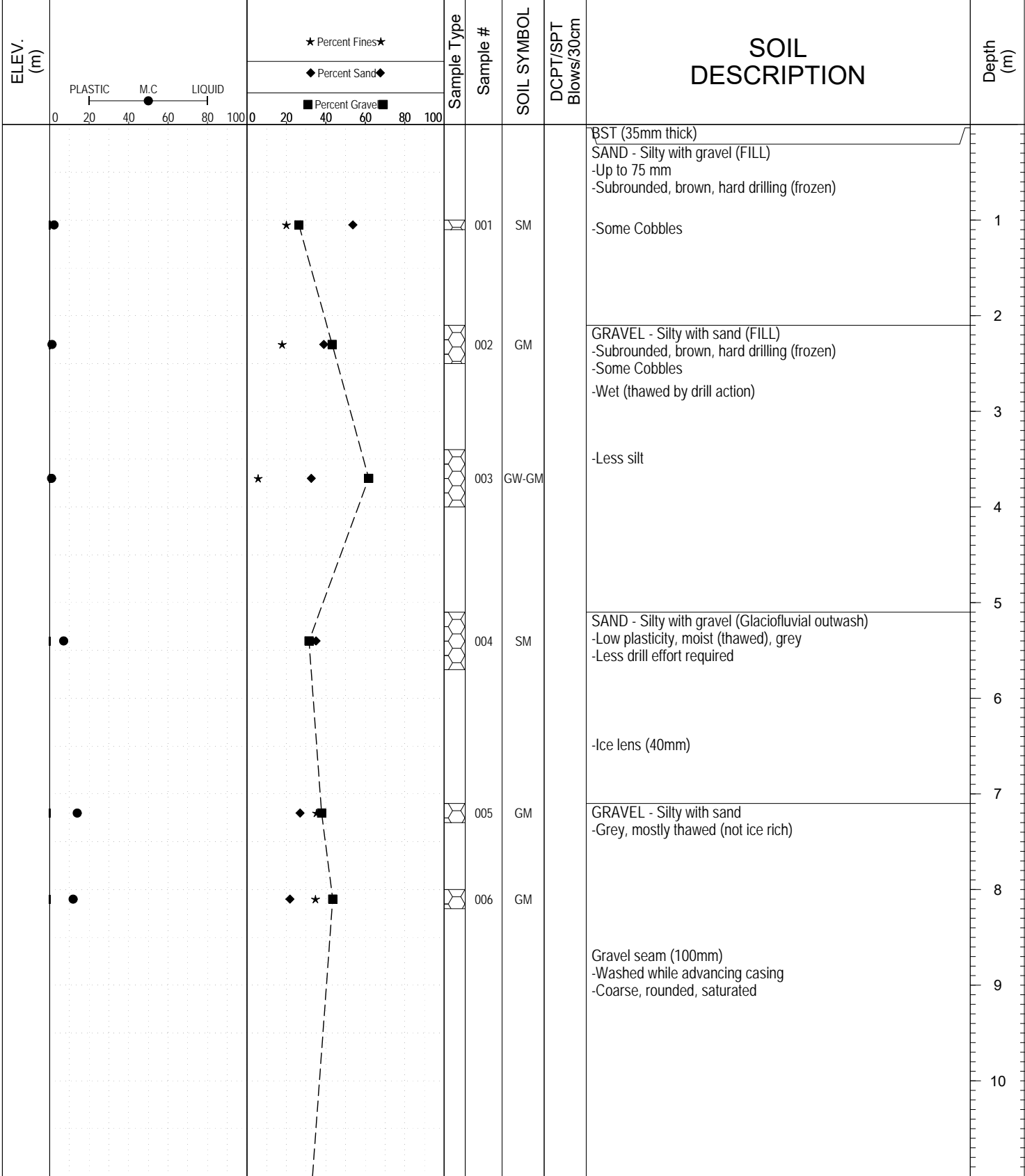
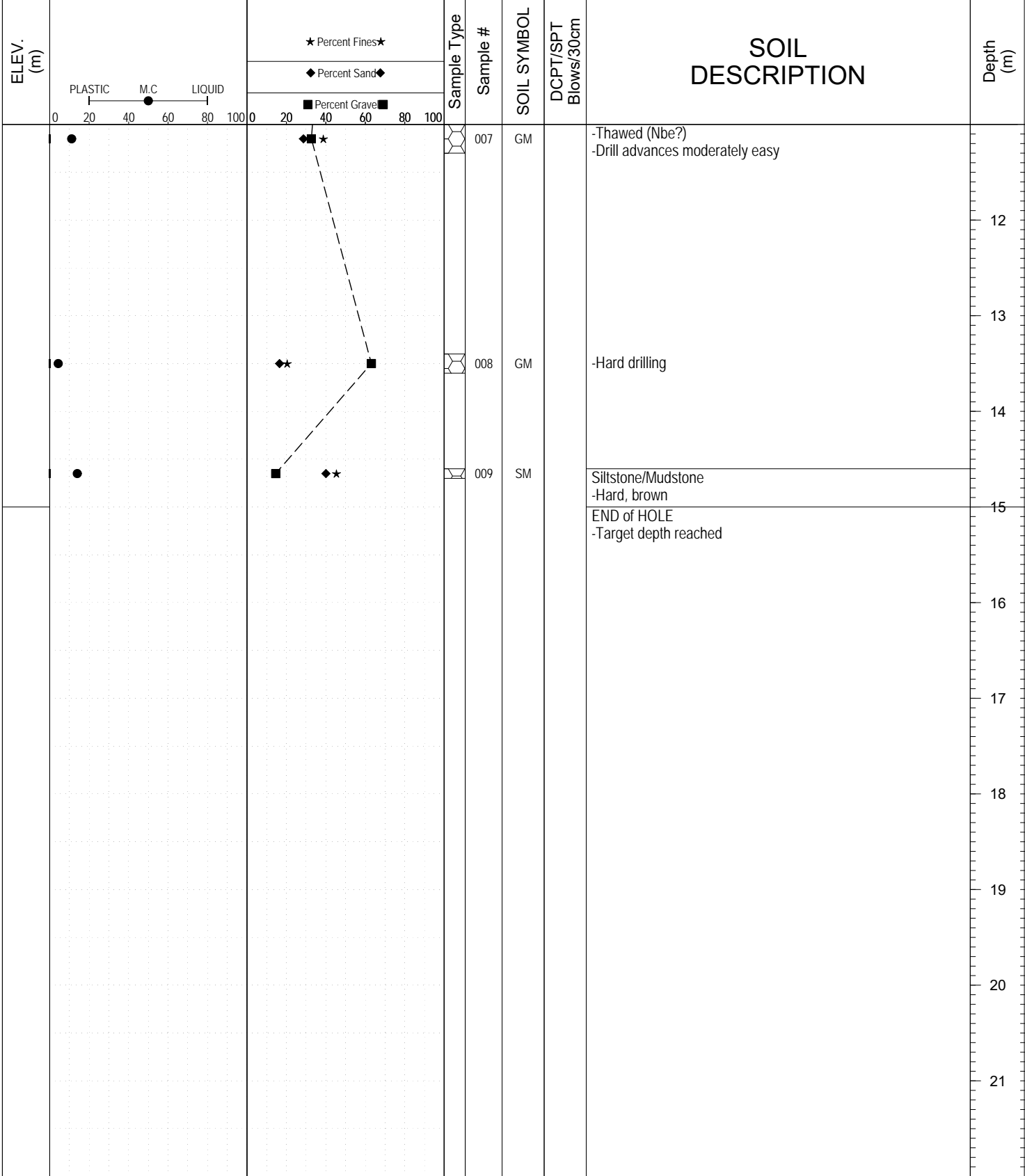


SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE

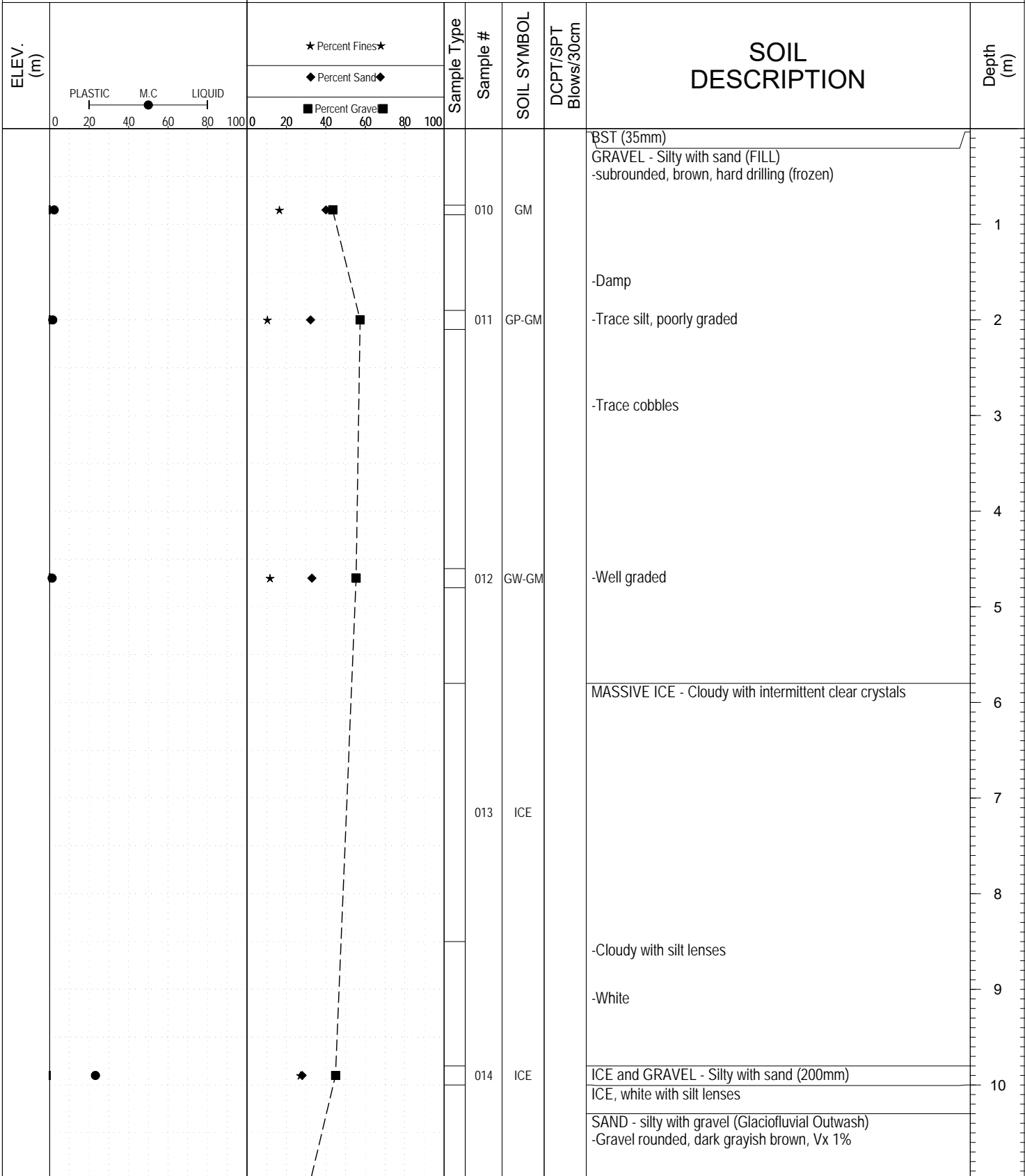


SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE



SUBSURFACE EXPLORATION AND TEST REPORT		Alaska Highway	SOURCE/TP#: 910-5790
Mudbay/MSD		Dry Creek Permafrost Drilling, km 1840	PROJECT NO: 552-202101
Sonic Drill		Coordinates: Z07V N6892441m E516534m	ELEVATION: m

SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE



Highways and Public Works  
Transportation Engineering Branch

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COMPILED BY: R.Stilwell	Complete: 3/17/2017 4:10:00 PM
REVIEWED BY: K.Elmer	Pit #: Page 1 of 2

SUBSURFACE EXPLORATION AND TEST REPORT	Alaska Highway	SOURCE/TP#: 910-5790
Mudbay/MSD	Dry Creek Permafrost Drilling, km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892441m E516534m	ELEVATION: m

SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE

ELEV. (m)	PLASTIC    M.C    LIQUID 0    20    40    60    80    100	★ Percent Fines ★ ◆ Percent Sand ◆ ■ Percent Gravel ■	Sample Type	Sample #	SOIL SYMBOL	DCPT/SPT Blows/30cm	SOIL DESCRIPTION	Depth (m)
				015	SM		Nbn	12
				016	GM		GRAVEL, silty with sand -Rounded, dark grey, Nbn	13
							END of HOLE -Target depth reached	15
								16
								17
								18
								19
								20
								21



Highways and Public Works  
Transportation Engineering Branch

LOGGED BY: KAE/GMK	Termination Depth: 15m
COMPILED BY: R.Stilwell	Complete: 3/17/2017 4:10:00 PM
REVIEWED BY: K.Elmer	Pit #: Page 2 of 2

SUBSURFACE EXPLORATION AND TEST REPORT		Alaska Highway		SOURCE/TP#: 910-5791					
Mudbay/MSD		Dry Creek Permafrost Drilling, km 1840		PROJECT NO: 552-202101					
Sonic Drill		Coordinates: Z07V N6892343m E516484m		ELEVATION: m					
SAMPLE TYPE		<input type="checkbox"/> UNDISTURBED <input checked="" type="checkbox"/> DCPT		<input type="checkbox"/> AUGER <input type="checkbox"/> BULK <input checked="" type="checkbox"/> SPT <input type="checkbox"/> CORE					
ELEV. (m)	PLASTIC      M.C      LIQUID 0      20      40      60      80      100	★ Percent Fines ★ ◆ Percent Sand ◆ ■ Percent Gravel ■		Sample Type	Sample #	SOIL SYMBOL	DCPT/SPT Blows/30cm	SOIL DESCRIPTION	Depth (m)
		0	20						
•		★	◆		017	SM		BST (35mm) SAND - silty with gravel (FILL) -light brown, wet (thawed by drill action) in top 0.3 m, hard drilling	1
•		★	◆	■	018	GM		GRAVEL - silty with sand -Light brown (thawed by drill action), hard drilling -Some cobbles, rock powder present	2
•		★	◆	■	019	GP-GM		-Some silt, poorly graded, brown	3
•		★	◆	■	020	GW-GM		-Well graded, damp (thawed)	4
									5
									6
					021	ICE		Cloudy MASSIVE ICE - Clear ice crystals intermixed, easy drilling	7
					022	ICE		-White and clear ice in 10mm lenses	8
					023	ICE		-Cloudy ice	9
					024	ICE		-White ice	10



SUBSURFACE EXPLORATION AND TEST REPORT		Alaska Highway	SOURCE/TP#: 910-5791
Mudbay/MSD		Dry Creek Permafrost Drilling, km 1840	PROJECT NO: 552-202101
Sonic Drill		Coordinates: Z07V N6892343m E516484m	ELEVATION: m

SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE

ELEV. (m)	PLASTIC    M.C    LIQUID 0    20    40    60    80    100	★ Percent Fines★ ◆ Percent Sand◆ ■ Percent Grave■	Sample Type	Sample #	SOIL SYMBOL	DCPT/SPT Blows/30cm	SOIL DESCRIPTION	Depth (m)
				025	ICE		-Suspended sand within ice <1%  -Cloudy, translucent, broken up by drilling process  -Cloudy, opaque	12 13 14
							END of HOLE -Target depth reached	15 16 17 18 19 20 21

