Attachment C

Drilling Documents

C-1 Lithologic Logs
C-2 Drilling Daily Logs
C-3 Downhole Geophysical Data

Attachment C-1
Lithologic Logs

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0–6		SILT, low plasticity, soft, with organics (25%); moist, 10YR 4/3 SILT, low plasticity, soft, with sand, fine (10%), trace cobbles (2%); dry, 10YR 5/3	Grout (neat cement) (0'-356' bgs)
		CH	6–8		CLAY, medium plasticity, medium stiff, with sand, fine to coarse (15%), sub-rounded, with gravel, fine to medium (10%), sub-angular; dry, 10YR 4/4	
		SC	8–10		CLAYEY SAND, fine to coarse (20% fine, 20% medium, 20% coarse), sub-rounded, clay/silt (20%), with gravel, fine to coarse (20%), angular; dry, 10YR 4/4	
		SC	10–11		CLAYEY SAND, fine to coarse (25% fine, 20% medium, 20% coarse), sub-rounded, clay/silt (20%), with gravel, fine to coarse (15%), angular; moist to wet, 10YR 4/4	4" LC Steel Casing (0'-360' bgs)
		CL-ML	11–12		SILTY CLAY, medium plasticity, soft, massive mottling; dry to moist, 10YR 6/3	
		SP-SM	12–14		CLAYEY SAND, fine to coarse (5% fine, 10% medium, 30% coarse), sub-rounded to well-rounded, with gravel, fine to coarse (30%), clay/silt (20%), trace cobbles (5%); moist, 10YR 5/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE 11/17/20 / DATE 11/23/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16–19		CLAY, low to medium plasticity, stiff, trace gravel, fine to medium (5%), sub-rounded; dry, 5R	
			19–20		CLAY, medium plasticity, soft, gravel, fine to medium (5-10%), sub-rounded, trace sand, medium (5%); dry	Grout (neat cement) (0'-356' bgs)
		CH	20–29		CLAY, medium to high plasticity, very stiff, gravel, fine to coarse (5-10%), sub-rounded to sub-angular; dry, GLEY1 3/10Y	4" LC Steel Casing (0'-360' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE 11/17/20 / DATE 11/23/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Platteville Fm. @ 36' bgs	CH	31–35		CLAY, high plasticity, medium stiff to stiff, trace sand, medium (5%), trace gravel, fine (5%); dry, GLEY1 4/10Y to GLEY1 3/10Y	Grout (neat cement) (0'-356' bgs)
			35		CLAY, high plasticity, medium stiff to stiff, with cobbles (15%), trace sand, medium (5%), trace gravel, fine (5%); dry, GLEY1 3/10Y	
		CL-ML	36		SILTY CLAY, medium to high plasticity, soft, lithic fragments (10%); 10YR 5/6	
		Opg	37		LIMESTONE, moderately competent, with shells/fossils (15%), iron staining (50%); GLEY1 5/10Y to 10YR 6/4 to 7.5YR 3/3, clay observed	
			38–39		LIMESTONE, competent, trace fractures (2%); GLEY1 5/10Y	
			40		LIMESTONE, not competent, with sand, fine to medium (15%), trace iron staining (3%); GLEY1 4/10Y, clay observed	4" LC Steel Casing (0'-360' bgs)
			41–44		LIMESTONE, moderately competent to competent, massive faint bioturbation and burrowing throughout, trace iron staining (5%), trace fractures (1%), trace manganese staining (1%); GLEY1 5/10Y to GLEY1 4/10Y to 10YR 5/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE 11/17/20 / DATE 11/23/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opg	46		LIMESTONE, moderately competent to competent, massive faint bioturbation and burrowing throughout, trace iron staining (5%), trace fractures (1%), trace manganese staining (1%); GLEY1 5/10Y to GLEY1 4/10Y to 10YR 5/3	
			47			
			48			
			49		LIMESTONE, moderately competent to competent, massive bioturbation, trace iron staining (5%); GLEY1 5/5GY to GLEY1 4/11 to 7.5YR 4/4	
			50		LIMESTONE, moderately competent to competent, massive fossiliferous bioturbation; GLEY1 6/10Y to GLEY1 5/10GY	Grout (neat cement) (0'-356' bgs)
			51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-360' bgs)
			56			
			57			
			58			
			59		LIMESTONE, not competent, weathered, trace silt and clay; GLEY 5/10Y	
					LIMESTONE, not competent, weathered, trace silt	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Glenwood Fm. @ 60' bgs	Opg	61		and clay, bioturbation; GLEY 5/10Y LIMESTONE, competent, fossiliferous bioturbation; GLEY1 5/N to GLEY1 6/N SHALE, moderately to well compacted, weathered, mottling/iron staining (15%); GLEY1 4/N	
			62			
			63			
			64			
	St. Peter Fm. @ 65' bgs		65		SANDSTONE, poorly cemented, fine to medium (50% fine, 35% medium), well-rounded, massive iron staining, silt/clastic cement (15%); 10YR 6/3	Grout (neat cement) (0'-356' bgs)
			66			
		Os	67		SANDSTONE, poorly cemented, fine to coarse (20% fine, 60% medium, 5% coarse), well-rounded, silt/clastic cement (15%), trace iron staining (5%); 10YR 8/1	
			68			
			69			
			70		SANDSTONE, poorly to moderately cemented, fine to coarse (10% fine, 50% medium, 15% coarse), well-rounded, silt/clastic cement (25%); GLEY1 7/10Y	4" LC Steel Casing (0'-360' bgs)
			71			
			72			
			73			
			74		SANDSTONE, poorly cemented, medium (100%), sub-rounded to well-rounded, faint iron staining (10%); 2.5Y 9/1	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE 11/17/20 / DATE 11/23/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly cemented, medium (100%), sub-rounded to well-rounded, faint iron staining (10%); 2.5Y 9/1	
			77		SANDSTONE, poorly cemented, fine to medium (10% fine, 90% medium), well-rounded, massive orange iron staining; 10YR 6/5	
			78		SANDSTONE, poorly cemented, fine to medium (65% fine, 35% medium), well-rounded, trace faint iron staining (5%); 10YR 8/6	
			79			
			80		SANDSTONE, poorly to moderately cemented, fine to medium (25% fine, 75% medium), well-rounded, massive faint iron staining; 10YR 7/4	Grout (neat cement) (0'-356' bgs)
			81			
			82			
		Os	83		SANDSTONE, poorly cemented, fine to medium (50% fine, 50% medium), well-rounded, massive faint iron staining; 10YR 7/6	
			84			
			85			4" LC Steel Casing (0'-360' bgs)
			86			
			87			
			88			
			89			
					SANDSTONE, poorly cemented, fine to medium	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		(75% fine, 25% medium), well-rounded; 10YR 7/4 SANDSTONE, poorly cemented, fine to medium (80% fine, 20% medium), sub-rounded to well-rounded; 10YR 8/2	
			92		SANDSTONE, poorly cemented, fine to medium (70% fine, 30% medium), sub-rounded to well-rounded, iron staining (25%); 10YR 8/6	
			93			
			94		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), sub-rounded to well-rounded, massive faint iron staining; 10YR 8/3	
			95			Grout (neat cement) (0'-356' bgs)
			96			
		Os	97			
			98			
			99			
			100		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), well-rounded, trace iron staining (5%); 2.5Y 8/1	4" LC Steel Casing (0'-360' bgs)
			101			
			102			
			103			
			104			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), well-rounded, trace iron staining (5%); 2.5Y 8/1	
			107		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), well-rounded, iron staining (10-15%); 10YR 8/4	
			108		SANDSTONE, poorly cemented, fine to medium (90% fine, 10% medium), well-rounded; white, 10YR 8/1	
			109			
			110			Grout (neat cement) (0'-356' bgs)
			111		SANDSTONE, poorly to moderately cemented, fine to medium (95% fine, 5% medium), well-rounded, trace iron staining (5%); 2.5Y 8/1	
			112			
		Os	113			
			114			
			115			4" LC Steel Casing (0'-360' bgs)
GRAB	MW1A-GW 116-120		116			
			117			
COMP	MW1A-SOIL 116-120		118			
			119			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 9 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SANDSTONE, poorly to moderately cemented, fine to medium (95% fine, 5% medium), well-rounded, iron staining (30%); 2.5Y 8/1 to 10YR 7/8	
			122			
			123			
			124			
			125		SANDSTONE, poorly cemented, fine to medium (95% fine, 5% medium), sub-rounded to well-rounded, massive faint iron staining; 10YR 8/1	Grout (neat cement) (0'-356' bgs)
			126			
		Os	127		SANDSTONE, poorly cemented, fine to medium (95% fine, 5% medium), well-rounded; 2.5Y 8/1	
			128			
			129			
			130		SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded, faint iron staining (30%); 2.5Y 8/1	4" LC Steel Casing (0'-360' bgs)
			131			
			132			
			133			
			134		SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded; 2.5Y 8/1	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 10 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded; 2.5Y 8/1	
			136		SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded, trace faint iron staining (5%); 10YR 7/1	
			137		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 6/3	
			138		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 7/2	
			139		SANDSTONE, poorly cemented, fine (100%), well-rounded; GLEY1 6/N to GLEY1 5/N	
			140		SANDSTONE, poorly cemented, fine (100%), well-rounded, faint iron staining (10%); 10YR 7/2	Grout (neat cement) (0'-356' bgs)
		Os	141			
			142			
			143			
			144		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8/1	
			145		SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded; 10YR 7/3	4" LC Steel Casing (0'-360' bgs)
			146		SANDSTONE, poorly to moderately cemented, fine (100%), sub-rounded to well-rounded, trace cemented medium sand (2%); GLEY1 7/N	
			147			
			148		SANDSTONE, poorly cemented, fine (100%), well-rounded, faint iron staining (20%); GLEY1 6/10Y	
			149			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SANDSTONE, poorly cemented, fine (100%), well-rounded, faint iron staining (20%); 10YR 8.5/1 to 10YR 8/2, trace iron staining @ 152.5' bgs, 10YR 7/6	
			152			
			153			
			154			
			155			Grout (neat cement) (0'-356' bgs)
GRAB	MW1A-GW 156-160		156		SANDSTONE, poorly cemented, fine (100%), sub-rounded to well-rounded; GLEY1 7/N to GLEY1 5/5GY	
			157			
COMP	MW1A-SOIL 156-160	Os	158			
			159			
			160		SANDSTONE, poorly cemented, very fine (85%), sub-rounded, silt (15%); GLEY1 7/N	4" LC Steel Casing (0'-360' bgs)
			161			
			162			
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 12 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	166		SANDSTONE, poorly cemented, very fine (85%), sub-rounded, silt (15%); GLEY1 7/N	Grout (neat cement) (0'-356' bgs)
			167		SANDSTONE, poorly cemented, very fine (100%), sub-rounded to well-rounded; GLEY1 7/N	
			168			
			169		SANDSTONE, poorly cemented, very fine (100%), sub-rounded to well-rounded; GLEY1 5/N	
			170		SANDSTONE, poorly cemented, very fine to fine (100%), sub-rounded to well-rounded; 2.5Y 8/1	
			171			
			172			
			173			
			174			
			175			4" LC Steel Casing (0'-360' bgs)
			176			
			177			
			178			
			179		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; GLEY1 5/10Y	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 13 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	181		SANDSTONE, poorly cemented, fine (100%), well-rounded; GLEY1 6/N	Grout (neat cement) (0'-356' bgs)
			189		SANDSTONE, poorly cemented, fine to medium (95% fine, 5% medium), well-rounded; GLEY1 6/N	
			190		SANDSTONE, poorly cemented, fine (100%), well-rounded; GLEY 6/N to GLEY1 5/N	4" LC Steel Casing (0'-360' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 14 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	196		SANDSTONE, poorly cemented, fine (100%), well-rounded; GLEY 6/N to GLEY1 5/N	
			197			
			198		SANDSTONE, moderately cemented, very fine to fine (100%), well-rounded; GLEY1 5/10Y	
			199			
			200		SANDSTONE, poorly cemented, fine (70%), well-rounded, silt (30%); GLEY1 5/10Y, clay observed	Grout (neat cement) (0'-356' bgs)
			201			
			202		SANDSTONE, moderately cemented, fine to medium (95% fine, 5% medium), well-rounded; GLEY1 5/10Y	
			203			
			204		SANDSTONE, poorly to moderately cemented, fine to medium (25% fine, 75% medium), well-rounded; GLEY1 4/5GY	
			205		SANDSTONE, moderately cemented, fine to medium (75% fine, 25% medium), well-rounded; GLEY1 5/10Y	4" LC Steel Casing (0'-360' bgs)
			206			
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 15 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SANDSTONE, poorly to moderately cemented, fine to coarse (70% fine, 15% medium, 5% coarse), well-rounded; GLEY1 5/10Y	
			212			
			213			
			214			
			215		SANDSTONE, moderately cemented, fine to medium (70% fine, 30% medium), well-rounded; GLEY1 5/10Y	Grout (neat cement) (0'-356' bgs)
			216			
		Os	217		SANDSTONE, moderately to well cemented, fine to coarse (60% fine, 30% medium, 10% coarse), well-rounded; GLEY1 5/10Y, trace fragements of sandy dolostone	
			218			
			219			
	Shakopee Fm. @ 220' bgs		220		DOLOSTONE, not competent to moderately competent, weathered, thin red bands (30%), iron staining (15%); GLEY1 5/10Y	4" LC Steel Casing (0'-360' bgs)
			221		DOLOSTONE, moderately competent, malachite staining (10%), vugs (5-10%), trace sand, medium (5%), trace iron staining (3%), trace pyrite (3%); 10YR 6/1 to 10YR 4/1	
			222			
		Ops	223		DOLOSTONE, moderately competent to competent, dolomitic precipitate (15%), trace sand, fine (5%), trace vugs (5%); 10YR 6/4 to 7.5YR 5/2	
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007			DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS	CHECKED BY: BK				SHEET 16 OF 25
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS					
GROUND SURFACE ELEVATION: 992.701 FT AMSL			WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)			TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85			DATE		DATE 11/17/20 / DATE 11/23/20
			CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW1A-GW 226-230	Ops	226		DOLOSTONE, moderately competent to competent, dolomitic precipitate (15%), trace sand, fine (5%), trace vugs (5%); 10YR 6/4 to 7.5YR 5/2	
			227		DOLOSTONE, moderately competent, oolitic texture (10-5%), trace dolomitic precipitate (5%), trace iron staining (5%), trace malachite (3%); 10YR 6/2	
			228			
			229			
			230			Grout (neat cement) (0'-356' bgs)
			231		DOLOSTONE, competent, sand, fine (15%), oolitic texture (15%), dolomitic precipitate (10%), iron staining (10-5%), trace fossils (5%); 10YR 5/3	
			232			
			233			
			234		DOLOSTONE, moderately competent, massive iron staining, sand, fine (10%), dolomitic precipitate (10%), trace malachite (3%), trace dark red iron staining (3%), trace thin fractures (2%); 10YR 6/4 to 7.5YR 6/6	
			235			4" LC Steel Casing (0'-360' bgs)
			236			
			237			
			238			
			239			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 17 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME 1230 / TIME 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE 11/17/20 / DATE 11/23/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, moderately competent to competent, iron staining (20%), sand, fine (10%), dolomitic precipitate (10%), trace malachite staining (5%), trace bedding observed; 10YR 6/1	
			242			
			243			
			244			
			245			Grout (neat cement) (0'-356' bgs)
			246		DOLOSTONE, not competent to competent, shale with red/purple iron staining (20%), dendritic manganese staining (10-5%), trace fractures (5%), trace oolitic texture (5%), trace vugs (2%), trace sand, fine (2%); 10YR 7/1	
		Ops	247			
			248		DOLOSTONE, competent, iron staining (20%), vugs (15%), malachite staining (10%), fractures (10-5%), trace dolomitic precipitate (5%), trace sand (3%); 10YR 6/3	
			249			
			250		DOLOSTONE, moderately competent, iron staining (50%), trace dolomitic precipitate (5%), trace thin fractures (5%), trace vugs (5%), trace sand (3%), trace manganese staining (2%); 10YR 6/1	4" LC Steel Casing (0'-360' bgs)
			251			
			252			
			253			
			254		DOLOSTONE, competent, thin fractures (5-10%), faint iron staining (5-10%), trace dendritic manganese staining along fractures (5%); 10YR 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW1A [850554]	
LOGGED BY: AS	CHECKED BY: BK			SHEET 18 OF 25	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 370 FT BGS					
GROUND SURFACE ELEVATION: 992.701 FT AMSL		WATER LEVEL		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1230	1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85		DATE		DATE 11/17/20	DATE 11/23/20
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			256		DOLOSTONE, moderately competent, iron staining (40-50%), dolomitic precipitate (15%), fractures (10-5%), trace sand (5%), trace malachite staining (3%); trace vugs; 10YR 6/3 to 10YR 6/6	
			257			
			258			
			259			
			260		DOLOSTONE, not competent, massive faint iron staining, dolomitic precipitate (10%), green staining (5-10%), trace vugs (3%); 10YR 6/2	Grout (neat cement) (0'-356' bgs)
			261			
			262		DOLOSTONE, not competent, massive iron staining, dolomitic precipitate (15%), chert (15%); 10YR 6/4	
		Ops	263			
			264			
			265			4" LC Steel Casing (0'-360' bgs)
			266			
			267			
			268		DOLOSTONE, not competent to moderately competent, iron staining (25%), trace small vugs (5%), trace sand (3%); 10YR 5/2, chert sheen	
			269			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW1A [850554]	
LOGGED BY: AS	CHECKED BY: BK							SHEET 19 OF 25	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 370 FT BGS									
GROUND SURFACE ELEVATION: 992.701 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1230	1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85			DATE					DATE	DATE
			CASING DEPTH					11/17/20	11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			271		DOLOSTONE, not competent, massive iron staining, dolomitic precipitate (10%), trace sand (5%), trace thin fractures (2%); 10YR 6/4	
			272			
			273			
			274		void space per driller, possibly karst feature	
			275			Grout (neat cement) (0'-356' bgs)
			276		DOLOSTONE, moderately competent, green malachite staining (30%), iron staining (15%), dolomitic precipitate (5-10%), trace sand (3%), trace thin fractures (3%); 10YR 6/2	
		Ops	277			
			278			
			279			
			280		DOLOSTONE, competent, iron staining (30%), sand, fine (15%), trace vugs (5%), trace manganese staining (1%); 10YR 6/3, green staining @ 280' bgs	4" LC Steel Casing (0'-360' bgs)
			281			
			282		DOLOSTONE, not competent, sand, fine (40%), platy shale??? (25%), iron staining (15%), trace manganese staining (5%); 10YR 8/1 to GLEY1 6/5GY	
			283			
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 20 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	286		DOLOSTONE, very competent, massive iron staining, dolomitic precipitate (25%), sand (15-20%), oolitic texture (15%), vugs (10%), trace shale bedding (2%); 10YR 6/6	
			287			
			288			
			289			
			290		DOLOSTONE, competent, massive iron staining, dolomitic precipitate (25%), vugs (15%), sand (5-10%), trace oolites (5%), trace green staining (3%), trace manganese staining (2%); 10YR 6/5	Grout (neat cement) (0'-356' bgs)
			291			
			292			
			293			
			294		SHALE, well compacted, sand (20%), dendritic manganese staining (15%); 10YR 8/1 to GLEY1 7/10Y	
			295		DOLOSTONE, moderately competent to competent, bedding observed, dolomitic precipitate (15%), sand (10-15%), trace green staining (5%), trace oolitic texture (1%); 10YR 6/6	4" LC Steel Casing (0'-360' bgs)
			296			
			297			
			298			
			299		DOLOSTONE, moderately competent, bedding observed, sand (25%), trace green staining (5%), trace reworked clasts (5%), trace iron staining (3%);	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW1A [850554]	
LOGGED BY: AS	CHECKED BY: BK									SHEET 21 OF 25	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 370 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 992.701 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						1230	1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85				DATE						DATE	DATE
				CASING DEPTH						11/17/20	11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 303' bgs	Ops	301		10YR 6/2 DOLOSTONE, moderately competent to competent, massive iron staining, green staining (25%), dolomitic precipitate (15%), trace sand (3%), trace vugs (3%); 10YR 5/2	
			302			
			303		DOLOSTONE, competent, dolomitic precipitate (10-15%), small vugs (10%); 10YR 7/2	
			304		DOLOSTONE, moderately competent to competent, massive iron staining, vugs (15%), quartz/calcite nodules (10%), dolomitic precipitate (5-10%); 10YR 6/2	
			305			Grout (neat cement) (0'-356' bgs)
			306			
			307			
			308			
		Opo	309			
			310		DOLOSTONE, moderately competent to very competent, vugs (50%), dolomitic precipitate (25%); 10YR 6/2 to 10YR 6/5; iron staining from 312.5' to 315' bgs	4" LC Steel Casing (0'-360' bgs)
			311			
			312			
			313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 22 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW1A-GW 316-320	Opo	316		DOLOSTONE, competent, massive faint orange tint, small vugs (15%), dolomitic precipitate (15%); 10YR 6/2	
			317			
			318			
			319			
			320		DOLOSTONE, very competent, trace fractures (5%), trace vugs (5%), trace fine dolomitic precipitate (5%), trace manganese staining (3%); 10YR 8/2, faint banding observed	Grout (neat cement) (0'-356' bgs)
			321			
			322			
			323			
			324			
			325		DOLOSTONE, moderately competent, iron staining (20%), dolomitic precipitate (10-15%), chert (5-10%), manganese staining (5%); 10YR 6/1, rubbly	4" LC Steel Casing (0'-360' bgs)
			326		DOLOSTONE, competent, bedding observed, thin fractures (10%), dolomitic precipitate (5-10%), trace vugs (4%), trace manganese staining along fractures (3%); 7.5YR 6/6	
			327		DOLOSTONE, moderately competent to competent, patchy iron staining (20%), trace large vugs (5%), trace medium grained dolomitic precipitate (5%), trace chert (2%); 10YR 5/3 to 5YR 7/6	
			328			
			329			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 23 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	331		DOLOSTONE, competent, fine to coarse dolomitic precipitate (50%), iron staining (20%), trace vugs (5%), trace fractures (2%); 10YR 6/1 to 7.5YR 7/4, dolomite rhombs, dissolution features	
			332			
			333			
			334			
			335		DOLOSTONE, moderately competent to competent, dolomitic precipitate (25%), trace vugs (5%), massive iron staining; 10YR 7/4	Grout (neat cement) (0'-356' bgs)
			336			
			337			
			338			
			339			
			340		DOLOSTONE, moderately competent to competent, dolomitic precipitate (25%), trace vugs (5%), trace iron staining; 5YR 6/3	4" LC Steel Casing (0'-360' bgs)
			341		DOLOSTONE, very competent, medium grained dolomitic precipitate (25%), vugs (10-15%), trace thin fractures (5%); GLEY1 5/10Y to 10YR 6/3, bedded grey to dark orange	
			342			
			343			
			344		DOLOSTONE, competent, dolomitic precipitate (30%), vugs (15%); GLEY1 7/10Y to 5YR 6/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 24 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			346			
			347			
			348			
	Coon Valley @ 349' bgs	Opo	349		SANDY DOLOSTONE, sand, medium to coarse (40%), faint glauconitic staining (10%); 7.5YR 6/4 to GLEY1 7/10Y, wavy bedding	
			350		SANDY DOLOSTONE, sand, medium to coarse (40%), faint glauconitic staining (10%); 5YR 5/4, wavy bedding	Grout (neat cement) (0'-356' bgs)
			351			
	Jordan Fm. @ 352' bgs		352		SANDSTONE, moderately to well compacted, fine to medium (35% fine, 65% medium), well-rounded; 10YR 7/2	
			353		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), well-rounded; 10YR 7/4	
			354			
			355		SANDSTONE, poorly cemented, fine to medium (15% fine, 85% medium), well-rounded; 10YR 7/1	4" LC Steel Casing (0'-360' bgs)
			356			
			357			2' Fine Sand (356'-358' bgs)
		Cj	358		SANDSTONE, moderately cemented, fine to medium (15% fine, 85% medium), well-rounded; 10YR 8/1	
			359		SANDSTONE, poorly cemented, fine to medium (15% fine, 85% medium), well-rounded; 10YR 8/1	Sand filter pack (358'-370' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1A [850554]
LOGGED BY: AS / CHECKED BY: BK			SHEET 25 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 992.701 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1730
COMMENTS: Northing: 4982424.184 Easting: 503582.85	DATE		DATE / DATE
	CASING DEPTH		11/17/20 / 11/23/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			361		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), well-rounded; 10YR 7/4	
			362			
			363		SANDSTONE, poorly cemented, fine to medium (75% fine, 25% medium), well-rounded, 10YR 7/4 to 10YR 7/6	
			364			Sand filter pack (358'-370' bgs)
		Cj	365			Screened interval (0.010" slot) (360'-370' bgs)
			366			
			367			
			368			
			369			
			370		E.O.B. @ 370' bgs, no refusal	
			371			
			372			
			373			
			374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1100
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		11/30/20 / 12/01/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–3		CLAY, low to medium plasticity, soft, with sand, fine (25%), with organics (15%); moist, 10YR 4/2	
		ML	3–7		SILT, low plasticity, soft, with sand, fine (15%), gravel, fine (5-10%); dry, 10YR 4/2	Grout (neat cement) (0'-96' bgs)
		SW	7–10		SAND, fine to coarse (25% fine, 25% medium, 20% coarse), sub-rounded, well graded, with cobbles (15%), with gravel, fine to coarse (15%), sub-rounded; dry, 10YR 4/4	
		ML	10–11		SILT, low plasticity, soft, sand, fine (10%), with clay (10%), trace gravel, fine to medium (5%); dry, 10YR 4/2	4" LC Steel Casing (0'-100' bgs)
GRAB COMP	MW1B-GW 12-15 MW1B-SOIL 12-15	SC	11–14		SILTY CLAYEY SAND, sand, fine to coarse (20% fine, 20% medium, 20% coarse), well-rounded, with gravel, fine to coarse (20%), sub-rounded, with silt (10%), with clay (10%); wet, 10YR 4/4	
		CL	14		CLAY, medium plasticity, stiff, with gravel, fine to	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1100
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		11/30/20 / 12/01/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		coarse (10% fine, 5% coarse); dry, 10YR 5/6 CLAY, medium plasticity, stiff, with gravel, fine to coarse (10% fine, 5% coarse); dry, 10YR 5/6	
		CL	17			
			18		CLAY, medium plasticity, stiff, with gravel, fine to coarse (10% fine, 5% coarse); dry, 10YR 4/1	
			19			
		GP	20		BOULDER/COBBLE, fractured, igneous; GLEY 1 3/N	Grout (neat cement) (0'-96' bgs)
			21		CLAY, medium to high plasticity, stiff, gravel, fine to coarse (5% fine, 5% medium, 3% coarse), sub-angular; dry, GLEY 1 3/N (10YR 3/1 from 22.5'-23')	
			22			
			23			
			24			
COMP	MW1B-SOIL 25-27	CH	25			4" LC Steel Casing (0'-100' bgs)
			26			
			27			
			28			
			29			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1100
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		11/30/20 / 12/01/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		CLAY, medium to high plasticity, stiff, gravel, fine to coarse (5% fine, 5% medium, 3% coarse), sub-angular, trace congolomeratic cobble @30' bgs (2%); dry, GLEY 1 3/10Y	
		CH	32			
			33			
			34			
			35			Grout (neat cement) (0'-96' bgs)
			36			
	Platteville Fm. @ 37' bgs		37		LIMESTONE, not competent to competent, fractures (10%), trace burrows with pyrite replacement (5%), trace iron staining (5%); GLEY 1, 5/10Y	
			38			
			39			
			40		LIMESTONE, competent, massive bioturbation, fractures (10%), trace iron staining (5%); GLEY 1 5/10GY	4" LC Steel Casing (0'-100' bgs)
		Opg	41			
			42			
GRAB	MW1B-GW 41-45		43			
			44			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1100
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		11/30/20 / 12/01/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		LIMESTONE, not competent, massive faint bioturbation, trace iron staining (5%); GLEY 1 5/5GY, clay observed SHALE, not compacted to well compacted, trace iron staining (5%); GLEY 1 5/5GY, clay observed	
			47			
			48		LIMESTONE, competent, bioturbation (20%), ~2mm shell fossils/fragments (10%); GLEY 1 5/5GY, clay observed	
			49			
			50		LIMESTONE, moderately competent to competent, massive bioturbation, bedding observed, possible phosphate replacement (detrital texture), ~2mm shell fossils/fragments (10%); GLEY 1 5/10Y	Grout (neat cement) (0'-96' bgs)
		Opg	51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-100' bgs)
			56			
			57			
			58			
	Glenwood Fm. @ 60' bgs		59			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1100
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		11/30/20 / 12/01/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 66' bgs	Opg	61		LIMESTONE, moderately competent to competent, massive bioturbation, bedding observed, possible phosphate replacement (detrital texture), ~2mm shell fossils/fragments (10%); GLEY 1 5/10Y, dolomitic limestone from ~61.1'-62.6' bgs	
			62			
			63		SHALE, not compacted, trace well compacted sandy shale (5-10%), trace glauconitic staining (5%); GLEY 1 2.5/N	
			64			
			65			Grout (neat cement) (0'-96' bgs)
		Os	66		SANDSTONE, moderately cemented, fine to medium (10% fine, 80% medium), well-rounded, silt (10%), trace faint iron staining (5%); 2.5Y 8/3	
			67			
			68		SANDSTONE, poorly cemented, medium (100%), well-rounded; GLEY 1 8/N	
			69			
			70		SANDSTONE, poorly cemented, medium (85%), well-rounded, silt (15%), trace iron staining (5%); 10YR 7/3 (with slight greenish tint)	4" LC Steel Casing (0'-100' bgs)
			71			
			72			
			73			
			74		SANDSTONE, poorly cemented, fine to medium (5% fine, 95% medium), well-rounded; 5Y 8/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW1B [854442]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 6 OF 8		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 80 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						1330	1100	
COMMENTS: Northing: Easting:			DATE						DATE	DATE	
			CASING DEPTH						11/30/20	12/01/20	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	76		SANDSTONE, poorly cemented, fine to medium (5% fine, 95% medium), well-rounded; 5Y 8/3	
			77		SANDSTONE, poorly cemented, massive faint iron staining, fine to medium (40% fine, 60% medium), well-rounded; 2.5Y 8/8, trace well cemented @ 67' bgs, grades finer towards 80' bgs	
			78			
			79			
			80		Begin blind drill @ 80' bgs	Grout (neat cement) (0'-96' bgs)
			81			
			82			
			83			
			84			
			85			4" LC Steel Casing (0'-100' bgs)
			86			
			87			
			88			
			89			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW1B [854442]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 7 OF 8		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 80 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						1330	1100	
COMMENTS: Northing: Easting:			DATE						DATE	DATE	
			CASING DEPTH						11/30/20	12/01/20	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91			Grout (neat cement) (0'-96' bgs)
			92			
			93			
			94			
			95			4" LC Steel Casing (0'-100' bgs)
			96			
			97		Blind drill 80-120' bgs	2' Fine Sand (96'-98' bgs)
			98			
			99			Sand filter pack (98'-120' bgs)
			100			
			101			
			102			Screened interval (0.010" slot) (100'-120' bgs)
			103			
			104			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1B [854442]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 80 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 1330 / TIME 1100
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE 11/30/20 / DATE 12/01/20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			106			
			107			
			108			
			109			Sand filter pack (98'-120' bgs)
			110			
			111			
			112			
			113		Blind drill 80-120' bgs	
			114			
			115			Screened interval (0.010" slot) (100'-120' bgs)
			116			
			117			
			118			
			119		E.O.B. @ 120' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1C [854439]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 55 FT BGS			
GROUND SURFACE ELEVATION: 992.647 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 900
COMMENTS: Northing: 4982426.264 Easting: 503584.546	DATE		DATE / DATE
	CASING DEPTH		04/20/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL-ML	0–2		SILTY CLAY, low plasticity, organics (10-15%), trace gravel (5%); moist, 10YR 4/2	
		ML	2–8		CLAYEY SILT, low plasticity, clay (25%), sand, fine (15%), trace organics (1%); dry, 10YR 4/1	Grout (neat cement) (0'-36' bgs)
		CL	8–10		SANDY CLAY, low plasticity, with sand, fine to coarse (30%), sub-rounded, with gravel, fine to coarse (25%), sub-angular to sub-rounded, trace cobble (5%); dry, 10YR 4/4	
		SW-SC	10–14		CLAYEY SAND, fine to coarse (10%fine, 10% medium, 20% coarse), clay/silt (30%), low plasticity, with gravel, fine to coarse (25%), trace cobbles (5%); moist, 10YR 4/4, 4" lense @ 13' bgs	4" LC Steel Casing (0'-40' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1C [854439]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 55 FT BGS			
GROUND SURFACE ELEVATION: 992.647 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 900
COMMENTS: Northing: 4982426.264 Easting: 503584.546	DATE		DATE / DATE
	CASING DEPTH		04/20/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		CLAY, low to medium plasticity, stiff, sand, fine (10%), gravel, fine (5-10%), sub-angular to angular; dry, 10YR 5/4, mottled	
			17			
			18			
			19		CLAY, low to medium plasticity, stiff, sand, fine (10%), gravel, fine to medium (5-10%), sub-angular to angular, trace orange and red streaks; dry, 10YR 4/1	
			20		CLAY, medium plasticity, very stiff, iron staining/mottling (10%), sand, fine (10%), gravel, fine (10%), trace cobble (3%); dry, 10YR 4/1	Grout (neat cement) (0'-36' bgs)
		CL	21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-40' bgs)
			26			
			27		CLAY, medium plasticity, very stiff, iron staining (10%), sand, fine (10%), gravel, fine (10%), trace cobble (3%); 10YR 3/1	
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1C [854439]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 55 FT BGS			
GROUND SURFACE ELEVATION: 992.647 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 900
COMMENTS: Northing: 4982426.264 Easting: 503584.546	DATE		DATE / DATE
	CASING DEPTH		04/20/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Platteville Fm. @ 36' bgs	CL	31–36		CLAY, medium plasticity, very stiff, iron staining (10%), gravel, fine (10%), trace sand, fine (5%), trace cobble (3%); 10YR 3/1	Grout (neat cement) (0'-36' bgs) 4" LC Steel Casing (0'-40' bgs)
			36–40		DOLOSTONE, competent, thinly banded iron staining (15%), trace shells partially pyrite replaced (5%), trace fractures with pyrite (5%), trace burrows (2%); fossiliferous	2' Fine Sand (36'-38' bgs)
		Opg	40–44		DOLOSTONE, competent, trace fractures (5%), trace shells @ 43' and 45'	Sand filter pack (38'-55' bgs) Screened interval (0.010" slot) (40'-45' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW1C [854439]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 55 FT BGS			
GROUND SURFACE ELEVATION: 992.647 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 900
COMMENTS: Northing: 4982426.264 Easting: 503584.546	DATE		DATE / DATE
	CASING DEPTH		04/20/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW1C-GW 51-55	Opg	46–59		DOLOSTONE, competent, trace fractures (5%), trace shells @ 43' and 45' DOLOSTONE, competent, small black shells, burrows DOLOSTONE, thinly bedded, with small black shells (15%) E.O.B. @ 55' bgs, backfill 45-55', screen 40'-45' bgs	Backfill sand (45'-55' bgs)

