Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	LDW ENR/AC Pilot Study Year 1	**Date Received:**	July 6, 2018
Project #:	18S140-02	**Sampled By:**	Client
Client :	Wood	**Date Reported:**	July 31, 2018
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Twelve samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The samples were run in a single batch and one sample from this job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. One sample did not contain the required amount of fines for the pipete portion of the analylsis. The sample could not be resplit to obtain the required amount of fines and stay within the capacity of the balance.
4. The data is provided in summary tables and plots.
5. There were no other noted anomalies in this project.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: LDW ENR/AC Pilot Study Year 1
Project #: 18S140-02
Date Received: July 6, 2018
Date Tested: July 27, 2018

Client: Wood
Sampled by: Client
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
LDW-Y1-IN-ENR-CA-CORE	100.0	99.7	77.9	58.9	34.6	13.0	6.5	4.3	2.4	1.6	0.8	0.5	0.3	0.2
	100.0	100.0	79.4	61.3	35.8	13.5	6.7	4.6	2.9	1.7	0.9	0.5	0.3	0.2
	100.0	100.0	78.6	59.4	34.1	12.3	6.0	3.9	2.0	1.0	0.5	0.4	0.3	0.2
LDW-Y1-IN-ENR-CB-CORE	100.0	99.7	70.6	53.0	30.7	12.6	7.7	5.9	4.3	2.6	1.4	0.8	0.4	0.3
LDW-Y1-IN-ENR-CC-CORE	100.0	99.7	71.5	51.9	30.2	13.8	8.9	6.3	6.0	3.4	1.7	1.0	0.5	0.4
LDW-Y1-IN-ENR+AC-CA-CORE	100.0	99.9	64.5	46.2	24.2	9.8	5.4	2.9	<2.9	<2.9	<2.9	<2.9	<2.9	<2.9
LDW-Y1-IN-ENR+AC-CB-CORE	100.0	100.0	65.4	44.5	22.4	7.8	4.7	3.3	2.1	1.3	0.8	0.5	0.3	0.3
LDW-Y1-IN-ENR+AC-CC-CORE	100.0	99.9	69.3	50.7	25.3	9.2	5.6	3.5	2.0	1.2	0.7	0.4	0.3	0.2
LDW-Y1-SC-ENR-CA-CORE	100.0	99.9	71.3	51.2	30.2	14.9	10.8	8.8	6.3	4.5	2.7	1.6	1.2	0.9
LDW-Y1-SC-ENR-CB-CORE	100.0	99.8	58.3	39.0	20.9	10.6	8.0	6.7	4.9	3.4	2.1	1.3	1.0	0.8
LDW-Y1-SC-ENR-CC-CORE	100.0	99.6	67.0	46.9	28.1	15.2	11.5	9.3	7.5	4.8	2.8	1.6	1.1	0.9
LDW-Y1-SC-ENR+AC-CA-CORE	100.0	100.0	73.6	55.0	29.2	11.0	6.9	5.8	4.4	3.4	2.2	1.3	1.0	0.8
LDW-Y1-SC-ENR+AC-CB-CORE	100.0	100.0	65.4	46.4	25.8	10.4	6.6	5.3	3.6	2.6	1.7	1.1	0.9	0.8
LDW-Y1-SC-ENR+AC-CC-CORE	100.0	99.7	64.5	46.6	24.9	9.5	5.3	4.2	3.0	2.3	1.5	1.0	0.8	0.7

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: LDW ENR/AC Pilot Study Year 1
Project #: 18S140-02
Date Received: July 6, 2018
Date Tested: July 27, 2018

