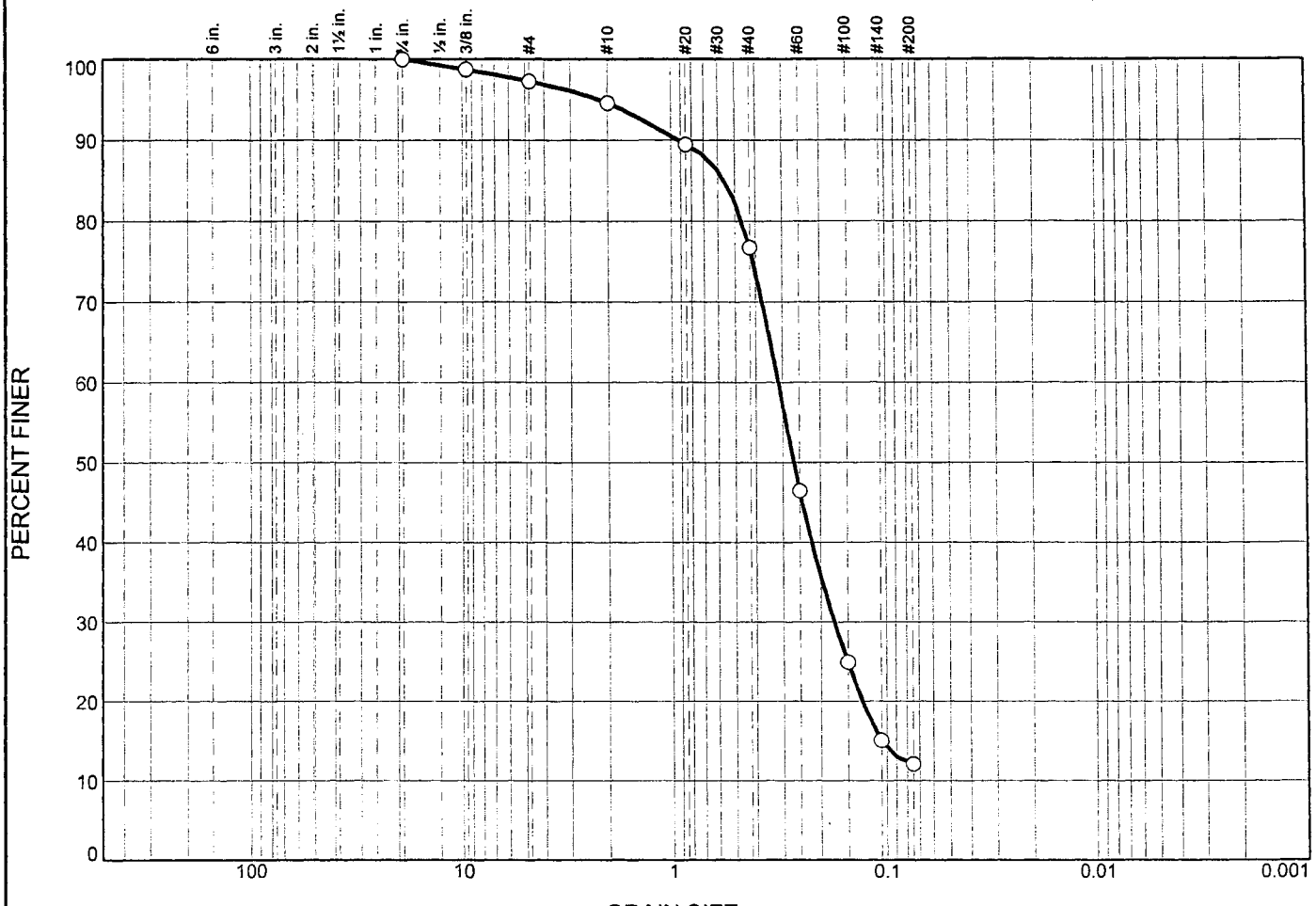
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.7	2.7	17.9	64.6	12.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5563	0.3138	0.2661	0.1729	0.1057			

Material Description	USCS	AASHTO
○ Poorly graded sand with silt	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB219 **Depth:** 34.0'-35.5 **Sample Number:** CB219

Remarks:

○ Moisture Content % 25.4 CP05-EAARS-CB-0317

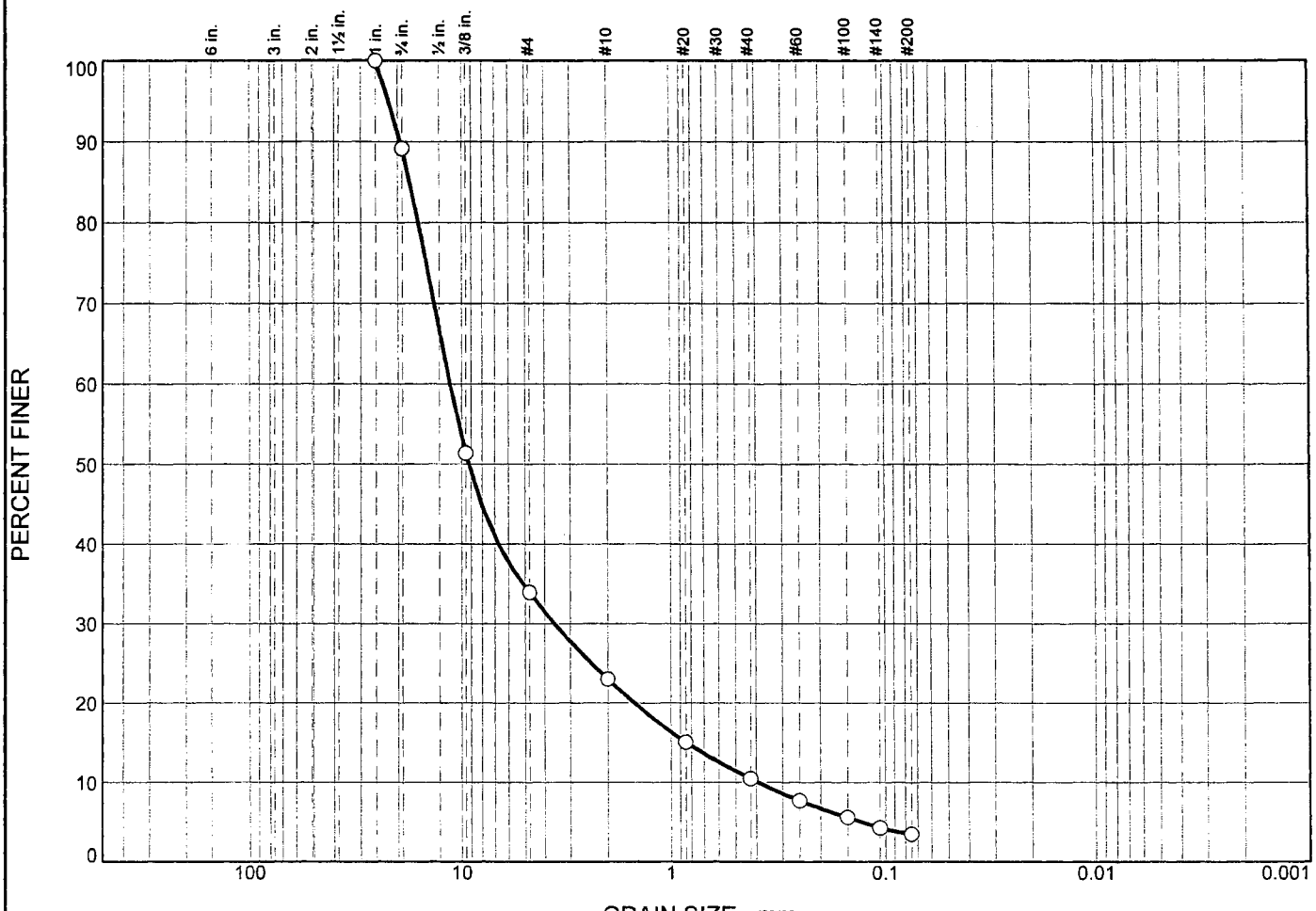
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: L Mazo **Checked By:** M Brown

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	10.8	55.3	10.9	12.5	7.0	3.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			17.4855	11.2897	9.2234	3.5693	0.8428	0.3896	2.90	28.98

Material Description	USCS	AASHTO
○ Poorly graded gravel with sand	GP	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB0228 **Depth:** 4.0'-5.5 **Sample Number:** CB0228

Remarks:

○ Moisture Content % 5.2 CP05-EAARS-CB-0326

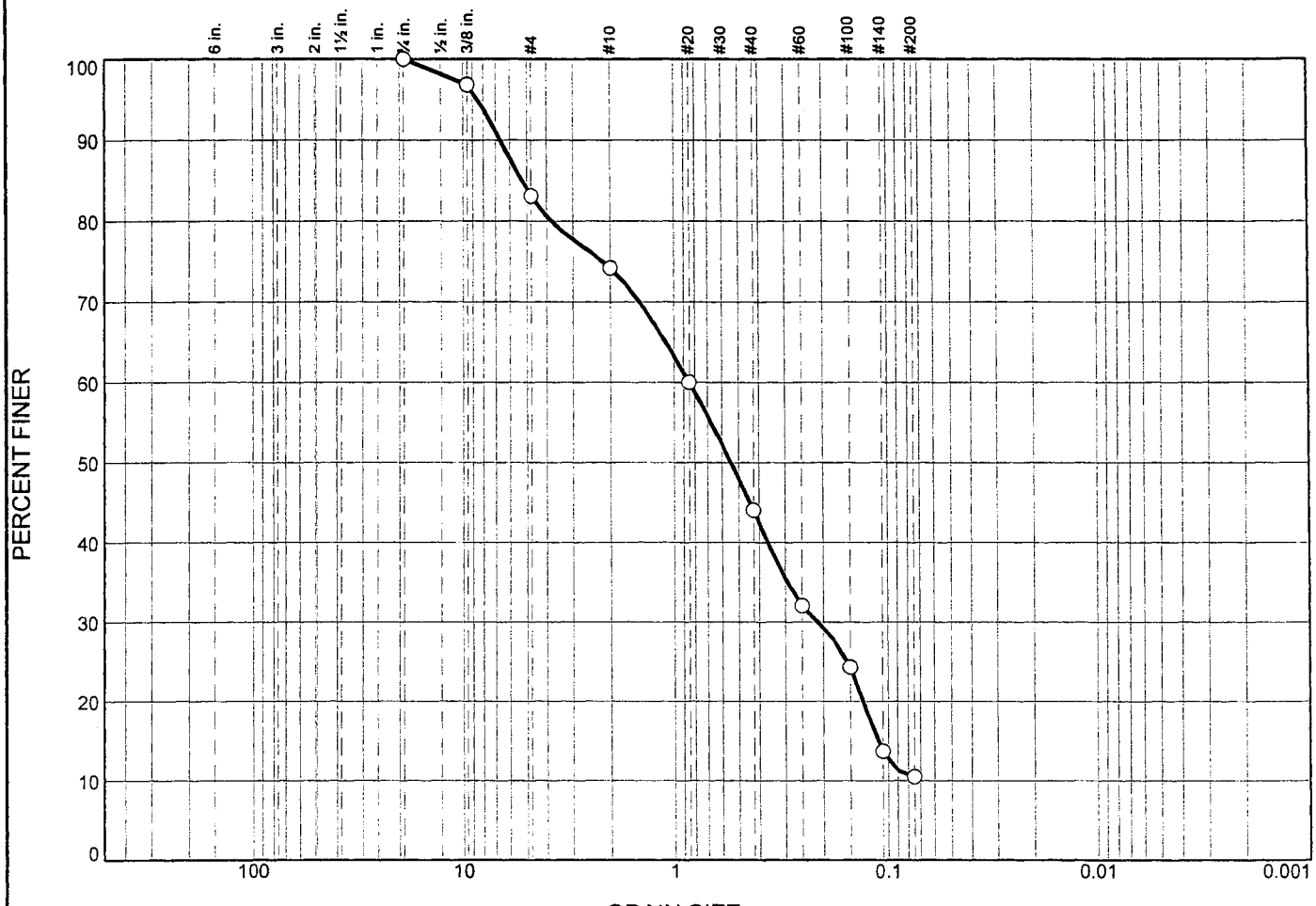
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: M Mazo **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	16.9	8.9	30.2	33.5	10.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			5.2567	0.8482	0.5416	0.2123	0.1115			

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB0228 **Depth:** 14.0'-15.5 **Sample Number:** CB0228

Remarks:

○ Moisture Content % 22.6 CP05-EAARS-CB-0326

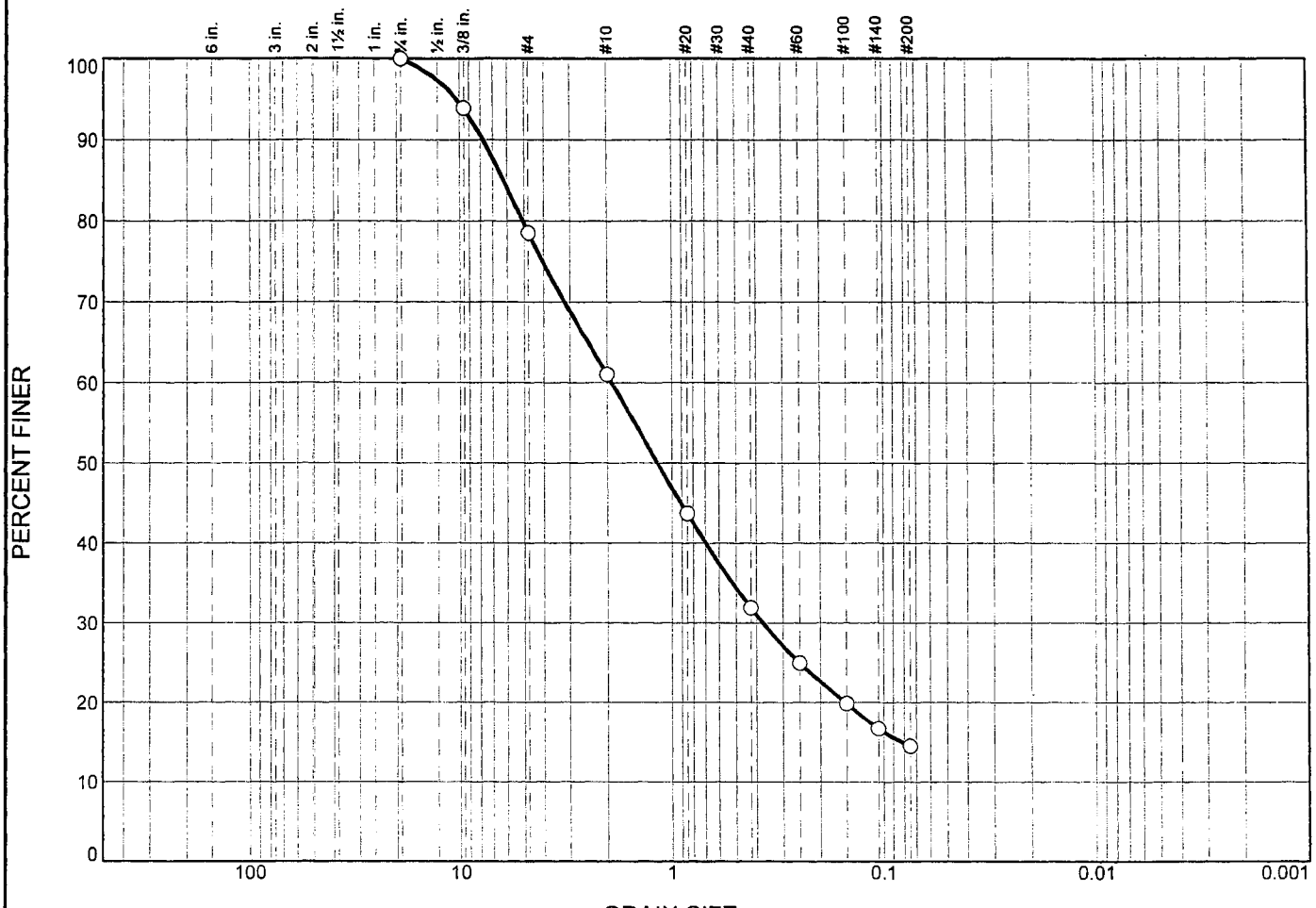
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	21.5	17.5	29.1	17.4	14.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.2268	1.8989	1.1658	0.3721	0.0819			

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB231 **Depth:** 8.5'-10.0' **Sample Number:** CB231

Remarks:

○ Moisture Content % 16.8 CP05-EAARS-CB-0329

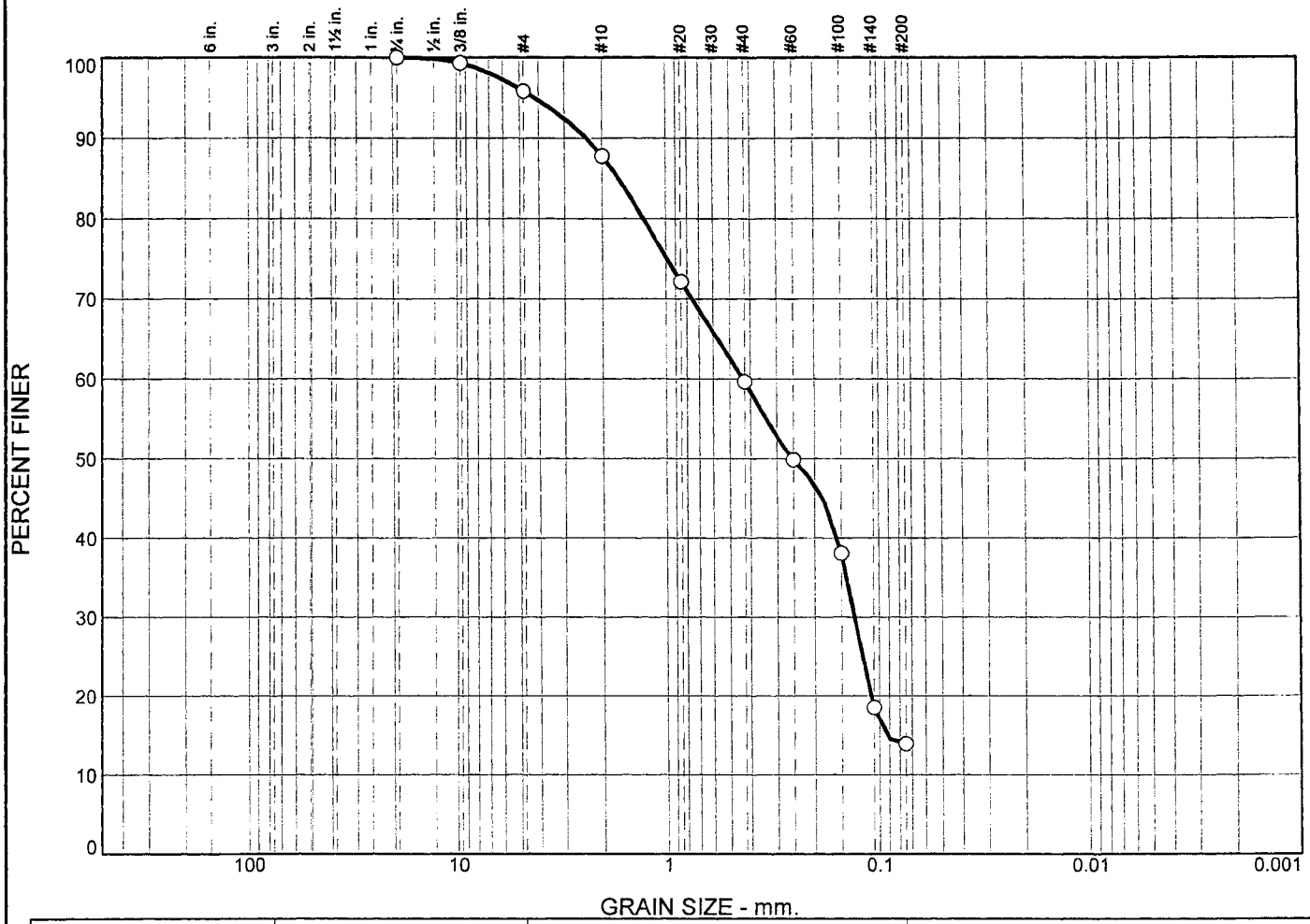
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.2	8.0	28.1	45.7	14.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.6785	0.4322	0.2521	0.1305	0.0926			

Material Description	USCS	AASHTO
○ Poorly graded sand with silt	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB231 **Depth:** 13.5'-15.0' **Sample Number:** CB231

Remarks:

○Moisture Content % 22.0 CP05-EAARS-CB-0329

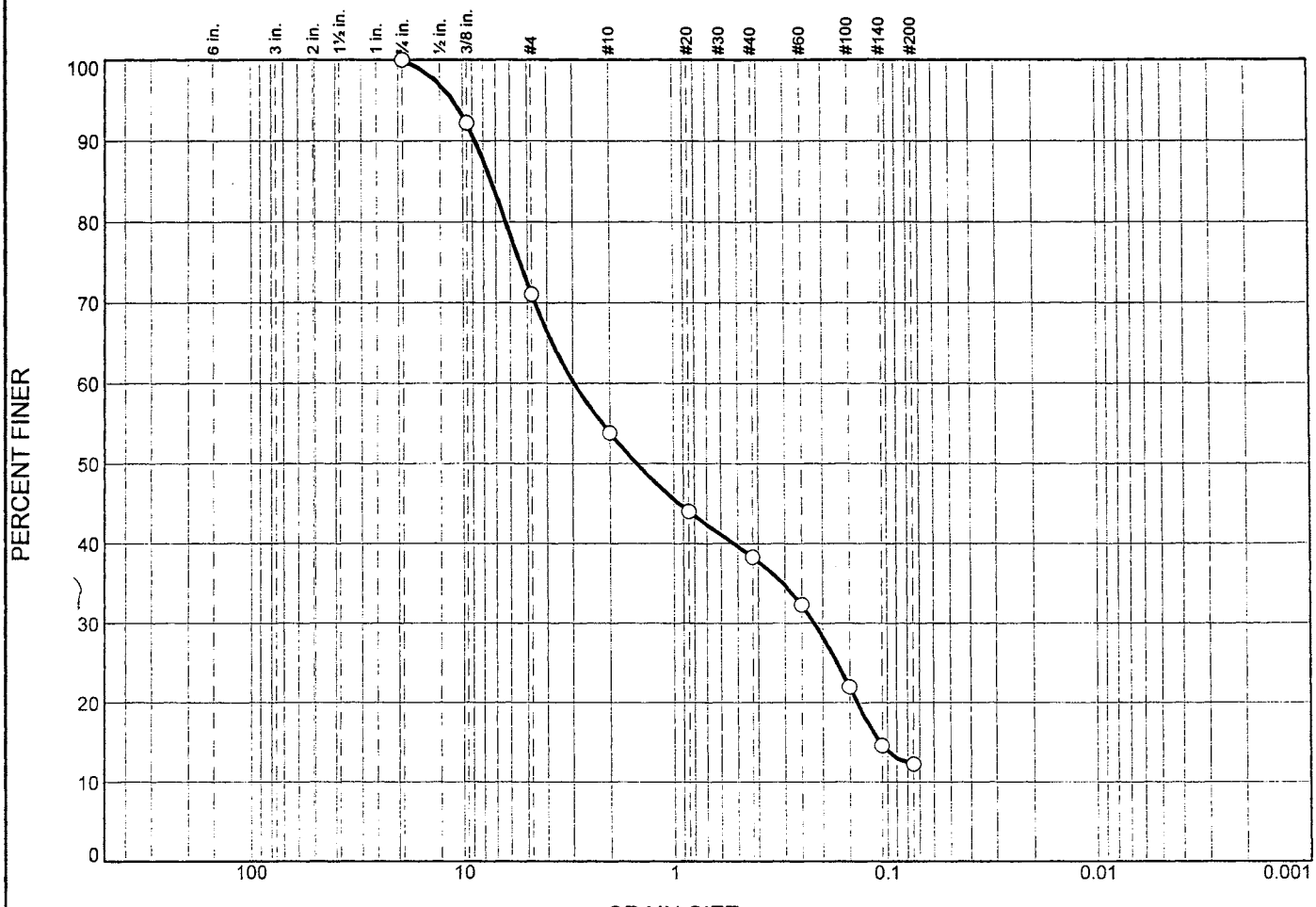
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	28.9	17.3	15.5	26.0	12.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.3318	2.9564	1.4925	0.2181	0.1089			

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB231 **Depth:** 18.5'-20.0 **Sample Number:** CB231

Remarks:

○ Moisture Content % 13.0 CP05-EAARS-CB-0329

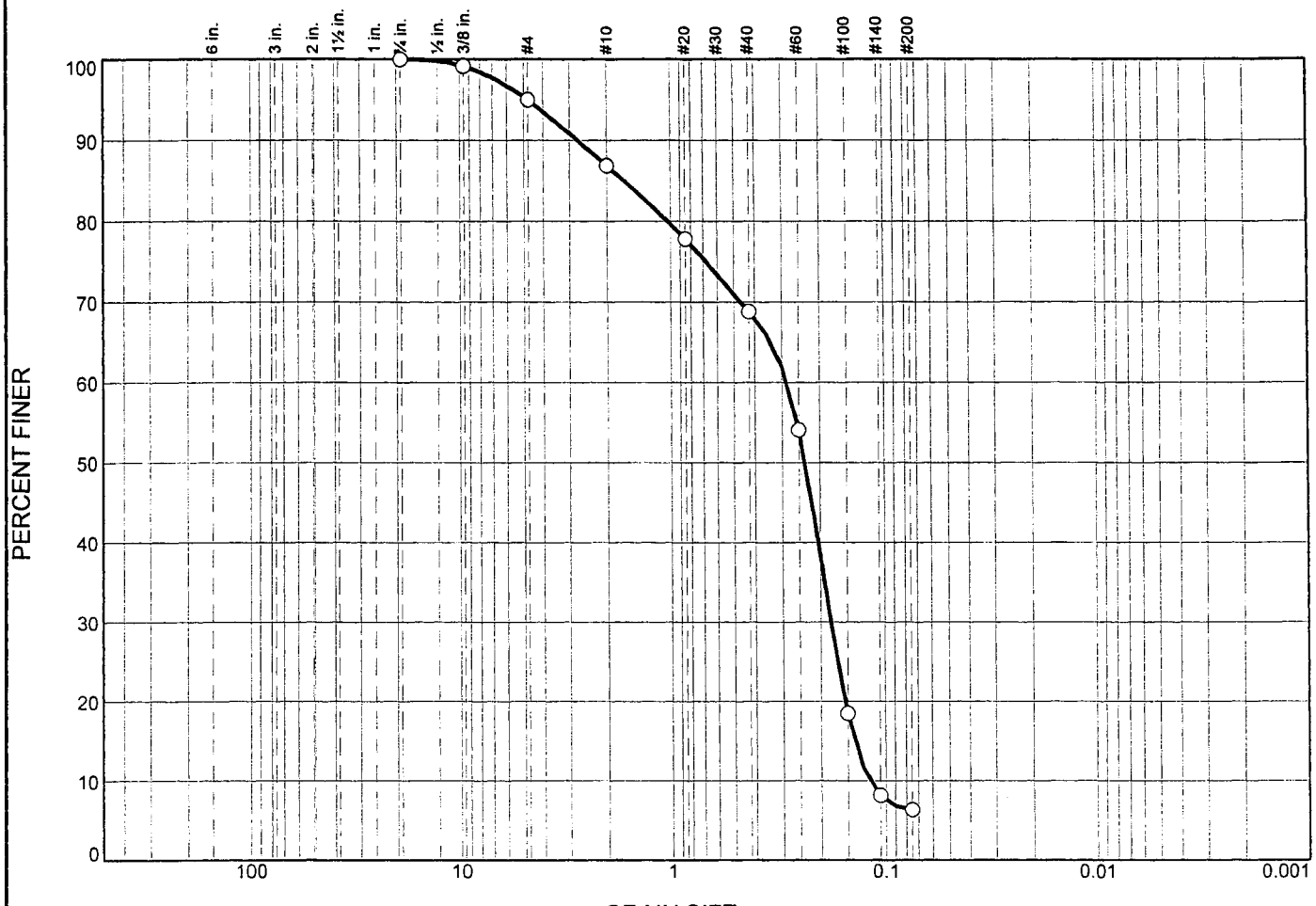
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.0	8.1	18.1	62.5	6.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.6571	0.2831	0.2339	0.1787	0.1394	0.1185	0.95	2.39

Material Description	USCS	AASHTO
○ Poorly graded sand with silt	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB231 **Depth:** 23.5'-25.0 **Sample Number:** CB231

Remarks:

○ Moisture Content % 25.6 CP05-EAARS-CB-0329

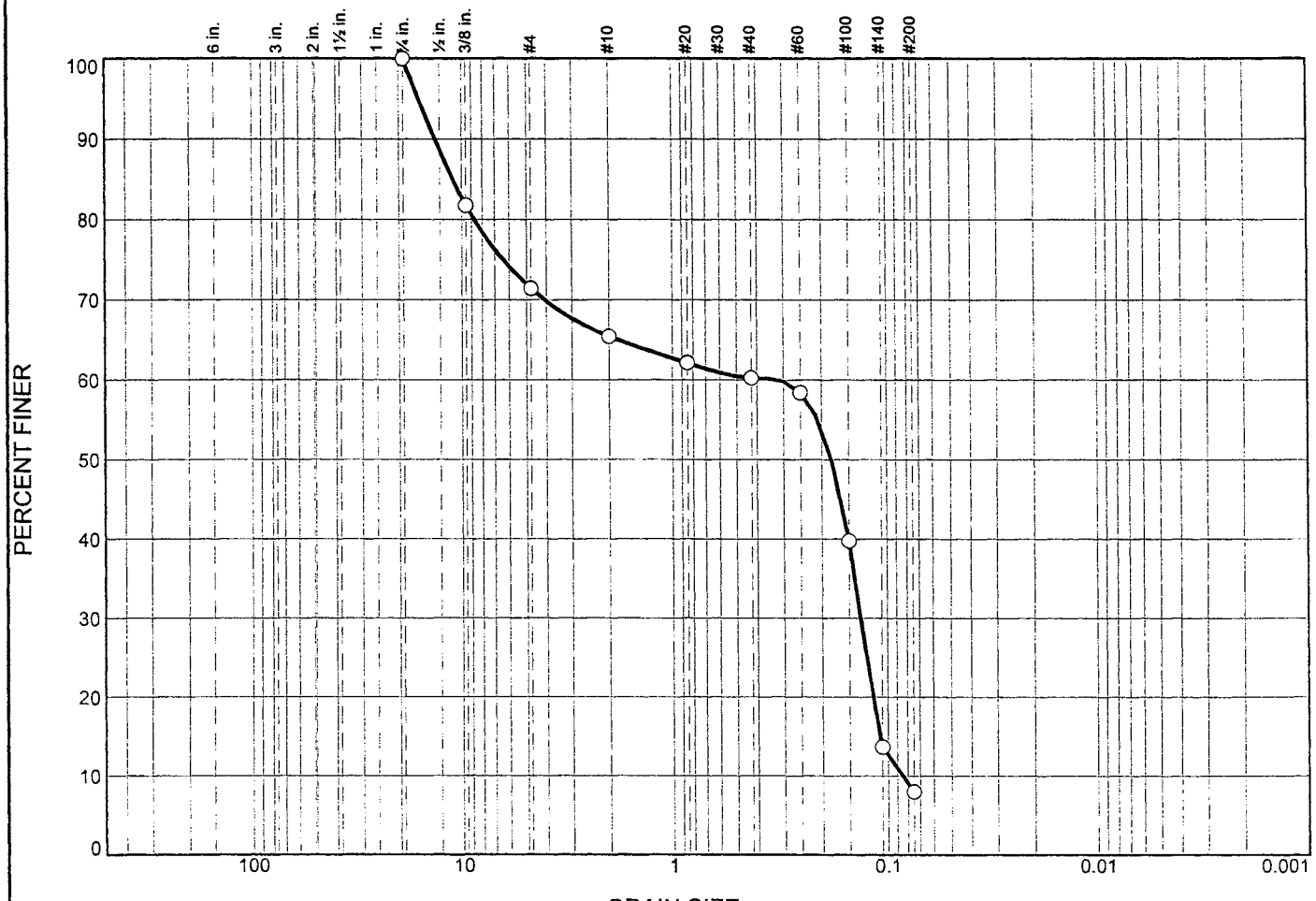
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	28.6	6.0	5.2	52.2	8.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			10.9857	0.3136	0.1797	0.1326	0.1086	0.0846	0.66	3.70

Material Description	USCS	AASHTO
○ Poorly graded fine sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB231 **Depth:** 33.5'-35.0 **Sample Number:** CB231

Remarks:

○ Moisture Content % 15.7 CP05-EAARS-CB-0329

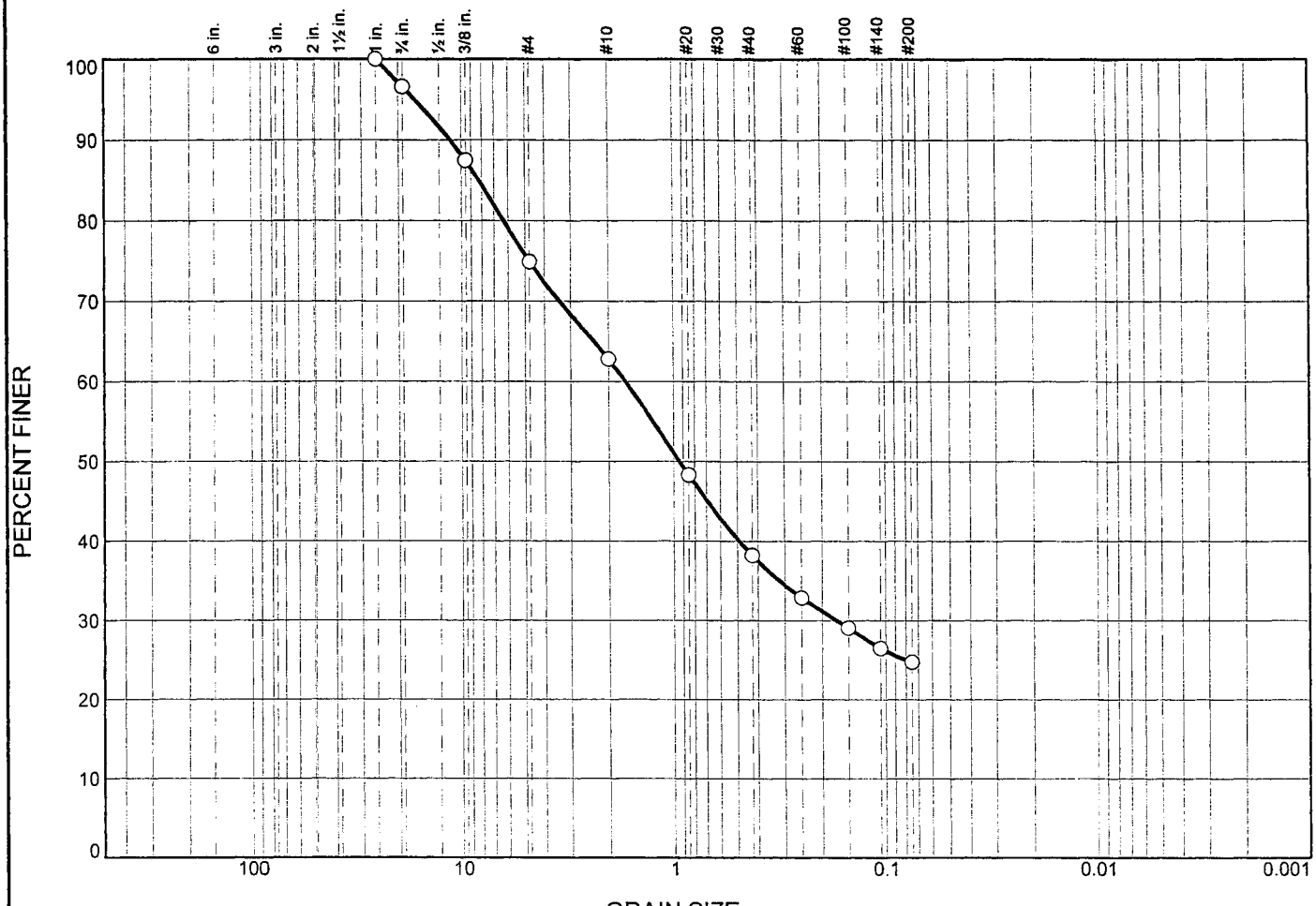
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	3.4	21.7	12.1	24.6	13.4	24.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.2515	1.6704	0.9373	0.1693				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB235 **Depth:** 8.5'-10.0 **Sample Number:** CB235

Remarks:

○ Moisture Content % 24.4 CP05-EAARS-CB-0333

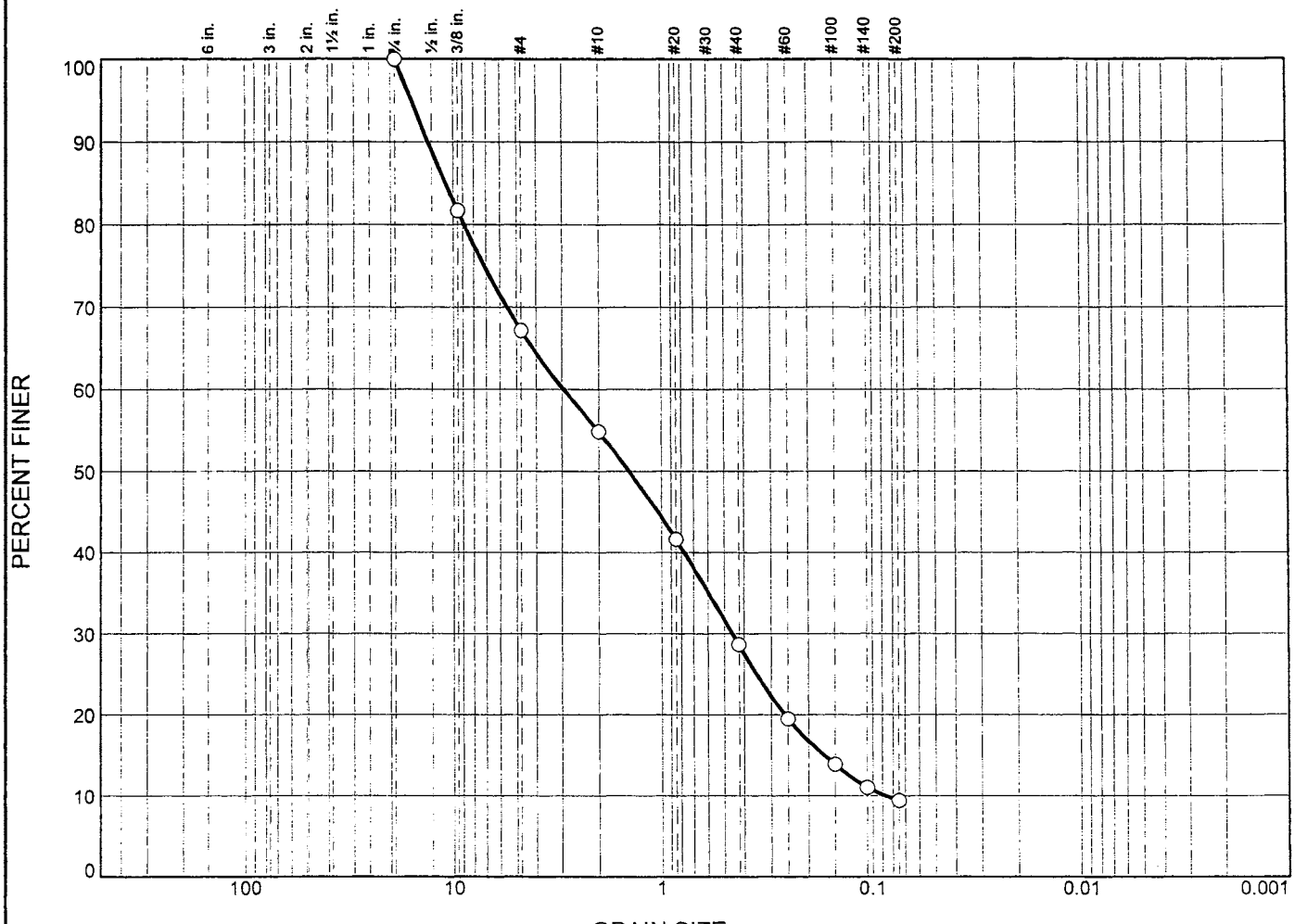
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	32.8	12.4	26.1	19.3	9.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			10.8848	2.9453	1.4254	0.4559	0.1689	0.0866	0.81	33.99

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB248 **Depth:** 10.0'-11.5 **Sample Number:** CB248

Remarks:

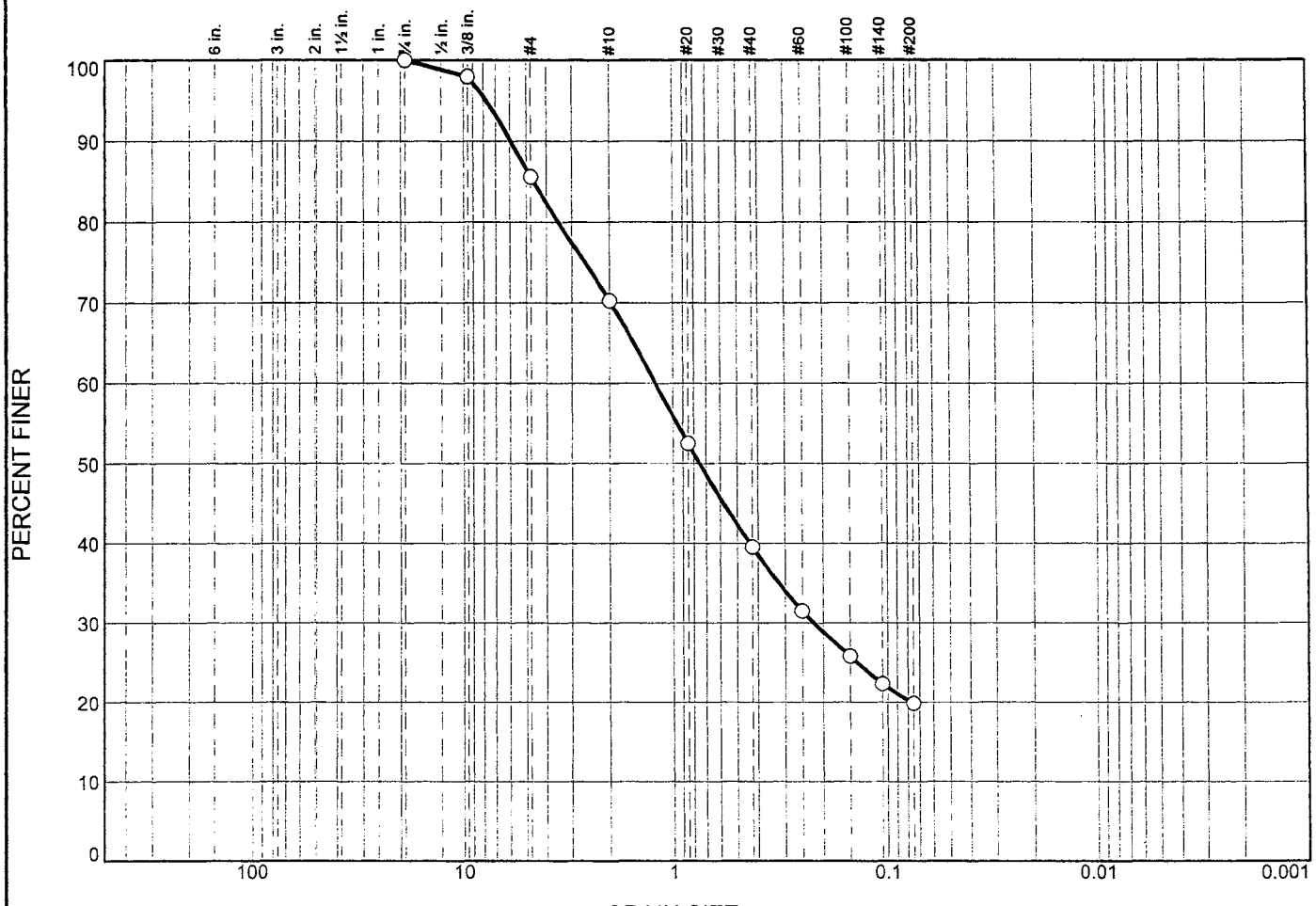
○ Moisture Content %10.1 CP05-EAARS-CB-0346

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	14.4	15.3	30.7	19.7	19.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.6041	1.2124	0.7504	0.2212				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB260 **Depth:** 13.0'-13.5 **Sample Number:** CB260

Remarks:

○ Moisture Content % 20.6 CP05-EAARS-CB-0358

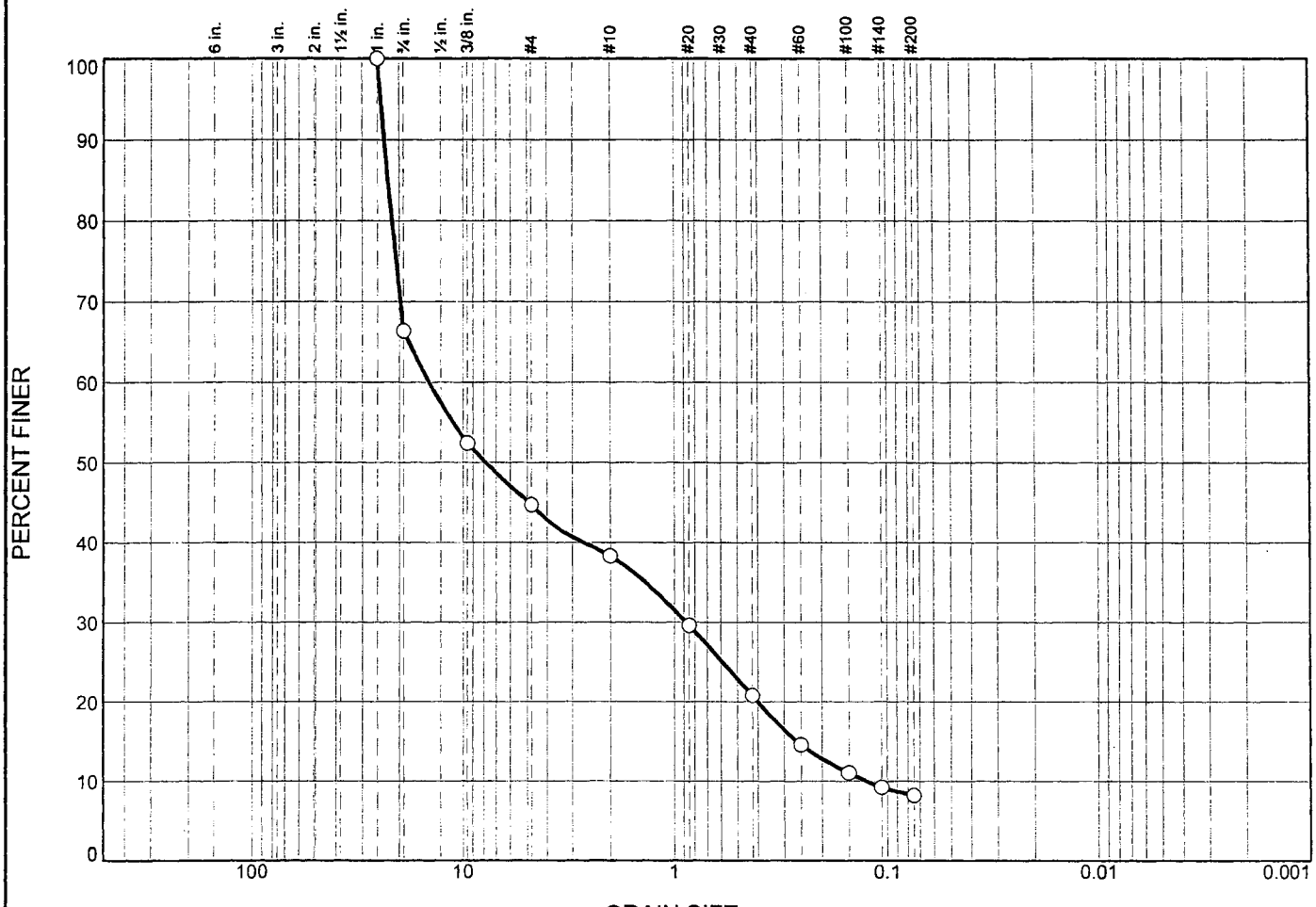
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	33.6	21.7	6.4	17.5	12.6	8.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			22.6245	14.3998	7.8074	0.8766	0.2614	0.1242	0.43	115.97

Material Description	USCS	AASHTO
○ Poorly graded gravel with silt and sand	GP-GM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB262 **Depth:** 8.5'-10.0 **Sample Number:** CB262

Remarks:

○Moisture Content % 25.6 CP05-EAARS-CB-0360

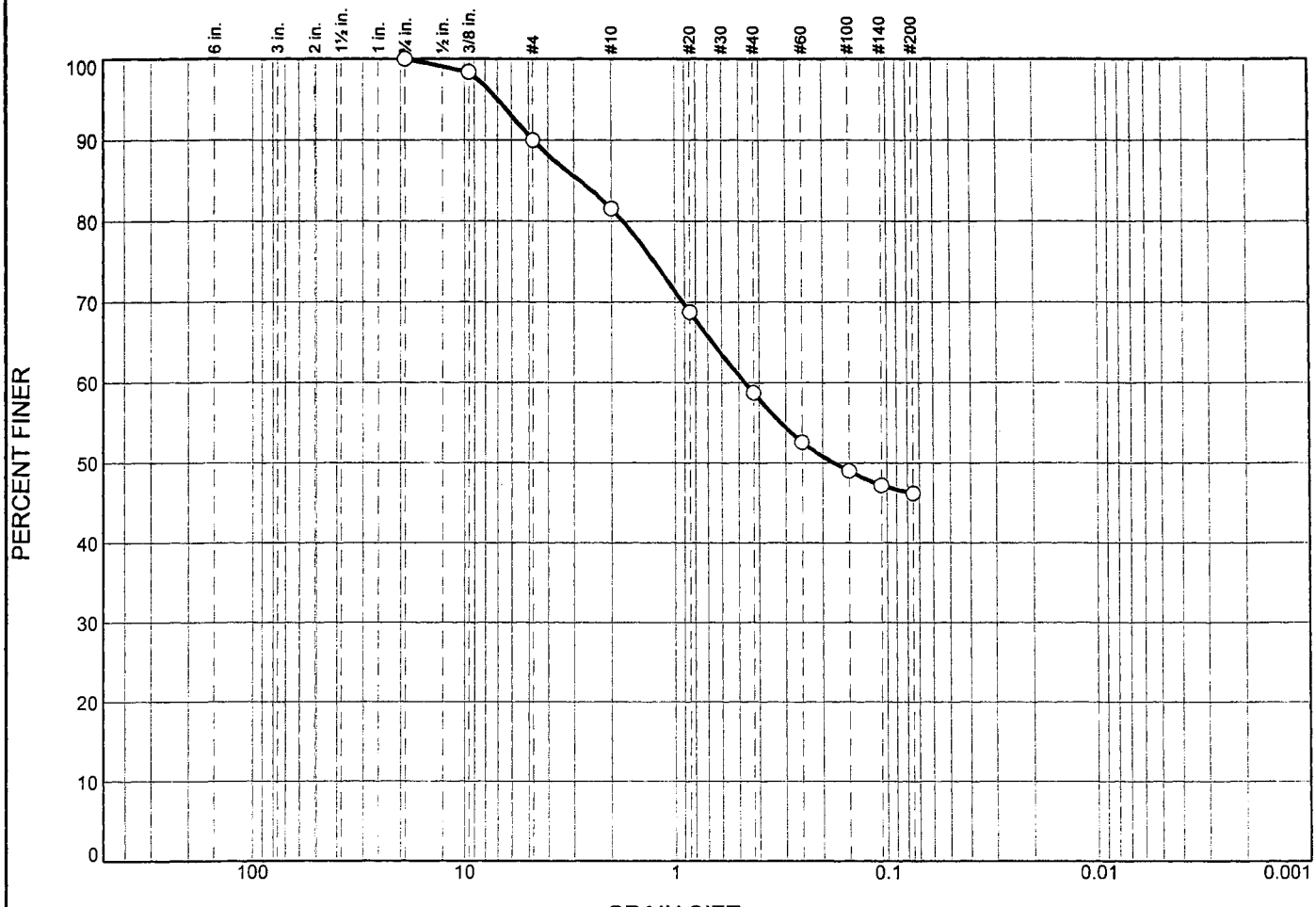
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.0	8.4	22.8	12.6	46.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.8203	0.4664	0.1766					

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB262 **Depth:** 13.5'-15.0' **Sample Number:** CB262

Remarks:

○Moisture Content % 31.4 CP05-EAARS-CB-0360

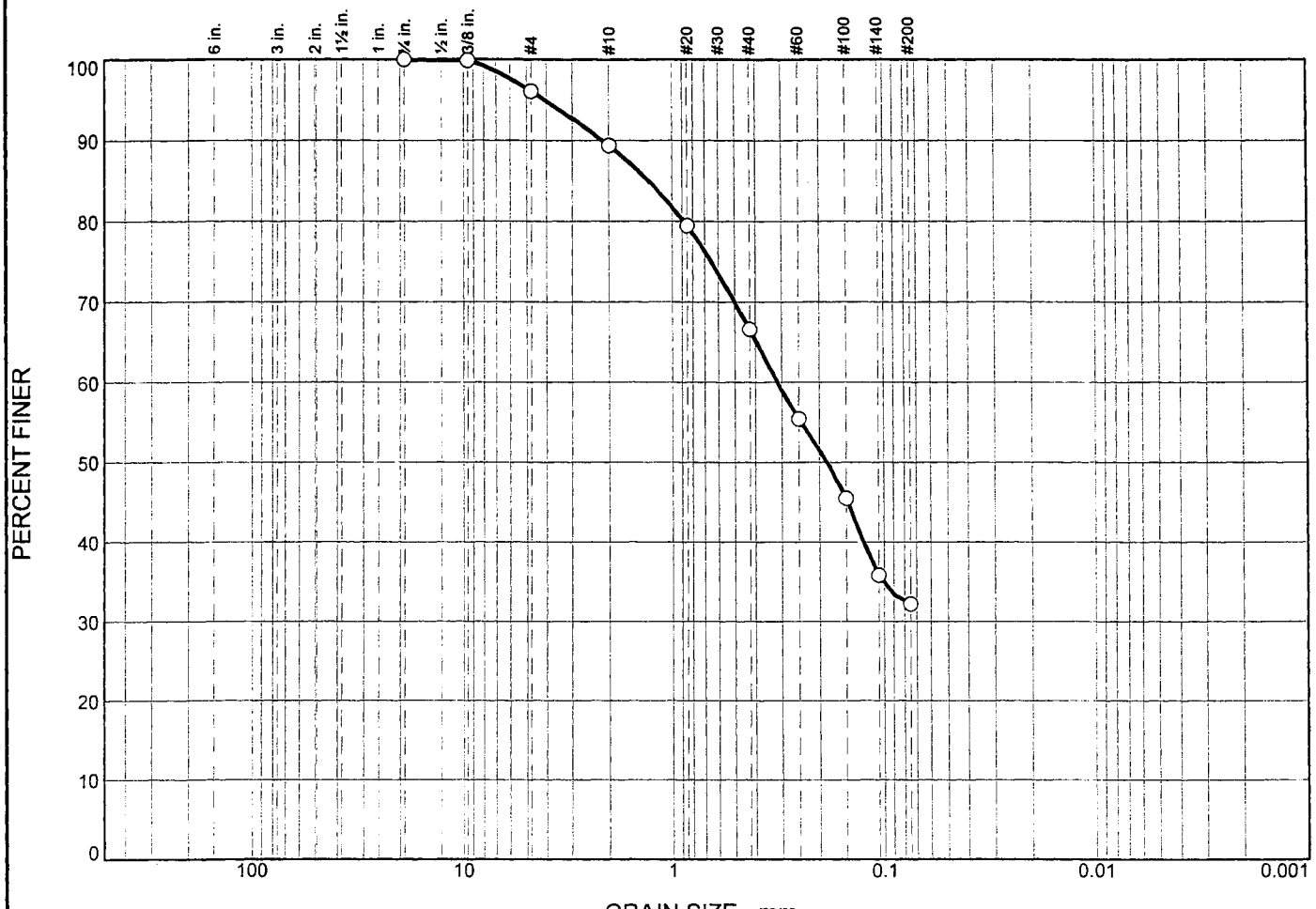
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.9	6.7	22.8	34.4	32.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○			1.2941	0.3140	0.1833					

Material Description	USCS	AASHTO
○ Silty sand	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB262 **Depth:** 18.5'-20.0 **Sample Number:** CB262

Remarks:

○ Moisture Content % 24.2 CP05-EAARS-CB-0360

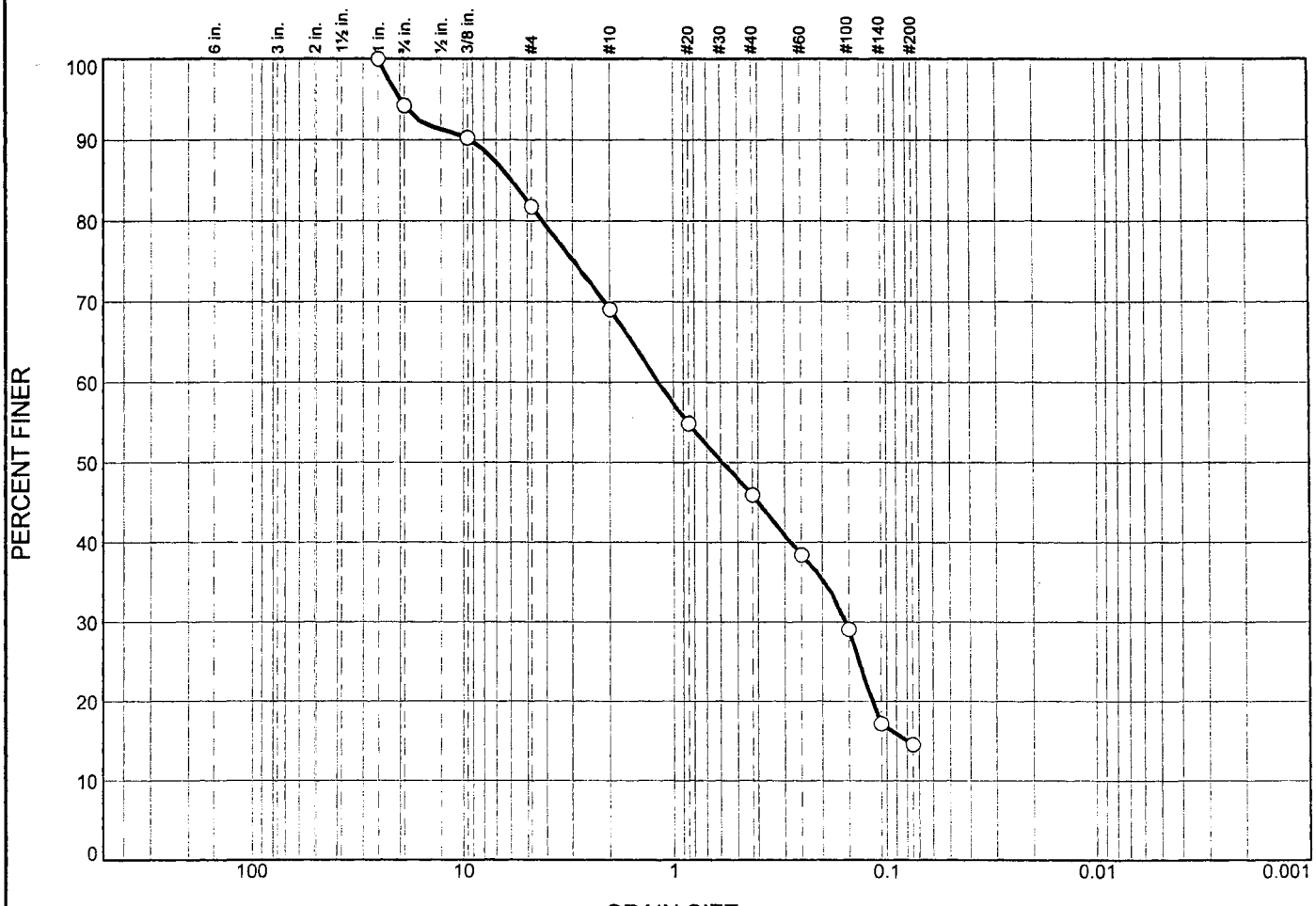
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	5.7	12.5	12.7	23.2	31.4	14.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			5.9210	1.1761	0.5855	0.1547	0.0796			

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB262 **Depth:** 23.5'-25.0 **Sample Number:** CB262

Remarks:

○ Moisture Content % 21.9 CP05-EAARS-CB-0360

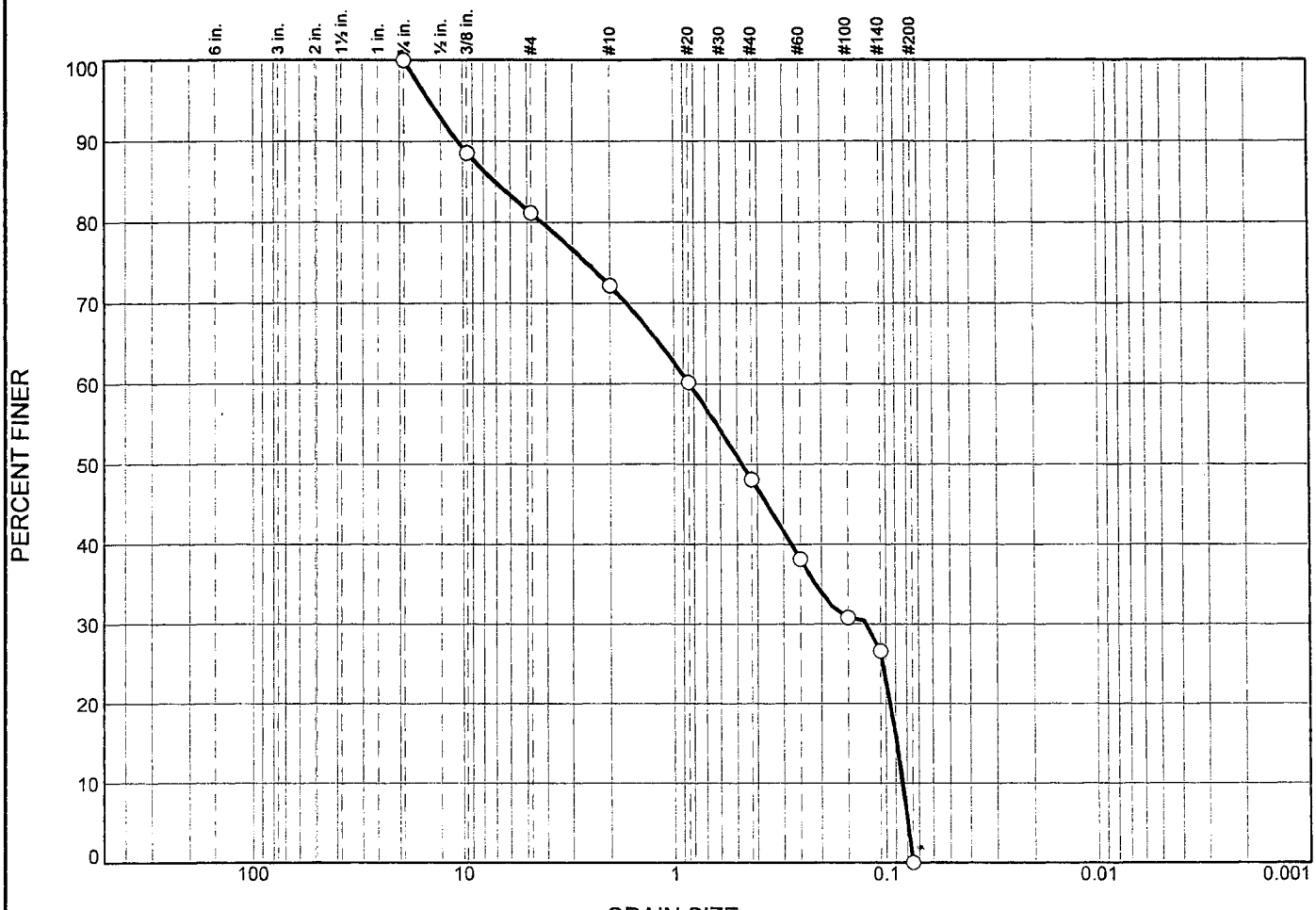
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	18.8	9.0	24.1	48.1	0.0	0.0

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.0631	0.8402	0.4709	0.1204	0.0886	0.0836	0.21	10.06

Material Description	USCS	AASHTO
○ Poorly graded sand with gravel	SP	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 0.0'-1.5' **Sample Number:** CB268

Remarks:

○ Moisture Content % 10.1 CP05-EAARS-CB-0365

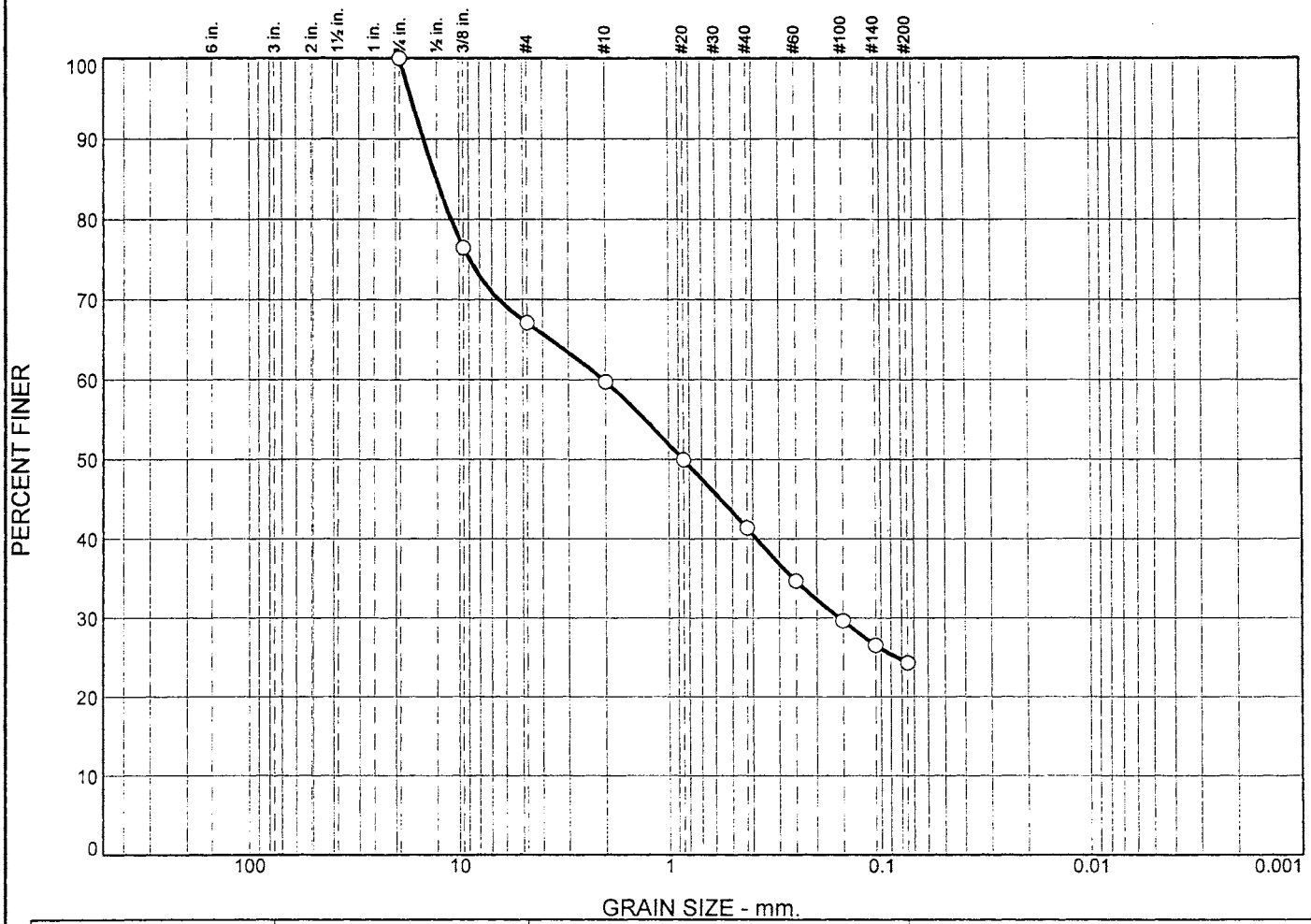
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	32.9	7.3	18.4	17.1	24.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			12.7439	2.0512	0.8540	0.1557				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 1.5'-3.0' **Sample Number:** CB268

Remarks:

○ Moisture Content % 12.9 CP05-EAARS-CB-0365

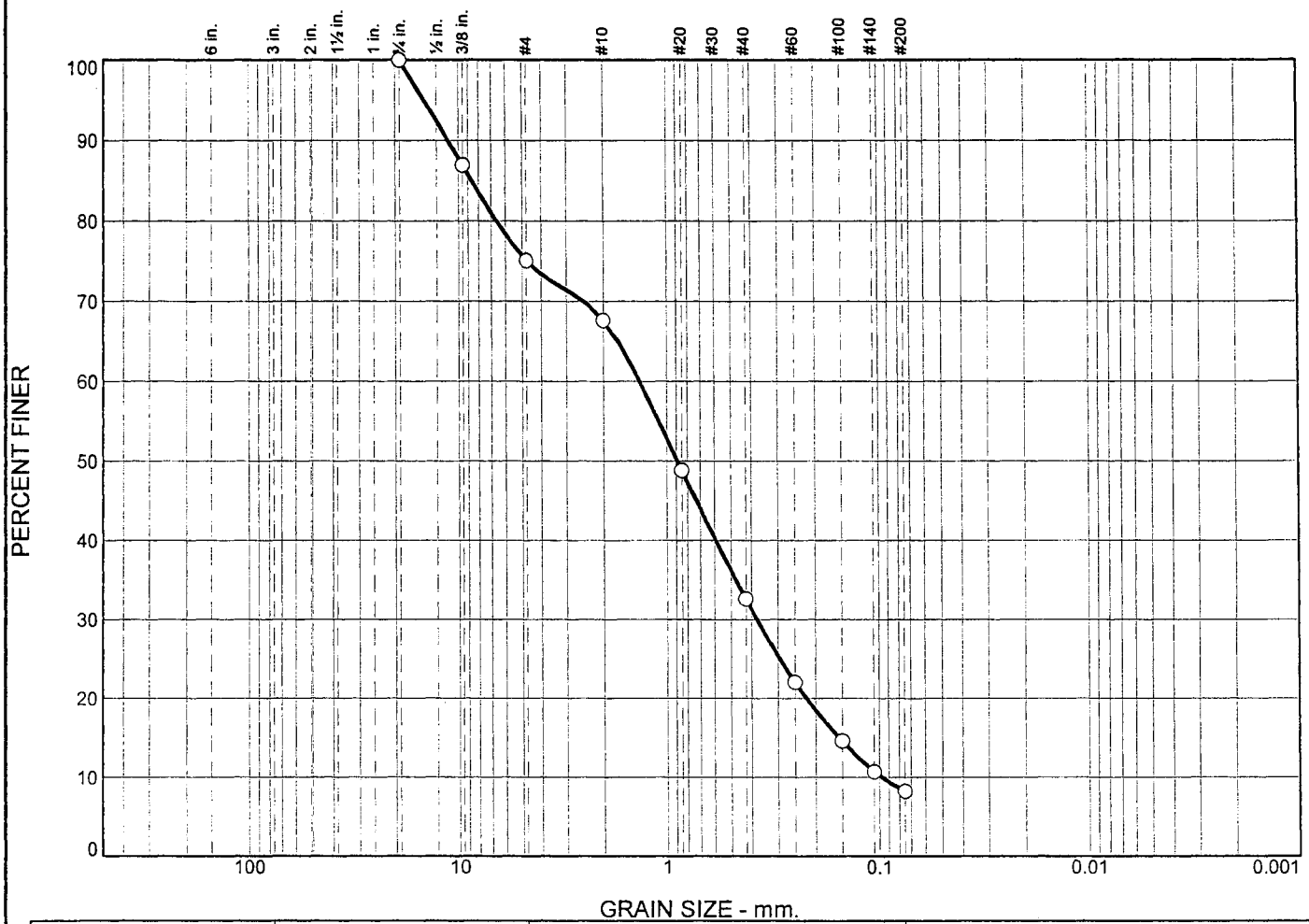
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	24.9	7.5	35.0	24.4	8.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.6202	1.3374	0.8908	0.3760	0.1545	0.0975	1.08	13.71

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 3.5'-5.0 **Sample Number:** CB268

Remarks:

○ Moisture Content % 87.5 CP05-EAARS-CB-0365

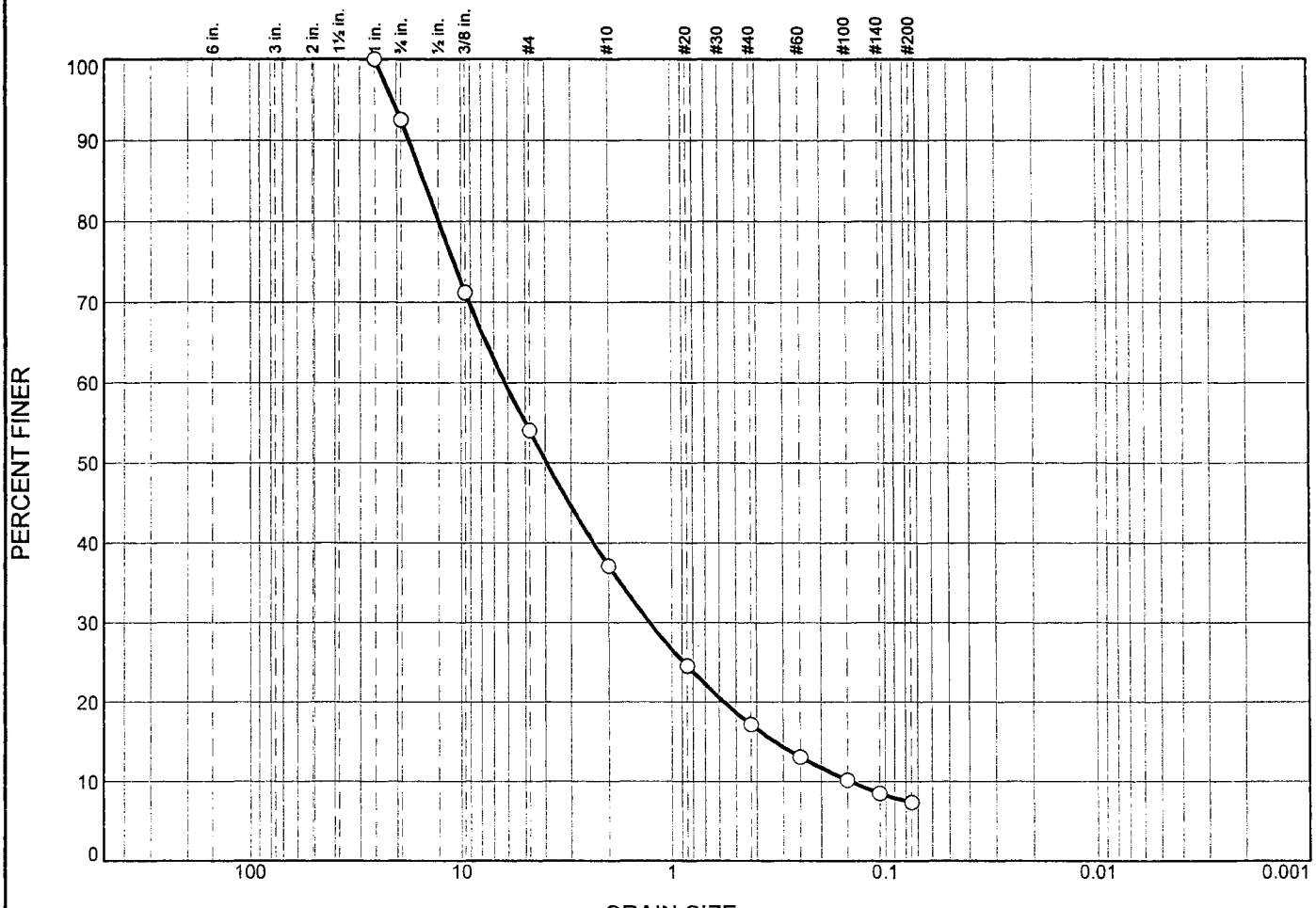
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.4	38.5	17.0	19.9	9.8	7.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			14.8118	6.1887	3.9230	1.2769	0.3276	0.1446	1.82	42.80

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 5.0'-6.5 **Sample Number:** CB268

Remarks:

○ Moisture Content % 12.8 CP05-EAARS-CB-0365

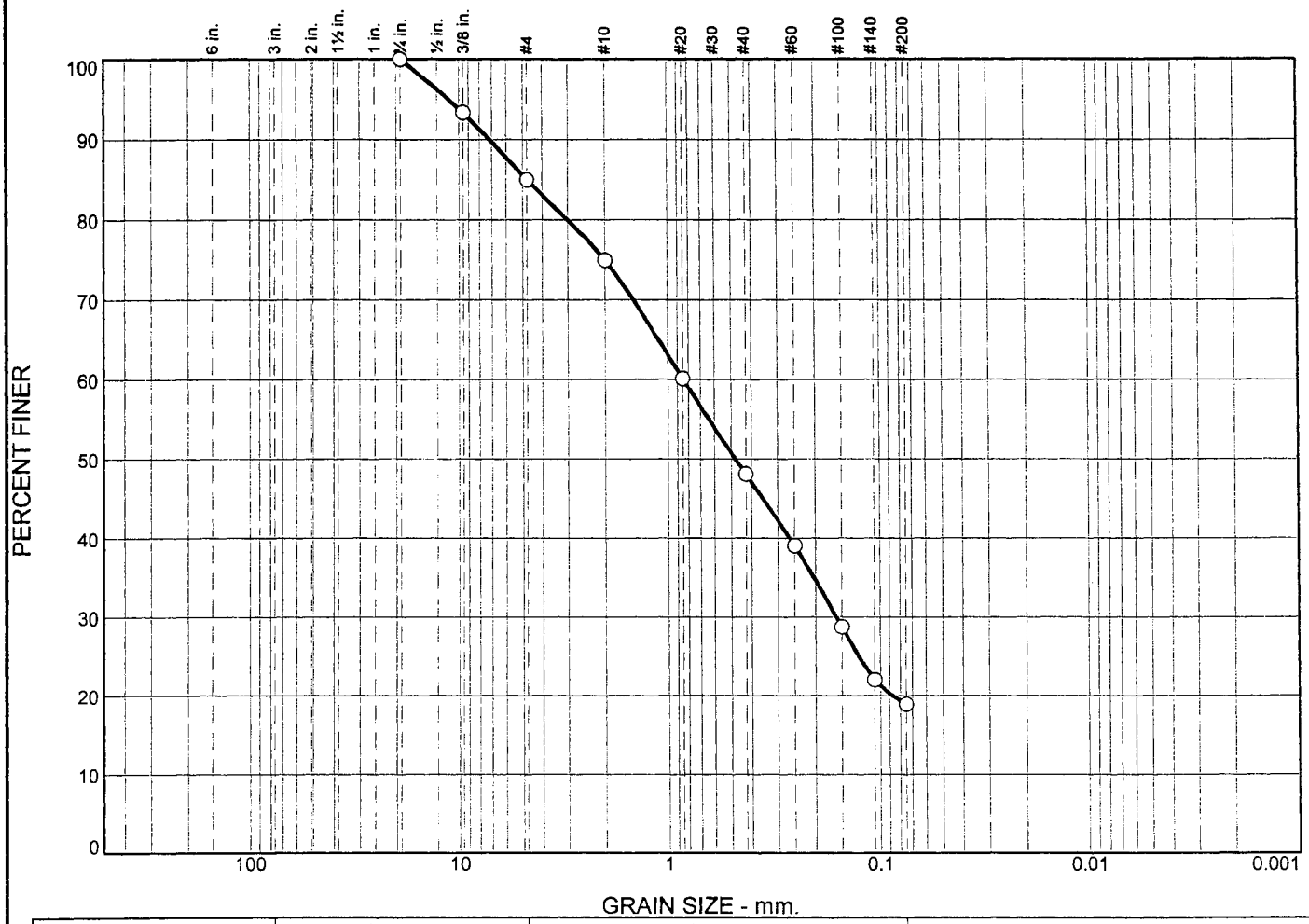
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	15.0	10.0	26.9	29.2	18.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.7460	0.8429	0.4759	0.1589				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 11.5'-13.0 **Sample Number:** CB268

Remarks:

○ Moisture Content % 29.3 CP05-EAARS-CB-0365

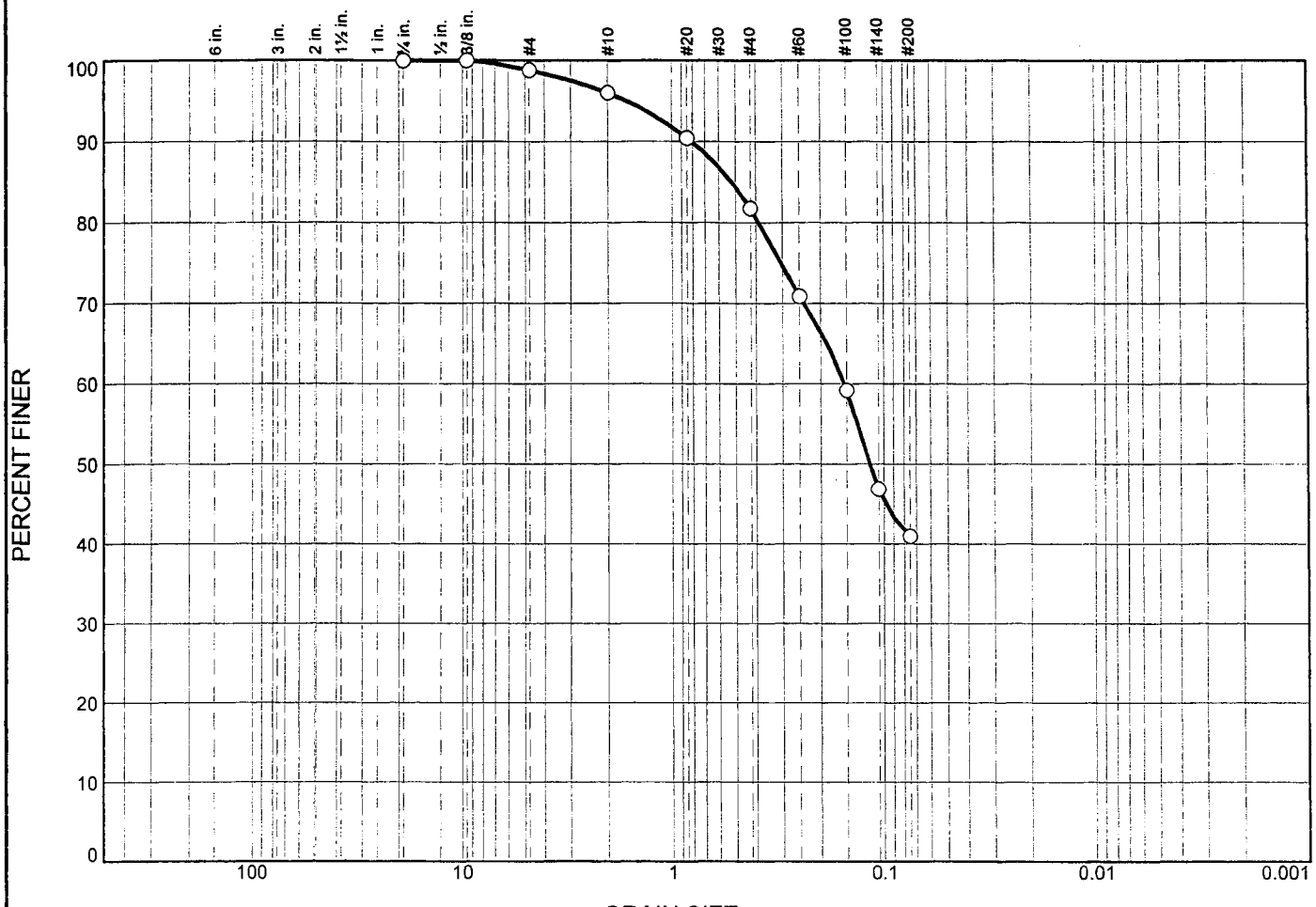
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.2	2.8	14.2	40.8	41.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5194	0.1536	0.1167					

