

APPENDIX C

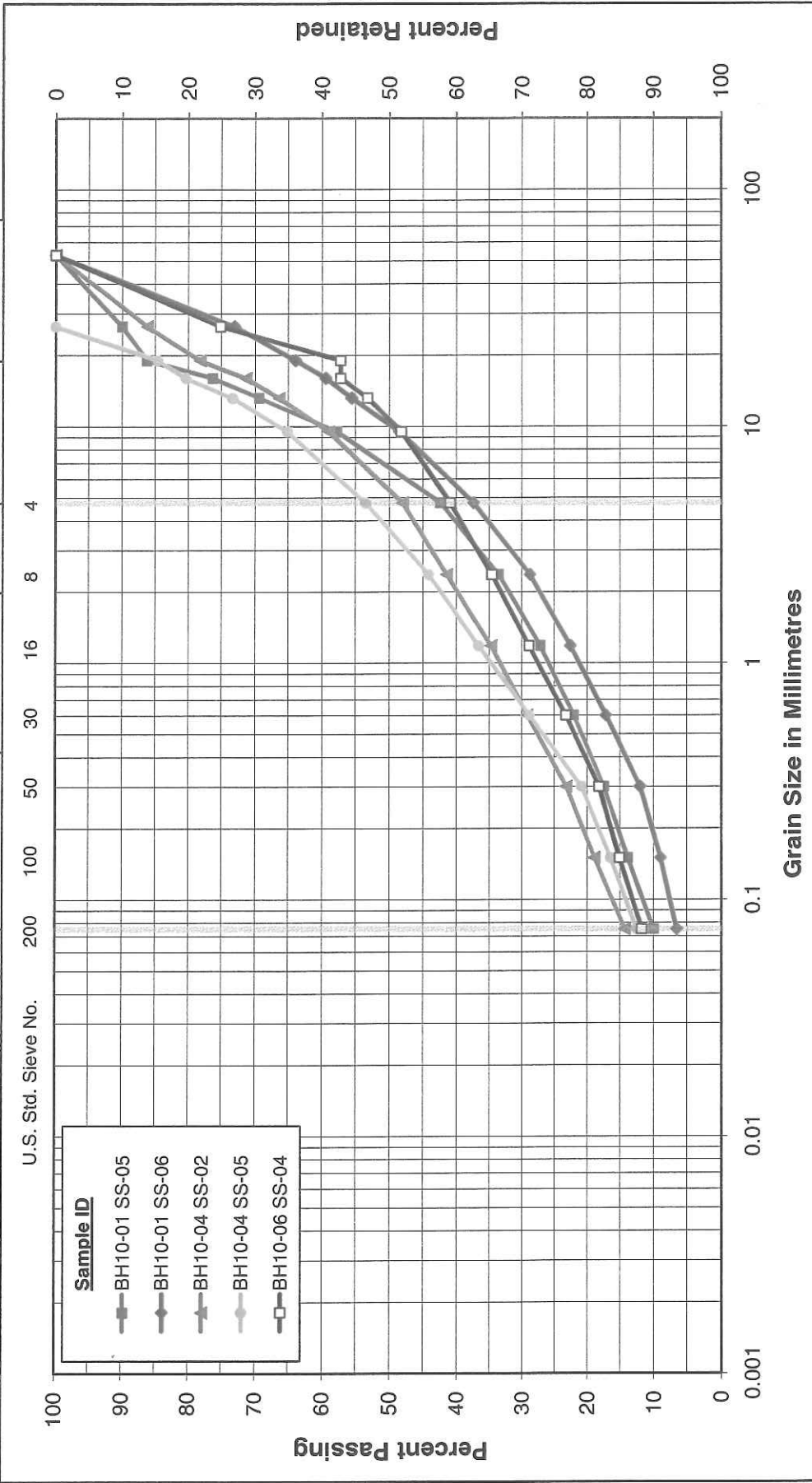
Laboratory Test Results

Figures 1-4: Grain Size Distribution Plots

Figure 5: Plasticity Chart

Unified Soil Classification System

CLAY & SILT	SAND			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



GRAIN SIZE DISTRIBUTION

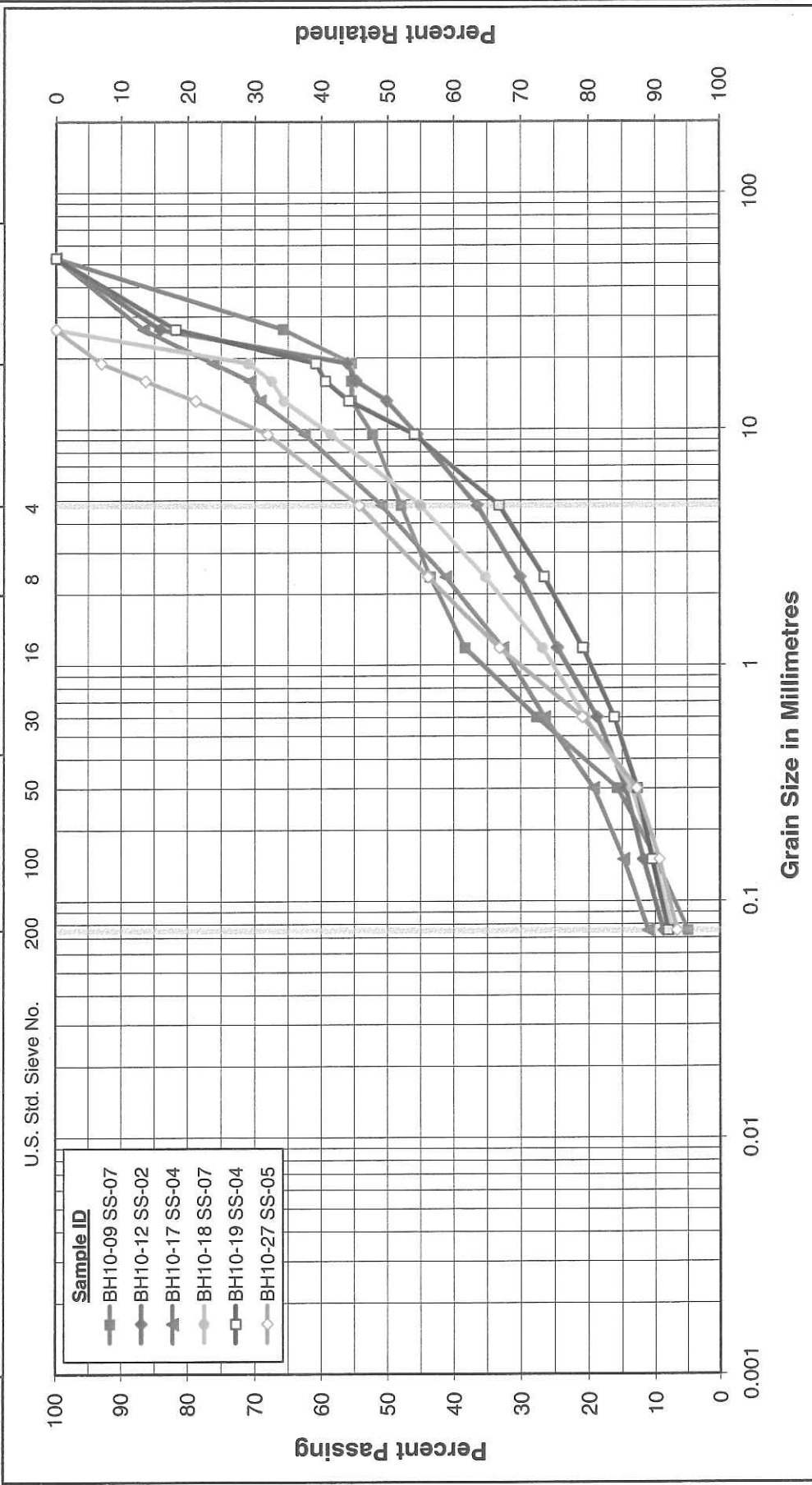
Gravel with Silt and Sand (GP-GM, GM, GW-GM)

Figure No. 1a

Project No. 165000749

Unified Soil Classification System

CLAY & SILT		SAND			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



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GRAIN SIZE DISTRIBUTION

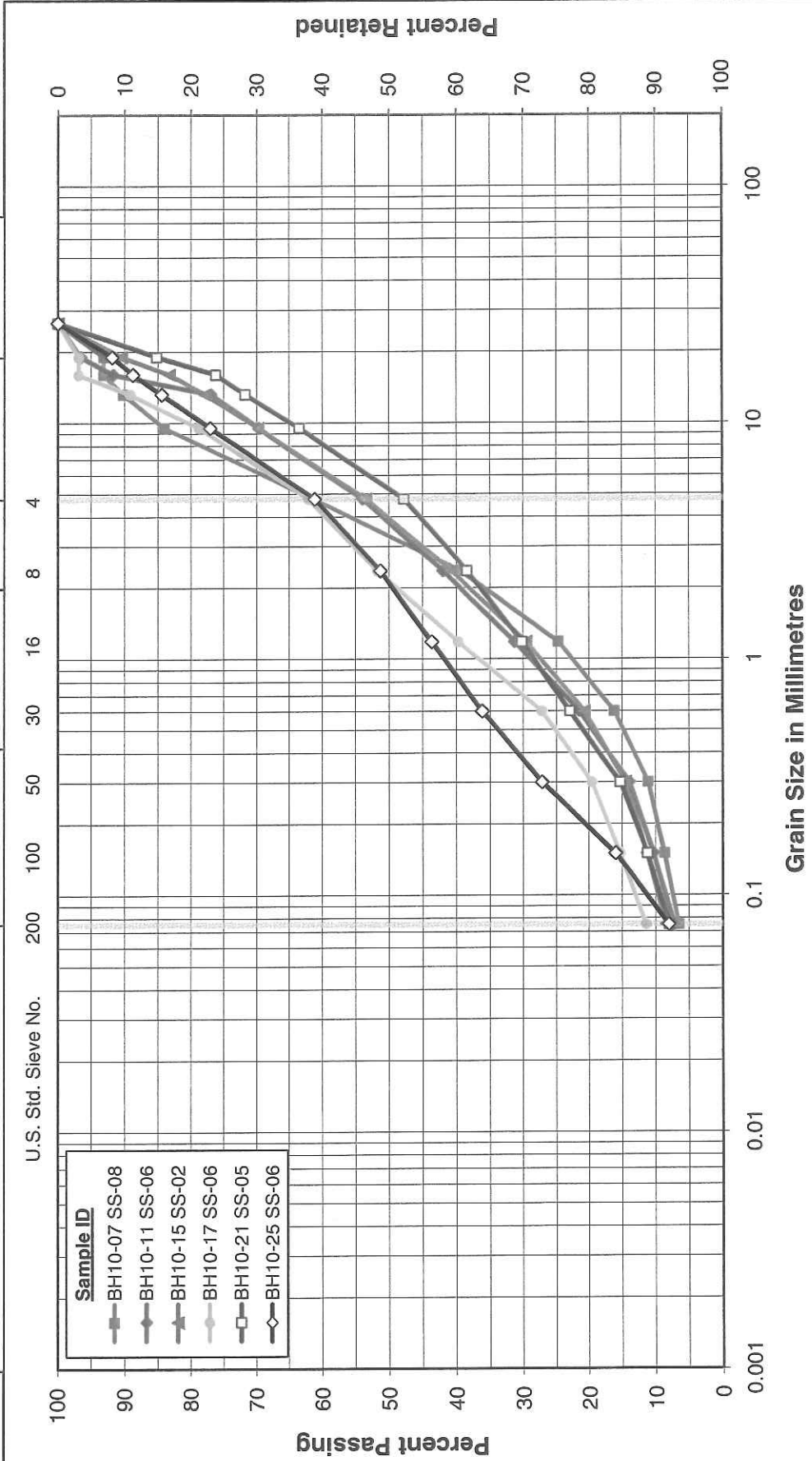
Gravel with Silt and Sand (GW-GM, GP-GM)

Figure No. 1b

Project No. 165000749

Unified Soil Classification System

CLAY & SILT	SAND				Gravel	
	Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

