

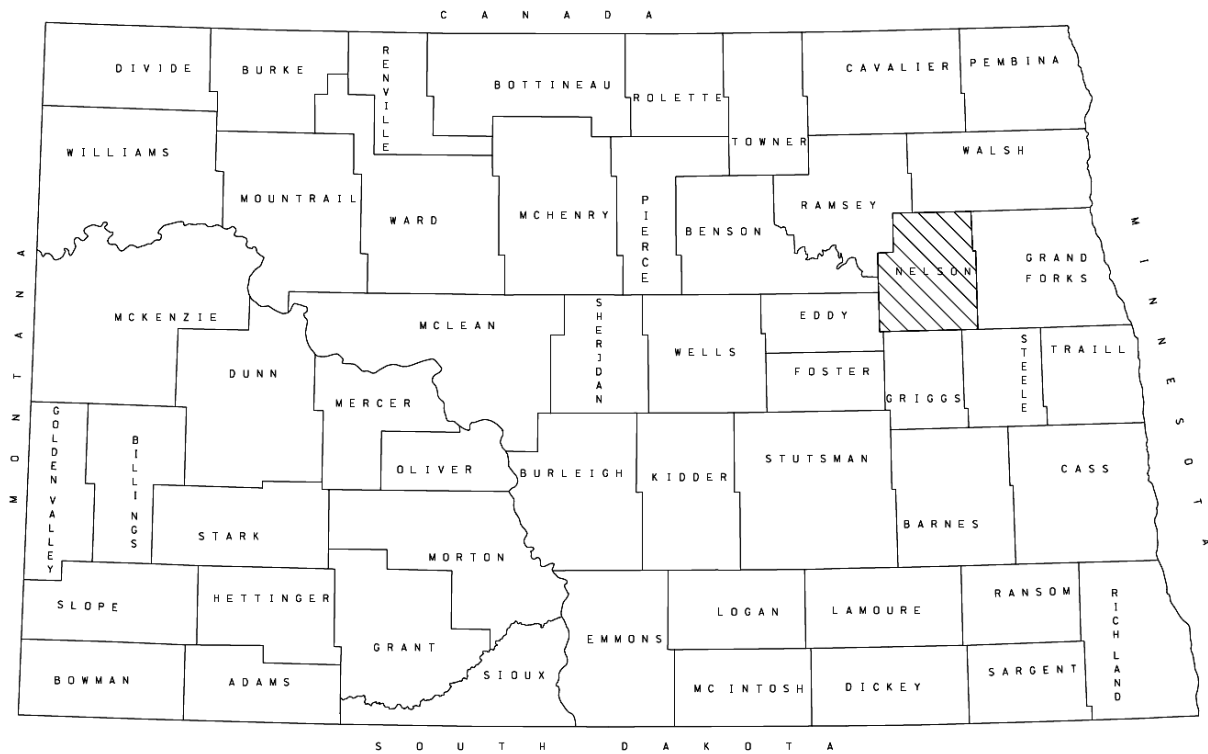
Borrow Site Report

PROJECT NO. BND-NH-6-002(134)313

PCN 22278

COUNTY: Nelson

US 2, RP 312.581 to RP 314.276



PREPARED BY: Riley McAdoo-Roesler

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION

February 2022

BND-NH-6-002(134)313

US 2, 1 East of ND 32 South

CERTIFICATION

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the State of North Dakota. This document was originally issued and sealed by Jared J. Loegering, Registration number PE-10931 on 02/09/2022 and the original document is stored at the North Dakota Department of Transportation.

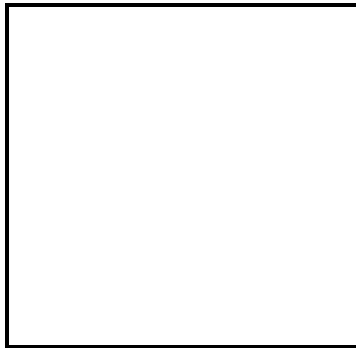


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Appendix A – Boring Locations

Appendix B – Summary and Lab Results for Meyers B-1 Site

Appendix C – NDDOT Material Source Certificate of Approvals

Introduction

This report includes the investigation of the Meyers B-1 borrow site for project BND-NH-6-002(134)313. The field and subsurface investigation was conducted on 11/8/2021 in order to develop this report.

Sampling and Testing Procedures

Borings were conducted with a six-inch solid flight auger. Soil samples were taken at each boring location. Borings that had significant changes in soil type were split into separate samples. Moisture content samples were taken at 1-foot intervals.

The samples were submitted to the laboratory for determination of AASHTO classification, moisture content, dry density, sieve analysis, and Atterberg limits.

Borrow Site

This borrow site was drilled on 11/8/2021. A total of 28 borings were completed. Laboratory data for the boring can be found in Appendix B. See Appendix C for the NDDOT Material Source Certificate of Approval for the borrow sites. There is a pipeline that runs through the west side of the borrow site that will need to be avoided.

Summary and Recommendations

Meyer B-1 Site Recommendation

A majority of the soils encountered in Meyers B-1 site are sandy lean and fat clays that are classified as A-7-6 soils. The soils vary from low to high swell potential with liquid limits ranging from 29 to 77. The soils generally have a moisture content ranging from 0 to 16 percent over optimum.

These soils are typical of clays found in North Dakota. In general, the moisture content of the soils is over optimum. Depending on the conditions at the time of construction, the soils may require moisture conditioning. The majority of the material in the borrow site will perform adequately as a subgrade material.

The soils found in denotated areas (avoidance areas 1&2) of the boring location map (Appendix A) contain silt and classify as A-7-5. These soils are inadequate subgrade material and cannot be used as embankment material for this project.

If soil of this type is encountered in other areas of the borrow site, that soil cannot be used as embankment material.

APPENDIX A

Map of Boring Locations



Legend

- Boring locations
- Reference Point



APPENDIX B

Summary and Lab Results

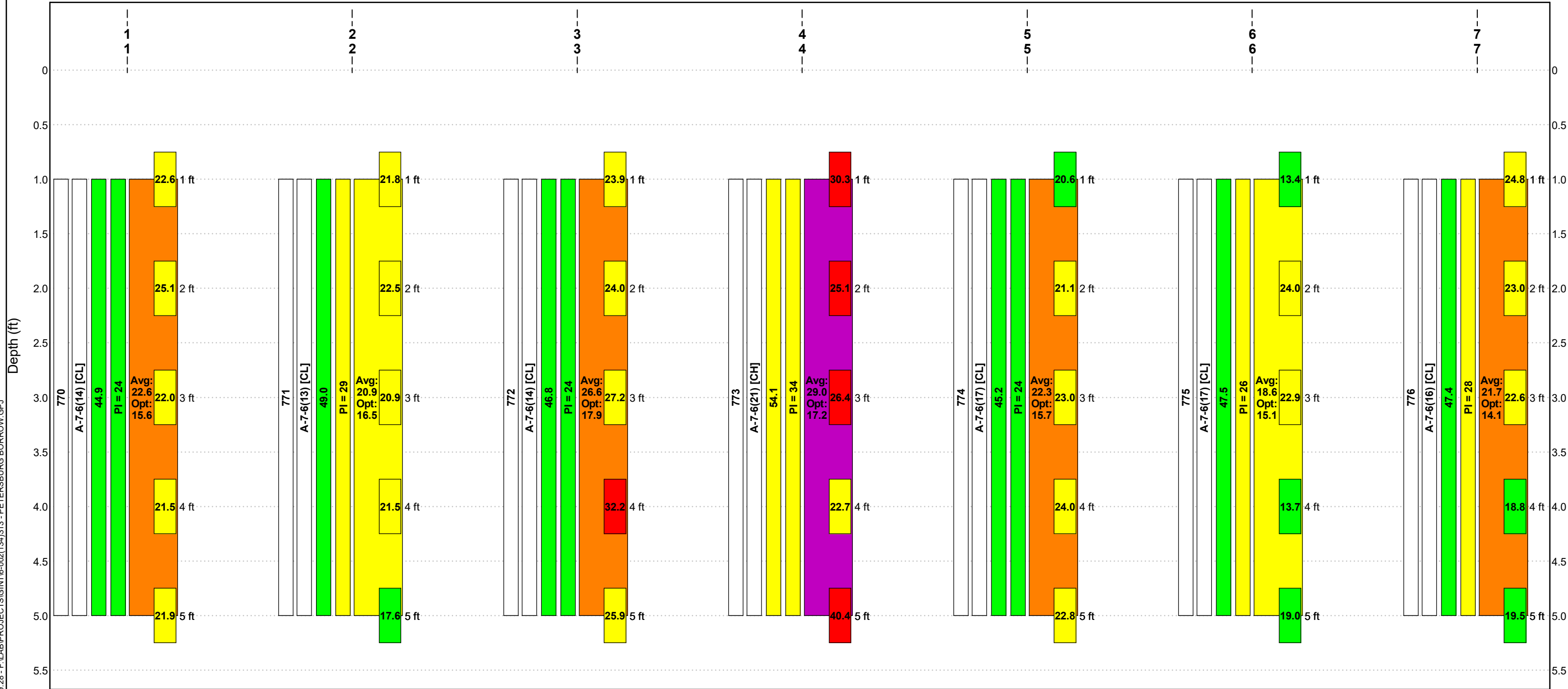
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 300 AIRPORT ROAD
 BISMARCK, ND 58504

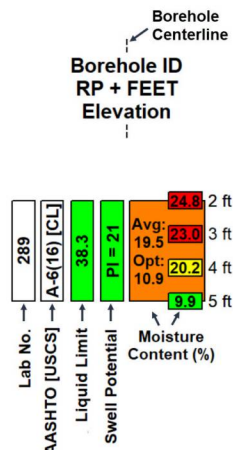
PROJECT NUMBER NH-6-002(134)313
 LOCATION Nelson County

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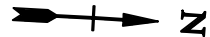
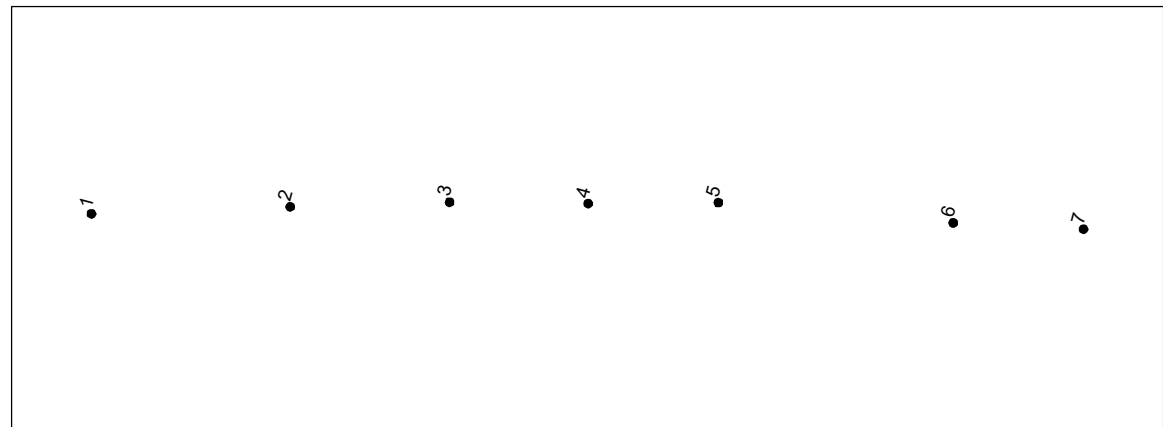


Boreholes Equally Spaced (0 to 650 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60		
Swell Potential	Low	Marginal	High		
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic	
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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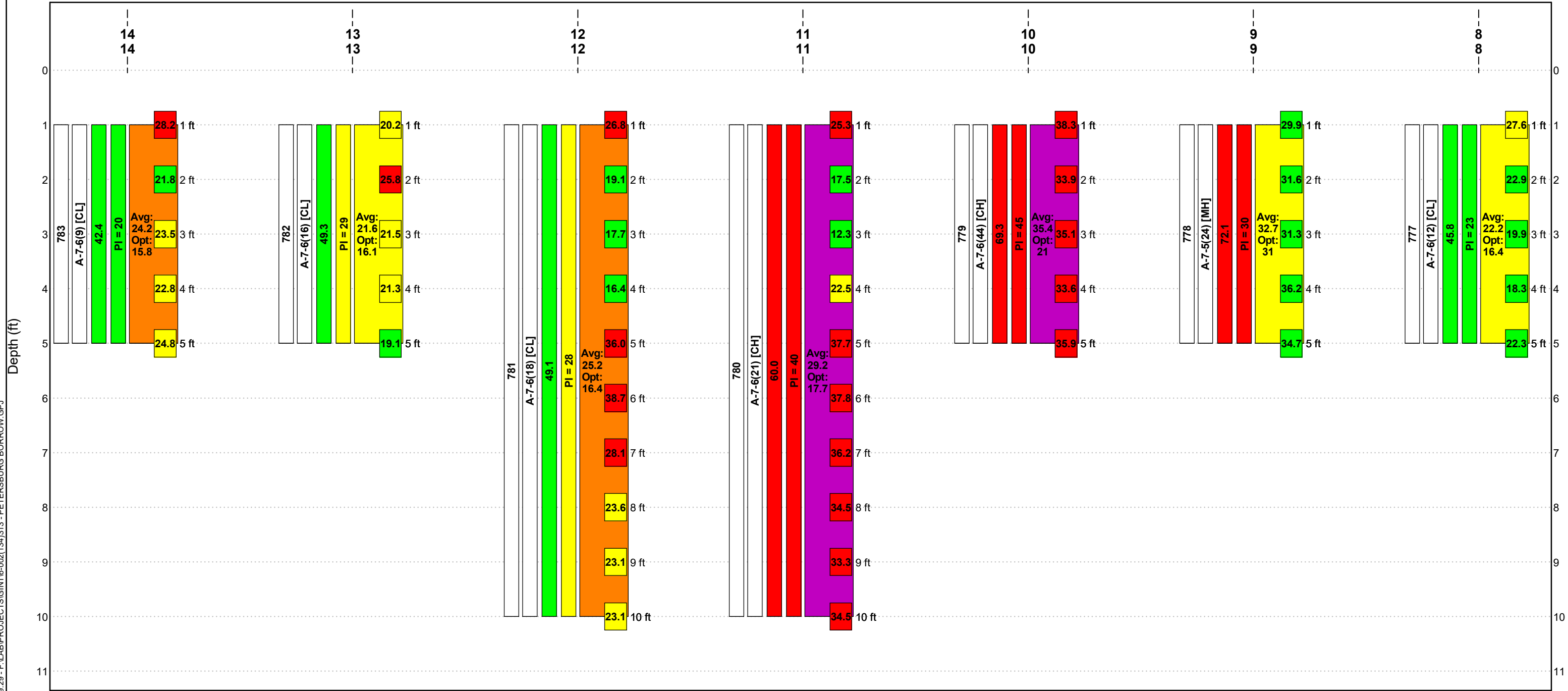


