.888	8.963	1.884	36.857	-19.369	0.451	0.826	0.174	28.61
208.3	14.66	4.645	8.836	2.011	31.738	-16.108	0.428	0.815	0.185	27.73
223.7	16.00	4.451	8.742	2.105	27.881	-14.047	0.410	0.806	0.194	26.99
239.1	17.25	4.281	8.657	2.191	24.868	-13.440	0.395	0.798	0.202	26.31
254.5	18.55	4.108	8.539	2.308	22.194	-12.415	0.379	0.787	0.213	25.69
269.9	19.86	3.957	8.440	2.407	19.969	-10.677	0.365	0.778	0.222	25.12
285.4	21.18	3.828	8.335	2.512	18.116	-9.093	0.353	0.768	0.232	24.67
300.8	22.53	3.715	8.254	2.593	16.533	-7.806	0.343	0.761	0.239	24.23
316.2	23.84	3.620	8.186	2.661	15.225	-6.934	0.334	0.755	0.245	23.86
331.6	25.14	3.534	8.112	2.735	14.090	-6.870	0.326	0.748	0.252	23.54
347.0	26.46	3.440	8.025	2.823	13.036	-6.442	0.317	0.740	0.260	23.20
362.5	27.81	3.362	7.936	2.911	12.121	-5.853	0.310	0.732	0.268	22.96
377.9	29.13	3.284	7.857	2.991	11.302	-5.958	0.303	0.724	0.276	22.68



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-19A - Depth: 145.5 - 147.3 ft
 Boring B-2302UD

LAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-19A - Depth: 145.5 - 147.3 ft

Boring B-2302UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2302UD_19a
 Task No.: NA Assign, $\sigma'_{v,c}$ = 12.24 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: Specific Gravity: 2.690 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2302UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-19	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 145.5 - 147.3	Specimen No.: A			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	997	2008	4072	117	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	183.41	4.14	
Mass Moist Soil + Cont. (g)	64.22	82.49	72.70	69.66		134.48	132.62	
Mass Dry Soil + Container (g)	58.63	73.79	66.40	63.27	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	31.60	30.43	30.12	33.02	Container No.			
WATER CONTENT (%)	20.68	20.06	17.36	21.12	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	19.37	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:				
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #		
☒ Trimming Ring for NGI Apparatus		Small-ring ID #		
$H_{s,t}$ (mm):	18.58	$A_{s,t}$ (cm ²):	34.68	
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	64.41	
Remarks:				
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
Height (H_{tr})	Diameter (D_o)	Remarks:		
1 18.620	1-T NA	For Free Standing or Reconstituted Spec.:		
2 18.560	2-M NA			
3 18.580	3-B NA			
4 18.590	1'-T NA			
5 18.580	2'-M NA			
Avg.	3'-B NA	A_{tr} (cm ²):	NA	
= 18.575	Avg NA	V_{tr} (cm ³):	NA	

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	130.34
Dry, $\gamma_{d,o}$ (lb/ft ³) =	109.19

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 5	ID, Rings (mm)			
Thickness (mm):	Top: 0.59	=	66.85	
☐ Single	Bottom: 0.62		Corr. for mem.	
☒ Double	Membr. Thick. = 0.30	=	66.245	
Area Ring with mem., A_o (cm ²) =		34.47	; (in ²) = 5.342	
Mass Top Cap, etc., M_{tc} =		528.0 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Pale Brown Lean CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/18/2008

Date: 3/18/2008

Date: 3/24/2008

Prelim. Calc. By: LF

Final Calc. By: LF

Reviewed By: HP *HP*

Specimen Take Down: ☒ Spec. removed right after shearing

Remarks:

☐ Spec. unloaded to zero stress with access to water

LAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 5G

File Name: B-2302UD_19a

Task Number: NA

Specific Gravity: 2.690



Measured;



Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed";

☐ Reconstituted;

☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	12.24	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.78 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	20.68	20.06	17.36	19.37	19.37	22.82
S_o	100.8	99.2	91.7	97.4	97.4	105.9
Measured final mass of moist soil, $M_{t,at}$ (g)						132.62
Final mass of moist soil corrected for excess dry soil, $M_{t,c}$ (g)						132.62

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	19.37
Initial, $M_{d,o}$	112.66
Final, $M_{d,at}$	109.49
Selected, M_d	111.07

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	12.240	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.850		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.850		
ΔV_n using A_o - spec. (cm ³)	2.95		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.93		
ΔV_n using burette meas. (cm ³)	-3.00		
Selected ΔV_n (cm ³)	2.95	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	2.95
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.93
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.95

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	17.73
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 3.32	ΔH_c (mm) = 0.850	$\epsilon_{a,c}$ (%) = 4.58	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 61.09	H_c (mm) = 17.725	$\epsilon_{v,c}$ (%) = 5.15	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.47	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio,
$G_s = 2.690$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	e
Condition:								
Initial (as trimmed)	18.575	64.41	34.68	21.1	130.3	107.7	101.7	0.560
After to $\sigma'_{v,c}$	17.725	61.09	34.47	17.7	133.6	113.5	100.0	0.489
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 31.9 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2302UD_19a
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2302UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-19	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 145.5 - 147.3	Specimen No.: A			☐ Kneading	☐ Undercompaction:	U _{ni} (%) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. =
						± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.690 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL	-200 %	Void Ratio, e
Condition:					Total (pcf)	Dry (pcf)		PL		
Initial								PI		
After to σ' _{v,c}										
Consol.: to σ' _{vc,max}	18.58	64.41	34.68	21.08	130.3	107.7	101.7	49	95.8	0.560
	17.73	61.09	34.47	17.73	133.6	113.5	100.0	15	NA	0.489
	NA	NA	NA	NA	NA	NA	NA	34	NA	NA

Consolidation Stress Summary and Loading Summary									
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	☒ Static Strain Rate = 4.7 %/hr.				
Vert. Consol. Stress, σ' _{v,c}	(ksf)	NA	12.254	NA	Cyclic Rate (Hz):	0.1;	1;	Other =	
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic	
Axial Strain during Consol., ε _{ax,c}	%	NA	4.58	NA	Change in Height, ΔH _{L,n} (mm):		NA	NA	
Horiz. Consol. Stress, τ _{h,c}	(ksf)	NA	NA	NA	Change in Vol., ΔV _{L,n} (cm ³):		NA	NA	
Consol. Stress Ratio, τ _{h,c} / σ' _{v,c}	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No	
Shear Strain during Consol., ε _{h,c}	%	NA	NA	NA	Number of Loading Cycles, N =		NA		
Undr. Ambient Shear Stress, τ _{h,ua}	(ksf)	NA	NA	NA	±τ _h =		NA (ksf)	±γ =	
Undr. Ambient Shear Strain, ε _{ua}	%	NA	NA	NA	at end of cyclic loading, σ' _{voy,r} =		NA (ksf)		

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No	Value: 12.254 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No	Using Effective Vertical Stress:
☐ Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☐ Yes ☒ No	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
☒ Regular Membrane with Rings	☐ Yes ☒ No	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms. F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

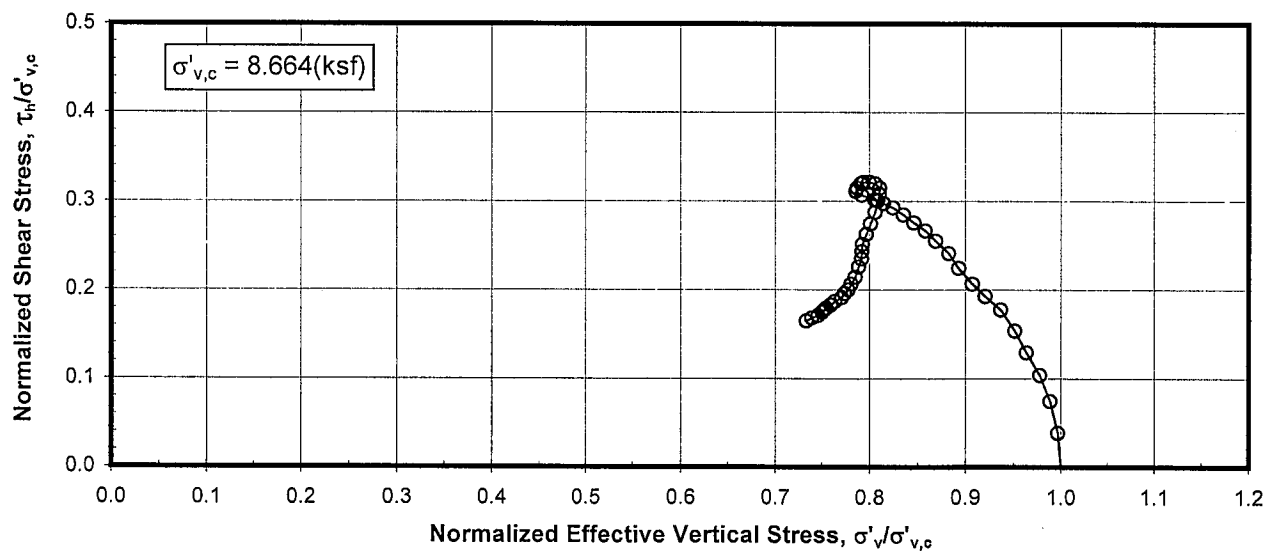
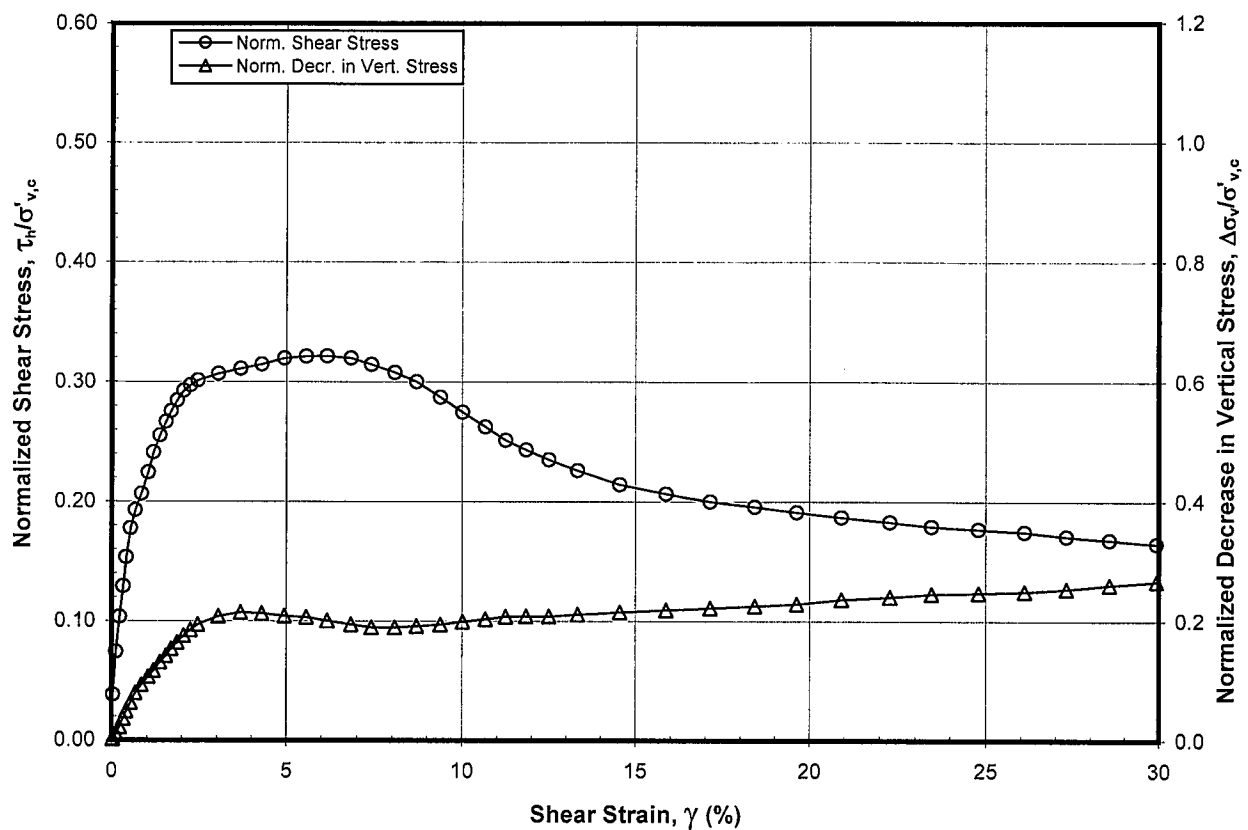
Final Visual Description and Remarks: Pale Brown Lean CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	c _v /σ' _{v,c} -
at Peak Shear Stress	7.665	10.50	9.474	0.809	0.227	0.625
at Maximum Strain	5.536	29.51	6.478	0.855	0.471	-

Boring No.: B-2302UD

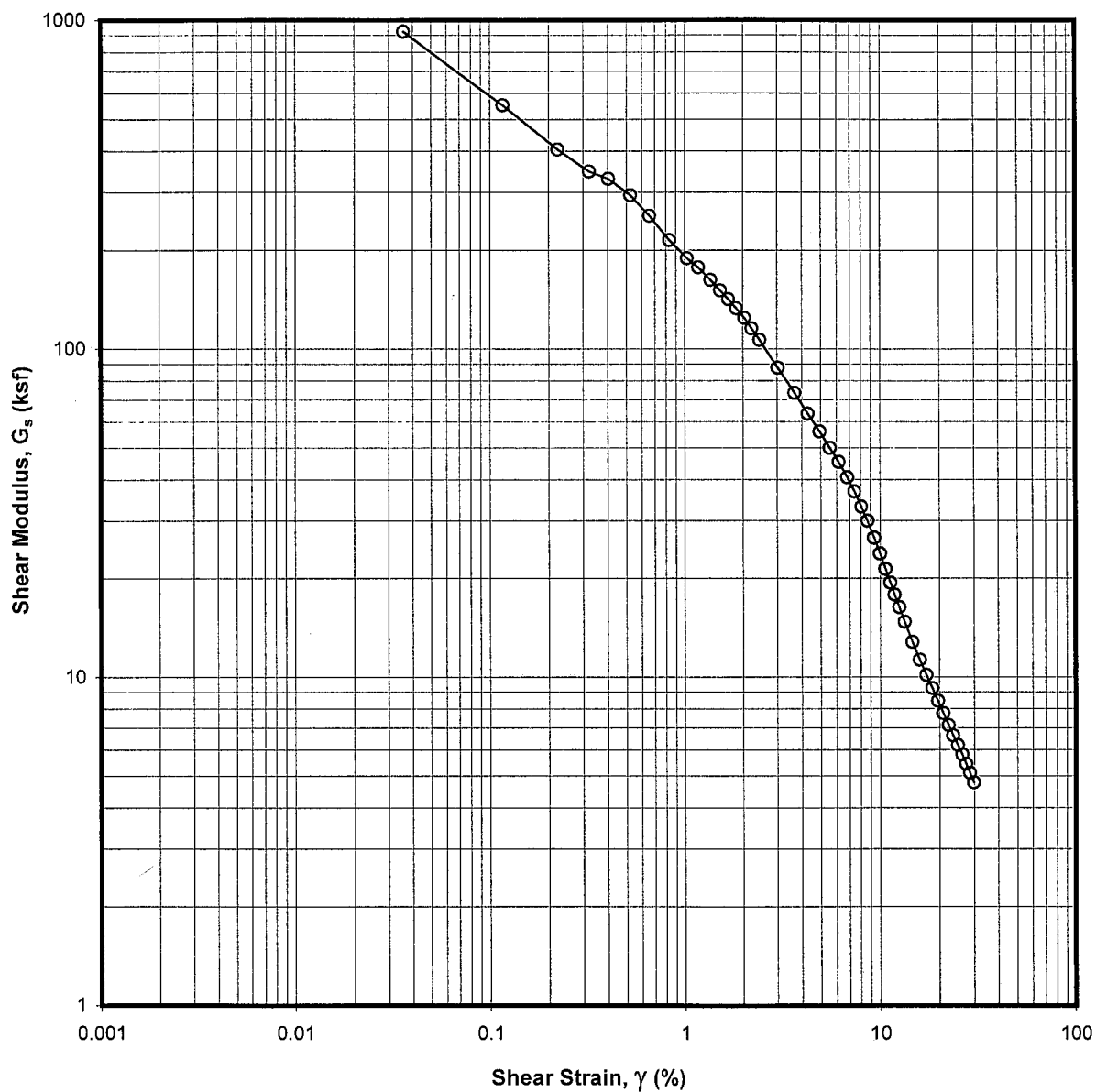
Sample No.: UD-19A

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{bss} (°)
0.0	0.00	-0.004	12.251	0.000	-	-	0.000	1.000	0.000	-0.02
2.6	0.09	0.180	12.232	0.019	209.992	260.117	0.015	0.998	0.002	0.84
5.1	0.18	0.453	12.222	0.029	260.140	283.670	0.037	0.997	0.002	2.12
7.7	0.26	0.678	12.202	0.049	259.127	238.566	0.055	0.996	0.004	3.18
10.3	0.35	0.872	12.151	0.099	249.334	222.171	0.071	0.992	0.008	4.11
12.9	0.44	1.069	12.101	0.150	244.336	213.278	0.087	0.987	0.012	5.05
15.5	0.53	1.246	12.058	0.193	237.332	196.300	0.102	0.984	0.016	5.90
18.1	0.61	1.414	12.016	0.235	230.618	186.615	0.115	0.981	0.019	6.71
20.6	0.70	1.574	11.963	0.288	224.646	179.675	0.128	0.976	0.024	7.50
22.4	0.76	1.678	11.945	0.305	220.936	164.540	0.137	0.975	0.025	8.00
25.8	0.89	1.878	11.873	0.378	210.900	243.394	0.153	0.969	0.031	8.99
28.4	0.95	2.059	11.837	0.414	217.940	267.577	0.168	0.966	0.034	9.87
31.0	1.05	2.269	11.809	0.442	216.249	159.680	0.185	0.964	0.036	10.88
33.5	1.23	2.483	11.771	0.479	201.888	111.972	0.203	0.961	0.039	11.91
36.1	1.43	2.689	11.703	0.547	188.702	101.710	0.219	0.955	0.045	12.94
38.7	1.62	2.874	11.636	0.615	178.112	96.558	0.235	0.950	0.050	13.87
41.3	1.81	3.058	11.572	0.679	169.246	97.454	0.250	0.944	0.055	14.80
45.6	2.11	3.360	11.471	0.780	159.268	116.407	0.274	0.936	0.064	16.33
53.3	2.68	4.110	11.301	0.950	153.775	131.538	0.335	0.922	0.078	19.98
61.1	3.22	4.817	11.131	1.120	149.740	117.483	0.393	0.908	0.091	23.40
68.8	3.79	5.414	10.948	1.303	143.038	93.147	0.442	0.893	0.106	26.31
76.5	4.35	5.874	10.777	1.474	134.994	75.339	0.479	0.879	0.120	28.59
84.3	4.95	6.291	10.605	1.646	127.054	61.657	0.513	0.865	0.134	30.68
92.0	5.55	6.613	10.449	1.802	119.178	49.927	0.540	0.853	0.147	32.33
99.7	6.15	6.886	10.297	1.954	112.108	41.306	0.562	0.840	0.159	33.77
107.4	6.76	7.110	10.149	2.102	105.281	31.364	0.580	0.828	0.171	35.01
115.2	7.36	7.267	10.016	2.235	98.799	25.931	0.593	0.817	0.182	35.96
122.9	7.97	7.425	9.937	2.314	93.177	21.018	0.606	0.811	0.189	36.77
130.6	8.60	7.526	9.837	2.414	87.614	15.035	0.614	0.803	0.197	37.42
138.4	9.22	7.613	9.723	2.528	82.603	9.429	0.621	0.793	0.206	38.06
146.1	9.85	7.645	9.606	2.645	77.651	4.096	0.624	0.784	0.216	38.51
153.8	10.50	7.665	9.474	2.776	73.067	0.817	0.625	0.773	0.227	38.97
161.6	11.13	7.655	9.338	2.912	68.846	-1.033	0.625	0.762	0.238	39.34
169.3	11.76	7.652	9.203	3.048	65.083	-3.709	0.624	0.751	0.249	39.74
182.2	12.83	7.578	8.950	3.301	59.081	-7.864	0.618	0.730	0.269	40.26
197.7	14.15	7.461	8.635	3.616	52.753	-9.921	0.609	0.705	0.295	40.83
213.1	15.45	7.319	8.334	3.917	47.387	-11.254	0.597	0.680	0.320	41.29
228.6	16.72	7.172	8.049	4.202	42.921	-11.784	0.585	0.657	0.343	41.71
244.1	18.02	7.016	7.790	4.460	38.967	-11.721	0.573	0.636	0.364	42.01
259.5	19.31	6.869	7.562	4.689	35.594	-12.099	0.561	0.617	0.383	42.25
275.0	20.64	6.699	7.355	4.895	32.481	-12.818	0.547	0.600	0.399	42.33
290.4	21.97	6.528	7.140	5.111	29.732	-14.049	0.533	0.583	0.417	42.44
305.9	23.27	6.329	6.987	5.264	27.215	-15.552	0.516	0.570	0.430	42.17
321.4	24.61	6.117	6.843	5.408	24.872	-14.735	0.499	0.558	0.441	41.79
336.8	25.97	5.932	6.725	5.526	22.855	-13.017	0.484	0.549	0.451	41.41
352.3	27.31	5.765	6.628	5.622	21.125	-11.675	0.470	0.541	0.459	41.02
367.7	28.62	5.622	6.546	5.704	19.656	-10.324	0.459	0.534	0.465	40.66
378.1	29.51	5.536	6.478	5.773	18.772	-9.718	0.452	0.529	0.471	40.52



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-8B - Depth: 83.5 - 85.5 ft
 Boring B-2304UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-8B - Depth: 83.5 - 85.5 ft

Boring B-2304UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 6G File Name: B-2304_UD8b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 8.64 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-8	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 83.5 - 85.5	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		CRS		90° Stress Path	Remarks:
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
Conditions:	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Strain Stress
					Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)				
Container No.	D-11	994	4091	4229	Mass Moist Soil + Tare (g)	307.09	129.10
Mass Moist Soil + Cont. (g)	67.91	94.91	64.66	71.84	Mass Tare (g)	182.69	4.20
Mass Dry Soil + Container (g)	59.45	80.23	56.69	61.37	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	124.40	124.90
Mass Container (g)	30.24	32.08	30.66	30.30	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	28.96	30.49	30.62	33.70	Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	30.02	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)		
See attached data sheet(s) for additional water contents					Mass Container (g)		
					Mass Excess Dry Soil (g)		
					0.00		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #	
☒ Trimming Ring for NGL Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.60	$A_{s,t}$ (cm ²):	34.90
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	64.91
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.690	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.590	2-M NA		
3 18.600	3-B NA		
4 18.620	1'-T NA		
5 18.560	2'-M NA		
Avg.	3-B NA	A_{tr} (cm ²):	NA
= 18.600	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	119.64
Dry, $\gamma_{d,o}$ (lb/ft ³) =	92.01

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress	Dia. by PiTape (mm)	Area, $A_{c,n}$		
Level	Meas. Corr.	(cm ²)	(in ²)	
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 6	ID, Rings (mm)			
Thickness (mm):	Top: 0.63	= 67.29		
☐ Single	Bottom: 0.62	Corr. for mem.		
☒ Double	Membr. Thick. = 0.31	= 66.660		
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		526.0 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Mottle Brownish Yellow and Pale Yellow Fat CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/28/2008

Date: 3/28/2008

Date: 3/30/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP *HP*

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

KAW 7116/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686
Task Number: NA

Test Station No.: 6G
Specific Gravity: 2.710

File Name: B-2304_UD8b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	8.64	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON,days,hrs)	NA	0.68 days	NA		Post Cy.Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal.
W_o	28.96	30.49	30.62	30.02	30.02	33.16
S_o	95.7	98.1	98.3	97.4	97.4	102.2
Measured final mass of moist soil, $M_{t,at}$ (g)						124.90
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						124.90

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	30.02
Initial, $M_{d,o}$	95.68
Final, $M_{d,at}$	93.42
Selected, M_d	94.55

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	8.640	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.390		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.390		
ΔV_n using A_o - spec. (cm ³)	1.36		
ΔV_n using $A_{c,n}$ - app. (cm ³)	1.36		
ΔV_n using burette meas. (cm ³)	-1.00		
Selected ΔV_n (cm ³)	1.36	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$
1.36	ΔV_c (cm ³)
By Cal. Height & App. Area	-0.50
ΔV_c (cm ³)	
1.36	By Saturation = 100% and
By Cal. Ht. & Init. Spec. Area	Spec. Unloaded to 0 Stress
ΔV_c (cm ³)	ΔV_c (cm ³)
1.36	NA

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	30.19
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) =	1.36	ΔH_c (mm) =	0.390	$\epsilon_{a,c}$ (%) =	2.10	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	63.55	H_c (mm) =	18.210	$\epsilon_{v,c}$ (%) =	2.10	$\epsilon_{ac,max}$ (%) =	NA
Conclusions	A_c (cm ²) =	34.90	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio,
$G_s = 2.710$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	e
Condition:								
Initial (as trimmed)	18.600	64.91	34.90	31.6	119.6	90.9	99.8	0.861
After to $\sigma'_{v,c}$	18.210	63.55	34.90	30.2	120.9	92.9	100.0	0.822
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 13.7 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 6G File Name: B-2304_UD8b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-8	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 83.5 - 85.5	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{nl} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water With - Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.710 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.60	64.91	34.90	31.57	119.6	90.9	99.8	61	93.7	0.861
After to σ' _{v,c}	18.21	63.55	34.90	30.19	120.9	92.9	100.0	26	NA	0.822
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	35	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.9 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	8.664	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	2.10	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,f} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 8.664 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model: ☐	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

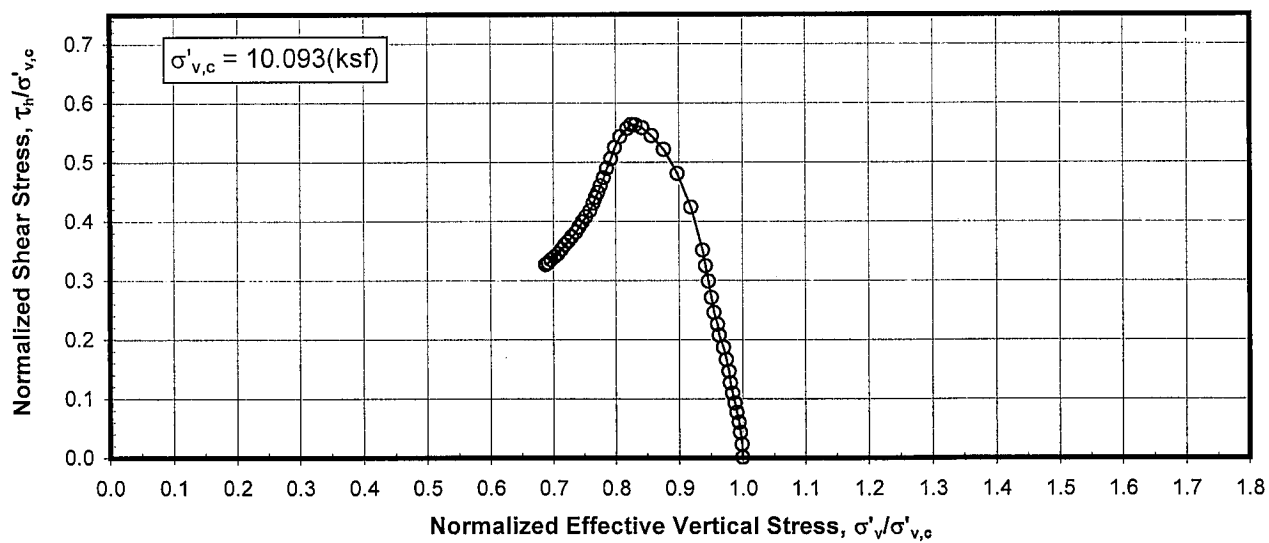
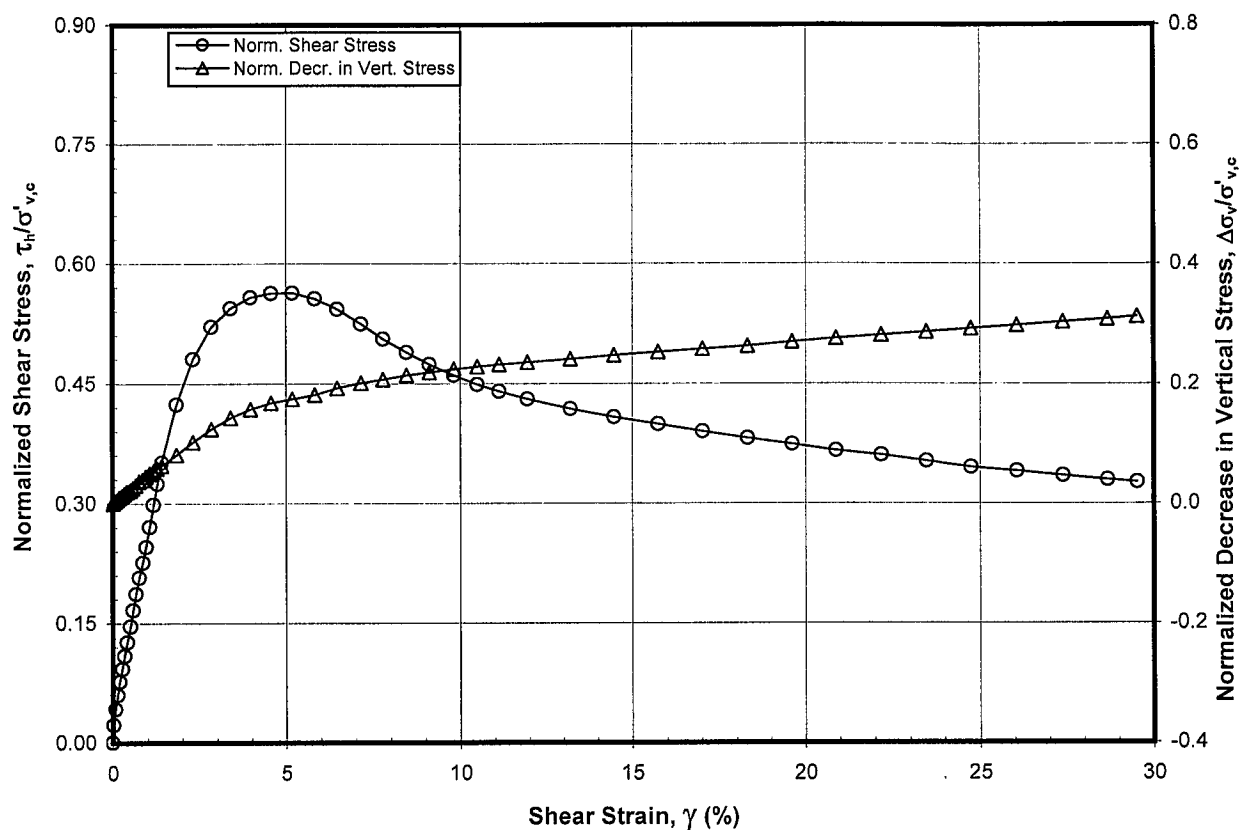
Final Visual Description and Remarks: Mottle Brownish Yellow and Pale Yellow Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{vc} -	c _d /σ' _{vc} -
at Peak Shear Stress	2.783	6.17	6.927	0.402	0.200	0.321
at Maximum Strain	1.426	29.94	6.355	0.224	0.266	-

Boring No.: B-2304UD

Sample No.: UD-8B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.002	8.664	0.000	-	-	0.000	1.000	0.000	-0.01
2.5	0.04	0.330	8.640	0.024	923.816	654.956	0.038	0.997	0.003	2.19
5.0	0.12	0.642	8.567	0.096	551.571	313.699	0.074	0.989	0.011	4.29
7.5	0.22	0.897	8.474	0.189	404.187	230.263	0.104	0.978	0.022	6.04
10.1	0.32	1.118	8.352	0.312	346.582	240.167	0.129	0.964	0.036	7.62
12.6	0.40	1.329	8.245	0.419	329.464	216.709	0.153	0.952	0.048	9.16
15.1	0.53	1.538	8.117	0.547	293.229	135.806	0.177	0.937	0.063	10.73
17.6	0.66	1.669	7.975	0.688	254.158	83.186	0.193	0.921	0.079	11.82
20.1	0.83	1.788	7.860	0.804	214.488	73.299	0.206	0.907	0.093	12.81
22.6	1.03	1.943	7.741	0.923	188.924	87.428	0.224	0.893	0.107	14.09
25.2	1.18	2.087	7.650	1.013	176.940	80.859	0.241	0.883	0.117	15.26
27.7	1.36	2.209	7.529	1.135	162.038	62.697	0.255	0.869	0.131	16.35
30.2	1.53	2.309	7.435	1.229	150.631	54.305	0.267	0.858	0.142	17.26
32.7	1.69	2.385	7.333	1.330	141.501	47.743	0.275	0.846	0.154	18.02
35.2	1.86	2.463	7.240	1.424	132.775	41.708	0.284	0.836	0.164	18.79
37.7	2.04	2.532	7.146	1.518	124.129	29.273	0.292	0.825	0.175	19.51
40.2	2.23	2.573	7.060	1.603	115.273	18.435	0.297	0.815	0.185	20.02
42.7	2.45	2.607	6.982	1.682	106.486	12.078	0.301	0.806	0.194	20.48
50.3	3.03	2.655	6.864	1.800	87.639	7.085	0.306	0.792	0.208	21.15
57.8	3.68	2.693	6.809	1.854	73.341	5.306	0.311	0.786	0.214	21.58
65.4	4.30	2.723	6.822	1.842	63.387	5.706	0.314	0.787	0.213	21.76
72.9	4.95	2.766	6.856	1.807	55.925	4.451	0.319	0.791	0.209	21.97
80.4	5.57	2.780	6.878	1.785	49.917	1.339	0.321	0.794	0.206	22.01
88.0	6.17	2.783	6.927	1.737	45.164	-0.859	0.321	0.800	0.200	21.89
95.5	6.83	2.768	6.983	1.681	40.561	-4.951	0.320	0.806	0.194	21.62
103.0	7.41	2.723	7.026	1.638	36.761	-8.360	0.314	0.811	0.189	21.19
110.5	8.07	2.664	7.023	1.641	33.021	-9.809	0.307	0.811	0.189	20.77
118.1	8.70	2.597	7.008	1.656	29.887	-13.300	0.300	0.809	0.191	20.34
125.6	9.38	2.488	6.983	1.681	26.544	-16.749	0.287	0.806	0.194	19.61
133.1	10.01	2.378	6.943	1.721	23.775	-16.830	0.274	0.801	0.199	18.91
140.7	10.67	2.272	6.906	1.758	21.326	-16.339	0.262	0.797	0.203	18.21
148.2	11.25	2.176	6.869	1.794	19.356	-14.206	0.251	0.793	0.207	17.57
155.7	11.84	2.106	6.864	1.800	17.806	-11.439	0.243	0.792	0.208	17.06
163.3	12.49	2.034	6.861	1.803	16.295	-10.107	0.235	0.792	0.208	16.51
173.3	13.33	1.957	6.833	1.831	14.693	-8.754	0.226	0.789	0.211	15.98
188.4	14.56	1.855	6.803	1.860	12.752	-6.753	0.214	0.785	0.215	15.25
203.5	15.87	1.786	6.768	1.896	11.268	-4.785	0.206	0.781	0.219	14.78
218.5	17.14	1.731	6.741	1.923	10.115	-3.610	0.200	0.778	0.222	14.40
233.6	18.41	1.695	6.709	1.955	9.219	-3.001	0.196	0.774	0.226	14.18
248.6	19.64	1.656	6.681	1.983	8.444	-3.055	0.191	0.771	0.229	13.92
263.7	20.92	1.618	6.620	2.044	7.744	-2.696	0.187	0.764	0.236	13.74
278.8	22.29	1.585	6.581	2.082	7.118	-2.573	0.183	0.760	0.240	13.54
293.8	23.47	1.553	6.540	2.124	6.625	-2.102	0.179	0.755	0.245	13.36
308.9	24.80	1.533	6.520	2.143	6.191	-1.549	0.177	0.753	0.247	13.23
324.0	26.11	1.512	6.502	2.162	5.798	-2.078	0.175	0.750	0.250	13.09
339.0	27.32	1.481	6.463	2.200	5.430	-2.347	0.171	0.746	0.254	12.91
354.1	28.56	1.454	6.407	2.257	5.100	-2.106	0.168	0.740	0.260	12.79
369.2	29.94	1.426	6.355	2.308	4.771	-2.067	0.165	0.734	0.266	12.65



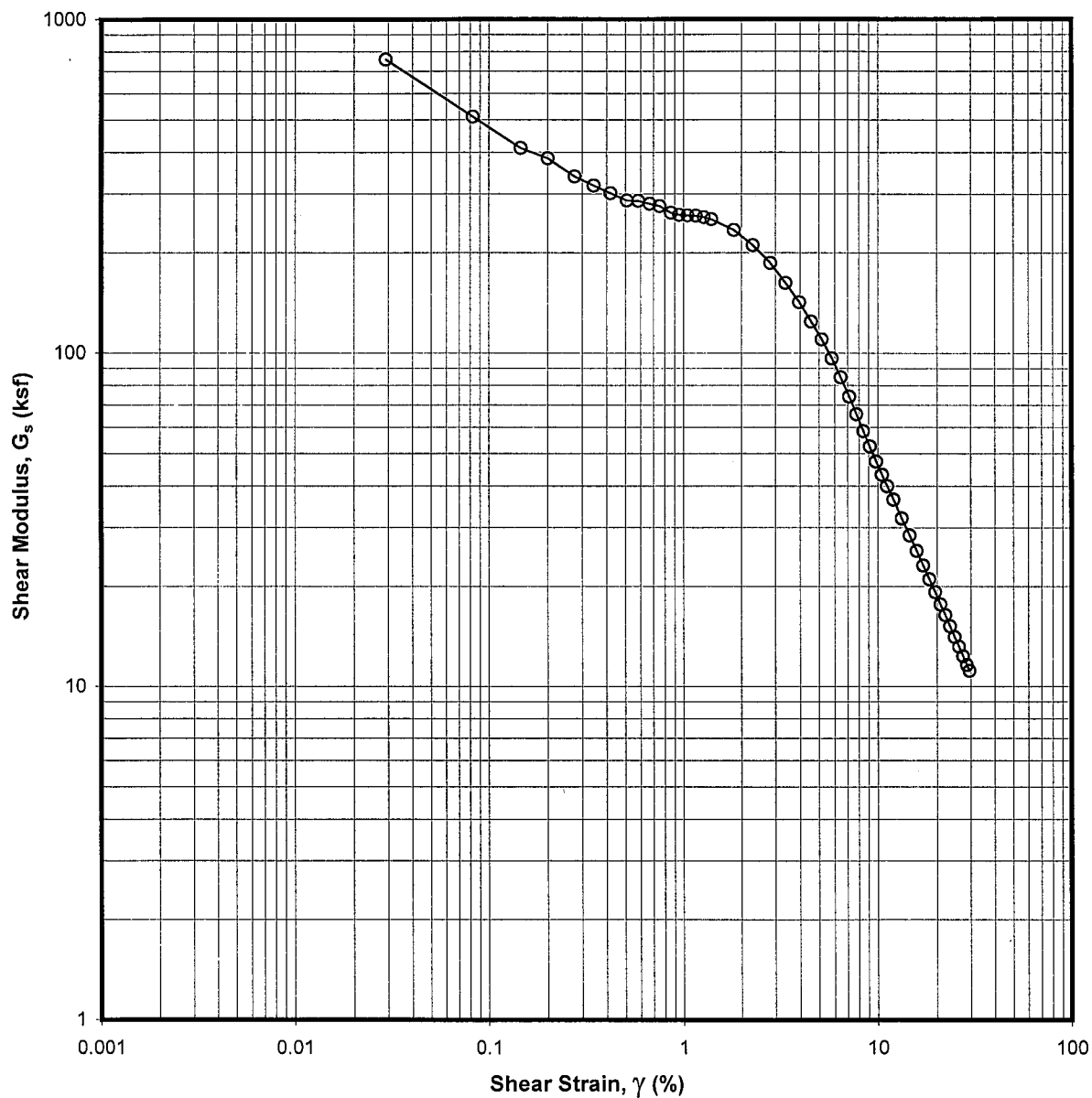
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-11B - Depth: 111.0 - 113.0 ft