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 1 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		SAND, medium to coarse (15% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (10% fine, 20% medium, 15% coarse), sub-angular; dry, 5YR 5/6	
			2			
			3		SAND, medium to coarse (15% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (10% fine, 20% medium, 15% coarse), sub-angular; dry, 5YR 3/6	
			4		SAND, fine to coarse (60% fine, 30% medium, 5% coarse), sub-rounded, poorly graded, trace gravel, medium to coarse (5%); dry, 10YR 5/6	
		SP	5		SAND, fine to coarse (5% fine, 55% medium, 10% coarse), sub-rouned, poorly graded, with gravel, fine to coarse (15% fine, 13% medium, 2% coarse), sub-angular to sub-rounded; dry, 5YR 4/6	Grout (neat cement) (0'-238' bgs)
			6			
			7			
DISCRETE	MW2A-SOIL 8-10		8			
			9		SAND, fine to coarse (5% fine, 20% medium, 40% coarse), sub-rounded, poorly graded, with gravel, medium to coarse (20% medium, 10% coarse), sub-rounded, trace clay (5%); moist, 10YR 4/4	
		SW	10		SAND, medium to coarse (15% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine to medium (10% fine, 5% medium); moist, 10YR 6/3	4" LC Steel Casing (0'-240' bgs)
DISCRETE	MW2A-SOIL 11-12		11			
GRAB	MW2A-GW 11-12	CL	12		CLAY, low plasticity, medium stiff, with sand, coarse (25%), sub-rounded, trace gravel, medium (5%); wet, 10YR 4/6, sand seams at: 10.25', 10.5', 11', 11.5' bgs	
			13			
			14			
		SP			SAND, medium to coarse (15% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine to medium (15% fine, 10% medium),	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 2 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16		sub-angular to sub-rounded; wet, 10YR 4/4 SAND, fine to coarse (5% fine, 30% medium, 60% coarse), well-rounded, poorly graded, trace gravel, fine (5%); wet, 10YR 5/3	
		GP	17		GRAVEL, fine (70%), sub-angular to sub-rounded, poorly graded, with sand, coarse (30%), well-rounded; wet, 10YR 4/4	
			18			
		SP	19		SAND, medium to coarse (10% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (30% fine, 10% medium, 10% coarse), sub-angular to sub-rounded; wet, 10YR 3/4	
		ML				
			20		SILT, no plasticity, soft, trace gravel, coarse (5%), trace clay (5%); moist to wet, 10YR 4/4	Grout (neat cement) (0'-238' bgs)
			21		CLAY, low to no plasticity, stiff, with sand, fine (15%), well-rounded, trace gravel, medium to coarse (5%); dry to moist, 10YR 4/4	
			22			
			23			
			24			
		CL	25			4" LC Steel Casing (0'-240' bgs)
			26			
			27		CLAY, low to no plasticity, stiff, with gravel, fine to coarse (10% fine, 5% medium, 5% coarse), sub-angular, with sand, fine (15%), well-rounded; dry to moist, 10YR 4/4, 1" sand seam at 29.75' bgs	
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 3 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		SAND, fine to coarse (70% fine, 20% medium, 10% coarse), sub-rounded, well graded; wet, 10YR 4/3	
		SW	32			
			33			
			34		GRAVEL, fine to medium (50% fine, 25% medium), angular to well-rounded, poorly graded, with sand, coarse (25%), well-rounded; wet, 10YR 4/4	
COMP	MW2A-SOIL 36-40	GP	35			Grout (neat cement) (0'-238' bgs)
			36			
GRAB	MW2A-GW 36-40					
			37		SAND, fine to coarse (40% fine, 15% medium, 30% coarse), sub-rounded, well graded, with gravel, fine (15%), angular; wet, 10YR 4/4	
GRAB	MW2A-GW 36-40 +DUP	SW	38		GRAVEL, fine (75%), angular to sub-angular, poorly graded, with sand, coarse (25%), well-rounded; moist, 10YR 4/3	
		SP	39			
		ML	40		SILT, no plasticity, soft, trace clay (5%); dry to moist, 10YR 3/4	4" LC Steel Casing (0'-240' bgs)
					No Recovery (drill pushed down rock, 4" rock fragment observed at 47' bgs)	
			41			
			42			
			43			
			44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 4 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		No Recovery (drill pushed down rock, 4" rock fragment observed at 47' bgs)	
		SW	47–49		SAND, fine to coarse (20% fine, 20% medium, 40% coarse), sub-rounded, well graded, with gravel, fine (20%), sub-rounded; wet, 10YR 4/3	
		SP	50		SAND, fine to medium (80% fine, 20% medium), sub-rounded, poorly graded, trace gravel, fine (5%); wet, 10YR 4/4	Grout (neat cement) (0'-238' bgs)
		GP	51–54		GRAVEL, fine to medium (65% fine, 10% medium), angular to sub-rounded, poorly graded, with sand, medium to coarse (10% medium, 15% coarse), well-rounded; wet, 10YR 4/4 GRAVEL, fine to medium (45% fine, 30% medium), angular to sub-rounded, poorly graded, with sand, medium to coarse (10% medium, 15% coarse), well-rounded; wet, 10YR 4/4 GRAVEL, fine to medium (65% fine, 10% medium), angular to sub-rounded, poorly graded, with sand, medium to coarse (10% medium, 15% coarse), well-rounded; wet, 10YR 4/4	
			55		GRAVEL, fine to medium (50% fine, 25% medium), sub-rounded to well-rounded, poorly graded, with sand, medium to coarse (15% medium, 10% coarse), well-rounded; wet, 10YR 4/4	4" LC Steel Casing (0'-240' bgs)
			56–58		GRAVEL, fine to medium (40% fine, 35% medium), angular to sub-rounded, poorly graded, with sand, medium to coarse (5% medium, 19% coarse), well-rounded, trace clay (1%); wet, 10YR 4/4	
		GW	59		GRAVEL, fine to coarse (20% fine, 65% medium, 15% coarse), angular to well-rounded, well graded; wet, 10YR 4/3	
		ML				

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 5 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START: 1000 / FINISH: 1330
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE: 06-22-20 / DATE: 06-24-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			60		SILT, no plasticity, soft, with sand, fine to medium (10% fine, 5% medium), well-rounded; dry to moist, 10YR 4/3, sand @ 60' bgs, wet	
			61		GRAVEL, fine to coarse (20% fine, 60% medium, 20% coarse), sub-angular to sub-rounded, well graded; moist, 10YR 4/3, low recovery from 60-70' bgs (2.5'/10')	
			62			
			63			
		GW	64			
			65			Grout (neat cement) (0'-238' bgs)
COMP	MW2A-SOIL 66-70		66			
			67			
	St. Peter Fm. @ 68' bgs		68		SANDSTONE, poorly cemented, fine to medium (70% fine, 30% medium), well-rounded; 2.5Y 8/2, clay observed, beginning of St Peter	
			69			
GRAB	MW2A-GW 66-70		70		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), well-rounded; 2.5Y 7/2, clay observed, oxidation at 72' bgs	4" LC Steel Casing (0'-240' bgs)
		Os	71			
			72			
			73			
			74			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 6 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), well-rounded; 2.5Y 7/2, clay observed, oxidation at 72' bgs	
			77		SANDSTONE, poorly cemented, fine to medium (80% fine, 20% medium), well-rounded; 8/N (white), oxidation at 79' and 80' bgs	
			78			
			79			
			80		SANDSTONE, well cemented, fine (100%), well-rounded, gray mottling; 10YR 6/6, silt observed, 1" silt seam at 85' bgs	Grout (neat cement) (0'-238' bgs)
			81			
		Os	82			
			83			
			84			
			85			4" LC Steel Casing (0'-240' bgs)
			86		SANDSTONE, poorly cemented, fine (100%), well-rounded; 8/N (white)	
			87			
			88		SANDSTONE, well cemented, fine to medium (90% fine, 10% medium), well-rounded; 5Y 7/4	
			89			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 7 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, moderately cemented, fine to medium (30% fine, 70% medium), well-rounded, trace red mottling; 5Y 7/1 to 10YR 7/8, silt observed, well cemented at 93' bgs	
			92			
			93			
			94			
		Os	95		SANDSTONE, poorly cemented, fine to coarse (5% fine, 30% medium, 65% coarse), sub-rounded to well-rounded; 10YR 5/8	Grout (neat cement) (0'-238' bgs)
			96			
			97		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), sub-rounded to well-rounded; 2.5Y 6/1	
			98		SANDSTONE, poorly cemented, medium to coarse (25% medium, 75% coarse), sub-rounded; 2.5Y 5/6, silt observed	
			99		SANDSTONE, moderately cemented, fine to medium (80% fine, 20% medium), well-rounded, mottling; 5Y 7/1 to 10YR 5/8	
	Shakopee Fm. @ 100' bgs		100		DOLOSTONE, not competent, oolitic texture (20%), dolomitic precipitate (10%), trace vugs (5%), trace chert (5%); 5YR 6/1, dendritic manganese and glauconitic staining at 105' bgs, beginning of Shakopee	4" LC Steel Casing (0'-240' bgs)
			101			
			102			
		Ops	103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 8 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW2A-GW 116-120	Ops	106		DOLOSTONE, moderately competent, massive iron staining, dolomitic precipitate (15%), small (<1mm) vugs (10%), trace dendritic manganese staining (5%); 5YR 6/2, silt observed at 106' bgs	
			107			
			108			
			109			
			110		DOLOSTONE, not to moderately competent, weathered, oolitic texture (30%), dolomitic precipitate (20%), small (<1mm) vugs (10%); 10YR 7/6	Grout (neat cement) (0'-238' bgs)
			111		DOLOSTONE, not competent, massive iron staining, dendritic manganese staining (10%), trace glauconitic staining (5%), trace small (<1mm) vugs (5%), trace sand, medium (1%), trace chert (1%); 10YR 7/4	
			112			
			113		DOLOSTONE, not to moderately competent, iron staining along fractures; 10YR 6/1, 2" sandy dolostone with dolomitic precipitate at 114' bgs	
			114			
			115		DOLOSTONE, moderately competent, massive, oxidized red staining/fine grained precipitate along fractures, trace vugs (5%); 10YR 6/1	4" LC Steel Casing (0'-240' bgs)
			116		DOLOSTONE, not to moderately competent, trace oolitic texture (5%), trace sand, fine (5%), trace manganese staining (3%); 10YR 7/3, iron staining (10YR 6/4) at 117' bgs	
			117			
			118		DOLOSTONE, not competent, fine to medium dolomitic precipitate (15%), trace small (<1mm) vugs (5%), trace glauconitic staining (5%), trace sand, fine (2%), trace manganese staining (2%); 10YR 5/6	
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW2A [848623]	
LOGGED BY: AEL	CHECKED BY: AS							SHEET 9 OF 18	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 263 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 913.092 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1000	1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3			DATE					DATE	DATE
			CASING DEPTH					06-22-20	06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	121		DOLOSTONE, not competent, massive iron staining, dolomitic precipitate (15%), small (<1mm) vugs (5-10%), oolitic texture (5-10%), trace sand, fine to medium (5%); 10YR 6/2	
			122			
			123			
			124		DOLOSTONE, not competent, very weathered, blocky, oolitic texture (10%), trace chert (5%), trace dendritic manganese staining (2%); 2.5Y 6/1, silt/clay observed	
			125		DOLOSTONE, moderately competent, fine dolomitic precipitate (15%), sand, medium (5-10%), trace oolitic texture (5%); 10YR 6/2	Grout (neat cement) (0'-238' bgs)
			126			
			127			
			128			
			129			
			130		DOLOSTONE, moderately competent, massive, iron staining along fractures, dendritic manganese staining (10%); 2.5Y 7/2	4" LC Steel Casing (0'-240' bgs)
			131		DOLOSTONE, not to moderately competent, sand, fine to medium (10-15%), dolomitic precipitate (10%), trace small (<1mm) vugs (2%); 10YR 6/1, 3" fine sand layer at 131.5' bgs	
			132			
			133			
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW2A [848623]	
LOGGED BY: AEL	CHECKED BY: AS							SHEET 10 OF 18	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 263 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 913.092 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1000	1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3			DATE					DATE	DATE
			CASING DEPTH					06-22-20	06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	136		SHALE, very weathered (clay); GLEY 8/2 DOLOSTONE, not competent, blocky, massive, chert (10%), manganese staining (10%); 2.5Y 6/2	
			137		SANDSTONE, moderately cemented, fine (100%), sub-rounded; 2.5Y 6/6	
			138		DOLOSTONE, not to moderately competent, massive iron staining, dolomitic precipitate (15%), sand, fine to medium (10-15%), manganese staining (10%), trace glauconitic staining (5%); 10YR 5/6	
			139		DOLOSTONE, not competent, very weathered, massive fine dolomitic precipitate, sand (20%); 5Y 4/2, clay observed	
			140		DOLOSTONE, moderately competent, iron staining along fractures (10%), trace glauconitic staining (5%), trace manganese staining (5%), trace vugs (5%); 2.5Y 5/3, clay observed	Grout (neat cement) (0'-238' bgs)
			141		DOLOSTONE, not to moderately competent, dolomitic precipitate (15%), sand, fine (5-10%), oolitic texture (5-10%), trace vugs (5%); 2.5Y 6/1	
			142			
			143			
			144		DOLOSTONE, moderately competent, massive, blocky, trace manganese staining along fractures (5%); 10YR 7/2, silt, dolomitic precipitation, glauconitic staining observed at 144.5' bgs	
			145			4" LC Steel Casing (0'-240' bgs)
			146		DOLOSTONE, not to moderately competent, dolomitic precipitate (15-20%), iron staining (10%), trace small (<1mm) vugs (5%), trace sand, fine (5%); 10YR 7/3	
			147		No Recovery (karst feature likely)	
			148			
			149			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 11 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	151		DOLOSTONE, not competent, very weathered, lithic fragments (80%), sand, coarse (15-20%); 10YR 5/4	Grout (neat cement) (0'-238' bgs)
			152		DOLOSTONE, not to moderately competent, weathered, iron staining (15-20%), oxidized dolomitic precipitate (15%), sand, medium (10%), trace small (<1mm) vugs (5%); 10YR 6/1	
			153			
			154		DOLOSTONE, moderately competent, iron staining (10%), dolomitic precipitate (10%), trace calcite precipitate (5%), trace sand, fine (2%); 10YR 7/1	
			155			
			156			
			157		DOLOSTONE, moderately competent to competent, massive staining, oolitic texture (10%), sand, fine to medium (10%), trace vugs (5%), trace quartz precipitate (2%); 10YR 5/6	
			158		DOLOSTONE, moderately competent, massive, blocky, trace iron staining (2%); 2.5Y 7/2	
			159		DOLOSTONE, not competent, very weathered, massive dark iron staining, glauconitic staining (10%); 10YR 6/2 to 10YR 4/6	
			160		DOLOSTONE, moderately competent, weathered, oxidized dolomitic precipitate (15%), green/pink chert (15%), vugs (10%), trace oxidized calcite precipitation (2%), trace sand, fine (2%); 2.5Y 7/1	4" LC Steel Casing (0'-240' bgs)
			161			
			162			
			163			
			164		DOLOSTONE, moderately competent, fine dolomitic precipitate (15%), glauconitic staining (5-10%), trace small (<1mm) vugs (5%); 2.5Y 6/1, less competent,	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 12 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					blocky, iron stained at 164' bgs	
			166		DOLOSTONE, moderately competent, fine dolomitic precipitate (15%), glauconitic staining (5-10%), trace small (<1mm) vugs (5%); 2.5Y 6/1, less competent, blocky, iron stained at 164' bgs	
			167		DOLOSTONE, moderately competent, weathered, oxidized dolomitic precipitate (15%), green/pink chert (15%), vugs (10%), trace oxidized calcite precipitation (2%), trace sand, fine (5%), trace glauconitic staining (2%); 2.5Y 7/1	
			168		SANDY DOLOSTONE, moderately competent, dolomitic precipitate (30%), sand, fine (30%), chert (5-10%), trace manganese staining (5%); 10YR 7/6, green (GLEY1 7/5GY), platy shale from 169'-169.25' bgs	
			169			
			170		DOLOSTONE, very competent, massive iron staining, oolitic texture (30%), small to medium vugs (15%), trace dolomitic precipitate (5%); 10YR 6/6	Grout (neat cement) (0'-238' bgs)
			171			
		Ops	172			
			173			
			174			
			175			4" LC Steel Casing (0'-240' bgs)
			176		DOLOSTONE, moderately competent, dolomitic precipitate (15%), small (<1) vugs (15%), dark red iron staining (10%), trace oolitic texture (5%); 10YR 6/6	
			177			
			178		SHALE, platy, manganese staining (5-10%); GLEY1 6/10Y	
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 13 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 186' bgs	Ops	181		DOLOSTONE, not competent, weathered, massive iron staining, dolomitic precipitate (30%), small (<1mm) vugs (15%), trace dendritic manganese staining (5%), trace chert (5%); 10YR 7/2, shale at 180.25' bgs	
			183		DOLOSTONE, not to moderately competent, dolomitic precipitate (30%), small (<1mm) vugs (20%), trace sand, fine to medium (3%), trace glauconitic staining (2%), trace dendritic manganese staining (1%); 2.5Y Y/2	Grout (neat cement) (0'-238' bgs)
			186		DOLOSTONE, moderately competent, orange iron staining (40%), vugs (30%); 10YR 6/1 to 10YR 6/6	
			190		DOLOSTONE, very competent, massive, small to medium vugs (25%), trace oolitic texture (5%); 2.5Y 7/1	4" LC Steel Casing (0'-240' bgs)
			191		DOLOSTONE, not competent, massive, vugs (50%), yellow precipitation (10%); 2.5Y 7/1	
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 14 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	196		DOLOSTONE, not competent, massive, vugs (50%), yellow precipitation (10%); 2.5Y 7/1	
			197		DOLOSTONE, moderately to very competent, massive, small (<1mm) vugs (15%), orange (oxidized) dolomitic precipitate (10%), dolomitic precipitate (10%), trace oolitic texture (5%); 5Y 7/1, beginning of Oneota	
			198			
			199			
			200		DOLOSTONE, moderately to very competent, massive, small to medium vugs (15-20%), dolomitic precipitate (15%), trace oolitic texture (5%); 10YR 7/1	Grout (neat cement) (0'-238' bgs)
			201			
			202			
		Opo	203			
			204			
			205		DOLOSTONE, moderately competent, massive, trace dendritic manganese staining (5%), trace dolomitic precipitate (5%); 10YR 7/1	4" LC Steel Casing (0'-240' bgs)
GRAB	MW2A-GW 206-210		206			
			207			
			208		DOLOSTONE, very competent, massive, small (<1mm) vugs (10%), trace oolitic texture (5%), trace faint iron staining (2%), trace dendritic manganese staining (1%); 2.5Y 7/2	
			209			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 15 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	211		DOLOSTONE, moderately to very competent, massive, small (<1mm) vugs (15%), trace manganese staining (2%); 10YR 7/2	
			212			
			213		DOLOSTONE, moderately competent, massive, dendtritic manganese staining (10%), trace small (<1mm) vugs (2%); 10YR 7/3	
			214			
			215		DOLOSTONE, moderately competent, small to medium vugs (20%), oxidized dolomitic precipitate (20%); 10YR 6/1 to 10YR 7/6	Grout (neat cement) (0'-238' bgs)
			216			
			217			
			218		DOLOSTONE, moderately to very competent, yellow dolomitic precipitate (20%), oolitic texture (10%), small (<1mm) vugs (10%), trace quartz precipitate (3%); 10YR 6/2	
			219		DOLOSTONE, moderately competent, massive, trace dolomitic precipitate (2%), trace manganese staining (2%); 10YR 6/1	
			220		DOLOSTONE, moderately competent, small to medium vugs (20%), oxidized dolomitic precipitate (20%); 10YR 5/1 to 10YR 6/6	4" LC Steel Casing (0'-240' bgs)
			221		DOLOSTONE, moderately competent, small to medium vugs (20%), oxidized dolomitic precipitate (20%), trace dendritic manganese staining (5%); 10YR 5/1 to 10YR 6/6	
			222			
			223		DOLOSTONE, very competent, oolitic texture (15%), small (<1mm) vugs (10%); 10YR 6/1	
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 16 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		DOLOSTONE, very competent, oolitic texture (15%), small (<1mm) vugs (10%); 10YR 6/1	
			227			
			228		DOLOSTONE, competent, massive iron staining, trace medium vugs (5%); 10YR 6/3	
			229		DOLOSTONE, not competent, oxidized dolomitic precipitate (30%), small to medium vugs (20%); 10YR 6/1 to 10YR 7/6	
			230		DOLOSTONE, not competent, massive, iron staining (30%), small (<1mm) vugs (15%), oxidized dolomitic precipitate (5-10%), trace manganese staining (5%), trace chert (2%), trace glauconitic staining (2%); 10YR 5/6	Grout (neat cement) (0'-238' bgs)
			231			
			232			
		Opo	233		DOLOSTONE, not to moderately competent, massive, oxidized dolomitic precipitate (15%), trace dendritic manganese staining (2%); 2.5Y 6/1 to 10YR 7/6	
			234			
			235			4" LC Steel Casing (0'-240' bgs)
			236			
			237		DOLOSTONE, not competent, very weathered, massive iron staining, trace glauconite, possible stromatolites; 10YR 6/8, beginning of Coon Valley	
			238		SANDY DOLOSTONE, moderately competent, dolomitic precipitate (15%), sand (5-30%), fine to coarse); 5YR 5/4, grades coarser/more sand with depth, loose sand possibly at 238' bgs	2' Fine Sand (238'-240' bgs)
	Jordan Fm. @ 240' bgs		239			
		Cj			SANDSTONE, loose sand; 2.5Y 6/6, beginning of	Grout Basket (240' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 17 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1330
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE / DATE
	CASING DEPTH		06-22-20 / 06-24-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	241		Jordan SANDSTONE, poorly cemented, medium to coarse (80% medium, 20% coarse), well-rounded; 2.5Y 8/6	
			242			
			243		SANDSTONE, poorly cemented, fine to coarse (5% fine, 90% medium, 5% coarse), well-rounded; 2.5Y 6/6	
			244		SANDSTONE, poorly cemented, fine to coarse (10% fine, 80% medium, 10% coarse), well-rounded; 2.5Y 8/6	
			245			
			246		SANDSTONE, poorly cemented, medium to coarse (30% medium, 70% coarse), well-rounded; 2.5Y 7/2	7" Open Hole (240'-363' bgs)
			247		SANDSTONE, poorly cemented, fine to coarse (25% fine, 70% medium, 5% coarse), well-rounded; 2.5Y 8/4	
			248			
			249		SANDSTONE, poorly cemented, fine to medium (75% fine, 25% medium), well-rounded; 2.5Y 8/1	
			250		SANDSTONE*, poorly cemented, medium to coarse (30% medium, 70% coarse), dark yellow/orange oxidized layers, trace shale at 250.5' bgs *logged from video - no recovery from 250'-260' bgs	
			251			
			252			
			253			
			254		SANDSTONE*, poorly cemented, fine to medium (90% fine, 10% medium), dark *logged from video - no recovery from 250'-260' bgs	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2A [848623]
LOGGED BY: AEL / CHECKED BY: AS			SHEET 18 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 263 FT BGS			
GROUND SURFACE ELEVATION: 913.092 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1330
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982063.717 Easting: 505707.3	DATE		DATE 06-22-20 / DATE 06-24-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	256–263		SANDSTONE*, poorly cemented, fine to medium (90% fine, 10% medium), dark *logged from video - no recovery from 250'-260' bgs	7" Open Hole (240'-363' bgs)
			263		E.O.B. at 263' bgs, no refusal	
			264–269			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2B [833405]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 1 OF 5
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START: 0900 FINISH: 1000
BORING DEPTH: 62 FT BGS			
GROUND SURFACE ELEVATION: 912.859 FT AMSL		WATER LEVEL / TIME / DATE / CASING DEPTH	TIME 0900 / TIME 1000 / DATE 10-13-20 / DATE 10-13-20
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4982065.471 Easting: 505709.63			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0–1		SILT, topsoil, organics; dry, 10YR 2/1.	
		SW	1–3		SAND, fine to coarse (fine 30%, medium 40%, coarse 10%), angular to rounded, well graded, with gravel (fine 3%, medium 4%, coarse 3%), with silt (10%); moist, 7.5YR 4/6.	
			3–4		Granite rock clasts in shoe, pink and black; 7.5YR 5/6 and 10YR 2/1.	
		SW	4–5		SAND, fine to coarse (fine 30%, medium 35%, coarse 10%), angular to sub-rounded, well graded, with gravel (fine 3%, medium 4%, coarse 3%), angular, with rock clasts (10%), trace silt (5%); moist, 7.5YR 4/4.	Grout (neat cement) (0'-51' bgs)
			5–6		SAND, fine to coarse (fine 40%, medium 40%, coarse 15%), angular to sub-rounded, well graded, trace silt (5%); moist, 7.5YR 5/6.	
			6–7		SAND, fine to coarse (fine 25%, medium 40%, coarse 30%), angular to sub-rounded, well graded, trace silt (5%); moist to wet (at 9.5' bgs), 10YR 5/1.	
			7–10			
		SP	10–11		SAND, fine to medium (fine 60%, medium 35%), sub-rounded to round, poorly graded, trace silt (5%); saturated, 7.5YR 5/6.	2" Black Iron Casing (0'-57' bgs)
		SW	11–13		SAND, fine to coarse (fine 15%, medium 50%, coarse 35%), angular to sub-rounded, well graded; saturated, 5YR 4/6.	
		SP	13–14		SAND, fine to medium (fine 60%, medium 35%), sub-rounded, poorly graded, trace silt (5%); saturated, 7.5YR 5/6.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2B [833405]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 2 OF 5
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START: 0900 FINISH: 1000
BORING DEPTH: 62 FT BGS			
GROUND SURFACE ELEVATION: 912.859 FT AMSL		WATER LEVEL	TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4982065.471 Easting: 505709.63		DATE	DATE / DATE: 10-13-20 / 10-13-20
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16		CLAY, low plasticity, soft, with gravel (coarse 20%); saturated, 10YR 4/4.	
		SP	17		SAND, fine to medium (fine 45%, medium 50%), poorly graded, trace silt (5%); wet, 7.5YR 4/4.	
			18		CLAYEY SAND, fine (75%), rounded, clay (20%), trace silt (5%); wet, 10RY 4/4.	
			19			
			20		CLAYEY SAND, fine (75%), sub-angular to sub-rounded, clay (15%), trace gravel (fine 2%, medium 3%), trace silt (5%); wet, 5YR 5/4.	Grout (neat cement) (0'-51' bgs)
			21			
			22		CLAYEY SAND, fine (75%), clay (20%), trace silt (5%), trace gravel (fine 5%), rounded; wet, 5YR 5/4.	
			23			
		SC	24		CLAYEY SAND, fine (70%), sub-angular to sub-rounded, clay (25%), trace silt (5%); wet, 7.5YR 5/4.	
			25		CLAYEY SAND, fine (75%), sub-rounded, clay (20%), trace silt (5%), rock clast seams at 25.5' bgs and 28' bgs; wet, 7.5YR 4/4.	2" Black Iron Casing (0'-57' bgs)
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2B [833405]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 3 OF 5
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START / FINISH
BORING DEPTH: 62 FT BGS			
GROUND SURFACE ELEVATION: 912.859 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1000
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982065.471 Easting: 505709.63	DATE		DATE 10-13-20 / DATE 10-13-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	31–32		CLAYEY SAND, fine to coarse (fine 80%, medium 3%, coarse 2%), sub-angular to sub-rounded, clay (15%); wet, 7.5YR 4/3.	
		SC	32–35		CLAYEY SAND, fine (75%), sub-angular to sub-rounded, clay (23%), trace gravel (fine 2%), round; wet, 7.5YR 4/3.	Grout (neat cement) (0'-51' bgs)
		GP	35–37		GRAVEL, fine to medium (fine 40%, medium 45%), sub-angular, poorly graded, with sand (fine 2%, medium 3%, coarse 10%), sub-angular to sub-rounded; wet, 7.5YR 4/2.	
		SC	37–39		CLAYEY SAND, fine to medium (fine 60%, medium 15%), sub-rounded to rounded, clay 25%; wet, 7.5YR 4/3.	
		SC	39–40		CLAYEY SAND, fine (80%), sub-rounded, clay (15%), with gravel (fine 2%, medium 2%, coarse 1%), sub-angular, wet; 7.5YR 4/3.	
		SC	40–44		CLAYEY SAND, fine to medium (fine 60%, medium 20%), sub-rounded, clay (15%), trace gravel (fine 5%), sub-rounded to round; wet, 7.5YR 4/3.	2" Black Iron Casing (0'-57' bgs)
		SC	44		CLAYEY SAND, fine to medium (fine 55%, medium 15%), sub-rounded, clay (25%), trace gravel (fine 5%), sub-rounded; wet, 7.5YR 4/3.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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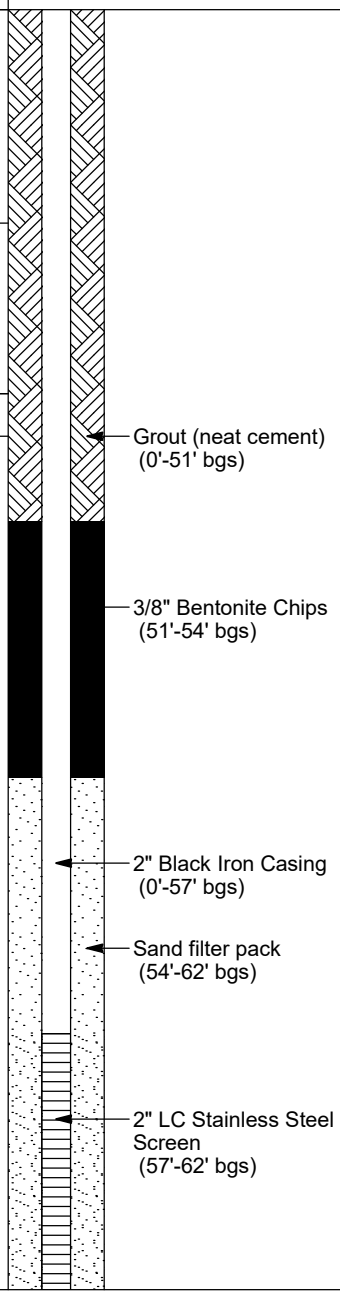
ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2B [833405]
LOGGED BY: JM/KR — CHECKED BY: AS			SHEET 4 OF 5
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad — EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 62 FT BGS			
GROUND SURFACE ELEVATION: 912.859 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1000
COMMENTS: Northing: 4982065.471 Easting: 505709.63	DATE		DATE / DATE
	CASING DEPTH		10-13-20 / 10-13-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION
		SW	46–47		SAND, fine to coarse (fine 30%, medium 40%, coarse 30%), sub-rounded to round, well graded; saturated, 7.5YR 4/3.
		SW	47–49		SAND, fine to coarse (fine 5%, medium 20%, coarse 75%), sub-rounded to round, well graded; saturated, 7.5YR 4/3.
		GW	49–50		GRAVEL, fine to coarse (fine 25%, medium 30%, coarse 35%), angular to rounded, well graded, with sand (coarse 10%), angular to rounded; saturated 7.5YR 4/2.
			50–59		E.O.B. @50' bgs, refusal. Augered down to 62' bgs to install well.