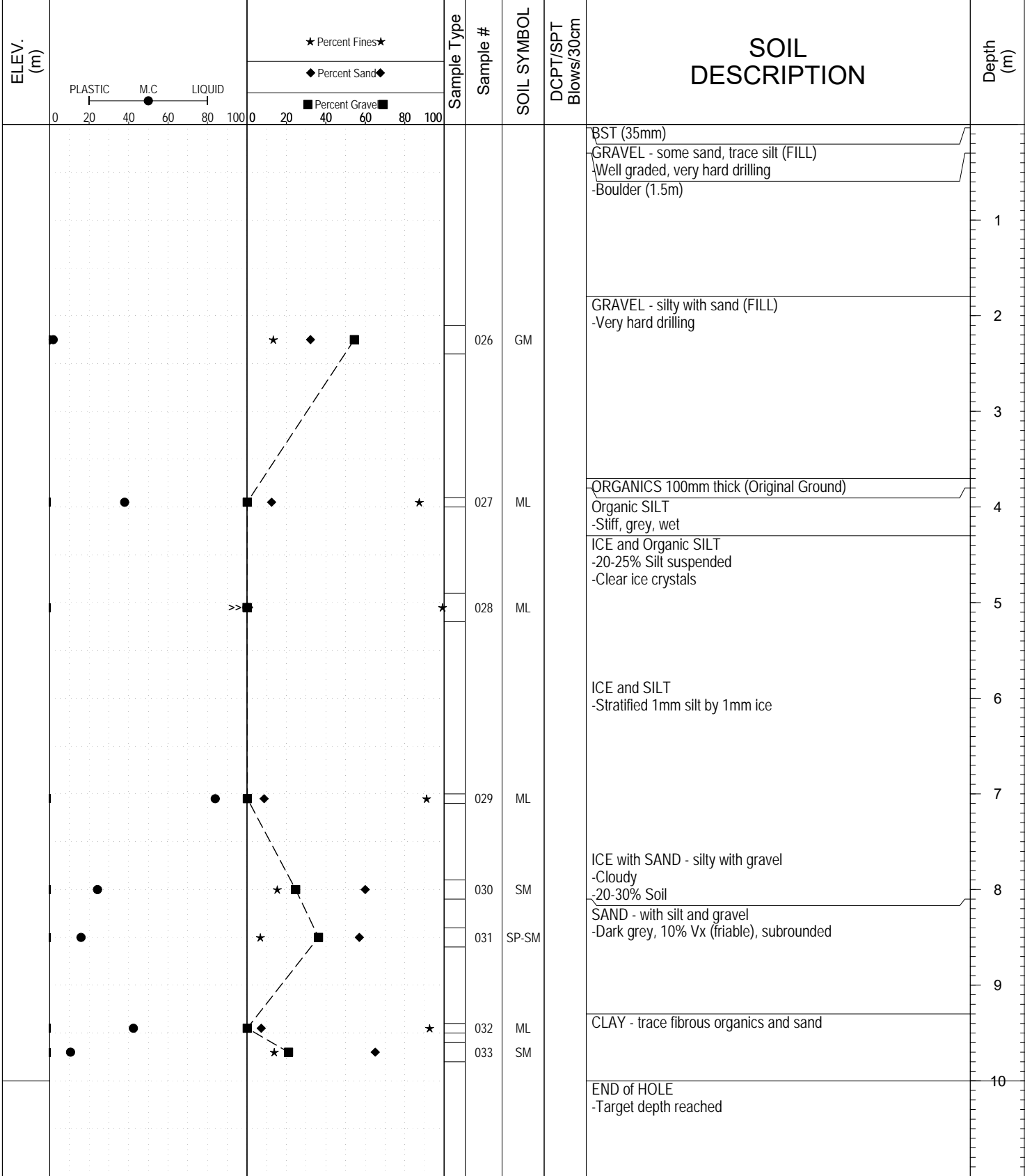


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Transportation Engineering Branch

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COMPILED BY: R.Stilwell	Complete: 3/17/2017 7:00:00 PM
REVIEWED BY: K.Elmer	Pit #: <span style="float: right;">Page 2 of 2</span>

SUBSURFACE EXPLORATION AND TEST REPORT		Alaska Highway	SOURCE/TP#: 910-5792
Mudbay/MSD		Mirror Creek Permafrost Drilling, km 1884	PROJECT NO: 552-202101
Sonic Drill		Coordinates: Z07V N6929333m E507225m	ELEVATION: m

SAMPLE TYPE     UNDISTURBED     DCPT     AUGER     BULK     SPT     CORE



Highways and Public Works  
Transportation Engineering Branch

LOGGED BY: KAE/GMK	Termination Depth: 10m
COMPILED BY: R.Stilwell	Complete: 3/18/2017 12:30:00 PM
REVIEWED BY: K.Elmer	Pit #: Page 1 of 1

SUBSURFACE EXPLORATION AND TEST REPORT		Alaska Highway		SOURCE/TP#: 910-5793						
Mudbay/MSD		Mirror Creek Permafrost Drilling, km 1884		PROJECT NO: 552-202101						
Sonic Drill		Coordinates: Z07V N6929457m E507240m		ELEVATION: m						
SAMPLE TYPE		UNDISTURBED	DCPT	AUGER	BULK	SPT	CORE			
ELEV. (m)	PLASTIC      M.C      LIQUID 0      20      40      60      80      100		★ Percent Fines★ ◆ Percent Sand◆ ■ Percent Gravel■		Sample Type	Sample #	SOIL SYMBOL	DCPT/SPT Blows/30cm	SOIL DESCRIPTION	Depth (m)
	0      20      40      60      80      100		0      20      40      60      80      100							
						034	SM		BST (35mm) - Raveling off SAND - silty with gravel (FILL)	1
									Cobble (200mm) -Geogrid	2
									COBBLES and GRAVEL	3
									-Geosynthetics -moist	4
									-Noted oxidization -Sample lost - slipping out to 7.3m	5
										6
						035	ML		SILT - sandy (Original Ground)	7
						036	SN		SAND - silty -Dark grey, saturated, rounded	8
						037	SP		-With gravel, very little silt -Poorly graded	9
						038	SP		END of HOLE -Target depth reached	10



GRAIN SIZE ANALYSIS	Dry Creek Permafrost Drilling	SOURCE/TP#: 910-5789
Mudbay/MSD	km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892614m E516594m	ELEVATION: m