Boring B-2304UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-11B - Depth: 111.0 - 113.0 ft

Boring B-2304UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2304_UD11b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 10.08 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA , NA , NA & NA
 Assig. Remarks: _____ Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer = _____
Boring No.: <u>B-2304UD</u>	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) = _____	No. Layers = _____
Sample No.: <u>UD-11</u>	Compostite No.: _____			☐ Pluviated:	Tamper Force (lb) = _____	Drop (in.) = _____
Depth (ft): <u>111.0 - 113.0</u>	Specimen No.: <u>B</u>			☐ Kneading	☐ Undercompaction: U_{ni} (%) = _____	Dia. (in.) = _____
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort = _____	% Comp. = _____ $\pm$ Opt. = _____

Type	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		CRS		90° Stress Path	Remarks: _____
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
Conditions:	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) _____ Strain _____ Stress _____
					Rate: <u>0.1</u> ; 1; Other: _____

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)				
Container No.	1157		4098	1152	Mass Moist Soil + Tare (g)	314.84	135.10
Mass Moist Soil + Cont. (g)	79.93		71.79	74.58	Mass Tare (g)	183.38	4.05
Mass Dry Soil + Container (g)	71.11		64.54	66.68	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	131.46	131.05
Mass Container (g)	31.75		30.41	32.38	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	22.41		21.24	23.03	Container No. _____		
Avg. Initial WC, $W_{o,avg}$ (%)	21.83		Final W_{at} : ☒ Slice ; ☐ Whole Spec.		Mass Dry Soil + Container (g) _____		
See attached data sheet(s) for additional water contents					Mass Container (g) _____		
					Mass Excess Dry Soil (g) <u>0.00</u>		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID # _____	
☒ Trimming Ring for NGI Apparatus		Small-ring ID # _____	
$H_{s,t}$ (mm):	18.65	$A_{s,t}$ (cm ²):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	64.67
Remarks: _____			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.680	1-T NA		
2 18.610	2-M NA		
3 18.660	3-B NA		
4 18.650	1'-T NA	For Free Standing	
5 18.630	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.650	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	126.90
Dry, $\gamma_{d,o}$ (lb/ft ³) =	104.17

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress	Dia. by PiTape (mm)		Area, $A_{c,n}$	
Level	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. <u>5</u>	ID, Rings (mm) _____			
Thickness (mm):	Top: <u>0.58</u>	= <u>67.05</u>		
☐ Single	Bottom: <u>0.61</u>	Corr. for mem. _____		
☒ Double	Membr. Thick. = <u>0.30</u>	= <u>66.450</u>		
Area Ring with mem., A_o (cm ²) =		<u>34.68</u>	; (in ²) = <u>5.375</u>	
Mass Top Cap, etc., M_{tc} =		<u>528.0</u> g,	<u>1.16</u> lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Other Remarks: _____

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/28/2008

Date: 3/28/2008

Date: 3/30/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks: _____

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 5G

File Name: B-2304_UD11b

Task Number: NA

Specific Gravity: 2.720

☒ Measured; ☐ Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	10.08	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.78 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No

 Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	22.41		21.24	21.83	21.83	23.42
S_o	96.0		93.3	94.7	94.7	98.2

 Measured final mass of moist soil, $M_{l,at}$ (g)

131.05

 Final mass of moist soil corrected for excess dry soil, $M_{l,at,c}$ (g)

131.05

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	21.83
Initial, $M_{d,o}$	107.90
Final, $M_{d,at}$	106.52
Selected, M_d	107.21

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	10.080	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.510		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.510		
ΔV_n using A_o - spec. (cm ³)	1.77		
ΔV_n using $A_{c,n}$ - app. (cm ³)	1.77		
ΔV_n using burette meas. (cm ³)	0.20		
Selected ΔV_n (cm ³)	1.77	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	1.77
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.77
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.77

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	21.81
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 1.76	ΔH_c (mm) = 0.510	$\epsilon_{a,c}$ (%) = 2.73	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 62.91	H_c (mm) = 18.140	$\epsilon_{v,c}$ (%) = 2.72	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.68	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.650	64.67	34.68	22.6	126.9	103.5	96.5	0.641
After to $\sigma'_{v,c}$	18.140	62.91	34.68	21.8	129.6	106.4	100.0	0.596
Consol.: to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
 3 - Uses measured value at appropriate stress level (NA for rings).

 Calculated By: LF
 Reviewed By: HP

Remarks: t95 for max stress = 16.9 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2304_UD11b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-11	Composite No.:			Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 111.0 - 113.0	Specimen No.: B			Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water With - Bath	Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties									
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %
Condition:								PI	
Initial	18.65	64.67	34.68	22.62	126.9	103.5	96.5	77	99.1
After to σ' _{v,c}	18.14	62.91	34.68	21.81	129.6	106.4	100.0	19	NA
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	58	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.7 %/hr.				
Vert. Consol. Stress, σ'_{vc}	(ksf)	NA	10.093	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., ϵ_{ac}	%	NA	2.73	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, τ_{hc}	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, τ_{hc} / σ'_{vc}	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., ϵ_{hc}	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm\tau_h =$ NA (ksf)		$\pm\gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No	Value: 10.093 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No	Using Effective Vertical Stress:
☐ Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☐ Yes ☒ No	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
☒ Regular Membrane with Rings		☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

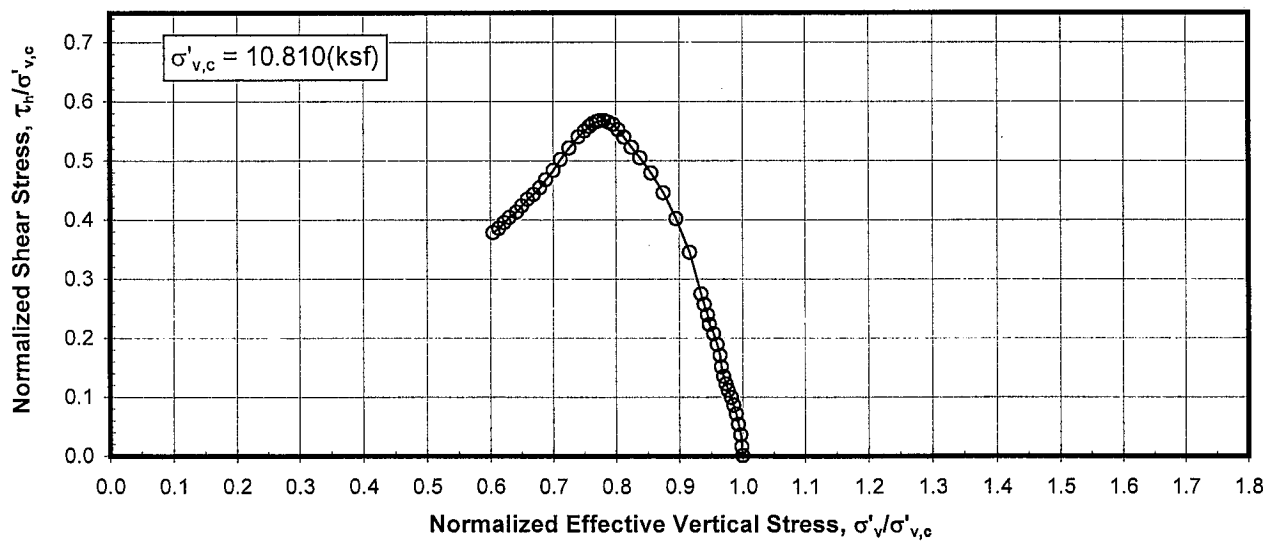
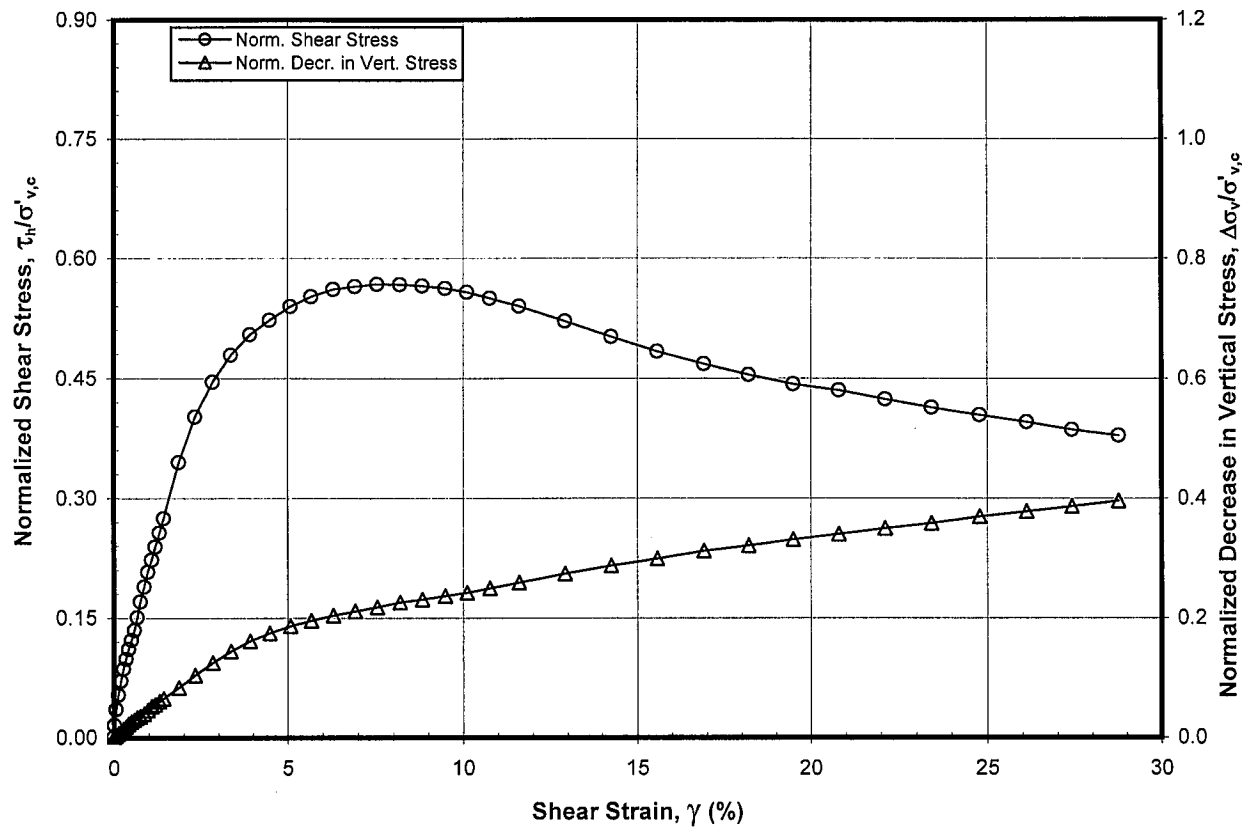
Final Visual Description and Remarks: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{vc}	c _i /σ' _{vc}
at Peak Shear Stress	5.687	5.18	8.334	0.682	0.174	0.563
at Maximum Strain	3.296	29.53	6.943	0.475	0.312	-

Boring No.: B-2304UD

Sample No.: UD-11B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.006	10.093	0.000	-	-	0.001	1.000	0.000	0.03
2.5	0.03	0.227	10.083	0.011	758.656	567.152	0.023	0.999	0.001	1.29
5.0	0.08	0.429	10.057	0.036	510.530	327.921	0.042	0.996	0.004	2.44
7.6	0.15	0.605	10.033	0.061	411.180	294.145	0.060	0.994	0.006	3.45
10.1	0.20	0.773	9.998	0.095	383.082	262.760	0.077	0.991	0.009	4.42
12.6	0.27	0.935	9.970	0.123	338.118	227.433	0.093	0.988	0.012	5.36
15.2	0.34	1.102	9.934	0.159	317.679	232.310	0.109	0.984	0.016	6.33
17.7	0.42	1.274	9.895	0.199	301.319	222.218	0.126	0.980	0.020	7.34
20.2	0.51	1.471	9.874	0.219	286.449	249.889	0.146	0.978	0.022	8.47
22.7	0.58	1.677	9.836	0.257	285.958	261.954	0.166	0.975	0.025	9.68
25.3	0.67	1.883	9.789	0.305	280.292	240.105	0.187	0.970	0.030	10.89
27.8	0.76	2.089	9.724	0.369	275.562	207.845	0.207	0.963	0.037	12.12
30.3	0.86	2.279	9.694	0.399	263.297	198.695	0.226	0.960	0.040	13.23
32.8	0.95	2.477	9.641	0.452	259.261	234.640	0.245	0.955	0.045	14.41
35.4	1.06	2.732	9.597	0.496	258.241	250.476	0.271	0.951	0.049	15.89
37.9	1.17	3.011	9.553	0.540	257.668	241.188	0.298	0.947	0.053	17.49
40.4	1.28	3.274	9.509	0.585	255.210	223.711	0.324	0.942	0.058	19.00
42.9	1.40	3.542	9.458	0.635	251.878	195.005	0.351	0.937	0.063	20.53
50.5	1.83	4.279	9.276	0.818	233.439	147.080	0.424	0.919	0.081	24.77
58.1	2.30	4.852	9.062	1.031	210.475	99.398	0.481	0.898	0.102	28.17
65.6	2.83	5.259	8.844	1.249	185.727	59.646	0.521	0.876	0.124	30.74
73.2	3.39	5.493	8.654	1.439	161.999	32.762	0.544	0.857	0.143	32.41
80.8	3.96	5.630	8.508	1.585	141.852	15.980	0.558	0.843	0.157	33.49
88.3	4.57	5.680	8.401	1.692	124.199	4.701	0.563	0.832	0.168	34.06
95.9	5.18	5.687	8.334	1.759	109.637	-5.075	0.563	0.826	0.174	34.31
103.5	5.83	5.614	8.263	1.830	96.204	-16.056	0.556	0.819	0.181	34.19
111.0	6.47	5.479	8.154	1.940	84.549	-24.405	0.543	0.808	0.192	33.90
118.6	7.14	5.293	8.067	2.026	74.007	-28.898	0.524	0.799	0.201	33.27
126.2	7.77	5.104	8.006	2.087	65.575	-27.254	0.506	0.793	0.207	32.52
133.7	8.45	4.937	7.940	2.153	58.334	-24.048	0.489	0.787	0.213	31.87
141.3	9.11	4.784	7.888	2.205	52.465	-21.583	0.474	0.781	0.219	31.23
148.9	9.81	4.645	7.834	2.259	47.282	-18.370	0.460	0.776	0.224	30.66
156.4	10.49	4.530	7.793	2.300	43.137	-15.351	0.449	0.772	0.228	30.17
164.0	11.12	4.443	7.754	2.339	39.914	-12.767	0.440	0.768	0.232	29.81
174.1	11.95	4.345	7.718	2.375	36.320	-10.879	0.430	0.765	0.235	29.38
189.2	13.20	4.221	7.664	2.429	31.925	-9.049	0.418	0.759	0.241	28.84
204.4	14.47	4.117	7.599	2.494	28.408	-7.610	0.408	0.753	0.247	28.44
219.5	15.74	4.028	7.545	2.548	25.553	-7.184	0.399	0.748	0.252	28.09
234.6	17.02	3.934	7.488	2.605	23.081	-6.877	0.390	0.742	0.258	27.71
249.7	18.31	3.851	7.440	2.653	20.998	-6.187	0.382	0.737	0.263	27.37
264.9	19.61	3.773	7.371	2.722	19.214	-6.091	0.374	0.730	0.270	27.11
280.0	20.89	3.694	7.312	2.781	17.657	-5.422	0.366	0.724	0.276	26.80
295.1	22.17	3.634	7.258	2.835	16.366	-5.212	0.360	0.719	0.281	26.60
310.3	23.46	3.560	7.204	2.889	15.147	-5.896	0.353	0.714	0.286	26.29
325.4	24.74	3.483	7.148	2.945	14.057	-4.846	0.345	0.708	0.292	25.98
340.5	26.06	3.434	7.092	3.001	13.155	-4.025	0.340	0.703	0.297	25.84
355.6	27.39	3.377	7.032	3.061	12.307	-4.134	0.335	0.697	0.303	25.65
370.8	28.67	3.326	6.985	3.109	11.581	-3.747	0.330	0.692	0.308	25.47
380.8	29.53	3.296	6.943	3.150	11.140	-3.586	0.327	0.688	0.312	25.39



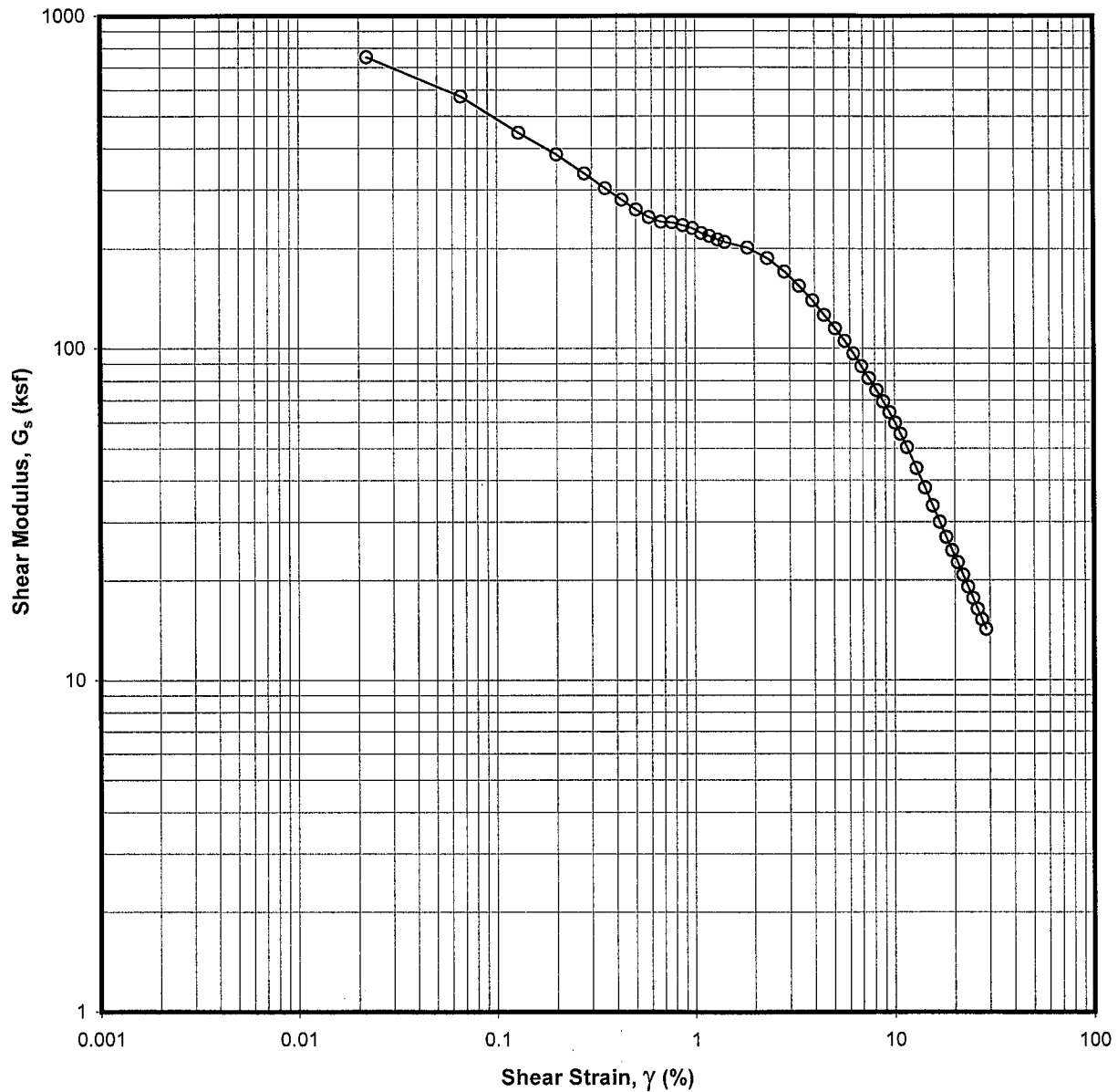
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-13B - Depth: 121.0 - 123.0 ft

Boring B-2304UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-13B - Depth: 121.0 - 123.0 ft

Boring B-2304UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2304_UD13b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 10.80 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2304UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-13		Compostite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 121.0 - 123.0		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	D7	615	4096	4072	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	182.72	138.28	4.43
Mass Moist Soil + Cont. (g)	71.02	107.30	67.43	80.10	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	134.36	133.85	
Mass Dry Soil + Container (g)	64.92	95.25	61.93	71.81	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	30.15	31.66	30.61	30.12	Container No.			
WATER CONTENT (%)	17.54	18.95	17.56	19.88	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	18.02	Final W_{at} :		☒ Slice ; ☐ Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:				
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #		
☒ Trimming Ring for NGI Apparatus		Small-ring ID #		
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm ²):	34.90	
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	64.65	
Remarks:				
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
Height (H_{tr})	Diameter (D_o)	Remarks:		
1 18.580	1-T NA	For Free Standing or Reconstituted Spec.:		
2 18.520	2-M NA			
3 18.550	3-B NA			
4 18.430	1'-T NA			
5 18.530	2'-M NA			
Avg.	3'-B NA	A_{tr} (cm ²):	NA	
= 18.525	Avg NA	V_{tr} (cm ³):	NA	

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	129.74
Dry, $\gamma_{d,o}$ (lb/ft ³) =	109.93

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Meas.	Corr.	Area, $A_{c,n}$ (cm ²) (in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No.	5	ID, Rings (mm)		
Thickness (mm):	Top: 0.65	= 67.30		
☐ Single	Bottom: 0.62	Corr. for mem.		
☒ Double	Membr. Thick. = 0.32	= 66.660		
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		528.0 g,	1.16 lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC
 Date: 3/24/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 3/29/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 3/26/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 5G

File Name: B-2304_UD13b

Task Number: NA

Specific Gravity: 2.710



Measured;



Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed";

☐ Reconstituted;

☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	10.8	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading		
Horizontal Force, $P_{hr,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)		
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)		
t_c (ON,days,hrs)	NA	0.94 days	NA		Post Cy.Displ. Reset to Null Position:		
						Yes;	No

 Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	17.54	18.95	17.56	18.02	18.02	20.34
S_o	89.7	93.7	89.8	91.1	91.1	97.3
Measured final mass of moist soil, M_{lat} (g)						133.85
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						133.85

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	18.02
Initial, $M_{d,o}$	113.85
Final, $M_{d,at}$	111.65
Selected, M_d	112.75

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	10.800	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.680		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.680		
ΔV_n using A_o - spec. (cm ³)	2.37		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.37		
ΔV_n using burette meas. (cm ³)	0.50		
Selected ΔV_n (cm ³)	2.37	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,o}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	2.37	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	0.51
ΔV_c (cm ³)	2.37	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	2.37		

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	18.24
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 2.37	ΔH_c (mm) = 0.680	$\epsilon_{a,c}$ (%) = 3.67	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 62.28	H_c (mm) = 17.845	$\epsilon_{v,c}$ (%) = 3.67	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.90	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio, e
$G_s = 2.710$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	
Condition:								
Initial (as trimmed)	18.525	64.65	34.90	19.2	129.7	108.9	94.2	0.554
After to $\sigma'_{v,c}$	17.845	62.28	34.90	18.2	133.6	113.0	100.0	0.497
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 7.7 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2304_UD13b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2304UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-13	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 121.0 - 123.0	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.710 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL	-200	Void Ratio
					Total (pcf)	Dry (pcf)		PL		
Condition:								PI	%	e
Initial	18.53	64.65	34.90	19.17	129.7	108.9	94.2	62	92.9	0.554
After to σ' _{v,c}	17.85	62.28	34.90	18.24	133.6	113.0	100.0	18	NA	0.497
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	44	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.6 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	10.810	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	3.67	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ub}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ub}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 10.810 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model: ☐	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

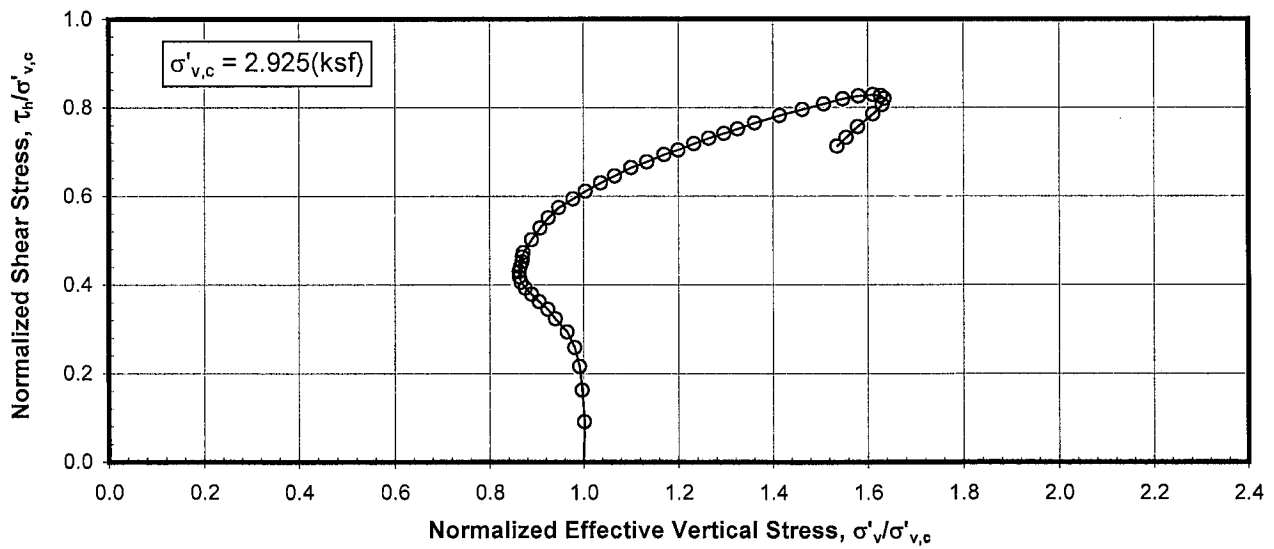
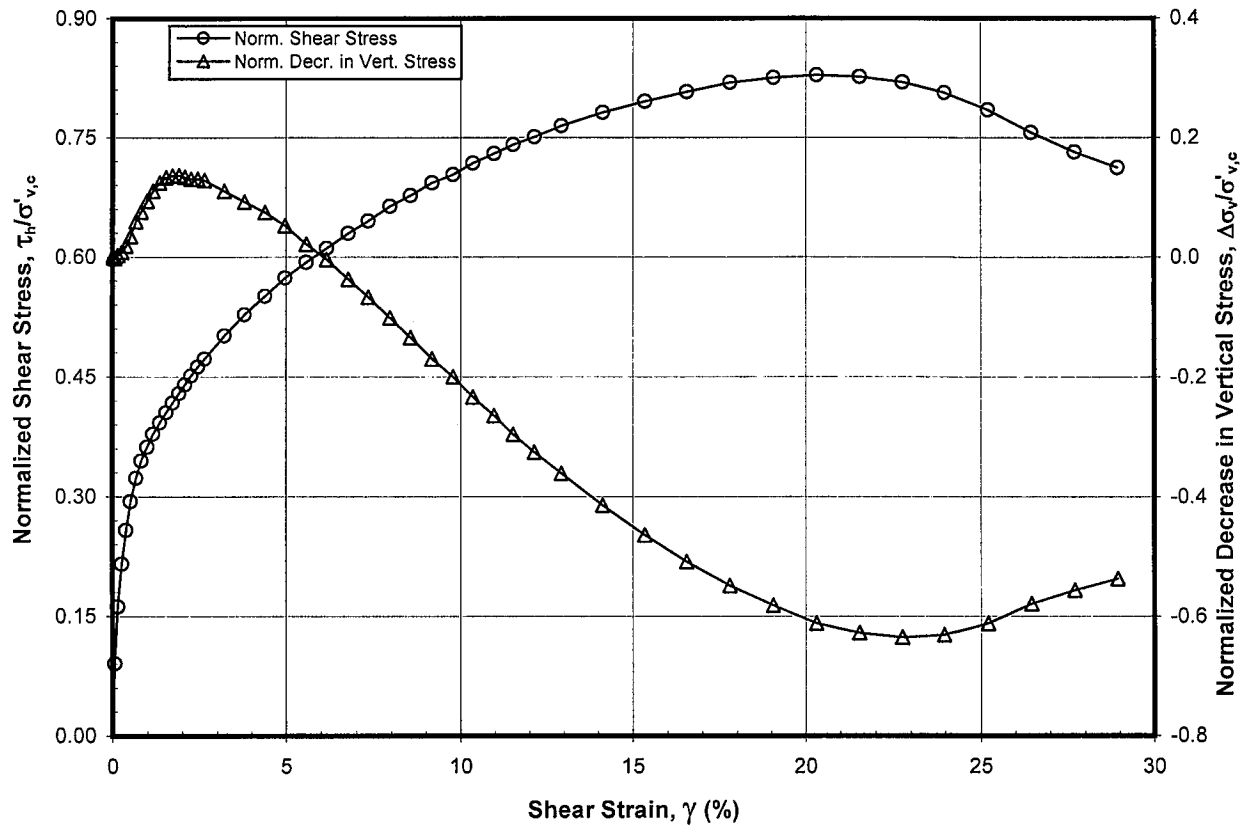
Final Visual Description and Remarks: Mottled Pale Yellow and Yellow Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	c _u /σ' _{v,c}
at Peak Shear Stress	6.136	7.54	8.453	0.726	0.218	0.568
at Maximum Strain	4.093	28.76	6.533	0.626	0.396	-

Boring No.: B-2304UD

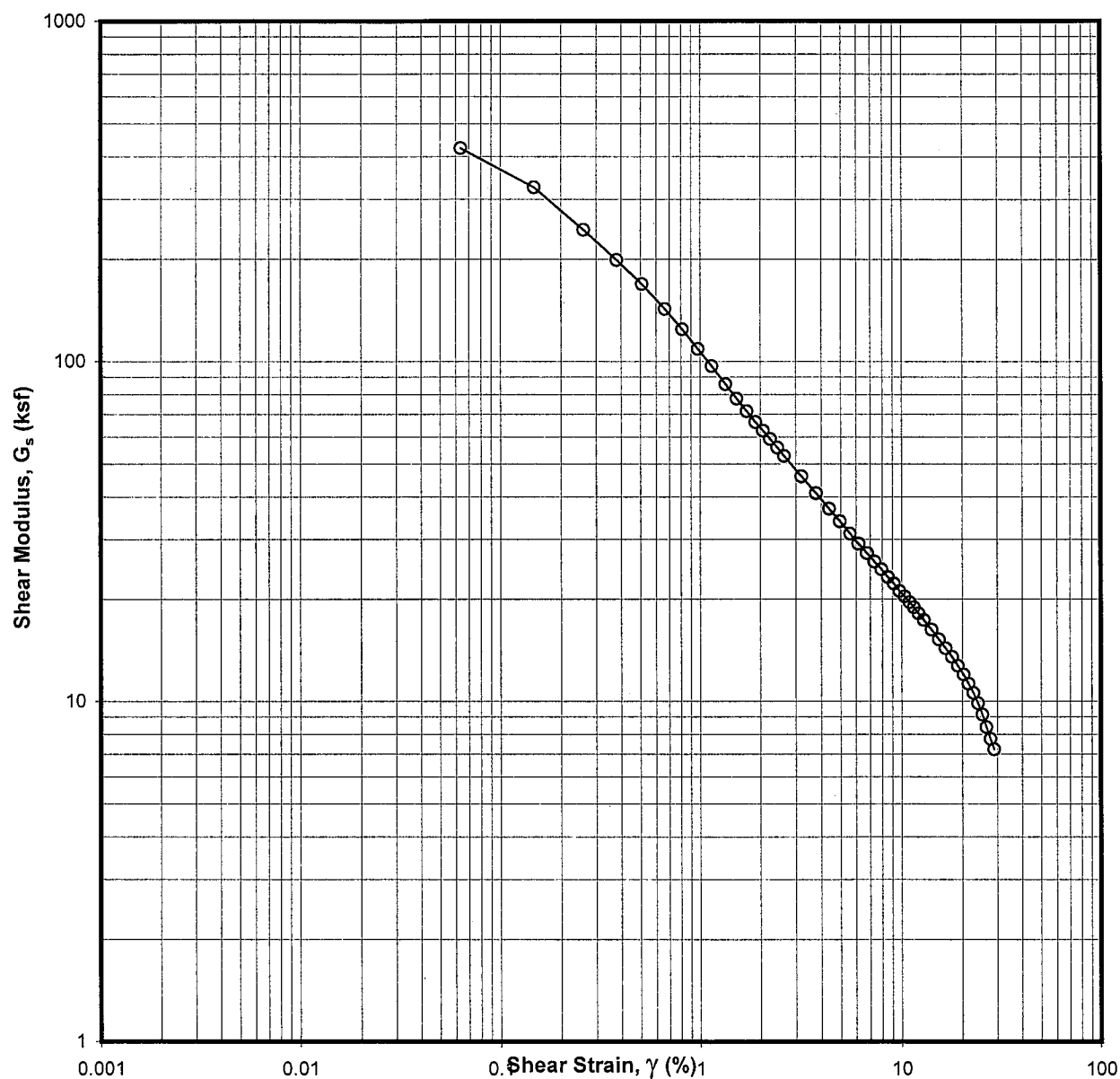
Sample No.: UD-13B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.005	10.810	0.000	-	-	0.000	1.000	0.000	0.03
2.6	0.02	0.170	10.792	0.019	751.290	617.098	0.016	0.998	0.002	0.90
5.1	0.07	0.384	10.774	0.037	571.951	397.445	0.036	0.997	0.003	2.04
7.7	0.13	0.579	10.737	0.074	445.660	290.688	0.054	0.993	0.007	3.09
10.3	0.20	0.771	10.699	0.112	383.062	240.833	0.071	0.990	0.010	4.12
12.8	0.28	0.932	10.657	0.153	336.025	196.741	0.086	0.986	0.014	5.00
15.4	0.35	1.068	10.615	0.195	302.947	178.495	0.099	0.982	0.018	5.74
18.0	0.43	1.201	10.564	0.247	280.391	166.876	0.111	0.977	0.023	6.48
20.5	0.50	1.323	10.524	0.287	261.561	160.966	0.122	0.973	0.027	7.17
23.1	0.58	1.455	10.486	0.325	248.145	177.472	0.135	0.970	0.030	7.90
25.7	0.68	1.629	10.445	0.365	240.438	211.181	0.151	0.966	0.034	8.86
28.3	0.77	1.841	10.426	0.384	239.351	214.259	0.170	0.964	0.036	10.02
30.8	0.87	2.043	10.376	0.434	234.394	194.796	0.189	0.960	0.040	11.14
33.4	0.97	2.242	10.317	0.493	229.938	171.906	0.207	0.954	0.046	12.26
36.0	1.08	2.406	10.244	0.567	222.030	160.707	0.223	0.948	0.052	13.22
38.6	1.19	2.584	10.208	0.602	217.441	165.408	0.239	0.944	0.056	14.21
41.1	1.30	2.775	10.154	0.657	212.292	164.609	0.257	0.939	0.061	15.29
43.7	1.42	2.971	10.101	0.709	208.694	171.451	0.275	0.934	0.066	16.39
51.4	1.85	3.727	9.908	0.903	200.697	152.827	0.345	0.916	0.084	20.61
59.1	2.32	4.344	9.680	1.130	186.645	112.290	0.402	0.895	0.105	24.17
66.8	2.83	4.816	9.459	1.352	169.968	80.861	0.446	0.875	0.125	26.98
74.5	3.36	5.177	9.250	1.561	153.987	59.023	0.479	0.856	0.144	29.24
82.2	3.92	5.457	9.063	1.748	139.036	41.912	0.505	0.838	0.162	31.05
89.9	4.48	5.649	8.918	1.892	125.858	32.540	0.523	0.825	0.175	32.35
97.6	5.09	5.836	8.793	2.017	114.616	26.785	0.540	0.813	0.187	33.57
105.3	5.67	5.968	8.693	2.118	105.096	19.389	0.552	0.804	0.196	34.47
113.0	6.30	6.069	8.605	2.206	96.303	11.306	0.561	0.796	0.204	35.20
120.7	6.92	6.109	8.526	2.284	88.236	5.375	0.565	0.789	0.211	35.62
128.4	7.54	6.136	8.453	2.358	81.313	1.975	0.568	0.782	0.218	35.97
136.1	8.20	6.133	8.368	2.442	74.780	-1.606	0.567	0.774	0.226	36.24
143.8	8.83	6.115	8.313	2.497	69.170	-4.018	0.566	0.769	0.231	36.34
151.5	9.48	6.081	8.249	2.562	64.067	-6.899	0.563	0.763	0.237	36.40
159.1	10.10	6.028	8.193	2.617	59.617	-10.559	0.558	0.758	0.242	36.34
166.8	10.76	5.946	8.111	2.699	55.224	-12.442	0.550	0.750	0.250	36.24
177.1	11.61	5.841	8.009	2.802	50.291	-13.939	0.540	0.741	0.259	36.11
192.5	12.94	5.635	7.848	2.962	43.527	-15.679	0.521	0.726	0.274	35.68
207.9	14.26	5.425	7.703	3.108	38.000	-15.540	0.502	0.713	0.287	35.16
223.3	15.57	5.225	7.576	3.235	33.521	-13.846	0.483	0.701	0.299	34.60
238.6	16.91	5.059	7.441	3.369	29.888	-11.978	0.468	0.688	0.312	34.21
254.0	18.20	4.910	7.342	3.469	26.953	-10.506	0.454	0.679	0.321	33.78
269.4	19.50	4.787	7.231	3.579	24.525	-8.055	0.443	0.669	0.331	33.50
284.8	20.80	4.701	7.132	3.679	22.576	-7.893	0.435	0.660	0.340	33.39
300.1	22.12	4.580	7.027	3.783	20.683	-8.887	0.424	0.650	0.350	33.09
315.5	23.43	4.467	6.940	3.871	19.045	-7.882	0.413	0.642	0.358	32.77
330.9	24.79	4.369	6.815	3.995	17.606	-7.164	0.404	0.630	0.370	32.66
346.3	26.12	4.274	6.725	4.085	16.344	-7.637	0.395	0.622	0.378	32.44
361.7	27.41	4.169	6.633	4.178	15.191	-6.904	0.386	0.614	0.386	32.15
377.1	28.76	4.093	6.533	4.277	14.214	-5.659	0.379	0.604	0.396	32.07