Material Description	USCS	AASHTO
○ Silty sand	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 18.5'-22.0' **Sample Number:** CB268

Remarks:

○ Moisture Content % 23.0 CP05-EAARS-CB-0365

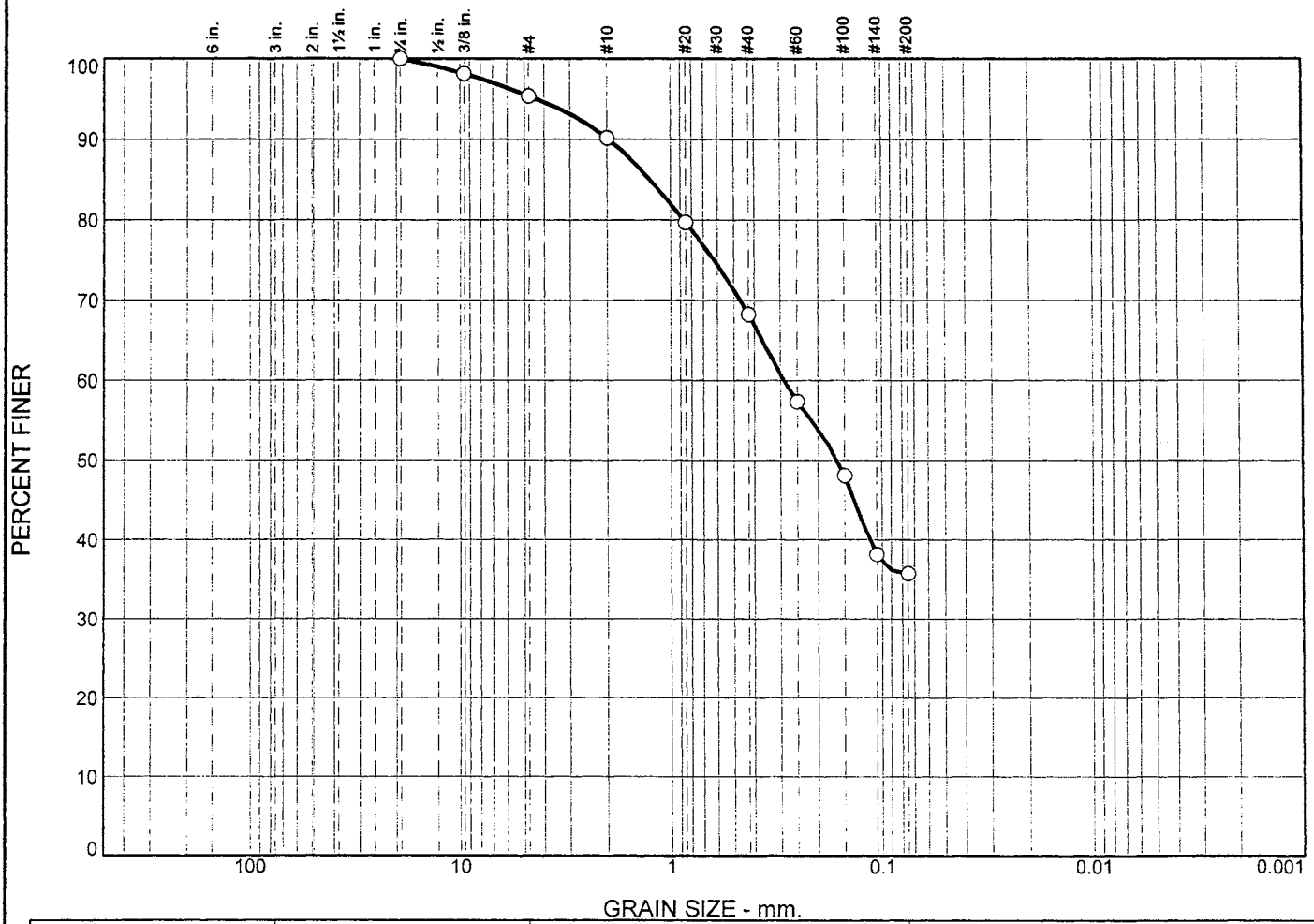
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.6	5.2	21.9	32.6	35.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.2520	0.2875	0.1620					

Material Description	USCS	AASHTO
○ Silty sand	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 23.5'-25.0 **Sample Number:** CB268

Remarks:

○ Moisture Content % 22.5 CP05-EAARS-CB-0365

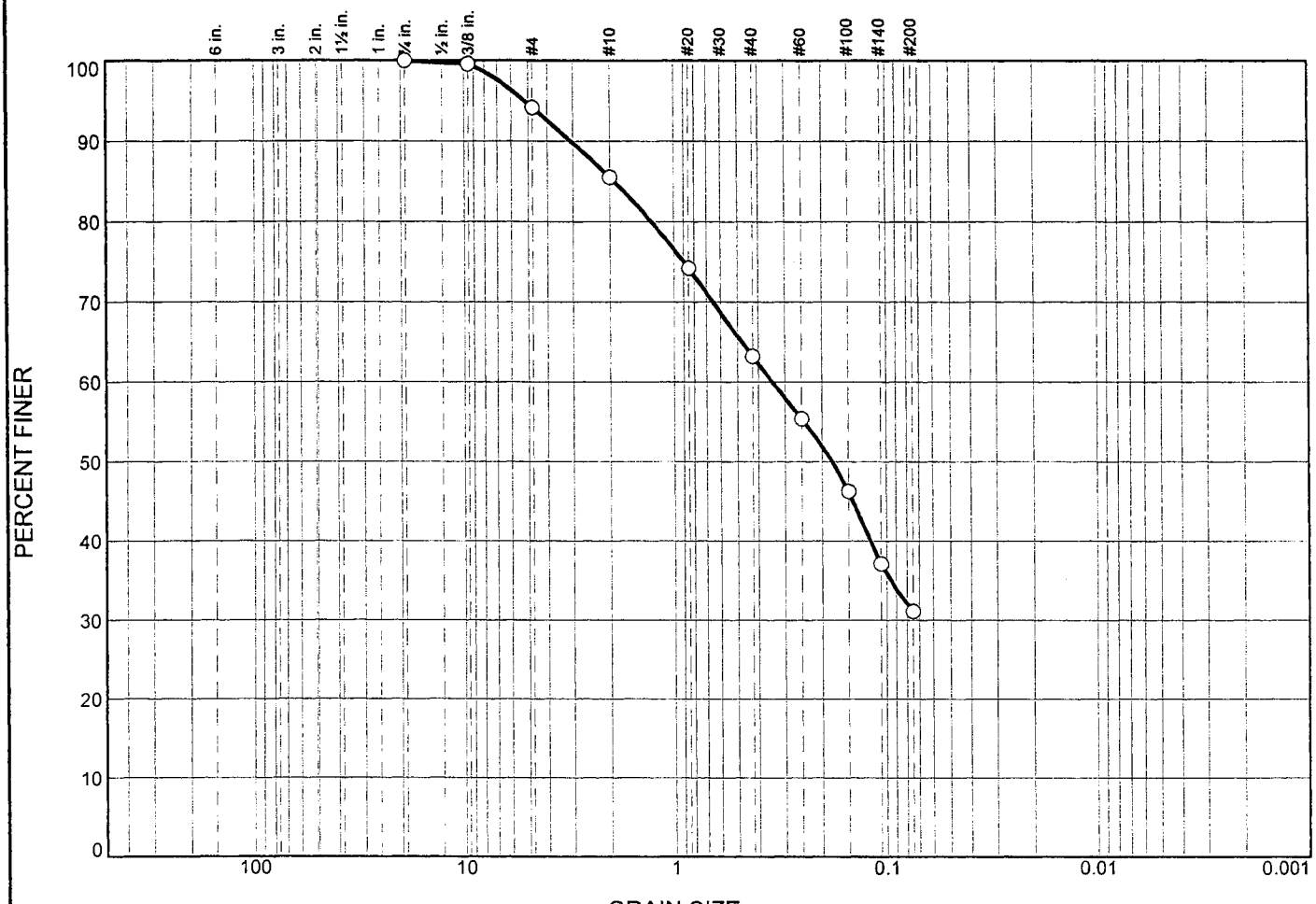
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.8	8.7	22.3	32.1	31.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.9072	0.3429	0.1781					

Material Description	USCS	AASHTO
○ Silty sand	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 28.5'-30.0 **Sample Number:** CB268

Remarks:

○ Moisture Content % 20.5 CP05-EAARS-CB-0365

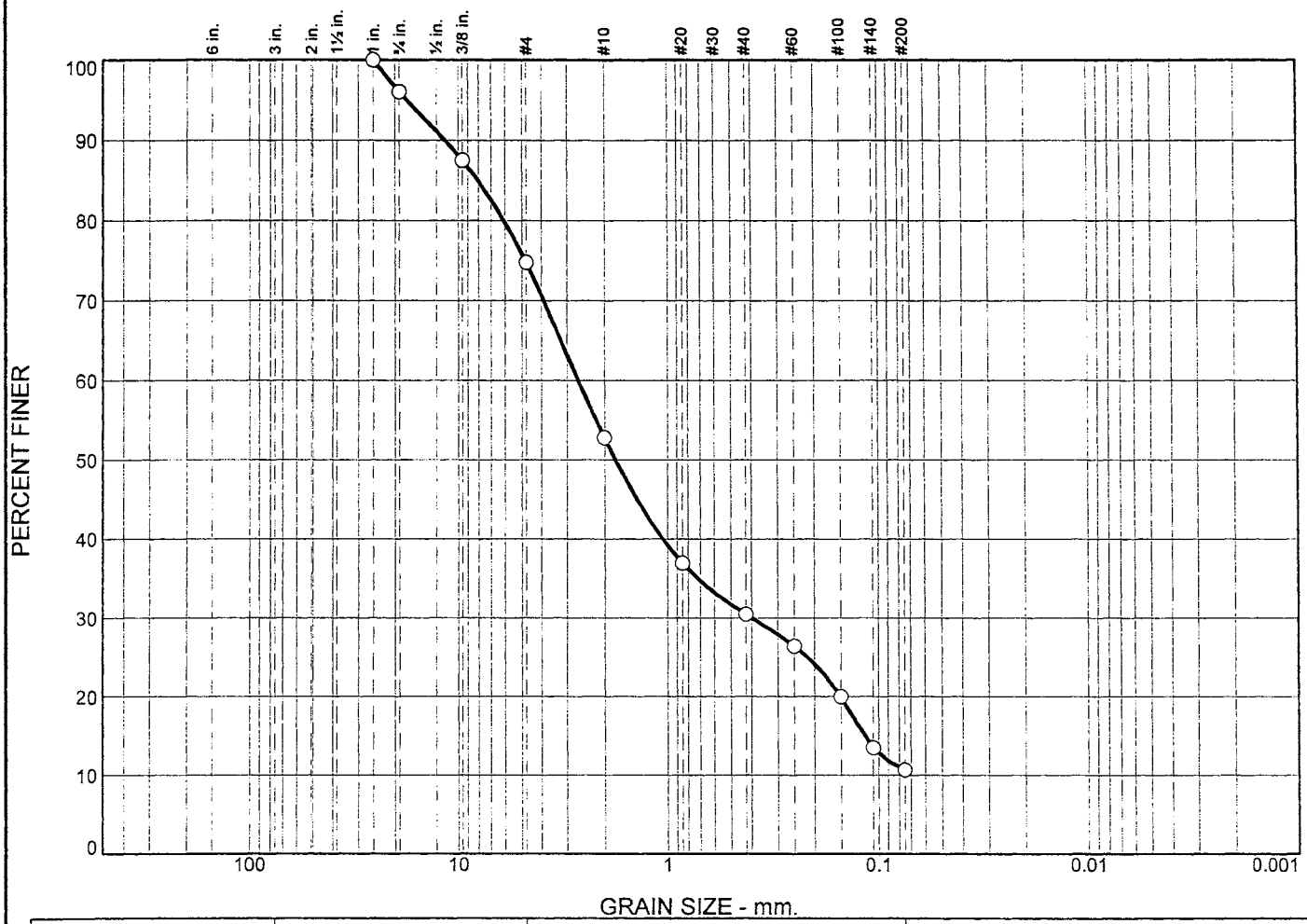
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	3.9	21.3	22.0	22.3	19.8	10.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.0526	2.6581	1.7733	0.3977	0.1161			

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-sm	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB268 **Depth:** 33.5'-35.0' **Sample Number:** CB268

Remarks:

○Moisture Content % 12.9 CP05-EAARS-CB-0365

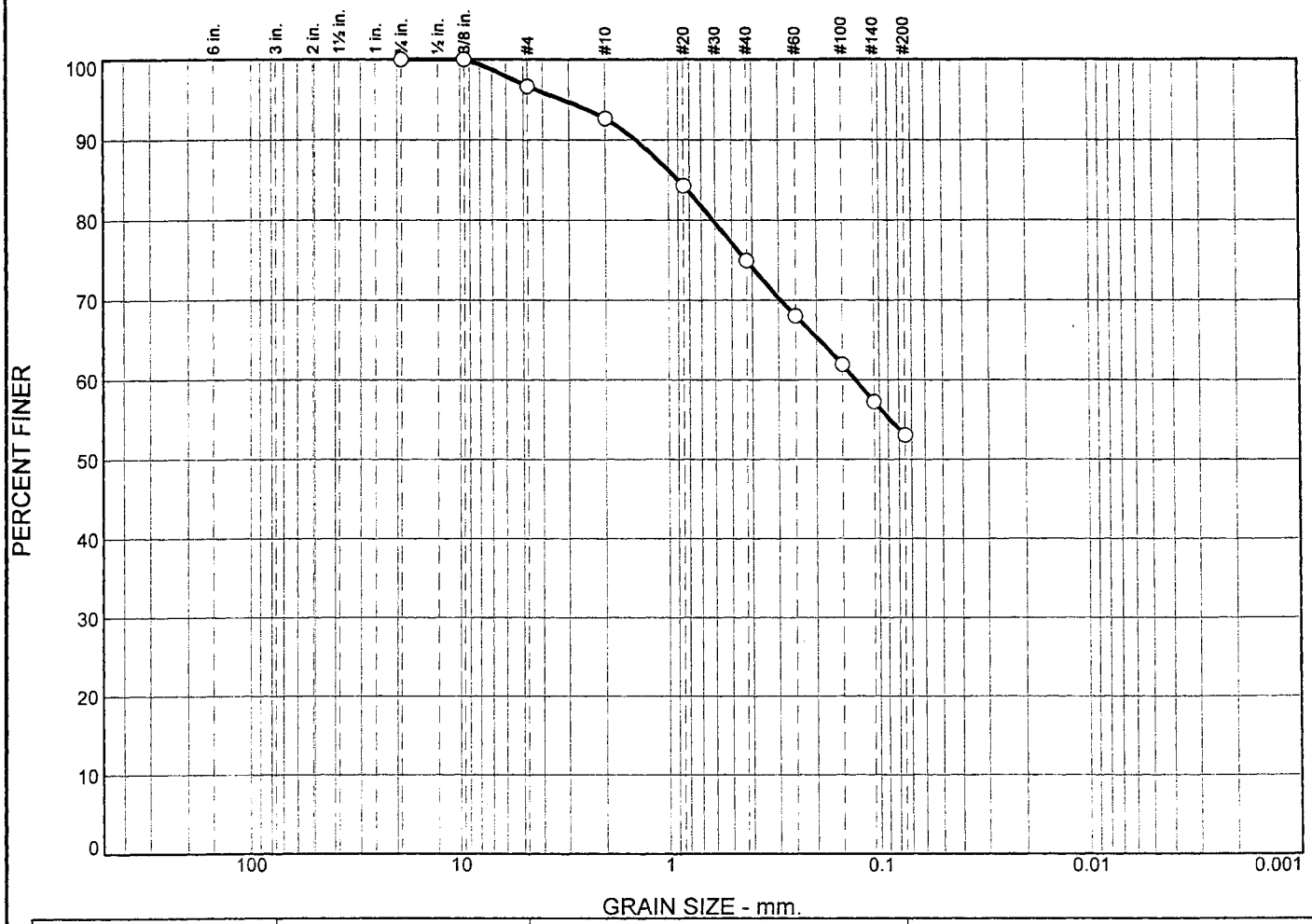
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.3	4.1	17.6	21.9	53.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.9016	0.1296						

Material Description	USCS	AASHTO
○ Sandy silt	ML	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB276 **Depth:** 14.5'-16.0' **Sample Number:** CB276

Remarks:

○ Moisture Content % 19.0 CP05-EAARS-CB-0372

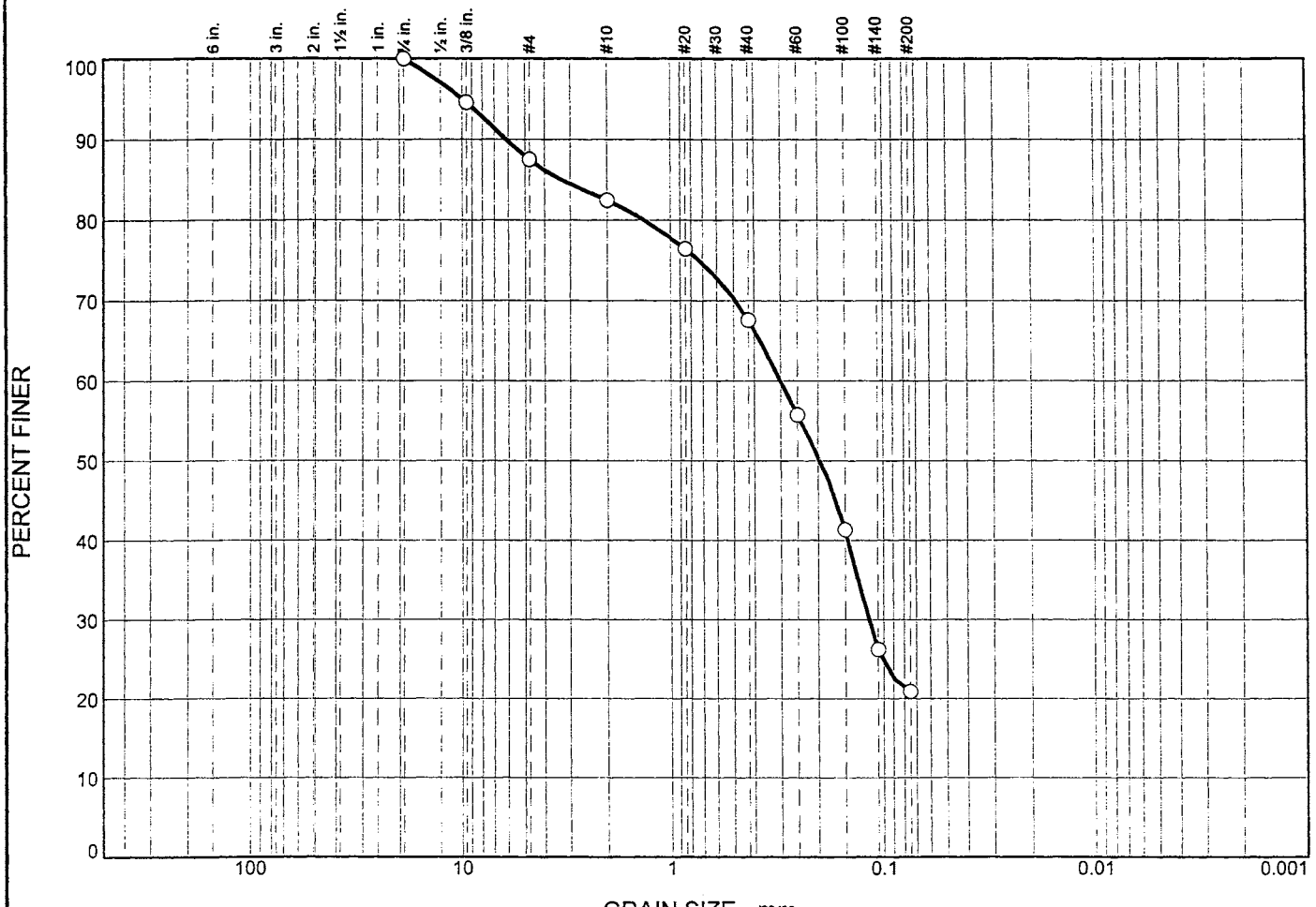
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	12.5	5.0	14.9	46.7	20.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.2918	0.3002	0.1954	0.1170				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB277 **Depth:** 19.0'-20.5' **Sample Number:** CB277

Remarks:

○ Moisture Content % 24.7 CP05-EAARS-CB-0373

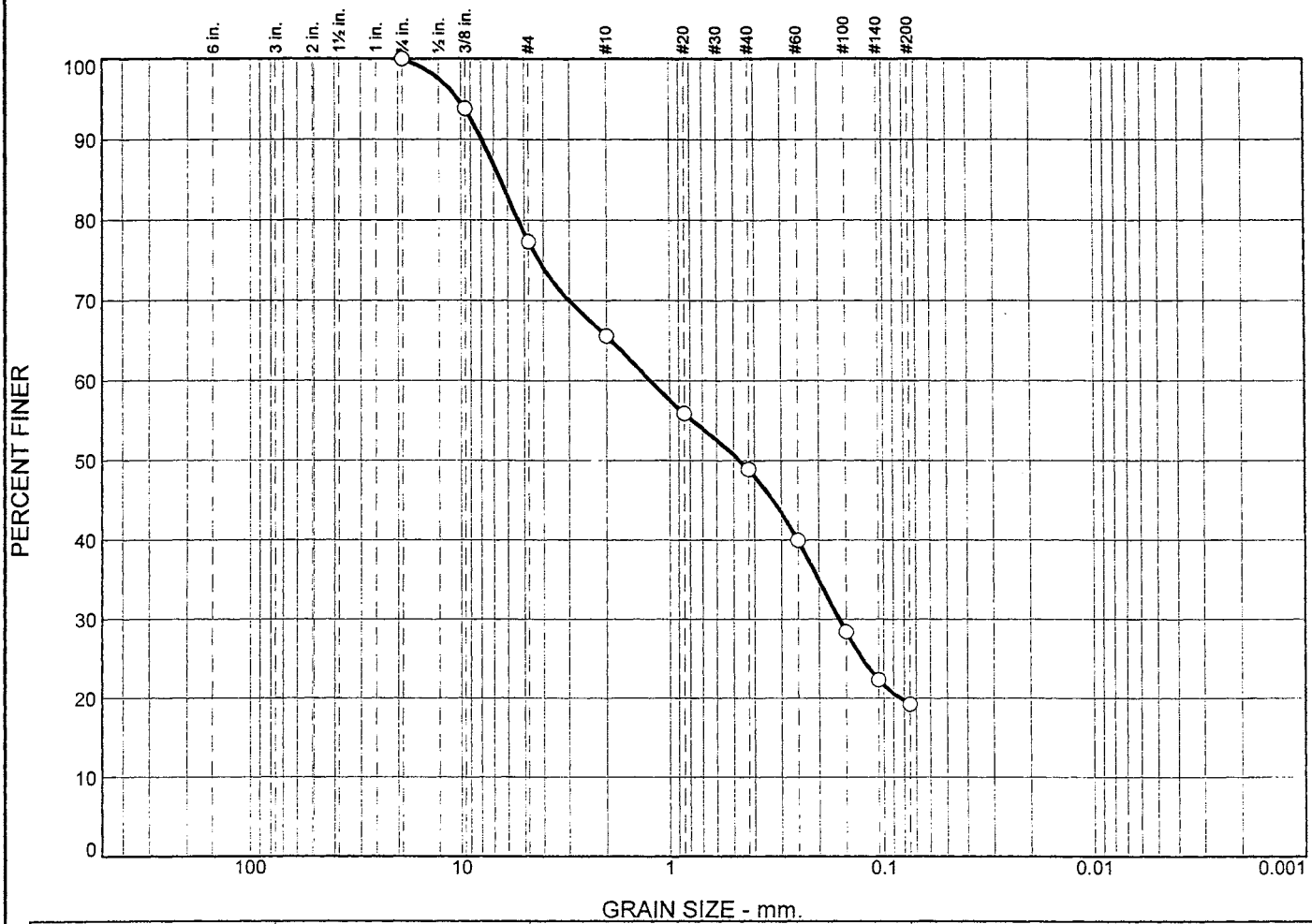
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	22.7	11.7	16.7	29.7	19.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.5031	1.2320	0.4654	0.1611				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB277 **Depth:** 29.0'-30.5' **Sample Number:** CB277

Remarks:

○ Moisture Content % 21.6 CP05-EAARS-CB-0373

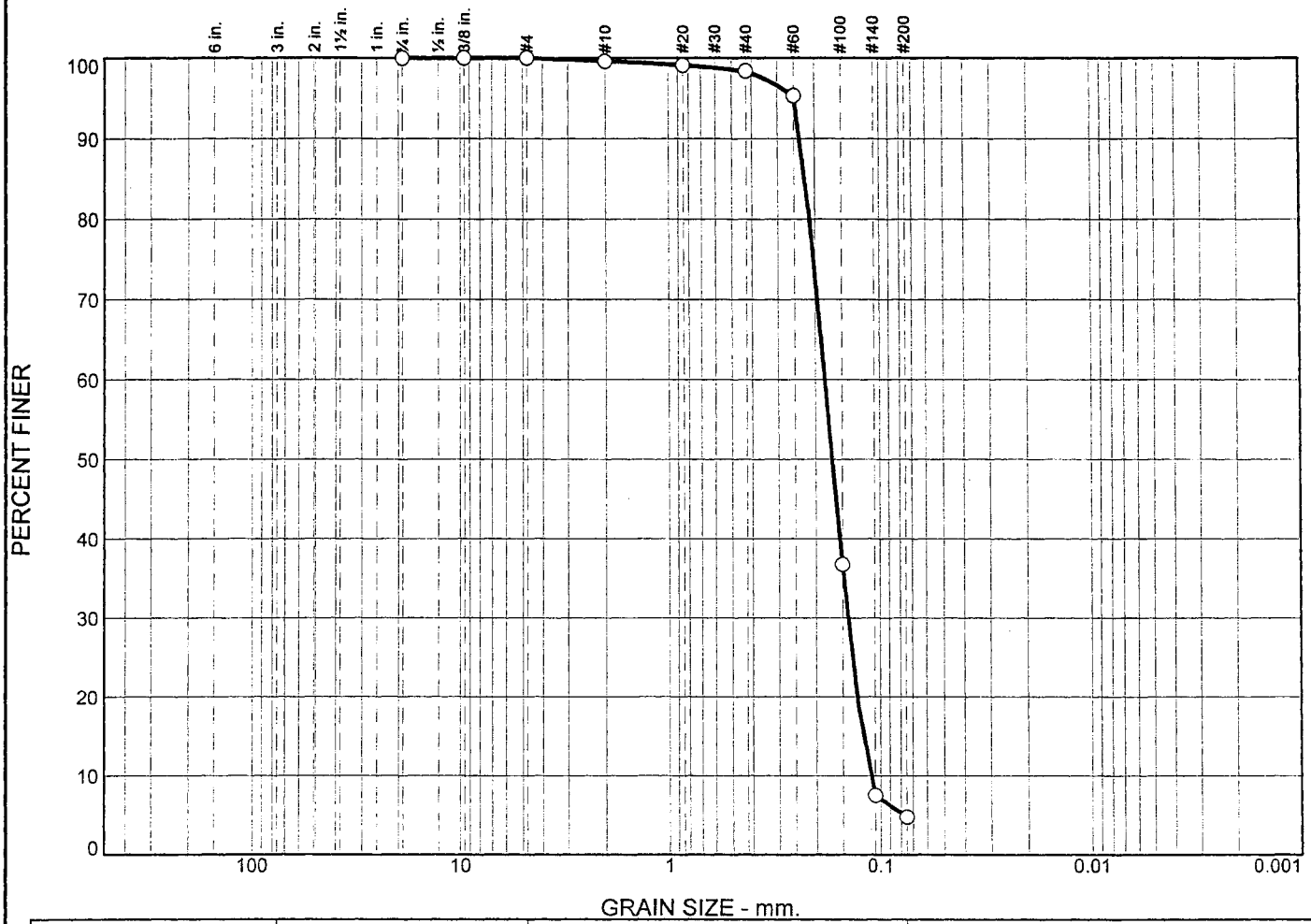
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	1.2	93.6	4.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2214	0.1799	0.1667	0.1414	0.1204	0.1116	1.00	1.61

Material Description	USCS	AASHTO
○ Poorly graded sand	sp	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB277 **Depth:** 34.0'-35.5' **Sample Number:** CB277

Remarks:

○ Moisture Content % 25.5 CP05-EAARS-CB-0373

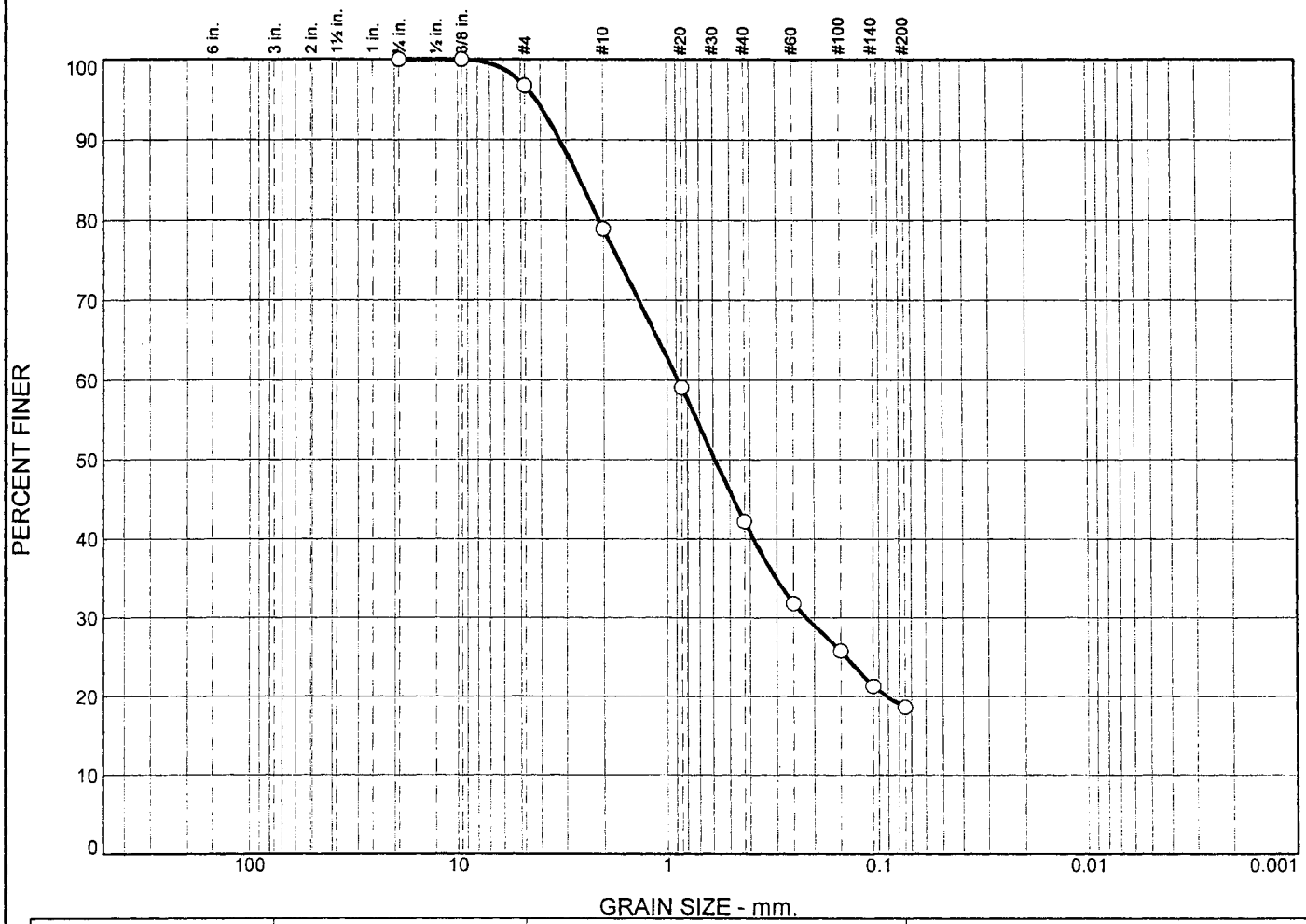
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.2	17.8	36.8	23.6	18.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.5756	0.8822	0.5869	0.2173				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB281 **Depth:** 15.5'-17.0' **Sample Number:** CB281

Remarks:

○ Moisture Content %18.2 CB05-EAARS-CB-0377

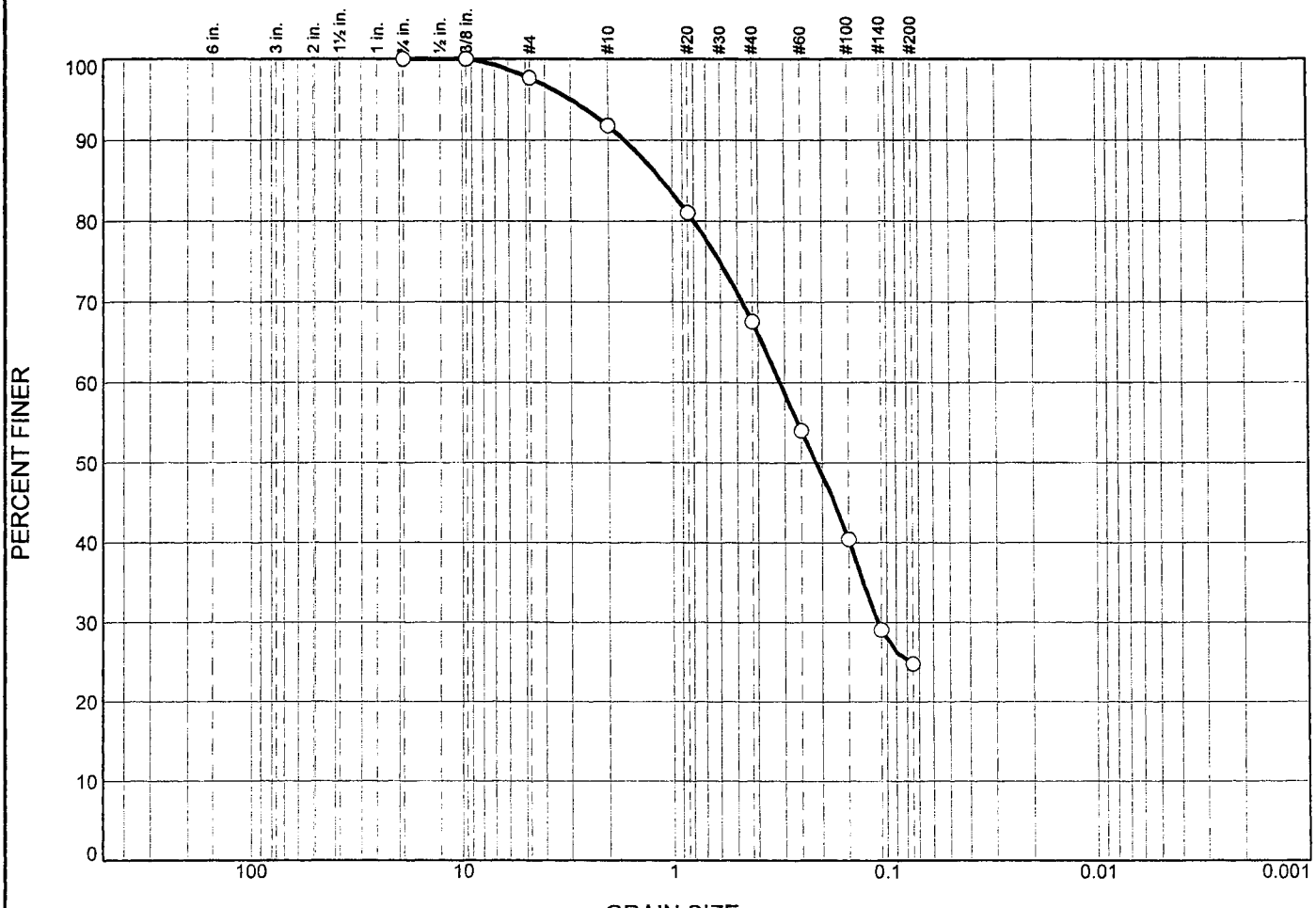
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.3	5.9	24.2	42.8	24.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.1108	0.3153	0.2118	0.1100				

Material Description	USCS	AASHTO
○ Silty sand	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB281 **Depth:** 19'-20.5' **Sample Number:** CB281

Remarks:

○ Moisture Content % 26.1 CB05-EAARS-CB-0377

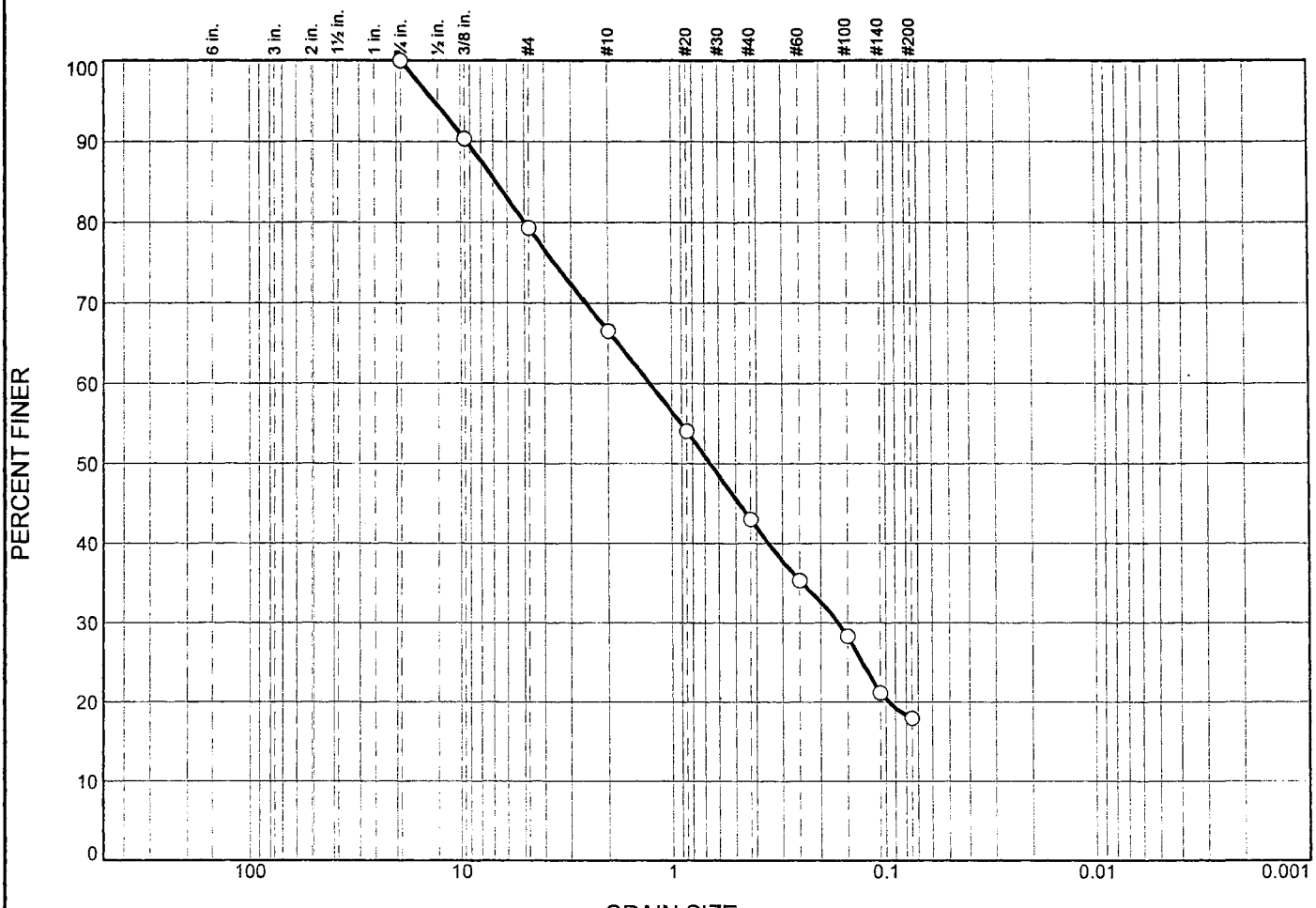
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	20.7	12.8	23.5	25.0	18.0	

╳	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.7792	1.2674	0.6570	0.1652				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB281 **Depth:** 24.0'-25.5' **Sample Number:** CB281

Remarks:

○ Moisture Content % 19.3 CB05-EAARS-CB-0377

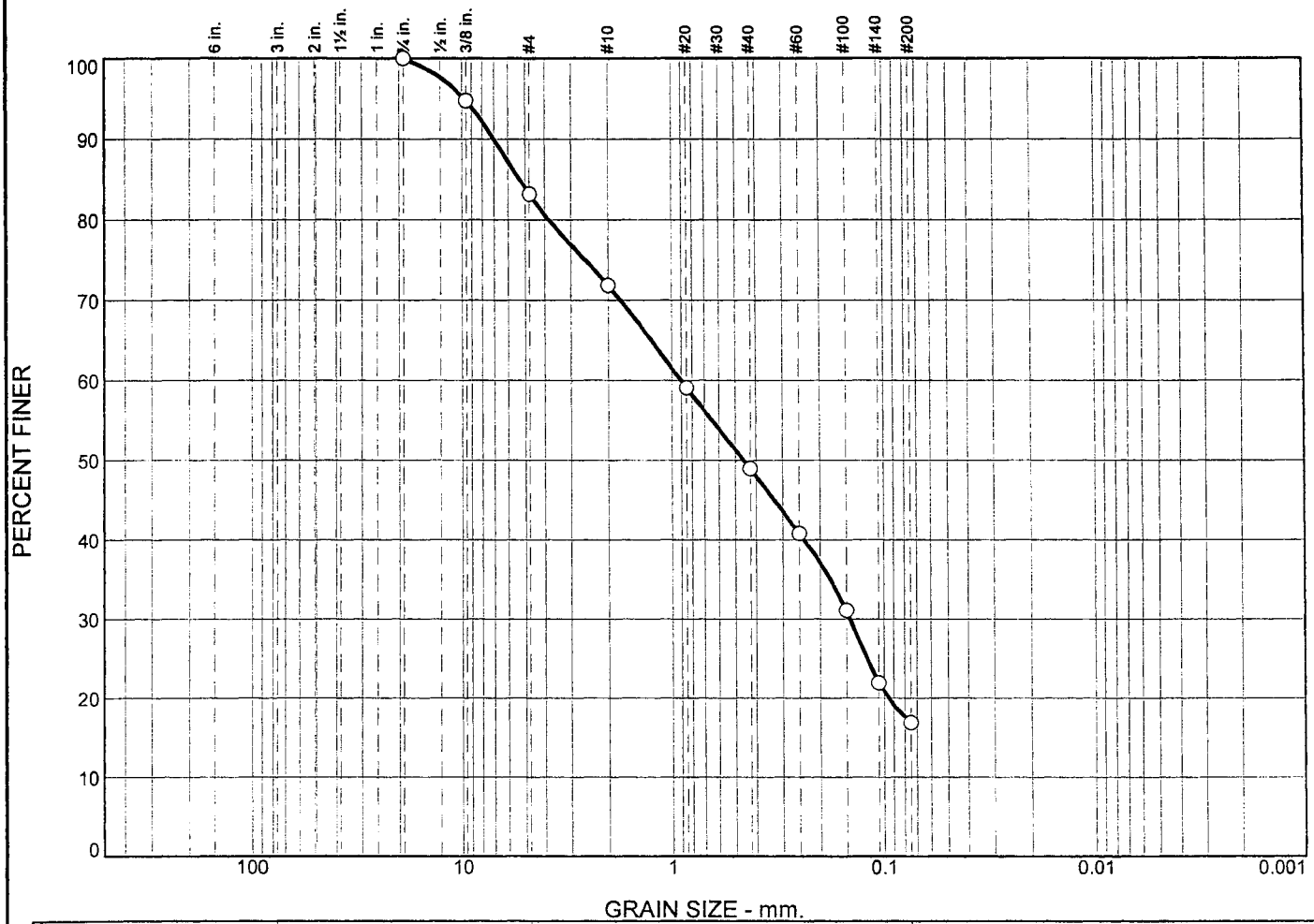
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	16.8	11.3	22.9	32.1	16.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			5.2904	0.9019	0.4549	0.1437				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB281 **Depth:** 29.0'-30.5' **Sample Number:** CB281

Remarks:

○ Moisture Content % 14.7 CB05-EAARS-CB-0377

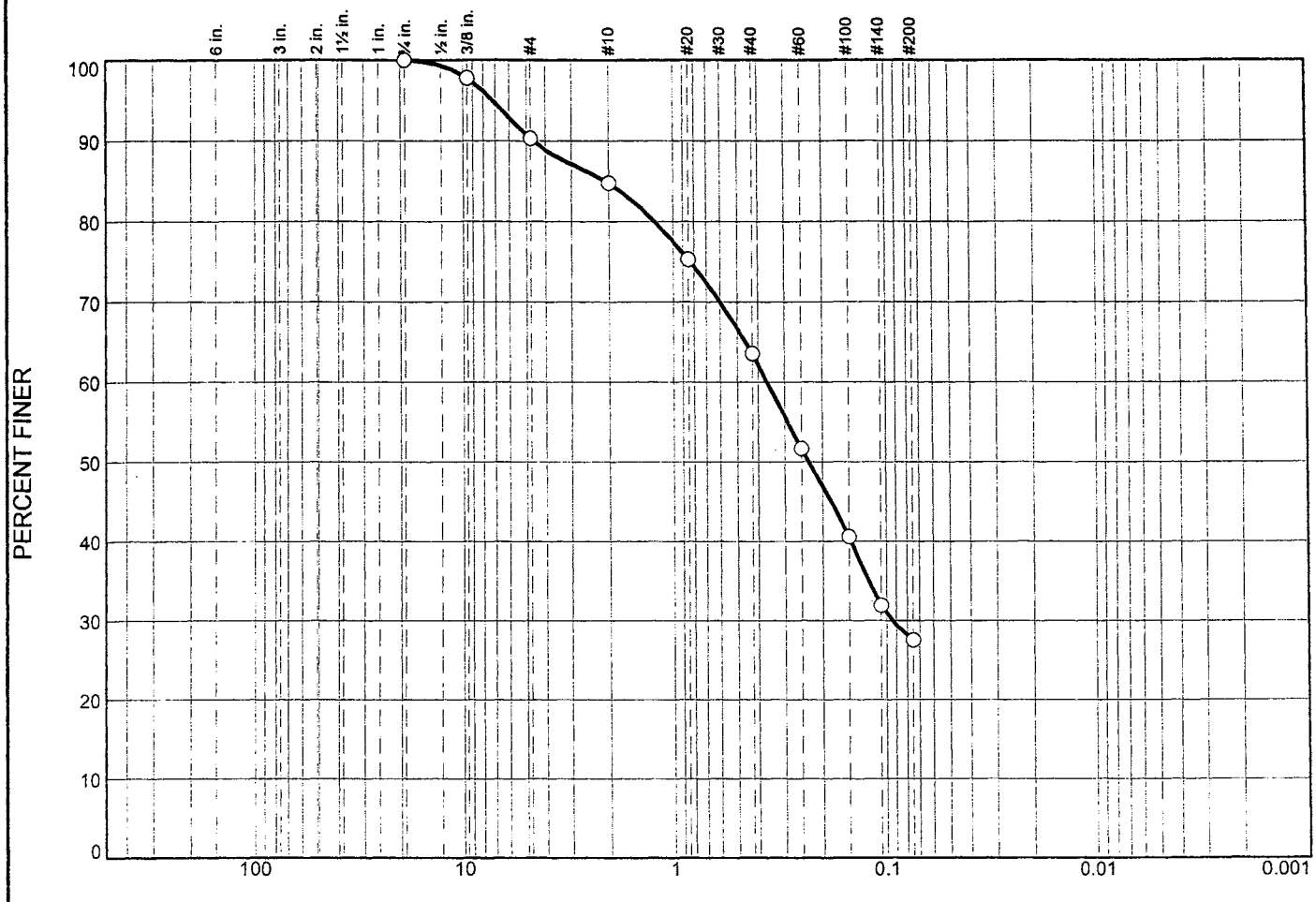
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	9.7	5.5	21.2	36.0	27.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.0697	0.3611	0.2308	0.0940				

Material Description	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB310 **Depth:** 23.5'-25.0' **Sample Number:** CB310

Remarks:

○ Moisture Content % 25.8 CP05-EAARS-CB-0406

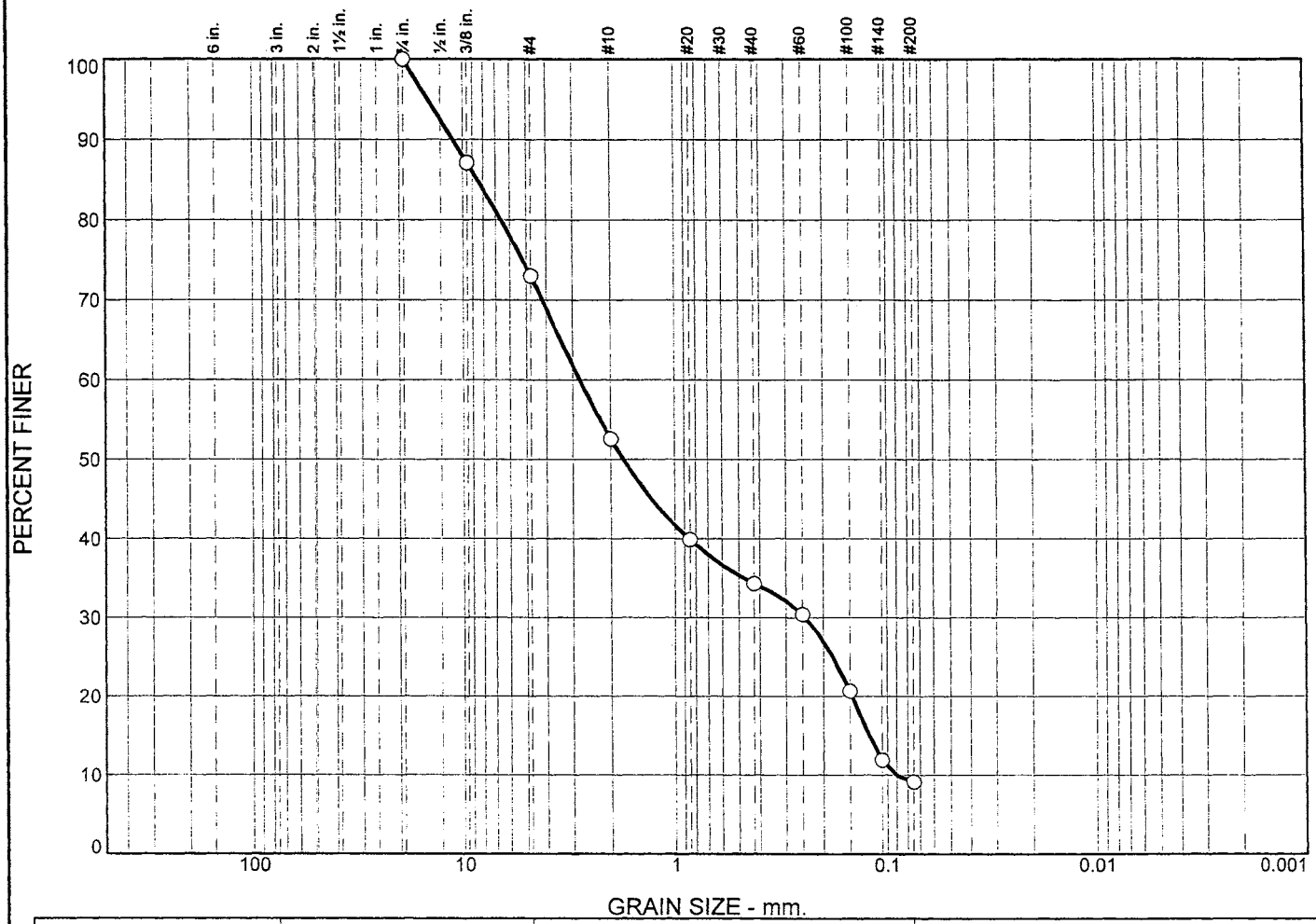
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	27.0	20.4	18.3	25.2	9.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			8.5204	2.7741	1.7491	0.2417	0.1218	0.0902	0.23	30.74

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB310 **Depth:** 33.5'-35.0' **Sample Number:** CB310

Remarks:

○ Moisture Content % 12.8 CP05-EAARS-CB-0406

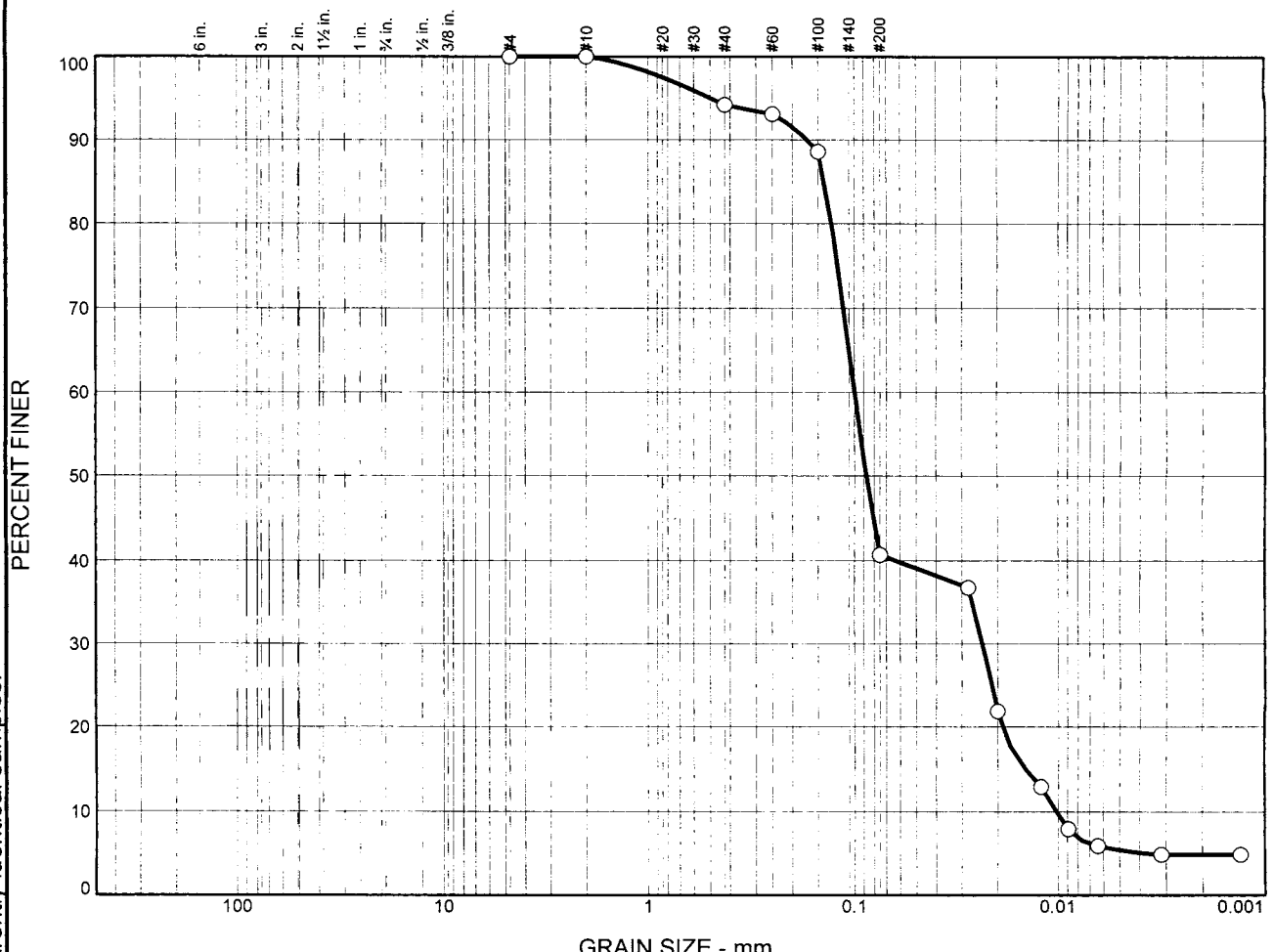
Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Tested By: Bolooki **Checked By:** K Leung

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	6	53	36	5

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.1397	0.1001	0.0878	0.0238	0.0146	0.0102	0.55	9.81

Material Description	USCS	AASHTO
○ SILTY SAND	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 175'-180' **Sample No.:** 36

Remarks:

○HYGROSCOPYC MOISTURE .4 % -NATURAL MOISTURE 17.6 % -CP05-EAARS-VB-0285

Nodarse & Associates, Inc.

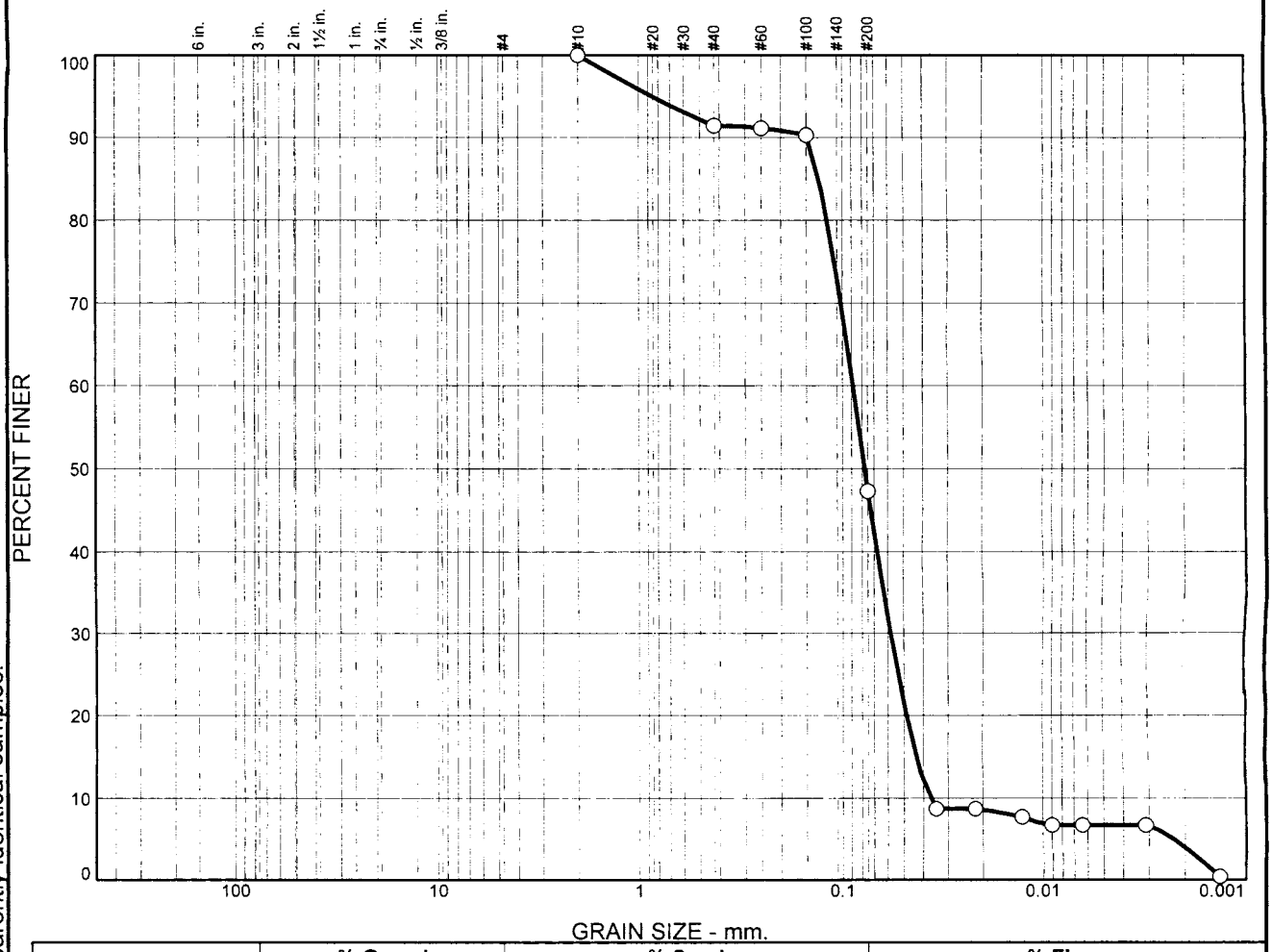
Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	9	44	40	7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NL	NP	0.1304	0.0888	0.0777	0.0581	0.0433	0.0369	1.03	2.40

Material Description	USCS	AASHTO
○ SILTY SAND	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 190'-195' **Sample No.:** 39

Remarks:

○ HYGROSCOPIC MOISTURE 2.63 % - NATURAL MOISTURE 27.7 % - CP05-EAARS VB 0285

Nodarse & Associates, Inc.

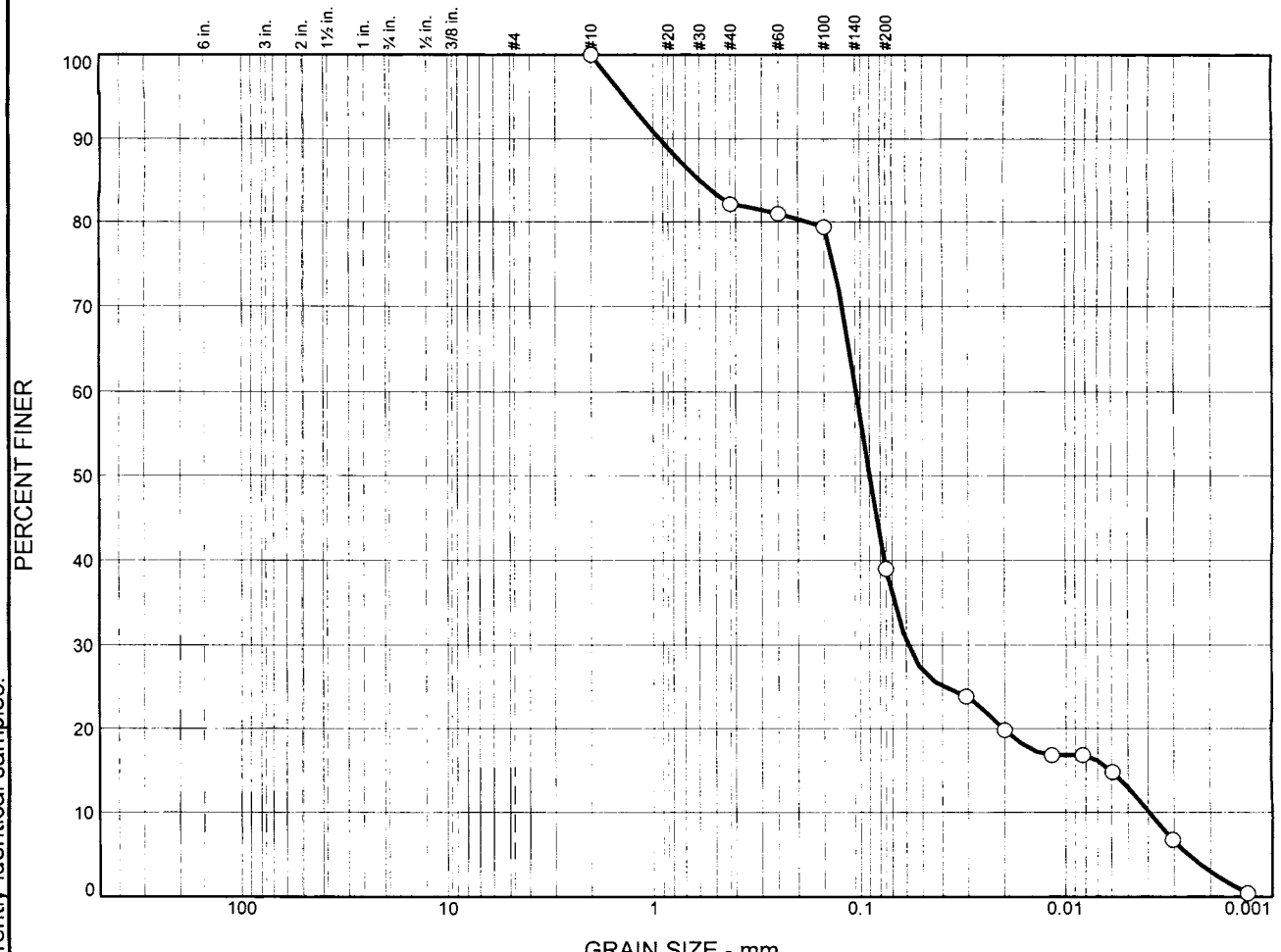
Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	18	43	26	13

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.5911	0.1047	0.0903	0.0587	0.0061	0.0040	8.30	26.43

Material Description	USCS	AASHTO
○ SILTY SAND	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 205'-210' **Sample No.:** 44

Remarks:

○ HYGROSCOPYC MOISTURE 4.0 % -NATURAL MOISTURE 31.8 % -CP05-EAARS-VB-0285.

Nodarse & Associates, Inc.

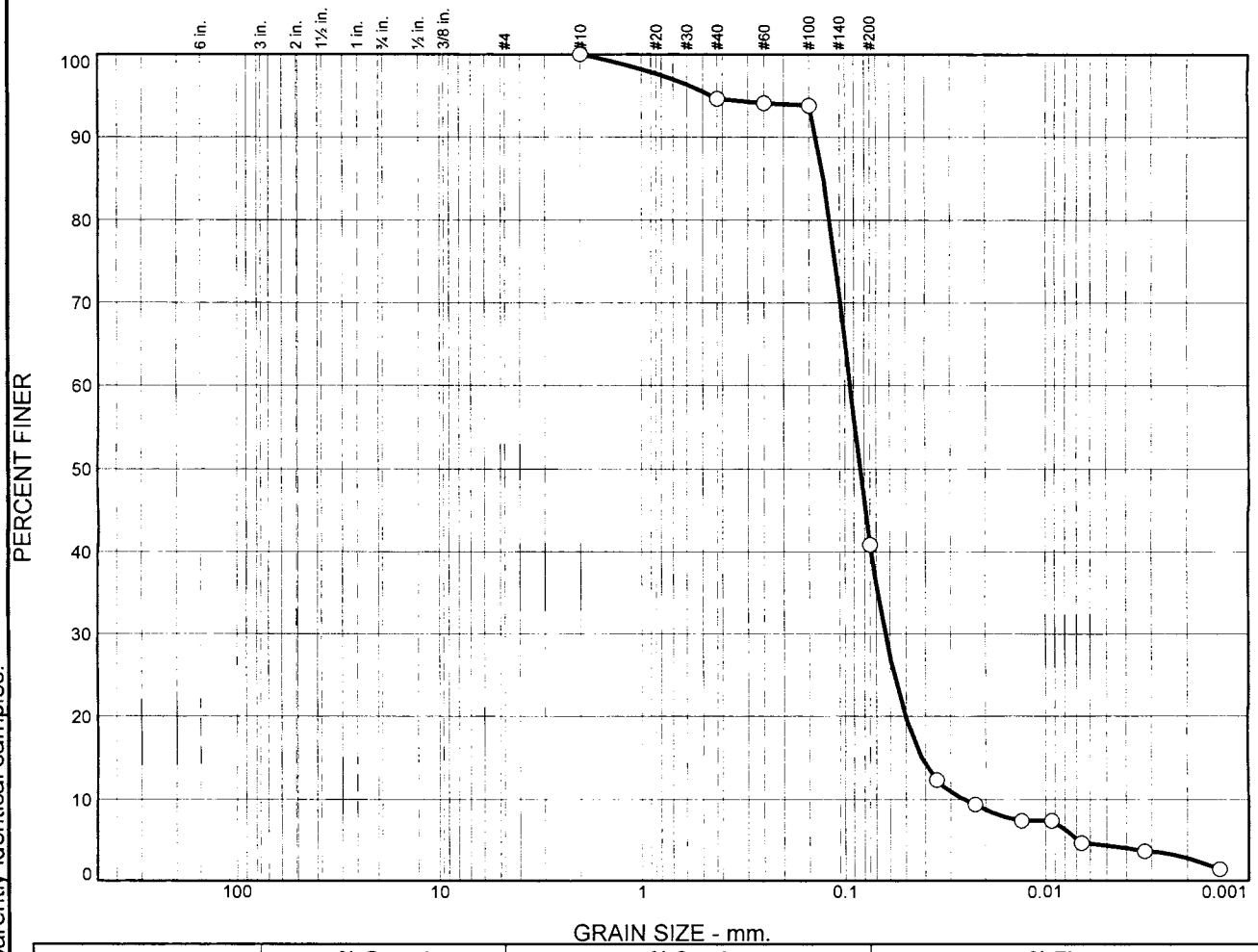
Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	5	54	37	4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NL	NP	0.1272	0.0941	0.0840	0.0634	0.0415	0.0255	1.67	3.69

Material Description	USCS	AASHTO
○ SILTY SAND	SM	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 210'-215' **Sample No.:** 43

Remarks:

○HYGROSCOPYC MOISTURE .6 % -NATURAL MOISTURE 34.4 % -CP05-EAARS-VB-0285.

Nodarse & Associates, Inc.

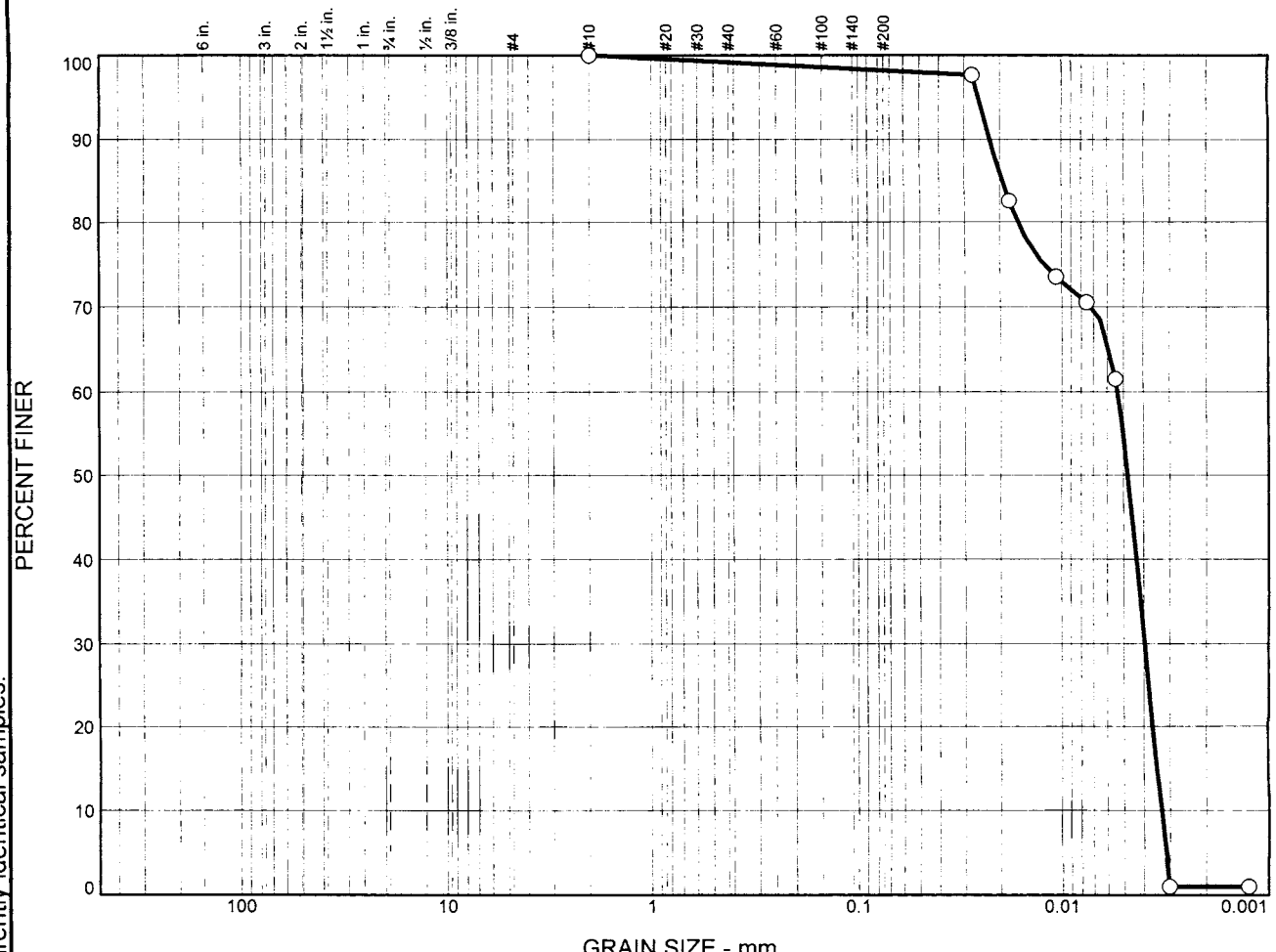
Miami Lakes, FL

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	1	1	43	55

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	65	24	0.0195	0.0053	0.0048	0.0040	0.0035	0.0033	0.89	1.61

Material Description	USCS	AASHTO
○ SANDY ELASTIC SILT	MH	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 215'-220' **Sample No.:** 44

Remarks:

○HYGROSCOPYC MOISTURE 7.7 -NATURAL MOISTURE 43. 3 % -CP05-EAARS-VB-0285

Nodarse & Associates, Inc.

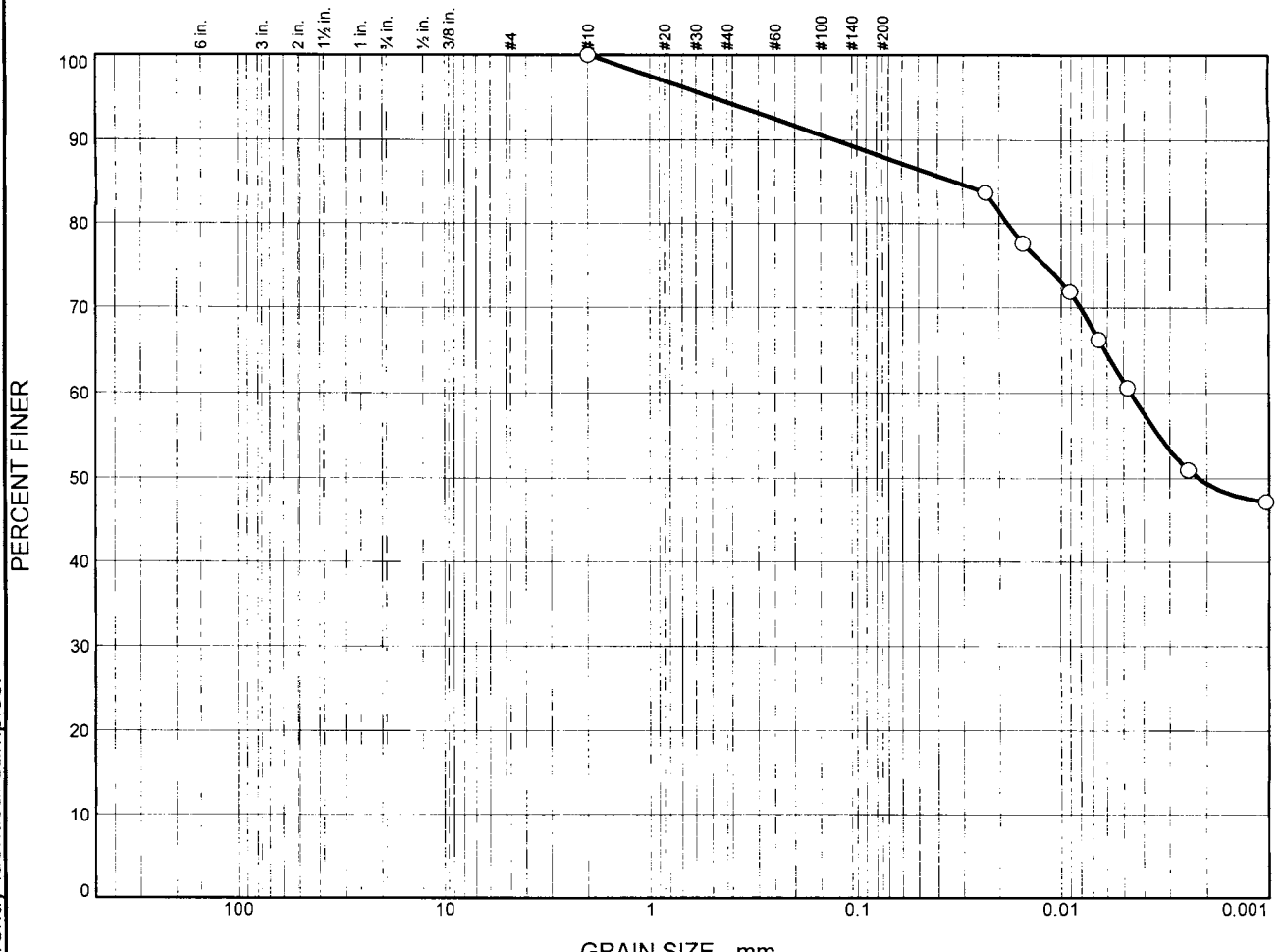
Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	6	6	27	61

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0324	0.0046	0.0022					

Material Description	USCS	AASHTO
○ SANDY ELASTIC SILT -With green glauconite colour	MH	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Source of Sample:** CB190 HYD **Depth:** 225' **Sample Number:** 15E

Remarks:

○ HYGROSCOPIC MOISTURE 9.6% - NATURAL MOISTURE CONTENT 101.4 % -CP05-EAARS-VB-0285-Insufficient sample for Atteberg limits.

Nodarse & Associates, Inc.

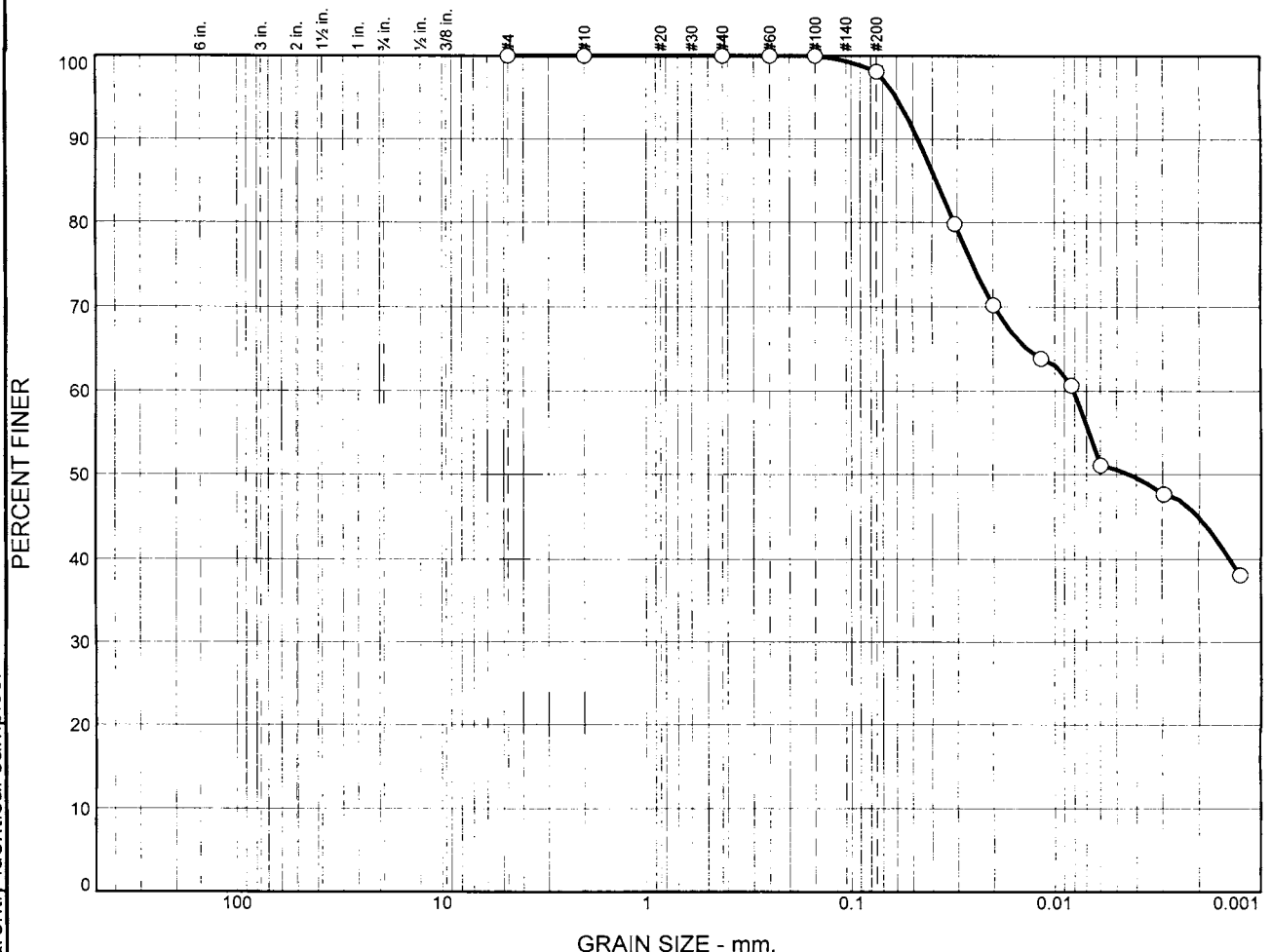
Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	0	2	47	51

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	126	62	0.0381	0.0081	0.0043					

Material Description	USCS	AASHTO
○ SANDY ELASTIC SILT. With green glauconite colour	MH	

Project No. 05-05-0013- **Client:** Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ **Sample Source:** CB190 HYD **Depth:** 245'-250' **Sample No.:** 50

Remarks:

○HYGROSCOPYC MOISTURE 2.3 % -NATURAL MOISTURE 151.2 % -CP05-EAARS-VB-0285

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure HYDROMETE

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: CAMARAZA **Checked By:** MAZO

EAA Reservoir
Project 05 05 0013 016A
Work Order No: 4

Compressive Strength of Rock Cores

Core Identification	Core Depth (feet)	Compressive Strength (psi)
CB-0158	1.0-5.5	2600
CB-0159	4.75-9.75	1250
CB-0161	4.5-8.0	1430
CB-0163	5.5-10.5	4340
CB-0165	6.5-11.5	3690
CB-0167	6.5-11.5	1530
CB-0172	2.5-7.5	1570
CB-0173	5.0-5.5	1860
CB-0175	3.5-6.5	4620
CB-0176	1.0-5.0	2650
CB-0177	4.5-9.5	3090
CB-0178	9.5-12.0	433
CB-0179	0.4-3.5	1676
CB-0187	2.5-3	1105
CB-0187	25-30	2400
CB-0188	1.0-6.0	650
CB-0211	5.0-10.0	5200
CB-0212	10.0-15.0	2710
CB-0212	3.0-3.5	5920
CB-0184	4-9	1870

Notes:

1 Core compressive strength determined in general accordance with ASTM D2938

EAA Reservoir
Project 05 05 0013 016A
Work Order No: 6

Compressive Strength of Rock Cores

CPOS - EAARS - CB

Core Identification	Core Depth (feet)	Compressive Strength (psi)
CB-0248 -0346	5.0-10.0	5010
CB-0260 -0358	8.5-13.0	2500
CB-0268 -0365	6.5-11.5	1500
CB-0276 -0372	4.0-9.0	3570
CB-0276 -0372	10.0-14.0	1570
CB-0277 -0373	4.5-9.5	1000
CB-0277 -0373	9.5-14.5	4430
CB-0281 -0377	5.5-10.5	3880
CB-0281 -0377	10.5-15.5	2250
CB-0302 -0398	7.0-12.0	2100
CB-0302 -0398	12.0-17.0	1040

Notes:

1 Core compressive strength determined in general accordance with ASTM D2938

Date:	10/18/2005
Project No:	05-05-0013-101 W.O.#5
Project Name:	EAA Resevior
Requested by:	Black & Veatch

Nodarse & Associates, Inc.