Client: Wood
Sampled by: Client
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
LDW-Y1-IN-ENR-CA-CORE	22.1	19.0	24.3	21.6	6.5	2.2	1.9	0.8	0.8	0.4	0.2	0.1	0.2	4.3
	20.6	18.1	25.5	22.3	6.7	2.1	1.7	1.2	0.8	0.4	0.3	0.1	0.2	4.6
	21.4	19.2	25.2	21.8	6.4	2.1	1.9	0.9	0.5	0.2	0.0	0.1	0.2	3.9
LDW-Y1-IN-ENR-CB-CORE	29.4	17.7	22.2	18.1	4.9	1.8	1.6	1.6	1.3	0.6	0.4	0.2	0.3	5.9
LDW-Y1-IN-ENR-CC-CORE	28.5	19.6	21.8	16.3	4.9	2.6	0.3	2.6	1.7	0.7	0.4	0.1	0.4	6.3
LDW-Y1-IN-ENR+AC-CA-CORE	35.5	18.4	22.0	14.4	4.4	2.5	<2.9	<2.9	<2.9	<2.9	<2.9	<2.9	<2.9	2.9
LDW-Y1-IN-ENR+AC-CB-CORE	34.6	20.9	22.2	14.6	3.1	1.4	1.2	0.8	0.5	0.3	0.2	0.1	0.3	3.3
LDW-Y1-IN-ENR+AC-CC-CORE	30.7	18.5	25.5	16.1	3.6	2.1	1.6	0.8	0.5	0.3	0.1	0.1	0.2	3.5
LDW-Y1-SC-ENR-CA-CORE	28.7	20.2	21.0	15.3	4.2	2.0	2.4	1.9	1.8	1.1	0.4	0.3	0.9	8.8
LDW-Y1-SC-ENR-CB-CORE	41.7	19.3	18.0	10.3	2.6	1.3	1.8	1.4	1.3	0.8	0.3	0.1	0.8	6.7
LDW-Y1-SC-ENR-CC-CORE	33.0	20.2	18.8	12.9	3.7	2.3	1.8	2.6	2.1	1.2	0.4	0.3	0.9	9.3
LDW-Y1-SC-ENR+AC-CA-CORE	26.4	18.6	25.7	18.2	4.1	1.1	1.4	1.0	1.2	0.8	0.3	0.2	0.8	5.8
LDW-Y1-SC-ENR+AC-CB-CORE	34.6	19.1	20.5	15.4	3.8	1.3	1.7	1.0	0.9	0.6	0.2	0.1	0.8	5.3
LDW-Y1-SC-ENR+AC-CC-CORE	35.5	17.9	21.7	15.5	4.1	1.1	1.2	0.7	0.8	0.5	0.2	0.2	0.7	4.2

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: LDW ENR/AC Pilot Study Year 1
Project #: 18S140-02
Date Received: July 6, 2018
Date Tested: July 27, 2018

Client: Wood
Sampled by: Client
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
LDW-Y1-IN-ENR-CA-CORE	100.0	99.7	77.9	58.9	34.6	13.0	6.5	4.3	2.4	1.6	0.8	0.5	0.3	0.2
	100.0	100.0	79.4	61.3	35.8	13.5	6.7	4.6	2.9	1.7	0.9	0.5	0.3	0.2
	100.0	100.0	78.6	59.4	34.1	12.3	6.0	3.9	2.0	1.0	0.5	0.4	0.3	0.2
AVE	100.0	99.9	78.7	59.9	34.9	12.9	6.4	4.3	2.4	1.4	0.8	0.4	0.3	0.2
STDEV	0.0	0.1	0.6	1.1	0.7	0.5	0.3	0.3	0.4	0.3	0.2	0.1	0.0	0.0
%RSD	0.0	0.1	0.8	1.8	2.0	3.6	4.9	6.6	15.6	19.6	22.2	15.6	8.8	11.7

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
LDW-Y1-IN-ENR-CA-CORE	7/6/2018	7/23/2018	7/27/2018	101.1		6.6
	7/6/2018	7/23/2018	7/27/2018	101.2		6.9
	7/6/2018	7/23/2018	7/27/2018	101.4		5.9
LDW-Y1-IN-ENR-CB-CORE	7/6/2018	7/23/2018	7/27/2018	100.9		9.0
LDW-Y1-IN-ENR-CC-CORE	7/6/2018	7/23/2018	7/27/2018	99.5		9.4
LDW-Y1-IN-ENR+AC-CA-CORE	7/6/2018	7/23/2018	7/27/2018	100.8	SS	4.3
LDW-Y1-IN-ENR+AC-CB-CORE	7/6/2018	7/23/2018	7/27/2018	100.8		5.1
LDW-Y1-IN-ENR+AC-CC-CORE	7/6/2018	7/23/2018	7/27/2018	101.1		5.3
LDW-Y1-SC-ENR-CA-CORE	7/6/2018	7/23/2018	7/27/2018	101.6		13.3
LDW-Y1-SC-ENR-CB-CORE	7/6/2018	7/23/2018	7/27/2018	101.4		9.9
LDW-Y1-SC-ENR-CC-CORE	7/6/2018	7/23/2018	7/27/2018	101.8		14.6
LDW-Y1-SC-ENR+AC-CA-CORE	7/6/2018	7/23/2018	7/27/2018	101.0		8.4
LDW-Y1-SC-ENR+AC-CB-CORE	7/6/2018	7/23/2018	7/27/2018	101.5		7.8
LDW-Y1-SC-ENR+AC-CC-CORE	7/6/2018	7/23/2018	7/27/2018	100.8		6.3