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
 Sample: UD-4B - Depth: 25.0 - 27.0 ft
 Boring B-2319UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-4B - Depth: 25.0 - 27.0 ft
 Boring B-2319UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 9G File Name: B-2319_UD4b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 2.88 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-4	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 25.0 - 27.0	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1;
						1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	592	997	4018	5005	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	134.44	137.39	
Mass Moist Soil + Cont. (g)	72.01	119.59	73.67	70.71				
Mass Dry Soil + Container (g)	65.82	105.18	66.92	63.52				
Mass Container (g)	31.70	31.60	30.17	31.53				
WATER CONTENT (%)	18.14	19.58	18.37	22.48				
Avg. Initial WC, $W_{o,avg}$ (%)	18.70	Final W_{at} :	☒ Slice ;	Whole Spec.				
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00	

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.63	$A_{s,t}$ (cm ²):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	64.58
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.670	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.630	2-M NA		
3 18.530	3-B NA		
4 18.560	1'-T NA		
5 18.680	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.625	Avg NA	V_{tr} (cm ³):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	129.95
Dry, $\gamma_{d,o}$ (lb/ft ³) =	109.48

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas. Corr.	(cm ²)	(in ²)	
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 9	ID, Rings (mm)			
Thickness (mm):	Top: 0.57	= 67.03		
☐ Single	Bottom: 0.59	Corr. for mem.		
☒ Double	Membr. Thick. = 0.29	= 66.450		
Area Ring with mem., A_c (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		528.7 g,	1.17	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Light Yellowish Brown Fat CLAY with sand (CH)

Other Remarks :

Trim./ Recon. By: HC	Setup By: HC	Take Down By: HC
Date: 3/26/2008	Date: 3/27/2008	Date: 3/30/2008
Prelim. Calc. By: HC	Final Calc. By: LF	Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686
Task Number: NA

Test Station No.: 9G
Specific Gravity: 2.720

File Name: B-2319_UD4b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	2.88	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{w,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{hr,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	1.23 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No

Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	18.14	19.58	18.37	18.70	18.70	19.85
S_o	91.2	95.2	91.9	92.8	92.8	95.9
Measured final mass of moist soil, $M_{t,at}$ (g)						137.39
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						137.39

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	18.70
Initial, $M_{d,o}$	113.26
Final, $M_{d,at}$	112.18
Selected, M_d	112.72

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{vc,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	2.880	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.023		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.023		
ΔV_n using A_o - spec. (cm ³)	0.08		
ΔV_n using $A_{c,n}$ - app. (cm ³)	0.08		
ΔV_n using burette meas. (cm ³)	-2.00		
Selected ΔV_n (cm ³)	0.08	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	0.08
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.08
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.08

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	20.36
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	0.07	ΔH_c (mm) =	0.023	$\epsilon_{a,c}$ (%) =	0.12	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	64.51	H_c (mm) =	18.602	$\epsilon_{v,c}$ (%) =	0.11	$\epsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.68	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.625	64.58	34.68	19.3	130.0	109.0	94.3	0.558
After to $\sigma'_{v,c}$	18.602	64.51	34.68	20.4	131.3	109.1	100.0	0.557
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
& Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF
Reviewed By: HP

Remarks: t95 for max stress = 0.9 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 9G File Name: B-2319_UD4b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-4	Composite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 25.0 - 27.0	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL	-200 %	Void Ratio, e
Condition:					Total (pcf)	Dry (pcf)		PL PI		
Initial	18.63	64.58	34.68	19.27	130.0	109.0	94.3	61	80.3	0.558
After to σ' _{v,c}	18.60	64.51	34.68	20.36	131.3	109.1	100.0	16	NA	0.557
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	45	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.8 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$:	(ksf)	NA	2.925	NA		Cyclic Rate (Hz):	0.1;	1;	Other =	
Induced OCR:	-	NA	NA	NA		During/End of Loading		Static	Cyclic	
Axial Strain during Consol., $\epsilon_{a,c}$:	%	NA	0.12	NA		Change in Height, $\Delta H_{L,n}$ (mm):		NA	NA	
Horiz. Consol. Stress, $\tau_{h,c}$:	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):		NA	NA	
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$:	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:		Yes;	No	
Shear Strain during Consol., $\epsilon_{h,c}$:	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$:	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua} :	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.17	Data Normalization: ☒ Yes ☐ No Value: 2.925 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

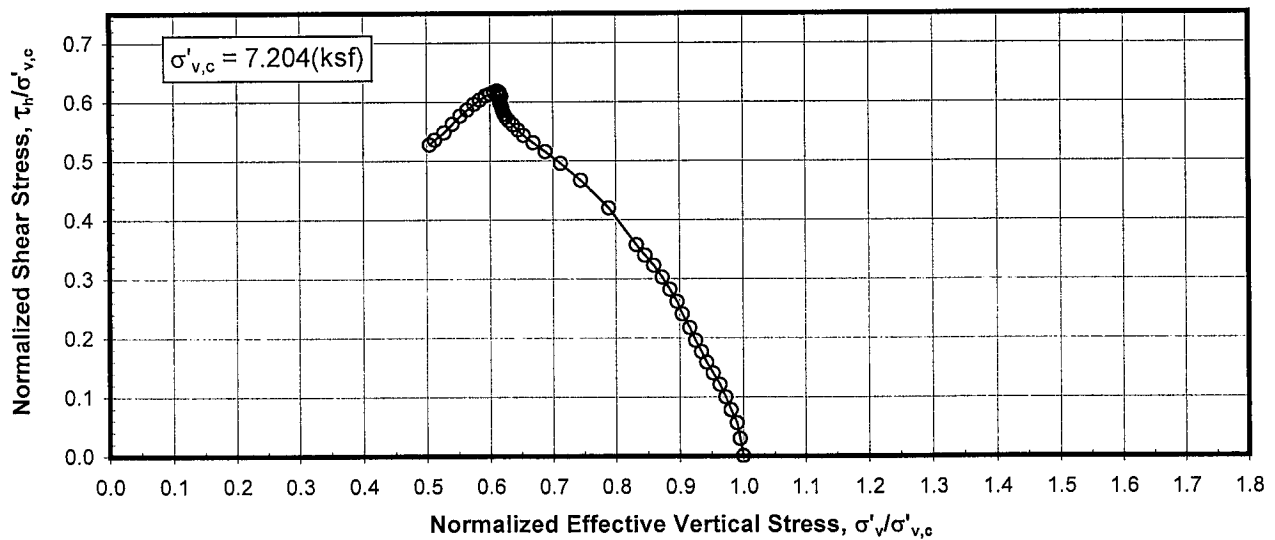
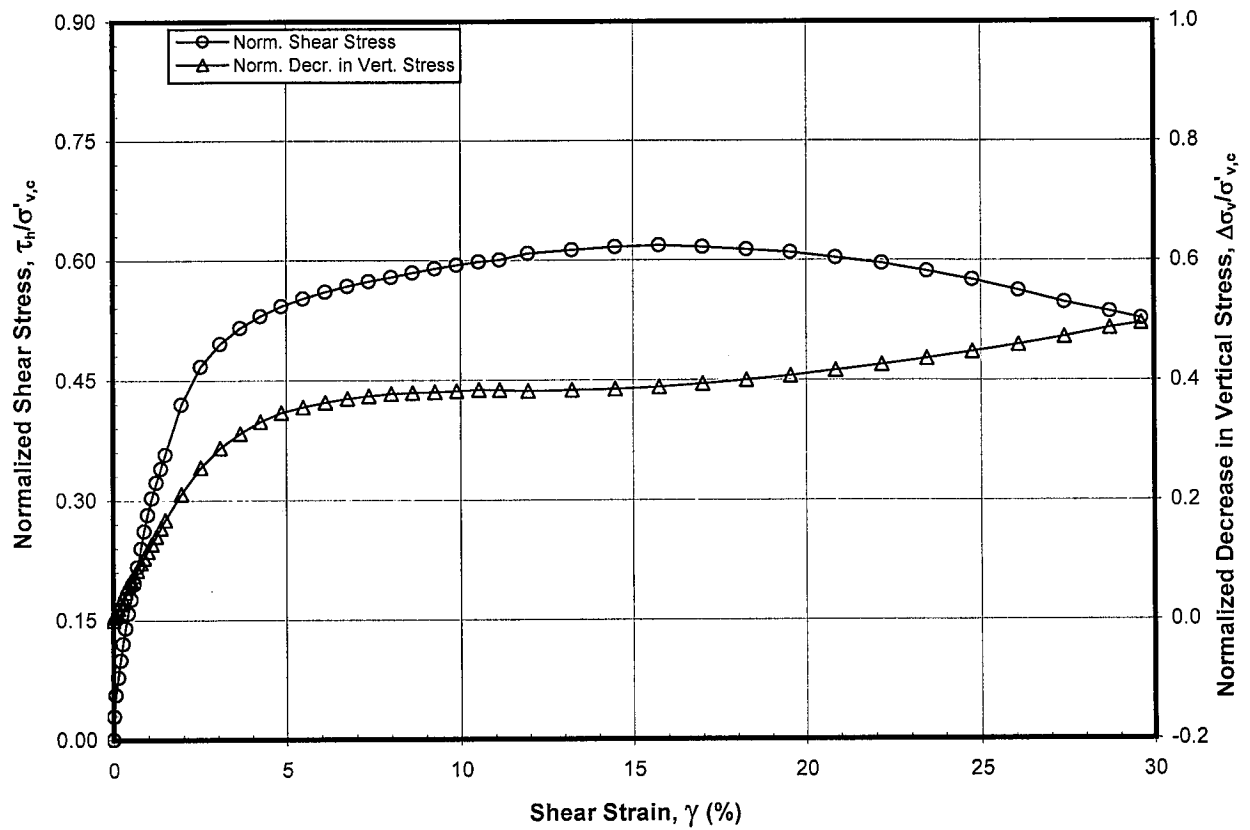
Final Visual Description and Remarks: Light Yellowish Brown Fat CLAY with sand (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{vc}	c _d /σ' _{vc}
at Peak Shear Stress	2.424	20.31	4.715	0.514	-0.612	0.829
at Maximum Strain	2.085	28.94	4.497	0.464	-0.537	-

Boring No.: B-2319UD

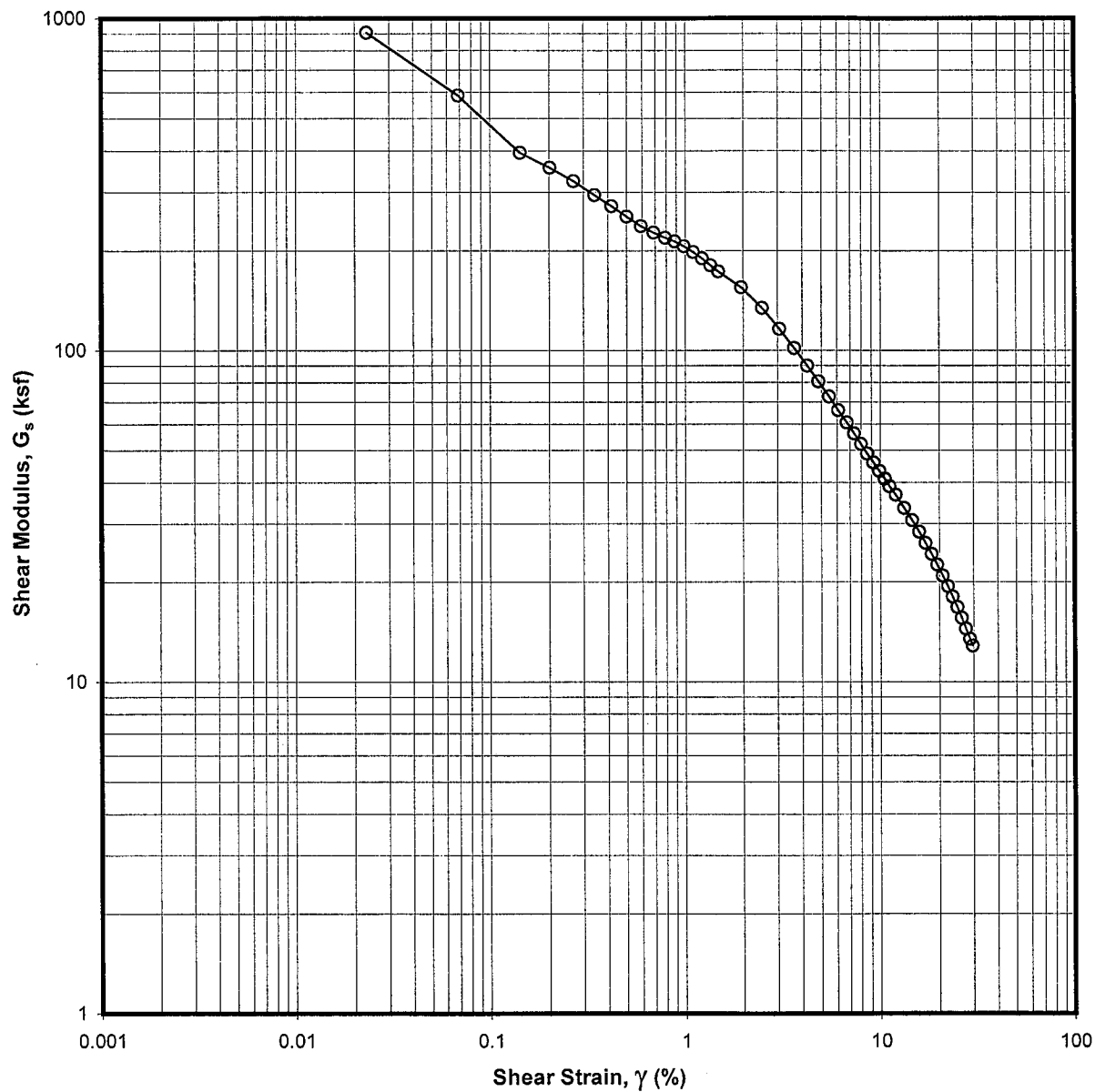
Sample No.: UD-4B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.004	2.925	0.000	-	-	-0.001	1.000	0.000	-0.07
2.5	0.06	0.266	2.931	-0.005	423.079	336.528	0.091	1.002	-0.002	5.18
4.9	0.15	0.474	2.917	0.008	325.025	194.269	0.162	0.997	0.003	9.22
7.4	0.26	0.630	2.902	0.024	244.004	120.313	0.215	0.992	0.008	12.25
9.8	0.38	0.754	2.871	0.054	198.721	91.753	0.258	0.981	0.019	14.72
12.3	0.51	0.859	2.824	0.102	169.066	68.338	0.294	0.965	0.035	16.92
14.8	0.67	0.945	2.750	0.176	142.584	49.021	0.323	0.940	0.060	18.96
17.2	0.81	1.008	2.704	0.221	124.352	36.602	0.345	0.924	0.076	20.45
19.7	0.98	1.058	2.650	0.275	108.632	29.522	0.362	0.906	0.094	21.76
22.2	1.15	1.107	2.602	0.324	96.783	24.750	0.378	0.889	0.111	23.04
24.6	1.34	1.148	2.561	0.364	85.655	20.438	0.392	0.876	0.124	24.14
27.1	1.53	1.185	2.536	0.390	77.675	19.443	0.405	0.867	0.133	25.05
29.5	1.72	1.220	2.527	0.398	71.264	19.096	0.417	0.864	0.136	25.78
32.0	1.90	1.256	2.526	0.400	66.290	19.086	0.429	0.863	0.137	26.43
34.4	2.07	1.287	2.533	0.392	62.485	18.805	0.440	0.866	0.134	26.93
36.9	2.24	1.320	2.543	0.382	59.053	17.726	0.451	0.869	0.131	27.42
39.4	2.43	1.352	2.544	0.382	55.732	16.060	0.462	0.869	0.131	27.98
41.8	2.63	1.382	2.550	0.376	52.724	15.115	0.472	0.871	0.129	28.46
49.2	3.20	1.467	2.602	0.323	45.928	14.049	0.501	0.890	0.110	29.41
56.6	3.78	1.544	2.655	0.270	40.913	12.282	0.528	0.908	0.092	30.18
63.9	4.39	1.612	2.707	0.219	36.833	11.326	0.551	0.925	0.075	30.78
71.3	4.97	1.679	2.772	0.154	33.838	10.363	0.574	0.947	0.053	31.20
78.7	5.59	1.736	2.862	0.063	31.137	9.159	0.593	0.978	0.022	31.24
86.1	6.16	1.787	2.938	-0.013	29.084	8.970	0.611	1.004	-0.004	31.32
93.4	6.76	1.842	3.035	-0.109	27.279	8.468	0.630	1.037	-0.037	31.26
100.8	7.34	1.888	3.121	-0.195	25.757	8.384	0.645	1.067	-0.067	31.17
108.2	7.96	1.942	3.222	-0.297	24.445	7.660	0.664	1.102	-0.102	31.08
115.6	8.56	1.981	3.320	-0.395	23.188	7.122	0.677	1.135	-0.135	30.83
122.9	9.17	2.029	3.424	-0.499	22.154	6.304	0.693	1.170	-0.170	30.65
130.3	9.78	2.058	3.511	-0.586	21.083	6.172	0.704	1.200	-0.200	30.38
137.7	10.36	2.101	3.609	-0.683	20.325	6.592	0.718	1.234	-0.234	30.21
145.1	10.96	2.136	3.700	-0.775	19.522	5.799	0.730	1.265	-0.265	29.99
152.4	11.52	2.169	3.792	-0.867	18.857	5.199	0.741	1.296	-0.296	29.76
159.8	12.14	2.197	3.879	-0.953	18.122	4.833	0.751	1.326	-0.326	29.53
169.6	12.92	2.237	3.983	-1.057	17.336	4.638	0.765	1.361	-0.361	29.32
184.4	14.13	2.287	4.139	-1.213	16.209	3.735	0.782	1.415	-0.415	28.93
199.1	15.34	2.327	4.283	-1.358	15.192	3.112	0.796	1.464	-0.464	28.52
213.9	16.55	2.362	4.414	-1.489	14.297	2.834	0.808	1.509	-0.509	28.15
228.6	17.78	2.397	4.532	-1.606	13.495	2.099	0.819	1.549	-0.549	27.87
243.3	19.06	2.415	4.628	-1.703	12.690	1.079	0.825	1.582	-0.582	27.55
258.1	20.31	2.424	4.715	-1.790	11.951	0.092	0.829	1.612	-0.612	27.21
272.8	21.53	2.417	4.762	-1.837	11.242	-1.065	0.826	1.628	-0.628	26.91
287.6	22.76	2.398	4.784	-1.859	10.552	-2.401	0.820	1.635	-0.635	26.62
302.3	23.97	2.359	4.772	-1.846	9.855	-4.116	0.806	1.631	-0.631	26.30
317.0	25.21	2.296	4.715	-1.790	9.122	-5.853	0.785	1.612	-0.612	25.97
331.8	26.46	2.213	4.620	-1.695	8.377	-6.212	0.756	1.579	-0.579	25.59
346.5	27.71	2.142	4.553	-1.627	7.742	-5.170	0.732	1.556	-0.556	25.19
361.3	28.94	2.085	4.497	-1.572	7.214	-4.603	0.713	1.537	-0.537	24.87



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
 Sample: UD-7B - Depth: 65.0 - 67.0 ft
 Boring B-2319UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-7B - Depth: 65.0 - 67.0 ft

Boring B-2319UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2319_UD7b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 7.20 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: Specific Gravity: 2.660 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ LPC Core			Impact/Rammer	Rammer Wgt.(lb)=	No. Layers =
Sample No.: UD-7	Composite No.:			Pluviated:	Tamper Force (lb)=	Drop (in.) =
Depth (ft): 65.0 - 67.0	Specimen No.: B			Kneading	Undercompaction: U_{pi} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort=	% Comp. = $\pm$ Opt.=

Type	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		CRS		90° Stress Path	Remarks:
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
Conditions:	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: 0.1; Strain 1; Stress

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)				
Container No.	2008		4200	4096	Mass Moist Soil + Tare (g)	317.30	134.60
Mass Moist Soil + Cont. (g)	158.35		62.69	68.66	Mass Tare (g)	186.86	4.38
Mass Dry Soil + Container (g)	137.35		57.09	62.14	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	130.44	130.22
Mass Container (g)	30.38		30.29	30.62	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	19.63		20.90	20.69	Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	20.26	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)		
See attached data sheet(s) for additional water contents					Mass Container (g)		
					Mass Excess Dry Soil (g)	0.00	

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.63	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.95
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_r)	Diameter (D_o)	Remarks:	
1 18.680	1-T NA		
2 18.630	2-M NA		
3 18.640	3-B NA		
4 18.600	1'-T NA	For Free Standing	
5 18.600	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.625	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³)=	125.38
Dry, $\gamma_{d,o}$ (lb/ft ³)=	104.25

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress	Dia. by PITape (mm)		Area, $A_{c,n}$	
Level	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 5	ID, Rings (mm)			
Thickness (mm):	Top: 0.65		=	67.28
☐ Single	Bottom: 0.64		Corr. for mem.	
☒ Double	Membr. Thick. = 0.32		=	66.630
Area Ring with mem., $A_{c,}$ (cm ²)=		34.87	;	(in ²)= 5.405
Mass Top Cap, etc., M_{tc} =		528.0 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Light Yellowish Brown Sandy Lean CLAY (CL)

Other Remarks :

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/25/2008

Date: 3/26/2008

Date: 3/28/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 5G

File Name: B-2319_UD7b

Task Number: NA

Specific Gravity: 2.660



Measured;



Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed";


Reconstituted;



Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	7.2	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{hr,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.65 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	19.63		20.90	20.26	20.26	20.89
S_o	89.8		92.9	91.4	91.4	92.9
Measured final mass of moist soil, $M_{t,at}$ (g)						130.22
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						130.22

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	20.26
Initial, $M_{d,o}$	108.46
Final, $M_{d,at}$	107.90
Selected, M_d	108.16

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	7.200	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.770		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.770		
ΔV_n using A_o - spec. (cm ³)	2.69		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.68		
ΔV_n using burette meas. (cm ³)	0.50		
Selected ΔV_n (cm ³)	2.69	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	2.69	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	0.22
ΔV_c (cm ³)	2.68	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	2.69		

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	19.86
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	2.69	ΔH_c (mm) =	0.770	$\epsilon_{a,c}$ (%) =	4.13	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.26	H_c (mm) =	17.855	$\epsilon_{v,c}$ (%) =	4.14	$\epsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio, e
$G_s = 2.660$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	
Condition:								
Initial (as trimmed)	18.625	64.95	34.87	20.6	125.4	104.0	92.2	0.597
After to $\sigma'_{v,c}$	17.855	62.26	34.87	19.9	130.0	108.5	100.0	0.531
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 3.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2319_UD7b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2319UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-7	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 65.0 - 67.0	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
		CRS		90° Stress Path		
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Dynamic	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.660 Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
Condition:	(mm)	(cm ³)	(cm ²)	(%)	Total	Dry	(%)	PL	%	e
Initial	18.63	64.95	34.87	20.60	125.4	104.0	92.2	39	54.7	0.597
After to σ' _{v,c}	17.86	62.26	34.87	19.86	130.0	108.5	100.0	17	NA	0.531
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.5 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	7.204	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	4.13	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 7.204 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

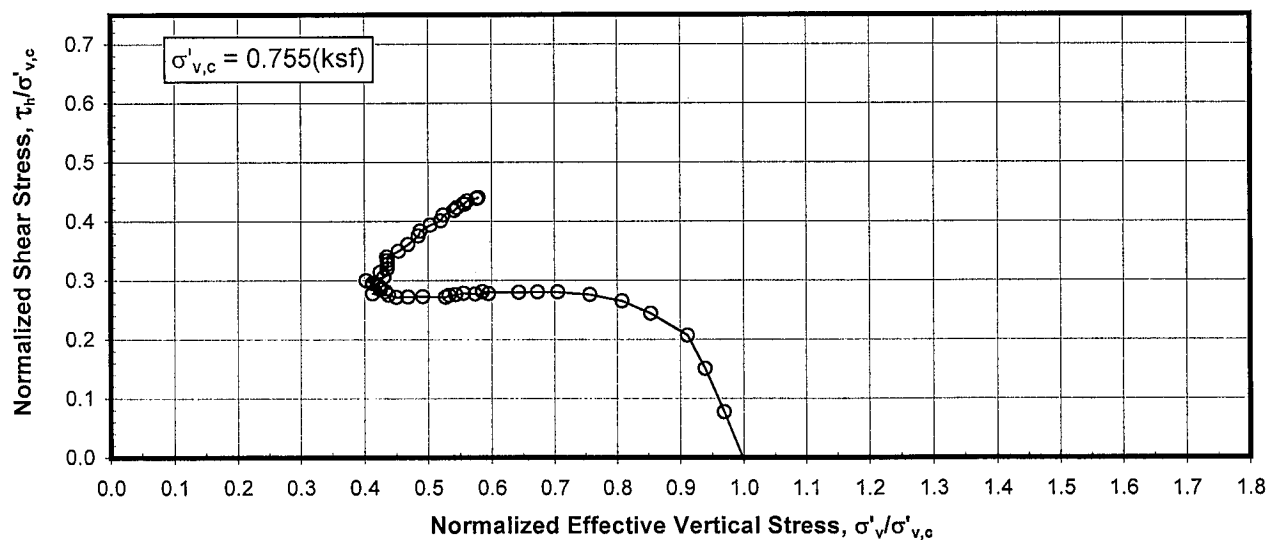
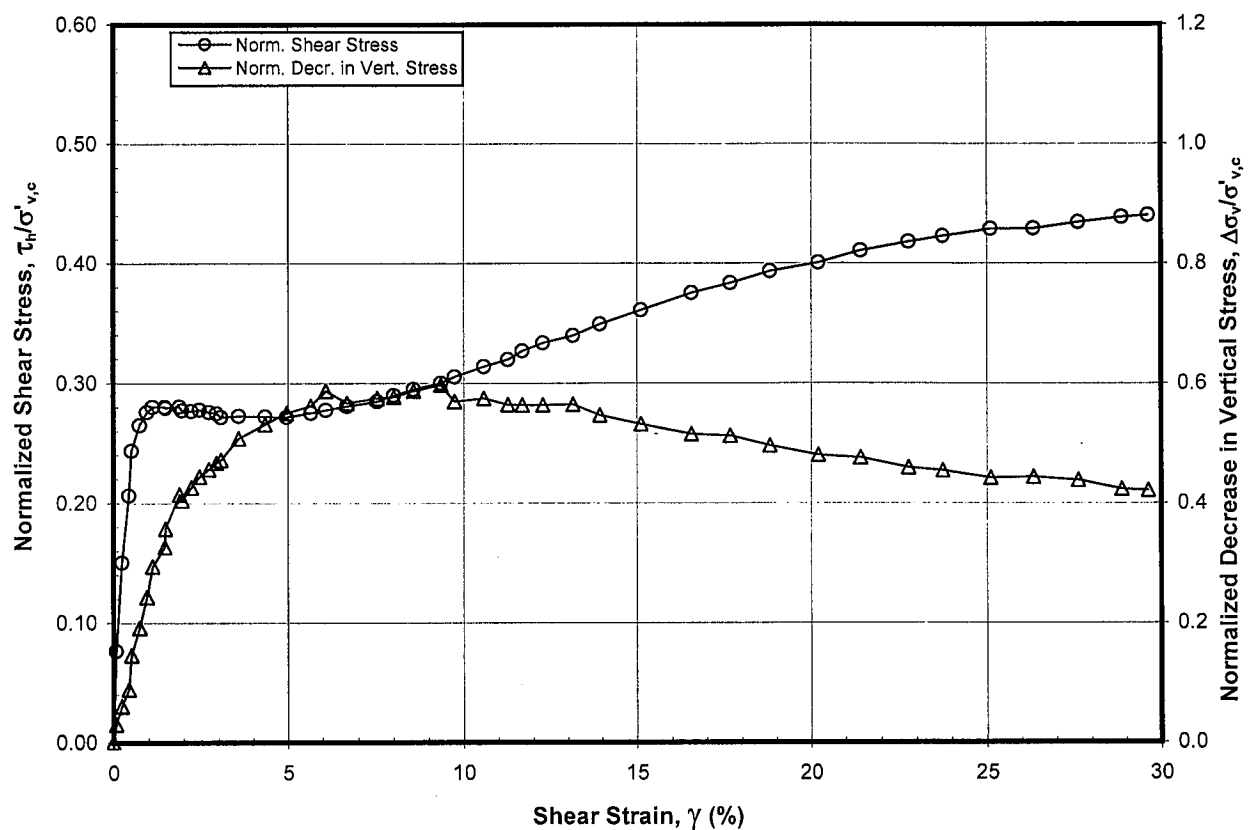
Final Visual Description and Remarks: Light Yellowish Brown Sandy Lean CLAY (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	c _d /σ' _{v,c} -
at Peak Shear Stress	4.456	15.74	4.408	1.011	0.388	0.618
at Maximum Strain	3.797	29.63	3.638	1.044	0.495	-

Boring No.: B-2319UD

Sample No.: UD-7B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.000	7.204	0.000	-	-	0.000	1.000	0.000	0.00
2.6	0.02	0.209	7.165	0.039	906.514	664.790	0.029	0.995	0.005	1.67
5.3	0.07	0.402	7.134	0.070	585.548	319.702	0.056	0.990	0.010	3.23
7.9	0.14	0.562	7.064	0.140	394.076	239.537	0.078	0.981	0.019	4.55
10.5	0.20	0.718	7.005	0.200	355.480	245.323	0.100	0.972	0.028	5.85
13.2	0.27	0.868	6.940	0.264	324.205	207.304	0.120	0.963	0.037	7.13
15.8	0.34	1.008	6.864	0.341	294.009	180.390	0.140	0.953	0.047	8.36
18.4	0.42	1.141	6.788	0.416	272.167	164.818	0.158	0.942	0.058	9.54
21.1	0.50	1.268	6.730	0.475	253.153	151.708	0.176	0.934	0.066	10.67
23.7	0.59	1.406	6.666	0.538	236.696	155.865	0.195	0.925	0.075	11.91
26.3	0.69	1.563	6.601	0.604	226.591	164.057	0.217	0.916	0.084	13.32
29.0	0.79	1.729	6.515	0.689	218.597	166.264	0.240	0.904	0.096	14.86
31.6	0.88	1.884	6.456	0.748	213.371	155.198	0.261	0.896	0.104	16.26
34.3	0.99	2.029	6.374	0.830	205.952	135.825	0.282	0.885	0.115	17.66
36.9	1.10	2.179	6.288	0.916	197.928	121.252	0.302	0.873	0.127	19.11
39.5	1.23	2.322	6.193	1.011	189.153	104.162	0.322	0.860	0.140	20.55
42.2	1.36	2.445	6.095	1.109	180.233	95.847	0.339	0.846	0.154	21.86
44.8	1.49	2.573	5.998	1.207	172.750	96.670	0.357	0.832	0.168	23.22
52.7	1.95	3.024	5.687	1.518	154.745	78.927	0.420	0.789	0.211	28.00
60.6	2.51	3.363	5.367	1.837	133.923	48.570	0.467	0.745	0.255	32.07
68.5	3.08	3.569	5.135	2.069	115.957	30.453	0.495	0.713	0.287	34.79
76.4	3.66	3.712	4.960	2.244	101.418	21.471	0.515	0.689	0.311	36.81
84.2	4.25	3.820	4.820	2.384	89.854	16.567	0.530	0.669	0.331	38.40
92.1	4.86	3.910	4.711	2.493	80.494	12.830	0.543	0.654	0.346	39.69
100.0	5.49	3.979	4.648	2.557	72.494	10.205	0.552	0.645	0.355	40.57
107.9	6.12	4.039	4.588	2.616	66.016	8.813	0.561	0.637	0.363	41.35
115.8	6.75	4.090	4.542	2.663	60.585	7.662	0.568	0.630	0.370	42.00
123.7	7.36	4.134	4.511	2.693	56.157	6.642	0.574	0.626	0.374	42.50
131.6	8.00	4.172	4.487	2.717	52.176	6.178	0.579	0.623	0.377	42.92
139.5	8.62	4.212	4.473	2.731	48.852	5.961	0.585	0.621	0.379	43.28
147.4	9.26	4.248	4.466	2.739	45.857	5.371	0.590	0.620	0.380	43.57
155.2	9.89	4.280	4.456	2.749	43.284	4.772	0.594	0.618	0.382	43.85
163.1	10.52	4.308	4.439	2.765	40.937	3.750	0.598	0.616	0.384	44.14
171.0	11.13	4.327	4.442	2.762	38.878	5.076	0.601	0.617	0.383	44.25
181.5	11.95	4.385	4.454	2.750	36.682	4.752	0.609	0.618	0.382	44.55
197.3	13.23	4.416	4.443	2.762	33.384	2.246	0.613	0.617	0.383	44.83
213.1	14.49	4.442	4.432	2.772	30.662	1.566	0.617	0.615	0.385	45.06
228.8	15.74	4.456	4.408	2.797	28.312	0.014	0.618	0.612	0.388	45.31
244.6	16.99	4.442	4.371	2.834	26.149	-1.442	0.617	0.607	0.393	45.47
260.4	18.26	4.419	4.326	2.879	24.208	-1.937	0.613	0.600	0.400	45.61
276.2	19.54	4.393	4.275	2.929	22.477	-2.854	0.610	0.593	0.407	45.78
291.9	20.86	4.345	4.208	2.996	20.830	-3.734	0.603	0.584	0.416	45.91
307.7	22.17	4.294	4.142	3.063	19.370	-4.652	0.596	0.575	0.425	46.04
323.5	23.46	4.224	4.066	3.138	18.002	-5.657	0.586	0.564	0.436	46.09
339.3	24.76	4.148	3.985	3.220	16.752	-6.619	0.576	0.553	0.447	46.15
355.0	26.09	4.050	3.897	3.307	15.525	-7.724	0.562	0.541	0.459	46.10
370.8	27.39	3.945	3.803	3.402	14.401	-7.274	0.548	0.528	0.472	46.05
386.6	28.72	3.859	3.695	3.509	13.437	-6.644	0.536	0.513	0.487	46.24
397.1	29.63	3.797	3.638	3.567	12.816	-6.782	0.527	0.505	0.495	46.23



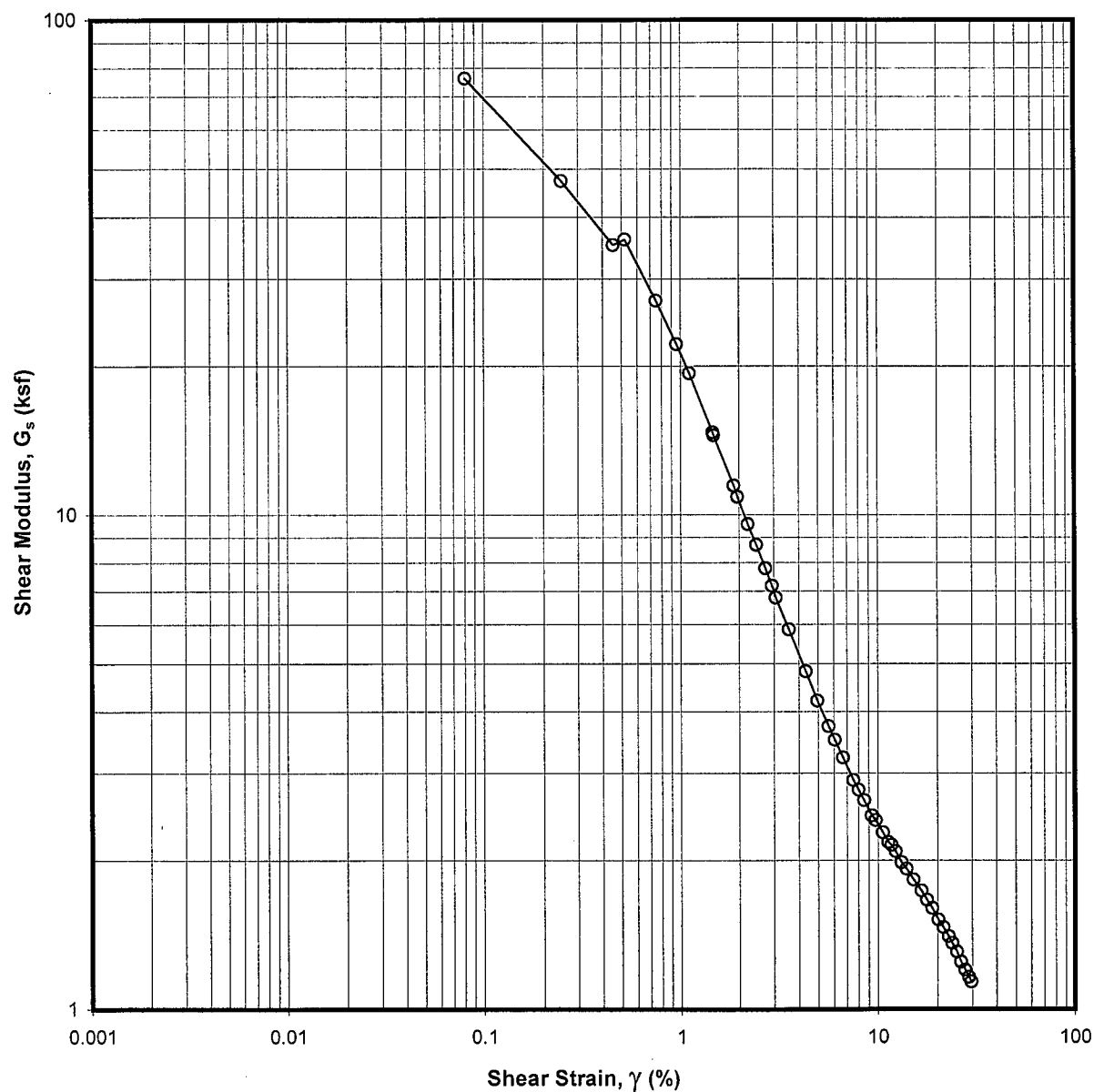
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-1B - Depth: 3.5 - 5.2 ft

Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-1B - Depth: 3.5 - 5.2 ft
 Boring B-2321UD

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 11G File Name: B-2321_UD1b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 0.72 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) = No. Layers =	
Sample No.: UD-1		Compostite No.:		☐ Pluviated:	Tamper Force (lb) = Drop (in.) =	
Depth (ft): 3.5 - 5.2		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{nl} (%) = Dia. (in.) =	
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort = % Comp. = $\pm$ Opt. =	

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	592	957	4201	4096	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	186.86	131.83	4.04
Mass Moist Soil + Cont. (g)	88.23	157.62	70.01	86.09	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	123.24	127.79	
Mass Dry Soil + Container (g)	80.21	138.59	63.30	75.72	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	31.71	32.13	30.35	30.62	Container No.			
WATER CONTENT (%)	16.54	17.88	20.36	22.99	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	18.26	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.60
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.540	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.530	2-M NA		
3 18.520	3-B NA		
4 18.520	1'-T NA		
5 18.500	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.525	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	119.10
Dry, $\gamma_{d,o}$ (lb/ft ³) =	100.71

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 11	ID, Rings (mm)			
Thickness (mm):	Top: 0.62	=		67.24
☐ Single	Bottom: 0.59	Corr. for mem.		
☒ Double	Membr. Thick. = 0.30	=		66.630
Area Ring with mem., A_o (cm ²) =		34.87	; (in ²) = 5.405	
Mass Top Cap, etc., M_{tc} =		525.4 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Dark Gray Sandy Lean CLAY (CL)

Other Remarks :

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/24/2008

Date: 3/24/2008

Date: 3/26/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing

Remarks:

☐ Spec. unloaded to zero stress with access to water

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: 11G File Name: B-2321_UD1b
 Task Number: NA Specific Gravity: 2.710 ☒ Measured; ☐ Assumed
 Type Test: SDSS Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary											
Test Stage:		Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = NA (%/hr or					
Nominal Vertical Stress, σ'_v (ksf)		NA	0.72	NA		Cyclic Rate (Hz):		0.1;		1; Other =	
Axial/Vertical Force, $P_{vr,n}$ (lbf)		NA	NA	NA		During/End of Loading				Static	Cyclic
Horizontal Force, $P_{hr,n}$ (lbf)		NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)				NA	NA
Nominal OCR		NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)				NA	NA
t_c (ON,days,hrs)		NA	0.98 days	NA		Post Cy.Displ. Reset to Null Position:			Yes;		No
	Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA										

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):					
	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Back Cal.
W_o	16.54	17.88	20.36	18.26	18.61
S_o	68.7	72.2	78.1	73.1	74.0
Measured final mass of moist soil, $M_{t,at}$ (g)					127.79
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)					127.79

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	18.26
Initial, $M_{d,o}$	104.21
Final, $M_{d,at}$	103.90
Selected, M_d	104.06

Initial Back Cal. Specific Gravity (TS):	
Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary			
Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	0.720	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.050		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.050		
ΔV_n using A_o - spec. (cm ³)	0.17		
ΔV_n using $A_{c,n}$ - app. (cm ³)	0.17		
ΔV_n using burette meas. (cm ³)	-2.80		
Selected ΔV_n (cm ³)	0.17	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures			
By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	0.17	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-4.55
ΔV_c (cm ³)	0.17	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	0.17		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	24.90
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 0.18	ΔH_c (mm) = 0.050	$\epsilon_{a,c}$ (%) = 0.27	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 64.42	H_c (mm) = 18.475	$\epsilon_{v,c}$ (%) = 0.28	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.87	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.710$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition: Initial (as trimmed)	18.525	64.60	34.87	18.4	119.1	100.6	73.5	0.682
After to $\sigma'_{v,c}$	18.475	64.42	34.87	24.9	125.9	100.8	100.0	0.678
Consol.: to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume. Calculated By: LF
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable Reviewed By: HP
 3 - Uses measured value at appropriate stress level (NA for rings).
 Remarks: t95 for max stress = 1.5 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 11G File Name: B-2321_UD1b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-1	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 3.5 - 5.2	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
		CRS		90° Stress Path		
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Dynamic	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.710 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition:					Total (pcf)	Dry (pcf)		PI		
Initial	18.53	64.60	34.87	18.44	119.1	100.6	73.5	42	70.1	0.682
After to σ' _{v,c}	18.48	64.42	34.87	24.90	125.9	100.8	100.0	13	NA	0.678
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	☒ Static Strain Rate = 5.0 %/hr.					
Vert. Consol. Stress, σ' _{vc}	(ksf)	NA	0.755	NA	Cyclic Rate (Hz):	0.1;	1;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., ε _{ac}	%	NA	0.27	NA	Change in Height, ΔH _{L,n} (mm):		NA	NA		
Horiz. Consol. Stress, τ _{hc}	(ksf)	NA	NA	NA	Change in Vol., ΔV _{L,n} (cm ³):		NA	NA		
Consol. Stress Ratio, τ _{hc} / σ' _{vc}	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No		
Shear Strain during Consol., ε _{hc}	%	NA	NA	NA	Number of Loading Cycles, N =		NA			
Undr. Ambient Shear Stress, τ _{h,ub}	(ksf)	NA	NA	NA	±τ _h =		NA (ksf)	±γ =		NA %
Undr. Ambient Shear Strain, ε _{ub}	%	NA	NA	NA	at end of cyclic loading, σ' _{vc,r} =		NA (ksf)			

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 0.755 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

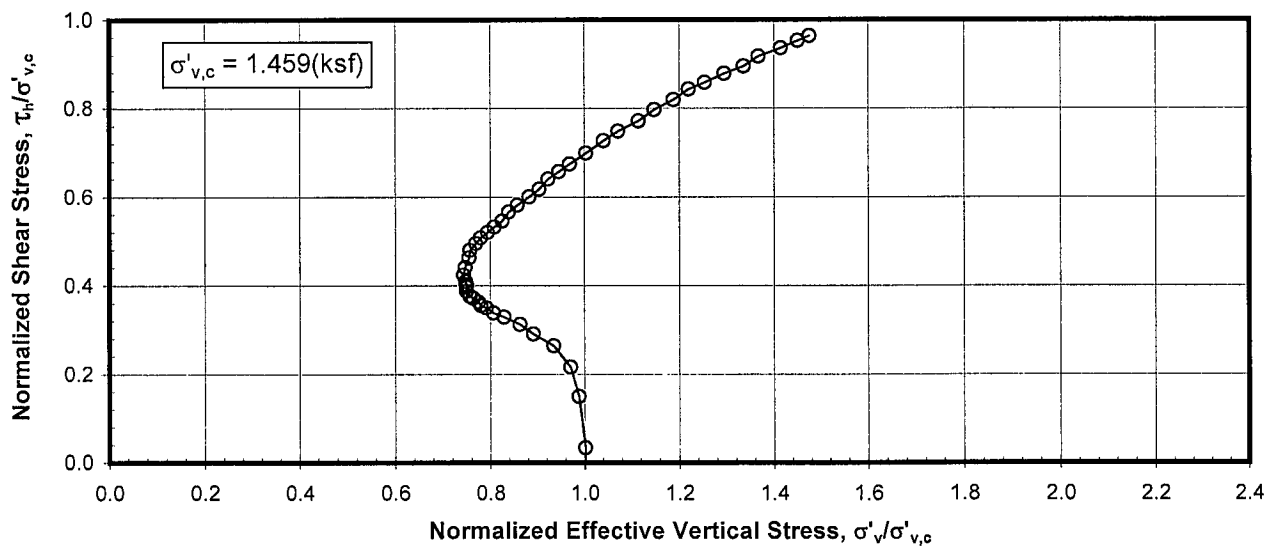
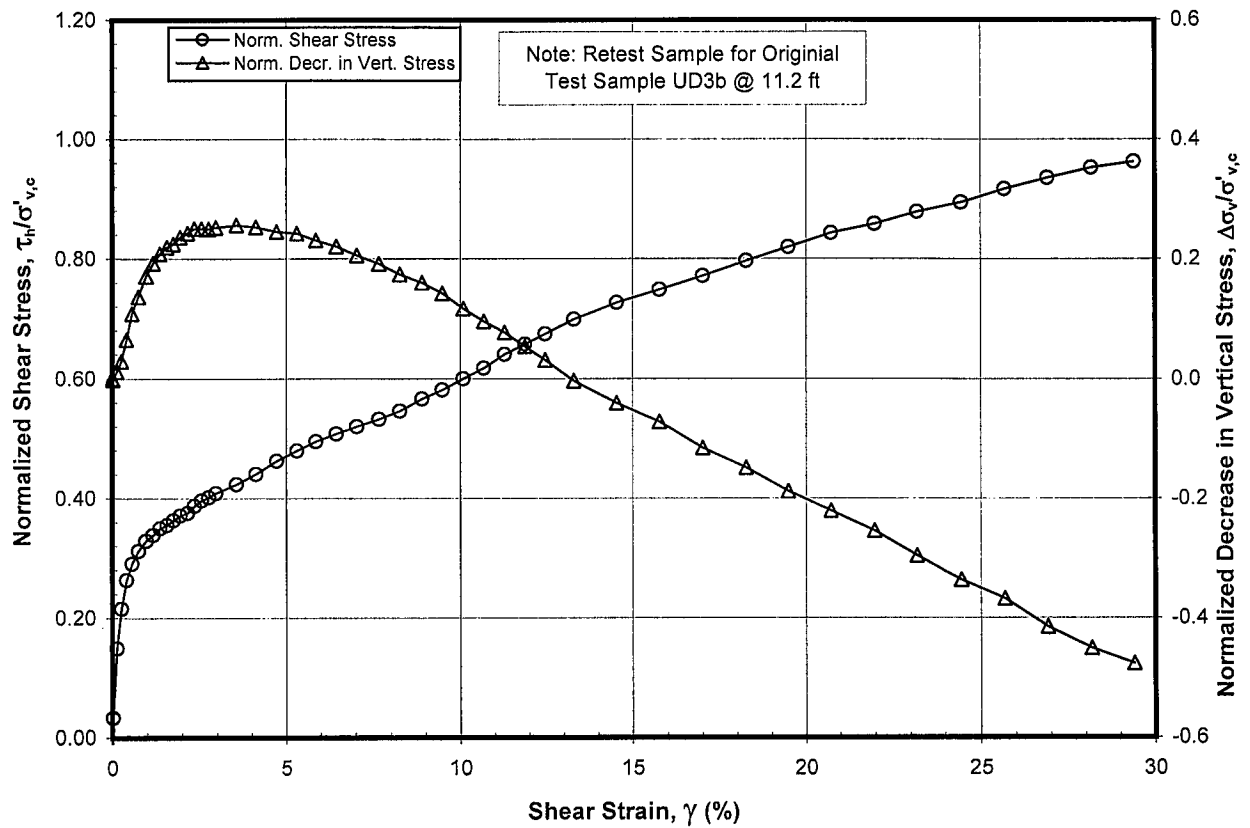
Final Visual Description and Remarks: Dark Gray Sandy Lean CLAY (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	c _d /σ' _{v,c} -
at Peak Shear Stress	0.332	29.63	0.437	0.761	0.421	0.440
at Maximum Strain	0.332	29.63	0.437	0.761	0.421	-

Boring No.: B-2321UD

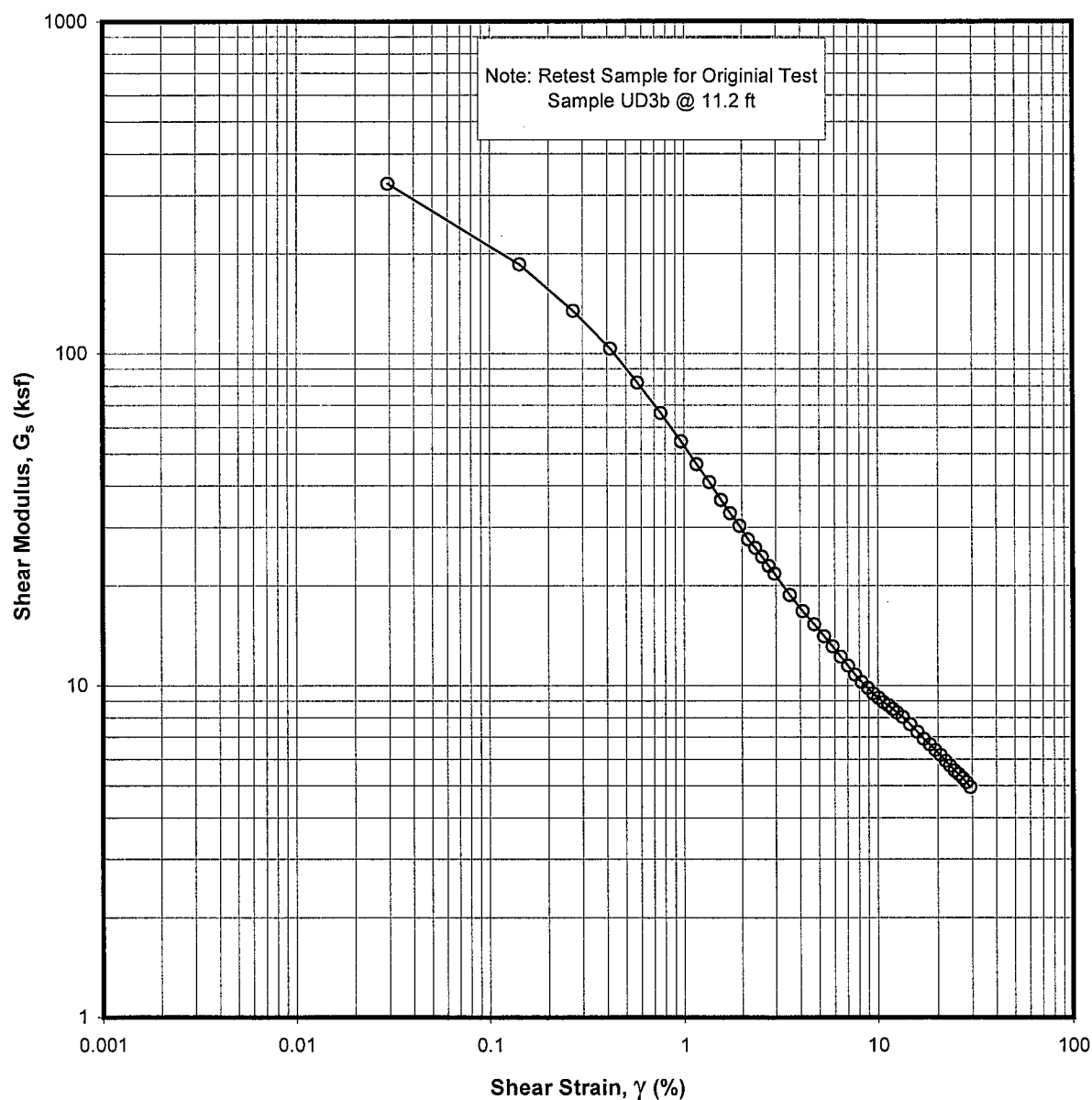
Sample No.: UD-1B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.004	0.755	0.000	-	-	-0.005	1.000	0.000	-0.29
2.5	0.08	0.058	0.732	0.023	76.202	54.787	0.077	0.969	0.031	4.51
5.0	0.25	0.114	0.709	0.046	47.329	26.924	0.150	0.939	0.061	9.09
7.5	0.45	0.156	0.688	0.067	35.128	31.310	0.206	0.911	0.089	12.76
9.9	0.52	0.184	0.645	0.110	36.028	24.585	0.244	0.854	0.146	15.93
12.4	0.75	0.200	0.610	0.145	27.136	5.493	0.265	0.808	0.192	18.16
14.9	0.96	0.208	0.572	0.183	22.132	3.029	0.276	0.757	0.243	20.03
17.4	1.11	0.212	0.533	0.222	19.335	1.027	0.280	0.706	0.294	21.66
19.8	1.47	0.211	0.508	0.247	14.673	-1.446	0.280	0.673	0.327	22.59
22.3	1.48	0.211	0.486	0.269	14.461	-1.321	0.279	0.643	0.357	23.48
24.8	1.88	0.212	0.442	0.313	11.453	-1.432	0.280	0.586	0.414	25.58
27.3	1.96	0.209	0.450	0.305	10.865	-1.612	0.277	0.596	0.404	24.96
29.7	2.22	0.209	0.433	0.322	9.561	0.083	0.277	0.574	0.426	25.74
32.2	2.46	0.210	0.420	0.335	8.690	-0.075	0.278	0.556	0.444	26.54
34.7	2.73	0.208	0.411	0.344	7.785	-0.457	0.276	0.544	0.456	26.91
37.2	2.94	0.207	0.403	0.352	7.177	-1.122	0.275	0.533	0.467	27.26
39.7	3.07	0.205	0.399	0.356	6.794	-0.816	0.272	0.528	0.472	27.22
47.1	3.58	0.206	0.371	0.384	5.861	0.051	0.273	0.492	0.508	29.01
54.5	4.34	0.205	0.354	0.401	4.821	-0.060	0.272	0.469	0.531	30.14
62.0	4.96	0.205	0.340	0.415	4.208	0.166	0.272	0.450	0.550	31.11
69.4	5.67	0.208	0.331	0.424	3.734	0.403	0.275	0.438	0.562	32.14
76.8	6.09	0.210	0.312	0.443	3.505	0.413	0.278	0.413	0.587	33.91
84.2	6.69	0.212	0.327	0.428	3.227	0.378	0.281	0.433	0.567	32.94
91.7	7.54	0.215	0.321	0.434	2.901	0.563	0.285	0.425	0.575	33.81
99.1	8.01	0.219	0.319	0.436	2.775	0.748	0.290	0.423	0.577	34.39
106.6	8.57	0.223	0.312	0.443	2.642	0.595	0.295	0.413	0.587	35.54
114.0	9.35	0.226	0.304	0.451	2.461	0.778	0.300	0.403	0.597	36.64
121.4	9.74	0.231	0.325	0.430	2.407	0.917	0.305	0.431	0.569	35.33
128.8	10.58	0.237	0.321	0.434	2.275	0.704	0.314	0.425	0.575	36.41
136.3	11.27	0.241	0.329	0.426	2.175	0.992	0.320	0.436	0.564	36.24
143.7	11.68	0.247	0.329	0.426	2.146	1.080	0.327	0.436	0.564	36.83
151.1	12.28	0.252	0.329	0.426	2.082	0.684	0.333	0.436	0.564	37.39
158.6	13.15	0.256	0.329	0.426	1.979	0.728	0.340	0.436	0.564	37.95
168.5	13.94	0.264	0.343	0.412	1.919	0.830	0.349	0.454	0.546	37.58
183.3	15.12	0.272	0.354	0.401	1.827	0.747	0.361	0.468	0.532	37.62
198.2	16.56	0.283	0.366	0.389	1.734	0.661	0.375	0.485	0.515	37.73
213.0	17.66	0.290	0.368	0.387	1.661	0.610	0.384	0.488	0.512	38.17
227.9	18.81	0.297	0.381	0.374	1.599	0.516	0.393	0.504	0.496	37.97
242.7	20.21	0.302	0.393	0.362	1.515	0.499	0.400	0.520	0.480	37.59
257.6	21.42	0.310	0.396	0.359	1.464	0.523	0.410	0.525	0.475	38.04
272.4	22.77	0.316	0.408	0.347	1.403	0.394	0.418	0.541	0.459	37.69
287.3	23.76	0.319	0.412	0.343	1.359	0.353	0.423	0.546	0.454	37.76
302.2	25.10	0.324	0.421	0.334	1.305	0.182	0.429	0.558	0.442	37.55
317.0	26.34	0.324	0.420	0.335	1.245	0.161	0.429	0.556	0.444	37.65
331.9	27.62	0.328	0.424	0.331	1.201	0.284	0.434	0.562	0.438	37.70
346.7	28.88	0.331	0.435	0.320	1.160	0.213	0.439	0.577	0.423	37.27
356.6	29.63	0.332	0.437	0.318	1.135	0.162	0.440	0.579	0.421	37.26



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
 Sample: UD-3B - Depth: 10.0 - 11.7 ft
 Boring B-2321UD

KAW 7/16/05



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-3B - Depth: 10.0 - 11.7 ft
 Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: B-2321_UD3e
 Task No.: NA Assign, $\sigma'_{v,c}$ = 1.49 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assign. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-3	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 10.0 - 11.7	Specimen No.: B			☐ Kneading	Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		CRS		90° Stress Path	Remarks:
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
Conditions:	Rapid	Stress	Post Cyclic	Drained	With - Bath
					Cyclic (Hz) Rate: 0.1; Strain 1; Stress Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)				
Container No.	997	4096	5005	4201	Mass Moist Soil + Tare (g)	317.92	135.94
Mass Moist Soil + Cont. (g)	51.89	137.04	64.36	80.80	Mass Tare (g)	186.87	4.38
Mass Dry Soil + Container (g)	49.25	121.56	59.26	72.51	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	131.05	131.56
Mass Container (g)	31.62	30.61	31.53	30.35	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	14.97	17.02	18.39	19.66	Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	16.80	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)		
See attached data sheet(s) for additional water contents					Mass Container (g)		
					Mass Excess Dry Soil (g)		
					0.00		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.60	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.86
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.650	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.590	2-M NA		
3 18.580	3-B NA		
4 18.570	1'-T NA		
5 18.580	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.600	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	126.14
Dry, $\gamma_{d,o}$ (lb/ft ³) =	108.00

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress	Dia. by PiTape (mm)	Area, $A_{c,n}$		
Level	Meas. Corr.	(cm ²)	(in ²)	
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 7	ID, Rings (mm)			
Thickness (mm):	Top: 0.60	=	67.22	
☐ Single	Bottom: 0.58	=	Corr. for mem.	
☒ Double	Membr. Thick. = 0.30	=	66.630	
Area Ring with mem., A_o (cm ²) =		34.87	; (in ²) = 5.405	
Mass Top Cap, etc., M_{tc} =		527.2 g,	1.16	lbf
Data corr. for M_{tc} : ☒ Yes;		☐ No	Plattens with Pins: ☐ Yes; ☒ No	

Final Visual Description: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Other Remarks : Retest Sample for Original Test Sample UD3b @ 11.2 ft

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 4/16/2008

Date: 4/16/2008

Date: 4/17/2008

Prelim. Calc. By: LF

Final Calc. By: LF

Reviewed By: HP *HP*

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7116/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 7G

File Name: B-2321_UD3e

Task Number: NA

Specific Gravity: 2.710

☒ Measured; ☐ Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	1.44	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.68 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal.
W_o	14.97	17.02	18.39	16.80	16.80	19.20
S_o	75.2	81.4	85.2	80.7	80.8	87.3
Measured final mass of moist soil, M_{lat} (g)						131.56
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						131.56

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	16.80
Initial, $M_{d,o}$	112.20
Final, $M_{d,at}$	109.94
Selected, M_d	111.07

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	1.440	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.180		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.180		
ΔV_n using A_o - spec. (cm ³)	0.63		
ΔV_n using $A_{c,n}$ - app. (cm ³)	0.63		
ΔV_n using burette meas. (cm ³)	-3.70		
Selected ΔV_n (cm ³)	0.63	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	0.63
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.63
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.63

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	20.82
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 0.63	ΔH_c (mm) = 0.180	$\epsilon_{a,c}$ (%) = 0.97	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 64.23	H_c (mm) = 18.420	$\epsilon_{v,c}$ (%) = 0.98	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.87	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio,
$G_s = 2.710$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	e
Condition:								
Initial (as trimmed)	18.600	64.86	34.87	18.0	126.1	106.9	84.1	0.583
After to $\sigma'_{v,c}$	18.420	64.23	34.87	20.8	130.4	108.0	100.0	0.567
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 2.4 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: B-2321_UD3e
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-3	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 10.0 - 11.7	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.710 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.60	64.86	34.87	17.99	126.1	106.9	84.1	51	93.5	0.583
After to σ' _{v,c}	18.42	64.23	34.87	20.82	130.4	108.0	100.0	16	NA	0.567
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	35	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	☒ Static Strain Rate = 4.8 %/hr.					
Vert. Consol. Stress, σ' _{vc}	(ksf)	NA	1.459	NA	Cyclic Rate (Hz):	0.1;	1;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., ε _{ac}	%	NA	0.97	NA	Change in Height, ΔH _{L,n} (mm):		NA	NA		
Horiz. Consol. Stress, τ _{hc}	(ksf)	NA	NA	NA	Change in Vol., ΔV _{L,n} (cm ³):		NA	NA		
Consol. Stress Ratio, τ _{hc} / σ' _{vc}	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No		
Shear Strain during Consol., ε _{hc}	%	NA	NA	NA	Number of Loading Cycles, N =		NA			
Undr. Ambient Shear Stress, τ _{hu}	(ksf)	NA	NA	NA	±τ _h =		NA (ksf)	±γ =		NA %
Undr. Ambient Shear Strain, ε _{hu}	%	NA	NA	NA	at end of cyclic loading, σ' _{vc,r} =		NA (ksf)			

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 1.459 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

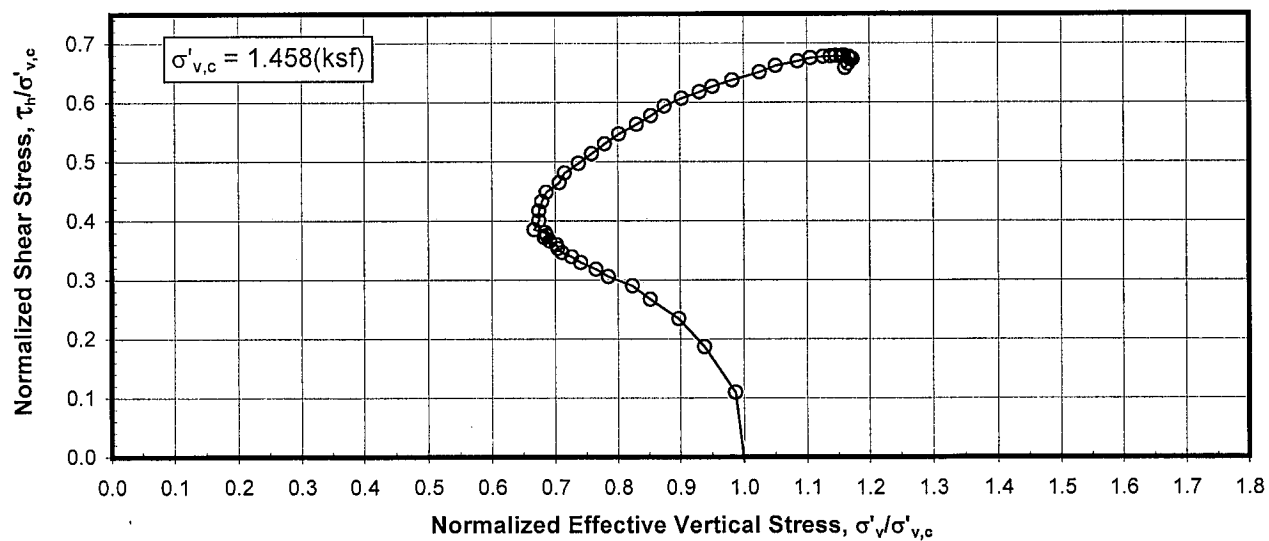
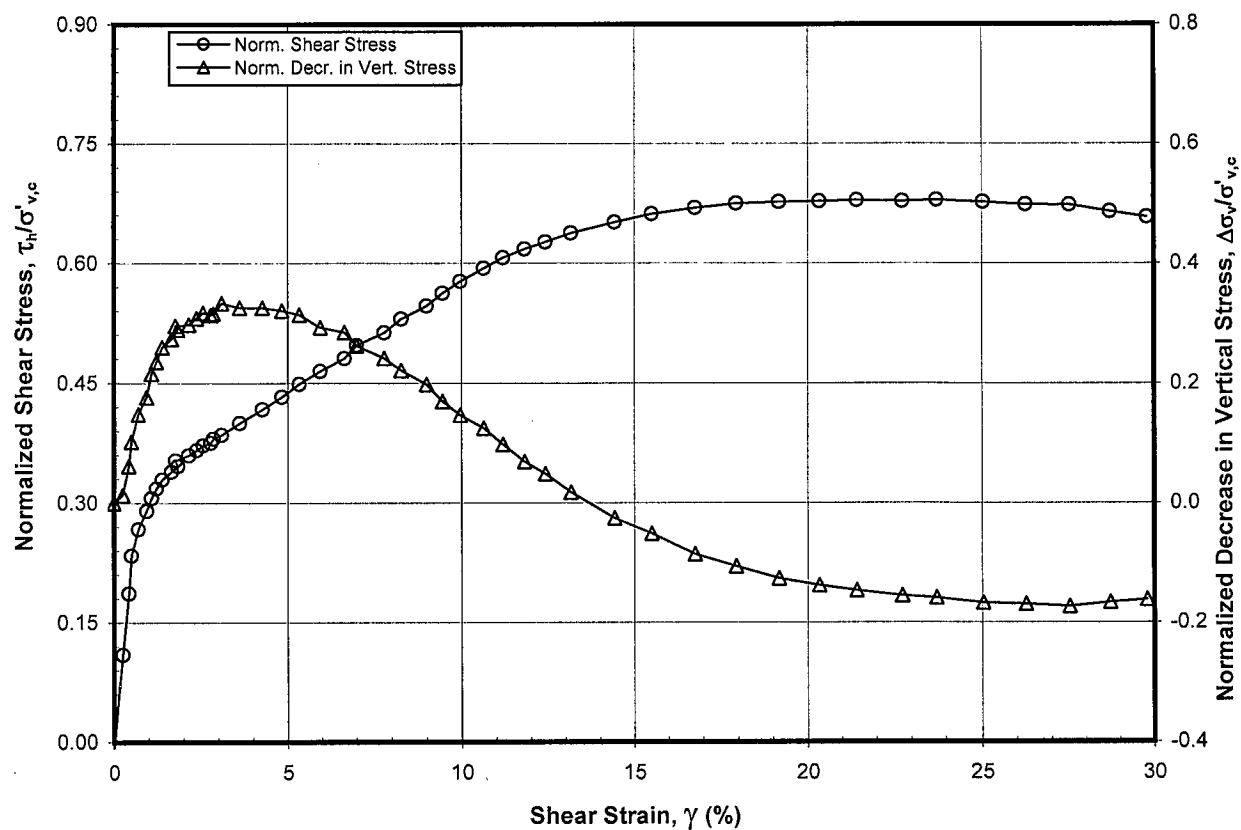
Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	C _d /σ' _{v,c} -
at Peak Shear Stress	1.405	29.40	2.154	0.652	-0.476	0.963
at Maximum Strain	1.405	29.40	2.154	0.652	-0.476	-

Boring No.: B-2321UD

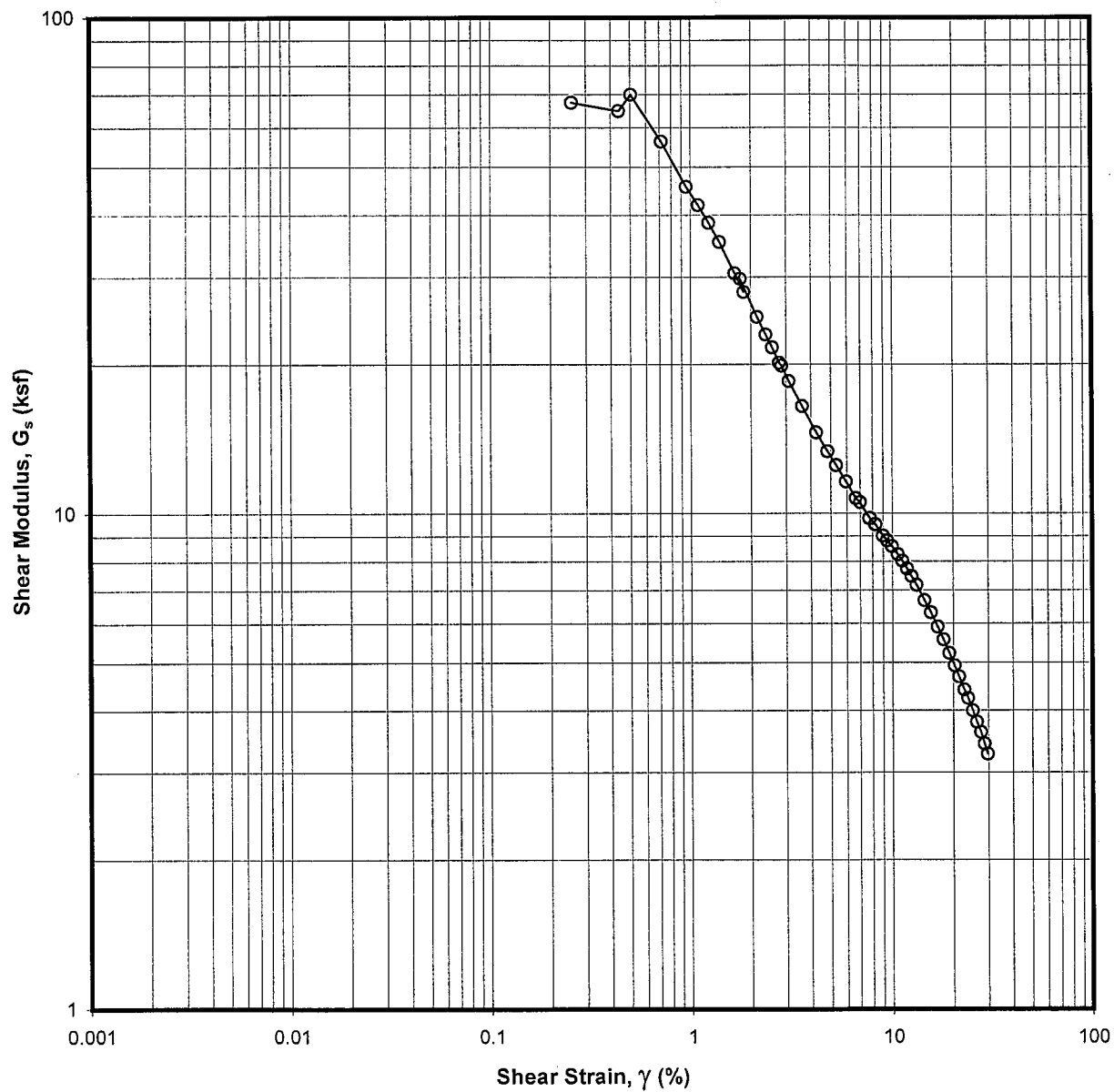
Sample No.: UD-3B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.047	1.459	0.000	-	-	-0.032	1.000	0.000	-1.86
2.5	0.03	0.048	1.462	-0.003	324.960	237.169	0.033	1.002	-0.002	1.89
5.0	0.14	0.218	1.442	0.017	185.578	112.971	0.149	0.988	0.012	8.59
7.4	0.27	0.315	1.417	0.043	134.450	61.772	0.216	0.971	0.029	12.52
9.9	0.42	0.385	1.364	0.095	103.288	35.836	0.264	0.935	0.065	15.74
12.4	0.58	0.424	1.301	0.158	81.702	20.929	0.290	0.892	0.108	18.04
14.9	0.76	0.455	1.260	0.199	66.067	14.432	0.312	0.863	0.137	19.87
17.4	0.97	0.480	1.210	0.249	54.300	9.343	0.329	0.829	0.171	21.63
19.9	1.17	0.494	1.178	0.282	46.372	7.761	0.338	0.807	0.193	22.74
22.4	1.36	0.510	1.156	0.304	40.908	6.144	0.350	0.792	0.208	23.83
24.8	1.56	0.518	1.139	0.320	36.141	5.038	0.355	0.781	0.219	24.45
27.3	1.75	0.529	1.132	0.328	33.028	6.207	0.363	0.775	0.225	25.07
29.8	1.95	0.542	1.115	0.345	30.244	4.507	0.371	0.764	0.236	25.92
32.3	2.16	0.548	1.105	0.354	27.548	5.781	0.376	0.757	0.243	26.38
34.8	2.36	0.565	1.094	0.365	25.988	7.624	0.387	0.750	0.250	27.30
37.3	2.56	0.578	1.094	0.365	24.454	5.121	0.396	0.750	0.250	27.86
39.8	2.76	0.586	1.094	0.365	22.905	4.475	0.401	0.750	0.250	28.15
42.3	2.96	0.596	1.091	0.368	21.736	4.485	0.408	0.748	0.252	28.65
49.7	3.55	0.618	1.086	0.374	18.726	4.003	0.423	0.744	0.256	29.64
57.2	4.12	0.643	1.090	0.369	16.732	4.823	0.440	0.747	0.253	30.51
64.6	4.72	0.674	1.102	0.357	15.289	4.773	0.462	0.755	0.245	31.46
72.1	5.31	0.699	1.105	0.354	14.060	4.155	0.479	0.758	0.242	32.32
79.5	5.87	0.722	1.123	0.337	13.105	3.605	0.495	0.769	0.231	32.74
87.0	6.45	0.740	1.137	0.322	12.206	3.155	0.507	0.779	0.221	33.06
94.4	7.04	0.759	1.159	0.300	11.454	2.971	0.520	0.794	0.206	33.21
101.9	7.67	0.776	1.180	0.279	10.745	3.082	0.532	0.809	0.191	33.34
109.3	8.26	0.796	1.205	0.254	10.213	4.034	0.546	0.826	0.174	33.47
116.8	8.89	0.826	1.225	0.234	9.820	4.197	0.566	0.840	0.160	33.99
124.3	9.48	0.848	1.251	0.208	9.440	4.140	0.581	0.858	0.142	34.12
131.7	10.09	0.875	1.288	0.171	9.150	4.424	0.600	0.883	0.117	34.20
139.2	10.68	0.901	1.320	0.139	8.880	4.935	0.617	0.905	0.095	34.31
146.6	11.27	0.934	1.347	0.112	8.706	4.869	0.640	0.923	0.077	34.74
154.1	11.87	0.959	1.381	0.078	8.476	4.210	0.657	0.946	0.054	34.77
161.5	12.46	0.984	1.414	0.045	8.278	4.258	0.674	0.969	0.031	34.83
171.5	13.30	1.019	1.465	-0.006	8.024	3.776	0.699	1.004	-0.004	34.83
186.4	14.54	1.061	1.519	-0.060	7.622	2.950	0.727	1.041	-0.041	34.93
201.3	15.77	1.092	1.565	-0.106	7.229	2.615	0.749	1.072	-0.072	34.92
216.2	17.01	1.125	1.628	-0.169	6.895	2.796	0.771	1.116	-0.116	34.65
231.1	18.26	1.162	1.676	-0.217	6.624	2.838	0.796	1.149	-0.149	34.73
246.0	19.48	1.195	1.734	-0.275	6.380	2.736	0.819	1.189	-0.189	34.57
260.9	20.73	1.230	1.782	-0.322	6.160	2.277	0.843	1.221	-0.221	34.62
275.8	21.98	1.252	1.830	-0.371	5.914	2.124	0.858	1.254	-0.254	34.38
290.7	23.19	1.282	1.891	-0.432	5.732	2.143	0.878	1.296	-0.296	34.13
305.6	24.46	1.305	1.951	-0.491	5.531	2.261	0.895	1.337	-0.337	33.79
320.5	25.69	1.338	1.996	-0.537	5.394	2.428	0.917	1.368	-0.368	33.84
335.4	26.92	1.365	2.065	-0.606	5.247	2.072	0.935	1.415	-0.415	33.47
350.3	28.18	1.390	2.117	-0.658	5.100	1.610	0.952	1.451	-0.451	33.28
365.2	29.40	1.405	2.154	-0.695	4.941	1.261	0.963	1.476	-0.476	33.12



