

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, $P_{h,n}$ (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	0.69 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., $W_{o,avg}$	Selct., $W_{o,s}$	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., $\Sigma \Delta d_{atc}$ (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_{atc} (%)			NA

Calculation of ΔV_c by Different Procedures			
By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	2.37	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{ul})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-1.64
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, $W_{c,bc}$ (%)	28.14
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation	ΔV_c (cm ³) = 2.37	ΔH_c (mm) = 0.680	$\epsilon_{a,c}$ (%) = 3.65	$\Delta V_{c,max}$ (cm ³) = NA
& Preshear	V_c (cm ³) = 62.71	H_c (mm) = 17.970	$\epsilon_{v,c}$ (%) = 3.65	$\epsilon_{ac,max}$ (%) = 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: $G_s = 2.720$ 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 **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	Composite 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 ₀ at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,SDSS}	☐ 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 (pcf)		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: 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'_{vc} :	(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., $\epsilon_{h,c}$:	%	NA	3.65	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, $\tau_{h,c} / \sigma'_{vc}$:	-	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, $\epsilon_{h,ua}$:	%	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: 3.632 (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

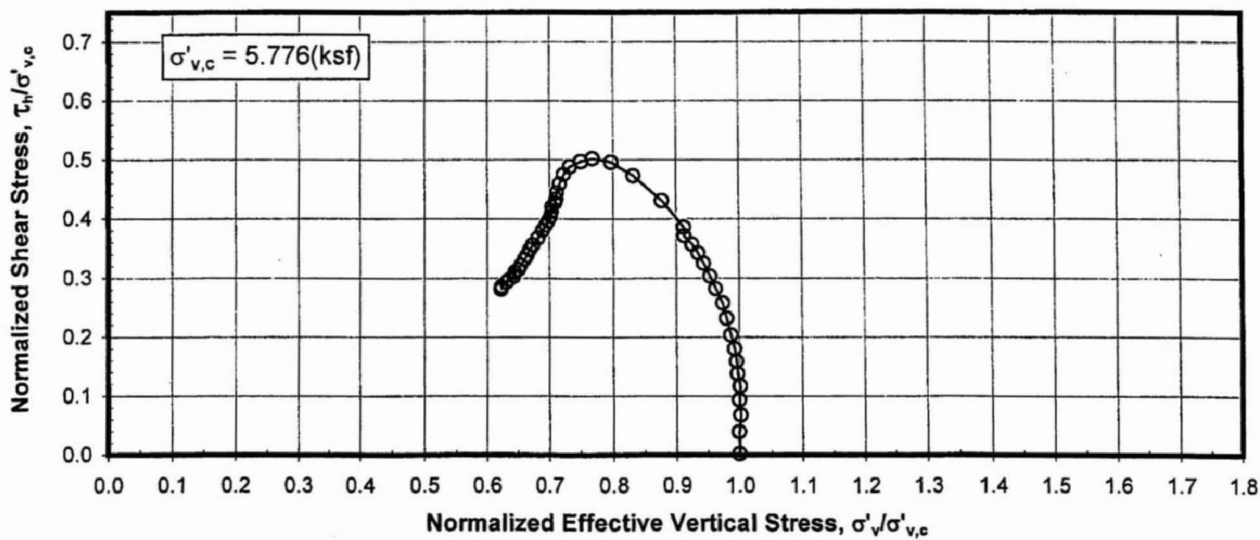
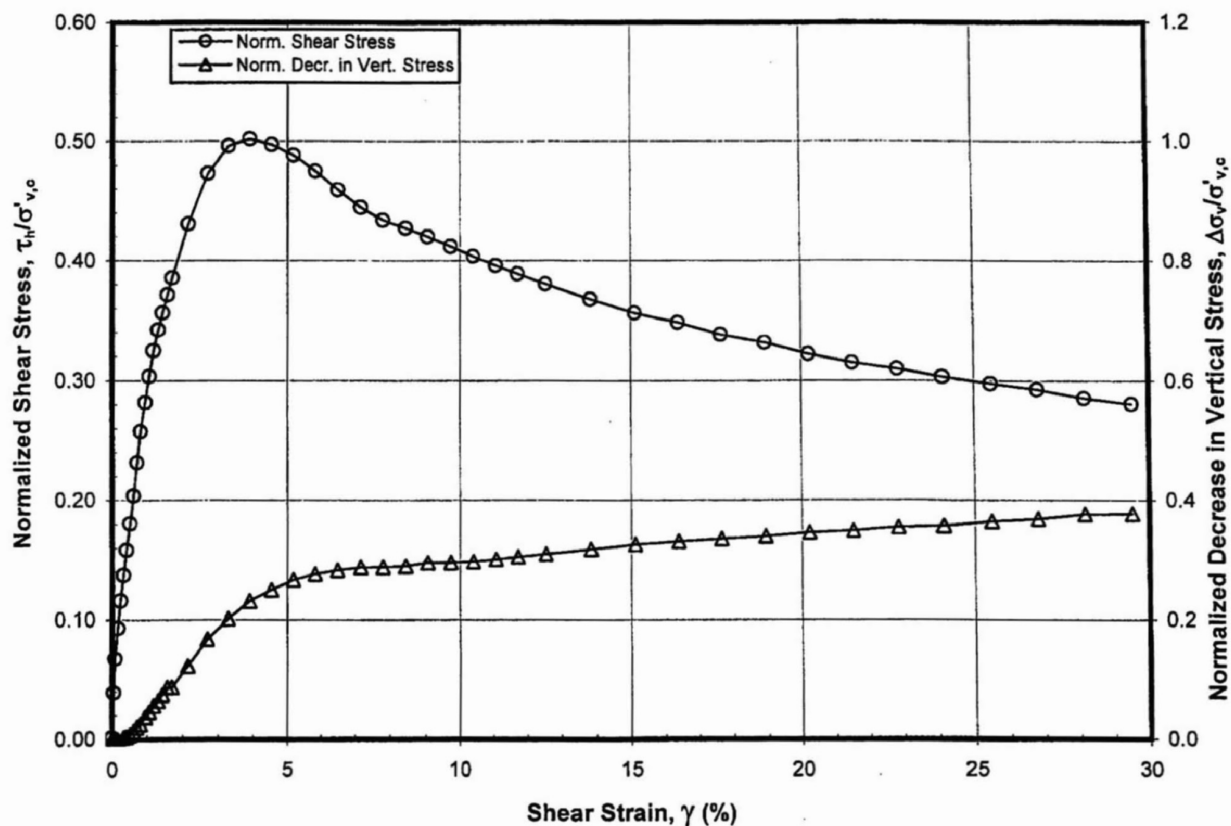
Final Visual Description and Remarks: Mottled Brownish Yellow and Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	C _d /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