WELL DIAGRAM



ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: GeoProbe						BORING NO. MW2B [833405]	
LOGGED BY: JM/KR	CHECKED BY: AS									SHEET 5 OF 5	
DRILLING CONTR.: Dakota											
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822			SAMPLING METHOD: 5' liners						DRILLING	
BORING DEPTH: 62 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 912.859 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						0900	1000
COMMENTS: Northing: 4982065.471 Easting: 505709.63				DATE						DATE	DATE
				CASING DEPTH						10-13-20	10-13-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			61			Sand filter pack (54'-62' bgs)
			62			2" LC Stainless Steel Screen (57'-62' bgs)
			63			
			64			
			65			
			66			
			67			
			68			
			69			
			70			
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2C [833406]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 1 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START: TIME 1020 / DATE 10-12-20
BORING DEPTH: 40 FT BGS			DRILLING FINISH: TIME 1120 / DATE 10-12-20
GROUND SURFACE ELEVATION: 912.951 FT AMSL	WATER LEVEL		
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982066.533 Easting: 505707.191	DATE		
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0–1		SILT, topsoil, organics; dry, 10YR 2/1.	
		GP	1–2		GRAVEL, coarse (80%), angular to sub-angular, with rock clasts (20%); dry, 5YR 4/6.	
		SW	2–3		SAND, fine to coarse (fine 40%, medium 35%, coarse 10%), round to sub-rounded, well graded, with gravel (fine 10%), rounded, trace silt (5%); dry, 5YR 4/6.	
			3		Rock clasts in shoe; 5YR 3/3.	
		SW	4–5		SAND, fine to coarse (fine 50%, medium 30%, coarse 10%), round to sub-rounded, well graded, trace gravel (fine 5%), trace silt (5%); dry, 5YR 4/4.	Grout (neat cement) (0'-29' bgs)
		SP	6		SAND, fine to coarse (fine 85%, medium 10%, coarse 2%), angular to sub-rounded, poorly graded, trace silt (3%); moist, 7.5YR 5/6.	
		SW	7		SAND, fine to coarse (fine 30%, medium 30%, coarse 10%), well graded, with gravel (fine 10%, medium 10%), with clay 10%; moist, 7.5YR 4/6. 1" layer of clay at 8' bgs.	
		SW	8–9		SAND, fine to coarse (fine 60%, medium 20%, coarse 10%), angular to sub-rounded, well graded, trace gravel (fine 5%), trace silt (3%), trace clay (2%); moist, 10YR 5/4.	
		SW	10–11		SAND, fine to coarse (fine 20%, medium 40%, coarse 25%), round to sub-rounded, well graded, with gravel (fine 10%), round, trace clay (5%); saturated, 7.5YR 5/4.	2" PVC Casing (0'-35' bgs)
		CL	12–14		CLAY, medium to high plasticity, soft, with sand (fine 20%); wet, 7.5YR 4/4.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2C [833406]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 2 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 912.951 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1020 / 1120
COMMENTS: Northing: 4982066.533 Easting: 505707.191	DATE		DATE / DATE
	CASING DEPTH		10-12-20 / 10-12-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16–17		SAND, fine to coarse (fine 70%, medium 20%, coarse 5%), poorly graded, trace silt (5%); saturated, 7.5YR 5/6.	
		SW	18–20		SAND, fine to coarse (fine 30%, medium 55%, coarse 10%), angular to sub-rounded, well graded, trace silt (5%); saturated, 7.5YR 5/6.	Grout (neat cement) (0'-29' bgs)
		SC	21–25		CAYEY SAND, fine to medium (fine 40%, medium 20%, coarse 15%), sub-rounded, clay (25%); wet to saturated, 7.5YR 4/4.	2" PVC Casing (0'-35' bgs)
		CL	26–29		SANDY CLAY, low plasticity, soft, sand (fine 45%), sub-rounded, trace gravel (fine 5%), sub-rounded; saturated, 7.5YR 4/3.	3/8" Bentonite Chips (29'-32' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2C [833406]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 3 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START: 1020 FINISH: 1120
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 912.951 FT AMSL		WATER LEVEL	
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4982066.533 Easting: 505707.191		DATE	DATE: 10-12-20
		CASING DEPTH	DATE: 10-12-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	31–34		CLAYEY SAND, fine to medium (fine 40%, medium 15%), sub-rounded, clay (40%), trace gravel (fine 5%), sub-rounded; saturated, 7.5YR 5/4.	3/8" Bentonite Chips (29'-32' bgs); Sand filter pack (32'-40' bgs)
			35		NO RECOVERY.	2" PVC Screen (35'-40' bgs)
			40		E.O.B. @40' bgs, no refusal	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2D [833407]
LOGGED BY: JM/KR / CHECKED BY: AS			SHEET 1 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad / EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 20 FT BGS			
GROUND SURFACE ELEVATION: 913.259 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1130 / 1210
COMMENTS: Northing: 4982063.207 Easting: 505705.077	DATE		DATE / DATE
	CASING DEPTH		10-13-20 / 10-13-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		SILT, topsoil, organics; dry, 10YR 2/1.	
		SP	1		SAND, fine to medium (fine 50%, medium 15%), sub-angular to sub-rounded, poorly graded, with gravel (fine 15%, medium 10%, coarse 5%), sub-angular to sub-rounded, trace silt (5%); moist, 5YR 3/4.	Grout (neat cement) (0'-3' bgs)
			2			
			3			3/8" Bentonite Chips (3'-4' bgs)
			4			
			5			
			6			2" PVC Casing (0'-7' bgs)
			7		SAND, fine to medium (fine 70%, medium 20%), sub-angular to sub-rounded, poorly graded, trace gravel (coarse 5%), sub-rounded, trace silt (5%), clay lens at 8.5' bgs; moist, 5YR 4/2.	
			8			
			9			
			10			
		SW	11		SAND, fine to coarse (fine 20%, medium 25%, coarse 40%), sub-angular to sub-rounded, well graded, trace gravel (coarse 5%), sub-rounded, trace silt (5%),trace clay (5%); moist, 10YR 5/2.	Sand filter pack (4'-17' bgs)
			12		CLAY, low plasticity, soft, trace sand (fine 5%), sub-rounded; moist, 5YR 5/3.	
		CL	13			2" PVC Screen (7'-17' bgs)
			14		CLAY, low plasticity, soft, with sand (fine 15%), sub-rounded to sub-angular, trace gravel (medium 5%), sub-rounded to sub-angular; moist, 10YR 3/3.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW2D [833407]
LOGGED BY: JM/KR	CHECKED BY: AS		SHEET 2 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START / FINISH
BORING DEPTH: 20 FT BGS			
GROUND SURFACE ELEVATION: 913.259 FT AMSL	WATER LEVEL		TIME: 1130 / 1210
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982063.207 Easting: 505705.077	DATE		DATE: 10-13-20 / 10-13-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16		SAND, fine to medium (fine 80%, medium 20%), sub-rounded, poorly graded; saturated, 10YR 3/4.	2" PVC Screen (7'-17' bgs); Sand filter pack (4'-17' bgs)
		SW	17		SAND, fine to coarse (fine 20%, medium 50%, coarse 30%), angular to sub-rounded, well graded; saturated, 10YR 4/4.	
		SC	18–19		CLAYEY SAND, fine to medium (fine 70%, medium 5%), round to sub-rounded, clay (25%); saturated, 10YR 4/4.	Sluff Backfill (17'-20' bgs)
			20		E.O.B. @20' bgs, no refusal	
			21–29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW2E [854440]
LOGGED BY: CK	CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut				
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 90 FT BGS				
GROUND SURFACE ELEVATION: 913.202 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		745 / 1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191		DATE		DATE / DATE
		CASING DEPTH		04/21/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill from 0' to 60' bgs.	Grout (neat cement) (0'-76' bgs) 4" LC Steel Casing (0'-80' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW2E [854440]
LOGGED BY: CK	CHECKED BY: BK			SHEET 2 OF 6
DRILLING CONTR.: Traut				
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 90 FT BGS				
GROUND SURFACE ELEVATION: 913.202 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		745 / 1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191		DATE		DATE / DATE
		CASING DEPTH		04/21/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		Blind drill from 0' to 60' bgs.	Grout (neat cement) (0'-76' bgs)
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-80' bgs)
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW2E [854440]	
LOGGED BY: CK	CHECKED BY: BK									SHEET 3 OF 6	
DRILLING CONTR.: Traut											
DRILLER: Andy Kritzeck	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 90 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 913.202 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						745	1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191				DATE						DATE	DATE
				CASING DEPTH						04/21/21	04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31 32 33 34 35 36 37 38 39 40 41 42 43 44		Blind drill from 0' to 60' bgs.	Grout (neat cement) (0'-76' bgs) 4" LC Steel Casing (0'-80' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW2E [854440]	
LOGGED BY: CK	CHECKED BY: BK									SHEET 4 OF 6	
DRILLING CONTR.: Traut											
DRILLER: Andy Kritzeck	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 90 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 913.202 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						745	1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191				DATE						DATE	DATE
				CASING DEPTH						04/21/21	04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46 47 48 49 50 51 52 53 54 55 56 57 58 59		Blind drill from 0' to 60' bgs.	Grout (neat cement) (0'-76' bgs) 4" LC Steel Casing (0'-80' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2E [854440]
LOGGED BY: CK / CHECKED BY: BK			SHEET 5 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 90 FT BGS			
GROUND SURFACE ELEVATION: 913.202 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		745 / 1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191	DATE		DATE / DATE
	CASING DEPTH		04/21/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 61' bgs	SP	61		GRAVELLY SAND, coarse sand (50%), sub-rounded, poorly graded, gravel, fine to coarse (20% fine, 20% medium, 10% coarse), sub-rounded to angular; moist, brown, sluff observed	
			61		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white, iron staining from 61' to 62'	
			62			
			63			
			64			
			65			Grout (neat cement) (0'-76' bgs)
			66			
			67			
		Os	68			
			69			
			70		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white, orange-yellow iron staining observed	4" LC Steel Casing (0'-80' bgs)
			71		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white	
			72			
			73			
			74		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white, slight brown iron staining observed	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2E [854440]
LOGGED BY: CK / CHECKED BY: BK			SHEET 6 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 90 FT BGS			
GROUND SURFACE ELEVATION: 913.202 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		745 / 1100
COMMENTS: Northing: 4982065.604 Easting: 505705.191	DATE		DATE / DATE
	CASING DEPTH		04/21/21 / 04/21/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white, slight brown iron staining observed	Grout (neat cement) (0'-76' bgs) 4" LC Steel Casing (0'-80' bgs)
			77		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry to moist, white, trace orange/yellow iron staining observed	
			78			2' Fine Sand (76'-78' bgs)
			79			
			80		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry, white, orange/yellow iron staining observed	
			81			
		Os	82			
			83			
			84		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry, white	Sand filter pack (78'-90' bgs)
			85			Screened interval (0.010" slot) (80'-90' bgs)
			86			
			87			
			88		SANDSTONE, fine to medium (70% fine, 30% medium), sub-rounded; dry, white, yellow/tan iron staining observed	
			89		E.O.B. @ 90', no refusal, screened 80-90'	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW2F [867666]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1025 / 1815
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/28/22 / 09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 150' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-126' bgs)
			3			
			4		Unconsolidated Material from 0'-62' bgs, per drillers	4" LC Steel Casing (0'-130' bgs)
			5			
			6			2' Fine Sand (126'-128' bgs)
			7		St. Peter Sandstone from 62'-102' bgs, per drillers	
			8			Sand filter pack (128'-150' bgs)
			9			
			10		Shakopee Dolostone from 102'-150' bgs, per drillers	
			11			
			12			
			13		E.O.B. @ 150' bgs, no refusal	Screened interval (0.010" slot) (130'-150' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 1 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE / DATE
	CASING DEPTH		01-06-20 / 01-08-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–2		SILTY SAND, fine to coarse (65% fine, 10% medium), well-rounded, silt (20%), trace organic material (5%); dry, 10YR 4/2	
		CL	2–3		CLAY, low plasticity, trace sand, fine (5%), well-rounded, trace organic material (5%); dry, 10YR 4/2	
		SC	3–4		CLAYEY SAND, fine to medium (32.5% fine, 32.5% medium), well-rounded, clay (20%), with gravel, fine to medium (10% fine, 5% medium), sub-angular to sub-rounded; dry to moist, 10YR 3/2	
		SP	4–7		SAND, medium to coarse (45% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (12% fine, 3% coarse), sub-angular to sub-rounded; dry to moist, 10YR 4/3	Grout (neat cement) (0'-228' bgs)
		CL	7–10		SILTY CLAY, low to no plasticity, trace gravel, medium to coarse (2% medium, 1% coarse), angular; dry, 10YR 4/3	4" LC Steel Casing (0'-230' bgs)
		ML	10–14		SILT, with clay (15%), with gravel, medium (10%), angular to sub-angular; dry to moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 2 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME: 1530 / 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE	DATE: 01-06-20 / 01-08-20
		CASING DEPTH	

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16–17		SILT, with clay (25%), with gravel, fine (10%), sub-rounded; dry to moist, 10YR 5/4	
		ML	17–19		SILT, with sand, fine (15%), well-rounded, trace clay (5%), trace gravel, coarse (2%), sub-rounded; dry to moist, 2.5Y 4/4	
		SP	19–20		SAND, fine to medium (15% fine, 70% medium), sub-angular to sub-rounded, poorly graded, with silt (10%), trace gravel, fine (5%), sub-angular to sub-rounded; moist, 2.5Y 4/4	Grout (neat cement) (0'-228' bgs)
		SP	20–22		SAND, medium to coarse (15% medium, 70% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 5% coarse), sub-angular, trace cobbles (5%); moist, 2.5Y 3/3	
		SP	22–23		SAND, coarse (70%), sub-rounded, poorly graded, with gravel, fine to medium (22% fine, 3% medium); dry to moist, 10YR 4/4	
		SP	23–24		SAND, fine to medium (15% fine, 70% medium), sub-angular, poorly graded, trace silt (5%); dry, 10YR 4/4	
		SP	24–26		SAND, medium to coarse (20% medium, 50% coarse), sub-angular, poorly graded, with gravel, fine to coarse (25% fine, 5% medium), sub-rounded; dry, 10YR 4/4	4" LC Steel Casing (0'-230' bgs)
		SM	26–28		SILTY SAND, fine to medium (60% fine, 20% medium), sub-rounded, silt (20%); dry, 10YR 5/4	
		SM	28–29		SILTY SAND, fine to medium (65% fine, 10% medium), sub-rounded, silt (25%); dry, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 3 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE	DATE 01-06-20 / DATE 01-08-20
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	31		SILTY SAND, fine to medium (70% fine, 10% medium), sub-rounded to well-rounded, silt (20%); wet, 10YR 5/4	
		SP	32		SAND, medium to coarse (25% medium, 75% coarse), sub-angular to well-rounded, poorly graded; wet, 10YR 4/3	
			33			
			34		SAND, fine (90%), well-rounded, poorly graded, with clay (10%), low plasticity; wet, 2.5Y 5/3	
		SW	35		SAND, fine to coarse (60% fine, 35% medium, 10% coarse), sub-rounded to well-rounded, well graded, trace silt (5%); moist to wet, 10YR 4/3	Grout (neat cement) (0'-228' bgs)
			36			
		CL			CLAY, medium plasticity; dry, 10YR 5/3	
		SW	37		SAND, fine to coarse (60% fine, 30% medium, 10% coarse), sub-rounded to well-rounded, well graded; moist to wet, 10YR 5/4	
		GP	38		GRAVEL, fine (75%), sub-rounded to well-rounded, poorly graded, with sand, coarse (25%), well-rounded; moist to wet, 2.5Y 5/3	
		SW	39		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-angular to well-rounded, well graded; moist to wet, 2.5Y 4/3	
		SP	40		SAND, fine to medium (50% medium, 50% coarse), sub-rounded, poorly graded; wet, 2.5Y 5/2	4" LC Steel Casing (0'-230' bgs)
			41			
			42			
			43			
			44		SAND, medium to coarse (45% medium, 45% coarse), sub-angular to well-rounded, poorly graded, with gravel, fine (10%), sub-angular; moist to wet, 2.5Y 4/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL / CHECKED BY: AEL/AS			SHEET 4 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE 01-06-20 / DATE 01-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46		SAND, fine to coarse (5% fine, 15% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine (20%), sub-angular to sub-rounded; wet, 2.5Y 4/2	
		GP	47–50		GRAVEL, fine to coarse (55% fine, 20% medium, 5% coarse), sub-angular to well-rounded, poorly graded, with sand, medium to coarse (10% medium, 10% coarse), sub-rounded; wet, 2.5Y 4/2	
		SP	50–57		SAND, medium to coarse (15% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine (15%), sub-angular to sub-rounded; dry to moist, 2.5Y 4/2 SAND, fine to medium (80% fine, 15% medium), sub-angular to sub-rounded, poorly graded, trace silt (5%); dry to moist, 2.5Y 4/2	Grout (neat cement) (0'-228' bgs) 4" LC Steel Casing (0'-230' bgs)
		GP	57–59		GRAVEL, fine to medium (70% fine, 5% medium), angular to sub-angular, poorly graded, with sand, coarse (25%), sub-angular to sub-rounded; dry to moist, 2.5Y 4/1	
		SP	59		SAND, fine to medium (75% fine, 15% medium), sub-angular, poorly graded, trace gravel, fine (5%), sub-angular, trace silt (5%); moist, 2.5Y 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 5 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE / CASING DEPTH	DATE 01-06-20 / DATE 01-08-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	61		SAND, fine to coarse (5% fine, 20% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, fine (5%), sub-angular to sub-rounded; dry to moist, 2.5Y 5/2	
		SW	62		SAND, fine to coarse (15% fine, 50% medium, 35% coarse), sub-rounded to well-rounded, well graded, trace gravel, medium (2%), sub-angular; dry to moist, 2.5Y 5/2	
		SP	63 64 65 66		SAND, medium to coarse (50% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine to medium (5% fine, 25% medium), sub-angular to sub-rounded; dry to moist, 2.5Y 4/1	Grout (neat cement) (0'-228' bgs)
		SM	67 68		SILTY SAND, fine to medium (65% fine, 20% medium), sub-angular to sub-rounded, silt (15%); dry, 2.5Y 4/2	
		SW	69		SAND, fine to coarse (15% fine, 25% medium, 45% coarse), sub-angular to sub-rounded, well graded, with gravel, medium (10%), sub-angular to sub-rounded, trace silt (5%); dry to moist, 2.5Y 4/2	
		GP	70 71 72 73		GRAVEL, fine to coarse (65% fine, 10% medium, 3% coarse), sub-angular to sub-rounded, poorly graded, with sand, coarse (17%), sub-rounded to well-rounded, trace silt (5%); moist, 2.5Y 4/2	4" LC Steel Casing (0'-230' bgs)
	Shakopee Fm. @ 74' bgs	Ops	74		DOLOSTONE, not competent, very weathered and broken, dolomitic precipitate (30%), trace glauconite grains/smear (2-3%); 10YR 5/6 (dolomitic	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 6 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE 01-06-20 / DATE 01-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					precipitate), 10YR 5/4	
			76		DOLOSTONE, not competent, very weathered and broken, dolomitic precipitate (30%), trace glauconite grains/smear (2-3%); 10YR 5/6 (dolomitic precipitate), 10YR 5/4	
			77		DOLOSTONE, competent, fine grained, massive, dolomitic precipitate (10-15%), trace sand, fine (3%), well-rounded, trace glauconite smears (1%); 10YR 5/4	
			78			
			79			
			80		DOLOSTONE, moderately competent, massive, dolomitic precipitate (10-15%), trace glaucomite (5%), trace quartz precipitation (2%); 2.5Y 6/6	Grout (neat cement) (0'-228' bgs)
			81			
			82		SANDY DOLOSTONE, not competent, apparent bedding, sand (20-30%), dolomitic precipitate (20%), vugs (5-10%), trace chert (5%); 2.5Y 6/3	
		Ops	83		DOLOSTONE, moderately competent, massive, trace sand (2%); 2.5Y 6/3	
			84			
			85		SANDY DOLOSTONE, competent, massive, sand, fine (20-30%), well-rounded, dolomitic precipitate (15-20%), trace vugs (5%), trace chert (2.5%), trace iron staining (2%) trace quartz; 2.5Y 6/4	4" LC Steel Casing (0'-230' bgs)
			86			
			87			
			88		SANDY DOLOSTONE, moderately competent, massive, dolomitic precipitate (20%), sand, fine (20%), well-rounded, trace quartz precipitate (5%), trace chert (5%); 2.5Y 6/3	
			89		DOLOSTONE, not competent, massive, iron staining along fractures; 2.5Y 6/4	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW3A [847052]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS			SHEET 7 OF 17	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 250 FT BGS					
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1530	1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE		DATE	DATE
		CASING DEPTH		01-06-20	01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		DOLOSTONE, not competent, massive, dolomitic precipitate (5-10%), trace iron staining (5%) - half of the staining on dolomitic precipitate, trace glauconite (5%); 2.5Y 6/3	
			92		DOLOSTONE, not competent, iron staining (10%), manganese staining (10%); 2.5Y 5/3, clay observed	
		Ops	93		SANDY DOLOSTONE, moderately competent, sand (20%), massive manganese staining (5-10%), trace 1 mm lamellae bands (5%), trace reworked clasts (3%); 2.5Y 6/3, clay observed	
			94		DOLOSTONE, moderately competent, patchy manganese/iron staining along fractures (20%), trace sand, medium (5%); 2.5Y 6/3, clay observed	
			95			Grout (neat cement) (0'-228' bgs)
			96		SILT, with weathered dolostone pieces (25%), with sand, fine (15%); 10YR 4/4, silt and clay not observed in the video log - may have been the result of drilling	
		ML	97			
			98		DOLOSTONE, very weathered, dolostone rock fragments (60%), with clay (30%), medium plasticity, firm, trace iron staining (5%), trace sand, fine to medium (5%); 2.5Y 6/2, silt and clay not observed in the video log - may have been the result of drilling	
			99			
			100		DOLOSTONE, not competent, iron staining/banding (5-10%), trace vugs (5%), trace dendritic manganese staining (1%); 2.5Y 6/2	4" LC Steel Casing (0'-230' bgs)
		Ops	101		DOLOSTONE, not competent, dolomitic precipitate (10-15%), iron staining/banding (10%), with sand, fine (10%), well-rounded, trace glauconite (2%); 2.5Y 4/3	
			102		SANDY DOLOSTONE, not competent, massive, sand, fine (20%),well-rounded, dolomitic precipitate (15%), vugs (10%), trace iron staining (5%); 2.5Y 6/4	
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 8 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE / DATE
	CASING DEPTH		01-06-20 / 01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106		DOLOSTONE, competent, massive, dolomitic precipitate (15%), vugs (5-10%), trace iron staining along fractures (5%), trace sand, fine (5%), well-rounded; 2.5Y 6/4	
			107		DOLOSTONE, moderately competent, bedded, dolomitic precipitate (15%), iron staining along fractures (15%), with sand, fine (15%), well-rouned, dendritic manganese staining (5-10%); 2.5Y 8/3	
			108			
			109		DOLOSTONE, competent, massive, dolomitic precipitate (30%), vugs (10-15%), trace iron staining on dolomitic precipitate (5%), trace sand, fine (2%), well-rounded; 2.5Y 5/3	
			110		DOLOSTONE, moderately competent, vuggy texture (10%), with sand, medium (10%), trace manganese staining on fractures (5%); 2.5Y 6/3, clay observed	Grout (neat cement) (0'-228' bgs)
			111			
			112			
			113		DOLOSTONE, moderately competent, dendritic manganese staining along fractures/bedding (10-20%), fractures (10%), banded iron staining (5-10%), trace sand, fine (5%); 2.5Y 7/4, 6'' clay lense @ 113' bgs	
			114			
			115		DOLOSTONE, competent, iron staining (5-10%), trace dendritic manganese staining (3%), trace dark red iron/manganese staining along fractures (3%), trace sand, medium (3%); 2.5Y 7/4, clay observed	4" LC Steel Casing (0'-230' bgs)
			116			
			117			
			118		DOLOSTONE, competent, with sand, fine to medium (5-10%), trace vugs (5%), trace iron staining (5%), trace dendritic manganese staining (2%); 2.5Y 6/3, clay observed	
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 9 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE / DATE
	CASING DEPTH		01-06-20 / 01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	121		DOLOSTONE, moderately competent, massive, very fine grained, dolomitic precipitate (10%), vugs (5-10%); 2.5Y 6/3	
			122			
			123		DOLOSTONE, not competent, dolomitic precipitate (20-30%), vugs (15%), trace iron staining (1-2%); 2.5Y 5/3	
			124			
			125			Grout (neat cement) (0'-228' bgs)
			126		DOLOSTONE, moderately competent, massive, dolomitic precipitate (10-15%), vugs (10%), trace iron staining on dolomitic precipitate (5%); 2.5Y 5/3, fine grained dolomitic precipitate at 129-130' bgs	
			127			
			128			
			129			
			130		DOLOSTONE, moderately competent, vugs (10-15%), trace granular dolomitic precipitate (5%), trace iron staining (4%), trace sand, fine (2%), trace glauconite (1%); 2.5Y 5/3	4" LC Steel Casing (0'-230' bgs)
			131			
			132			
			133		DOLOSTONE, moderately competent, massive, dolomitic precipitate (5-10%), trace vugs (5%), trace sand, fine (1%), well-rounded; 2.5Y 5/3	
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 10 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME: 1530 / 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE	DATE: 01-06-20 / 01-08-20
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		DOLOSTONE, moderately competent, dolomitic precipitate (15%), trace iron banding along fractures (5%), trace sand, fine (1%), well-rounded; 2.5Y 5/4	
			137		DOLOSTONE, not competent, trace dolomitic precipitate (5%), trace iron staining on rock and dolomitic precipitate (5%); 2.5Y 6/3	
			138		DOLOSTONE, moderately competent, dolomitic precipitation (15%), iron staining/banding along dolomitic precipitate (10%); 2.5Y 6/3	
			139		SANDY DOLOSTONE, moderately competent, quartz precipitates, sand, fine to medium (20%), well-rounded; 2.5Y 4/4	
			140		DOLOSTONE, moderately competent, massive iron staining along fractures (20%), trace dendritic manganese staining (5%), trace sand, fine (2%); 2.5Y 6/4, clay observed	Grout (neat cement) (0'-228' bgs)
			141			
			142			
		Ops	143		DOLOSTONE, not competent, very weathered, 5-15 mm dolostone pieces, 6" silt lense; 10YR 6/4	
			144		DOLOSTONE, moderately competent, massive, dolomitic precipiate (15%), iron staining/banding (15%), with sand, fine (10-15%), well-rounded, trace vugs (5%), trace chert (2%); 10YR 5/4	
			145			4" LC Steel Casing (0'-230' bgs)
			146		SANDY DOLOSTONE, moderately competent, weathered, platy, iron staining (20-30%), sand, fine to medium (15% fine, 5% medium), well-rounded, dolomitic precipitate (10%), trace dendritic manganese staining (5%); 10YR 6/6	
			147		SANDY DOLOSTONE, not competent, very weathered, inter-bedded, platy, sand, fine (20-25%), well-rounded, iron staining (10%), dendritic manganese staining along fractures (10%), dolomitic precipitation (10-15%); 2.5Y 7/4	
			148			
			149		DOLOSTONE, moderately competent, weathered, massive, fine grained, iron staining (20-30%), dolomitic precipitate (10%), trace dendritic	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 11 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE	DATE 01-06-20 / DATE 01-08-20
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					manganese staining (5%); 2.5Y 6/3	
			151		DOLOSTONE, moderately competent, dolomitic precipitate (10%), with sand, fine to medium (5% fine, 5% medium), trace glauconite grains (3%); 10YR 6/6	
			152			
			153		SANDY DOLOSTONE, competent, sand, fine to medium (30%), oolitic texture (20%), vugs (15%); 2.5Y 6/3	
			154			
			155			Grout (neat cement) (0'-228' bgs)
			156		DOLOSTONE, moderately competent, oolitic texture (30%), chert (15-20%), trace glauconite (2%), trace iron staining (2%); 2.5Y 6/4	
			157		DOLOSTONE, moderately competent, bedding visible, platy, manganese staining along fractures and core surface (20-30%), dolomitic precipitate (5-10%), trace iron staining on dolomitic precipitate (5%); 5Y 7/2	
		Ops	158			
			159		SANDY DOLOSTONE, not competent, very weathered, platy, sand, fine to medium (20-25%), well-rounded, dendritic manganese staining (10%), trace chert (5%); 2.5Y 6/4	
			160		CHERT, moderately competent, dendritic manganese staining (10-15%), trace iron staining (1%); 2.5Y 6/1	4" LC Steel Casing (0'-230' bgs)
			161			
			162		DOLOSTONE, moderately competent, oolitic texture (10-15%), with sand, fine to medium (5% fine, 5% medium), trace chert (5%), trace vugs (3%), trace glauconite (3%); 2.5Y 6/3	
			163			
			164			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW3A [847052]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS							SHEET 12 OF 17	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 250 FT BGS									
GROUND SURFACE ELEVATION: 910.508 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1530	1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86			DATE					DATE	DATE
			CASING DEPTH					01-06-20	01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 170' bgs	Ops	166		DOLOSTONE, moderately competent, dolomitic precipitate (5-10%), trace sand, fine (2%), well-rounded, trace glauconite (2%); 2.5Y 5/3	
			167			
			168		DOLOSTONE, competent, massive, dolomitic precipitate (15%), trace vugs (5%), trace dendritic manganese staining (2%); 2.5Y 6/4, trace sand (5%) @ 167.75-168' bgs	
			169			
			170		DOLOSTONE, not competent, weathered, iron staining on dolomitic precipitate (20%), dolomitic precipitate (15-20%), trace sand, fine (3%), well-rounded; 2.5Y 5/4	Grout (neat cement) (0'-228' bgs)
			171			
			172			
			173		DOLOSTONE, not competent, very weathered, reworked, dolomitic precipitate (25-30%), dendritic manganese staining (10%); 2.5Y 6/6, some precipitate stained dark red at fractures	
			174			
		Opo	175		DOLOSTONE, competent, massive, vugs (20%), dolomitic precipitate (10%), trace iron staining (1%); 2.5Y 6/3	4" LC Steel Casing (0'-230' bgs)
			176			
			177		DOLOSTONE, moderately competent, massive, dolomitic precipitate (20%), vugs (15%), iron staining (5%); 2.5Y 6/2	
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 13 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE 01-06-20 / DATE 01-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		DOLOSTONE, moderately competent, vugs (15-20%), dolomitic precipitate (10-15%), trace oolitic texture (5%), trace iron staining (4%); 2.5Y 7/4, 40x10 mm quartz nodule	
			182		DOLOSTONE, competent, dolomitic precipitate (5-10%), trace chert (5%); 2.5Y 6/3	
			183			
			184			
			185		DOLOSTONE, moderately competent, massive iron staining, trace banded iron staining (5%); 10YR 6/8, clay observed	Grout (neat cement) (0'-228' bgs)
			186			
			187		DOLOSTONE, competent, massive, fine grained dolomitic precipitate (15-20%), trace iron staining (5%); 2.5Y 6/3	
		Opo	188			
			189			
			190		DOLOSTONE, competent, massive, vugs (10%), trace fractures (5%), trace reworked clasts (2%); 2.5Y 6/4	4" LC Steel Casing (0'-230' bgs)
			191			
			192			
			193		DOLOSTONE, competent, massive, manganese staining along fractures/vugs (5-10%), trace fractures (3%), trace vugs (1%); 2.5Y 6/6	
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 14 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE / DATE
	CASING DEPTH		01-06-20 / 01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			196		DOLOSTONE, competent, massive, very fine grained, vugs (15%), manganese staining (10%); 2.5Y 6/3	
			197		DOLOSTONE, moderately competent, massive, manganese staining (5-10%), trace dolomitic precipitate (5%), trace iron banding (2%); 2.5Y 6/3	
			198		DOLOSTONE, moderately competent, massive, trace dolomitic precipitate (5%), trace manganese staining (3%), trace iron banding (2%); 2.5Y 6/2	
			199			
			200		DOLOSTONE, moderately competent, banded iron staining (10-15%), dolomitic precipitate (5-10%), trace vugs (5%); 2.5Y 6/3	← Grout (neat cement) (0'-228' bgs)
			201			
			202			
		Opo	203		DOLOSTONE, moderately competent, dolomitic precipitate (15%), trace iron staining (3%), trace chert (3%); 2.5Y 7/3	
			204			
			205		DOLOSTONE, moderately competent, massive, dolomitic precipitate (20%), trace iron staining (3%), trace vugs (3%); 10YR 6/3	← 4" LC Steel Casing (0'-230' bgs)
			206			
			207			
			208		DOLOSTONE, competent, massive, dolomitic precipitate (10%), trace fractures (5%), trace vugs (5%); 10YR 5/2, fractures parallel to bedding	
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 15 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE 01-06-20 / DATE 01-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not competent, weathered, massive, banded iron staining (30%), trace sand (1%); 10YR 6/6	
			211		CHERT, dolomitic precipitate (10%); 2.5Y 6/3	
			212		DOLOSTONE, moderately competent, dendritic iron staining (15%), dendritic manganese staining along fractures (5-10%); 2.5Y 7/3	
			213			
			214		DOLOSTONE, moderately competent, trace glauconite (2%), trace vugs (1%); 2.5Y 7/2, clay observed	
			215		DOLOSTONE, competent, banded iron staining (10%), trace fine grained dolomitic precipitate (5%); 2.5Y 7/4	Grout (neat cement) (0'-228' bgs)
		Opo	216			
			217			
			218		DOLOSTONE, competent, banded iron staining (10%), fine grained dolomitic precipitate (10%); 10YR 6/4	
	Coon Valley @ 220' bgs		219			
			220		SANDY DOLOSTONE, not competent, weathered, sand, coarse (50%), well-rounded, iron staining (30%); 10YR 6/4	4" LC Steel Casing (0'-230' bgs)
	Jordan Fm. @ 221' bgs		221		QUARTZ ARENITE, fine to coarse (10% fine, 70% medium, 20% coarse), well-rounded; 2.5Y 8/3	Grout Basket (221' bgs)
			222			
		Cj	223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 16 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1815
COMMENTS: Northing: 4979696.86 Easting: 507372.86	DATE		DATE / DATE
	CASING DEPTH		01-06-20 / 01-08-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		QUARTZ ARENITE, fine to coarse (10% fine, 75% medium, 15% coarse), well-rounded; 2.5Y 8/2	Grout (neat cement) (0'-228' bgs) 4" LC Steel Casing (0'-230' bgs)
			227			
			228			
			229			1.5' pellet seal on top of 0.5' pea rock (228'-230' bgs)
			230			
			231			
		Cj	232		QUARTZ ARENITE, medium to coarse (70% medium, 30% coarse), well-rounded, iron staining (5-15%); 2.5Y 6/6	
			233		QUARTZ ARENITE, medium to coarse (70% medium, 30% coarse), well-rounded, pieces of well cemented bedrock (5-10%), massive iron staining; 2.5Y 6/6	
			234			7" Open Hole (230'-250' bgs)
			235		QUARTZ ARENITE, medium to coarse (55% medium, 45% coarse), well-rounded, massive iron staining; 10YR 5/6	
			236			
			237		QUARTZ ARENITE, medium to coarse (65% medium, 45% coarse), well-rounded; 2.5Y 8/1	
			238			
			239			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3A [847052]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 17 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 910.508 FT AMSL		WATER LEVEL	TIME 1530 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979696.86 Easting: 507372.86		DATE	DATE 01-06-20 / DATE 01-08-20
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		QUARTZ ARENITE, medium to coarse (85% medium, 15% coarse), well-rounded; 2.5Y 8/3	
			242		QUARTZ ARENITE, fine to coarse (10% fine, 80% medium, 10% coarse), well-rounded, trace well-cemented bedrock (5%); 2.5Y 7/4	
			243		QUARTZ ARENITE, fine to coarse (5% fine, 85% medium, 10% coarse), well-rounded, trace well-cemented bedrock (3%); 2.5Y 8/4	7" Open Hole (230'-250' bgs)
		Cj	245			
			246		QUARTZ ARENITE, fine to medium (5% fine, 95% medium), well-rounded; 2.5Y 8/1	
			248		QUARTZ ARENITE, fine to coarse (5% fine, 75% medium, 20% coarse), well-rounded, iron staining (5-15%), trace well-cemented bedrock (5%); 7.5Y 6/4	
			250		E.O.B. @250' bgs, no refusal	
			251			
			252			
			253			
			254			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 1 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 130 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635	
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20 / DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1		CLAY, low plasticity, medium stiff, trace organics (5%); 10YR 4/3	
		SM	2–5		SILTY SAND, medium to coarse (60% medium, 15% coarse), sub-rounded, silt (20%), trace organics (5%); dry, 10YR 4/4	
		SM	5–7		SILTY SAND, fine to medium (50% fine, 15% medium), sub-rounded, silt (30%), trace clay (5%); dry to moist, 10YR 4/3	Grout (neat cement) (0'-108' bgs)
		SC	7–10		SANDY CLAY, low plasticity, stiff, sand, fine to medium (10% fine, 5% medium), sub-angular to sub-rounded; dry to moist, 10YR 4/4	
		CL-ML	10–12		SANDY SILTY CLAY, low plasticity, silt (30%), sand, fine to coarse (20% fine, 10% medium, 10% coarse), sub-rounded to well-rounded; dry, 10YR 5/4	4" LC Steel Casing (0'-110' bgs)
		CL-ML	12–14		SANDY SILTY CLAY, low plasticity, silt (27%), sand, fine to medium (20% fine, 5% medium), sub-rounded to well-rounded, trace gravel, medium (3%), sub-angular; dry, 10YR 5/6	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 2 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW3B-SOIL 15-16.5	CL-ML	16		SANDY SILTY CLAY, low plasticity, silt (27%), sand, fine to medium (20% fine, 5% medium), sub-rounded to well-rounded, trace gravel, medium (3%), sub-angular; dry, 10YR 5/6	
DISCRETE	MW3B-SOIL 16.5-19	SW	17		SAND, fine to coarse (20% fine, 50% medium, 17% coarse), sub-angular to sub-rounded, well graded, with clay (10%), low plasticity, trace gravel, medium to coarse (3%), sub-angular to sub-rounded; moist, 10YR 5/6	
GRAB	MW3B-GW 16.5-19	SM	18		SILTY SAND, fine (60%), well-rounded, silt (30%), with gravel, coarse (10%), sub-rounded; moist, 10YR 5/4	
		GP	19		GRAVEL, fine to medium (70% fine, 10% medium), sub-angular to sub-rounded, poorly graded, with sand, coarse (20%), sub-angular, moist to wet, 10YR 4/4	
			20		SAND, fine to coarse (5% fine, 30% medium, 50% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine (10%), sub-angular, trace silt (5%); wet, 10YR 5/4	Grout (neat cement) (0'-108' bgs)
			21			
			22		SAND, medium to coarse (45% medium, 45% coarse), sub-rounded, poorly graded, trace gravel, fine (5%), well-rounded, trace silt (5%); moist, 10YR 5/3	
		SP	23			
			24		SAND, medium to coarse (45% medium, 50% coarse), sub-rounded, poorly graded, trace gravel, coarse (5%), sub-angular; moist, 10YR 5/3	
			25		SAND, medium to coarse (25% medium, 70% coarse), sub-rounded, poorly graded, trace gravel, fine (5%), sub-angular; moist, 10YR 5/4	4" LC Steel Casing (0'-110' bgs)
			26		SAND, fine to coarse (15% fine, 50% medium, 25% coarse), sub-angular to sub-rounded, well graded, trace gravel, fine (5%), sub-rounded, trace silt (5%); moist, 10YR 5/3	
		SW	27			
			28		SAND, medium to coarse (25% medium, 65% coarse), sub-rounded, poorly graded, with gravel, fine (10%), sub-angular; moist, 10YR 5/3	
		SP	29			