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	LDW ENR/AC Pilot Study Year 1	**Date Received:**	July 6, 2018
Project #:	18S140-02	**Sampled By:**	Client
Client :	Wood	**Date Tested:**	July 31, 2018
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

Data Qualifiers

PSEP Grain Size Analysis

SM - The sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations.

SS - The sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis.

W - The weight of the sample in some pipette aliquots was below the level required for accurate weighing.

F - The samples were frozen prior to particle size determination.

LV - Due to low sample volume provided, the samples could not be rerun to meet QA requirements.

Reviewed by: _____

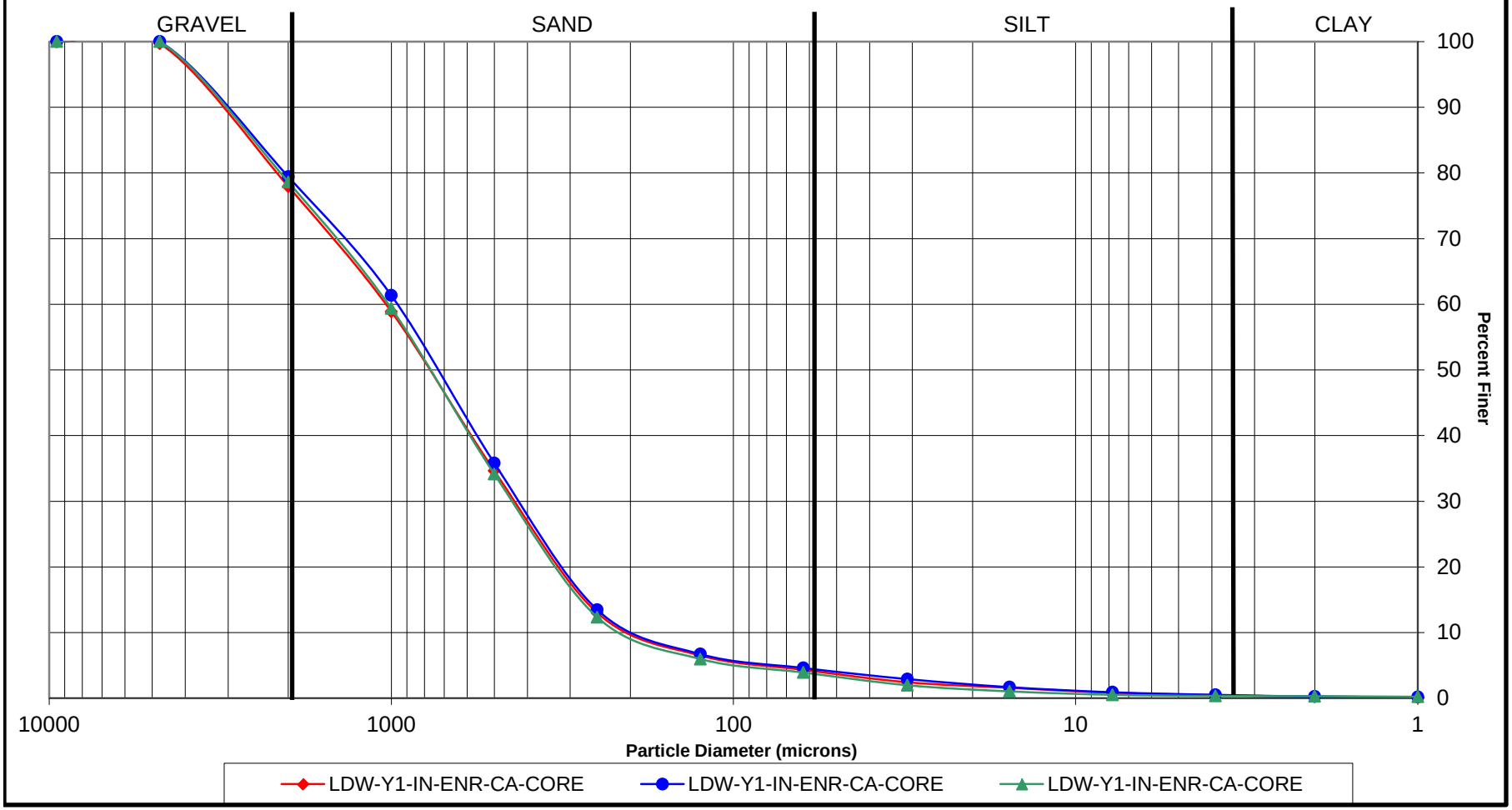
Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