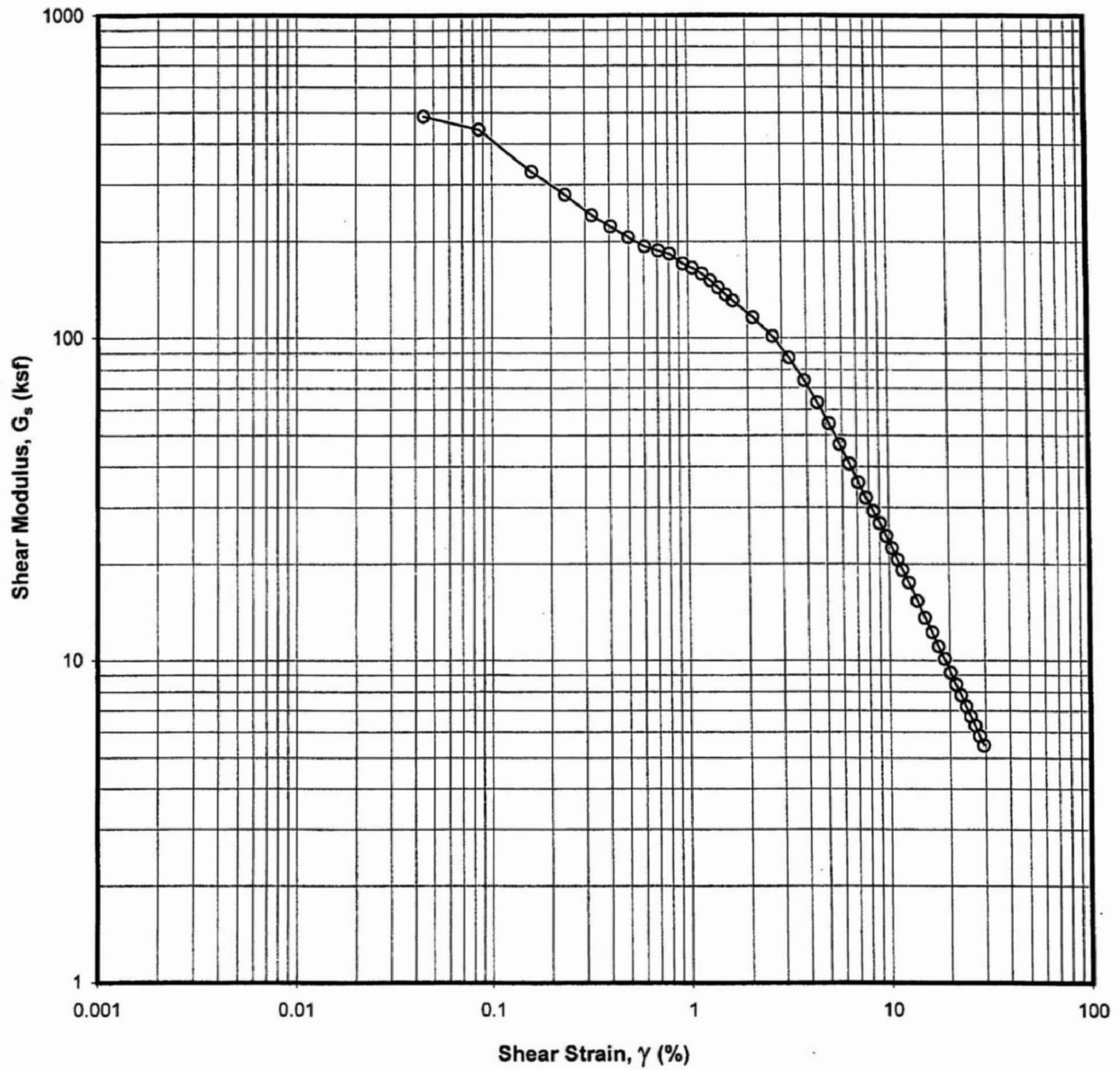
Sample No.: UD-6B

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 $\tau_v/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ_{pass} (°)
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_0 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 & 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. (lbf) =	No. Layers =
Sample No.: UD-8	Composite 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. =	$\pm$ 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)	Mass Tare (g)		
Container No.	592	4091	5005	4018	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	304.65	125.71	
Mass Moist Soil + Cont. (g)	49.54	139.55	57.17	63.22		182.69	4.52	
Mass Dry Soil + Container (g)	45.59	114.19	51.14	55.61		121.96	121.19	
Mass Container (g)	31.71	30.66	31.53	30.13	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	28.46	30.36	30.75	29.87				
Avg. Initial WC, $W_{o,avg}$ (%)	29.86	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	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

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) =	116.98
Dry, $\gamma_{d,o}$ (lb/ft ³) =	90.08

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PITape (mm) 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: 0.63		= 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

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

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) = 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., $W_{o,avg}$	Selet., $W_{o,s}$	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_{lat} (g)						121.19
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (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

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)	2.72
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
	NA

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	29.75
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation	ΔV_c (cm ³) = 2.70	ΔH_c (mm) = 0.775	$\epsilon_{a,c}$ (%) = 4.16	$\Delta V_{c,max}$ (cm ³) = NA
& Preshear	V_c (cm ³) = 62.38	H_c (mm) = 17.875	$\epsilon_{v,c}$ (%) = 4.15	$\epsilon_{ac,max}$ (%) = 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: $G_s = 2.720$ 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.