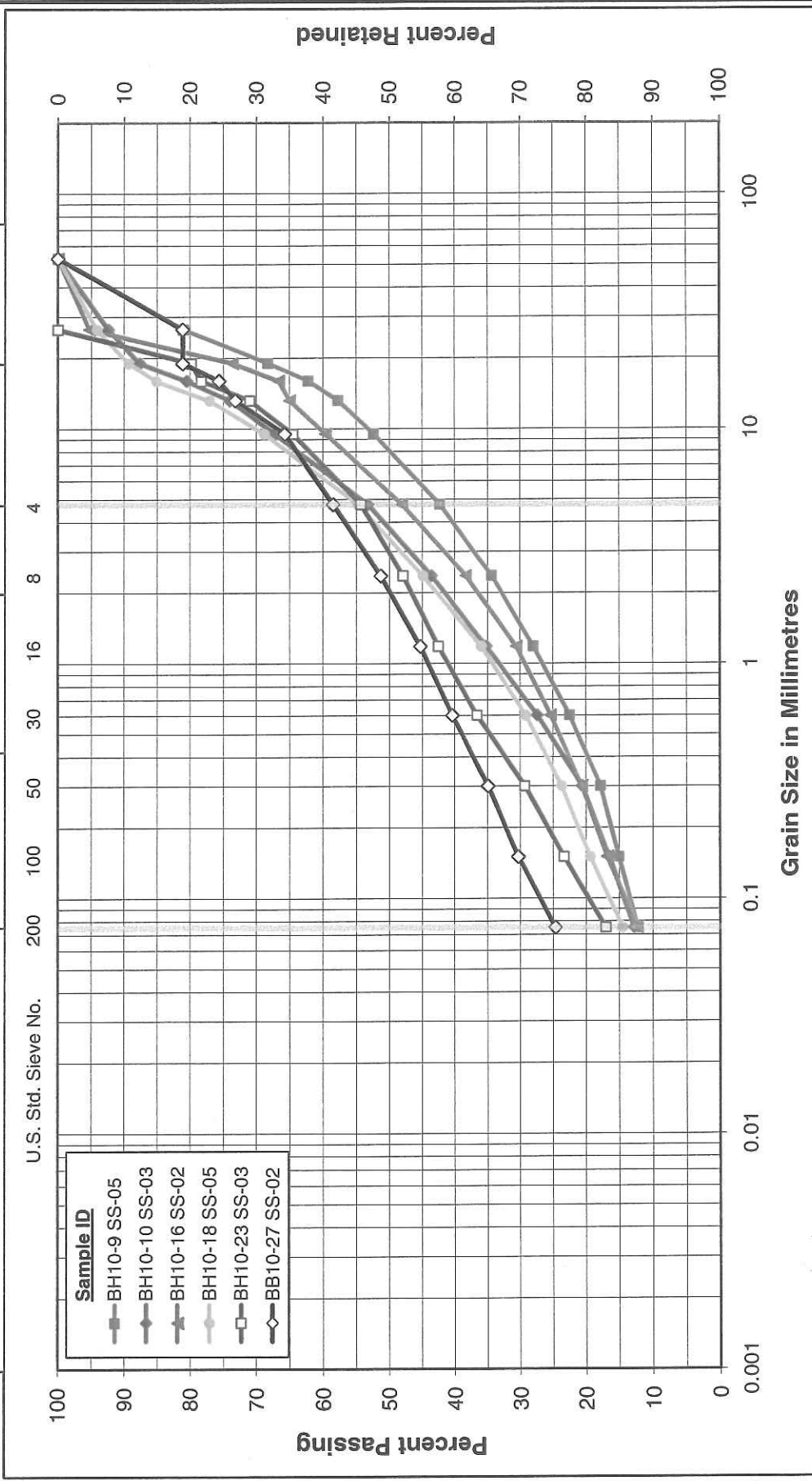
Gravel and Sand with Silt (GW-GM, SW-SM, SP)

Figure No. 1c

Project No. 165000749

Unified Soil Classification System

CLAY & SILT	SAND			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



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GRAIN SIZE DISTRIBUTION

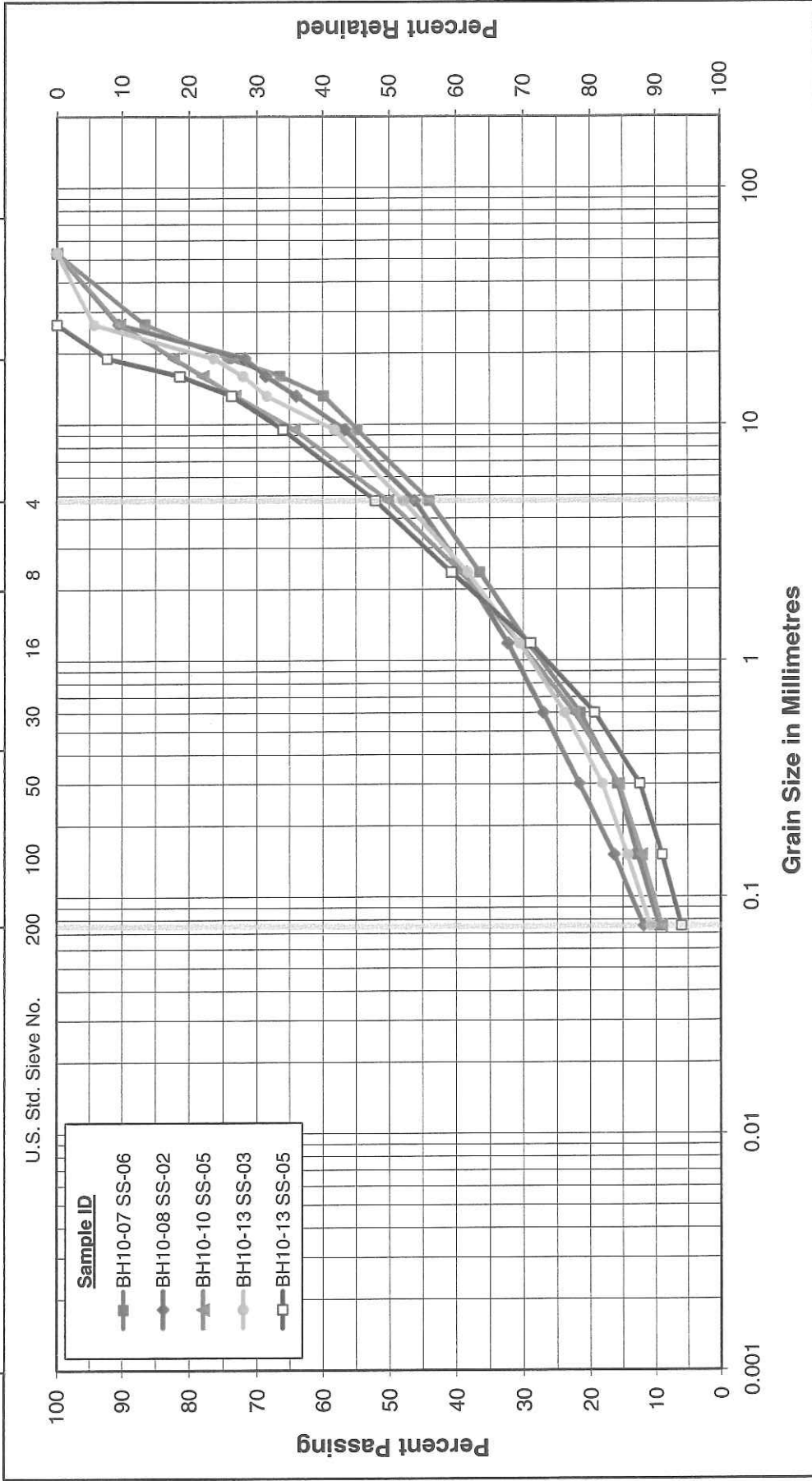
Silty Gravel with Sand (GM)

Figure No. 1d

Project No. 165000749

Unified Soil Classification System

CLAY & SILT		SAND				GRAVEL	
		Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

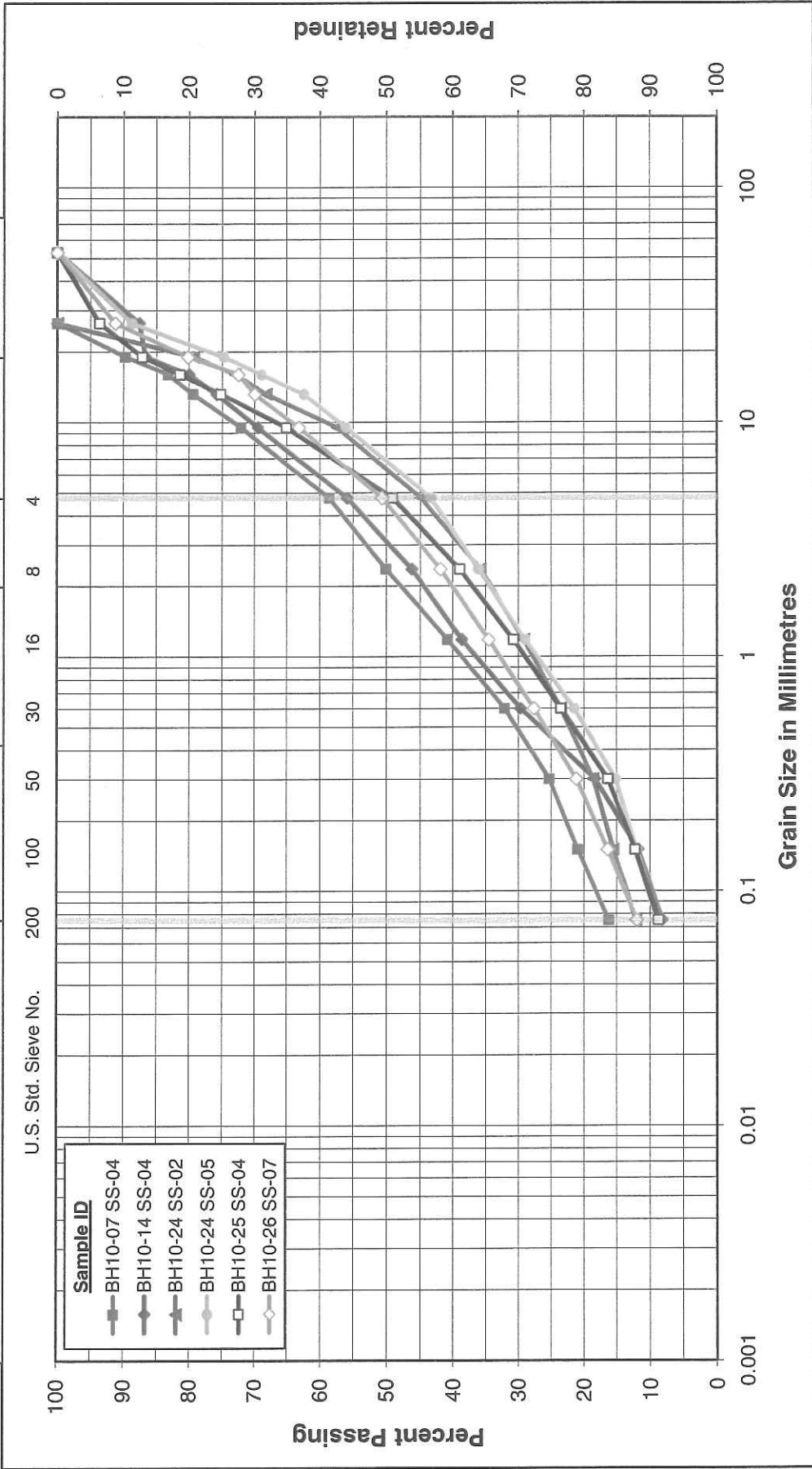
Well-graded Gravel with Silt and Sand (GW-GM)

Figure No. 1e

Project No. 165000749

Unified Soil Classification System

CLAY & SILT	SAND				Gravel	
	Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