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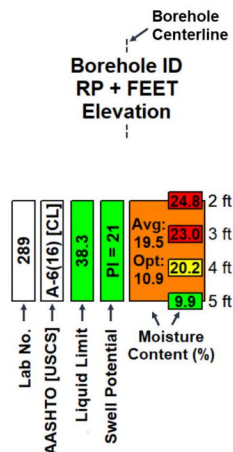
PCN 22278

LOCATION Nelson County

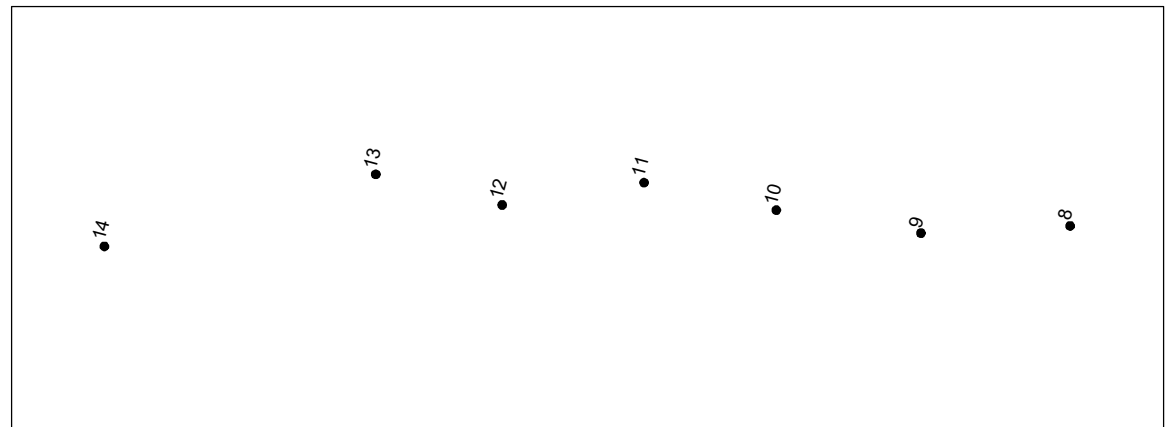


Boreholes Equally Spaced (0 to 550 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60		
Swell Potential	Low	Marginal	High		
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic	
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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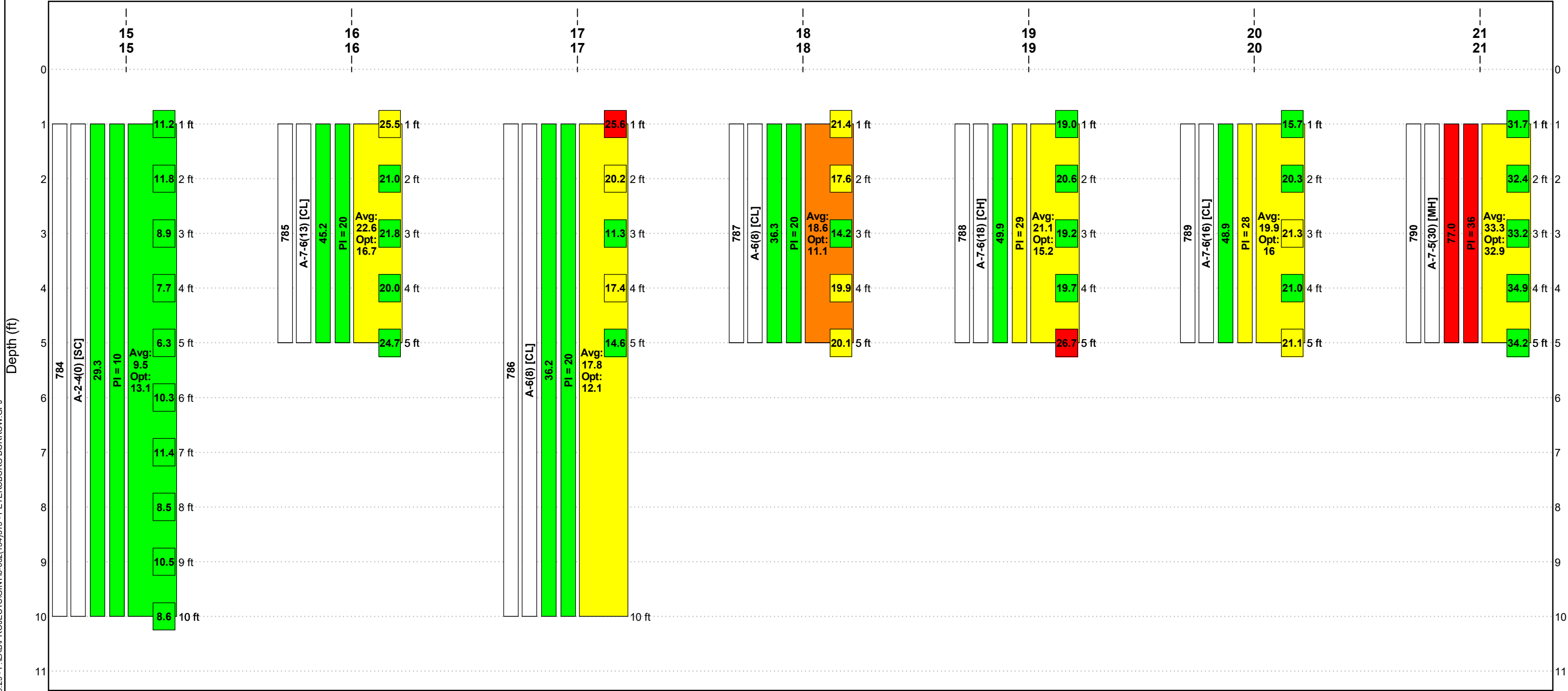


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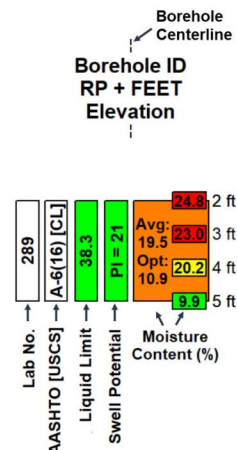
PCN 22278

LOCATION Nelson County

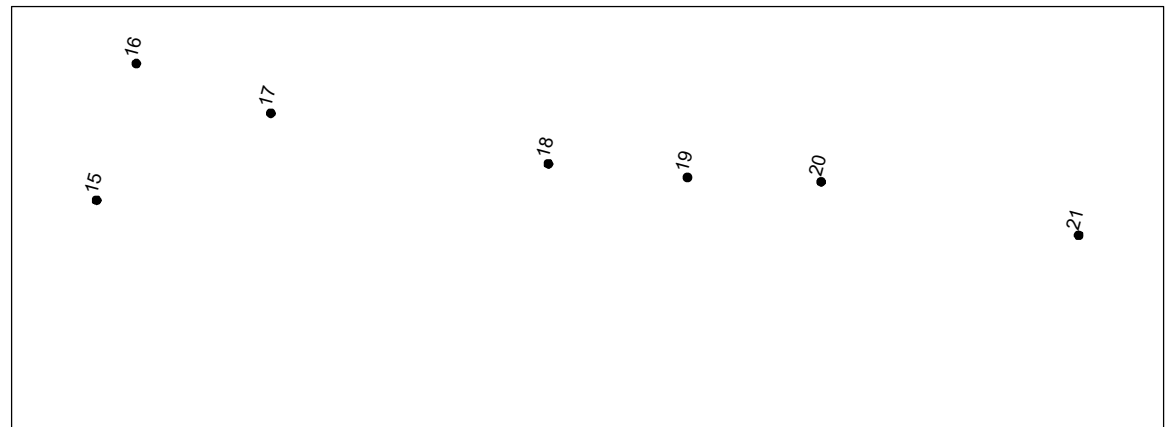


Boreholes Equally Spaced (0 to 600 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60		
Swell Potential	Low	Marginal	High		
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic	
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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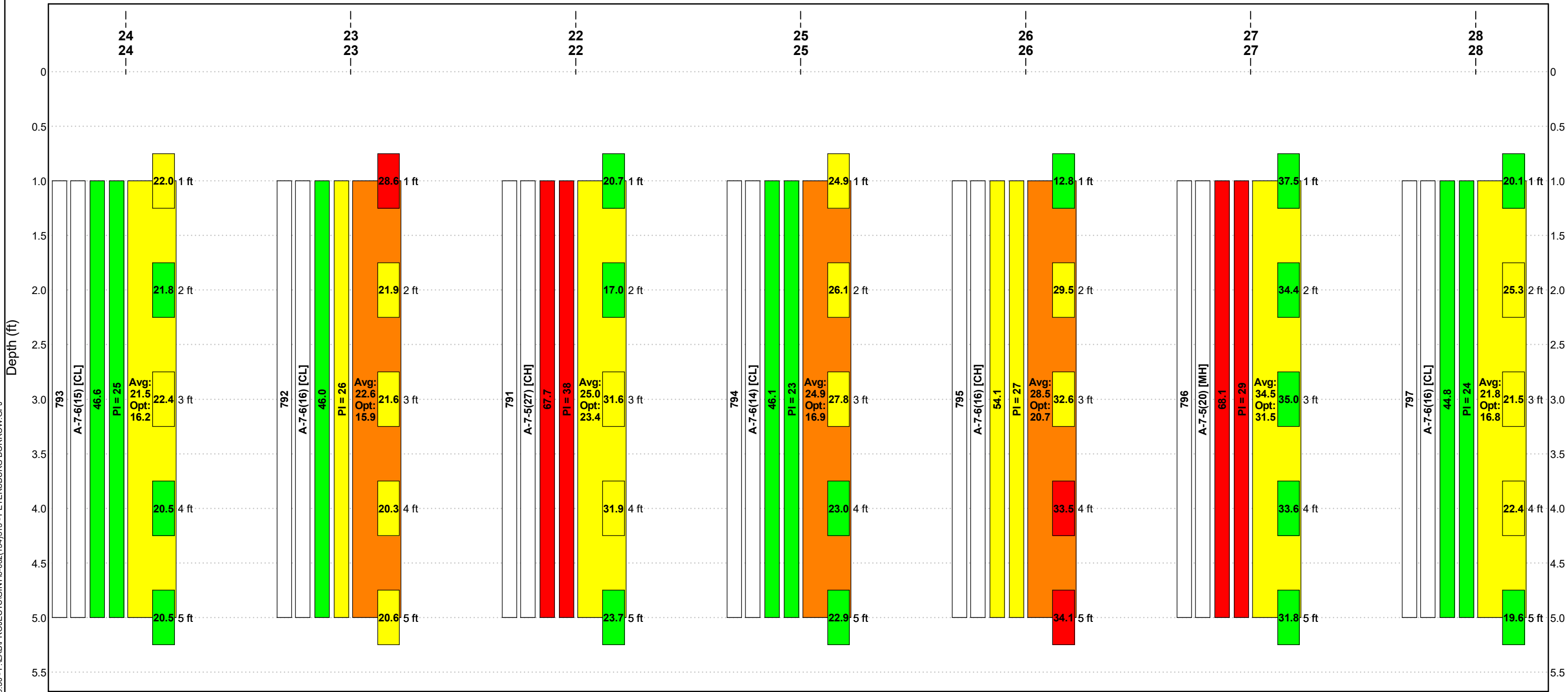


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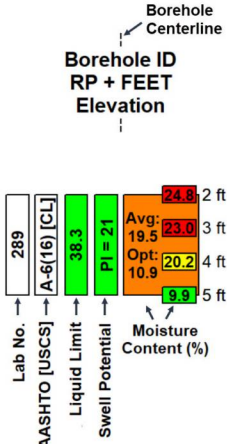
PCN 22278

LOCATION Nelson County

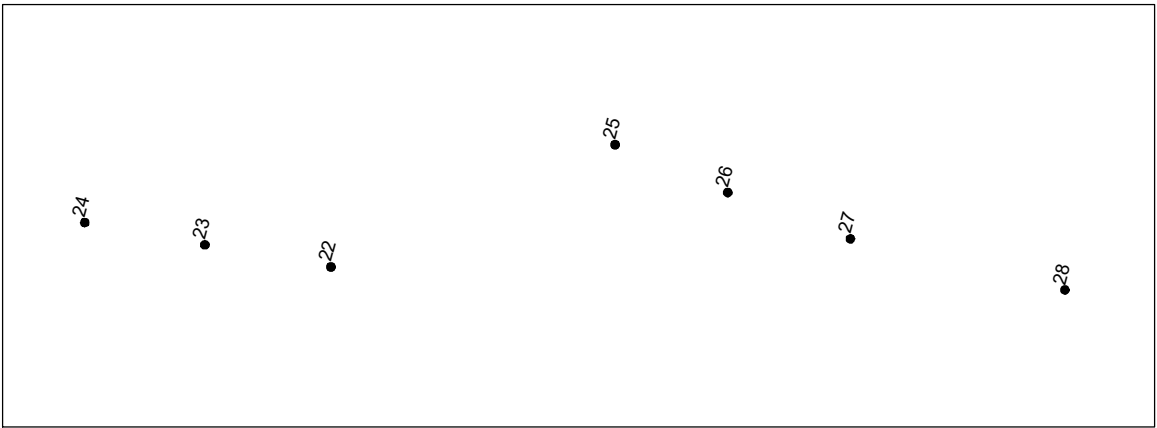


Boreholes Equally Spaced (0 to 650 ft)