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 = 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. (lb) =	No. Layers =
Sample No.: UD-8	Composite 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. = ± 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	-200	Void Ratio
					Total (pcf)	Dry (pcf)		PL		
Condition:								PI	%	e
Initial	18.65	65.09	34.90	30.27	117.0	89.8	92.7	64	97	0.891
After to σ' _{v,c}	17.88	62.38	34.90	29.75	121.6	93.7	100.0	16	NA	0.812
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	48	NA	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, $\sigma'_{v,c}$	(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., $\epsilon_{a,c}$	%	NA	4.16	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, $\epsilon_{h,ua}$	%	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: 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

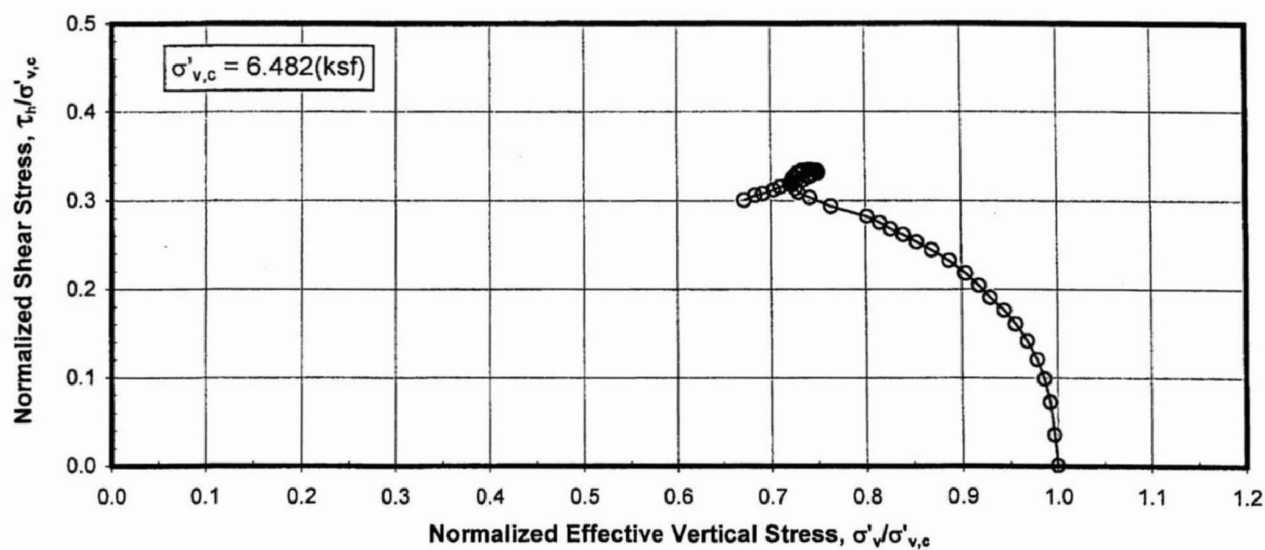
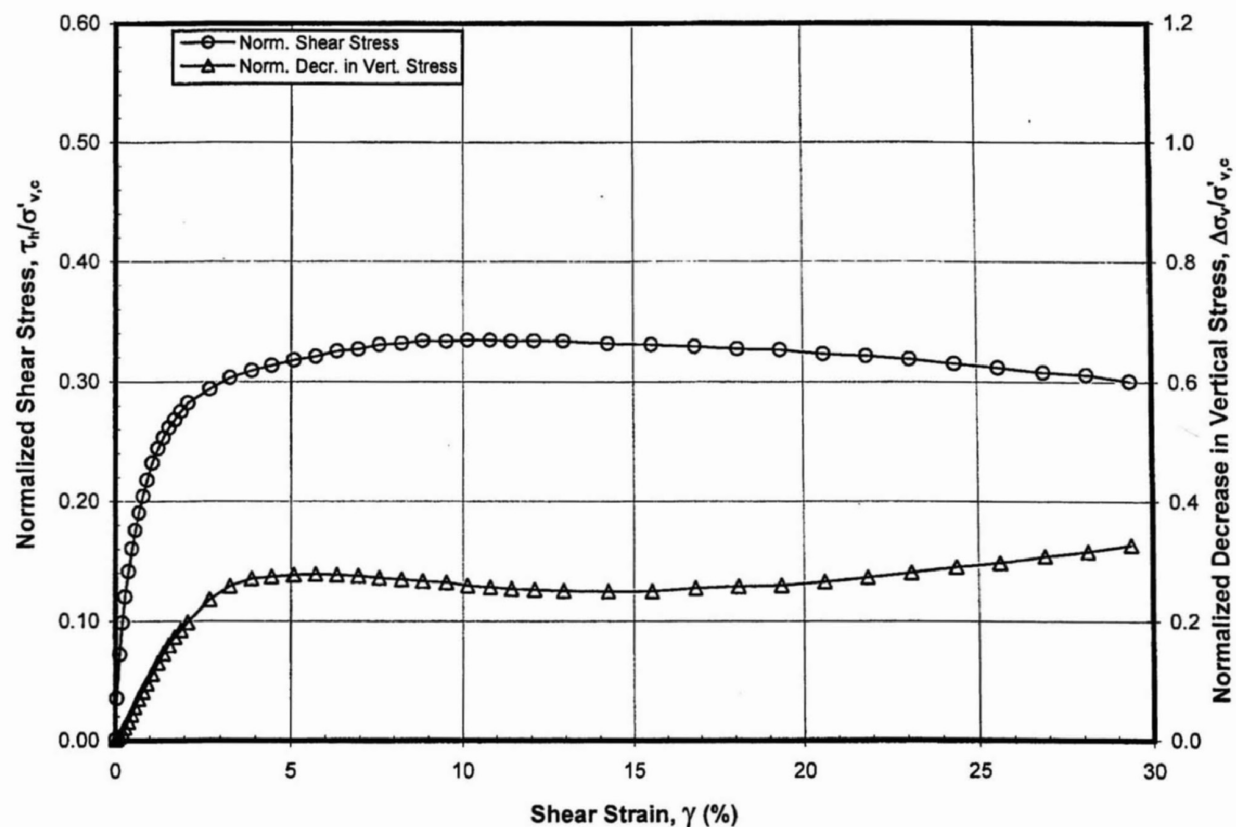
Final Visual Description and Remarks: Mottled Light Yellowish Brown and Light Gray Fat CLAY (CH)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ'/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