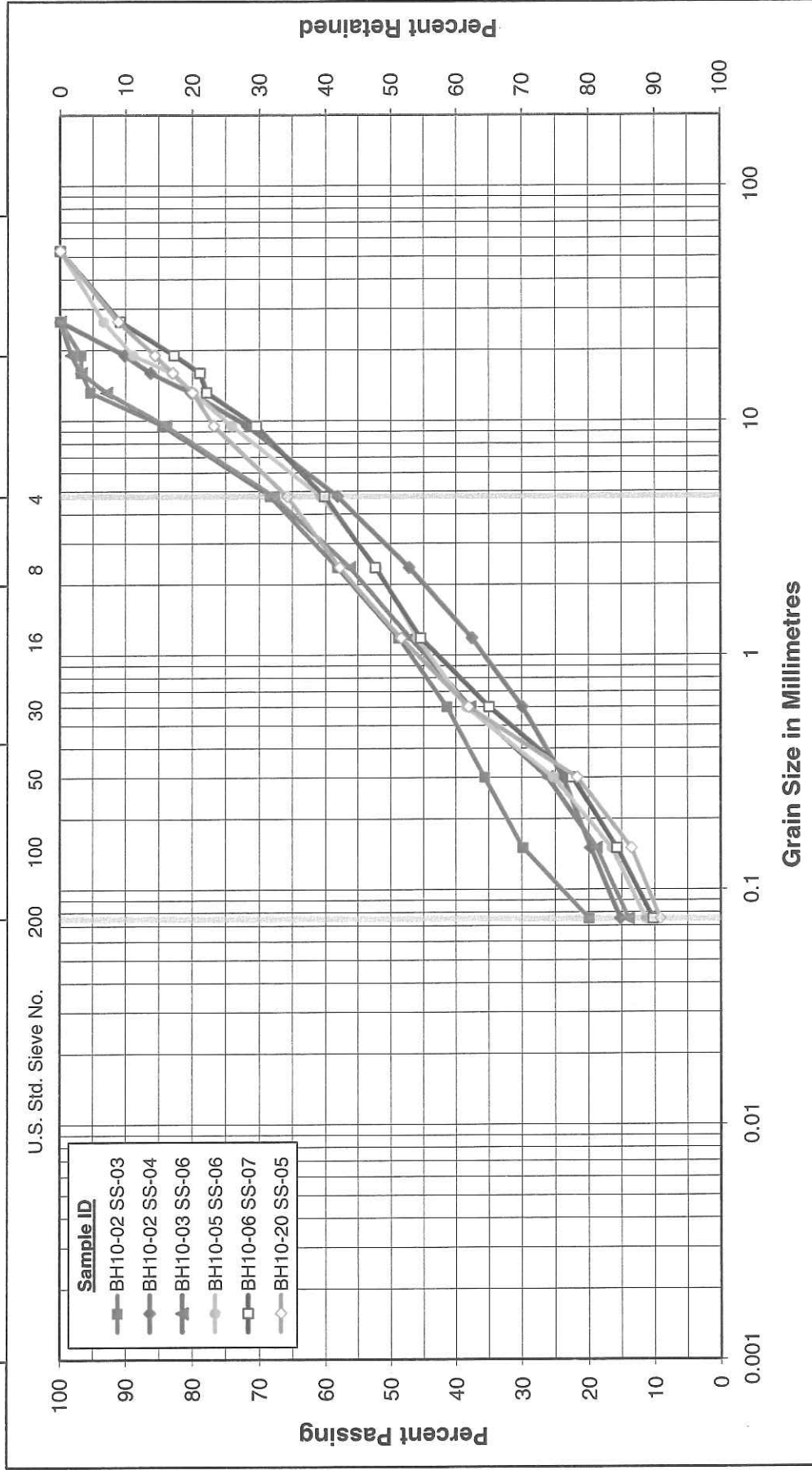
Well-graded Gravel with Silt and Sand (GW-GM)

Figure No. 1f

Project No. 1650000749

Unified Soil Classification System

CLAY & SILT		SAND			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



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GRAIN SIZE DISTRIBUTION

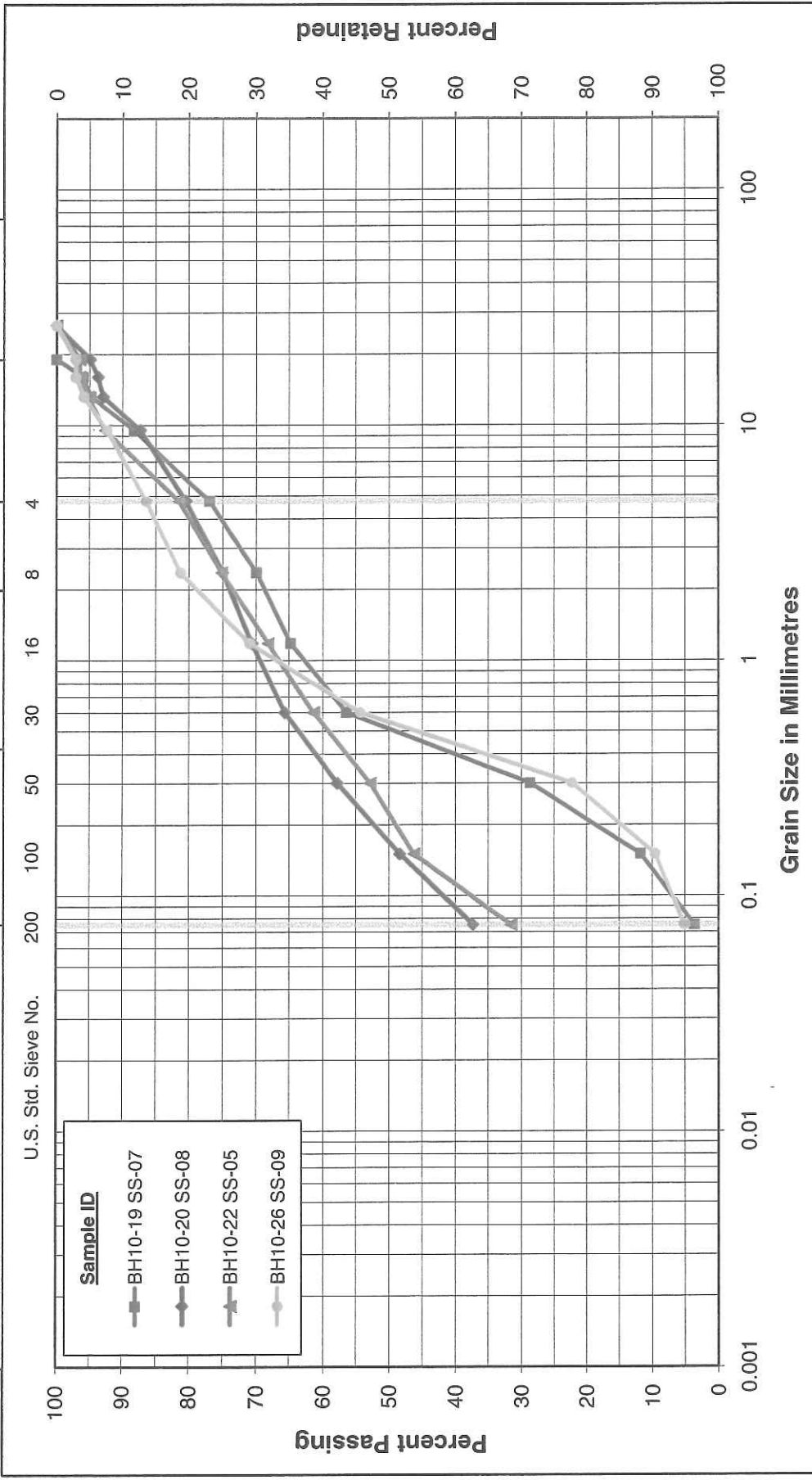
Sand with Silt and Gravel (SP-SM)

Figure No. 1g

Project No. 165000749

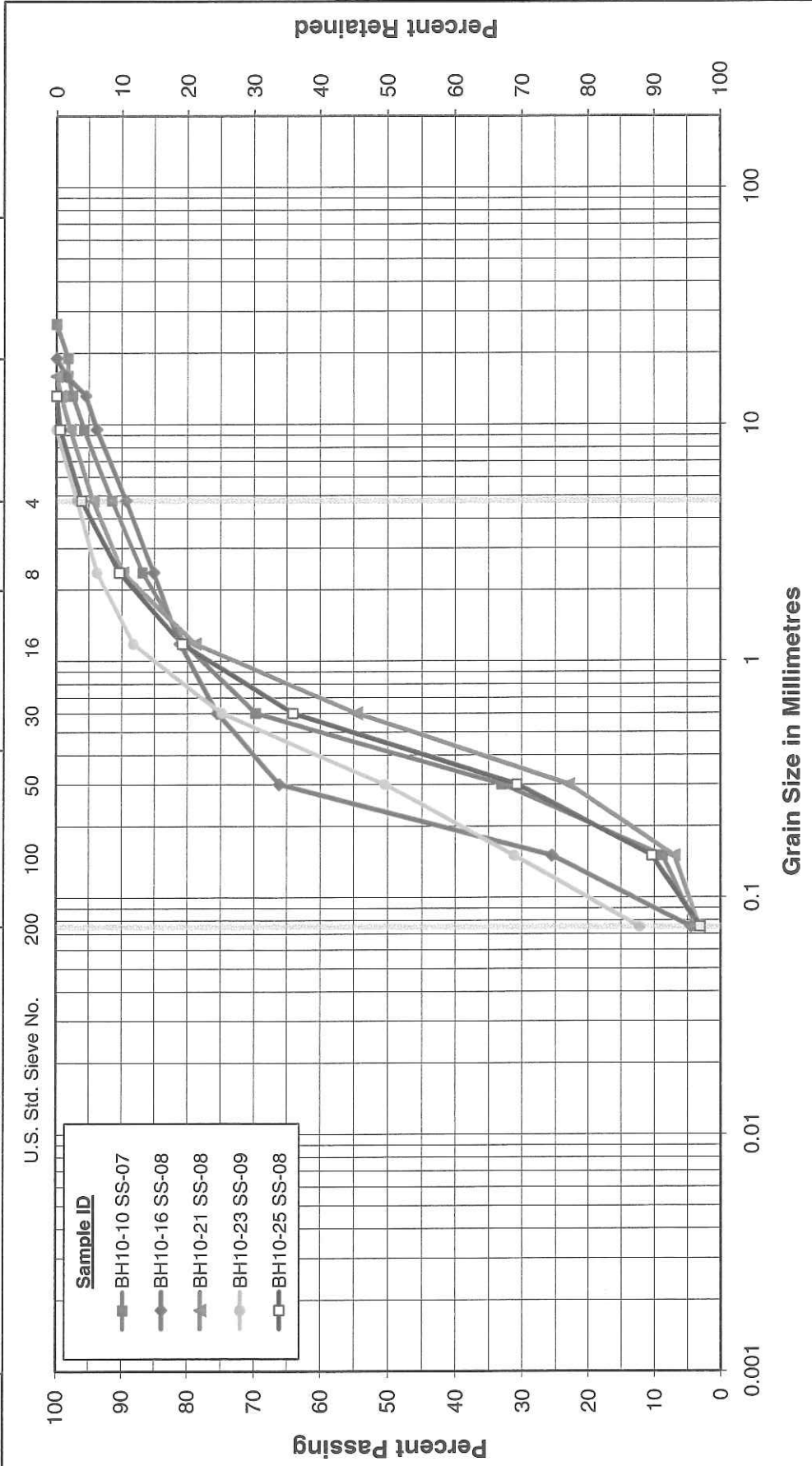
Unified Soil Classification System

CLAY & SILT		SAND			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



Unified Soil Classification System

CLAY & SILT	SAND				Gravel	
	Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