LEGEND



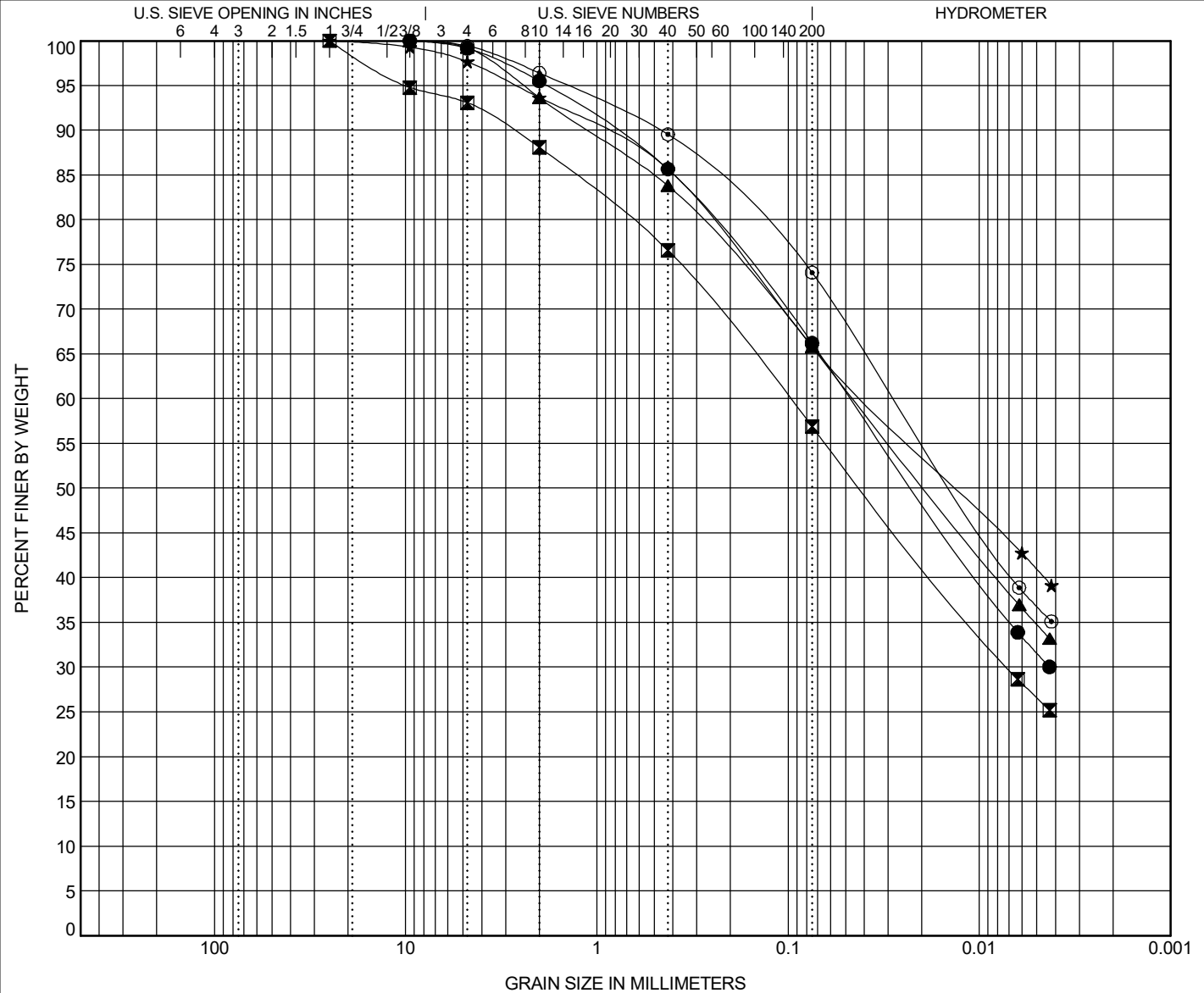
Liquid Limit	LL<50	50<=LL<60	LL>=60		
Swell Potential	Low	Marginal	High		
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic	
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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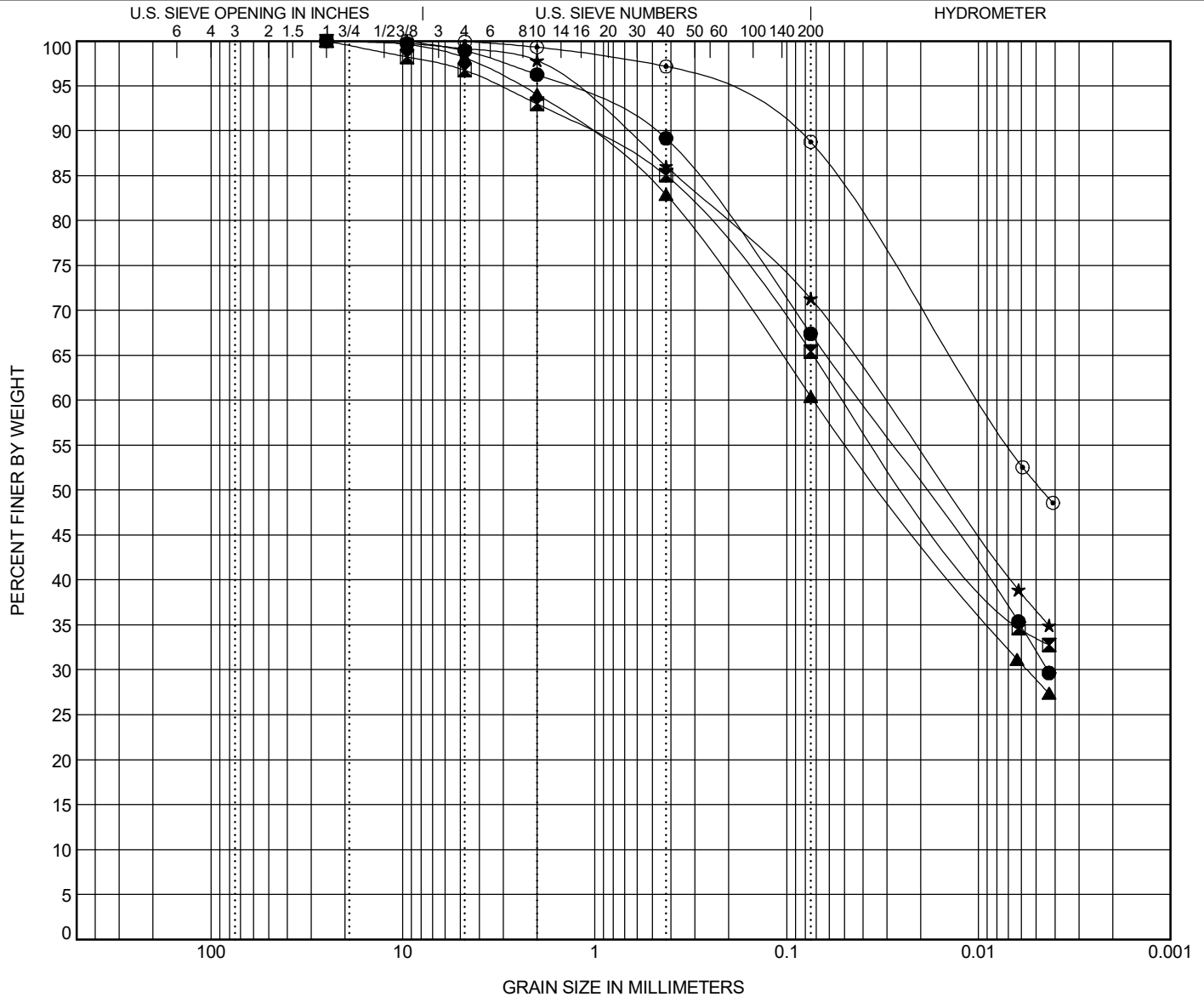
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification		USCS Classification		LL	PL	PI	Cc	Cu
● 1	1.0	A-7-6 (14)		CL		45	21	24		
■ 2	1.0	A-7-6 (13)		CL		49	20	29		
▲ 3	1.0	A-7-6 (14)		CL		47	23	24		
★ 4	1.0	A-7-6 (21)		CH		54	20	34		
⊙ 5	1.0	A-7-6 (17)		CL		45	21	24		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 1	1.0	9.5	0.047			0.8	32.9	66.2		
■ 2	1.0	25	0.099	0.007		6.9	36.2	56.9		
▲ 3	1.0	9.5	0.045			0.7	33.5	65.8		
★ 4	1.0	25	0.04			2.3	31.8	65.8		
⊙ 5	1.0	9.5	0.028			0.6	25.3	74.1		

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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

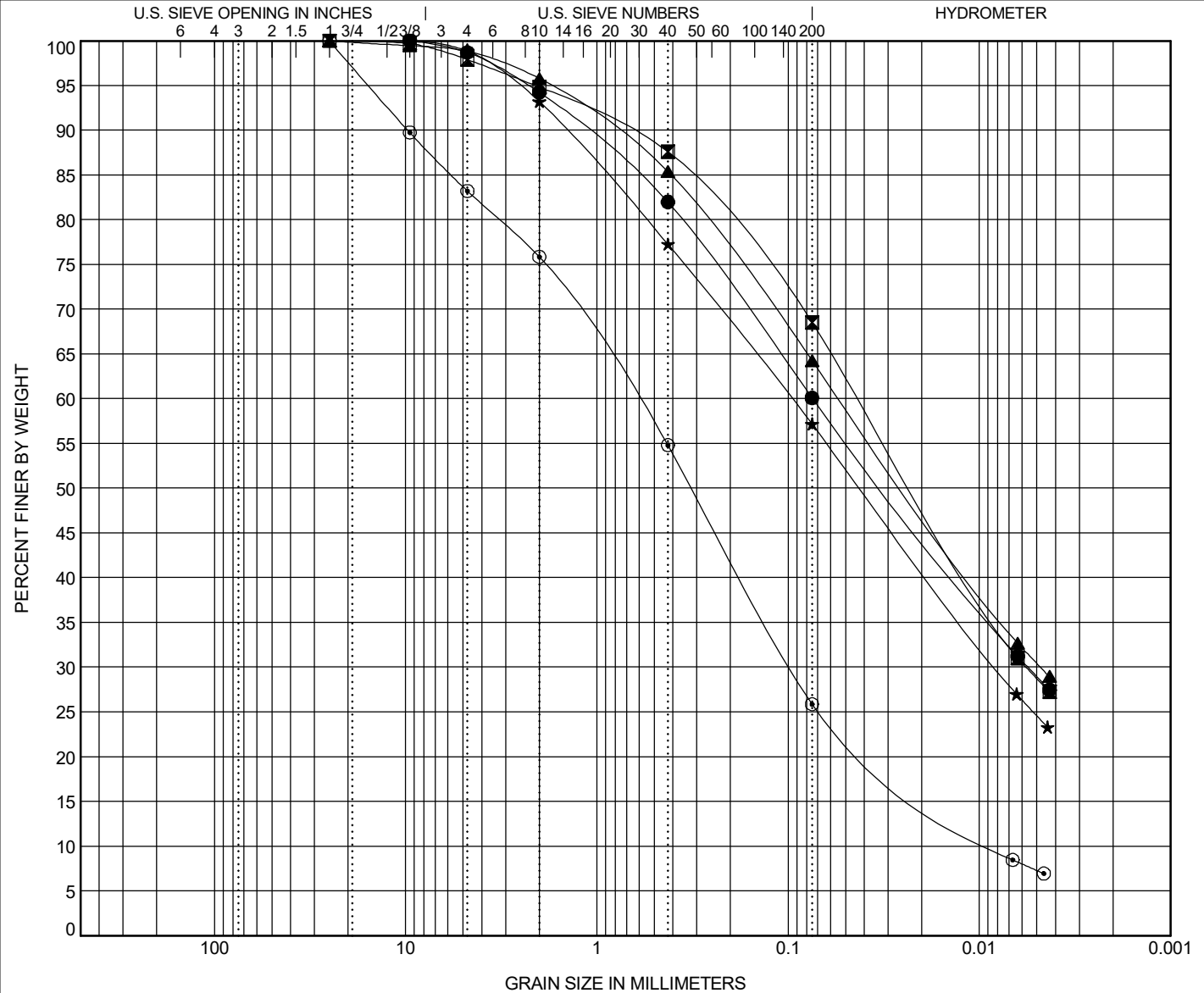
BOREHOLE		DEPTH	AASHTO Classification			USCS Classification		LL	PL	PI	Cc	Cu
●	6	1.0	A-7-6 (17)			CL		48	21	27		
■	7	1.0	A-7-6 (16)			CL		47	20	27		
▲	8	1.0	A-7-6 (12)			CL		46	23	23		
★	9	1.0	A-7-5 (24)			MH		72	42	30		
◎	10	1.0	A-7-6 (44)			CH		69	25	44		
BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	6	1.0	25	0.042	0.004		1.1	31.5	67.4			
■	7	1.0	25	0.048			3.3	31.3	65.4			
▲	8	1.0	25	0.073	0.006		1.9	37.7	60.4			
★	9	1.0	9.5	0.031			0.9	27.8	71.3			
◎	10	1.0	9.5	0.01			0.1	11.1	88.8			

GRAIN SIZE DISTRIBUTION

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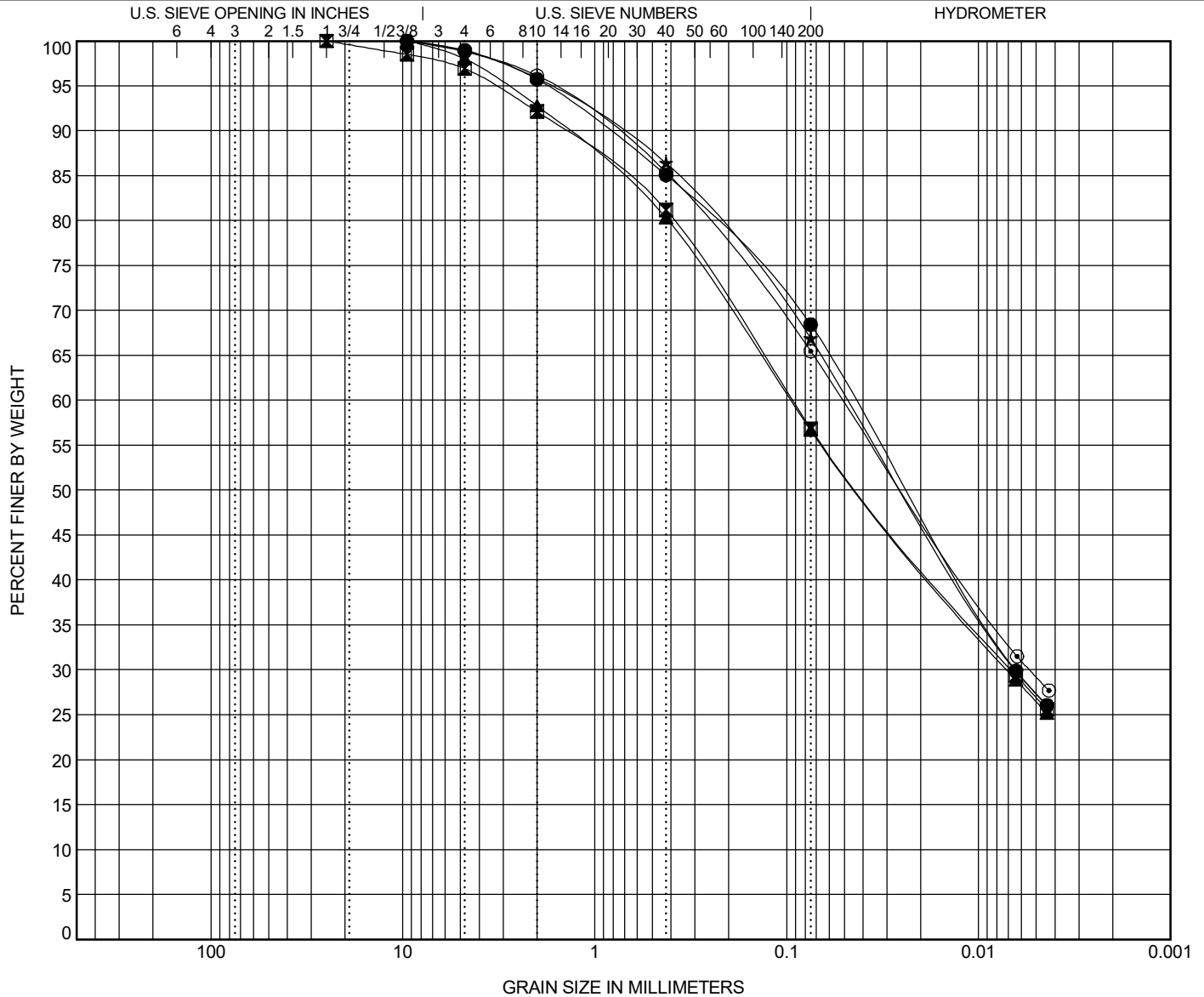
PCN 22278