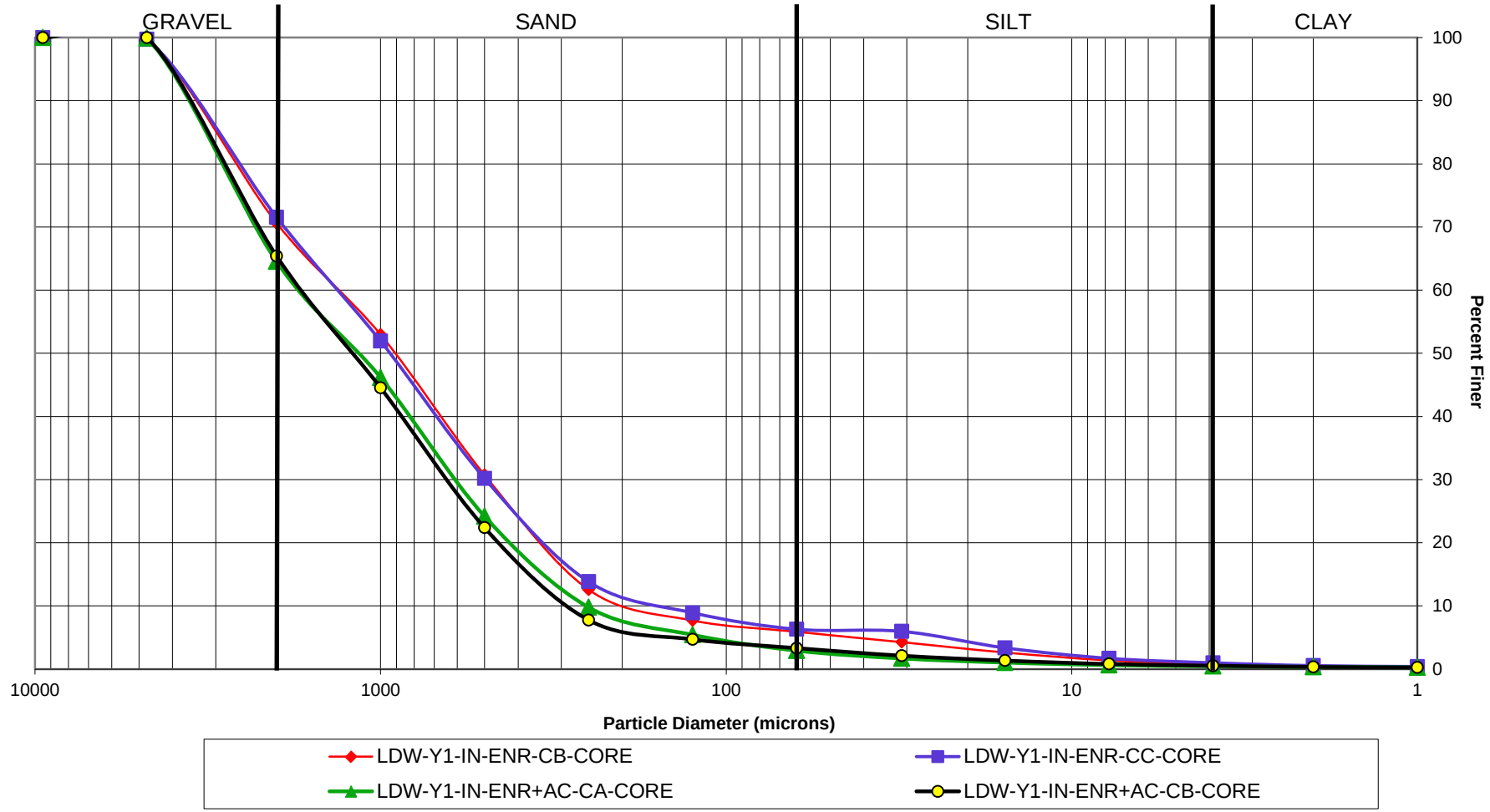
Visit our website: www.mtc-inc.net

PSEP Grain Size Distribution