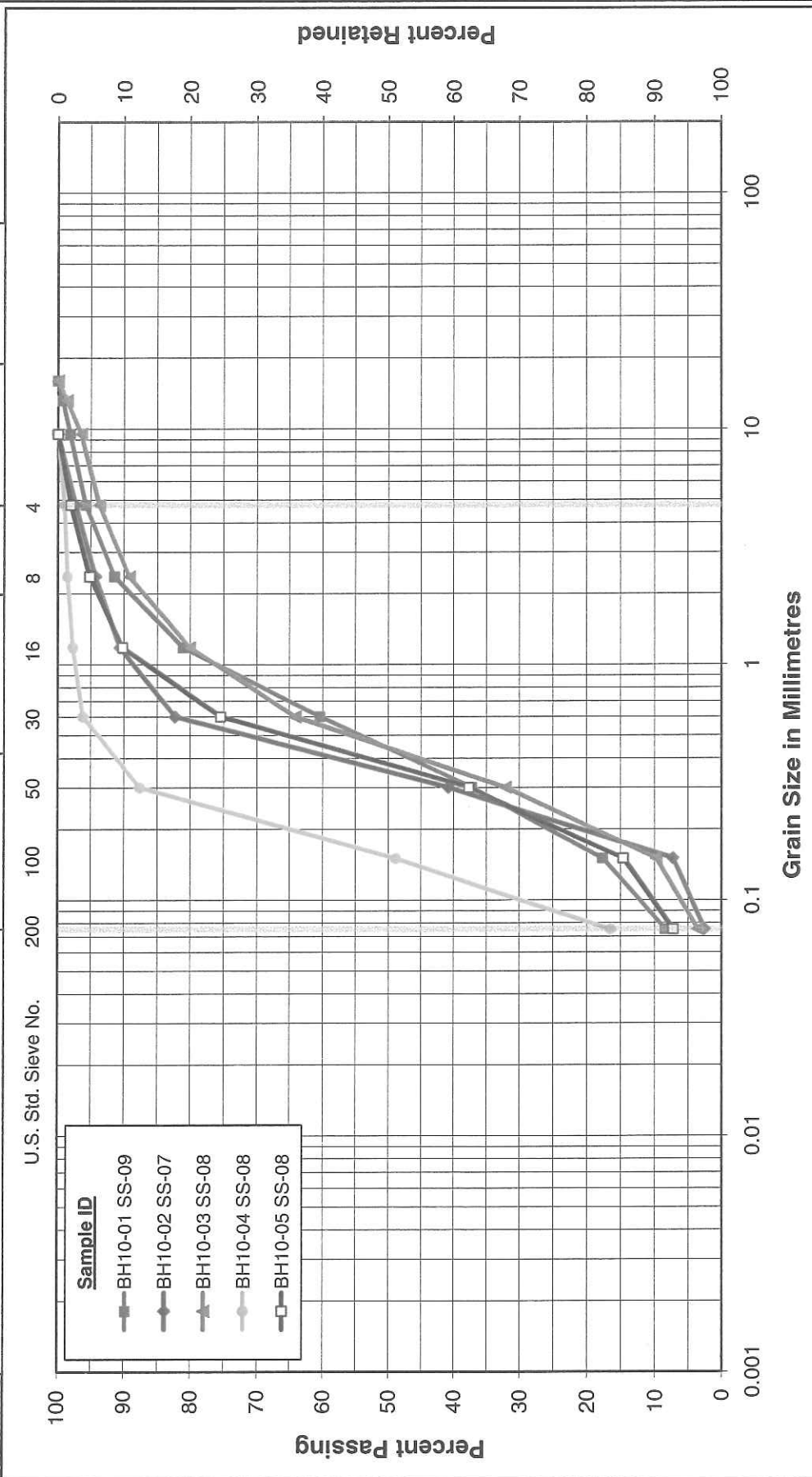
Poorly Graded Sand (SP)

Figure No. 2b

Project No. 165000749

Unified Soil Classification System

CLAY & SILT		SAND				Gravel	
		Fine	Medium	Coarse	Fine	Coarse	



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GRAIN SIZE DISTRIBUTION

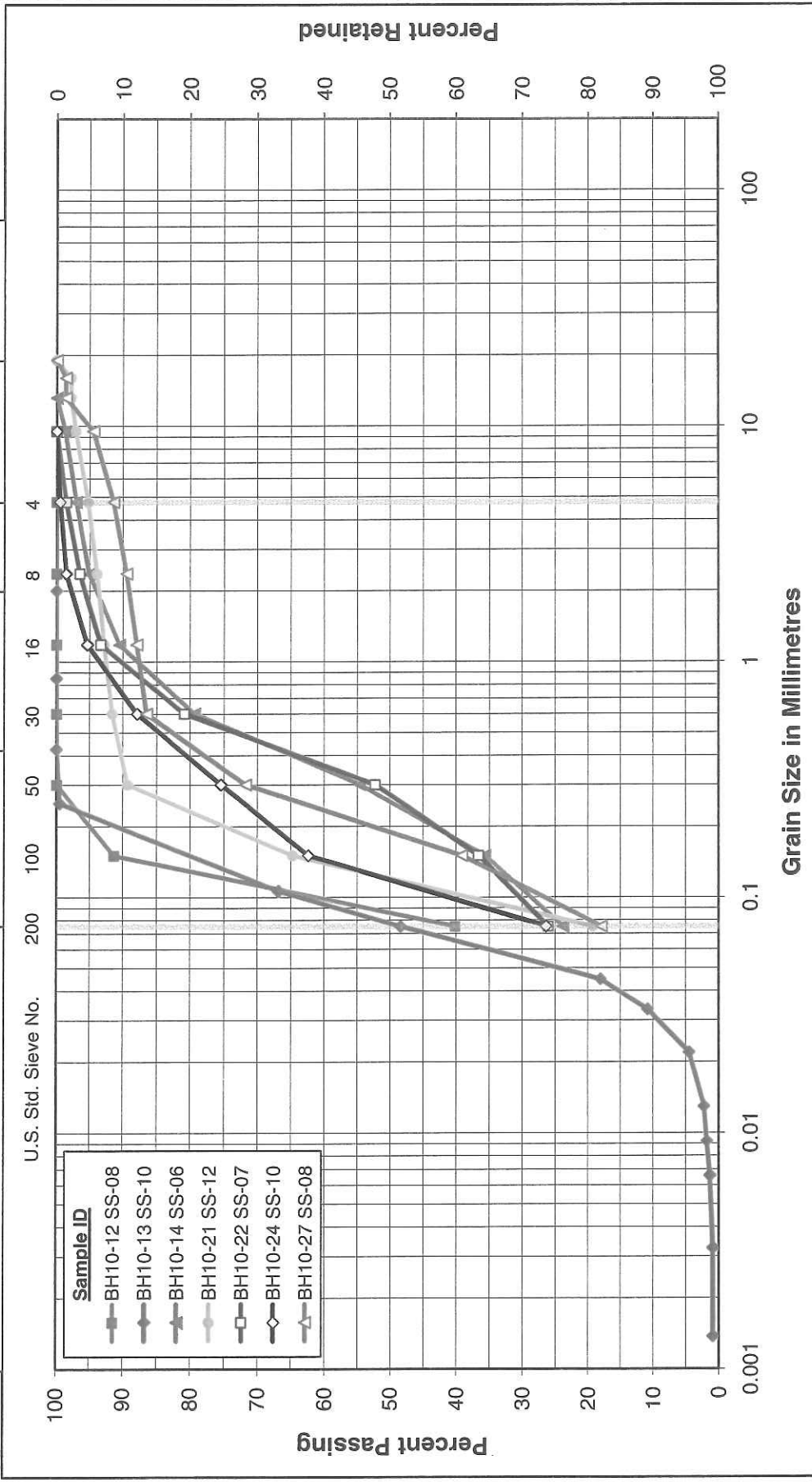
Sand (SP, SW-SM, SP-SM)

Figure No. 2c

Project No. 165000749

Unified Soil Classification System

CLAY & SILT		SAND				Gravel	
		Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

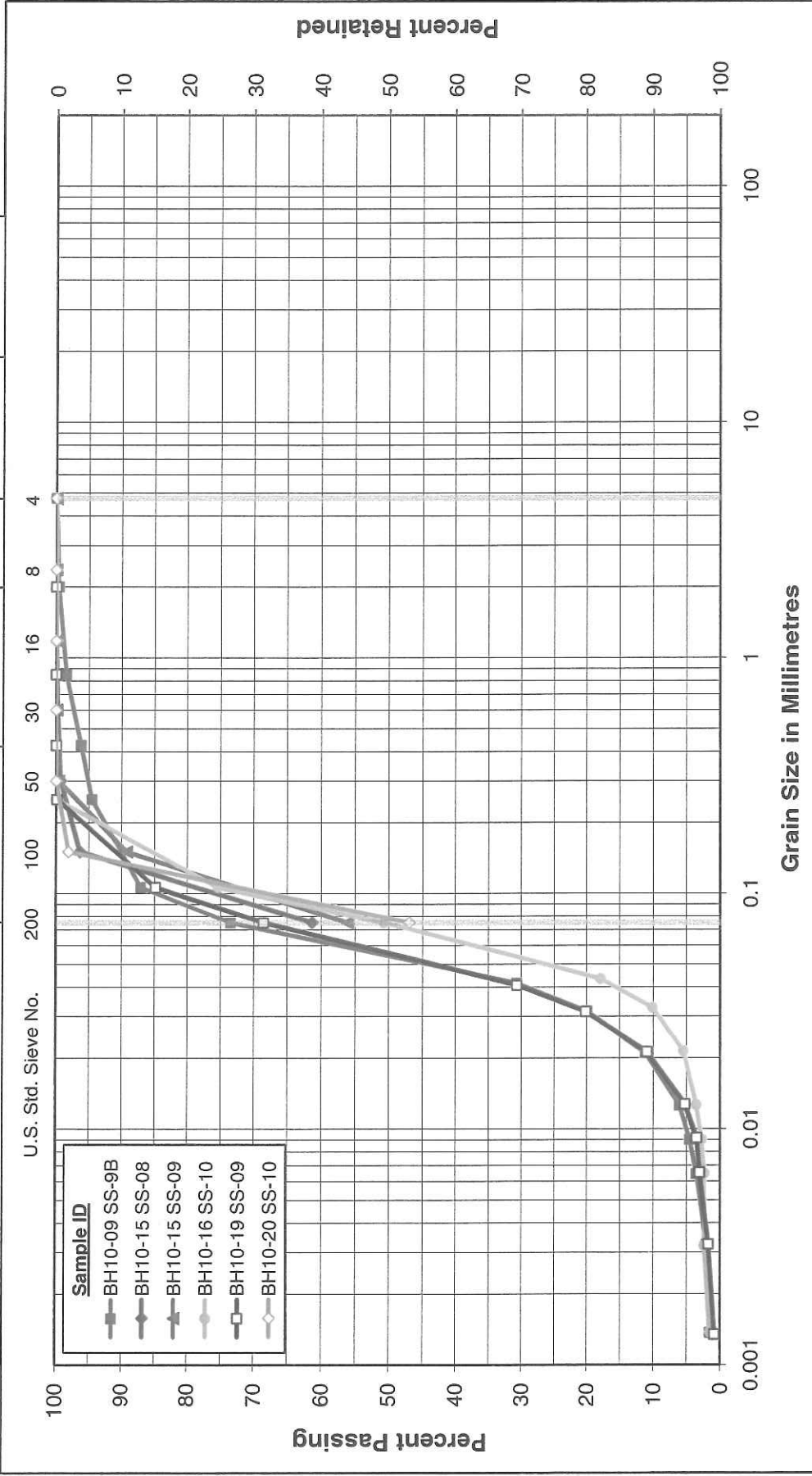
Silty Sand (SM)