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LOCATION Nelson County

PCN 22278



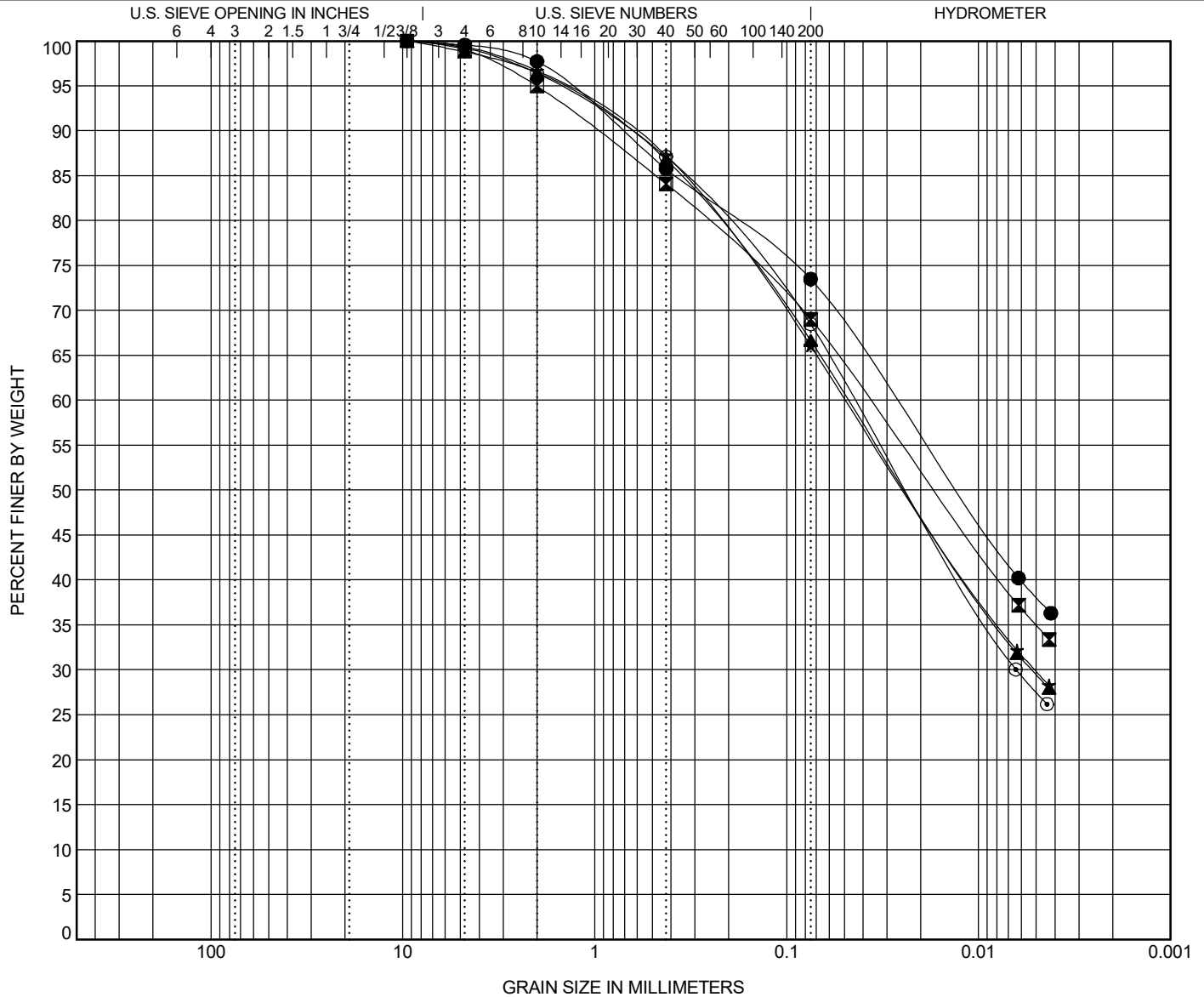
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification		USCS Classification		LL	PL	PI	Cc	Cu
● 16	1.0	A-7-6 (13)		CL		45	25	20		
■ 17	1.0	A-6 (8)		CL		36	16	20		
▲ 18	1.0	A-6 (8)		CL		36	17	19		
★ 19	1.0	A-7-6 (18)		CH		50	21	29		
◎ 20	1.0	A-7-6 (16)		CL		49	21	28		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 16	1.0	9.5	0.044	0.006		1.0	30.5	68.4		
■ 17	1.0	25	0.094	0.007		3.1	40.1	56.8		
▲ 18	1.0	9.5	0.096	0.007		2.0	41.4	56.6		
★ 19	1.0	9.5	0.047	0.006		1.1	32.0	66.9		
◎ 20	1.0	9.5	0.05	0.005		1.2	33.3	65.5		

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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

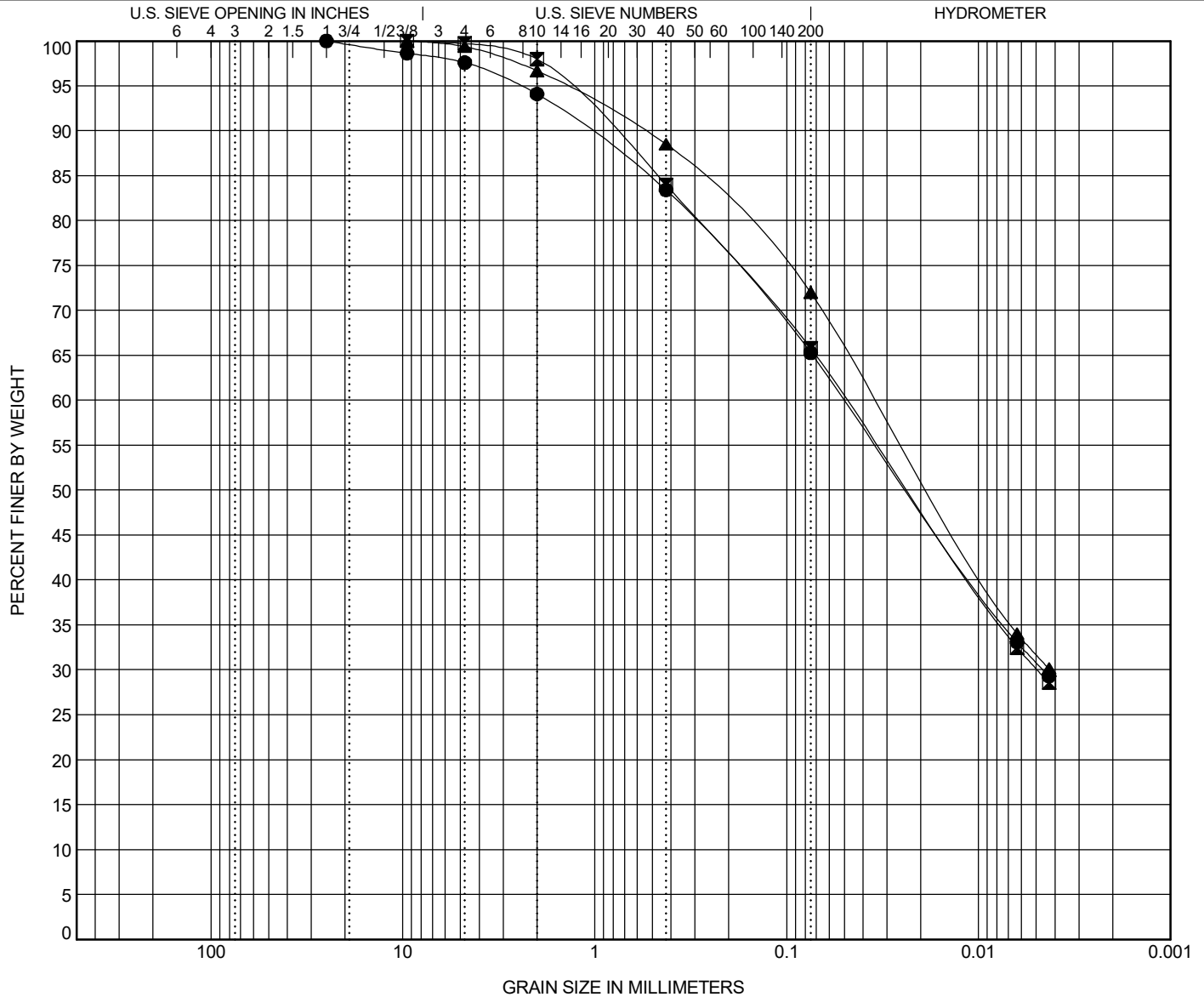
BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 21	1.0	A-7-5 (30)	MH	77	41	36		
■ 22	1.0	A-7-5 (27)	CH	68	30	38		
▲ 23	1.0	A-7-6 (16)	CL	46	20	26		
★ 24	1.0	A-7-6 (15)	CL	47	22	25		
⊙ 25	1.0	A-7-6 (14)	CL	46	23	23		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 21	1.0	9.5	0.027			0.4	26.1	73.5	
■ 22	1.0	9.5	0.037			1.0	30.0	69.0	
▲ 23	1.0	9.5	0.047	0.005		1.2	32.2	66.6	
★ 24	1.0	9.5	0.048	0.005		0.6	33.3	66.1	
⊙ 25	1.0	9.5	0.044	0.006		0.8	30.7	68.5	

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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification		USCS Classification		LL	PL	PI	Cc	Cu
● 26	1.0	A-7-6 (16)		CH		54	28	26		
■ 27	1.0	A-7-5 (20)		MH		68	39	29		
▲ 28	1.0	A-7-6 (16)		CL		45	21	24		
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 26	1.0	25	0.05	0.005		2.4	32.3	65.3		
■ 27	1.0	9.5	0.049	0.005		0.3	33.9	65.8		
▲ 28	1.0	9.5	0.034			0.6	27.4	72.0		

SUMMARY OF LABORATORY RESULTS

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LOCATION Nelson County

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Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
1	1.0	45	21	24	9.5	66	A-7-6 (14)	CL	22.6	22.6			
1	2.0								25.1	22.6			
1	3.0								22.0	22.6			
1	4.0								21.5	22.6			
1	5.0								21.9	22.6			
2	1.0	49	20	29	25	57	A-7-6 (13)	CL	21.8	20.9			
2	2.0								22.5	20.9			
2	3.0								20.9	20.9			
2	4.0								21.5	20.9			
2	5.0								17.6	20.9			
3	1.0	47	23	24	9.5	66	A-7-6 (14)	CL	23.9	26.6			
3	2.0								24.0	26.6			
3	3.0								27.2	26.6			
3	4.0								32.2	26.6			
3	5.0								25.9	26.6			
4	1.0	54	20	34	25	66	A-7-6 (21)	CH	30.3	29.0			
4	2.0								25.1	29.0			
4	3.0								26.4	29.0			
4	4.0								22.7	29.0			
4	5.0								40.4	29.0			
5	1.0	45	21	24	9.5	74	A-7-6 (17)	CL	20.6	22.3			
5	2.0								21.1	22.3			
5	3.0								23.0	22.3			
5	4.0								24.0	22.3			
5	5.0								22.8	22.3			
6	1.0	48	21	27	25	67	A-7-6 (17)	CL	13.4	18.6			
6	2.0								24.0	18.6			
6	3.0								22.9	18.6			
6	4.0								13.7	18.6			
6	5.0								19.0	18.6			
7	1.0	47	20	27	25	65	A-7-6 (16)	CL	24.8	21.7			
7	2.0								23.0	21.7			
7	3.0								22.6	21.7			
7	4.0								18.8	21.7			
7	5.0								19.5	21.7			
8	1.0	46	23	23	25	60	A-7-6 (12)	CL	27.6	22.2			
8	2.0								22.9	22.2			
8	3.0								19.9	22.2			
8	4.0								18.3	22.2			
8	5.0								22.3	22.2			
9	1.0	72	42	30	9.5	71	A-7-5 (24)	MH	29.9	32.7			
9	2.0								31.6	32.7			
9	3.0								31.3	32.7			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER NH-6-002(134)313