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ENVIRONMENTAL BORING LOG

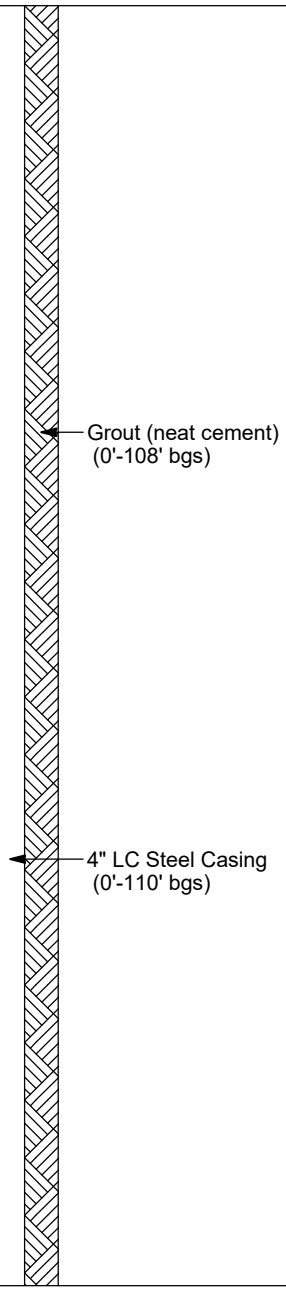
CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW3B [847053]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS		SHEET 3 OF 9
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 130 FT BGS			
GROUND SURFACE ELEVATION: 910.379 FT AMSL			
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4979693.32 Easting: 507372.01			

	WATER LEVEL	TIME	DATE	CASING DEPTH	TIME	DATE
	16.5'	1130	01-13-20	19'	1100	01-13-20
	22'	1230	01-13-20	35'		
	39.6'	1545	01-13-20	45'		
	21.5'	1635	01-13-20	55'	1830	01-14-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	MATERIAL DESCRIPTION
		SP	31	SAND, fine to medium (70% fine, 25% medium), sub-rounded to well-rounded, poorly graded, trace silt (5%); dry to moist, 10YR 5/3
COMPOSITE	MW3B-SOIL 31-35	SW	32	SAND, fine to coarse (20% fine, 55% medium, 10% coarse), sub-rounded to well-rounded, well graded, with gravel, fine to coarse (5% fine, 10% coarse), sub-angular; dry to moist, 10YR 5/4
GRAB	MW3B-GW 31-35	SP	33	SAND, fine to coarse (70% fine, 15% medium, 5% coarse), sub-rounded, poorly graded, trace gravel, coarse (5%), sub-angular, trace silt (5%); moist, 10YR 5/3
		SW	35	SAND, fine to coarse (30% fine, 60% medium, 10% coarse), sub-rounded to well-rounded, well graded; wet, 10YR 5/4
		SP	36	SAND, fine to coarse (5% fine, 50% medium, 40% coarse), sub-rounded, poorly graded, trace gravel, fine (5%), angular to sub-angular; wet, 10YR 5/3
			39	SAND, medium to coarse (25% medium, 55% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine to coarse (5% fine, 5% coarse), sub-angular, with cobbles (10%); moist, 10YR 5/2
DISCRETE	MW3B-SOIL 41-42		41	SAND, fine to coarse (30% fine, 60% medium, 5% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, fine (5%), well-rounded; moist, 10YR 5/2
GRAB	MW3B-GW 41-45		42	SAND, medium to coarse (20% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine (10%), sub-rounded; moist, 10YR 4/1
DISCRETE	MW3B-SOIL 44-45		44	SAND, fine to coarse (30% fine, 60% medium, 5% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, medium (5%), sub-angular to sub-rounded; dry to moist, 10YR 5/2

WELL DIAGRAM



ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 4 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL		WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)		TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01		DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
		CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SAND, fine to coarse (65% fine, 30% medium, 5% coarse), sub-angular to sub-rounded, poorly graded; dry to moist, 10YR 6/2 SAND, fine to coarse (5% fine, 75% medium, 15% coarse), sub-rounded, poorly graded, trace gravel, medium (5%), sub-angular; dry to moist, 10YR 5/2	
			47			
		SP	48			
			49		SAND, medium to coarse (10% medium, 60% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine (25%), sub-rounded, trace cobbles (5%); dry to moist, 10YR 4/1	
			50			Grout (neat cement) (0'-108' bgs)
DISCRETE	MW3B-SOIL 51-53		51		SAND, fine to coarse (10% fine, 30% medium, 45% coarse), sub-angular to sub-rounded, well graded, with gravel, fine (15%), sub-angular; moist, 10YR 4/1	
			52			
DISCRETE	MW3B-SOIL 53-55	SW	53		SAND, fine to coarse (25% fine, 65% medium, 10% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 5/1	
			54			
GRAB	MW3B-GW 51-55		55			4" LC Steel Casing (0'-110' bgs)
					SAND, medium to coarse (15% medium, 70% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine (15%), sub-angular; moist, 2.5Y 5/2	
			56		SAND, fine to coarse (40% fine, 55% medium, 5% coarse), sub-angular to sub-rounded, poorly graded; moist to wet, 2.5Y 6/3	
			57			
		SP	58			
			59		SAND, medium to coarse (10% medium, 60% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine to medium (25% fine, 5% medium),	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN			
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 5 OF 9
DRILLING CONTR.: Traut							
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING
BORING DEPTH: 130 FT BGS							START / FINISH
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20
			CASING DEPTH	19'	35'	45'	55'

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
					sub-rounded; moist, 2.5Y 5/3	
			61		SAND, fine to coarse (5% fine, 15% medium, 70% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine (10%), angular to sub-angular; dry to moist, 2.5Y 5/2	
			62			
			63		SAND, medium to coarse (15% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine to medium (10% fine, 5% medium), angular to sub-rounded; dry to moist, 2.5Y 5/3	
			64			
			65		SAND, medium to coarse (10% medium, 75% coarse), well-rounded, poorly graded, with gravel, fine to medium (10% fine, 5% medium), angular; moist, 2.5Y 5/2	Grout (neat cement) (0'-108' bgs)
			66			
		SP	67			
			68			
			69			
			70			4" LC Steel Casing (0'-110' bgs)
			71		SAND, medium to coarse (10% medium, 45% coarse), well-rounded, poorly graded, with gravel, fine to coarse (20% fine, 15% medium, 5% coarse), angular to well-rounded, trace cobbles (5%); moist, 2.5Y 5/2	
			72			
			73			
			74		SANDY SILT, sand, fine (35%), sub-angular to sub-rounded; moist, 2.5Y 5/3	
		SM				

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 6 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 79' bgs	SP	76		SAND, fine to medium (60% fine, 35% medium), sub-rounded to well-rounded, poorly graded, trace silt (5%); moist, 2.5Y 6/1	
			77			
			78			
			79		DOLOSTONE, not competent, heavily weathered, fine grained dolomitic precipitate (10%), with sand, fine (10%); 10YR 6/6, clay observed	
			80		DOLOSTONE, moderately competent, iron staining (10%), trace green smears on rock (5%); 10YR 6/6, green silt observed	Grout (neat cement) (0'-108' bgs)
			81			
			82		SANDY DOLOSTONE, moderately competent, fine to coarse sand (20% fine, 20% medium, 10% coarse); 10YR 6/3	
			83		DOLOSTONE, competent, vugs (10%), trace iron staining (5%), trace sand, medium (5%); 10YR 5/3	
		Ops	84			
			85		SANDY DOLOSTONE, competent, sand, medium (20%), manganese staining along fractures (5-10%), trace vugs (3%); 10YR 6/4	4" LC Steel Casing (0'-110' bgs)
			86			
			87			
			88		DOLOSTONE, moderately competent, iron staining (10%), trace sand, medium (5%); 10YR 7/3, green silt observed	
			89			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 7 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDY DOLOSTONE, moderately competent, sand, medium to coarse (20% medium, 15% coarse); 10YR 4/2	
			92		DOLOSTONE, moderately competent, iron staining (15%), with sand, medium (10%), trace chert (5%); 10YR 5/3	
			93		DOLOSTONE, moderately competent, iron staining (15%), with sand, medium (10%), manganese staining (10%), trace glauconite (5%); 10YR 5/4	
			94			
			95			Grout (neat cement) (0'-108' bgs)
			96		DOLOSTONE, not competent, weathered, iron staining (10%), trace sand, fine to medium (5%), trace dolomitic precipitate (5%); 10YR 6/3, silt and clay observed	
		Ops	97			
			98			
			99			
			100		SANDY DOLOSTONE, not competent, weathered, sand, medium to coarse (15%), reworked 3-5 mm clasts (5-10%); 10YR 4/6	4" LC Steel Casing (0'-110' bgs)
			101			
			102		DOLOSTONE, moderately competent, dolomitic precipitate (10%), trace massive iron staining (5%), trace sand, medium (5%), trace manganese staining (5%); 10YR 5/6	
			103			
			104			
					SANDY DOLOSTONE, competent, sand, fine (15%), trace massive iron staining (5%); 10YR 5/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 8 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106		SANDY DOLOSTONE, competent, sand, fine (15%), trace massive iron staining (5%); 10YR 5/4	Grout (neat cement) (0'-108' bgs)
			107		SANDY DOLOSTONE, competent, sand, fine to medium (20%), trace iron staining (5%), trace vugs (5%); 10YR 7/2	4" LC Steel Casing (0'-110' bgs)
			108			
			109			1.5' pellet seal on top of 0.5' pea rock (108'-110' bgs)
			110			
			111		DOLOSTONE, competent, dendritic manganese staining (25%), cross bedding (10%), trace iron staining in 1-3mm bands (4%); 10YR 7/2, iron banding horizontal across "core disks"	
			112			
			113			7" Open Hole (110'-130' bgs)
			114			
			115			
			116		DOLOSTONE, moderately competent, iron staining (10%), trace sand, medium (5%), trace dendritic manganese staining (5%); 10YR 6/3	
			117			
			118			
			119			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW3B [847053]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 9 OF 9	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 130 FT BGS								
GROUND SURFACE ELEVATION: 910.379 FT AMSL			WATER LEVEL	16.5'	22'	39.6'	21.5'	TIME 1100	TIME 1830
DATUM: NAD 83 UTM 15 (meters)			TIME	1130	1230	1545	1635		
COMMENTS: Northing: 4979693.32 Easting: 507372.01			DATE	01-13-20	01-13-20	01-13-20	01-13-20	DATE 01-13-20	DATE 01-14-20
			CASING DEPTH	19'	35'	45'	55'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, moderately competent, fine to coarse grained dolomitic precipitate (10-15%), with sand, fine (5-10%), trace vugs (5%); 10YR 6/3	
			122			
			123		DOLOSTONE, moderately competent, trace fine grained dolomitic precipitate (5%), trace iron staining (5%); 10YR 6/2	
			124			7" Open Hole (110'-130' bgs)
		Ops	125		DOLOSTONE, moderately competent, banded iron staining (15%), medium grained dolomitic precipitate (5-10%); 10YR 6/4	
			126			
			127		DOLOSTONE, competent, fine grained dolomitic precipitate (5-10%), trace iron staining (5%); 10YR 6/3	
			128			
			129			
			130		E.O.B. @ 130' bgs, no refusal	
			131			
			132			
			133			
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 1 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0800 / 1700
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE / DATE
	CASING DEPTH		12-13-19 / 12-16-19

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0		SILT, organic matter, low plasticity; 10YR 2/2	
		CL	1		CLAY, medium plasticity, firm; dry, 10YR 4/3	
		SW	2		SAND, fine to coarse (10% fine, 60% medium, 20% coarse), angular to sub-rounded, well graded, with gravel, medium (10%), well-rounded; dry, 10YR 4/2	
			5		SAND, fine to coarse (20% fine, 35%, 30% coarse), angular to sub-rounded, well graded, with gravel, medium (15%), well-rounded; dry, 10YR 4/3	Grout (neat cement) (0'-138' bgs)
DISCRETE	MW4A-SOIL 8-8.5	CL	8		SANDY CLAY, medium plasticity, soft, sand, fine to coarse (16% fine, 8% medium, 8% coarse), sub-angular to sub-rounded, with gravel, coarse (12%), well-rounded; dry, 10YR 4/3	
		SW	9		SAND, fine to coarse (20% fine, 30% medium, 40% coarse), sub-angular to well-rounded, well graded, with gravel, fine (10%), well-rounded; wet, 10YR 4/3	4" LC Steel Casing (0'-140' bgs)
			10		SAND, fine to medium (80% fine, 10% medium), sub-angular to well-rounded, poorly graded, trace silt (5%), trace clay (5%); moist, 10YR 5/2	
		SP	12		SAND, fine to coarse (20% fine, 30% medium, 30% coarse), sub-angular to well-rounded, poorly graded, with gravel, medium (15%), sub-angular to well-rounded, trace silt (5%); moist, 10YR 5/2	
			13		SAND, fine to medium (50% fine, 40% medium), sub-angular to well-rounded, poorly graded, trace gravel, coarse (5%), well-rounded, trace silt (5%); moist, 10YR 4/1	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 2 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE 12-13-19 / DATE 12-16-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16–17		SAND, fine to medium (50% fine, 40% medium), sub-angular to well-rounded, poorly graded, trace gravel, coarse (5%), well-rounded, trace silt (5%); moist, 10YR 4/1	
		SP	17–18		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-angular to well-rounded, well graded, with gravel, coarse (10%), well-rounded; moist, 10YR 4/2	
		SM	19		SILTY SAND, fine, sub-rounded to well-rounded, silt (40%); moist, 10YR 4/4	
		SW	20		SAND, fine to coarse (25% fine, 25% medium, 25% coarse), sub-angular to well-rounded, well graded, with gravel, fine (15%), angular to well-rounded; moist, 10YR 5/3	Grout (neat cement) (0'-138' bgs)
DISCRETE	MW4A-SOIL 20-21	SC	21		CLAYEY SAND, fine, well-rounded, clay (50%); moist, 10YR 5/3	
		SP	22		SAND, fine to coarse (35% fine, 35% medium, 5% coarse), sub-rounded to well-rounded, poorly graded, with gravel, coarse (15%), angular, with silt (10%); moist, 10YR 5/3	
DISCRETE	MW4A-SOIL 20-23	SC	23–27		CLAYEY SAND, fine to medium (50% fine, 15% medium), sub-rounded to well-rounded, poorly graded, clay (30%), trace gravel, coarse (5%); moist, 10YR 5/3	4" LC Steel Casing (0'-140' bgs)
		SC	28–29		CLAYEY SAND, fine to medium (50% fine, 15% medium), sub-rounded to well-rounded, poorly graded, clay (30%), trace gravel, coarse (5%), well-rounded; moist, 10YR 5/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 3 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL		WATER LEVEL	TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME	0800 / 1700
COMMENTS: Northing: 4980608.11 Easting: 508614.01		DATE	DATE / DATE
		CASING DEPTH	12-13-19 / 12-16-19

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW4A-SOIL 31-32	SC	31–36		CLAYEY SAND, fine, well-rounded, poorly graded, clay (30%), with gravel, fine to coarse (5% fine, 5% coarse), well-rounded; moist to wet, 10YR 4/4	Grout (neat cement) (0'-138' bgs)
		CL	36–37		CLAY, medium plasticity, stiff, trace sand, fine (5%), well-rounded, trace gravel, fine (3%), well-rounded; moist, 10YR 4/2	
DISCRETE	MW4A-SOIL 37-38	SW	37–40		SAND, fine to coarse (15% fine, 35% medium, 45% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine (5%), well-rounded; wet, 10YR 5/3	
DISCRETE	MW4A-SOIL 38-40		40–44		SAND, fine to coarse (30% fine, 35% medium, 30% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine (5%), well-rounded; wet, 10YR 5/2	4" LC Steel Casing (0'-140' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 4 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0800 / 1700
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE / DATE
	CASING DEPTH		12-13-19 / 12-16-19

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	46–49		SAND, fine to coarse (30% fine, 35% medium, 30% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine (5%), well-rounded; wet, 10YR 5/2	
		SP	50–51		SAND, fine to medium (60% fine, 30% medium), sub-rounded to well-rounded, poorly graded, with silt (10%); moist, 10YR 5/2	Grout (neat cement) (0'-138' bgs)
DISCRETE	MW4A-SOIL 51-52	SW	52–59		SAND, fine to coarse (30% fine, 50% medium, 10% coarse), sub-rounded to well-rounded, well graded, with silt (10%); wet, 10YR 5/2	4" LC Steel Casing (0'-140' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 5 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE 12-13-19 / DATE 12-16-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW4A-SOIL 60-62	SW	61–67		SAND, fine to coarse (30% fine, 30% medium, 40% coarse), sub-rounded to well-rounded, well graded; wet, 10YR 5/2	Grout (neat cement) (0'-138' bgs)
			67		SAND, fine to coarse (20% fine, 30% medium, 40% coarse), sub-angular to well-rounded, well graded, with cobbles (10%); moist, 10YR 4/3	
			68		SAND, fine to coarse (45% fine, 45% medium, 5% coarse), sub-angular to well-rounded, poorly graded, trace cobbles (5%), well-rounded; moist, 10YR 4/2	
DISCRETE	MW4A-SOIL 68-70	SP	69–70		SAND, fine to medium (60% fine, 35% medium), sub-rounded to well-rounded, poorly graded, trace silt (5%); wet, 10YR 5/3	4" LC Steel Casing (0'-140' bgs)
			71–73			
DISCRETE	MW4A-SOIL 74-75	SW	74		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded to well-rounded, well graded, trace silt (1%); wet, 10YR 5/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 6 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL		WATER LEVEL	TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4980608.11 Easting: 508614.01		DATE / CASING DEPTH	DATE 12-13-19 / DATE 12-16-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	76		SAND, fine to coarse (40% fine, 25% medium, 25% coarse), sub-angular to well-rounded, well graded, with gravel, fine (7%), well-rounded, trace cobbles (3%), well-rounded; moist, 10YR 5/1	
		SP	77		SAND, fine to coarse (10% fine, 30% medium, 30% coarse), angular to well-rounded, well graded, with gravel, coarse (30%), angular to well-rounded; wet, 10YR 4/1	
		GP	78		COBBLES, well-rounded, with sand, fine to coarse (10% fine, 15% medium, 15% coarse), sub-angular to well-rounded; wet, 10YR 6/1	
		Ops	79		DOLOSTONE, weathered, medium plasticity, stiff, iron banding (10-25%), clay observed; 10YR 6/3	
DISCRETE	MW4A-SOIL 80-81	GP	80		GRAVEL, medium to coarse (60% medium, 10% coarse), sub-rounded to well-rounded, poorly graded, with sand, fine to coarse sand (10% fine, 10% medium, 10% coarse), sub-rounded to well-rounded; wet, 10YR 5/3	Grout (neat cement) (0'-138' bgs)
			81			
			82			
			83			
			84			
DISCRETE	MW4A-SOIL 85-86	SP	85		SAND, fine to medium (50% fine, 45% medium), sub-rounded to well-rounded, poorly graded, trace gravel, medium (5%), well-rounded; moist, 10YR 5/3	4" LC Steel Casing (0'-140' bgs)
		SW	86		SAND, fine to coarse (15% fine, 15% medium, 20% coarse), sub-angular to well-rounded, well graded, with gravel, fine (20%), sub-rounded to well-rounded, with dolostone, cobbles (30%), weathered; moist, 10YR 5/3	
			87			
			88			
DISCRETE	MW4A-SOIL 88-89		89			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 7 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0800 / 1700
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE / DATE
	CASING DEPTH		12-13-19 / 12-16-19

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 90' bgs	Ops	91		DOLOSTONE, not competent, vugs (10%), trace iron staining (3%), dendritic manganese staining (2%), clay observed; 10YR 5/3	
			94		DOLOSTONE, moderately competent, trace sand, medium (5%), trace oolitic texture (3-5%), trace glauconite (2%); 10YR 5/2	Grout (neat cement) (0'-138' bgs)
			97		DOLOSTONE, not competent, iron staining (5-10%), trace sand, fine to medium (5%), trace oolitic texture (5%), trace glauconite (1%), clay observed; 10YR 5/3	
			100		DOLOSTONE, moderately competent, oolitic texture (5-10%), reworked ~4mm clasts (5%), trace sand, fine to medium (3%), trace dendritic manganese staining along 1mm fractures (1%); 10YR 6/2	4" LC Steel Casing (0'-140' bgs)
			103		DOLOSTONE, moderately competent, iron staining (15%), reworked clasts (10%), chert (5-10%), trace sand, medium (3%); 10YR 5/3	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 8 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE 12-13-19 / DATE 12-16-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106		DOLOSTONE, moderately competent, iron staining (15%), reworked clasts (10%), chert (5-10%), trace sand, medium (3%); 10YR 5/3	
			107			
			108		DOLOSTONE, competent, oolitic texture (5-10%), trace vugs (5%), trace sand, medium (3-5%); 10YR 5/3	
			109			
			110		DOLOSTONE, competent, with sand, fine (20%), well-rounded, vugs (10%), dolomitic precipitate (10%); 10YR 6/2	Grout (neat cement) (0'-138' bgs)
			111		DOLOSTONE, moderately competent, with sand, fine (5-10%), well-rounded, dendritic manganese (15%), dolomitic precipitate (5-10%); 2.5Y 7/2	
			112			
			113			
			114		DOLOSTONE, moderately competent, oolitic texture (30%), dolomitic precipitate (10%); 10YR 6/2	
			115		DOLOSTONE, moderately competent, ooids (20%), iron staining (10%), trace sand, fine (5%), well-rounded; 2.5 Y 6/3	4" LC Steel Casing (0'-140' bgs)
			116		DOLOSTONE, not competent, oolitic texture (20-30%), with sand, fine (10-15%), well-rounded, trace iron banding (2%), trace dendritic manganese staining (2%); 2.5Y 8/2	
			117		DOLOSTONE, moderately competent, iron staining (20%), vugs (15%), dolomitic precipitate (15%); 10YR 6/3	
			118		DOLOSTONE, not competent, oolitic texture (20-30%), ooids (10%), dolomitic precipitate (5-10%), with sand (5-10%), trace iron staining (5%), trace dendritic manganese staining (5%); 2.5Y 7/2	
			119			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 9 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL		WATER LEVEL	TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4980608.11 Easting: 508614.01		DATE	DATE 12-13-19 / DATE 12-16-19
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, competent, with sand, fine (30%), well-rounded, dendritic mangenese (10-15%), trace iron banding (5%), trace stiff medium plasticity clay (2%); 5Y 7/2	
			122			
			123		DOLOSTONE, not competent, oolitic texture (30%), dolomitic precipitate (10%), trace iron banding (2%), trace dendritic manganese staining (2%); 2.5Y 7/4	
			124			
			125		DOLOSTONE, moderately competent, dolomitic precipitate (15%), trace sand, fine (5%), well-rounded, trace iron banding (2%); 5Y 7/1	Grout (neat cement) (0'-138' bgs)
			126		DOLOSTONE, competent, with sand, fine (10%), dolomitic precipitates (10%); 2.5Y 7/3	
		Ops	127		SANDY DOLOSTONE, competent, sand (20-30%), well-rounded, dolomitic precipitate (15%), vugs (10%), trace oolitic texture (5%), trace iron banding (2%); 2.5Y 7/2	
			128			
			129		DOLOSTONE, competent, dolomitic precipitate (15%), vugs (10%), with sand (5-10%), trace iron banding (2%); 2.5Y 7/2	
			130		DOLOSTONE, moderately competent, massive, dolomitic precipitate (10%), vugs (10%), with sand @ 132-133 (5-10%), trace iron staining (2%); 2.5Y 7/1	4" LC Steel Casing (0'-140' bgs)
			131			
			132			
	Oneota Fm. @ 133' bgs		133		DOLOSTONE, moderately competent, massive, dolomitic precipitate (10%), vugs (10%), trace iron staining (2%); 2.5Y 7/2	
		Opo	134		DOLOSTONE, not competent, oxidized fine grained dolomitic precipitate (20-30%), vugs (20-30%), trace silt (2%); 2.5Y 7/2	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 10 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL		WATER LEVEL	TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4980608.11 Easting: 508614.01		DATE / CASING DEPTH	DATE 12-13-19 / DATE 12-16-19

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	136		DOLOSTONE, not competent, oxidized fine grained dolomitic precipitate (20-30%), vugs (20-30%), trace silt (2%); 2.5Y 7/2	Grout (neat cement) (0'-138' bgs)
			137		DOLOSTONE, moderately competent, massive, fine grained dolomite precipitate (15%), trace vugs (2%), trace dark precipitate (2%); 2.5Y 7/2	4" LC Steel Casing (0'-140' bgs)
			138			
			139			1.5' pellet seal on top of 0.5' pea rock (138'-140' bgs)
			140		DOLOSTONE, moderately competent, massive, iron staining with dendritic manganese along fractures (15%), dendritic manganese staining on surface (10%); 10YR 7/3	Grout Basket (140' bgs)
			141			
			142		DOLOSTONE, moderately competent, massive, dolomitic precipitates (30%), vugs (15-20%), iron staining (2%); 2.5Y 6/2	
			143			7" Open Hole (140'-160' bgs)
			144			
			145		DOLOSTONE, not competent, massive, dolomitic precipitate (40-50%), vugs (30%), trace iron staining (2%); 2.5Y 6/3	
			146			
			147		DOLOSTONE, moderately competent, massive, dolomitic precipitate (10%), trace iron staining (2-3%); 2.5Y 7/2	
			148		DOLOSTONE, competent, ~5 mm vugs (15-20%), dolomitic precipitate (10-15%), trace iron banding (5%); 2.5Y 7/2	
			149			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW4A [847054]
LOGGED BY: JM/AEL/AS	CHECKED BY: AEL/AS		SHEET 11 OF 11
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 890.060 FT AMSL	WATER LEVEL		TIME 0800 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980608.11 Easting: 508614.01	DATE		DATE 12-13-19 / DATE 12-16-19
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	151		DOLOSTONE, competent, massive, dolomitic precipitate (20%), vugs (10%), trace dendritic manganese staining (2%); 2.5Y 7/2	7" Open Hole (140'-160' bgs)
			155		DOLOSTONE, moderately competent, massive, dolomitic precipitate (15-20%), iron staining and banding (10%); 2.5Y 7/3	
			157		DOLOSTONE, not competent, platy, dolomitic precipitate (75-100%); 2.5Y 7/3	
			160		EOB @ 160' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 1 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1		SANDY CLAY, medium plasticity, sand, fine to medium (5% fine, 15% medium), sub-rounded, with gravel, medium to coarse (5% medium, 5% coarse), sub-angular; wet, 10YR 3/6	
		SW	2		SAND, fine to coarse (15% fine, 30% medium, 30% coarse), sub-rounded, well graded, with gravel, medium to coarse (10% medium, 10% coarse), sub-angular, trace clay (5%), low plasticity; wet, 10YR 4/6	
		CL	4		CLAY, low plasticity, with sand, medium (10%), sub-rounded, trace gravel, medium to coarse (2%), sub-angular, trace cobbles (1%); moist to wet, 10YR 3/4	
		SP	6		SAND, fine (88%), well-rounded, with clay (10%), low plasticity, trace gravel, medium (2%), angular; dry to moist, 10YR 4/6	← Grout (neat cement) (0'-208' bgs)
			7		SAND, fine (88%), well-rounded, with silt (10%), low plasticity, trace gravel, medium (2%), angular; dry, 10YR 4/6	
		ML	8		SILT, low plasticity, trace clay (5%); dry, 10YR 4/6	
			10		SILT, low plasticity, with clay (15-20%); dry, 10YR 4/4	← 4" LC Steel Casing (0'-210' bgs)
		SW	11		SAND, fine to coarse (55% fine, 20% medium, 10% coarse), well-rounded, well graded, with gravel, fine (15%), sub-angular to sub-rounded; dry, 10YR 4/4, more gravel (20-30%) @ 12.5-13'	
		CL	13		CLAY, low plasticity, stiff, with gravel, medium to coarse (5% medium, 2% coarse), sub-angular to sub-rounded; dry to moist, 10YR 4/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 2 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16–20		CLAY, low plasticity, stiff, with gravel, medium to coarse (5% medium, 2% coarse), sub-angular to sub-rounded; dry to moist, 10YR 4/6	
			20–27		CLAY, low plasticity, medium, trace gravel, coarse (2%), sub-angular to sub-rounded, trace cobbles (2%); moist, 10YR 4/3, 5" competent limestone cobble @ 20' bgs	Grout (neat cement) (0'-208' bgs) 4" LC Steel Casing (0'-210' bgs)
			27–29		SANDY CLAY, low plasticity, sand, fine to medium (25% fine, 10% medium), sub-angular to sub-rounded, trace cobbles (3%); 10YR 5/3	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 3 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
			31		SAND, medium to coarse (35% medium, 60% coarse), sub-angular, poorly graded, trace gravel, fine (5%), well-rounded; wet, 10YR 5/2	
			32		SAND, fine to coarse (5% fine, 25% medium, 55% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine to coarse (10% fine, 5% coarse), sub-angular to sub-rounded; moist, 10YR 4/2	
			33			
			34		SAND, fine to coarse (5% fine, 20% medium, 70% coarse), sub-rounded, poorly graded, trace gravel, medium to coarse (3% medium, 2% coarse), sub-angular to sub-rounded; moist, 10YR 5/2	
		SP	35			Grout (neat cement) (0'-208' bgs)
			36			
			37			
			38			
			39		SAND, fine to coarse (5% fine, 60% medium, 30% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, medium (5%), sub-angular to sub-rounded; wet, 10YR 5/3	
			40		SAND, fine to coarse (20% fine, 50% medium, 20% coarse), sub-angular to sub-rounded, well graded, trace gravel, medium (5%), sub-rounded, trace silt (5%); moist, 10YR 5/2, silt/clay lense @ 41.5' bgs	4" LC Steel Casing (0'-210' bgs)
			41			
		SW	42			
			43			
			44		SANDY CLAY, low plasticity, medium, sand, medium to coarse (15% medium, 15% coarse), sub-angular; moist, 10YR 6/2	
		CL				

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 4 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46		SAND, medium to coarse (30% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (15% fine, 10% medium, 5% coarse), sub-rounded; moist, 10YR 4/2	
		CL	47		CLAY, medium plasticity, soft; dry to moist, 10YR 6/3	
			48			
		SW	49		SAND, fine to coarse (20% fine, 50% medium, 20% coarse), sub-angular to sub-rounded, well graded, trace gravel, medium (5%), sub-rounded, trace silt (5%); moist, 10YR 5/2	
			50		SAND, fine to coarse (10% fine, 35% medium, 45% coarse), sub-rounded to well-rounded, well graded, with gravel, fine to coarse (7% fine, 3% coarse), angular to sub-angular; moist, 10YR 3/6	Grout (neat cement) (0'-208' bgs)
			51			
			52		SAND, medium to coarse (40% medium, 50% coarse), sub-angular to well-rounded, poorly graded, with gravel, fine to coars (8% fine, 2% coarse), sub-angular; moist, 10YR 3/6	
		SP	53		SAND, fine to medium (40% fine, 60% medium), sub-rounded, poorly graded; moist, 10YR 4/6	
			54		SAND, medium to coarse (30% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine to medium (6% fine, 4% medium), sub-angular to well-rounded; moist, 10YR 4/6	
			55		SAND, fine to coarse (20% fine, 60% medium, 15% coarse), sub-angular to sub-rounded, well graded, trace gravel, fine (5%), sub-rounded; moist, 10YR 4/3	4" LC Steel Casing (0'-210' bgs)
		SW	56			
			57			
			58			
			59			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 5 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME 1345 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE 12-02-19 / DATE 12-04-19
	CASING DEPTH		