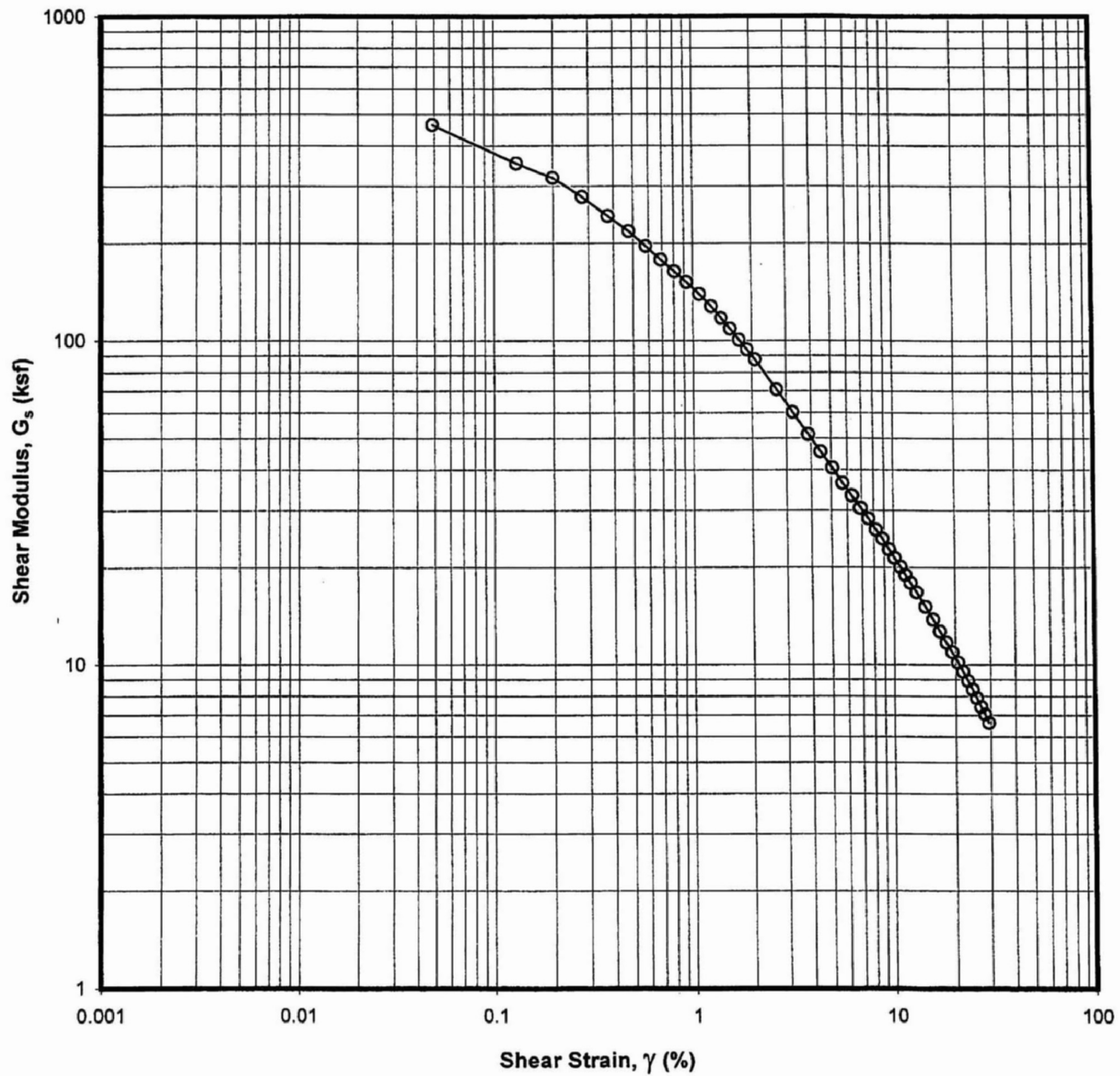
Sample No.: UD-8B

Elapsed Time	Shear Strain	Shear Stress	Effective Vertical Stress	Calculated Pore Press. Change	Secant Shear Modulus	Tangent Modulus	Norm. Shear Stress	Norm. Vert. Stress	Norm. Decr. in V. Stress	Stress Ratio
(min)	γ (%)	τ_h (ksf)	σ'_v (ksf)	$\Delta U = \Delta \sigma'_v$ (ksf)	G_s (ksf)	G_T (ksf)	$\tau_h/\sigma'_{v,c}$	$\sigma'_v/\sigma'_{v,c}$	$\Delta \sigma'_v/\sigma'_{v,c}$	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_0 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
 Assig. 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	Composite 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
	☐ 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 ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	C40	115	4051	5059	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	134.69	135.26	
Mass Moist Soil + Cont. (g)	76.70	78.10	75.78	76.93	Mass Dry Soil + Container (g)			
Mass Dry Soil + Container (g)	69.18	70.23	68.25	68.67	Mass Container (g)			
Mass Container (g)	30.16	31.74	29.75	30.59	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	19.27	20.45	19.56	21.69	Container No.			
Avg. Initial WC, $W_{o,avg}$ (%)	19.76	Final W_{at} :	☒ Slice ;	Whole Spec.	Mass Dry Soil + Container (g)			
					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_t)	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_c (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		528.2 g	1.16	lb
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
☐ 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, $P_{v,n}$ (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	0.77 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.
19.27	20.45	19.56	19.76	19.76	21.18
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_{alc} (%)			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	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-0.57
ΔV_c (cm ³)	2.35	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	2.35		