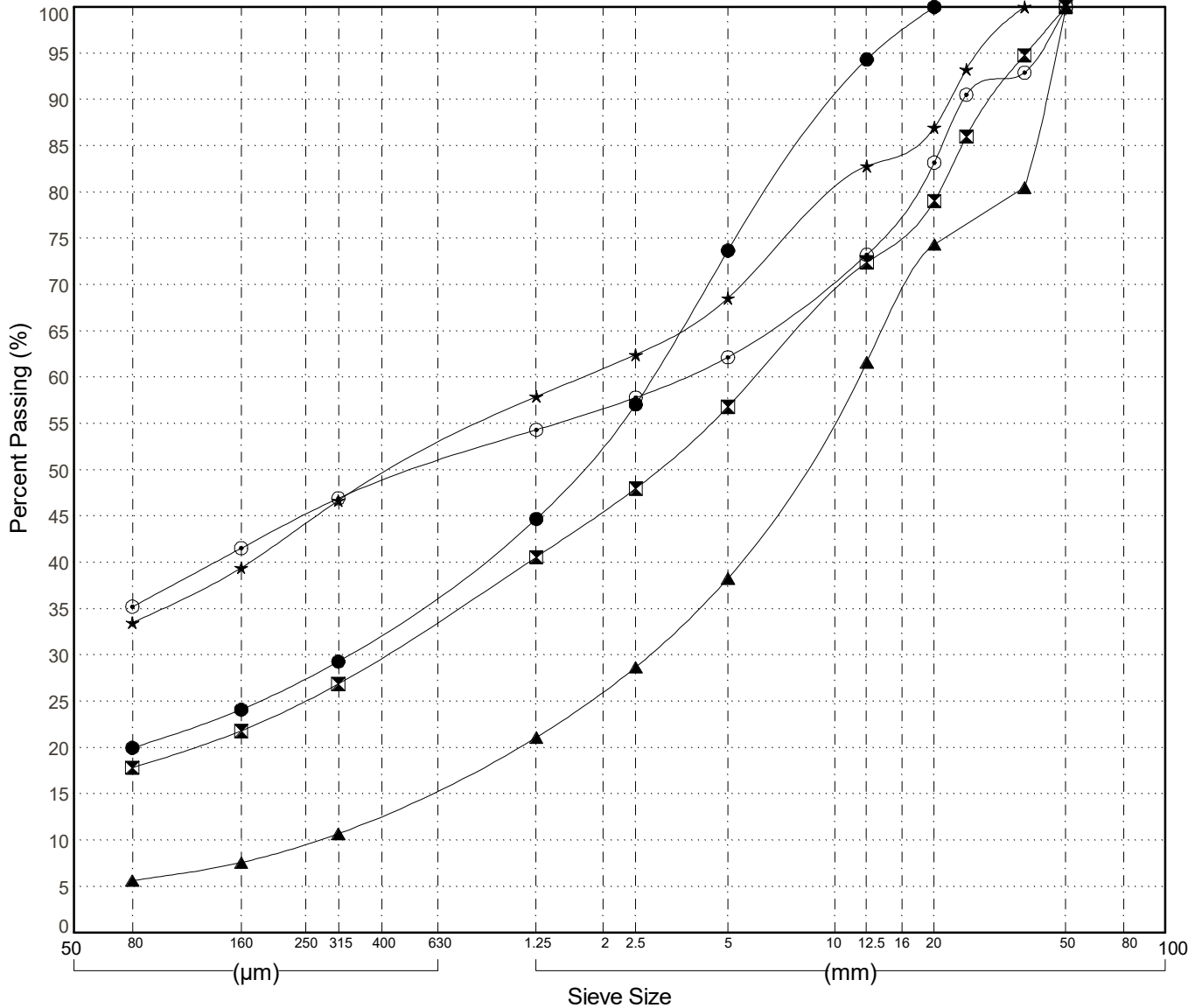
Master Revised June 2017

Field#	Lab#	Depth	Classification	%H2O	LL	PL	PI	Cc	Cu	D10
● 001	727	1.0 to 1.1	SILTY SAND with GRAVEL(SM)	2.2	NP	NP	NP			
☒ 002	728	2.1 to 2.5	SILTY GRAVEL with SAND(GM)	1.2	NP	NP	NP			
▲ 003	729	3.4 to 4.0	WELL-GRADED GRAVEL with SILT and SAND(GW-GM)	0.9	NP	NP	NP	2.4	43.3	0.270
★ 004	730	5.1 to 5.7	SILTY SAND with GRAVEL(SM)	7.1	NP	NP	NP			
⊙ 005	731	7.1 to 7.3	SILTY GRAVEL with SAND(GM)	13.9	NP	NP	NP			

Field#	Lab#	100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	% Breakdown			
		% PASSING														Gravel	Sand	Silt	Clay
● 001	727	100.0	100.0	100.0	100.0	100.0	94.3	89.6	73.7	57.1	44.7	37.0	29.3	24.1	20.0	26.3	53.7	20.0	
☒ 002	728	100.0	100.0	100.0	86.0	79.1	72.4	68.8	56.8	48.0	40.6	33.8	26.9	21.8	17.8	43.2	39.0	17.8	
▲ 003	729	100.0	100.0	100.0	76.5	74.4	61.6	56.2	38.3	28.7	21.1	15.9	10.7	7.6	5.7	61.7	32.6	5.7	
★ 004	730	100.0	100.0	100.0	93.3	87.0	82.8	79.5	68.5	62.4	57.9	52.3	46.7	39.4	33.5	31.5	35.0	33.5	
⊙ 005	731	100.0	100.0	100.0	90.5	83.2	73.2	70.7	62.2	57.8	54.3	50.6	46.9	41.5	35.2	37.8	26.9	35.2	

Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



Highways and Public Works  
Transportation Engineering Branch

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REVIEWED BY: K.Elmer

Pit #  
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GRAIN SIZE ANALYSIS	Dry Creek Permafrost Drilling	SOURCE/TP#: 910-5789
Mudbay/MSD	km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892614m E516594m	ELEVATION: m

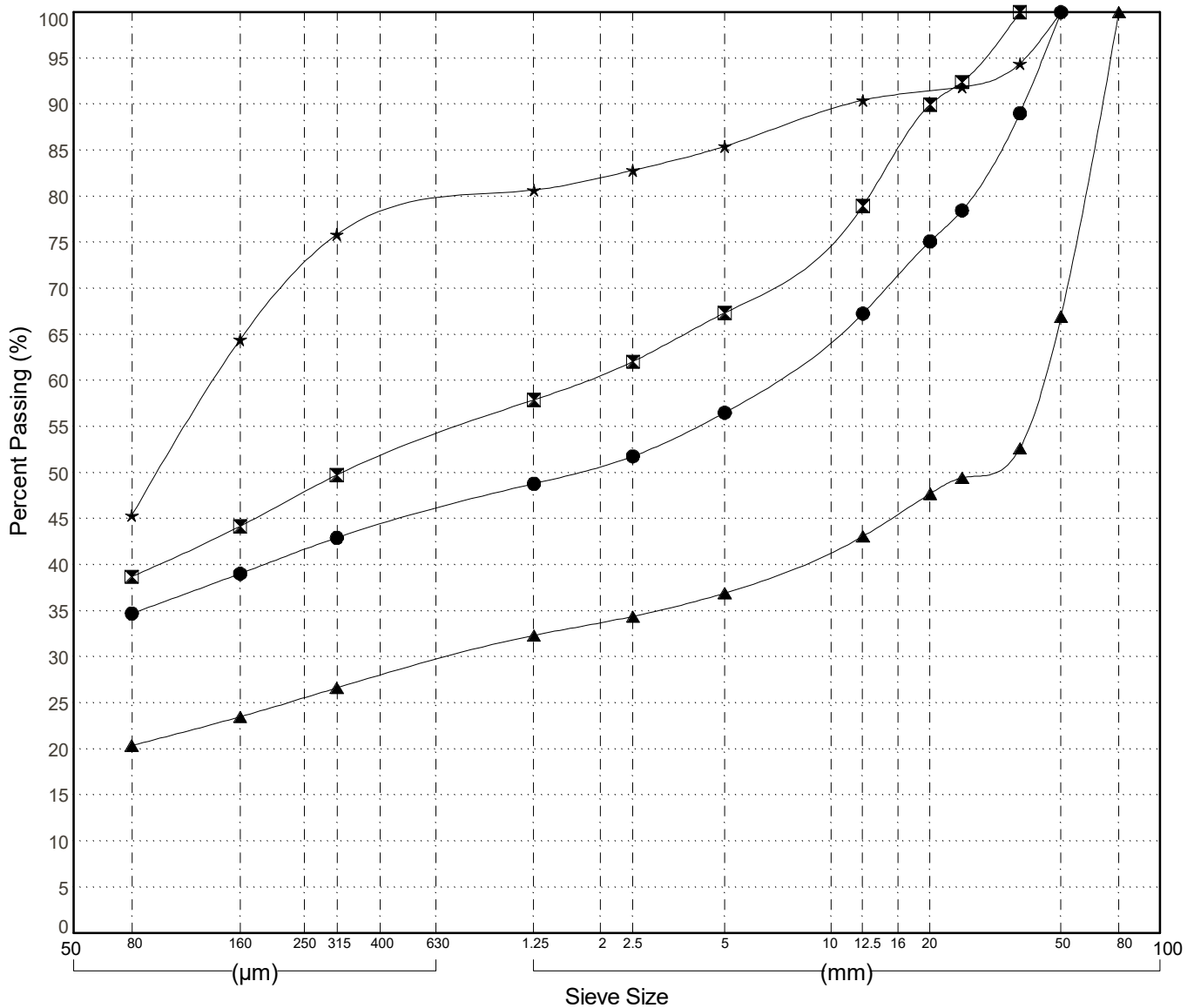
Master Revised June 2017

Field#	Lab#	Depth	Classification	%H2O	LL	PL	PI	Cc	Cu	D10
● 006	732	8.0 to 8.2	SILTY GRAVEL with SAND(GM)	11.9	NP	NP	NP			
☒ 007	733	11.0 to 11.3	SILTY GRAVEL with SAND(GM)	11.1	NP	NP	NP			
▲ 008	734	13.4 to 13.6	SILTY GRAVEL with SAND(GM)	4.3	NP	NP	NP			
★ 009	735	14.6 to 14.7	SILTY SAND(SM)	14.0	NP	NP	NP			