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Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
9	4.0								36.2	32.7			
9	5.0								34.7	32.7			
10	1.0	69	25	44	9.5	89	A-7-6 (44)	CH	38.3	35.4			
10	2.0								33.9	35.4			
10	3.0								35.1	35.4			
10	4.0								33.6	35.4			
10	5.0								35.9	35.4			
11	1.0	60	20	40	9.5	60	A-7-6 (21)	CH	25.3	29.2			
11	2.0								17.5	29.2			
11	3.0								12.3	29.2			
11	4.0								22.5	29.2			
11	5.0								37.7	29.2			
11	6.0								37.8	29.2			
11	7.0								36.2	29.2			
11	8.0								34.5	29.2			
11	9.0								33.3	29.2			
11	10.0								34.5	29.2			
12	1.0	49	21	28	25	69	A-7-6 (18)	CL	26.8	25.2			
12	2.0								19.1	25.2			
12	3.0								17.7	25.2			
12	4.0								16.4	25.2			
12	5.0								36.0	25.2			
12	6.0								38.7	25.2			
12	7.0								28.1	25.2			
12	8.0								23.6	25.2			
12	9.0								23.1	25.2			
12	10.0								23.1	25.2			
13	1.0	49	20	29	25	64	A-7-6 (16)	CL	20.2	21.6			
13	2.0								25.8	21.6			
13	3.0								21.5	21.6			
13	4.0								21.3	21.6			
13	5.0								19.1	21.6			
14	1.0	42	22	20	9.5	57	A-7-6 (9)	CL	28.2	24.2			
14	2.0								21.8	24.2			
14	3.0								23.5	24.2			
14	4.0								22.8	24.2			
14	5.0								24.8	24.2			
15	1.0	29	20	9	25	26	A-2-4 (0)	SC	11.2	9.5			
15	2.0								11.8	9.5			
15	3.0								8.9	9.5			
15	4.0								7.7	9.5			
15	5.0								6.3	9.5			
15	6.0								10.3	9.5			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
15	7.0								11.4	9.5			
15	8.0								8.5	9.5			
15	9.0								10.5	9.5			
15	10.0								8.6	9.5			
16	1.0	45	25	20	9.5	68	A-7-6 (13)	CL	25.5	22.6			
16	2.0								21.0	22.6			
16	3.0								21.8	22.6			
16	4.0								20.0	22.6			
16	5.0								24.7	22.6			
17	1.0	36	16	20	25	57	A-6 (8)	CL	25.6	17.8			
17	2.0								20.2	17.8			
17	3.0								11.3	17.8			
17	4.0								17.4	17.8			
17	5.0								14.6	17.8			
18	1.0	36	17	19	9.5	57	A-6 (8)	CL	21.4	18.6			
18	2.0								17.6	18.6			
18	3.0								14.2	18.6			
18	4.0								19.9	18.6			
18	5.0								20.1	18.6			
19	1.0	50	21	29	9.5	67	A-7-6 (18)	CH	19.0	21.1			
19	2.0								20.6	21.1			
19	3.0								19.2	21.1			
19	4.0								19.7	21.1			
19	5.0								26.7	21.1			
20	1.0	49	21	28	9.5	65	A-7-6 (16)	CL	15.7	19.9			
20	2.0								20.3	19.9			
20	3.0								21.3	19.9			
20	4.0								21.0	19.9			
20	5.0								21.1	19.9			
21	1.0	77	41	36	9.5	73	A-7-5 (30)	MH	31.7	33.3			
21	2.0								32.4	33.3			
21	3.0								33.2	33.3			
21	4.0								34.9	33.3			
21	5.0								34.2	33.3			
22	1.0	68	30	38	9.5	69	A-7-5 (27)	CH	20.7	25.0			
22	2.0								17.0	25.0			
22	3.0								31.6	25.0			
22	4.0								31.9	25.0			
22	5.0								23.7	25.0			
23	1.0	46	20	26	9.5	67	A-7-6 (16)	CL	28.6	22.6			
23	2.0								21.9	22.6			
23	3.0								21.6	22.6			
23	4.0								20.3	22.6			



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

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PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
23	5.0								20.6	22.6			
24	1.0	47	22	25	9.5	66	A-7-6 (15)	CL	22.0	21.5			
24	2.0								21.8	21.5			
24	3.0								22.4	21.5			
24	4.0								20.5	21.5			
24	5.0								20.5	21.5			
25	1.0	46	23	23	9.5	68	A-7-6 (14)	CL	24.9	24.9			
25	2.0								26.1	24.9			
25	3.0								27.8	24.9			
25	4.0								23.0	24.9			
25	5.0								22.9	24.9			
26	1.0	54	28	26	25	65	A-7-6 (16)	CH	12.8	28.5			
26	2.0								29.5	28.5			
26	3.0								32.6	28.5			
26	4.0								33.5	28.5			
26	5.0								34.1	28.5			
27	1.0	68	39	29	9.5	66	A-7-5 (20)	MH	37.5	34.5			
27	2.0								34.4	34.5			
27	3.0								35.0	34.5			
27	4.0								33.6	34.5			
27	5.0								31.8	34.5			
28	1.0	45	21	24	9.5	72	A-7-6 (16)	CL	20.1	21.8			
28	2.0								25.3	21.8			
28	3.0								21.5	21.8			
28	4.0								22.4	21.8			
28	5.0								19.6	21.8			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
1	1.0	45	21	24	9.5	66	A-7-6 (14)	CL	22.6	22.6			
1	2.0								25.1	22.6			
1	3.0								22.0	22.6			
1	4.0								21.5	22.6			
1	5.0								21.9	22.6			
2	1.0	49	20	29	25	57	A-7-6 (13)	CL	21.8	20.9			
2	2.0								22.5	20.9			
2	3.0								20.9	20.9			
2	4.0								21.5	20.9			
2	5.0								17.6	20.9			
3	1.0	47	23	24	9.5	66	A-7-6 (14)	CL	23.9	26.6			
3	2.0								24.0	26.6			
3	3.0								27.2	26.6			
3	4.0								32.2	26.6			
3	5.0								25.9	26.6			
4	1.0	54	20	34	25	66	A-7-6 (21)	CH	30.3	29.0			
4	2.0								25.1	29.0			
4	3.0								26.4	29.0			
4	4.0								22.7	29.0			
4	5.0								40.4	29.0			
5	1.0	45	21	24	9.5	74	A-7-6 (17)	CL	20.6	22.3			
5	2.0								21.1	22.3			
5	3.0								23.0	22.3			
5	4.0								24.0	22.3			
5	5.0								22.8	22.3			
6	1.0	48	21	27	25	67	A-7-6 (17)	CL	13.4	18.6			
6	2.0								24.0	18.6			
6	3.0								22.9	18.6			
6	4.0								13.7	18.6			
6	5.0								19.0	18.6			
7	1.0	47	20	27	25	65	A-7-6 (16)	CL	24.8	21.7			
7	2.0								23.0	21.7			
7	3.0								22.6	21.7			
7	4.0								18.8	21.7			
7	5.0								19.5	21.7			
8	1.0	46	23	23	25	60	A-7-6 (12)	CL	27.6	22.2			
8	2.0								22.9	22.2			
8	3.0								19.9	22.2			
8	4.0								18.3	22.2			
8	5.0								22.3	22.2			
9	1.0	72	42	30	9.5	71	A-7-5 (24)	MH	29.9	32.7			
9	2.0								31.6	32.7			
9	3.0								31.3	32.7			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
9	4.0								36.2	32.7			
9	5.0								34.7	32.7			
10	1.0	69	25	44	9.5	89	A-7-6 (44)	CH	38.3	35.4			
10	2.0								33.9	35.4			
10	3.0								35.1	35.4			
10	4.0								33.6	35.4			
10	5.0								35.9	35.4			
11	1.0	60	20	40	9.5	60	A-7-6 (21)	CH	25.3	29.2			
11	2.0								17.5	29.2			
11	3.0								12.3	29.2			
11	4.0								22.5	29.2			
11	5.0								37.7	29.2			
11	6.0								37.8	29.2			
11	7.0								36.2	29.2			
11	8.0								34.5	29.2			
11	9.0								33.3	29.2			
11	10.0								34.5	29.2			
12	1.0	49	21	28	25	69	A-7-6 (18)	CL	26.8	25.2			
12	2.0								19.1	25.2			
12	3.0								17.7	25.2			
12	4.0								16.4	25.2			
12	5.0								36.0	25.2			
12	6.0								38.7	25.2			
12	7.0								28.1	25.2			
12	8.0								23.6	25.2			
12	9.0								23.1	25.2			
12	10.0								23.1	25.2			
13	1.0	49	20	29	25	64	A-7-6 (16)	CL	20.2	21.6			
13	2.0								25.8	21.6			
13	3.0								21.5	21.6			
13	4.0								21.3	21.6			
13	5.0								19.1	21.6			
14	1.0	42	22	20	9.5	57	A-7-6 (9)	CL	28.2	24.2			
14	2.0								21.8	24.2			
14	3.0								23.5	24.2			
14	4.0								22.8	24.2			
14	5.0								24.8	24.2			
15	1.0	29	20	9	25	26	A-2-4 (0)	SC	11.2	9.5			
15	2.0								11.8	9.5			
15	3.0								8.9	9.5			
15	4.0								7.7	9.5			
15	5.0								6.3	9.5			
15	6.0								10.3	9.5			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
15	7.0								11.4	9.5			
15	8.0								8.5	9.5			
15	9.0								10.5	9.5			
15	10.0								8.6	9.5			
16	1.0	45	25	20	9.5	68	A-7-6 (13)	CL	25.5	22.6			
16	2.0								21.0	22.6			
16	3.0								21.8	22.6			
16	4.0								20.0	22.6			
16	5.0								24.7	22.6			
17	1.0	36	16	20	25	57	A-6 (8)	CL	25.6	17.8			
17	2.0								20.2	17.8			
17	3.0								11.3	17.8			
17	4.0								17.4	17.8			
17	5.0								14.6	17.8			
18	1.0	36	17	19	9.5	57	A-6 (8)	CL	21.4	18.6			
18	2.0								17.6	18.6			
18	3.0								14.2	18.6			
18	4.0								19.9	18.6			
18	5.0								20.1	18.6			
19	1.0	50	21	29	9.5	67	A-7-6 (18)	CH	19.0	21.1			
19	2.0								20.6	21.1			
19	3.0								19.2	21.1			
19	4.0								19.7	21.1			
19	5.0								26.7	21.1			
20	1.0	49	21	28	9.5	65	A-7-6 (16)	CL	15.7	19.9			
20	2.0								20.3	19.9			
20	3.0								21.3	19.9			
20	4.0								21.0	19.9			
20	5.0								21.1	19.9			
21	1.0	77	41	36	9.5	73	A-7-5 (30)	MH	31.7	33.3			
21	2.0								32.4	33.3			
21	3.0								33.2	33.3			
21	4.0								34.9	33.3			
21	5.0								34.2	33.3			
22	1.0	68	30	38	9.5	69	A-7-5 (27)	CH	20.7	25.0			
22	2.0								17.0	25.0			
22	3.0								31.6	25.0			
22	4.0								31.9	25.0			
22	5.0								23.7	25.0			
23	1.0	46	20	26	9.5	67	A-7-6 (16)	CL	28.6	22.6			
23	2.0								21.9	22.6			
23	3.0								21.6	22.6			
23	4.0								20.3	22.6			



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
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SUMMARY OF LABORATORY RESULTS

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PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

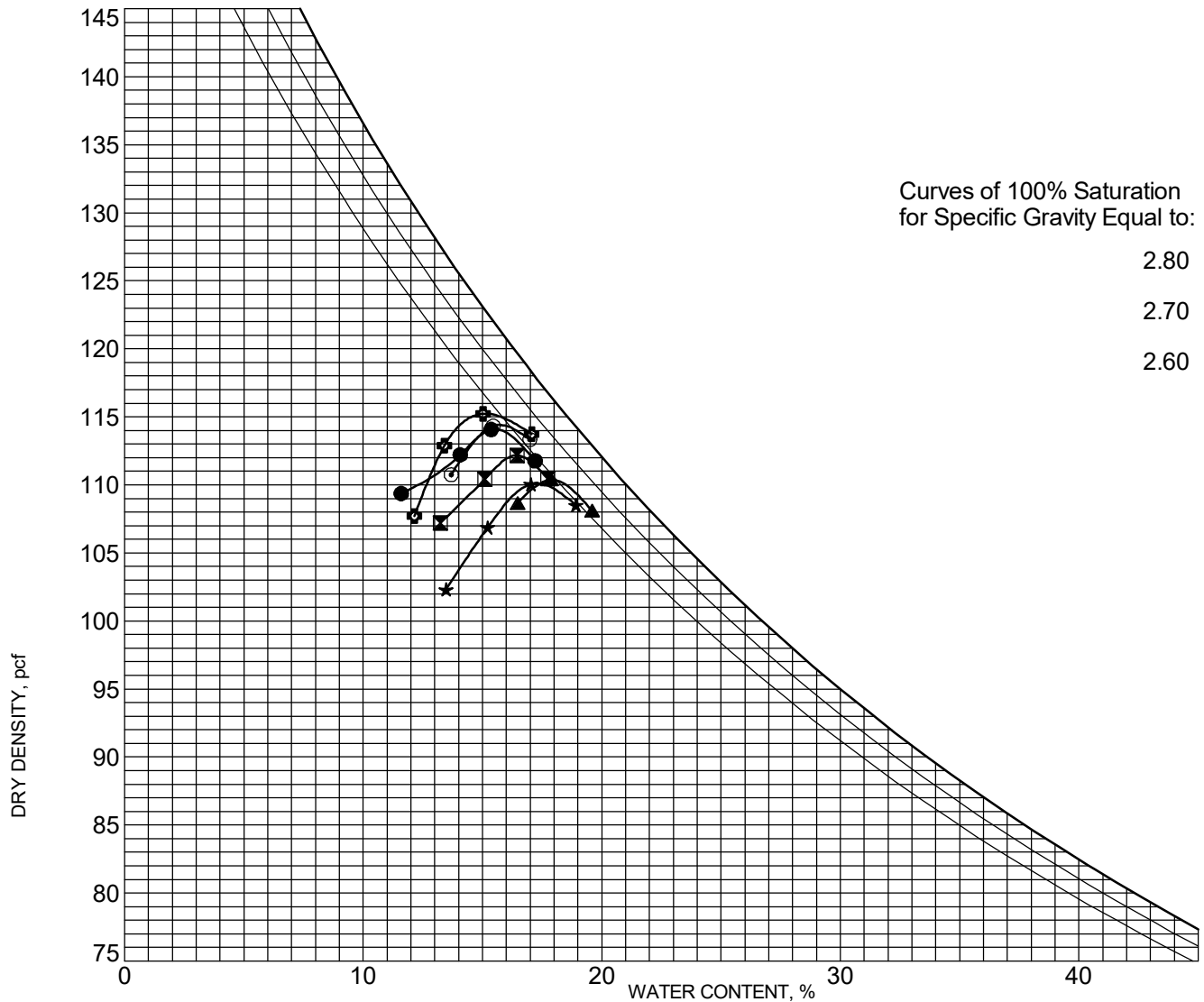
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Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Classification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
23	5.0								20.6	22.6			
24	1.0	47	22	25	9.5	66	A-7-6 (15)	CL	22.0	21.5			
24	2.0								21.8	21.5			
24	3.0								22.4	21.5			
24	4.0								20.5	21.5			
24	5.0								20.5	21.5			
25	1.0	46	23	23	9.5	68	A-7-6 (14)	CL	24.9	24.9			
25	2.0								26.1	24.9			
25	3.0								27.8	24.9			
25	4.0								23.0	24.9			
25	5.0								22.9	24.9			
26	1.0	54	28	26	25	65	A-7-6 (16)	CH					
27	1.0	68	39	29	9.5	66	A-7-5 (20)	MH	37.5	34.5			
27	2.0								34.4	34.5			
27	3.0								35.0	34.5			
27	4.0								33.6	34.5			
27	5.0								31.8	34.5			
28	1.0	45	21	24	9.5	72	A-7-6 (16)	CL	20.1	21.8			
28	2.0								25.3	21.8			
28	3.0								21.5	21.8			
28	4.0								22.4	21.8			
28	5.0								19.6	21.8			