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 60' bgs		61		DOLOSTONE, not competent, weathered, medium plasticity, micritic, dendritic manganese staining (15%), dolomitic precipitate (5-10%), trace vugs (5%); 10YR 5/3, clay observed	
			62			
			63			
			64			
			65		DOLOSTONE, moderately competent, massive, vugs (5-15%), reworked clasts (5-15%), trace glauconite (1%); 10YR 5/6, clay observed	Grout (neat cement) (0'-208' bgs)
			66			
			67		SANDY DOLOSTONE, moderately competent, oolitic texture (20-30%), sand, fine to medium (25%), trace dolomitic precipitate (5%), trace glauconite (5%); gley 1 7/10Y to 2.5Y 6/6, clay observed	
		Ops	68		DOLOSTONE, moderately competent, micritic, iron staining (5-10%), trace dendritic manganese staining (5%); 2.5Y 7/3	
			69			
			70		SANDY DOLOSTONE, not competent, weathered, massive, sand, fine (20%), iron staining (15%), oolitic texture (10-15%); 10YR 7/2, clay observed, blocky texture @ 71' bgs	4" LC Steel Casing (0'-210' bgs)
			71			
			72			
			73		DOLOSTONE, not competent, weathered, massive, dark iron staining (30-50%), trace sand, fine (5%), trace vugs (5%); 10YR 6/2	
			74			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 6 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDY DOLOSTONE, moderately competent, weathered, sand, fine to coarse (15% fine, 5% medium, 15% coarse), iron staining (15%), trace glauconite (5%); 10YR 6/3	
			77		DOLOSTONE, competent, banded iron staining/staining along fractures (25%), vugs (15%), trace sand, fine to coarse (2% fine, 3% coarse), trace glauconite (1%); 10YR 6/3, clay lense @ 79' bgs	
			78			
			79			
			80		DOLOSTONE, competent, massive, oolitic texture (35%), with sand, fine (15%), trace vugs with manganese staining (3%); 10YR 6/2, clay observed	Grout (neat cement) (0'-208' bgs)
			81			
			82		DOLOSTONE, competent, cross bedding, iron staining (5-20%), trace sand, fine (3%); 10YR 6/2, clay observed	
		Ops	83			
			84		DOLOSTONE, competent, massive, trace medium grained dolomite precipitate (5%), trace oolitic texture (5%), trace sand, fine (3%); 10YR 6/3, clay observed	
			85		DOLOSTONE, competent, massive, iron staining throughout, oolitic texture (10%), trace vugs (5%), trace sand, fine (5%), trace dendritic manganese staining (5%); 10YR 6/3, clay observed	4" LC Steel Casing (0'-210' bgs)
			86			
			87			
			88		DOLOSTONE, competent, massive, iron staining throughout, trace fine grained dolomitic precipitate (5%), trace glauconite (3%), trace vugs (3%), trace manganese staining (2%); 10YR 6/4, clay observed	
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 7 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	91		DOLOSTONE, competent, fine grained, iron staining along fractures (15-20%), trace sand (2%), trace vugs (1%); 5Y 7/2	
			92		DOLOSTONE, competent, fine grained, vugs (30-40%), trace iron staining (5%); 5Y 6/2	
			93			
			94		SANDY DOLOSTONE, competent, fine grained, bedding visible, sand (20%), banded iron staining (10%), trace manganese staining (2%); 5Y 6/2	
			95		DOLOSTONE, competent, dolomitic precipitate (15%), vugs (5-10%), banded iron staining (5-10%), trace oolitic texture (5%); 5Y 6/3	Grout (neat cement) (0'-208' bgs)
			96		DOLOSTONE, moderately competent, massive, banded iron staining (30-40%), trace iron staining along fractures (2%); 5Y 6/3	
			97			
			98		DOLOSTONE, competent, vugs (15-20%), with sand (15%), iron staining (10%), trace manganese staining (5%), trace glauconite (1%); 5Y 7/2	
			99			
			100		DOLOSTONE, competent, fine grained, vugs (30-40%), dolomitic precipitate (10%), trace iron staining (2%); 5Y 7/2	4" LC Steel Casing (0'-210' bgs)
			101			
			102		SANDY DOLOSTONE, competent, fine grained, sand, fine (30%), well-rounded, trace iron staining (5%), trace vugs (5%); 5Y 7/3	
			103		SANDY DOLOSTONE, competent, fine grained, massive, sand, fine (20-30%), well-rounded, banded iron staining (10%); 5Y 8/3	
			104		DOLOSTONE, moderately competent, manganese staining (10%), with sand, fine (5-10%), well-rounded, dolomitic precipitate (5-10%), iron	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 8 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			106		staining (2%), trace glauconite (1%); 5Y 8/3 DOLOSTONE, not competent, blocky, iron staining throughout, dolomitic precipitate (10-15%), trace dark iron staining (5%), trace dendritic manganese staining (5%); 10YR 5/6	
			107			
			108			
			109		DOLOSTONE, moderately competent, massive, blocky, iron staining throughout, trace sand, fine (5%), trace dendritic manganese staining (3%), trace dark iron staining (3%); 10YR 5/4	
			110		DOLOSTONE, not competent, blocky, dolomitic precipitate (5-10%), trace dark iron staining (5%), trace manganese staining (1%); 2.5Y 6/4	Grout (neat cement) (0'-208' bgs)
			111			
			112			
		Ops	113		DOLOSTONE, moderately competent, banded iron staining (10-15%), oolitic texture (10-15%), dolomitic precipitate (10%), trace vugs (5%); 2.5Y 6/4	
			114		DOLOSTONE, not competent, blocky, banded iron staining (15-20%), dolomitic precipitate (15%); 2.5Y 6/3	
			115			4" LC Steel Casing (0'-210' bgs)
			116			
			117		DOLOSTONE, moderately competent, massive, with sand, fine (10%), well-rounded, dolomitic precipitate (10%), iron banding (5-10%), oolitic texture (5-10%), trace dendritic manganese staining (5%); 10YR 6/4, no sand from 119-120' bgs	
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 9 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, not competent, iron staining throughout, dark iron staining (15%), 10 mm white banding (10%); 10YR 7/2	
			122		DOLOSTONE, competent, massive, coarse grained, oolitic texture (30-40%), vugs (20-25%), with sand, very fine to fine (10-15%), trace banded iron staining (1%); 10YR 7/2	
			123			
			124			
			125		DOLOSTONE, competent, wavy banded iron staining; 5YR 5/6	Grout (neat cement) (0'-208' bgs)
			126		DOLOSTONE, not competent, oolitic texture (20-25%), banded iron staining, green/gray dolomitic precipitate; GLEY 1 7/5G-/1 to 5YR 5/6, sand, fine (15-20%) and vugs (15-20%) from 129.9 to 130' bgs	
		Ops	127			
			128			
			129			
			130		DOLOSTONE, competent, oolitic texture (35-40%), vugs (15-20%), trace glauconite (1%); 10YR 6/2, green shale observed on borehole sidewalls in video log (12/4) @ 131.2' bgs, area of dolomitic precipitate and oolitic texture @ 130-131' bgs	4" LC Steel Casing (0'-210' bgs)
			131			
			132			
			133			
			134			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 10 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 140' bgs	Ops	136		SANDY DOLOSTONE, not competent, sand, fine (30-40%), dolomitic precipitate (10%), trace oolitic texture (2%); 2.5Y 6/4	Grout (neat cement) (0'-208' bgs)
			137		SANDY DOLOSTONE, competent, oolitic texture (50%), sand, fine (20%), trace iron staining (5%), trace glauconite (2%); 2.5Y 7/2	
			138		SANDY DOLOSTONE, not competent, platy, staining along fractures, micritic on surface, sand, fine (15-20%), well-rounded, trace banded manganese staining (2%); 10YR 3/3 to 2.5Y 7/3	
			139			
			140		DOLOSTONE, not competent, oolites (30%), trace banded iron staining (5%); 10YR 7/3	
		Opo	141		DOLOSTONE, not competent, oolitic texture (10-15%), trace dolomitic precipitate (5%), trace iron staining (5%), trace vugs (5%); 2.5Y 7/4	
			142			
			143			
			144		DOLOSTONE, not competent, fine grained, trace iron staining (5%), trace oolitic texture (1%); 2.5Y 6/3	4" LC Steel Casing (0'-210' bgs)
			145			
			146			
			147			
			148			
			149		DOLOSTONE, not competent, weathered, vugs	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 11 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
					(50%), dolomitic precipitate (30%), iron staining (30%), trace quartz 4 mm nodules (5%); 2.5Y 6/1	
			151		DOLOSTONE, not competent, very weathered; 2.5YR 7/2, clays and non-carbonate gravel observed	
			152		DOLOSTONE, not competent, reworked clasts (10-15%), red to dark iron staining (10%); 2.5YR 6/3, clay observed	
			153			
			154		DOLOSTONE, moderately competent, massive, vugs (10-15%), trace oolitic texture (5%), trace banded iron staining (5%); 2.5YR 7/2, clay observed	
			155			Grout (neat cement) (0'-208' bgs)
			156			
			157		DOLOSTONE, moderately competent, massive, trace vugs with quartz precipitate (5%), trace iron staining (2%), trace dendritic manganese staining (1%); 2.5YR 7/2, clay observed	
		Opo	158			
			159			
			160		DOLOSTONE, not competent, vugs (25%), trace oolitic texture (5%), red banded iron staining (5%); 2.5YR 7/2, clay observed	4" LC Steel Casing (0'-210' bgs)
			161			
			162			
			163		DOLOSTONE, very competent, vugs (10%), oolitic texture (5-10%), trace reworked micrite clasts (5%), trace micritic banding (5%); 2.5YR 6/3	
			164			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 12 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			166		DOLOSTONE, not competent, very weathered, vugs filled by precipitate (50%), iron staining (50%); 10YR 7/3	
			167		DOLOSTONE, moderately competent, dolomitic precipitate (50%), iron staining (10%); 2.5Y 7/2, vugs (5-10%) @ 169-170' bgs	
			168			
			169			
			170		DOLOSTONE, competent, massive, vugs (10%), trace manganese staining (1%); 2.5Y 7/2	Grout (neat cement) (0'-208' bgs)
			171		DOLOSTONE, moderately competent, dolomitic precipitate (10%), trace vugs (5%); 2.5Y 6/2	
		Opo	172		DOLOSTONE, moderately competent, oolitic texture (20%); 2.5Y 6/2	
			173		DOLOSTONE, moderately competent, trace iron staining (1%), trace manganese staining (1%); 2.5Y 7/2	
			174			
			175			4" LC Steel Casing (0'-210' bgs)
			176		DOLOSTONE, moderately competent, fine grained dolomitic precipitate, dendritic manganese staining (20-30%), trace iron staining (1%); 2.5Y 7/2	
			177			
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 13 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	181		DOLOSTONE, competent, massive, vugs (10-15%), dolomitic precipitate (10%), iron staining (5-10%), trace fractures (5%), trace reworked micrite clasts (5%), trace oolitic texture (5%), trace dendritic manganese staining (2%); 2.5YR 7/3, clay observed	
			182			
			183			
			184			
			185		DOLOSTONE, moderately competent, massive, medium grained dolomitic precipitate (50%), 5-10 mm vugs (5-10%), trace oolitic texture (5%), trace iron staining (3%); 2.5Y 6/4, clay observed	Grout (neat cement) (0'-208' bgs)
			186			
			187			
			188		DOLOSTONE, competent, bedding visible, fine grained to micritic, dolomitic precipitate (50%), yellow iron staining (20-25%); 2.5YR 7/3	
			189			
			190		DOLOSTONE, not competent, weathered, red iron staining (50%), trace chert (5%); 10YR 4/6, clay observed	4" LC Steel Casing (0'-210' bgs)
			191		DOLOSTONE, competent, bedding visible, dolomitic precipitate (20%), oolitic texture (10%), trace vugs (5%), trace dendritic manganese staining (1%); 2.5Y 5/4, clay observed	
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 14 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1345 / 1800
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE / DATE
	CASING DEPTH		12-02-19 / 12-04-19

SURFACE CONDITIONS: Asphalt

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Coon Valley @ 198' bgs		196		DOLOSTONE, competent, vugs (10-15%), trace iron staining (4%), trace manganese staining (3%), trace quartz/chert nodules (2%); 2.5Y 6/3	
			197			
			198		DOLOSTONE, not competent, very weathered, iron staining throughout, calcite (30-40%), stromatolites (15-20%); 10YR 5/6, clay observed	
		Opo	199			
			200		SANDSTONE, cemented, dolostone lithic fragments (10-15%); 5Y 7/1	Grout (neat cement) (0'-208' bgs)
			201			
			202			
	Jordan Fm. @ 203' bgs		203		QUARTZ ARENITE, fine to coarse, (40% fine, 40% medium, 20% coarse), well-rounded, iron staining throughout medium sized grains, trace cemented sandstone with banded iron staining (5%); 5Y 7/2	
			204		QUARTZ ARENITE, cemented, coarse, sub-rounded, banded iron staining along bedding (10%), less cemented and stained @ 204.75' bgs; 2.5Y 6/4 to 10YR 5/8	
			205			4" LC Steel Casing (0'-210' bgs)
			206		QUARTZ ARENITE, not cemented, clean, medium to coarse (15% medium, 85% coarse); 10YR 8/1 - bright white	
		Cj	207		QUARTZ ARENITE, not cemented, fine to medium (30% fine, 70% medium); 10YR 7/8	
			208		QUARTZ ARENITE, not cemented, medium to coarse (70% medium, 30% coarse); 10YR 5/8	
			209		QUARTZ ARENITE, not cemented, fine to medium (85% fine, 15% medium); 10YR 5/8	1.5' pellet seal on top of 0.5' pea rock (208'-210' bgs)
					QUARTZ ARENITE, not cemented, fine to medium	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5A [847056]
LOGGED BY: AEL/AS/MDG/HT/CK	CHECKED BY: AEL/AS		SHEET 15 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 908.045 FT AMSL	WATER LEVEL		TIME 1345 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980840.19 Easting: 508682.95	DATE		DATE 12-02-19 / DATE 12-04-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
					(15% fine, 85% medium); 10YR 5/8	Grout Basket (210' bgs)
					QUARTZ ARENITE, not cemented, fine to coarse (40% fine, 40% medium, 20% coarse); 5Y 8/1	
			211		QUARTZ ARENITE, not cemented, medium to coarse (30% medium, 70% coarse); 2.5Y 6/2	
			212			
			213			
			214			
		Cj	215		QUARTZ ARENITE, not cemented, fine to coarse (45% fine, 45% medium, 10% coarse); 2.5Y 7/6	7" Open Hole (210'-220' bgs)
			216		QUARTZ ARENITE, not cemented, fine to medium (50% fine, 50% medium); 5Y 8/1	
			217			
			218		QUARTZ ARENITE, not cemented, fine to medium (70% fine, 30% medium); 5Y 8/1	
			219			
			220		E.O.B. @ 220' bgs, no refusal	
			221			
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN			
PROJECT: Project 1007		DRILLING METHOD: Sonic				BORING NO. MW5B [847057]
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS					SHEET 1 OF 8
DRILLING CONTR.: Traut						
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags				DRILLING START / FINISH
BORING DEPTH: 120 FT BGS						
GROUND SURFACE ELEVATION: 907.861 FT AMSL		WATER LEVEL	31'	20.4'	20.2'	TIME 1400 / TIME 1750
DATUM: NAD 83 UTM 15 (meters)		TIME	1530	1815	1020	
COMMENTS: Northing: 4980837.84 Easting: 508681.37		DATE	12-09-19	12-09-19	12-10-19	DATE 12-09-19 / DATE 12-10-19
		CASING DEPTH	35'	55'	58'	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–1		SILTY SAND, medium to coarse (30% medium, 20% coarse), sub-angular to sub-rounded, silt (30%), with organics (10%), with cobbles (10%); wet, 10YR 4/3	
		SC	1–4		CLAYEY SAND, medium to coarse (40% medium, 20% coarse), sub-rounded to well-rounded, clay (20%), with gravel, fine to medium (10% fine, 10% medium); moist, 10YR 5/4	
		SM	4–7		SILTY SAND, fine to coarse (50% fine, 23% medium, 10% coarse), sub-rounded to well-rounded, silt (15%), trace gravel, fine (2%); dry, 10YR 5/4	Grout (neat cement) (0'-108' bgs)
DISCRETE	MW5B-SOIL 8-9		7–10		SILTY SAND, fine to medium (30% fine, 15% medium), sub-rounded, silt (25%), clay (25%), trace gravel, fine (3%), trace cobbles (2%); dry, 10YR 4/3	
			10–12		SILTY SAND, fine to medium (50% fine, 20% medium), sub-angular to sub-rounded, silt (25%), trace gravel, fine (3%), trace cobbles (2%); dry, 10YR 5/4	4" LC Steel Casing (0'-110' bgs)
		CL	12–14		CLAY, low plasticity, stiff, trace gravel, medium (3%), trace cobbles (2%); dry, 10YR 4/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS						SHEET 2 OF 8	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 120 FT BGS								
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'	TIME 1400	TIME 1750
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020		
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19	DATE 12-09-19	DATE 12-10-19
			CASING DEPTH	35'	55'	58'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW5B-SOIL 16-18	CL	16–20		CLAY, low plasticity, stiff, trace gravel, medium (3%), trace cobbles (2%); dry, 10YR 4/3	
DISCRETE	MW5B-SOIL 18-20	CL	20–25		CLAY, low plasticity, stiff, with gravel, coarse (7%), sub-rounded; dry to moist, 10YR 4/3	Grout (neat cement) (0'-108' bgs)
		CL	25–28		SANDY CLAY, low plasticity, stiff, sand, fine to medium (20% fine, 5% medium), sub-rounded to well-rounded, trace gravel, coarse (5%), trace cobbles (5%); dry to moist, 10YR 4/3	4" LC Steel Casing (0'-110' bgs)
DISCRETE	MW5B-SOIL 28-30	ML	29		SANDY SILT, low plasticity, sand, fine to medium (25% fine, 10% medium), sub-rounded to well-rounded, trace gravel, fine to coarse (3% fine, 5% coarse); dry to moist, 10YR 4/4, 6" black mica lense @ 28.5'	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW5B [847057]
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS		SHEET 3 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 120 FT BGS			
GROUND SURFACE ELEVATION: 907.861 FT AMSL			
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4980837.84 Easting: 508681.37			

	WATER LEVEL	TIME	DATE	CASING DEPTH	TIME	DATE
	31'	1530	12-09-19	35'	1400	12-09-19
	20.4'	1815	12-09-19	55'		
	20.2'	1020	12-10-19	58'	1750	12-10-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt / MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW5B-SOIL 31-32	ML	31		SANDY SILT, low plasticity, sand, fine to coarse (15% fine, 10% medium, 5% coarse), sub-angular to sub-rounded, trace cobbles (5%); wet, 10YR 4/3	
GRAB	MW5B-GW 31-35	SP	32		SAND, fine to coarse (5% fine, 35% medium, 50% coarse), sub-rounded, poorly graded, with gravel, fine to medium (8% fine, 2% medium), sub-rounded to sub-angular; moist, 10YR 3/2	
DISCRETE	MW5B-SOIL 34-35		34		SAND, fine to coarse (5% fine, 35% medium, 55% coarse), sub-angular, poorly graded, with gravel, fine to coarse (8% fine, 2% coarse), sub-angular; moist, 10YR 4/4	Grout (neat cement) (0'-108' bgs)
		SP	38		SAND, fine to coarse (3% fine, 25% medium, 55% coarse), sub-angular to well-rounded, poorly graded, with gravel, fine to coarse (10% fine, 5% medium, 2% coarse), angular to sub-angular; moist, 10YR 4/3, gravel @ 42' - 46'	4" LC Steel Casing (0'-110' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS						SHEET 4 OF 8	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 120 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'	TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020	1400	1750
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19	DATE 12-09-19	DATE 12-10-19
			CASING DEPTH	35'	55'	58'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46		SAND, fine to coarse (3% fine, 25% medium, 55% coarse), sub-angular to well-rounded, poorly graded, with gravel, fine to coarse (10% fine, 5% medium, 2% coarse), angular to sub-angular; moist, 10YR 4/3, gravel @ 42' - 46'	
		SW	47		SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-angular to well-rounded, well graded; moist, 10YR 4/4	
		CL	48		CLAY, low plasticity, soft; wet, 10YR 5/4	
DISCRETE	MW5B-SOIL 48-49		49			
		GP	50		GRAVEL, fine to medium (60% fine, 10% medium), angular to sub-angular, poorly graded, sand, medium to coarse (5% medium, 15% coarse), sub-angular, with silt (10%); moist, 10YR 4/3	Grout (neat cement) (0'-108' bgs)
		ML	51		SANDY SILT, low plasticity, sand, fine to medium (15% fine, 5% medium), sub-angular to sub-rounded, trace gravel, coarse (5%), sub-rounded; moist, 10YR 5/3	
COMPOSITE	MW5B-SOIL 50-54		52		SAND, fine to coarse (40% fine, 50% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, coarse (5%), well-rounded; dry to moist, 10YR 6/4	
			53			
GRAB	MW5B-GW 51-55		54			
		SP	55			4" LC Steel Casing (0'-110' bgs)
COMPOSITE	MW5B-SOIL 55-58		56		SAND, medium to coarse (30% medium, 56% coarse), well-rounded, poorly graded, with gravel, coarse (10%), sub-angular to sub-rounded, trace silt (2%), trace clay (2%); dry, 10YR 5/4	
			57			
GRAB	MW5B-GW 55-58		58			
		Ops	59		DOLOSTONE, not competent, very weathered, with gravel, fine (10%), with cobbles (10%); 10YR 6/6, clay observed	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS						SHEET 5 OF 8	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 120 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'	TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020	1400	1750
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19	DATE	DATE
			CASING DEPTH	35'	55'	58'	12-09-19	12-10-19

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 60' bgs	Ops	61		DOLOSTONE, not competent, very weathered, with gravel, fine (10%), with cobbles (10%); 10YR 6/6, clay observed	
			62		DOLOSTONE, moderately competent, oolitic texture (15%), dendritic manganese staining (10%), with sand, fine (15%), trace glauconite (1%); 10YR 6/2	
			63			
			64		DOLOSTONE, moderately competent, trace banded iron staining (5%); 10YR 5/4	
			65		DOLOSTONE, competent, oolitic texture, with sand, fine (5-10%), trace glauconite (1%); 10YR 5/6, clay observed	Grout (neat cement) (0'-108' bgs)
			66		SANDY DOLOSTONE, competent, oolitic texture, sand, fine to coarse (30% fine, 5% coarse), trace reworked clasts (5%), trace glauconite (1%); 10YR 6/4	
			67			
			68		DOLOSTONE, competent, massive, trace calcite (1%); 10YR 6/4	
			69		SANDY DOLOSTONE, not competent, massive, sand, fine (35%), oolitic texture (10-20%), trace calcite (1%), trace vugs (1%); 10YR 6/4, clay observed	
			70		SANDY DOLOSTONE, not competent, massive, sand, fine to medium (35%), trace vugs (1%); 10YR 6/2, clay observed	4" LC Steel Casing (0'-110' bgs)
			71		SANDY DOLOSTONE, not competent, massive, sand, fine to medium (20%), trace vugs (1%), trace oolitic texture (1%); 10YR 6/2, clay observed	
			72		DOLOSTONE, not competent, massive, with sand, fine to medium (10%), trace vugs (3%), trace glauconite (1%); 10YR 6/2, clay observed	
			73			
			74			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS							SHEET 6 OF 8	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 120 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'		TIME 1400	TIME 1750
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020			
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19		DATE 12-09-19	DATE 12-10-19
			CASING DEPTH	35'	55'	58'			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not competent, massive, with sand, fine to medium (10%); 10YR 6/4	
			76		DOLOSTONE, not competent, massive, trace vugs (3%), trace banded iron staining (2%); 10YR 6/4	
			77		DOLOSTONE, not competent, massive, very fine grained, dendritic manganese staining (10%); 10YR 6/4	
			78			
			79		DOLOSTONE, not competent, massive, oolitic texture (30%), with sand (5-10%), fine to medium (5-10%), trace dendritic manganese staining (5%); 10YR 5/3	
			80		DOLOSTONE, not competent, massive, very fine grained; 10YR 5/1	Grout (neat cement) (0'-108' bgs)
			81		DOLOSTONE, competent, massive, trace sand, fine (5%), trace banded iron staining (1%); 10YR 7/2	
		Ops	82			
			83			
			84		DOLOSTONE, not competent, massive, oolitic texture (10%), trace sand, fine (5%), trace banded iron staining (5%), trace dendritic manganese staining (5%); 10YR 7/6	
			85		SANDY DOLOSTONE, competent, sand, fine to medium (20-30%), trace dendritic manganese staining (5%), trace dolomitic precipitate (5%); 10YR 6/3	4" LC Steel Casing (0'-110' bgs)
			86		DOLOSTONE, competent, trace vugs (5%), trace dolomitic precipitate (5%), trace sand, fine (3%); 10YR 7/2	
			87		DOLOSTONE, moderately competent, very fine grained, banded iron staining (10%), trace dendritic manganese staining (5%), trace sand, fine (5%); 10YR 6/3	
			88			
			89		DOLOSTONE, moderately competent, fine grained, oolitic texture (15%), trace vugs (2%); 10YR 6/2, vugs filled with dolomitic precipitate	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS						SHEET 7 OF 8	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 120 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'	TIME 1400	TIME 1750
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020		
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19	DATE 12-09-19	DATE 12-10-19
			CASING DEPTH	35'	55'	58'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	91		DOLOSTONE, not competent, massive, very fine grained, dolomitic precipitate, vugs (50%); 10YR 6/3	
			92		DOLOSTONE, not competent, massive, very fine grained, trace dendritic manganese staining (5%), trace banded iron staining (2%); 10YR 7/3	
			93			
			94		SANDY DOLOSTONE, not competent, massive, sand, fine to medium (15-20%), trace banded iron staining (2%); 10YR 6/5	
			95		DOLOSTONE, moderately competent, very fine grained, dolomitic precipitate, trace oolitic texture (5%), trace vugs (3%), trace glauconite (1%); 10YR 8/2	Grout (neat cement) (0'-108' bgs)
			96		DOLOSTONE, moderately competent, very fine grained, banded iron staining (10-12%); 10YR 8/2	
			97			
			98		DOLOSTONE, moderately competent, very fine grained, trace dendritic manganese staining (5%), trace banded iron staining (2%); 10YR 7/3	
			99		DOLOSTONE, moderately competent, very fine grained, dolomitic precipitate, trace sand, fine to medium (5%), trace vugs (2%), trace glauconite (2%); 10YR 7/3	
			100		DOLOSTONE, moderately competent, very fine grained, dolomitic precipitate, trace oolitic texture (5%), trace vugs (5%), trace glauconite (2%); 10YR 7/3	4" LC Steel Casing (0'-110' bgs)
			101		DOLOSTONE, competent, massive, vugs (15-20%), trace dendritic manganese staining (2%); 10YR 6/2	
			102		SANDY DOLOSTONE, moderately competent, trace vugs (5%), dendritic manganese staining @ 103' (5%); 10YR 7/3	
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW5B [847057]	
LOGGED BY: AS/JM/MGD	CHECKED BY: AEL/AS						SHEET 8 OF 8	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 120 FT BGS								
GROUND SURFACE ELEVATION: 907.861 FT AMSL			WATER LEVEL	31'	20.4'	20.2'	TIME 1400	TIME 1750
DATUM: NAD 83 UTM 15 (meters)			TIME	1530	1815	1020		
COMMENTS: Northing: 4980837.84 Easting: 508681.37			DATE	12-09-19	12-09-19	12-10-19	DATE 12-09-19	DATE 12-10-19
			CASING DEPTH	35'	55'	58'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Asphalt MATERIAL DESCRIPTION	WELL DIAGRAM
			106		DOLOSTONE, competent, massive, with sand, fine to medium (5-10%), trace vugs (5%); 10YR 6/3	Grout (neat cement) (0'-108' bgs)
			107			4" LC Steel Casing (0'-110' bgs)
			108		DOLOSTONE, competent, massive, with sand, fine to medium (5-10%), trace vugs (5%), trace banded iron staining (5%); 10YR 6/3	
			109		DOLOSTONE, competent, massive, with sand, fine to medium (5-10%), trace vugs (5%), trace dolomitic precipitate (5%), trace iron staining (2%); 10YR 6/3	1.5' pellet seal on top of 0.5' pea rock (108'-110' bgs)
			110		DOLOSTONE, not competent, trace medium grained dolomitic precipitate (5%); 10YR 7/2	Grout Basket (110' bgs)
			111		DOLOSTONE, not competent, with sand, medium (5-10%), trace banded iron staining (2-5%); 10YR 6/3	
		Ops	112			
			113			
			114			
			115		DOLOSTONE, moderately competent, massive, oolitic texture (20-25%), trace banded iron staining (5%), trace sand (5%); 10YR 6/4	7" Open Hole (110'-120' bgs)
			116			
			117			
			118		DOLOSTONE, moderately competent, massive, with sand, medium (5%), reworked clasts (10%), trace massive iron staining (5%), trace vugs (5%); 10YR 6/3	
			119		E.O.B. @ 120' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 1 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					No Recovery	
		ML	1		SILT, low plasticity, trace non-native clay (5%); dry to moist, 2.5Y 4/4	
		CL	2		CLAY, low plasticity; dry to moist, 2.5Y 4/4	
		SW	3		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded, well graded; moist, 5Y 3/2	Grout (neat cement) (0'-183' bgs)
			4			
			5			
		SP	6		SAND, fine, well-rounded, poorly graded; dry to moist, 2.5Y 4/4	
			7		SAND, medium, sub-rounded to well-rounded, poorly graded, with gravel (10%), coarse, subangular; dry to moist, 2.5Y 4/4	
			8			
		SW	9		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded, well graded; dry to moist, 2.5Y 4/4	
			10		SAND, fine to coarse (27% fine, 27% medium, 27% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 5% medium), sub-angular to well-rounded; wet, 2.5Y 4/3	4" LC Steel Casing (0'-185' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW6A [847058]	
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS							SHEET 2 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 210 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 890.464 FT AMSL			WATER LEVEL	9'				TIME 1520	TIME 1130
DATUM: NAD 83 UTM 15 (meters)			TIME	0800					
COMMENTS: Northing: 4980133.29 Easting: 509410.8			DATE	11-13-19				DATE 11-11-19	DATE 11-14-19
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–18		SAND, fine to coarse (27% fine, 27% medium, 27% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 5% medium), sub-angular to well-rounded; wet, 2.5Y 4/3	
			18–20		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), sub-angular to sub-rounded; wet, 2.5Y 5/3	
			20–22		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), sub-rounded; wet, 2.5Y 4/3	Grout (neat cement) (0'-183' bgs)
		SW	22–26		SAND, fine to coarse (25% fine, 25% medium, 25% coarse), sub-rounded, well graded, with gravel, fine (25%), sub-rounded; wet, 2.5Y 4/3, 15% of gravel in seams	4" LC Steel Casing (0'-185' bgs)
			26–28		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), sub-rounded; wet, 2.5Y 4/3	
			28–29		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 5% medium), sub-rounded; moist, 2.5Y 4/3	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW6A [847058]	
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS							SHEET 3 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 210 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 890.464 FT AMSL			WATER LEVEL	9'				TIME 1520	TIME 1130
DATUM: NAD 83 UTM 15 (meters)			TIME	0800					
COMMENTS: Northing: 4980133.29 Easting: 509410.8			DATE	11-13-19				DATE 11-11-19	DATE 11-14-19
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–37		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 5% medium), sub-rounded; moist, 2.5Y 4/3 SAND, fine to coarse (27% fine, 27% medium, 27% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 9% medium), sub-angular to sub-rounded; moist, 2.5Y 4/3	Grout (neat cement) (0'-183' bgs) 4" LC Steel Casing (0'-185' bgs)
		SP	37–40		SAND, fine, well-rounded, poorly graded; dry to moist, 10YR 5/3, iron staining @ 39.5' bgs	
		SW	40–44		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded, well graded; moist, 10YR 5/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 4 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46		SAND, fine to medium (50% fine, 50% medium), sub-rounded, poorly graded; moist, 10YR 5/3	
			47		SAND, fine, well-rounded, poorly graded; dry, 10YR 5/4	
			48		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded, well graded; moist, 10YR 5/3	
			49		SAND, fine to coarse (45% fine, 45% medium, 10% coarse), sub-rounded, well graded; moist, 10YR 5/3	
			50		SAND, fine to coarse (33% fine, 33% medium, 33% coarse), sub-rounded, well graded; moist to wet, 10YR 5/3	Grout (neat cement) (0'-183' bgs)
		SW	51			
			52		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), sub-rounded; moist to wet, 10YR 5/3	
			53		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-rounded, well graded, with gravel, fine (10%), well-rounded; moist to wet, 10YR 4/3	
			54			
		SP	55		SAND, fine, well-rounded, poorly graded; moist, 10YR 5/3	4" LC Steel Casing (0'-185' bgs)
			56		SAND, fine to coarse (32% fine, 32% medium 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), well-rounded; moist to wet, 10YR 4/3	
		SW	57			
		SP	58		SAND, fine to medium (50% fine, 50% medium), sub-rounded, poorly graded; moist, 10YR 5/4	
		SW	59		SAND, fine to coarse (32% fine, 32% medium 32% coarse), sub-rounded, well graded, trace gravel, fine (4%), well-rounded; moist to wet, 10YR 4/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 5 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	61–64		SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-rounded, well graded; wet, 10YR 5/4	
			65		SAND, fine to coarse (5% fine, 60% medium, 30% coarse), sub-rounded, poorly graded, trace gravel, medium (5%), sub-angular; 10YR 5/2	Grout (neat cement) (0'-183' bgs)
		SP	66–69		SAND, fine, sub-rounded to well-rounded, poorly graded; wet, 10YR 5/2	
			70–72		SAND, fine to medium (70% fine, 30% medium), sub-angular to sub-rounded, poorly graded; wet, 10YR 4/3	4" LC Steel Casing (0'-185' bgs)
			73–74		SAND, fine to coarse (40% fine, 50% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, fine (5%), well-rounded; wet, 10YR 4/3	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 6 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	76–79		SAND, fine to coarse (40% fine, 50% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, fine (5%), well-rounded; wet, 10YR 4/3	
		SW	79–80		SAND, fine to coarse (20% fine, 40% medium, 30% coarse), sub-angular to sub-rounded, well graded, with gravel, fine (10%), well-rounded; wet, 10YR 4/3	
		SW	80–87		SAND, fine to coarse (30% fine, 60% medium, 10% coarse), sub-rounded, well graded; wet, 10YR 5/2	Grout (neat cement) (0'-183' bgs) 4" LC Steel Casing (0'-185' bgs)
		SP	87		SAND, fine to medium (95% fine, 5% medium), sub-rounded, poorly graded; wet, 10YR 5/2	
		SW	88–89		SAND, fine to coarse (30% fine, 60% medium, 10% coarse), sub-rounded, well graded; wet, 10YR 5/2	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW6A [847058]	
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS							SHEET 7 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 210 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 890.464 FT AMSL			WATER LEVEL	9'				TIME 1520	TIME 1130
DATUM: NAD 83 UTM 15 (meters)			TIME	0800					
COMMENTS: Northing: 4980133.29 Easting: 509410.8			DATE	11-13-19				DATE 11-11-19	DATE 11-14-19
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	91–97		SAND, fine to coarse (20% fine, 40% medium, 30% coarse), sub-angular to sub-rounded, well graded, trace gravel, fine (5%), well-rounded; 10YR 4/2	Grout (neat cement) (0'-183' bgs)
		SP	97–98		SAND, fine, sub-rounded to well-rounded, poorly graded; 10YR 4/2	
			98–99		SAND, medium to coarse (50% medium, 50% coarse), sub-rounded, poorly graded; 10YR 4/2	
		SW	99–100		SAND, fine to coarse (20% fine, 50% medium, 15% coarse), sub-angular to sub-rounded, well graded, with gravel, medium to coarse (10% medium, 5% coarse), sub-angular to sub-rounded; 10YR 4/2	4" LC Steel Casing (0'-185' bgs)
		SW	100–103		SAND, fine to coarse (45% fine, 35% medium, 10% coarse), sub-angular to sub-rounded, well graded, trace gravel, medium (5%), sub-angular to sub-rounded, trace cobbles (5%); wet, 10YR 4/2	
		SP	103–104		SAND, fine to medium (50% fine, 50% medium), sub-angular to sub-rounded, poorly graded; wet, 10YR 4/2	
		GP			GRAVEL, fine to medium (55% fine, 35% medium),	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 8 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 109' bgs	GP	106–109		angular to sub-angular, poorly graded, with sand, coarse (9%) sub-angular to sub-rounded, trace cobbles (1%); 10YR 3/1	
		Ops	110		DOLOSTONE, competent, massive, fine grained dolomitic precipitate, oolitic texture (5-15%); 10YR 4/2	Grout (neat cement) (0'-183' bgs)
			111–119		SANDY DOLOSTONE, competent, fine to medium sub-rounded sand (20%), chert (5-10%), angular, trace reworked clasts (5%), trace micrite bands (5%), trace glauconite (2%); 2.5Y 7/2	4" LC Steel Casing (0'-185' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 9 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, competent, oolitic texture (20%), vugs (15%), with sand, fine (5-10%), well-rounded, trace glauconite (2%); 10YR 5/3	
			122		DOLOSTONE, competent, oolitic texture (20%), vugs (10%), trace sand, fine (5%), well-rounded; 10YR 5/3	
			123			
			124			
		Ops	125			Grout (neat cement) (0'-183' bgs)
			126			
			127		DOLOSTONE, moderately competent, iron oxidation (20-30%), vugs (20%), oolitic texture (15%), trace fine sand (5%); 10YR 5/4, quartz (20%) @ 130' bgs	
			128			
			129			
	Oneota Fm. @ 130' bgs		130		DOLOSTONE, moderately competent, iron oxidation (20-30%), vugs (20%), oolitic texture (15%); 10YR 5/4	4" LC Steel Casing (0'-185' bgs)
			131		DOLOSTONE, competent, vugs (10%), oolitic texture (5-10%), trace iron oxidation (5%); 10YR6/3, trace micrite layers 133-136' bgs	
		Opo	132			
			133			
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 10 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	136		DOLOSTONE, competent, vugs (10%), oolitic texture (5-10%), trace iron oxidation (5%); 10YR6/3, trace micrite layers 133-136' bgs	
			137		DOLOSTONE, competent, bedding visible, vugs (10%), trace dendritic manganese staining (2%), trace glauconite (1%); 10YR 7/4	
			138			
			139			
			140		DOLOSTONE, competent, fine grained dolomitic precipitate (10-50%); 2.5Y 7/2	Grout (neat cement) (0'-183' bgs)
			141			
			142			
			143			
			144			
		Opo	145		DOLOSTONE, competent, fine grained dolomitic precipitate (10-50%), trace oolitic texture (5%); 2.5Y 7/3	4" LC Steel Casing (0'-185' bgs)
			146			
			147			
			148			
			149			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 11 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	151		DOLOSTONE, competent, fine grained dolomitic precipitate, oolitic texture (15-20%), vugs (10-15%), trace dendritic manganese staining (1%); 2.5Y 6/3	
			155		DOLOSTONE, competent, dendritic manganese staining (5-10%), trace oolitic texture (5%); 2.5Y 7/4	Grout (neat cement) (0'-183' bgs)
			160		DOLOSTONE, competent, trace dendritic manganese staining (5%), trace small (1mm) vugs (5%); 2.5Y 7/2	4" LC Steel Casing (0'-185' bgs)
			163		DOLOSTONE, moderately competent, dendritic manganese staining (10%), trace small (1mm) vugs (5%); 2.5Y 7/2	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 12 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		DOLOSTONE, moderately competent, trace dendritic manganese staining (5%), trace small (1mm) vugs (5%); 2.5Y 7/2	
			167		SANDY DOLOSTONE, moderately competent, platy, medium sand (10-30%), oolitic texture (15%); 2.5Y 7/2	
			168			
			169			
			170		DOLOSTONE, comepetent, trace oolitic texture (5%), trace vugs (5%); 2.5Y 6/3	Grout (neat cement) (0'-183' bgs)
			171		DOLOSTONE, competent, bedded, dolomitic precipitate (15-20%), vugs (20%), oolitic texture (15-20%); 2.5Y 6/3	
		Opo	172			
			173			
			174			
			175		DOLOSTONE, competent, dendritic manganese staining (5-10%), trace oolitic texture (5%), trace iron banding (5%); 2.5Y 6/4	4" LC Steel Casing (0'-185' bgs)
			176			
			177			
			178			
	Coon Valley @ 179' bgs		179		DOLOSTONE, not competent, clay and silt (40%), with sand (5-10%); 10YR 5/8	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW6A [847058]
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS		SHEET 13 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 890.464 FT AMSL	WATER LEVEL: 9'		TIME: 1520 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 0800		
COMMENTS: Northing: 4980133.29 Easting: 509410.8	DATE: 11-13-19		DATE: 11-11-19 / 11-14-19
	CASING DEPTH:		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 182' bgs	Opo	181		SANDY DOLOSTONE, weathered, 10-30 mm angular to sub-angular fragments, fine sand (15%), iron banding (5-10%), trace silt/clay (5%); 2.5Y 6/6	Grout (neat cement) (0'-183' bgs)
			182		QUARTZ ARENITE, fine to coarse (5% fine, 75% medium, 20% coarse), well-rounded; 2.5Y 7/1	4" LC Steel Casing (0'-185' bgs)
			183			
			184		QUARTZ ARENITE, fine to coarse (10% fine, 65% medium, 5% coarse), well-rounded, with silt (15%), trace clay (5%); 2.5Y 7/1	1.5' pellet seal on top of 0.5' pea rock (183'-185' bgs)
			185		QUARTZ ARENITE, fine to coarse (10% fine, 20% medium, 70% coarse), well-rounded; 2.5Y 7/1	
			186			
			187			Telescoping Screen (185'-192' bgs)
		Cj	188			
			189			
			190		QUARTZ ARENITE, fine to coarse (5% fine, 80% medium, 15% coarse), well-rounded; 10YR 7/1	
			191			
			192			
			193			
			194			7" Open Hole (192'-210' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW6A [847058]	
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS							SHEET 14 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 210 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 890.464 FT AMSL			WATER LEVEL	9'				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	0800				1520	1130
COMMENTS: Northing: 4980133.29 Easting: 509410.8			DATE	11-13-19				DATE 11-11-19	DATE 11-14-19
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	196–199		QUARTZ ARENITE, fine to coarse (5% fine, 90% medium, 5% coarse), well-rounded; 10YR 7/1	
		Cj	200–202		QUARTZ ARENITE, medium to coarse (50% medium, 45% coarse), well-rounded, trace silt (5%); 5Y 8/1	
		Cj	203–206		QUARTZ ARENITE, fine to medium (30% fine, 70% medium), well-rounded; 5Y 8/1	7" Open Hole (192'-210' bgs)
		Cj	207–208		QUARTZ ARENITE, medium to coarse (40% medium, 60% coarse), well-rounded; 5Y 8/1	
		Cj	209		QUARTZ ARENITE, fine to medium (20% fine, 70% medium), well-rounded, silt (10%); 5Y 8/1	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW6A [847058]	
LOGGED BY: AEL/MGD	CHECKED BY: AEL/AS							SHEET 15 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 210 FT BGS									
GROUND SURFACE ELEVATION: 890.464 FT AMSL			WATER LEVEL	9'				TIME 1520	TIME 1130
DATUM: NAD 83 UTM 15 (meters)			TIME	0800					
COMMENTS: Northing: 4980133.29 Easting: 509410.8			DATE	11-13-19				DATE 11-11-19	DATE 11-14-19
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					E.O.B. @ 210' bgs, No Refusal	