Figure No. 2d

Project No. 165000749

Unified Soil Classification System

CLAY & SILT		SAND			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



GRAIN SIZE DISTRIBUTION

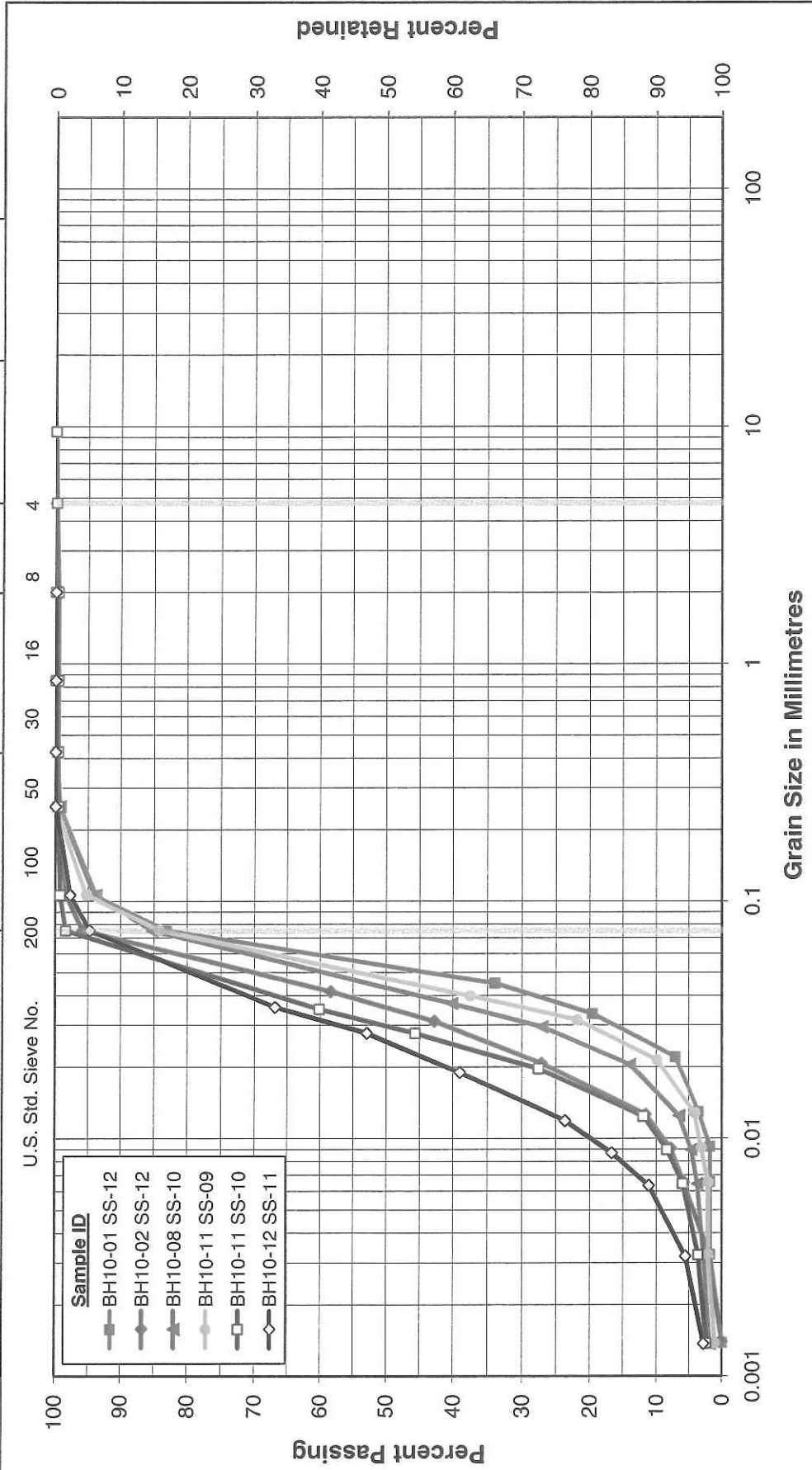
Silt to Sandy Silt (ML)

Figure No. 3a

Project No. 165000749

Unified Soil Classification System

CLAY & SILT	SAND				Gravel	
	Fine	Medium	Coarse		Fine	Coarse



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GRAIN SIZE DISTRIBUTION

Silt to Sandy Silt (ML)

Figure No. 3b

Project No. 165000749

	SAND			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
CLAY & SILT					

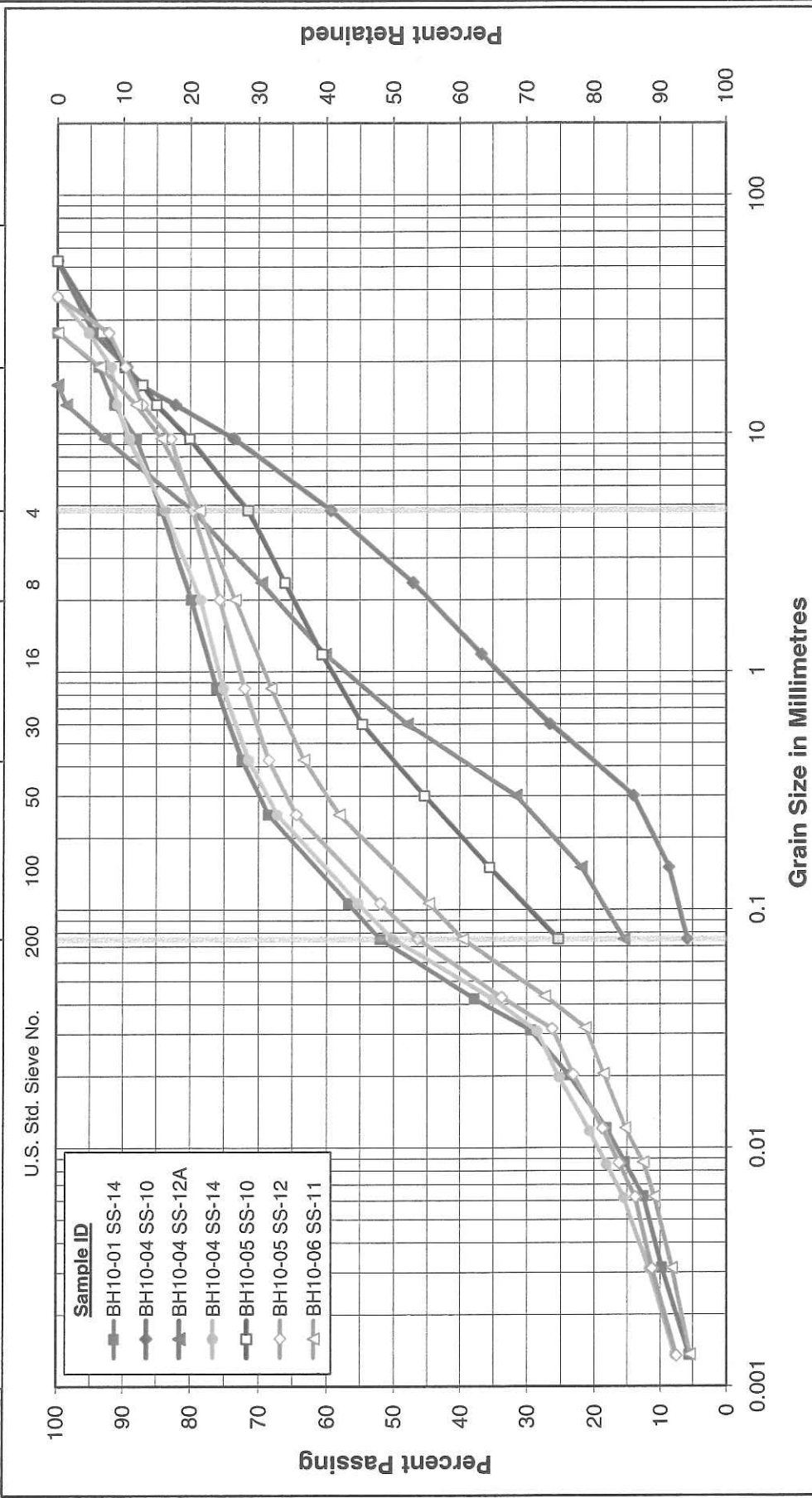


Sandy silt (ML)