CP05 - EAA2S - CB

Sample No.	Length(inches)	Avg Diameter(inches)	Load (lbs)	Strenght(psi)	Comments
CB_0162. 7-12 ft	-0266 4.83	2.48	47180	9768	
CB-0191. 9.6-10.9ft	-0290 4.83	2.48	4220	874	
CB-0191 24-29ft	-0290 4	2.48	10700	2215	
CB-0194 41.5-45.5ft	-0293 83	2.49	5120	1053	
CB-0204 10-15ft	-0303 4.86	2.49	41020	8389	
CB-0206 9.5-14.5ft	-0304 4.86	2.49	15530	3195	
CB-0208 8.25-11.0ft	-0306 4.86	2.49	39270	8080	
CB-0216 26.1-27ft	-0314 4.86	2.46	14090	2979	
CB-0216 32.9-34.1ft	-0314 4.73	2.49	23890	4916	
CB--0220 19.9-25ft	-0318 4.86	2.49	4650	960	
CB-0220 25.0-30.0ft	-0318 4.86	2.49	15040	3095	
CB-0222 17.5-18.1ft	-0320 4.86	2.49	7200	1481	
CB-0231 2.0-7.0ft	-0329 4.52	2.47	8440	1867	
CB-0292 0-5.0ft	-0388 4.79	2.47	10150	2119	
CB-0296 0-5.0ft	-0392 4.83	2.48	8720	1805	

Nodarse & Associates, Inc.

Date: 10/4/2005

Project Name: EAA Resivior A-1

Project No: 05-05-0013-101 WO#5

Tested by: Chris B

Depth See sample #

Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption of Rock for Erosion Control

CP05-CARR3-CB1

Sample No.	Wt.inH2O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr	Apparent Sp. Gr	Absorption	Comments
CB-0191 24-29ft	-0290 320.1	544.1	516.8	2.31	2.43	2.63	5.26	
CB-0194 37.8-38.5ft	-0293 663.1	1157.8	1062	2.14	2.34	2.66	9.02	
CB-0201 10-10.7ft	-0300 958.1	1631.5	1555.2	2.31	2.42	2.61	7.96	
CB-0204 10-15ft	-0303 548.2	981.7	889.1	2.05	2.26	2.61	10.43	
CB-0208 8.25-11ft	-0306 815.2	1346.1	1310.8	2.47	2.53	2.64	2.69	
CB-0220 19.9-25ft	-0318 562.5	1023.5	889.2	1.93	2.22	2.72	15.1	
CB-0220 25-30.0ft	-0318 658.2	1142.6	1059.4	2.19	2.36	2.31	7.85	

Bulk spec. gravity =A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir
05 05 0013 106A
Work Order No: 4
Rock Core Specific Gravity and Absorption

CP05-EARRS-

	Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0312	CB-0214	32.5-33.2	1.501	1.600	1.680	7.38
CB-0324	CB-0226	4.74-9.75	2.340	2.440	2.600	4.35
CB-0324	CB-0226	16.0-21.0	2.390	2.460	2.560	2.90
CB-0325	CB-0227	5.75-10.75	2.400	2.480	2.600	3.27
CB-0326	CB-0228	6.5-11.5	2.204	2.360	2.610	7.11
CB-0326	CB-0228	17.5-22.5	2.010	2.210	2.550	11.0
CB-0287	CB-0187	2.5-3.0	2.000	2.210	2.550	10.97
CB-0289	CB-0189	20.5-25.5	2.460	2.550	2.700	3.56
CB-0309	CB-0211	5.0-10.0	2.460	2.510	2.585	1.83
CB-0310	CB-0212	10.0-15.0	1.740	1.890	2.030	8.41
CB-0310	CB-0212	30.0-35.0	2.960	3.140	3.600	6.10
CB-0311	CB-0213	23.5-28.5	1.910	2.170	2.570	13.28
CB-0274	CB-0178	9.5-12.0	2.260	2.350	2.500	4.10
CB-0275	CB-0179	0.4-5.5	2.400	2.500	2.680	4.44
CB-0276	CB-0180	1.0-4.5	2.240	2.340	2.501	4.70
CB-0279	CB-0184	4.0-9.0	2.220	2.370	2.603	6.70
CB-0287	CB-0187	25.0-30.0	2.470	2.520	2.601	2.05
CB-0288	CB-0188	1.0-6.0	2.330	2.460	2.670	5.40
CB-0267	CB-0170	6.0-9.5	2.320	2.450	2.660	5.35
CB-0269	CB-0172	2.5-7.5	2.520	2.600	2.730	3.10
CB-0270	CB-0173	5.0-8.5	2.350	2.420	2.550	3.32
CB-0271	CB-0175	3.5-6.5	2.620	2.680	2.700	2.10
CB-0272	CB-0176	1.0-5.0	2.400	2.500	2.700	4.65
CB-0273	CB-0177	4.5-9.5	2.140	2.240	2.380	4.73
CB-0256	CB-0158	1.0-5.5	2.410	2.500	2.621	3.30
CB-0257	CB-0159	4.75-9.75	2.030	2.190	2.410	7.71
CB-0259	CB-0161	4.5-8.0	1.440	1.850	2.480	29.5

Notes:

1 Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

EAA Reservoir
05 05 0013 106A
Work Order No: 4
Rock Core Specific Gravity and Absorption

CP05 - EAARS -

	Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0261	CB-0163	5.5-10.5	2.320	2.440	2.650	5.39
CB-0262	CB-0165	6.5-11.5	2.430	2.500	2.580	2.39
CB-0264	CB-0167	6.5-11.5	2.270	2.380	2.550	4.93
CB-0327	CB-0229	4.0-9.0	2.160	2.304	2.510	6.53
CB-0327	CB-0229	18.0-23.0	1.901	2.090	2.330	9.63
CB-0327	CB-0229	23.0-28.0	1.970	2.190	2.540	11.57
CB-0331	CB-0233	2.5-7.5	2.310	2.410	2.550	4.0

Notes:

2 Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

EAA Reservoir
05 05 0013 106A
Work Order No: 6
Rock Core Specific Gravity and Absorption

CP05- EARRS - CB

Core Identification	Core Depth (feet)	~~Bulk~~ Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0248 -0346	5.0-10.0	2.42	2.49	2.60	2.90
CB-0260 -0358	2.0-7.0	2.40	2.50	2.50	1.51
CB-0260 -0358	8.5-13.0	2.17	2.30	2.50	6.10
CB-0268 0365	6.5-11.5	1.84	2.13	2.60	16.00
CB-0276 0372	4.0-9.0	2.17	2.34	2.60	7.87
CB-0276 0372	10.0-14.0	2.36	2.45	2.60	3.97
CB-0277 0373	4.5-9.5	2.23	2.37	2.60	6.20
CB-0277 0373	9.5-14.5	2.23	2.39	2.70	7.10
CB-0281 0377	5.5-10.5	2.19	2.33	2.60	6.78
CB-0281 0377	10.5-15.5	2.47	2.51	2.60	1.87
CB-0302 0398	7.0-12.0	2.04	2.20	2.40	7.90
CB-0302 0398	12.0-17.0	2.15	2.32	2.60	8.04

Notes: Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

Nodarse & Associates, Inc.

Date: 10/19/2005

Project Name: EAA Resivior A-1

Project No: 05-05-0013-101 WO#4

Tested by: Chris B

Depth See sample #

Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption of Rock for Erosion Control

Sample No.	Wt.inH2O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr	Apparent Sp. Gr	Absorption	Comments
Rip Rap sample 1	411.1	700.7	680.1	2.35	2.42	2.53	3.02	
Rip Rap sample 2	350.3	587.7	569.9	2.4	2.48	2.59	3.12	
Rip Rap sample 3	447.3	763.4	741.7	2.35	2.42	2.52	2.93	

Bulk spec. gravity =A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Los Angles Abrasion

Sample Number	1	2	3
Percent Wear	31.3	31.3	30.6
Grading	"A"	"A"	"A"

Note: Laboratory testing completed by Wingerter Laboratories Inc. of Miami Florida
Laboratory testing completed in accordance with ASTM C-131 & C-535.

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Soundness of Rock

Sample Number	1	2	3
Percentage Loss	0%	0%	0%

Notes: Laboratory testing completed in general accordance with ASTM D5240.

LABORATORY TEST RESULTS FOR
EAA RESERVOIR A-1
Nodarse & Associates, Inc. Project No. 05-05-0013

Boring Number	Sample Depth (ft)	Carbonate Content (%)
TC1-N-2	8.5	79.0
TC1-N-12	58.5	63.2
TC1-N-16	78.5	45.9
TC1-E-3	9.0	82.3
TC1-E-7	28.5	14.5
TC1-E-14	63.5	41.6
TC1-E-16	73.5	69.1
TC1-W-4	18.5	91.9
TC1-W-7	33.5	56.5
TC1-W-15	73.5	65.0
TC1-W-20	98.5	67.7
TC1-S-4	18.5	87.1
TC1-S-9	43.5	25.3
TC1-S-15	73.5	68.9
TC1-S-16	78.5	67.8
TC1-S-8	38.5	40.7

EAA Reservoir
05 05 0013 106A
Work Order No. 3
Carbonate Test Data

CB-0266

Boring Number	Depth (feet)	Carbonate Content (%)
CB 169 CP05-EAARS	5.5-8.5	76.6
CB 171 CP05-EAARS-CB-0268	7.0-10.0	81.6
CB 175 CP05-EAARS-CB-0271	13.5-15.0	81.8
CB 186 CP05-EAARS-CB 0281	33.5-35.0	34.7

227 TC-2 S 4
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

89.5 %

Crucible Number:		T
Wt. Of Crucible:	B	72.7778
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: *A-B = R*	R	0.1050

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FZR

TC-2 W 8
33.5'

Project Name: EAA
Project No:
Date: 7-21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

23.3 %

Crucible Number:		105
Wt. Of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: *A-B = R*	R	0.7670

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

305 TC-2W 5
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.6 %

Crucible Number:		500
Wt. Of Crucible:	B	70.8534
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: *A-B = R*	R	0.2139

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

234

TC-2 E S
18.5'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

80.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5465
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: *A-B = R*	R	0.1945

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

234 TC-2 E S 18.5'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

80.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5465
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: *A-B = R*	R	0.1945

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

227 TC-2 S 4
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

89.5 %

Crucible Number:		T
Wt. Of Crucible:	B	72.7778
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: *A-B = R*	R	0.1050

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FZR

TC-2 W 8
33.5'

NODARSE & ASSOCIATES, INC.

Project Name: EAA
Project No:
Date: 2-21

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

23.3 %

Crucible Number:		105
Wt. Of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: *A-B = R*	R	0.7670

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

305 TC-2 W 3
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.6 %

Crucible Number:		500
Wt. Of Crucible:	B	70.8534
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: *A-B = R*	R	0.2139

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

EAA Reservoir
05 05 0013 106A
Work Order No: 5
Carbonate Test Data

CP05 - EAARS - VB

	Boring Number	Depth (feet)	Carbonate Content (%)
-0283	CB-0174	100-105	71.7
"	CB-0174	110-115	75.5
"	CB-0174	115-120	75.9
"	CB-0174	125-130	77.7
"	CB-0174	140-145	53.0
"	CB-0174	150-155	68.3
"	CB-0174	160-165	67.2
"	CB-0174	165-170	41.2
"	CB-0174	180-185	37.9
"	CB-0174	185-190	53.6
"	CB-0174	195-200	36.6
"	CB-0174	200-205	23.9
-0283	CB-0174	205-210	30.5

Notes:

1 Carbonate content determined in general accordance with FDOT Standard.

EAA Reservoir
05 05 0013 106A
Work Order No. 6
Carbonate Test Data

CP05 -ETTARS-VB -

	Boring Number	Depth (feet)	Carbonate Content (%)
0282	CB 164	55060	61.8
0282	CB 164	70-75	72.3
0282	CB 164	130-135	32.8
0282	CB 164	180-185	54.8
0284	CB 182	70-75	78.8
0284	CB 182	90-95	72.1
0284	CB 182	140-145	55.4
0284	CB 182	175-180	48.2
0286	CB 205	60-65	77.1
0286	CB 205	75-80	72.0
0286	CB 205	140-145	58.2
0286	CB 205	160-165	61.6

281

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

102

BA-01
5.5-7.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

87.4%

Crucible Number:		202
Wt. Of Crucible:	B	18.3244
Mass of Sample:	W	1.6001
Crucible + Insoluble Residue After Burn:	A	18.4508
Insoluble Residue: *A-B = R*	R	0.1264

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

1

205

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-01
28.5-30.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

29.1 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5444
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2531
Insoluble Residue: *A-B = R*	R	0.7087

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

2

302

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-01
43.5-45.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

10.9 %

Crucible Number:		203
Wt. Of Crucible:	B	17.2999
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.1907
Insoluble Residue: *A-B = R*	R	0.8908

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:11 From: 407 740 5961 To:19134583323 P.7/29

216

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
2.5-10.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

82.6 %

Crucible Number:		105
Wt. Of Crucible:	B	25.8748
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0486
Insoluble Residue: *A-B = R*	R	0.1738

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

4

200

100

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
29-30.5

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

40.5 %

Crucible Number:		100
Wt. Of Crucible:	B	26.1823
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.7771
Insoluble Residue: *A-B = R*	R	0.5948

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:12 From: 407 740 5961 To:19134583323 P.9/29

263

105

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
43.5'-45.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

37.3%

Crucible Number:		105
Wt. Of Crucible:	B	25.8741
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.5013
Insoluble Residue: *A-B = R*	R	0.6272

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

253

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

101

BA-04
6.2'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

87.7%

Crucible Number:		203
Wt. Of Crucible:	B	17.2991
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	17.4220
Insoluble Residue: *A-B = R*	R	0.1229

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

7

800

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-04
18.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

82.7 %

Crucible Number:		B
Wt. Of Crucible:	B	76.4770
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	76.6500
Insoluble Residue: *A-B = R*	R	0.1730

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:12 From: 407 740 5961 To:19134583323 P.12/29

207

101

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-04 33.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

31.4%

Crucible Number:		101
Wt. Of Crucible:	B	25.2995
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9857
Insoluble Residue: *A-B = R*	R	0.6862

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

9

222

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-05
28.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

36.8 %

Crucible Number:		100
Wt. Of Crucible:	B	26.1721
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.8037
Insoluble Residue: *A-B = R*	R	0.6316

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

246

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-05
8.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

86.2 %

Crucible Number:		101
Wt. Of Crucible:	B	25.3000
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.4383
Insoluble Residue: *A-B = R*	R	0.1383

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:12 From: 407 740 5961 To:19134583323 P.15/29

231

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-05
38.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

31.4 %

Crucible Number:		11
Wt. Of Crucible:	B	29.4254
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	30.1114
Insoluble Residue: *A-B = R*	R	0.6860

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:12 From: 407 740 5961 To:19134583323 P.16/29

TT-6

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
6.0-7.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

84.7 %

Crucible Number:		100
Wt. Of Crucible:	B	26.1653
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3184
Insoluble Residue: *A-B = R*	R	0.1531

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:12 From: 407 740 5961 To:19134583323 P.17/29

309

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
28.5-30.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

27.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5440
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2680
Insoluble Residue: *A-B = R*	R	0.7240

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

[redacted] 261

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
48.5-50.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

34.6 %

Crucible Number:		102
Wt. Of Crucible:	B	25.6848
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3388
Insoluble Residue: *A-B = R*	R	0.6540

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

[redacted] 500

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-07
6.0-7.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.0 %

Crucible Number:		204
Wt. Of Crucible:	B	17.8940
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.0643
Insoluble Residue: *A-B = R*	R	0.1703

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:13 From: 407 740 5961 To:19134583323 P.20/29

~~[illegible]~~ 260

Project Name: EAA
Project No:
Date:

NOUARSE & ASSOCIATES, INC.

B4.07
18.5-20.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

84.8 %

Crucible Number:		202
Wt. Of Crucible:	B	18.3399
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.4918
Insoluble Residue: *A-B = R*	R	0.1519

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:13 From: 407 740 5961 To:19134583323 P.21/29

[redacted] 803

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-07
38.5-40.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

28.5 %

Crucible Number:		102
Wt. Of Crucible:	B	25.6892
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4045
Insoluble Residue: *A-B = R*	R	0.7153

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:13 From: 407 740 5961 To:19134583323 P.22/29

279

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
8.5'-10.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

85.9 %

Crucible Number:		105
Wt. Of Crucible:	B	25.8640
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0054
Insoluble Residue: *A-B = R*	R	0.1414

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

252

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
13.5-15.0'

100

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.7 %

Crucible Number:		11
Wt. Of Crucible:	B	29.4172
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	29.5807
Insoluble Residue: *A-B = R*	R	0.1635

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

22S

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
38.5-40.0

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

32.0 %

Crucible Number:		101
Wt. Of Crucible:	B	25.2934
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9733
Insoluble Residue: *A-B = R*	R	0.3201

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:13 From: 407 740 5961 To:19134583323 P.25/29

301

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-09
23.5-25.0'

105

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.5 %

Crucible Number:		204
Wt. Of Crucible:	B	17.8686
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	18.0836
Insoluble Residue: *A-B = R*	R	0.2150

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:13 From: 407 740 5961 To:19134583323 P.26/29

255

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA.09
38.5-40.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

25.3 %

Crucible Number:		T
Wt. Of Crucible:	B	1.0001
Mass of Sample:	W	72.7716
Crucible + Insoluble Residue After Burn:	A	73.5187
Insoluble Residue: *A-B = R*	R	0.7471

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:14 From: 407 740 5961 To:19134583323 P.27/29

SECA

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-10
13.5-15.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.5 %

Crucible Number:		A
Wt. Of Crucible:	B	75.0438
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.2091
Insoluble Residue: *A-B = R*	R	0.1653

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:14 From: 407 740 5961 To:19134583323 P.28/29

241

102

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-10
33.5-35.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

26.7 %

Crucible Number:		102
Wt. Of Crucible:	B	25.6924
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4250
Insoluble Residue: *A-B = R*	R	0.7326

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FEB-09-2005 14:14 From: 407 740 5961 To:19134583323 P.29/29

TRIAXIAL TEST RESULTS

Note: Material for triaxial tests on remolded samples was obtained from soil used in Test Cell construction.

EAA Reservoir
05 05 0013 106A
Work Order No: 5
Corrosion Test Data

CP05 - EAARS - VB - 1

	Boring Number	Depth (feet)	Electrical Resisitivity (0hm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
-0283	CB-0174	5-10	8.2 x 1k	8.5	60	25
-0283	CB-0174	115-120	3.0 x 1k	8.3	60	Less than 5

Notes:

1 Corrosion Series determined in general accordance with FDOT Standards.

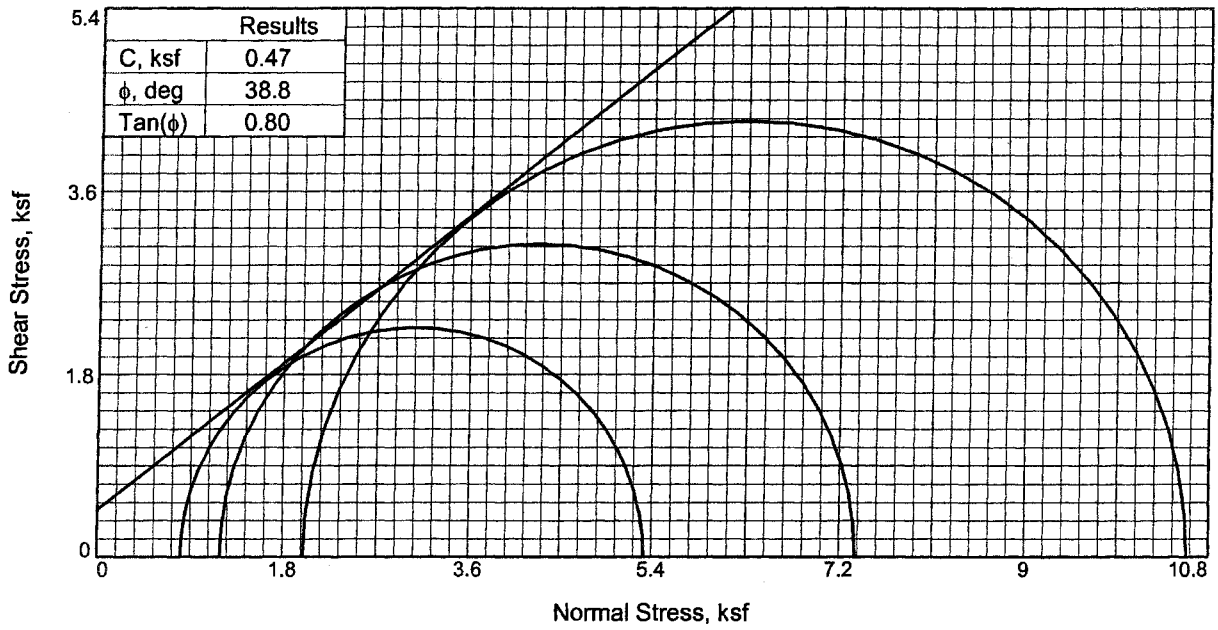
EAA Reservoir
05 05 0013 106A
Work Order No: 6
Corrosion Test Data

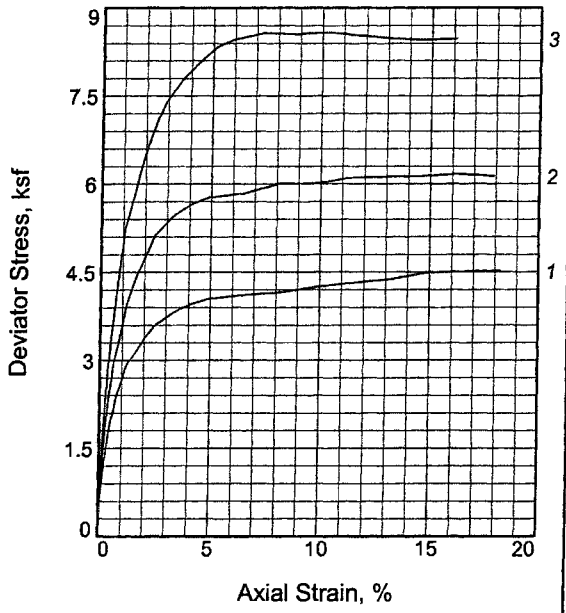
Boring Number	Depth (feet)	Electrical Resisitivity (0hm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
CB-0164	5-10	6.1 x 1k	8.9	90	60

1CP05 - EAARS - CB - 0361

Notes:

1 Corrosion Series determined in general accordance with FDOT Standards.





Sample No.		1	2	3
Initial	Water Content,	15.9	16.2	15.8
	Dry Density, pcf	104.4	107.4	107.3
	Saturation,	67.4	74.0	71.9
	Void Ratio	0.6508	0.6047	0.6066
	Diameter, in.	2.84	2.84	2.84
	Height, in.	6.05	6.15	6.83
At Test	Water Content,	22.8	21.7	21.9
	Dry Density, pcf	105.8	107.8	107.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6304	0.6000	0.6044
	Diameter, in.	2.83	2.84	2.84
	Height, in.	6.02	6.14	6.83
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		4.5	6.2	8.6
Ult. Stress, ksf				
σ_1 Failure, ksf		5.3	7.4	10.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: sample moist cured 14 days

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

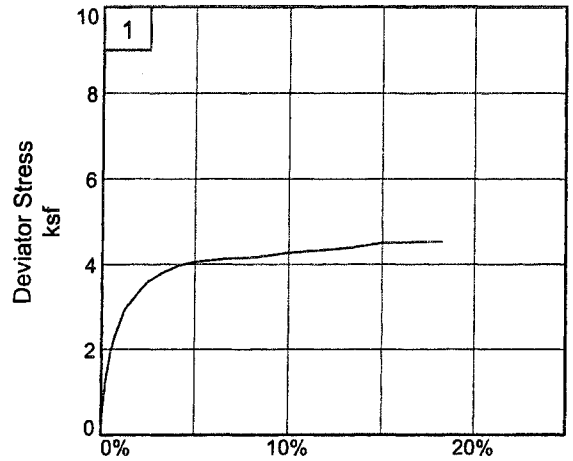
Sample Number: UU-95% 14 day cured

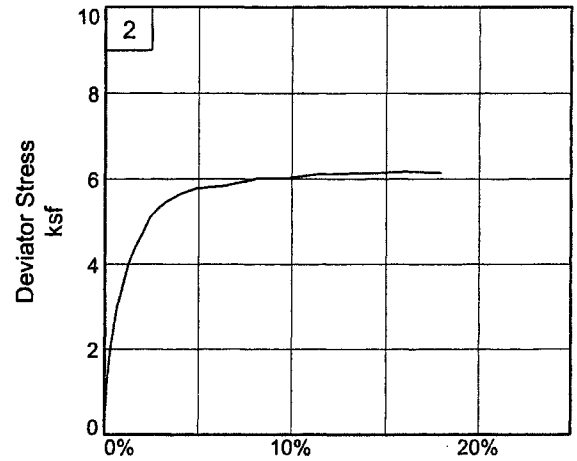
Proj. No.: 6738-05-4573 **Date:** 6-28-05

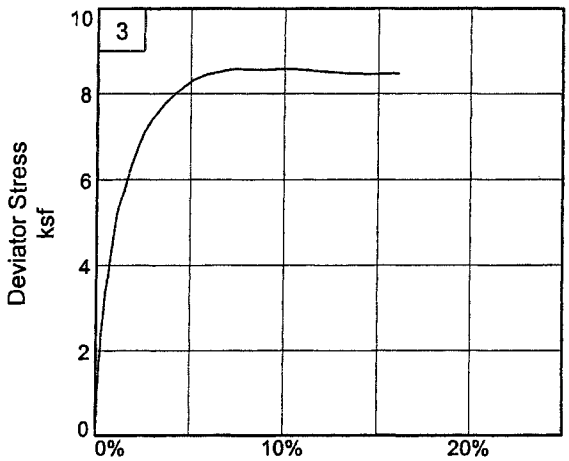
TRIAXIAL SHEAR TEST REPORT

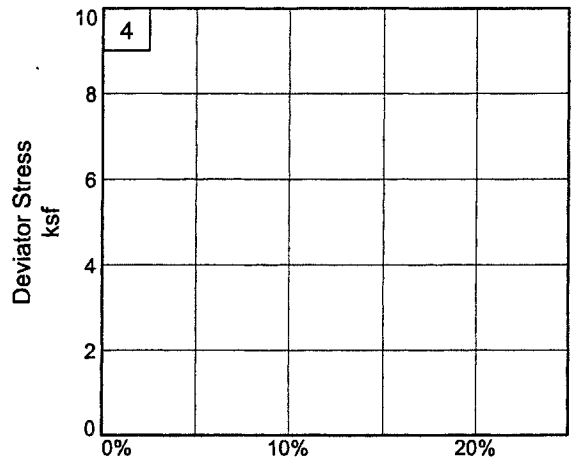
MACTEC ENGINEERING AND CONSULTING, INC.

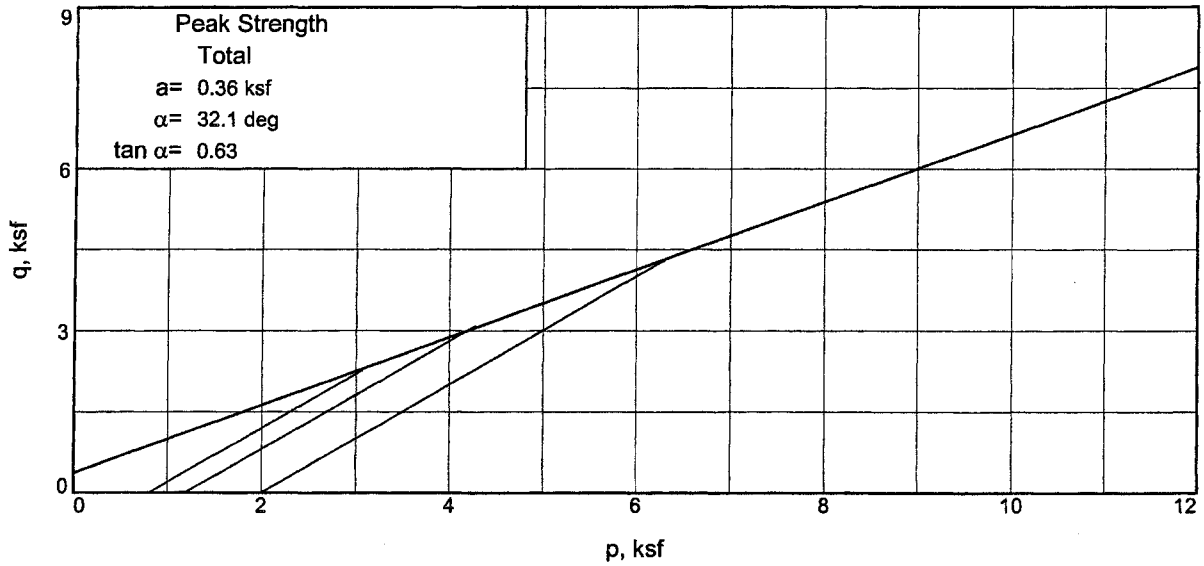
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
9:00 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: sample moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	125.860		413.600
Moisture content: Dry soil+tare, gms.	112.030		364.200
Moisture content: Tare, gms.	24.930		50.800
Moisture, %	15.9	22.8	15.8
Moist specimen weight, gms.	1217.6		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.28	
Height, in.	6.05	6.02	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.0	129.9	
Dry density, pcf	104.4	105.8	
Void ratio	0.6508	0.6304	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.52 ksf **at reading no.** 27

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	12.0	5.6	0.0	0.13	0.81	0.93	1.16		0.87
2	0.0050	65.0	30.1	0.1	0.69	0.81	1.50	1.85		1.15
3	0.0100	95.0	44.0	0.2	1.01	0.81	1.81	2.25		1.31
4	0.0150	124.0	57.4	0.2	1.31	0.81	2.12	2.63		1.46
5	0.0200	145.0	67.1	0.3	1.53	0.81	2.34	2.90		1.57
6	0.0250	165.0	76.4	0.4	1.74	0.81	2.55	3.16		1.68
7	0.0300	183.0	84.7	0.5	1.93	0.81	2.74	3.40		1.77
8	0.0350	195.0	90.3	0.6	2.06	0.81	2.86	3.55		1.84
9	0.0400	208.0	96.3	0.7	2.19	0.81	3.00	3.72		1.90
10	0.0450	222.0	102.8	0.7	2.34	0.81	3.14	3.90		1.98
11	0.0500	233.0	107.9	0.8	2.45	0.81	3.26	4.04		2.03
12	0.0750	280.0	129.6	1.2	2.93	0.81	3.74	4.64		2.27
13	0.1000	303.0	140.3	1.7	3.16	0.81	3.97	4.92		2.39
14	0.1250	327.0	151.4	2.1	3.40	0.81	4.20	5.21		2.51
15	0.1500	347.0	160.7	2.5	3.59	0.81	4.40	5.45		2.60
16	0.1750	359.0	166.2	2.9	3.70	0.81	4.51	5.59		2.66
17	0.2000	371.0	171.8	3.3	3.81	0.81	4.61	5.72		2.71
18	0.2500	389.0	180.1	4.1	3.96	0.81	4.76	5.91		2.78
19	0.3000	401.0	185.7	5.0	4.04	0.81	4.85	6.01		2.83
20	0.4000	415.0	192.1	6.6	4.11	0.81	4.92	6.10		2.86
21	0.5000	427.0	197.7	8.3	4.16	0.81	4.96	6.15		2.88
22	0.6000	445.0	206.0	10.0	4.25	0.81	5.06	6.27		2.93
23	0.7000	460.0	213.0	11.6	4.31	0.81	5.12	6.35		2.96
24	0.8000	475.0	219.9	13.3	4.37	0.81	5.18	6.42		2.99
25	0.9000	497.0	230.1	14.9	4.49	0.81	5.29	6.56		3.05
26	1.0000	509.0	235.7	16.6	4.51	0.81	5.31	6.59		3.06
27	1.1000	521.0	241.2	18.3	4.52	0.81	5.33	6.60		3.07

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	128.130		1393.600
Moisture content: Dry soil+tare, gms.	114.500		1212.300
Moisture content: Tare, gms.	30.350		116.100
Moisture, %	16.2	21.7	16.5
Moist specimen weight, gms.	1276.8		
Diameter, in.	2.84	2.84	
Area, in.^{2}	6.33	6.32	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	124.9	131.2	
Dry density, pcf	107.4	107.8	
Void ratio	0.6047	0.6000	
Saturation, %	74.0	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.16 ksf **at reading no.** 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	33.0	15.3	0.0	0.35	1.20	1.54	1.29		1.37
2	0.0050	77.0	35.7	0.1	0.81	1.20	2.01	1.68		1.60
3	0.0100	127.0	58.8	0.2	1.34	1.20	2.53	2.12		1.86
4	0.0150	164.0	75.9	0.2	1.73	1.20	2.92	2.44		2.06
5	0.0200	193.0	89.4	0.3	2.03	1.20	3.22	2.70		2.21
6	0.0250	220.0	101.9	0.4	2.31	1.20	3.51	2.93		2.35
7	0.0300	242.0	112.0	0.5	2.54	1.20	3.73	3.12		2.46
8	0.0350	262.0	121.3	0.6	2.75	1.20	3.94	3.30		2.57
9	0.0400	287.0	132.9	0.7	3.01	1.20	4.20	3.52		2.70
10	0.0450	298.0	138.0	0.7	3.12	1.20	4.31	3.61		2.75
11	0.0500	310.0	143.5	0.8	3.24	1.20	4.44	3.71		2.82
12	0.0750	380.0	175.9	1.2	3.96	1.20	5.15	4.31		3.17
13	0.1000	426.0	197.2	1.6	4.42	1.20	5.61	4.70		3.40
14	0.1250	460.0	213.0	2.0	4.75	1.20	5.95	4.98		3.57
15	0.1500	497.0	230.1	2.4	5.11	1.20	6.31	5.28		3.75
16	0.2000	534.0	247.2	3.3	5.45	1.20	6.64	5.56		3.92
17	0.2500	558.0	258.4	4.1	5.64	1.20	6.84	5.72		4.02
18	0.3000	575.0	266.2	4.9	5.77	1.20	6.96	5.83		4.08
19	0.4000	592.0	274.1	6.5	5.84	1.20	7.03	5.88		4.11
20	0.5000	619.0	286.6	8.1	6.00	1.20	7.19	6.02		4.19
21	0.6000	631.0	292.2	9.8	6.00	1.20	7.20	6.02		4.20
22	0.7000	653.0	302.3	11.4	6.10	1.20	7.30	6.11		4.25
23	0.8000	667.0	308.8	13.0	6.12	1.20	7.31	6.12		4.25
24	0.9000	681.0	315.3	14.6	6.13	1.20	7.32	6.13		4.26

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	1.0000	698.0	323.2	16.3	6.16	1.20	7.36	6.16		4.28
26	1.1000	708.0	327.8	17.9	6.13	1.20	7.32	6.13		4.26

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.870		333.740
Moisture content: Dry soil+tare, gms.	110.280		294.900
Moisture content: Tare, gms.	30.550		52.160
Moisture, %	15.8	21.9	16.0
Moist specimen weight, gms.	1411.4		
Diameter, in.	2.84	2.84	
Area, in.^{2}	6.33	6.33	
Height, in.	6.83	6.83	
Net decrease in height, in.		0.00	
Wet Density, pcf	124.3	131.0	
Dry density, pcf	107.3	107.5	
Void ratio	0.6066	0.6044	
Saturation, %	71.9	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 8.58 ksf **at reading no.** 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	27.0	12.5	0.0	0.28	2.00	2.29	1.14		2.14
2	0.0050	78.0	36.1	0.1	0.82	2.00	2.82	1.41		2.41
3	0.0100	146.0	67.6	0.1	1.54	2.00	3.54	1.77		2.77
4	0.0150	192.0	88.9	0.2	2.02	2.00	4.02	2.01		3.01
5	0.0200	233.0	107.9	0.3	2.45	2.00	4.45	2.22		3.23
6	0.0250	265.0	122.7	0.4	2.78	2.00	4.78	2.39		3.39
7	0.0300	295.0	136.6	0.4	3.09	2.00	5.10	2.55		3.55
8	0.0350	323.0	149.5	0.5	3.39	2.00	5.39	2.69		3.69
9	0.0400	347.0	160.7	0.6	3.63	2.00	5.64	2.82		3.82
10	0.0450	368.0	170.4	0.7	3.85	2.00	5.85	2.92		3.93
11	0.0500	393.0	182.0	0.7	4.11	2.00	6.11	3.05		4.06
12	0.0750	503.0	232.9	1.1	5.24	2.00	7.24	3.62		4.62
13	0.1000	553.0	256.0	1.5	5.74	2.00	7.74	3.87		4.87
14	0.1250	609.0	282.0	1.8	6.30	2.00	8.30	4.15		5.15
15	0.1500	655.0	303.3	2.2	6.75	2.00	8.75	4.37		5.38
16	0.1750	693.0	320.9	2.6	7.11	2.00	9.11	4.55		5.56
17	0.2000	724.0	335.2	2.9	7.40	2.00	9.40	4.70		5.70
18	0.2500	768.0	355.6	3.7	7.79	2.00	9.80	4.89		5.90

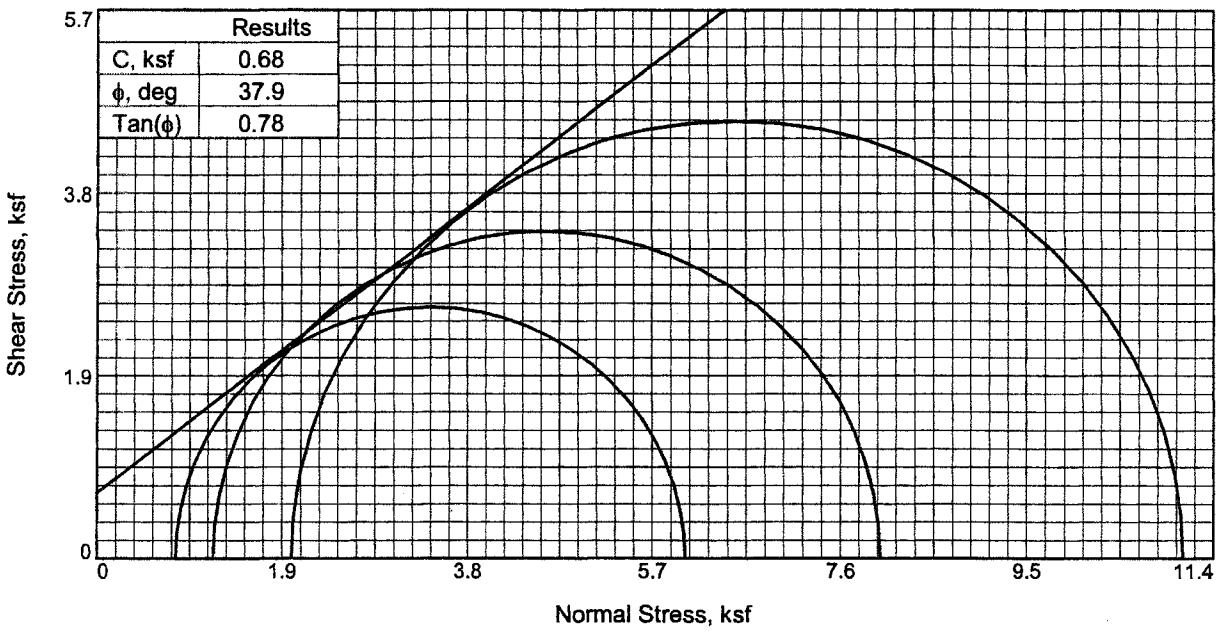
Test Readings for Specimen No. 3

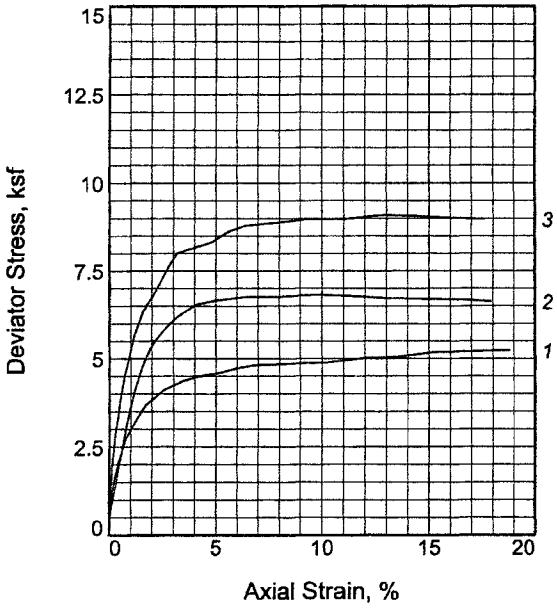
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
19	0.3000	802.0	371.3	4.4	8.08	2.00	10.08	5.04		6.04
20	0.3500	832.0	385.2	5.1	8.32	2.00	10.32	5.15		6.16
21	0.4000	852.0	394.5	5.9	8.45	2.00	10.45	5.22		6.23
22	0.5000	878.0	406.5	7.3	8.57	2.00	10.57	5.28		6.29
23	0.6000	890.0	412.1	8.8	8.55	2.00	10.55	5.27		6.28
24	0.7000	908.0	420.4	10.3	8.58	2.00	10.59	5.29		6.29
25	0.8000	917.0	424.6	11.7	8.53	2.00	10.53	5.26		6.27
26	0.9000	927.0	429.2	13.2	8.48	2.00	10.48	5.24		6.24
27	1.0000	940.0	435.2	14.6	8.45	2.00	10.45	5.22		6.23
28	1.1000	959.0	444.0	16.1	8.47	2.00	10.48	5.23		6.24

14 day cured specimens Nodarse 6738-05-4576-02 cast 6-28-05 tested 7-12-05

Tube Weight 766.2 Tube Diameter (in) 2.84 Area 6.334702 Length 25.2 cm maximum density
9.92126 in 115.5

weight w/ sample and tube	weight sample (lb)	distance to sample (cm)	sample length (in)	sample volume (cuft)	sample wet density (lb/cuft)	wet wt w/ can	dry wt. w/ can	can wt	% moisture	sample dry density (lb/cuft)	% compaction	
2104.2	2.95	9.6	6.14	0.0225	131.0	113.5	101.81	30.01	16.28	112.67026	97.6	not used
2147.1	3.04	7.8	6.85	0.0251	121.2	113.5	101.81	30.01	16.28	104.25353	90.3	1 A 13.9
2182.2	3.12	7	7.17	0.0263	118.8	112.71	100.4	24.58	16.24	102.24443	88.5	2 A 5.6
2253.5	3.28	6.7	7.28	0.0267	122.8	122.11	109.3	30.67	16.29	105.60068	91.4	not used
1978	2.67	8.8	6.06	0.0222	120.2	122.11	109.3	30.67	16.29	103.35942	89.5	3 A 8.3
2117.8	2.98	8	6.77	0.0248	120.0	139.18	124.28	32.03	16.15	103.34316	89.5	4
2173.6	3.10	7.5	6.97	0.0255	121.5	115.81	103.08	25.01	16.31	104.43123	90.4	5
2128	3.00	8.1	6.73	0.0247	121.6	93.51	84.65	30.01	16.22	104.67476	90.6	6
2135.8	3.02	8.3	6.65	0.0244	123.8	93.51	84.65	30.01	16.22	106.52016	92.2	not used
1996.8	2.71	10.5	5.79	0.0212	127.9	114.18	102.63	30.35	15.98	110.25697	95.5	1
2047.8	2.83	9.9	6.02	0.0221	128.0	125.86	112.03	24.93	15.88	110.41974	95.6	2
2057.3	2.85	9.7	6.10	0.0224	127.2	128.13	114.5	30.35	16.20	109.5015	94.8	3
2193.9	3.15	8	6.77	0.0248	126.8	122.87	110.25	30.55	15.79	109.50206	94.8	4
2060	2.90	9.3	6.26	0.0229	126.2	137.59	122.83	31.78	16.18	108.64164	94.1	5
1989	2.70	10.4	5.83	0.0214	126.2	106.78	96.22	31.52	16.32	108.49796	93.9	6





Sample No.		1	2	3
Initial	Water Content,	16.0	16.3	16.2
	Dry Density, pcf	108.3	108.0	107.6
	Saturation,	74.5	75.5	74.1
	Void Ratio	0.5925	0.5972	0.6030
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.87	6.15	6.28
At Test	Water Content,	20.9	21.3	20.9
	Dry Density, pcf	109.4	108.5	109.3
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5763	0.5886	0.5770
	Diameter, in.	2.83	2.83	2.82
	Height, in.	5.85	6.14	6.25
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		5.2	6.8	9.1
Ult. Stress, ksf				
σ_1 Failure, ksf		6.0	8.0	11.1
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: Samples moist cured 14 days

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

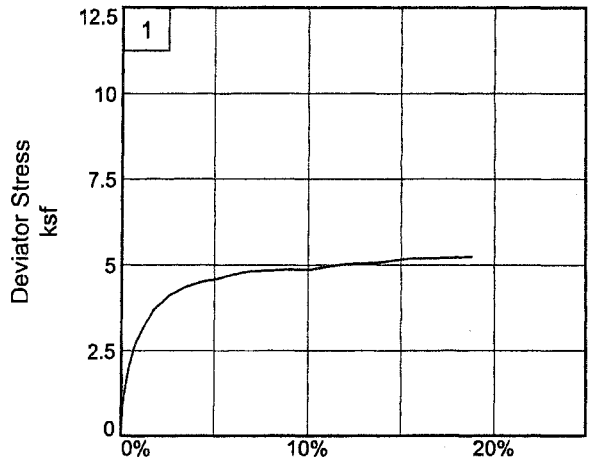
Sample Number: UU-95% 14 day cured

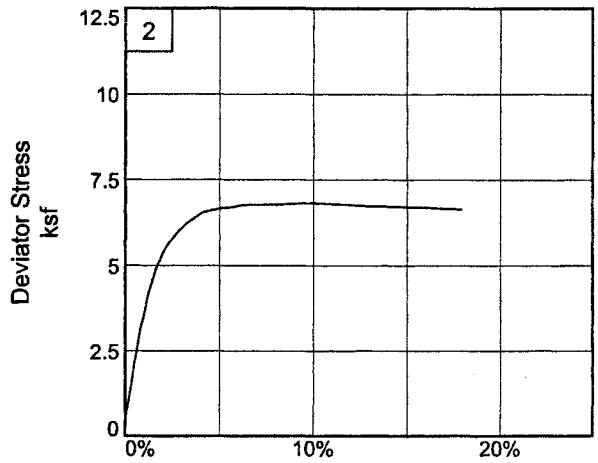
Proj. No.: 6738-05-4573 **Date:** 6-28-05

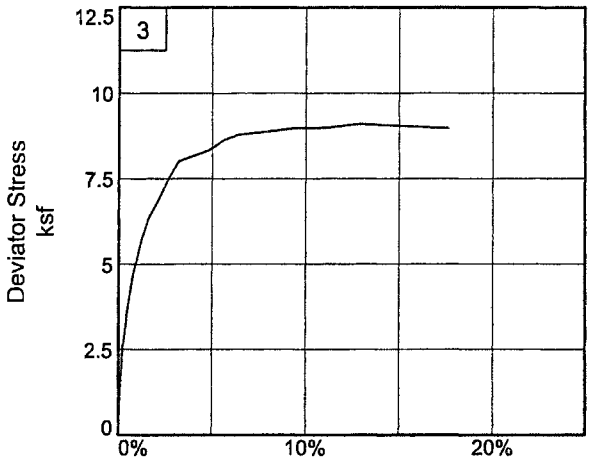
TRIAXIAL SHEAR TEST REPORT

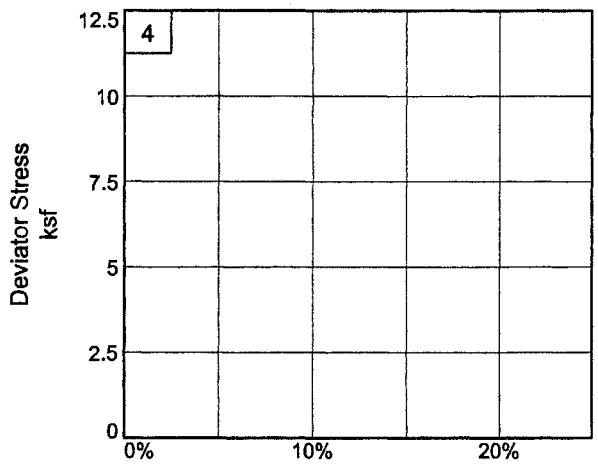
MACTEC ENGINEERING AND CONSULTING, INC.

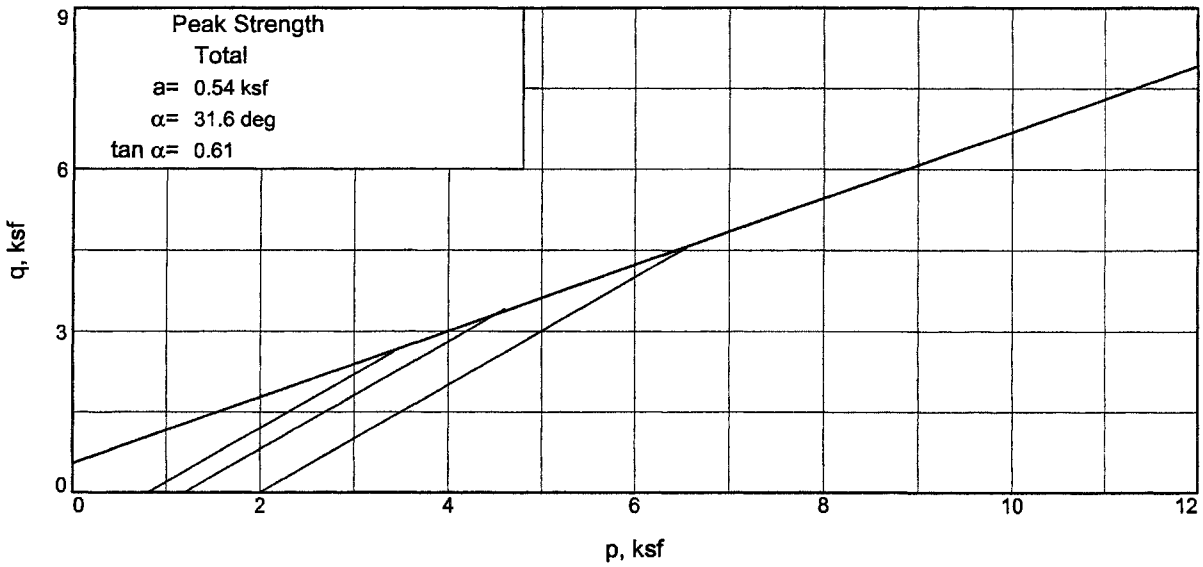
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
9:03 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Samples moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	114.180		409.300
Moisture content: Dry soil+tare, gms.	102.630		360.550
Moisture content: Tare, gms.	30.350		52.330
Moisture, %	16.0	20.9	15.8
Moist specimen weight, gms.	1225.7		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.29	
Height, in.	5.87	5.85	
Net decrease in height, in.		0.02	
Wet Density, pcf	125.6	132.2	
Dry density, pcf	108.3	109.4	
Void ratio	0.5925	0.5763	
Saturation, %	74.5	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 5.23 ksf **at reading no.** 28

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	31.0	14.4	0.0	0.33	0.81	1.13	1.41		0.97
2	0.0050	78.0	36.1	0.1	0.83	0.81	1.63	2.02		1.22
3	0.0100	121.0	56.0	0.2	1.28	0.81	2.09	2.59		1.45
4	0.0150	148.0	68.5	0.3	1.56	0.81	2.37	2.94		1.59
5	0.0200	172.0	79.6	0.3	1.82	0.81	2.62	3.25		1.71
6	0.0250	193.0	89.4	0.4	2.04	0.81	2.84	3.53		1.82
7	0.0300	210.0	97.2	0.5	2.21	0.81	3.02	3.75		1.91
8	0.0350	227.0	105.1	0.6	2.39	0.81	3.20	3.97		2.00
9	0.0400	243.0	112.5	0.7	2.56	0.81	3.36	4.17		2.09
10	0.0450	256.0	118.5	0.8	2.69	0.81	3.50	4.34		2.15
11	0.0500	268.0	124.1	0.9	2.82	0.81	3.62	4.49		2.21
12	0.0750	312.0	144.5	1.3	3.26	0.81	4.07	5.05		2.44
13	0.1000	352.0	163.0	1.7	3.67	0.81	4.47	5.55		2.64
14	0.1250	374.0	173.2	2.1	3.88	0.81	4.69	5.81		2.75
15	0.1500	397.0	183.8	2.6	4.10	0.81	4.91	6.08		2.86
16	0.1750	410.0	189.8	3.0	4.21	0.81	5.02	6.23		2.91
17	0.2000	425.0	196.8	3.4	4.35	0.81	5.16	6.39		2.98
18	0.2500	443.0	205.1	4.3	4.49	0.81	5.30	6.57		3.05
19	0.3000	455.0	210.7	5.1	4.57	0.81	5.38	6.67		3.09
20	0.3500	473.0	219.0	6.0	4.71	0.81	5.52	6.84		3.16
21	0.4000	486.0	225.0	6.8	4.80	0.81	5.60	6.95		3.21
22	0.5000	500.0	231.5	8.5	4.85	0.81	5.65	7.01		3.23
23	0.6000	512.0	237.1	10.3	4.87	0.81	5.68	7.04		3.24
24	0.7000	537.0	248.6	12.0	5.01	0.81	5.82	7.21		3.31
25	0.8000	552.0	255.6	13.7	5.05	0.81	5.86	7.26		3.33
26	0.9000	577.0	267.2	15.4	5.17	0.81	5.98	7.42		3.39
27	1.0000	591.0	273.6	17.1	5.19	0.81	6.00	7.44		3.40
28	1.1000	608.0	281.5	18.8	5.23	0.81	6.04	7.49		3.42

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	106.780		858.900
Moisture content: Dry soil+tare, gms.	96.220		771.000
Moisture content: Tare, gms.	31.520		230.300
Moisture, %	16.3	21.3	16.3
Moist specimen weight, gms.	1284.2		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.31	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	125.6	131.7	
Dry density, pcf	108.0	108.5	
Void ratio	0.5972	0.5886	
Saturation, %	75.5	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.81 ksf **at reading no.** 23

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	37.0	17.1	0.0	0.39	1.20	1.59	1.33		1.39
2	0.0050	62.0	28.7	0.1	0.65	1.20	1.85	1.55		1.52
3	0.0100	90.0	41.7	0.2	0.95	1.20	2.14	1.79		1.67
4	0.0150	115.0	53.2	0.2	1.21	1.20	2.41	2.01		1.80
5	0.0200	141.0	65.3	0.3	1.48	1.20	2.68	2.24		1.94
6	0.0250	168.0	77.8	0.4	1.77	1.20	2.96	2.48		2.08
7	0.0300	195.0	90.3	0.5	2.05	1.20	3.24	2.71		2.22
8	0.0350	220.0	101.9	0.6	2.31	1.20	3.51	2.93		2.35
9	0.0400	245.0	113.4	0.7	2.57	1.20	3.77	3.15		2.48
10	0.0450	270.0	125.0	0.7	2.83	1.20	4.03	3.37		2.61
11	0.0500	296.0	137.0	0.8	3.10	1.20	4.30	3.59		2.75
12	0.0750	395.0	182.9	1.2	4.12	1.20	5.32	4.45		3.26
13	0.1000	467.0	216.2	1.6	4.85	1.20	6.05	5.06		3.62
14	0.1250	520.0	240.8	2.0	5.38	1.20	6.58	5.50		3.89
15	0.1500	555.0	257.0	2.4	5.72	1.20	6.91	5.79		4.05
16	0.1750	584.0	270.4	2.9	5.99	1.20	7.19	6.01		4.19
17	0.2000	608.0	281.5	3.3	6.21	1.20	7.41	6.20		4.30
18	0.2500	644.0	298.2	4.1	6.53	1.20	7.72	6.46		4.46
19	0.3000	660.0	305.6	4.9	6.63	1.20	7.83	6.55		4.51
20	0.3500	672.0	311.1	5.7	6.69	1.20	7.89	6.60		4.54
21	0.4000	685.0	317.2	6.5	6.76	1.20	7.96	6.66		4.58
22	0.5000	697.0	322.7	8.1	6.76	1.20	7.96	6.66		4.58
23	0.6000	715.0	331.0	9.8	6.81	1.20	8.01	6.70		4.60
24	0.7000	724.0	335.2	11.4	6.78	1.20	7.97	6.67		4.58

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	731.0	338.5	13.0	6.72	1.20	7.91	6.62		4.55
26	0.9000	743.0	344.0	14.7	6.70	1.20	7.89	6.60		4.54
27	1.0000	755.0	349.6	16.3	6.68	1.20	7.87	6.59		4.53
28	1.1000	764.0	353.7	17.9	6.62	1.20	7.82	6.54		4.51

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	137.560		345.130
Moisture content: Dry soil+tare, gms.	122.830		304.400
Moisture content: Tare, gms.	31.780		49.860
Moisture, %	16.2	20.9	16.0
Moist specimen weight, gms.	1305.0		
Diameter, in.	2.84	2.82	
Area, in.^{2}	6.33	6.27	
Height, in.	6.28	6.25	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.0	132.2	
Dry density, pcf	107.6	109.3	
Void ratio	0.6030	0.5770	
Saturation, %	74.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

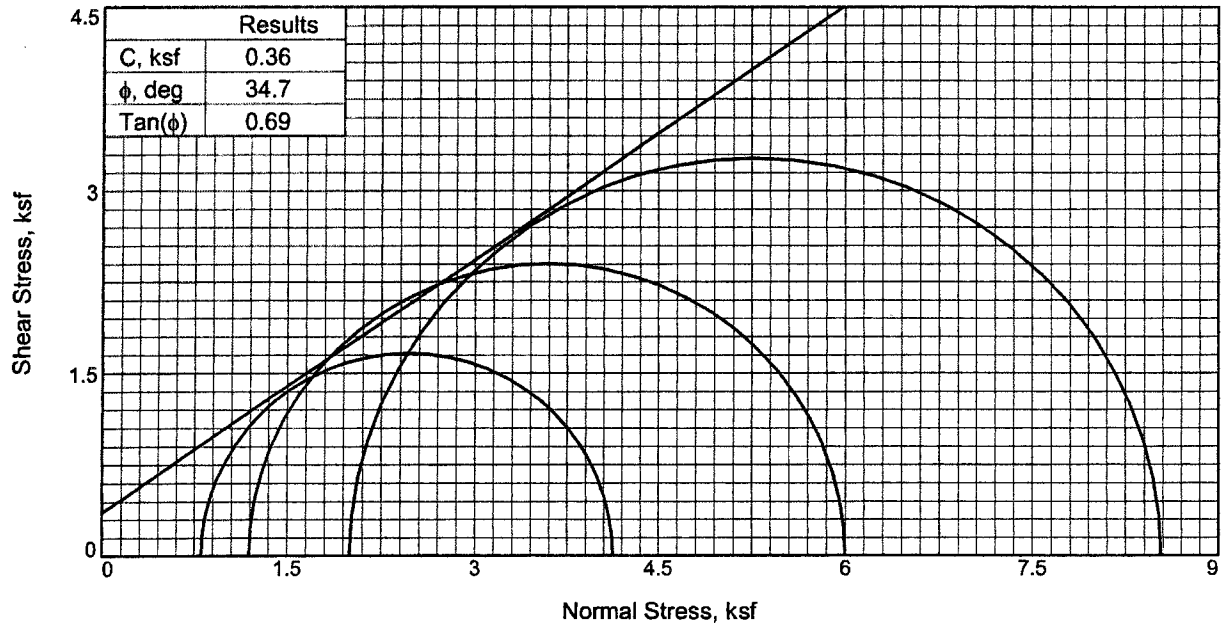
Strain rate, in./min. = 0.05

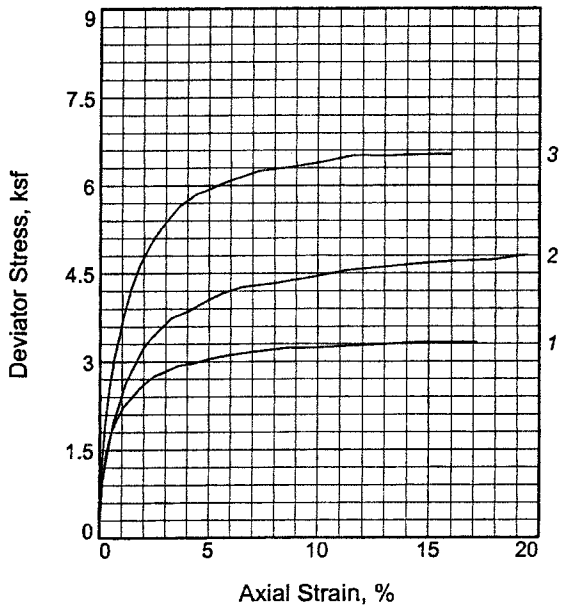
Fail. Stress = 9.09 ksf **at reading no.** 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	32.0	14.8	0.0	0.34	2.00	2.34	1.17		2.17
2	0.0050	118.0	54.6	0.1	1.25	2.00	3.26	1.63		2.63
3	0.0100	188.0	87.0	0.2	2.00	2.00	4.00	2.00		3.00
4	0.0150	242.0	112.0	0.2	2.57	2.00	4.57	2.28		3.29
5	0.0200	281.0	130.1	0.3	2.98	2.00	4.98	2.49		3.49
6	0.0250	313.0	144.9	0.4	3.32	2.00	5.32	2.66		3.66
7	0.0300	348.0	161.1	0.5	3.68	2.00	5.69	2.84		3.84
8	0.0350	375.0	173.6	0.6	3.97	2.00	5.97	2.98		3.99
9	0.0400	403.0	186.6	0.6	4.26	2.00	6.26	3.13		4.13
10	0.0450	427.0	197.7	0.7	4.51	2.00	6.51	3.25		4.26
11	0.0500	446.0	206.5	0.8	4.71	2.00	6.71	3.35		4.36
12	0.0750	538.0	249.1	1.2	5.66	2.00	7.66	3.83		4.83
13	0.1000	605.0	280.1	1.6	6.33	2.00	8.34	4.16		5.17
14	0.1250	645.0	298.6	2.0	6.73	2.00	8.73	4.36		5.36
15	0.1500	690.0	319.5	2.4	7.17	2.00	9.17	4.58		5.58
16	0.1750	737.0	341.2	2.8	7.62	2.00	9.62	4.81		5.81

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
17	0.2000	777.0	359.8	3.2	8.00	2.00	10.00	5.00		6.00
18	0.3000	821.0	380.1	4.8	8.32	2.00	10.32	5.15		6.16
19	0.3500	858.0	397.3	5.6	8.62	2.00	10.62	5.31		6.31
20	0.4000	882.0	408.4	6.4	8.78	2.00	10.79	5.39		6.39
21	0.5000	907.0	419.9	8.0	8.88	2.00	10.88	5.44		6.44
22	0.6000	934.0	432.4	9.6	8.98	2.00	10.98	5.49		6.49
23	0.7000	951.0	440.3	11.2	8.98	2.00	10.99	5.49		6.49
24	0.8000	980.0	453.7	12.8	9.09	2.00	11.09	5.54		6.55
25	0.9000	995.0	460.7	14.4	9.06	2.00	11.06	5.53		6.53
26	1.0000	1008.0	466.7	16.0	9.01	2.00	11.01	5.50		6.51
27	1.1000	1023.0	473.6	17.6	8.97	2.00	10.97	5.48		6.49





Sample No.		1	2	3
Initial	Water Content,	16.2	16.3	16.3
	Dry Density, pcf	103.5	100.7	101.2
	Saturation,	67.4	63.2	63.8
	Void Ratio	0.6653	0.7122	0.7043
	Diameter, in.	2.84	2.84	2.84
	Height, in.	7.04	6.19	6.89
At Test	Water Content,	22.7	25.2	24.9
	Dry Density, pcf	105.9	101.7	102.2
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6278	0.6957	0.6866
	Diameter, in.	2.82	2.83	2.83
	Height, in.	6.99	6.17	6.87
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		3.32	4.80	6.53
Ult. Stress, ksf				
σ_1 Failure, ksf		4.13	6.00	8.53
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test:
Unconsolidated Undrained

Sample Type: Remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: Specimen cured 14 days after molding.

Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-90% 14 day cured

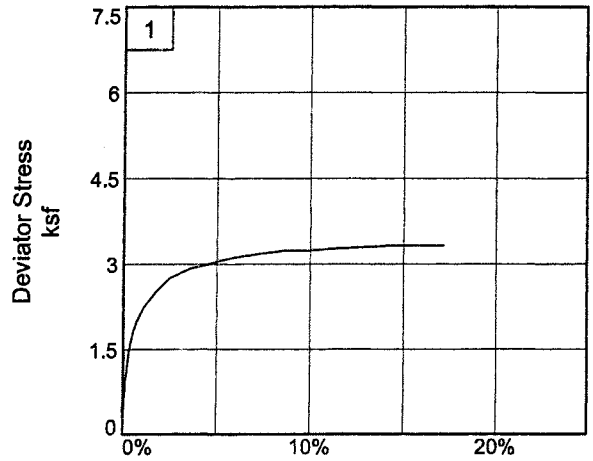
Proj. No.: 6738-05-4573 **Date:** 7/12/05

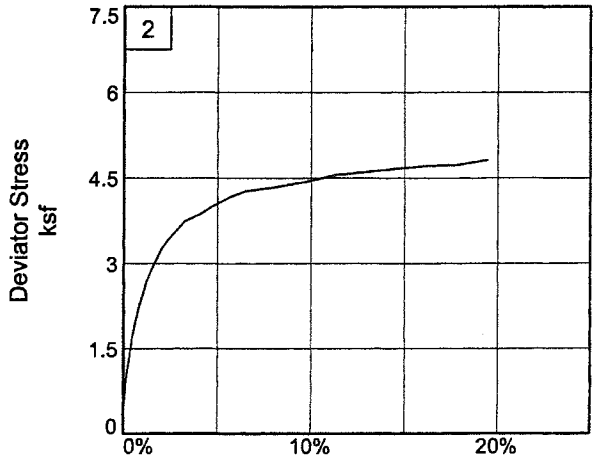
TRIAXIAL SHEAR TEST REPORT

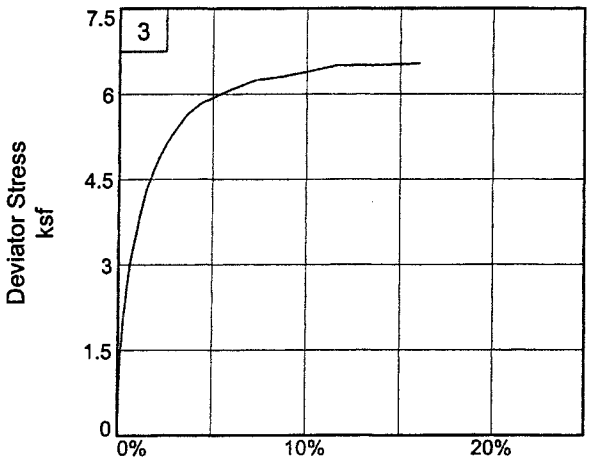
MACTEC ENGINEERING AND CONSULTING, INC.

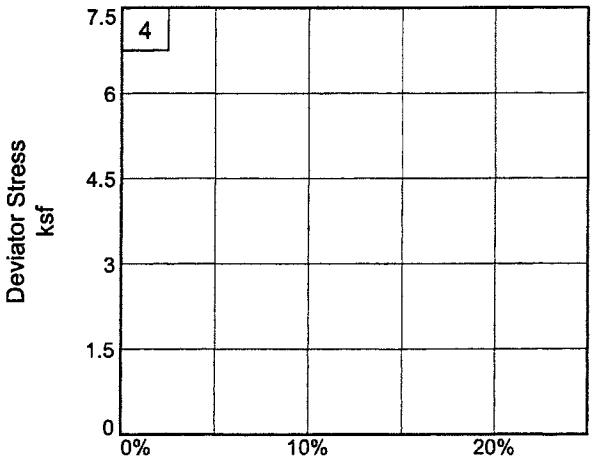
Reviewed By _____

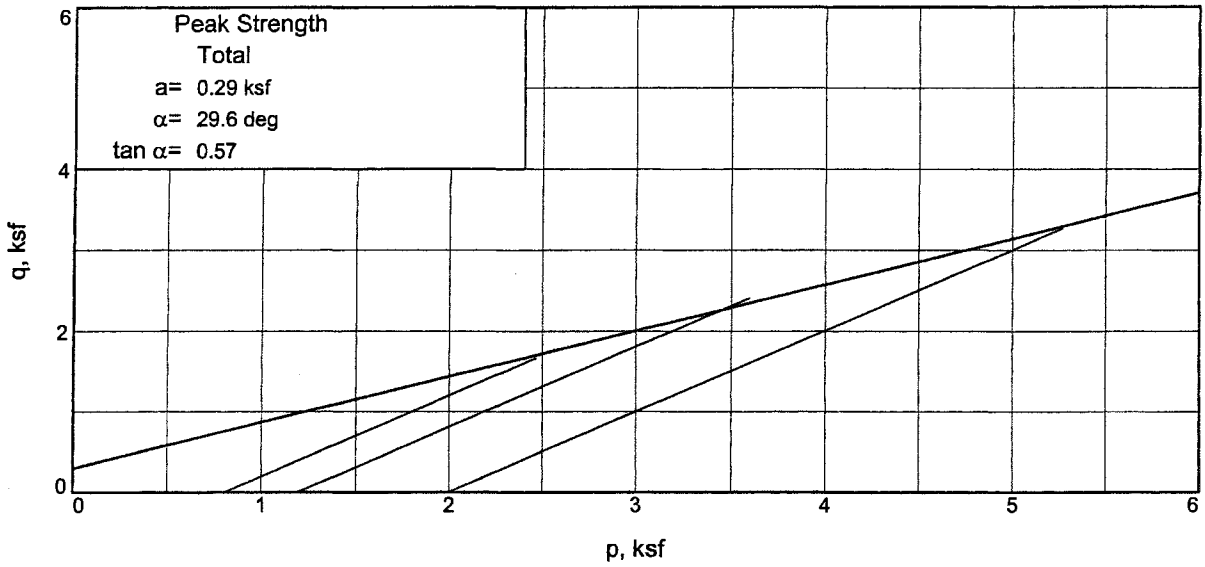
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
8:57 AM

Date: 7/12/05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimen cured 14 days after molding.
Type of Sample: Remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	112.710		1524.300
Moisture content: Dry soil+tare, gms.	100.400		1328.800
Moisture content: Tare, gms.	24.580		115.390
Moisture, %	16.2	22.7	16.1
Moist specimen weight, gms.	1408.9		
Diameter, in.	2.84	2.82	
Area, in.^{2}	6.33	6.24	
Height, in.	7.04	6.99	
Net decrease in height, in.		0.05	
Wet Density, pcf	120.4	130.0	
Dry density, pcf	103.5	105.9	
Void ratio	0.6653	0.6278	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 3.32 ksf **at reading no.** 28

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	20.0	9.3	0.0	0.21	0.81	1.02	1.26		0.91
2	0.0050	56.0	25.9	0.1	0.60	0.81	1.40	1.74		1.11
3	0.0100	93.0	43.1	0.1	0.99	0.81	1.80	2.23		1.30
4	0.0150	107.0	49.5	0.2	1.14	0.81	1.95	2.41		1.38
5	0.0200	130.0	60.2	0.3	1.39	0.81	2.19	2.72		1.50
6	0.0250	142.0	65.7	0.4	1.51	0.81	2.32	2.87		1.56
7	0.0300	153.0	70.8	0.4	1.63	0.81	2.43	3.02		1.62
8	0.0350	164.0	75.9	0.5	1.74	0.81	2.55	3.16		1.68
9	0.0400	173.0	80.1	0.6	1.84	0.81	2.64	3.28		1.73
10	0.0450	178.0	82.4	0.6	1.89	0.81	2.70	3.34		1.75
11	0.0500	186.0	86.1	0.7	1.97	0.81	2.78	3.45		1.79
12	0.0750	210.0	97.2	1.1	2.22	0.81	3.03	3.75		1.92
13	0.1000	226.0	104.6	1.4	2.38	0.81	3.19	3.95		2.00
14	0.1250	241.0	111.6	1.8	2.53	0.81	3.34	4.14		2.07
15	0.1500	253.0	117.1	2.1	2.65	0.81	3.45	4.28		2.13
16	0.1750	264.0	122.2	2.5	2.75	0.81	3.56	4.41		2.18
17	0.2000	270.0	125.0	2.9	2.80	0.81	3.61	4.48		2.21
18	0.2500	283.0	131.0	3.6	2.92	0.81	3.72	4.62		2.26
19	0.3000	290.0	134.3	4.3	2.97	0.81	3.77	4.68		2.29
20	0.3500	299.0	138.4	5.0	3.03	0.81	3.84	4.76		2.32
21	0.4000	307.0	142.1	5.7	3.09	0.81	3.90	4.84		2.35
22	0.5000	319.0	147.7	7.2	3.16	0.81	3.97	4.92		2.39
23	0.6000	330.0	152.8	8.6	3.22	0.81	4.03	5.00		2.42
24	0.7000	336.0	155.6	10.0	3.23	0.81	4.04	5.01		2.42
25	0.8000	345.0	159.7	11.4	3.26	0.81	4.07	5.05		2.44
26	0.9000	353.0	163.4	12.9	3.29	0.81	4.09	5.08		2.45
27	1.0000	362.0	167.6	14.3	3.31	0.81	4.12	5.11		2.46
28	1.1000	369.0	170.8	15.7	3.32	0.81	4.13	5.12		2.47
29	1.2000	375.0	173.6	17.2	3.32	0.81	4.13	5.12		2.47

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.110		1314.500
Moisture content: Dry soil+tare, gms.	109.300		1148.100
Moisture content: Tare, gms.	30.670		108.500
Moisture, %	16.3	25.2	16.0
Moist specimen weight, gms.	1205.4		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	6.19	6.17	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.1	127.3	
Dry density, pcf	100.7	101.7	
Void ratio	0.7122	0.6957	
Saturation, %	63.2	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.80 ksf **at reading no.** 29

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	25.0	11.6	0.0	0.26	1.20	1.46	1.22		1.33
2	0.0050	68.0	31.5	0.1	0.72	1.20	1.91	1.60		1.56
3	0.0100	94.0	43.5	0.2	0.99	1.20	2.19	1.83		1.69
4	0.0150	113.0	52.3	0.2	1.19	1.20	2.39	2.00		1.79
5	0.0200	130.0	60.2	0.3	1.37	1.20	2.57	2.15		1.88
6	0.0250	146.0	67.6	0.4	1.54	1.20	2.74	2.29		1.97
7	0.0300	162.0	75.0	0.5	1.71	1.20	2.90	2.43		2.05
8	0.0350	175.0	81.0	0.6	1.84	1.20	3.04	2.54		2.12
9	0.0400	189.0	87.5	0.6	1.99	1.20	3.18	2.66		2.19
10	0.0450	197.0	91.2	0.7	2.07	1.20	3.27	2.73		2.23
11	0.0500	208.0	96.3	0.8	2.19	1.20	3.38	2.83		2.29
12	0.0750	255.0	118.1	1.2	2.67	1.20	3.86	3.23		2.53
13	0.1000	285.0	132.0	1.6	2.97	1.20	4.17	3.49		2.68
14	0.1250	313.0	144.9	2.0	3.25	1.20	4.44	3.72		2.82
15	0.1500	332.0	153.7	2.4	3.43	1.20	4.63	3.87		2.91
16	0.1750	348.0	161.1	2.8	3.58	1.20	4.78	4.00		2.99
17	0.2000	364.0	168.5	3.2	3.73	1.20	4.93	4.12		3.06
18	0.2500	379.0	175.5	4.1	3.85	1.20	5.05	4.22		3.12
19	0.3000	399.0	184.7	4.9	4.02	1.20	5.22	4.36		3.21
20	0.3500	416.0	192.6	5.7	4.16	1.20	5.35	4.48		3.27
21	0.4000	430.0	199.1	6.5	4.26	1.20	5.46	4.56		3.33
22	0.5000	445.0	206.0	8.1	4.33	1.20	5.53	4.62		3.36
23	0.6000	463.0	214.4	9.7	4.43	1.20	5.62	4.70		3.41
24	0.7000	484.0	224.1	11.3	4.55	1.20	5.74	4.80		3.47

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	499.0	231.0	13.0	4.60	1.20	5.80	4.85		3.50
26	0.9000	515.0	238.4	14.6	4.66	1.20	5.85	4.90		3.53
27	1.0000	530.0	245.4	16.2	4.70	1.20	5.90	4.94		3.55
28	1.1000	542.0	250.9	17.8	4.72	1.20	5.91	4.95		3.55
29	1.2000	563.0	260.7	19.4	4.80	1.20	6.00	5.02		3.60

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	113.500		1454.600
Moisture content: Dry soil+tare, gms.	101.810		1264.500
Moisture content: Tare, gms.	30.010		106.100
Moisture, %	16.3	24.9	16.4
Moist specimen weight, gms.	1347.8		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.29	
Height, in.	6.89	6.87	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.6	127.6	
Dry density, pcf	101.2	102.2	
Void ratio	0.7043	0.6866	
Saturation, %	63.8	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

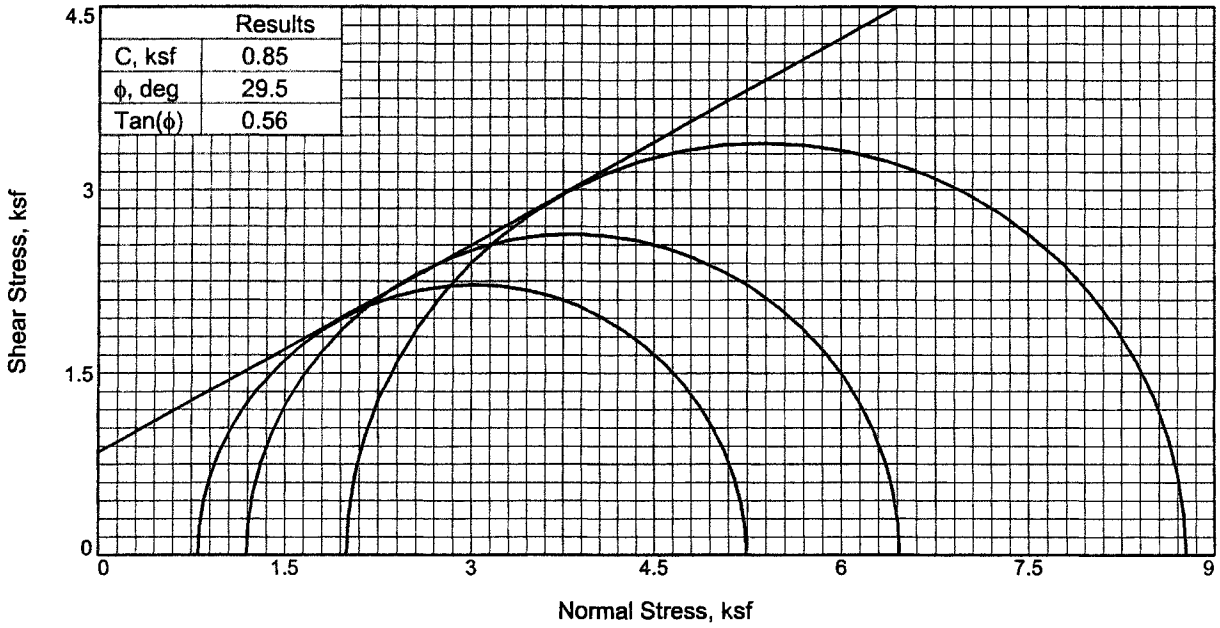
Strain rate, in./min. = 0.05

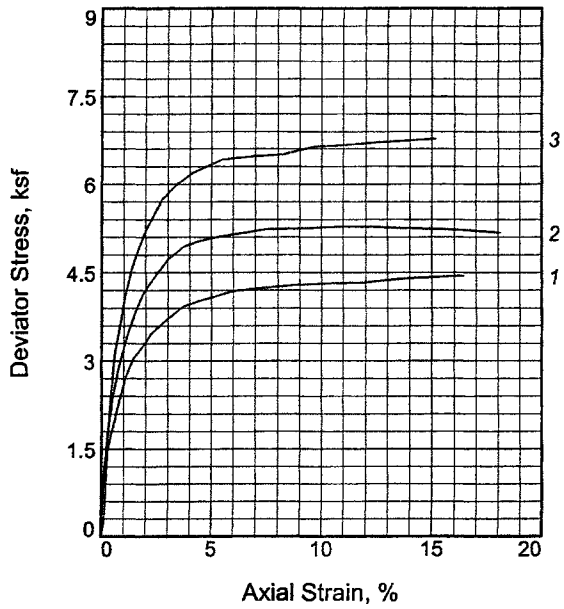
Fail. Stress = 6.53 ksf **at reading no.** 28

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	15.0	6.9	0.0	0.16	2.00	2.16	1.08		2.08
2	0.0050	87.0	40.3	0.1	0.92	2.00	2.92	1.46		2.46
3	0.0100	138.0	63.9	0.1	1.46	2.00	3.46	1.73		2.73
4	0.0150	170.0	78.7	0.2	1.80	2.00	3.80	1.90		2.90
5	0.0200	193.0	89.4	0.3	2.04	2.00	4.04	2.02		3.02
6	0.0250	217.0	100.5	0.4	2.29	2.00	4.29	2.14		3.15
7	0.0300	237.0	109.7	0.4	2.50	2.00	4.50	2.25		3.25
8	0.0350	255.0	118.1	0.5	2.69	2.00	4.69	2.34		3.35
9	0.0400	272.0	125.9	0.6	2.87	2.00	4.87	2.43		3.43
10	0.0450	290.0	134.3	0.7	3.05	2.00	5.06	2.53		3.53
11	0.0500	300.0	138.9	0.7	3.16	2.00	5.16	2.58		3.58
12	0.0750	360.0	166.7	1.1	3.77	2.00	5.78	2.89		3.89
13	0.1000	408.0	188.9	1.5	4.26	2.00	6.26	3.13		4.13
14	0.1250	445.0	206.0	1.8	4.63	2.00	6.63	3.31		4.32
15	0.1500	473.0	219.0	2.2	4.90	2.00	6.91	3.45		4.45

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	497.0	230.1	2.5	5.13	2.00	7.13	3.56		4.57
17	0.2000	517.0	239.4	2.9	5.32	2.00	7.32	3.66		4.66
18	0.2500	553.0	256.0	3.6	5.65	2.00	7.65	3.82		4.83
19	0.3000	576.0	266.7	4.4	5.84	2.00	7.84	3.92		4.92
20	0.3500	591.0	273.6	5.1	5.94	2.00	7.95	3.97		4.97
21	0.4000	607.0	281.0	5.8	6.06	2.00	8.06	4.03		5.03
22	0.5000	635.0	294.0	7.3	6.24	2.00	8.24	4.12		5.12
23	0.6000	652.0	301.9	8.7	6.31	2.00	8.31	4.15		5.15
24	0.7000	672.0	311.1	10.2	6.40	2.00	8.40	4.20		5.20
25	0.8000	695.0	321.8	11.7	6.51	2.00	8.51	4.25		5.26
26	0.9000	706.0	326.9	13.1	6.50	2.00	8.50	4.25		5.25
27	1.0000	720.0	333.4	14.6	6.52	2.00	8.52	4.26		5.26
28	1.1000	734.0	339.8	16.0	6.53	2.00	8.53	4.26		5.27





Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.3
	Dry Density, pcf	105.1	105.8	103.8
	Saturation,	69.7	71.1	68.1
	Void Ratio	0.6400	0.6298	0.6609
	Diameter, in.	2.85	2.84	2.84
	Height, in.	6.72	6.65	7.32
At Test	Water Content,	22.6	22.2	22.4
	Dry Density, pcf	106.1	106.9	106.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6254	0.6136	0.6189
	Diameter, in.	2.84	2.83	2.82
	Height, in.	6.70	6.63	7.26
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		4.44	5.27	6.77
Ult. Stress, ksf				
σ_1 Failure, ksf		5.24	6.47	8.77
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test:
Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: Specimens cured 14 days

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

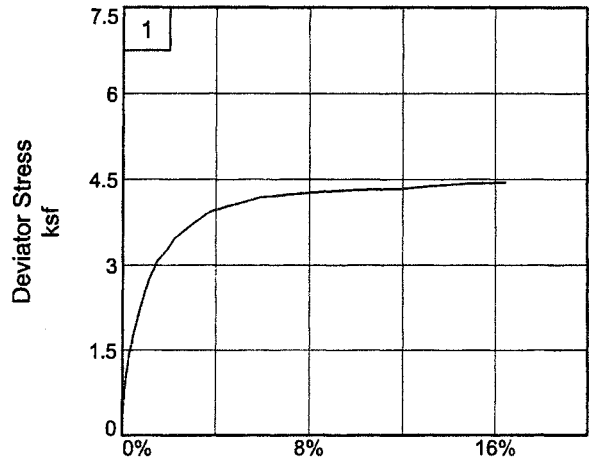
Sample Number: UU-90%-14 day cured

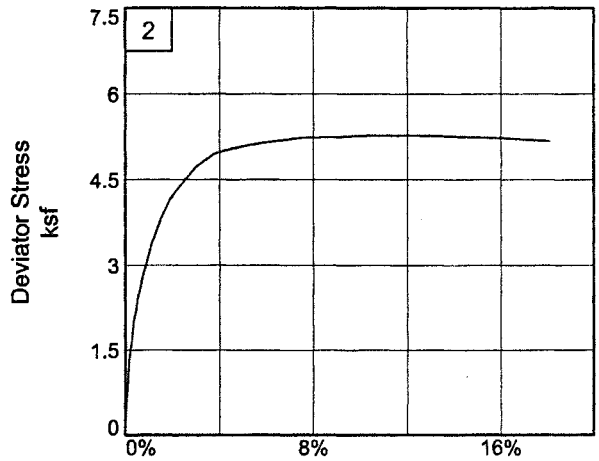
Proj. No.: 6738-05-4573 **Date:** 6-28-05

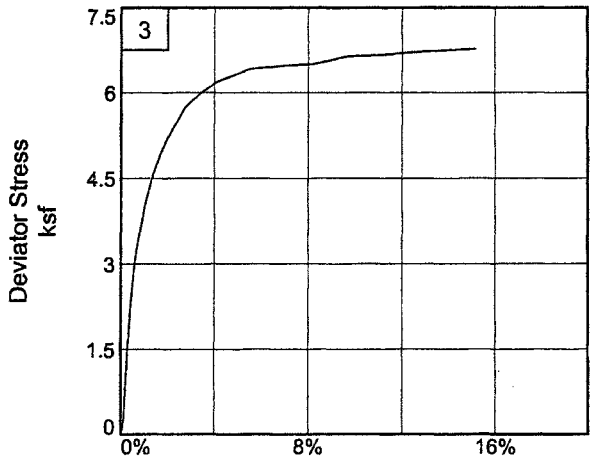
TRIAXIAL SHEAR TEST REPORT

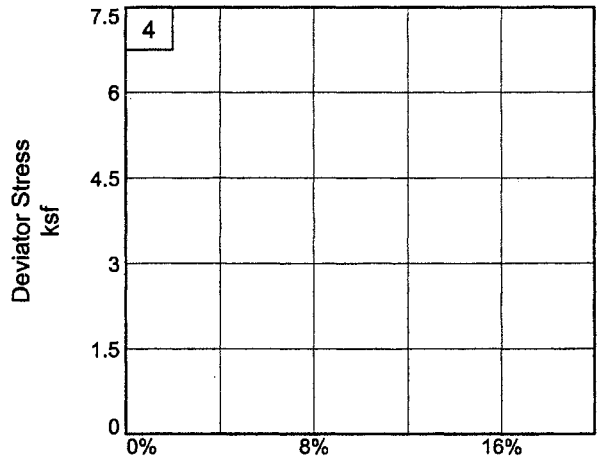
MACTEC ENGINEERING AND CONSULTING, INC.