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_{ub} (%) = 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.:	<u>B-2321UD</u>	☐ LPC Core		☐ Impact/Rammer	Rammer Wgt.(lb)=	No. Layers =
Sample No.:	<u>UD-9</u>	Compositite No.:		☐ Pluviated:	Tamper Force (lb)=	Drop (in.) =
Depth (ft):	<u>58.5 - 61.0</u>	Specimen No.:	<u>B</u>	☐ Kneading	Undercompaction:	U _{ni} (%) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort=	% Comp. = ± Opt.=

Type Consolidation:	☒ K ₀ 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 = 2.680 Measured	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200
Condition:	(mm)	(cm ³)	(cm ²)	(%)	Total	Dry	(%)	PL	%
Initial	18.83	65.28	34.68	20.46	128.8	106.9	97.6	49	77
After to σ' _{v,c}	18.15	62.94	34.68	18.87	131.8	110.9	100.0	14	NA
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	35	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' _{v,c}	(ksf)	NA	6.482	NA	Cyclic Rate (Hz):	☐ 0.1; ☐ 1; Other =			
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic	
Axial Strain during Consol., ε _{h,c}	%	NA	3.60	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' _{vc,r} =		NA (ksf)		

Weight Top Cap, etc., M _{tc} (lb):	<u>1.16</u>	Data Normalization:	☒ Yes	☐ No	Value: <u>6.482</u> (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

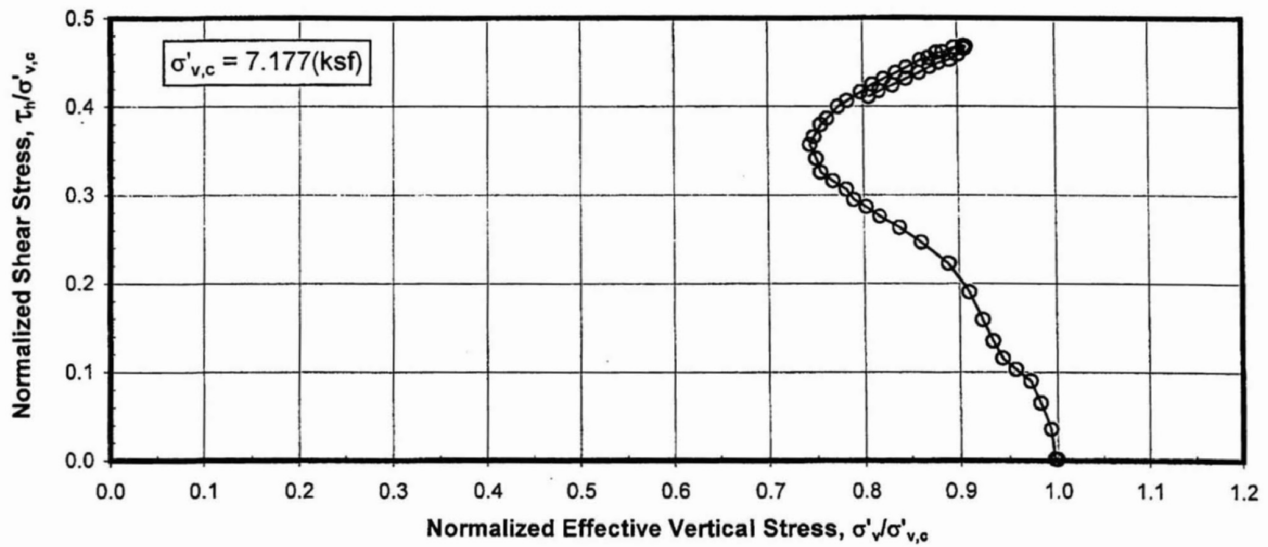
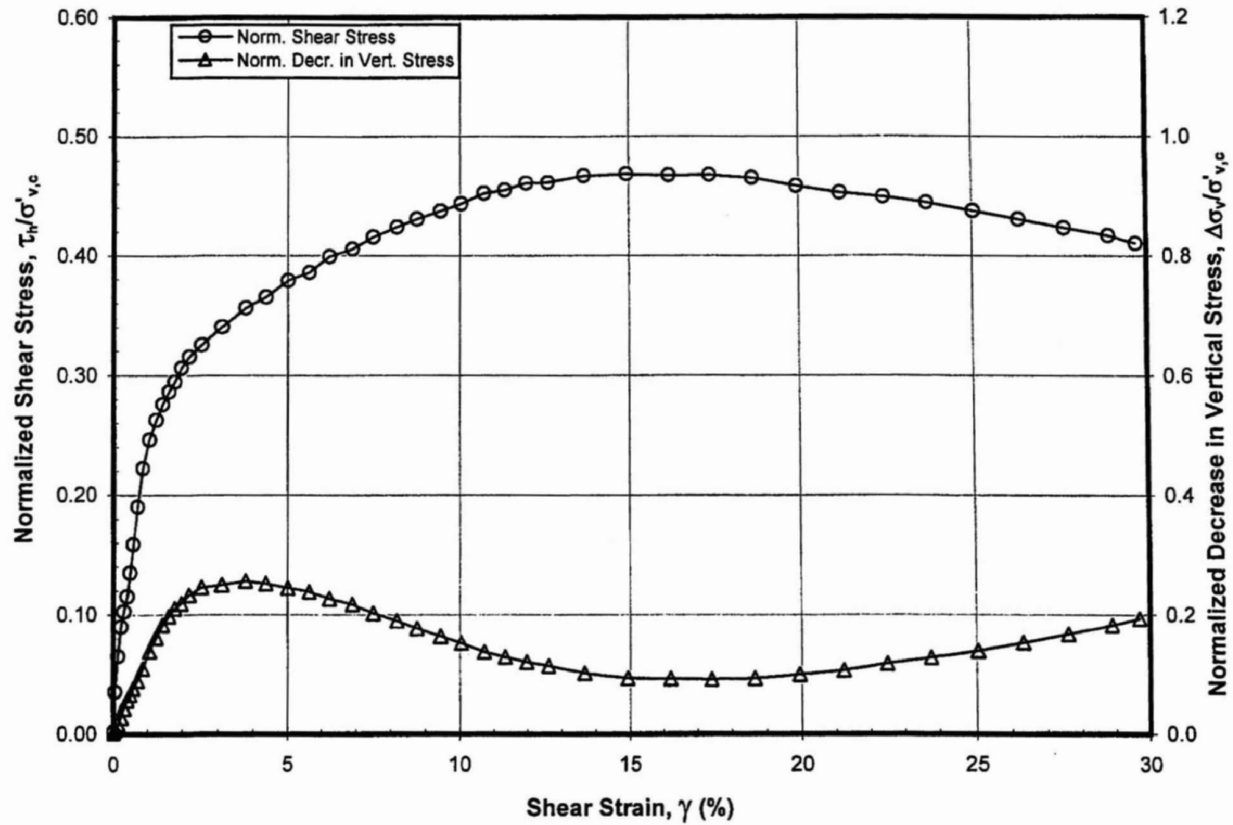
Final Visual Description and Remarks: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{v,c} -	c _v /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