Field#	Lab#	% PASSING	Sieve Size (mm)													% Breakdown			
			100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	Gravel	Sand	Clay
●	006	732	100.0	100.0	100.0	78.5	75.1	67.3	64.8	56.5	51.8	48.8	45.9	42.9	39.0	34.7	43.5	21.8	34.7
☒	007	733	100.0	100.0	100.0	92.4	90.0	79.0	76.3	67.3	62.1	57.9	53.9	49.8	44.2	38.7	32.7	28.6	38.7
▲	008	734	100.0	100.0	66.9	49.4	47.7	43.1	41.7	36.9	34.4	32.3	29.5	26.6	23.5	20.4	63.1	16.5	20.4
★	009	735	100.0	100.0	100.0	91.8	91.4	90.4	89.3	85.4	82.8	80.7	78.3	75.9	64.4	45.4	14.6	40.1	45.4

Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



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Transportation Engineering Branch

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GRAIN SIZE ANALYSIS	Dry Creek Permafrost Drilling	SOURCE/TP#: 910-5790
Mudbay/MSD	km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892441m E516534m	ELEVATION: m

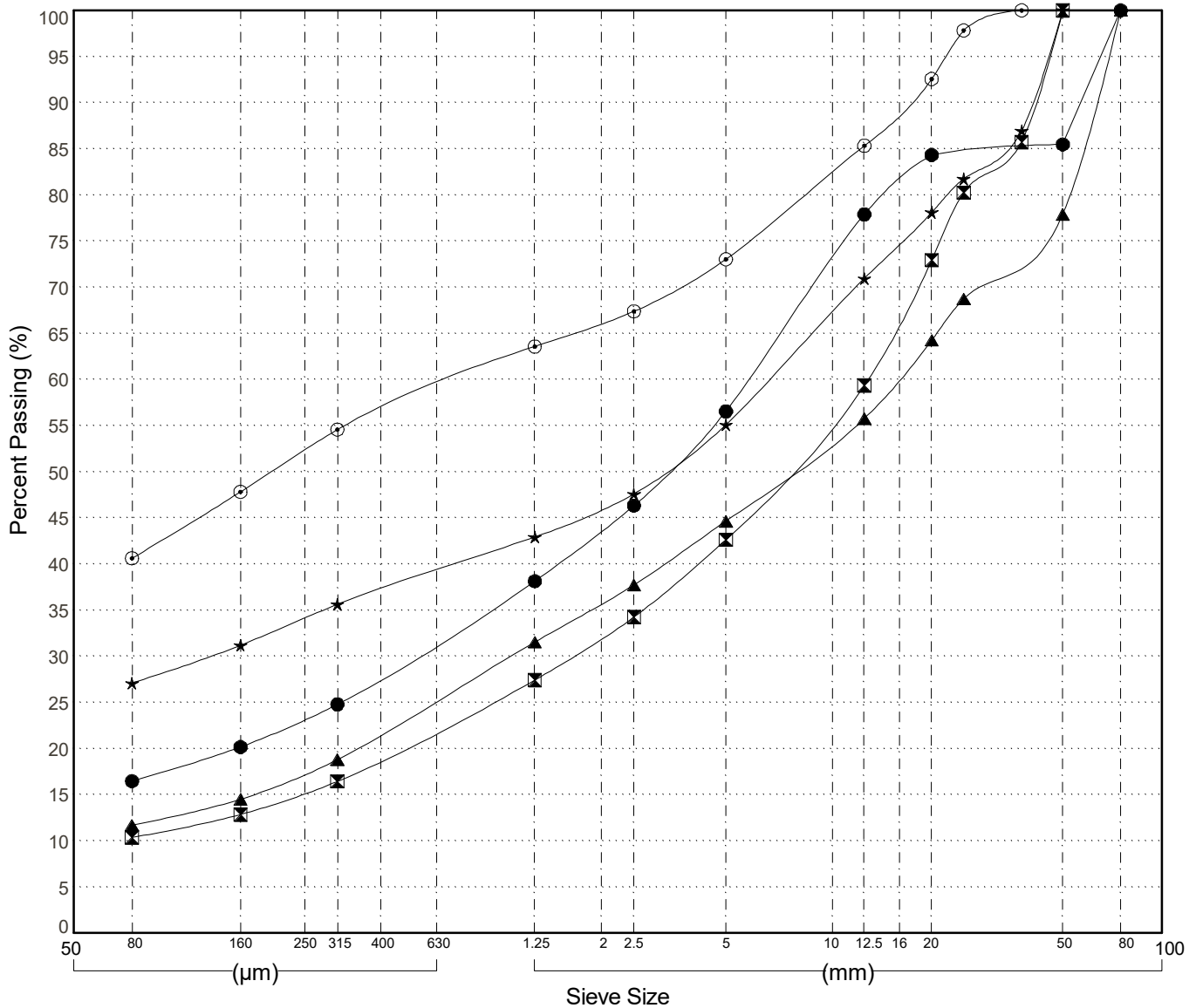
Master Revised June 2017

Field #	Lab #	Depth	Classification	%H <sub>2</sub> O	LL	PL	PI	C <sub>c</sub>	C <sub>u</sub>	D <sub>10</sub>
● 010	736	0.8 to 0.9	SILTY GRAVEL with SAND(GM)	2.3	NP	NP	NP			
☒ 011	737	1.9 to 2.1	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	1.5	NP	NP	NP	3.1	190.1	
▲ 012	738	4.6 to 4.8	WELL-GRADED GRAVEL with SILT and SAND(GW-GM)	1.2	NP	NP	NP	1.5	333.3	
★ 014	740	9.8 to 10.0	SILTY GRAVEL with SAND(GM)	23.2	NP	NP	NP			
◎ 015	741	11.3 to 11.6	SILTY SAND with GRAVEL(SM)	21.4	NP	NP	NP			

Field #	Lab #	% PASSING	Sieve Size (mm)																% Breakdown		
			100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	Gravel	Sand	Silt	Clay	
● 010	736	100.0	100.0	100.0	85.5	84.6	84.3	77.9	73.0	56.5	46.3	38.1	31.5	24.8	20.2	16.5	43.5	40.1	16.5		
☒ 011	737	100.0	100.0	100.0	80.3	72.9	59.3	55.5	42.6	34.2	27.4	22.0	16.4	12.9	10.4	57.4	32.3	10.4			
▲ 012	738	100.0	100.0	77.9	68.7	64.2	55.8	53.2	44.6	37.7	31.5	25.2	18.8	14.5	11.7	55.4	32.9	11.7			
★ 014	740	100.0	100.0	100.0	81.7	78.1	70.9	67.3	55.1	47.6	42.9	39.3	35.6	31.2	27.1	44.9	28.0	27.1			
◎ 015	741	100.0	100.0	100.0	97.8	92.6	85.3	82.5	73.0	67.4	63.6	59.1	54.6	47.8	40.6	27.0	32.4	40.6			

Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



Highways and Public Works  
Transportation Engineering Branch

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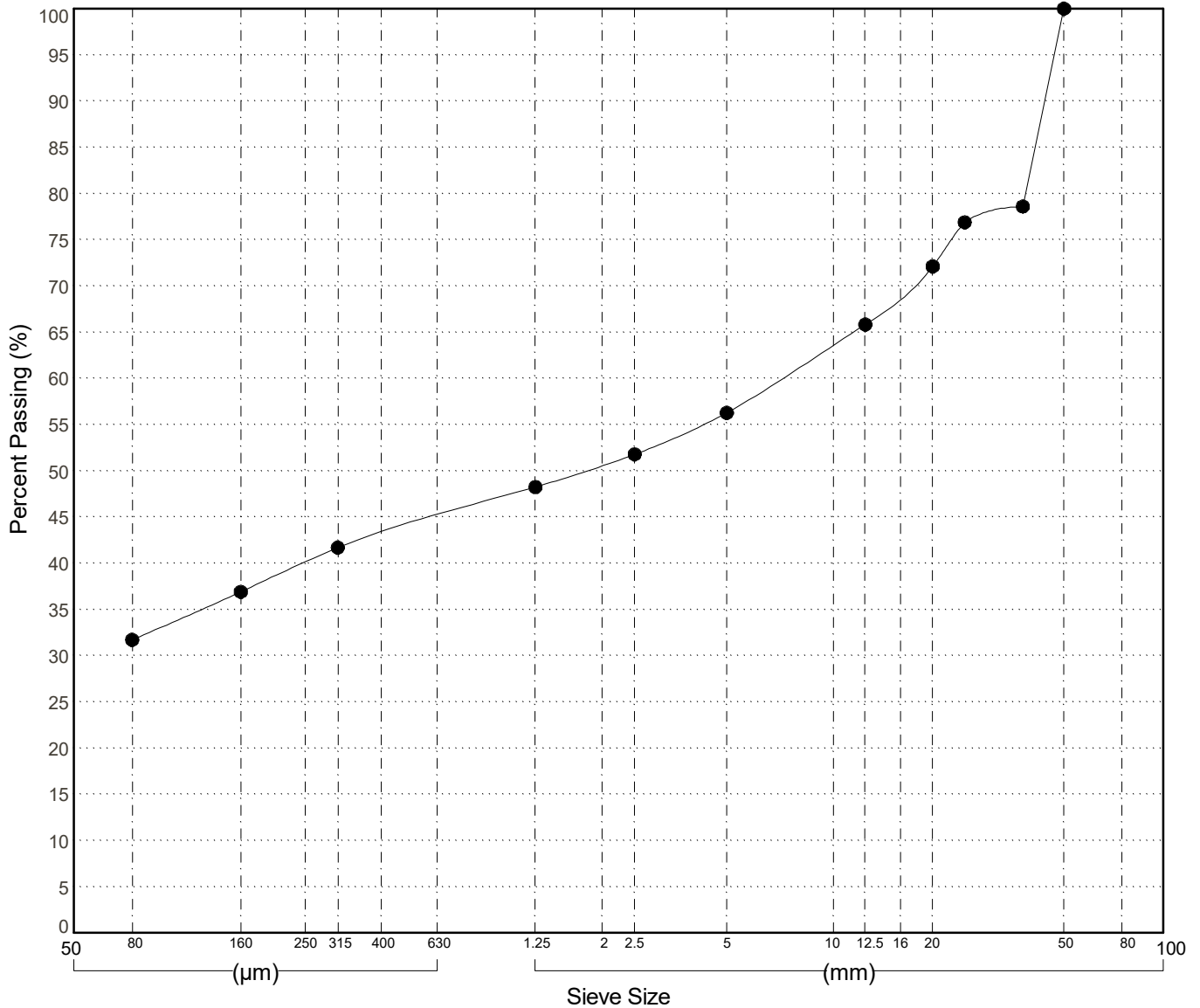
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GRAIN SIZE ANALYSIS	Dry Creek Permafrost Drilling	SOURCE/TP#: 910-5790
Mudbay/MSD	km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892441m E516534m	ELEVATION: m

Master Revised June 2017

Field#	Lab#	Depth	Classification											%H2O	LL	PL	PI	Cc	Cu	D10
● 016	742	13.1 to 13.4	SILTY GRAVEL with SAND(GM)											16.1	NP	NP	NP			
Field#	Lab#	100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	% Breakdown				
● 016	742	100.0	100.0	100.0	76.9	72.1	65.8	63.6	56.3	51.8	48.3	45.0	41.7	36.9	31.7	Gravel	Sand	Silt	Clay	
																43.7	24.6	31.7		

Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



Highways and Public Works  
Transportation Engineering Branch

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REVIEWED BY: K.Elmer

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GRAIN SIZE ANALYSIS	Dry Creek Permafrost Drilling	SOURCE/TP#: 910-5791
Mudbay/MSD	km 1840	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6892343m E516484m	ELEVATION: m