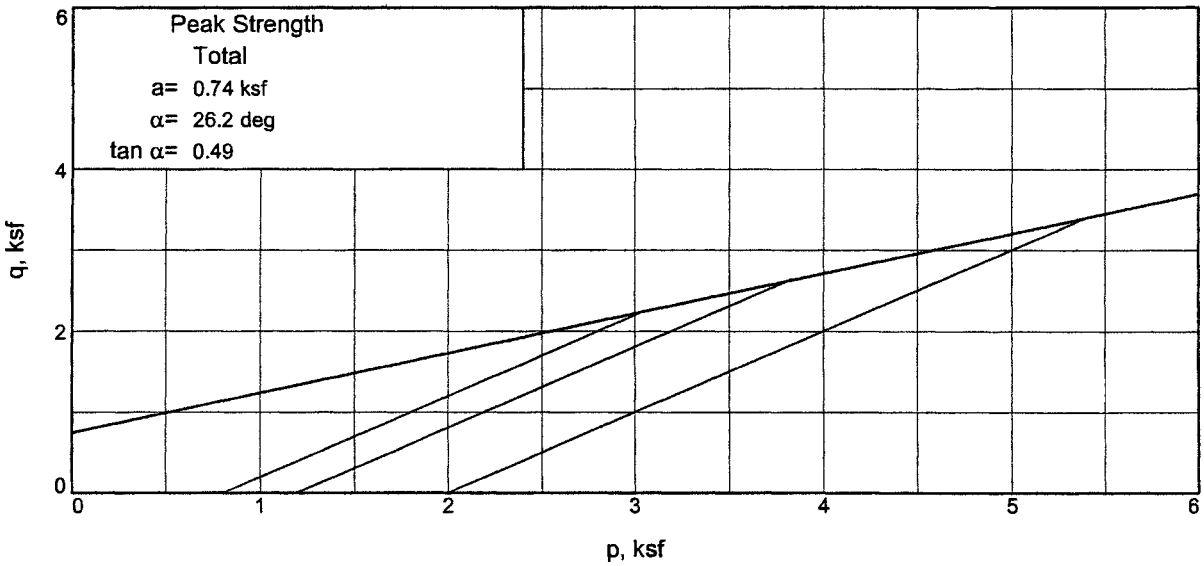
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
8:59 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimens cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	139.180		1490.700
Moisture content: Dry soil+tare, gms.	124.280		1300.300
Moisture content: Tare, gms.	32.030		116.290
Moisture, %	16.2	22.6	16.1
Moist specimen weight, gms.	1374.2		
Diameter, in.	2.85	2.84	
Area, in.^{2}	6.38	6.34	
Height, in.	6.72	6.70	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.1	130.1	
Dry density, pcf	105.1	106.1	
Void ratio	0.6400	0.6254	
Saturation, %	69.7	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.44 ksf **at reading no.** 27

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	23.0	10.6	0.0	0.24	0.81	1.05	1.30		0.93
2	0.0050	68.0	31.5	0.1	0.71	0.81	1.52	1.89		1.16
3	0.0100	98.0	45.4	0.1	1.03	0.81	1.84	2.28		1.32
4	0.0150	117.0	54.2	0.2	1.23	0.81	2.03	2.52		1.42
5	0.0200	138.0	63.9	0.3	1.45	0.81	2.25	2.79		1.53
6	0.0250	150.0	69.5	0.4	1.57	0.81	2.38	2.95		1.59
7	0.0300	167.0	77.3	0.4	1.75	0.81	2.55	3.17		1.68
8	0.0350	178.0	82.4	0.5	1.86	0.81	2.67	3.31		1.74
9	0.0400	188.0	87.0	0.6	1.96	0.81	2.77	3.44		1.79
10	0.0450	201.0	93.1	0.7	2.10	0.81	2.91	3.60		1.86
11	0.0500	211.0	97.7	0.7	2.20	0.81	3.01	3.73		1.91
12	0.0750	262.0	121.3	1.1	2.72	0.81	3.53	4.38		2.17
13	0.1000	296.0	137.0	1.5	3.07	0.81	3.87	4.80		2.34
14	0.1250	314.0	145.4	1.9	3.24	0.81	4.05	5.02		2.43
15	0.1500	337.0	156.0	2.2	3.46	0.81	4.27	5.30		2.54
16	0.2000	364.0	168.5	3.0	3.71	0.81	4.52	5.60		2.66
17	0.2500	388.0	179.6	3.7	3.93	0.81	4.73	5.87		2.77
18	0.3000	400.0	185.2	4.5	4.02	0.81	4.82	5.98		2.81
19	0.3500	411.0	190.3	5.2	4.10	0.81	4.90	6.08		2.85
20	0.4000	423.0	195.8	6.0	4.18	0.81	4.99	6.19		2.90
21	0.5000	436.0	201.9	7.5	4.24	0.81	5.05	6.26		2.93
22	0.6000	448.0	207.4	9.0	4.29	0.81	5.09	6.32		2.95
23	0.7000	458.0	212.1	10.4	4.31	0.81	5.12	6.35		2.96
24	0.8000	467.0	216.2	11.9	4.32	0.81	5.13	6.36		2.97
25	0.9000	482.0	223.2	13.4	4.39	0.81	5.19	6.44		3.00
26	1.0000	494.0	228.7	14.9	4.42	0.81	5.22	6.48		3.02
27	1.1000	505.0	233.8	16.4	4.44	0.81	5.24	6.50		3.03

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	93.510		1475.100
Moisture content: Dry soil+tare, gms.	84.650		1284.200
Moisture content: Tare, gms.	30.010		115.500
Moisture, %	16.2	22.2	16.3
Moist specimen weight, gms.	1359.6		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.29	
Height, in.	6.65	6.63	
Net decrease in height, in.		0.02	
Wet Density, pcf	123.0	130.6	
Dry density, pcf	105.8	106.9	
Void ratio	0.6298	0.6136	
Saturation, %	71.1	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 5.27 ksf **at reading no.** 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	20.0	9.3	0.0	0.21	1.20	1.41	1.18		1.30
2	0.0050	63.0	29.2	0.1	0.67	1.20	1.86	1.56		1.53
3	0.0100	110.0	50.9	0.2	1.16	1.20	2.36	1.97		1.78
4	0.0150	141.0	65.3	0.2	1.49	1.20	2.69	2.25		1.94
5	0.0200	166.0	76.9	0.3	1.75	1.20	2.95	2.47		2.07
6	0.0250	190.0	88.0	0.4	2.01	1.20	3.20	2.68		2.20
7	0.0300	205.0	94.9	0.5	2.16	1.20	3.36	2.81		2.28
8	0.0350	223.0	103.2	0.5	2.35	1.20	3.55	2.97		2.37
9	0.0400	239.0	110.7	0.6	2.52	1.20	3.71	3.11		2.45
10	0.0450	254.0	117.6	0.7	2.67	1.20	3.87	3.24		2.53
11	0.0500	268.0	124.1	0.8	2.82	1.20	4.01	3.36		2.60
12	0.0750	322.0	149.1	1.1	3.37	1.20	4.57	3.82		2.88
13	0.1000	365.0	169.0	1.5	3.81	1.20	5.00	4.19		3.10
14	0.1250	398.0	184.3	1.9	4.14	1.20	5.33	4.46		3.26
15	0.1500	420.0	194.5	2.3	4.35	1.20	5.54	4.64		3.37
16	0.1750	440.0	203.7	2.6	4.54	1.20	5.73	4.80		3.46
17	0.2000	460.0	213.0	3.0	4.73	1.20	5.92	4.95		3.56
18	0.2500	485.0	224.6	3.8	4.94	1.20	6.14	5.14		3.67
19	0.3000	498.0	230.6	4.5	5.04	1.20	6.23	5.21		3.71
20	0.3500	508.0	235.2	5.3	5.10	1.20	6.29	5.27		3.74
21	0.4000	517.0	239.4	6.0	5.15	1.20	6.34	5.31		3.77
22	0.5000	534.0	247.2	7.5	5.23	1.20	6.43	5.38		3.81
23	0.6000	544.0	251.9	9.1	5.24	1.20	6.44	5.39		3.82
24	0.7000	556.0	257.4	10.6	5.27	1.20	6.46	5.41		3.83

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	566.0	262.1	12.1	5.27	1.20	6.47	5.41		3.83
26	0.9000	574.0	265.8	13.6	5.26	1.20	6.45	5.40		3.82
27	1.0000	582.0	269.5	15.1	5.24	1.20	6.43	5.38		3.81
28	1.1000	590.0	273.2	16.6	5.21	1.20	6.41	5.36		3.80
29	1.2000	596.0	275.9	18.1	5.17	1.20	6.37	5.33		3.78

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	115.810		358.120
Moisture content: Dry soil+tare, gms.	103.080		315.900
Moisture content: Tare, gms.	25.010		54.860
Moisture, %	16.3	22.4	16.2
Moist specimen weight, gms.	1469.7		
Diameter, in.	2.84	2.82	
Area, in.^{2}	6.33	6.23	
Height, in.	7.32	7.26	
Net decrease in height, in.		0.06	
Wet Density, pcf	120.7	130.4	
Dry density, pcf	103.8	106.5	
Void ratio	0.6609	0.6189	
Saturation, %	68.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

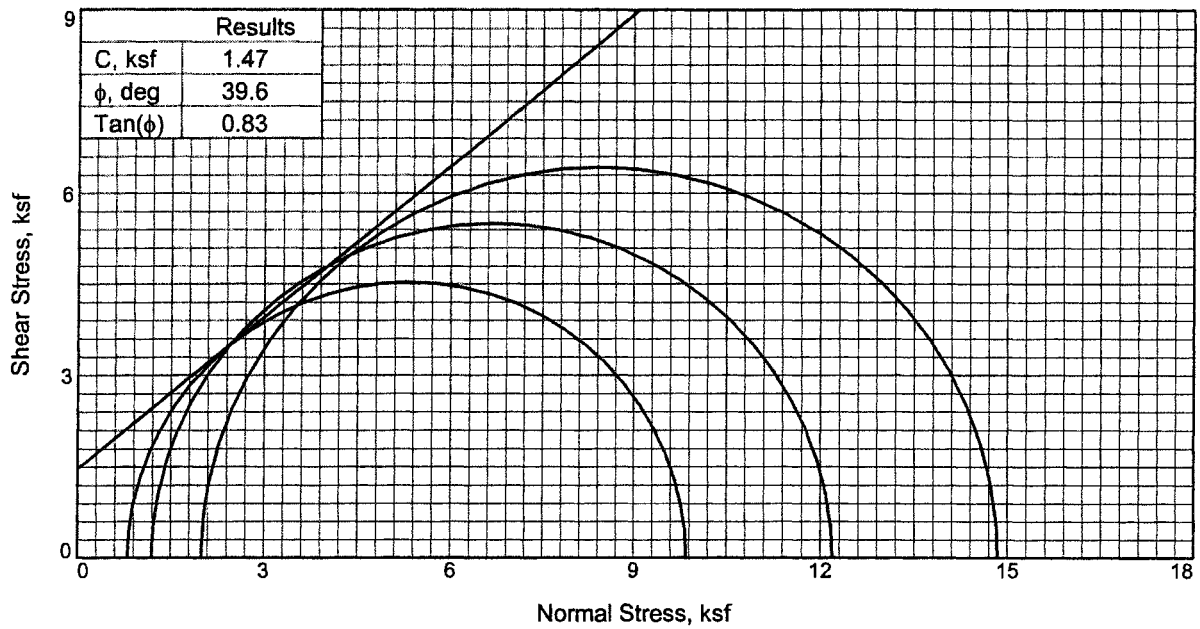
Strain rate, in./min. = 0.05

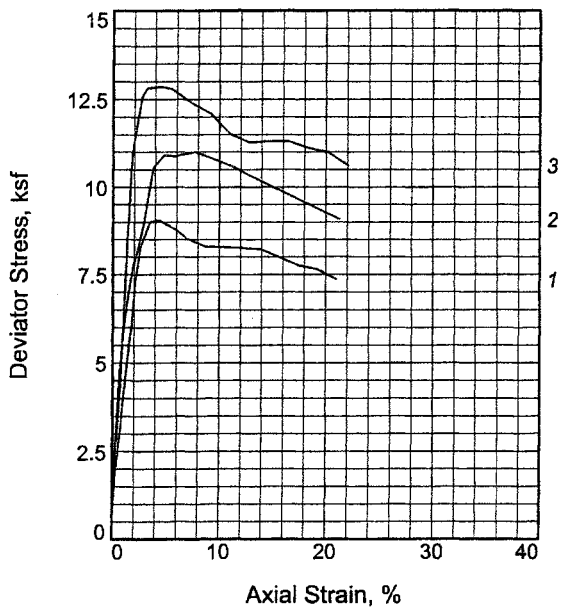
Fail. Stress = 6.77 ksf **at reading no.** 27

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	5.0	2.3	0.0	0.05	2.00	2.06	1.03		2.03
2	0.0050	7.0	3.2	0.1	0.07	2.00	2.08	1.04		2.04
3	0.0100	25.0	11.6	0.1	0.27	2.00	2.27	1.13		2.14
4	0.0150	80.0	37.0	0.2	0.85	2.00	2.86	1.43		2.43
5	0.0200	123.0	56.9	0.3	1.31	2.00	3.31	1.66		2.66
6	0.0250	175.0	81.0	0.3	1.87	2.00	3.87	1.93		2.94
7	0.0300	209.0	96.8	0.4	2.23	2.00	4.23	2.11		3.12
8	0.0350	240.0	111.1	0.5	2.56	2.00	4.56	2.28		3.28
9	0.0400	268.0	124.1	0.6	2.85	2.00	4.86	2.43		3.43
10	0.0450	290.0	134.3	0.6	3.09	2.00	5.09	2.54		3.54
11	0.0500	307.0	142.1	0.7	3.26	2.00	5.27	2.63		3.63
12	0.0750	378.0	175.0	1.0	4.01	2.00	6.01	3.00		4.00
13	0.1000	432.0	200.0	1.4	4.56	2.00	6.56	3.28		4.28
14	0.1250	470.0	217.6	1.7	4.95	2.00	6.95	3.47		4.47
15	0.1500	501.0	232.0	2.1	5.25	2.00	7.25	3.62		4.63

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.2000	552.0	255.6	2.8	5.75	2.00	7.75	3.87		4.88
17	0.2500	580.0	268.5	3.4	6.00	2.00	8.00	4.00		5.00
18	0.3000	603.0	279.2	4.1	6.19	2.00	8.19	4.09		5.10
19	0.3500	618.0	286.1	4.8	6.30	2.00	8.30	4.15		5.15
20	0.4000	634.0	293.5	5.5	6.41	2.00	8.42	4.20		5.21
21	0.5000	649.0	300.5	6.9	6.47	2.00	8.47	4.23		5.24
22	0.6000	662.0	306.5	8.3	6.50	2.00	8.50	4.25		5.25
23	0.7000	686.0	317.6	9.6	6.64	2.00	8.64	4.32		5.32
24	0.8000	699.0	323.6	11.0	6.66	2.00	8.66	4.33		5.33
25	0.9000	715.0	331.0	12.4	6.71	2.00	8.71	4.35		5.35
26	1.0000	730.0	338.0	13.8	6.74	2.00	8.74	4.37		5.37
27	1.1000	745.0	344.9	15.2	6.77	2.00	8.77	4.38		5.39





Sample No.		1	2	3
Initial	Water Content,	15.3	15.3	15.4
	Dry Density, pcf	109.5	109.0	108.9
	Saturation,	73.5	72.7	72.9
	Void Ratio	0.5754	0.5818	0.5835
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.73	5.23	5.47
At Test	Water Content,	20.4	19.3	20.3
	Dry Density, pcf	110.4	112.5	110.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5622	0.5331	0.5601
	Diameter, in.	2.83	2.81	2.83
	Height, in.	5.71	5.18	5.44
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		9.1	11.0	12.8
Ult. Stress, ksf				
σ_1 Failure, ksf		9.9	12.2	14.8
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-95%-B

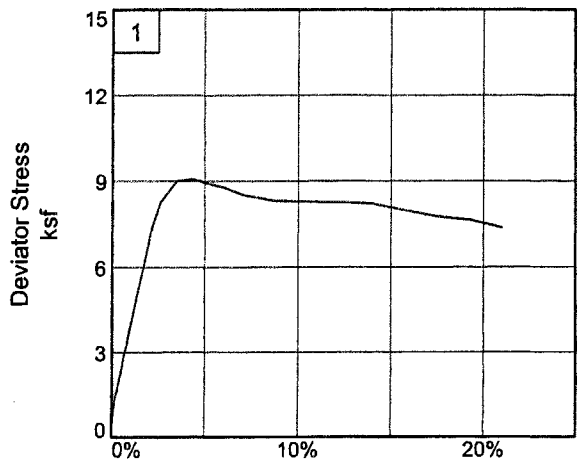
Proj. No.: 6738-05-4573 **Date:** 6-11-05

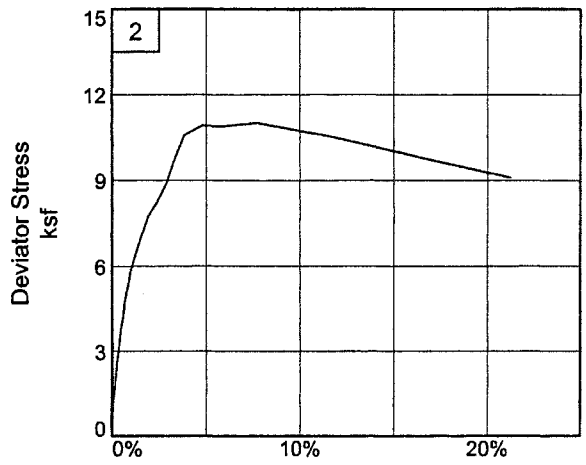
TRIAXIAL SHEAR TEST REPORT

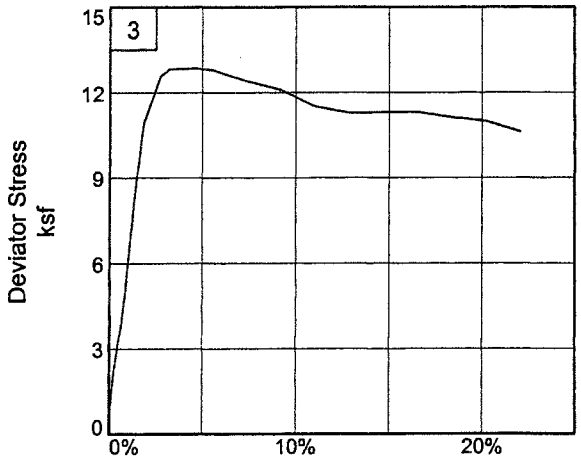
MACTEC ENGINEERING AND CONSULTING, INC.

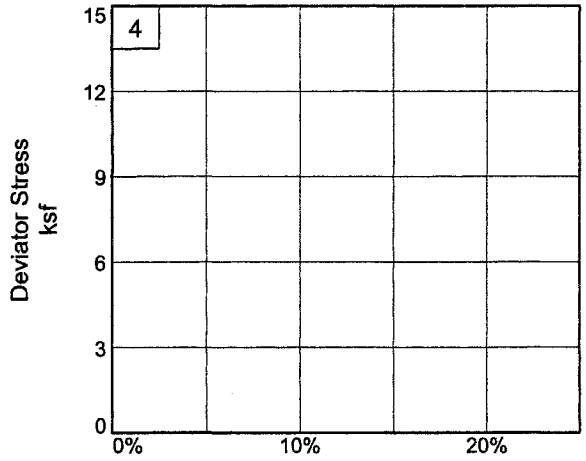
Reviewed By _____

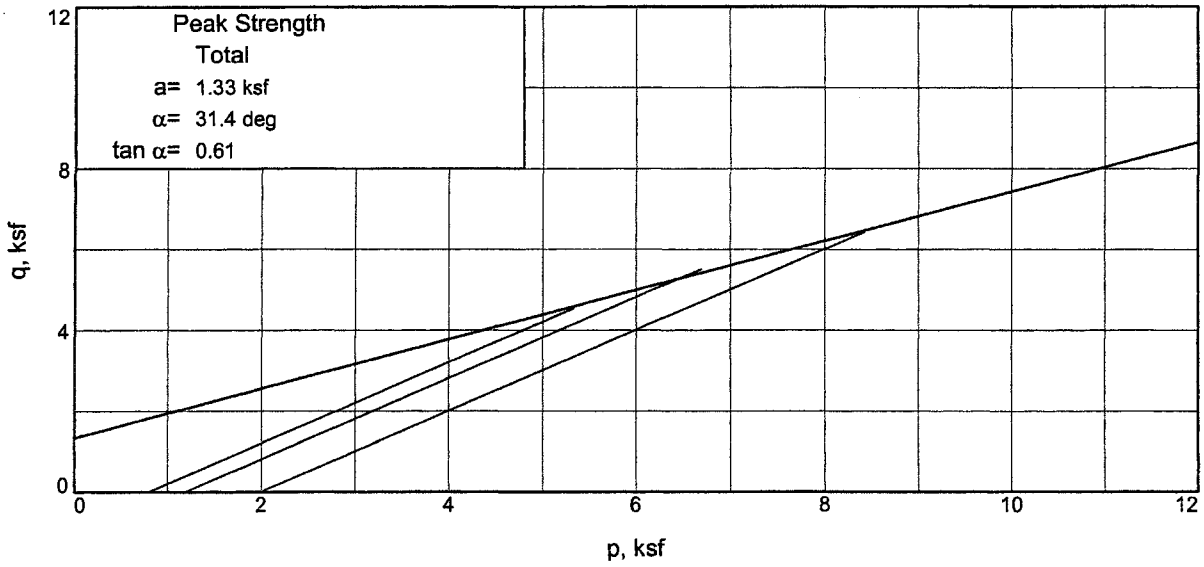
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:46 AM

Date: 6-11-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1340.400
Moisture content: Dry soil+tare, gms.	170.070		1175.600
Moisture content: Tare, gms.	52.090		116.300
Moisture, %	15.3	20.4	15.6
Moist specimen weight, gms.	1202.5		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.30	
Height, in.	5.73	5.71	
Net decrease in height, in.		0.02	
Wet Density, pcf	126.2	132.8	
Dry density, pcf	109.5	110.4	
Void ratio	0.5754	0.5622	
Saturation, %	73.5	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.05 ksf **at reading no.** 17

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	5.00	16.6	0.0	0.38	0.81	1.19	1.47		1.00
2	0.0050	12.00	39.8	0.1	0.91	0.81	1.71	2.13		1.26
3	0.0100	18.00	59.6	0.2	1.36	0.81	2.17	2.69		1.49
4	0.0150	22.00	72.9	0.3	1.66	0.81	2.47	3.06		1.64
5	0.0200	26.00	86.1	0.4	1.96	0.81	2.77	3.43		1.79
6	0.0250	29.00	96.1	0.4	2.19	0.81	2.99	3.71		1.90
7	0.0300	32.00	106.0	0.5	2.41	0.81	3.22	3.99		2.01
8	0.0350	36.00	119.3	0.6	2.71	0.81	3.52	4.36		2.16
9	0.0400	40.00	132.5	0.7	3.01	0.81	3.81	4.73		2.31
10	0.0450	43.00	142.5	0.8	3.23	0.81	4.04	5.01		2.42
11	0.0500	47.00	155.7	0.9	3.53	0.81	4.33	5.38		2.57
12	0.0750	65.00	215.3	1.3	4.86	0.81	5.66	7.02		3.24
13	0.1000	81.00	268.4	1.8	6.03	0.81	6.83	8.47		3.82
14	0.1250	100.00	331.3	2.2	7.41	0.81	8.21	10.19		4.51
15	0.1500	112.00	371.1	2.6	8.26	0.81	9.07	11.24		4.94
16	0.2000	123.00	407.5	3.5	8.99	0.81	9.80	12.15		5.30
17	0.2500	125.00	414.1	4.4	9.05	0.81	9.86	12.23		5.33
18	0.3000	124.00	410.8	5.3	8.90	0.81	9.70	12.03		5.26
19	0.3500	123.00	407.5	6.1	8.74	0.81	9.55	11.84		5.18
20	0.4000	121.00	400.9	7.0	8.52	0.81	9.33	11.57		5.07
21	0.5000	120.00	397.6	8.8	8.29	0.81	9.10	11.28		4.95
22	0.6000	122.00	404.2	10.5	8.27	0.81	9.08	11.25		4.94
23	0.7000	124.00	410.8	12.3	8.24	0.81	9.05	11.22		4.93
24	0.8000	126.00	417.4	14.0	8.21	0.81	9.01	11.18		4.91
25	0.9000	125.00	414.1	15.8	7.98	0.81	8.78	10.89		4.79
26	1.0000	124.00	410.8	17.5	7.75	0.81	8.55	10.61		4.68
27	1.1000	125.00	414.1	19.3	7.64	0.81	8.45	10.48		4.63
28	1.2000	123.00	407.5	21.0	7.36	0.81	8.17	10.13		4.49

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1199.200
Moisture content: Dry soil+tare, gms.	170.070		1052.600
Moisture content: Tare, gms.	52.090		115.000
Moisture, %	15.3	19.3	15.6
Moist specimen weight, gms.	1093.1		
Diameter, in.	2.84	2.81	
Area, in.²	6.33	6.20	
Height, in.	5.23	5.18	
Net decrease in height, in.		0.05	
Wet Density, pcf	125.7	134.2	
Dry density, pcf	109.0	112.5	
Void ratio	0.5818	0.5331	
Saturation, %	72.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 11.00 ksf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	5.00	16.6	0.0	0.38	1.20	1.58	1.32		1.39
2	0.0050	16.00	53.0	0.1	1.23	1.20	2.42	2.03		1.81
3	0.0100	26.00	86.1	0.2	2.00	1.20	3.19	2.67		2.19
4	0.0150	35.00	116.0	0.3	2.68	1.20	3.88	3.25		2.54
5	0.0200	41.00	135.8	0.4	3.14	1.20	4.34	3.63		2.77
6	0.0250	49.00	162.3	0.5	3.75	1.20	4.95	4.14		3.07
7	0.0300	54.00	178.9	0.6	4.13	1.20	5.32	4.45		3.26
8	0.0350	61.00	202.1	0.7	4.66	1.20	5.85	4.90		3.52
9	0.0400	66.00	218.7	0.8	5.04	1.20	6.23	5.21		3.71
10	0.0450	70.00	231.9	0.9	5.34	1.20	6.53	5.46		3.86
11	0.0500	76.00	251.8	1.0	5.79	1.20	6.98	5.84		4.09
12	0.0750	90.00	298.2	1.4	6.82	1.20	8.02	6.71		4.61
13	0.1000	103.00	341.2	1.9	7.77	1.20	8.96	7.50		5.08
14	0.1250	110.00	364.4	2.4	8.25	1.20	9.45	7.91		5.32
15	0.1500	119.00	394.2	2.9	8.89	1.20	10.08	8.43		5.64
16	0.1750	132.00	437.3	3.4	9.81	1.20	11.00	9.21		6.10
17	0.2000	143.00	473.8	3.9	10.57	1.20	11.77	9.85		6.48
18	0.2500	149.00	493.6	4.8	10.90	1.20	12.10	10.12		6.65
19	0.3000	150.00	497.0	5.8	10.87	1.20	12.06	10.09		6.63
20	0.4000	155.00	513.5	7.7	11.00	1.20	12.19	10.20		6.69
21	0.5000	155.00	513.5	9.7	10.77	1.20	11.96	10.01		6.58
22	0.6000	155.00	513.5	11.6	10.54	1.20	11.73	9.82		6.46
23	0.7000	154.00	510.2	13.5	10.24	1.20	11.44	9.57		6.32
24	0.8000	153.00	506.9	15.5	9.95	1.20	11.14	9.32		6.17

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.9000	152.00	503.6	17.4	9.66	1.20	10.85	9.08		6.02
26	1.0000	151.00	500.3	19.3	9.37	1.20	10.56	8.84		5.88
27	1.1000	150.00	497.0	21.3	9.08	1.20	10.28	8.60		5.74

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	189.370		1256.200
Moisture content: Dry soil+tare, gms.	171.030		1099.800
Moisture content: Tare, gms.	51.890		98.400
Moisture, %	15.4	20.3	15.6
Moist specimen weight, gms.	1142.9		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.27	
Height, in.	5.47	5.44	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.7	132.9	
Dry density, pcf	108.9	110.5	
Void ratio	0.5835	0.5601	
Saturation, %	72.9	100.0	

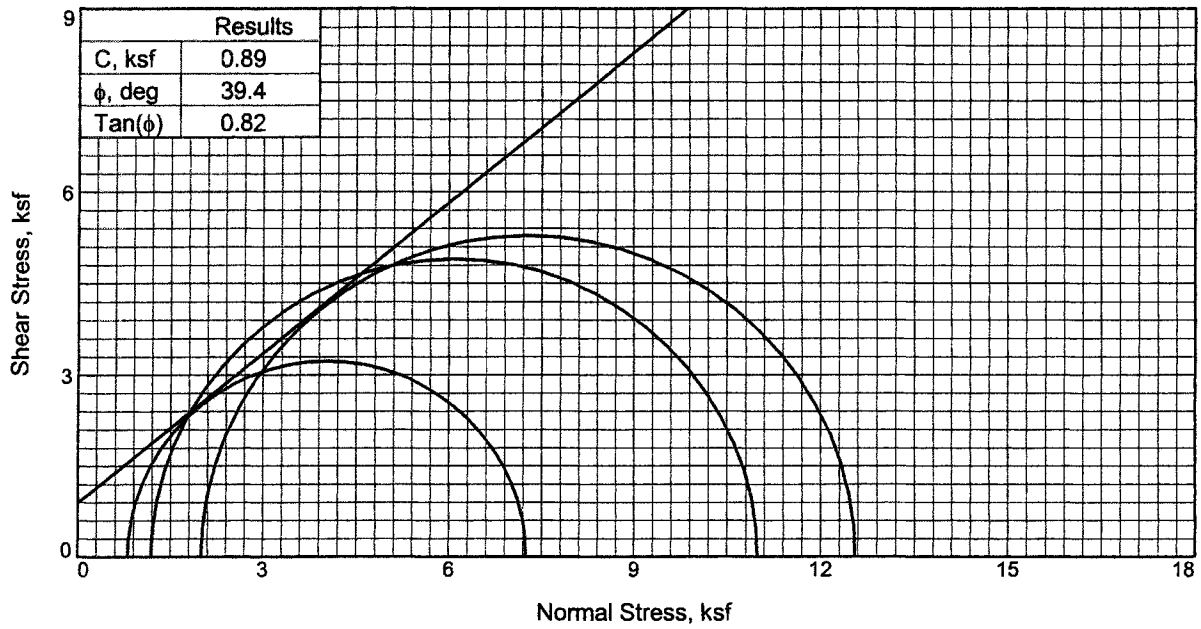
Test Readings for Specimen No. 3

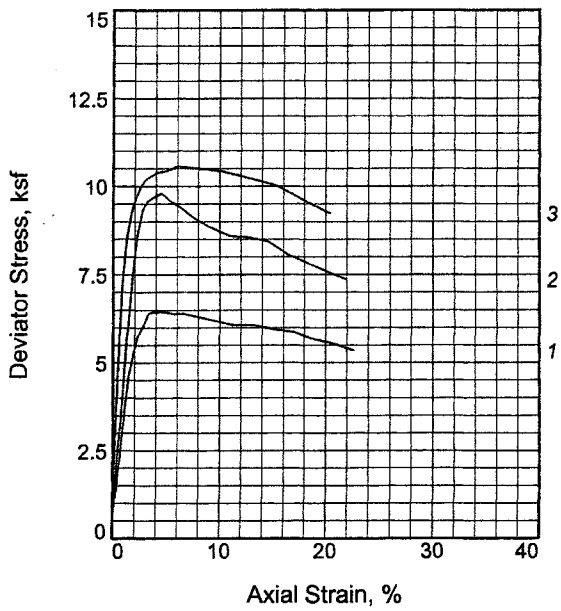
Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 12.84 ksf **at reading no.** 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	6.00	19.9	0.0	0.46	2.00	2.46	1.23		2.23
2	0.0050	17.00	56.3	0.1	1.29	2.00	3.29	1.65		2.65
3	0.0100	24.00	79.5	0.2	1.82	2.00	3.82	1.91		2.91
4	0.0150	30.00	99.4	0.3	2.28	2.00	4.28	2.14		3.14
5	0.0200	36.00	119.3	0.4	2.73	2.00	4.73	2.36		3.37
6	0.0250	41.00	135.8	0.5	3.10	2.00	5.11	2.55		3.55
7	0.0300	46.00	152.4	0.6	3.48	2.00	5.48	2.74		3.74
8	0.0350	51.00	169.0	0.6	3.85	2.00	5.86	2.93		3.93
9	0.0400	57.00	188.8	0.7	4.30	2.00	6.31	3.15		4.15
10	0.0450	64.00	212.0	0.8	4.83	2.00	6.83	3.41		4.42
11	0.0500	72.00	238.5	0.9	5.43	2.00	7.43	3.71		4.71
12	0.0750	112.00	371.1	1.4	8.40	2.00	10.40	5.20		6.20
13	0.1000	146.00	483.7	1.8	10.90	2.00	12.90	6.45		7.45
14	0.1500	170.00	563.2	2.8	12.57	2.00	14.58	7.28		8.29
15	0.1750	174.00	576.5	3.2	12.81	2.00	14.81	7.40		8.41
16	0.2000	175.00	579.8	3.7	12.82	2.00	14.82	7.41		8.41
17	0.2500	177.00	586.4	4.6	12.84	2.00	14.85	7.42		8.42

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
18	0.3000	178.00	589.7	5.5	12.79	2.00	14.79	7.39		8.40
19	0.3500	177.00	586.4	6.4	12.60	2.00	14.60	7.29		8.30
20	0.4000	176.00	583.1	7.3	12.40	2.00	14.40	7.20		8.20
21	0.5000	175.00	579.8	9.2	12.09	2.00	14.09	7.04		8.05
22	0.6000	170.00	563.2	11.0	11.51	2.00	13.51	6.75		7.75
23	0.7000	170.00	563.2	12.9	11.27	2.00	13.27	6.63		7.64
24	0.8000	174.00	576.5	14.7	11.29	2.00	13.29	6.64		7.65
25	0.9000	178.00	589.7	16.5	11.30	2.00	13.30	6.65		7.65
26	1.0000	179.00	593.0	18.4	11.11	2.00	13.12	6.55		7.56
27	1.1000	181.00	599.7	20.2	10.98	2.00	12.99	6.49		7.49
28	1.2000	179.00	593.0	22.0	10.61	2.00	12.61	6.30		7.31





Sample No.		1	2	3
Initial	Water Content,	16.6	16.1	16.8
	Dry Density, pcf	104.1	103.5	104.6
	Saturation,	70.0	66.7	71.5
	Void Ratio	0.6567	0.6651	0.6486
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.32	5.50	5.90
At Test	Water Content,	22.9	23.3	22.8
	Dry Density, pcf	105.6	105.0	105.7
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6334	0.6425	0.6310
	Diameter, in.	2.83	2.83	2.83
	Height, in.	5.29	5.47	5.88
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		6.4	9.8	10.6
Ult. Stress, ksf				
σ_1 Failure, ksf		7.3	11.0	12.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

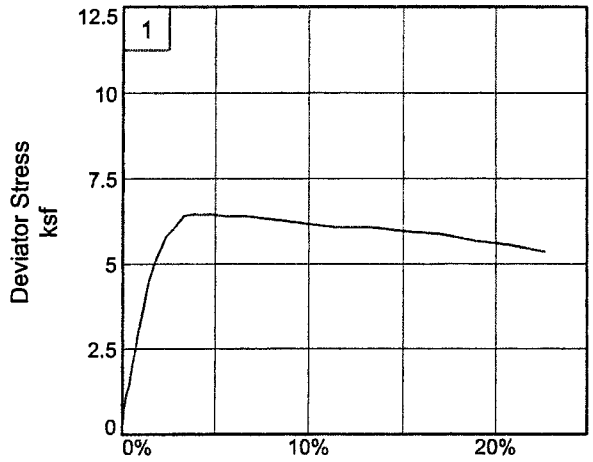
Sample Number: UU-90%-B

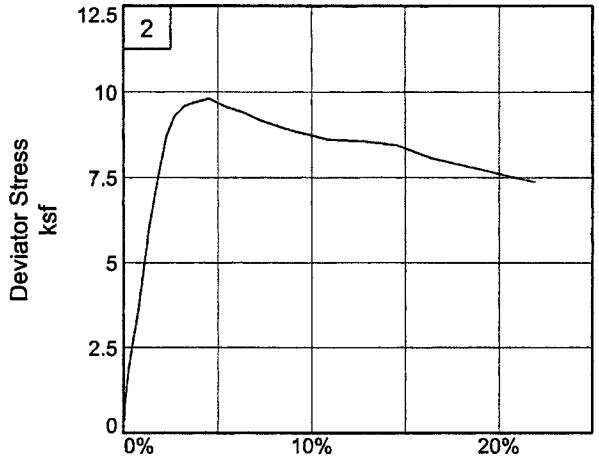
Proj. No.: 6738-05-4573 **Date:** 6-10-05

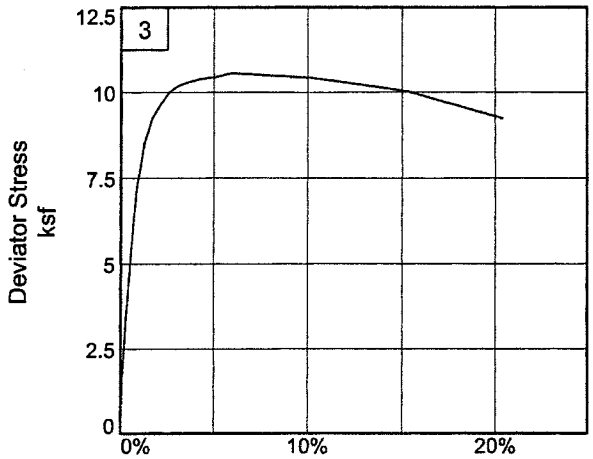
TRIAXIAL SHEAR TEST REPORT

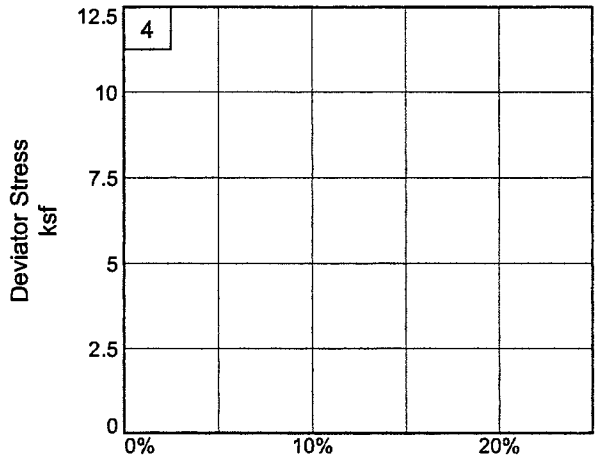
MACTEC ENGINEERING AND CONSULTING, INC.

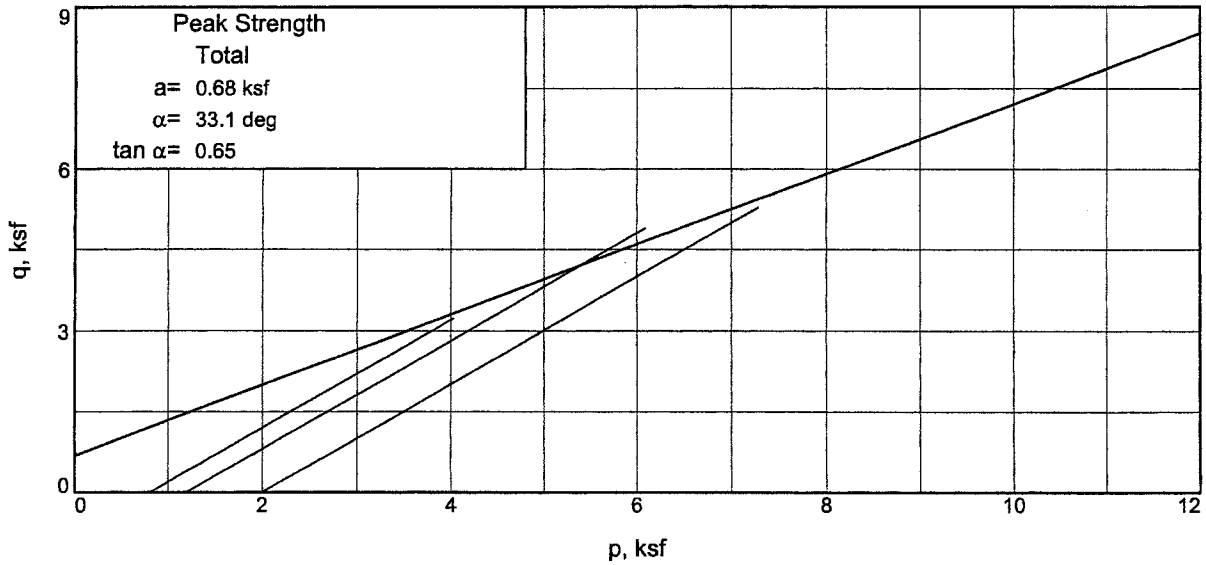
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:45 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	229.580		1194.700
Moisture content: Dry soil+tare, gms.	204.670		1041.000
Moisture content: Tare, gms.	55.040		115.200
Moisture, %	16.6	22.9	16.6
Moist specimen weight, gms.	1074.0		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.28	
Height, in.	5.32	5.29	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.4	129.8	
Dry density, pcf	104.1	105.6	
Void ratio	0.6567	0.6334	
Saturation, %	70.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 6.45 ksf **at reading no.** 18

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	3.00	9.9	0.0	0.23	0.81	1.03	1.28		0.92
2	0.0050	10.00	33.1	0.1	0.76	0.81	1.57	1.94		1.19
3	0.0100	14.00	46.4	0.2	1.06	0.81	1.87	2.32		1.34
4	0.0150	17.00	56.3	0.3	1.29	0.81	2.10	2.60		1.45
5	0.0200	19.00	62.9	0.4	1.44	0.81	2.25	2.78		1.53
6	0.0250	24.00	79.5	0.5	1.82	0.81	2.62	3.25		1.71
7	0.0300	28.00	92.8	0.6	2.12	0.81	2.92	3.62		1.86
8	0.0350	31.00	102.7	0.7	2.34	0.81	3.15	3.90		1.98
9	0.0400	35.00	116.0	0.8	2.64	0.81	3.45	4.27		2.13
10	0.0450	39.00	129.2	0.8	2.94	0.81	3.75	4.65		2.28
11	0.0500	42.00	139.1	0.9	3.16	0.81	3.97	4.92		2.39
12	0.0750	60.00	198.8	1.4	4.50	0.81	5.30	6.58		3.05
13	0.1000	70.00	231.9	1.9	5.22	0.81	6.03	7.47		3.42
14	0.1250	78.00	258.4	2.4	5.79	0.81	6.60	8.18		3.70
15	0.1500	82.00	271.7	2.8	6.06	0.81	6.86	8.51		3.84
16	0.1750	87.00	288.2	3.3	6.40	0.81	7.20	8.93		4.00
17	0.2000	88.00	291.5	3.8	6.44	0.81	7.24	8.98		4.03
18	0.2500	89.00	294.9	4.7	6.45	0.81	7.25	8.99		4.03
19	0.3000	89.00	294.9	5.7	6.38	0.81	7.19	8.92		4.00
20	0.3500	90.00	298.2	6.6	6.39	0.81	7.20	8.92		4.00
21	0.4000	90.00	298.2	7.6	6.33	0.81	7.13	8.84		3.97
22	0.5000	90.00	298.2	9.4	6.20	0.81	7.00	8.68		3.90
23	0.6000	90.00	298.2	11.3	6.07	0.81	6.87	8.52		3.84
24	0.7000	92.00	304.8	13.2	6.07	0.81	6.88	8.53		3.84
25	0.8000	92.00	304.8	15.1	5.94	0.81	6.74	8.36		3.78
26	0.9000	93.00	308.1	17.0	5.87	0.81	6.67	8.28		3.74
27	1.0000	92.00	304.8	18.9	5.67	0.81	6.48	8.04		3.64
28	1.1000	92.00	304.8	20.8	5.54	0.81	6.35	7.87		3.58
29	1.2000	91.00	301.5	22.7	5.35	0.81	6.16	7.63		3.48

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	299.270		1196.700
Moisture content: Dry soil+tare, gms.	265.040		1041.800
Moisture content: Tare, gms.	51.880		106.200
Moisture, %	16.1	23.3	16.6
Moist specimen weight, gms.	1099.1		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.28	
Height, in.	5.50	5.47	
Net decrease in height, in.		0.03	
Wet Density, pcf	120.2	129.4	
Dry density, pcf	103.5	105.0	
Void ratio	0.6651	0.6425	
Saturation, %	66.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.79 ksf **at reading no.** 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	3.00	9.9	0.0	0.23	1.20	1.42	1.19		1.31
2	0.0050	11.00	36.4	0.1	0.84	1.20	2.03	1.70		1.61
3	0.0100	18.00	59.6	0.2	1.37	1.20	2.56	2.14		1.88
4	0.0150	24.00	79.5	0.3	1.82	1.20	3.01	2.52		2.10
5	0.0200	28.00	92.8	0.4	2.12	1.20	3.32	2.77		2.26
6	0.0250	32.00	106.0	0.5	2.42	1.20	3.62	3.03		2.41
7	0.0300	37.00	122.6	0.5	2.80	1.20	3.99	3.34		2.59
8	0.0350	40.00	132.5	0.6	3.02	1.20	4.22	3.53		2.71
9	0.0400	45.00	149.1	0.7	3.40	1.20	4.59	3.84		2.89
10	0.0450	49.00	162.3	0.8	3.69	1.20	4.89	4.09		3.04
11	0.0500	54.00	178.9	0.9	4.07	1.20	5.26	4.40		3.23
12	0.0750	80.00	265.0	1.4	6.00	1.20	7.19	6.02		4.19
13	0.1000	100.00	331.3	1.8	7.46	1.20	8.66	7.24		4.93
14	0.1250	117.00	387.6	2.3	8.69	1.20	9.88	8.27		5.54
15	0.1500	126.00	417.4	2.7	9.31	1.20	10.51	8.79		5.85
16	0.1750	130.00	430.7	3.2	9.56	1.20	10.76	9.00		5.98
17	0.2000	132.00	437.3	3.7	9.67	1.20	10.86	9.09		6.03
18	0.2500	135.00	447.3	4.6	9.79	1.20	10.99	9.19		6.09
19	0.3000	133.00	440.6	5.5	9.55	1.20	10.75	8.99		5.97
20	0.3500	132.00	437.3	6.4	9.39	1.20	10.59	8.86		5.89
21	0.4000	130.00	430.7	7.3	9.16	1.20	10.35	8.66		5.77
22	0.5000	128.00	424.1	9.1	8.84	1.20	10.04	8.40		5.62
23	0.6000	127.00	420.8	11.0	8.59	1.20	9.79	8.19		5.49
24	0.7000	129.00	427.4	12.8	8.55	1.20	9.75	8.15		5.47

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	130.00	430.7	14.6	8.44	1.20	9.63	8.06		5.41
26	0.9000	127.00	420.8	16.4	8.07	1.20	9.26	7.75		5.23
27	1.0000	126.00	417.4	18.3	7.83	1.20	9.02	7.55		5.11
28	1.1000	125.00	414.1	20.1	7.59	1.20	8.79	7.35		4.99
29	1.2000	124.00	410.8	21.9	7.36	1.20	8.55	7.16		4.87

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	169.450		1346.000
Moisture content: Dry soil+tare, gms.	152.380		1169.600
Moisture content: Tare, gms.	50.720		115.300
Moisture, %	16.8	22.8	16.7
Moist specimen weight, gms.	1198.4		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.29	
Height, in.	5.90	5.88	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.2	129.9	
Dry density, pcf	104.6	105.7	
Void ratio	0.6486	0.6310	
Saturation, %	71.5	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 10.56 ksf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	8.00	26.5	0.0	0.61	2.00	2.61	1.30		2.30
2	0.0050	22.00	72.9	0.1	1.67	2.00	3.67	1.83		2.84
3	0.0100	31.00	102.7	0.2	2.35	2.00	4.35	2.17		3.18
4	0.0150	42.00	139.1	0.3	3.18	2.00	5.18	2.59		3.59
5	0.0200	50.00	165.7	0.3	3.78	2.00	5.78	2.89		3.89
6	0.0250	58.00	192.2	0.4	4.38	2.00	6.38	3.19		4.19
7	0.0300	66.00	218.7	0.5	4.98	2.00	6.98	3.49		4.49
8	0.0350	74.00	245.2	0.6	5.58	2.00	7.58	3.79		4.79
9	0.0400	81.00	268.4	0.7	6.10	2.00	8.10	4.05		5.05
10	0.0450	88.00	291.5	0.8	6.62	2.00	8.63	4.31		5.31
11	0.0500	95.00	314.7	0.9	7.14	2.00	9.15	4.57		5.57
12	0.0750	114.00	377.7	1.3	8.54	2.00	10.54	5.26		6.27
13	0.1000	124.00	410.8	1.7	9.25	2.00	11.25	5.62		6.62
14	0.1250	130.00	430.7	2.1	9.65	2.00	11.65	5.82		6.83
15	0.1500	135.00	447.3	2.6	9.98	2.00	11.98	5.99		6.99

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	138.00	457.2	3.0	10.16	2.00	12.16	6.07		7.08
17	0.2000	140.00	463.8	3.4	10.26	2.00	12.26	6.12		7.13
18	0.2500	143.00	473.8	4.3	10.39	2.00	12.39	6.19		7.19
19	0.3000	145.00	480.4	5.1	10.44	2.00	12.44	6.21		7.22
20	0.3500	148.00	490.3	6.0	10.56	2.00	12.56	6.27		7.28
21	0.4000	149.00	493.6	6.8	10.53	2.00	12.53	6.26		7.27
22	0.5000	151.00	500.3	8.5	10.48	2.00	12.48	6.24		7.24
23	0.6000	153.00	506.9	10.2	10.42	2.00	12.42	6.21		7.21
24	0.7000	154.00	510.2	11.9	10.29	2.00	12.29	6.14		7.15
25	0.8000	155.00	513.5	13.6	10.16	2.00	12.16	6.07		7.08
26	0.9000	156.00	516.8	15.3	10.02	2.00	12.02	6.01		7.01
27	1.0000	155.00	513.5	17.0	9.76	2.00	11.76	5.87		6.88
28	1.1000	154.00	510.2	18.7	9.50	2.00	11.50	5.74		6.75
29	1.2000	153.00	506.9	20.4	9.24	2.00	11.24	5.61		6.62

Vaeth, Dick

From: Stathis Payiatakis [stathisp@nodarse.com]
Sent: Monday, February 06, 2006 7:53 AM
To: Vaeth, Dick
Cc: Stathis Payiatakis
Subject: FW: EAA Proctor

Dick,
As agreed on Friday
Regards
Stathis P

From: Coleman, Mark [mailto:MACOLEMAN@mactec.com]
Sent: Friday, February 03, 2006 3:15 PM
To: Stathis Payiatakis
Subject: EAA Proctor

Stathis,

I reviewed the select fill compaction test report for the EAA project, MACTEC project number 6738-05-4573-02. The test specification D-1557-91 procedure B modified shown on the report should be D-698-91 procedure B standard. If you have any questions please call.

Thanks,

Mark Coleman

MACTEC Engineering and Consulting

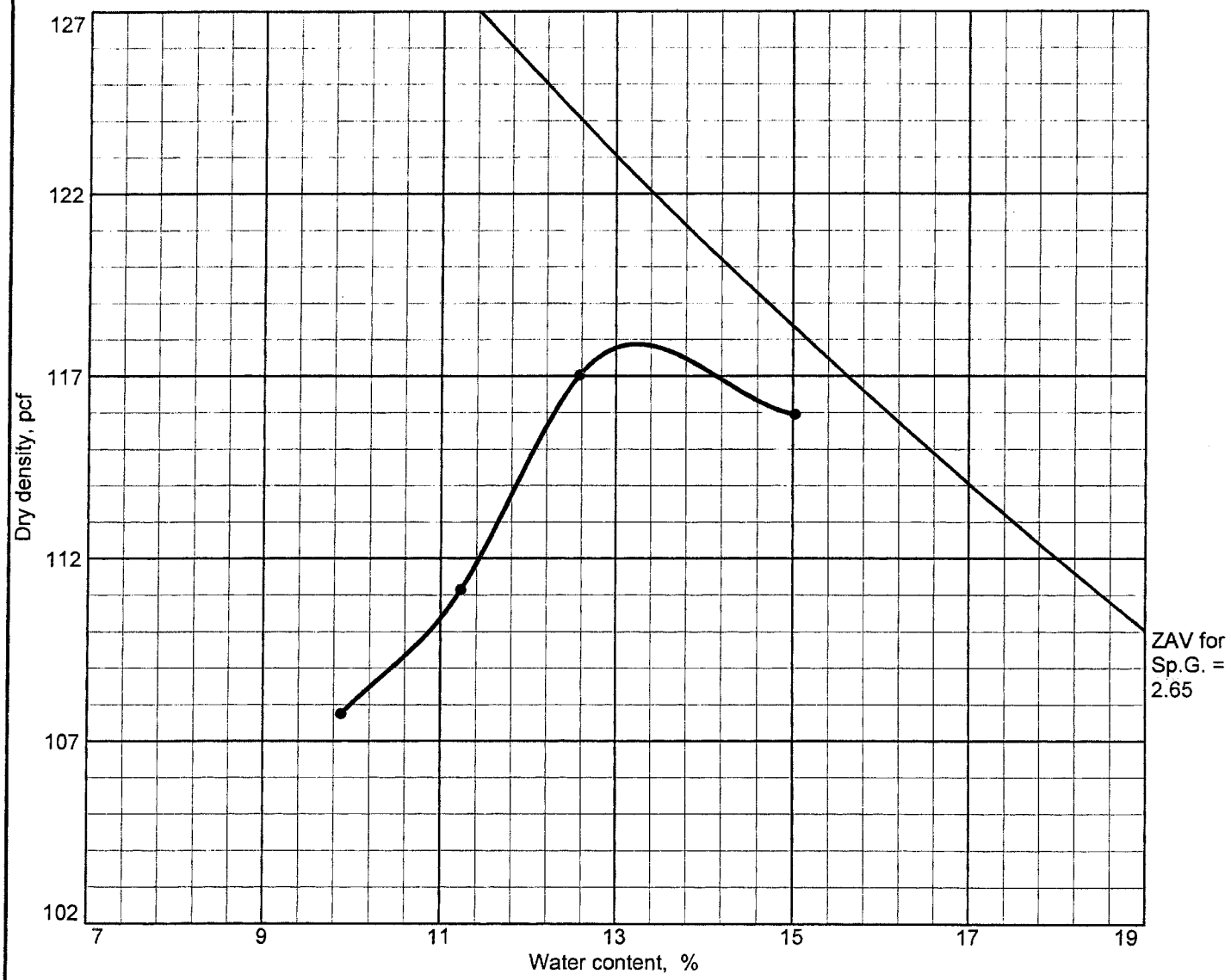
Jacksonville, Florida 32207

904-398-1084

Fax 904-398-1084

macoleman@mactec.com

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure B Modified
Oversize correction applied to each point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
	SM	A-1-b					18.3	21.1

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 13.0 %	Light gray and tan clayey fine SAND with limerock and shell fragments

Project No.: 6738-05-4573-02 **Client:** Nodarse and Associates, Inc.
Project: EAA

● **Source:** Select Fill **Sample No.:** composite

Remarks:

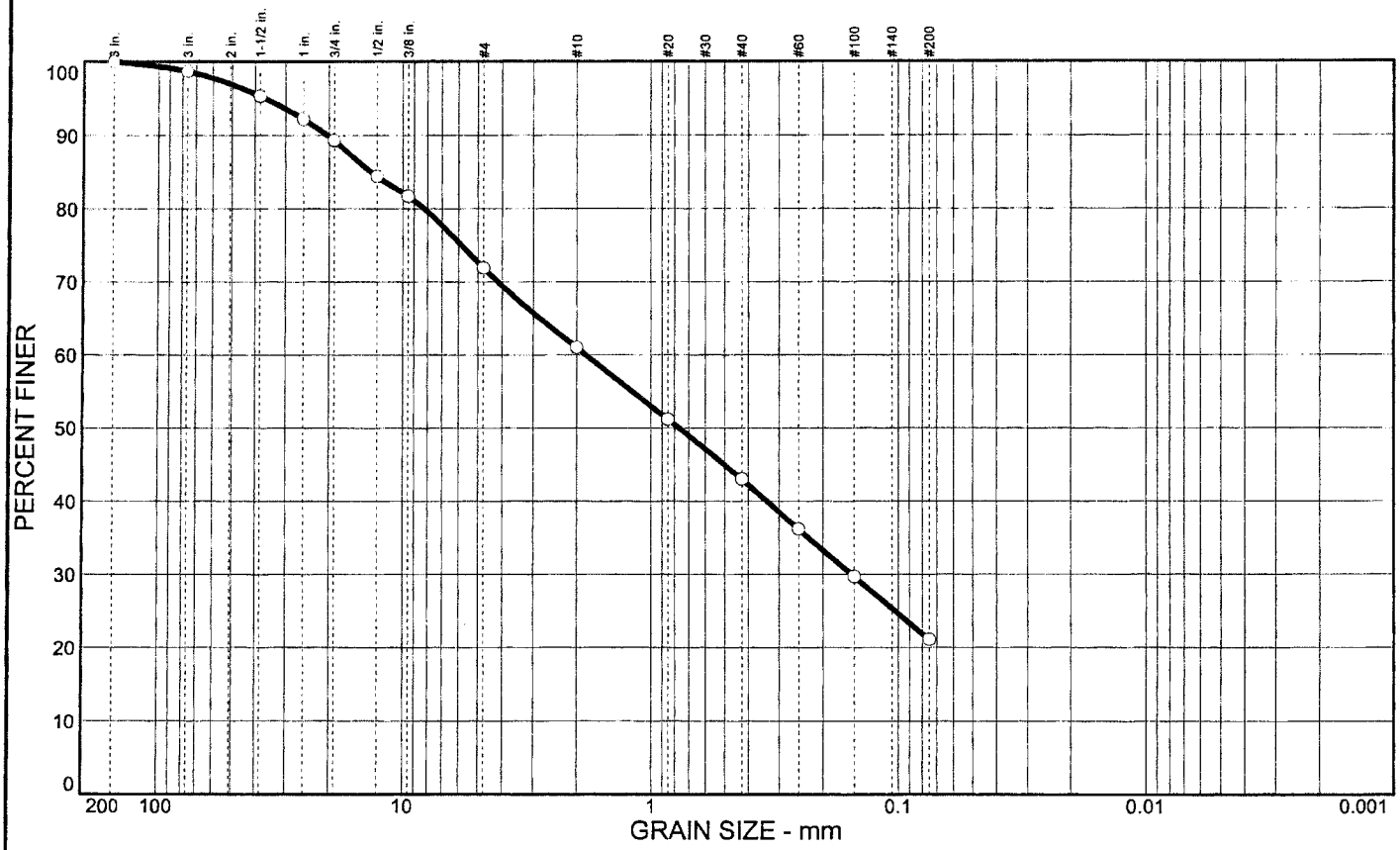
Rajni Sukhwani

Reviewed By

COMPACTION TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Grain Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	1.3	26.8	50.8	21.1		SM	A-1-b		

SIEVE inches size	PERCENT FINER ○		
6	100.0		
3	98.7		
1.5	95.3		
1	92.2		
.75	89.3		
.5	84.4		
.375	81.7		
GRAIN SIZE			
D_{60}	1.83		
D_{30}	0.154		
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	71.9		
#10	61.0		
#20	51.2		
#40	43.0		
#60	36.2		
#100	29.7		
#200	21.1		

SOIL DESCRIPTION

○ Light gray and tan clayey fine SAND with limerock and shell fragments

REMARKS:

○

○ Source: Select Fill

Sample No.: composite

MACTEC ENGINEERING. AND CONSULTING, INC.

Client: Nodarse and Associates, Inc.

Project: EAA

Project No.: 6738-05-4573-02

R.S

Reviewed By

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Nodarse and Associates, Inc.
Project: EAA
Project Number: 6738-05-4573-02

Sample Data

Source: Select Fill
Sample No.: composite
Elev. or Depth: **Sample Length (in./cm.):**
Location:
Description: Light gray and tan clayey fine SAND with limerock and shell fragments
Liquid Limit: **Plastic Limit:**
USCS Classification: SM **AASHTO Classification:** A-1-b
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	183928.00
Tare =	0.00
Dry sample weight =	183928.00

Sample split on .5 inch **sieve**
Split sample data:
Sample and tare = 478.20 **Tare =** .00 **Sample weight =** 478.20
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
6 inch	0.00	100.0
3 inch	2404.00	98.7
1.5 inch	8637.00	95.3
1 inch	14330.00	92.2
.75 inch	19677.00	89.3
.5 inch	28701.00	84.4
.375 inch	15.49	81.7
# 4	70.85	71.9
# 10	132.55	61.0
# 20	188.10	51.2
# 40	234.34	43.0
# 60	273.23	36.2
# 100	309.97	29.7
# 200	358.68	21.1

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 1.3 **% GRAVEL** = 26.8 **% SAND** = 50.8
% FINES = 21.1

D_{85}= 13.42 D_{60}= 1.83 D_{50}= 0.77
D_{30}= 0.15

MOISTURE DENSITY TEST DATA

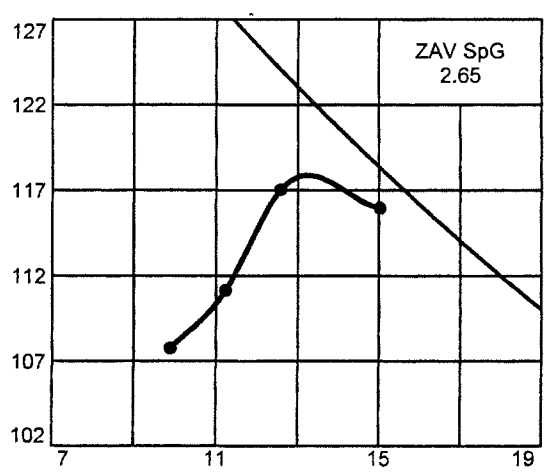
Client: Nodarse and Associates, Inc.
Project: EAA
Project Number: 6738-05-4573-02

Specimen Data

Source: Select Fill
Sample No.: composite
Elev. or Depth: **Sample Length (in./cm.):**
Location:
Description: Light gray and tan clayey fine SAND with limerock and shell fragments
USCS Classification: SM **AASHTO Classification:** A-1-b
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks:
Percent retained on 3/8 in. sieve: 18.3
Percent passing No. 200 sieve: 21.1 **Specific gravity:**

Test Data And Results

Type of test: ASTM D 1557-91 Procedure B Modified
Mold Dia.: 4.00 in. **Hammer Wt.:** 10 lb. **Drop:** 18 in.
Layers: five **Blows per Layer:** 25

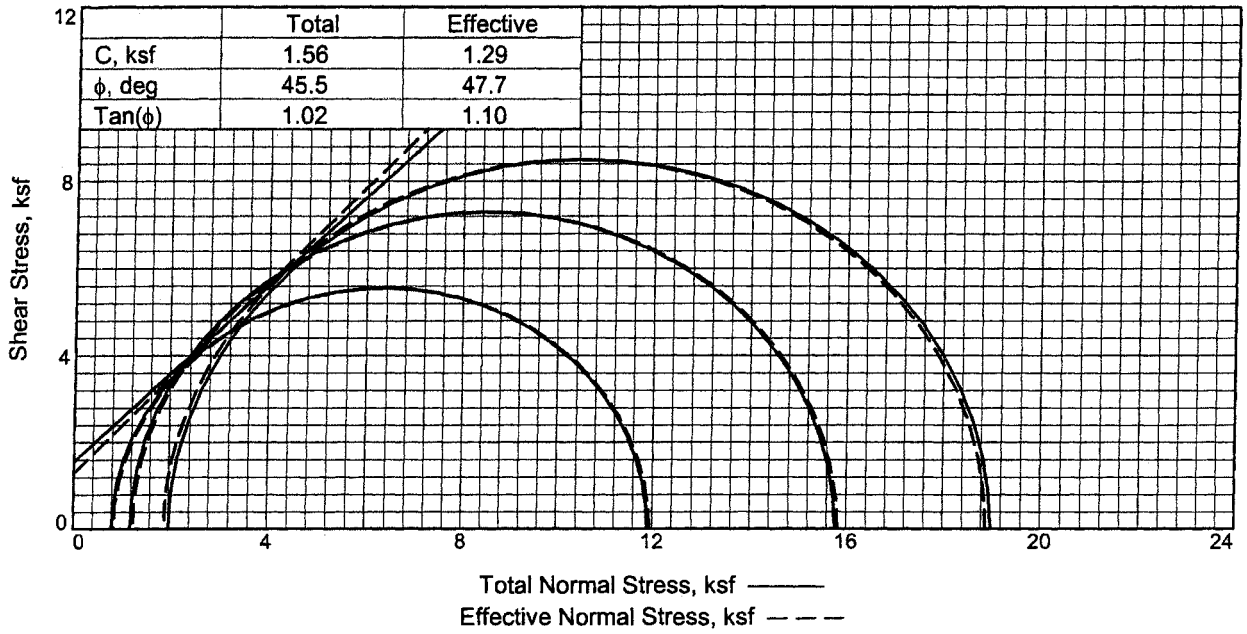


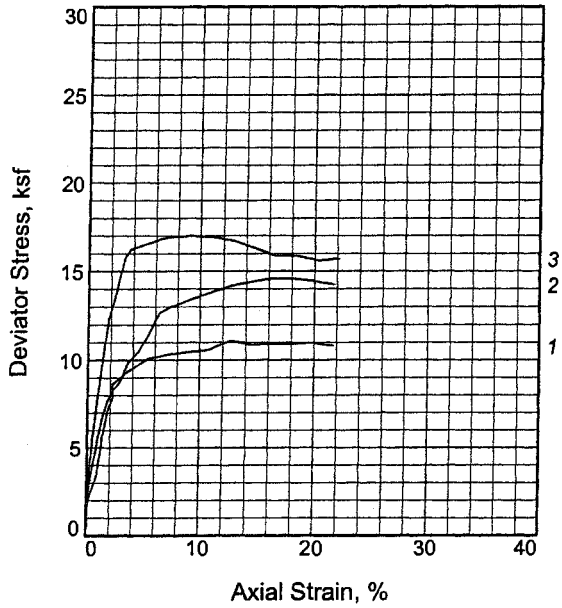
POINT NO.	1	2	3	4
WM + WS	6084.0	6114.0	5941.0	5850.0
WM	4129.0	4129.0	4129.0	4129.0
WW+T	540.90	451.40	507.80	478.20
WD+T	478.20	388.78	455.60	435.46
TARE	0.00	0.00	0.00	0.00
MOIST	13.1	16.1	11.5	9.8
MOISTURE	12.6	15.0	11.2	9.9
DRY DEN	117.0	116.0	111.2	107.8

Max dry den= 118.0 pcf **Opt moisture=** 13.0 %
Uncorrected Results: **Max dry den=** 115.5 pcf **Opt moisture=** 14.0 %

ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.095
Moisture of Oversize Material = 10.2 %
Corrections Applied to Every Test Point

	Total	Effective
C, ksf	1.56	1.29
ϕ, deg	45.5	47.7
Tan(ϕ)	1.02	1.10





Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.2
	Dry Density, pcf	108.3	108.0	110.0
	Saturation,	75.6	75.0	78.7
	Void Ratio	0.5917	0.5966	0.5674
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.58	5.54	5.43
At Test	Water Content,	20.1	21.1	20.0
	Dry Density, pcf	110.9	108.9	111.1
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5543	0.5836	0.5518
	Diameter, in.	2.82	2.83	2.83
	Height, in.	5.54	5.53	5.41
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		11.1	14.6	17.0
Total Pore Pr., ksf		7.2	7.1	7.3
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		11.9	15.8	18.9
$\bar{\sigma}_3$ Failure, ksf		0.8	1.3	1.9

Type of Test:
CU with Pore Pressures

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

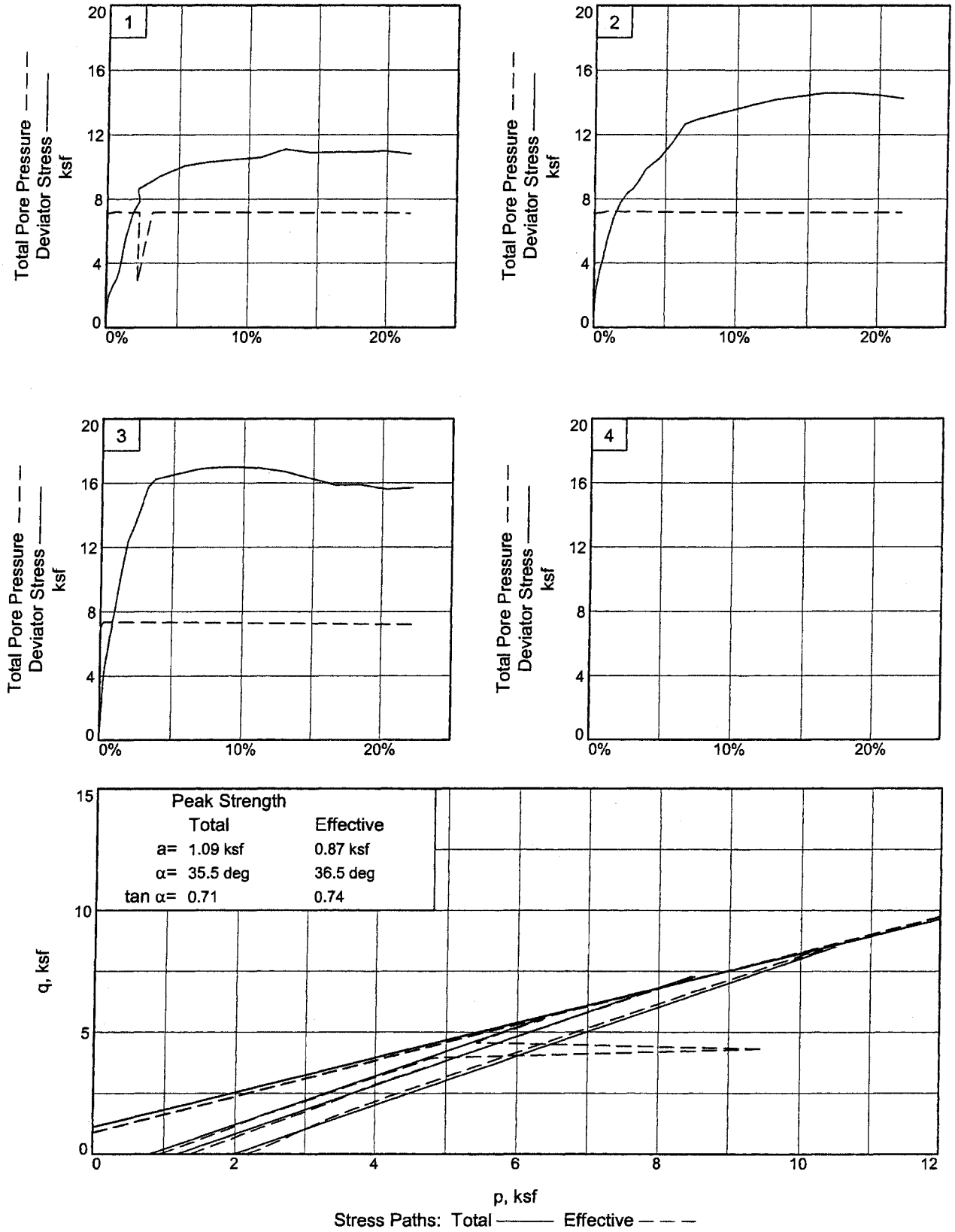
Sample Number: CU-95%-B

Proj. No.: 6738-05-4573 **Date:** 6-12-05

TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: mc **Checked By:** Rajni Sukhwani



Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-95%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:57 AM

Date: 6-12-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1326.000
Moisture content: Dry soil+tare, gms.	156.910			1142.000
Moisture content: Tare, gms.	55.030			115.790
Moisture, %	16.2	21.4	20.1	17.9
Moist specimen weight, gms.	1167.9			
Diameter, in.	2.84	2.84	2.82	
Area, in.^{2}	6.33	6.33	6.23	
Height, in.	5.58	5.58	5.54	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	125.9	131.5	133.2	
Dry density, pcf	108.3	108.3	110.9	
Void ratio	0.5917	0.5917	0.5543	
Saturation, %	75.6	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 11.10 ksf **at reading no.** 24

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.95	0.95	1.00	49.00	0.95	0.00
1	0.0010	8.00	26.5	0.0	0.61	0.94	1.55	1.65	49.10	1.24	0.31
2	0.0050	19.00	62.9	0.1	1.45	0.91	2.36	2.60	49.30	1.63	0.73
3	0.0100	26.00	86.1	0.2	1.99	0.89	2.88	3.22	49.40	1.89	0.99
4	0.0150	29.00	96.1	0.3	2.21	0.88	3.09	3.52	49.50	1.98	1.11
5	0.0200	31.00	102.7	0.4	2.36	0.86	3.23	3.74	49.60	2.05	1.18
6	0.0250	34.00	112.6	0.5	2.59	0.84	3.43	4.10	49.80	2.13	1.29
7	0.0300	36.00	119.3	0.5	2.74	0.84	3.57	4.28	49.80	2.21	1.37
8	0.0350	38.00	125.9	0.6	2.89	0.82	3.71	4.52	49.90	2.27	1.44
9	0.0400	40.00	132.5	0.7	3.04	0.82	3.86	4.70	49.90	2.34	1.52
10	0.0450	43.00	142.5	0.8	3.26	0.82	4.08	4.98	49.90	2.45	1.63
11	0.0500	46.00	152.4	0.9	3.49	0.84	4.32	5.18	49.80	2.58	1.74
12	0.0750	75.00	248.5	1.4	5.66	0.85	6.51	7.66	49.70	3.68	2.83
13	0.1000	95.00	314.7	1.8	7.14	0.88	8.02	9.13	49.50	4.45	3.57
14	0.1250	105.00	347.9	2.3	7.85	0.86	8.72	10.09	49.60	4.79	3.93
15	0.1200	115.00	381.0	2.2	8.61	5.20	13.81	2.66	~~19.50~~ 49.50	9.50	4.30
16	0.1750	123.00	407.5	3.2	9.11	0.88	9.99	11.38	49.50	5.44	4.56
17	0.2000	127.00	420.8	3.6	9.37	0.84	10.20	12.21	49.80	5.52	4.68
18	~~0.3000~~ 7.52	139.00	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
19	0.3000	139.00	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
20	0.3500	142.00	470.4	6.3	10.18	0.84	11.01	13.19	49.80	5.92	5.09
21	0.4000	145.00	480.4	7.2	10.29	0.85	11.14	13.12	49.70	6.00	5.15
22	0.5000	150.00	497.0	9.0	10.44	0.85	11.29	13.29	49.70	6.07	5.22
23	0.6000	155.00	513.5	10.8	10.57	0.85	11.42	13.45	49.70	6.14	5.29
24	0.7000	166.00	550.0	12.6	11.10	0.85	11.95	14.06	49.70	6.40	5.55
25	0.8000	166.00	550.0	14.5	10.87	0.86	11.73	13.58	49.60	6.30	5.43
26	0.9000	170.00	563.2	16.3	10.89	0.86	11.76	13.61	49.60	6.31	5.45
27	1.0000	174.00	576.5	18.1	10.91	0.86	11.77	13.63	49.60	6.32	5.45
28	1.1000	179.00	593.0	19.9	10.98	0.88	11.85	13.49	49.50	6.37	5.49
29	1.2000	180.00	596.3	21.7	10.79	0.89	11.68	13.08	49.40	6.29	5.39

Correction Made
MM
6-16-05

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1288.400
Moisture content: Dry soil+tare, gms.	156.910			1108.100
Moisture content: Tare, gms.	55.030			95.600
Moisture, %	16.2	21.6	21.1	17.8
Moist specimen weight, gms.	1156.0			
Diameter, in.	2.84	2.84	2.83	
Area, in.^{2}	6.33	6.33	6.30	
Height, in.	5.54	5.54	5.53	
Net decrease in height, in.		0.00	0.01	
Wet Density, pcf	125.5	131.3	131.9	
Dry density, pcf	108.0	108.0	108.9	
Void ratio	0.5966	0.5966	0.5836	
Saturation, %	75.0	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 14.58 ksf **at reading no.** 26

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.38	1.38	1.00	48.70	1.38	0.00
1	0.0010	10.00	33.1	0.0	0.76	1.35	2.11	1.56	48.90	1.73	0.38
2	0.0050	24.00	79.5	0.1	1.82	1.31	3.13	2.39	49.20	2.22	0.91
3	0.0100	33.00	109.3	0.2	2.49	1.30	3.79	2.92	49.30	2.54	1.25
4	0.0150	39.00	129.2	0.3	2.95	1.28	4.23	3.30	49.40	2.75	1.47
5	0.0200	44.00	145.8	0.4	3.32	1.28	4.60	3.59	49.40	2.94	1.66
6	0.0250	49.00	162.3	0.5	3.69	1.27	4.96	3.91	49.50	3.11	1.85
7	0.0300	53.00	175.6	0.5	3.99	1.27	5.26	4.15	49.50	3.26	2.00
8	0.0350	57.00	188.8	0.6	4.29	1.25	5.54	4.42	49.60	3.40	2.14
9	0.0400	62.00	205.4	0.7	4.66	1.22	5.88	4.81	49.80	3.55	2.33
10	0.0450	66.00	218.7	0.8	4.96	1.20	6.15	5.15	50.00	3.67	2.48
11	0.0500	72.00	238.5	0.9	5.40	1.17	6.57	5.63	50.20	3.87	2.70
12	0.0750	91.00	301.5	1.4	6.80	1.17	7.96	6.83	50.20	4.56	3.40
13	0.1000	104.00	344.6	1.8	7.73	1.20	8.93	7.47	50.00	5.06	3.87
14	0.1250	112.00	371.1	2.3	8.29	1.20	9.48	7.94	50.00	5.34	4.14
15	0.1500	117.00	387.6	2.7	8.62	1.20	9.81	8.21	50.00	5.50	4.31
16	0.1750	125.00	414.1	3.2	9.17	1.20	10.36	8.67	50.00	5.78	4.58
17	0.2000	135.00	447.3	3.6	9.85	1.21	11.06	9.15	49.90	6.14	4.93
18	0.2500	145.00	480.4	4.5	10.48	1.21	11.69	9.67	49.90	6.45	5.24
19	0.3000	160.00	530.1	5.4	11.46	1.21	12.67	10.47	49.90	6.94	5.73
20	0.3500	178.00	589.7	6.3	12.62	1.22	13.85	11.31	49.80	7.54	6.31
21	0.4000	184.00	609.6	7.2	12.92	1.22	14.15	11.56	49.80	7.69	6.46
22	0.5000	194.00	642.7	9.0	13.36	1.24	14.60	11.79	49.70	7.92	6.68
23	0.6000	204.00	675.9	10.9	13.77	1.25	15.02	11.99	49.60	8.14	6.88

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	214.00	709.0	12.7	14.15	1.27	15.42	12.17	49.50	8.34	7.08
25	0.8000	222.00	735.5	14.5	14.38	1.27	15.64	12.34	49.50	8.46	7.19
26	0.9000	230.00	762.0	16.3	14.58	1.25	15.83	12.64	49.60	8.54	7.29
27	1.0000	235.00	778.6	18.1	14.57	1.25	15.83	12.63	49.60	8.54	7.29
28	1.1000	238.00	788.5	19.9	14.43	1.25	15.69	12.52	49.60	8.47	7.22
29	1.2000	240.00	795.1	21.7	14.23	1.25	15.48	12.36	49.60	8.37	7.11

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	132.350			1281.400
Moisture content: Dry soil+tare, gms.	121.490			1110.500
Moisture content: Tare, gms.	54.280			106.100
Moisture, %	16.2	20.5	20.0	17.0
Moist specimen weight, gms.	1153.8			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.29	
Height, in.	5.43	5.43	5.41	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	127.8	132.6	133.3	
Dry density, pcf	110.0	110.0	111.1	
Void ratio	0.5674	0.5674	0.5518	
Saturation, %	78.7	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Consolidation cell pressure = 63.90 psi (9.20 ksf)

Consolidation back pressure = 50.00 psi (7.20 ksf)

Consolidation effective confining stress = 2.00 ksf

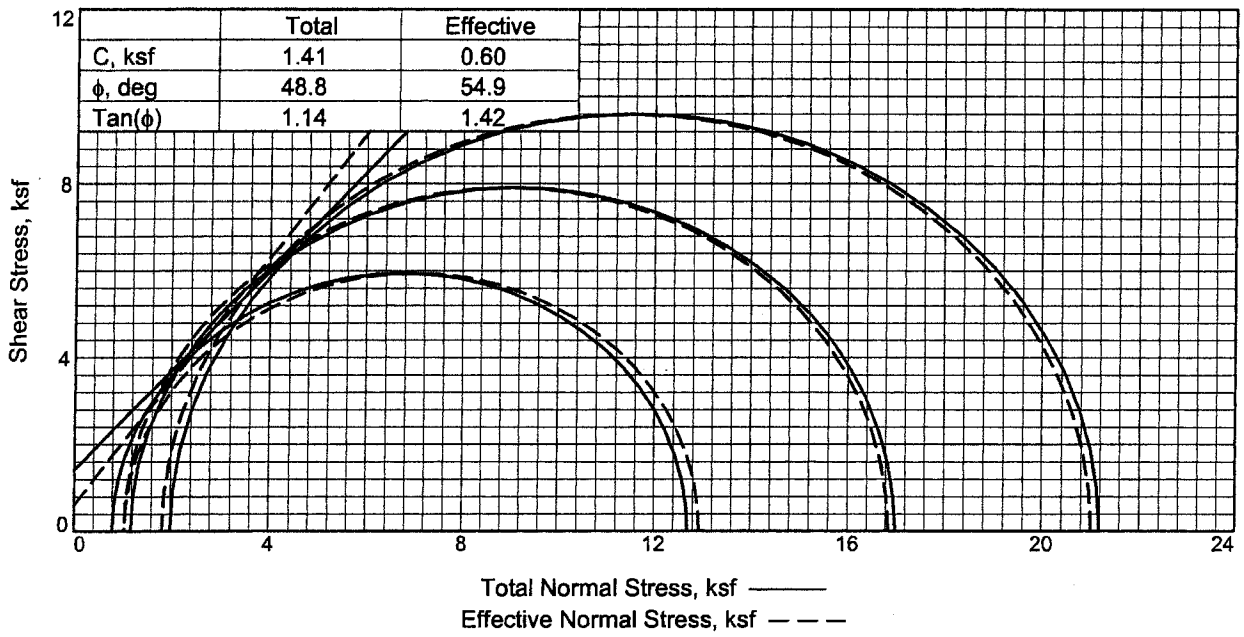
Strain rate, in./min. = 0.05

Fail. Stress = 17.00 ksf **at reading no.** 22

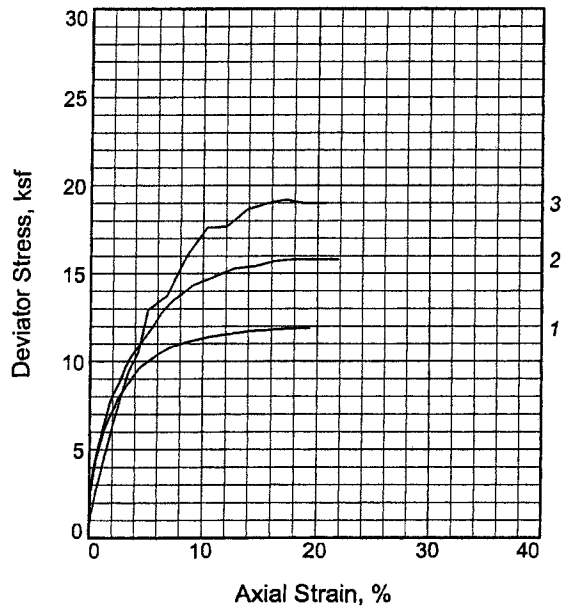
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.17	2.17	1.00	48.80	2.17	0.00
1	0.0010	5.00	16.6	0.0	0.38	2.17	2.55	1.17	48.80	2.36	0.19
2	0.0050	22.00	72.9	0.1	1.67	2.03	3.70	1.82	49.80	2.86	0.83
3	0.0100	39.00	129.2	0.2	2.95	1.90	4.85	2.55	50.70	3.38	1.48
4	0.0150	52.00	172.3	0.3	3.93	1.86	5.79	3.12	51.00	3.82	1.97
5	0.0200	62.00	205.4	0.4	4.68	1.84	6.53	3.54	51.10	4.18	2.34
6	0.0250	69.00	228.6	0.5	5.21	1.84	7.05	3.82	51.10	4.45	2.60
7	0.0300	77.00	255.1	0.6	5.81	1.84	7.65	4.15	51.10	4.75	2.90
8	0.0350	85.00	281.6	0.6	6.40	1.84	8.25	4.47	51.10	5.04	3.20
9	0.0400	91.00	301.5	0.7	6.85	1.84	8.69	4.72	51.10	5.27	3.42
10	0.0450	98.00	324.7	0.8	7.37	1.84	9.21	5.00	51.10	5.53	3.68
11	0.0500	104.00	344.6	0.9	7.81	1.84	9.65	5.24	51.10	5.75	3.91
12	0.0750	138.00	457.2	1.4	10.32	1.86	12.17	6.55	51.00	7.02	5.16
13	0.1000	166.00	550.0	1.8	12.35	1.86	14.21	7.65	51.00	8.03	6.18

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	180.00	596.3	2.3	13.33	1.86	15.19	8.18	51.00	8.52	6.67
15	0.1500	198.00	656.0	2.8	14.60	1.87	16.47	8.80	50.90	9.17	7.30
16	0.1750	215.00	712.3	3.2	15.77	1.87	17.64	9.43	50.90	9.76	7.89
17	0.2000	222.00	735.5	3.7	16.21	1.87	18.08	9.66	50.90	9.98	8.10
18	0.2500	227.00	752.1	4.6	16.41	1.87	18.29	9.77	50.90	10.08	8.21
19	0.3000	232.00	768.6	5.5	16.61	1.87	18.49	9.87	50.90	10.18	8.31
20	0.3500	237.00	785.2	6.5	16.81	1.87	18.68	9.98	50.90	10.27	8.40
21	0.4000	241.00	798.4	7.4	16.92	1.89	18.81	9.97	50.80	10.35	8.46
22	0.5000	247.00	818.3	9.2	17.00	1.90	18.90	9.94	50.70	10.40	8.50
23	0.6000	251.00	831.6	11.1	16.92	1.92	18.83	9.83	50.60	10.37	8.46
24	0.7000	253.00	838.2	12.9	16.70	1.93	18.63	9.65	50.50	10.28	8.35
25	0.8000	252.00	834.9	14.8	16.28	1.94	18.22	9.37	50.40	10.08	8.14
26	0.9000	251.00	831.6	16.6	15.86	1.96	17.82	9.10	50.30	9.89	7.93
27	1.0000	257.00	851.4	18.5	15.88	1.97	17.86	9.05	50.20	9.91	7.94
28	1.1000	258.00	854.8	20.3	15.58	1.99	17.57	8.84	50.10	9.78	7.79
29	1.2000	266.00	881.3	22.2	15.69	2.00	17.70	8.84	50.00	9.85	7.85



	Total	Effective
C, ksf	1.41	0.60
ϕ, deg	48.8	54.9
Tan(ϕ)	1.14	1.42



Sample No.		1	2	3
Initial	Water Content,	16.6	16.6	16.6
	Dry Density, pcf	109.1	109.5	109.5
	Saturation,	79.1	79.9	79.8
	Void Ratio	0.5800	0.5745	0.5747
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.70	5.52	5.82
At Test	Water Content,	20.7	20.0	20.3
	Dry Density, pcf	109.8	111.1	110.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5709	0.5523	0.5609
	Diameter, in.	2.83	2.83	2.83
	Height, in.	5.69	5.49	5.80
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		11.9	15.8	19.2
Total Pore Pr., ksf		7.0	7.3	7.4
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		12.9	16.9	21.0
$\bar{\sigma}_3$ Failure, ksf		1.1	1.1	1.8

Type of Test:
CU with Pore Pressures
Sample Type: remolded
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762
Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

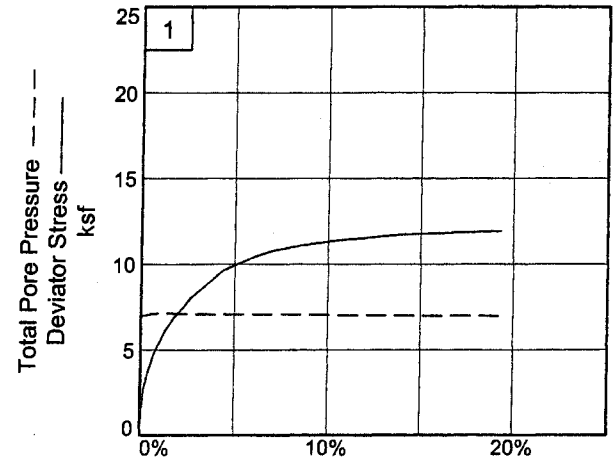
Sample Number: CU-95%-A

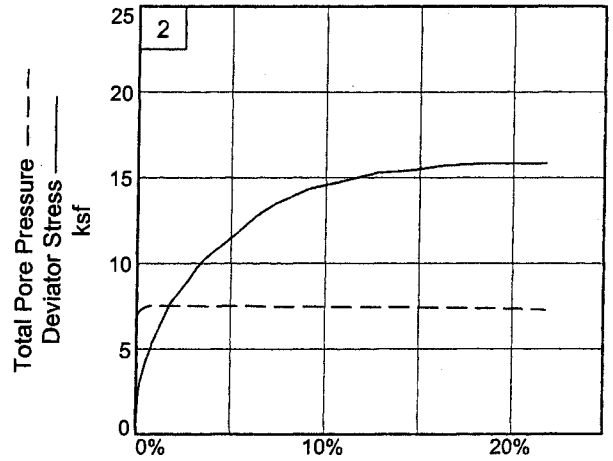
Proj. No.: 6738-05-4573 **Date:** 6-10-05

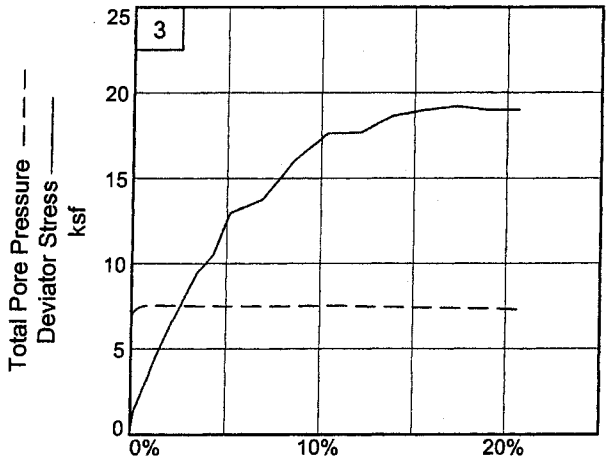
TRIAXIAL SHEAR TEST REPORT

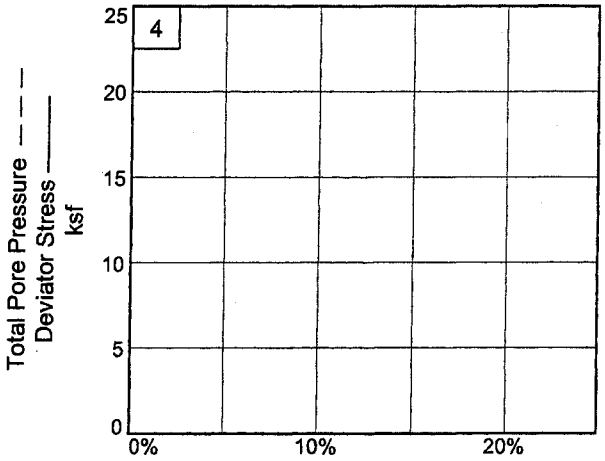
MACTEC ENGINEERING AND CONSULTING, INC.