Project No. 165000749

Unified Soil Classification System

CLAY & SILT	SAND				Gravel	
	Fine	Medium	Coarse		Fine	Coarse

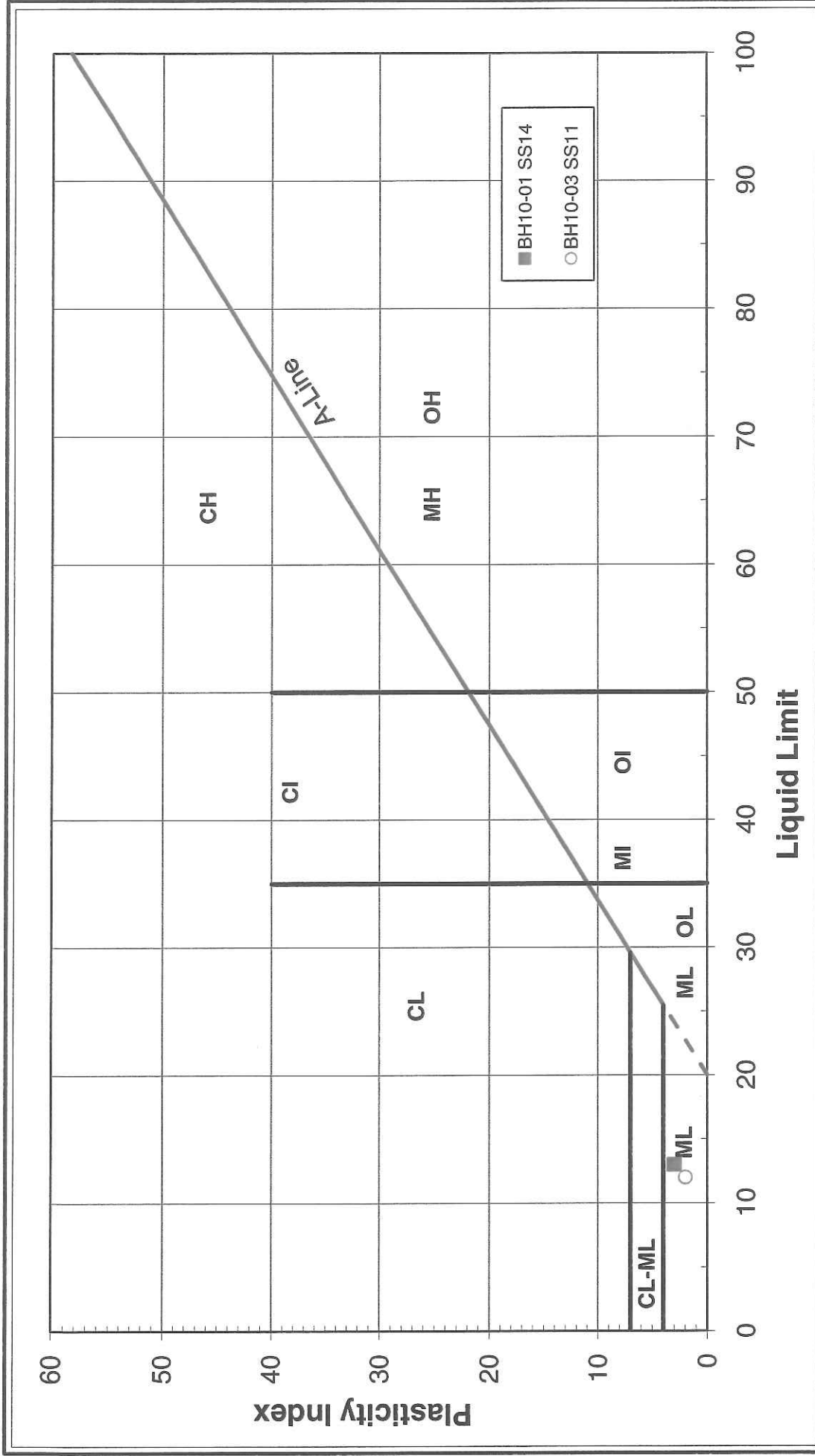


GRAIN SIZE DISTRIBUTION

Sandy Silt with Gravel (ML) / TILL

Figure No. 4a

Project No. 165000749

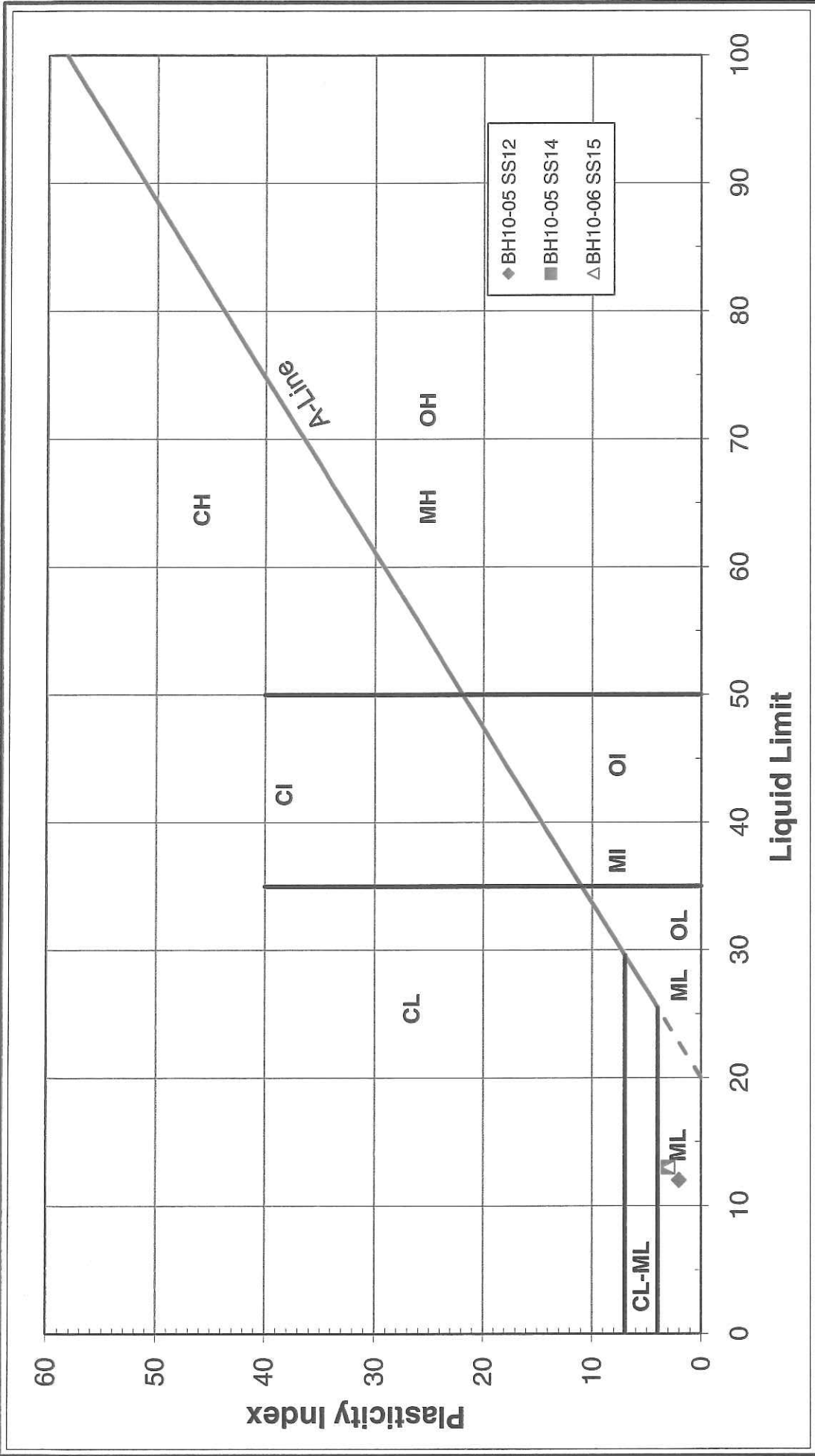


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PLASTICITY CHART

Figure No. 5a

Project No. 165000749



PLASTICITY CHART

Figure No. 5b

Project No. 165000749

APPENDIX D

Figure 6: Design Parameters

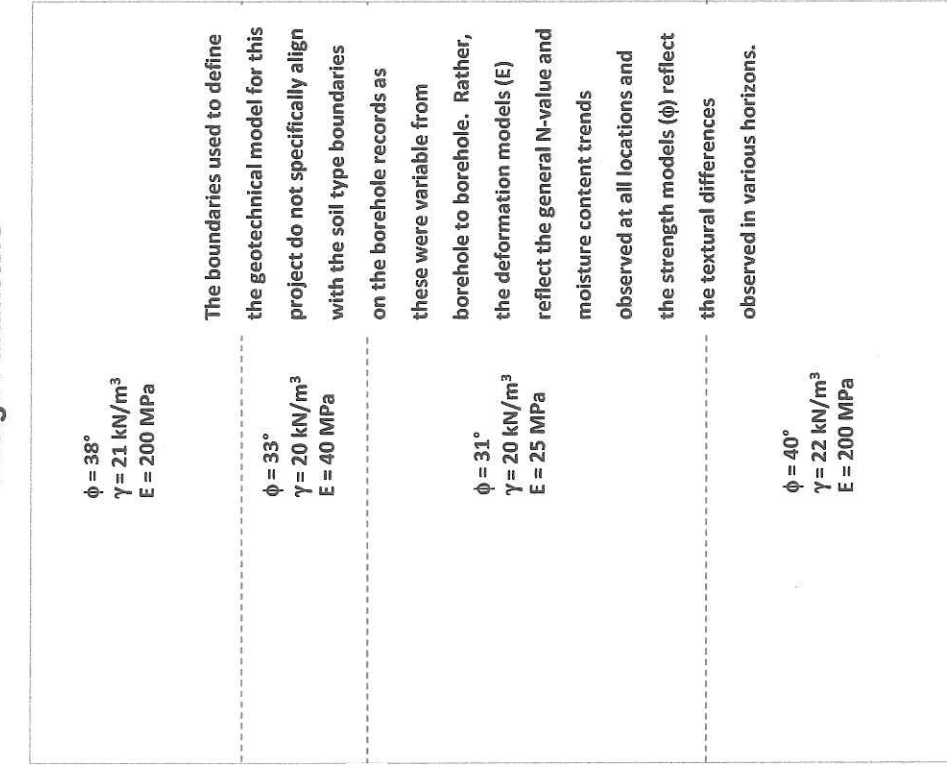
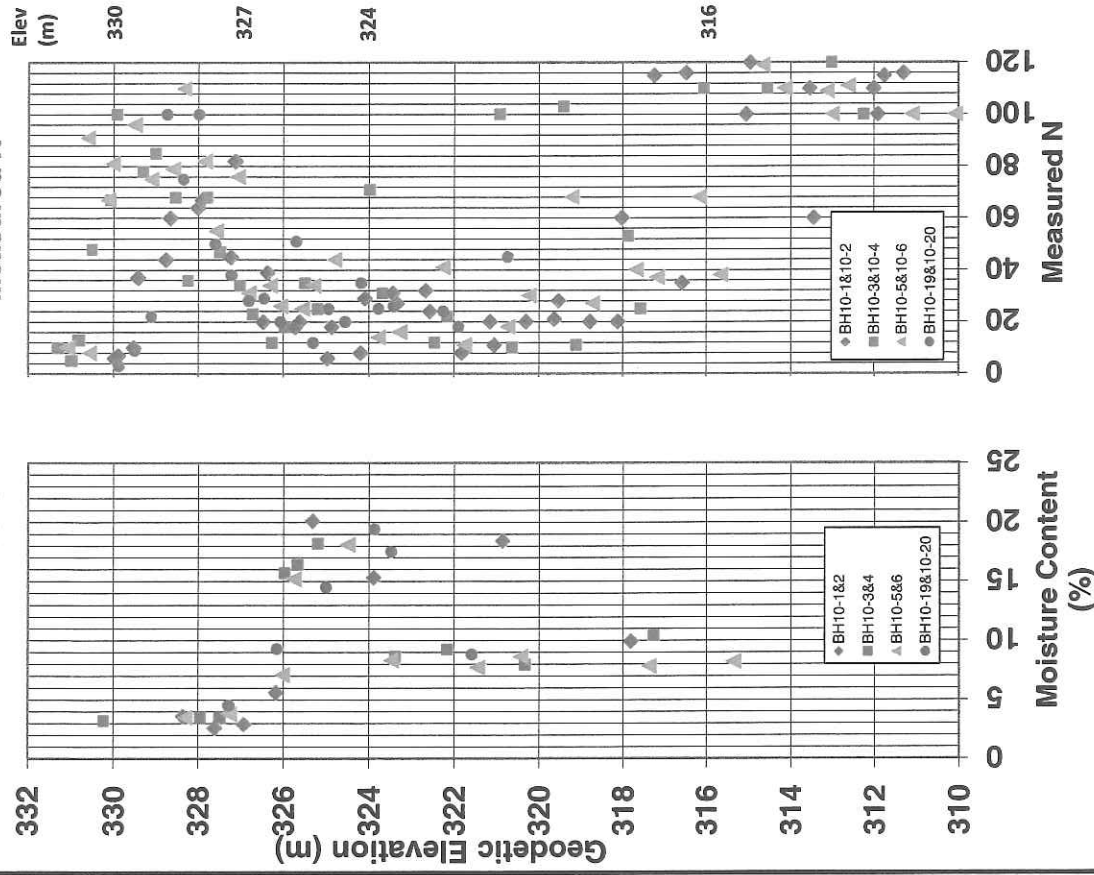
Figure 7-10: Typical Slope Stability Evaluation Results (Slope/W)

Figure 11-13: Typical Settlement Evaluation Results (Settle3D)

Moisture Content

Measured N

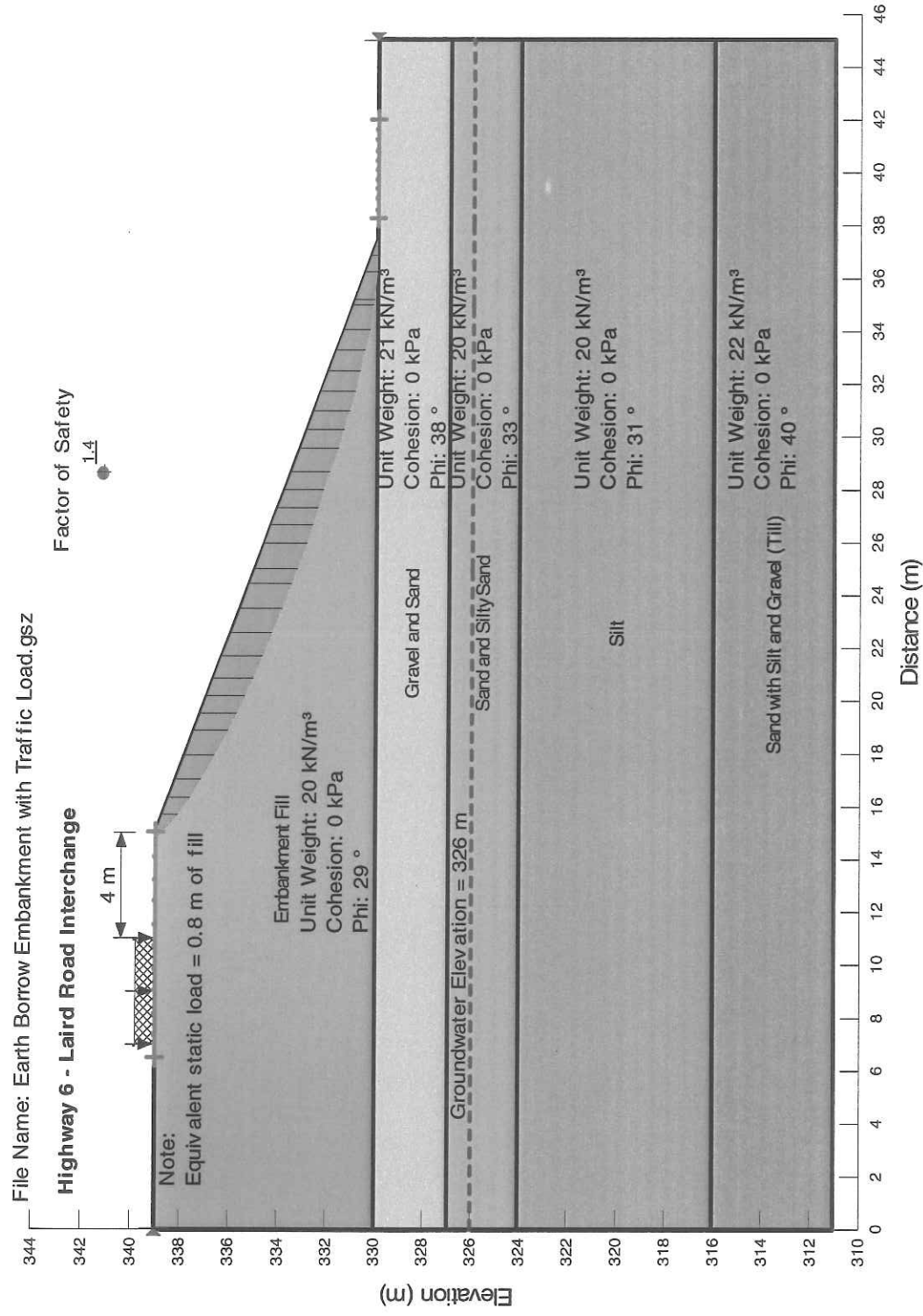
Design Parameters



Stantec Consulting Ltd.