STATIC DSS TEST
K_o Consolidation - OCR = NA
Sample: UD-4B - Depth: 13.5 - 15.2 ft
Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-4B - Depth: 13.5 - 15.2 ft

Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 12G File Name: B-2321_UD4b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 1.44 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: _____ Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer = _____
Boring No.: <u>B-2321UD</u>	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) = _____	No. Layers = _____
Sample No.: <u>UD-4</u>	Compostite No.: _____			☐ Pluviated:	Tamper Force (lb) = _____	Drop (in.) = _____
Depth (ft): <u>13.5 - 15.2</u>	Specimen No.: <u>B</u>			☐ Kneading	☐ Undercompaction: U_{ni} (%) = _____	Dia. (in.) = _____
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort = _____	% Comp. = _____ $\pm$ Opt. = _____

Type	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
Consolidation:		<u>CRS</u>			<u>90° Stress Path</u>	Remarks: _____
Loading	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
Conditions:	<u>Rapid</u>	<u>Stress</u>	<u>Post Cyclic</u>	<u>Drained</u>	<u>With - Bath</u>	Rate: <u>0.1</u> ; <u>1</u> ; Other: _____

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	191	1152	4155	4247	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	182.70	4.08	
Mass Moist Soil + Cont. (g)	52.13	152.90	59.67	84.72	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	169.38	172.22	
Mass Dry Soil + Container (g)	48.52	131.65	54.07	73.29	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	30.75	32.37	29.97	30.14	Container No.	5005		
WATER CONTENT (%)	20.32	21.40	23.24	26.49	Mass Dry Soil + Container (g)	32.31		
Avg. Initial WC, $W_{o,avg}$ (%)	21.65	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Container (g)	31.54		
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)	0.77		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	25.68	$A_{s,t}$ (cm ²):	34.90
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	89.60
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_r)	Diameter (D_o)	Remarks: #10 CAP USED	
1 25.740	1-T NA		
2 25.750	2-M NA		
3 25.610	3-B NA		
4 25.710	1'-T NA	For Free Standing	
5 25.600	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 25.675	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	118.01
Dry, $\gamma_{d,o}$ (lb/ft ³) =	97.01

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress	Dia. by PiTape (mm)		Area, $A_{c,n}$	
Level	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No.	12	ID, Rings (mm)		
Thickness (mm):	Top: <u>0.57</u>		= 67.24	
☐ Single	Bottom: <u>0.59</u>		Corr. for mem.	
☒ Double	Membr. Thick. = <u>0.29</u>		= 66.660	
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		526.9 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Other Remarks: _____

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 3/26/2008

Date: 3/27/2008

Date: 3/29/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks: _____

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686
Task Number: NA

Test Station No.: 12G
Specific Gravity: 2.720

File Name: B-2321_UD4b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or
Nominal Vertical Stress, σ'_v (ksf)	NA	1.44	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON,days,hrs)	NA	0.75 days	NA		Post Cy.Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	20.32	21.40	23.24	21.65	21.65	23.70
S_o	75.9	78.3	82.1	78.8	78.8	83.0
Measured final mass of moist soil, $M_{t,at}$ (g)						172.22
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						173.19

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	21.65
Initial, $M_{d,o}$	139.24
Final, $M_{d,at}$	136.92
Selected, M_d	138.08

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	1.440	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.120		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.120		
ΔV_n using A_o - spec. (cm ³)	0.42		
ΔV_n using $A_{c,n}$ - app. (cm ³)	0.42		
ΔV_n using burette meas. (cm ³)	-3.00		
Selected ΔV_n (cm ³)	0.42	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	0.42
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.42
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	0.42

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	27.71
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 0.42	ΔH_c (mm) = 0.120	$\epsilon_{a,c}$ (%) = 0.47	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 89.19	H_c (mm) = 25.555	$\epsilon_{v,c}$ (%) = 0.47	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.90	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	25.675	89.60	34.90	22.7	118.0	96.2	80.9	0.765
After to $\sigma'_{v,c}$	25.555	89.19	34.90	27.7	123.4	96.7	100.0	0.757
Consol.: to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
& Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF

Reviewed By: HP

Remarks: t95 for max stress = 1.8 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 12G File Name: B-2321_UD4b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-4	Compostite No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 13.5 - 15.2	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water With - Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	25.68	89.60	34.90	22.67	118.0	96.2	80.9	81	92.2	0.765
After to σ' _{v,c}	25.56	89.19	34.90	27.71	123.4	96.7	100.0	22	NA	0.757
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	59	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	☒ Static Strain Rate = 6.5 %/hr.					
Vert. Consol. Stress, σ' _{vc}	(ksf)	NA	1.458	NA	Cyclic Rate (Hz):	0.1;	1;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., ε _{ax,c}	%	NA	0.47	NA	Change in Height, ΔH _{L,n} (mm):		NA	NA		
Horiz. Consol. Stress, τ _{hc}	(ksf)	NA	NA	NA	Change in Vol., ΔV _{L,n} (cm ³):		NA	NA		
Consol. Stress Ratio, τ _{hc} / σ' _{vc}	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No		
Shear Strain during Consol., ε _{hc}	%	NA	NA	NA	Number of Loading Cycles, N =		NA			
Undr. Ambient Shear Stress, τ _{h,ua}	(ksf)	NA	NA	NA	±τ _h = NA (ksf)		±γ = NA %			
Undr. Ambient Shear Strain, ε _{ua}	%	NA	NA	NA	at end of cyclic loading, σ' _{vcy,r} =		NA (ksf)			

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 1.458 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

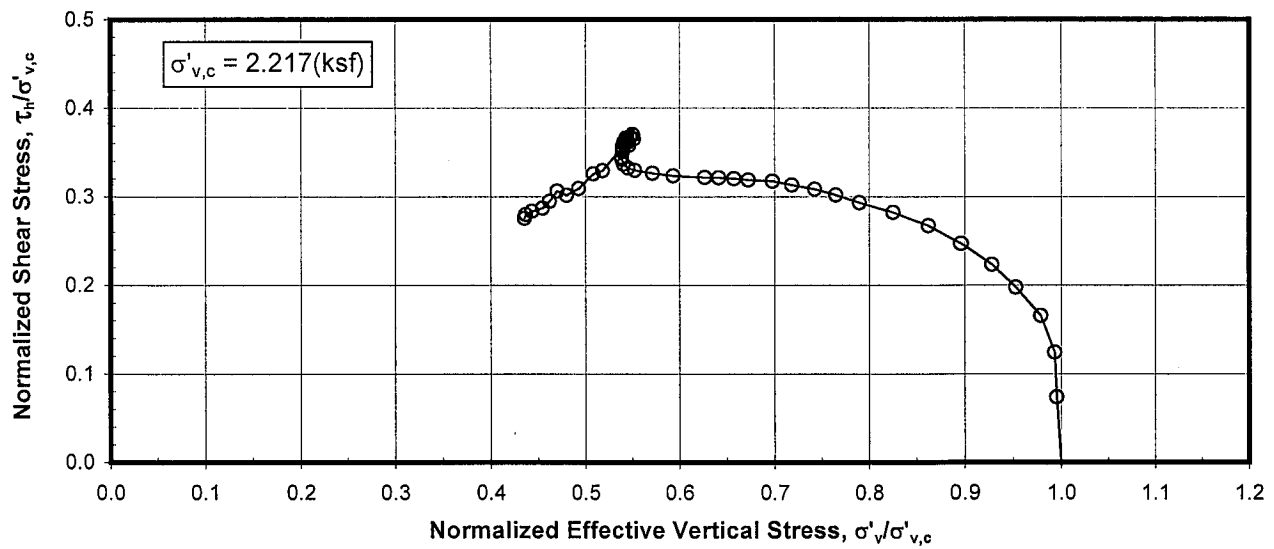
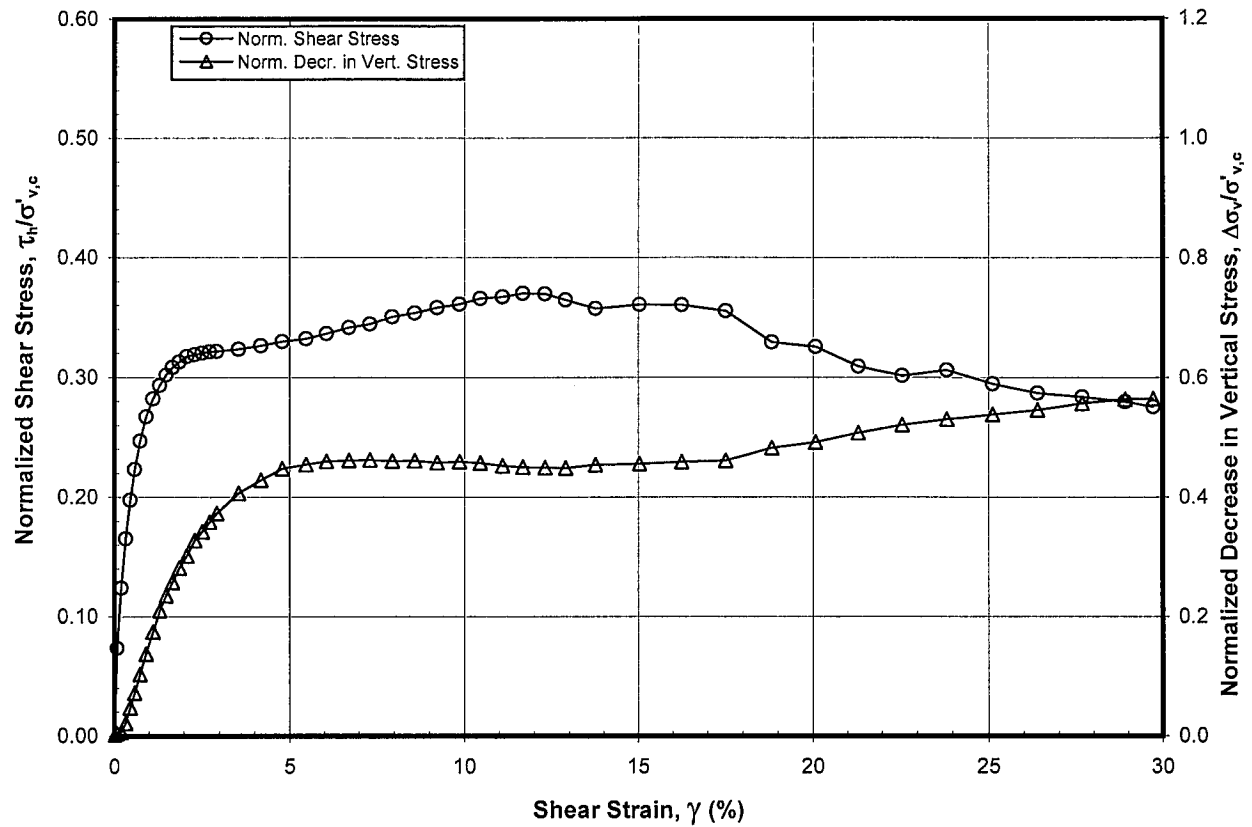
Final Visual Description and Remarks: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{vc} -	c _v /σ' _{vc} -
at Peak Shear Stress	0.990	23.73	1.691	0.586	-0.159	0.679
at Maximum Strain	0.960	29.80	1.694	0.566	-0.162	-

Boring No.: B-2321UD

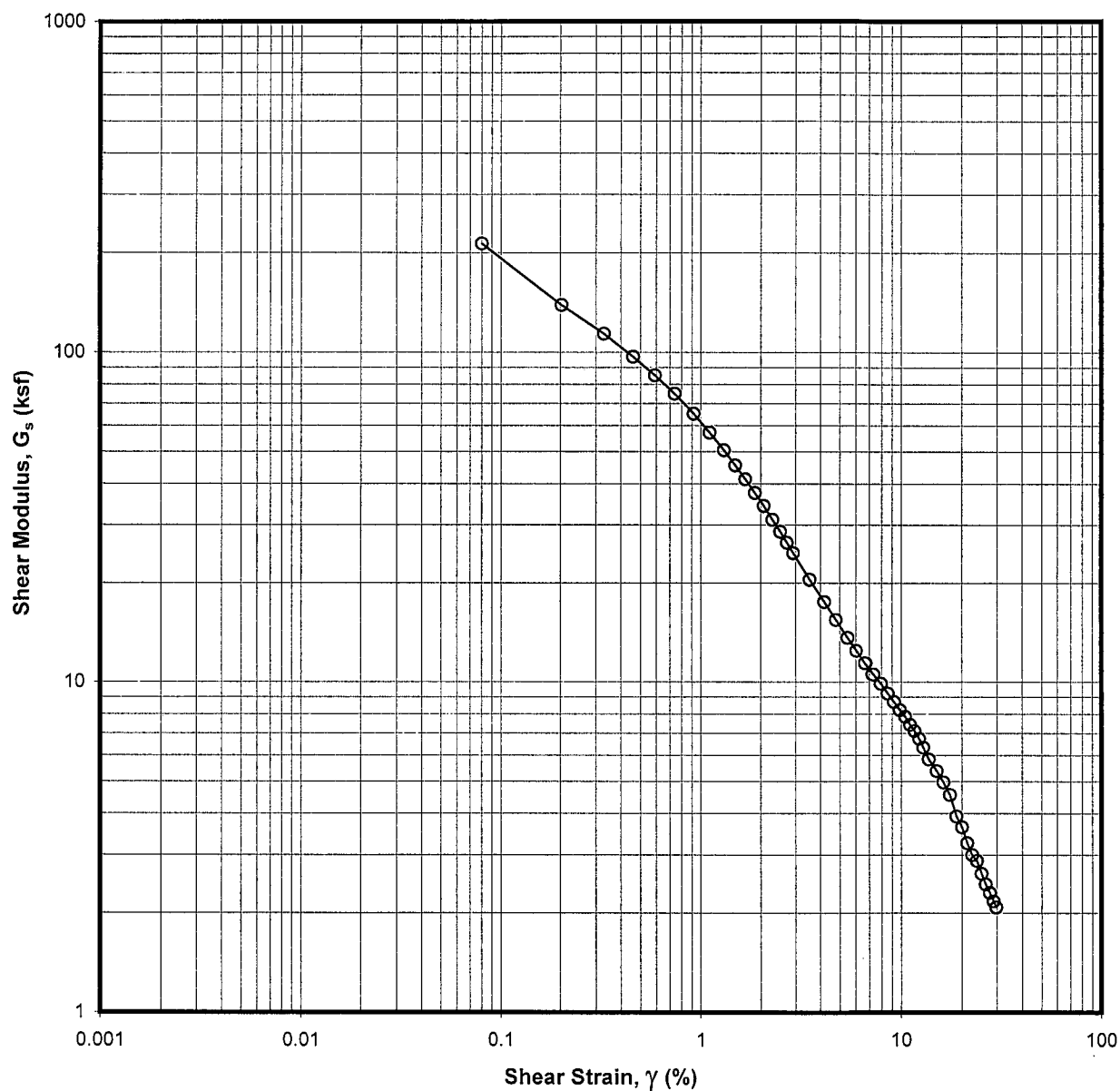
Sample No.: UD-4B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.012	1.458	0.000	-	-	-0.008	1.000	0.000	-0.48
1.8	0.26	0.160	1.439	0.019	67.360	64.320	0.109	0.987	0.013	6.33
3.6	0.44	0.272	1.368	0.090	64.820	82.328	0.186	0.938	0.062	11.24
5.4	0.51	0.341	1.310	0.149	69.933	63.248	0.234	0.898	0.102	14.60
7.2	0.72	0.390	1.242	0.216	56.210	18.451	0.267	0.852	0.148	17.41
9.0	0.95	0.422	1.201	0.257	45.615	15.175	0.290	0.823	0.177	19.38
10.8	1.09	0.446	1.145	0.314	41.862	14.553	0.306	0.785	0.215	21.28
12.6	1.23	0.463	1.116	0.343	38.569	11.470	0.318	0.765	0.235	22.55
14.4	1.40	0.480	1.080	0.378	35.295	7.890	0.329	0.741	0.259	23.96
16.2	1.66	0.495	1.060	0.399	30.486	5.381	0.339	0.727	0.273	25.02
17.9	1.85	0.504	1.037	0.421	27.976	-4.422	0.346	0.711	0.289	25.94
19.7	1.77	0.515	1.028	0.431	29.698	-5.890	0.353	0.705	0.295	26.60
21.5	2.16	0.524	1.025	0.433	24.882	3.293	0.359	0.703	0.297	27.08
23.3	2.38	0.533	1.009	0.449	22.911	4.407	0.366	0.692	0.308	27.86
25.1	2.56	0.542	0.996	0.462	21.612	3.527	0.372	0.683	0.317	28.55
26.9	2.78	0.547	1.002	0.457	20.105	6.074	0.375	0.687	0.313	28.64
28.7	2.86	0.555	0.998	0.460	19.830	6.243	0.380	0.684	0.316	29.06
30.5	3.11	0.561	0.973	0.485	18.466	3.481	0.385	0.667	0.333	29.98
35.9	3.62	0.583	0.984	0.474	16.445	4.057	0.400	0.675	0.325	30.66
41.3	4.26	0.608	0.984	0.475	14.548	3.959	0.417	0.675	0.325	31.72
46.6	4.83	0.631	0.990	0.468	13.312	4.293	0.433	0.679	0.321	32.51
52.0	5.34	0.654	1.001	0.458	12.479	4.158	0.449	0.686	0.314	33.17
57.4	5.96	0.677	1.031	0.427	11.577	3.554	0.465	0.707	0.293	33.30
62.7	6.66	0.701	1.043	0.415	10.712	5.097	0.480	0.715	0.285	33.88
68.1	7.01	0.725	1.076	0.383	10.519	4.928	0.497	0.738	0.262	33.97
73.5	7.79	0.748	1.106	0.352	9.761	4.070	0.513	0.759	0.241	34.07
78.9	8.27	0.773	1.136	0.322	9.492	4.224	0.530	0.779	0.221	34.23
84.2	9.00	0.797	1.170	0.288	8.995	4.238	0.546	0.802	0.198	34.26
89.6	9.45	0.821	1.211	0.247	8.811	4.672	0.563	0.830	0.170	34.12
95.0	9.96	0.842	1.245	0.214	8.573	3.856	0.577	0.853	0.147	34.07
100.3	10.64	0.866	1.277	0.182	8.254	3.497	0.594	0.875	0.125	34.14
105.7	11.19	0.885	1.317	0.142	8.016	3.008	0.607	0.903	0.097	33.90
111.1	11.82	0.901	1.358	0.100	7.727	2.348	0.618	0.931	0.069	33.56
116.5	12.42	0.914	1.388	0.071	7.456	2.145	0.627	0.952	0.048	33.36
123.6	13.16	0.930	1.433	0.025	7.158	1.873	0.638	0.983	0.017	32.97
134.4	14.43	0.950	1.496	-0.038	6.668	1.495	0.651	1.026	-0.026	32.41
145.1	15.50	0.965	1.533	-0.075	6.303	1.136	0.662	1.051	-0.051	32.19
155.9	16.76	0.976	1.583	-0.125	5.895	0.783	0.669	1.086	-0.086	31.64
166.6	17.94	0.984	1.613	-0.155	5.554	0.477	0.675	1.106	-0.106	31.38
177.3	19.18	0.987	1.643	-0.184	5.212	0.163	0.677	1.126	-0.126	31.01
188.1	20.34	0.988	1.660	-0.201	4.918	0.113	0.678	1.138	-0.138	30.77
198.8	21.44	0.990	1.672	-0.214	4.675	0.020	0.679	1.147	-0.147	30.62
209.5	22.75	0.988	1.684	-0.226	4.398	0.057	0.678	1.155	-0.155	30.40
220.3	23.73	0.990	1.691	-0.232	4.226	-0.015	0.679	1.159	-0.159	30.37
231.0	25.03	0.987	1.702	-0.244	3.992	-0.322	0.677	1.167	-0.167	30.11
241.8	26.27	0.982	1.706	-0.247	3.786	-0.216	0.674	1.170	-0.170	29.94
252.5	27.54	0.982	1.711	-0.253	3.610	-0.529	0.673	1.173	-0.173	29.84
263.2	28.72	0.970	1.701	-0.243	3.419	-0.981	0.665	1.167	-0.167	29.69
274.0	29.80	0.960	1.694	-0.236	3.261	-0.953	0.658	1.162	-0.162	29.53



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
 Sample: UD-5B - Depth: 17.0 - 18.7 ft
 Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-5B - Depth: 17.0 - 18.7 ft
 Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 9G File Name: B-2321_UD5b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 2.16 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assign. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-5	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 17.0 - 18.7	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	124	4155	5059	4072	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	309.75	129.13	
Mass Moist Soil + Cont. (g)	58.63	154.14	61.42	72.81		186.86	4.24	
Mass Dry Soil + Container (g)	54.37	134.10	55.98	64.94		122.89	124.89	
Mass Container (g)	30.51	29.89	30.58	30.11	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	17.85	19.23	21.42	22.60	Container No.			
Avg. Initial WC, $W_{o,avg}$ (%)	19.50	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)			
See attached data sheet(s) for additional water contents					Mass Container (g)			
					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.60	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.86
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.630	1-T NA		
2 18.620	2-M NA		
3 18.580	3-B NA		
4 18.540	1'-T NA	For Free Standing	
5 18.600	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.600	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	118.28
Dry, $\gamma_{d,o}$ (lb/ft ³) =	98.98

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Meas.	Corr.	Area, $A_{c,n}$ (cm ²) (in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 9	ID, Rings (mm)			
Thickness (mm):	Top: 0.59	= 67.21		
☐ Single	Bottom: 0.57	Corr. for mem.		
☒ Double	Membr. Thick. = 0.29	= 66.630		
Area Ring with mem., A_o (cm ²) =		34.87	; (in ²) = 5.405	
Mass Top Cap, etc., M_{tc} =		528.7 g,	1.17 lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Other Remarks :

Trim./ Recon. By: HC
 Date: 3/24/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 3/25/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 3/27/2008
 Reviewed By: HP **HP**

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 9G

File Name: B-2321_UD5b

Task Number: NA

Specific Gravity: 2.720



Measured;



Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed";

☐ Reconstituted;

☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	2.16	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	1.05 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	17.85	19.23	21.42	19.50	19.50	20.63
S_o	70.5	73.8	78.7	74.4	74.4	77.0
Measured final mass of moist soil, $M_{t,at}$ (g)						124.89
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						124.89

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	19.50
Initial, $M_{d,o}$	102.84
Final, $M_{d,at}$	101.87
Selected, M_d	102.35

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	2.160	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.370		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.370		
ΔV_n using A_o - spec. (cm ³)	1.29		
ΔV_n using $A_{c,n}$ - app. (cm ³)	1.29		
ΔV_n using burette meas. (cm ³)	-3.40		
Selected ΔV_n (cm ³)	1.29	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	1.29
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.29
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.29

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	25.23
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	1.30	ΔH_c (mm) =	0.370	$\epsilon_{a,c}$ (%) =	1.99	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	63.56	H_c (mm) =	18.230	$\epsilon_{v,c}$ (%) =	2.00	$\epsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.600	64.86	34.87	20.1	118.3	98.5	75.7	0.724
After to $\sigma'_{v,c}$	18.230	63.56	34.87	25.2	125.9	100.5	100.0	0.689
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: MP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 2.7 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 9G File Name: B-2321_UD5b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-5	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 17.0 - 18.7	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water With - Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties									
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %
Condition: Initial	18.60	64.86	34.87	20.06	118.3	98.5	75.7	40	90.4
After to σ' _{v,c}	18.23	63.56	34.87	25.23	125.9	100.5	100.0	15	NA
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	25	NA

Consolidation Stress Summary and Loading Summary									
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 5.0 %/hr.			
Vert. Consol. Stress, σ' _{v,c}	(ksf)	NA	2.217	NA		Cyclic Rate (Hz):	0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading	Static	Cyclic	
Axial Strain during Consol., ε _{a,c}	%	NA	1.99	NA		Change in Height, ΔH _{L,n} (mm):	NA	NA	
Horiz. Consol. Stress, τ _{h,c}	(ksf)	NA	NA	NA		Change in Vol., ΔV _{L,n} (cm ³):	NA	NA	
Consol. Stress Ratio, τ _{h,c} / σ' _{v,c}	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:	Yes;	No	
Shear Strain during Consol., ε _{h,c}	%	NA	NA	NA		Number of Loading Cycles, N =	NA		
Undr. Ambient Shear Stress, τ _{h,ua}	(ksf)	NA	NA	NA		±τ _h = NA (ksf)	±γ = NA %		
Undr. Ambient Shear Strain, ε _{h,ua}	%	NA	NA	NA		at end of cyclic loading, σ' _{vcy,r} =	NA (ksf)		

Weight Top Cap, etc., M _{tc} (lb): 1.17	Data Normalization: ☒ Yes ☐ No Value: 2.217 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

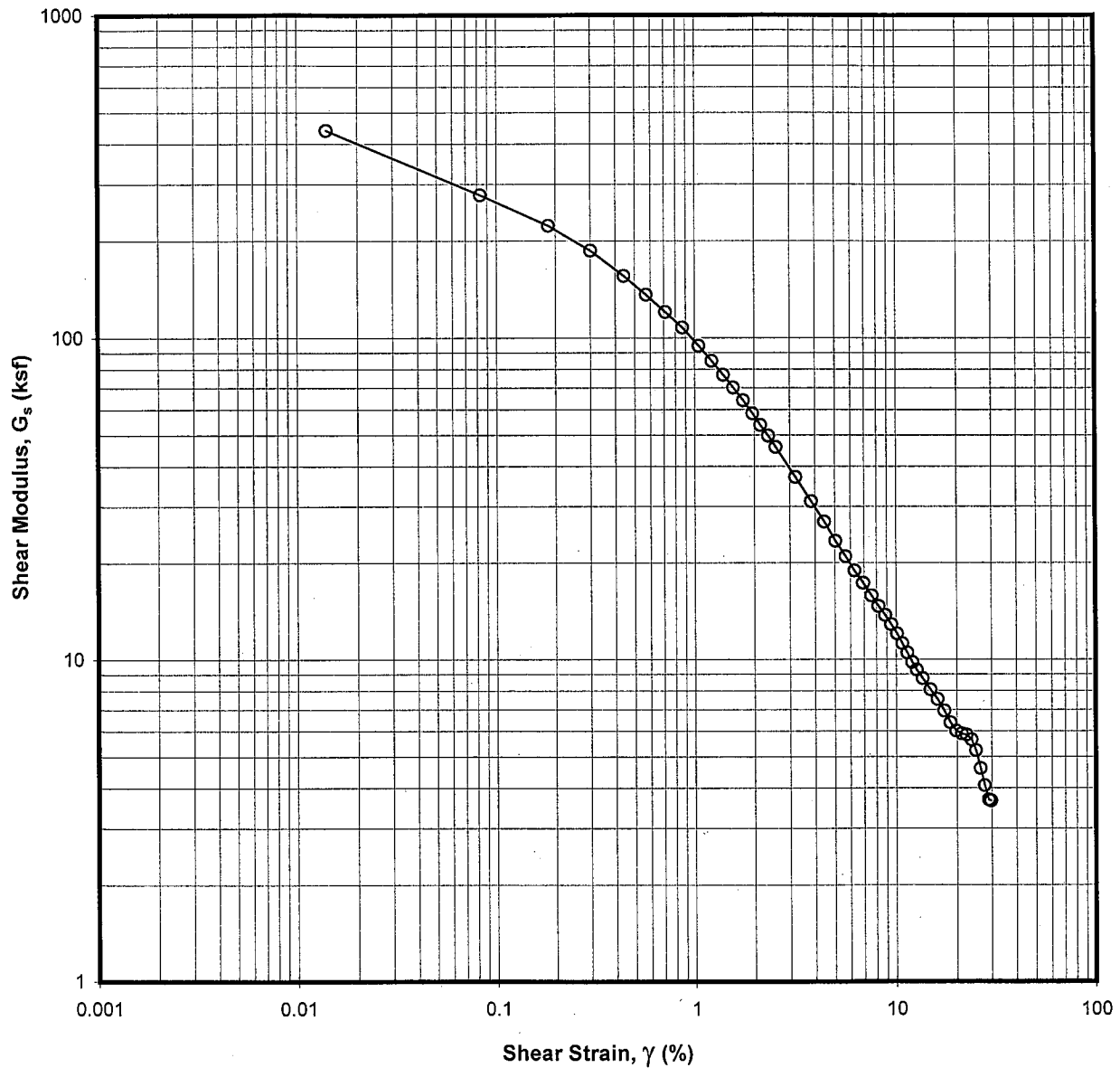
Final Visual Description and Remarks: Mottled Brownish Yellow and Light Gray Lean CLAY (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	c _v /σ' _{v,c}
at Peak Shear Stress	0.821	11.67	1.220	0.673	0.450	0.370
at Maximum Strain	0.611	29.72	0.966	0.632	0.565	-

Boring No.: B-2321UD

Sample No.: UD-5B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.007	2.217	0.000	-	-	-0.003	1.000	0.000	-0.19
2.5	0.08	0.163	2.207	0.010	212.762	151.706	0.074	0.995	0.005	4.23
4.9	0.20	0.275	2.203	0.015	138.764	81.660	0.124	0.993	0.007	7.12
7.4	0.33	0.367	2.170	0.047	113.487	63.751	0.165	0.979	0.021	9.59
9.9	0.46	0.438	2.112	0.105	96.842	49.091	0.198	0.953	0.047	11.72
12.3	0.59	0.495	2.057	0.160	85.038	39.153	0.223	0.928	0.072	13.52
14.8	0.74	0.547	1.988	0.230	74.853	29.937	0.247	0.896	0.104	15.40
17.3	0.92	0.592	1.913	0.305	65.105	21.358	0.267	0.863	0.137	17.20
19.7	1.11	0.626	1.831	0.387	57.110	15.139	0.282	0.826	0.174	18.87
22.2	1.30	0.650	1.751	0.466	50.406	11.366	0.293	0.790	0.210	20.36
24.7	1.49	0.669	1.696	0.521	45.372	8.983	0.302	0.765	0.235	21.53
27.2	1.68	0.683	1.646	0.571	41.226	6.448	0.308	0.743	0.257	22.54
29.6	1.87	0.694	1.593	0.624	37.481	4.896	0.313	0.718	0.282	23.53
32.1	2.08	0.703	1.548	0.670	34.202	3.102	0.317	0.698	0.302	24.43
34.6	2.30	0.707	1.491	0.726	31.076	1.566	0.319	0.673	0.327	25.35
37.0	2.51	0.710	1.459	0.759	28.555	1.254	0.320	0.658	0.342	25.95
39.5	2.72	0.712	1.423	0.794	26.452	0.680	0.321	0.642	0.358	26.58
42.0	2.93	0.713	1.391	0.826	24.603	0.537	0.321	0.627	0.373	27.13
49.4	3.55	0.717	1.317	0.901	20.433	0.847	0.323	0.594	0.406	28.56
56.8	4.18	0.723	1.268	0.950	17.471	1.128	0.326	0.572	0.428	29.71
64.2	4.79	0.731	1.225	0.992	15.413	1.027	0.330	0.553	0.447	30.81
71.6	5.47	0.736	1.210	1.007	13.599	1.226	0.332	0.546	0.454	31.33
79.0	6.06	0.746	1.199	1.019	12.432	1.686	0.337	0.541	0.459	31.90
86.4	6.71	0.757	1.195	1.023	11.399	1.354	0.342	0.539	0.461	32.37
93.8	7.32	0.763	1.194	1.024	10.531	1.577	0.344	0.538	0.462	32.59
101.2	7.95	0.777	1.197	1.020	9.864	1.652	0.350	0.540	0.460	32.99
108.6	8.59	0.784	1.196	1.021	9.218	1.345	0.354	0.540	0.460	33.25
116.0	9.22	0.794	1.203	1.015	8.692	1.320	0.358	0.542	0.458	33.44
123.4	9.86	0.801	1.200	1.018	8.200	1.399	0.361	0.541	0.459	33.73
130.8	10.46	0.811	1.204	1.013	7.829	1.090	0.366	0.543	0.457	33.97
138.2	11.09	0.814	1.215	1.002	7.409	0.791	0.367	0.548	0.452	33.83
145.7	11.67	0.821	1.220	0.997	7.096	0.470	0.370	0.550	0.450	33.93
153.1	12.30	0.820	1.222	0.996	6.723	-1.030	0.370	0.551	0.449	33.86
160.5	12.89	0.809	1.224	0.994	6.329	-1.857	0.365	0.552	0.448	33.46
170.3	13.76	0.793	1.212	1.005	5.814	-0.643	0.357	0.547	0.453	33.18
185.1	15.03	0.800	1.208	1.010	5.369	0.263	0.361	0.545	0.455	33.51
199.9	16.26	0.799	1.201	1.017	4.963	-0.467	0.360	0.542	0.458	33.65
214.7	17.51	0.788	1.196	1.022	4.544	-2.665	0.355	0.539	0.461	33.38
229.6	18.82	0.730	1.149	1.068	3.917	-2.534	0.329	0.518	0.482	32.42
244.4	20.07	0.722	1.127	1.090	3.633	-1.804	0.326	0.508	0.492	32.63
259.2	21.31	0.685	1.093	1.124	3.250	-2.164	0.309	0.493	0.507	32.08
274.0	22.57	0.668	1.064	1.153	2.992	-0.272	0.301	0.480	0.520	32.12
288.8	23.85	0.678	1.043	1.175	2.876	-0.572	0.306	0.470	0.530	33.05
303.6	25.12	0.653	1.024	1.193	2.630	-1.688	0.295	0.462	0.538	32.53
318.4	26.39	0.636	1.008	1.210	2.438	-0.968	0.287	0.455	0.545	32.25
333.2	27.67	0.629	0.983	1.234	2.299	-0.630	0.284	0.444	0.556	32.59
348.0	28.91	0.620	0.968	1.249	2.170	-0.935	0.280	0.437	0.563	32.63
357.9	29.72	0.611	0.966	1.252	2.079	-1.177	0.275	0.435	0.565	32.31



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-6B - Depth: 28.5 - 30.2 ft

Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: B-2321_UD6b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 3.60 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA , NA , NA & NA
 Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-6	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 28.5 - 30.2	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{nl} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_0 at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	191	4208	5005	4229	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	304.22	127.06	
Mass Moist Soil + Cont. (g)	75.60	140.54	62.41	47.19	Mass Tare (g)	182.70	3.90	
Mass Dry Soil + Container (g)	66.87	118.71	56.02	43.42	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	121.52	123.16	
Mass Container (g)	30.76	30.65	31.54	30.29	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	24.18	24.79	26.10	28.71	Container No.			
Avg. Initial WC, $W_{o,avg}$ (%)	25.02	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)			
See attached data sheet(s) for additional water contents					Mass Container (g)			
					Mass Excess Dry Soil (g)	0.00		

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.65	$A_{s,t}$ (cm ²):	34.90
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	65.09
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.670	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.640	2-M NA		
3 18.650	3-B NA		
4 18.600	1'-T NA		
5 18.670	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.650	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	116.55
Dry, $\gamma_{d,o}$ (lb/ft ³) =	93.23

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 7	ID, Rings (mm)			
Thickness (mm):	Top: 0.57			= 67.23
☐ Single	Bottom: 0.56			Corr. for mem.
☒ Double	Membr. Thick. = 0.28			= 66.660
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		527.2 g,	1.16	lbf
Data corr. for M_{tc} :		☒ Yes;	☐ No	Plattens with Pins: ☐ Yes; ☒ No

Final Visual Description: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Other Remarks:

Trim./ Recon. By: HC
 Date: 3/25/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 3/26/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 3/28/2008
 Reviewed By: HP *HP*

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

KAW 7/11/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 7G

File Name: B-2321_UD6b

Task Number: NA

Specific Gravity: 2.720

☒ Measured; ☐ Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	3.6	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{hr,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.69 Days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$	Back Cal.
W_o	24.18	24.79	26.10	25.02	25.02	27.00
S_o	81.6	82.8	85.1	83.2	83.2	86.7
Measured final mass of moist soil, $M_{t,at}$ (g)						123.16
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						123.16

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	25.02
Initial, $M_{d,o}$	97.20
Final, $M_{d,at}$	95.69
Selected, M_d	96.45

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	3.600	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.680		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.680		
ΔV_n using A_o - spec. (cm ³)	2.37		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.37		
ΔV_n using burette meas. (cm ³)	-3.00		
Selected ΔV_n (cm ³)	2.37	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	2.37
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.37
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.37