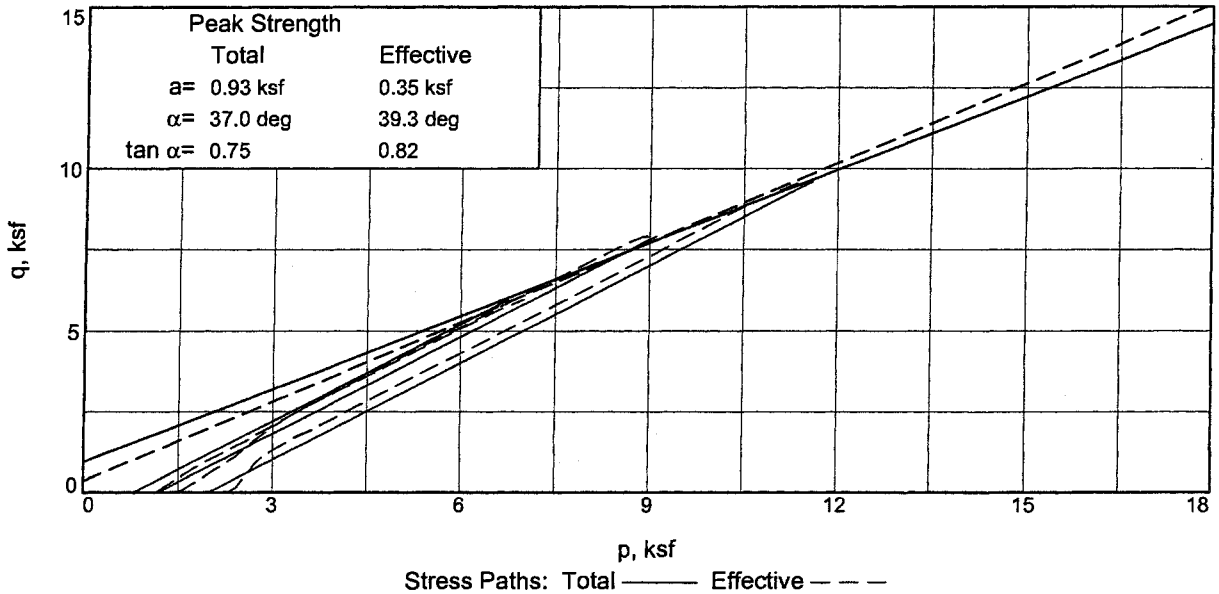
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-95%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:39 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-95%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	188.090			1333.800
Moisture content: Dry soil+tare, gms.	168.510			1149.300
Moisture content: Tare, gms.	50.650			95.400
Moisture, %	16.6	21.0	20.7	17.5
Moist specimen weight, gms.	1206.2			
Diameter, in.	2.84	2.84	2.83	
Area, in.^{2}	6.33	6.33	6.31	
Height, in.	5.70	5.70	5.69	
Net decrease in height, in.		0.00	0.01	
Wet Density, pcf	127.3	132.0	132.5	
Dry density, pcf	109.1	109.1	109.8	
Void ratio	0.5800	0.5800	0.5709	
Saturation, %	79.1	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 11.89 ksf **at reading no.** 28

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.17	1.17	1.00	47.50	1.17	0.00
1	0.0010	5.00	16.6	0.0	0.38	1.11	1.49	1.34	47.90	1.30	0.19
2	0.0050	22.00	72.9	0.1	1.66	1.01	2.67	2.65	48.60	1.84	0.83
3	0.0100	35.00	116.0	0.2	2.64	0.99	3.64	3.66	48.70	2.31	1.32
4	0.0150	41.00	135.8	0.3	3.09	1.01	4.10	4.07	48.60	2.55	1.55
5	0.0200	47.00	155.7	0.4	3.54	0.96	4.51	4.67	48.90	2.74	1.77
6	0.0250	51.00	169.0	0.4	3.84	0.96	4.80	4.98	48.90	2.88	1.92
7	0.0300	55.00	182.2	0.5	4.14	0.94	5.07	5.42	49.10	3.00	2.07
8	0.0350	59.00	195.5	0.6	4.43	0.92	5.35	5.81	49.20	3.14	2.22
9	0.0400	63.00	208.7	0.7	4.73	0.91	5.64	6.21	49.30	3.27	2.36
10	0.0450	66.00	218.7	0.8	4.95	0.91	5.86	6.46	49.30	3.38	2.48
11	0.0500	69.00	228.6	0.9	5.17	0.89	6.06	6.79	49.40	3.48	2.59
12	0.0750	82.00	271.7	1.3	6.12	0.89	7.01	7.85	49.40	3.95	3.06
13	0.1000	92.00	304.8	1.8	6.83	0.91	7.74	8.53	49.30	4.32	3.42
14	0.1250	100.00	331.3	2.2	7.39	0.91	8.30	9.15	49.30	4.60	3.70
15	0.1500	109.00	361.1	2.6	8.02	0.92	8.95	9.71	49.20	4.93	4.01
16	0.1750	115.00	381.0	3.1	8.43	0.92	9.35	10.14	49.20	5.14	4.21
17	0.2000	121.00	400.9	3.5	8.83	0.92	9.75	10.58	49.20	5.33	4.41
18	0.2500	133.00	440.6	4.4	9.61	0.94	10.55	11.27	49.10	5.74	4.81
19	0.3000	140.00	463.8	5.3	10.03	0.94	10.96	11.71	49.10	5.95	5.01
20	0.3500	147.00	487.0	6.2	10.43	0.95	11.38	11.97	49.00	6.17	5.21
21	0.4000	153.00	506.9	7.0	10.75	0.96	11.72	12.15	48.90	6.34	5.38
22	0.5000	161.00	533.4	8.8	11.10	0.96	12.07	12.51	48.90	6.52	5.55
23	0.6000	168.00	556.6	10.5	11.36	0.99	12.36	12.43	48.70	6.67	5.68
24	0.7000	174.00	576.5	12.3	11.54	1.01	12.54	12.44	48.60	6.78	5.77
25	0.8000	180.00	596.3	14.1	11.69	1.02	12.72	12.44	48.50	6.87	5.85
26	0.9000	185.00	612.9	15.8	11.77	1.04	12.81	12.36	48.40	6.92	5.89
27	1.0000	190.00	629.5	17.6	11.84	1.04	12.88	12.42	48.40	6.96	5.92
28	1.1000	195.00	646.0	19.3	11.89	1.05	12.94	12.31	48.30	7.00	5.95

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	188.090			1272.600
Moisture content: Dry soil+tare, gms.	168.510			1089.700
Moisture content: Tare, gms.	50.650			106.200
Moisture, %	16.6	20.8	20.0	18.6
Moist specimen weight, gms.	1172.2			
Diameter, in.	2.84	2.84	2.83	
Area, in.^{2}	6.33	6.33	6.28	
Height, in.	5.52	5.52	5.49	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	127.7	132.3	133.3	
Dry density, pcf	109.5	109.5	111.1	
Void ratio	0.5745	0.5745	0.5523	
Saturation, %	79.9	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 15.81 ksf **at reading no.** 28

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.51	1.51	1.00	47.80	1.51	0.00
1	0.0010	10.00	33.1	0.0	0.76	1.47	2.23	1.52	48.10	1.85	0.38
2	0.0050	29.00	96.1	0.1	2.20	1.31	3.51	2.68	49.20	2.41	1.10
3	0.0100	39.00	129.2	0.2	2.96	1.17	4.13	3.54	50.20	2.65	1.48
4	0.0150	45.00	149.1	0.3	3.41	1.08	4.49	4.16	50.80	2.79	1.71
5	0.0200	50.00	165.7	0.4	3.79	1.02	4.81	4.70	51.20	2.92	1.89
6	0.0250	55.00	182.2	0.5	4.16	0.96	5.13	5.31	51.60	3.05	2.08
7	0.0300	59.00	195.5	0.5	4.46	0.94	5.40	5.77	51.80	3.17	2.23
8	0.0350	62.00	205.4	0.6	4.68	0.91	5.59	6.16	52.00	3.25	2.34
9	0.0400	66.00	218.7	0.7	4.98	0.89	5.87	6.58	52.10	3.38	2.49
10	0.0450	70.00	231.9	0.8	5.28	0.88	6.16	7.01	52.20	3.52	2.64
11	0.0500	73.00	241.8	0.9	5.50	0.88	6.38	7.26	52.20	3.63	2.75
12	0.0750	88.00	291.5	1.4	6.60	0.88	7.48	8.51	52.20	4.18	3.30
13	0.1000	103.00	341.2	1.8	7.69	0.88	8.57	9.75	52.20	4.72	3.84
14	0.1250	112.00	371.1	2.3	8.32	0.88	9.20	10.47	52.20	5.04	4.16
15	0.1500	121.00	400.9	2.7	8.95	0.88	9.83	11.19	52.20	5.35	4.47
16	0.1750	132.00	437.3	3.2	9.72	0.89	10.61	11.88	52.10	5.75	4.86
17	0.2000	140.00	463.8	3.6	10.26	0.91	11.16	12.31	52.00	6.04	5.13
18	0.2500	152.00	503.6	4.6	11.03	0.91	11.94	13.16	52.00	6.42	5.52
19	0.3000	165.00	546.6	5.5	11.86	0.89	12.75	14.28	52.10	6.82	5.93
20	0.3500	179.00	593.0	6.4	12.74	0.91	13.65	15.05	52.00	7.28	6.37
21	0.4000	190.00	629.5	7.3	13.39	0.92	14.32	15.53	51.90	7.62	6.70
22	0.5000	207.00	685.8	9.1	14.31	0.92	15.23	16.52	51.90	8.07	7.15
23	0.6000	218.00	722.2	10.9	14.76	0.94	15.70	16.77	51.80	8.32	7.38

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	230.00	762.0	12.7	15.26	0.95	16.21	17.05	51.70	8.58	7.63
25	0.8000	237.00	785.2	14.6	15.39	0.96	16.36	16.96	51.60	8.66	7.70
26	0.9000	247.00	818.3	16.4	15.70	0.99	16.70	16.80	51.40	8.84	7.85
27	1.0000	254.00	841.5	18.2	15.80	1.02	16.82	16.45	51.20	8.92	7.90
28	1.1000	260.00	861.4	20.0	15.81	1.05	16.86	16.04	51.00	8.96	7.90
29	1.2000	266.00	881.3	21.8	15.81	1.12	16.93	15.07	50.50	9.03	7.90

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	216.390			1358.600
Moisture content: Dry soil+tare, gms.	192.800			1164.300
Moisture content: Tare, gms.	50.680			108.400
Moisture, %	16.6	20.8	20.3	18.4
Moist specimen weight, gms.	1235.6			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.30	
Height, in.	5.82	5.82	5.80	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	127.7	132.3	132.9	
Dry density, pcf	109.5	109.5	110.5	
Void ratio	0.5747	0.5747	0.5609	
Saturation, %	79.8	100.0	100.0	

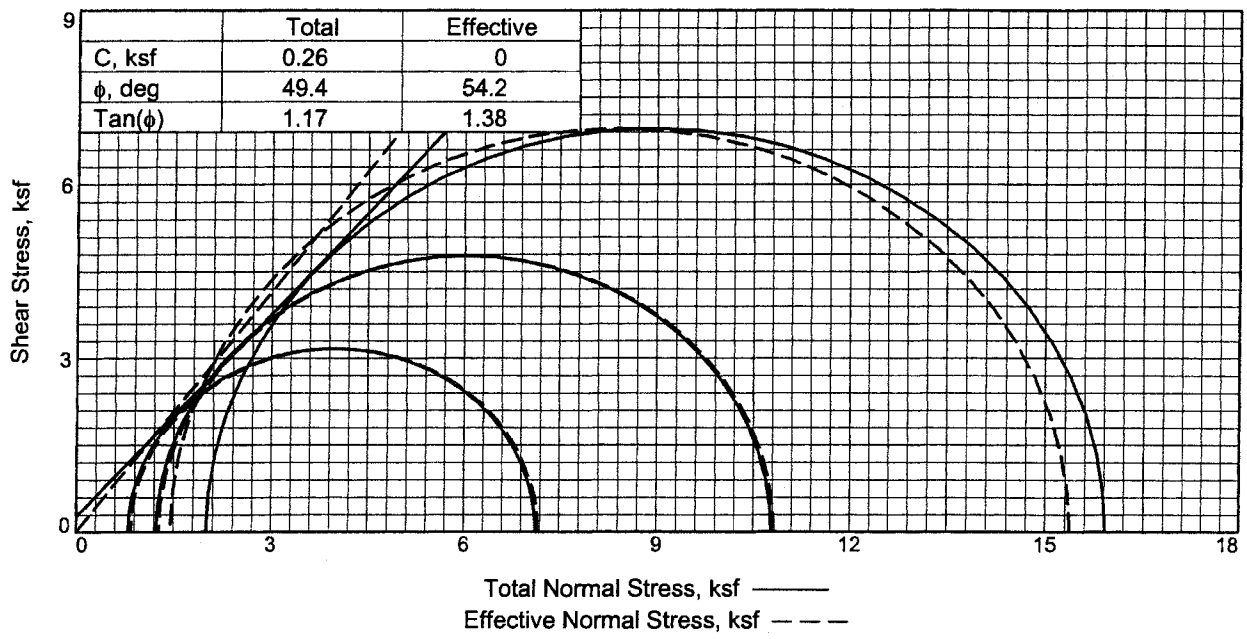
Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 63.90 psi (9.20 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 2.00 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 19.19 ksf **at reading no.** 26

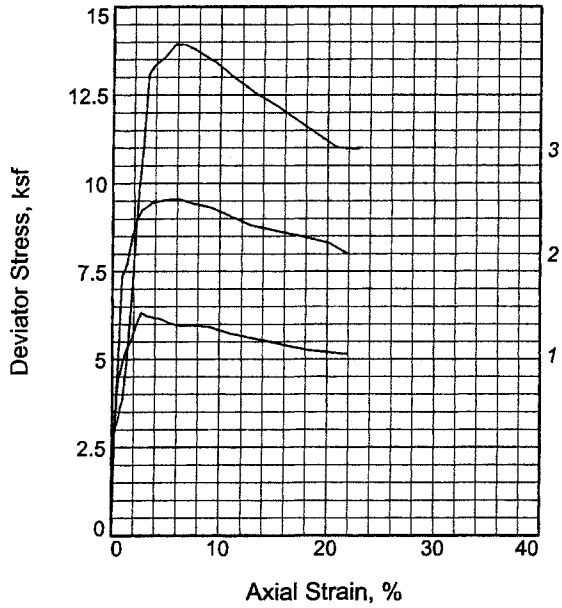
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.30	2.30	1.00	47.90	2.30	0.00
1	0.0010	4.00	13.3	0.0	0.30	2.28	2.58	1.13	48.10	2.43	0.15
2	0.0050	11.00	36.4	0.1	0.83	2.12	2.95	1.39	49.20	2.53	0.42
3	0.0100	18.00	59.6	0.2	1.36	1.97	3.33	1.69	50.20	2.65	0.68
4	0.0150	21.00	69.6	0.3	1.59	1.89	3.47	1.84	50.80	2.68	0.79
5	0.0200	24.00	79.5	0.3	1.81	1.83	3.64	1.99	51.20	2.73	0.91
6	0.0250	28.00	92.8	0.4	2.11	1.77	3.88	2.19	51.60	2.83	1.06
7	0.0300	31.00	102.7	0.5	2.34	1.74	4.08	2.34	51.80	2.91	1.17
8	0.0350	35.00	116.0	0.6	2.64	1.71	4.35	2.54	52.00	3.03	1.32
9	0.0400	38.00	125.9	0.7	2.86	1.70	4.56	2.68	52.10	3.13	1.43
10	0.0450	41.00	135.8	0.8	3.08	1.68	4.77	2.83	52.20	3.23	1.54
11	0.0500	44.00	145.8	0.9	3.30	1.68	4.99	2.96	52.20	3.34	1.65
12	0.0750	60.00	198.8	1.3	4.49	1.68	6.17	3.66	52.20	3.93	2.24
13	0.1000	75.00	248.5	1.7	5.58	1.68	7.27	4.31	52.20	4.48	2.79

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	89.00	294.9	2.2	6.60	1.68	8.28	4.92	52.20	4.98	3.30
15	0.1500	102.00	337.9	2.6	7.53	1.68	9.21	5.47	52.20	5.45	3.76
16	0.1750	116.00	384.3	3.0	8.52	1.70	10.22	6.02	52.10	5.96	4.26
17	0.2000	129.00	427.4	3.4	9.44	1.71	11.15	6.51	52.00	6.43	4.72
18	0.2500	145.00	480.4	4.3	10.51	1.71	12.22	7.13	52.00	6.97	5.26
19	0.3000	180.00	596.3	5.2	12.93	1.73	14.66	8.48	51.90	8.19	6.47
20	0.4000	195.00	646.0	6.9	13.75	1.73	15.48	8.96	51.90	8.60	6.88
21	0.5000	232.00	768.6	8.6	16.06	1.71	17.77	10.37	52.00	9.74	8.03
22	0.6000	259.00	858.1	10.3	17.59	1.68	19.28	11.44	52.20	10.48	8.80
23	0.7000	265.00	877.9	12.1	17.65	1.73	19.38	11.22	51.90	10.55	8.83
24	0.8000	285.00	944.2	13.8	18.61	1.77	20.38	11.51	51.60	11.08	9.31
25	0.9000	296.00	980.6	15.5	18.95	1.80	20.75	11.53	51.40	11.27	9.47
26	1.0000	306.00	1013.8	17.2	19.19	1.83	21.01	11.49	51.20	11.42	9.59
27	1.1000	309.00	1023.7	19.0	18.97	1.86	20.83	11.21	51.00	11.34	9.49
28	1.2000	316.00	1046.9	20.7	18.99	1.93	20.92	10.84	50.50	11.42	9.49



	Total	Effective
C, ksf	0.26	0
ϕ, deg	49.4	54.2
Tan(ϕ)	1.17	1.38



Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.2
	Dry Density, pcf	103.7	104.0	103.8
	Saturation,	67.5	67.9	67.7
	Void Ratio	0.6631	0.6587	0.6612
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.50	5.50	5.29
At Test	Water Content,	22.5	22.4	22.1
	Dry Density, pcf	106.3	106.5	107.1
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6225	0.6191	0.6107
	Diameter, in.	2.82	2.82	2.81
	Height, in.	5.46	5.46	5.24
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		6.3	9.5	13.9
Total Pore Pr., ksf		7.2	7.2	7.7
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		7.2	10.8	15.4
$\bar{\sigma}_3$ Failure, ksf		0.8	1.3	1.5

Type of Test:
CU with Pore Pressures

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

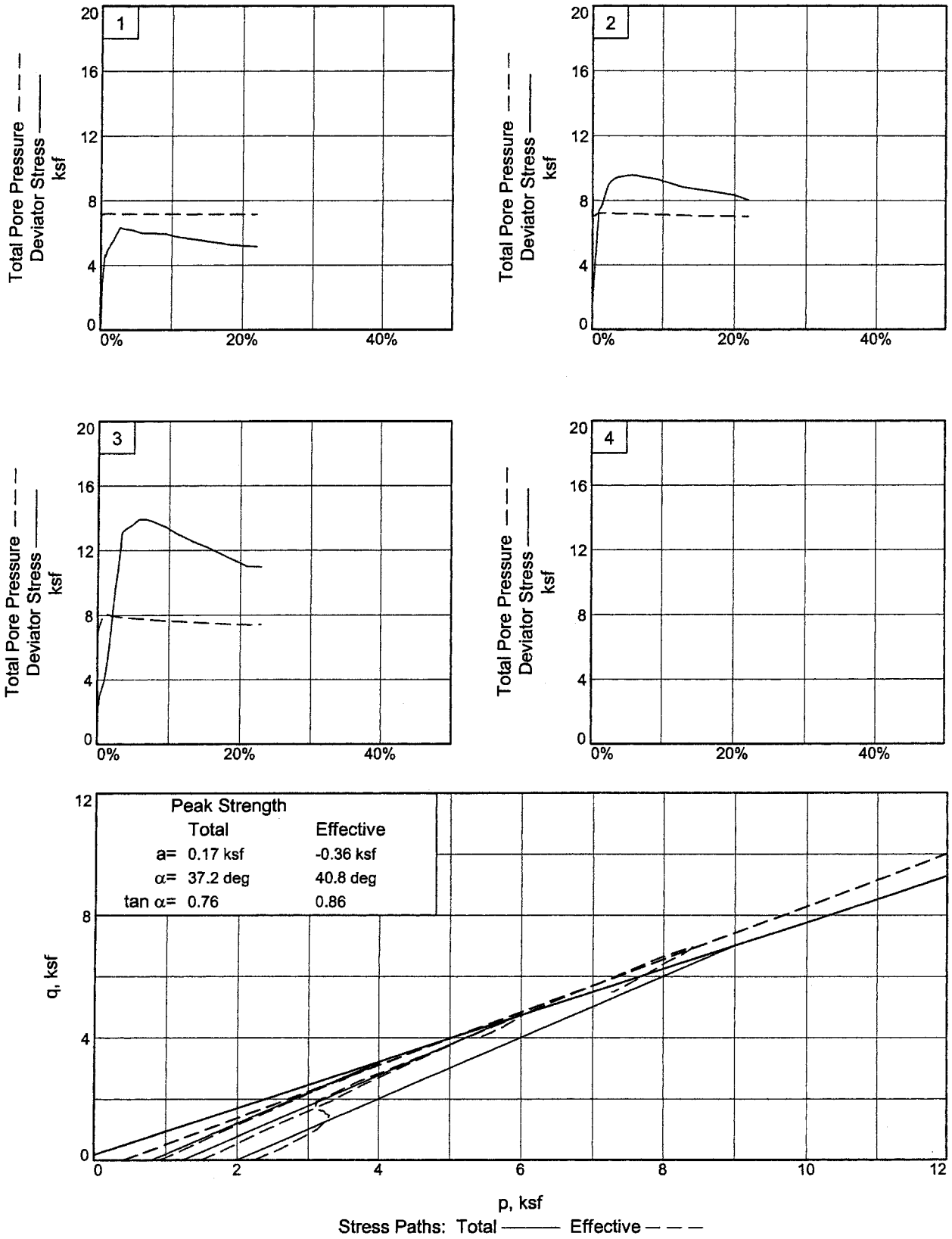
Sample Number: CU-90%-B

Proj. No.: 6738-05-4573 **Date:** 6-15-05

TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: mc **Checked By:** Rajni Sukhwani



Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-90%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:29 AM

Date: 6-15-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-90%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1296.900
Moisture content: Dry soil+tare, gms.	244.810			1117.500
Moisture content: Tare, gms.	50.150			115.570
Moisture, %	16.2	24.0	22.5	17.9
Moist specimen weight, gms.	1101.8			
Diameter, in.	2.84	2.84	2.82	
Area, in.^{2}	6.33	6.33	6.23	
Height, in.	5.50	5.50	5.46	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	120.5	128.6	130.2	
Dry density, pcf	103.7	103.7	106.3	
Void ratio	0.6631	0.6631	0.6225	
Saturation, %	67.5	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 6.33 ksf **at reading no.** 15

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.92	0.92	1.00	49.20	0.92	0.00
1	0.0010	1.00	3.3	0.0	0.08	0.92	1.00	1.08	49.20	0.96	0.04
2	0.0050	5.00	16.6	0.1	0.38	0.92	1.30	1.42	49.20	1.11	0.19
3	0.0100	24.00	79.5	0.2	1.83	0.86	2.70	3.12	49.60	1.78	0.92
4	0.0150	39.00	129.2	0.3	2.98	0.86	3.84	4.45	49.60	2.35	1.49
5	0.0200	46.00	152.4	0.4	3.51	0.85	4.36	5.13	49.70	2.60	1.75
6	0.0250	52.00	172.3	0.5	3.96	0.85	4.81	5.66	49.70	2.83	1.98
7	0.0300	57.00	188.8	0.5	4.34	0.84	5.18	6.20	49.80	3.01	2.17
8	0.0350	61.00	202.1	0.6	4.64	0.84	5.48	6.56	49.80	3.16	2.32
9	0.0400	60.00	198.8	0.7	4.56	0.84	5.40	6.46	49.80	3.12	2.28
10	0.0450	62.00	205.4	0.8	4.71	0.84	5.54	6.64	49.80	3.19	2.35
11	0.0500	64.00	212.0	0.9	4.86	0.84	5.69	6.81	49.80	3.26	2.43
12	0.0750	70.00	231.9	1.4	5.29	0.84	6.12	7.33	49.80	3.48	2.64
13	0.1000	74.00	245.2	1.8	5.56	0.84	6.40	7.66	49.80	3.62	2.78
14	0.1250	80.00	265.0	2.3	5.98	0.85	6.83	8.04	49.70	3.84	2.99
15	0.1500	85.00	281.6	2.7	6.33	0.85	7.18	8.45	49.70	4.01	3.16
16	0.1750	84.00	278.3	3.2	6.23	0.85	7.07	8.33	49.70	3.96	3.11
17	0.2000	84.00	278.3	3.7	6.20	0.85	7.05	8.29	49.70	3.95	3.10
18	0.2500	84.00	278.3	4.6	6.14	0.85	6.99	8.22	49.70	3.92	3.07
19	0.3000	83.00	275.0	5.5	6.01	0.85	6.85	8.07	49.70	3.85	3.00
20	0.3500	83.00	275.0	6.4	5.95	0.85	6.80	8.00	49.70	3.82	2.97
21	0.4000	84.00	278.3	7.3	5.96	0.85	6.81	8.01	49.70	3.83	2.98
22	0.5000	85.00	281.6	9.2	5.91	0.85	6.76	7.96	49.70	3.81	2.96
23	0.6000	84.00	278.3	11.0	5.72	0.86	6.59	7.62	49.60	3.73	2.86
24	0.7000	84.00	278.3	12.8	5.61	0.86	6.47	7.49	49.60	3.67	2.80
25	0.8000	84.00	278.3	14.7	5.49	0.86	6.35	7.35	49.60	3.61	2.74
26	0.9000	84.00	278.3	16.5	5.37	0.86	6.23	7.22	49.60	3.55	2.69
27	1.0000	84.00	278.3	18.3	5.25	0.88	6.13	6.98	49.50	3.50	2.63
28	1.1000	85.00	281.6	20.2	5.20	0.86	6.06	7.01	49.60	3.46	2.60
29	1.2000	86.00	284.9	22.0	5.14	0.88	6.01	6.85	49.50	3.45	2.57

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1291.100
Moisture content: Dry soil+tare, gms.	244.810			1113.500
Moisture content: Tare, gms.	50.150			115.000
Moisture, %	16.2	23.8	22.4	17.8
Moist specimen weight, gms.	1104.7			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.23	
Height, in.	5.50	5.50	5.46	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	120.8	128.7	130.4	
Dry density, pcf	104.0	104.0	106.5	
Void ratio	0.6587	0.6587	0.6191	
Saturation, %	67.9	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.60 psi (8.44 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.24 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 9.55 ksf **at reading no.** 19

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.50	1.50	1.00	48.20	1.50	0.00
1	0.0010	6.00	19.9	0.0	0.46	1.50	1.96	1.31	48.20	1.73	0.23
2	0.0050	23.00	76.2	0.1	1.76	1.43	3.18	2.23	48.70	2.30	0.88
3	0.0100	34.00	112.6	0.2	2.60	1.41	4.01	2.84	48.80	2.71	1.30
4	0.0150	42.00	139.1	0.3	3.21	1.41	4.62	3.27	48.80	3.01	1.60
5	0.0200	50.00	165.7	0.4	3.81	1.40	5.21	3.73	48.90	3.30	1.91
6	0.0250	58.00	192.2	0.5	4.42	1.35	5.77	4.26	49.20	3.56	2.21
7	0.0300	64.00	212.0	0.5	4.87	1.32	6.20	4.68	49.40	3.76	2.44
8	0.0350	70.00	231.9	0.6	5.32	1.31	6.63	5.06	49.50	3.97	2.66
9	0.0400	80.00	265.0	0.7	6.08	1.30	7.37	5.69	49.60	4.33	3.04
10	0.0450	88.00	291.5	0.8	6.68	1.28	7.96	6.21	49.70	4.62	3.34
11	0.0500	97.00	321.4	0.9	7.36	1.27	8.62	6.80	49.80	4.95	3.68
12	0.0750	102.00	337.9	1.4	7.70	1.25	8.95	7.15	49.90	5.10	3.85
13	0.1000	112.00	371.1	1.8	8.41	1.24	9.65	7.79	50.00	5.45	4.21
14	0.1250	120.00	397.6	2.3	8.97	1.24	10.21	8.25	50.00	5.73	4.49
15	0.1500	124.00	410.8	2.7	9.23	1.25	10.48	8.37	49.90	5.87	4.61
16	0.1750	126.00	417.4	3.2	9.33	1.27	10.60	8.37	49.80	5.93	4.67
17	0.2000	128.00	424.1	3.7	9.44	1.27	10.70	8.45	49.80	5.99	4.72
18	0.2500	130.00	430.7	4.6	9.49	1.27	10.76	8.49	49.80	6.01	4.75
19	0.3000	132.00	437.3	5.5	9.55	1.28	10.83	8.45	49.70	6.06	4.77
20	0.3500	133.00	440.6	6.4	9.53	1.28	10.81	8.43	49.70	6.04	4.76
21	0.4000	133.00	440.6	7.3	9.43	1.30	10.73	8.28	49.60	6.01	4.72
22	0.5000	134.00	443.9	9.2	9.32	1.32	10.64	8.03	49.40	5.98	4.66
23	0.6000	133.00	440.6	11.0	9.06	1.35	10.41	7.69	49.20	5.88	4.53

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	132.00	437.3	12.8	8.81	1.38	10.19	7.37	49.00	5.79	4.40
25	0.8000	133.00	440.6	14.7	8.69	1.41	10.10	7.16	48.80	5.75	4.34
26	0.9000	134.00	443.9	16.5	8.56	1.41	9.98	7.07	48.80	5.69	4.28
27	1.0000	135.00	447.3	18.3	8.44	1.41	9.85	6.98	48.80	5.63	4.22
28	1.1000	136.00	450.6	20.2	8.31	1.43	9.74	6.83	48.70	5.58	4.16
29	1.2000	134.00	443.9	22.0	8.00	1.43	9.43	6.61	48.70	5.43	4.00

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1252.000
Moisture content: Dry soil+tare, gms.	244.810			1083.200
Moisture content: Tare, gms.	50.150			121.200
Moisture, %	16.2	23.9	22.1	17.5
Moist specimen weight, gms.	1060.9			
Diameter, in.	2.84	2.84	2.81	
Area, in.^{2}	6.33	6.33	6.21	
Height, in.	5.29	5.29	5.24	
Net decrease in height, in.		0.00	0.05	
Wet Density, pcf	120.6	128.6	130.7	
Dry density, pcf	103.8	103.8	107.1	
Void ratio	0.6612	0.6612	0.6107	
Saturation, %	67.7	100.0	100.0	

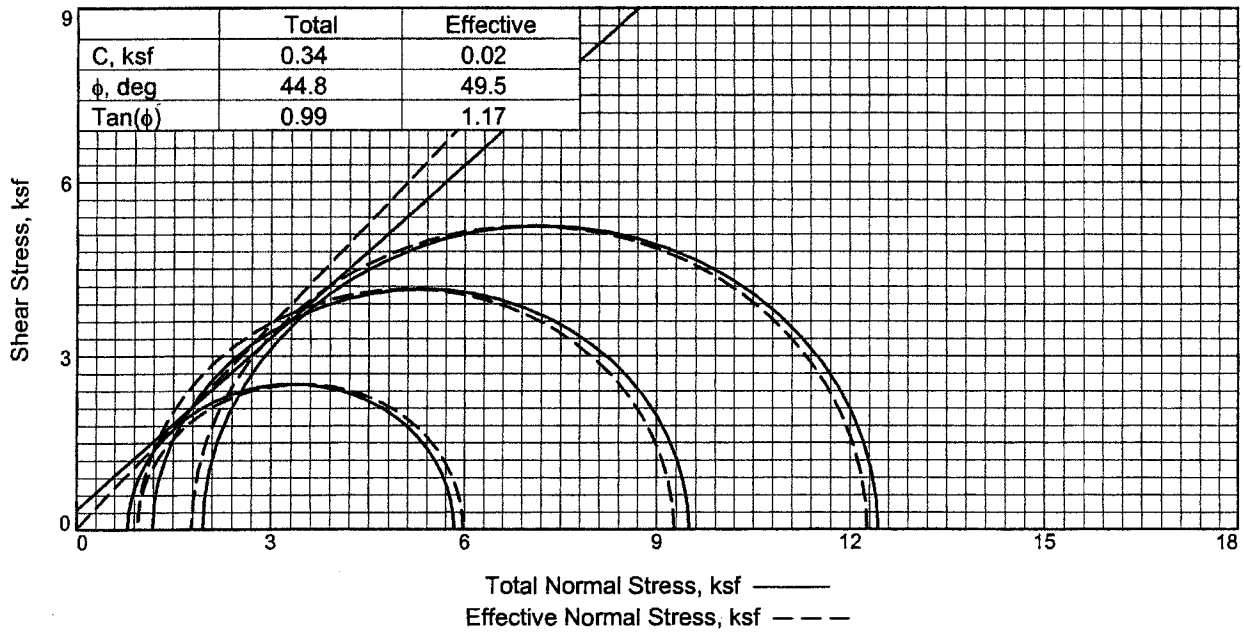
Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 63.90 psi (9.20 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 2.00 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 13.92 ksf **at reading no.** 20

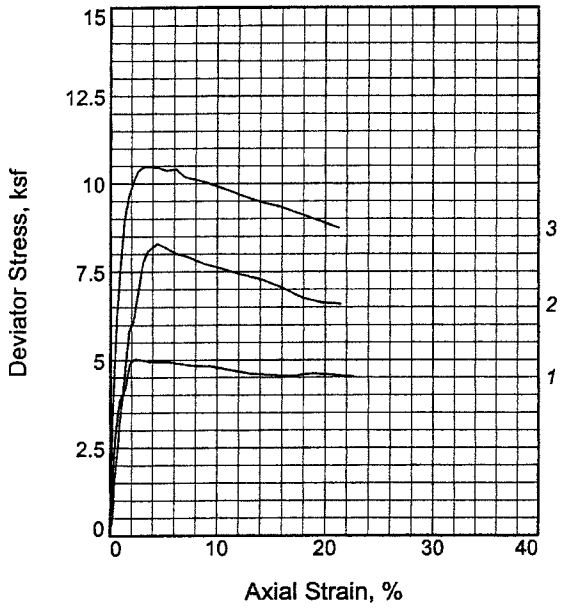
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.25	2.25	1.00	48.30	2.25	0.00
1	0.0010	9.00	29.8	0.0	0.69	2.25	2.94	1.31	48.30	2.59	0.35
2	0.0050	26.00	86.1	0.1	2.00	2.13	4.13	1.94	49.10	3.13	1.00
3	0.0100	33.00	109.3	0.2	2.53	1.99	4.52	2.27	50.10	3.25	1.27
4	0.0150	38.00	125.9	0.3	2.91	1.84	4.76	2.58	51.10	3.30	1.46
5	0.0200	40.00	132.5	0.4	3.06	1.71	4.78	2.79	52.00	3.25	1.53
6	0.0250	42.00	139.1	0.5	3.21	1.61	4.83	2.99	52.70	3.22	1.61
7	0.0300	43.00	142.5	0.6	3.29	1.47	4.76	3.24	53.70	3.11	1.64
8	0.0350	45.00	149.1	0.7	3.44	1.38	4.82	3.49	54.30	3.10	1.72
9	0.0400	47.00	155.7	0.8	3.59	1.31	4.90	3.74	54.80	3.10	1.79
10	0.0450	49.00	162.3	0.9	3.73	1.25	4.99	3.98	55.20	3.12	1.87
11	0.0500	50.00	165.7	1.0	3.81	1.21	5.02	4.15	55.50	3.11	1.90
12	0.0750	68.00	225.3	1.4	5.15	1.15	6.30	5.47	55.90	3.73	2.58
13	0.1000	94.00	311.4	1.9	7.09	1.24	8.33	6.72	55.30	4.78	3.54

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	125.00	414.1	2.4	9.38	1.27	10.65	8.40	55.10	5.96	4.69
15	0.1500	146.00	483.7	2.9	10.90	1.31	12.21	9.32	54.80	6.76	5.45
16	0.1750	176.00	583.1	3.3	13.08	1.34	14.42	10.77	54.60	7.88	6.54
17	0.2000	180.00	596.3	3.8	13.31	1.37	14.68	10.73	54.40	8.02	6.65
18	0.2500	185.00	612.9	4.8	13.54	1.40	14.94	10.70	54.20	8.17	6.77
19	0.3000	192.00	636.1	5.7	13.92	1.43	15.34	10.76	54.00	8.38	6.96
20	0.3500	194.00	642.7	6.7	13.92	1.45	15.37	10.57	53.80	8.41	6.96
21	0.4000	194.00	642.7	7.6	13.78	1.50	15.27	10.20	53.50	8.39	6.89
22	0.5000	193.00	639.4	9.5	13.42	1.56	14.98	9.63	53.10	8.27	6.71
23	0.6000	190.00	629.5	11.5	12.93	1.58	14.52	9.17	52.90	8.05	6.47
24	0.7000	188.00	622.8	13.4	12.52	1.64	14.16	8.63	52.50	7.90	6.26
25	0.8000	187.00	619.5	15.3	12.18	1.68	13.86	8.23	52.20	7.77	6.09
26	0.9000	185.00	612.9	17.2	11.78	1.73	13.51	7.82	51.90	7.62	5.89
27	1.0000	183.00	606.3	19.1	11.38	1.77	13.15	7.43	51.60	7.46	5.69
28	1.1000	181.00	599.7	21.0	10.99	1.80	12.79	7.11	51.40	7.30	5.50
29	1.2000	185.00	612.9	22.9	10.96	1.79	12.75	7.14	51.50	7.27	5.48



	Total	Effective
C, ksf	0.34	0.02
ϕ, deg	44.8	49.5
Tan(ϕ)	0.99	1.17



Sample No.		1	2	3
Initial	Water Content,	16.3	16.3	16.3
	Dry Density, pcf	103.7	103.7	103.6
	Saturation,	68.0	68.1	67.8
	Void Ratio	0.6626	0.6624	0.6650
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.35	5.62	5.66
At Test	Water Content,	22.1	22.9	23.3
	Dry Density, pcf	107.0	105.6	104.9
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6116	0.6323	0.6430
	Diameter, in.	2.81	2.82	2.83
	Height, in.	5.29	5.59	5.63
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		5.0	8.3	10.5
Total Pore Pr., ksf		7.1	7.4	7.4
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		6.0	9.3	12.3
$\bar{\sigma}_3$ Failure, ksf		1.0	1.0	1.8

Type of Test: CU with Pore Pressures

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

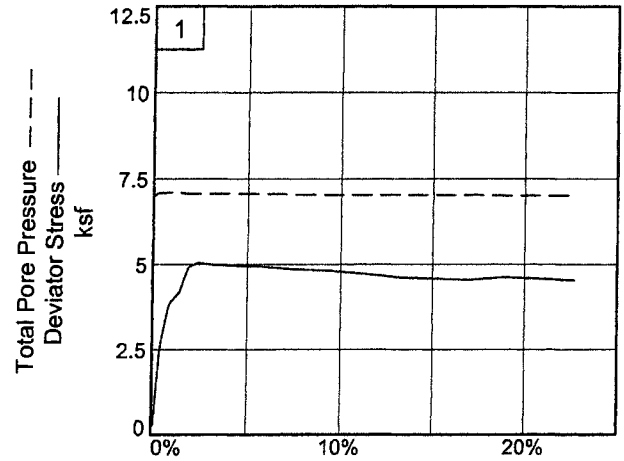
Sample Number: CU-90%-A

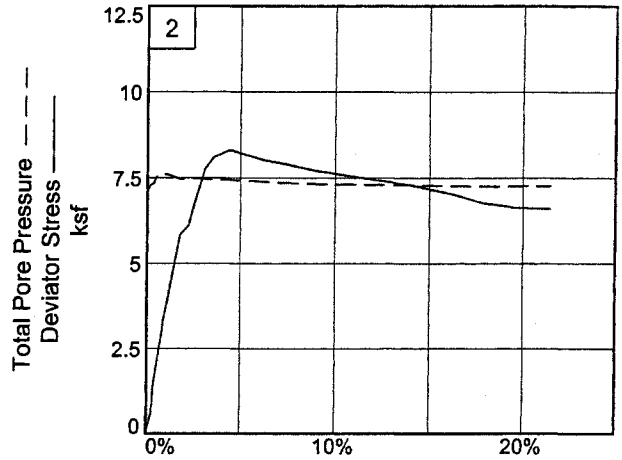
Proj. No.: 6738-05-4573 **Date:** 6-14-05

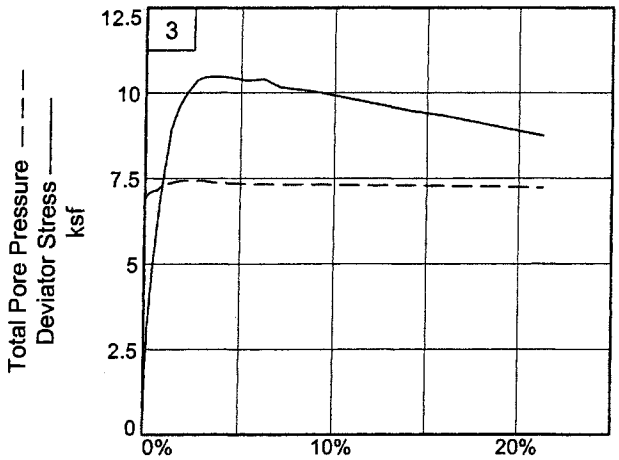
TRIAXIAL SHEAR TEST REPORT

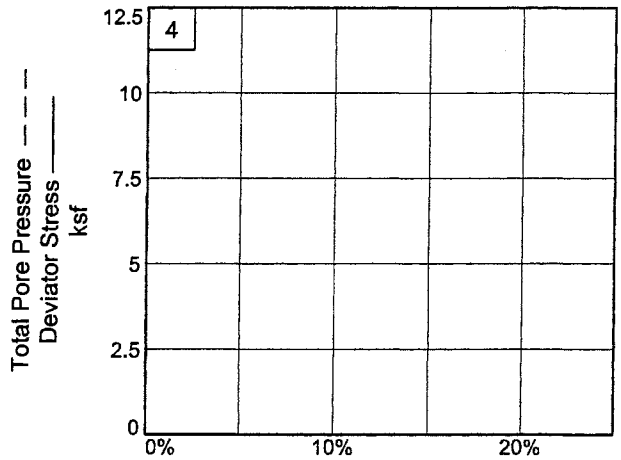
MACTEC ENGINEERING AND CONSULTING, INC.

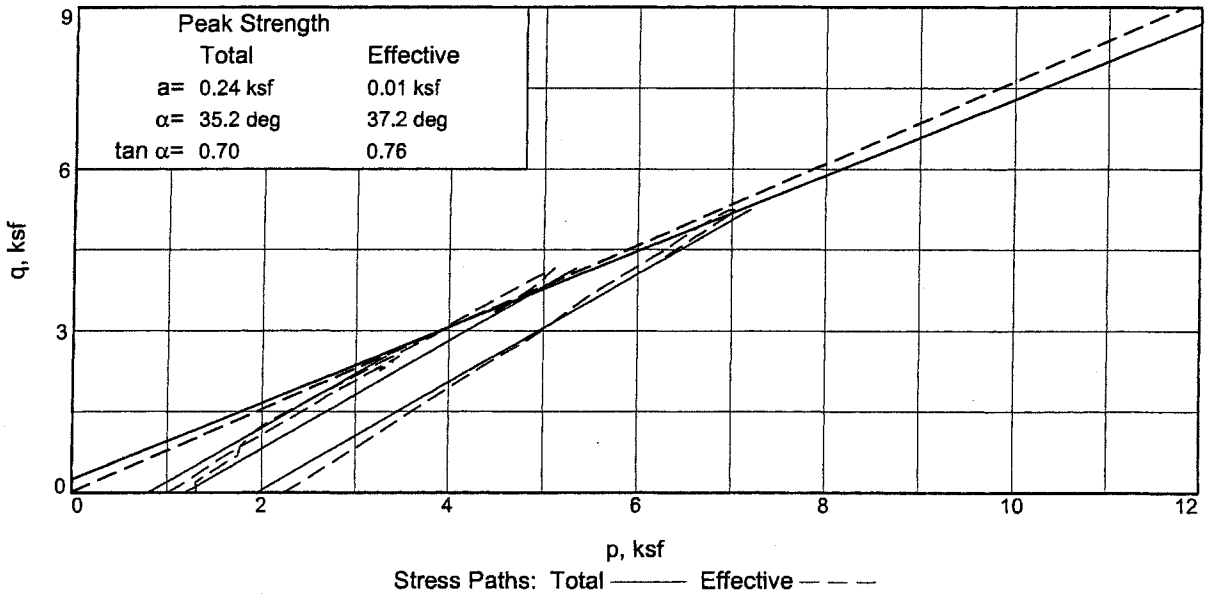
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-90%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:07 AM

Date: 6-14-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-90%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1187.000
Moisture content: Dry soil+tare, gms.	212.600			1009.800
Moisture content: Tare, gms.	55.000			115.150
Moisture, %	16.3	24.0	22.1	19.8
Moist specimen weight, gms.	1073.2			
Diameter, in.	2.84	2.84	2.81	
Area, in.^{2}	6.33	6.33	6.20	
Height, in.	5.35	5.35	5.29	
Net decrease in height, in.		0.00	0.06	
Wet Density, pcf	120.6	128.6	130.7	
Dry density, pcf	103.7	103.7	107.0	
Void ratio	0.6626	0.6626	0.6116	
Saturation, %	68.0	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 5.03 ksf **at reading no.** 14

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.01	1.01	1.00	48.60	1.01	0.00
1	0.0010	3.00	9.9	0.0	0.23	1.01	1.24	1.23	48.60	1.12	0.12
2	0.0050	4.00	13.3	0.1	0.31	1.01	1.32	1.30	48.60	1.16	0.15
3	0.0100	14.00	46.4	0.2	1.07	0.95	2.02	2.13	49.00	1.49	0.54
4	0.0150	23.00	76.2	0.3	1.76	0.94	2.70	2.88	49.10	1.82	0.88
5	0.0200	31.00	102.7	0.4	2.37	0.94	3.31	3.54	49.10	2.12	1.19
6	0.0250	36.00	119.3	0.5	2.76	0.94	3.69	3.94	49.10	2.31	1.38
7	0.0300	40.00	132.5	0.6	3.06	0.94	3.99	4.27	49.10	2.47	1.53
8	0.0350	43.00	142.5	0.7	3.28	0.94	4.22	4.51	49.10	2.58	1.64
9	0.0400	46.00	152.4	0.8	3.51	0.92	4.43	4.81	49.20	2.68	1.76
10	0.0450	49.00	162.3	0.8	3.74	0.92	4.66	5.05	49.20	2.79	1.87
11	0.0500	51.00	169.0	0.9	3.88	0.92	4.81	5.21	49.20	2.86	1.94
12	0.0750	55.00	182.2	1.4	4.17	0.94	5.11	5.45	49.10	3.02	2.08
13	0.1000	65.00	215.3	1.9	4.90	0.95	5.85	6.16	49.00	3.40	2.45
14	0.1250	67.00	222.0	2.4	5.03	0.95	5.98	6.29	49.00	3.47	2.52
15	0.1500	67.00	222.0	2.8	5.01	0.95	5.96	6.27	49.00	3.45	2.50
16	0.1750	67.00	222.0	3.3	4.98	0.95	5.93	6.24	49.00	3.44	2.49
17	0.2000	67.00	222.0	3.8	4.96	0.95	5.91	6.22	49.00	3.43	2.48
18	0.3000	68.00	225.3	5.7	4.93	0.95	5.88	6.19	49.00	3.42	2.47
19	0.4000	68.00	225.3	7.6	4.83	0.98	5.81	5.94	48.80	3.40	2.42
20	0.5000	69.00	228.6	9.4	4.80	0.99	5.80	5.84	48.70	3.40	2.40
21	0.6000	69.00	228.6	11.3	4.70	0.99	5.70	5.73	48.70	3.35	2.35
22	0.7000	69.00	228.6	13.2	4.60	0.99	5.60	5.63	48.70	3.30	2.30
23	0.8000	70.00	231.9	15.1	4.57	0.99	5.56	5.60	48.70	3.28	2.28
24	0.9000	71.00	235.2	17.0	4.53	0.99	5.52	5.56	48.70	3.26	2.27
25	1.0000	74.00	245.2	18.9	4.62	1.01	5.62	5.58	48.60	3.32	2.31
26	1.1000	75.00	248.5	20.8	4.57	1.01	5.58	5.53	48.60	3.29	2.28
27	1.2000	76.00	251.8	22.7	4.52	1.01	5.53	5.48	48.60	3.27	2.26

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1262.200
Moisture content: Dry soil+tare, gms.	212.600			1068.100
Moisture content: Tare, gms.	55.000			108.400
Moisture, %	16.3	24.0	22.9	20.2
Moist specimen weight, gms.	1127.5			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.26	
Height, in.	5.62	5.62	5.59	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	120.7	128.6	129.8	
Dry density, pcf	103.7	103.7	105.6	
Void ratio	0.6624	0.6624	0.6323	
Saturation, %	68.1	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 8.30 ksf **at reading no.** 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.31	1.31	1.00	49.20	1.31	0.00
1	0.0010	1.00	3.3	0.0	0.08	1.27	1.34	1.06	49.50	1.31	0.04
2	0.0050	3.00	9.9	0.1	0.23	1.20	1.42	1.19	50.00	1.31	0.11
3	0.0100	5.00	16.6	0.2	0.38	1.11	1.49	1.34	50.60	1.30	0.19
4	0.0150	8.00	26.5	0.3	0.61	1.09	1.70	1.56	50.70	1.40	0.30
5	0.0200	18.00	59.6	0.4	1.37	1.07	2.43	2.28	50.90	1.75	0.68
6	0.0250	22.00	72.9	0.4	1.67	0.94	2.61	2.78	51.80	1.77	0.83
7	0.0300	26.00	86.1	0.5	1.97	0.86	2.84	3.28	52.30	1.85	0.99
8	0.0350	30.00	99.4	0.6	2.27	0.79	3.06	3.87	52.80	1.93	1.14
9	0.0400	34.00	112.6	0.7	2.57	0.78	3.35	4.31	52.90	2.06	1.29
10	0.0450	38.00	125.9	0.8	2.87	0.78	3.65	4.70	52.90	2.21	1.44
11	0.0500	43.00	142.5	0.9	3.25	0.79	4.04	5.10	52.80	2.42	1.62
12	0.0750	60.00	198.8	1.3	4.51	0.85	5.36	6.31	52.40	3.11	2.26
13	0.1000	78.00	258.4	1.8	5.84	0.94	6.78	7.24	51.80	3.86	2.92
14	0.1250	82.00	271.7	2.2	6.11	0.91	7.02	7.74	52.00	3.96	3.06
15	0.1500	94.00	311.4	2.7	6.97	0.92	7.90	8.57	51.90	4.41	3.49
16	0.1750	105.00	347.9	3.1	7.75	0.94	8.69	9.28	51.80	4.81	3.88
17	0.2000	110.00	364.4	3.6	8.09	0.95	9.04	9.51	51.70	4.99	4.04
18	0.2500	114.00	377.7	4.5	8.30	0.96	9.27	9.60	51.60	5.12	4.15
19	0.3000	113.00	374.4	5.4	8.15	0.99	9.15	9.20	51.40	5.07	4.08
20	0.3500	112.00	371.1	6.3	8.00	1.02	9.03	8.83	51.20	5.02	4.00
21	0.4000	112.00	371.1	7.2	7.93	1.05	8.98	8.54	51.00	5.01	3.96
22	0.5000	111.00	367.7	9.0	7.70	1.08	8.78	8.13	50.80	4.93	3.85
23	0.6000	111.00	367.7	10.7	7.55	1.09	8.65	7.90	50.70	4.87	3.78

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	111.00	367.7	12.5	7.40	1.11	8.51	7.68	50.60	4.81	3.70
25	0.8000	111.00	367.7	14.3	7.25	1.12	8.37	7.45	50.50	4.75	3.63
26	0.9000	110.00	364.4	16.1	7.03	1.14	8.17	7.18	50.40	4.65	3.52
27	1.0000	108.00	357.8	17.9	6.76	1.15	7.91	6.87	50.30	4.53	3.38
28	1.1000	108.00	357.8	19.7	6.61	1.14	7.75	6.81	50.40	4.44	3.31
29	1.2000	110.00	364.4	21.5	6.58	1.14	7.72	6.79	50.40	4.43	3.29

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1285.300
Moisture content: Dry soil+tare, gms.	212.600			1102.400
Moisture content: Tare, gms.	55.000			115.700
Moisture, %	16.3	24.1	23.3	18.5
Moist specimen weight, gms.	1133.7			
Diameter, in.	2.84	2.84	2.83	
Area, in.^{2}	6.33	6.33	6.28	
Height, in.	5.66	5.66	5.63	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	120.5	128.5	129.4	
Dry density, pcf	103.6	103.6	104.9	
Void ratio	0.6650	0.6650	0.6430	
Saturation, %	67.8	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Consolidation cell pressure = 63.60 psi (9.16 ksf)

Consolidation back pressure = 50.00 psi (7.20 ksf)

Consolidation effective confining stress = 1.96 ksf

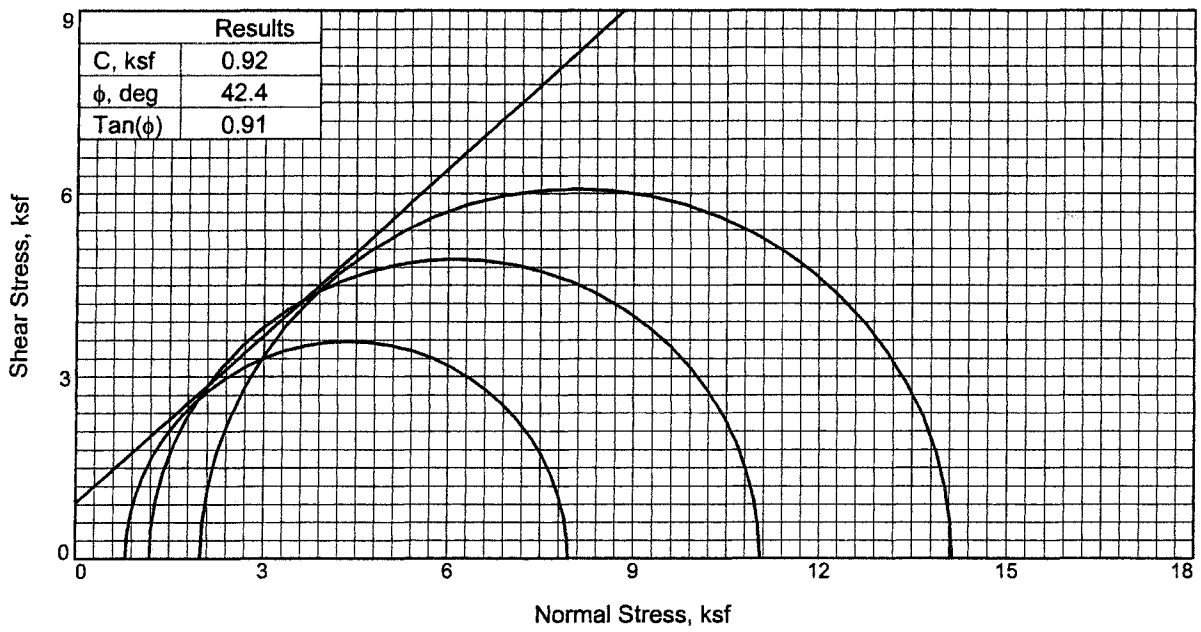
Strain rate, in./min. = 0.05

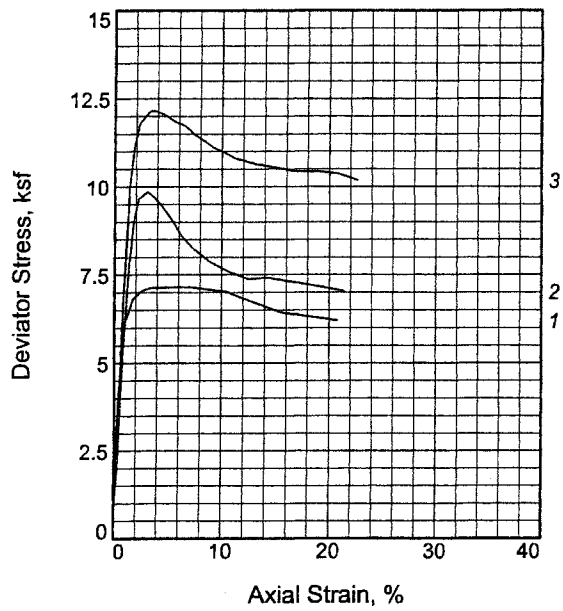
Fail. Stress = 10.48 ksf **at reading no.** 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.25	2.25	1.00	48.00	2.25	0.00
1	0.0010	4.00	13.3	0.0	0.30	2.25	2.55	1.14	48.00	2.40	0.15
2	0.0050	22.00	72.9	0.1	1.67	2.19	3.86	1.76	48.40	3.02	0.84
3	0.0100	42.00	139.1	0.2	3.19	2.10	5.29	2.52	49.00	3.70	1.59
4	0.0150	50.00	165.7	0.3	3.79	2.07	5.86	2.83	49.20	3.97	1.89
5	0.0200	58.00	192.2	0.4	4.39	2.04	6.44	3.15	49.40	4.24	2.20
6	0.0250	66.00	218.7	0.4	4.99	2.02	7.01	3.48	49.60	4.51	2.50
7	0.0300	73.00	241.8	0.5	5.52	2.02	7.53	3.74	49.60	4.77	2.76
8	0.0350	80.00	265.0	0.6	6.04	1.99	8.03	4.04	49.80	5.01	3.02
9	0.0450	91.00	301.5	0.8	6.86	1.89	8.75	4.64	50.50	5.32	3.43
10	0.0500	97.00	321.4	0.9	7.30	1.84	9.15	4.96	50.80	5.50	3.65
11	0.0750	119.00	394.2	1.3	8.92	1.80	10.72	5.96	51.10	6.26	4.46
12	0.1000	129.00	427.4	1.8	9.63	1.74	11.37	6.53	51.50	6.56	4.81
13	0.1250	135.00	447.3	2.2	10.03	1.73	11.76	6.80	51.60	6.74	5.02

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1500	140.00	463.8	2.7	10.35	1.73	12.08	6.99	51.60	6.91	5.18
15	0.1750	142.00	470.4	3.1	10.45	1.74	12.20	7.00	51.50	6.97	5.23
16	0.2000	143.00	473.8	3.5	10.48	1.79	12.27	6.87	51.20	7.03	5.24
17	0.2500	144.00	477.1	4.4	10.46	1.80	12.26	6.81	51.10	7.03	5.23
18	0.3000	144.00	477.1	5.3	10.36	1.83	12.19	6.66	50.90	7.01	5.18
19	0.3500	146.00	483.7	6.2	10.40	1.83	12.23	6.69	50.90	7.03	5.20
20	0.4000	144.00	477.1	7.1	10.16	1.84	12.01	6.51	50.80	6.93	5.08
21	0.5000	145.00	480.4	8.9	10.04	1.84	11.88	6.45	50.80	6.86	5.02
22	0.6000	145.00	480.4	10.6	9.84	1.86	11.70	6.30	50.70	6.78	4.92
23	0.7000	145.00	480.4	12.4	9.65	1.87	11.52	6.15	50.60	6.70	4.82
24	0.8000	145.00	480.4	14.2	9.45	1.87	11.33	6.05	50.60	6.60	4.73
25	0.9000	146.00	483.7	16.0	9.32	1.89	11.21	5.94	50.50	6.55	4.66
26	1.0000	146.00	483.7	17.7	9.12	1.90	11.03	5.80	50.40	6.46	4.56
27	1.1000	146.00	483.7	19.5	8.93	1.92	10.84	5.66	50.30	6.38	4.46
28	1.2000	146.00	483.7	21.3	8.73	1.93	10.66	5.52	50.20	6.30	4.37





Sample No.		1	2	3
Initial	Water Content,	15.7	15.6	15.4
	Dry Density, pcf	110.6	109.4	109.4
	Saturation,	77.3	75.1	73.9
	Void Ratio	0.5596	0.5756	0.5765
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.77	5.64	5.32
At Test	Water Content,	20.3	19.5	20.0
	Dry Density, pcf	110.6	112.0	111.0
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5596	0.5398	0.5534
	Diameter, in.	2.84	2.82	2.83
	Height, in.	5.77	5.60	5.29
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		7.1	9.9	12.1
Ult. Stress, ksf				
σ_1 Failure, ksf		8.0	11.0	14.1
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

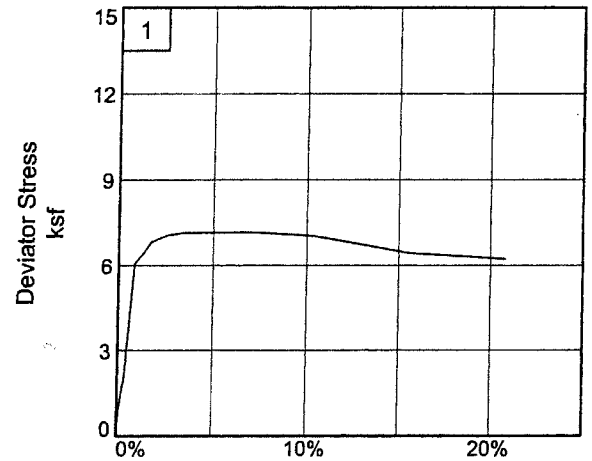
Sample Number: UU-95%-A

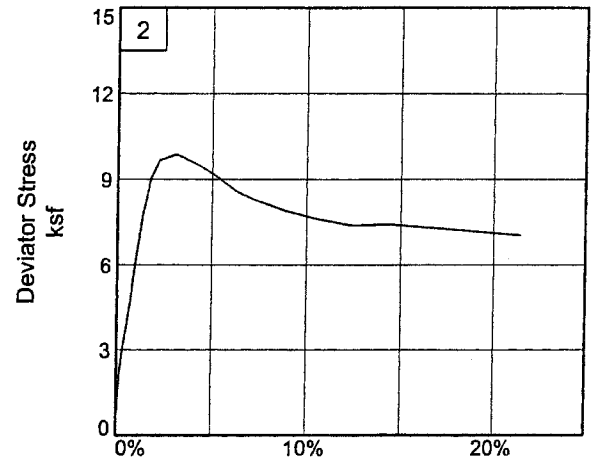
Proj. No.: 6738-05-4573 **Date:** 6-11-05

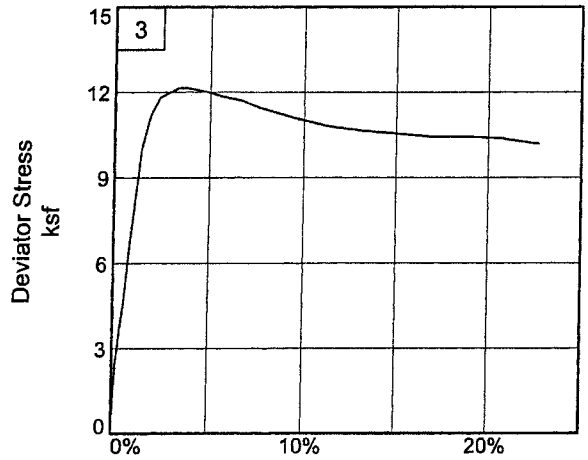
TRIAXIAL SHEAR TEST REPORT

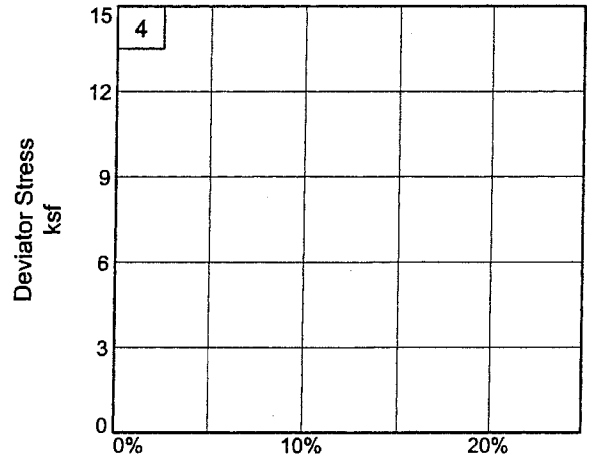
MACTEC ENGINEERING AND CONSULTING, INC.