PROJECT NUMBER NH-6-002(134)313

LOCATION Nelson County

PCN 22278



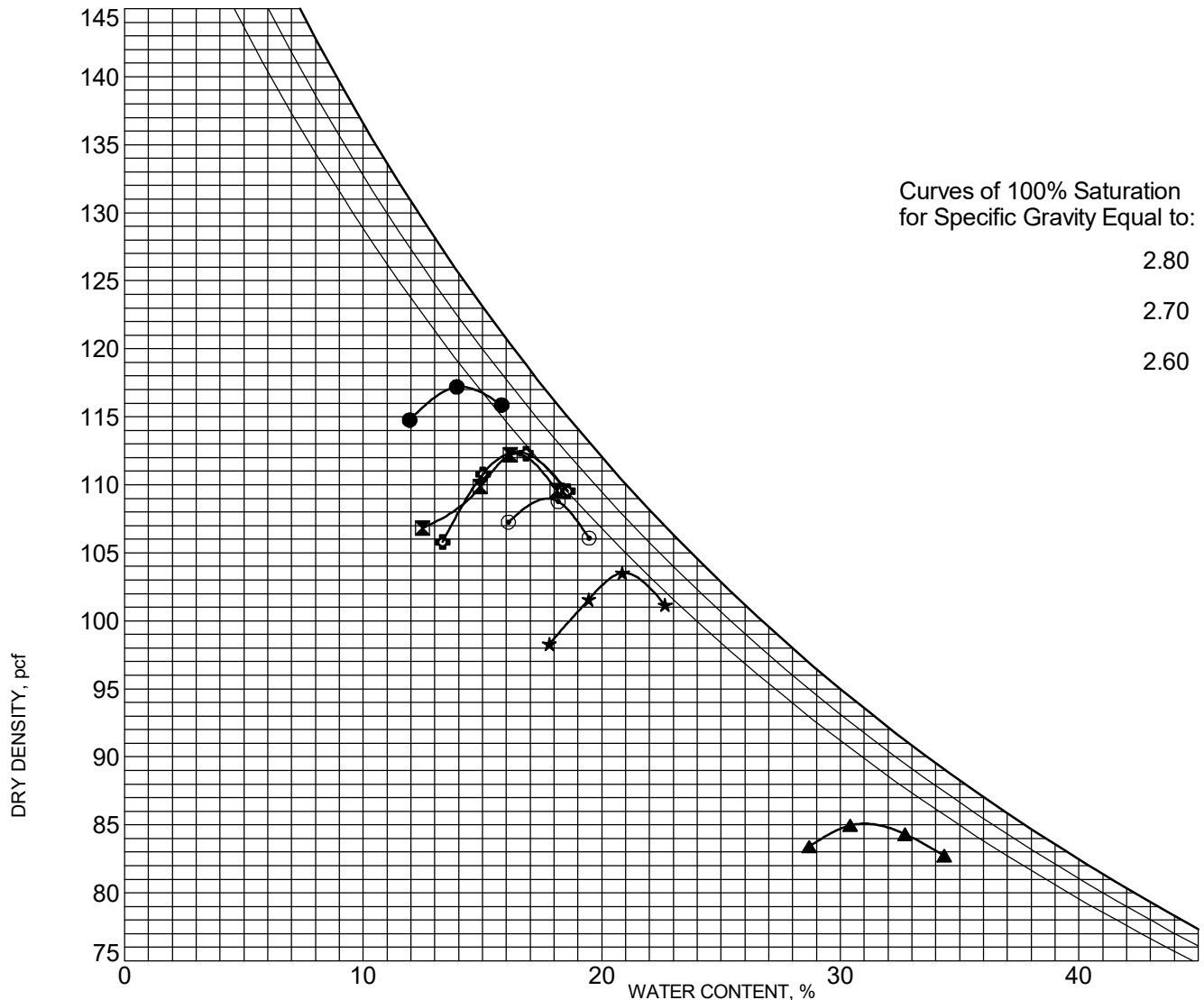
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 1	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)
⊠ 2	1.0	A-7-6 (13)	SANDY LEAN CLAY(CL)
▲ 3	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)
★ 4	1.0	A-7-6 (21)	SANDY FAT CLAY(CH)
⊙ 5	1.0	A-7-6 (17)	LEAN CLAY with SAND(CL)
⊕ 6	1.0	A-7-6 (17)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 1	1.0	AASHTO T-180 Method A	45	21	24	114.1 PCF	15.6 %
⊠ 2	1.0	AASHTO T-180 Method A	49	20	29	112.2 PCF	16.5 %
▲ 3	1.0	AASHTO T-180 Method A	47	23	24	110.4 PCF	17.9 %
★ 4	1.0	AASHTO T-180 Method A	54	20	34	110.1 PCF	17.2 %
⊙ 5	1.0	AASHTO T-180 Method A	45	21	24	114.4 PCF	15.7 %
⊕ 6	1.0	AASHTO T-180 Method A	48	21	27	115.2 PCF	15.1 %

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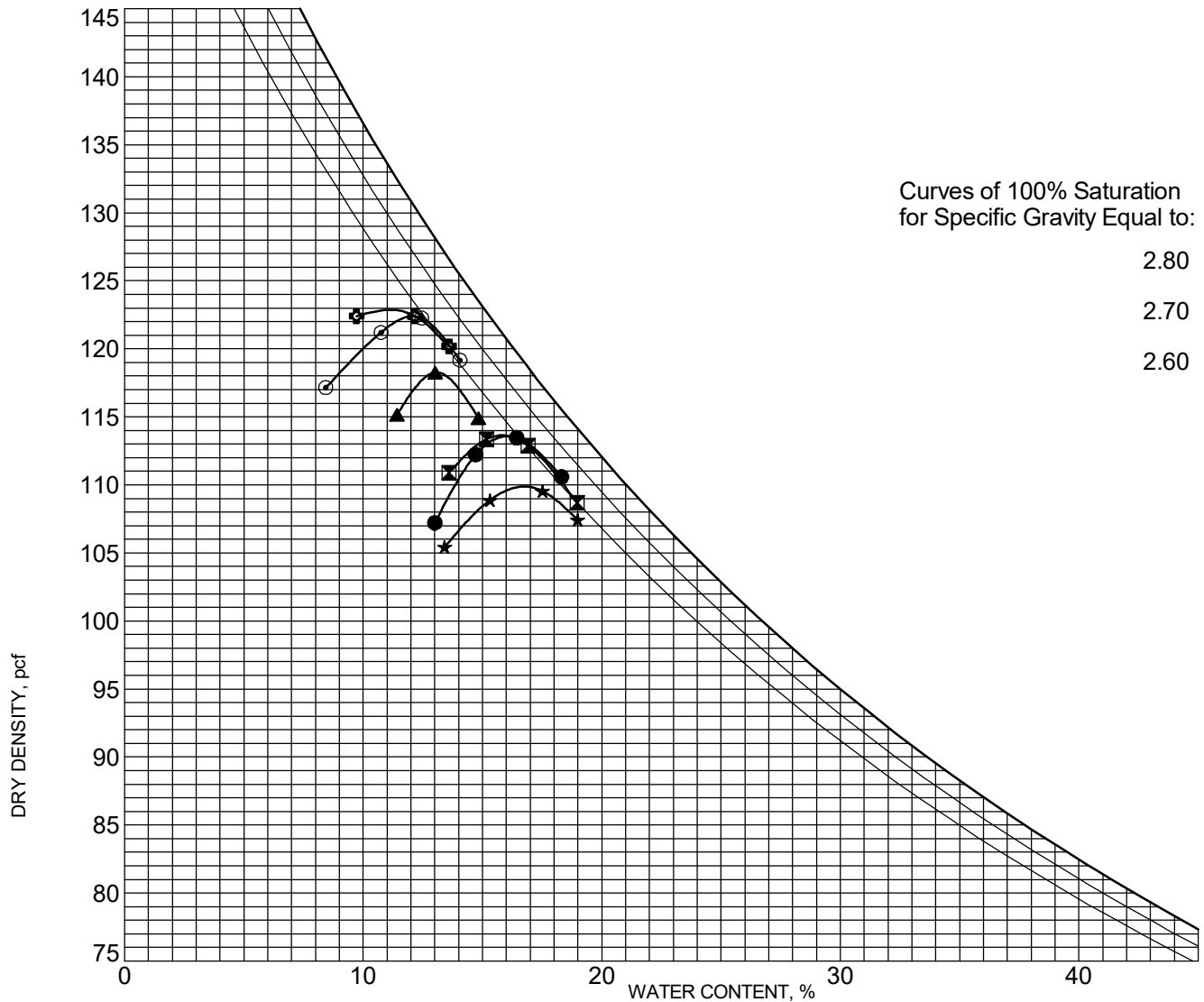
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 7	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
▣ 8	1.0	A-7-6 (12)	SANDY LEAN CLAY(CL)
▲ 9	1.0	A-7-5 (24)	ELASTIC SILT with SAND(MH)
★ 10	1.0	A-7-6 (44)	FAT CLAY(CH)
⊙ 11	1.0	A-7-6 (21)	SANDY FAT CLAY(CH)
⊕ 12	1.0	A-7-6 (18)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 7	1.0	AASHTO T-180 Method A	47	20	27	117.2 PCF	14.1 %
▣ 8	1.0	AASHTO T-180 Method A	46	23	23	112.3 PCF	16.4 %
▲ 9	1.0	AASHTO T-180 Method A	72	42	30	85.1 PCF	31.0 %
★ 10	1.0	AASHTO T-180 Method A	69	25	44	103.5 PCF	21.0 %
⊙ 11	1.0	AASHTO T-180 Method A	60	20	40	109.0 PCF	17.7 %
⊕ 12	1.0	AASHTO T-180 Method A	49	21	28	112.4 PCF	16.4 %

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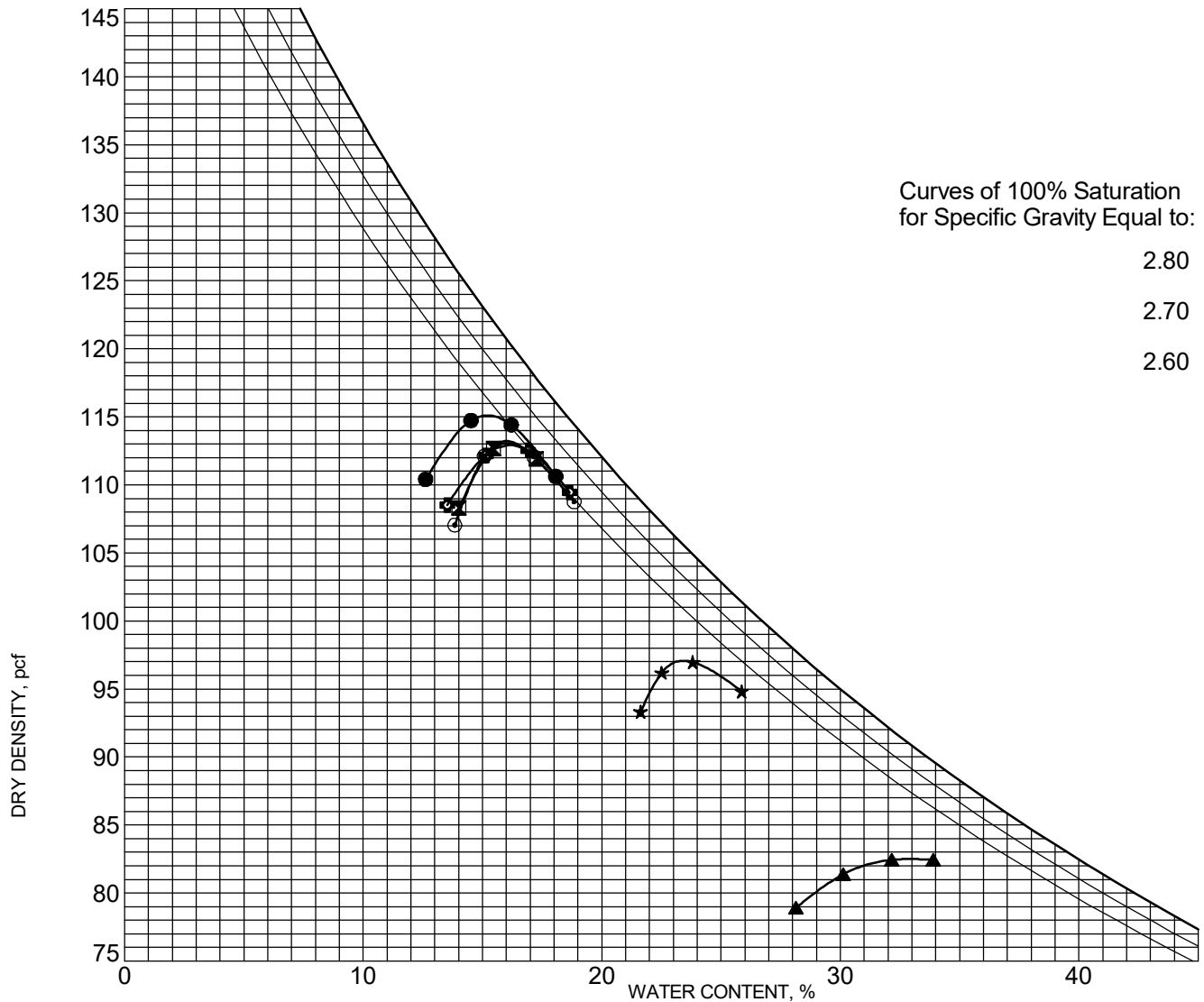
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 13	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
⊠ 14	1.0	A-7-6 (9)	SANDY LEAN CLAY(CL)
▲ 15	1.0	A-2-4 (0)	CLAYEY SAND with GRAVEL(SC)
★ 16	1.0	A-7-6 (13)	SANDY LEAN CLAY(CL)
⊙ 17	1.0	A-6 (8)	SANDY LEAN CLAY(CL)
⊕ 18	1.0	A-6 (8)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 13	1.0	AASHTO T-180 Method A	49	20	29	113.6 PCF	16.1 %
⊠ 14	1.0	AASHTO T-180 Method A	42	22	20	113.6 PCF	15.8 %
▲ 15	1.0	AASHTO T-180 Method A	29	20	9	118.2 PCF	13.1 %
★ 16	1.0	AASHTO T-180 Method A	45	25	20	109.9 PCF	16.7 %
⊙ 17	1.0	AASHTO T-180 Method A	36	16	20	122.4 PCF	12.1 %
⊕ 18	1.0	AASHTO T-180 Method A	36	17	19	122.9 PCF	11.1 %