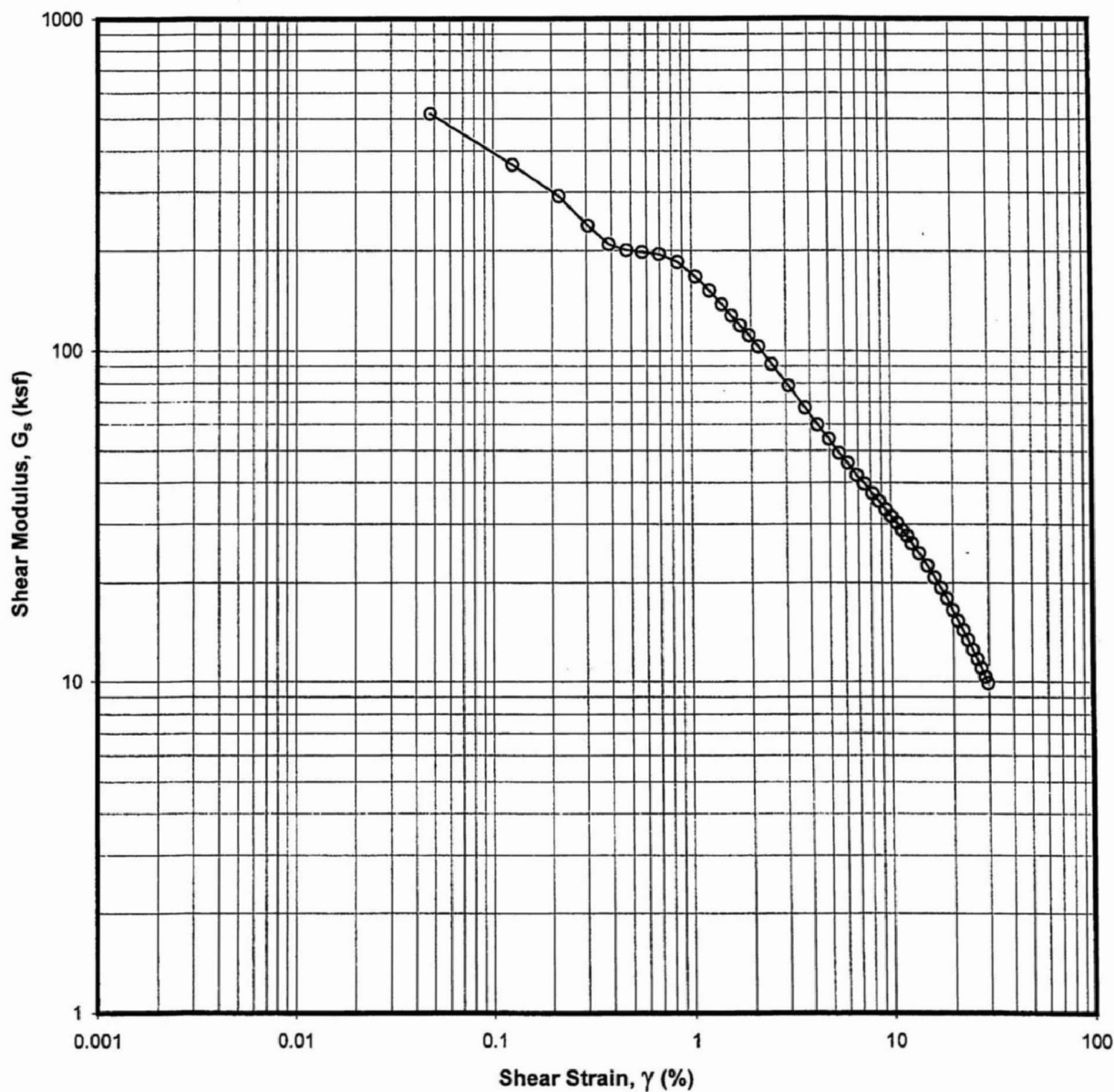
Sample No.: UD-9B

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_o 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	Composite 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 CRS	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
				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; 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 ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	1152	2008	4018	D-11	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	325.29	143.70	
Mass Moist Soil + Cont. (g)	78.55	80.91	80.31	71.24		186.86	4.36	
Mass Dry Soil + Container (g)	72.75	74.00	73.68	65.47		138.43	139.34	
Mass Container (g)	32.38	30.38	30.18	30.24	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	14.37	15.84	15.24	16.38		Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	15.15	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):	18.58	$A_{s,t}$ (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	