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	28.14
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 2.37	ΔH_c (mm) = 0.680	$\epsilon_{a,c}$ (%) = 3.65	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 62.71	H_c (mm) = 17.970	$\epsilon_{v,c}$ (%) = 3.65	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.90	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.650	65.09	34.90	26.0	116.6	92.5	84.9	0.836
After to $\sigma'_{v,c}$	17.970	62.71	34.90	28.1	123.0	96.0	100.0	0.769
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 1.5 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: B-2321_UD6b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-6	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 28.5 - 30.2	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	Dynamic	Stress	Post Cyclic	Drained	With - Bath
					Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL	-200	Void Ratio,
					Total (pcf)	Dry (pcf)		PL		
Condition:								PI	%	e
Initial	18.65	65.09	34.90	25.99	116.6	92.5	84.9	75	94.7	0.836
After to σ' _{v,c}	17.97	62.71	34.90	28.14	123.0	96.0	100.0	20	NA	0.769
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	55	NA	NA

Consolidation Stress Summary and Loading Summary									
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.0 %/hr.			
Vert. Consol. Stress, σ' _{v,c}	(ksf)	NA	3.632	NA		Cyclic Rate (Hz):	0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading	Static	Cyclic	
Axial Strain during Consol., ε _{ac}	%	NA	3.65	NA		Change in Height, ΔH _{L,n} (mm):	NA	NA	
Horiz. Consol. Stress, τ _{hc}	(ksf)	NA	NA	NA		Change in Vol., ΔV _{L,n} (cm ³):	NA	NA	
Consol. Stress Ratio, τ _{hc} / σ' _{v,c}	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:	Yes;	No	
Shear Strain during Consol., ε _{hc}	%	NA	NA	NA		Number of Loading Cycles, N =	NA		
Undr. Ambient Shear Stress, τ _{h,us}	(ksf)	NA	NA	NA		±τ _h = NA (ksf)	±γ = NA %		
Undr. Ambient Shear Strain, ε _{h,s}	%	NA	NA	NA		at end of cyclic loading, σ' _{vc,r} =	NA (ksf)		

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 3.632 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

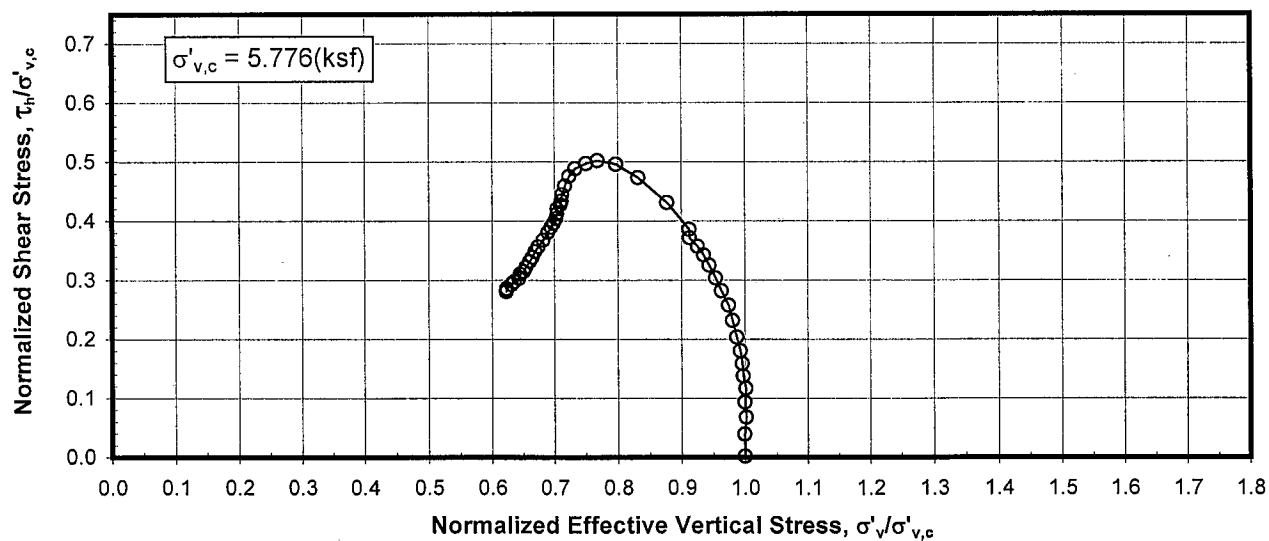
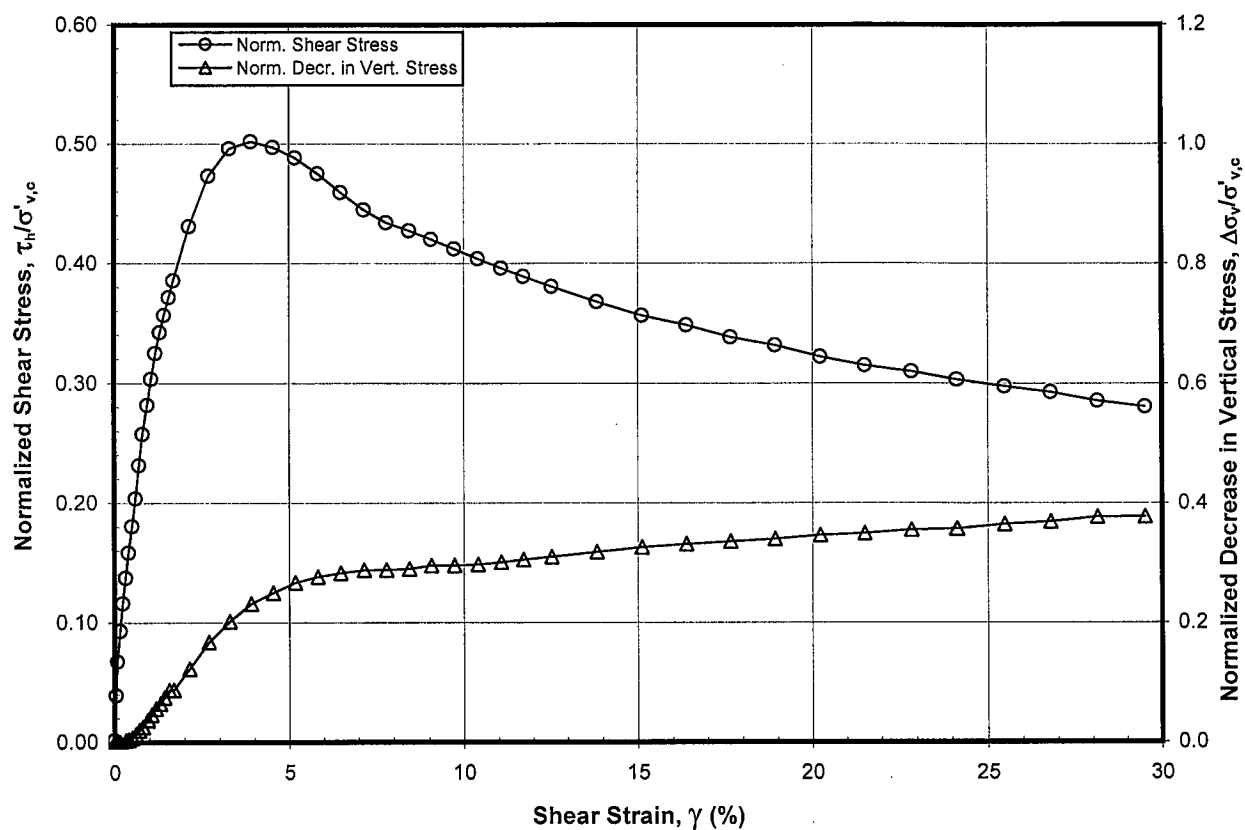
Final Visual Description and Remarks: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	C _u /σ' _{v,c} -
at Peak Shear Stress	1.339	23.75	2.485	0.539	0.316	0.369
at Maximum Strain	1.084	29.78	2.336	0.464	0.357	-

Boring No.: B-2321UD

Sample No.: UD-6B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.000	3.632	0.000	-	-	0.000	1.000	0.000	0.00
3.1	0.01	0.062	3.610	0.022	440.262	342.301	0.017	0.994	0.006	0.98
6.2	0.08	0.231	3.618	0.014	277.491	211.088	0.064	0.996	0.004	3.65
9.3	0.18	0.411	3.610	0.022	222.812	153.533	0.113	0.994	0.006	6.49
12.4	0.30	0.562	3.586	0.046	186.453	109.114	0.155	0.987	0.013	8.90
15.6	0.44	0.686	3.533	0.099	155.580	79.195	0.189	0.973	0.027	10.99
18.7	0.57	0.776	3.472	0.160	135.921	63.275	0.214	0.956	0.044	12.61
21.8	0.71	0.858	3.415	0.217	120.201	53.453	0.236	0.940	0.060	14.10
24.9	0.87	0.936	3.338	0.294	107.456	39.949	0.258	0.919	0.081	15.67
28.0	1.05	0.990	3.258	0.374	94.384	27.913	0.273	0.897	0.103	16.90
31.2	1.22	1.034	3.178	0.454	84.651	23.688	0.285	0.875	0.125	18.03
34.3	1.40	1.072	3.126	0.506	76.705	19.154	0.295	0.861	0.139	18.94
37.4	1.57	1.101	3.073	0.559	70.082	15.763	0.303	0.846	0.154	19.72
40.5	1.77	1.130	3.016	0.616	63.972	10.835	0.311	0.830	0.170	20.55
43.6	1.96	1.144	2.971	0.661	58.206	6.517	0.315	0.818	0.182	21.06
46.8	2.15	1.156	2.934	0.698	53.630	6.745	0.318	0.808	0.192	21.50
49.9	2.36	1.170	2.899	0.733	49.650	4.931	0.322	0.798	0.202	21.98
53.0	2.56	1.176	2.855	0.777	45.878	2.245	0.324	0.786	0.214	22.38
62.4	3.21	1.188	2.749	0.883	36.975	1.214	0.327	0.757	0.243	23.37
71.7	3.83	1.191	2.685	0.947	31.078	0.297	0.328	0.739	0.261	23.92
81.0	4.44	1.191	2.633	0.999	26.803	-0.685	0.328	0.725	0.275	24.34
90.4	5.06	1.183	2.577	1.055	23.362	-0.419	0.326	0.710	0.290	24.65
99.7	5.68	1.186	2.555	1.077	20.883	0.765	0.327	0.703	0.297	24.91
109.0	6.31	1.192	2.534	1.098	18.891	1.052	0.328	0.698	0.302	25.20
118.4	6.95	1.200	2.519	1.113	17.257	0.596	0.330	0.694	0.306	25.46
127.7	7.60	1.200	2.475	1.157	15.783	0.263	0.330	0.682	0.318	25.86
137.1	8.23	1.203	2.467	1.165	14.621	1.092	0.331	0.679	0.321	26.00
146.4	8.86	1.214	2.458	1.174	13.694	0.979	0.334	0.677	0.323	26.29
155.7	9.48	1.215	2.471	1.161	12.812	0.054	0.335	0.680	0.320	26.19
165.1	10.11	1.215	2.477	1.155	12.011	-0.852	0.334	0.682	0.318	26.12
174.4	10.76	1.204	2.480	1.152	11.194	-1.663	0.332	0.683	0.317	25.90
183.7	11.39	1.193	2.475	1.157	10.477	-2.006	0.329	0.681	0.319	25.74
193.1	12.04	1.178	2.472	1.160	9.785	-1.345	0.324	0.681	0.319	25.49
202.4	12.67	1.176	2.466	1.166	9.278	0.239	0.324	0.679	0.321	25.50
214.9	13.54	1.184	2.464	1.168	8.738	0.889	0.326	0.679	0.321	25.66
233.5	14.85	1.195	2.482	1.150	8.049	1.014	0.329	0.683	0.317	25.71
252.2	16.08	1.209	2.499	1.133	7.519	0.389	0.333	0.688	0.312	25.82
270.9	17.40	1.205	2.515	1.117	6.922	-0.878	0.332	0.692	0.308	25.60
289.6	18.66	1.187	2.493	1.139	6.361	-0.322	0.327	0.686	0.314	25.46
308.2	19.91	1.196	2.476	1.156	6.010	2.353	0.329	0.682	0.318	25.79
326.9	21.21	1.248	2.477	1.155	5.884	4.470	0.344	0.682	0.318	26.74
345.6	22.47	1.311	2.485	1.147	5.833	3.589	0.361	0.684	0.316	27.82
364.2	23.75	1.339	2.485	1.147	5.637	-0.193	0.369	0.684	0.316	28.31
382.9	25.03	1.306	2.464	1.168	5.217	-4.851	0.360	0.678	0.322	27.93
401.6	26.36	1.211	2.382	1.250	4.594	-6.888	0.333	0.656	0.344	26.96
420.3	27.67	1.124	2.347	1.285	4.064	-5.694	0.310	0.646	0.354	25.60
438.9	28.96	1.063	2.335	1.297	3.670	-1.058	0.293	0.643	0.357	24.47
451.4	29.78	1.084	2.336	1.296	3.642	2.626	0.299	0.643	0.357	24.90



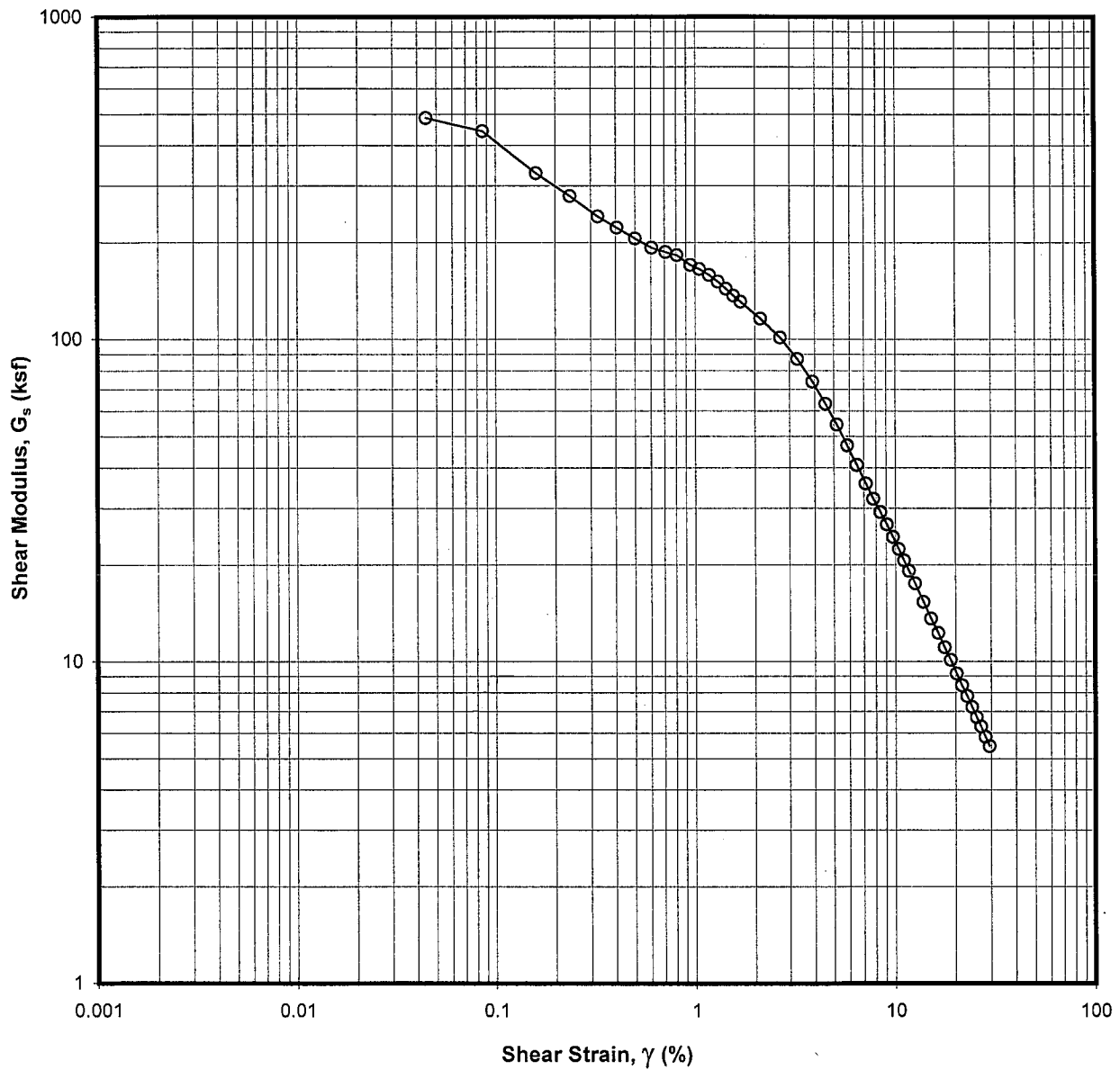
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-8B - Depth: 48.5 - 50.2 ft

Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-8B - Depth: 48.5 - 50.2 ft
 Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: B-2321_UD8b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 5.76 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA , NA & NA
 Assig. Remarks: Specific Gravity: 2.720 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-8		Compostite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 48.5 - 50.2		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Water Content (WC);		Initial - Trimming Location			Final, W _{at} (see below)	Soil and Ring Masses	Initial	Final
		Top (W _{o,1})	Bottom (W _{o,2})	Sides (W _{o,3})		Mass Moist Soil + Tare (g)	304.65	125.71
Container No.		592	4091	5005	4018	Mass Tare (g)	182.69	4.52
Mass Moist Soil + Cont. (g)		49.54	139.55	57.17	63.22	Mass Moist Soil, M _{t,o} M _{t,at} (g)	121.96	121.19
Mass Dry Soil + Container (g)		45.59	114.19	51.14	55.61	Excess Dry Soil (soil not included in final mass above)		
Mass Container (g)		31.71	30.66	31.53	30.13	Container No.		
WATER CONTENT (%)		28.46	30.36	30.75	29.87	Mass Dry Soil + Container (g)		
Avg. Initial WC, W _{o,avg} (%)		29.86	Final W _{at} : X Slice ;		Whole Spec.	Mass Container (g)		
See attached data sheet(s) for additional water contents						Mass Excess Dry Soil (g)		0.00

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.65	$A_{s,t}$ (cm ²):	34.90
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	65.09
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.730	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.630	2-M NA		
3 18.570	3-B NA		
4 18.660	1'-T NA		
5 18.670	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.650	Avg NA	V_{tr} (cm ³):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	116.98
Dry, $\gamma_{d,o}$ (lb/ft ³) =	90.08

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 5	ID, Rings (mm)			
Thickness (mm):	Top: 0.63	=		67.28
☐ Single	Bottom: 0.60	Corr. for mem.		
☒ Double	Membr. Thick. = 0.31	=		66.660
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		528.0 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Mottled Light Yellowish Brown and Light Gray Fat CLAY (CH)

Other Remarks:

Trim./ Recon. By: HC	Setup By: HC	Take Down By: HC
Date: 4/1/2008	Date: 4/2/2008	Date: 4/5/2008
Prelim. Calc. By: HC	Final Calc. By: LF	Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

 Project Number: 0411-08-1686

 Test Station No.: 5G

 File Name: B-2321_UD8b

 Task Number: NA

 Specific Gravity: 2.720
☒ Measured; ☐ Assumed

 Type Test: SDSS

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	5.76	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	1.19 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	28.46	30.36	30.75	29.86	29.86	30.69
S_o	89.9	92.9	93.5	92.1	92.1	93.4
Measured final mass of moist soil, $M_{t,at}$ (g)						121.19
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						121.19

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	29.86
Initial, $M_{d,o}$	93.92
Final, $M_{d,at}$	93.32
Selected, M_d	93.62

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	5.760	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.775		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.775		
ΔV_n using A_o - spec. (cm ³)	2.70		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.70		
ΔV_n using burette meas. (cm ³)	0.30		
Selected ΔV_n (cm ³)	2.72	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	2.72
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.70
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.70

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	29.75
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	2.70	ΔH_c (mm) =	0.775	$\varepsilon_{a,c}$ (%) =	4.16	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.38	H_c (mm) =	17.875	$\varepsilon_{v,c}$ (%) =	4.15	$\varepsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.90	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.720$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.650	65.09	34.90	30.3	117.0	89.8	92.7	0.891
After to $\sigma'_{v,c}$	17.875	62.38	34.90	29.7	121.6	93.7	100.0	0.812
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
 3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF
 Reviewed By: HP

Remarks: t95 for max stress = 15.2 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: B-2321_UD8b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lbf) =	No. Layers =
Sample No.: UD-8	Composited No.:			☐ Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 48.5 - 50.2	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht. Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties									
Specific Gravity: G _s = 2.720 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	LL PL	-200 %
Condition: Initial	18.65	65.09	34.90	30.27	117.0	89.8	92.7	64	97
After to σ' _{v,c}	17.88	62.38	34.90	29.75	121.6	93.7	100.0	16	NA
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	48	NA

Consolidation Stress Summary and Loading Summary									
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.7 %/hr.			
Vert. Consol. Stress, σ' _{v,c}	(ksf)	NA	5.776	NA		Cyclic Rate (Hz):	0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading	Static	Cyclic	
Axial Strain during Consol., ε _{a,c}	%	NA	4.16	NA		Change in Height, ΔH _{L,n} (mm):	NA	NA	
Horiz. Consol. Stress, τ _{h,c}	(ksf)	NA	NA	NA		Change in Vol., ΔV _{L,n} (cm ³):	NA	NA	
Consol. Stress Ratio, τ _{h,c} / σ' _{v,c}	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:	Yes;	No	
Shear Strain during Consol., ε _{h,c}	%	NA	NA	NA		Number of Loading Cycles, N =	NA		
Undr. Ambient Shear Stress, τ _{h,ua}	(ksf)	NA	NA	NA		±τ _h = NA (ksf)	±γ = NA %		
Undr. Ambient Shear Strain, ε _{ua}	%	NA	NA	NA		at end of cyclic loading, σ' _{vc,r} =	NA (ksf)		

Weight Top Cap, etc., M _{tc} (lbf): 1.16	Data Normalization: ☒ Yes ☐ No Value: 5.776 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

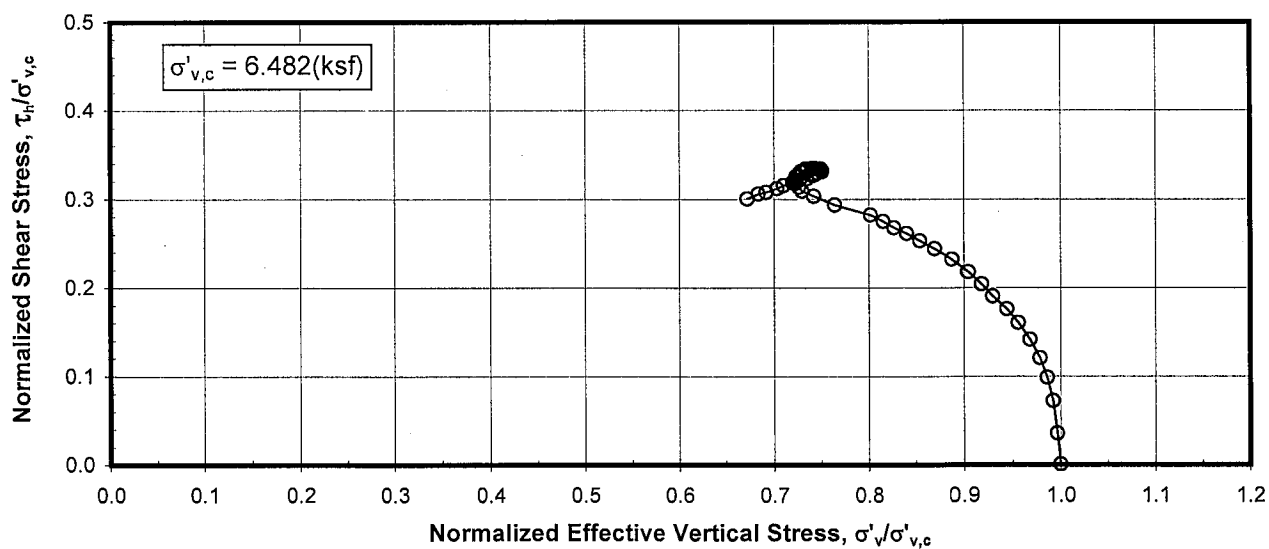
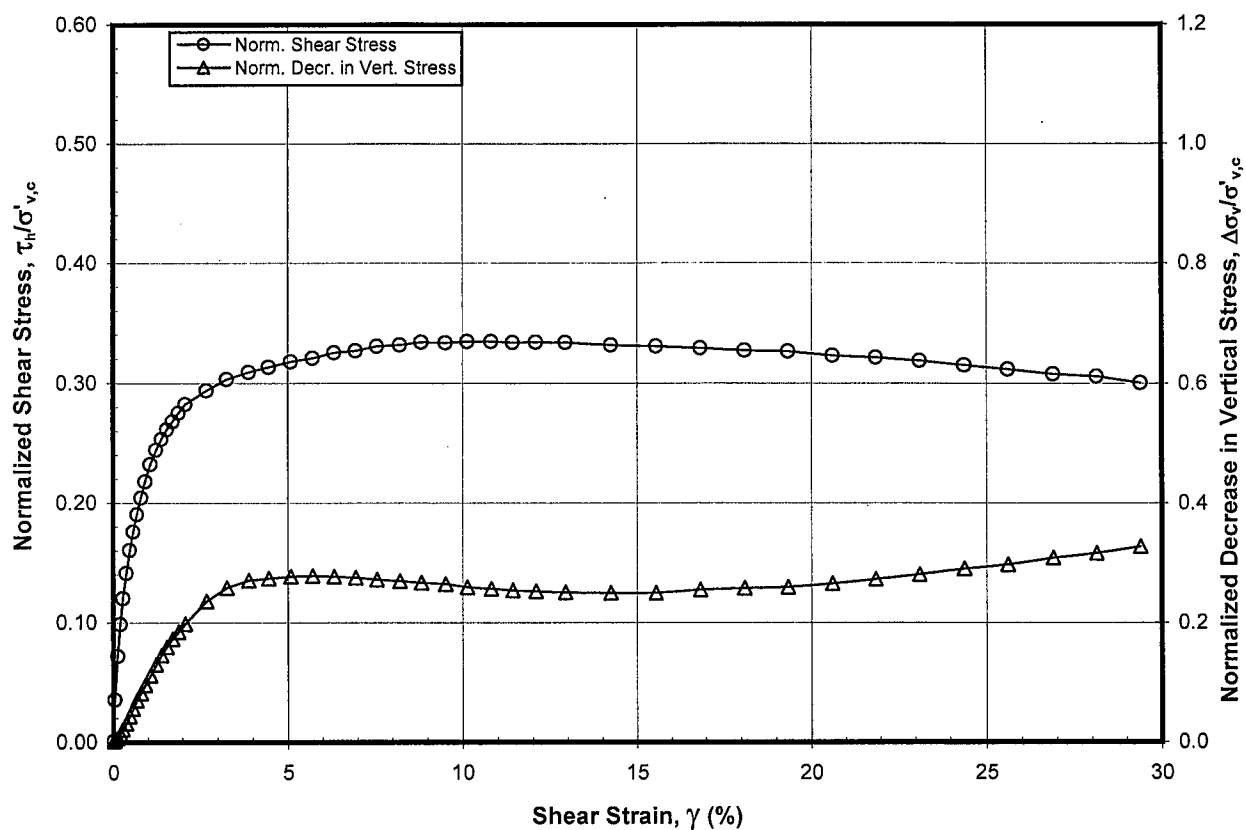
Final Visual Description and Remarks: Mottled Light Yellowish Brown and Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	c _v /σ' _{v,c}
at Peak Shear Stress	2.899	3.91	4.441	0.653	0.231	0.502
at Maximum Strain	1.622	29.51	3.597	0.451	0.377	-

Boring No.: B-2321UD

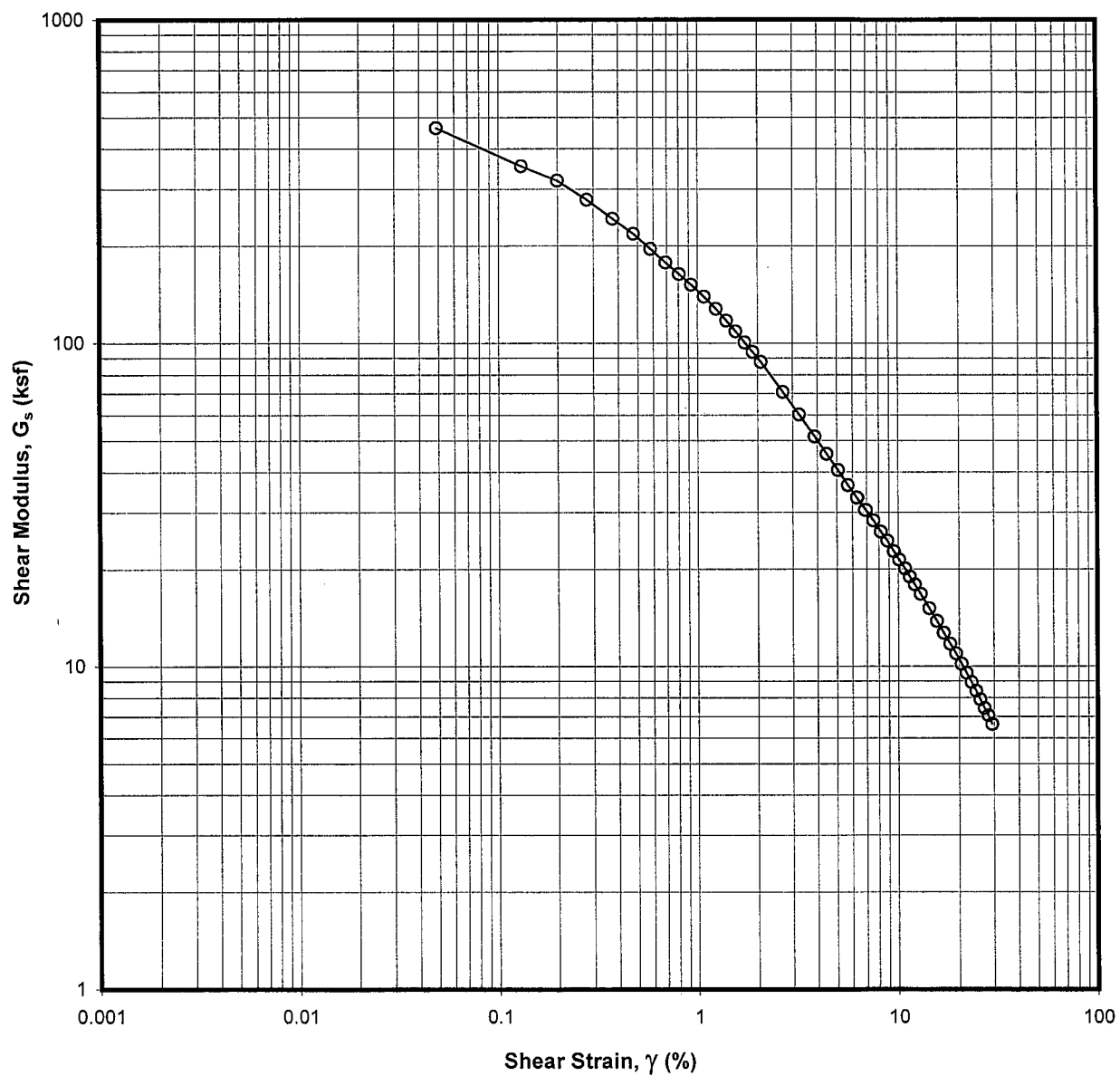
Sample No.: UD-8B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.009	5.776	0.000	-	-	0.002	1.000	0.000	0.09
2.6	0.04	0.226	5.772	0.004	486.940	441.352	0.039	0.999	0.001	2.24
5.2	0.09	0.390	5.787	-0.011	442.924	296.010	0.068	1.002	-0.002	3.86
7.7	0.16	0.537	5.776	0.001	328.046	185.208	0.093	1.000	0.000	5.32
10.3	0.24	0.670	5.784	-0.007	278.643	156.731	0.116	1.001	-0.001	6.61
12.9	0.33	0.793	5.761	0.015	240.787	143.999	0.137	0.997	0.003	7.84
15.4	0.41	0.914	5.752	0.024	222.417	141.485	0.158	0.996	0.004	9.03
18.0	0.50	1.042	5.733	0.043	205.700	131.464	0.180	0.992	0.008	10.30
20.6	0.61	1.176	5.701	0.076	192.433	140.537	0.204	0.987	0.013	11.66
23.1	0.71	1.336	5.664	0.113	186.526	152.438	0.231	0.981	0.019	13.27
25.7	0.81	1.488	5.630	0.147	182.349	126.279	0.258	0.975	0.025	14.80
28.3	0.95	1.627	5.563	0.213	170.271	109.989	0.282	0.963	0.037	16.30
30.9	1.05	1.752	5.511	0.266	165.301	109.615	0.303	0.954	0.046	17.64
33.4	1.18	1.876	5.453	0.324	158.304	90.454	0.325	0.944	0.056	18.99
36.0	1.30	1.978	5.404	0.373	150.980	73.398	0.342	0.935	0.065	20.10
38.6	1.43	2.060	5.346	0.431	143.414	64.823	0.357	0.925	0.075	21.07
41.1	1.56	2.146	5.275	0.502	136.639	62.927	0.372	0.913	0.087	22.14
43.7	1.70	2.227	5.272	0.504	130.795	60.111	0.386	0.913	0.087	22.90
51.4	2.14	2.489	5.067	0.709	115.836	51.505	0.431	0.877	0.123	26.16
59.1	2.69	2.733	4.808	0.968	101.164	33.156	0.473	0.832	0.168	29.61
66.8	3.29	2.865	4.608	1.168	86.793	13.812	0.496	0.798	0.202	31.87
74.5	3.91	2.899	4.441	1.335	73.866	0.600	0.502	0.769	0.231	33.14
82.2	4.54	2.872	4.336	1.440	63.006	-6.237	0.497	0.751	0.249	33.51
89.8	5.18	2.820	4.237	1.540	54.294	-9.852	0.488	0.733	0.267	33.65
97.5	5.83	2.744	4.181	1.596	46.877	-12.656	0.475	0.724	0.276	33.28
105.2	6.50	2.653	4.144	1.633	40.690	-13.301	0.459	0.717	0.283	32.63
112.9	7.16	2.568	4.118	1.659	35.731	-11.278	0.445	0.713	0.287	31.95
120.6	7.80	2.506	4.112	1.664	32.018	-7.818	0.434	0.712	0.288	31.36
128.3	8.44	2.468	4.103	1.673	29.113	-6.286	0.427	0.710	0.290	31.02
136.0	9.07	2.426	4.070	1.706	26.644	-6.791	0.420	0.705	0.295	30.80
143.7	9.73	2.380	4.071	1.706	24.372	-7.065	0.412	0.705	0.295	30.32
151.4	10.40	2.332	4.062	1.714	22.336	-6.889	0.404	0.703	0.297	29.86
159.1	11.07	2.288	4.038	1.738	20.582	-6.380	0.396	0.699	0.301	29.53
166.8	11.71	2.248	4.016	1.761	19.116	-6.057	0.389	0.695	0.305	29.24
177.0	12.54	2.199	3.986	1.790	17.460	-5.867	0.381	0.690	0.310	28.88
192.4	13.84	2.124	3.940	1.836	15.282	-5.443	0.368	0.682	0.318	28.33
207.8	15.12	2.059	3.896	1.881	13.557	-4.368	0.356	0.674	0.326	27.85
223.2	16.39	2.012	3.865	1.911	12.220	-4.135	0.348	0.669	0.331	27.50
238.6	17.65	1.954	3.839	1.937	11.020	-3.833	0.338	0.665	0.335	26.98
253.9	18.93	1.916	3.816	1.961	10.072	-3.650	0.332	0.661	0.339	26.66
269.3	20.23	1.860	3.779	1.997	9.147	-3.733	0.322	0.654	0.346	26.20
284.7	21.52	1.819	3.760	2.016	8.408	-2.723	0.315	0.651	0.349	25.81
300.1	22.85	1.788	3.726	2.051	7.785	-2.611	0.310	0.645	0.355	25.64
315.5	24.14	1.750	3.715	2.062	7.213	-2.679	0.303	0.643	0.357	25.23
330.8	25.47	1.718	3.671	2.105	6.710	-2.283	0.297	0.636	0.364	25.08
346.2	26.79	1.690	3.644	2.132	6.273	-2.613	0.293	0.631	0.369	24.88
361.6	28.15	1.648	3.600	2.176	5.824	-2.513	0.285	0.623	0.377	24.60
377.0	29.51	1.622	3.597	2.179	5.464	-1.971	0.281	0.623	0.377	24.27



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-9B - Depth: 58.5 - 61.0 ft
 Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-9B - Depth: 58.5 - 61.0 ft

Boring B-2321UD

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 10G File Name: B-2321_UD9b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 6.48 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assign. Remarks: Specific Gravity: 2.680 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	Constant Effort: Blows/Tamps per Layer =	
Boring No.: B-2321UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-9		Compostite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 58.5 - 61.0		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: 0.1; 1; Other:

Water Content (WC);		Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses	Initial	Final
		Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	318.06	139.91
Container No.		C40	115	4051	5059	Mass Tare (g)	183.37	4.65
Mass Moist Soil + Cont. (g)		76.70	78.10	75.78	76.93	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	134.69	135.26
Mass Dry Soil + Container (g)		69.18	70.23	68.25	68.67	Excess Dry Soil (soil not included in final mass above)		
Mass Container (g)		30.16	31.74	29.75	30.59	Container No.		
WATER CONTENT (%)		19.27	20.45	19.56	21.69	Mass Dry Soil + Container (g)		
Avg. Initial WC, $W_{o,avg}$ (%)		19.76	Final W_{at} :	X	Slice ;	Whole Spec.	Mass Container (g)	
	See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.83	$A_{s,t}$ (cm ²):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	65.28
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.870	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.890	2-M NA		
3 18.730	3-B NA		
4 18.800	1'-T NA		
5 18.820	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.825	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	128.81
Dry, $\gamma_{d,o}$ (lb/ft ³) =	107.56

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm)	Meas.	Corr.	Area, $A_{c,n}$ (cm ²) (in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No.	10	ID, Rings (mm)		
Thickness (mm):	Top: 0.65		= 67.12	
☐ Single	Bottom: 0.68		Corr. for mem.	
☒ Double	Membr. Thick. = 0.33		= 66.450	
Area Ring with mem., A_o (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		528.2 g,	1.16 lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL)

Other Remarks :

Trim./ Recon. By: HC

Setup By: HC

Take Down By: HC

Date: 4/1/2008

Date: 4/1/2008

Date: 4/3/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing

Remarks:

☐ Spec. unloaded to zero stress with access to water

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686
Task Number: NA

Test Station No.: 10G
Specific Gravity: 2.680

File Name: B-2321_UD9b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	6.48	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{vr,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{hr,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON,days,hrs)	NA	0.77 days	NA		Post Cy.Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	19.27	20.45	19.56	19.76	19.76	21.18
S_o	94.5	97.6	95.3	95.8	95.8	99.4
Measured final mass of moist soil, M_{lat} (g)						135.26
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						135.26