PROJECT NUMBER NH-6-002(134)313

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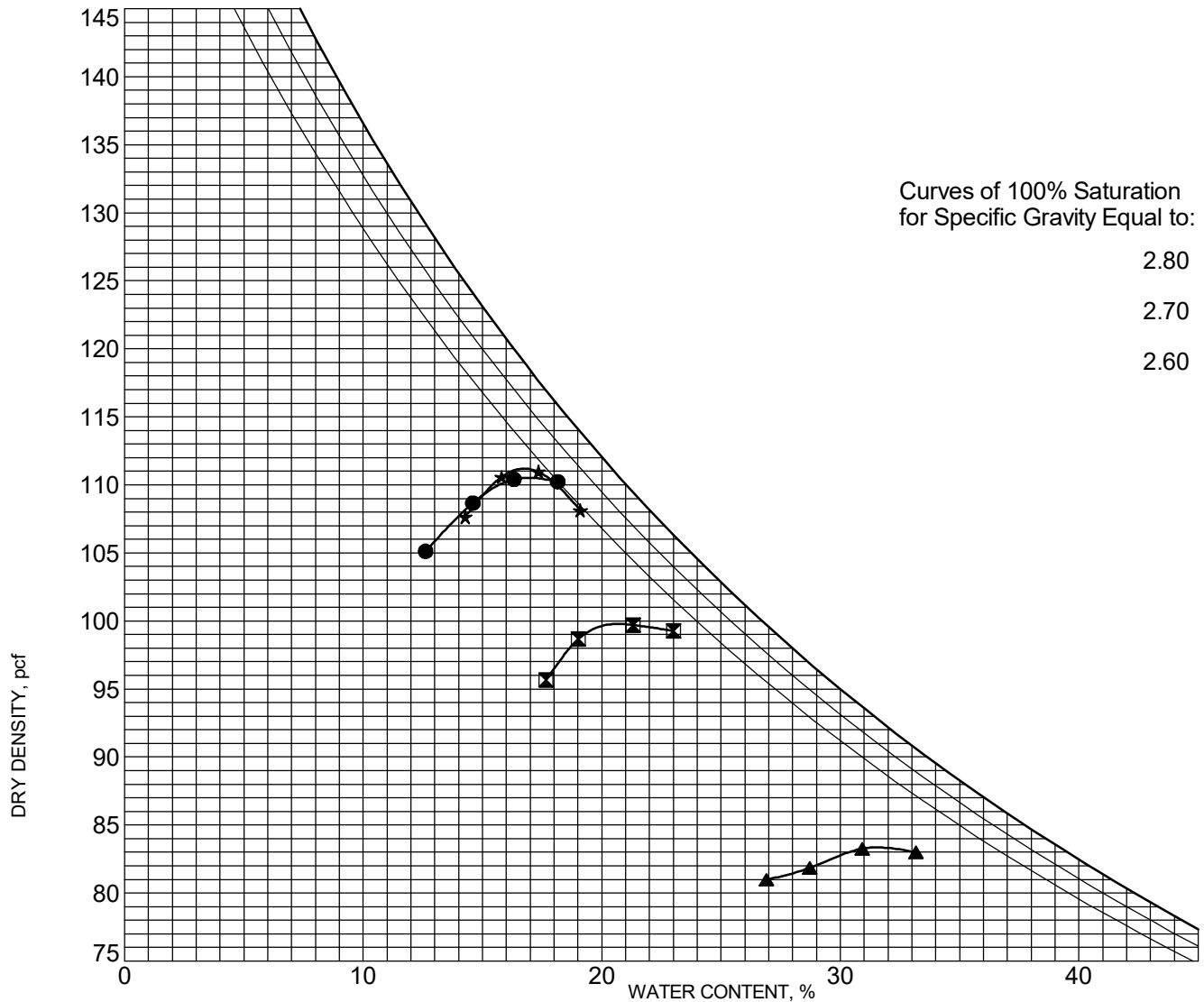
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 19	1.0	A-7-6 (18)	SANDY FAT CLAY(CH)
☒ 20	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
▲ 21	1.0	A-7-5 (30)	ELASTIC SILT with SAND(MH)
★ 22	1.0	A-7-5 (27)	SANDY FAT CLAY(CH)
⊙ 23	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
⊕ 24	1.0	A-7-6 (15)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 19	1.0	AASHTO T-180 Method A	50	21	29	115.1 PCF	15.2 %
☒ 20	1.0	AASHTO T-180 Method A	49	21	28	113.1 PCF	16.0 %
▲ 21	1.0	AASHTO T-180 Method A	77	41	36	82.5 PCF	32.9 %
★ 22	1.0	AASHTO T-180 Method A	68	30	38	97.1 PCF	23.4 %
⊙ 23	1.0	AASHTO T-180 Method A	46	20	26	113.2 PCF	15.9 %
⊕ 24	1.0	AASHTO T-180 Method A	47	22	25	112.9 PCF	16.2 %

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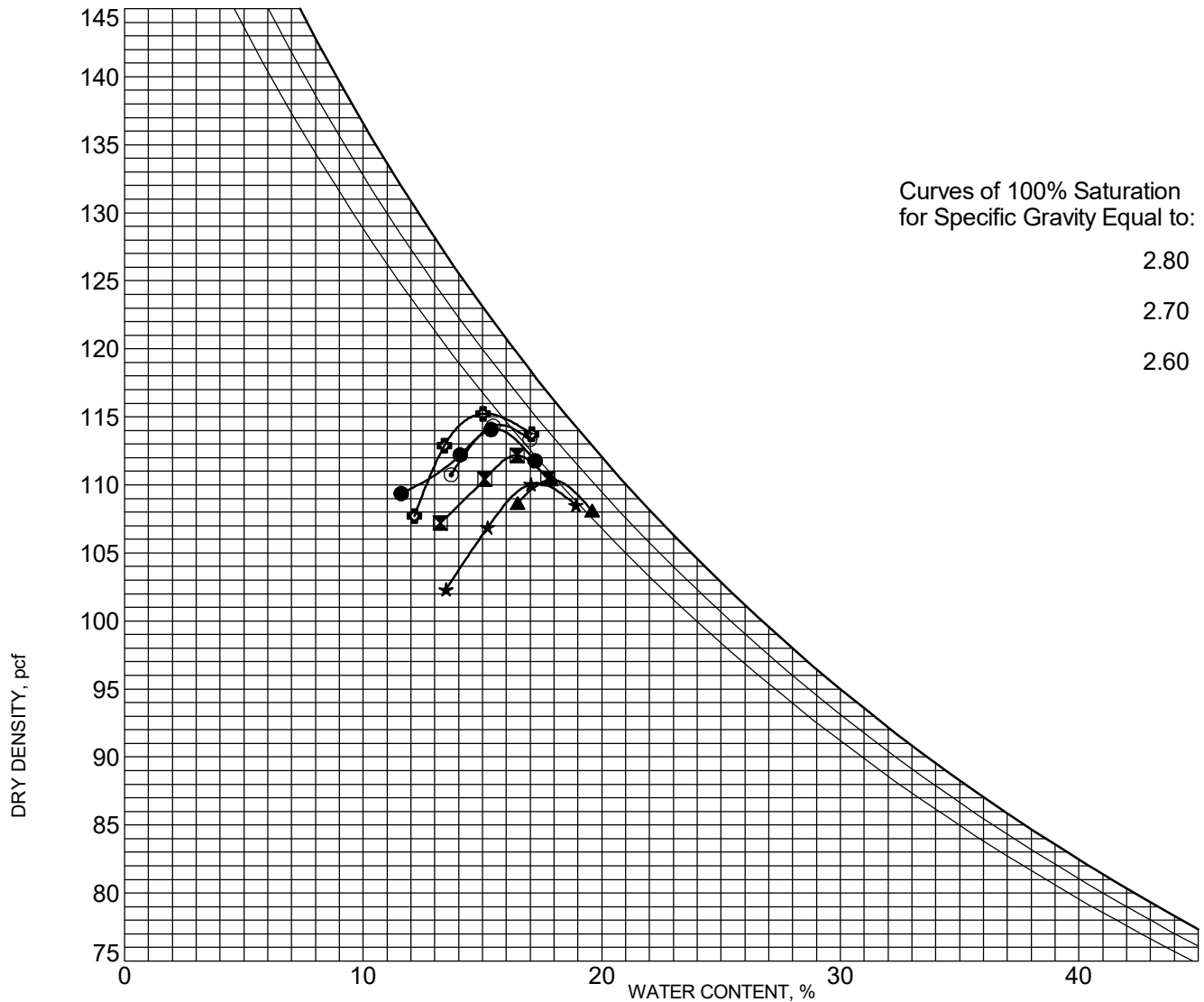
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 25	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)
⊠ 26	1.0	A-7-6 (16)	SANDY FAT CLAY(CH)
▲ 27	1.0	A-7-5 (20)	SANDY ELASTIC SILT(MH)
★ 28	1.0	A-7-6 (16)	LEAN CLAY with SAND(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 25	1.0	AASHTO T-180 Method A	46	23	23	110.5 PCF	16.9 %
⊠ 26	1.0	AASHTO T-180 Method A	54	28	26	99.8 PCF	20.7 %
▲ 27	1.0	AASHTO T-180 Method A	68	39	29	83.4 PCF	31.5 %
★ 28	1.0	AASHTO T-180 Method A	45	21	24	111.2 PCF	16.8 %

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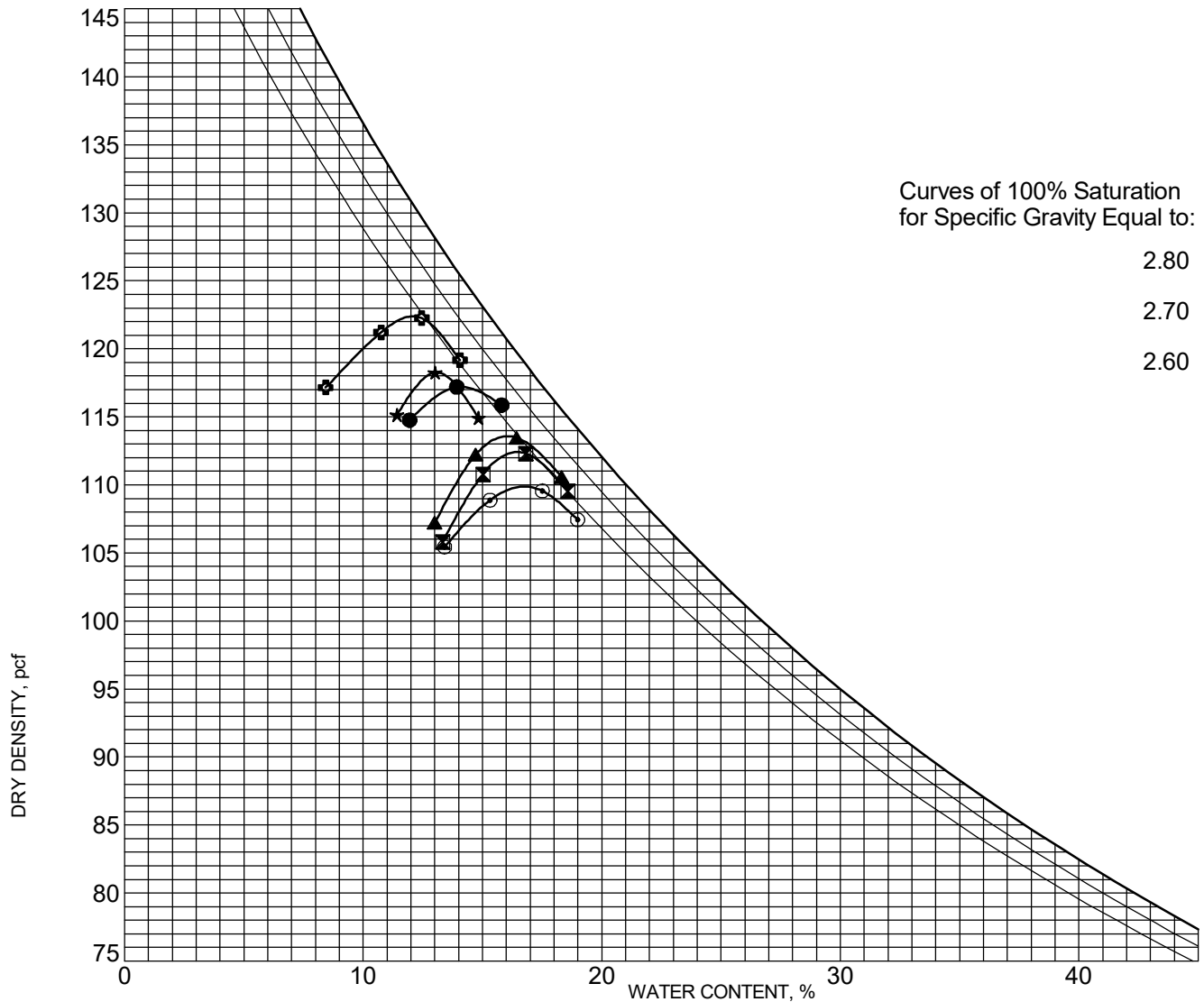
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 1	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)
▣ 2	1.0	A-7-6 (13)	SANDY LEAN CLAY(CL)
▲ 3	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)
★ 4	1.0	A-7-6 (21)	SANDY FAT CLAY(CH)
⊙ 5	1.0	A-7-6 (17)	LEAN CLAY with SAND(CL)
⊕ 6	1.0	A-7-6 (17)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 1	1.0	AASHTO T-180 Method A	45	21	24	114.1 PCF	15.6 %
▣ 2	1.0	AASHTO T-180 Method A	49	20	29	112.2 PCF	16.5 %
▲ 3	1.0	AASHTO T-180 Method A	47	23	24	110.4 PCF	17.9 %
★ 4	1.0	AASHTO T-180 Method A	54	20	34	110.1 PCF	17.2 %
⊙ 5	1.0	AASHTO T-180 Method A	45	21	24	114.4 PCF	15.7 %
⊕ 6	1.0	AASHTO T-180 Method A	48	21	27	115.2 PCF	15.1 %