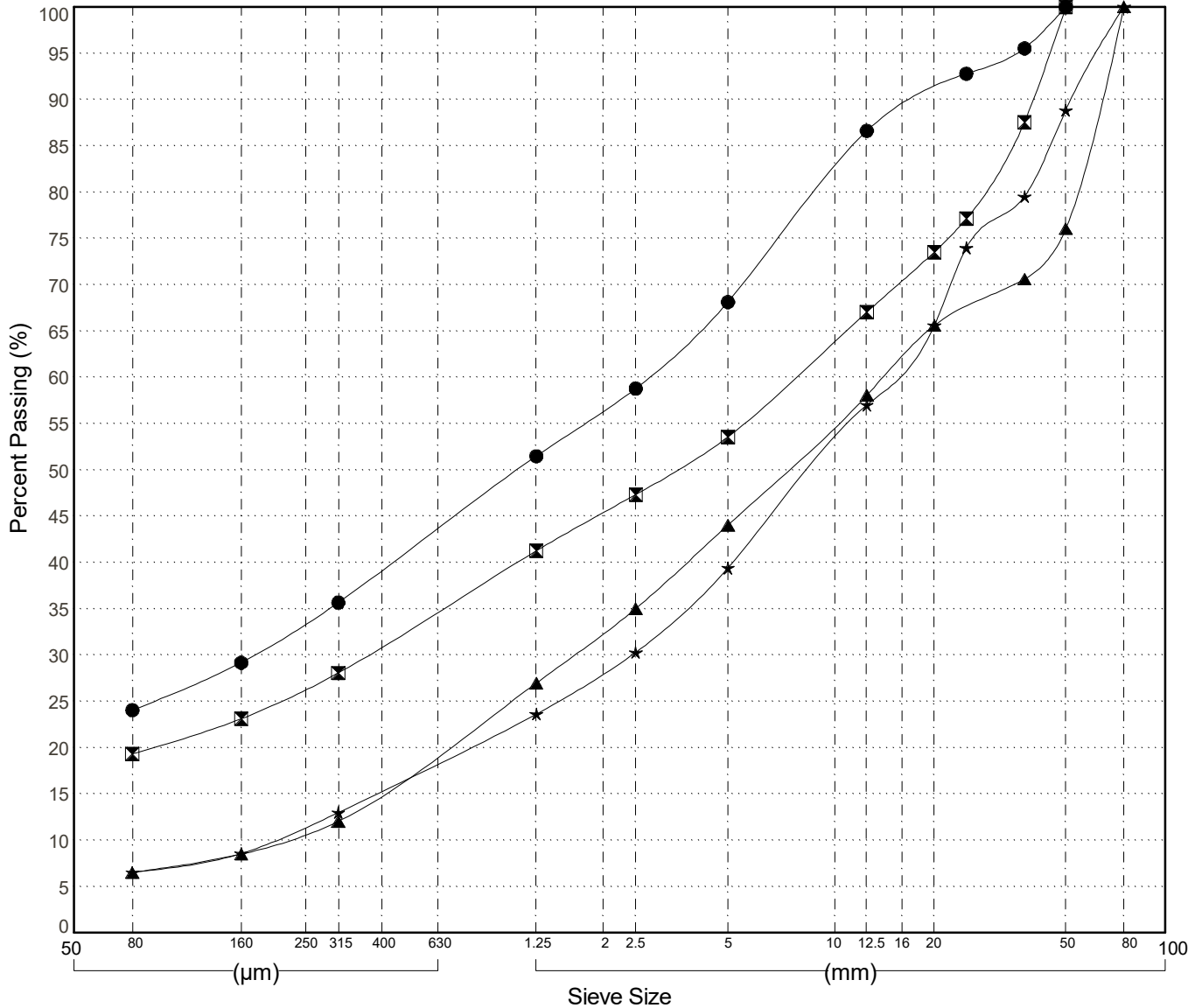
Master Revised June 2017

Field#	Lab#	Depth	Classification	%H2O	LL	PL	PI	Cc	Cu	D10
● 017	743	0.6 to 0.9	SILTY SAND with GRAVEL(SM)	2.6	NP	NP	NP			
☒ 018	744	2.4 to 2.6	SILTY GRAVEL with SAND(GM)	0.7	NP	NP	NP			
▲ 019	745	3.6 to 3.9	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	0.5	NP	NP	NP	0.9	66.2	0.213
★ 020	746	4.9 to 5.2	WELL-GRADED GRAVEL with SILT and SAND(GW-GM)	1.1	NP	NP	NP	2.0	73.9	0.199

Field#	Lab#	% PASSING	100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	% Breakdown			
																	Gravel	Sand	Silt	Clay
●	017	743	100.0	100.0	100.0	92.8	90.8	86.6	82.4	68.1	58.8	51.5	43.6	35.7	29.2	24.1	31.9	44.1	24.1	
☒	018	744	100.0	100.0	100.0	77.1	73.5	67.0	63.9	53.6	47.3	41.3	34.7	28.1	23.1	19.3	46.4	34.3	19.3	
▲	019	745	100.0	100.0	76.0	67.4	65.6	58.1	54.8	44.0	35.0	27.0	19.5	12.0	8.5	6.5	56.0	37.5	6.5	
★	020	746	100.0	100.0	88.8	74.0	65.6	57.0	52.9	39.4	30.3	23.6	18.3	13.0	8.6	6.5	60.6	32.9	6.5	

Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



Highways and Public Works  
Transportation Engineering Branch

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COMPILED BY: R.Stilwell  
REVIEWED BY: K.Elmer

Pit #  
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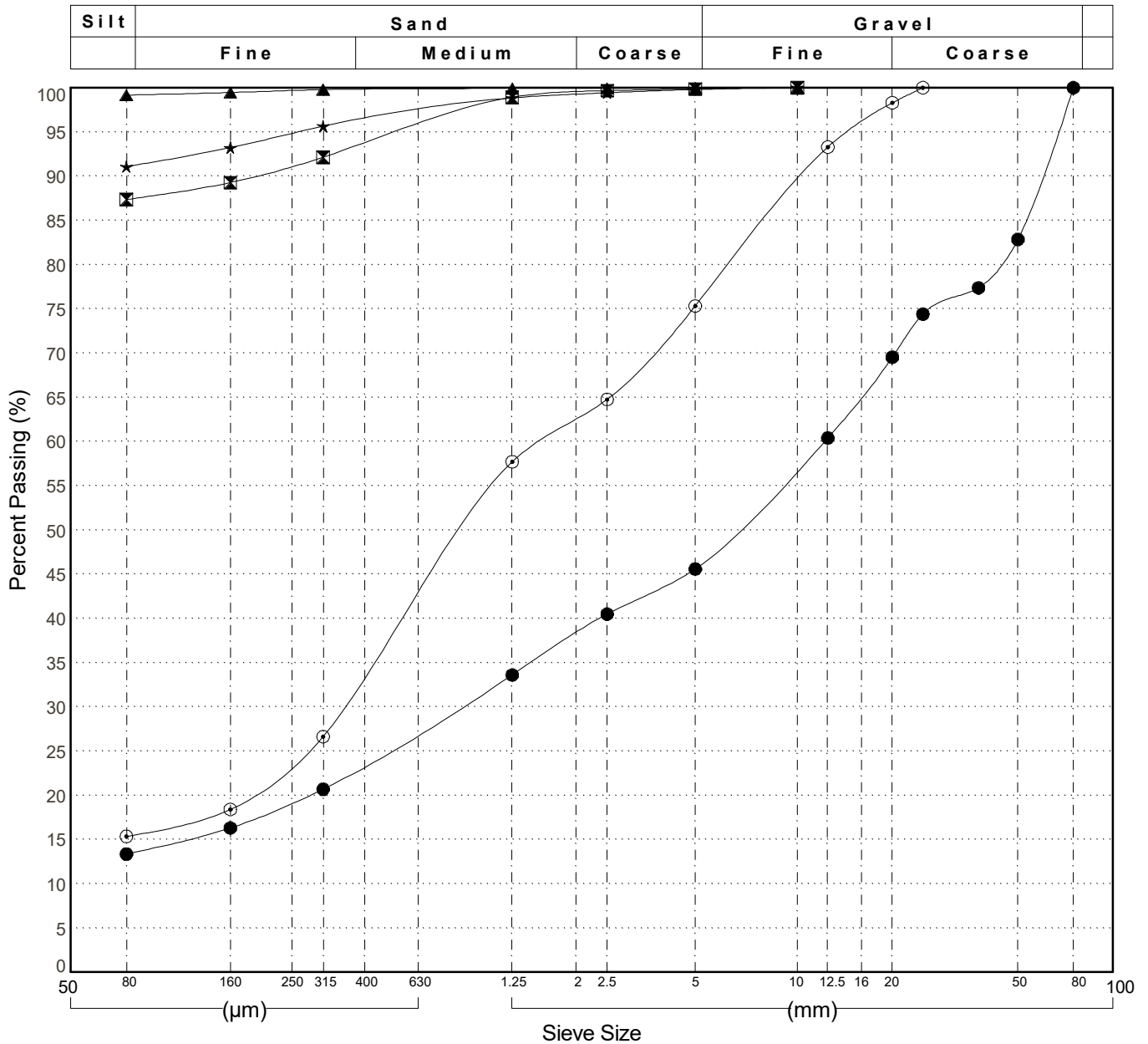
GRAIN SIZE ANALYSIS	Mirror Creek Permafrost Drilling	SOURCE/TP#: 910-5792
Mudbay/MSD	km 1884	PROJECT NO: 552-202101
Sonic Drill	Coordinates:Z07V N6929333m E507225m	ELEVATION: m

Master Revised June 2017

Field #	Lab #	Depth	Classification	%H <sub>2</sub> O	LL	PL	PI	C <sub>c</sub>	C <sub>u</sub>	D <sub>10</sub>
● 026	752	2.1 to 2.4	SILTY GRAVEL with SAND(GM)	1.8	NP	NP	NP			
☒ 027	753	3.9 to 4.0	SILT(ML)	38.0	NP	NP	NP			
▲ 028	754	4.9 to 5.2	SILT(ML)	164.3	NP	NP	NP			
★ 029	755	7.0 to 7.1	SILT(ML)	83.9	NP	NP	NP			
⊙ 030	756	7.9 to 8.1	SILTY SAND with GRAVEL(SM)	24.2	NP	NP	NP			