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ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 1 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	1		TOPSOIL, silt (85%), medium sand (15%); wet, 5YR 3/1	
		SW	2		SAND, fine to coarse (10% fine, 30% medium, 45% coarse), sub-angular to sub-rounded, well graded, with gravel, fine (10%), sub-angular, trace clay (5%); dry, 10YR 4/3	
		SM	4		SILTY SAND, fine, subrounded, poorly graded, silt (20%), trace clay (5%); dry, 7.5YR 3/2	
		SW	5		SAND, fine to coarse (15% fine, 65% medium, 10% coarse), sub-angular to sub-rounded, well graded, with clay (8%), trace gravel, coarse (2%), angular; dry to moist, 7.5YR 4/2	Grout (neat cement) (0'-138' bgs)
DISCRETE	MW6B-SOIL 6-7		7			
DISCRETE	MW6B-SOIL 8.5-10		9			
			10			4" LC Steel Casing (0'-140' bgs)
COMPOSITE	MW6B-SOIL 10-13	GP	11		GRAVEL, medium, sub-angular to sub-rounded, poorly graded, with sand, coarse (30%), angular to sub-angular, trace cobbles (5%), sub-angular to sub-rounded, trace clay 5%; wet, 7.5YR 3/2	
GRAB	MW6B-GW 11-13		12			
		GW	13		GRAVEL, fine to coarse (50% fine, 20% medium, 10% coarse), sub-angular, well graded, with sand, coarse (15%), sub-angular to sub-rounded, trace clay (5%); wet, 10YR 3/4	
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 2 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
GROUND SURFACE ELEVATION: 890.534 FT AMSL			TIME	0840	1000	1345	0800		
DATUM: NAD 83 UTM 15 (meters)			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
COMMENTS: Northing: 4980132.12 Easting: 509412.93			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
		GW	16		GRAVEL, fine to coarse (50% fine, 20% medium, 10% coarse), sub-angular, well graded, with sand, coarse (15%), sub-angular to sub-rounded, trace clay (5%); wet, 10YR 3/4	
		SW	17		SAND, fine to coarse (19% fine, 40% medium, 40% coarse), sub-angular to sub-rounded, well graded, trace cobbles (1%), sub-angular; moist to wet, 10YR 3/4	
		GW	18		GRAVEL, fine to coarse (60% fine, 20% medium, 10% coarse), angular to well-rounded, well graded, with sand, medium to coarse (5% medium, 5% coarse), sub-angular to sub-rounded; wet, 10YR 3/4	
			19		SAND, coarse, sub-rounded, poorly graded sand, with gravel, fine to medium (30% fine, 5% medium), sub-angular; wet, 10YR 3/4	
			20		SAND, fine to coarse (5% fine, 10% medium, 80% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, coarse (5%), sub-angular to sub-rounded; moist, 7.5Y 5/4	Grout (neat cement) (0'-138' bgs)
		SP	21			
			22			
			23			
			24			
			25		GRAVEL, medium to coarse (60% medium, 5% coarse), sub-angular, poorly graded, with sand, fine to coarse (5% fine, 10% medium, 20% coarse), sub-angular; moist, 10YR 3/2	4" LC Steel Casing (0'-140' bgs)
		GP	26			
			27		SAND, fine to coarse (5% fine, 10% medium, 75% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 2% medium, 3% coarse), sub-rounded; moist, 10YR 3/2, gravel lense @ 28-28.5' bgs	
		SP	28			
			29		SAND, fine to coarse (10% fine, 5% medium, 60% coarse), sub-rounded, poorly graded, with clay (10%), with silt (10%), trace gravel, medium (5%), sub-rounded; moist, 10YR 4/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 3 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
			31		SAND, fine to coarse (5% fine, 30% medium, 60% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, medium (5%), angular; moist, 10YR 4/2	
			32			
		SP	33			
			34			
			35			Grout (neat cement) (0'-138' bgs)
GRAB	MW6B-GW 36-40		36		SAND, fine to medium (30% fine, 60% medium), sub-rounded to well-rounded, poorly graded, with silt (8%), trace gravel, fine (2%); moist, 10YR 5/2	
DISCRETE	MW6B-SOIL 37-38	GP	37		GRAVEL, fine to medium (75% fine, 10% medium), angular to sub-angular, poorly graded, with sand, medium to coarse (5% medium, 10% coarse), sub-rounded to well-rounded; moist, 10YR 4/2	
		SP	38		SAND, fine to medium (30% fine, 60% medium), sub-rounded to well-rounded, poorly graded, with silt (8%), trace gravel, fine (2%); moist, 10YR 5/2	
DISCRETE	MW6B-SOIL 38-39	GP	39		GRAVEL, fine to medium (75% fine, 10% medium), angular to sub-angular, poorly graded, with sand, medium to coarse (5% medium, 10% coarse), sub-rounded to well-rounded; moist, 10YR 4/2	
COMPOSITE	MW6B-SOIL 36-40	SP	40			4" LC Steel Casing (0'-140' bgs)
			41		SAND, fine to coarse, (50% fine, 40% medium, 5% coarse), sub-rounded to well-rounded, poorly graded, trace silt (5%); moist, 10YR 5/2	
			42		SAND, fine to medium (45% fine, 45% medium), sub-rounded to well-rounded, poorly graded, with silt (10%); moist, 10YR 5/2	
		SW	43		SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-angular to sub-rounded, well graded; moist, 10YR 5/3	
			44		SAND, fine to coarse (10% fine, 60% medium, 30% coarse), sub-angular to sub-rounded, well graded; moist, 10YR 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 4 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW6B-SOIL 46-47	SW	46		SAND, fine to coarse (10% fine, 60% medium, 30% coarse), sub-angular to sub-rounded, well graded; moist, 10YR 5/2	
		SM	47		SILTY SAND, fine, sub-rounded to rounded, poorly graded, silt (30%); dry to moist, 10YR 5/4	
		SW	48		SAND, fine to coarse (10% fine, 30% medium, 45% coarse), sub-angular to sub-rounded, well graded, with gravel, fine (10%), sub-angular, trace clay (5%); dry, 10YR 4/3	
		SM	49		SILTY SAND, fine to medium (35% medium, 50% fine), well-rounded, poorly graded, silt (15%); dry to moist, 10YR 5/4	
		SW	50		SAND, fine to coarse (10% fine, 45% medium, 45% coarse), sub-angular to well-rounded, well graded; moist, 10YR 5/2	Grout (neat cement) (0'-138' bgs)
			51			
			52			
			53			
		SP	54		SAND, fine to coarse (5% fine, 35% medium, 60% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 4/3	
			55			4" LC Steel Casing (0'-140' bgs)
			56			
			57			
		CL	58		CLAY, low plasticity, soft, silt (40%); dry to moist, 10YR 5/3	
		SW	59		SAND, fine to coarse (10% fine, 30% medium, 60% coarse), angular to sub-rounded, well graded; moist, 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 5 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	61–64		SAND, fine to coarse (10% fine, 30% medium, 55% coarse), sub-angular to sub-rounded, well graded, trace gravel (5%), medium, sub-angular; moist, 10YR 4/4	
		SW	64–65		SAND, fine to coarse (10% fine, 40% medium, 40% coarse), angular to sub-rounded, well graded; dry to moist, 10YR 4/3	Grout (neat cement) (0'-138' bgs)
		SP	66–68		SAND, medium to coarse (20% medium, 70% coarse), sub-rounded to well-rounded, poorly graded, with gravel, medium (10%), sub-angular to sub-rounded; dry to moist, 10YR 4/3	
		SP	68–70		SAND, fine to medium (35% fine, 60% medium), sub-rounded, poorly graded, trace silt (5%); dry, 10YR 5/3	
		SP	70–74		SAND, fine to medium (35% fine, 60% medium), sub-rounded, poorly graded, trace silt (5%); wet, 10YR 5/3	4" LC Steel Casing (0'-140' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 6 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SAND, fine to medium (25% fine, 75% medium), sub-rounded, poorly graded; moist, 10YR 6/2	
			77			
			78			
			79			
			80		SAND, medium to coarse (35% medium, 60% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, medium (5%), sub-angular to sub-rounded; moist, 10YR 5/2	Grout (neat cement) (0'-138' bgs)
		SP	81			
			82			
COMPOSITE	MW6B-SOIL 81-85		83			
			84		SAND, medium to coarse (45% medium, 55% coarse), sub-rounded, poorly graded; moist, 10YR 5/2	
GRAB	MW6B-GW 81-85		85		SAND, fine to coarse (5% fine, 55% medium, 40% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 4/2	4" LC Steel Casing (0'-140' bgs)
			86		SAND, fine to coarse (5% fine, 70% medium, 25% coarse), sub-angular to well-rounded, poorly graded; moist, 10YR 5/2	
			87			
			88		CLAY, low plasticity, soft, silt (40%); dry to moist, 10YR 5/3	
		CL				
		SW	89		SAND, fine to coarse (10% fine, 60% medium, 30% coarse), sub-angular to well-rounded, well graded; moist, 10YR 4/2	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 7 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SAND, fine to coarse (5% fine, 30% medium, 60% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, medium (5%), sub-rounded; moist, 10YR 4/1	
			92			
			93			
			94			
		SP	95		SAND, medium to coarse (25% medium, 60% coarse), sub-angular to sub-rounded, poorly graded, with gravel, medium (15%), sub-angular; moist, 10YR 4/1	Grout (neat cement) (0'-138' bgs)
			96			
			97		SAND, fine to coarse (5% fine, 30% medium, 58% coarse), sub-angular to sub-rounded, poorly graded, with gravel, medium to coarse (5% medium, 2% coarse), angular to sub-angular; moist, 10YR 4/1	
			98			
			99		SAND, fine to medium (65% fine, 25% medium), sub-rounded, poorly graded, with silt (10%); dry to moist, 10YR 4/2	
			100		SAND, fine to coarse (10% fine, 60% medium, 30% coarse), sub-angular to sub-rounded, well graded; dry to moist, 10YR 4/2	4" LC Steel Casing (0'-140' bgs)
		SW	101			
			102			
			103		SAND, medium to coarse (40% medium, 40% coarse), sub-angular, poorly graded, with gravel, fine (20%), sub-angular; moist, 10YR 4/2	
		SP	104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 8 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL		WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)		TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93		DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
		CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
COMPOSITE	MW6B-SOIL 106-110	SP	106–108		SAND, fine to medium (45% fine, 50% medium), sub-rounded, poorly graded, trace gravel, medium (5%), sub-angular; moist, 10YR 5/2 SAND, medium to coarse (30% medium, 50% coarse), sub-angular to well-rounded, poorly graded, with gravel, medium (20%), angular; moist, 10YR 4/2	
GRAB	MW6B-GW 106-110	GP	109		GRAVEL, medium to coarse (30% medium, 35% coarse), sub-angular, poorly graded, with sand, medium to coarse (10% medium, 25% coarse), sub-rounded; moist, 10YR 4/2	
		Ops	110		DOLOSTONE, not competent, very weathered; 10YR 4/2	Grout (neat cement) (0'-138' bgs)
		SP	111–113		SAND, medium to coarse (20% medium, 70% coarse), sub-rounded, poorly graded, with gravel, fine (10%), sub-rounded; wet, 10YR 3/2	
		GP	113–117		GRAVEL, fine, sub-angular to sub-rounded, poorly graded, with sand, medium to coarse (5% medium, 15% coarse), sub-angular to sub-rounded; moist, 10YR 3/2 GRAVEL, fine to medium (80% fine, 10% medium), angular to sub-rounded, poorly graded, with sand, coarse (10%), sub-angular; moist, 10YR 4/2	4" LC Steel Casing (0'-140' bgs)
			119		GRAVEL, fine to coarse (15% fine, 5% medium, 70% coarse), angular to sub-rounded, poorly graded, with silt (10%); wet, 10YR 3/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 9 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
		GP	121		GRAVEL, fine to coarse (15% fine, 5% medium, 70% coarse), angular to sub-rounded, poorly graded, with silt (10%); wet, 10YR 3/2	
			122		SAND, medium to coarse (15% medium, 65% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine (20%), sub-angular; moist, 10YR 4/2, low recovery (5/10 ft in bag from 120-130')	
		SP	123			
			124			
			125			Grout (neat cement) (0'-138' bgs)
			126			
			127			
			128		GRAVEL, fine to coarse (15% fine, 20% medium, 55% coarse), angular to sub-rounded, well graded, trace sand, coarse (5%), trace silt (5%); wet, 10YR 4/2	
COMPOSITE	MW6B-SOIL 129-133	GW	129			
			130			4" LC Steel Casing (0'-140' bgs)
			131			
	Oneota Fm. @ 132.6' bgs		132			
		Ops	133		DOLOSTONE, not competent, weathered, medium plasticity carbonate clay (30%), iron banding (15-20%), trace dolomitic precipitate (5%), trace oolitic texture (5%); 2.5Y 6/4	
			134		DOLOSTONE, moderately competent, fine grained dolomitic precipitate, oolitic texture (15%), trace vugs (5%), trace iron banding (2%); 2.5Y 6/4	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW6B [847059]	
LOGGED BY: AS/AEL	CHECKED BY: AEL/AS						SHEET 10 OF 10	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 150 FT BGS								
GROUND SURFACE ELEVATION: 890.534 FT AMSL			WATER LEVEL	10.1'	10.1'	13'	10.3'	TIME 0830	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	0840	1000	1345	0800		
COMMENTS: Northing: 4980132.12 Easting: 509412.93			DATE	11-19-19	11-19-19	11-19-19	11-20-19	DATE 11-19-19	DATE 11-21-19
			CASING DEPTH	13'	40'	85'	110'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass/Mud MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW6B-GW 136-140	Ops	136		DOLOSTONE, moderately competent, visible bedding, fine grained dolomitic precipitate, vugs (10-15%), iron banding (10%), trace oolitic texture (5%); 2.5Y 6/3	
			137			
			138			1' of fine sand or pellets (138'-139' bgs)
			139		DOLOSTONE, moderately competent, fine grained dolomitic precipitate, trace vugs (5%), trace dendritic manganese staining (2%); 2.5Y 6/2	Sand filter pack (139'-150' bgs)
			140		DOLOSTONE, moderately competent, fine to medium grained dolomitic precipitate, sparry, trace iron staining (2%); 2.5Y 6/2	
			141			
			142		DOLOSTONE, moderately competent, nonuniform oolitic texture (15%), trace vugs (5%); 2.5Y 6/2	
			143		DOLOSTONE, moderately competent, fine grained dolomitic precipitate, oolitic texture (5-10%), trace 0.25-0.50 mm iron bands (5%), trace vugs (2%); 2.5Y 6/3	
			144			
			145		DOLOSTONE, moderately competent, fine grained dolomitic precipitate, trace vugs (5%), trace non-uniform iron staining (5%), trace oolitic texture (5%); 2.5Y 6/2	Screened interval (0.010" slot) (140'-150' bgs)
			146			
			147			
			148			
			149		E.O.B. @ 150' bgs, no refusal	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW6C [833403]
LOGGED BY: CK/MS	CHECKED BY: JM		SHEET 1 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START: 1040 FINISH: 1215
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 890.710 FT AMSL		WATER LEVEL / TIME / DATE / CASING DEPTH	TIME / DATE
DATUM: NAD 83 UTM 15 (meters)			11-16-20
COMMENTS: Northing: 4980131.764 Easting: 509409.647			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–5		SILTY SAND, fine to medium (fine 60%, medium 10%), sub-rounded, silt (20%), with clay (10%); dry to moist, 7.5R 6/6.	
		SW	5–10		SAND, fine to coarse (fine 40%, medium 10%, coarse 30%), sub-rounded, well graded, with gravel (fine 10%), with silt (10%); moist, 7.5R 5/6 and 7.5YR 5/2.	Grout (neat cement) (0'-30' bgs)
		SW	10–12		SAND, fine to coarse (fine 10%, medium 20%, coarse 40%), sub-rounded, well graded, with gravel (fine 5%, medium 5%, coarse 10%), sub-rounded to sub-angular, with silt (10%); moist to wet, 7.5R 5/6 and 7.5YR 5/2.	2" Black Iron Casing (0'-35' bgs)
		SM	12–14		SILTY SAND, fine to medium (fine 55%, medium 10%), sub-rounded, poorly graded, silt (25%), with gravel (fine 10%), sub-rounded, low recovery; saturated, 7.5R 6/6 and 7.5YR 5.2.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW6C [833403]
LOGGED BY: CK/MS	CHECKED BY: JM		SHEET 2 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 890.710 FT AMSL	WATER LEVEL		TIME 1040 / TIME 1215
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980131.764 Easting: 509409.647	DATE		DATE 11-16-20 / DATE 11-16-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–29		SAND, fine to coarse (fine 10%, medium 10%, coarse 60%), sub-rounded, well graded, with gravel (fine 15%, medium 5%), sub-angular; saturated, 7.5YR 6/3.	Grout (neat cement) (0'-30' bgs)
			25–29		SAND, fine to coarse (fine 20%, medium 35%, coarse 40%), sub-rounded, well graded, trace gravel (fine 5%); moist, 7.5YR 6/3.	2" Black Iron Casing (0'-35' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW6C [833403]
LOGGED BY: CK/MS	CHECKED BY: JM		SHEET 3 OF 3
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad	EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners	DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 890.710 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1040 / 1215
COMMENTS: Northing: 4980131.764 Easting: 509409.647	DATE		DATE / DATE
	CASING DEPTH		11-16-20 / 11-16-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–40		SAND, fine to coarse (fine 50%, medium 20%, coarse 20%), sub-rounded, well graded, trace gravel (fine 5%), sub-rounded, trace clay (5%); moist, 7.5YR 6/3.	3/8" Bentonite Chips (30'-33' bgs) 2" Black Iron Casing (0'-35' bgs) Sand filter pack (33'-40' bgs) 2" PVC Screen (35'-40' bgs)
			40		E.O.B. @40' bgs, no refusal	
			41–44			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW6D [833404]
LOGGED BY: AL / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad / EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 18 FT BGS			
GROUND SURFACE ELEVATION: 890.730 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 0930
COMMENTS: Northing: 4980130.455 Easting: 509411.719	DATE		DATE / DATE
	CASING DEPTH		11-17-20 / 11-17-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		TOPSOIL	0		TOPSOIL, with silt, with organics; dry to moist, 10YR 2/1.	
		CL	1		CLAY, medium stiffness, low plasticity; dry to moist, 10YR 3/3.	Grout (neat cement) (0'-3' bgs)
		SW	2		SAND, fine to coarse (fine 20%, medium 40%, coarse 30%), sub-rounded, well graded, with gravel (fine 10%), sub-angular to sub-rounded; moist, 10YR 4/6.	
			3			
			4		SAND, fine to coarse (fine 60%, medium 15%, coarse 15%), sub-rounded, well graded, with gravel (fine 10%), sub-rounded; dry, 10YR 3/4.	3/8" Bentonite Chips (3'-6' bgs)
			5		SAND, fine to coarse (fine 20%, medium 40%, coarse 30%), sub-rounded, well graded, with gravel (fine 10%), sub-angular to sub-rounded; moist, 10YR 4/6.	
			6		SAND, fine to coarse (fine 45%, medium 30%, coarse 15%), sub-rounded, well graded, with gravel (fine 10%), sub-rounded; dry, 10YR 5/4.	
			7			
			8			2" PVC Casing (0'-8' bgs)
			9			
			10		SAND, fine to coarse (fine 10%, medium 30%, coarse 50%), sub-rounded, well graded, with gravel (fine 10%), sub-rounded; wet, 10YR 5/6.	
			11		GRAVEL, fine to medium (fine 50%, medium 25%), sub-angular to sub-rounded, well graded, with sand (fine 5%, medium 10%, coarse 10%), sub-rounded; wet, 10YR 4/6.	Sand filter pack (6'-18' bgs)
			12			
			13			2" PVC Screen (8'-18' bgs)
			14			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW6D [833404]
LOGGED BY: AL / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad / EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 18 FT BGS			
GROUND SURFACE ELEVATION: 890.730 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 0930
COMMENTS: Northing: 4980130.455 Easting: 509411.719	DATE		DATE / DATE
	CASING DEPTH		11-17-20 / 11-17-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		GW	16–17		GRAVEL, fine to medium (fine 50%, medium 25%), sub-angular to sub-rounded, well graded, with sand (fine 5%, medium 10%, coarse 10%), sub-rounded; wet, 10YR 4/6.	2" PVC Screen (8'-18' bgs); Sand filter pack (6'-18' bgs)
			18		E.O.B. @18' bgs, no refusal	
			19–29			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 1 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	0–1		SAND, fine to coarse (25% fine, 25% medium, 25% coarse), sub-rounded, well graded, with organics (25%); moist, 10YR 4/3	
		CL	1–2		GRAVELLY CLAY, medium plasticity, stiff, gravel, fine to medium (15% fine, 15% medium), sub-rounded, with sand, medium (15%), sub-angular, trace organics (5%); moist, 10YR 4/4	
		SP	2–4		SAND, medium to coarse (62% medium, 13% coarse), sub-angular, poorly graded, with gravel, medium to coarse, sub-angular (25%); moist, 10YR 5/3	
		SP	4–7		SAND, medium to coarse (75% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, fine to coarse (5%); moist, 10YR 5/3	Grout (neat cement) (0'-198' bgs)
		SW	7–9		SAND, fine to coarse (20% fine, 20% medium, 40% coarse), sub-rounded, well graded, with gravel, fine to medium (20%); moist, 10YR 4/3	
		SP	9–10		SAND, medium to coarse (70% medium, 25% coarse), sub-rounded, poorly graded, trace gravel, fine (5%); moist, 10YR 5/3	
		SP	10–12		SAND, medium to coarse (40% medium, 45% coarse), sub-rounded, poorly graded, gravel, fine (10%), trace clay (5%); moist, 10YR 4/3	4" LC Steel Casing (0'-200' bgs)
DISCRETE	MW7A-SOIL 12-14	SP	12–13		SAND, coarse (80%), sub-angular to sub-rounded, poorly graded, with gravel, fine to medium (15% fine, 3% medium), trace cobbles (2%); moist, 10YR 5/3	
DISCRETE	MW7A-SOIL 12-14					
GRAB	MW7A-GW 12-16					
		SP	13–14		SAND, coarse (89%), sub-angular to sub-rounded, poorly graded, gravel, fine (10%), trace silt (1%); moist, 10YR 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL — CHECKED BY: AS			SHEET 2 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SAND, coarse (89%), sub-angular to sub-rounded, poorly graded, gravel, fine (10%), trace silt (1%); moist, 10YR 5/2	
			17			
			18		SAND, medium to coarse (50% medium, 45% coarse), sub-angular, poorly graded, trace gravel, fine (5%); moist, 10YR 5/3	
		SP	19			
			20		SAND, medium to coarse (50% medium, 33% coarse), sub-angular, poorly graded, with gravel, fine (15%), trace silt (2%); moist to wet, 10YR 4/3	Grout (neat cement) (0'-198' bgs)
			21			
			22		SAND, medium to coarse (25% medium, 45% coarse), sub-angular to sub-rounded, poorly graded, with gravel, fine to coarse (15% fine, 5% medium, 10% coarse), sub-angular to sub-rounded; moist, 10YR 4/2	
			23			
		SW	24		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-angular, well graded, trace gravel, fine to medium (4%); moist, 10YR 4/2	
			25			4" LC Steel Casing (0'-200' bgs)
			26		SAND, fine to medium (25% fine, 75% medium), sub-rounded, poorly graded; moist, 10YR 5/2	
COMP	MW7A-SOIL 26-30		27		SAND, medium to coarse (65% medium, 30% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, fine (5%); moist, 10YR 4/3	
GRAB	MW7A-GW 26-30	SP	28			
			29		SAND, coarse (85%), sub-angular, poorly graded, with gravel, fine (10-15%), sub-angular; moist, 10YR 5/2	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL — CHECKED BY: AS			SHEET 3 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	31–33		SAND, medium to coarse (30% medium, 55% coarse), sub-angular, poorly graded, gravel, fine (10%), trace clay (5%); moist, 10YR 4/2, clay lense @ 31' bgs	
		SP	33–36		SAND, medium to coarse (75% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, medium (5%); moist, 10YR 4/2	Grout (neat cement) (0'-198' bgs)
		SP	36–37		SAND, medium to coarse (35% medium, 55% coarse), sub-angular, poorly graded, gravel, fine to medium (5% fine, 5% medium); moist, 10YR 4/2	
		SP	37		SAND, fine (95%), sub-rounded to well-rounded, poorly graded, trace clay (5%); dry, 10YR 4/1	
		GW	37–39		GRAVEL, fine to coarse (20% fine, 20% medium, 40% coarse), angular to sub-rounded, well graded, with sand, coarse (20%); moist, 10YR 4/1	
		SC	39–40		CLAYEY SAND, medium (75%), sub-rounded, clay (25%); wet, 10YR 4/3	
		SP	40–42		SAND, medium (100%), sub-rounded, poorly graded; moist, 10YR 4/2	4" LC Steel Casing (0'-200' bgs)
		GP	42		GRAVEL, fine to medium (90% fine, 10% medium), sub-angular to sub-rounded, poorly graded; moist, 10YR 3/2	
		SP	42–43		SAND, fine to medium (20% fine, 65% medium), sub-rounded, poorly graded, with clay (10%), trace gravel, medium (5%); moist to wet, 10YR 4/1	
		SP	43–44		SAND, medium to coarse (45% medium, 45% coarse), sub-rounded, poorly graded, with clay (5-10%), trace gravel, fine (5%); moist, 10YR 4/2, two-1" clay rich layers @ 44' and 47' bgs	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW7A [848622]	
LOGGED BY: AS/AEL	CHECKED BY: AS			SHEET 4 OF 15	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 220 FT BGS					
GROUND SURFACE ELEVATION: 885.023 FT AMSL		WATER LEVEL		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1045	1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38		DATE		DATE	DATE
		CASING DEPTH		05-26-20	05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP GRAB	MW7A-SOIL 46-50 MW7A-GW 46-50 +DUP+MS/MSD	SP	46		SAND, medium to coarse (45% medium, 45% coarse), sub-rounded, poorly graded, with clay (5-10%), trace gravel, fine (5%); moist, 10YR 4/2, two-1" clay rich layers @ 44' and 47' bgs	
		CL	47 48 49		SANDY CLAY, low plasticity, soft to medium, sand, fine to medium (40%); moist, 10YR 4/1, 2" sand rich layer @ 48' bgs, wet @ 47' bgs	
		SW	50 51		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-rounded, well graded, trace silt (5-10%); wet, 10YR 4/1, potentially sluff	Grout (neat cement) (0'-198' bgs)
		SP	52 53 54		SAND, medium to coarse (44% medium, 44% coarse), sub-rounded, poorly graded, gravel, fine to coarse (5% fine, 5% medium, 2% coarse); moist, 10YR 4/1	
		CL	55		SANDY CLAY, low plasticity, soft, sand, medium to coarse (40%); moist, 10YR 4/1	4" LC Steel Casing (0'-200' bgs)
		SC	56 57		CLAYEY SAND, medium to coarse (40% medium, 40% coarse), sub-rounded, clay, medium plasticity, soft (20%); dry, 10YR 4/1, 2" clay layer observed	
		SP	58 59		SAND, medium (90%), sub-rounded, poorly graded, with clay, soft, low plasticity (5-10%); dry, 10YR 4/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 5 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME 1045 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE 05-26-20 / DATE 05-28-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					No Recovery Drillers: All sand from 60-77' bgs	
GRAB	MW7A-GW 73-77		61 62 63 64 65 66 67 68 69 70 71 72 73 74			Grout (neat cement) (0'-198' bgs) 4" LC Steel Casing (0'-200' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL — CHECKED BY: AS			SHEET 6 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		No Recovery Drillers: All sand from 60-77' bgs	
	Shakopee Fm. @ 77' bgs		77		DOLOSTONE, very competent, coarse dolomitic precipitate (60%), trace 2-4mm vugs (5%), trace glauconite (2%); 10YR 7/1, beginning of Shakopee	
			78		DOLOSTONE, not competent, sand, fine (10%), massive iron staining (5-10%), trace manganese staining (3%); 10YR 6/2	
			79			
			80		DOLOSTONE, not competent, massive faint iron staining (10%), trace dolomitic precipitate (5%); 10YR 6/2, clay observed	Grout (neat cement) (0'-198' bgs)
			81			
			82			
		Ops	83			
			84		DOLOSTONE, not competent, sand, medium (10%), trace small (<1mm) vugs (5%), trace patchy iron staining (5%); 10YR 6/1	
GRAB	MW7A-GW 86-90		85			4" LC Steel Casing (0'-200' bgs)
			86			
			87		DOLOSTONE, competent, massive faint iron staining along fractures, trace 1-3mm vugs (5%), trace sand (2%); 10YR 7/2	
			88			
			89		DOLOSTONE, not competent, massive iron staining (75%), with sand, medium to coarse (15%), trace dolomitic precipitate (5%); 10YR 6/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 7 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	91		DOLOSTONE, not competent, trace sand, medium to coarse (5%), trace patchy iron staining (5%), trace dolomitic precipitate (5%); 10YR 6/3	
			92			
			93			
			94		DOLOSTONE, not competent, massive faint iron staining (>50%), medium to coarse dolomitic precipitate (5%); 10YR 6/4	
			95			Grout (neat cement) (0'-198' bgs)
			96		DOLOSTONE, not to moderately competent, trace fine to coarse dolomitic precipitate (5%), trace patchy dark red iron staining (3%), trace sand (4%); 10YR 5/4, clay observed	
			97			
			98		DOLOSTONE, not to moderately competent, sand, fine to medium (15%), small (1-2mm) vugs (5-10%), trace reworked clasts (5%), trace iron staining (2%); 10YR 6/3	
			99			
			100		DOLOSTONE, not competent, with sand, fine to medium (15%), dolomitic precipitate (10%), trace vugs (5%), trace reworked clasts (4%); 10YR 6/3, clay observed	4" LC Steel Casing (0'-200' bgs)
			101			
			102			
			103		DOLOSTONE, not to moderately competent, dark iron staining (20%), fine to coarse dolomitic precipitate (15%), trace chert (5%), trace vugs (2%); 10YR 6/4, clay observed	
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 8 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106		DOLOSTONE, not to moderately competent, dark iron staining (20%), fine to coarse dolomitic precipitate (15%), trace chert (5%), trace vugs (2%); 10YR 6/4, clay observed	
			107			
			108		DOLOSTONE, not to moderately competent, dark iron staining along fractures (30%), trace coarse dolomitic precipitate (5%), trace sand, medium (2%); 10YR 6/3	
			109			
			110		DOLOSTONE, moderately competent, massive dark iron staining (50%), trace sand, fine (5%), trace dolomitic precipitate and coarse calcite (2%); 10YR 5/3 to 7.5YR 3/3	Grout (neat cement) (0'-198' bgs)
			111			
			112			
			113		DOLOSTONE, competent, banded orange iron staining (40%), trace sand, medium (5%); 10YR 7/3	
			114			
			115		DOLOSTONE, very competent, massive faint iron staining (>50%), oolites (25%), trace small (<1mm) vugs (2%), trace dark iron staining (2%); 10YR 6/3	4" LC Steel Casing (0'-200' bgs)
			116			
			117		DOLOSTONE, very competent, massive iron staining (>50%), small (<1mm) vugs (20%), dolomitic precipitate (10%), trace sand (5%), trace oolites (3%); 10YR 5/3 to 10YR 7/3	
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 9 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, not to moderately competent, massive faint iron staining (>50%), trace oolites (3%); 10YR7/2, clay observed	
			122			
			123			
			124		DOLOSTONE, not competent, massive iron staining (>50%), sand, medium to coarse (15%); 10YR 6/4, clay observed	
			125			Grout (neat cement) (0'-198' bgs)
			126		DOLOSTONE, moderately competent, trace oolites (3%), trace sand, fine (3%), trace glauconite on core fracture (1%); 10YR 5/3	
		Ops	127			
			128			
			129		DOLOSTONE, competent, oolites (20%), trace sand, coarse (5%); 10YR 6/4	
			130		DOLOSTONE, not competent, dolomitic precipitate (10%), trace vugs (5%), trace sand (1%); 10YR 6/2, trace small (3-4") fragments with medium sand (30%)	4" LC Steel Casing (0'-200' bgs)
			131			
			132			
	Oneota Fm. @ 133' bgs		133		DOLOSTONE, moderately competent, vugs (5-10%), trace dolomitic precipitate (5%); 10YR 6/2, beginning of Oneota	
		Opo	134			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 10 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	136		DOLOSTONE, very competent, oolitic texture (40%), small (<1mm) vugs (15%); 10YR 6/6 to 10YR 6/2, banding from drilling observed	
			137			
			138			
			139			
			140		DOLOSTONE, moderately competent, dolomitic precipitate (20-30%), vugs (5-10%); 10YR 6/6	Grout (neat cement) (0'-198' bgs)
			141		DOLOSTONE, not competent, blocky, fine to medium dolomitic precipitate (10%), trace iron staining along fractures (5%); 10YR 6/3	
			142			
			143			
			144		DOLOSTONE, competent, oolitic texture (40%), small (<1mm) vugs (10%), orange/gray banding; 10YR 6/4	
			145			4" LC Steel Casing (0'-200' bgs)
			146			
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 11 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW7A-GW 156-160	Opo	151		DOLOSTONE, moderately competent, oolitic texture (30-40%), vugs (20%); 10YR 6/4, banding from drilling observed	Grout (neat cement) (0'-198' bgs)
			152		DOLOSTONE, very competent, oolitic texture (30%), vugs (10%); 10YR 6/4	
			153			
			154			
			155			
			156			
			157			
			158			
			159		DOLOSTONE, very competent, oolitic texture (30%), vugs (10%); 10YR 6/6	4" LC Steel Casing (0'-200' bgs)
			160			
			161			
			162			
			163			
			164		DOLOSTONE, very competent, oolitic texture (30%), vugs (5%), trace manganese staining (1%); 10YR 7/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 12 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME 1045 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE 05-26-20 / DATE 05-28-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		DOLOSTONE, very competent, oolitic texture (30%), vugs (5%), trace manganese staining (1%); 10YR 7/2	
			167			
			168			
			169		DOLOSTONE, competent, oolitic texture (20%), coarse dolomitic precipitate (10%), trace small (<1mm) vugs (3%), trace manganese staining (3%); 10YR 7/2	
			170		DOLOSTONE, competent, oolitic texture (40%), vugs (10%); 10YR 6/3	Grout (neat cement) (0'-198' bgs)
			171			
		Opo	172		DOLOSTONE, moderately competent, oolitic texture (20%), dark iron staining (10%), trace glauconite (2%); 10YR 4/3	
			173		DOLOSTONE, not competent, fractures (10%), trace dark iron staining (5%); 10YR 7/2	
			174			
			175			4" LC Steel Casing (0'-200' bgs)
			176			
			177		DOLOSTONE, not competent, iron staining (50%), fractures (40%), stromatolites (20%); 10YR 5/4	
			178			
			179		DOLOSTONE, moderately competent, fractures (20%), iron staining (20%), trace vugs (5%); 10YR 6/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 13 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1045 / 1830
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE / DATE
	CASING DEPTH		05-26-20 / 05-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		DOLOSTONE, moderately competent, trace fractures (5%), trace stromatolites (5%), trace manganese staining (3%); 10YR 6/2	
			182		DOLOSTONE, not competent, very weathered, massive orange iron staining (100%), dark iron staining (15%); 10YR 6/8, clay observed	
			183		DOLOSTONE, not competent, trace dark iron staining (3%); 10YR 4/4 to 7.5YR 3/3, clay observed	
			184			
			185			Grout (neat cement) (0'-198' bgs)
			186			
		Opo	187			
			188			
			189		DOLOSTONE, competent, trace vugs (5%), trace oolitic texture (1%); 10YR 6/3	
	Coon Valley @ 190' bgs		190		SANDY DOLOSTONE, competent, medium sand (40%), well-rounded; 10YR 6/6	4" LC Steel Casing (0'-200' bgs)
			191			
			192		SANDSTONE, moderately cemented, fine to medium (50% fine, 50% medium), sub-rounded to well-rounded; 10YR 4/6	
			193		SANDSTONE, poorly to moderately cemented, medium (100%), sub-rounded to well-rounded; N/8.5	
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW7A [848622]	
LOGGED BY: AS/AEL	CHECKED BY: AS			SHEET 14 OF 15	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 220 FT BGS					
GROUND SURFACE ELEVATION: 885.023 FT AMSL		WATER LEVEL		TIME 1045	TIME 1830
DATUM: NAD 83 UTM 15 (meters)		TIME			
COMMENTS: Northing: 4979425.32 Easting: 511211.38		DATE		DATE 05-26-20	DATE 05-28-20
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 197' bgs	Opo	196		SANDSTONE, poorly to moderately cemented, medium (100%), sub-rounded to well-rounded; N/8.5	Grout (neat cement) (0'-196' bgs) 4" LC Steel Casing (0'-200' bgs)
			197		SANDY DOLOSTONE, not competent, medium sand (50%), well-rounded; 10YR 5/6	
			198		SANDSTONE, fine to medium (50% fine, 50% medium), well-rounded; 10YR 5/6 to 5Y 8/4	2' Fine Sand (196'-198' bgs)
			199			Sand filter pack (198'-210' bgs)
			200		SANDSTONE, fine to medium (10% fine, 90% medium), sub-rounded; 2.5Y 6/8	
			201			
			202			
			203			
		Cj	204		SANDSTONE, fine to medium (5% fine, 95% medium), sub-rounded, trace cemented sand; 10YR 4/6	
			205			Screened interval (0.010" slot) (200'-210' bgs)
			206		SANDSTONE, fine to coarse (10% fine, 70% medium, 20% coarse), sub-angular to sub-rounded; 2.5Y 6/6	
			207		SANDSTONE, fine to medium (5% fine, 95% medium), sub-angular to sub-rounded; 2.5Y 6/2 to N/8	
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW7A [848622]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 15 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 220 FT BGS			
GROUND SURFACE ELEVATION: 885.023 FT AMSL	WATER LEVEL		TIME 1045 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979425.32 Easting: 511211.38	DATE		DATE 05-26-20 / DATE 05-28-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SANDSTONE, fine to medium (25% fine, 75% medium), sub-rounded to well-rounded; 5Y 6/4	
			212		SANDSTONE, fine to coarse (10% fine, 85% medium, 5% coarse), well-rounded to sub-rounded; 5Y 7/3	
			213			
			214			
		Cj	215			Sluff Backfill (210'-220' bgs)
			216			
			217		SANDSTONE, fine to coarse (20% fine, 75% medium, 5% coarse), sub-rounded; 2.5Y 8/1	
			218			
			219			
			220		E.O.B. @ 220' bgs, no refusal	
			221			
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 1 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 80' bgs, well log abbreviated	
			2			
			3			
			4		Shakopee Dolostone 29'-127' bgs, per drillers	
			5			Grout (neat cement) (0'-198' bgs)
			6			
			7			
			8			
			9			
			10			4" LC Steel Casing (0'-202' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML	CHECKED BY: BK			SHEET 2 OF 15
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS				
GROUND SURFACE ELEVATION: 879.007 FT AMSL		WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)		TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943		DATE		DATE 08/15/22 / DATE 08/16/22
		CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		Blind drill to 80' bgs, well log abbreviated	Grout (neat cement) (0'-198' bgs)
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-202' bgs)
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 3 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0930 / 1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE / DATE
	CASING DEPTH		08/15/22 / 08/16/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		Blind drill to 80' bgs, well log abbreviated	Grout (neat cement) (0'-198' bgs)
			32			
			33			
			34			
			35			
			36			
			37			
			38			
			39			
			40			4" LC Steel Casing (0'-202' bgs)
			41			
			42			
			43			
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW8A [867654]	
LOGGED BY: GG/ML	CHECKED BY: BK							SHEET 4 OF 15	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 212 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 879.007 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					0930	1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943			DATE					DATE	DATE
			CASING DEPTH					08/15/22	08/16/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		Blind drill to 80' bgs, well log abbreviated	Grout (neat cement) (0'-198' bgs)
			47			
			48			
			49			
			50			
			51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-202' bgs)
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 5 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
			61		Blind drill to 80' bgs, well log abbreviated	Grout (neat cement) (0'-198' bgs)
			62			
			63			
			64			
			65			
			66			
			67			
			68			
			69			
			70			4" LC Steel Casing (0'-202' bgs)
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 6 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0930 / 1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE / DATE
	CASING DEPTH		08/15/22 / 08/16/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		Blind drill to 80' bgs, well log abbreviated	
			77			
			78			
			79			
			80		DOLOSTONE, low to moderately competent, sand (20%), chert veins and nodules (2%), vugs (2%); 2.5Y 6/4	Grout (neat cement) (0'-198' bgs)
			81			
			82			
			83			
			84		DOLOSTONE, not competent, highly weathered, interbedded shale, significant fracturing, fully oxidized, sand (5%); 10YR 6/8	
		Ops	85			4" LC Steel Casing (0'-202' bgs)
			86			
			87		DOLOSTONE, low competent; 2.5Y 7/8	
			88		DOLOSTONE, glauconite shale (50%), dendritic manganese (20%); GLEY1 7/10GY	
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 7 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		DOLOSTONE, low competent, sand (5%), dendritic manganese (5%), vugs (5%); 10YR 6/4	
			92			
			93			
			94		DOLOSTONE, low competent, glauconite nodules (15%), dendritic manganese (10%), vugs (5%), iron staining (5%), secondary deposition features (3%), quartz veins (1%); 10YR 6/3	
			95			Grout (neat cement) (0'-198' bgs)
			96			
			97		DOLOSTONE, low to moderately competent, sand (5%), dendritic manganese (5%), vugs (2%), iron staining (1%); 10YR 7/4	
		Ops	98			
			99			
			100		DOLOSTONE, low competent, sand (5%), vugs (5%), glauconite shale; 10YR 6/3	4" LC Steel Casing (0'-202' bgs)
			101		DOLOSTONE, moderately competent, carbonate precipitation (15%), sand (10%), vugs (10%), chert (5%), glauconite stain (5%), 1-2 mm glauconite interbeds (3%); 10YR 5/6	
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 8 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106–119		DOLOSTONE, very competent, carbonate precipitation (20%), sand (10%), vugs (10%), chert (10%), glauconite staining (3%); 10YR 6/5	Grout (neat cement) (0'-198' bgs) 4" LC Steel Casing (0'-202' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 9 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 127' bgs	Ops	121–126		DOLOSTONE, very competent, carbonate precipitation (20%), sand (10%), vugs (10%), chert (10%), glauconite staining (3%); 10YR 6/5	Grout (neat cement) (0'-198' bgs)
		Opo	127–134		DOLOSTONE, low to moderately competent, iron staining (60%), carbonate precipitation (20%), vugs (10%), dendritic manganese (1%), quartz nodules (1%), iron stained veining (1%); 10YR 6/6	4" LC Steel Casing (0'-202' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 10 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not to low competent, iron staining (20%), vugs (15%); 10YR 8/4	
			136		DOLOSTONE, competent, iron staining (50%), carbonate precipitation (10%), vugs (10%), iron stained veining (2%); 10YR 7/3	
			137			
			138		DOLOSTONE, not to low competent, iron stained chert veins and nodules (10%), carbonate precipitation (5%), vugs (5%); 10YR 5/2	
			139			
			140		DOLOSTONE, not to low competent, purple quartz (20%), vugs (5%), carbonate precipitation (5%), iron staining (2%); 10YR 7/1	Grout (neat cement) (0'-198' bgs)
			141			
			142		DOLOSTONE, not competent, iron staining (20%), carbonate precipitation (15%), vugs (1%), purple quartz (1%); 10YR 7/2	
		Opo	143			
			144			
			145		DOLOSTONE, not to low competent, iron staining (20%), carbonate precipitation (10%); 10YR 7/1	4" LC Steel Casing (0'-202' bgs)
			146		DOLOSTONE, not competent, interbedded purple and white quartz (55%), vugs (10%); 10YR 6/2	
			147		DOLOSTONE, not to low competent, white quartz (20%), iron staining (15%), carbonate precipitation (10%), vugs (5%); 10YR 7/4	
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 11 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		DOLOSTONE, not competent, oxidized carbonate precipitation (20%); 10YR 6/4	
			152		DOLOSTONE, not competent, silt (60%), oxidized iron staining (70%), carbonate precipitation (15%), vugs (5%); 10YR 7/3	
			153			
			154			
			155			Grout (neat cement) (0'-198' bgs)
			156			
			157		DOLOSTONE, low to moderately competent, oxidized iron staining (70%), vugs (5%), purple quartz (2%), dendritic manganese (1%); 10YR 6/3	
		Opo	158			
			159			
			160		DOLOSTONE, competent, vugs (5%), iron staining (5%), carbonate precipitation (5%), dendritic manganese (2%); 10YR 7/4	4" LC Steel Casing (0'-202' bgs)
			161			
			162			
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML — CHECKED BY: BK			SHEET 12 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0930 / 1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE / DATE
	CASING DEPTH		08/15/22 / 08/16/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	166		DOLOSTONE, competent, vugs (5%), iron staining (5%), carbonate precipitation (5%), dendritic manganese (2%); 10YR 7/4	
			167			
			168		DOLOSTONE, low to moderately competent, glauconite infilled voids (10%), carbonate precipitation (5%); 10YR 7/4	
			169			
			170		DOLOSTONE, competent, iron staining (40%), vugs (30%), carbonate precipitation (20%); 10YR 6/4	Grout (neat cement) (0'-198' bgs)
			171			
			172			
			173			
			174			
			175			4" LC Steel Casing (0'-202' bgs)
			176			
			177		SILTSTONE, chunks of dolostone, glauconite (2%); 10YR 4/6	
	Coon Valley Fm. @ 178' bgs		178		DOLOSTONE, not competent, iron staining, glauconite stain (5%), silt seam @ 183'	
		Opo	179			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML — CHECKED BY: BK			SHEET 13 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0930 / 1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE / DATE
	CASING DEPTH		08/15/22 / 08/16/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		DOLOSTONE, not competent, iron staining, glauconite stain (5%), silt seam @ 183'	
			182			
			183			
			184		DOLOSTONE, low to moderately competent, vugs (2%)	
		Opo	185			Grout (neat cement) (0'-198' bgs)
			186		DOLOSTONE, sand (30%), vugs (2%)	
			187			
			188		SANDSTONE, poorly to moderately cemented, dolostone cobbles (<1.5"), iron staining (15%)	
			189			
	Jordan Fm. @ 190' bgs				SANDSTONE, well cemented	
			190		SANDSTONE, moderately cemented, fine to medium (15% fine, 85% medium); 2.5Y 8.5/2	4" LC Steel Casing (0'-202' bgs)
			191			
			192			
		Cj	193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 14 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0930 / 1900
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE / DATE
	CASING DEPTH		08/15/22 / 08/16/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, well cemented, fine to medium (15% fine, 85% medium); 2.5Y 8.5/2	Grout (neat cement) (0'-198' bgs)
			196		SANDSTONE, moderately cemented, fine to medium (15% fine, 85% medium); 2.5Y 8.5/2	
			197			4" LC Steel Casing (0'-202' bgs)
			198			
			199		SANDSTONE, moderately cemented, fine to medium (10% fine, 90% medium), glauconite staining (5%); 10YR 9/2	2' Fine Sand (198'-200' bgs)
			200		Blind drill 200-215'	
			201			
		Cj	202			
			203			
			204			
			205			
			206			Sand filter pack (200'-212' bgs)
			207			Screened interval (0.010" slot) (202'-212' bgs)
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8A [867654]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 15 OF 15
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 212 FT BGS			
GROUND SURFACE ELEVATION: 879.007 FT AMSL	WATER LEVEL		TIME 0930 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979062.429 Easting: 512336.943	DATE		DATE 08/15/22 / DATE 08/16/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	211–214		Blind drill 200-215'	Sand filter pack (200'-212' bgs) Screened interval (0.010" slot) (202'-212' bgs) Backfill by natural collapse (212-215' bgs)
			215		E.O.B. @ 215' bgs, no refusal	
			216–224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW8B [867655]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 60 FT BGS			
GROUND SURFACE ELEVATION: 879.406 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0845 / 1600
COMMENTS: Northing: 4979063.188 Easting: 512339.519	DATE		DATE / DATE
	CASING DEPTH		08/18/22 / 08/18/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 60' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-46' bgs)
			3			
			4		Unconsolidated Material from 0'-27' bgs, per drillers	4" LC Steel Casing (0'-50' bgs)
			5			
			6			2' Fine Sand (46'-48' bgs)
			7		Shakopee Dolostone from 27'-60' bgs, per drillers	
			8			Sand filter pack (48'-60' bgs)
			9			
			10		E.O.B. @ 60' bgs, no refusal	
			11			
			12			
			13			Screened interval (0.010" slot) (50'-60' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 1 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 0830 FINISH: 0930
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE: 06-02-20 / DATE: 06-03-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW9A-SOIL 3-5	CL	1–3		SANDY CLAY, low plasticity, soft, sand, fine to medium (40%), sub-rounded, with organics (10%); moist, 10YR 3/2	
			3–5		CLAY, medium plasticity, soft, with sand, medium to coarse (15%), sub-rounded, trace gravel, medium (5%); moist, 10YR 5/2	
DISCRETE	MW9A-SOIL 5-7		5		CLAYEY SAND, fine to coarse (25% fine, 20% medium, 20% coarse), sub-angular, clay (30%), trace gravel, medium (5%); dry to moist, 10YR 5/4	Grout (neat cement) (0'-137' bgs)
GRAB	MW9A-GW 6-10	SC	6–7			
		SP	7–10		SAND, medium to coarse (60% medium, 20% coarse), sub-rounded, poorly graded, with clay (10%), gravel, fine to medium (7% fine, 3% medium); moist, 10YR 5/4	
			10–12		SAND, medium to coarse (60% medium, 32% coarse), sub-angular, poorly graded, trace clay (5%), trace gravel, fine (3%); moist, 10YR 5/4	4" LC Steel Casing (0'-140' bgs)
		CL	12		SANDY CLAY, low plasticity, soft, sand, fine (30%); dry to moist, 10YR 5/3	
		SP	13–14		SAND, medium to coarse (50% medium, 48% coarse), sub-angular, poorly graded, trace gravel, fine (2%); dry, 10YR 5/4	
			14		SAND, medium to coarse (30% medium, 70%	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 2 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 0830 FINISH: 0930
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE: 06-02-20 / DATE: 06-03-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16		coarse), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/3 SAND, medium to coarse (30% medium, 70% coarse), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/3	
COMP	MW9A-SOIL 16-20 +DUP+MS/MSD	SW	17		SAND, fine to coarse (32% fine, 32% medium, 32% coarse), sub-angular to sub-rounded, well graded, trace gravel, fine (4%); dry, 10YR 5/2, grades coarser towards 20' bgs	
GRAB	MW9A-GW 16-20		18			
			19			
		SM	20		SILTY SAND, fine to medium (60% fine, 20% medium), sub-rounded, silt (20%); moist, 10YR 5/6	Grout (neat cement) (0'-137' bgs)
			21			
			22			
		ML	23		SANDY SILT, low plasticity, soft, sand, fine (30%), sub-rounded, trace gravel, medium (3%); moist to wet, 10YR 5/6	
			24			
			25			4" LC Steel Casing (0'-140' bgs)
		CL-ML	26		SILTY CLAY, low plasticity, medium stiff, with sand, fine to coarse (20% fine, 5% coarse), silt (15%), trace gravel, fine to medium (4%); dry to moist, 10YR 5/4, stiff clay from 26'-26.5' bgs	
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 3 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE / DATE
	CASING DEPTH		06-02-20 / 06-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	31–34		CLAY, low plasticity, soft, with sand, fine (20%), well-rounded, trace gravel, coarse (5%); dry to moist, 2.5Y 5/6	
		SC	34–36		CLAYEY SAND, fine to medium (50% fine, 10% medium), well-rounded, clay (15%), with gravel, fine to medium (15%), sub-angular to sub-rounded; moist, 2.5Y 5/6	Grout (neat cement) (0'-137' bgs)
			36		CLAYEY SAND, fine to medium (40% fine, 10% medium), well-rounded, clay (15%), with gravel, fine to medium (25%), sub-angular to sub-rounded; moist to wet, 2.5Y 5/6	
			37–38		CLAY, low plasticity, stiff, with sand, fine (20%), well-rounded, gravel, fine to medium (20%), sub-angular, 2.5-4" cobbles (20%), sub-angular; moist, 2.5Y 5/6	
			38–40		CLAY, low plasticity, stiff, with gravel, fine to medium (15%), sub-angular to sub-rounded; moist, 2.5Y 5/6	
		CL	40–44		CLAY, medium plasticity, very stiff, with gravel, fine to coarse (20%), sub-rounded; dry, 10YR 5/1	4" LC Steel Casing (0'-140' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 4 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME: 0830 / 0930
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE: 06-02-20 / 06-03-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	46–50		CLAY, medium plasticity, very stiff, with gravel, fine to coarse (20%), sub-rounded; dry, 10YR 5/1	
		CH	50–59		CLAY, high plasticity, very stiff, trace sand, coarse (2%), trace gravel, fine (3%); dry, 10YR 5/1	Grout (neat cement) (0'-137' bgs) 4" LC Steel Casing (0'-140' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 5 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME 0830 / TIME 0930
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE 06-02-20 / DATE 06-03-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61–70		CLAY, high plasticity, very stiff, trace sand, medium to coarse (5%), trace gravel, fine to coarse (4%); dry, 10YR 4/1, expanding clay - high recovery	Grout (neat cement) (0'-137' bgs)
		CH	70–72		CLAY, high plasticity, very stiff, trace sand, mottled, medium to coarse (5%), trace gravel, fine to coarse (4%); dry, 10YR 5/8	4" LC Steel Casing (0'-140' bgs)
		ML	72–74		SILT, low plasticity, medium stiff, mottled (gray/orange streaks), clay (15%); dry to moist, 10YR 5/8	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL — CHECKED BY: AS			SHEET 6 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE / DATE
	CASING DEPTH		06-02-20 / 06-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	76–78		SILT, low plasticity, medium stiff, mottled (gray/orange streaks), clay (15%); dry to moist, 10YR 5/8	
		ML	78–80		SILT, low plasticity, medium stiff, mottled (gray/orange streaks), with sand, fine (15%), clay (15%); moist, 10YR 5/8	
		SP	80–84		SAND, fine (90%), sub-rounded, poorly graded, with silt (10%); moist, 10YR 5/6	Grout (neat cement) (0'-137' bgs)
		SM	84–88		SILTY SAND, fine (75%), sub-rounded, poorly graded, silt (25%); moist, 10YR 6/6	4" LC Steel Casing (0'-140' bgs)
		ML	88–89		SILT, low plasticity, soft, with sand, fine (20%), sub-rounded; moist, 10YR 6/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 7 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE / DATE
	CASING DEPTH		06-02-20 / 06-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SAND, fine to medium (80% fine, 15% medium), sub-angular to sub-rounded, poorly graded, trace silt (5%); moist, 10YR 5/6	
			92			
		SP	93			
			94		SAND, fine to medium (60% fine, 40% medium), sub-angular, poorly graded; dry, 7YR 4/4	
			95		SAND, fine to medium (45% fine, 45% medium), sub-angular, poorly graded, with silt (10%); moist, 5YR 5/8	Grout (neat cement) (0'-137' bgs)
COMP	MW9A-SOIL 96-100		96		GRAVEL, fine to coarse (40% fine, 9% medium, 1% coarse), sub-angular, poorly graded, with sand, fine to coarse (5% fine, 40% coarse), sub-rounded, trace silt (5%); moist, 5YR 5/8	
		GP	97			
GRAB	MW9A-GW 96-100		98			
			99		SAND, fine to coarse (5% fine, 5% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine (25%), sub-angular, trace silt (5%); moist, 5YR 5/8, 2" clay lense @ 103' bgs	
			100			4" LC Steel Casing (0'-140' bgs)
		SP	101			
			102			
			103		GRAVEL, fine to coarse (35% fine, 35% medium, 15% coarse), angular to sub-rounded, well graded, cobbles (10%), sub-angular to sub-rounded, trace sand, coarse (5%); moist to wet, 7.5YR 5/8	
		GW	104			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL	CHECKED BY: AS		SHEET 8 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 0930
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE / DATE
	CASING DEPTH		06-02-20 / 06-03-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		GW	106		GRAVEL, fine to coarse (35% fine, 35% medium, 15% coarse), angular to sub-rounded, well graded, cobbles (10%), sub-angular to sub-rounded, trace sand, coarse (5%); moist to wet, 7.5YR 5/8	Grout (neat cement) (0'-137' bgs)
			110		GRAVEL, fine to coarse (30% fine, 35% medium, 15% coarse), angular to sub-rounded, well graded, cobbles (15%), sub-angular to sub-rounded, trace sand, coarse (5%); moist to wet, 7.5YR 5/8	
			112		GRAVEL, fine to coarse (35% fine, 35% medium, 15% coarse), angular to sub-rounded, well graded, cobbles (10%), sub-angular to sub-rounded, trace sand, coarse (5%); moist to wet, 7.5YR 5/8	4" LC Steel Casing (0'-140' bgs)