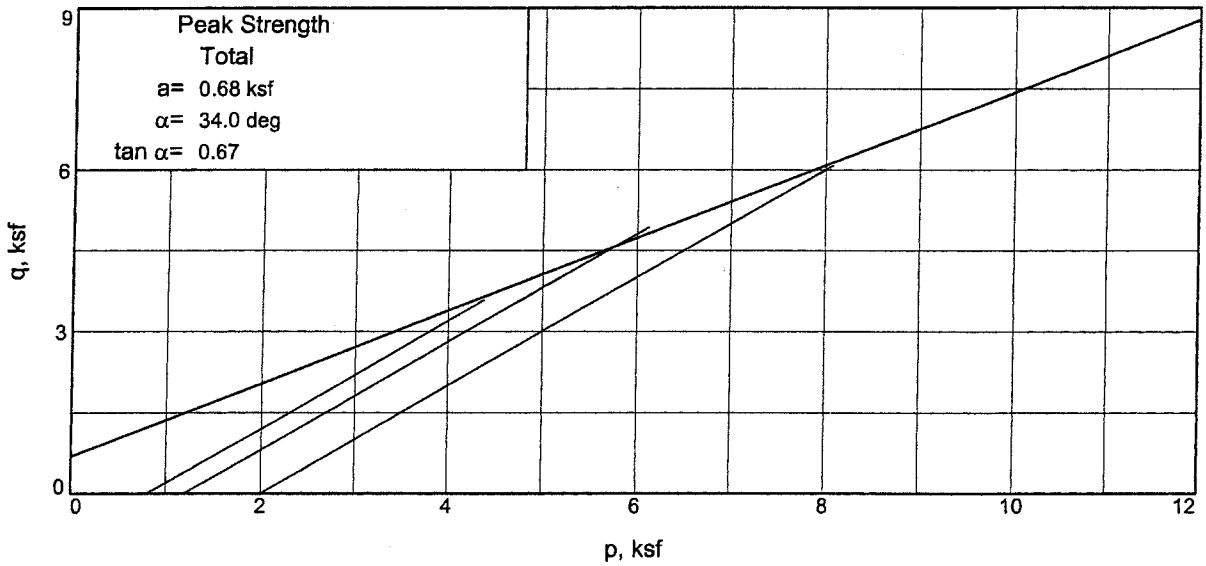
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:46 AM

Date: 6-11-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	224.300		1320.500
Moisture content: Dry soil+tare, gms.	200.660		1168.100
Moisture content: Tare, gms.	49.750		230.100
Moisture, %	15.7	20.3	16.2
Moist specimen weight, gms.	1226.9		
Diameter, in.	2.84	2.84	
Area, in.^{2}	6.33	6.33	
Height, in.	5.77	5.77	
Net decrease in height, in.		0.00	
Wet Density, pcf	127.9	133.0	
Dry density, pcf	110.6	110.6	
Void ratio	0.5596	0.5596	
Saturation, %	77.3	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 7.15 ksf **at reading no.** 21

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	5.00	16.6	0.0	0.38	0.81	1.18	1.47		0.99
2	0.0050	12.00	39.8	0.1	0.90	0.81	1.71	2.12		1.26
3	0.0100	17.00	56.3	0.2	1.28	0.81	2.08	2.58		1.45
4	0.0150	22.00	72.9	0.3	1.65	0.81	2.46	3.05		1.63
5	0.0200	26.00	86.1	0.3	1.95	0.81	2.76	3.42		1.78
6	0.0250	35.00	116.0	0.4	2.62	0.81	3.43	4.25		2.12
7	0.0300	44.00	145.8	0.5	3.30	0.81	4.10	5.09		2.45
8	0.0350	53.00	175.6	0.6	3.97	0.81	4.77	5.92		2.79
9	0.0400	62.00	205.4	0.7	4.64	0.81	5.44	6.75		3.12
10	0.0450	71.00	235.2	0.8	5.31	0.81	6.11	7.58		3.46
11	0.0500	81.00	268.4	0.9	6.05	0.81	6.85	8.50		3.83
12	0.0750	86.00	284.9	1.3	6.39	0.81	7.20	8.93		4.00
13	0.1000	92.00	304.8	1.7	6.81	0.81	7.61	9.44		4.21
14	0.1250	94.00	311.4	2.2	6.93	0.81	7.73	9.59		4.27
15	0.1500	96.00	318.0	2.6	7.04	0.81	7.85	9.73		4.33
16	0.1750	97.00	321.4	3.0	7.08	0.81	7.89	9.78		4.35
17	0.2000	98.00	324.7	3.5	7.12	0.81	7.93	9.84		4.37
18	0.2500	99.00	328.0	4.3	7.13	0.81	7.94	9.85		4.37
19	0.3000	100.00	331.3	5.2	7.14	0.81	7.95	9.85		4.38
20	0.3500	101.00	334.6	6.1	7.14	0.81	7.95	9.86		4.38
21	0.4000	102.00	337.9	6.9	7.15	0.81	7.96	9.87		4.38
22	0.5000	103.00	341.2	8.7	7.08	0.81	7.89	9.79		4.35
23	0.6000	104.00	344.6	10.4	7.02	0.81	7.82	9.70		4.32
24	0.7000	103.00	341.2	12.1	6.82	0.81	7.62	9.45		4.21
25	0.8000	102.00	337.9	13.9	6.62	0.81	7.42	9.21		4.11
26	0.9000	101.00	334.6	15.6	6.42	0.81	7.23	8.96		4.02
27	1.0000	102.00	337.9	17.3	6.35	0.81	7.16	8.87		3.98
28	1.1000	103.00	341.2	19.1	6.28	0.81	7.08	8.79		3.95
29	1.2000	104.00	344.6	20.8	6.20	0.81	7.01	8.69		3.91

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	165.540		1261.000
Moisture content: Dry soil+tare, gms.	150.080		1103.500
Moisture content: Tare, gms.	51.290		109.000
Moisture, %	15.6	19.5	15.8
Moist specimen weight, gms.	1186.9		
Diameter, in.	2.84	2.82	
Area, in.²	6.33	6.24	
Height, in.	5.64	5.60	
Net decrease in height, in.		0.04	
Wet Density, pcf	126.6	133.9	
Dry density, pcf	109.4	112.0	
Void ratio	0.5756	0.5398	
Saturation, %	75.1	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.85 ksf **at reading no.** 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	8.00	26.5	0.0	0.61	1.20	1.81	1.51		1.50
2	0.0050	18.00	59.6	0.1	1.38	1.20	2.57	2.15		1.88
3	0.0100	30.00	99.4	0.2	2.29	1.20	3.49	2.92		2.34
4	0.0150	36.00	119.3	0.3	2.75	1.20	3.94	3.30		2.57
5	0.0200	42.00	139.1	0.4	3.20	1.20	4.40	3.68		2.80
6	0.0250	47.00	155.7	0.4	3.58	1.20	4.77	3.99		2.98
7	0.0300	51.00	169.0	0.5	3.88	1.20	5.07	4.25		3.13
8	0.0350	56.00	185.5	0.6	4.26	1.20	5.45	4.56		3.32
9	0.0400	62.00	205.4	0.7	4.71	1.20	5.90	4.94		3.55
10	0.0450	67.00	222.0	0.8	5.08	1.20	6.28	5.25		3.74
11	0.0500	74.00	245.2	0.9	5.61	1.20	6.80	5.69		4.00
12	0.0750	102.00	337.9	1.3	7.70	1.20	8.89	7.44		5.04
13	0.1000	120.00	397.6	1.8	9.01	1.20	10.21	8.54		5.70
14	0.1250	129.00	427.4	2.2	9.65	1.20	10.84	9.07		6.02
15	0.1500	131.00	434.0	2.7	9.75	1.20	10.95	9.16		6.07
16	0.1750	133.00	440.6	3.1	9.85	1.20	11.05	9.24		6.12
17	0.2000	132.00	437.3	3.6	9.73	1.20	10.93	9.14		6.06
18	0.2500	129.00	427.4	4.5	9.42	1.20	10.62	8.89		5.91
19	0.3000	125.00	414.1	5.4	9.05	1.20	10.24	8.57		5.72
20	0.3500	120.00	397.6	6.3	8.60	1.20	9.80	8.20		5.50
21	0.4000	117.00	387.6	7.1	8.31	1.20	9.50	7.95		5.35
22	0.5000	113.00	374.4	8.9	7.87	1.20	9.07	7.58		5.13
23	0.6000	111.00	367.7	10.7	7.58	1.20	8.77	7.34		4.98
24	0.7000	110.00	364.4	12.5	7.36	1.20	8.56	7.16		4.88

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	113.00	374.4	14.3	7.41	1.20	8.60	7.20		4.90
26	0.9000	114.00	377.7	16.1	7.32	1.20	8.51	7.12		4.85
27	1.0000	115.00	381.0	17.9	7.22	1.20	8.42	7.04		4.81
28	1.1000	116.00	384.3	19.7	7.13	1.20	8.32	6.96		4.76
29	1.2000	117.00	387.6	21.4	7.03	1.20	8.22	6.88		4.71

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.450		1186.300
Moisture content: Dry soil+tare, gms.	161.940		1039.700
Moisture content: Tare, gms.	54.840		106.200
Moisture, %	15.4	20.0	15.7
Moist specimen weight, gms.	1116.7		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.27	
Height, in.	5.32	5.29	
Net decrease in height, in.		0.03	
Wet Density, pcf	126.2	133.2	
Dry density, pcf	109.4	111.0	
Void ratio	0.5765	0.5534	
Saturation, %	73.9	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

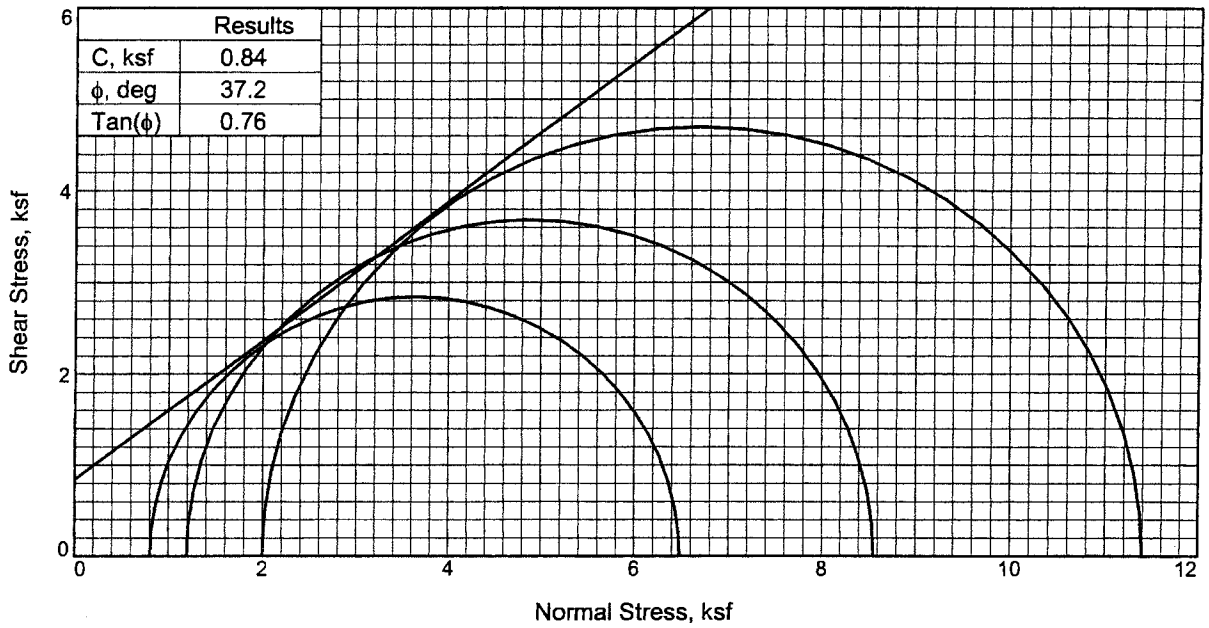
Strain rate, in./min. = 0.05

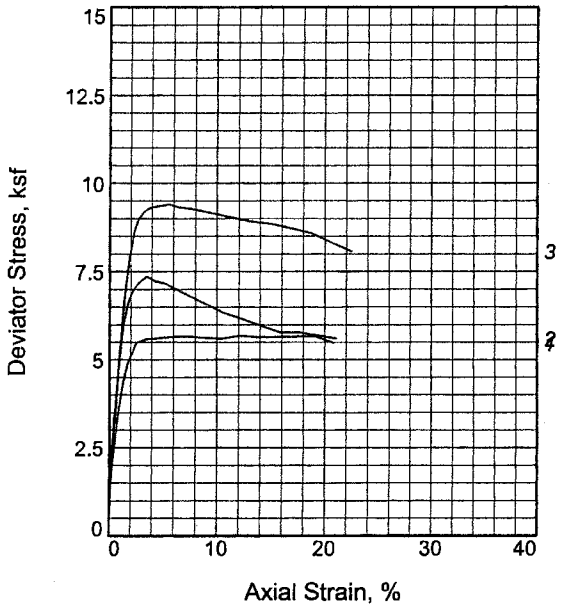
Fail. Stress = 12.15 ksf **at reading no.** 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	6.00	19.9	0.0	0.46	2.00	2.46	1.23		2.23
2	0.0050	20.00	66.3	0.1	1.52	2.00	3.52	1.76		2.76
3	0.0100	32.00	106.0	0.2	2.43	2.00	4.43	2.21		3.22
4	0.0150	40.00	132.5	0.3	3.03	2.00	5.04	2.52		3.52
5	0.0200	48.00	159.0	0.4	3.64	2.00	5.64	2.82		3.82
6	0.0250	55.00	182.2	0.5	4.16	2.00	6.16	3.08		4.08
7	0.0300	62.00	205.4	0.6	4.69	2.00	6.69	3.34		4.35
8	0.0350	71.00	235.2	0.7	5.36	2.00	7.37	3.68		4.68
9	0.0400	80.00	265.0	0.8	6.04	2.00	8.04	4.02		5.02
10	0.0450	89.00	294.9	0.9	6.71	2.00	8.71	4.35		5.36
11	0.0500	96.00	318.0	0.9	7.23	2.00	9.23	4.61		5.62
12	0.0750	133.00	440.6	1.4	9.97	2.00	11.97	5.98		6.99
13	0.1000	150.00	497.0	1.9	11.19	2.00	13.19	6.59		7.60
14	0.1250	159.00	526.8	2.4	11.81	2.00	13.81	6.90		7.91
15	0.1500	162.00	536.7	2.8	11.97	2.00	13.97	6.98		7.99

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	165.00	546.6	3.3	12.13	2.00	14.14	7.06		8.07
17	0.2000	166.00	550.0	3.8	12.15	2.00	14.15	7.07		8.08
18	0.2500	166.00	550.0	4.7	12.03	2.00	14.03	7.01		8.02
19	0.3000	165.00	546.6	5.7	11.84	2.00	13.84	6.91		7.92
20	0.3500	165.00	546.6	6.6	11.72	2.00	13.72	6.85		7.86
21	0.4000	163.00	540.0	7.6	11.46	2.00	13.46	6.73		7.73
22	0.5000	161.00	533.4	9.4	11.09	2.00	13.09	6.54		7.55
23	0.6000	160.00	530.1	11.3	10.79	2.00	12.79	6.39		7.40
24	0.7000	161.00	533.4	13.2	10.63	2.00	12.63	6.31		7.31
25	0.8000	163.00	540.0	15.1	10.52	2.00	12.53	6.26		7.26
26	0.9000	165.00	546.6	17.0	10.42	2.00	12.42	6.20		7.21
27	1.0000	169.00	559.9	18.9	10.43	2.00	12.43	6.21		7.21
28	1.1000	172.00	569.8	20.8	10.36	2.00	12.36	6.18		7.18
29	1.2000	173.00	573.1	22.7	10.17	2.00	12.18	6.08		7.09





Sample No.		1	2	3
Initial	Water Content,	16.6	16.6	16.6
	Dry Density, pcf	104.1	103.8	104.0
	Saturation,	69.9	69.4	69.7
	Void Ratio	0.6562	0.6605	0.6579
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.78	5.72	5.36
At Test	Water Content,	22.9	22.8	23.0
	Dry Density, pcf	105.7	105.9	105.4
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6313	0.6284	0.6357
	Diameter, in.	2.83	2.82	2.83
	Height, in.	5.75	5.68	5.34
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		5.7	7.4	9.4
Ult. Stress, ksf				
σ_1 Failure, ksf		6.5	8.6	11.4
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

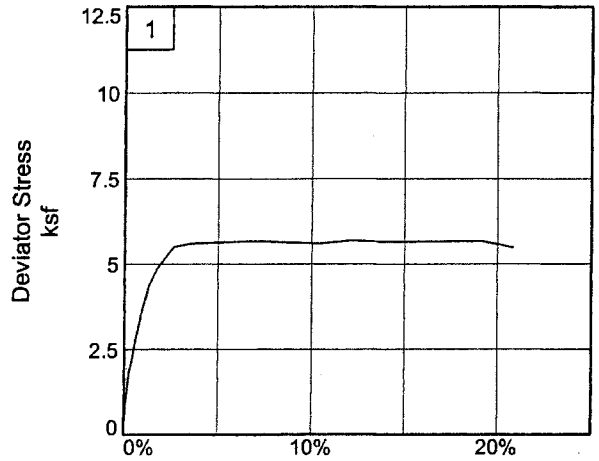
Sample Number: UU-90%-A

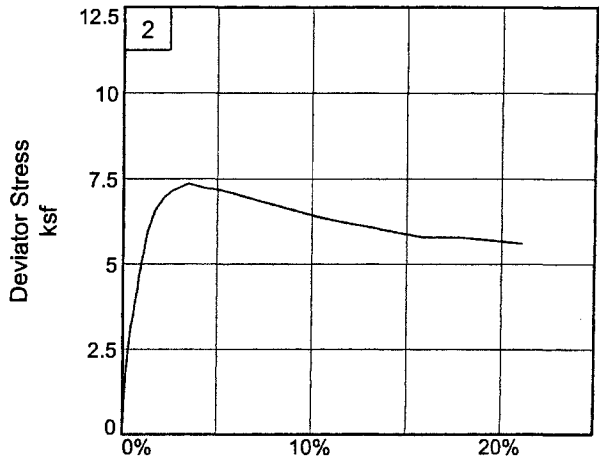
Proj. No.: 6738-05-4573 **Date:** 6-10-05

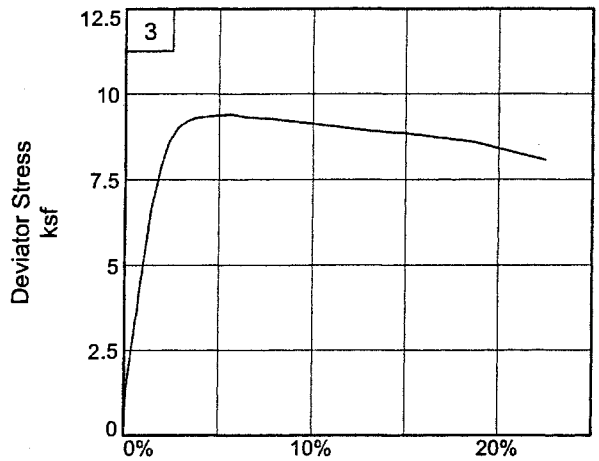
TRIAXIAL SHEAR TEST REPORT

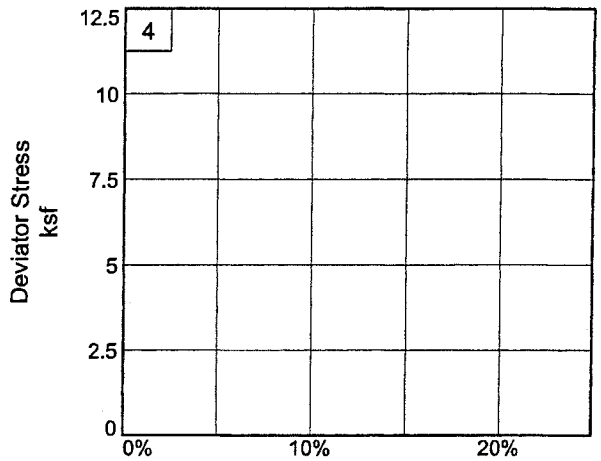
MACTEC ENGINEERING AND CONSULTING, INC.

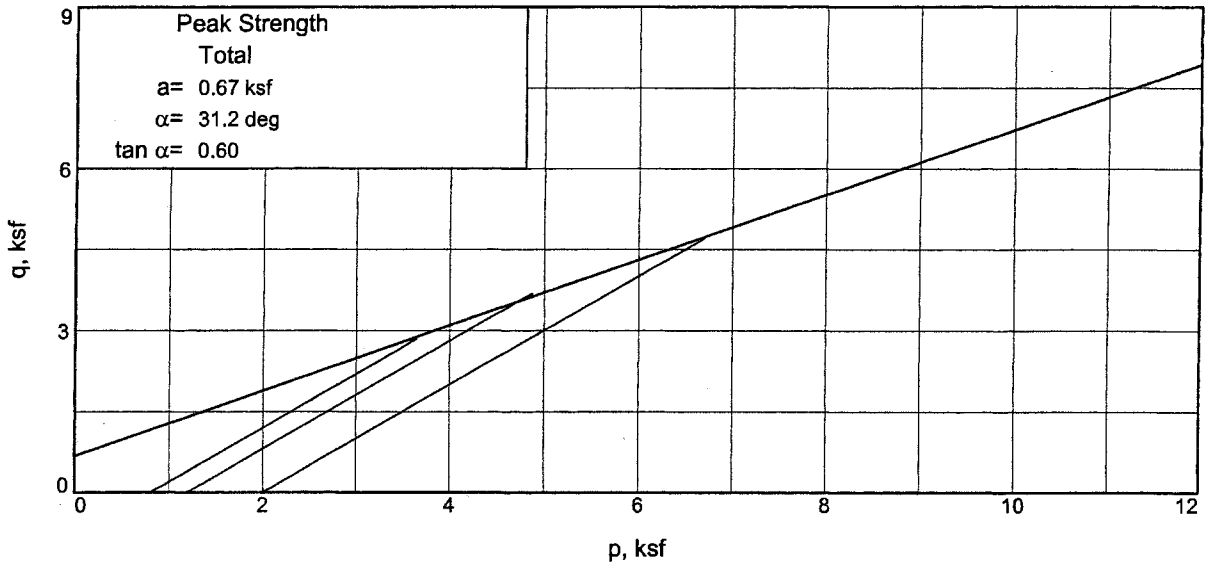
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:45 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1181.000
Moisture content: Dry soil+tare, gms.	160.220		1025.700
Moisture content: Tare, gms.	50.320		115.200
Moisture, %	16.6	22.9	17.1
Moist specimen weight, gms.	1166.8		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.27	
Height, in.	5.78	5.75	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.4	129.9	
Dry density, pcf	104.1	105.7	
Void ratio	0.6562	0.6313	
Saturation, %	69.9	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 5.68 ksf **at reading no.** 23

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	3.00	9.9	0.0	0.23	0.81	1.03	1.28		0.92
2	0.0050	12.00	39.8	0.1	0.91	0.81	1.72	2.13		1.26
3	0.0100	18.00	59.6	0.2	1.37	0.81	2.17	2.70		1.49
4	0.0150	24.00	79.5	0.3	1.82	0.81	2.63	3.26		1.72
5	0.0200	27.00	89.5	0.3	2.05	0.81	2.85	3.54		1.83
6	0.0250	30.00	99.4	0.4	2.27	0.81	3.08	3.82		1.94
7	0.0300	34.00	112.6	0.5	2.57	0.81	3.38	4.19		2.09
8	0.0350	37.00	122.6	0.6	2.80	0.81	3.60	4.47		2.21
9	0.0400	40.00	132.5	0.7	3.02	0.81	3.83	4.75		2.32
10	0.0450	43.00	142.5	0.8	3.25	0.81	4.05	5.02		2.43
11	0.0500	46.00	152.4	0.9	3.47	0.81	4.28	5.30		2.54
12	0.0750	58.00	192.2	1.3	4.35	0.81	5.16	6.40		2.98
13	0.1000	65.00	215.3	1.7	4.86	0.81	5.67	7.03		3.24
14	0.1500	74.00	245.2	2.6	5.48	0.81	6.29	7.80		3.55
15	0.1750	75.00	248.5	3.0	5.53	0.81	6.34	7.86		3.57
16	0.2000	76.00	251.8	3.5	5.58	0.81	6.39	7.92		3.60
17	0.2500	77.00	255.1	4.3	5.60	0.81	6.41	7.95		3.61
18	0.3000	78.00	258.4	5.2	5.62	0.81	6.43	7.97		3.62
19	0.3500	79.00	261.7	6.1	5.64	0.81	6.45	8.00		3.63
20	0.4000	80.00	265.0	7.0	5.66	0.81	6.47	8.02		3.64
21	0.5000	81.00	268.4	8.7	5.63	0.81	6.43	7.98		3.62
22	0.6000	82.00	271.7	10.4	5.59	0.81	6.39	7.93		3.60
23	0.7000	85.00	281.6	12.2	5.68	0.81	6.49	8.04		3.65
24	0.8000	86.00	284.9	13.9	5.63	0.81	6.44	7.98		3.62
25	0.9000	88.00	291.5	15.6	5.65	0.81	6.45	8.00		3.63
26	1.0000	90.00	298.2	17.4	5.66	0.81	6.46	8.01		3.63
27	1.1000	92.00	304.8	19.1	5.66	0.81	6.47	8.02		3.64
28	1.2000	91.00	301.5	20.9	5.48	0.81	6.28	7.79		3.55

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1253.500
Moisture content: Dry soil+tare, gms.	160.220		1090.600
Moisture content: Tare, gms.	50.320		116.400
Moisture, %	16.6	22.8	16.7
Moist specimen weight, gms.	1151.7		
Diameter, in.	2.84	2.82	
Area, in.^{2}	6.33	6.25	
Height, in.	5.72	5.68	
Net decrease in height, in.		0.04	
Wet Density, pcf	121.1	130.0	
Dry density, pcf	103.8	105.9	
Void ratio	0.6605	0.6284	
Saturation, %	69.4	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm^2

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 7.36 ksf **at reading no.** 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	5.00	16.6	0.0	0.38	1.20	1.58	1.32		1.39
2	0.0050	14.00	46.4	0.1	1.07	1.20	2.26	1.89		1.73
3	0.0100	24.00	79.5	0.2	1.83	1.20	3.02	2.53		2.11
4	0.0150	31.00	102.7	0.3	2.36	1.20	3.55	2.97		2.37
5	0.0200	36.00	119.3	0.4	2.74	1.20	3.93	3.29		2.56
6	0.0250	42.00	139.1	0.4	3.19	1.20	4.39	3.67		2.79
7	0.0300	45.00	149.1	0.5	3.42	1.20	4.61	3.86		2.90
8	0.0350	49.00	162.3	0.6	3.72	1.20	4.91	4.11		3.05
9	0.0400	53.00	175.6	0.7	4.02	1.20	5.21	4.36		3.20
10	0.0450	56.00	185.5	0.8	4.24	1.20	5.43	4.55		3.31
11	0.0500	61.00	202.1	0.9	4.61	1.20	5.81	4.86		3.50
12	0.0750	79.00	261.7	1.3	5.95	1.20	7.14	5.98		4.17
13	0.1000	88.00	291.5	1.8	6.60	1.20	7.79	6.52		4.49
14	0.1250	93.00	308.1	2.2	6.94	1.20	8.13	6.81		4.67
15	0.1500	96.00	318.0	2.6	7.13	1.20	8.33	6.97		4.76
16	0.1750	98.00	324.7	3.1	7.25	1.20	8.44	7.06		4.82
17	0.2000	100.00	331.3	3.5	7.36	1.20	8.56	7.16		4.88
18	0.2500	99.00	328.0	4.4	7.22	1.20	8.42	7.04		4.81
19	0.3000	99.00	328.0	5.3	7.15	1.20	8.35	6.99		4.77
20	0.3500	98.00	324.7	6.2	7.02	1.20	8.21	6.87		4.70
21	0.4000	97.00	321.4	7.0	6.88	1.20	8.08	6.76		4.64
22	0.5000	95.00	314.7	8.8	6.61	1.20	7.81	6.53		4.50
23	0.6000	93.00	308.1	10.6	6.35	1.20	7.54	6.31		4.37
24	0.7000	92.00	304.8	12.3	6.15	1.20	7.35	6.15		4.27

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	91.00	301.5	14.1	5.97	1.20	7.16	5.99		4.18
26	0.9000	90.00	298.2	15.8	5.78	1.20	6.97	5.84		4.08
27	1.0000	92.00	304.8	17.6	5.78	1.20	6.98	5.84		4.09
28	1.2000	93.00	308.1	21.1	5.60	1.20	6.79	5.68		3.99

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1178.400
Moisture content: Dry soil+tare, gms.	160.220		1022.600
Moisture content: Tare, gms.	50.320		115.200
Moisture, %	16.6	23.0	17.2
Moist specimen weight, gms.	1080.9		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.28	
Height, in.	5.36	5.34	
Net decrease in height, in.		0.02	
Wet Density, pcf	121.3	129.7	
Dry density, pcf	104.0	105.4	
Void ratio	0.6579	0.6357	
Saturation, %	69.7	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.40 ksf **at reading no.** 19

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	7.00	23.2	0.0	0.53	2.00	2.53	1.27		2.27
2	0.0050	17.00	56.3	0.1	1.29	2.00	3.29	1.64		2.65
3	0.0100	23.00	76.2	0.2	1.74	2.00	3.75	1.87		2.87
4	0.0150	28.00	92.8	0.3	2.12	2.00	4.12	2.06		3.06
5	0.0200	34.00	112.6	0.4	2.57	2.00	4.58	2.29		3.29
6	0.0250	39.00	129.2	0.5	2.95	2.00	4.95	2.47		3.48
7	0.0300	44.00	145.8	0.6	3.32	2.00	5.33	2.66		3.66
8	0.0350	48.00	159.0	0.7	3.62	2.00	5.63	2.81		3.81
9	0.0400	54.00	178.9	0.7	4.07	2.00	6.07	3.03		4.04
10	0.0450	60.00	198.8	0.8	4.52	2.00	6.52	3.26		4.26
11	0.0500	64.00	212.0	0.9	4.82	2.00	6.82	3.41		4.41
12	0.0750	89.00	294.9	1.4	6.67	2.00	8.67	4.33		5.34
13	0.1000	105.00	347.9	1.9	7.83	2.00	9.83	4.91		5.92
14	0.1250	116.00	384.3	2.3	8.61	2.00	10.61	5.30		6.31
15	0.1500	122.00	404.2	2.8	9.01	2.00	11.01	5.50		6.51
16	0.1750	125.00	414.1	3.3	9.19	2.00	11.19	5.59		6.60

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
17	0.2000	127.00	420.8	3.7	9.29	2.00	11.29	5.64		6.65
18	0.2500	129.00	427.4	4.7	9.34	2.00	11.35	5.67		6.67
19	0.3000	131.00	434.0	5.6	9.40	2.00	11.40	5.69		6.70
20	0.3500	131.00	434.0	6.6	9.30	2.00	11.30	5.65		6.65
21	0.4000	132.00	437.3	7.5	9.28	2.00	11.28	5.64		6.64
22	0.5000	133.00	440.6	9.4	9.16	2.00	11.16	5.58		6.58
23	0.6000	134.00	443.9	11.2	9.04	2.00	11.04	5.52		6.52
24	0.7000	135.00	447.3	13.1	8.91	2.00	10.91	5.45		6.46
25	0.8000	137.00	453.9	15.0	8.85	2.00	10.85	5.42		6.43
26	0.9000	138.00	457.2	16.9	8.72	2.00	10.72	5.36		6.36
27	1.0000	139.00	460.5	18.7	8.58	2.00	10.58	5.29		6.29
28	1.1000	138.00	457.2	20.6	8.32	2.00	10.33	5.16		6.16
29	1.2000	137.00	453.9	22.5	8.07	2.00	10.07	5.03		6.04

LABORATORY TESTING PERFORMED FOR THE PREPARATION OF THE EAA SUPPLEMENTAL GEOTECHNICAL SERVICES GEOTECHNICAL DATA REPORT – SUPPLEMENT 2, BLACK & VEATCH (2007)

Nodarse & Associates, Inc.

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Black & Veatch Corporation
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Attn: Mr. Ray A. Moore, P.E.

Report Date: 11/16/06
Project No: 05-06-0070-101
Sheet:
Report No.: 1

IN-PLACE DENSITY TEST REPORT
EAA Reservoir A-1 WO #16
Palm Beach County, Florida

Test Date: 11/16/06
Technician: J. Olson

General Test Location: Test Cell #2

Required Compaction (%): 95

Test No.	Test Location	(ft.) Depth/ Elevation	Soil ID	Wet Density	Moisture (%)	Dry Density	Compaction (%)	Notes (Below)
1	Sand Cone, S.E. Corner, Lift #4	EL+12.00'/-12"	17	126.3	8.3	116.6	**98**	
2	Sand Cone, S.E. Corner, Lift #4	EL+12.00'/-12"	17	135.7	14.1	118.9	**100+**	
3	Sand Cone, S.E. Corner, Lift #4	EL+12.00'/-12"	17	132.9	14.3	116.3	**98**	
4	Sand Cone, S.E. Corner, Lift #3	EL+9.00'/-12"	15	131.8	13.1	116.5	**100+**	
5	Sand Cone, S.E. Corner, Lift #3	EL+9.00'/-12"	15	137.1	13.5	120.8	**100+**	
6	Sand Cone, S.E. Corner, Lift #3	EL+9.00'/-12"	15	134.7	13.9	118.3	**100+**	
7	Sand Cone, S.E. Corner, Lift #2	EL+6.00'/-12"	13	137.3	14.3	120.1	**100+**	
8	Sand Cone, S.E. Corner, Lift #2	EL+6.00'/-12"	13	137.6	12.7	122.1	**100+**	
9	Sand Cone, S.E. Corner, Lift #2	EL+6.00'/-12"	13	134.9	12.4	120.0	**100+**	
10	Sand Cone, S.E. Corner, Lift #1	EL+3.00'/-12"	11	132.9	11.1	119.6	**100+**	
11	Sand Cone, S.E. Corner, Lift #1	EL+3.00'/-12"	11	133.5	14.6	116.5	**100+**	
12	Sand Cone, S.E. Corner, Lift #1	EL+3.00'/-12"	11	135.4	13.1	119.7	**100+**	

Moisture-Density Relationship Data:

Soil ID	Maximum Density	Optimum Moisture	Test Method	Description	LBR
11	115.9	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
13	115.8	14.6	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
15	115.2	15.6	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
17	118.8	14.3	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A

Notes:
1) *Test result below minimum compaction requirement.
2) **Retest result meets minimum compaction requirement.
3) Density in pounds per cubic foot (pcf).
4) Depth of test referenced from elevation
5) Test Methods:
Density: ASTM D2922 Nuclear Gauge
6) Density/Moisture Standards:
7) Adjusments: N/A

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Black & Veatch Corporation
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West Palm Beach, Florida 33406

Report Date: 11/17/06
Project No: 05-06-0070-101
Sheet: 1

Attn: Mr. Ray A. Moore, P.E.

IN-PLACE DENSITY TEST REPORT(SAND CONE)
EAA Reservoir A-1 WO #16
Palm Beach County, Florida

Test Date: 11/17/06
Technician: J. Olson

General Test Location: Test Cell #2

Required Compaction (%): 95

Test No.	Test Location	(ft.) Depth/ Elevation	Soil ID	Wet Density	Moisture (%)	Dry Density	Compaction (%)	Notes (Below)
1	S.E. Corner, Lift #4	EL+12.00'/-12"	17	123.8	11.4	111.1	**94**	*
2	S.E. Corner, Lift #4	EL+12.00'/-12"	17	124.0	11.6	111.1	**94**	*
3	S.E. Corner, Lift #4	EL+12.00'/-12"	17	118.0	10.9	106.4	**90**	*
4	S.E. Corner, Lift #3	EL+9.00'/-12"	15	111.9	11.0	100.8	**88**	*
5	S.E. Corner, Lift #3	EL+9.00'/-12"	15	110.9	11.8	99.2	**86**	*
6	S.E. Corner, Lift #3	EL+9.00'/-12"	15	115.4	11.6	103.4	**90**	*
7	S.E. Corner, Lift #2	EL+6.00'/-12"	13	124.3	10.6	112.4	**97**	

Moisture-Density Relationship Data:

Soil ID	Maximum Density	Optimum Moisture	Test Method	Description	LBR
13	115.8	14.6	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
15	115.2	15.6	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
17	118.8	14.3	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A

Notes:
1) *Test result below minimum compaction requirement.
2) **Retest result meets minimum compaction requirement.
3) Density in pounds per cubic foot (pcf).
4) Depth of test referenced from elevation
5) Test Methods: ASTM D1556
6) Density/Moisture Standards:
7) Adjusments: N/A

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1601 Belvedere Road, Suite 3015
West Palm Beach, Florida 33406

Report Date: 11/18/06
Project No: 05-06-0070-101
Sheet: 1

Attn: Mr. Ray A. Moore, P.E.

IN-PLACE DENSITY TEST REPORT(SAND CONE)
EAA Reservoir A-1 WO #16
Palm Beach County, Florida

Test Date: 11/18/06
Technician: J. Olson

General Test Location: Test Cell #2

Required Compaction (%): 95

Test No.	Test Location	(ft.) Depth/ Elevation	Soil ID	Wet Density	Moisture (%)	Dry Density	Compaction (%)	Notes (Below)
1	S.E. Corner, Lift #2	EL+12.00'/-12"	13	121.3	9.9	110.4	**95**	
2	S.E. Corner, Lift #2	EL+12.00'/-12"	13	119.8	9.7	109.2	**94**	*
3	S.E. Corner, Lift #1	EL+12.00'/-12"	11	123.8	10.4	112.1	**97**	
4	S.E. Corner, Lift #1	EL+9.00'/-12"	11	122.9	11.6	110.1	**95**	
5	S.E. Corner, Lift #1	EL+9.00'/-12"	11	117.1	14.2	102.5	**88**	*
6	N.W. Corner, Lift #4	EL+9.00'/-12"	18	121.3	10.0	110.3	**94**	*
7	N.W. Corner, Lift #4	EL+6.00'/-12"	18	124.7	10.9	112.4	**96**	
8	N.W. Corner, Lift #4	EL+6.00'/-12"	18	119.3	10.0	108.5	**93**	*

Moisture-Density Relationship Data:

Soil ID	Maximum Density	Optimum Moisture	Test Method	Description	LBR
11	115.9	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
13	115.8	14.6	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
18	117.2	14.4	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A

Notes:
1) *Test result below minimum compaction requirement.
2) **Retest result meets minimum compaction requirement.
3) Density in pounds per cubic foot (pcf).
4) Depth of test referenced from elevation
5) Test Methods: ASTM D1556
6) Density/Moisture Standards:
7) Adjusments: N/A

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Report Date: 11/20/06
Project No: 05-06-0070-101
Sheet: 1

Attn: Mr. Ray A. Moore, P.E.

IN-PLACE DENSITY TEST REPORT(SAND CONE)
EAA Reservoir A-1 WO #16
Palm Beach County, Florida

Test Date: 11/20/06
Technician: J. Olson

General Test Location: Test Cell #2

Required Compaction (%): 95

Test No.	Test Location	(ft.) Depth/ Elevation	Soil ID	Wet Density	Moisture (%)	Dry Density	Compaction (%)	Notes (Below)
1	N.W. Corner, Lift #3	EL+9.00'/-12"	16	113.5	11.8	101.5	**88**	*
2	N.W. Corner, Lift #3	EL+9.00'/-12"	16	112.4	12.1	100.3	**87**	*
3	N.W. Corner, Lift #3	EL+9.00'/-12"	16	112.6	10.6	101.8	**88**	*
4	N.W. Corner, Lift #2	EL+6.00'/-12"	14	126.0	10.0	114.5	**100**	
5	N.W. Corner, Lift #2	EL+6.00'/-12"	14	125.1	10.2	113.5	**99**	
6	N.W. Corner, Lift #2	EL+6.00'/-12"	14	117.4	10.8	106.0	**92**	*
7	N.W. Corner, Lift #1	EL+3.00'/-12"	12	103.7	13.6	91.3	**79**	*
8	N.W. Corner, Lift #1	EL+3.00'/-12"	12	116.0	10.4	105.1	**91**	*
9	N.W. Corner, Lift #1	EL+3.00'/-12"	12	132.9	11.0	119.7	**100+**	

Moisture-Density Relationship Data:

Soil ID	Maximum Density	Optimum Moisture	Test Method	Description	LBR
12	115.2	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
14	114.6	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
16	115.7	15.8	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A

Notes:
1) *Test result below minimum compaction requirement.
2) **Retest result meets minimum compaction requirement.
3) Density in pounds per cubic foot (pcf).
4) Depth of test referenced from elevation
5) Test Methods: ASTM D1556
6) Density/Moisture Standards:
7) Adjusments: N/A

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Attn: Mr. Ray A. Moore, P.E.

Report Date: 11/21/06
Project No: 05-06-0070-101
Sheet:
Report No.: 1

IN-PLACE DENSITY TEST REPORT
EAA Reservoir A-1 WO #16
Palm Beach County, Florida

Test Date: 11/21/06
Technician: J. Olson

General Test Location: Test Cell #2

Required Compaction (%): 95

Test No.	Test Location	(ft.) Depth/ Elevation	Soil ID	Wet Density	Moisture (%)	Dry Density	Compaction (%)	Notes (Below)
1	Sand Cone, N.W. Corner, Lift #4	EL+12.00'/-12"	18	129.2	11.4	116.0	**99**	
2	Sand Cone, N.W. Corner, Lift #4	EL+12.00'/-12"	18	133.1	11.2	119.7	**100+**	
3	Sand Cone, N.W. Corner, Lift #4	EL+12.00'/-12"	18	132.9	11.6	119.1	**100+**	
4	Sand Cone, N.W. Corner, Lift #3	EL+9.00'/-12"	16	134.8	10.7	121.8	**100+**	
5	Sand Cone, N.W. Corner, Lift #3	EL+9.00'/-12"	16	135.4	10.6	122.4	**100+**	
6	Sand Cone, N.W. Corner, Lift #3	EL+9.00'/-12"	16	131.0	11.3	117.7	**100+**	
7	Sand Cone, N.W. Corner, Lift #2	EL+6.00'/-12"	14	131.2	12.3	116.8	**100+**	
8	Sand Cone, N.W. Corner, Lift #2	EL+6.00'/-12"	14	133.3	12.1	118.9	**100+**	
9	Sand Cone, N.W. Corner, Lift #2	EL+6.00'/-12"	14	136.4	14.1	119.5	**100+**	
10	Sand Cone, N.W. Corner, Lift #1	EL+3.00'/-12"	12	131.3	12.7	116.5	**100+**	
11	Sand Cone, N.W. Corner, Lift #1	EL+3.00'/-12"	12	132.0	12.3	117.5	**100+**	
12	Sand Cone, N.W. Corner, Lift #1	EL+3.00'/-12"	12	127.0	15.7	109.8	**95**	

Moisture-Density Relationship Data:

Soil ID	Maximum Density	Optimum Moisture	Test Method	Description	LBR
12	115.2	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
14	114.6	14.5	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
16	115.7	15.8	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A
18	117.2	14.4	ASTM D-698	Tan Coarse Sand with Limerock and Shell	N/A

Notes:
1) *Test result below minimum compaction requirement.
2) **Retest result meets minimum compaction requirement.
3) Density in pounds per cubic foot (pcf).
4) Depth of test referenced from elevation
5) Test Methods:
Density: ASTM D2922 Nuclear Gauge
6) Density/Moisture Standards:
7) Adjusments: N/A

Fouad S. Masri, PE
Florida Registration No. 52706

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT NAME: E A A Reservoir

SAMPLE # Proctor # 14 Lab 2308

PROJECT NO: 05-06-0070-101

MATERIAL *Tan Coarse Sand W/Limerock & Shell*

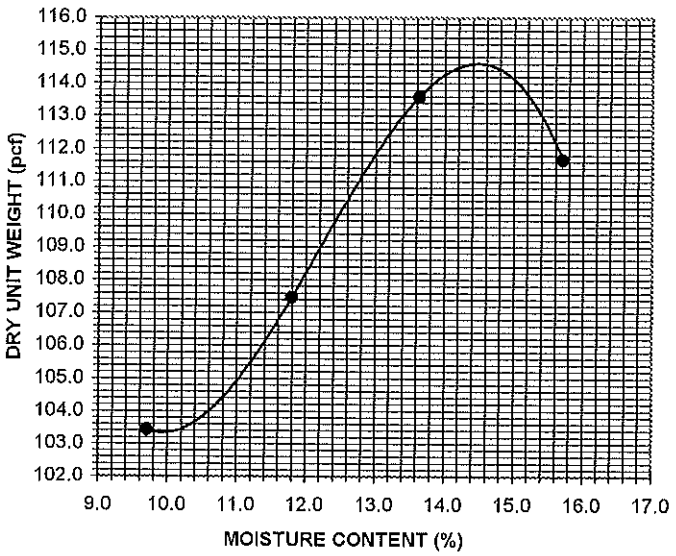
TEST METHOD: D-698

DATE TESTED: December 19, 2006

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 2B

SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.10	23.60	24.27	24.28
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.51	9.01	9.68	9.69
WET DENSITY	pcf	113.47	120.13	129.07	129.20
DRY DENSITY	pcf	103.4	107.5	113.6	111.7
TARE NUMBER		7A	3A	3M	4A
WET SOIL + CAN	gm	696.50	696.30	693.80	697.10
DRY SOIL + CAN	gm	644.50	634.40	623.80	617.00
WATER WEIGHT	gm	52.00	61.90	70.00	80.10
TARE WT	gm	108.80	109.60	110.30	107.10
WEIGHT DRY SOIL	gm	535.70	524.80	513.50	509.90
MOISTURE	%	9.7	11.8	13.6	15.7



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	**14.5**	15
MAX DENSITY:	**114.6**	115

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

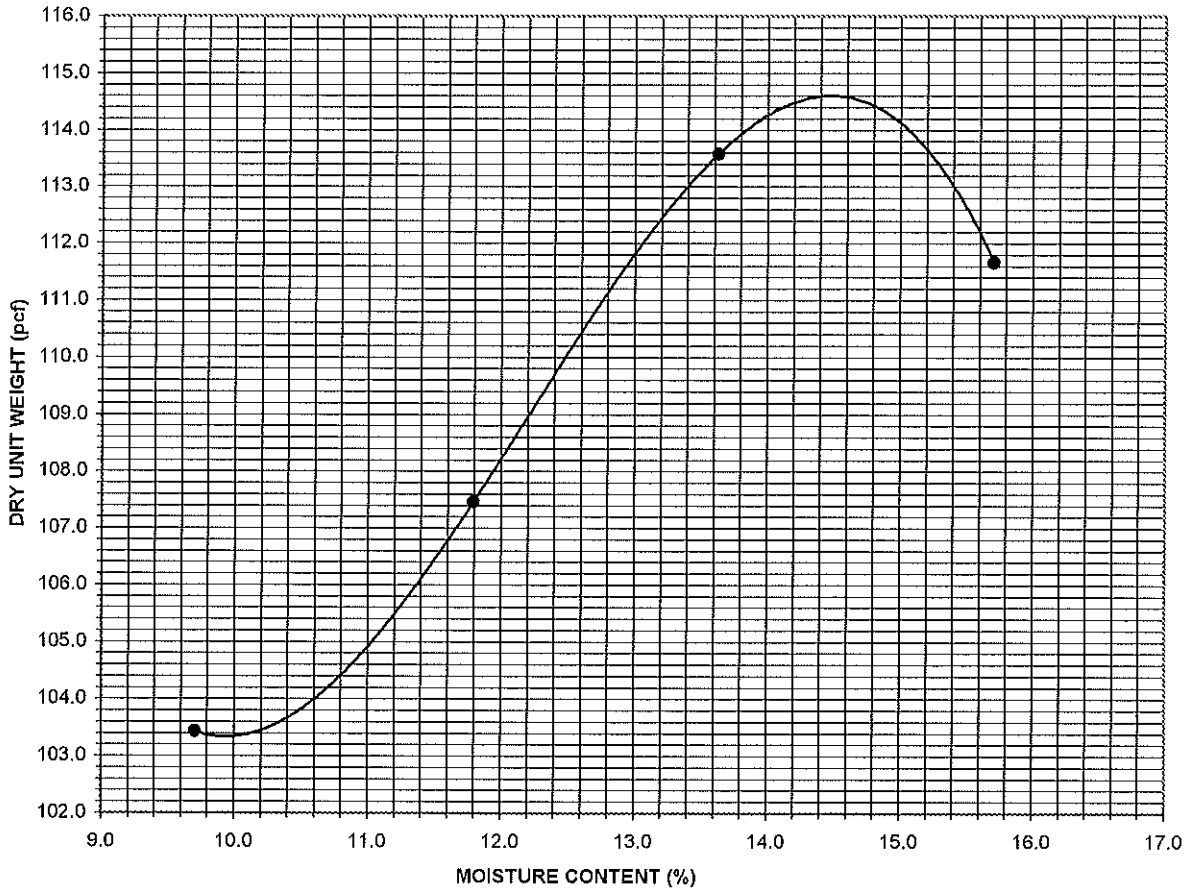
MATERIAL Tan Coarse Sand W/Limerock & Shell

SAMPLE # Proctor # 14 Lab 2308

DATE TESTED: December 19, 2006

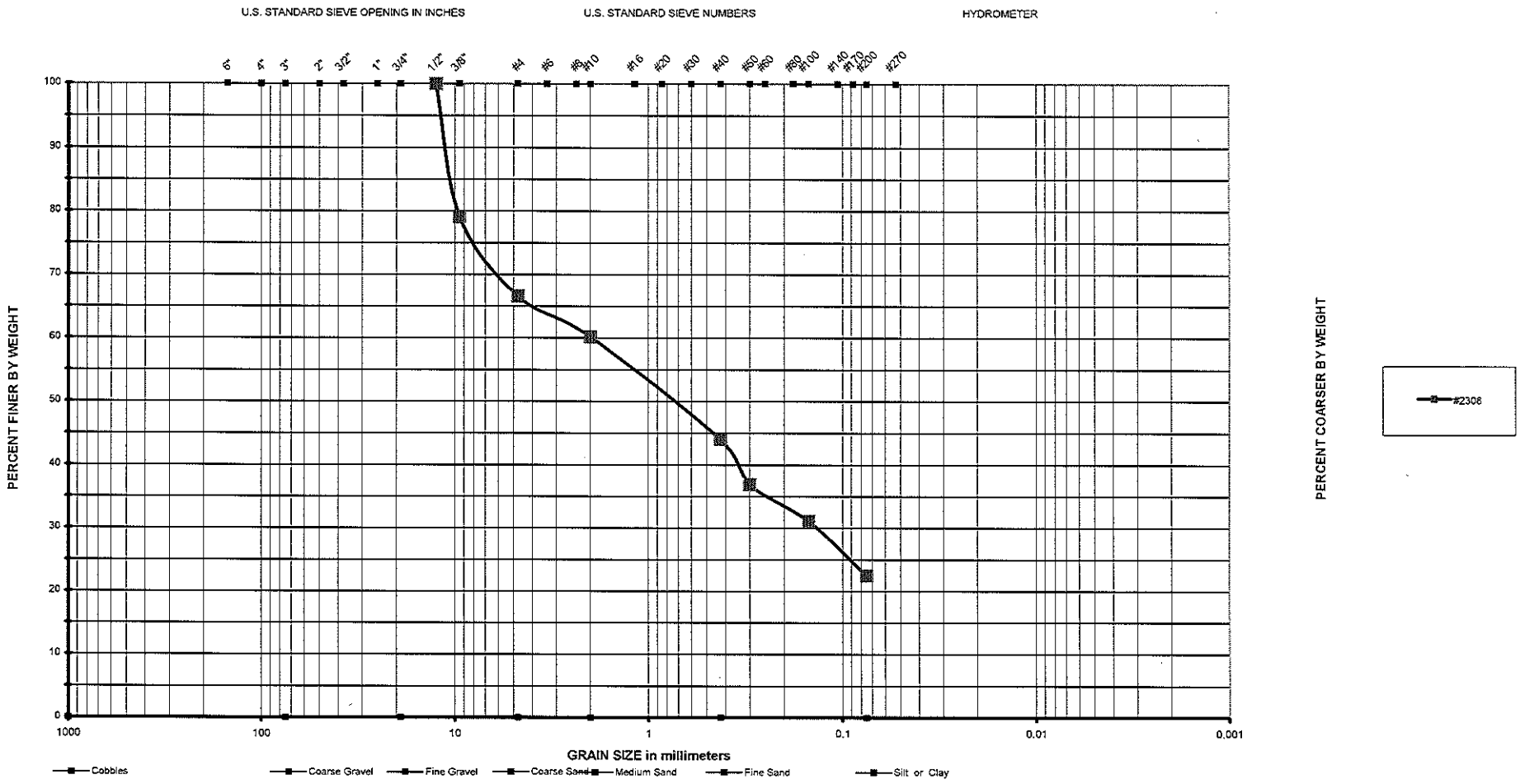
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 2B



OPT MOISTURE: **14.5**

MAX DENSITY: **114.6**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	7

No.	Sample Location	Classification	-200	w %	LL	PL	PI
3	Test Cell 2 S.E. Lift 2B	SM	22.5	5	-	-	-
	#2308						

NODARSE & ASSOCIATES, INC.

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT NAME: E A A Reservoir

SAMPLE # Proctor # 13 Lab 2307

PROJECT NO: 05-06-0070-101

MATERIAL *Tan Coarse Sand W/Limerock & Shell*

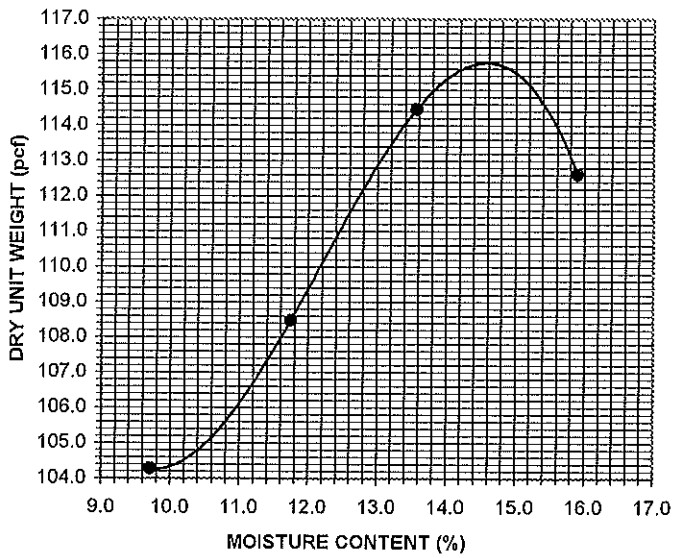
TEST METHOD: D-698

DATE TESTED: December 19, 2006

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 2A

SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.17	23.68	24.34	24.38
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.58	9.09	9.75	9.79
WET DENSITY	pcf	114.40	121.20	130.00	130.53
DRY DENSITY	pcf	104.3	108.5	114.5	112.6
TARE NUMBER		3G	15A	11A	17A
WET SOIL + CAN	gm	697.50	696.70	695.50	694.30
DRY SOIL + CAN	gm	645.40	634.90	625.40	614.00
WATER WEIGHT	gm	52.10	61.80	70.10	80.30
TARE WT	gm	109.10	108.70	108.90	109.00
WEIGHT DRY SOIL	gm	536.30	526.20	516.50	505.00
MOISTURE	%	9.7	11.7	13.6	15.9



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	**14.6**	15
MAX DENSITY:	**115.8**	116

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

MATERIAL Tan Coarse Sand W/Limerock & Shell

DATE TESTED: December 19, 2006

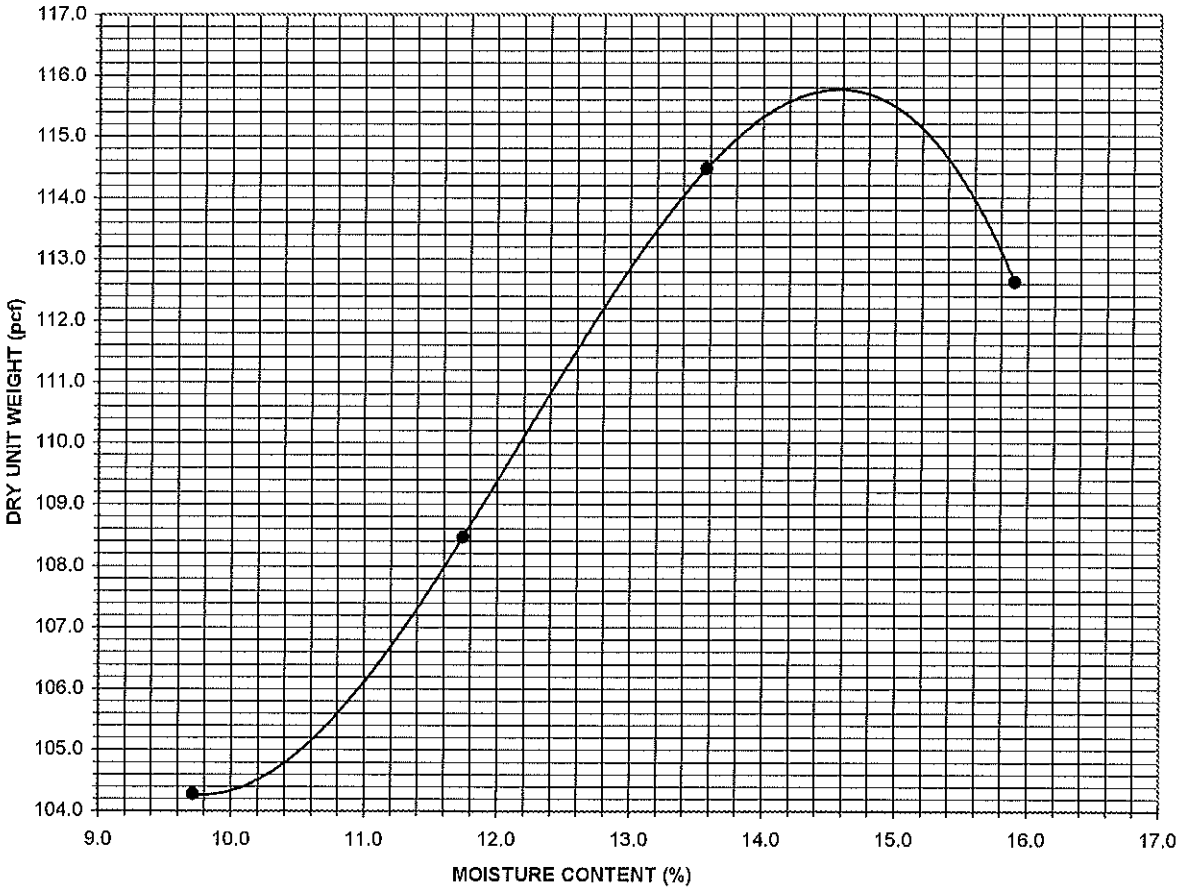
PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

SAMPLE # Proctor # 13 Lab 2307

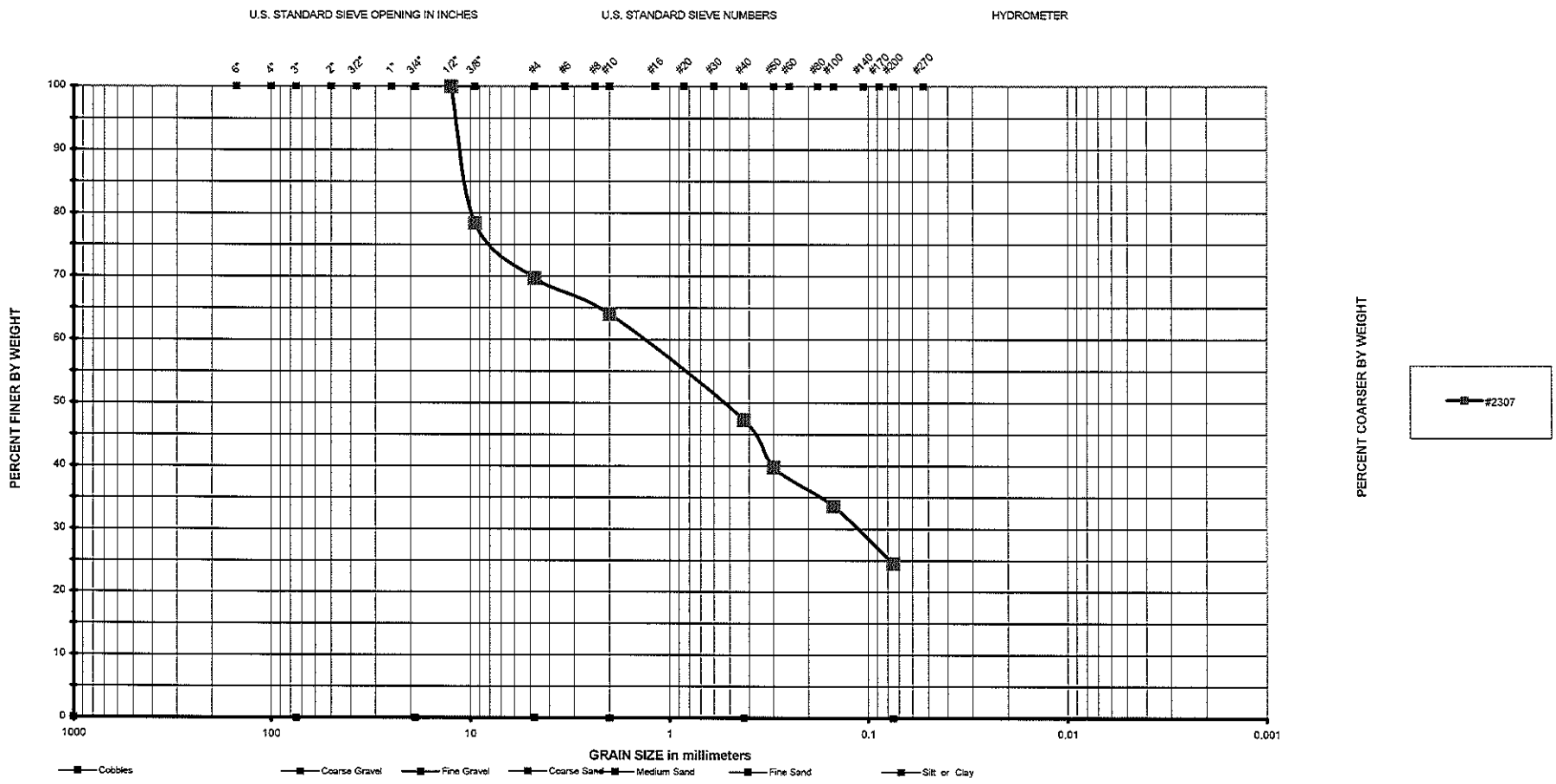
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 2A



OPT MOISTURE: **14.6**

MAX DENSITY: **115.8**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
4	Test Cell 2 S.E. Lift 2A	SM	24.5	5	-	-	-
	#2307						

NODARSE & ASSOCIATES, INC.

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT NAME: E A A Reservoir

SAMPLE # Proctor # 11 Lab 2305

PROJECT NO: 05-06-0070-101

MATERIAL *Tan Coarse Sand W/Limerock & Shell*

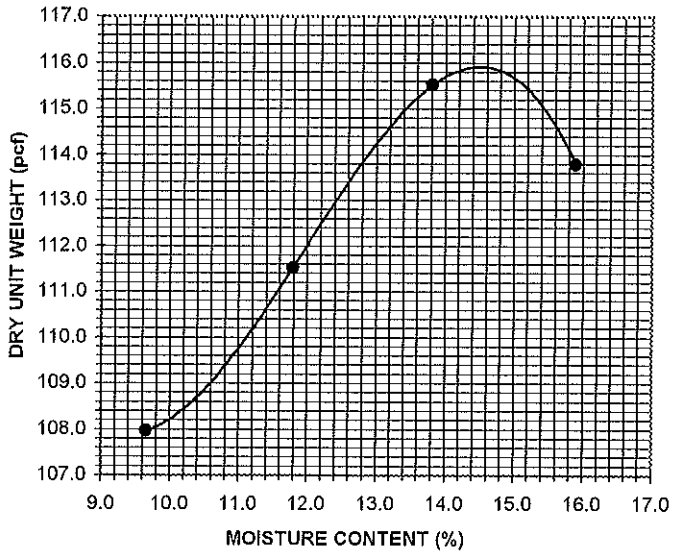
TEST METHOD: D-698

DATE TESTED: December 18, 2006

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 1A

SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.47	23.94	24.45	24.48
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.88	9.35	9.86	9.89
WET DENSITY	pcf	118.40	124.67	131.47	131.87
DRY DENSITY	pcf	108.0	111.5	115.5	113.8
TARE NUMBER		12A	3C	5A	2A
WET SOIL + CAN	gm	694.20	695.60	694.10	695.70
DRY SOIL + CAN	gm	642.50	633.80	623.10	615.40
WATER WEIGHT	gm	51.70	61.80	71.00	80.30
TARE WT	gm	107.20	109.80	109.10	110.20
WEIGHT DRY SOIL	gm	535.30	524.00	514.00	505.20
MOISTURE	%	9.7	11.8	13.8	15.9



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	14.5	15
MAX DENSITY:	115.9	116

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

MATERIAL Tan Coarse Sand W/Limerock & Shell

DATE TESTED: December 18, 2006

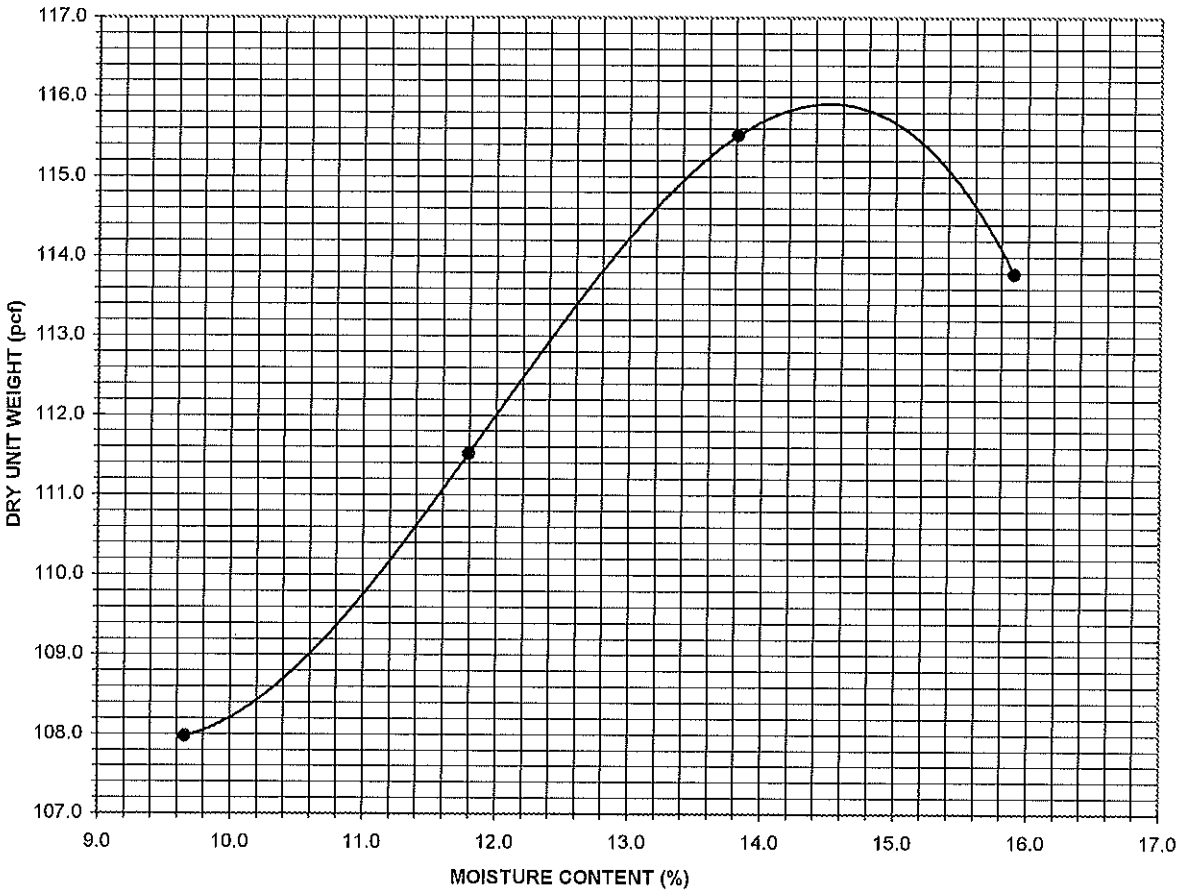
PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

SAMPLE # Proctor # 11 Lab 2305

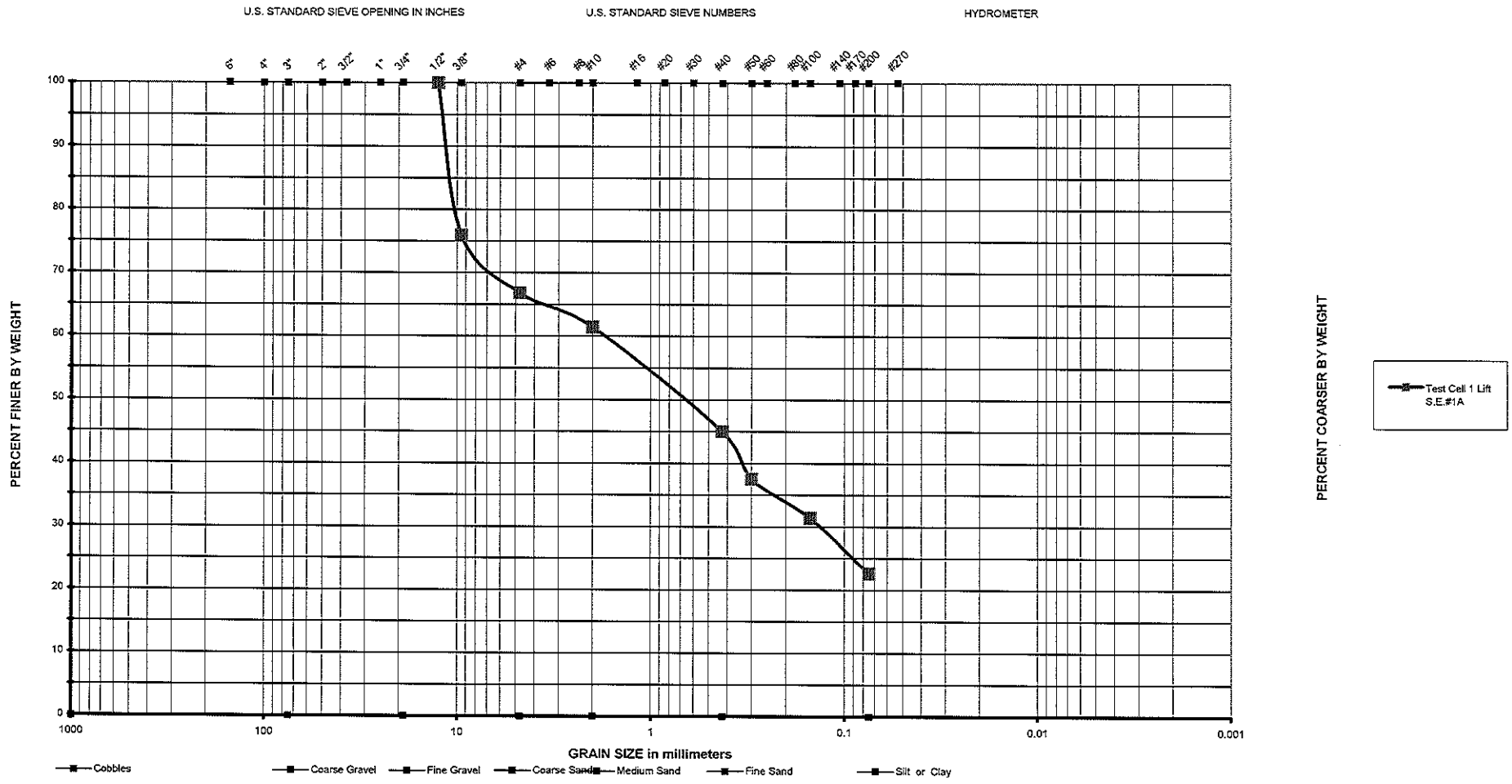
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 1A



OPT MOISTURE: **14.5**

MAX DENSITY: **115.9**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	6

No.	Sample Location	Classification	-200	w %	LL	PL	PI
2	Test Cell 1 Lift S.E.#1A	SM	22.6	7	-	-	-
	#2305						

NODARSE & ASSOCIATES, INC.

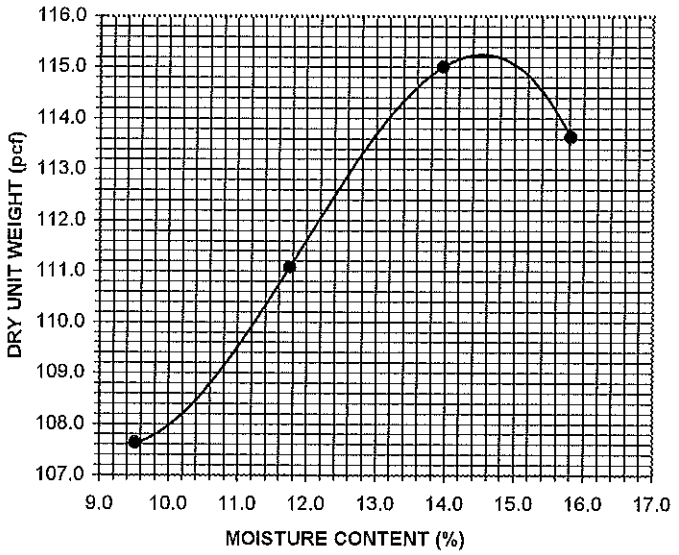
TESTED FOR: Nodarse and Associates
West Palm Beach, Florida
SAMPLE # Proctor # 12 Lab 2306
MATERIAL *Tan Coarse Sand W/Limerock & Shell*
TEST METHOD: D-698
DATE TESTED: December 18, 2006

PROJECT NAME: E A A Reservoir

PROJECT NO: 05-06-0070-101

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 1B
SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.43	23.90	24.42	24.46
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.84	9.31	9.83	9.87
WET DENSITY	pcf	117.87	124.13	131.07	131.60
DRY DENSITY	pcf	107.6	111.1	115.0	113.6
TARE NUMBER		113	9A	3B	3F
WET SOIL + CAN	gm	751.60	698.40	696.60	695.00
DRY SOIL + CAN	gm	699.50	636.40	624.70	615.00
WATER WEIGHT	gm	52.10	62.00	71.90	80.00
TARE WT	gm	152.10	109.00	110.00	109.20
WEIGHT DRY SOIL	gm	547.40	527.40	514.70	505.80
MOISTURE	%	9.5	11.8	14.0	15.8



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	**14.5**	15
MAX DENSITY:	**115.2**	115

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

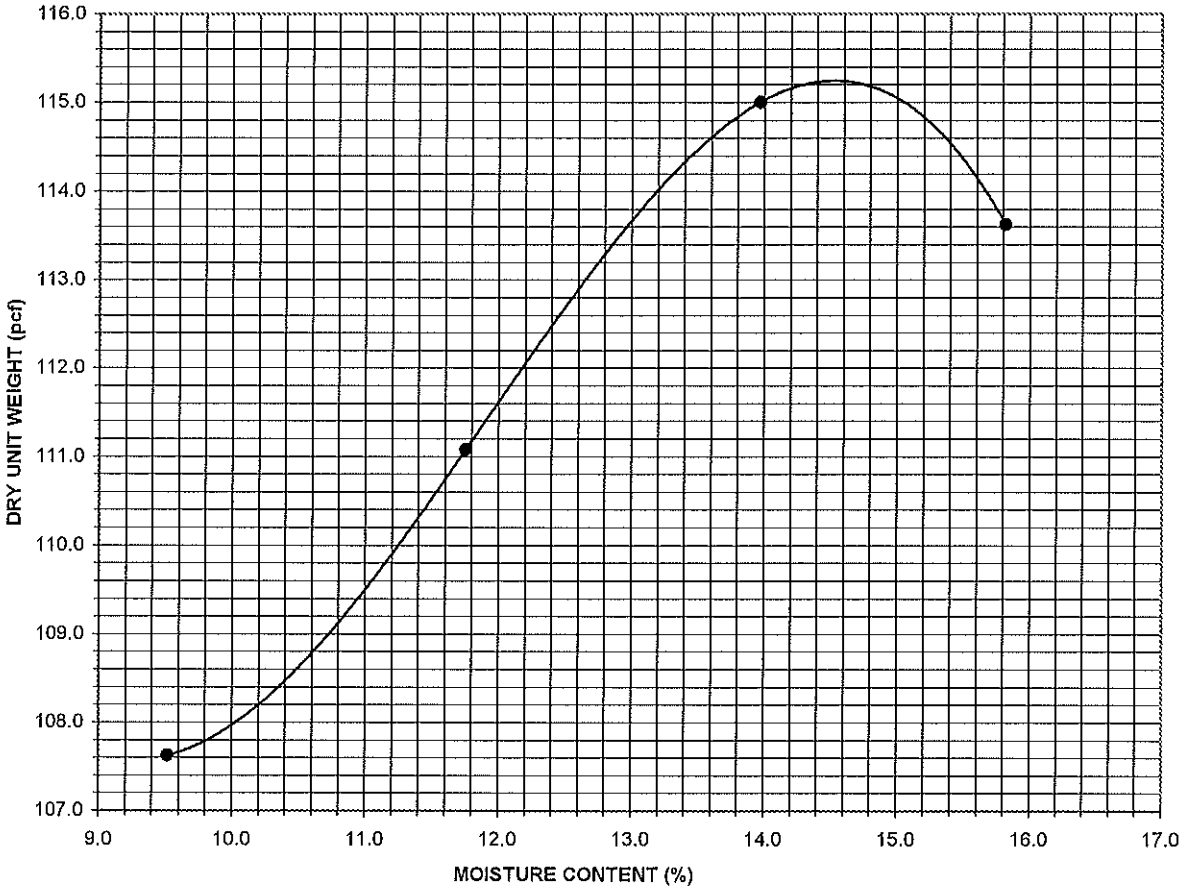
MATERIAL Tan Coarse Sand W/Limerock & Shell

SAMPLE # Proctor # 12 Lab 2306

DATE TESTED: December 18, 2006

TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 1B



OPT MOISTURE: **14.5**

MAX DENSITY: **115.2**

Grain-size Distribution Analysis

Project name:	EAA Reservoir
Date: 12/18/2006	N&A Project No. 05-06-0070-101
	Figure No. 5

No.	Sample Location	Classification	-200	w %	LL	PL	PI
1	Test Cell 1 S.E.Lift 1B #2306	SM	23.6	6	-	-	-

NODARSE & ASSOCIATES, INC.

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT NAME: E A A Reservoir

SAMPLE # Proctor # 18 Lab 2312

PROJECT NO: 05-06-0070-101

MATERIAL *Tan Coarse Sand W/Limerock & Shell*

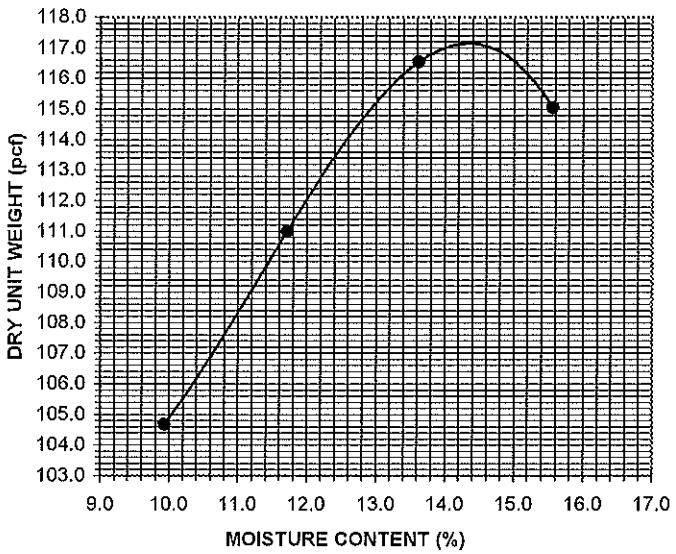
TEST METHOD: D-698

DATE TESTED: December 19, 2006

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 4B

SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.22	23.89	24.52	24.56
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.63	9.30	9.93	9.97
WET DENSITY	pcf	115.07	124.00	132.40	132.93
DRY DENSITY	pcf	104.7	111.0	116.5	115.0
TARE NUMBER		3A	3M	7A	4A
WET SOIL + CAN	gm	694.00	695.70	696.10	698.20
DRY SOIL + CAN	gm	641.20	634.30	625.70	618.60
WATER WEIGHT	gm	52.80	61.40	70.40	79.60
TARE WT	gm	109.60	110.30	108.80	107.10
WEIGHT DRY SOIL	gm	531.60	524.00	516.90	511.50
MOISTURE	%	9.9	11.7	13.6	15.6



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	**14.4**	14
MAX DENSITY:	**117.2**	117

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

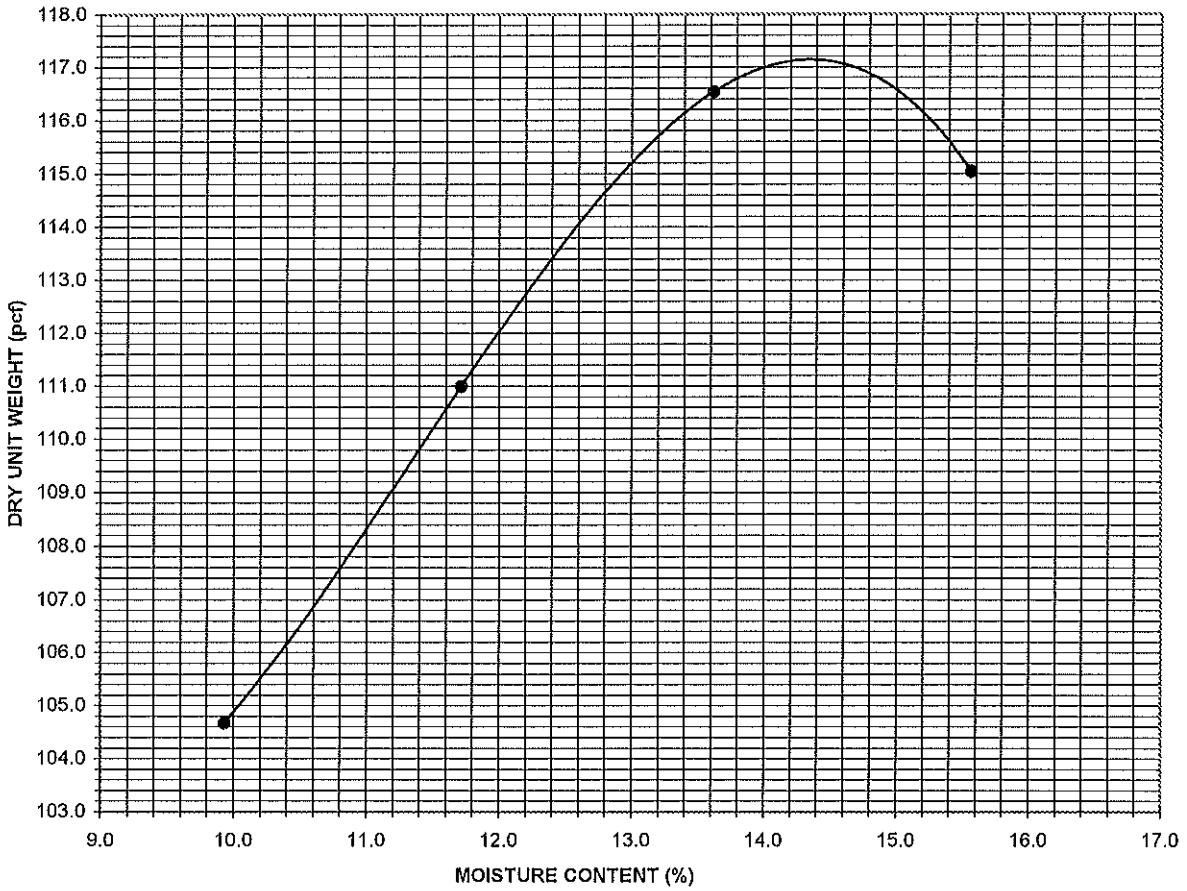
MATERIAL Tan Coarse Sand W/Limerock & Shell

SAMPLE # Proctor # 18 Lab 2312

DATE TESTED: December 19, 2006

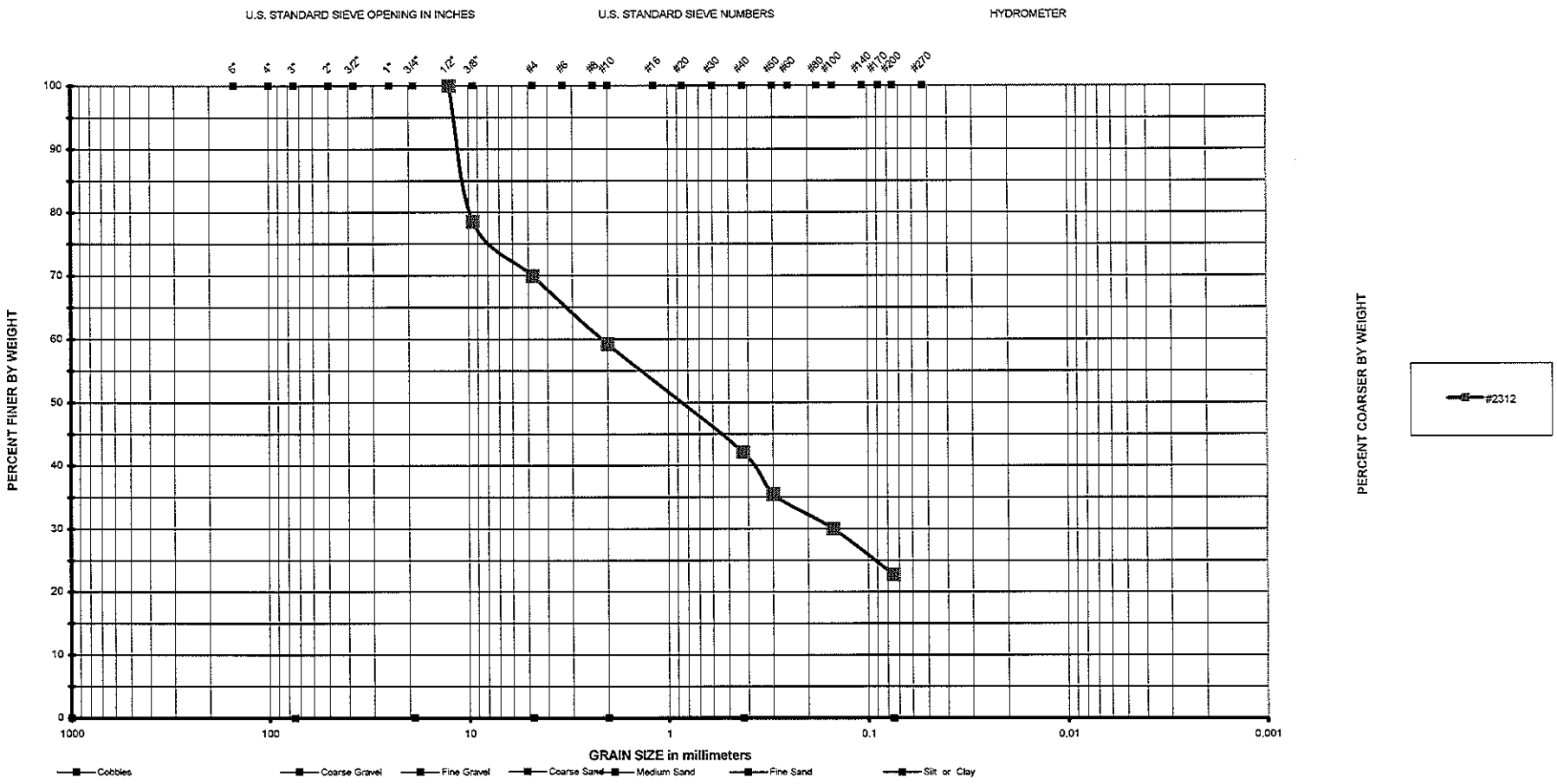
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 4B



OPT MOISTURE: **14.4**

MAX DENSITY: **117.2**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
5	#2312 Test Cell 4 S.E. Lift 4B	SM	22.7	1	-	-	-

NODARSE & ASSOCIATES, INC.