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	19.76
Initial, $M_{d,o}$	112.47
Final, $M_{d,at}$	111.15
Selected, M_d	111.81

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	6.480	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.677		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.677		
ΔV_n using A_o - spec. (cm ³)	2.35		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.35		
ΔV_n using burette meas. (cm ³)	0.50		
Selected ΔV_n (cm ³)	2.36	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	2.36
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.35
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.35

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	18.87
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 2.34	ΔH_c (mm) = 0.677	$\epsilon_{a,c}$ (%) = 3.60	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 62.94	H_c (mm) = 18.148	$\epsilon_{v,c}$ (%) = 3.58	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.68	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.680$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.825	65.28	34.68	20.5	128.8	106.9	97.6	0.565
After to $\sigma'_{v,c}$	18.148	62.94	34.68	18.9	131.8	110.9	100.0	0.508
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 0.7 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 10G File Name: B-2321_UD9b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-9	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 58.5 - 61.0	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	Dynamic	Stress	Post Cyclic	Drained	With - Bath
					Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties

Specific Gravity: G _s = 2.680 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition:								PI		
Initial	18.83	65.28	34.68	20.46	128.8	106.9	97.6	49	77	0.565
After to σ' _{v,c}	18.15	62.94	34.68	18.87	131.8	110.9	100.0	14	NA	0.508
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	35	NA	NA

Consolidation Stress Summary and Loading Summary

Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.8 %/hr.
Vert. Consol. Stress, σ' _{v,c}	(ksf)	NA	6.482	NA		Cyclic Rate (Hz): 0.1; 1; Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading
Axial Strain during Consol., ε _{a,c}	%	NA	3.60	NA		Change in Height, ΔH _{L,n} (mm): NA
Horiz. Consol. Stress, τ _{h,c}	(ksf)	NA	NA	NA		Change in Vol., ΔV _{L,n} (cm ³): NA
Consol. Stress Ratio, τ _{h,c} / σ' _{v,c}	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.: Yes; No
Shear Strain during Consol., ε _{h,c}	%	NA	NA	NA		Number of Loading Cycles, N = NA
Undr. Ambient Shear Stress, τ _{h,ua}	(ksf)	NA	NA	NA		±τ _h = NA (ksf) ±γ = NA %
Undr. Ambient Shear Strain, ε _{ua}	%	NA	NA	NA		at end of cyclic loading, σ' _{vcy,r} = NA (ksf)

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 6.482 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL)

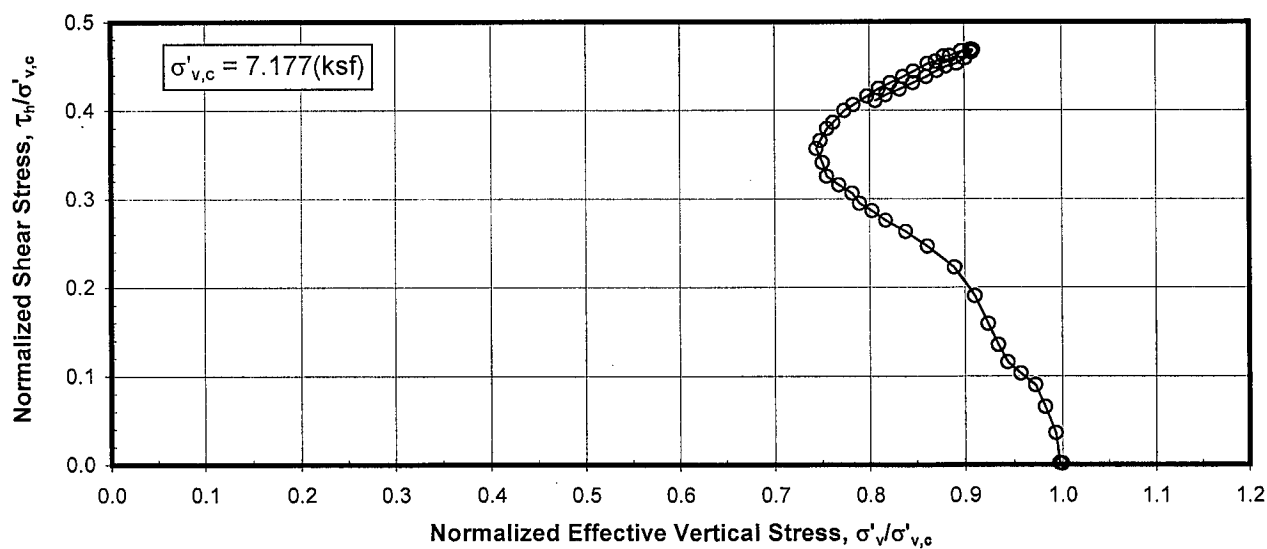
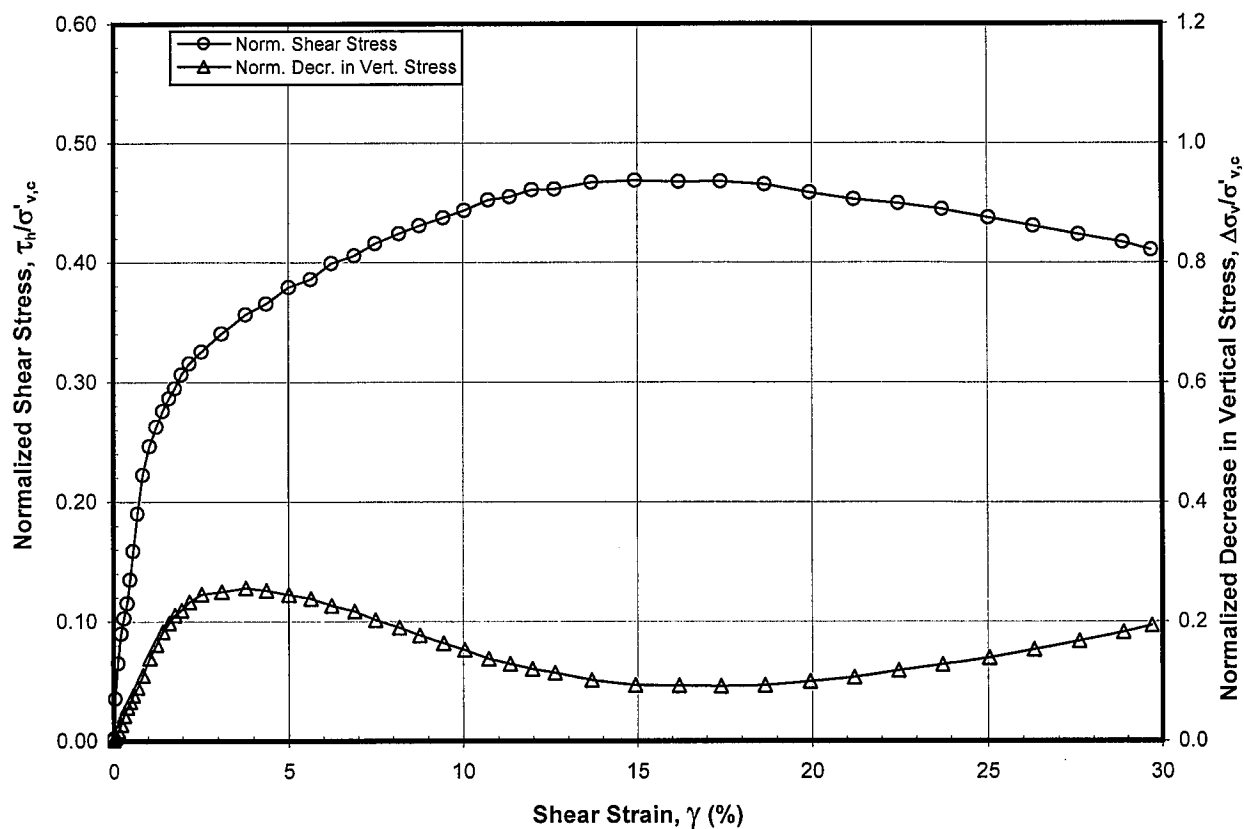
Loading Summary

	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ'/σ' _{v,c}	c _u /σ' _{v,c}
at Peak Shear Stress	2.169	10.14	4.802	0.452	0.259	0.335
at Maximum Strain	1.946	29.40	4.359	0.447	0.328	-

Boring No.: B-2321UD

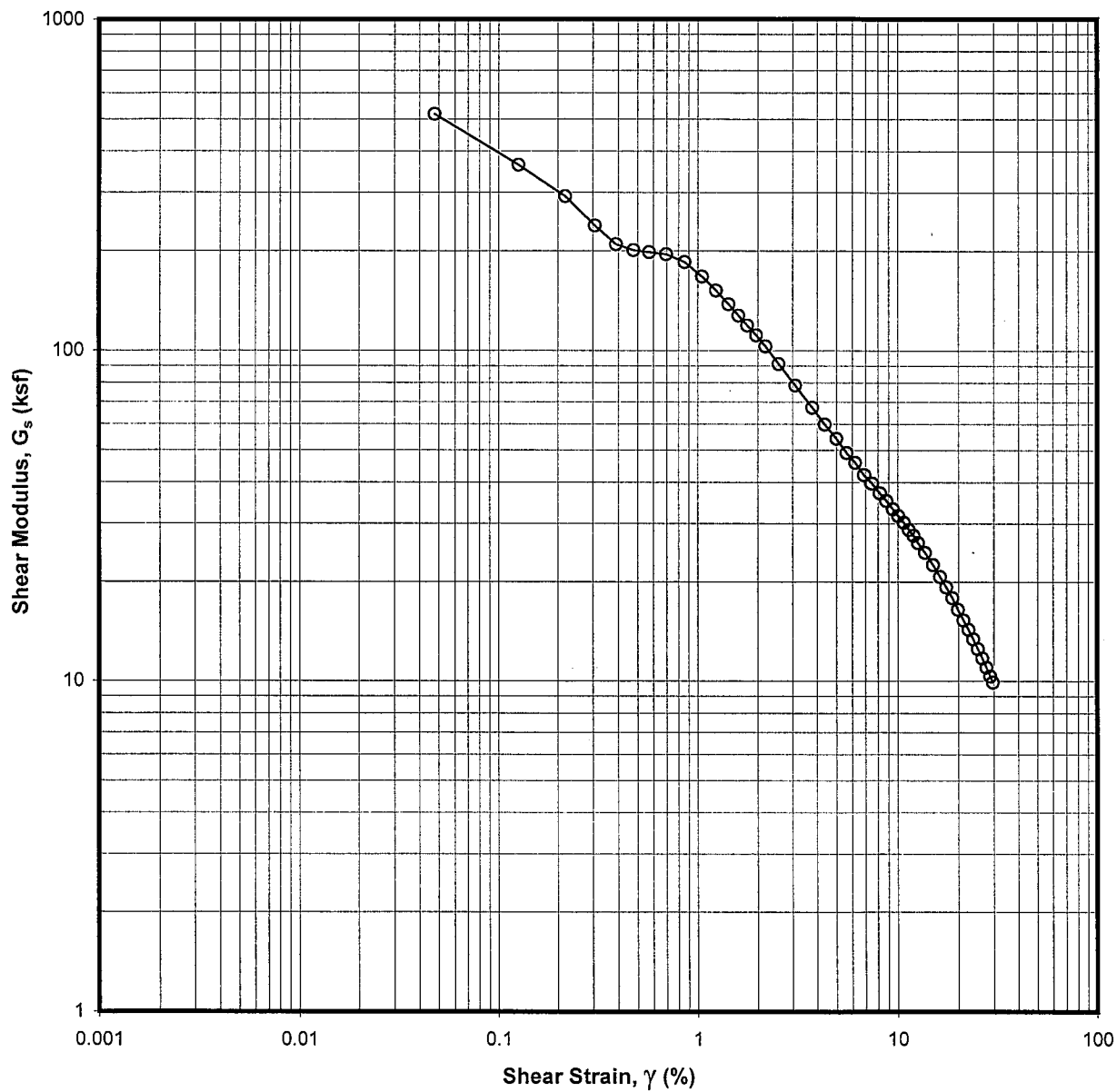
Sample No.: UD-9B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.003	6.482	0.000	-	-	0.000	1.000	0.000	0.02
2.5	0.05	0.229	6.462	0.020	463.372	375.351	0.035	0.997	0.003	2.03
5.1	0.13	0.467	6.432	0.050	352.827	269.887	0.072	0.992	0.008	4.15
7.6	0.20	0.639	6.393	0.089	318.559	214.153	0.099	0.986	0.014	5.71
10.1	0.28	0.780	6.345	0.137	277.722	158.155	0.120	0.979	0.021	7.00
12.6	0.38	0.915	6.277	0.205	242.549	132.231	0.141	0.968	0.032	8.29
15.2	0.48	1.039	6.198	0.284	217.594	110.059	0.160	0.956	0.044	9.52
17.7	0.58	1.140	6.120	0.362	195.738	89.564	0.176	0.944	0.056	10.55
20.2	0.69	1.233	6.024	0.457	177.528	80.926	0.190	0.929	0.071	11.56
22.7	0.81	1.323	5.949	0.533	163.474	75.602	0.204	0.918	0.082	12.54
25.2	0.93	1.412	5.862	0.620	151.491	67.105	0.218	0.904	0.096	13.54
27.8	1.08	1.505	5.758	0.724	139.056	55.647	0.232	0.888	0.112	14.64
30.3	1.24	1.583	5.640	0.842	127.614	42.839	0.244	0.870	0.130	15.68
32.8	1.40	1.640	5.538	0.944	117.199	34.815	0.253	0.854	0.146	16.50
35.3	1.55	1.693	5.448	1.033	108.746	29.495	0.261	0.841	0.159	17.26
37.9	1.72	1.736	5.361	1.121	100.575	26.517	0.268	0.827	0.173	17.95
40.4	1.90	1.783	5.287	1.195	93.936	25.803	0.275	0.816	0.184	18.64
42.9	2.09	1.830	5.199	1.283	87.554	18.149	0.282	0.802	0.198	19.39
50.5	2.69	1.903	4.953	1.528	70.587	11.514	0.294	0.764	0.236	21.02
58.0	3.26	1.965	4.810	1.672	60.169	8.348	0.303	0.742	0.258	22.22
65.6	3.89	2.002	4.731	1.750	51.395	5.359	0.309	0.730	0.270	22.93
73.2	4.46	2.030	4.710	1.772	45.446	4.779	0.313	0.727	0.273	23.31
80.7	5.08	2.059	4.687	1.795	40.435	3.948	0.318	0.723	0.277	23.71
88.3	5.71	2.079	4.682	1.800	36.372	3.955	0.321	0.722	0.278	23.94
95.9	6.33	2.108	4.689	1.793	33.267	3.102	0.325	0.723	0.277	24.21
103.4	6.95	2.117	4.700	1.782	30.416	2.766	0.327	0.725	0.275	24.25
111.0	7.57	2.142	4.720	1.761	28.266	2.603	0.330	0.728	0.272	24.41
118.6	8.23	2.150	4.735	1.746	26.098	1.747	0.332	0.731	0.269	24.42
126.1	8.84	2.164	4.755	1.727	24.446	0.928	0.334	0.734	0.266	24.47
133.7	9.52	2.161	4.767	1.715	22.673	0.410	0.333	0.735	0.265	24.39
141.3	10.14	2.169	4.802	1.680	21.366	0.570	0.335	0.741	0.259	24.31
148.8	10.82	2.168	4.818	1.663	20.018	-0.390	0.334	0.743	0.257	24.22
156.4	11.43	2.164	4.837	1.645	18.905	-0.254	0.334	0.746	0.254	24.10
164.0	12.09	2.165	4.847	1.635	17.879	-0.006	0.334	0.748	0.252	24.07
174.0	12.94	2.163	4.857	1.625	16.700	-0.627	0.334	0.749	0.251	24.01
189.2	14.24	2.149	4.866	1.616	15.073	-0.815	0.332	0.751	0.249	23.83
204.3	15.55	2.142	4.866	1.616	13.760	-0.640	0.331	0.751	0.249	23.76
219.4	16.84	2.133	4.832	1.650	12.653	-0.894	0.329	0.745	0.255	23.82
234.5	18.10	2.119	4.814	1.667	11.697	-0.745	0.327	0.743	0.257	23.76
249.7	19.34	2.114	4.802	1.680	10.916	-1.078	0.326	0.741	0.259	23.76
264.8	20.61	2.092	4.765	1.717	10.139	-1.283	0.323	0.735	0.265	23.71
279.9	21.86	2.082	4.715	1.766	9.511	-1.106	0.321	0.727	0.273	23.82
295.1	23.13	2.064	4.665	1.816	8.912	-1.577	0.318	0.720	0.280	23.87
310.2	24.38	2.042	4.604	1.878	8.363	-1.780	0.315	0.710	0.290	23.92
325.3	25.61	2.020	4.559	1.923	7.878	-1.901	0.312	0.703	0.297	23.90
340.4	26.90	1.994	4.486	1.996	7.403	-1.501	0.308	0.692	0.308	23.97
355.6	28.14	1.982	4.433	2.049	7.033	-1.911	0.306	0.684	0.316	24.09
370.7	29.40	1.946	4.359	2.123	6.612	-2.848	0.300	0.672	0.328	24.06



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
Sample: UD-10B - Depth: 63.0 - 65.5 ft
Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-10B - Depth: 63.0 - 65.5 ft
 Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 8G File Name: B-2321_UD10b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 7.20 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.670 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-10		Compostite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 63.0 - 65.5		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	1152	2008	4018	D-11	Mass Moist Soil + Tare (g)	186.86	325.29	143.70
Mass Moist Soil + Cont. (g)	78.55	80.91	80.31	71.24	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	138.43		139.34
Mass Dry Soil + Container (g)	72.75	74.00	73.68	65.47	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	32.38	30.38	30.18	30.24	Container No.			
WATER CONTENT (%)	14.37	15.84	15.24	16.38	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	15.15	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.58	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.77
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.600	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.580	2-M NA		
3 18.540	3-B NA		
4 18.560	1'-T NA		
5 18.610	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.575	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Light Olive Gray Sandy Lean CLAY (CL)

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	133.42
Dry, $\gamma_{d,o}$ (lb/ft ³) =	115.87

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 8	ID, Rings (mm)			
Thickness (mm):	Top: 0.64		= 67.25	
☐ Single	Bottom: 0.60		Corr. for mem.	
☒ Double	Membr. Thick. = 0.31		= 66.630	
Area Ring with mem., A_o (cm ²) =		34.87	; (in ²) = 5.405	
Mass Top Cap, etc., M_{tc} =		527.1 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Other Remarks :

Trim./ Recon. By: HC
 Date: 4/1/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 4/1/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 4/3/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

 Project Number: 0411-08-1686

 Test Station No.: 8G

 File Name: B-2321_UD10b

 Task Number: NA

 Specific Gravity: 2.670
☒ Measured; ☐ Assumed

 Type Test: SDSS

 Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	7.2	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON,days,hrs)	NA	1.04 days	NA		Post Cy.Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	14.37	15.84	15.24	15.15	15.15	15.62
S_o	90.0	95.1	93.1	92.8	92.8	94.4
Measured final mass of moist soil, $M_{t,at}$ (g)						139.34
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						139.34

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	15.15
Initial, $M_{d,o}$	120.22
Final, $M_{d,at}$	119.73
Selected, M_d	119.97

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	7.200	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.533		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.533		
ΔV_n using A_o - spec. (cm ³)	1.86		
ΔV_n using $A_{c,n}$ - app. (cm ³)	1.86		
ΔV_n using burette meas. (cm ³)	-0.90		
Selected ΔV_n (cm ³)	1.85	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,e}$ (%)			
			NA

 Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	1.85	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-0.91
ΔV_c (cm ³)	1.86	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	1.86		

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	14.89
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) =	1.86	ΔH_c (mm) =	0.533	$\varepsilon_{a,c}$ (%) =	2.87	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.91	H_c (mm) =	18.042	$\varepsilon_{v,c}$ (%) =	2.88	$\varepsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.670$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.575	64.77	34.87	15.4	133.4	115.6	93.6	0.442
After to $\sigma'_{v,c}$	18.042	62.91	34.87	14.9	136.8	119.1	100.0	0.400
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
 3 - Uses measured value at appropriate stress level (NA for rings).

 Calculated By: LF
 Reviewed By: HP

Remarks: t95 for max stress = 3.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 8G File Name: B-2321_UD10b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-10	Composited No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 63.0 - 65.5	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Dynamic	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.670 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL PL PI	-200 %	Void Ratio, e
					Total (pcf)	Dry (pcf)				
Condition: Initial	18.58	64.77	34.87	15.39	133.4	115.6	93.6	36	60.1	0.442
After to σ' _{v,c}	18.04	62.91	34.87	14.89	136.8	119.1	100.0	14	NA	0.400
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.8 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	7.177	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	2.87	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 7.177 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength
☒ Regular Membrane with Rings	☐ Yes ☒ No
☒ Pre-Shear Conditions	☐ Post-Cyclic Conditions
☐ Maximum Stress during Consol.	

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

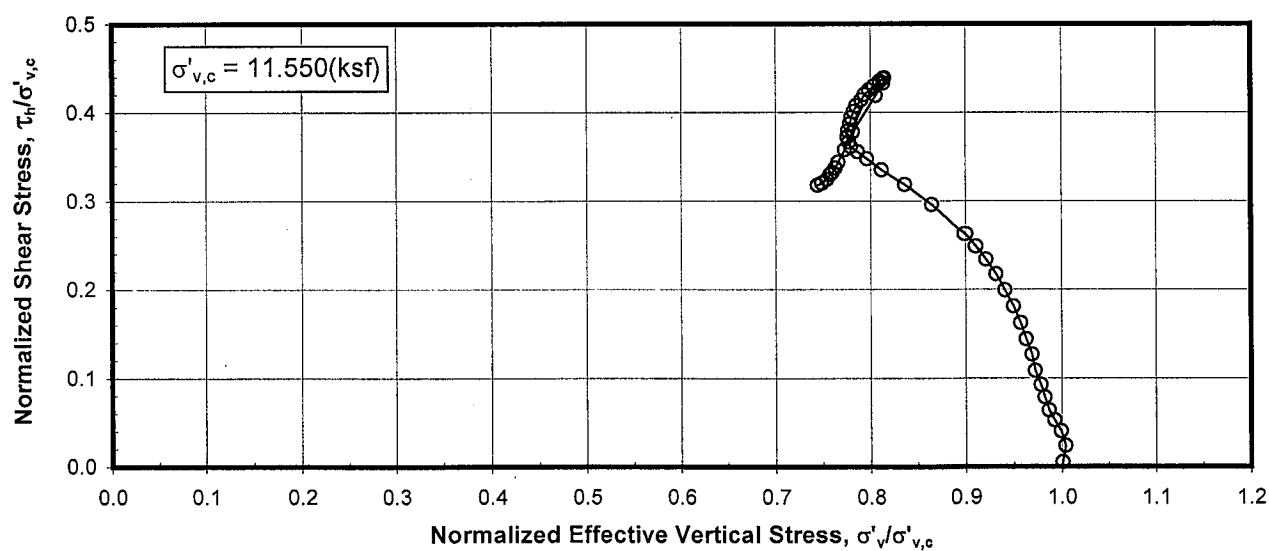
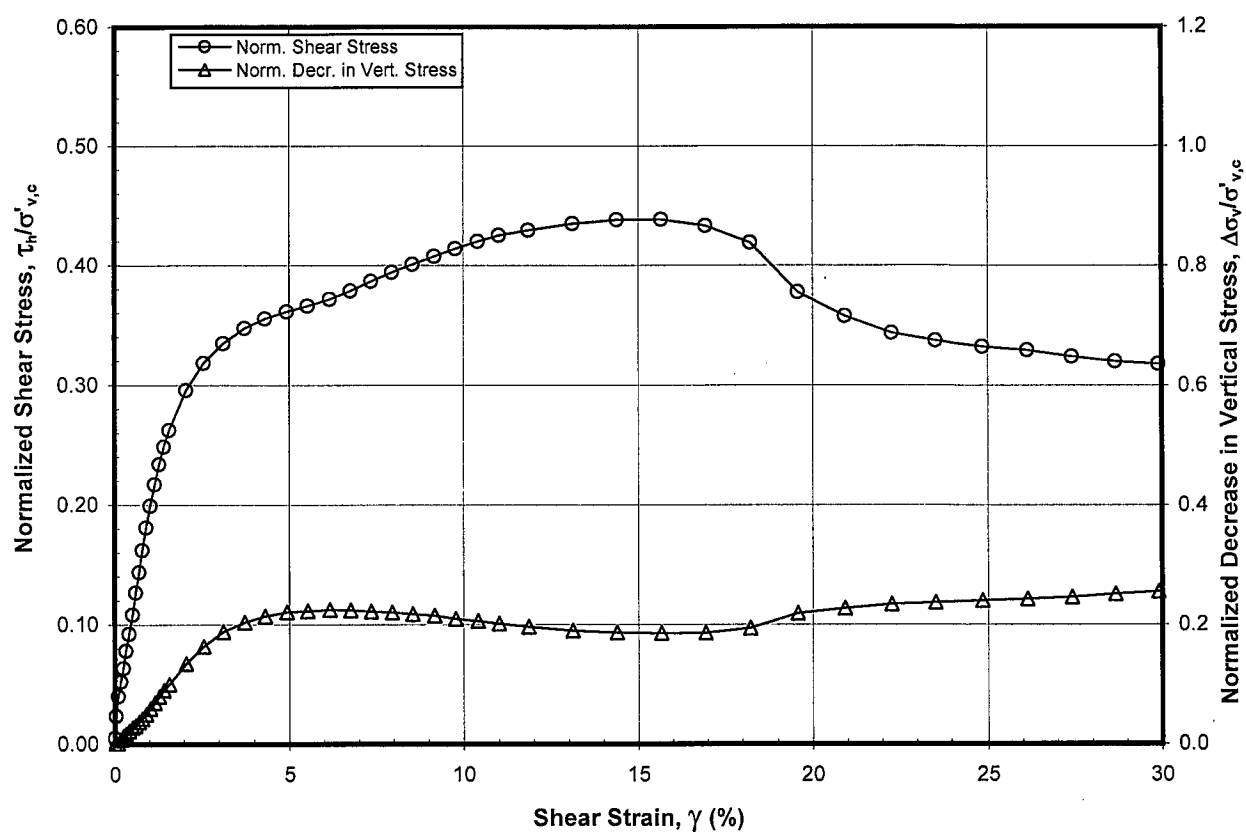
Final Visual Description and Remarks: Light Olive Gray Sandy Lean CLAY (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	C _d /σ' _{v,c}
at Peak Shear Stress	3.364	14.94	6.507	0.517	0.093	0.469
at Maximum Strain	2.948	29.70	5.789	0.509	0.193	-

Boring No.: B-2321UD

Sample No.: UD-10B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.008	7.177	0.000	-	-	0.001	1.000	0.000	0.07
2.8	0.00	0.014	7.158	0.019	-	-	0.002	0.997	0.003	0.11
5.3	0.05	0.255	7.130	0.047	516.755	383.720	0.036	0.993	0.007	2.05
7.8	0.13	0.467	7.053	0.124	363.049	231.779	0.065	0.983	0.017	3.79
10.4	0.22	0.645	6.979	0.198	291.707	148.828	0.090	0.972	0.028	5.28
12.9	0.31	0.737	6.870	0.308	237.720	104.809	0.103	0.957	0.043	6.12
15.5	0.39	0.827	6.772	0.405	209.039	134.403	0.115	0.944	0.056	6.96
18.0	0.48	0.967	6.702	0.475	200.750	173.254	0.135	0.934	0.066	8.21
20.5	0.57	1.139	6.626	0.551	197.902	183.079	0.159	0.923	0.077	9.76
23.1	0.69	1.365	6.529	0.648	195.217	161.813	0.190	0.910	0.090	11.81
25.6	0.86	1.595	6.388	0.789	184.844	114.726	0.222	0.890	0.110	14.02
28.1	1.05	1.767	6.183	0.994	167.146	76.159	0.246	0.862	0.138	15.95
30.7	1.24	1.885	6.018	1.159	151.644	56.111	0.263	0.838	0.162	17.39
33.2	1.43	1.978	5.866	1.311	137.808	46.130	0.276	0.817	0.183	18.63
35.8	1.61	2.055	5.762	1.415	127.487	39.354	0.286	0.803	0.197	19.63
38.3	1.77	2.113	5.667	1.510	118.795	38.411	0.294	0.790	0.210	20.45
40.8	1.97	2.195	5.609	1.568	111.125	35.940	0.306	0.782	0.218	21.37
43.4	2.19	2.263	5.510	1.667	102.764	24.769	0.315	0.768	0.232	22.33
47.6	2.55	2.333	5.419	1.758	91.098	19.766	0.325	0.755	0.245	23.29
55.2	3.10	2.444	5.386	1.791	78.432	18.341	0.340	0.750	0.250	24.40
62.8	3.79	2.558	5.341	1.836	67.287	13.937	0.356	0.744	0.256	25.59
70.4	4.38	2.623	5.370	1.808	59.768	13.388	0.366	0.748	0.252	26.04
78.0	5.01	2.723	5.422	1.755	54.134	11.604	0.379	0.755	0.245	26.67
85.6	5.64	2.770	5.467	1.710	49.008	11.774	0.386	0.762	0.238	26.87
93.2	6.24	2.866	5.552	1.625	45.819	11.437	0.399	0.774	0.226	27.31
100.8	6.90	2.912	5.619	1.558	42.094	9.461	0.406	0.783	0.217	27.39
108.4	7.50	2.984	5.724	1.453	39.672	10.312	0.416	0.798	0.202	27.54
116.0	8.19	3.044	5.815	1.362	37.052	8.386	0.424	0.810	0.190	27.63
123.6	8.78	3.092	5.905	1.272	35.130	7.666	0.431	0.823	0.177	27.63
131.2	9.45	3.140	6.001	1.176	33.148	7.277	0.437	0.836	0.164	27.62
138.8	10.04	3.184	6.082	1.095	31.612	8.382	0.444	0.847	0.153	27.63
146.4	10.72	3.247	6.189	0.988	30.216	6.179	0.452	0.862	0.138	27.69
154.0	11.34	3.265	6.252	0.925	28.725	4.743	0.455	0.871	0.129	27.58
161.7	11.98	3.307	6.311	0.866	27.545	3.613	0.461	0.879	0.121	27.66
169.3	12.62	3.312	6.359	0.818	26.178	2.223	0.461	0.886	0.114	27.51
181.9	13.68	3.351	6.446	0.731	24.445	2.383	0.467	0.898	0.102	27.47
197.1	14.94	3.364	6.507	0.670	22.465	0.161	0.469	0.907	0.093	27.34
212.3	16.20	3.356	6.512	0.665	20.660	-0.260	0.468	0.907	0.093	27.26
227.5	17.42	3.357	6.519	0.658	19.228	-0.608	0.468	0.908	0.092	27.25
242.7	18.66	3.340	6.509	0.668	17.854	-2.601	0.465	0.907	0.093	27.17
257.9	19.95	3.291	6.463	0.714	16.458	-3.551	0.459	0.901	0.099	26.99
273.2	21.21	3.250	6.411	0.766	15.283	-2.557	0.453	0.893	0.107	26.88
288.4	22.49	3.226	6.330	0.847	14.306	-2.339	0.450	0.882	0.118	27.01
303.6	23.76	3.190	6.258	0.919	13.390	-3.312	0.444	0.872	0.128	27.01
318.8	25.04	3.142	6.180	0.997	12.512	-3.866	0.438	0.861	0.139	26.95
334.0	26.31	3.092	6.078	1.099	11.718	-3.973	0.431	0.847	0.153	26.96
349.2	27.60	3.040	5.974	1.203	10.983	-3.809	0.424	0.832	0.168	26.97
364.4	28.87	2.994	5.867	1.310	10.340	-4.611	0.417	0.818	0.182	27.03
374.5	29.70	2.948	5.789	1.388	9.898	-5.609	0.411	0.807	0.193	26.99



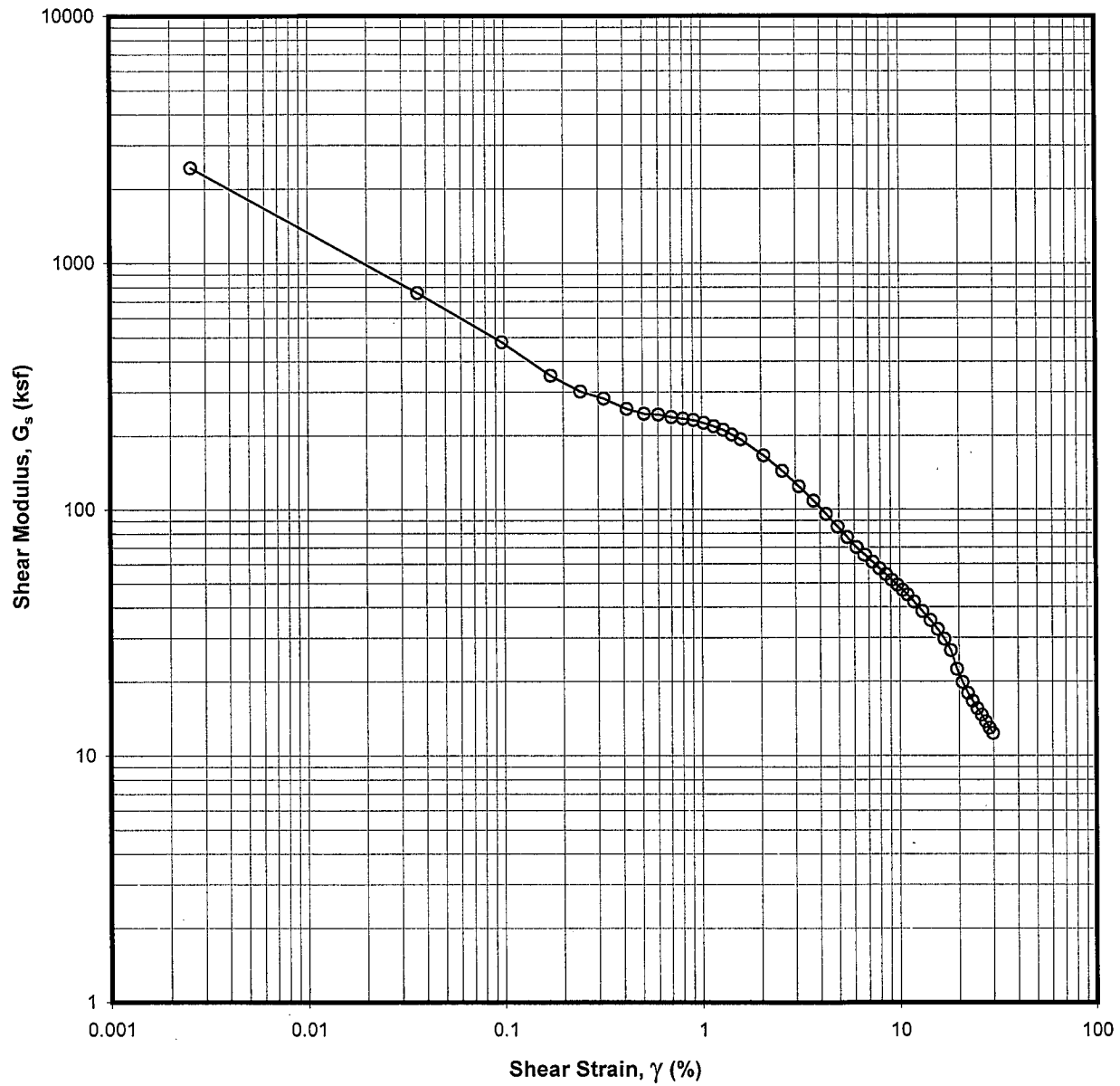
STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-15B - Depth: 130.5 - 132.5 ft

Boring B-2321UD

KAW 7/16/08



STATIC DSS TEST

K_o Consolidation - OCR = NA

Sample: UD-15B - Depth: 130.5 - 132.5 ft

Boring B-2321UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: B-2321_UD15b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 11.52 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-15	Compostite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 130.5 - 132.5	Specimen No.: B			☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	; ☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: 0.1; Strain 1; Other:

Water Content (WC);		Initial - Trimming Location			Final, W _{at} (see below)	Soil and Ring Masses	Initial	Final
		Top (W _{o,1})	Bottom (W _{o,2})	Sides (W _{o,3})		Mass Moist Soil + Tare (g)	315.61	135.56
Container No.		139	771	4041	4041	Mass Tare (g)	183.39	3.83
Mass Moist Soil + Cont. (g)		63.13	126.69	66.00	69.73	Mass Moist Soil, M _{t,o} , M _{t,at} (g)	132.22	131.73
Mass Dry Soil + Container (g)		58.33	110.38	60.25	63.16	Excess Dry Soil (soil not included in final mass above)		
Mass Container (g)		30.12	31.53	30.00	30.01	Container No.		
WATER CONTENT (%)		17.02	20.68	19.01	19.82	Mass Dry Soil + Container (g)		
Avg. Initial WC, W _{o,avg} (%)		18.90	Final W _{at} : X Slice ;		Whole Spec.	Mass Container (g)		
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.78	$A_{s,t}$ (cm ²):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	65.10
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.850	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.670	2-M NA		
3 18.830	3-B NA		
4 18.770	1'-T NA		
5 18.790	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.775	Avg NA	V_{tr} (cm ³):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	126.79
Dry, $\gamma_{d,o}$ (lb/ft ³) =	106.63

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 7	ID, Rings (mm)			
Thickness (mm):	Top: 0.57		= 67.01	
☐ Single	Bottom: 0.54		Corr. for mem.	
☒ Double	Membr. Thick. = 0.28		= 66.450	
Area Ring with mem., A_o (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		527.2 g,	1.16 lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Pale Yellow Fat CLAY with sand (CH)

Other Remarks:

Trim./ Recon. By: HC
 Date: 3/24/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 3/24/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 3/26/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 7G

File Name: B-2321_UD15b

Task Number: NA

Specific Gravity: 2.710



Measured;



Assumed

Type Test: SDSS

 Specimen: ☒ "Undisturbed";

☐ Reconstituted;

☐ Remolded

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	11.52	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.91 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	17.02	20.68	19.01	18.90	18.90	20.26
S_o	82.5	92.3	88.0	87.8	87.7	91.2
Measured final mass of moist soil, $M_{t,at}$ (g)						131.73
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						131.73

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	18.90
Initial, $M_{d,o}$	111.20
Final, $M_{d,at}$	109.94
Selected, M_d	110.57