Project No. 16500749

Figure 6



Static Slope Stability Analysis

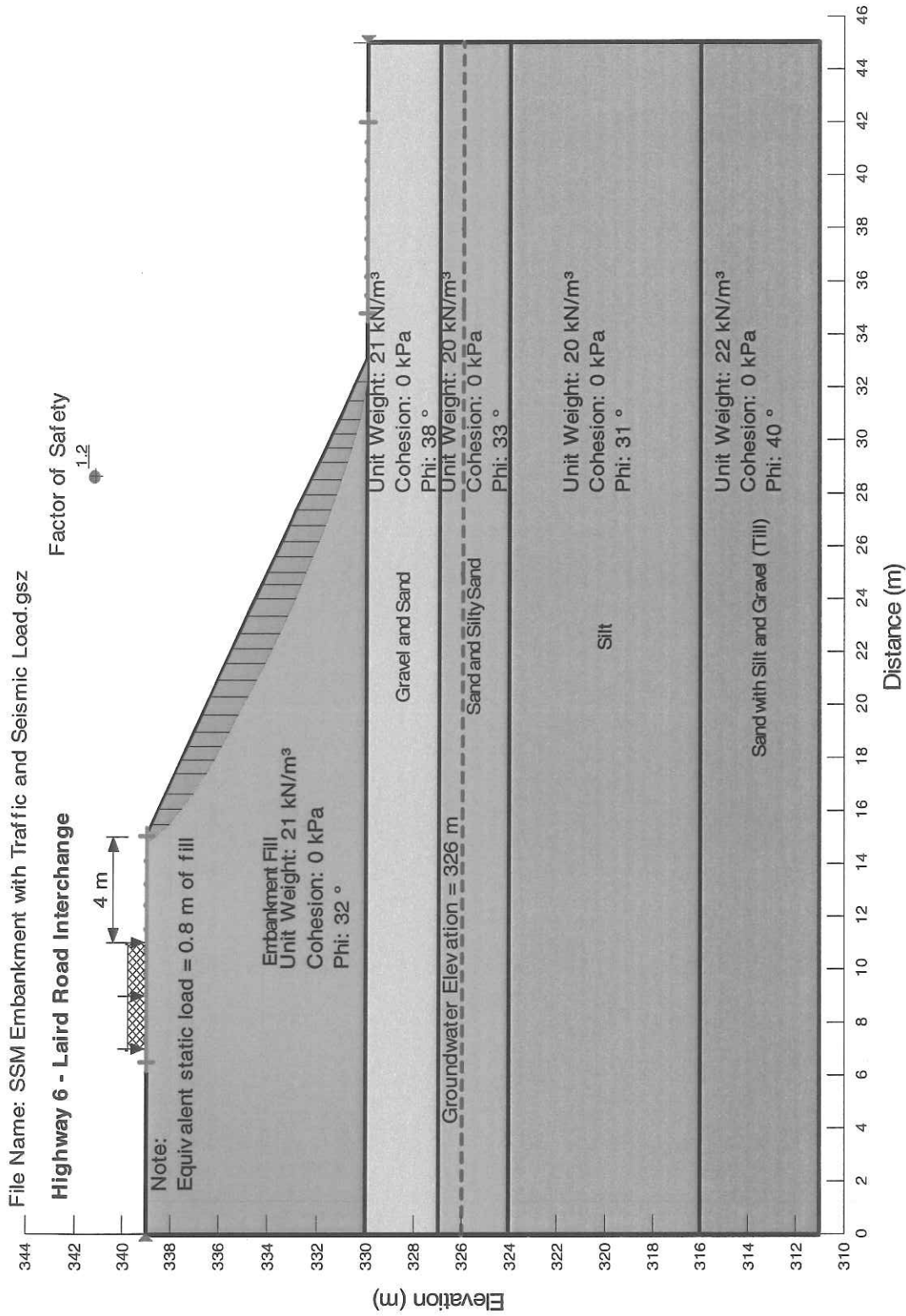
Highway 6 - Laird Road Interchange
Earth Borrow: Side slope at 2.5H:1V

Figure 8

Project No. 165000749



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Seismic Slope Stability Analysis

Highway 6 - Laird Road Interchange

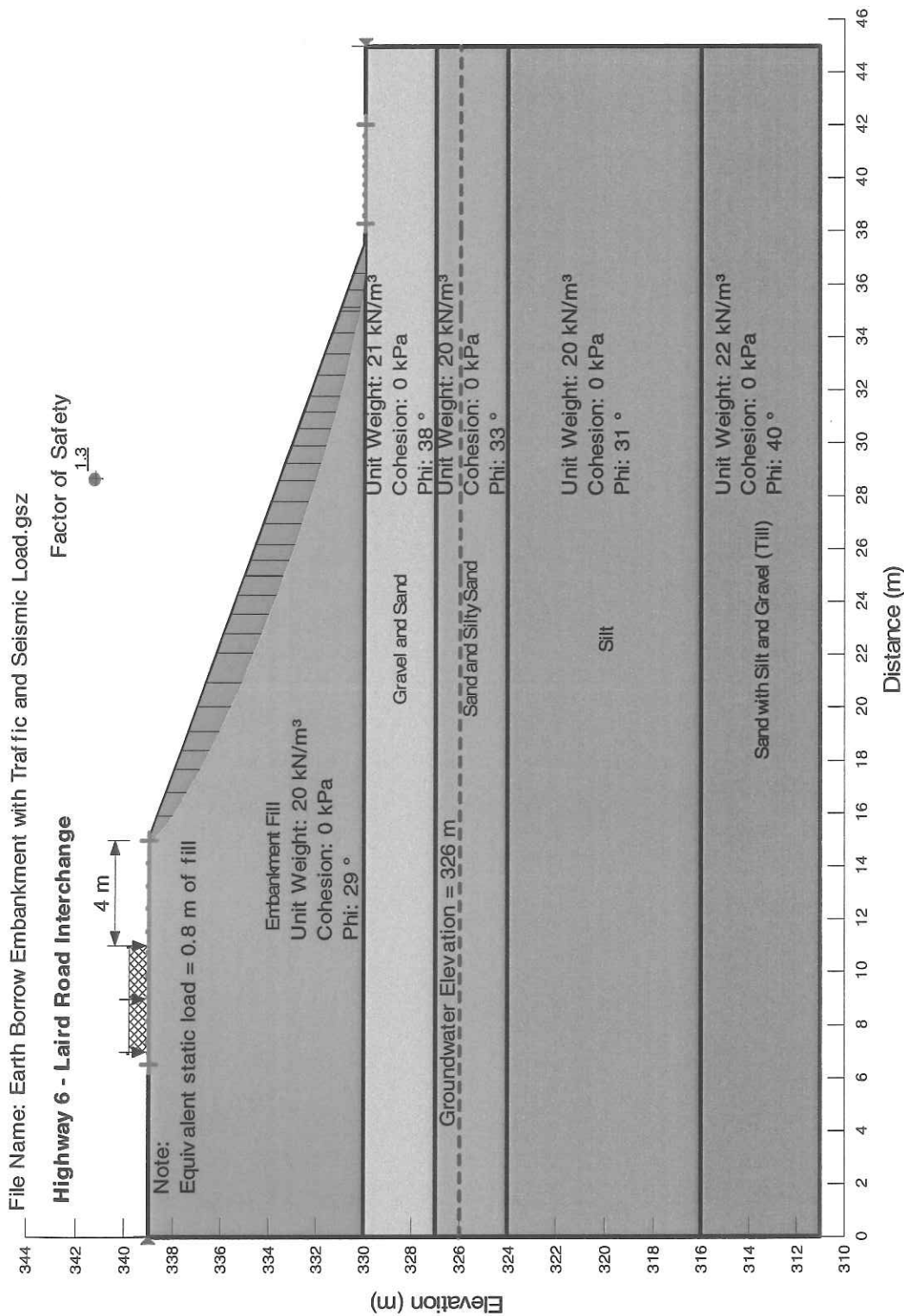
SSM: Side slope at 2H:1V



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Figure 9

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Seismic Slope Stability Analysis