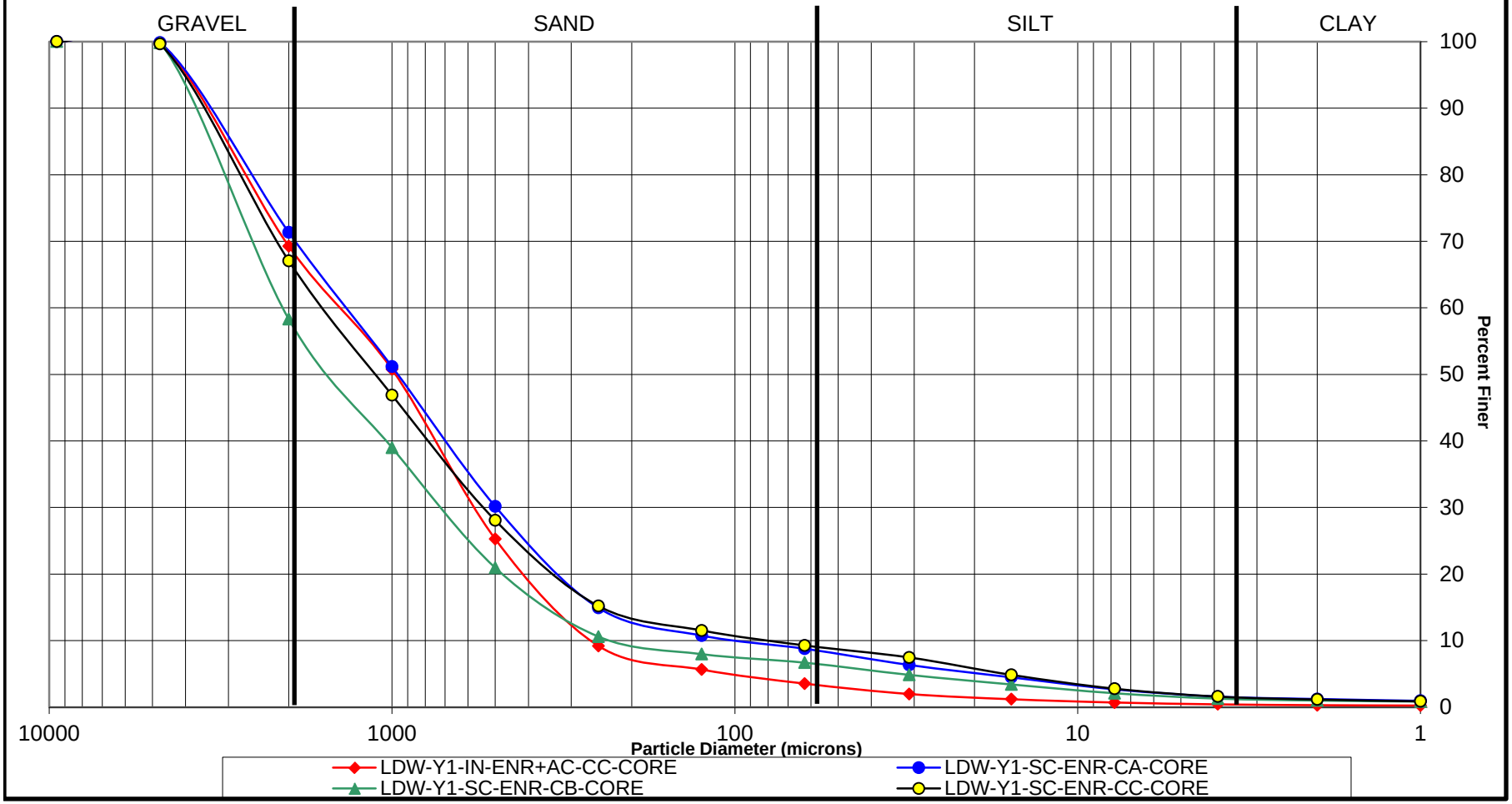
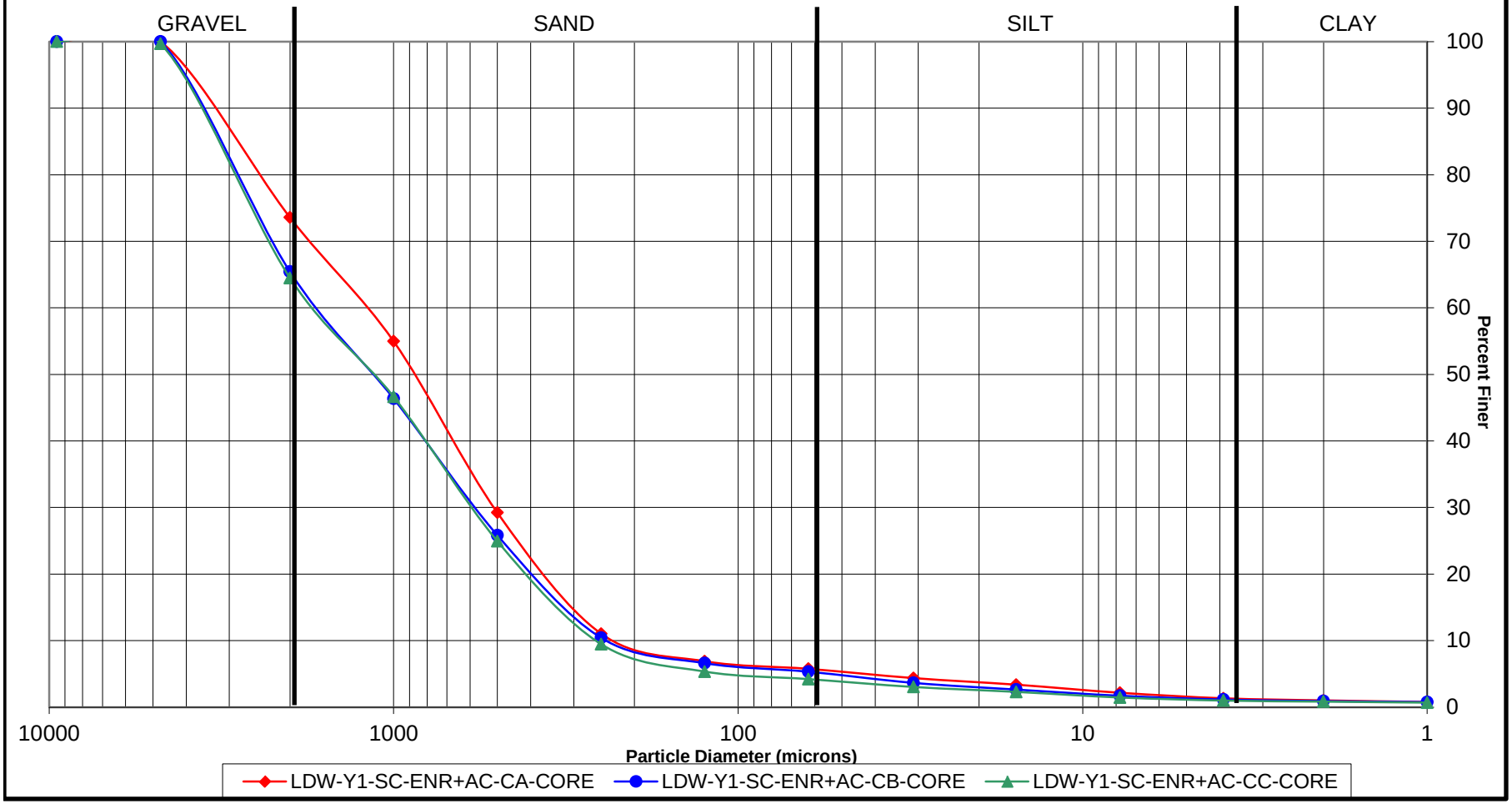
Triplicate Sample Plot



PSEP Grain Size Distribution



PSEP Grain Size Distribution



PSEP Grain Size Distribution