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

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)

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 **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
Task Number: NA

Test Station No.: 8G
Specific Gravity: 2.670

File Name: B-2321_UD10b

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., $W_{o,avg}$	Select., $W_{o,s}$	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_{lat} (g)						139.34
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						139.34

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	15.15
Initial, $M_{d,o}$	120.22
Final, $M_{d,sl}$	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, $W_{at,c}$ (%)			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)	1.85
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.86
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	1.86
	NA

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	14.89
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	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
Conclusions	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.

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
Project Name: Exelon (Victoria)

Test Type: SDSS Test Sta. No.: 8G File Name: B-2321_UD10b
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	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. =	± Opt. =

Type Consolidation:	☒ K ₀ at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,SS}	☐ 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, σ' _{vc} :	(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., ε _{ax} :	%	NA	2.87	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 _{sh} :	%	NA	NA	NA		Number of Loading Cycles, N =	NA		
Undr. Ambient Shear Stress, τ _{h,amb} :	(ksf)	NA	NA	NA		±τ _h =	NA (ksf)	±γ =	NA %
Undr. Ambient Shear Strain, ε _{sh} :	%	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: 7.177 (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

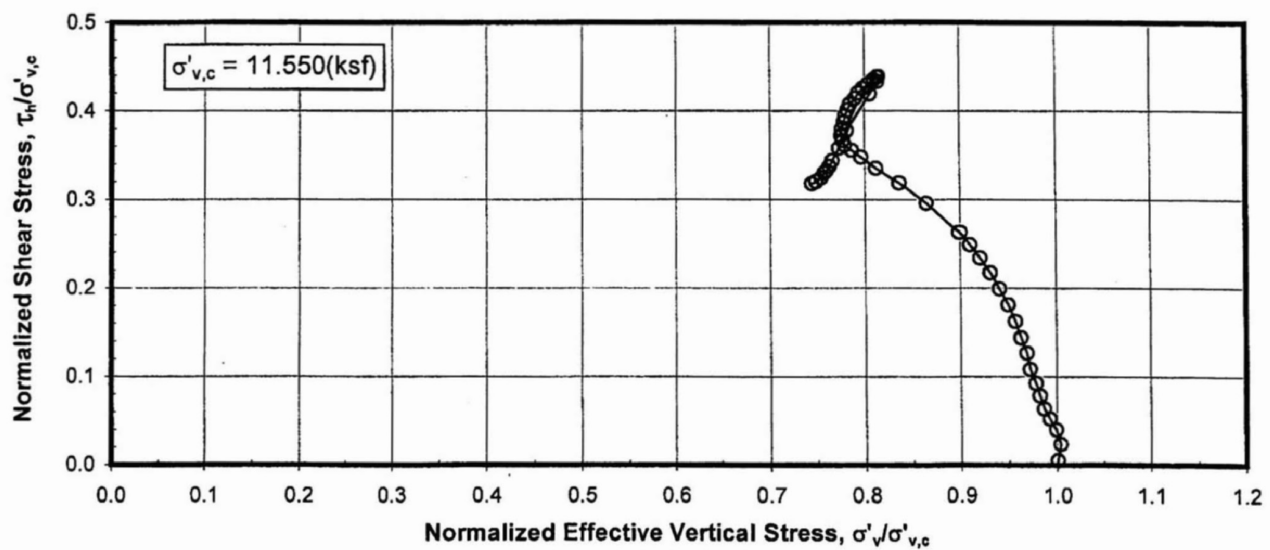
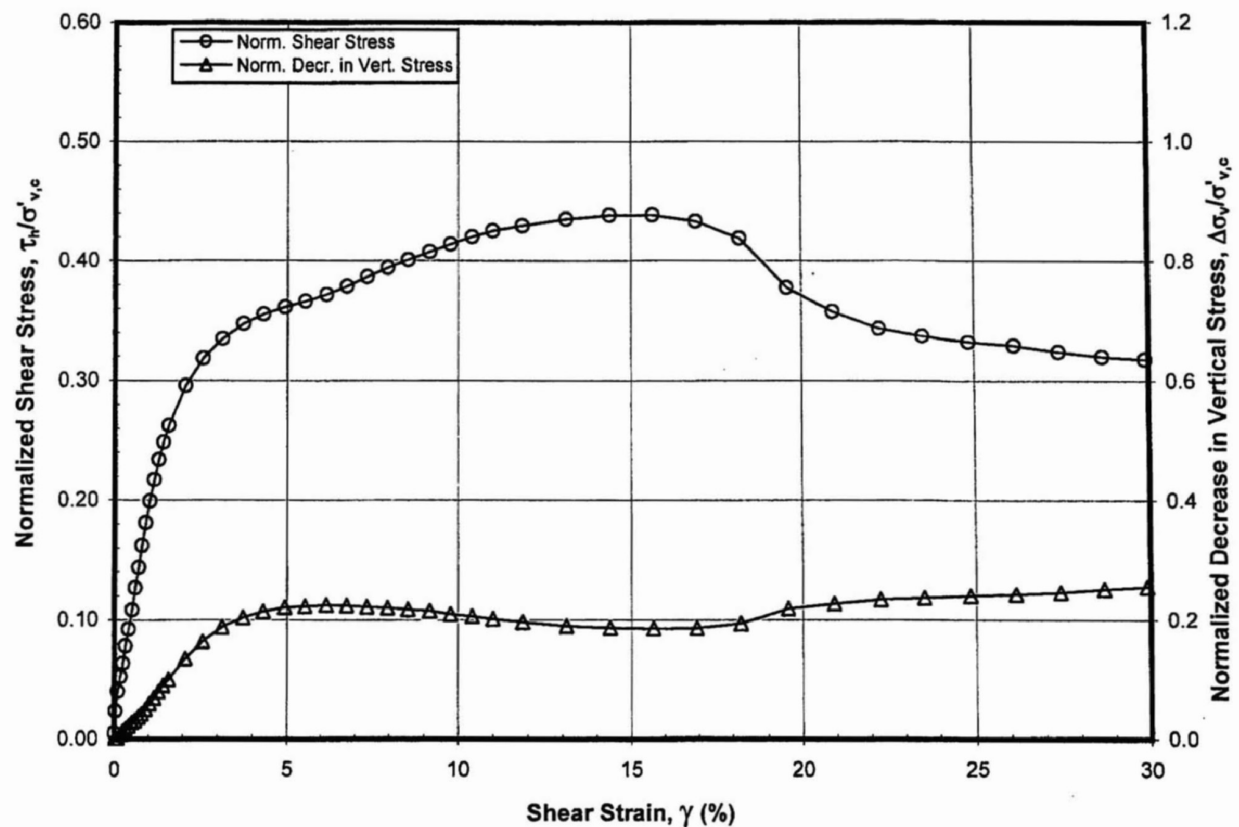
Final Visual Description and Remarks: Light Olive Gray Sandy Lean CLAY (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	c _v /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