Field #	Lab #	% PASSING											% Breakdown							
		100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	Gravel	Sand	Silt	Clay	
●	026	752	100.0	100.0	82.8	74.4	69.5	60.4	57.0	45.6	40.5	33.6	27.2	20.7	16.3	13.4	54.4	32.2	13.4	
☒	027	753	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	98.9	95.6	92.1	89.3	87.3	0.1	12.5	87.3	
▲	028	754	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8	99.8	99.4	99.2	99.2	0.0	0.8	99.2	
★	029	755	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	98.8	97.3	95.6	93.2	91.1	91.1	0.2	8.7	91.1	
⊙	030	756	100.0	100.0	100.0	100.0	98.3	93.3	89.1	75.3	64.8	57.7	42.3	26.6	18.4	15.4	24.7	60.0	15.4	



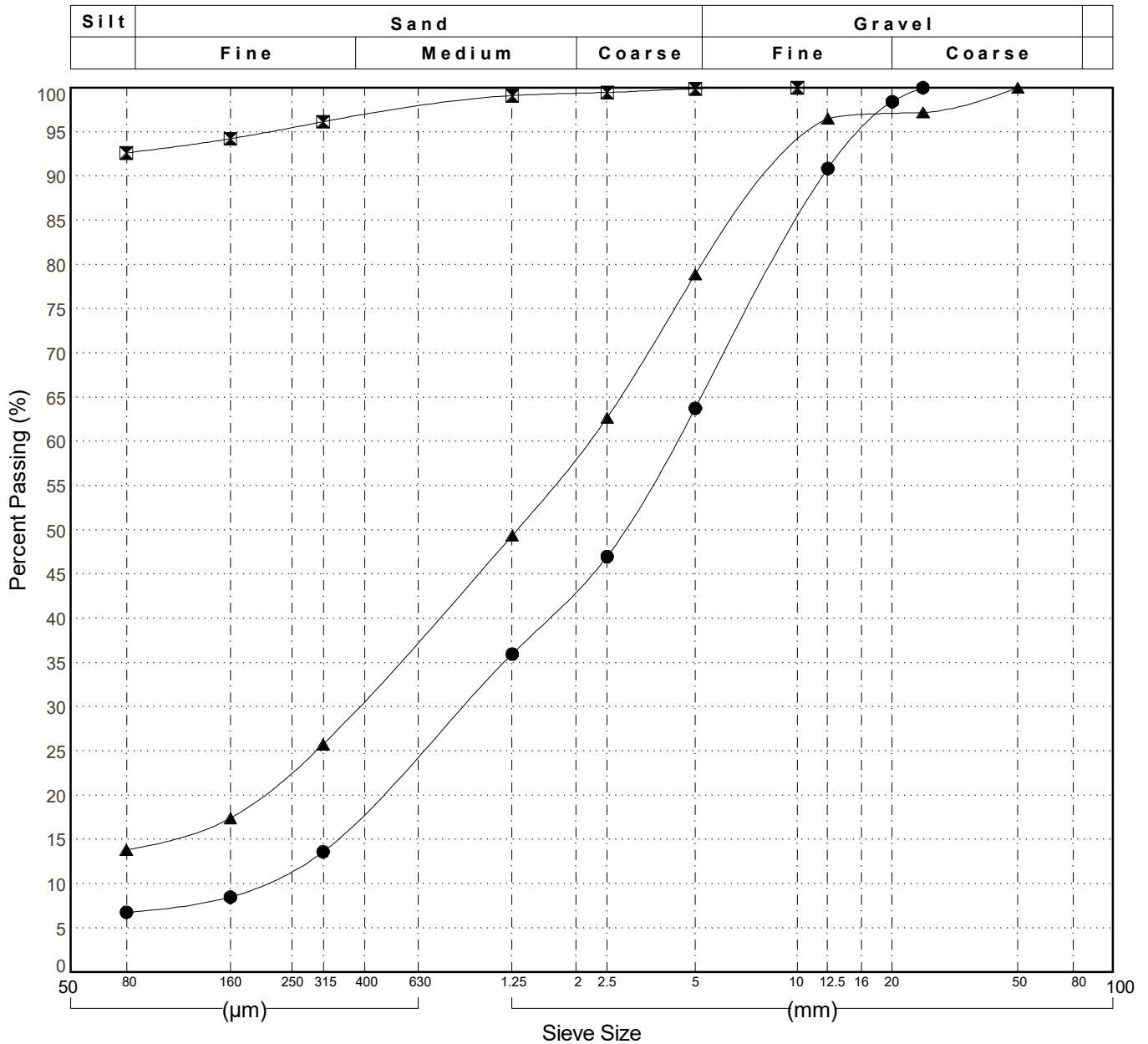
GRAIN SIZE ANALYSIS	Mirror Creek Permafrost Drilling	SOURCE/TP#: 910-5792
Mudbay/MSD	km 1884	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6929333m E507225m	ELEVATION: m

Master Revised June 2017

Field #	Lab #	Depth	Classification	%H <sub>2</sub> O	LL	PL	PI	C <sub>c</sub>	C <sub>u</sub>	D <sub>10</sub>
● 031	757	8.4 to 8.6	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	15.9	NP	NP	NP	0.9	21.1	0.195
☒ 032	758	9.4 to 9.5	SILT (ML)	42.4	NP	NP	NP			
▲ 033	759	9.6 to 9.8	SILTY SAND with GRAVEL(SM)	10.6	NP	NP	NP			

Field #	Lab #	100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	% Breakdown			
		% PASSING														Gravel	Sand	Silt	Clay
● 031	757	100.0	100.0	100.0	100.0	98.4	90.9	84.6	63.7	47.0	36.0	24.9	13.6	8.5	6.8	36.3	57.0	6.8	
☒ 032	758	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	99.1	97.6	96.1	94.2	92.6	0.1	7.3	92.6	
▲ 033	759	100.0	100.0	100.0	97.2	97.0	96.5	92.4	78.9	62.7	49.4	37.6	25.8	17.4	13.8	21.1	65.0	13.8	



GRAIN SIZE ANALYSIS	Mirror Creek Permafrost Drilling	SOURCE/TP#: 910-5793
Mudbay/MSD	km 1884	PROJECT NO: 552-202101
Sonic Drill	Coordinates: Z07V N6929457m E507240m	ELEVATION: m

Master Revised June 2017

Field#	Lab#	Depth	Classification	%H2O	LL	PL	PI	Cc	Cu	D10
● 034	760	0.8 to 0.9	SILTY SAND with GRAVEL(SM)	2.8	NP	NP	NP			
☒ 035	761	7.3 to 7.4	SANDY SILT(ML)	37.4	NP	NP	NP			
▲ 036	762	7.5 to 7.6	SILTY SAND(SM)	21.4	NP	NP	NP			
★ 037	763	8.4 to 8.5	POORLY GRADED SAND with GRAVEL(SP)	13.1	NP	NP	NP	0.5	9.8	0.270
⊙ 038	764	9.8 to 10.0	POORLY GRADED SAND with GRAVEL(SP)	8.8	NP	NP	NP	0.6	4.9	1.287

Field#	Lab#	100.0	80.0	50.0	25.0	20.0	12.5	10.0	5.0	2.5	1.25	0.630	0.315	0.160	0.080	%Breakdown			
		%PASSING														Gravel	Sand	Silt	Clay
● 034	760	100.0	100.0	100.0	100.0	100.0	91.2	85.0	64.4	51.4	42.6	34.4	26.1	21.2	17.8	35.6	46.6	17.8	
☒ 035	761	100.0	100.0	100.0	100.0	98.2	96.2	94.8	89.9	86.2	82.2	78.7	75.2	72.9	69.2	10.1	20.8	69.2	
▲ 036	762	100.0	100.0	100.0	93.7	93.2	92.3	91.4	88.5	84.4	80.8	56.9	32.7	23.4	19.5	11.5	68.9	19.5	
★ 037	763	100.0	100.0	100.0	100.0	95.1	90.1	87.8	80.1	58.2	48.7	30.4	12.0	3.1	1.8	19.9	78.4	1.8	
⊙ 038	764	100.0	100.0	100.0	96.1	90.3	76.9	71.3	52.7	35.9	8.9	6.3	3.8	2.8	2.3	47.3	50.4	2.3	