Highway 6 - Laird Road Interchange

Earth Borrow: Side slope at 2.5H:1V

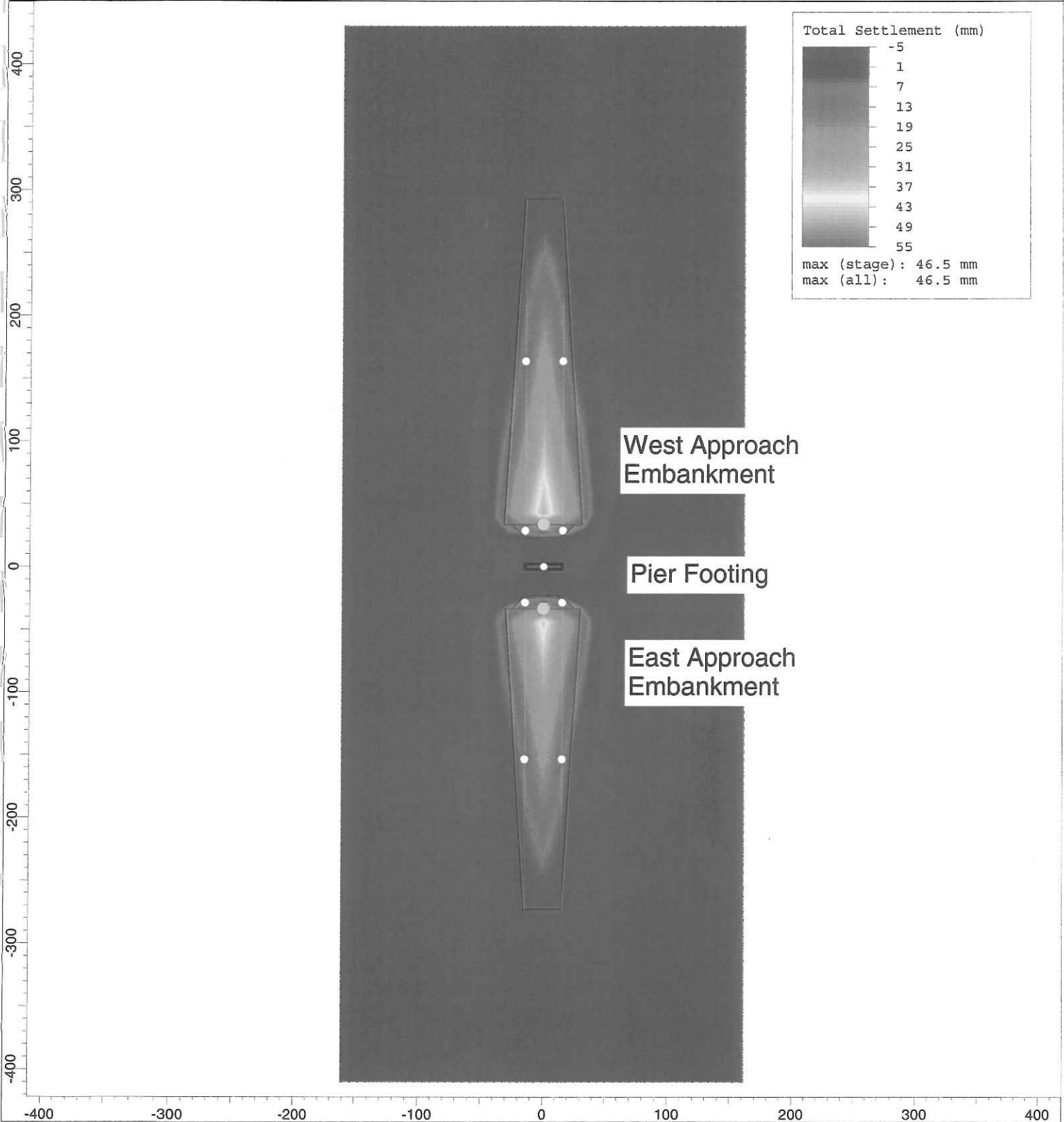
Figure 10

Project No. 165000749



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Figure 11

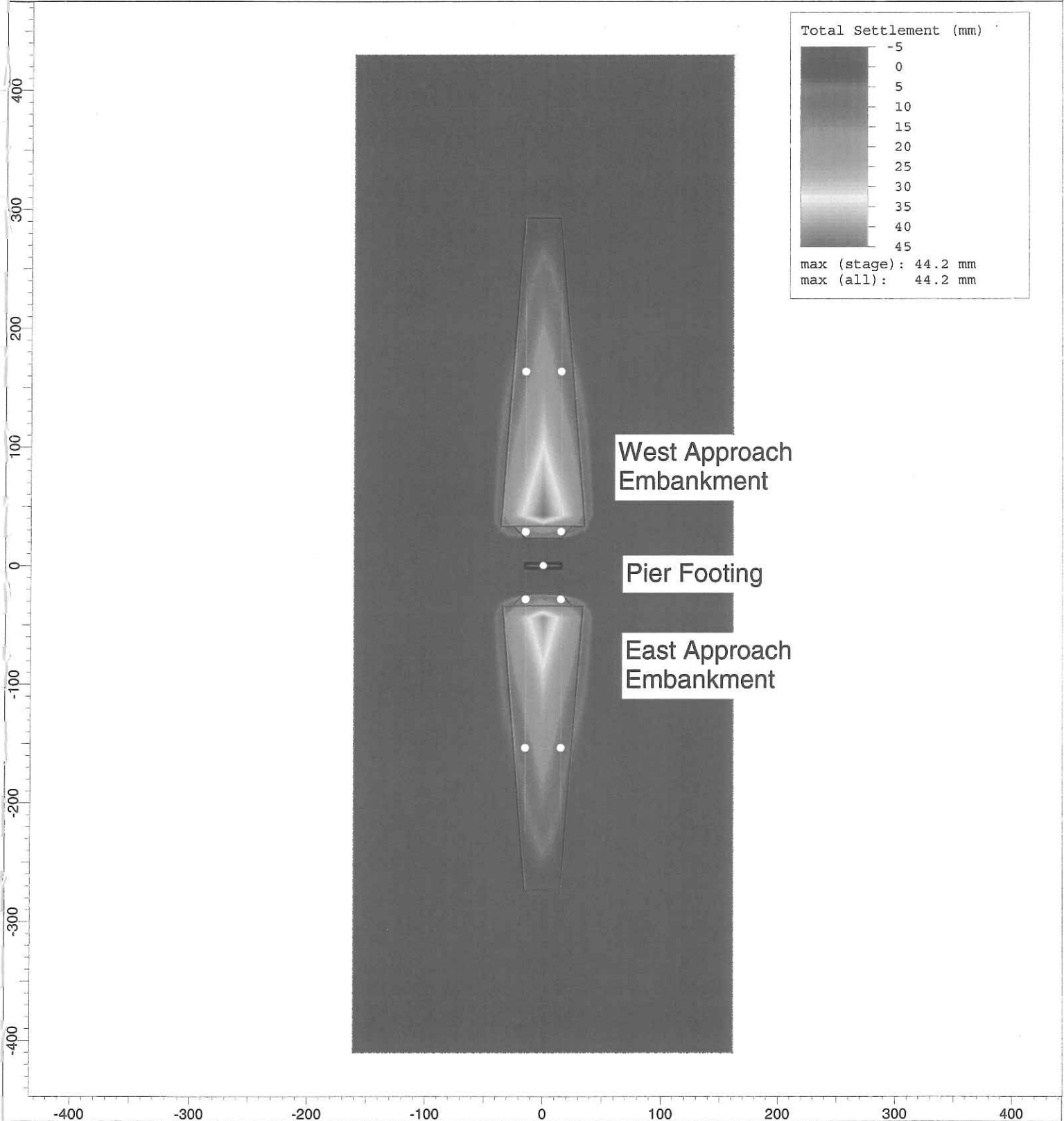


SETTLE3D 2.010

Stantec

Project			Highway 6 - Laird Road Interchange		
Analysis Description			Settlement Due to Approach Embankment and Granular Pad - SSM		
Drawn By		SG		Company	
				Stantec Consulting Ltd	
Date		9/17/2010, 12:48:15 PM		File Name	
				W-E Embankment - SSM with GranPad.s3z	

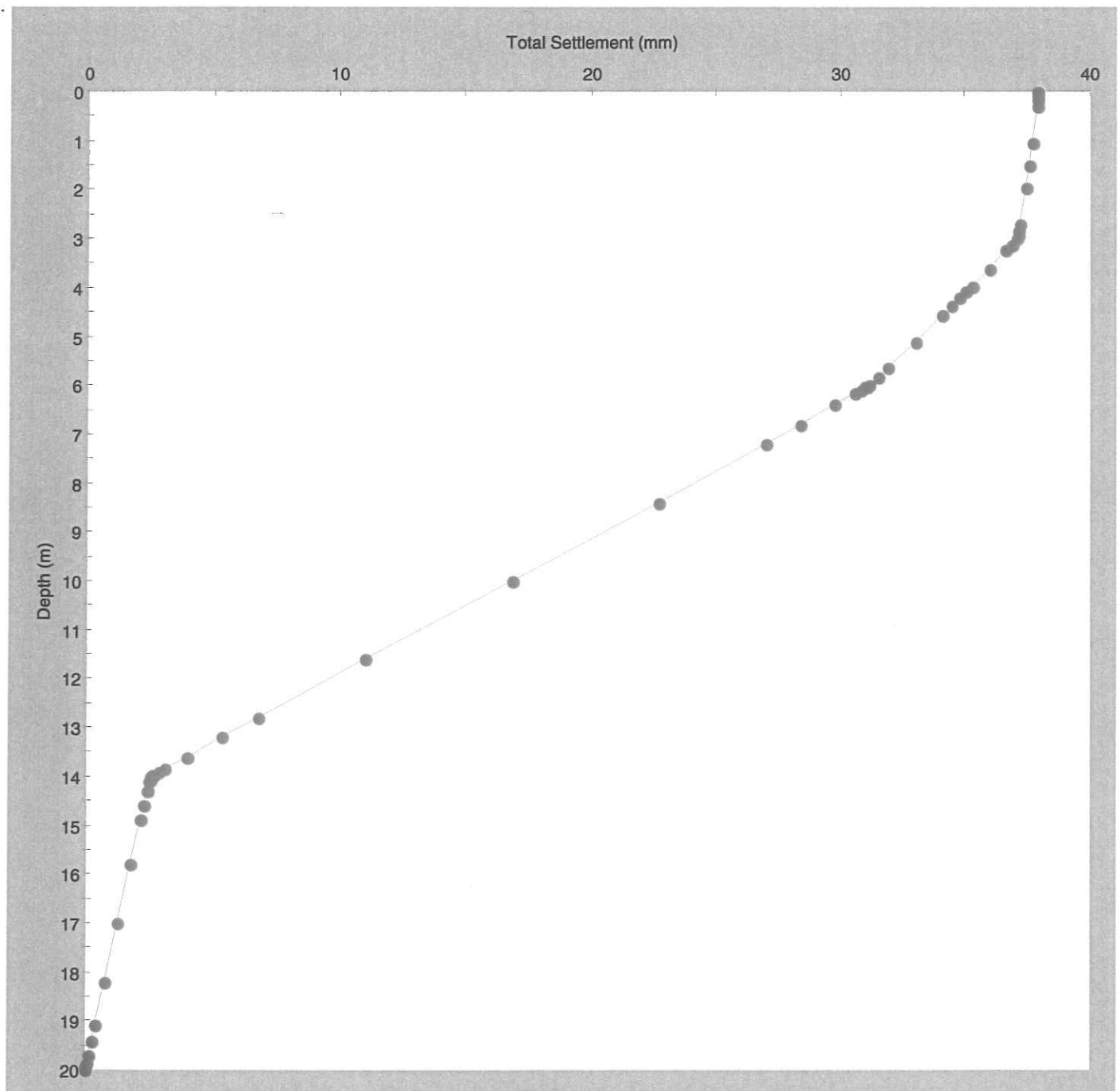
Figure 12



Project	Highway 6 - Laird Road Interchange		
Analysis Description	Settlement Due to Approach Embankment and Granular Pad - Earth Borrow		
Drawn By	SG	Company	Stantec Consulting Ltd
Date	9/17/2010, 12:48:15 PM	File Name	W-E Embankment- Earth Borrow with GranPad.s3z

Figure 13

Total Settlement vs. Depth



Query Point 1 (Stage 1)
Reference Stage: None



SETTLE3D 2.010

Stantec

Project			Highway 6 - Laird Road Interchange		
Analysis Description			Settlement Profile at Abutment Location - SSM		
Drawn By		SG		Company	
				Stantec Consulting Ltd	
Date		9/17/2010, 12:48:15 PM		File Name	
				W-E Embankment - SSM with GranPad-a.s3z	

APPENDIX E

Geological Survey of Canada Seismic Hazard Calculation

2005 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Requested by: Simon Gudina, Stantec

August 16, 2010

Site Coordinates: 43.5833 North 80.3333 West

User File Reference: Highway 6, Guelph

National Building Code ground motions:

2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.2)	Sa(0.5)	Sa(1.0)	Sa(2.0)	PGA (g)
0.202	0.101	0.049	0.014	0.121

Notes. Spectral and peak hazard values are determined for firm ground (NBCC 2005 soil class C - average shear wave velocity 360-750 m/s). Median (50th percentile) values are given in units of g. 5% damped spectral acceleration (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are tabulated. Only 2 significant figures are to be used. *These values have been interpolated from a 10 km spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the calculated values.*

Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.2)	0.031	0.085	0.128
Sa(0.5)	0.016	0.042	0.063
Sa(1.0)	0.006	0.019	0.031
Sa(2.0)	0.002	0.006	0.009
PGA	0.017	0.053	0.080

References

National Building Code of Canada 2005 NRCC no. 47666; sections 4.1.8, 9.20.1.2, 9.23.10.2, 9.31.6.2, and 6.2.1.3

Appendix C: Climatic Information for Building Design in Canada - table in Appendix C starting on page C-11 of Division B, volume 2

User's Guide - NBC 2005, Structural Commentaries NRCC no. 48192

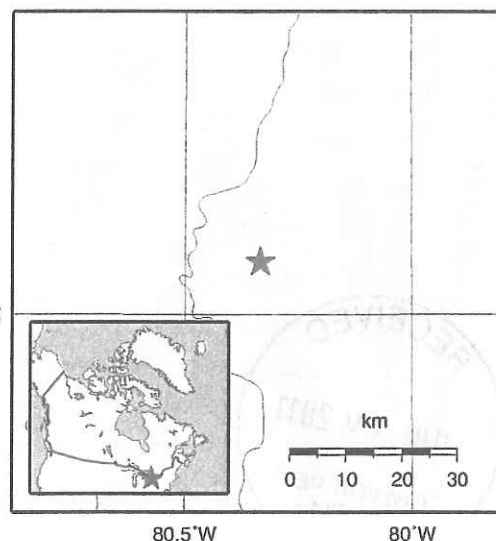
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File xxxx

Fourth generation seismic hazard maps of Canada: Grid values to be used with the 2005 National Building Code of Canada (in preparation)

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

Aussi disponible en français



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