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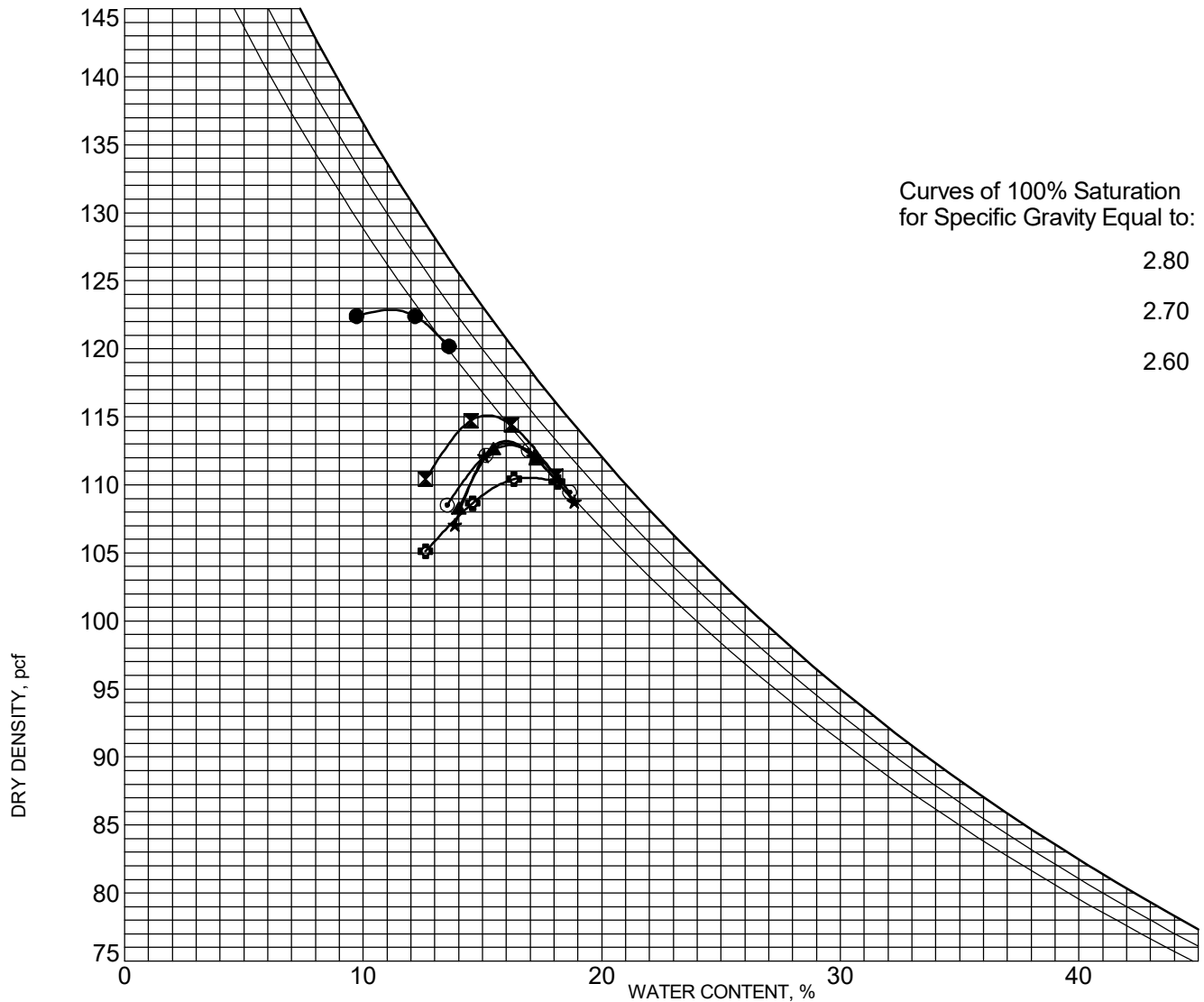
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 7	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
⊠ 12	1.0	A-7-6 (18)	SANDY LEAN CLAY(CL)
▲ 13	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
★ 15	1.0	A-2-4 (0)	CLAYEY SAND with GRAVEL(SC)
⊙ 16	1.0	A-7-6 (13)	SANDY LEAN CLAY(CL)
⊕ 17	1.0	A-6 (8)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 7	1.0	AASHTO T-180 Method A	47	20	27	117.2 PCF	14.1 %
⊠ 12	1.0	AASHTO T-180 Method A	49	21	28	112.4 PCF	16.4 %
▲ 13	1.0	AASHTO T-180 Method A	49	20	29	113.6 PCF	16.1 %
★ 15	1.0	AASHTO T-180 Method A	29	20	9	118.2 PCF	13.1 %
⊙ 16	1.0	AASHTO T-180 Method A	45	25	20	109.9 PCF	16.7 %
⊕ 17	1.0	AASHTO T-180 Method A	36	16	20	122.4 PCF	12.1 %

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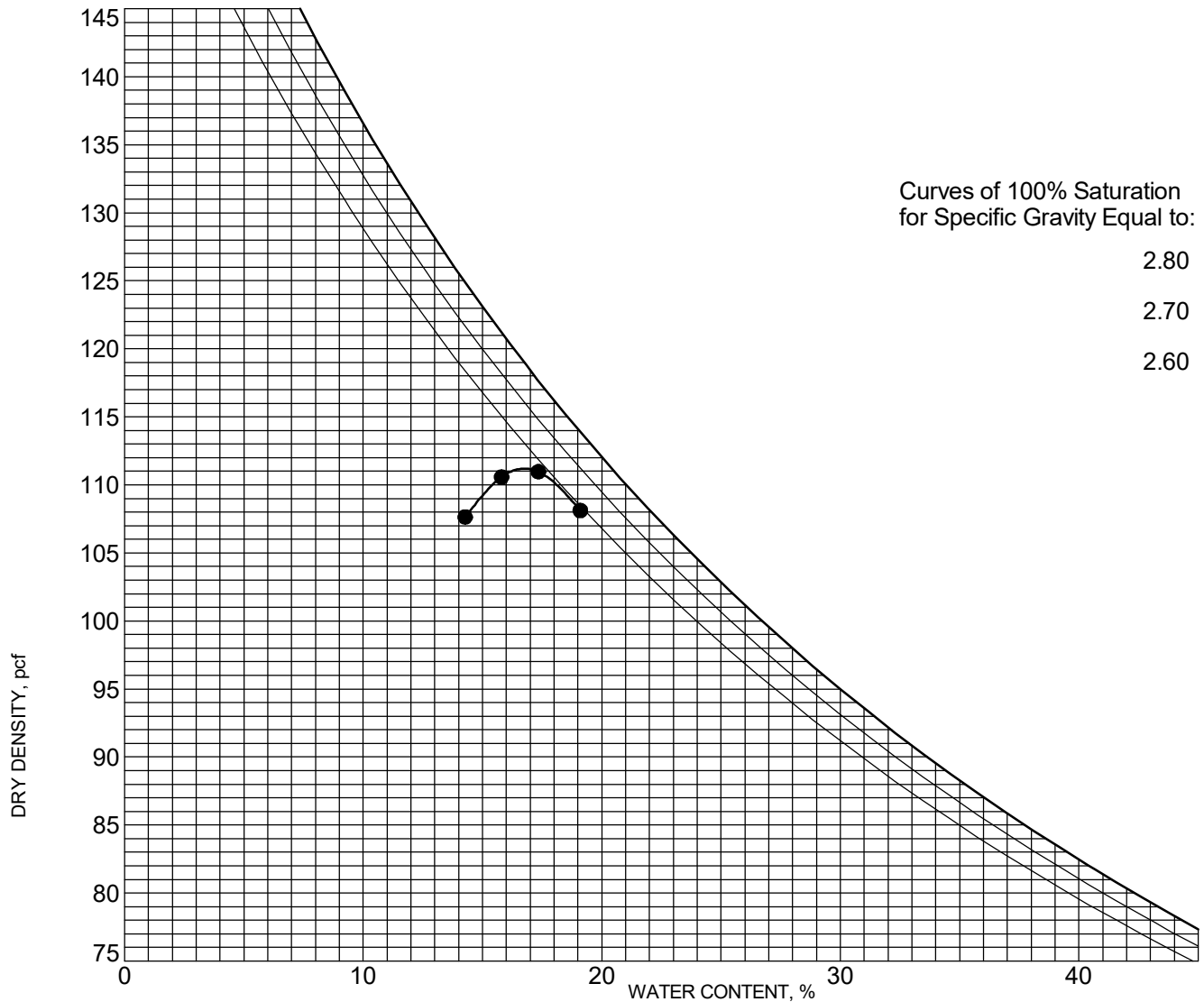
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 18	1.0	A-6 (8)	SANDY LEAN CLAY(CL)
⊠ 19	1.0	A-7-6 (18)	SANDY FAT CLAY(CH)
▲ 20	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
★ 23	1.0	A-7-6 (16)	SANDY LEAN CLAY(CL)
⊙ 24	1.0	A-7-6 (15)	SANDY LEAN CLAY(CL)
⊕ 25	1.0	A-7-6 (14)	SANDY LEAN CLAY(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 18	1.0	AASHTO T-180 Method A	36	17	19	122.9 PCF	11.1 %
⊠ 19	1.0	AASHTO T-180 Method A	50	21	29	115.1 PCF	15.2 %
▲ 20	1.0	AASHTO T-180 Method A	49	21	28	113.1 PCF	16.0 %
★ 23	1.0	AASHTO T-180 Method A	46	20	26	113.2 PCF	15.9 %
⊙ 24	1.0	AASHTO T-180 Method A	47	22	25	112.9 PCF	16.2 %
⊕ 25	1.0	AASHTO T-180 Method A	46	23	23	110.5 PCF	16.9 %

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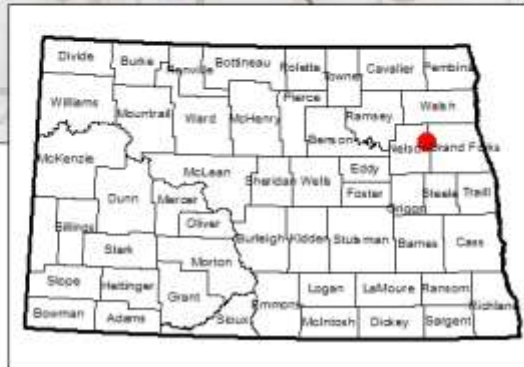
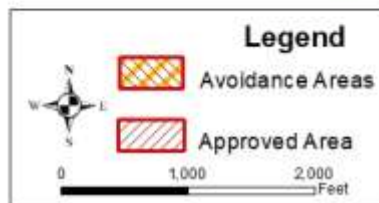
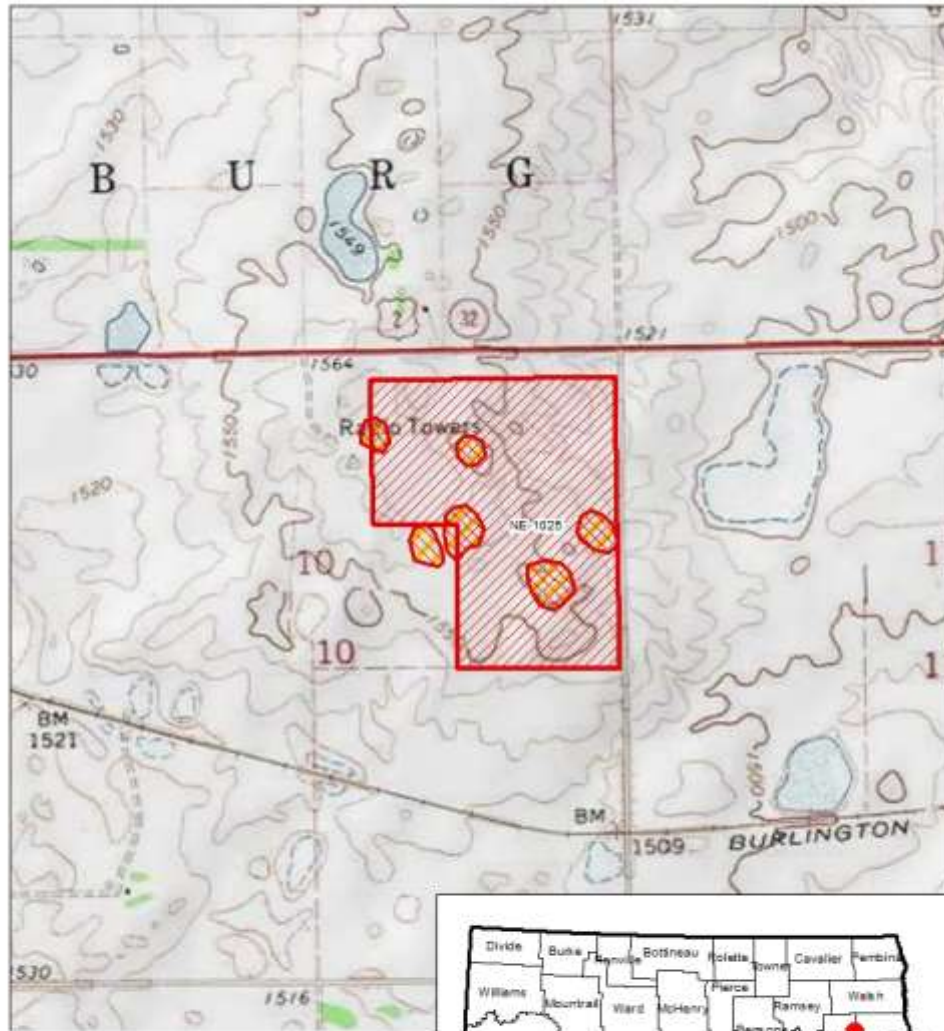
BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● 28	1.0	A-7-6 (16)	LEAN CLAY with SAND(CL)

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● 28	1.0	AASHTO T-180 Method A	45	21	24	111.2 PCF	16.8 %

APPENDIX C

NDDOT Material Source Certificate of Approvals

NDDOT Material Source Certificate of Approval



NE-1025

Pit Name:
Meyer B-1



NE1/4

S. 10 T. 152 N, R 57 W

County: Nelson

Conditions:

This location is approved for use, provided all avoidance areas shown on the map are avoided and all Conditions listed above and below are complied with.

NDDOT advises that all applicants (contractors or their representatives) may be subject to meeting certain legal responsibilities pursuant to one or more of the following authorities administered by the USFWS: Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.); Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.); and Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250). It is the responsibility of the applicants and/or any individual conducting activities at any approved site to fulfill the requirements of these Acts. The contractor will be responsible obtaining all applicable permits outlined in Section 107 of the Standard Specifications for Road and Bridge Construction (SSRBC). Additionally, contractor will be responsible for any impacts to wetlands, including permitting those impacts and mitigating the loss of the wetlands. As with all projects, if cultural artifacts and/or features (e.g., stone tools, fire hearths, stone circles, burials) are encountered, provisions outlined in Section 107.06 of SSRBC shall be followed.

This approval does not imply landowner permission to acquire material at this location. An agreement with the landowner is still necessary. If you have any questions regarding material sources please email materialsource@nd.gov