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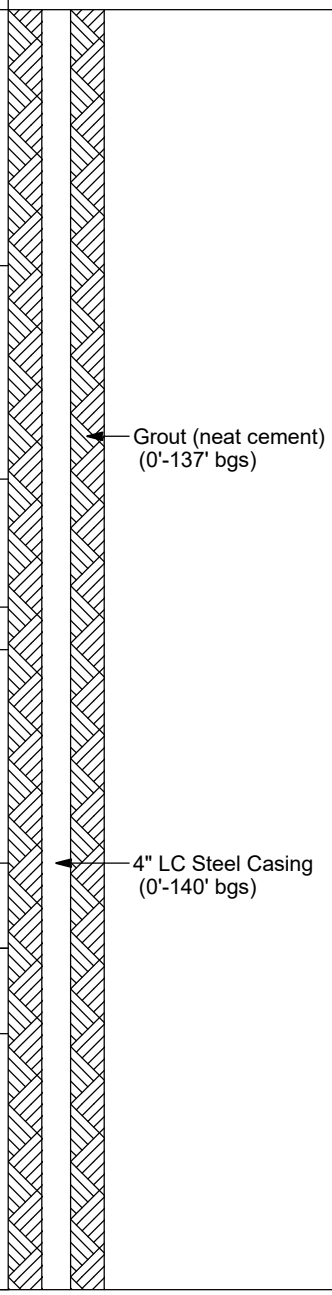
ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL — CHECKED BY: AS			SHEET 9 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen — EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME 0830 / TIME 0930
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE 06-02-20 / DATE 06-03-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	MATERIAL DESCRIPTION
			121	SAND, fine to coarse (10% fine, 40% medium, 10% coarse), sub-rounded, well graded, with gravel, fine to coarse (10% fine, 15% medium, 5% coarse), sub-angular, with clay (10%); moist, 10YR 4/3
		SW	122	
			123	SAND, fine to coarse (10% fine, 40% medium, 10% coarse), sub-rounded, well graded, with gravel, fine to coarse (10% fine, 10% medium, 5% coarse), sub-angular, trace clay (5%), trace cobbles (5%); moist, 10YR 4/3
			124	
			125	
			126	SAND, fine to medium (20% fine, 55% medium), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 10% medium, 5% coarse), sub-rounded, trace clay (5%); dry to moist, 10YR 4/3
			127	SAND, fine to coarse (20% fine, 70% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, trace gravel, fine to medium (5%); dry to moist, 10YR 5/4
COMP	MW9A-SOIL 127-131	SP	128	SAND, fine to medium (20% fine, 55% medium), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 10% medium, 5% coarse), sub-rounded, trace clay (5%); dry to moist, 10YR 5/3
			129	
			130	SAND, fine to medium (20% fine, 50% medium), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 10% medium, 5% coarse), sub-rounded, with clay (10%); dry to moist, 10YR 5/3
	Oneota @ 131' bgs		131	DOLOSTONE, very weathered, fine to coarse lithic fragments, sand, coarse (10%); 10YR 6/4, clay observed, beginning of Oneota
			132	DOLOSTONE, very weathered, fine to medium lithic fragments, sand, medium to coarse (30%); 10YR 6/6, clay observed
		Opo	133	
			134	

WELL DIAGRAM



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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9A [848624]
LOGGED BY: AS/AEL / CHECKED BY: AS			SHEET 10 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 870.054 FT AMSL	WATER LEVEL		TIME 0830 / TIME 0930
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4978389.197 Easting: 512443.1	DATE		DATE 06-02-20 / DATE 06-03-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		DOLOSTONE, very weathered, fine to medium lithic fragments, sand, medium to coarse (30%); 10YR 6/6, clay observed	Grout (neat cement) (0'-137' bgs) 4" LC Steel Casing (0'-140' bgs)
			137		DOLOSTONE, not competent, fine to medium dolomitic precipitate (30%), trace iron staining (5%); 10YR 6/3	
			138			2' Fine Sand (137'-139' bgs)
			139		DOLOSTONE, competent, dolomitic precipitate (15%), trace thinly banded iron staining (3%); 10YR 6/4	Sand filter pack (139'-150' bgs)
			140			
			141		DOLOSTONE, competent, dolomitic precipitate (10-15%), 1-15mm vugs (10%), trace iron staining along fractures (2%); 10YR 6/4	
			142			
		Opo	143		DOLOSTONE, not to moderately competent, dolomitic precipitate (15-20%), trace calcite nodules (5%), trace fractures (1%); 10YR 6/3	
			144			
			145			Screened interval (0.010" slot) (140'-150' bgs)
			146			
			147		DOLOSTONE, moderately competent, dolomitic precipitate (5-10%), iron staining along fractures (5-10%); 10YR 6/4	
			148			
			149			
					E.O.B. @ 150' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0–6		SANDY SILT, low plasticity, soft, with organics (roots, 15%), medium sand (20%), sub-rounded; moist, 10YR 6/3 to 10YR 5/2	
		ML	2–6		SILT, low to medium plasticity, medium to soft, with clay (25%), with fine sand (10%), mottled, trace organics (3%); dry, 10YR 5/3	
		ML	6–8		SANDY SILT, low plasticity, soft, sand, fine to coarse (30-40%), trace fine gravel (5%); dry, 10YR 5/4	
		SP-SC	8–10		SANDY CLAY, medium plasticity, soft to medium hard, sand, fine to medium (30%), sub-rounded; 10YR 5/4	
		SP	10–14		SAND, fine to coarse (15% fine, 70% medium, 5% coarse), sub-rounded to well-rounded, trace fine gravel (3%); moist, 10YR 5/3, grades slightly coarser towards 20' bgs	Grout (neat cement) (0'-86' bgs) 4" LC Steel Casing (0'-90' bgs)

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16–19		SAND, fine to coarse (15% fine, 70% medium, 5% coarse), sub-rounded to well-rounded, trace fine gravel (3%); moist, 10YR 5/3, grades slightly coarser towards 20' bgs	
		SP-SC	20		SANDY CLAY, medium plasticity, soft to medium, sand, fine to medium (30%), sub-rounded; 10YR 5/4	Grout (neat cement) (0'-86' bgs)
		SW-SM	21–22		SANDY SILT, low plasticity, soft, fine to coarse sand (35%), trace fine gravel (5%), trace angular cobbles (3%); dry to moist, 10YR 5/4, medium to coarse 3" sand lense at 21' bgs	
		ML	23–25		SANDY SILT, low plasticity, soft, fine sand (50%), trace medium gravel (5%); moist, 10YR 5/4, 1" sand lens @ 26" bgs	4" LC Steel Casing (0'-90' bgs)
		ML	26–29		SANDY SILT, low plasticity, medium soft, sand, fine to medium (30%), with clay (25%), sand, with gravel, medium to coarse (5-10%); 10YR 5/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31–39		SANDY SILT, low to medium plasticity, soft to medium stiff, sand, fine to medium (30%), with clay (25%), sand, with gravel, fine to medium (10%), trace cobbles/boulders (5%, at 31' and 39' bgs); 10YR 5/4, lens with 50% more sand between 38-39' bgs	Grout (neat cement) (0'-86' bgs)
		CH	40–44		CLAY, medium plasticity, stiff, with fine gravel (3%), with fine sand (10%); dry, 10YR 4/1 CLAY, high plasticity, very stiff, with gravel, fine to medium (10%), sub-angular, with fine sand (5-10%); dry, 10YR 4/1	4" LC Steel Casing (0'-90' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		CLAY, high plasticity, very stiff, with gravel, fine to medium (10%), sub-angular, with fine sand (5-10%); dry, 10YR 4/1	
			47			
			48			
			49			
			50		CLAY, high plasticity, very stiff, with gravel, fine to coarse (10%), sub-angular, with fine sand (5-10%); dry, 10YR 4/1	Grout (neat cement) (0'-86' bgs)
			51			
			52			
		CH	53			
			54			
			55			4" LC Steel Casing (0'-90' bgs)
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61–69		CLAY, high plasticity, very stiff, with gravel, fine to coarse (10%), sub-angular, with fine sand (5-10%); dry, 10YR 4/1	Grout (neat cement) (0'-86' bgs)
		ML	70–74		SILT, medium plasticity, very stiff, mottled; dry, 10YR 5/6 to 10YR 5/1 SILT, low plasticity, soft to medium stiff, mottled; dry, 10YR 5/4	4" LC Steel Casing (0'-90' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SP-SM	76–80		SILTY SAND, fine (85%), sub-rounded, silt (15%), trace mottling; dry to moist, 10YR 5/4	
		ML	80–87		SANDY SILT, low plasticity, soft, with fine sand (30%), with mottling (25%); moist, 10YR 5/6	Grout (neat cement) (0'-86' bgs); 4" LC Steel Casing (0'-90' bgs); 2' Fine Sand (86'-88' bgs)
		SP	87–89		SAND, fine (100%), sub-rounded, trace mottling; moist, 10YR 5/6	Sand filter pack (78'-90' bgs)