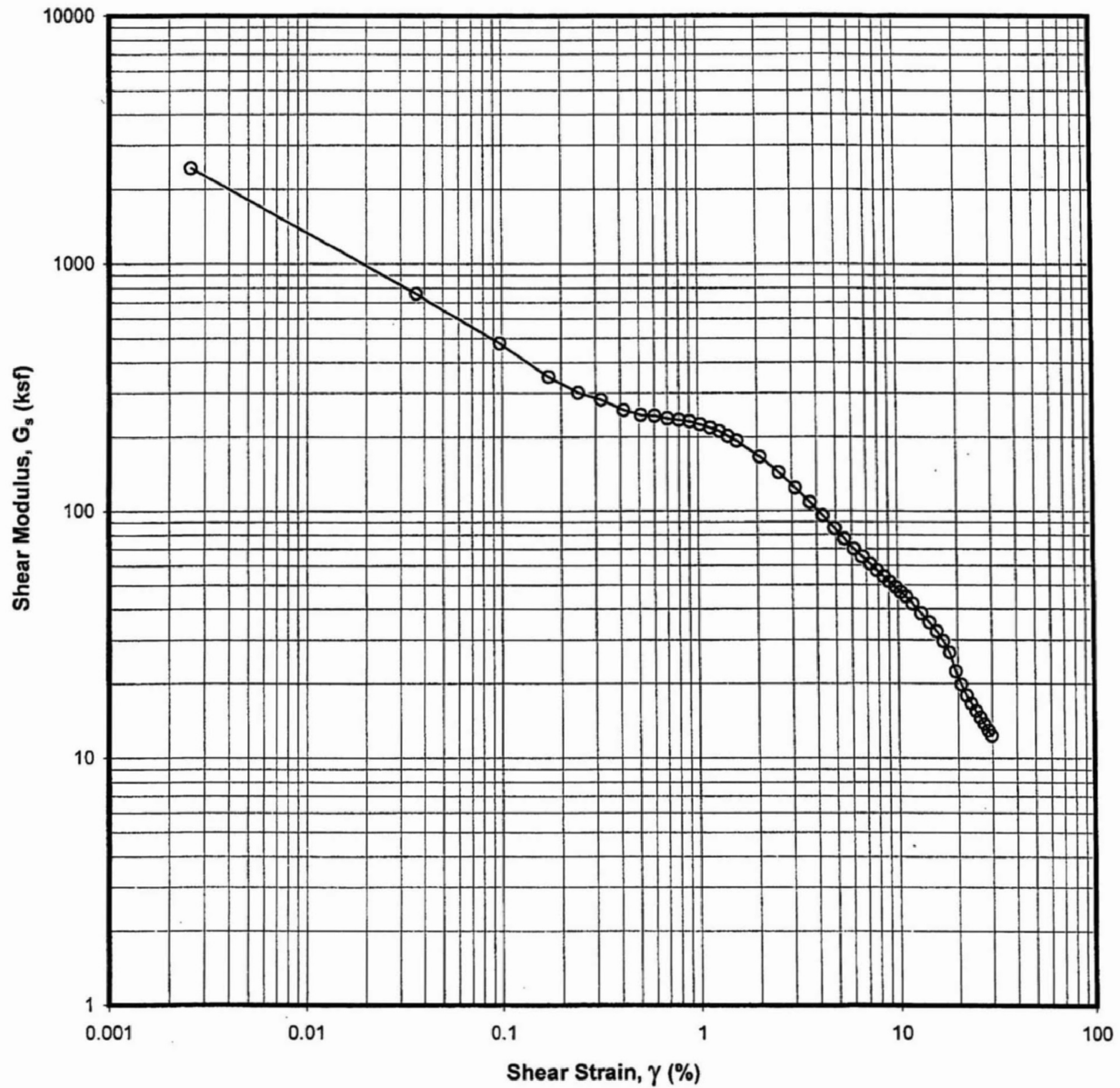
STATIC DSS TEST

K_0 Consolidation - OCR = NA

Sample: UD-15B - Depth: 130.5 - 132.5 ft

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KAW 7/16/08



STATIC DSS TEST

K_0 Consolidation - OCR = NA

Sample: UD-15B - Depth: 130.5 - 132.5 ft

Boring B-2321UD

KAW 7/16/08