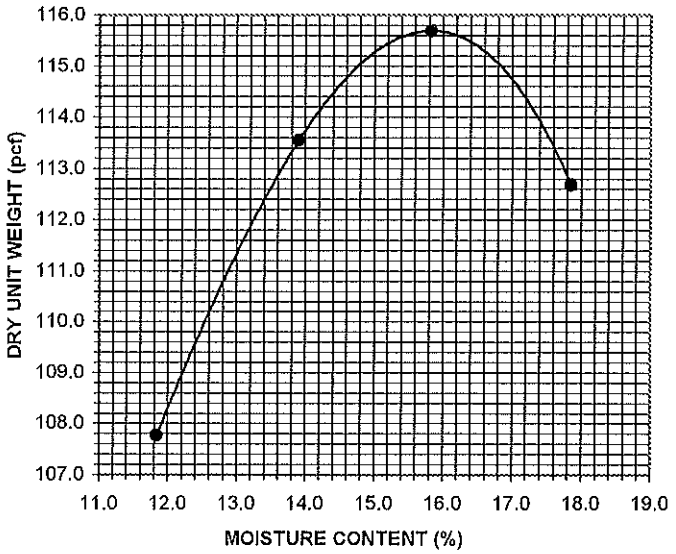
TESTED FOR: Nodarse and Associates
West Palm Beach, Florida
SAMPLE # Proctor # 16 Lab 2310
MATERIAL *Tan Coarse Sand W/Limerock & Shell*
TEST METHOD: D-698
DATE TESTED: December 19, 2006

PROJECT NAME: E A A Reservoir

PROJECT NO: 05-06-0070-101

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 3B
SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.63	24.29	24.64	24.55
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	9.04	9.70	10.05	9.96
WET DENSITY	pcf	120.53	129.33	134.00	132.80
DRY DENSITY	pcf	107.8	113.5	115.7	112.7
TARE NUMBER		2A	5A	3C	12A
WET SOIL + CAN	gm	695.70	698.00	696.80	694.50
DRY SOIL + CAN	gm	633.70	626.10	616.60	605.53
WATER WEIGHT	gm	62.00	71.90	80.20	88.97
TARE WT	gm	110.20	109.10	109.80	107.20
WEIGHT DRY SOIL	gm	523.50	517.00	506.80	498.33
MOISTURE	%	11.8	13.9	15.8	17.9



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	15.8	16
MAX DENSITY:	115.7	116

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

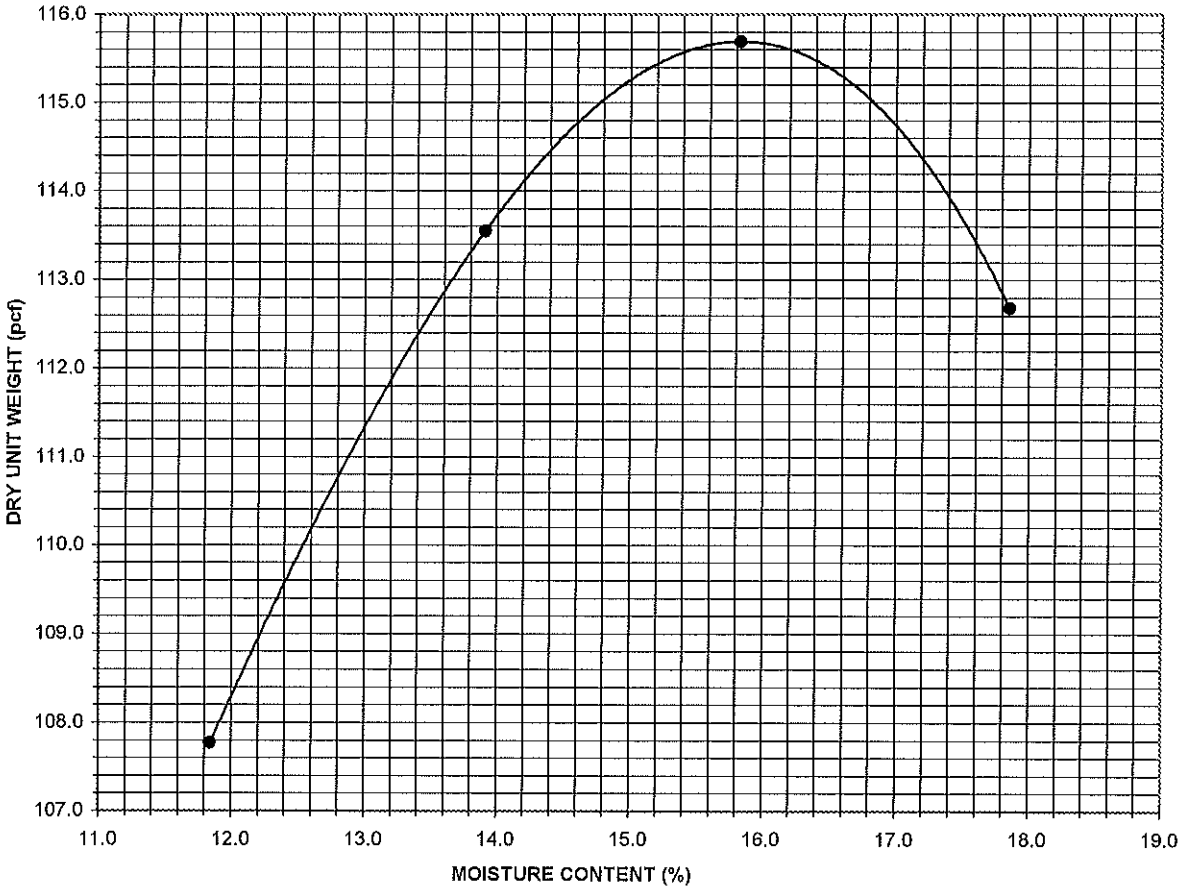
MATERIAL Tan Coarse Sand W/Limerock & Shell

SAMPLE # Proctor # 16 Lab 2310

DATE TESTED: December 19, 2006

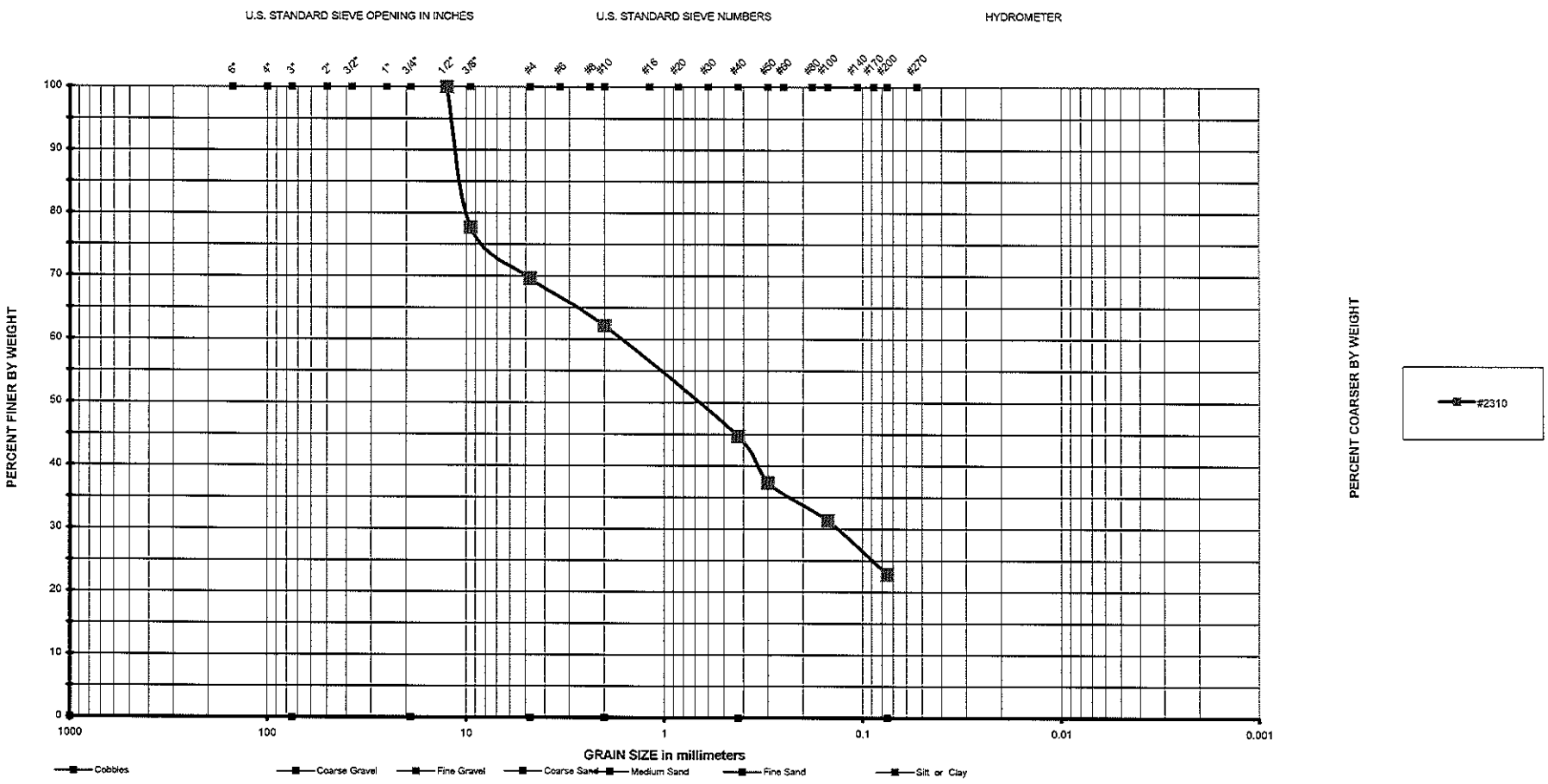
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 3B



OPT MOISTURE: **15.8**

MAX DENSITY: **115.7**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
8	Test Cell 3 S.E. Lift 3B	SM	22.8	1	-	-	-
	#2310						

NODARSE & ASSOCIATES, INC.

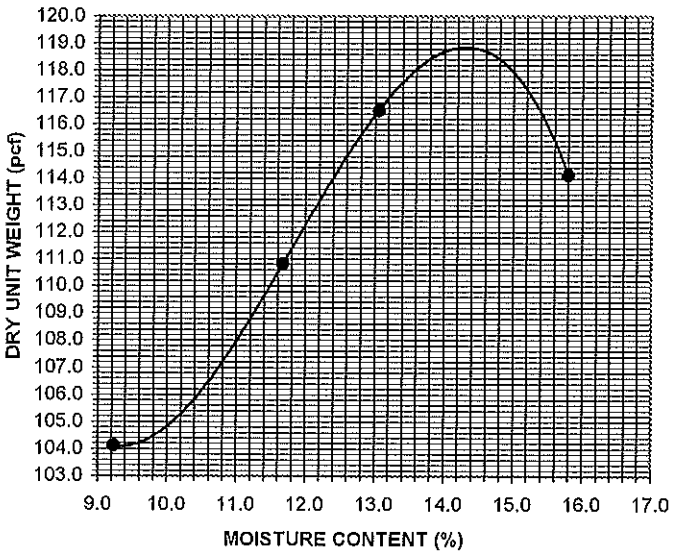
TESTED FOR: Nodarse and Associates
West Palm Beach, Florida
SAMPLE # Proctor # 17 Lab 2311
MATERIAL *Tan Coarse Sand W/Limerock & Shell*
TEST METHOD: D-698
DATE TESTED: December 19, 2006

PROJECT NAME: E A A Reservoir

PROJECT NO: 05-06-0070-101

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 4A
SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.12	23.87	24.47	24.50
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	8.53	9.28	9.88	9.91
WET DENSITY	pcf	113.73	123.73	131.73	132.13
DRY DENSITY	pcf	104.1	110.8	116.5	114.1
TARE NUMBER		11A	3G	17A	15A
WET SOIL + CAN	gm	694.70	697.50	697.80	695.00
DRY SOIL + CAN	gm	645.20	636.00	629.80	615.00
WATER WEIGHT	gm	49.50	61.50	68.00	80.00
TARE WT	gm	108.90	109.10	109.00	108.70
WEIGHT DRY SOIL	gm	536.30	526.90	520.80	506.30
MOISTURE	%	9.2	11.7	13.1	15.8



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	14.3	14
MAX DENSITY:	118.8	119

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

MATERIAL Tan Coarse Sand W/Limerock & Shell

DATE TESTED: December 19, 2006

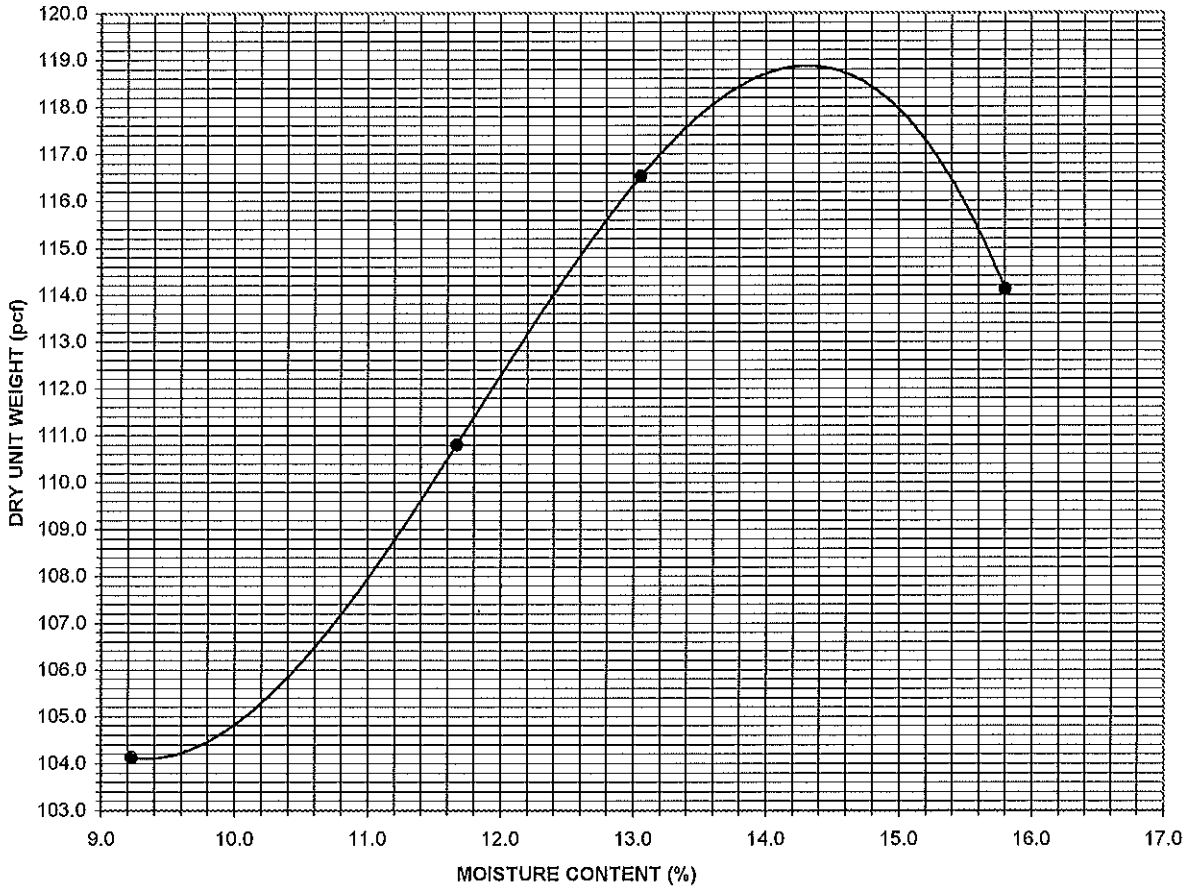
PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

SAMPLE # Proctor # 17 Lab 2311

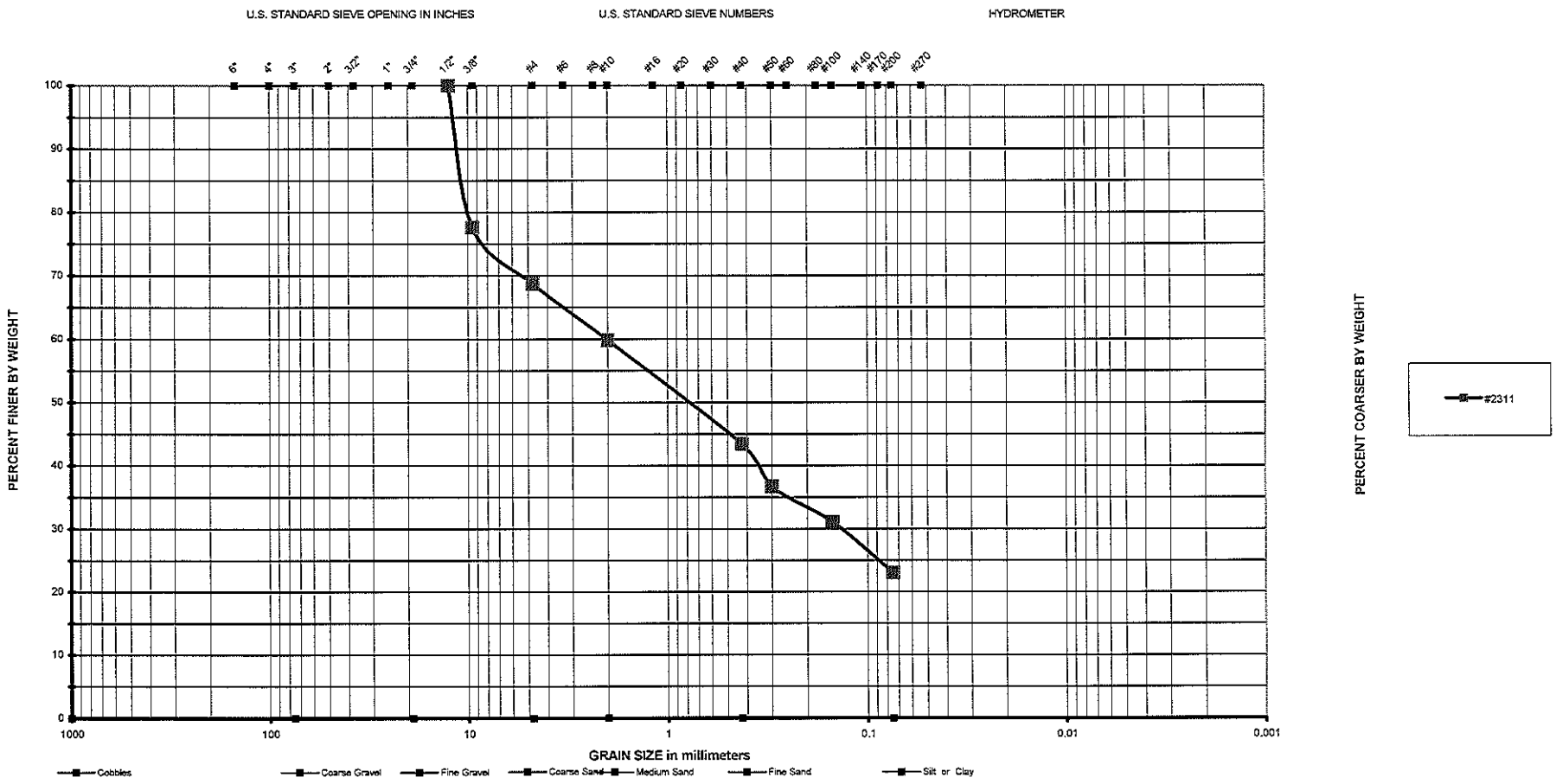
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 4A



OPT MOISTURE: **14.3**

MAX DENSITY: **118.8**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
6	Test Cell #4 S.E. Lift 4	SM	23	1	-	-	-
	#2311						

NODARSE & ASSOCIATES, INC.

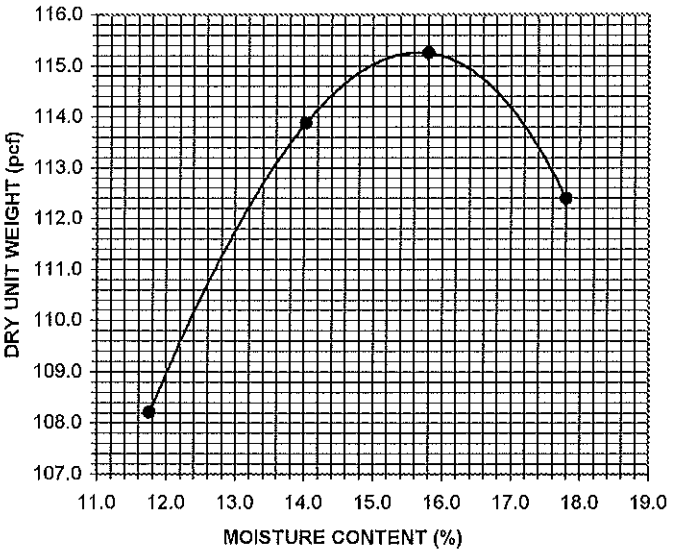
TESTED FOR: Nodarse and Associates
West Palm Beach, Florida
SAMPLE # Proctor # 15 Lab 2309
MATERIAL *Tan Coarse Sand W/Limerock & Shell*
TEST METHOD: D-698
DATE TESTED: December 19, 2006

PROJECT NAME: E A A Reservoir

PROJECT NO: 05-06-0070-101

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 3A
SOIL DESCRIPTION: *Tan Coarse Sand W/Limerock & Shell*

WT SOIL + CYLINDER	lbs	23.66	24.33	24.60	24.52
WT CYLINDER	lbs	14.59	14.59	14.59	14.59
WT WET SOIL	lbs	9.07	9.74	10.01	9.93
WET DENSITY	pcf	120.93	129.87	133.47	132.40
DRY DENSITY	pcf	108.2	113.9	115.2	112.4
TARE NUMBER		3A	3M	7A	4A
WET SOIL + CAN	gm	696.80	693.60	695.60	694.60
DRY SOIL + CAN	gm	635.00	621.80	615.50	605.80
WATER WEIGHT	gm	61.80	71.80	80.10	88.80
TARE WT	gm	109.60	110.30	108.80	107.10
WEIGHT DRY SOIL	gm	525.40	511.50	506.70	498.70
MOISTURE	%	11.8	14.0	15.8	17.8



	TEST RESULTS	AASHTO Spec Report
OPT MOISTURE:	**15.6**	16
MAX DENSITY:	**115.2**	115

TESTED FOR: Nodarse and Associates
West Palm Beach, Florida

PROJECT: E A A Reservoir

PROJECT: NO 05-06-0070-101

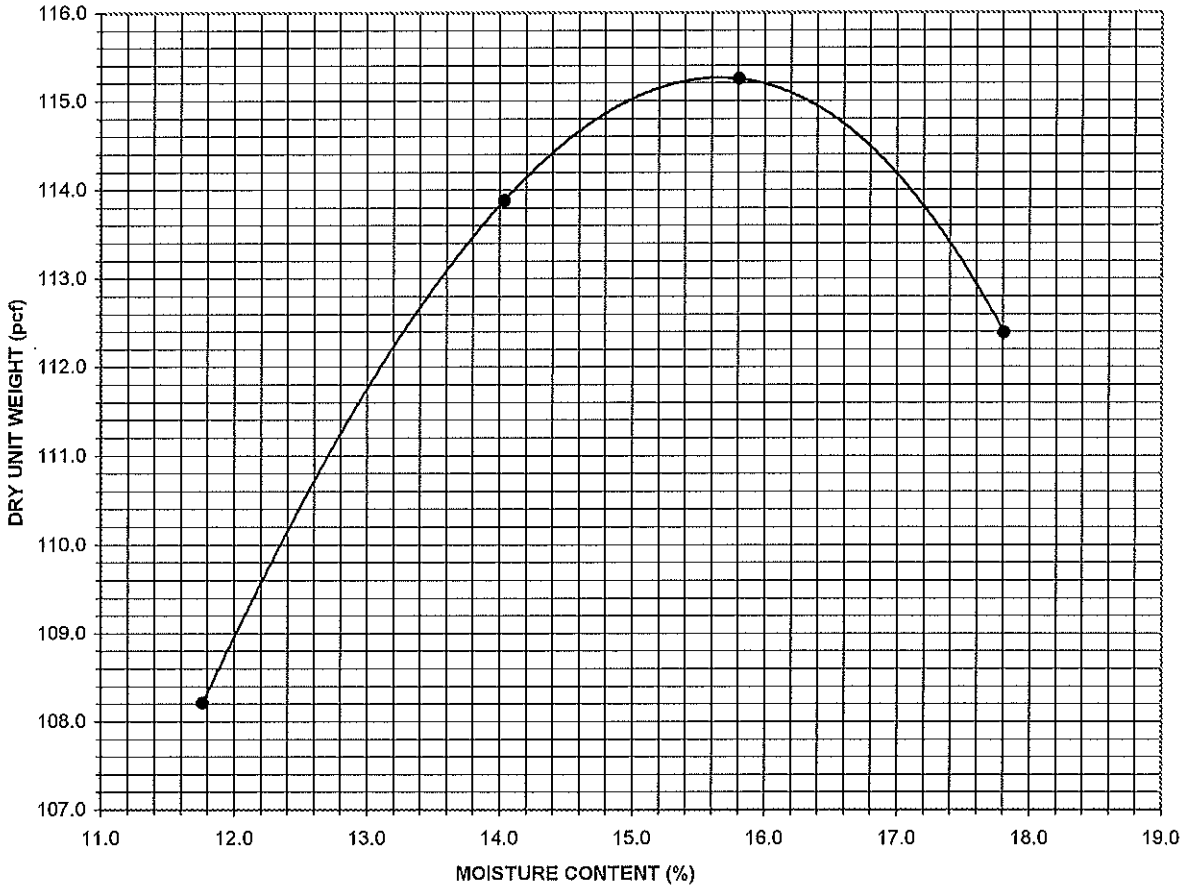
MATERIAL Tan Coarse Sand W/Limerock & Shell

SAMPLE # Proctor # 15 Lab 2309

DATE TESTED: December 19, 2006

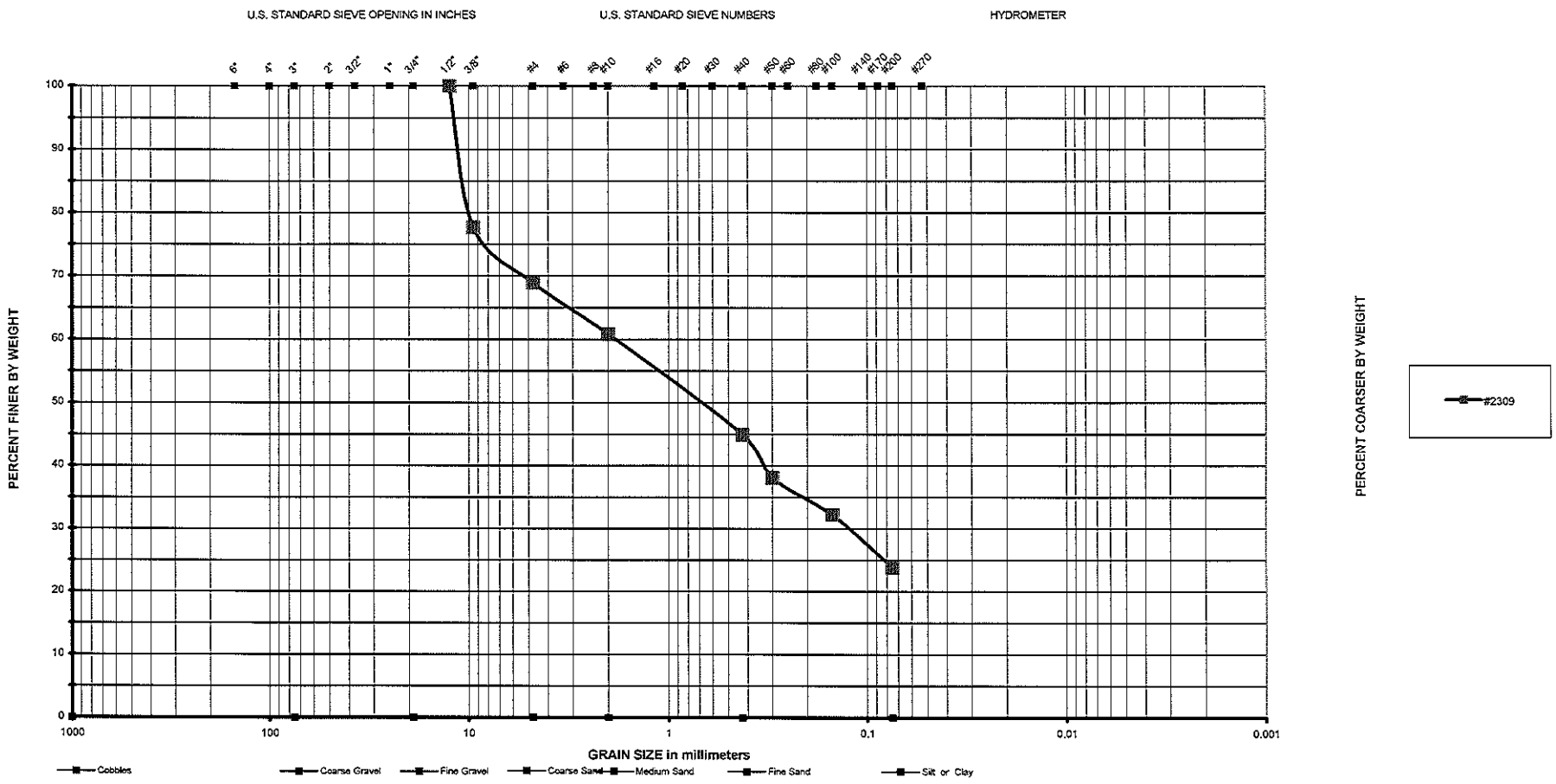
TEST METHOD: D-698

SAMPLE LOCATION: Test Cell 2 S.E. Corner Lift - 3A



OPT MOISTURE: **15.6**

MAX DENSITY: **115.2**



Grain-size Distribution Analysis

Project name:	EAA Reservoir		
Date:	12/18/2006	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
7	Test Cell 3 Lift #3A	SM	23.8	1	-	-	-
	#2309						

NODARSE & ASSOCIATES, INC.

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project: EAA Reservoir
Project Number: 05-06-0070

Sample Data

Source:
Sample No.: 1
Elev. or Depth: 22.5-24.0'
Sample Length (in./cm.):
Location: CP06-EAARS-CB-0462
Description:
Date:
PL:
LL:
PI:
USCS Classification:
AASHTO Classification:
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	266.30
Tare =	0.00
Dry sample weight =	266.30

Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
1/2 inch	0.00	100.0
3/8 inch	2.75	99.0
# 4	8.60	96.8
# 10	14.00	94.7

Hydrometer Analysis Data

Separation sieve is #10
Percent -#10 based upon complete sample= 94.7
Weight of hydrometer sample: 60.0
Hygroscopic moisture correction:
Moist weight & tare = 38.50
Dry weight & tare = 38.50
Tare = 28.30
Hygroscopic moisture= 0.0 %
Calculated biased weight= 63.36
Table of composite correction values:

Temp, deg C:	21.7	22.2	22.8	23.3	24.4
Comp. corr:	-6.5	-6.4	-6.3	-6.2	-6.0

Meniscus correction only= 0.0
Specific gravity of solids= 2.69
Specific gravity correction factor= 0.991
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	8.0	1.8	0.0130	8.0	15.0	0.0354	2.8
5.00	23.3	7.0	0.8	0.0130	7.0	15.1	0.0225	1.3
15.00	23.3	7.0	0.8	0.0130	7.0	15.1	0.0130	1.3
30.00	23.3	6.0	-0.2	0.0130	6.0	15.3	0.0093	0.0
60.00	23.3	6.0	-0.2	0.0130	6.0	15.3	0.0065	0.0
250.00	23.9	5.0	-1.1	0.0129	5.0	15.5	0.0032	0.0

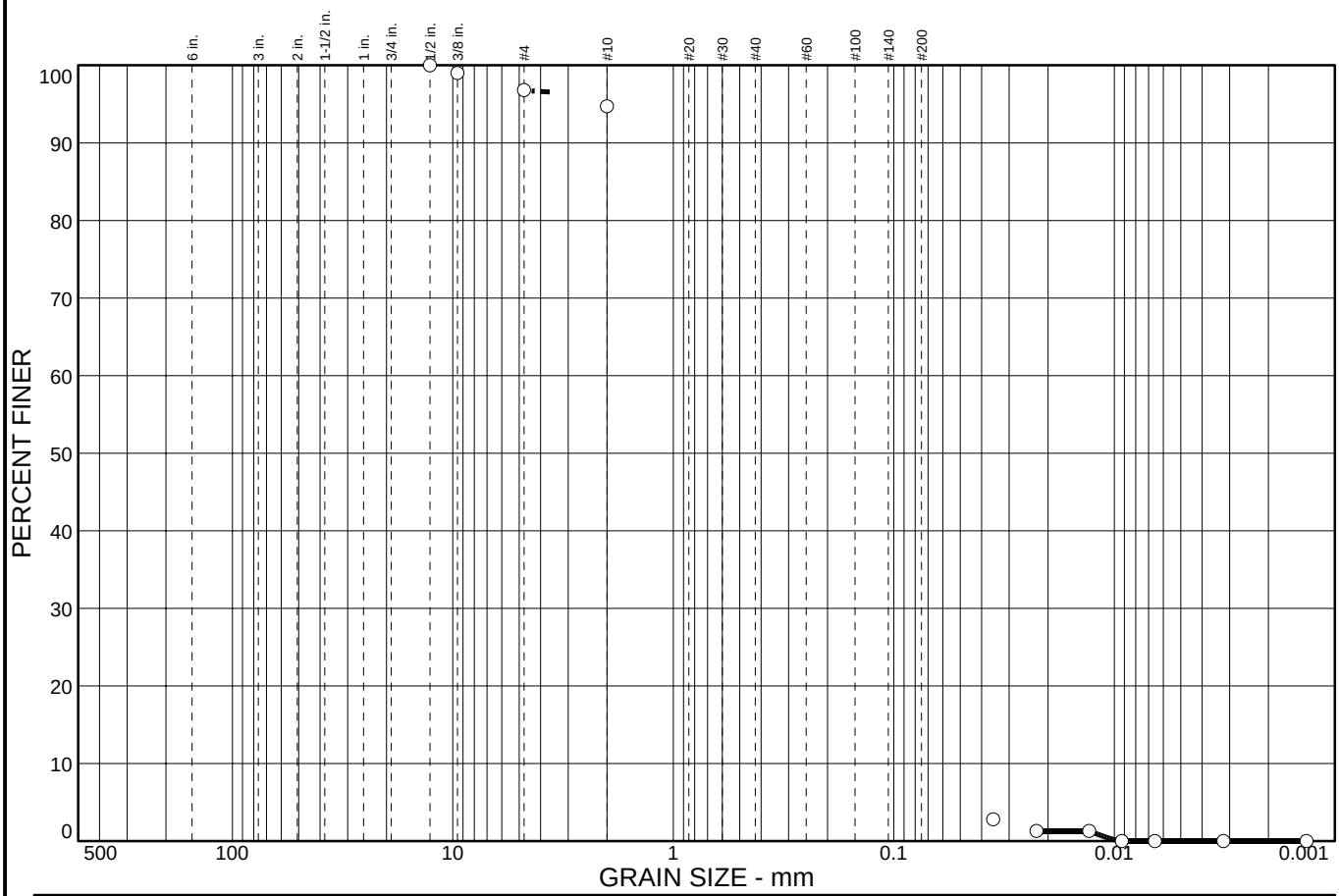
Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1440.00	23.3	5.0	-1.2	0.0130	5.0	15.5	0.0013	0.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = **% GRAVEL =** 3.2 **(% coarse =** **% fine =** 3.2**)**
% SAND = 82.8 **(% coarse =** 2.1 **% medium =** 32.1 **% fine =** 48.6**)**
% FINES = 14.0

D_{85}= 1.02 D_{60}= 0.39 D_{50}= 0.28
D_{30}= 0.14 D_{15}= 0.08 D_{10}= 0.06
C_c= 0.846 C_u= 6.3362

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.2	2.1	32.1	48.6	14.0	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	99.0		
#4	96.8		
#10	94.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.02 D_{60}= 0.388 D_{50}= 0.279
D_{30}= 0.142 D_{15}= 0.0786 D_{10}= 0.0613
C_u= 6.34 C_c= 0.85

Classification

USCS= AASHTO=

Remarks

Sample No.: 1 **Source of Sample:** **Date:**
Location: CP06-EAARS-CB-0462 **Elev./Depth:** 22.5-24.0'

Nodarse & Associates, Inc.

Winter Park, FL

Client:
Project: EAA Reservoir
Project No: 05-06-0070 **Plate**

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project: EAA Reservoir
Project Number: 05-06-0070

Sample Data

Source:
Sample No.: 2
Elev. or Depth: 24.0-25.5'
Sample Length (in./cm.):
Location: CP06-EAARS-CB-0462
Description:
Date:
PL:
LL:
PI:
USCS Classification:
AASHTO Classification:
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	301.85
Tare =	0.00
Dry sample weight =	301.85

Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3/4 inch	0.00	100.0
1/2 inch	5.20	98.3
3/8 inch	9.24	96.9
# 4	14.90	95.1
# 10	18.94	93.7

Hydrometer Analysis Data

Separation sieve is #10
Percent -#10 based upon complete sample= 93.7
Weight of hydrometer sample: 60.0
Hygroscopic moisture correction:
Moist weight & tare = 38.20
Dry weight & tare = 38.16
Tare = 28.30
Hygroscopic moisture= 0.4 %
Calculated biased weight= 63.78
Table of composite correction values:

Temp, deg C:	21.7	22.2	23.9	23.3	24.4
Comp. corr:	-6.5	-6.4	-6.1	-6.2	-6.0

Meniscus correction only= 0.0
Specific gravity of solids= 2.72
Specific gravity correction factor= 0.985
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	36.0	29.8	0.0128	36.0	10.4	0.0293	46.0
5.00	23.3	33.0	26.8	0.0128	33.0	10.9	0.0189	41.4
15.00	23.9	31.5	25.4	0.0127	31.5	11.1	0.0110	39.2
30.00	23.9	30.0	23.9	0.0127	30.0	11.4	0.0078	36.9
60.00	23.9	27.5	21.4	0.0127	27.5	11.8	0.0056	33.0

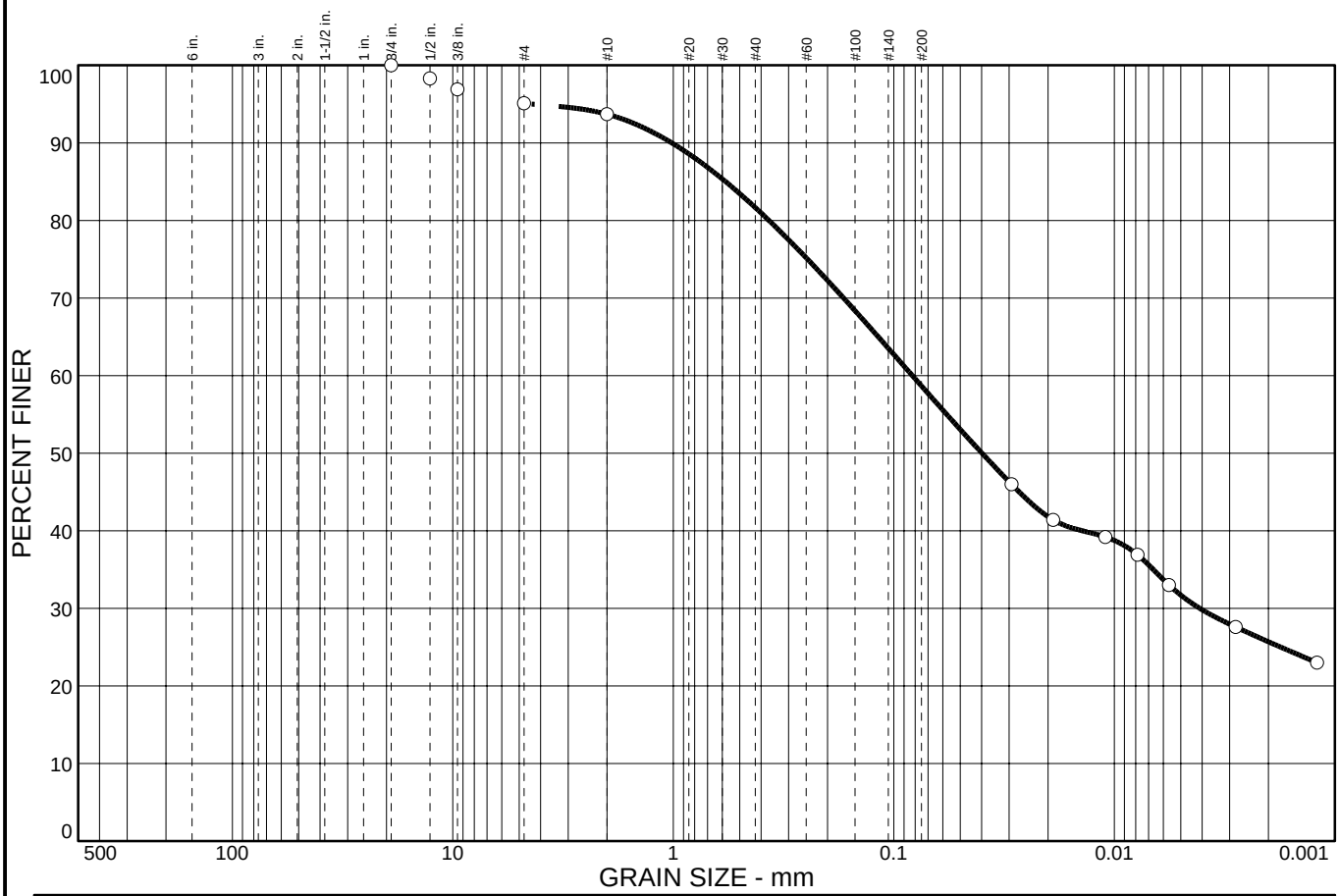
Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
250.00	24.4	24.0	18.0	0.0127	24.0	12.4	0.0028	27.6
1440.00	23.9	21.0	14.9	0.0127	21.0	12.9	0.0012	23.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = **% GRAVEL =** 4.9 **(% coarse =** **% fine =** 4.9**)**
% SAND = 36.4 **(% coarse =** 1.4 **% medium =** 12.0 **% fine =** 23.0**)**
% SILT = 27.0 **% CLAY =** 31.7

D_{85}= 0.58 D_{60}= 0.08 D_{50}= 0.04
D_{30}= 0.00

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	4.9	1.4	12.0	23.0	27.0	31.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	98.3		
3/8 in.	96.9		
#4	95.1		
#10	93.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.580 D_{60}= 0.0824 D_{50}= 0.0398
D_{30}= 0.0041 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: 2 **Source of Sample:** **Date:**
Location: CP06-EAARS-CB-0462 **Elev./Depth:** 24.0-25.5'

Nodarse & Associates, Inc.

Winter Park, FL

Client:
Project: EAA Reservoir
Project No: 05-06-0070 **Plate**

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project: EAA Reservoir
Project Number: 05-06-0070

Sample Data

Source:
Sample No.: 3
Elev. or Depth: 16.5-18.0'
Sample Length (in./cm.):
Location: CP06-EAARS-CB-0463
Description:
Date:
PL:
LL:
PI:
USCS Classification:
AASHTO Classification:
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	274.70
Tare =	0.00
Dry sample weight =	274.70

Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
1/2 inch	0.00	100.0
3/8 inch	4.35	98.4
# 4	30.50	88.9
# 10	84.12	69.4

Hydrometer Analysis Data

Separation sieve is #10
Percent -#10 based upon complete sample= 69.4
Weight of hydrometer sample: 60.0
Hygroscopic moisture correction:
Moist weight & tare = 38.10
Dry weight & tare = 37.93
Tare = 28.30
Hygroscopic moisture= 1.8 %
Calculated biased weight= 84.96
Table of composite correction values:

Temp, deg C:	21.7	22.2	23.9	23.3	24.4
Comp. corr:	-6.5	-6.4	-6.1	-6.2	-6.0

Meniscus correction only= 0.0
Specific gravity of solids= 3.06
Specific gravity correction factor= 0.925
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	24.4	37.0	31.0	0.0116	37.0	10.2	0.0262	33.6
5.00	24.4	34.0	28.0	0.0116	34.0	10.7	0.0170	30.4
15.00	24.4	31.0	25.0	0.0116	31.0	11.2	0.0100	27.1
30.00	24.4	28.0	22.0	0.0116	28.0	11.7	0.0072	23.8
60.00	24.4	26.0	20.0	0.0116	26.0	12.0	0.0052	21.7
250.00	24.4	24.0	18.0	0.0116	24.0	12.4	0.0026	19.5

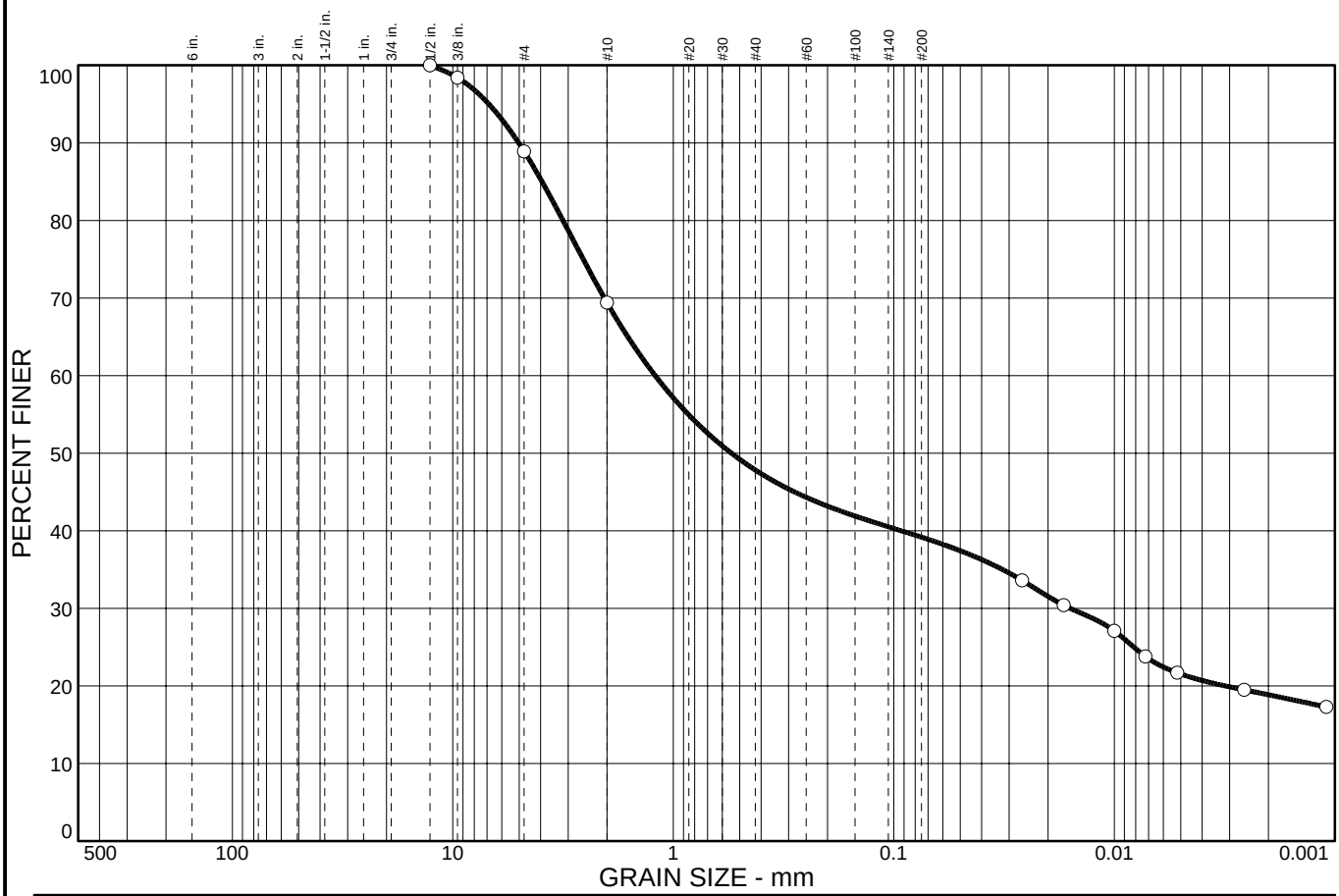
Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1440.00	23.9	22.0	15.9	0.0116	22.0	12.7	0.0011	17.3

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = **% GRAVEL =** 11.1 **(% coarse =** **% fine =** 11.1**)**
% SAND = 49.7 **(% coarse =** 19.5 **% medium =** 21.6 **% fine =** 8.6**)**
% SILT = 17.6 **% CLAY =** 21.6

D_{85}= 3.94 D_{60}= 1.21 D_{50}= 0.55
D_{30}= 0.02

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	11.1	19.5	21.6	8.6	17.6	21.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	98.4		
#4	88.9		
#10	69.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.94 D_{60}= 1.21 D_{50}= 0.545
D_{30}= 0.0158 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: 3 **Source of Sample:** **Date:**
Location: CP06-EAARS-CB-0463 **Elev./Depth:** 16.5-18.0'

Nodarse & Associates, Inc.

Winter Park, FL

Client:
Project: EAA Reservoir
Project No: 05-06-0070 **Plate**

GRAIN SIZE DISTRIBUTION TEST DATA

Client:
Project: EAA Reservoir
Project Number: 05-06-0070

Sample Data

Source:
Sample No.: 4
Elev. or Depth: 13.5-15.0'
Sample Length (in./cm.):
Location: CP06-EAARS-CB-0463
Description:
Date:
PL:
LL:
PI:
USCS Classification:
AASHTO Classification:
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	197.50
Tare =	0.00
Dry sample weight =	197.50

Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3/4 inch	0.00	100.0
1/2 inch	9.12	95.4
3/8 inch	11.35	94.3
# 4	24.70	87.5
# 10	55.12	72.1

Hydrometer Analysis Data

Separation sieve is #10
Percent -#10 based upon complete sample= 72.1
Weight of hydrometer sample: 38.0
Hygroscopic moisture correction:
Moist weight & tare = 39.00
Dry weight & tare = 38.87
Tare = 28.30
Hygroscopic moisture= 1.2 %
Calculated biased weight= 52.06
Table of composite correction values:

Temp, deg C:	21.7	22.2	23.9	23.3	25.6
Comp. corr:	-6.5	-6.4	-6.1	-6.2	-5.8

Meniscus correction only= 0.0
Specific gravity of solids= 2.14
Specific gravity correction factor= 1.169
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	25.6	5.0	-0.8	0.0153	5.0	15.5	0.0427	0.0
5.00	25.6	5.0	-0.8	0.0153	5.0	15.5	0.0270	0.0
15.00	25.6	5.0	-0.8	0.0153	5.0	15.5	0.0156	0.0
30.00	25.6	5.0	-0.8	0.0153	5.0	15.5	0.0110	0.0
60.00	25.6	4.0	-1.8	0.0153	4.0	15.6	0.0078	0.0

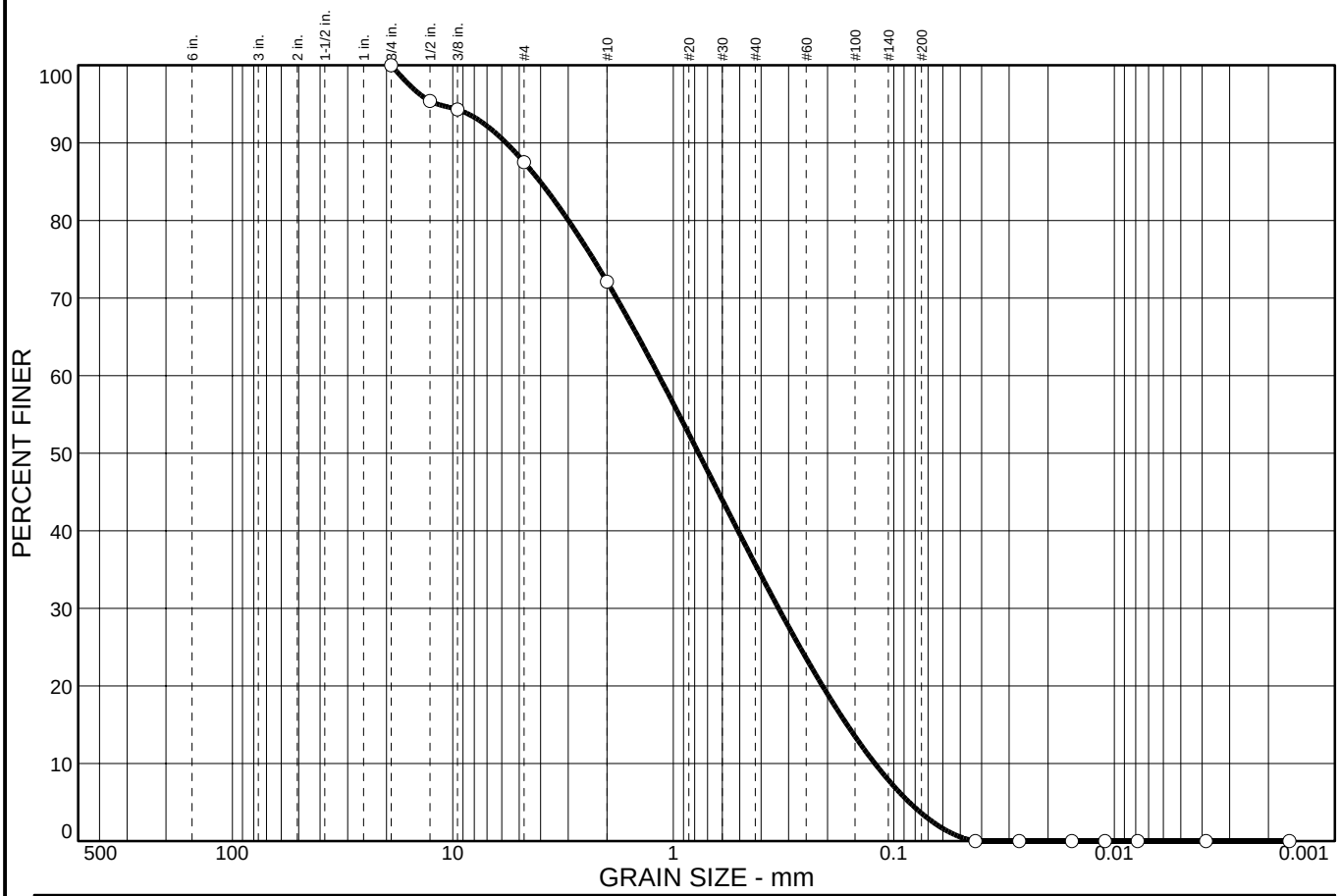
Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
250.00	25.6	4.0	-1.8	0.0153	4.0	15.6	0.0038	0.0
1440.00	25.6	3.0	-2.8	0.0153	3.0	15.8	0.0016	0.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = **% GRAVEL =** 12.5 **(% coarse =** **% fine =** 12.5**)**
% SAND = 83.9 **(% coarse =** 15.4 **% medium =** 36.4 **% fine =** 32.1**)**
% FINES = 3.6

D_{85}= 4.02 D_{60}= 1.16 D_{50}= 0.77
D_{30}= 0.33 D_{15}= 0.16 D_{10}= 0.12
C_c= 0.7831 C_u= 9.5563

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	12.5	15.4	36.4	32.1	3.6	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	95.4		
3/8 in.	94.3		
#4	87.5		
#10	72.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 4.02 D_{60}= 1.16 D_{50}= 0.768
D_{30}= 0.333 D_{15}= 0.163 D_{10}= 0.122
C_u= 9.56 C_c= 0.78

Classification

USCS= AASHTO=

Remarks

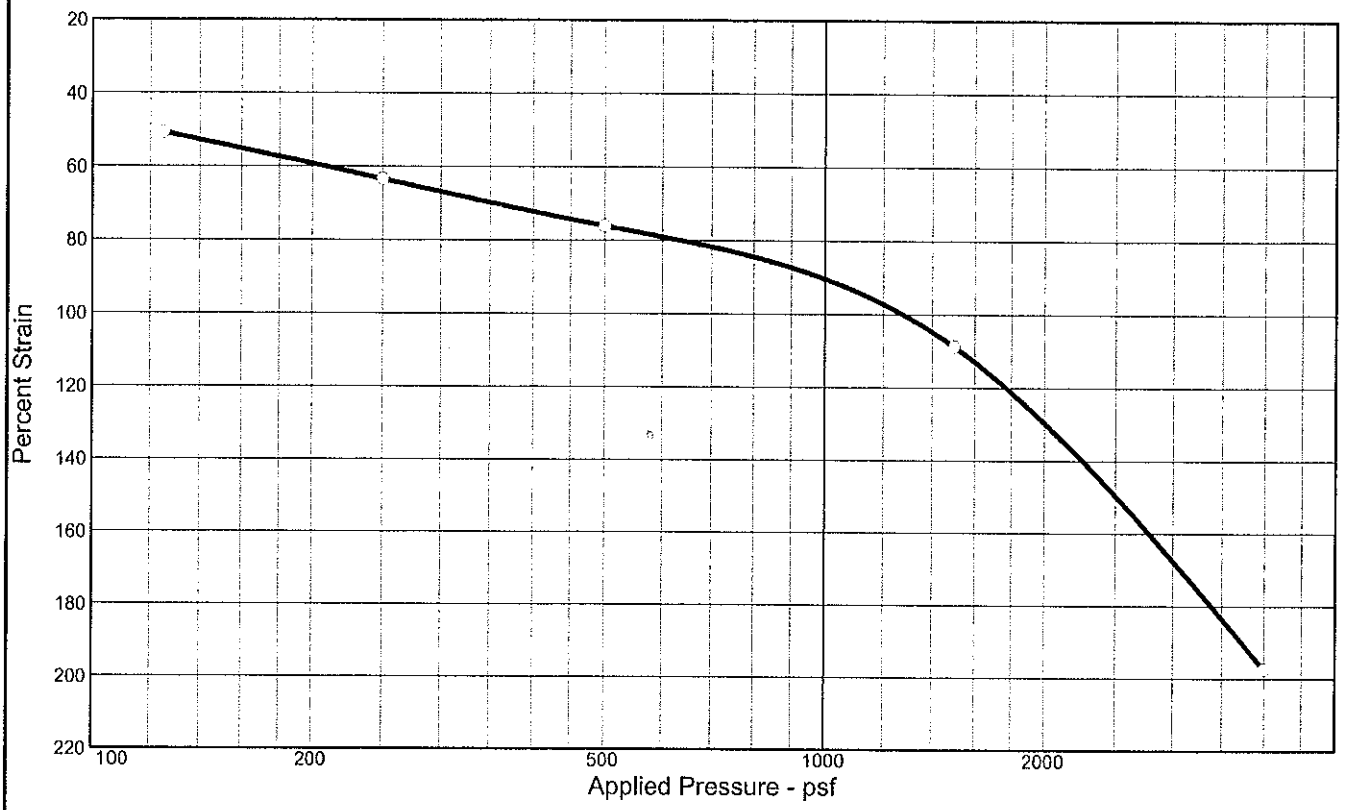
Sample No.: 4 **Source of Sample:** **Date:**
Location: CP06-EAARS-CB-0463 **Elev./Depth:** 13.5-15.0'

Nodarse & Associates, Inc.

Winter Park, FL

Client:
Project: EAA Reservoir
Project No: 05-06-0070 **Plate**

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125	0.18	0.008								
2	250	0.02									
3	500	0.03									
4	1500	0.00	0.258								
5	4000	0.07	-0.010								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
					2.69		1563	3.56				0.644

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 1

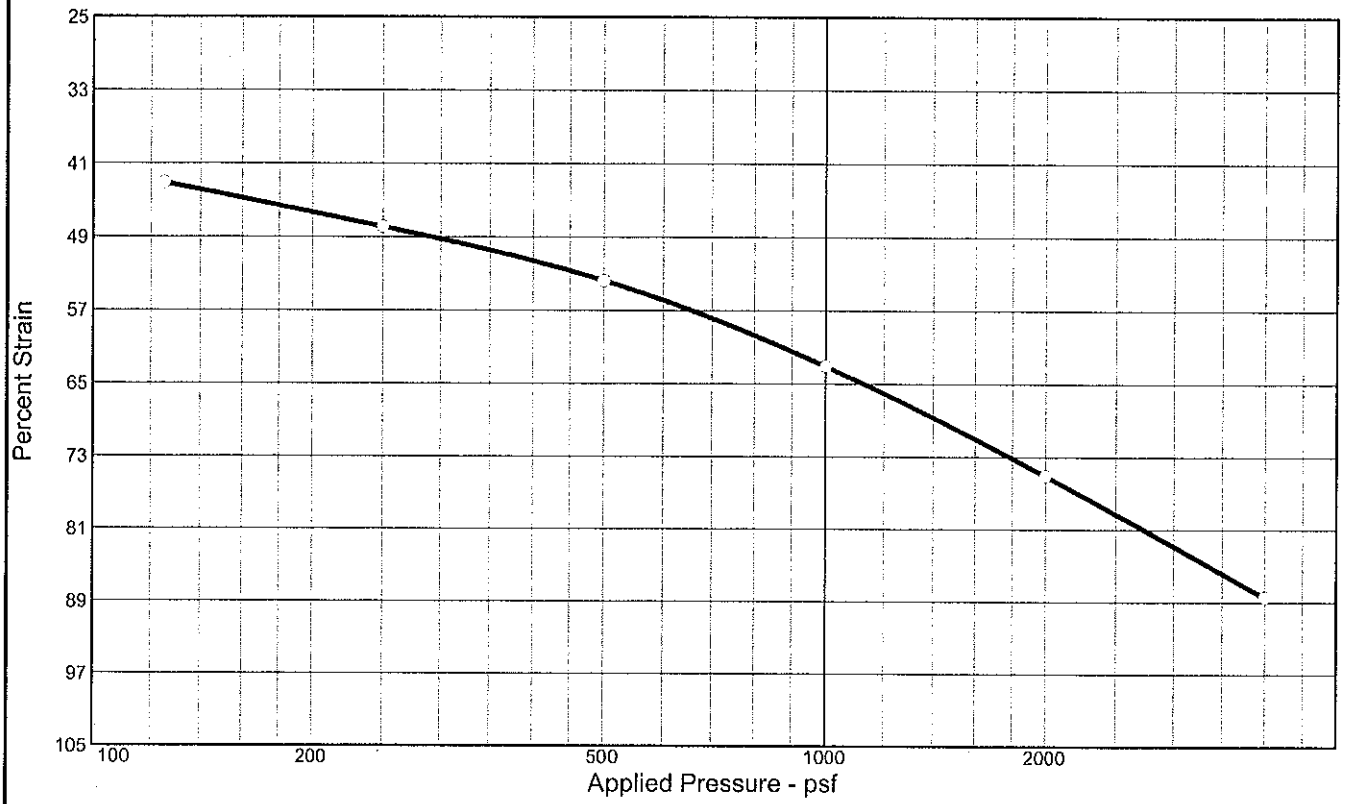
Remarks:
Compacted to 96%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation											
No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α
1	125	0.05	0.001								
2	250	0.14	0.001								
3	500	0.21	0.007								
4	1000	0.04	0.000								
5	2000	0.02	0.000								
6	4000	0.01	0.000								

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
Sat.	Moist.											
					2.69		745	0.64				0.443

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 2

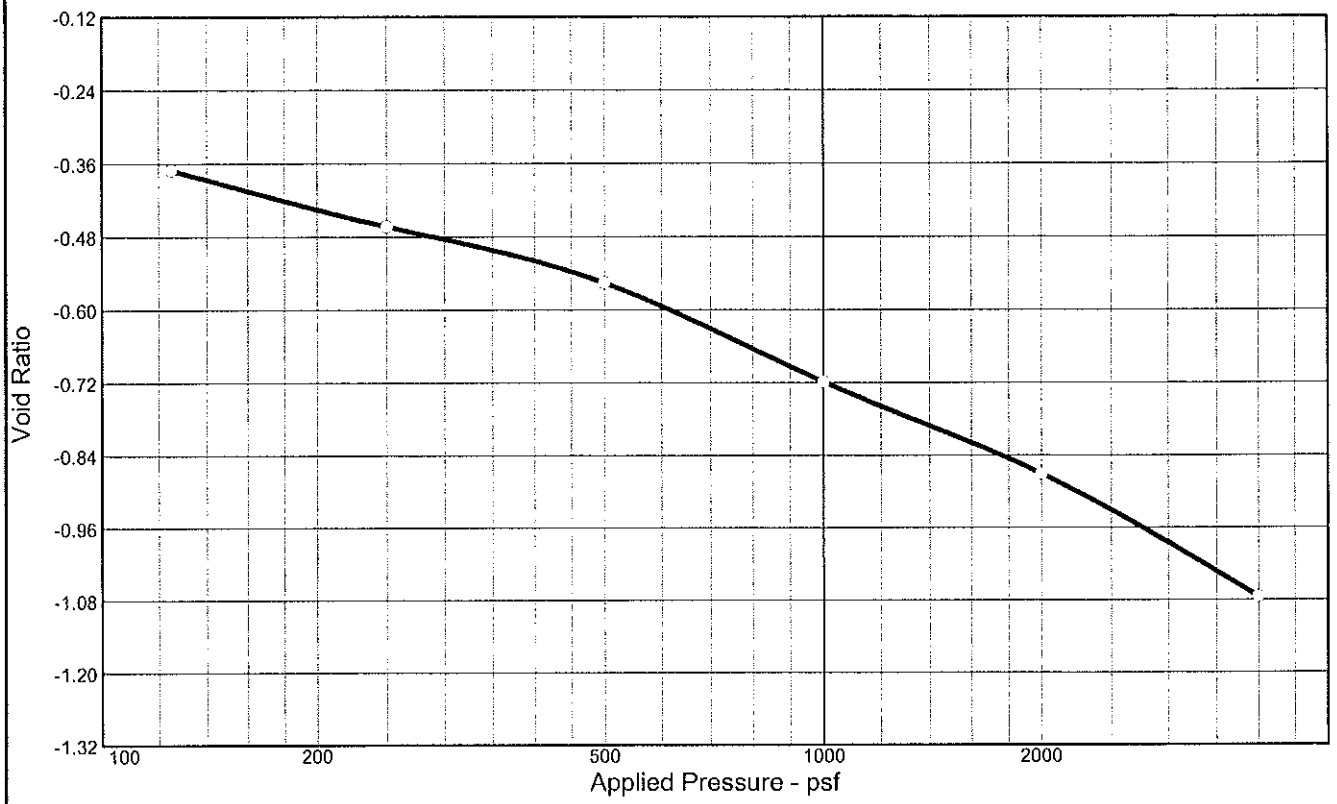
Remarks:
Compacted to 96%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125	0.05									
2	250	0.03	0.021								
3	500	0.05	0.000								
4	1000	0.01	0.025								
5	2000	0.01	0.055								
6	4000	0.00	0.029								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
					2.69		849	0.69				0.389

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 3

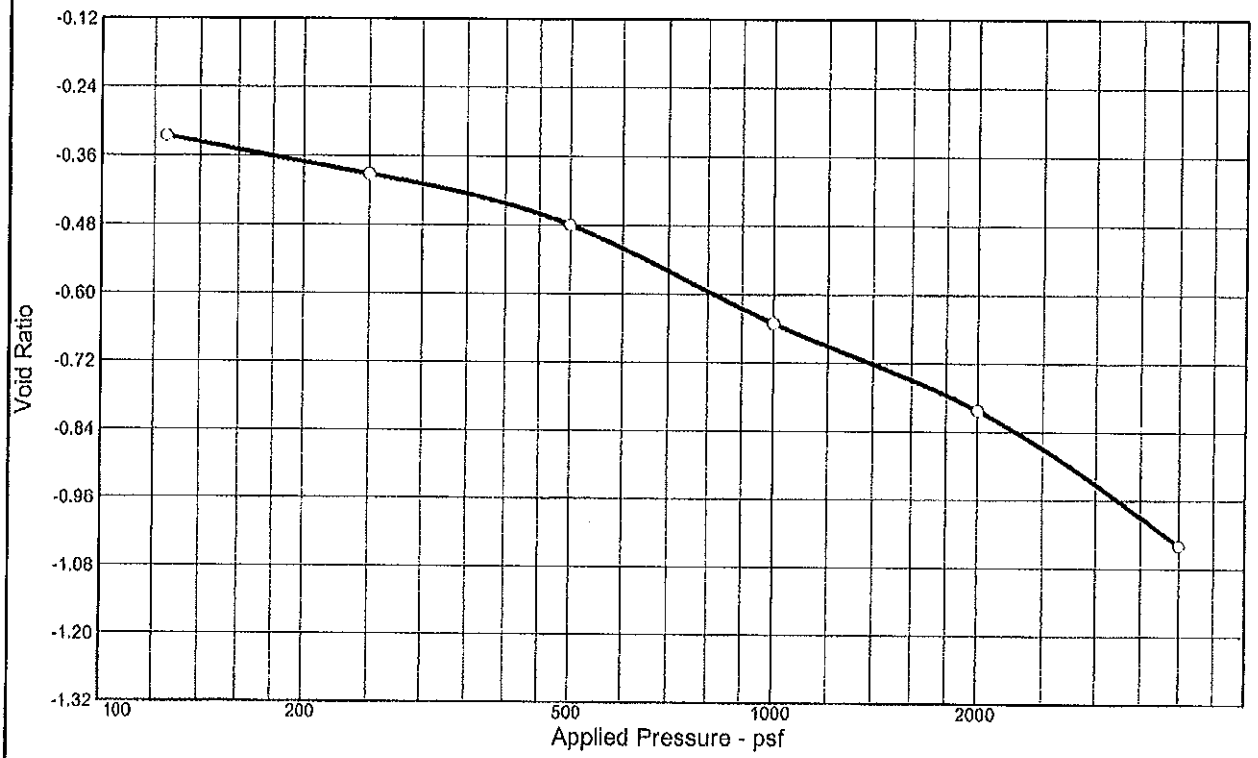
Remarks:
Compacted to 94%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125	0.05	0.004								
2	250	0.10	0.000								
3	500	0.10									
4	1000	0.04	0.043								
5	2000	0.01	0.000								
6	4000	0.00	0.000								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
					2.69		1011	0.81				0.496

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 4

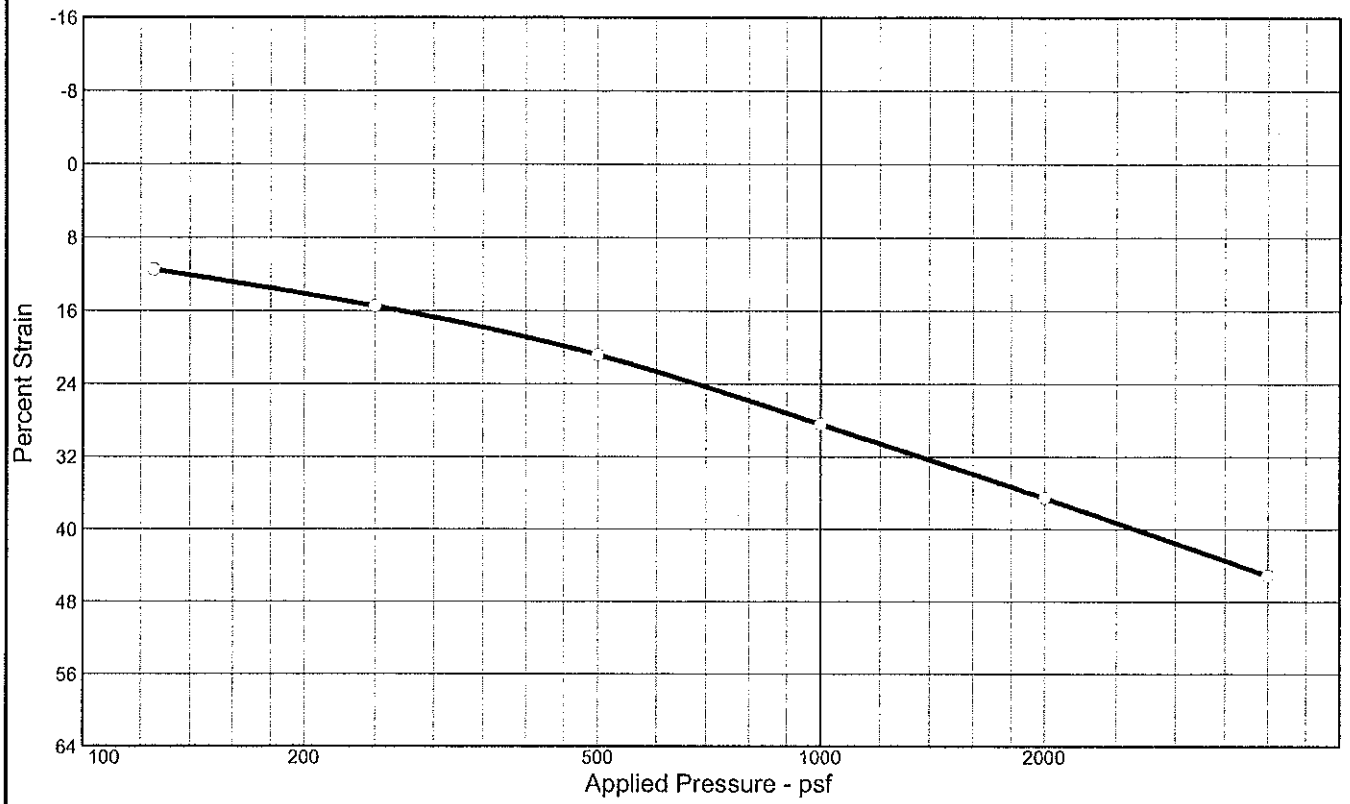
Remarks:
Compacted to 94%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α
1	125	0.42	0.003								
2	250	0.19	0.009								
3	500	0.60									
4	1000	0.06	0.008								
5	2000	0.05									
6	4000	0.14	0.017								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
							498					

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 1 at 92%

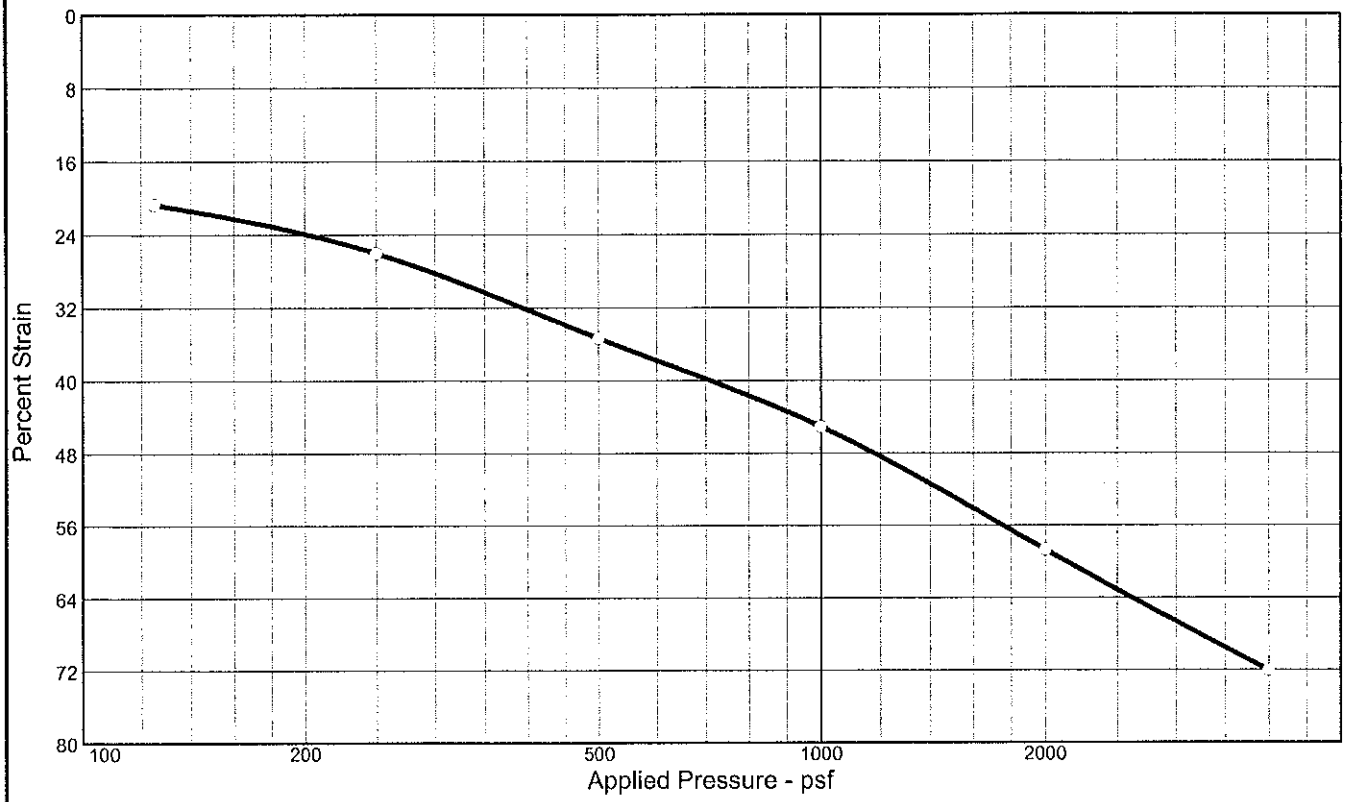
Remarks:
Compacted at 92%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation											
No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α	No.	Load (psf)	C_v (ft.^{2}/day)	C_α
1	125	0.10	0.005								
2	250	0.11									
3	500	0.05	0.012								
4	1000	0.06									
5	2000	0.01	0.040								
6	4000	0.04									

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
Sat.	Moist.											
							510					

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 2 at 92%

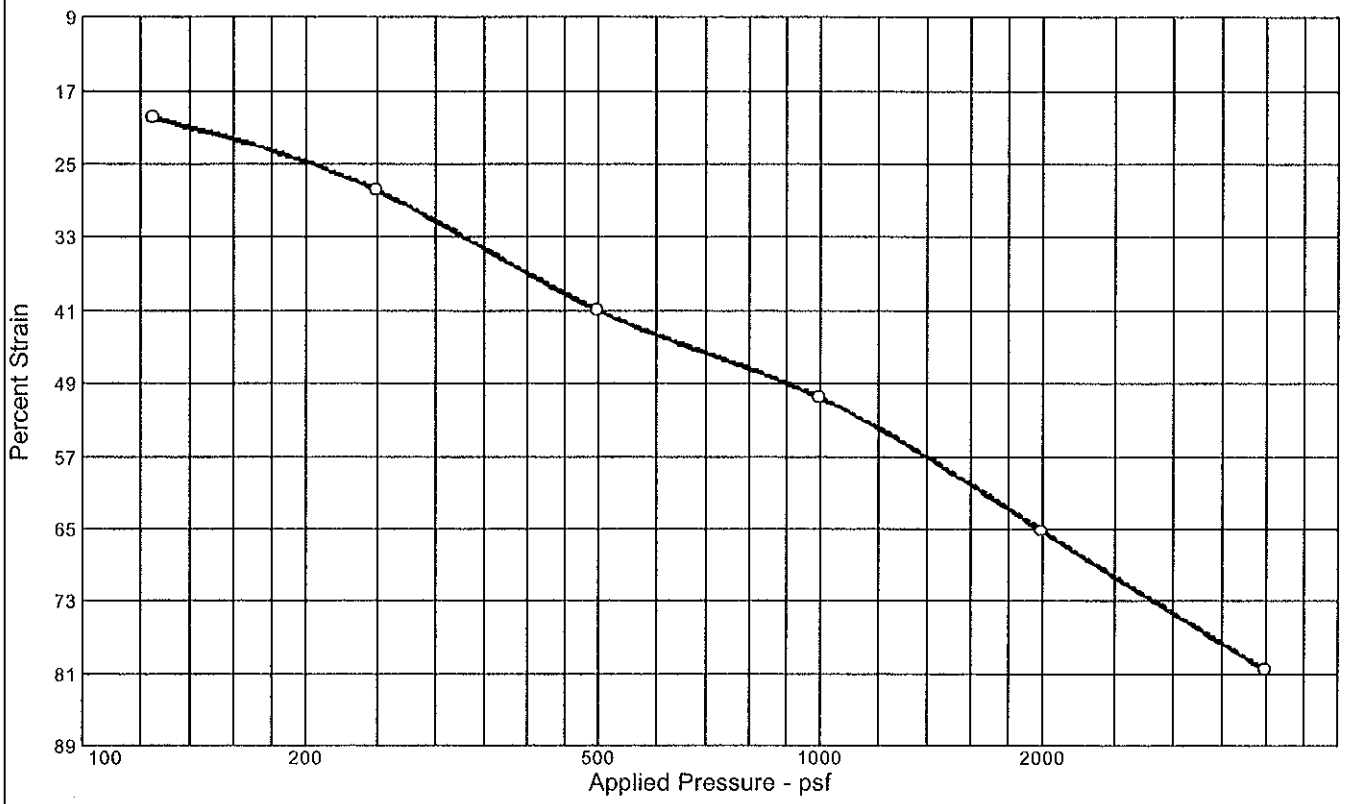
Remarks:
Compacted at 92%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125	0.26	0.000								
2	250	0.04	0.011								
3	500	0.09	0.020								
4	1000	0.12	0.023								
5	2000	0.07	0.028								
6	4000	0.01	0.037								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
							698					

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 1 at 90%

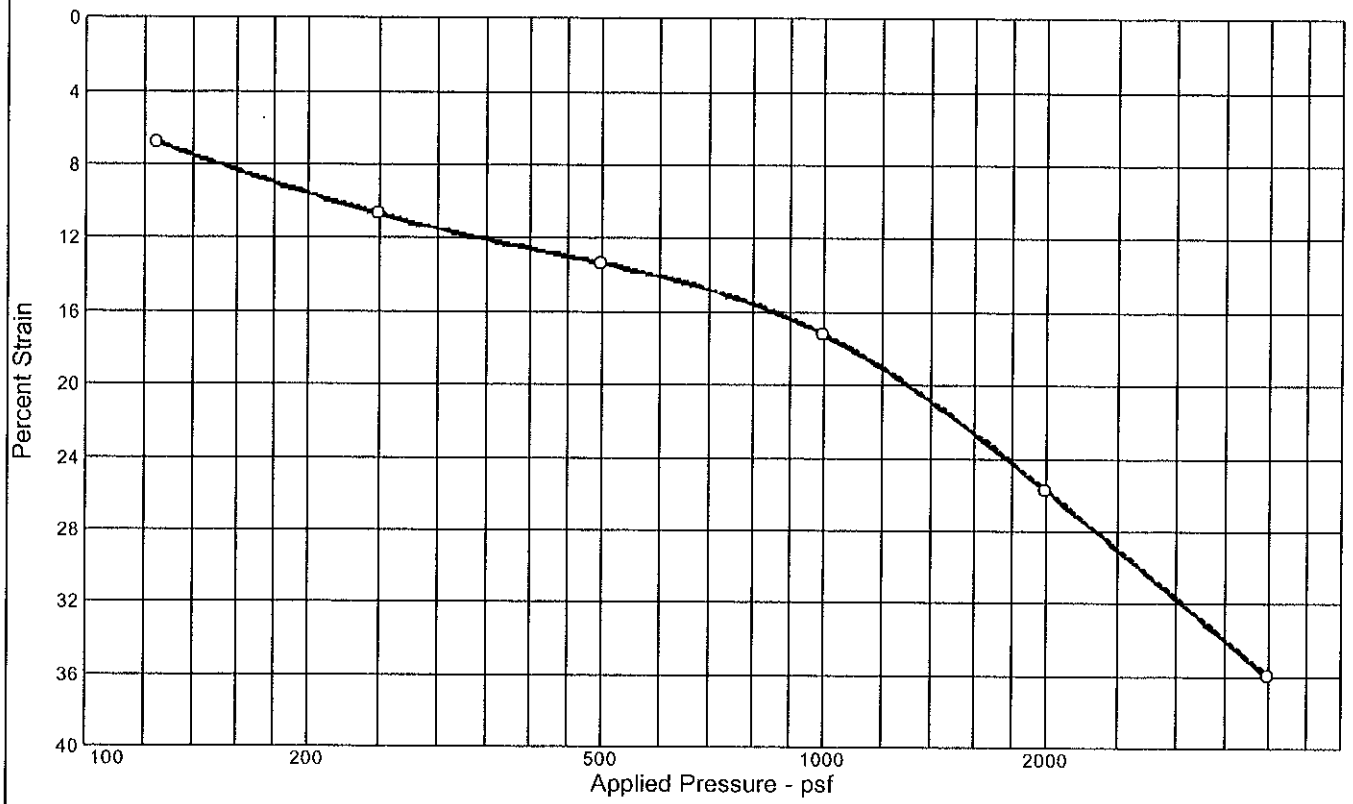
Remarks:
Compacted to 90%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125	0.10									
2	250	0.15	0.005								
3	500	0.08	0.001								
4	1000	0.36	0.011								
5	2000	0.04	0.020								
6	4000	0.22	0.014								

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Heave %	e_o
							912					

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** Black and Veatch

Project: EAA

Source: Test Cell 2 – SE Corner **Sample No.:** 2 at 90%

Remarks:
Compacted to 90%

Nodarse & Associates, Inc.

Winter Park, FL

Plate

Results of Constant Head Permeability Tests

Project No: 05-06-0070-101
Project Name: EAA Reservoir A-1

Description of material: Tan silty sand with limestone fragments

Area of Sample: 12.56 sq.inch

Height of Sample: 4.58 inches

Sample Preparation: All the samples were remolded in accordance to ASTM D-698 at the required relative compaction.

Table 1: Summary Table

Permeability Test No.	Compaction Percentage (%)	Hydraulic Gradient	Coefficient of Hydraulic Conductivity	
			cm/sec	in/sec
Perm # 1	95	10	1.86 E-04	7.32 E-05
Perm # 2	95	10	1.43 E-04	5.63 E-05
Perm # 3	95	10	1.30 E-05	0.51 E-05
Perm # 4	92	10	1.37 E-04	5.39 E-05
Perm # 5	92	10	5.20 E-05	2.05 E-05
Perm # 6	92	10	4.70 E-04	18.5 E-05

Note: Three trials were performed for each permeability tests. The average of the three trials is presented in the table above.

The permeability results for each test are presented in the tables below.