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	11.520	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.670		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.670		
ΔV_n using A_o - spec. (cm ³)	2.32		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.32		
ΔV_n using burette meas. (cm ³)	-6.00		
Selected ΔV_n (cm ³)	2.32	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	2.32
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.32
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	2.32

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	19.78
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 2.31	ΔH_c (mm) = 0.670	$\epsilon_{a,c}$ (%) = 3.57	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 62.79	H_c (mm) = 18.105	$\epsilon_{v,c}$ (%) = 3.56	$\epsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.68	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ua} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio,
$G_s = 2.710$ Measured	(mm)	(cm ³)	(cm ²)	(%)	(pcf)	(pcf)	(%)	e
Condition:								
Initial (as trimmed)	18.775	65.10	34.68	19.6	126.8	106.0	89.5	0.596
After to $\sigma'_{v,c}$	18.105	62.79	34.68	19.8	131.7	109.9	100.0	0.539
Consol.: to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 5.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: B-2321_UD15b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-15	Composite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 130.5 - 132.5	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c, DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Dynamic	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties									
Specific Gravity: G _s = 2.710 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight Total (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %
Condition:								PI	Void Ratio, e
Initial	18.78	65.10	34.68	19.58	126.8	106.0	89.5	61	77
After to σ' _{v,c}	18.11	62.79	34.68	19.78	131.7	109.9	100.0	17	NA
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	44	NA

Consolidation Stress Summary and Loading Summary									
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.6 %/hr.			
Vert. Consol. Stress, σ'_{vc}	(ksf)	NA	11.550	NA		Cyclic Rate (Hz):	0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading		Static	Cyclic
Axial Strain during Consol., ϵ_{ac}	%	NA	3.57	NA		Change in Height, $\Delta H_{L,n}$ (mm):		NA	NA
Horiz. Consol. Stress, τ_{hc}	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):		NA	NA
Consol. Stress Ratio, τ_{hc} / σ'_{vc}	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:		Yes;	No
Shear Strain during Consol., ϵ_{hc}	%	NA	NA	NA		Number of Loading Cycles, N = NA			
Undr. Ambient Shear Stress, τ_{ua}	(ksf)	NA	NA	NA		$\pm\tau_h =$ NA (ksf)	$\pm\gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{ua}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf)			

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No	Value: 11.550 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No	Using Effective Vertical Stress:
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
☒ Regular Membrane with Rings	☐ Yes ☒ No	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

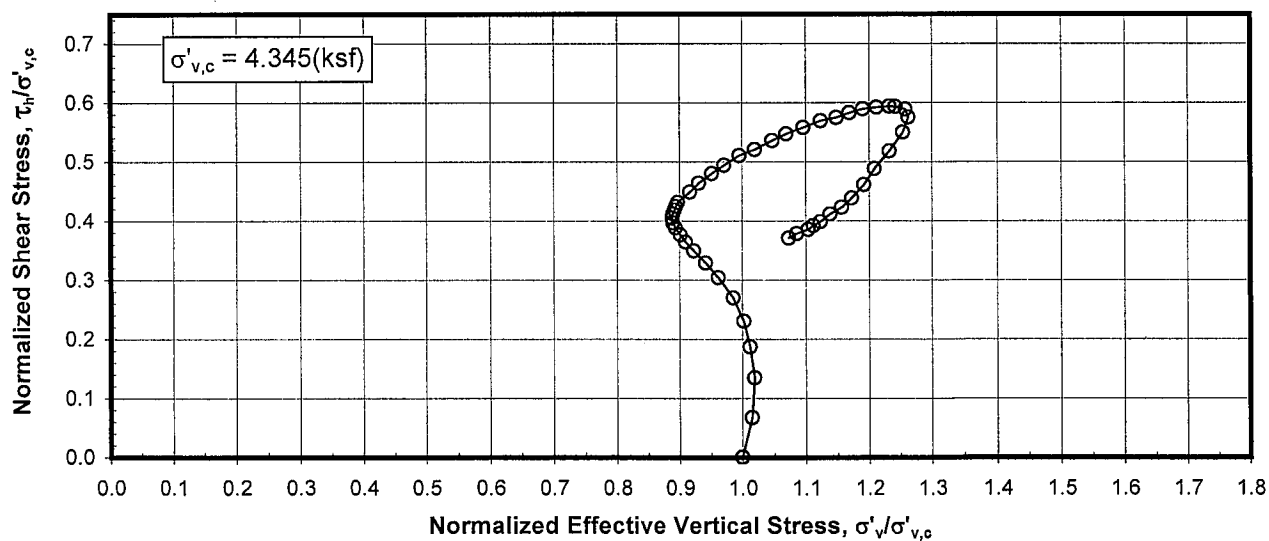
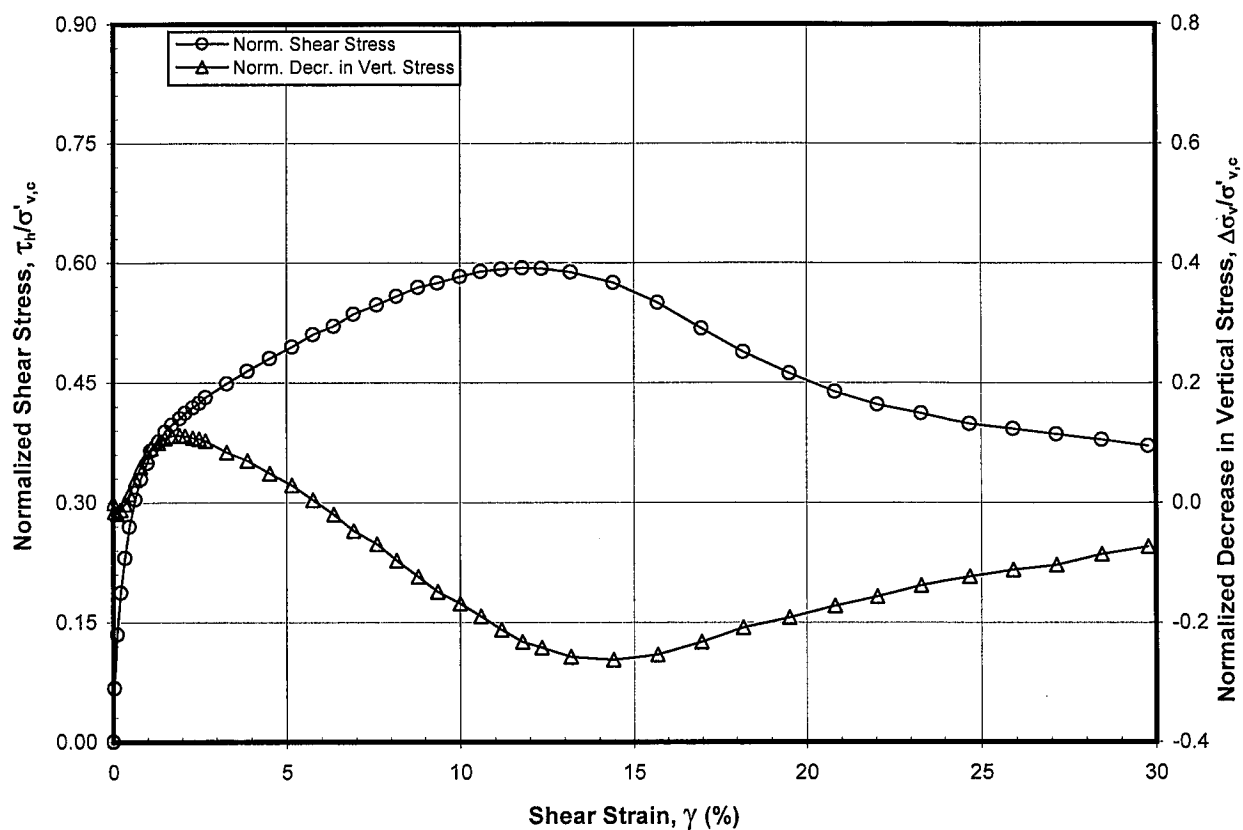
Final Visual Description and Remarks: Pale Yellow Fat CLAY with sand (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{vc} -	C _v /σ' _{vc} -
at Peak Shear Stress	5.065	15.67	9.411	0.538	0.185	0.439
at Maximum Strain	3.669	29.90	8.598	0.427	0.256	-

Boring No.: B-2321UD

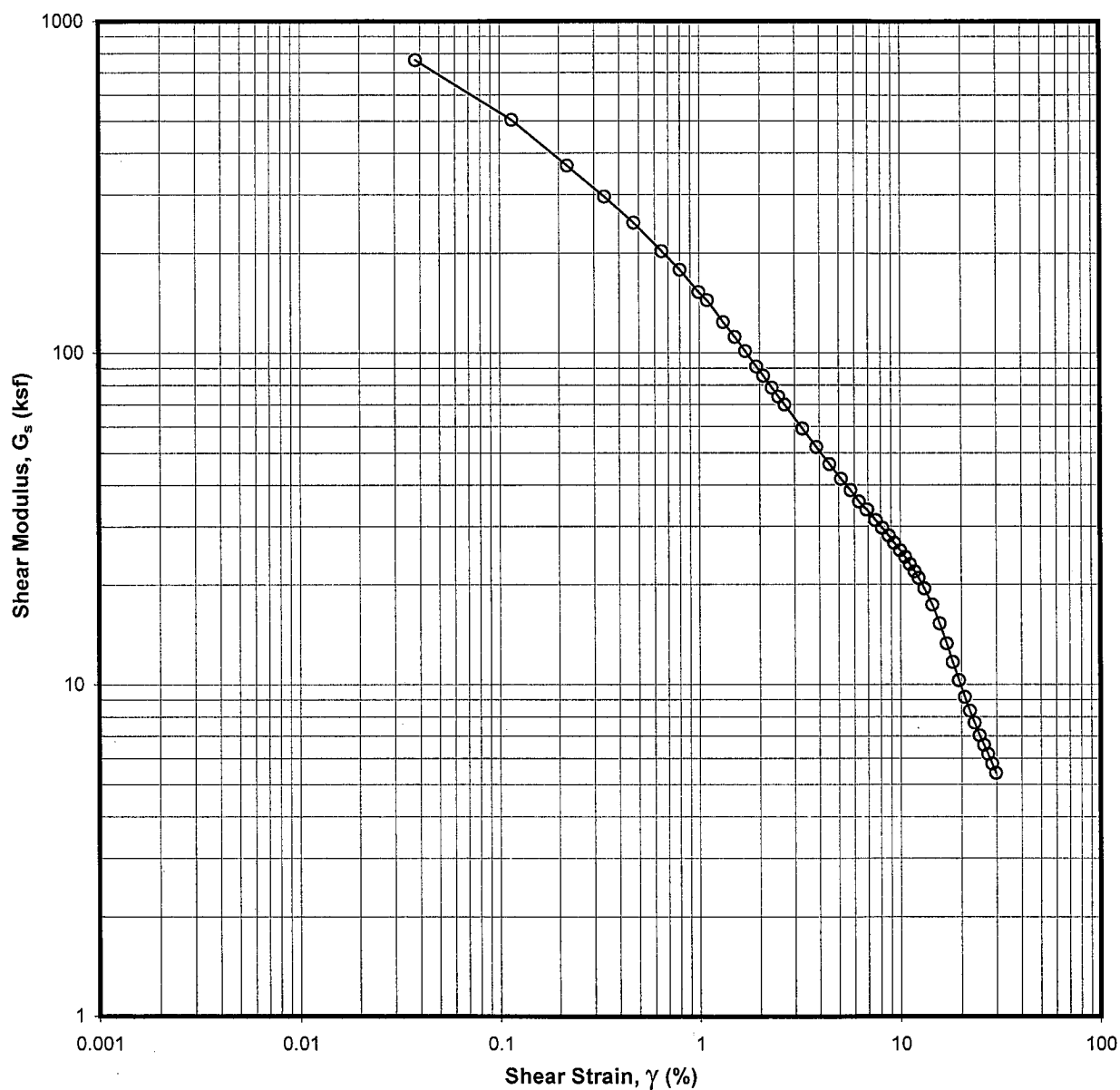
Sample No.: UD-15B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.004	11.550	0.000	-	-	0.000	1.000	0.000	-0.02
2.5	0.00	0.058	11.566	-0.015	2427.057	1529.118	0.005	1.001	-0.001	0.29
5.1	0.04	0.271	11.601	-0.051	757.852	471.937	0.023	1.004	-0.004	1.34
7.6	0.10	0.462	11.544	0.006	478.784	248.504	0.040	1.000	0.000	2.29
10.1	0.17	0.602	11.466	0.085	349.540	183.416	0.052	0.993	0.007	3.01
12.6	0.24	0.732	11.399	0.151	300.944	202.807	0.063	0.987	0.013	3.67
15.2	0.32	0.902	11.350	0.200	282.497	196.205	0.078	0.983	0.017	4.54
17.7	0.42	1.065	11.300	0.250	256.315	181.081	0.092	0.978	0.022	5.38
20.2	0.51	1.249	11.232	0.319	244.510	212.958	0.108	0.972	0.028	6.34
22.8	0.60	1.462	11.192	0.358	242.778	216.268	0.127	0.969	0.031	7.44
25.3	0.70	1.661	11.121	0.429	236.634	205.926	0.144	0.963	0.037	8.49
27.8	0.80	1.872	11.056	0.494	233.630	209.901	0.162	0.957	0.043	9.61
30.4	0.91	2.089	10.969	0.581	230.606	191.435	0.181	0.950	0.050	10.78
32.9	1.03	2.300	10.864	0.686	224.175	168.924	0.199	0.941	0.059	11.95
35.4	1.16	2.507	10.752	0.798	217.350	154.136	0.217	0.931	0.069	13.12
37.9	1.29	2.700	10.633	0.917	210.015	132.581	0.234	0.921	0.079	14.25
40.5	1.43	2.868	10.512	1.038	201.043	113.940	0.248	0.910	0.090	15.26
43.0	1.58	3.031	10.395	1.155	192.260	93.576	0.262	0.900	0.100	16.26
50.6	2.07	3.413	9.995	1.555	165.463	65.040	0.296	0.865	0.135	18.85
58.2	2.58	3.676	9.661	1.889	142.880	42.902	0.318	0.836	0.164	20.83
65.7	3.13	3.868	9.376	2.174	123.547	29.522	0.335	0.812	0.188	22.42
73.3	3.73	4.015	9.199	2.351	107.757	20.185	0.348	0.796	0.204	23.58
80.9	4.32	4.107	9.083	2.467	95.210	13.183	0.356	0.786	0.214	24.33
88.5	4.94	4.174	9.003	2.547	84.616	10.173	0.361	0.779	0.221	24.87
96.0	5.52	4.230	8.980	2.570	76.659	9.958	0.366	0.777	0.223	25.22
103.6	6.16	4.296	8.957	2.594	69.791	11.828	0.372	0.775	0.225	25.62
111.2	6.76	4.375	8.966	2.584	64.820	14.385	0.379	0.776	0.224	26.01
118.8	7.36	4.468	8.989	2.561	60.766	14.724	0.387	0.778	0.222	26.43
126.4	7.96	4.553	9.006	2.544	57.228	13.468	0.394	0.780	0.220	26.82
133.9	8.57	4.631	9.036	2.514	54.109	12.682	0.401	0.782	0.218	27.13
141.5	9.17	4.706	9.069	2.481	51.343	12.361	0.407	0.785	0.215	27.43
149.1	9.77	4.780	9.131	2.420	48.946	11.732	0.414	0.791	0.209	27.63
156.7	10.41	4.851	9.172	2.379	46.649	10.466	0.420	0.794	0.206	27.87
164.3	11.00	4.909	9.223	2.327	44.645	7.921	0.425	0.799	0.201	28.03
174.4	11.85	4.961	9.283	2.268	41.885	5.568	0.429	0.804	0.196	28.12
189.5	13.11	5.024	9.357	2.193	38.347	3.932	0.435	0.810	0.190	28.23
204.7	14.38	5.060	9.395	2.155	35.208	1.615	0.438	0.813	0.187	28.31
219.8	15.67	5.065	9.411	2.140	32.360	-2.279	0.439	0.815	0.185	28.29
235.0	16.94	5.002	9.399	2.151	29.559	-8.791	0.433	0.814	0.186	28.02
250.2	18.23	4.839	9.307	2.243	26.565	-24.006	0.419	0.806	0.194	27.47
265.3	19.58	4.362	9.023	2.527	22.302	-26.302	0.378	0.781	0.219	25.80
280.5	20.92	4.131	8.929	2.621	19.765	-14.653	0.358	0.773	0.227	24.83
295.6	22.27	3.968	8.847	2.703	17.833	-8.913	0.344	0.766	0.234	24.15
310.8	23.54	3.895	8.815	2.735	16.562	-5.168	0.337	0.763	0.237	23.84
325.9	24.84	3.835	8.778	2.773	15.458	-3.521	0.332	0.760	0.240	23.60
341.1	26.13	3.804	8.751	2.799	14.571	-3.619	0.329	0.758	0.242	23.49
356.2	27.42	3.742	8.711	2.839	13.664	-4.281	0.324	0.754	0.246	23.25
371.4	28.67	3.695	8.650	2.901	12.904	-2.930	0.320	0.749	0.251	23.13
386.6	29.90	3.669	8.598	2.952	12.283	-2.111	0.318	0.744	0.256	23.11



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-4B - Depth: 35.0 - 36.7 ft
 Boring B-2359UD

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-4B - Depth: 35.0 - 36.7 ft
 Boring B-2359UD

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 6G File Name: B-2359_UD4b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 4.32 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.730 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2359UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-4		Composite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 35.0 - 36.7		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)		
Container No.	771	997	4201	D-11	Mass Tare (g)	183.37	4.59	
Mass Moist Soil + Cont. (g)	86.29	80.18	76.08	66.62	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	133.43	131.05	
Mass Dry Soil + Container (g)	76.50	71.18	67.75	59.94	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	31.56	31.59	30.35	30.24	Container No.			
WATER CONTENT (%)	21.78	22.73	22.27	22.49	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	22.26	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.68	$A_{s,t}$ (cm ²):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	64.76
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.730	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.660	2-M NA		
3 18.670	3-B NA		
4 18.640	1-T NA		
5 18.700	2-M NA		
Avg.	3-B NA	A_{tr} (cm ²):	NA
= 18.675	Avg NA	V_{tr} (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	128.63
Dry, $\gamma_{d,o}$ (lb/ft ³) =	105.21

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No.	6	ID, Rings (mm)		
Thickness (mm):	Top: 0.64		= 67.11	
☐ Single	Bottom: 0.67		Corr. for mem.	
☒ Double	Membr. Thick. = 0.33		= 66.450	
Area Ring with mem., A_o (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		526.0 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Light Gray Fat CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC
 Date: 4/2/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 4/2/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 4/6/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686
Task Number: NA

Test Station No.: 6G
Specific Gravity: 2.730

File Name: B-2359_UD4b

Type Test: SDSS

Specimen: ☒ "Undisturbed"; ☐ Reconstituted; ☐ Remolded

Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	4.32	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading		
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)		
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)		
t_c (ON, days, hrs)	NA	1.64 days	NA		Post Cy. Displ. Reset to Null Position:		
						Yes;	No

Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	21.78	22.73	22.27	22.26	22.26	24.72
S_o	97.4	99.6	98.5	98.5	98.5	103.9
Measured final mass of moist soil, M_{lat} (g)						131.05
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						131.05

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	22.26
Initial, $M_{d,o}$	109.14
Final, $M_{d,at}$	106.99
Selected, M_d	108.06

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	4.320	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.360		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.360		
ΔV_n using A_o - spec. (cm ³)	1.25		
ΔV_n using $A_{c,n}$ - app. (cm ³)	1.25		
ΔV_n using burette meas. (cm ³)	-0.90		
Selected ΔV_n (cm ³)	1.25	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	1.25	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	
ΔV_c (cm ³)	1.25		2.38
By Cal. Ht. & Init. Spec. Area		By Saturation = 100% and Spec. Unloaded to 0 Stress	
ΔV_c (cm ³)	1.25	ΔV_c (cm ³)	NA

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	22.04
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	1.24	ΔH_c (mm) =	0.360	$\epsilon_{a,c}$ (%) =	1.93	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	63.52	H_c (mm) =	18.315	$\epsilon_{v,c}$ (%) =	1.91	$\epsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.68	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.730$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.675	64.76	34.68	23.5	128.6	104.2	101.2	0.636
After to $\sigma'_{v,c}$	18.315	63.52	34.68	22.0	129.6	106.2	100.0	0.604
Consol.: to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
& Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF
Reviewed By: HP

Remarks: t95 for max stress = 0.4 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 6G File Name: B-2359_UD4b
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2359UD	☐ LPC Core			☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-4	Composite No.:			☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 35.0 - 36.7	Specimen No.: B			☐ Kneading	☐ Undercompaction:	U _{ni} (%) = Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = ± Opt. =

Type Consolidation:	☒ K _o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DES}	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	☐ Dynamic	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.730 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL	-200	Void Ratio, e
Condition:					Total (pcf)	Dry (pcf)		PL		
Initial	18.68	64.76	34.68	23.48	128.6	104.2	101.2	68	98.2	0.636
After to σ' _{v,c}	18.32	63.52	34.68	22.04	129.6	106.2	100.0	17	NA	0.604
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	51	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.9 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	4.345	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	1.93	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:			Yes;	No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,un}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, ϵ_{un}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 4.345 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	☐ Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

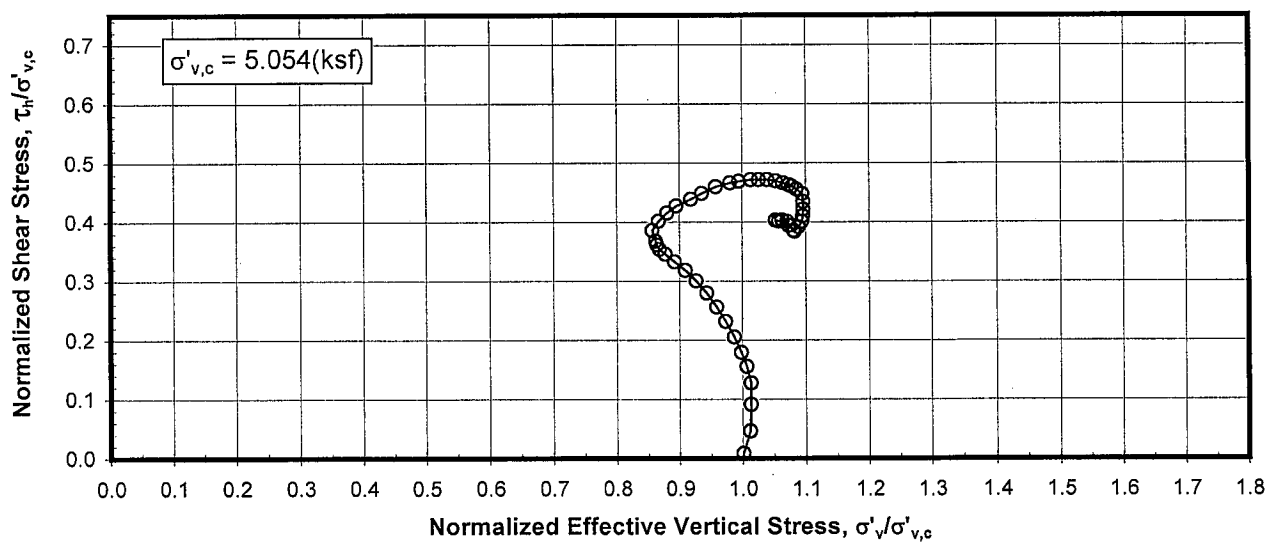
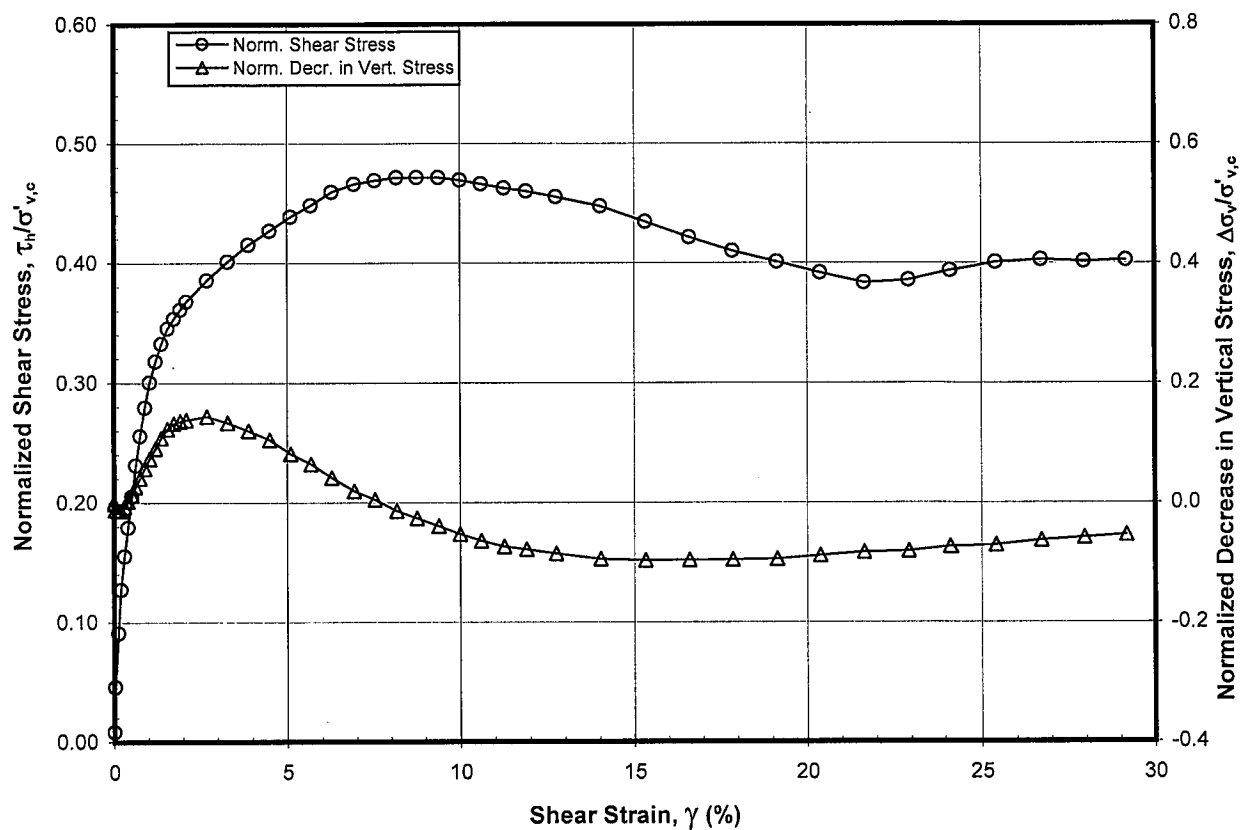
Final Visual Description and Remarks: Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	C _u /σ' _{v,c}
at Peak Shear Stress	2.580	11.79	5.355	0.482	-0.232	0.594
at Maximum Strain	1.613	29.78	4.663	0.346	-0.073	-

Boring No.: B-2359UD

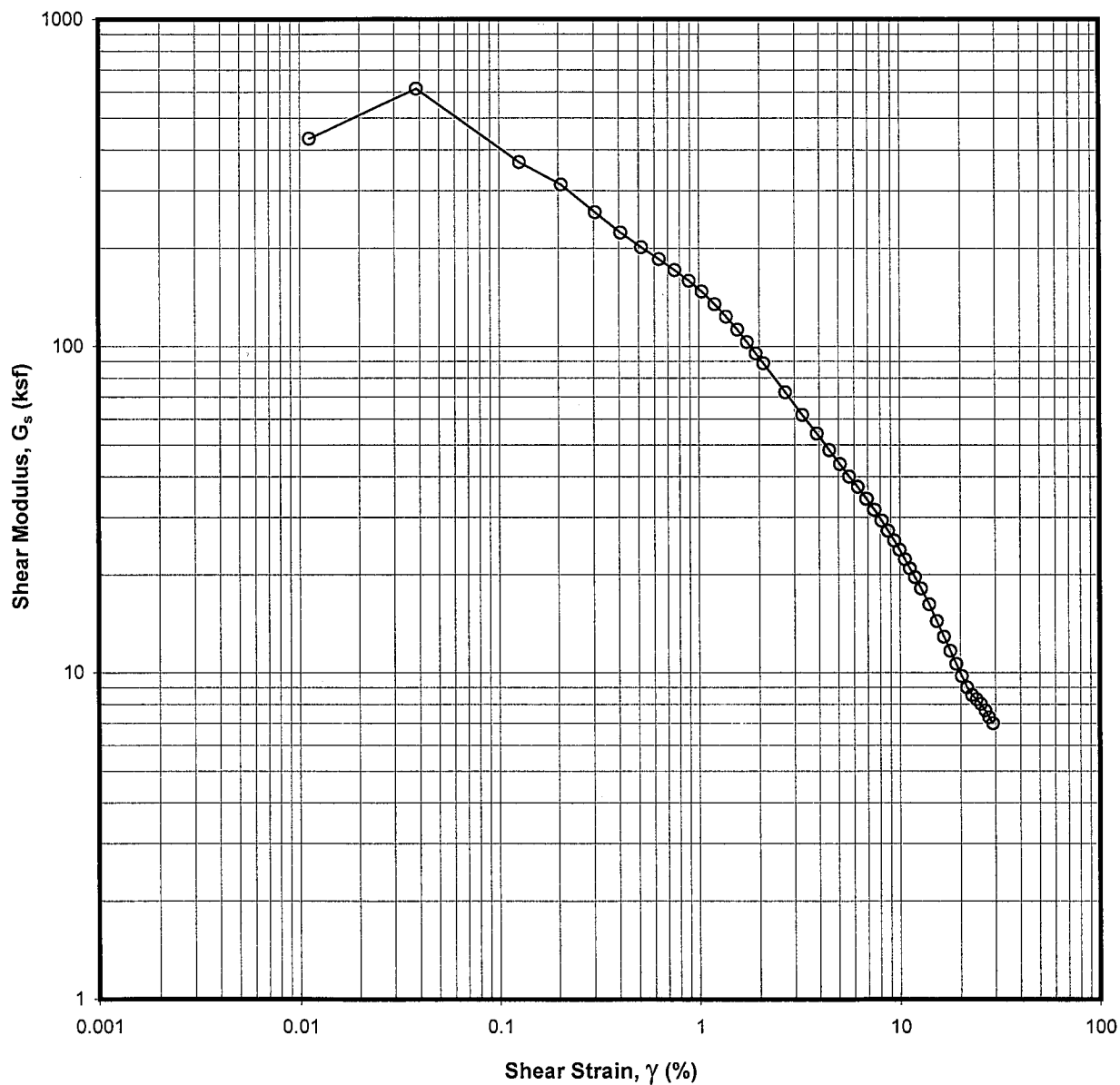
Sample No.: UD-4B

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.002	4.345	0.000	-	-	0.001	1.000	0.000	0.03
2.5	0.04	0.293	4.410	-0.065	763.041	569.708	0.068	1.015	-0.015	3.81
5.0	0.12	0.585	4.427	-0.082	503.840	295.863	0.135	1.019	-0.019	7.53
7.5	0.22	0.813	4.397	-0.053	366.077	188.200	0.187	1.012	-0.012	10.48
10.0	0.34	1.002	4.355	-0.010	295.224	143.256	0.231	1.002	-0.002	12.95
12.5	0.47	1.172	4.282	0.063	246.620	104.460	0.270	0.986	0.014	15.31
15.0	0.65	1.320	4.178	0.167	202.267	77.993	0.304	0.962	0.038	17.53
17.5	0.80	1.429	4.089	0.256	177.848	59.085	0.329	0.941	0.059	19.27
20.0	0.99	1.517	4.010	0.335	152.364	55.044	0.349	0.923	0.077	20.72
22.5	1.10	1.583	3.952	0.393	144.075	43.741	0.364	0.910	0.090	21.84
25.0	1.32	1.635	3.915	0.429	123.586	25.093	0.376	0.901	0.099	22.66
27.5	1.51	1.687	3.883	0.462	111.469	23.497	0.388	0.894	0.106	23.48
30.0	1.70	1.725	3.863	0.482	101.055	17.489	0.397	0.889	0.111	24.06
32.5	1.93	1.759	3.858	0.486	90.911	16.778	0.405	0.888	0.112	24.51
35.0	2.10	1.790	3.864	0.480	85.251	15.917	0.412	0.889	0.111	24.85
37.5	2.31	1.819	3.877	0.468	78.478	13.565	0.419	0.892	0.108	25.14
40.0	2.50	1.844	3.884	0.460	73.773	15.148	0.424	0.894	0.106	25.39
42.5	2.68	1.875	3.899	0.446	69.801	14.397	0.431	0.897	0.103	25.68
50.0	3.30	1.950	3.982	0.363	59.064	11.828	0.449	0.916	0.084	26.09
57.5	3.88	2.017	4.043	0.302	51.903	11.183	0.464	0.931	0.069	26.51
65.0	4.52	2.086	4.135	0.210	46.144	10.317	0.480	0.952	0.048	26.77
72.5	5.16	2.148	4.221	0.123	41.595	10.611	0.494	0.972	0.028	26.97
80.0	5.76	2.217	4.327	0.018	38.478	9.473	0.510	0.996	0.004	27.13
87.5	6.35	2.262	4.432	-0.087	35.553	9.583	0.521	1.020	-0.020	27.03
95.0	6.92	2.328	4.551	-0.206	33.592	9.460	0.536	1.047	-0.047	27.10
102.5	7.61	2.377	4.646	-0.301	31.226	7.779	0.547	1.069	-0.069	27.10
110.0	8.18	2.425	4.764	-0.419	29.631	8.007	0.558	1.096	-0.096	26.98
117.5	8.81	2.473	4.883	-0.538	28.058	6.089	0.569	1.124	-0.124	26.86
125.0	9.36	2.498	4.991	-0.646	26.669	4.934	0.575	1.149	-0.149	26.59
132.5	10.00	2.533	5.078	-0.733	25.294	4.986	0.583	1.169	-0.169	26.51
140.0	10.59	2.560	5.171	-0.826	24.154	3.391	0.589	1.190	-0.190	26.34
147.5	11.18	2.573	5.266	-0.921	22.987	1.710	0.592	1.212	-0.212	26.04
155.0	11.79	2.580	5.355	-1.010	21.871	0.306	0.594	1.232	-0.232	25.73
162.5	12.35	2.577	5.397	-1.053	20.853	-1.494	0.593	1.242	-0.242	25.52
172.5	13.17	2.557	5.465	-1.120	19.400	-3.527	0.589	1.258	-0.258	25.08
187.5	14.41	2.499	5.485	-1.141	17.332	-6.596	0.575	1.263	-0.263	24.49
202.4	15.70	2.390	5.448	-1.103	15.212	-9.707	0.550	1.254	-0.254	23.69
217.4	16.97	2.250	5.354	-1.010	13.247	-10.768	0.518	1.232	-0.232	22.80
232.4	18.19	2.122	5.251	-0.906	11.652	-9.723	0.488	1.208	-0.208	22.00
247.4	19.51	2.004	5.179	-0.834	10.261	-8.203	0.461	1.192	-0.192	21.16
262.4	20.81	1.906	5.094	-0.750	9.147	-6.619	0.439	1.173	-0.173	20.51
277.4	22.04	1.836	5.027	-0.682	8.322	-4.758	0.423	1.157	-0.157	20.07
292.4	23.32	1.787	4.946	-0.601	7.657	-3.928	0.411	1.138	-0.138	19.87
307.4	24.68	1.732	4.880	-0.536	7.010	-3.188	0.399	1.123	-0.123	19.54
322.3	25.91	1.704	4.832	-0.487	6.565	-2.346	0.392	1.112	-0.112	19.42
337.3	27.15	1.675	4.796	-0.452	6.160	-2.307	0.385	1.104	-0.104	19.25
352.3	28.45	1.645	4.718	-0.373	5.775	-2.351	0.379	1.086	-0.086	19.22
367.3	29.78	1.613	4.663	-0.318	5.408	-2.434	0.371	1.073	-0.073	19.08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-5B - Depth: 40.0 - 41.7 ft
 Boring B-2359UD

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STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: UD-5B - Depth: 40.0 - 41.7 ft
 Boring B-2359UD

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DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: B-2359_UD5b
 Task No.: NA Assign, $\sigma'_{v,c}$ = 5.04 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA NA NA & NA
 Assig. Remarks: Specific Gravity: 2.710 ☒ Meas.; ☐ Assumed

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2359UD		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-5		Composite No.:		☐ Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 40.0 - 41.7		Specimen No.: B		☐ Kneading	☐ Undercompaction: U_{ni} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = $\pm$ Opt. =

Type Consolidation:	☒ K_o at:	☒ Incremental	;	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS			90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water	☐ Cyclic (Hz)
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath	Rate: ☐ 0.1; ☐ 1; Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	D-7	191	4072	4091	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	182.69	5.03	136.69
Mass Moist Soil + Cont. (g)	84.87	79.66	74.67	74.41	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	131.26		131.66
Mass Dry Soil + Container (g)	74.48	70.58	66.42	65.51	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	30.14	30.75	30.12	30.66	Container No.			
WATER CONTENT (%)	23.43	22.80	22.73	25.54	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	22.99	Final W_{at} : ☒ Slice ; ☐ Whole Spec.			Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL5	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.60	$A_{s,t}$ (cm ²):	34.90
$D_{s,t}$ (mm):	66.66	$V_{s,t}$ (cm ³):	64.91
Remarks:			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_{tr})	Diameter (D_o)	Remarks:	
1 18.650	1-T NA	For Free Standing or Reconstituted Spec.:	
2 18.580	2-M NA		
3 18.610	3-B NA		
4 18.590	1'-T NA		
5 18.620	2'-M NA		
Avg.	3'-B NA	A_{tr} (cm ²):	NA
= 18.600	Avg NA	V_{tr} (cm ³):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	126.24
Dry, $\gamma_{d,o}$ (lb/ft ³) =	102.64

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. 7	ID, Rings (mm)			
Thickness (mm):	Top: 0.61		= 67.29	
☐ Single	Bottom: 0.65		Corr. for mem.	
☒ Double	Membr. Thick. = 0.32		= 66.660	
Area Ring with mem., A_o (cm ²) =		34.90	; (in ²) = 5.409	
Mass Top Cap, etc., M_{tc} =		527.2 g,	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Pale Brown Fat CLAY (CH)

Other Remarks :

Trim./ Recon. By: HC
 Date: 4/2/2008
 Prelim. Calc. By: HC

Setup By: HC
 Date: 4/3/2008
 Final Calc. By: LF

Take Down By: HC
 Date: 4/6/2008
 Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 7/16/08