Table 2: Perm#1 – 95% Compaction
Test Cell 2: SE Corner

Test No.	**Area of sample(A) cm^2**	**Ht. Of sample(L) cm**	**Constant Head(h) cm**	**Volume(Q) cm^3**	**Time(t) sec**	**Permeability(k) cm/s**
1	81	11.63	116.3	47	300	1.93E-04
2	81	11.63	116.3	45	300	1.85E-04
3	81	11.63	116.3	44	300	1.81E-04
					Average	1.86E-04

Table 3: Perm#2 – 95% Compaction
Test Cell 2: SE Corner

Test No.	Area of sample(A) cm^2	Ht. Of sample(L) cm	Constant Head(h) cm	Volume(Q) cm^3	Time(t) sec	Permeability(k) cm/s
1	81	11.63	116.3	42	300	1.77E-04
2	81	11.63	116.3	35	300	1.47E-04
3	81	11.63	116.3	28	300	1.18E-04
					Average	1.43E-04

Table 4: Perm#3 - 95% Compaction
Test Cell 2: SE Corner

Test No.	Area of sample(A) cm^2	Ht. Of sample(L) cm	Constant Head(h) cm	Volume(Q) cm^3	Time(t) sec	Permeability(k) cm/s
1	81	11.63	116.3	13	1200	1.34E-05
2	81	11.63	116.3	12	1200	1.23E-05
3	81	11.63	116.3	13	1200	1.34E-05
					Average	1. 30E-05

Table 5: Perm#4 – 92% Compaction
Test Cell 2: SE Corner

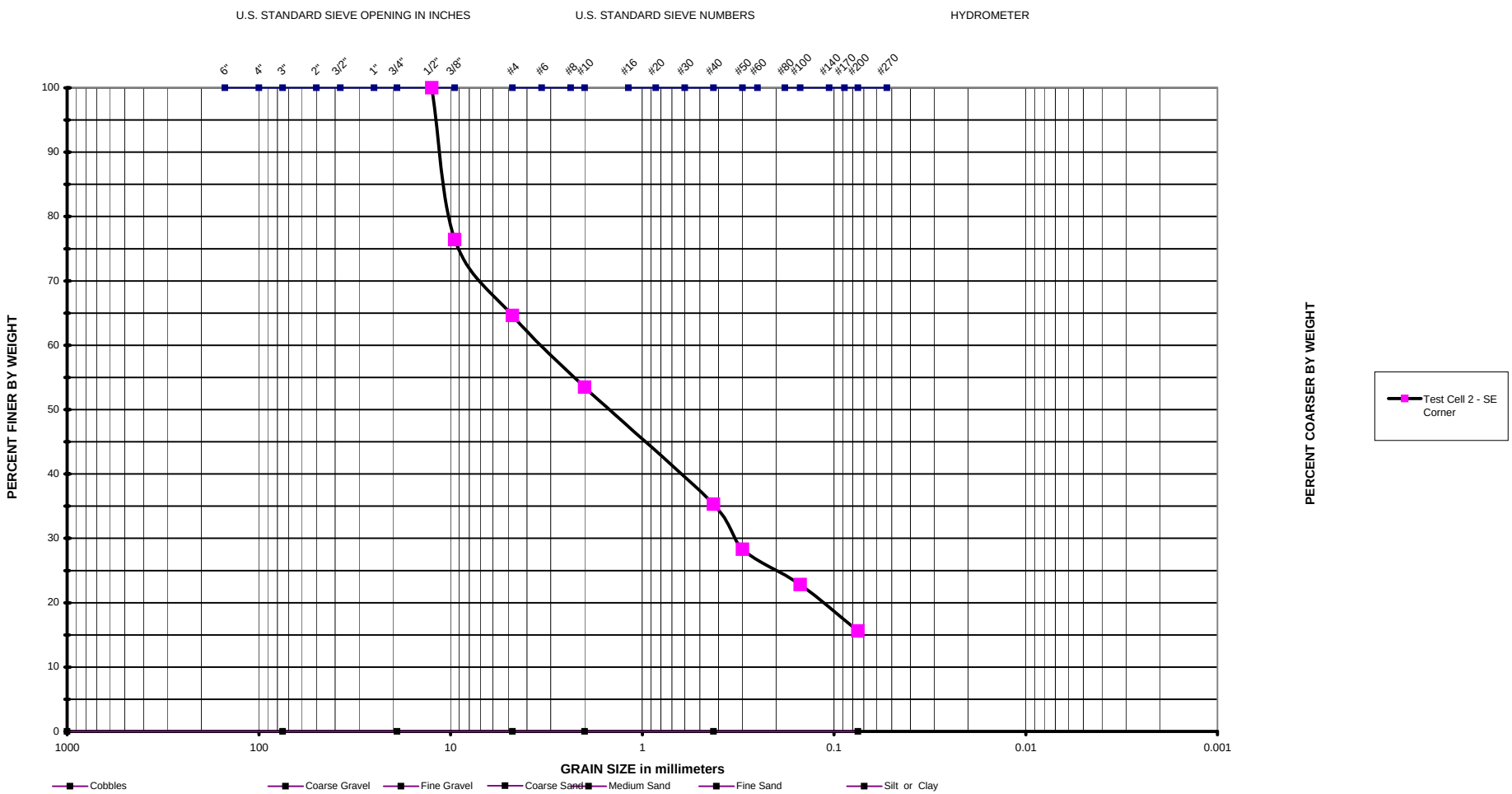
Test No.	Area of sample(A) cm^2	Ht. Of sample(L) cm	Constant Head(h) cm	Volume(Q) cm^3	Time(t) sec	Permeability(k) cm/s
1	81	11.63	116.3	38	300	1.56E-04
2	81	11.63	116.3	32	300	1.32E-04
3	81	11.63	116.3	30	300	1.23E-04
					Average	1. 37E-04

Table 6: Perm#5 – 92% Compaction
Test Cell 2: SE Corner

Test No.	Area of sample(A) cm^2	Ht. Of sample(L) cm	Constant Head(h) cm	Volume(Q) cm^3	Time(t) sec	Permeability(k) cm/s
1	81	11.63	116.3	13	300	5.35E-05
2	81	11.63	116.3	12.5	300	5.14E-05
3	81	11.63	116.3	13	300	5.35E-05
					Average	5.20E-05

Table 7: Perm#6 – 92% Compaction
Test Cell 2: SE Corner

Test No.	Area of sample(A) cm^2	Ht. Of sample(L) cm	Constant Head(h) cm	Volume(Q) cm^3	Time(t) sec	Permeability(k) cm/s
1	81	11.63	116.3	123	300	5.06E-04
2	81	11.63	116.3	115	300	4.73E-04
3	81	11.63	116.3	106	300	4.36E-04
					Average	4.70E-04

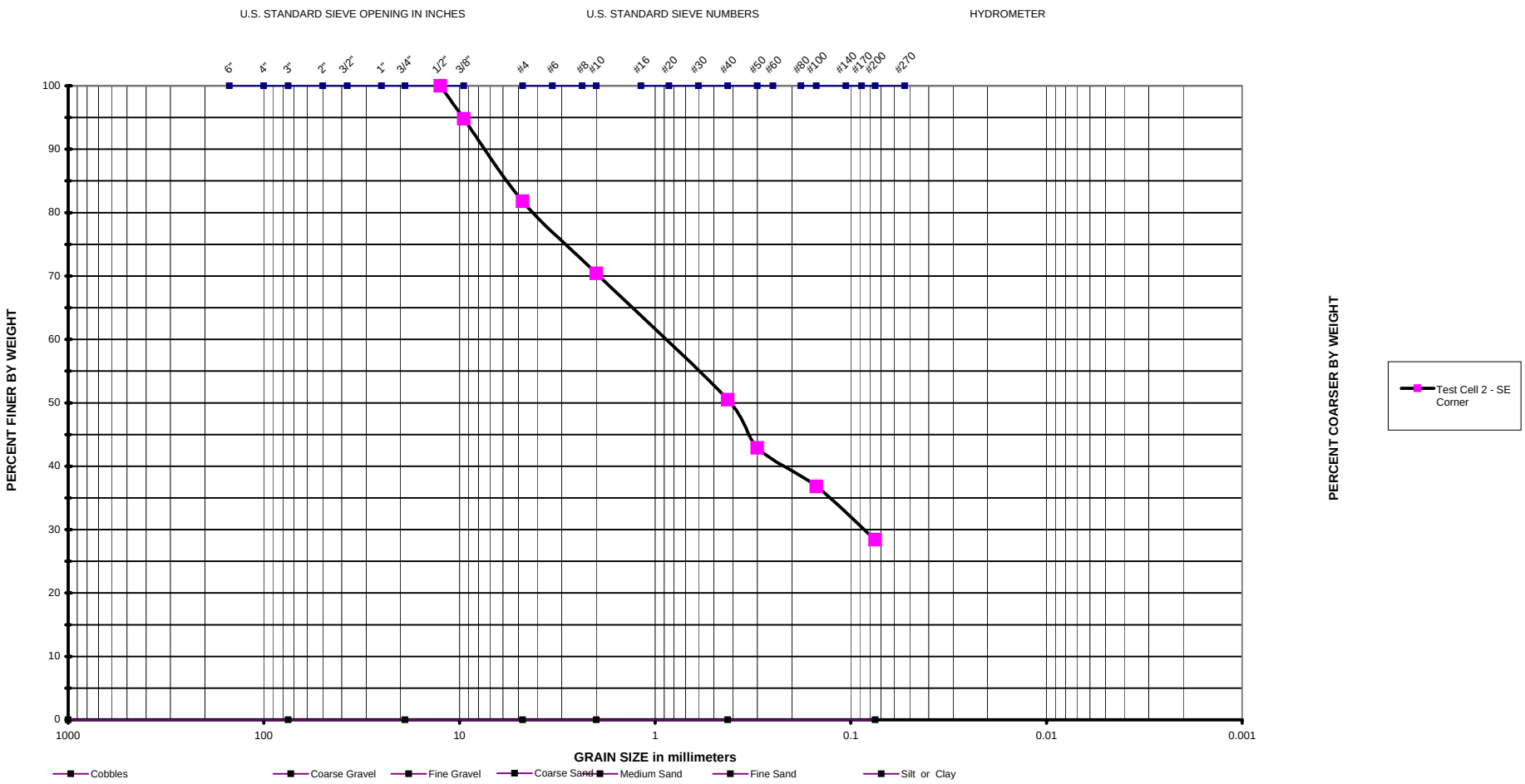


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/22/2007	N&A Project No.	05-06-0070-101
		Figure No.	1

No.	Sample Location	Classification	-200	w %	LL	PL	PI
1	Test Cell 2 - SE Corner	SM	15.6	16	-	-	-

NODARSE & ASSOCIATES, INC.

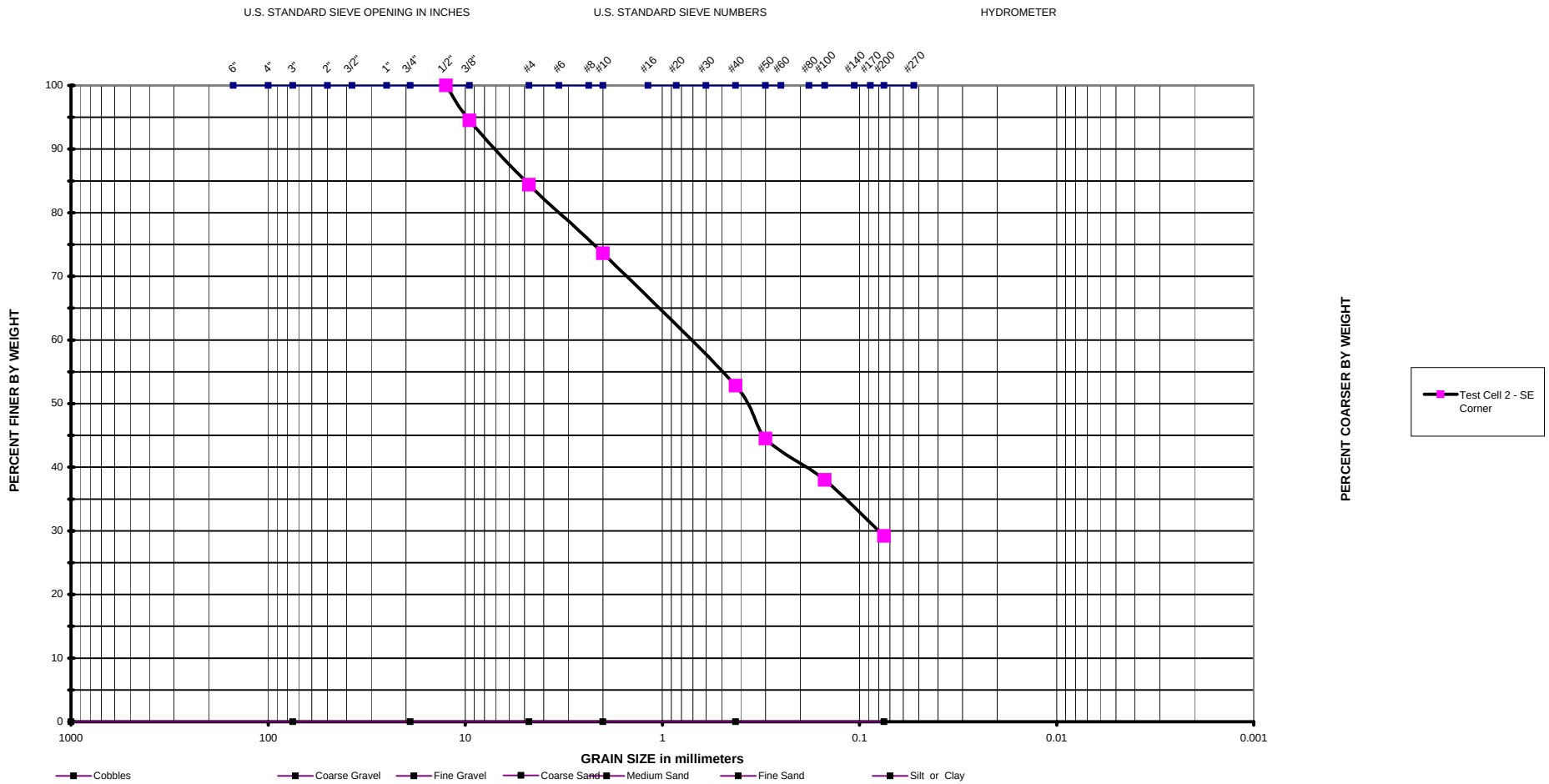


Grain-size Distribution Analysis

Project name:	EAA
Date: 1/22/2007	N&A Project No. 05-06-0070-101
	Figure No. 2

No.	Sample Location	Classification	-200	w %	LL	PL	PI
2	Test Cell 2 - SE Corner	SM	28.4	16	-	-	-

NODARSE & ASSOCIATES, INC.

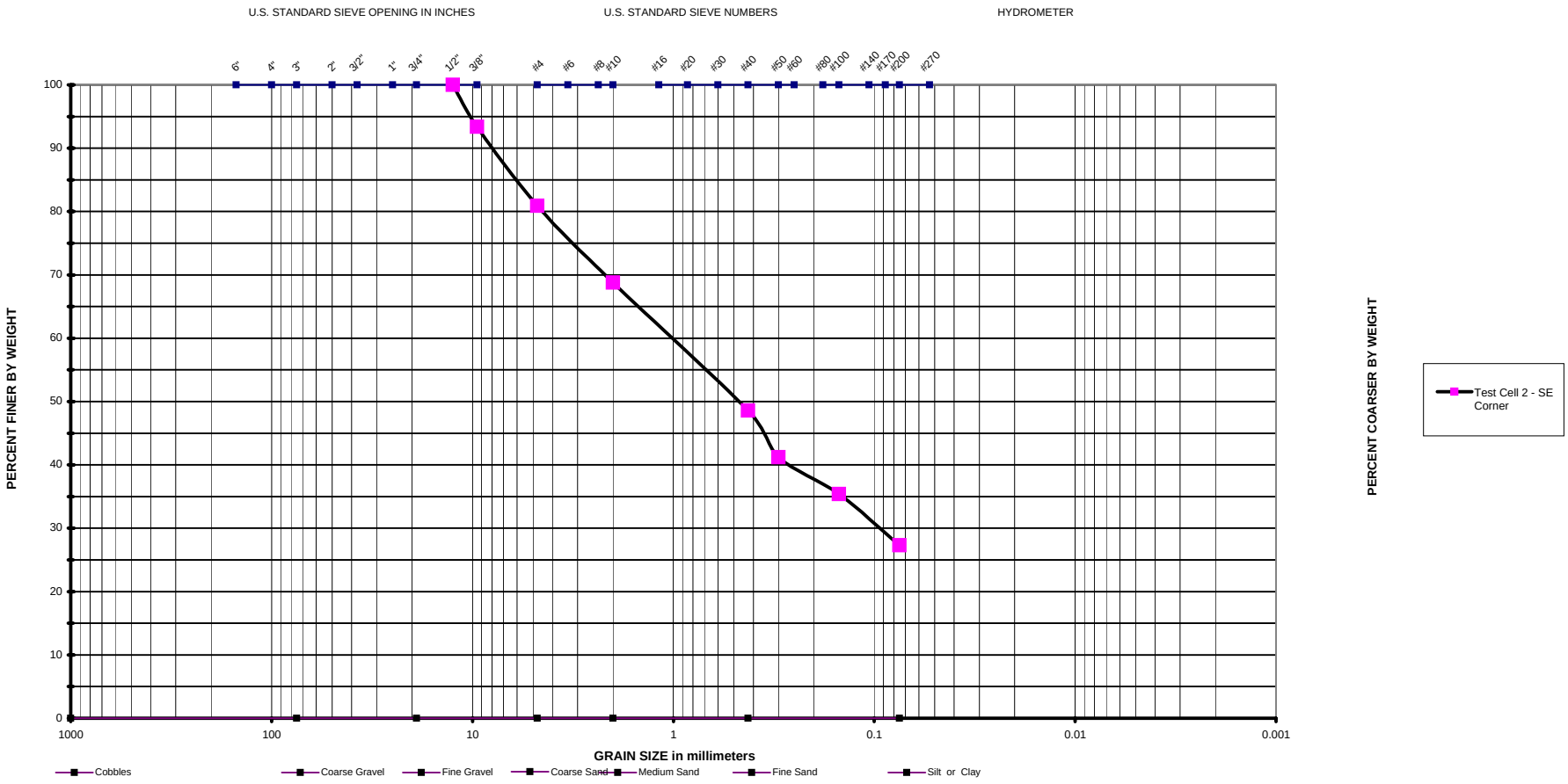


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/22/2007	N&A Project No.	05-06-0070-101
		Figure No.	3

No.	Sample Location	Classification	-200	w %	LL	PL	PI
3	Test Cell 2 - SE Corner	SM	29.2	16	-	-	-

NODARSE & ASSOCIATES, INC.

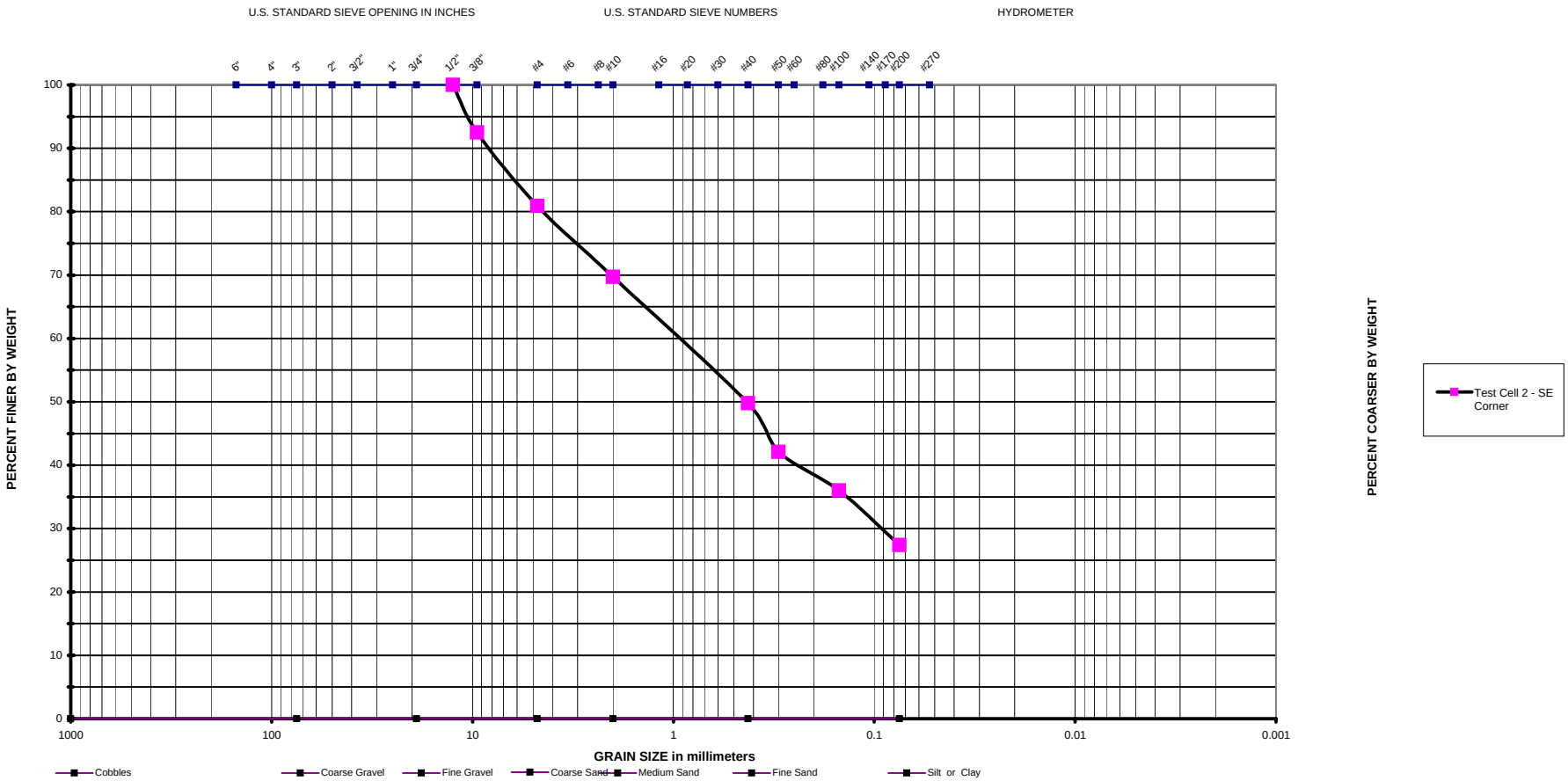


Grain-size Distribution Analysis

Project name:	EAA
Date: 1/22/2007	N&A Project No. 05-06-0070-101
	Figure No. 4

No.	Sample Location	Classification	-200	w %	LL	PL	PI
4	Test Cell 2 - SE Corner	SM	27.3	16	-	-	-

NODARSE & ASSOCIATES, INC.

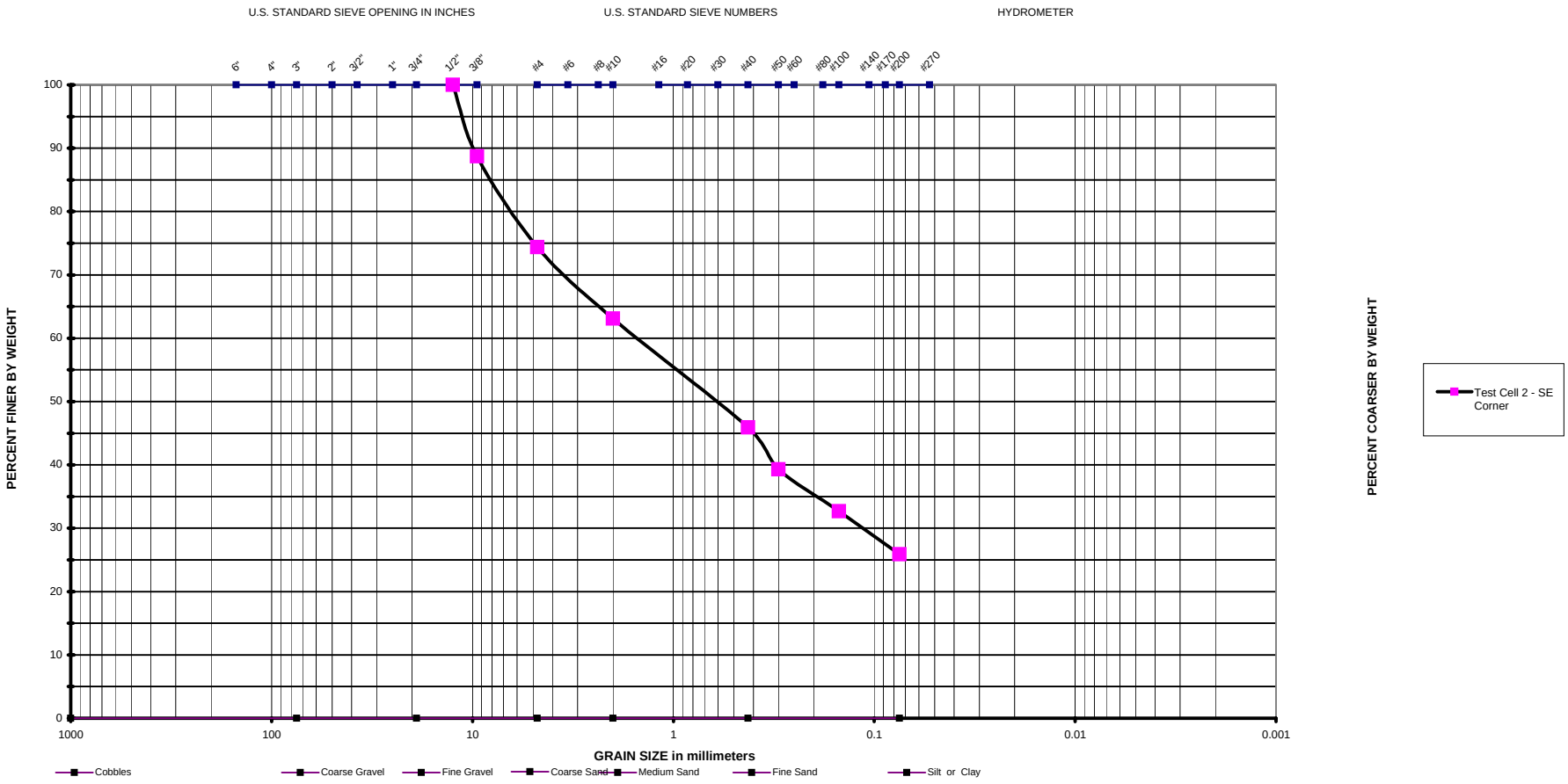


Grain-size Distribution Analysis

Project name:	EAA
Date: 1/22/2007	N&A Project No. 05-06-0070-101
	Figure No. 5

No.	Sample Location	Classification	-200	w %	LL	PL	PI
5	Test Cell 2 - SE Corner	SM	27.4	16	-	-	-

NODARSE & ASSOCIATES, INC.



Grain-size Distribution Analysis

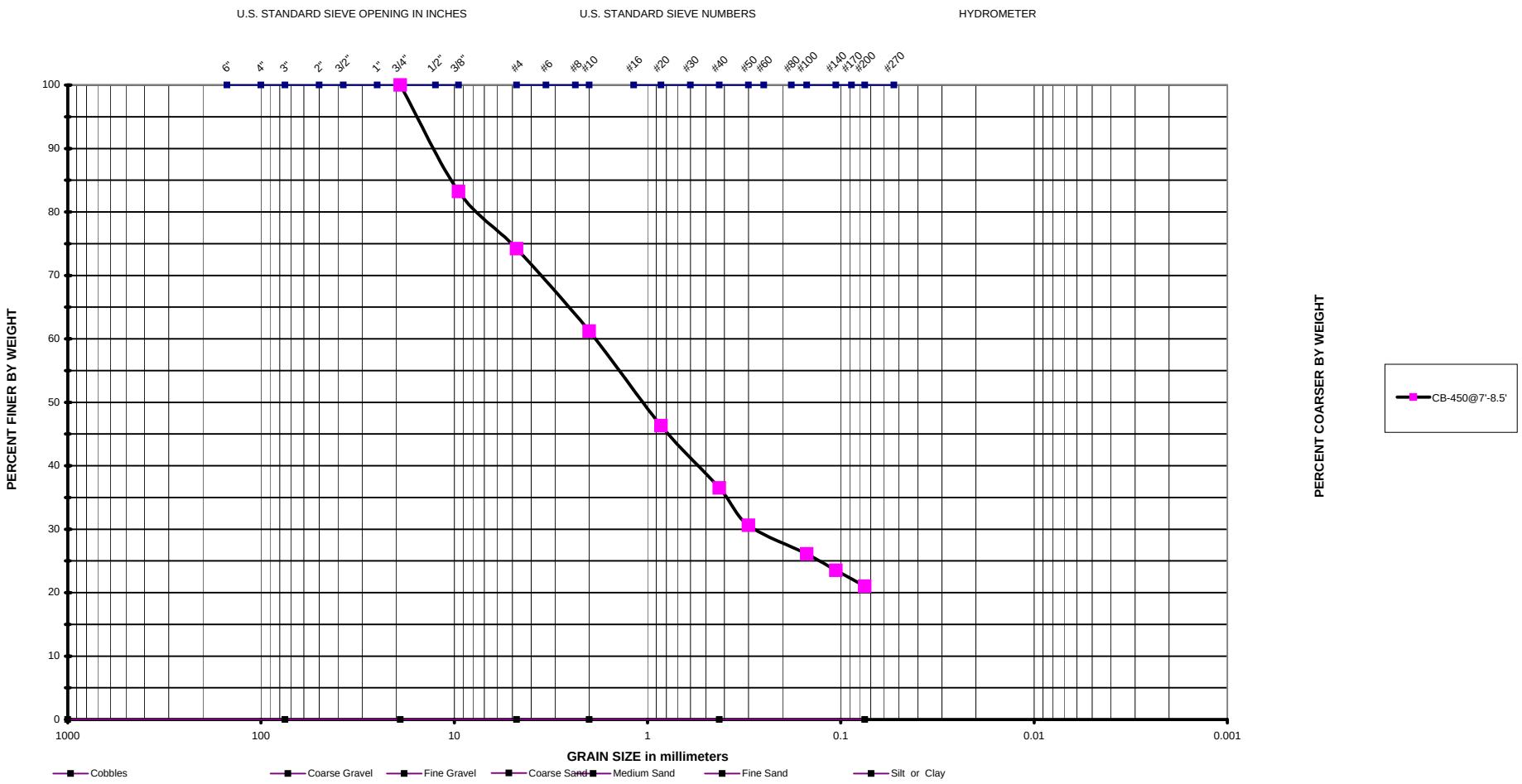
Project name:	EAA		
Date:	1/22/2007	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
6	Test Cell 2 - SE Corner	SM	25.9	16	-	-	-

NODARSE & ASSOCIATES, INC.

LABORATORY TEST RESULTS FOR
PROJECT NAME: EAA RESERVOIR A-1
PROJECT No: 05-06-0070-101
WORK ORDER NO.16, SUPPLEMENT 2
N&A

Boring No	Approximate Sample Depth (feet)	Passing Sieve Number (%)					Moisture Content (%)	Organic Content (%)	Atterberg Limits		AASHTO or U.S.C.S. Classification
		10	40	60	100	200			LL	PI	
CB-450	7.0′-8.5′	61	37	31	26	21	16	-	-	-	SM
CB-450	8.5′-10.0′	47	29	25	22	18	22	-	-	-	SM
CB-450	13.5′-15.0′	88	69	60	51	34	28	-	-	-	SM
CB-450	28.5′-30.0′	61	52	48	33	10	15	-	-	-	SP-SM
CB-451	11.5′-13.0′	53	25	18	14	10	16	-	-	-	SP-SM
CB-451	33.5′-35.0′	53	34	30	22	11	13	-	-	-	SP-SM
CB-452	6.0′-7.5′	46	25	20	16	12	14	-	-	-	SP-SM
CB-452	18.5′-20.0′	80	51	44	37	21	22	-	-	-	SM
CB-452	33.5′-35.0′	73	59	50	28	9	18	-	-	-	SP-SM
CB-452	48.5′-50.0′	87	45	30	18	8	16	-	-	-	SP-SM
CB-453	7.0′-8.5′	47	31	27	24	20	19	-	-	-	SM
CB-453	13.5′-15.0′	73	49	43	39	34	20	-	-	-	SM
CB-453	23.5′-25.0′	86	63	51	37	16	23	-	-	-	SM
CB-453	43.5′-45.0′	58	44	39	32	8	14	-	-	-	SP-SM
CB-462	12.0′-13.5′	-	-	-	-	-	21	-	33	9	-
CB-462	25.5′-27.0′	-	-	-	-	7	21	-	-	-	-
CB-462	27.0′-28.5′	-	-	-	-	8	16	-	-	-	-
CB-462	39.0′-40.5′	-	-	-	-	13	7	-	-	-	-
CB-462	43.5′-45.0′	-	-	-	-	18	7	-	-	-	-
CB-463	3.0′-4.5′	-	-	-	-	18	8	-	-	-	-
CB-463	15.0′-16.5′	-	-	-	-	27	16	-	-	-	-
CB-463	18.0′-19.5′	-	-	-	-	-	24	-	29	9	-
CB-463	22.5′-24.0′	-	-	-	-	26	33	-	-	-	-
CB-463	34.5′-36.0′	-	-	-	-	28	24	-	-	-	-

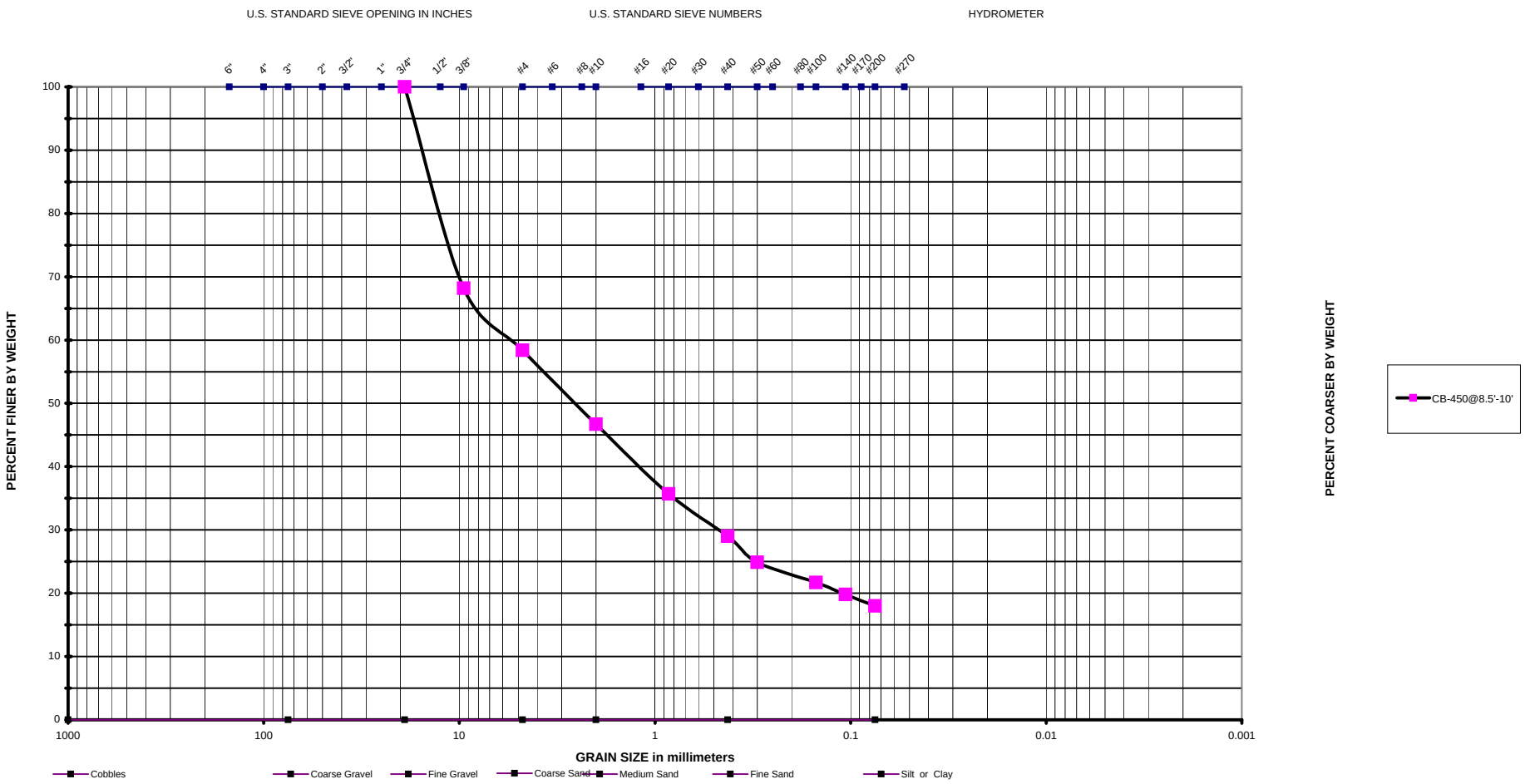


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	1

No.	Sample Location	Classification	-200	w %	LL	PL	PI
1	CB-450@7'-8.5'	SM	21	16	-	-	-

NODARSE & ASSOCIATES, INC.

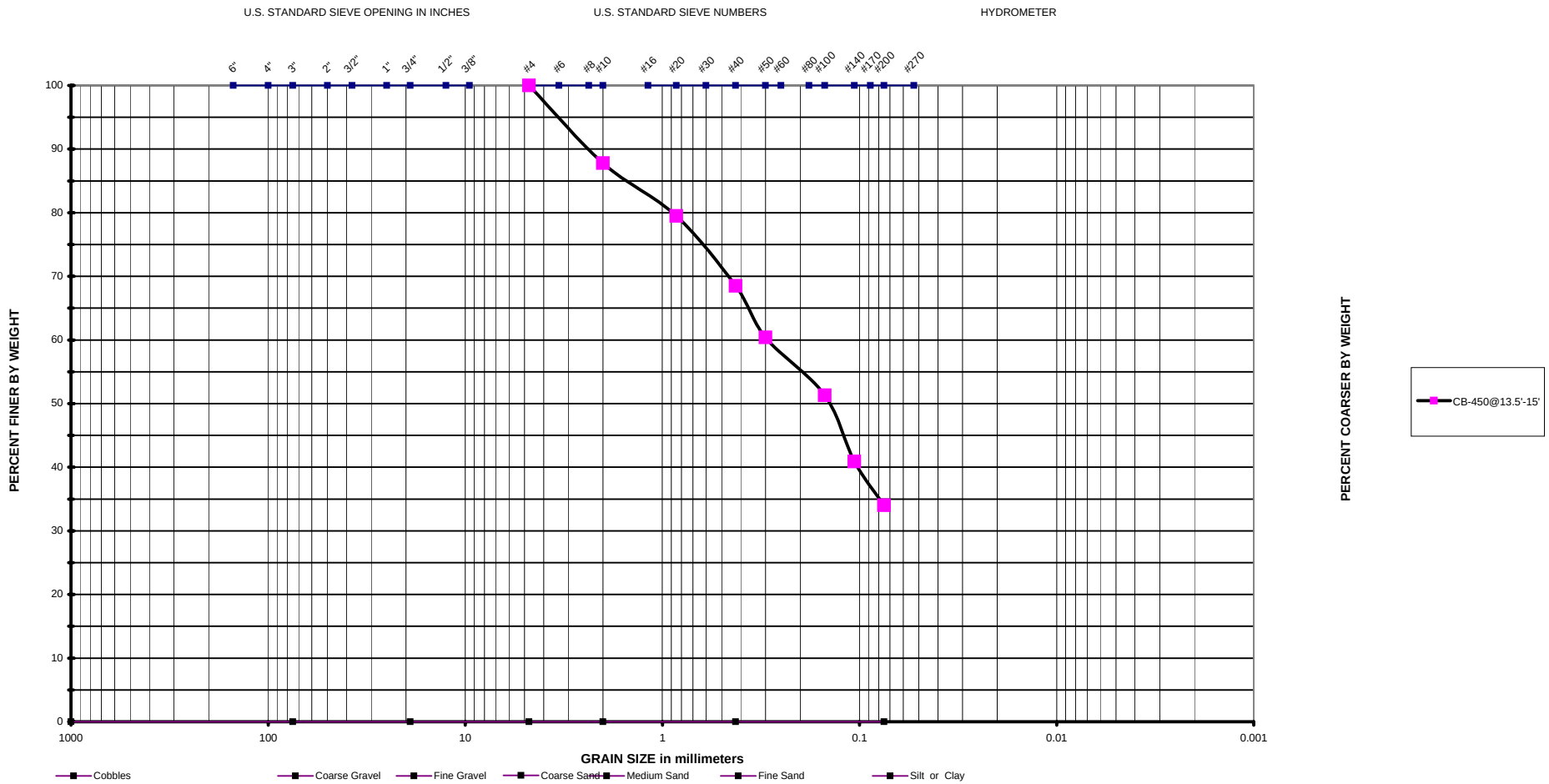


Grain-size Distribution Analysis

Project name:	EAA
Date: 1/29/2007	N&A Project No. 05-06-0070-101
	Figure No. 2

No.	Sample Location	Classification	-200	w %	LL	PL	PI
2	CB-450@8.5'-10'	SM	18	22	-	-	-

NODARSE & ASSOCIATES, INC.

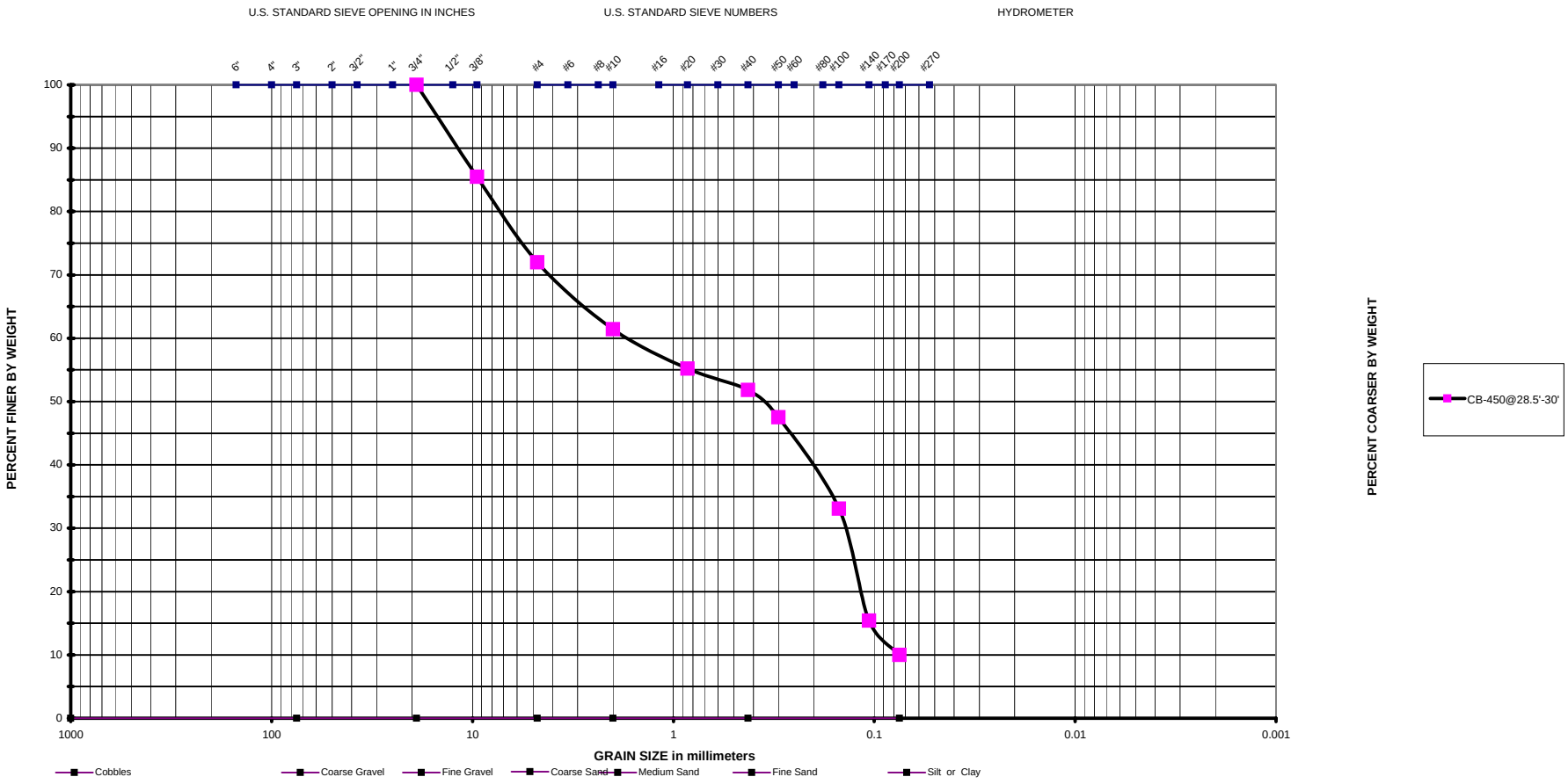


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	3

No.	Sample Location	Classification	-200	w %	LL	PL	PI
3	CB-450@13.5'-15'	SM	34	28	-	-	-

NODARSE & ASSOCIATES, INC.

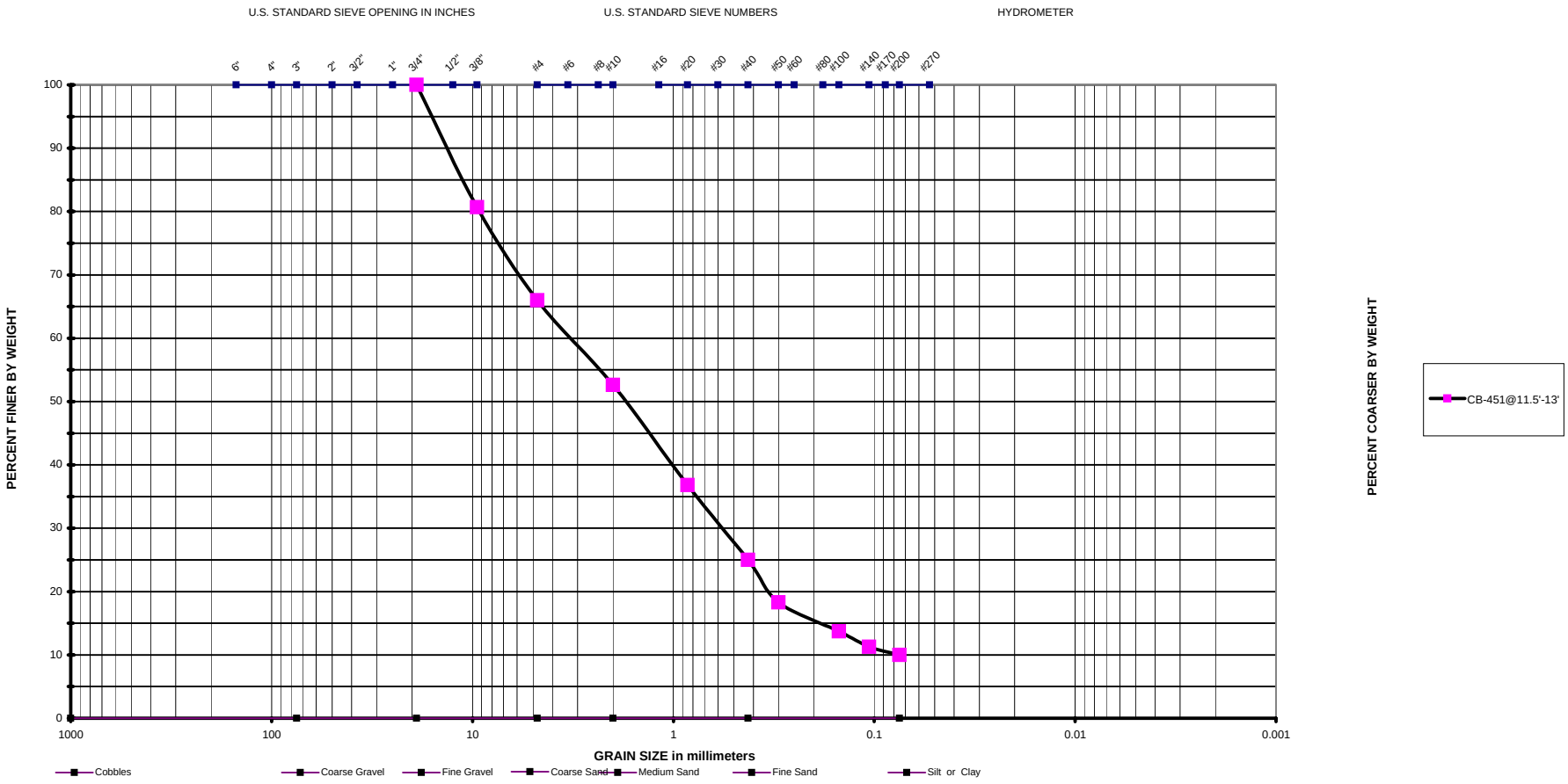


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	4

No.	Sample Location	Classification	-200	w %	LL	PL	PI
4	CB-450@28.5'-30'	SP-SM	10	15	-	-	-

NODARSE & ASSOCIATES, INC.

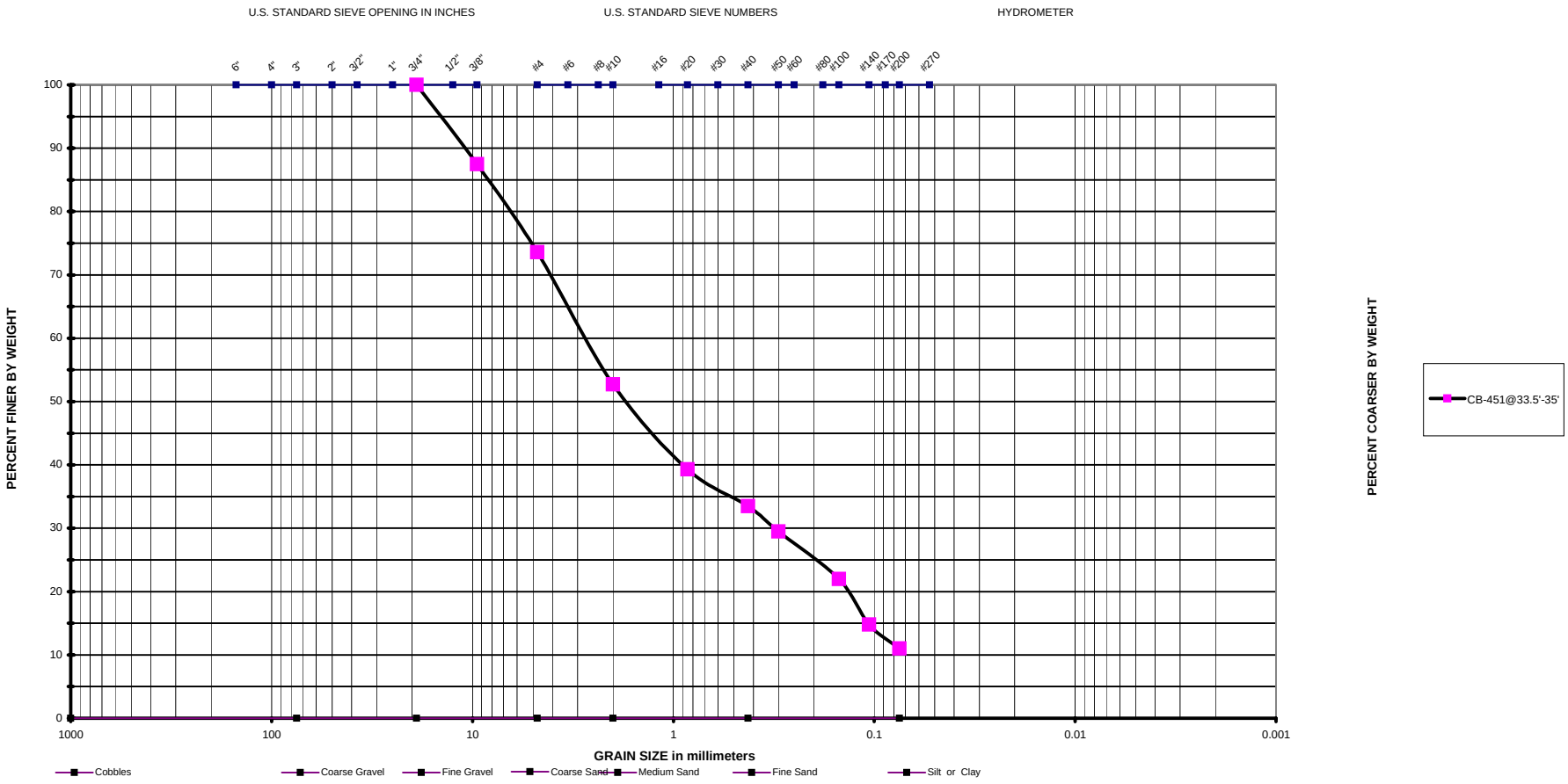


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	5

No.	Sample Location	Classification	-200	w %	LL	PL	PI
5	CB-451@11.5'-13'	SP-SM	10	16	-	-	-

NODARSE & ASSOCIATES, INC.

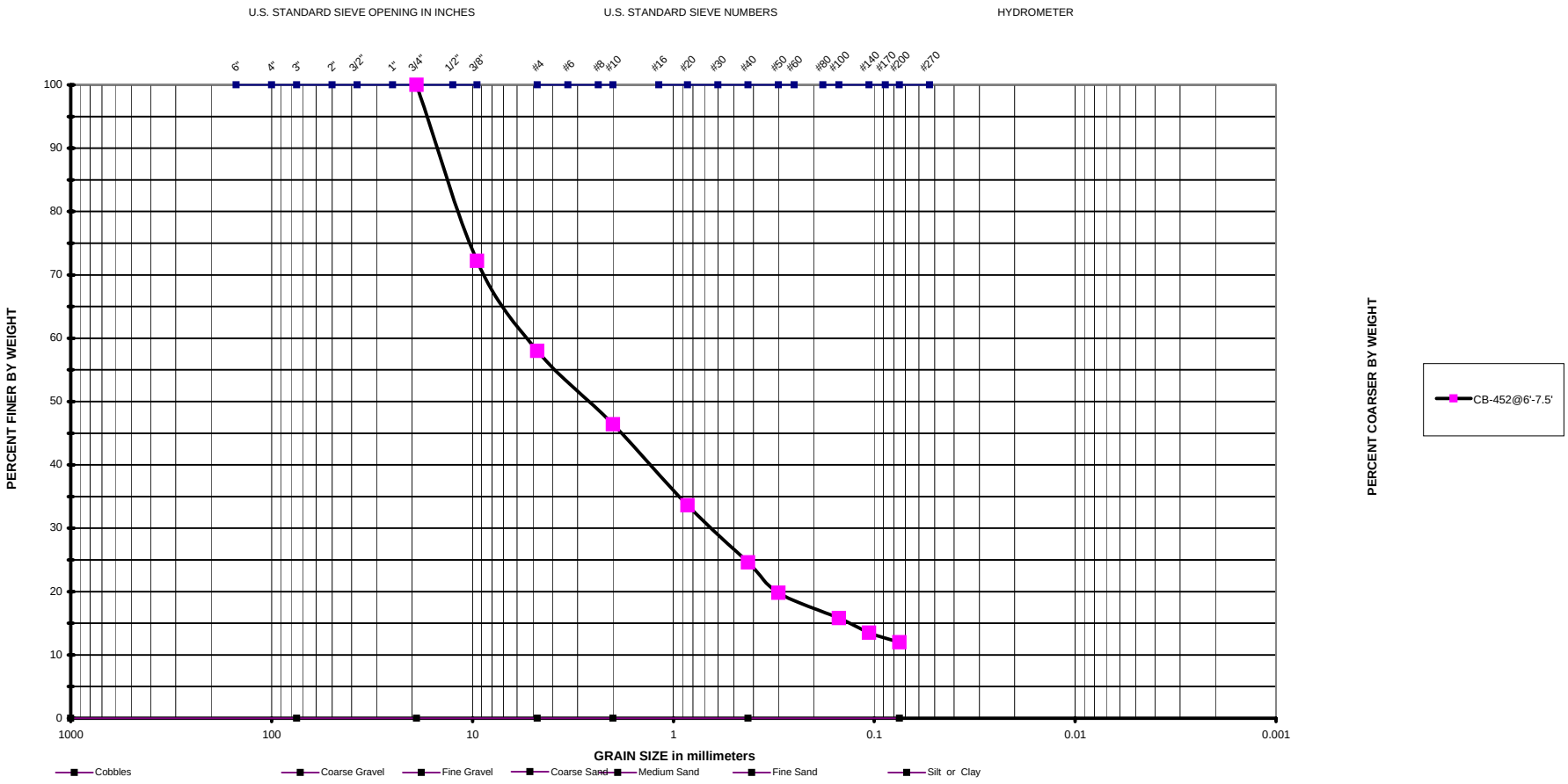


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	6

No.	Sample Location	Classification	-200	w %	LL	PL	PI
6	CB-451@33.5'-35'	SP-SM	11	13	-	-	-

NODARSE & ASSOCIATES, INC.

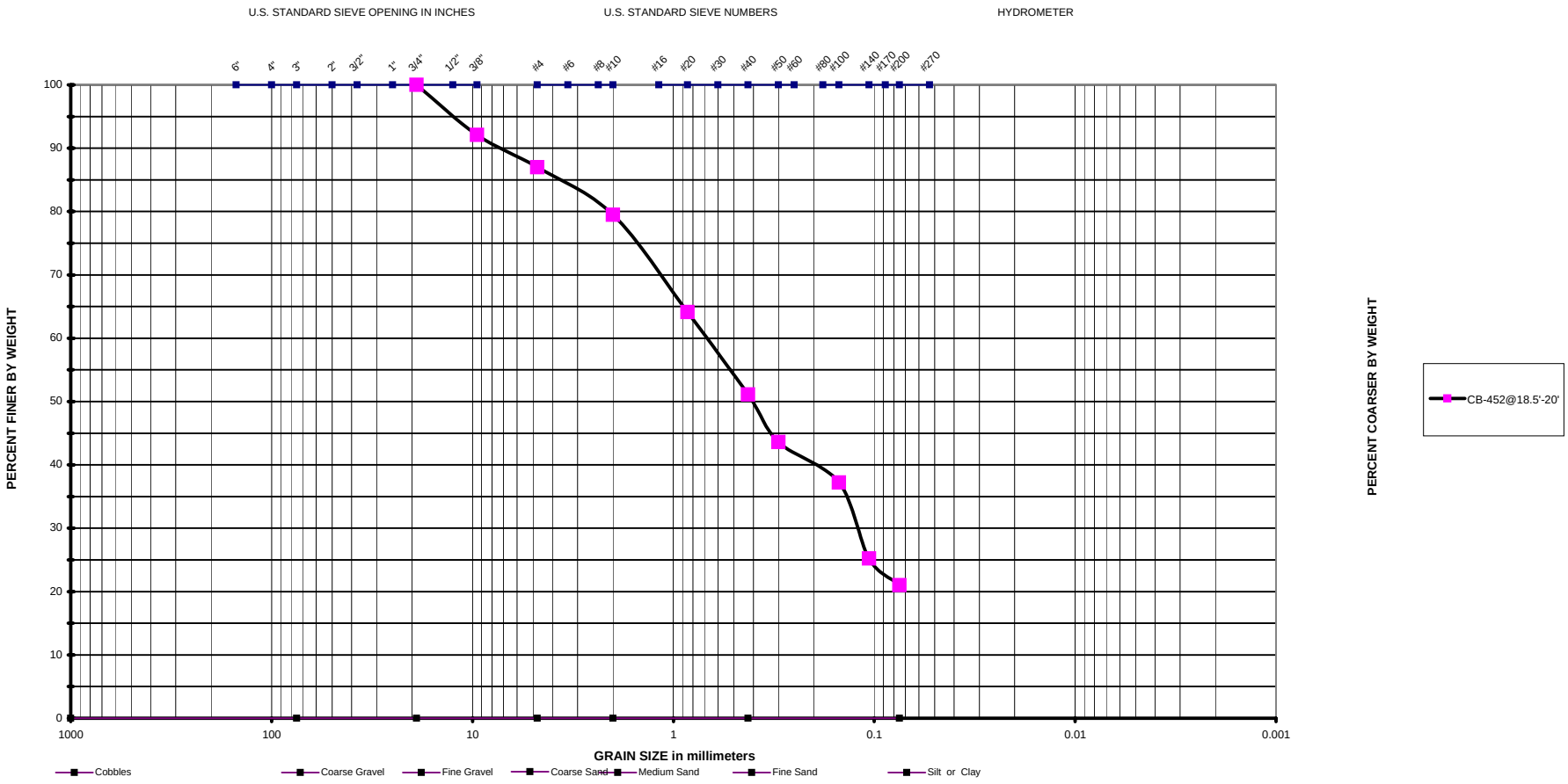


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	7

No.	Sample Location	Classification	-200	w %	LL	PL	PI
7	CB-452@6'-7.5'	SP-SM	12	14	-	-	-

NODARSE & ASSOCIATES, INC.

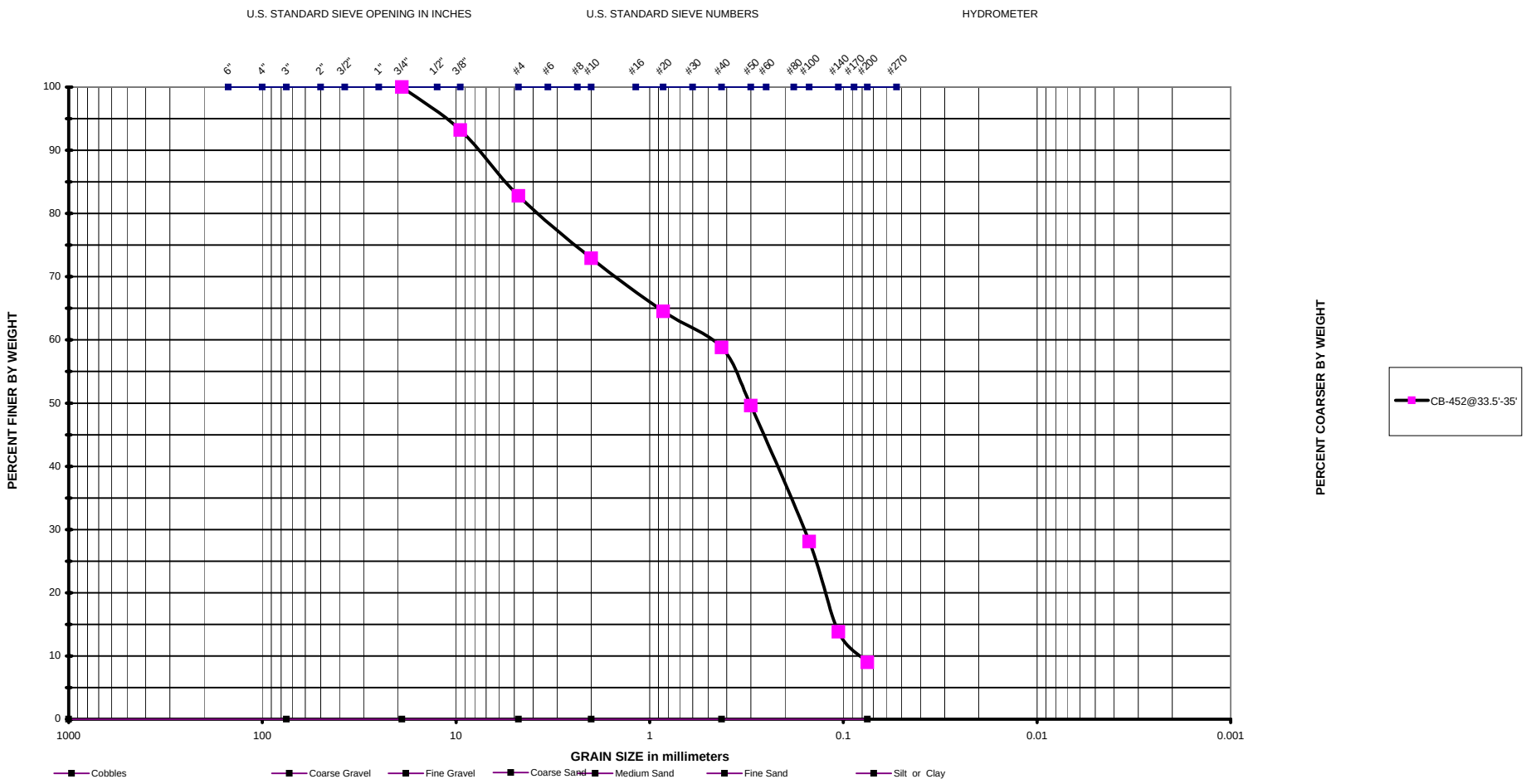


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	8

No.	Sample Location	Classification	-200	w %	LL	PL	PI
8	CB-452@18.5'-20'	SM	21	22	-	-	-

NODARSE & ASSOCIATES, INC.

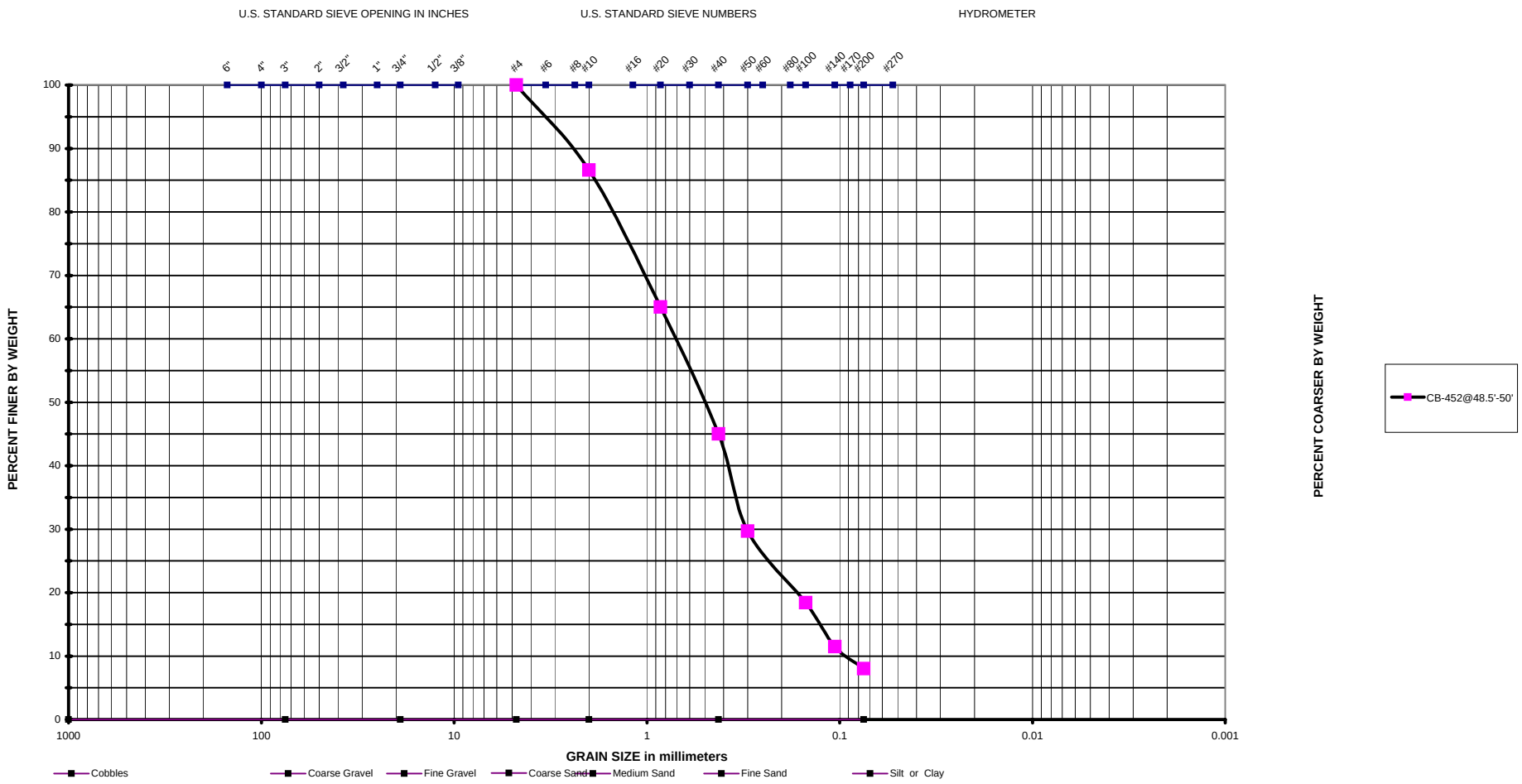


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	9

No.	Sample Location	Classification	-200	w %	LL	PL	PI
9	CB-452@33.5'-35'	SP-SM	9	18	-	-	-

NODARSE & ASSOCIATES, INC.

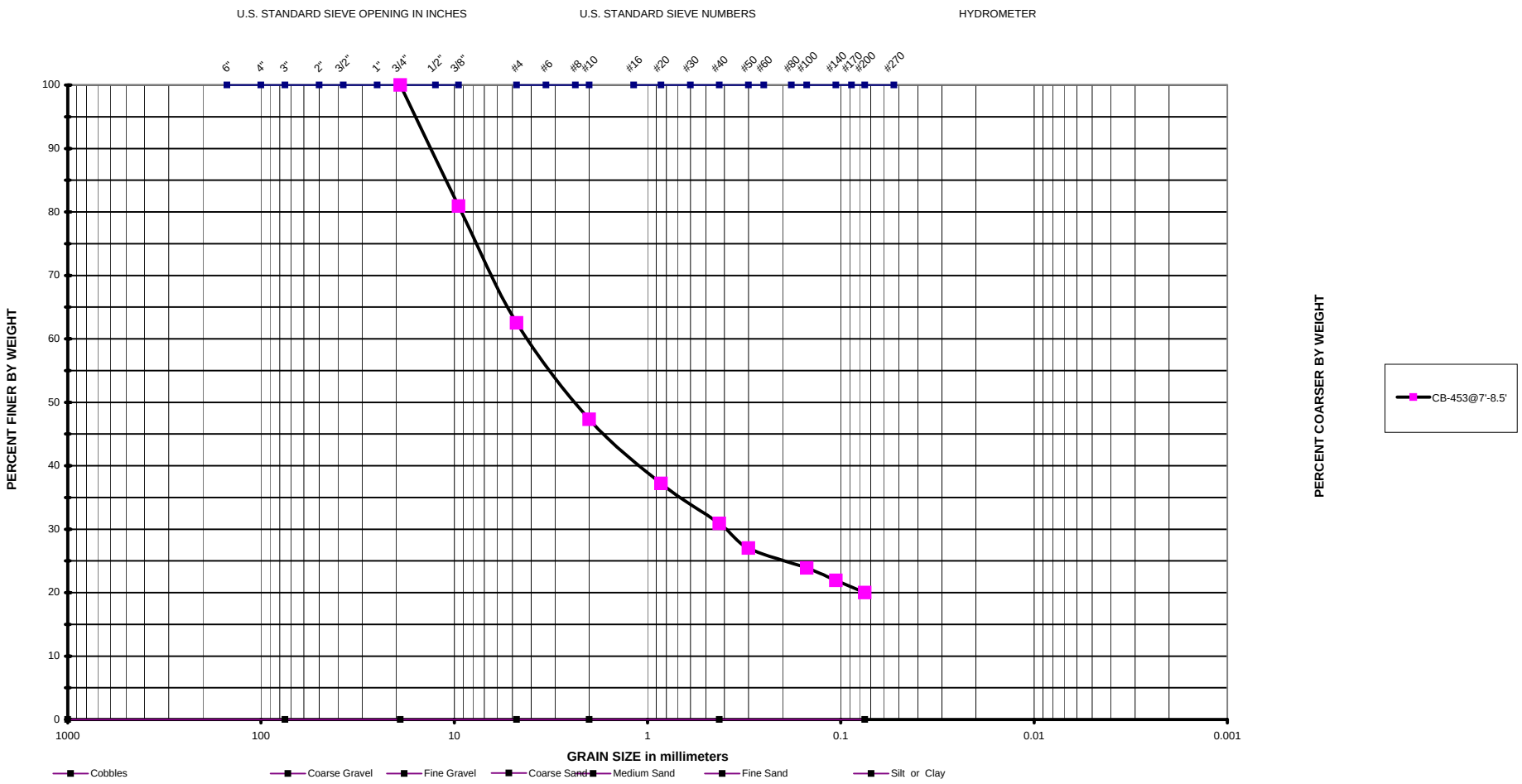


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	10

No.	Sample Location	Classification	-200	w %	LL	PL	PI
10	CB-452@48.5'-50'	SP-SM	8	16	-	-	-

NODARSE & ASSOCIATES, INC.

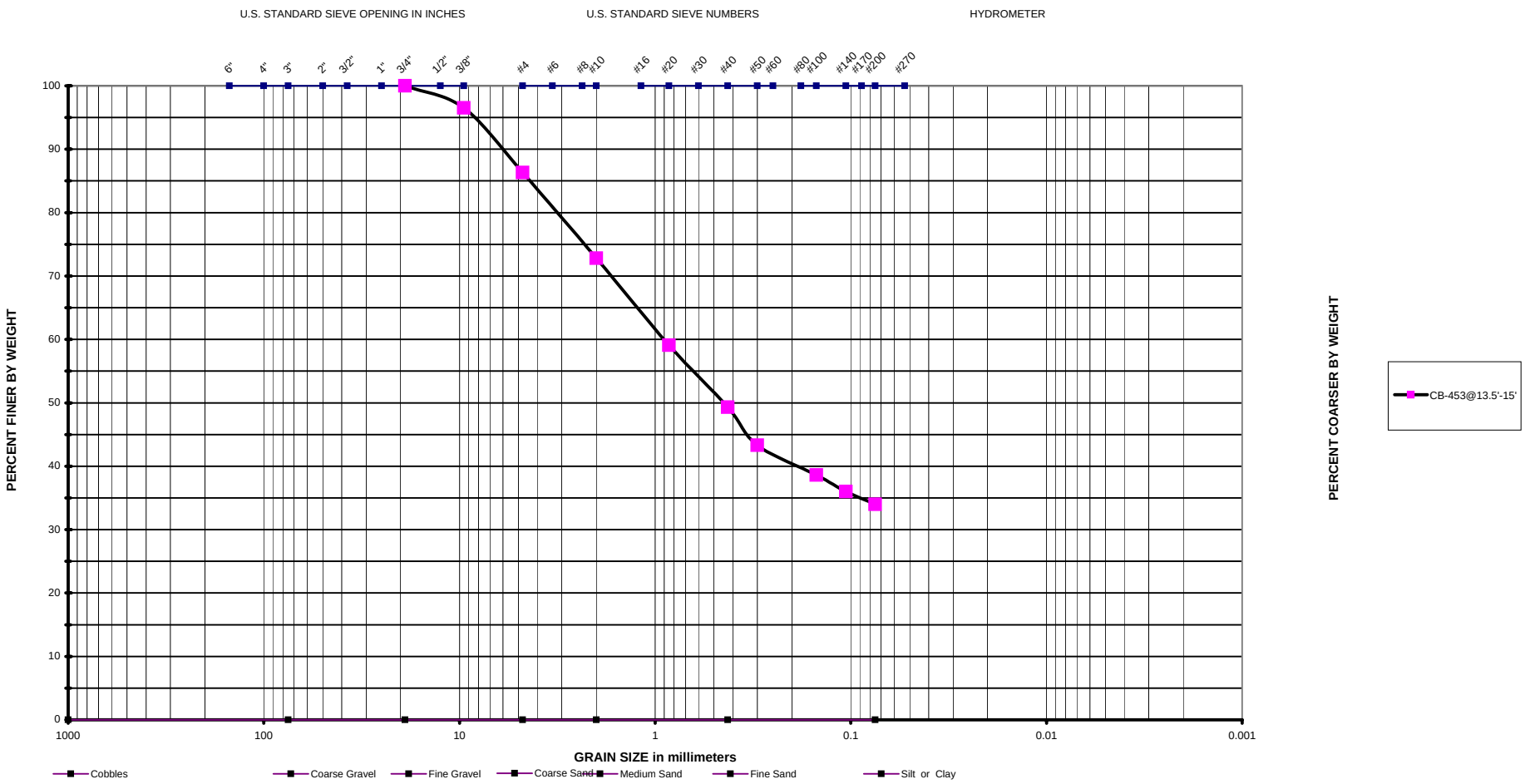


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	11

No.	Sample Location	Classification	-200	w %	LL	PL	PI
1	CB-453@7'-8.5'	SM	20	19	-	-	-

NODARSE & ASSOCIATES, INC.

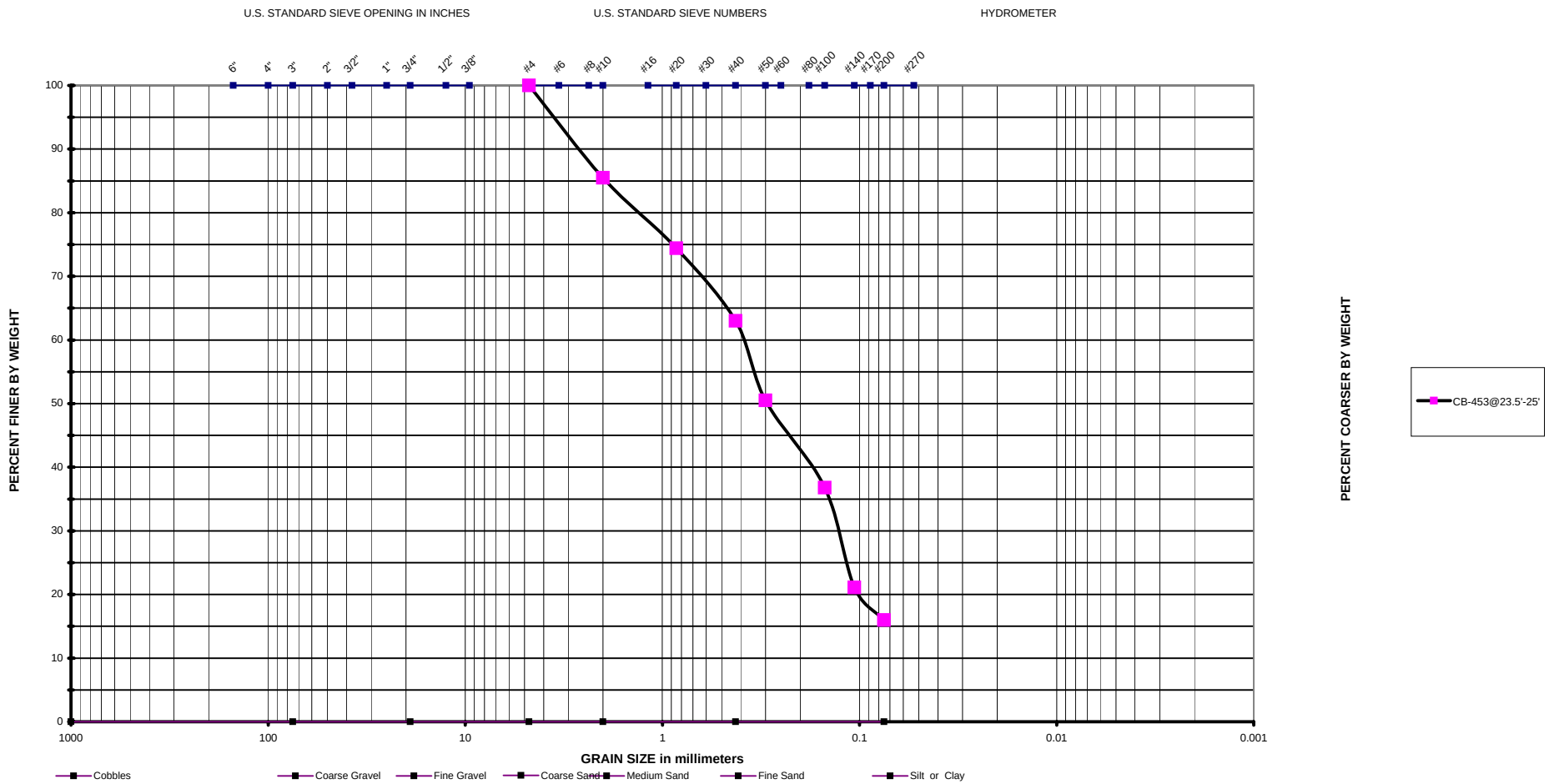


Grain-size Distribution Analysis

Project name:	EAA
Date: 1/29/2007	N&A Project No. 05-06-0070-101
	Figure No. 12

No.	Sample Location	Classification	-200	w %	LL	PL	PI
2	CB-453@13.5'-15'	SM	34	20	-	-	-

NODARSE & ASSOCIATES, INC.

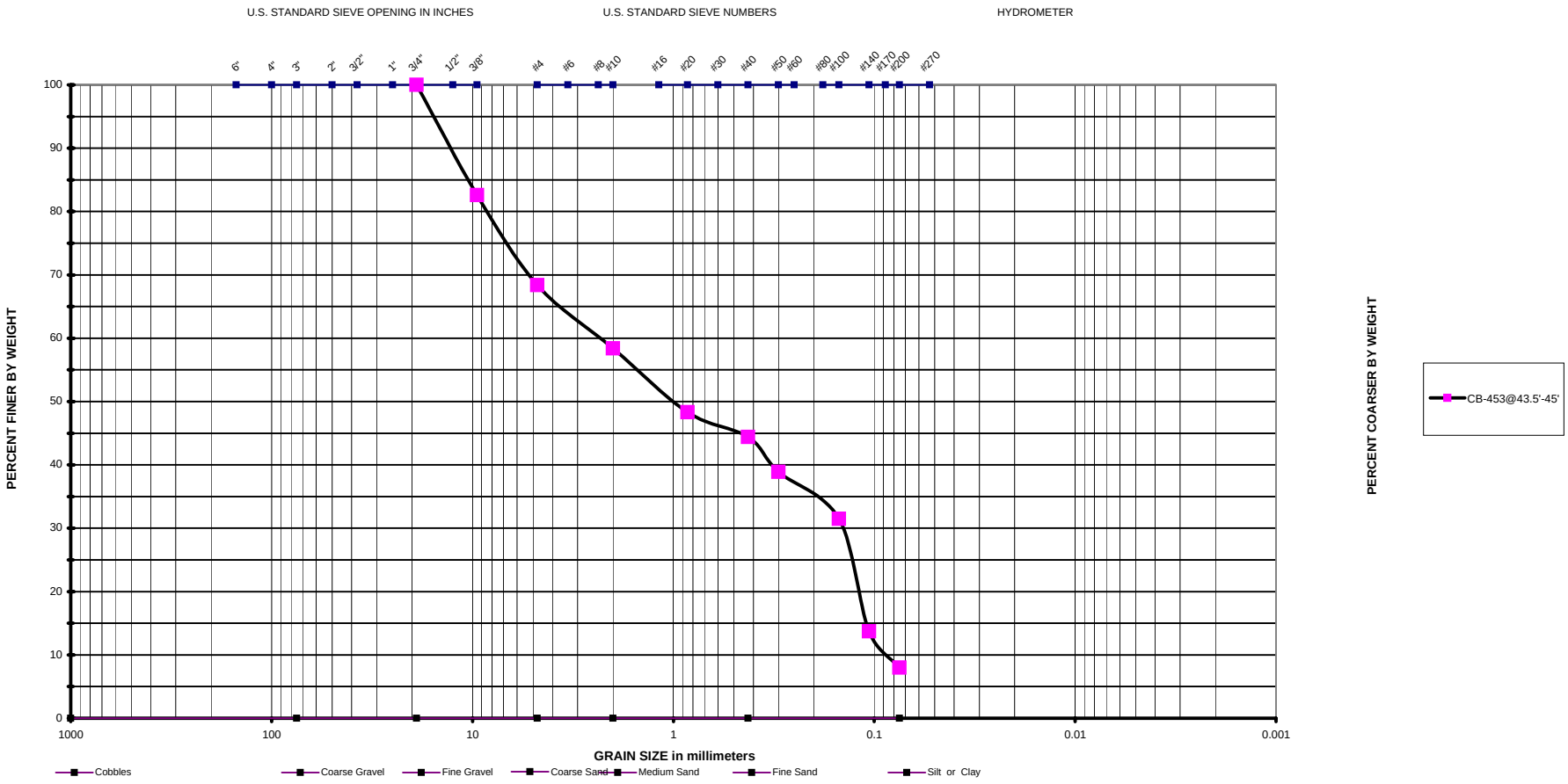


Grain-size Distribution Analysis

Project name:	EAA		
Date:	1/29/2007	N&A Project No.	05-06-0070-101
		Figure No.	13

No.	Sample Location	Classification	-200	w %	LL	PL	PI
3	CB-453@23.5'-25'	SM	16	23	-	-	-

NODARSE & ASSOCIATES, INC.



Grain-size Distribution Analysis

Project name:	EAA
Date: 1/29/2007	N&A Project No. 05-06-0070-101
	Figure No. 14

No.	Sample Location	Classification	-200	w %	LL	PL	PI
4	CB-453@43.5'-45'	SP-SM	8	14	-	-	-

NODARSE & ASSOCIATES, INC.

LIMESTONE UNCONFINED COMPRESSION STRENGTH TEST RESULTS

Boring Location	Depth (ft)	Length (inch)	Diameter (inch)	L/D Ratio	Area (sq. inch)	Maximum Load (lbs)	Strength (psi)
CB-0440	25.0′-30.0′	5.15	2.39	2.15	4.49	22180	4940
CB-0441	26.9′-31.9′	5.04	2.39	2.10	4.49	19180	4270
CB-0443	23.8′-28.8′	5.10	2.39	2.13	4.49	16280	3630