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW9B [854441]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 870.268 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1400
COMMENTS: Northing: 4978389.138 Easting: 512445.968	DATE		DATE / DATE
	CASING DEPTH		04/22/21 / 04/22/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	91–93		SAND, fine (95%), sub-rounded to well-rounded, poorly graded, massive mottling, trace silt (5%); moist, 10YR 5/6	
		SP	93–96		SAND, fine to coarse (80% fine, 5% medium, 5% coarse), sub-rounded, poorly graded, trace silt (5%), trace medium gravel (5%); moist, 10YR 5/6	Sand filter pack (78'-90' bgs); Screened interval (0.010" slot) (90'-100' bgs)
		SW	96–100		SAND, medium to coarse (30% medium, 45% coarse), with gravel, fine (10%) to coarse (5%), with silt (10%); moist, 10YR 4/6	
			100		E.O.B. @ 100' bgs, no refusal, screened 90-100'	
			101–104			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 1 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1–8		SANDY CLAY, low plasticity, soft, sand, fine to coarse (5% fine, 10% medium, 5% coarse), trace gravel (5%), trace organics (5%); wet, 10YR 3/4	Grout (neat cement) (0'-269' bgs)
		CL	2–8		SANDY CLAY, low plasticity, soft, gravel, fine to coarse (5% fine, 2% medium, 5% coarse), trace sand, medium (3%); moist, 10YR 3/4	
		SP	9		SAND, fine to medium (30% fine, 70% medium), sub-rounded, poorly graded, trace gravel, fine to medium (5%); dry, 10YR 5/6	
		SW	10–11		SAND, fine to coarse (35% fine, 35% medium, 10% coarse), well graded, with gravel, fine to medium (15%), trace silt (5%); moist, 10YR 4/6	4" LC Steel Casing (0'-273' bgs)
		SW	12–14		SAND, fine to coarse (20% fine, 50% medium, 10% coarse), well graded, with gravel, fine to coarse (10% fine, 3% medium, 7% coarse); dry, 10YR 4/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 2 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–20		SAND, fine to coarse (20% fine, 50% medium, 10% coarse), well graded, with gravel, fine to coarse (10% fine, 3% medium, 7% coarse); dry, 10YR 4/6	
		SW	17–20		SAND, fine to coarse (45% fine, 35% medium, 15% coarse), well graded, with gravel, fine to medium (10% fine, 5% medium); dry 10YR 5/6	
		SW	20–24		SAND, fine to coarse (10% fine, 45% medium, 15% coarse), sub-rounded, well graded, with gravel, fine to coarse (10% fine, 5% medium, 10% coarse), trace silt (5%); dry, 10YR 5/3	Grout (neat cement) (0'-269' bgs)
		SP	24–29		SAND, fine to medium (10% fine, 80% medium), well rounded, poorly graded, gravel, fine to coarse (1% fine, 4% medium, 5% coarse); dry 10YR 5/4	4" LC Steel Casing (0'-273' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 3 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–34		SAND, fine to coarse (50% fine, 33% medium, 10% coarse), well graded, trace silt (5%), trace gravel (2%); moist, 10YR 3/4	
		SW	34–35		SAND, fine to coarse (60% fine, 22% medium, 10% coarse), well graded, trace gravel, fine to medium (3% fine, 2% medium), trace silt (3%); moist, 10YR 3/4	Grout (neat cement) (0'-269' bgs)
		SW	35–39		SAND, fine to coarse (50% fine, 22% medium, 10% coarse), well graded, with gravel, fine to coarse (5% fine, 5% medium, 5%), trace silt (3%); moist, 10YR 3/4	
		SW	39–40		SAND, fine to coarse (40% fine, 33% medium, 10% coarse), well graded, with gravel, fine to coarse (7% fine, 7% medium, 3% coarse); dry, 10YR 3/6	
		GP	40–42		GRAVEL, medium to coarse (25% medium, 25% coarse), sub-angular to sub-rounded, poorly graded; wet from drill, assorted igneous rock, black to red to pink	4" LC Steel Casing (0'-273' bgs)
		SW	42–44		SAND, fine to coarse (25% fine, 35% medium, 25% coarse), sub-rounded, well graded, gravel, fine to coarse (2% fine, 3% medium, 5% coarse), trace silt (5%); moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 4 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: TIME 1230 / DATE 11/15/21 — FINISH: TIME 1430 / DATE 11/17/21
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL / TIME / DATE / CASING DEPTH		
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4983106.431 Easting: 507553.442			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46		SAND, fine to medium (67% fine, 30% medium), sub-rounded, poorly graded, trace gravel, fine to medium (3%); dry, 10YR 5/4	
			47		SAND, fine to coarse (50% fine, 10% medium, 10% coarse), sub-rounded, well graded, with silt, (15%), with gravel, fine to coarse (5% fine, 5% medium, 5% coarse); moist, 10YR 5/6, cobble @ 49' bgs	
			48			
			49			
			50			Grout (neat cement) (0'-269' bgs)
		SW	51			
			52			
			53		SAND, fine to coarse (20% fine, 57% medium, 20% coarse), sub-rounded, well graded, trace gravel, coarse (3%); dry, 10YR 4/4	
			54		SAND, fine to medium (65% fine, 20% medium), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 5% medium, 5% coarse); dry, 10YR 5/4, silty fine white layer @ 56.5'	
			55			4" LC Steel Casing (0'-273' bgs)
			56			
		SP	57		SAND, fine to medium (70% fine, 10% medium), sub-rounded to rounded, poorly graded, with silt, (15%), trace gravel, medium to coarse (5%); dry, 10YR 4/4	
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN						
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW10A [860296]		
LOGGED BY: AS/LL	CHECKED BY: BK							SHEET 5 OF 19		
DRILLING CONTR.: Traut										
DRILLER:	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING		
BORING DEPTH: 285 FT BGS								START	FINISH	
GROUND SURFACE ELEVATION: 970.135 FT AMSL			WATER LEVEL					TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME					1230	1430	
COMMENTS: Northing: 4983106.431 Easting: 507553.442			DATE					DATE	DATE	
			CASING DEPTH					11/15/21	11/17/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	61–66		SANDY SILT, low plasticity, silt (70%), sand (30%), gravel (8%); dry, 10YR 4/3	Grout (neat cement) (0'-269' bgs)
		SP	66–68		SAND, fine to coarse (49% fine, 35% medium, 5% coarse), poorly graded, gravel, fine to medium (3% fine, 3% medium), trace silt (5%); dry, 10YR 4/4	
		SP	68–70		SAND, fine to coarse (45% fine, 34% medium, 5% coarse), poorly graded, silt (10%), gravel, fine to coarse (2% fine, 2% medium, 2% coarse); moist, 10YR 5/6	
		SP	70–71		SAND, fine to medium (60% fine, 38% medium), poorly graded, trace gravel, fine (2%); moist, 10YR 5/3	4" LC Steel Casing (0'-273' bgs)
		SW	71–73		SAND, fine to coarse (58% fine, 38% medium, 10% coarse), well graded, trace gravel, fine to medium (2% fine, 2% medium); moist, 10YR 4/3	
		SP	73–74		SAND, fine to medium (80% fine, 20% medium), poorly graded; moist, 10YR 5/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 6 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: TIME 1230 / DATE 11/15/21 — FINISH: TIME 1430 / DATE 11/17/21
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL / TIME / DATE / CASING DEPTH		
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4983106.431 Easting: 507553.442			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	76		SILT, low plasticity, stiff, sand, fine (10%), trace gravel, fine (5%), trace mottling; dry, 10YR 4/6	
		SP	77		SAND, fine to coarse (40% fine, 15% medium, 5% coarse), poorly graded, with silt (20%), with gravel, fine to coarse (5% fine, 5% medium, 10% coarse); moist, 10YR 4/6	
			78		SAND, fine to medium (85% fine, 10% medium), well-rounded, poorly graded, trace gravel, fine to coarse (5%); moist, 7.5YR 5/4	
			79			
		SW	80		SAND, fine to coarse (55% fine, 30% medium, 10% coarse), well-rounded, well graded, trace fine gravel (5%); moist, 10YR 4/4	Grout (neat cement) (0'-269' bgs)
			81			
		CL	82		SANDY CLAY, low plasticity, sand (30% fine), trace gravel, fine to medium (5%), trace mottling (5%); moist, 10YR 4/4	
	St. Peter Fm. @ 84' bgs		83			
		Os	84		SANDSTONE, poorly cemented, fine (100%), well-rounded; moist, 5Y 7/1	
			85			4" LC Steel Casing (0'-273' bgs)
			86			
			87			
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 7 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine (80%), with silt (20%); moist, 5Y 8/1	
			92			
			93			
			94		SANDSTONE, poorly cemented, very fine (85%), with silt (15%); 5Y 7/2	
			95			Grout (neat cement) (0'-269' bgs)
			96			
			97			
		Os	98			
			99			
			100		SANDSTONE, moderately cemented, trace mottling (3%); 5Y 7/2, with siltstone layers, fine sand (10%) and silt (90%)	4" LC Steel Casing (0'-273' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 8 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 1230 DATE: 11/15/21
BORING DEPTH: 285 FT BGS			DRILLING FINISH: 1430 DATE: 11/17/21
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL / TIME / DATE / CASING DEPTH		
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4983106.431 Easting: 507553.442			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly cemented, fine (85%), with silt (15%), mottling (15%); 5Y 7/1	
			107			
			108			
			109			
			110		SANDSTONE, moderately cemented, coarse (100%), mottling (20%); 5Y 7/1 SANDSTONE, moderately to well cemented; 5Y 7/1	Grout (neat cement) (0'-269' bgs)
			111			
			112			
		Os	113		SANDSTONE, poorly cemented, fine to medium (5% fine, 90% medium), trace silt (5%); 10YR 6/6	
			114			
			115			4" LC Steel Casing (0'-273' bgs)
			116			
			117		SANDSTONE, moderately cemented, fine to medium (80% fine, 15% medium), well-rounded, trace silt (5%); 10YR 5/6	
			118			
			119		SANDSTONE, poorly to moderately cemented, fine to coarse (65% fine, 10% medium, 15% coarse), silt (10%); 5Y 7/1, shale weathered into stiff clay @ bottom 6", orange, green and brown mottling, platy	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 9 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 122' bgs	Os	121		SANDSTONE, poorly to moderately cemented, fine to coarse (65% fine, 10% medium, 15% coarse), silt (10%); 5Y 7/1, shale weathered into stiff clay @ bottom 6", orange, green and brown mottling, platy	
			122		DOLOSTONE, not competent to moderately competent, with sand (10%), iron staining (25%), precipitate (15%), oolitic texture (10%), trace manganse staining (5%), trace small vugs (5%), trace fractures (2%); 10YR 5/2	
			123			
			124			
			125			Grout (neat cement) (0'-269' bgs)
			126		DOLOSTONE, not competent, trace sand (5%), trace small vugs (5%); 10YR 6/3	
			127			
		Ops	128			
			129		DOLOSTONE, not competent to competent, with sand (10-15%), precipitate (10%), trace vugs (4%), trace fractures (3%); 10YR 6/3	
			130		DOLOSTONE, not competent to competent, with sand (25%), shale (10%), dolomitic precipitate (10%), trace iron staining (5%), trace vugs (3%), trace manganses staining (2%), trace fractures (2%); 10YR 6/3 to 10YR 5/3	4" LC Steel Casing (0'-273' bgs)
			131			
			132			
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 10 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	136		DOLOSTONE, competent, bedding observed, sand (10%), trace vugs (5%), trace dolomitic precipitate (2%); 10YR 7/3	
			137			
			138		DOLOSTONE, not competent to competent, sand (10%), shale (10%), iron staining (30%), dendritic and faint manganese staining (10%); 10YR 7/4	
			139			
			140		DOLOSTONE, not competent to moderately competent, manganese staining (10%), iron staining (10-5%), trace sand (3%), trace shale (3%), trace fractures (3%); 10YR 4/4	Grout (neat cement) (0'-269' bgs)
			141			
			142			
			143			
			144		DOLOSTONE, not competent to competent, intermittent shale (10-20%), sand (10%), iron staining (15%), dolomitic precipitate (10%), trace vugs (2%); 10YR 5/2	
			145			4" LC Steel Casing (0'-273' bgs)
			146			
			147			
			148		DOLOSTONE, moderately competent to competent, sand (10%), iron staining (15%), manganese staining (10%), small vugs (10%); 10YR 6/6	
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 11 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	151		DOLOSTONE, moderately competent to competent, bedding observed, dolomitic precipitate (10%), trace vugs (5%), trace shale (2%), trace thin fractures (2%), trace quartz or calcite (1%); 10YR 5/4	
			152		DOLOSTONE, not competent to competent, bedding observed, trace vugs (5%), trace dolomitic precipitate (5%), trace iron staining (3%), trace manganese staining (3%); 10YR 4/6	
			154		DOLOSTONE, not competent to very competent, bedding observed, iron staining along bedding (15%), dolomitic precipitate (15%), trace sand (3%), trace vugs (2%), trace manganese staining (1%); 10YR 6/3	Grout (neat cement) (0'-269' bgs)
			158		DOLOSTONE, not competent to moderately competent, iron staining (15%), trace sand (5%), trace precipitate (5%), trace manganese staining (1%); 10YR 5/4	
			159		DOLOSTONE, moderately competent to competent, bedding observed, trace vugs (5%), trace thin fractures (3%), trace iron staining (2%), trace manganese staining in fractures (2%), trace dolomitic precipitate (2%), trace glauconite (1%); 10YR 6/3	4" LC Steel Casing (0'-273' bgs)
			161		DOLOSTONE, competent to very competent, vugs (15%), dolomitic precipitate (15%), iron staining (10%), trace thin fractures (5%), trace faint dendritic manganese staining (5%); 10YR 7/3	
			164		DOLOSTONE, not competent to competent, dolomitic precipitate (20%), iron staining and banding (15%), vugs (10%), trace thin fractures	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 12 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					along bedding (5%); 10YR 6/2	
			166		DOLOSTONE, not competent to competent, dolomitic precipitate (20%), iron staining and banding (15%), vugs (10%), trace thin fractures along bedding (5%); 10YR 6/2	
			167		DOLOSTONE, not competent to competent, iron staining (10%), trace vugs (3%), trace dendritic and spotty manganese staining (3%), trace sand (2%), trace thin fractures (1%); 10YR 6/2	
			168			
			169			
			170		DOLOSTONE, not competent to moderately competent, iron staining (20-15%), trace sand (5%), trace manganese staining (5%), trace vugs (3%); 10YR 7/3	Grout (neat cement) (0'-269' bgs)
			171			
		Opo	172			
			173			
			174			
			175		DOLOSTONE, not competent to moderately competent, iron staining (25%), dolomitic precipitate (25-15%), trace manganese staining (3%), trace thin fractures (2%); 10YR 6/2	4" LC Steel Casing (0'-273' bgs)
			176			
			177			
			178		DOLOSTONE, not competent to moderately competent, dolomitic precipitate (10%), trace iron staining (5%), trace fractures (5%), trace sand (3%), trace manganese staining (2%); 10YR 6/2	
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 13 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	181		DOLOSTONE, moderately competent to competent, sand (10%), trace vugs (2%); 10YR 5/4	
			182			
			183		DOLOSTONE, not competent to competent, iron staining (25%), dolomitic precipitate (10%), sand (10-5%), trace manganese staining (3%), trace thin fractures (3%), trace chert (1%); 10YR 5/2 to 10YR 6/3, shales lens approx. 1" @183' bgs	
			184			
			185			Grout (neat cement) (0'-269' bgs)
			186			
			187			
			188			
			189			
			190		DOLOSTONE, moderately competent, small rip-up clasts (20%), trace iron staining (3%), trace sand (1%); 10YR 6/3	4" LC Steel Casing (0'-273' bgs)
			191		SHALE, well compacted, sand (10-5%), trace iron staining (5%), trace manganese staining (1%); GLEY1 6/5GY	
			192			
			193		DOLOSTONE, competent, trace iron staining (5%), trace oolitic texture (5%), trace glauconitic staining (3%); 10YR 6/4	
			194			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 14 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	196		DOLOSTONE, competent, trace iron staining (5%), trace oolitic texture (5%), trace glauconitic staining (3%); 10YR 6/4	
			197		DOLOSTONE, moderately competent to competent, oolitic texture (15%), dolomitic precipitate (15%), rip-up clasts (10%), trace iron staining (5%), trace vugs (3%); 10YR 7/4	
			198			
			199			
			200		DOLOSTONE, competent, bedding observed, faint iron staining (15%), dolomitic precipitate (10%), sand (10%), vugs (10%); 10YR 6/3	Grout (neat cement) (0'-269' bgs)
			201		SHALE, well compacted, bedding observed, sand (10%), iron staining (10%), trace manganese staining (3%); GLEY1 6/1DY	
			202			
			203		DOLOSTONE, not competent to competent, bedding observed, sand (15%), iron staining (15%), vugs (10%), trace glauconite (5%), trace manganese staining (5%), trace thin fractures (3%); 10YR 6/4	
			204			
			205			4" LC Steel Casing (0'-273' bgs)
			206		DOLOSTONE, not competent to competent, sand (15%), vugs (10%), trace iron staining (5%), trace glauconite (5%), trace thin fractures (2%); 10YR 5/2, begins to look rubbly at 210' bgs	
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 15 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		DOLOSTONE, not competent to competent, iron staining (10%), trace sand (3%); 10YR 6/2 to 10YR 7/4, rubbly texture	
	Oneota Fm. @ 214' bgs	Opo	212			
			213			
			214		DOLOSTONE, very competent, vugs (15-10%), trace dolomitic precipitate (5%); 10YR 7/2	
			215			Grout (neat cement) (0'-269' bgs)
			216		DOLOSTONE, not competent to competent, vugs (20-15%), trace iron staining along fracture surfaces (5%); 10YR 7/2, quartz/calcite nodule @ 219' bgs, clay observed @ 220' bgs	
			217			
			218			
			219			
			220		DOLOSTONE, not competent, dolomitic precipitate (25%), trace vugs (5%); 10YR 6/3	4" LC Steel Casing (0'-273' bgs)
			221		DOLOSTONE, not competent to competent, bedding observed, vugs (15%), trace dolomitic precipitate (5%), trace thin fractures (2%); 10YR 6/1	
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 16 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		DOLOSTONE, not competent to competent, bedding observed, vugs (15%), trace dolomitic precipitate (5%), trace thin fractures (2%); 10YR 6/1	
			227		DOLOSTONE, not competent to competent, vugs (10%), trace quartz/calcite nodule (5%), trace dolomitic precipitate (3%); 10YR 6/8	
			228			
			229		DOLOSTONE, not competent to competent, vugs (15%), trace dolomitic precipitate (5%); 10YR 6/2 to 10YR 6/6, bioturbation	
			230		DOLOSTONE, moderately competent to competent, bedding observed, manganese staining (25%), trace dolomitic precipitate (5%), trace vugs (5%), trace faint iron staining (1%); 2.5Y 7/3	Grout (neat cement) (0'-269' bgs)
		Opo	231			
			232			
			233			
			234		DOLOSTONE, competent, trace dolomitic precipitate (5%), trace manganese/iron staining (5%), trace vugs (3%), trace fractures (2%); 2.5Y 7/2	
			235			4" LC Steel Casing (0'-273' bgs)
			236			
			237			
GRAB	MW10A-GW 236-240		238			
			239		DOLOSTONE, not competent to competent, vugs (20-15%), dolomitic precipitate (15%); 2.5Y 6/3, orange/gray rubbly texture	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 17 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, not competent to moderately competent, vugs (20-15%), dolomitic precipitate (15%); 2.5Y 6/3, orange/gray rubbly texture	
			242		DOLOSTONE, competent, dolomitic precipitate (10-5%), trace quartz/calcite nodule (5%), trace vugs (3%), trace manganese staining (3%); 2.5Y 7/2	
			243			
			244			
			245			Grout (neat cement) (0'-269' bgs)
			246			
			247		DOLOSTONE, not competent to moderately competent, bedding observed, trace manganese staining (2%); 2.5Y 6/2	
		Opo	248			
			249		DOLOSTONE, not competent to competent, dolomitic precipitate (15%), trace vugs (3%), fractures (1%); 10YR 7/2 to 10YR 7/4	
			250		DOLOSTONE, not competent to moderately competent, bedding fractures, iron staining (20%), trace dolomitic precipitate (5%); 10YR 6/4	4" LC Steel Casing (0'-273' bgs)
			251			
			252		DOLOSTONE, not competent to moderately competent, vugs (15-10%), dolomitic precipitate (10%), trace thinly bedded iron staining (4%), trace fractures (3%), trace quartz/calcite nodule (3%); 10YR 6/6	
			253			
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 18 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 1230 FINISH: 1430
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE: 11/15/21 DATE: 11/17/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			256		DOLOSTONE, moderately competent to competent, bedding observed, vugs (15-10%), dolomitic precipitate (10%), trace glauconitic staining (2%), trace manganese staining along fractures (1%); 10YR 7/6	
			257			
		Opo	258			
			259		DOLOSTONE, moderately competent to competent, iron staining (10%), trace dolomitic precipitate (5%); 10YR 7/1 to 10YR 4/6, bedding fractures, platy	
			260		DOLOSTONE, moderately competent to competent, bedding observed, sand (20%), trace iron staining (5%), trace manganese staining (2%); 7.5YR 5/6	Grout (neat cement) (0'-269' bgs)
			261		SANDSTONE, poorly to well cemented, medium to coarse (50% medium, 50% coarse), well-rounded, massive iron staining; 7.5YR 6/8	
	Jordan Fm. @ 263' bgs		262			
			263		SANDSTONE, poorly to well cemented, medium to coarse (95% medium, 5% coarse), well-rounded; 2.5Y 7/1, two 1" iron bands @ 263.5 bgs	
			264			
		Cj	265		SANDSTONE, poorly cemented, fine to medium (10% fine, 90% medium), well-rounded, iron staining (25%); 2.5Y 7/2	4" LC Steel Casing (0'-273' bgs)
			266			
			267		SANDSTONE, poorly to trace well cemented, medium (100%), well-rounded; 2.5Y 8/1	
			268			
			269			2' Fine Sand (269'-271' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10A [860296]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 19 OF 19
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 285 FT BGS			
GROUND SURFACE ELEVATION: 970.135 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1430
COMMENTS: Northing: 4983106.431 Easting: 507553.442	DATE		DATE / DATE
	CASING DEPTH		11/15/21 / 11/17/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	271		SANDSTONE, poorly cemented, fine to medium (10% fine, 90% medium), well-rounded; WHT 8/N to 10YR 8/1	2' Fine Sand (269'-271' bgs)
			272			
			273			Sand filter pack (271'-283' bgs)
			274			
			275			
			276			
			277			
			278			Screened interval (0.010" slot) (273'-283' bgs)
			279		SANDSTONE, poorly cemented to trace well cemented, fine to medium (20% fine, 75% medium), trace silt (5%), trace iron staining (2%); 10YR 8/1	
			280		No recovery from 280-285'	
			281			
			282			
			283			
			284		E.O.B. @ 285' bgs, no refusal	Backfill by natural collapse (283-285')

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 1 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME: 1000 / 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE: 11/22/21 / 11/22/21
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			0		No recovery	Grout (neat cement) (0'-126' bgs)
			10		CLAY, medium to high plasticity, medium hard to stiff, trace organics (5%), trace coarse gravel (3%); 10YR 5/4 to 10YR 5/6	4" LC Steel Casing (0'-130' bgs)
		CH	11			
			12		CLAYEY SAND, fine to coarse (20% fine, 20% medium, 10% coarse), sub-angular, clay (40%), gravel (5%), fine to medium, roots/organics (5%); 10YR 4/4, dry	
		SC	13			
		CL	14		SANDY CLAY, low plasticity, soft, with sand, fine to medium (15% fine, 15% medium), sub-rounded, trace gravel (5%); dry, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 2 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16–17		SANDY CLAY, low plasticity, soft, with sand, fine to medium (15% fine, 15% medium), sub-rounded, trace gravel (5%); dry, 10YR 4/5	
		SP	17–20		SAND, fine to medium (20% fine, 75% medium), sub-rounded, poorly graded, trace cobbles (5%); dry, 10YR 5/6 SAND, fine to medium (30% fine, 60% medium), sub-rounded, poorly graded, with gravel, fine to medium (5% fine, 5% medium); dry, 10YR 5/4	
		GW	20–23		SANDY GRAVEL, fine to coarse (30% fine, 20% medium, 10% coarse), sub-angular to sub-rounded, sand, medium to coarse (10% medium, 30% coarse), sub-angular to sub-rounded; 10YR 4/3	Grout (neat cement) (0'-126' bgs)
		SP	23–27		GRAVELLY SAND, medium to coarse (30% medium, 30% coarse), sub-angular to sub-rounded, poorly graded, gravel, fine to coarse (25% fine, 10% medium, 5% coarse), sub-angluar to sub-rounded; 10YR 4/4	4" LC Steel Casing (0'-130' bgs)
		SW	27–29		SAND, fine to coarse (15% fine, 40% medium, 15% coarse), well graded, with gravel, fine to coarse (12% fine, 10% medium, 5% coarse), trace silt (3%); 10YR 3/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 3 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–33		SAND, fine to coarse (15% fine, 40% medium, 15% coarse), well graded, with gravel, fine to coarse (12% fine, 10% medium, 5% coarse), trace silt (3%); 10YR 3/4	
		SW	33–40		SAND, fine to coarse (42% fine, 30% medium, 10% coarse), sub-angular to sub-rounded, well graded, with gravel, fine to coarse (7% fine, 4% medium, 3% coarse), sub-angular to sub-rounded, trace cobbles (3%), trace silt (1%); dry, 10YR 4/4	Grout (neat cement) (0'-126' bgs)
		SW	37–40		SAND, fine to coarse (15% fine, 40% medium, 15% coarse), well graded, with gravel, fine to coarse (12% fine, 10% medium, 5% coarse), trace silt (3%); 10YR 3/5	
		SW	40–44		SAND, fine to coarse (10% fine, 50% medium, 10%), well-rounded, well graded, with gravel, fine to coarse (10% fine, 10% medium, 5% coarse), rounded, trace silt/clay (5%); moist from drill, 10YR 3/4, boulder @ 42' bgs	4" LC Steel Casing (0'-130' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 4 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE 11/22/21 / DATE 11/22/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46–50		SAND, fine to medium (15% fine, 80% medium), sub-angular to sub-rounded, poorly graded, trace gravel, fine to medium (3%), trace silt (2%); dry, 10YR 3/6	
		ML	50–51		SILT, low plasticity, soft, with sand, fine to medium (15% fine, 5% medium), sub-angular to sub-rounded, with gravel, fine to coarse (3% fine, 4% medium, 3% coarse), sub-angular to sub-rounded; dry, 10YR 4/4	Grout (neat cement) (0'-126' bgs)
		SW	51–53		SAND, fine to coarse (10% fine, 25% medium, 35% coarse), sub-angular to sub-rounded, well graded, with gravel, fine to coarse (15% fine, 10% medium, 5% coarse); dry, 10YR 5/4	
		SP-SM	53–57		SILTY SAND, fine to coarse (60% fine, 20% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, with gravel (15%), sub-angular to sub-rounded; dry, 10YR 3/6	4" LC Steel Casing (0'-130' bgs)
			57–59		SILTY SAND, fine to medium (50% fine, 5% medium), with silt (40%), trace medium gravel (5%); dry, 10YR 3/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 5 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	61–67		CLAY, low plasticity, soft to medium hardness, with sand, fine to medium (15-30%), trace gravel, coarse (5%); dry, 10YR 4/4	Grout (neat cement) (0'-126' bgs)
		SP	67–68		SAND, fine (100%), sub-rounded, poorly graded; dry, 10YR 5/4	
			69		SAND, fine (100%), sub-rounded, poorly graded; moist from drill, 10YR 4/0	
			70–73		SAND, fine to medium (86% fine, 10% medium), sub-angular to sub-rounded, poorly graded, trace gravel, fine to medium (2% fine, 2% medium); dry to moist, 10YR 5/3	4" LC Steel Casing (0'-130' bgs)
			74		SAND, fine to coarse (20% fine, 40% medium, 20% coarse), sub-angular to sub-rounded, well graded, clay (10%), trace gravel, medium (5%), trace	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 6 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: TIME 1000 / FINISH: TIME 1800
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE 11/22/21 / DATE 11/22/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					mottling (5%); dry to moist, 10YR 4/4	
		SW	76		SAND, fine to coarse (10% fine, 25% medium, 30% coarse), sub-angular to sub-rounded, well graded, with clay (25%) and gravel, fine to medium (5% fine, 15% medium); dry, 10YR 3/6	
		SM	77		SILTY SAND, fine to medium (50% fine, 10% medium), sub-angular to sub-rounded, silt (10%), gravel, medium to coarse (5% medium, 5% coarse); dry to moist, 10YR 4/6, 5" clay lense @ 77' bgs	
		SW	78		SAND, fine to coarse (40% fine, 20% medium, 10% coarse), sub-angular to sub-rounded, well graded, with silt (22%), gravel, fine to coarse (2% fine, 3% medium, 3%coarse); dry to moist, 10YR 3/6	Grout (neat cement) (0'-126' bgs)
		SP	79		SAND, fine to coarse (75% fine, 15% medium, 5% coarse), sub-angular, poorly graded, trace gravel, coarse (3%), trace silt (2%); dry to moist, 10YR 4/4	
		SP	80		SAND, fine to medium (75% fine, 25% medium), well-rounded, poorly graded; moist, 10YR 4/6	
	St. Peter Fm. @ 84' bgs	CL	81		CLAY, low to high plasticity, medium stiff to stiff, with sand, medium (25%), with silt (15%), trace gravel (5%); 10YR 4/6, granitic cobble @ 84'	
			82			
			83			
			84		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (1%); 2.5Y 8/1	
			85			4" LC Steel Casing (0'-130' bgs)
			86			
		Os	87			
GRAB	MW10B-GW 86-90		88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 7 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE 11/22/21 / DATE 11/22/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine (97%), well-rounded, trace iron staining (5%), trace silt (3%); 2.5Y 8/2	
			92			
			93			
			94		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 8/1	
			95			Grout (neat cement) (0'-126' bgs)
			96			
			97			
		Os	98			
			99			
			100		SANDSTONE, poorly cemented, fine to medium (85% fine, 5% medium), well-rounded, silt (15%), trace iron staining (3%); 2.5Y 8/1, intermittent platy siltstone	4" LC Steel Casing (0'-130' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 8 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly cemented, fine to medium (85% fine, 5% medium), well-rounded, silt (15%), trace iron staining (3%); 2.5Y 8/1, intermittent platy siltstone	
			107		SANDSTONE, poorly cemented, fine (80%), well-rounded, with silt (20%); 10YR 4/4 to 10YR3/1	
			108		SANDSTONE, poorly to moderately cemented, fine to medium (80% fine, medium 1%), well-rounded, with silt (19%), trace iron staining (2%); 10YR 6/2	
			109			
			110		SANDSTONE, poorly cemented, fine to medium (89% fine, 1% medium), sub-rounded, iron staining (10%), trace silt (1%); 5Y 7/1	Grout (neat cement) (0'-126' bgs)
			111			
			112			
		Os	113		SANDSTONE, poorly cemented, fine to medium (67% fine, 30% medium), sub-rounded, massive iron staining, trace silt/clay (3%); 10YR 4/6	
			114		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 5/8	
			115		SANDSTONE, poorly cemented, fine to medium (60% fine, 30% medium), well-rounded, massive iron staining, silt (10%); 10YR 5/6	4" LC Steel Casing (0'-130' bgs)
			116		SANDSTONE, poorly cemented, fine to medium (65% fine, 30% medium), well-rounded, massive iron staining, trace silt (5%); 10YR 6/3	
GRAB	MW10B-GW 116-120		117		SANDSTONE, poorly cemented, fine to coarse (20% fine, 40% medium, 35% coarse), well-rounded, massive iron staining, trace silt (5%); 10YR 4/6	
			118		SANDSTONE, poorly cemented, fine to coarse (40% fine, 40% medium, 20% medium), well-rounded, iron staining (25%); 10 YR 6/1	
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 9 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 122' bgs From MW10A logging	Os	121		E.O.B. @ 120' bgs, blind drill 120'-140' bgs	Grout (neat cement) (0'-126' bgs)
			122			
			123			
			124			
			125			4" LC Steel Casing (0'-130' bgs)
			126			
			127			2' Fine Sand (126'-128' bgs)
		Ops	128			
			129			
			130			
			131			Sand filter pack (128'-140' bgs)
			132			
			133			Screened interval (0.010" slot) (130'-140' bgs)
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW10B
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 10 OF 10
DRILLING CONTR.: Traut			
DRILLER:	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 970.286 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1800
COMMENTS: Northing: 4983103.724 Easting: 507553.282	DATE		DATE / DATE
	CASING DEPTH		11/22/21 / 11/22/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	136		E.O.B. @ 120' bgs, blind drill 120'-140' bgs	Sand filter pack (128'-140' bgs) Screened interval (0.010" slot) (130'-140' bgs)
			137			
			138			
			139			
			140			
			141			
			142			
			143			
			144			
			145			
			146			
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Geoprobe/HSA		BORING NO. MW10C [855328]
LOGGED BY: AS / CHECKED BY: GG/AS			SHEET 1 OF 2
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Geoprobe/HSA	SAMPLING METHOD: 4' sleeves		DRILLING START / FINISH
BORING DEPTH: 20 FT BGS			
GROUND SURFACE ELEVATION: 913.493 FT AMSL	WATER LEVEL: 12.95'		TIME: 0740 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME: 1100		
COMMENTS: Northing: 4983416.706 Easting: 507625.685	DATE: 04-28-21		DATE: 04-28-21 / 04-28-21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	1		SAND, fine to medium (70% fine, 15% medium), sub-rounded, poorly graded, with clay (10%), trace organics (5% grass); dry, 10YR 3/3	
		MLS	2–4		SANDY SILT, low plasticity, soft, sand, fine (30%), sub-rounded, with clay (10%), trace gravel (3%); dry, 10YR 2/2	Grout (neat cement) (0'-6' bgs)
		CL	4–5		CLAY, low to medium plasticity, soft, with sand, fine (20%), trace gravel, fine (2%), trace mottling; dry, 7YR 5/8	2" PVC Casing (0'-10' bgs)
		SP-SC	5–8		SAND, fine to medium (70% fine, 10% medium), sub-rounded, poorly graded, with clay (10%), with gravel, fine to medium (10%); dry, 7YR 5/8	3/8" Bentonite Chips (6'-8' bgs)
		CLS	8–10		SANDY CLAY, low to medium plasticity, soft, sand, fine to medium (30%), with gravel, fine (10%); dry, 10YR 5/4	Sand filter pack (8'-20' bgs)
		SW	10–12		SAND, fine to coarse (10% fine, 40% medium, 30% coarse), sub-rounded, well graded, with gravel, fine to coarse (5% fine, 15% coarse); dry to moist, 10YR 5/4, coarse gravel possibly broken up from cobble/boulder	2" Stainless Steel Screen (10'-20' bgs)
		SP	12–13		SAND, medium to coarse (85% medium, 15% coarse), sub-rounded, poorly graded; dry to moist, 10YR 5/4	
		SW	13–14		SAND, fine to coarse (10% fine, 40% medium, 35% coarse), sub-rounded, well graded, with gravel, fine to medium (10%), trace clay (5%); moist to wet (wet at 13', 10YR 5/6	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Geoprobe/HSA		BORING NO. MW10C [855328]
LOGGED BY: AS / CHECKED BY: GG/AS			SHEET 2 OF 2
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Geoprobe/HSA	SAMPLING METHOD: 4' sleeves		DRILLING START / FINISH
BORING DEPTH: 20 FT BGS			
GROUND SURFACE ELEVATION: 913.493 FT AMSL	WATER LEVEL: 12.95'		TIME: 0740 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME: 1100		
COMMENTS: Northing: 4983416.706 Easting: 507625.685	DATE: 04-28-21		DATE: 04-28-21 / 04-28-21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Low Recovery from 16'-20' (4"). Due to pushing rock down.	SW	16–20		SAND, fine to coarse (10% fine, 40% medium, 35% coarse), sub-rounded, well graded, with gravel, fine to medium (10%), trace clay (5%); moist to wet (wet at 13'), 10YR 5/6	Sand filter pack (8'-20' bgs) 2" Stainless Steel Screen (10'-20' bgs)
			20		E.O.B. at 20' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN			
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]
LOGGED BY: AS	CHECKED BY: AEL						SHEET 1 OF 24
DRILLING CONTR.: Traut							
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START / FINISH
BORING DEPTH: 360 FT BGS							
GROUND SURFACE ELEVATION: 894.860 FT AMSL		WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300 / TIME 1000
DATUM: NAD 83 UTM 15 (meters)		TIME	1200	~1515	0930	0800	
COMMENTS: Northing: 4977584.33 Easting: 513957.884		DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20 / DATE 10-16-20
		CASING DEPTH	100'	230'	260'	360'	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0		SILT, low plasticity, soft, with organics (30%), with sand, fine (20%), sub-rounded; moist, 10YR 3/1	
			1		SANDY SILT, no plasticity, soft, sand, fine (30%), sub-rounded, trace gravel, medium to coarse (5%), sub-angular to sub-rounded; dry, 7.5YR 5/4 to 7.5YR 4/4	
			2			
			3			
			4			
			5			Grout (neat cement) (0'-346' bgs)
			6			
			7			
			8			
			9		SILT, low plasticity, soft, with sand, fine (15%), sub-rounded, trace gravel, medium to coarse (5%), sub-angular to sub-rounded; dry, 7.5YR 5/4 to 7.5YR 4/4	
			10		SILT, low plasticity, soft, trace sand, fine (5%), sub-rounded, trace gravel, fine (2%), sub-rounded, trace cobbles (5%) @ 13' bgs; dry, 10YR 5/4	4" LC Steel Casing (0'-350' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN			
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]
LOGGED BY: AS	CHECKED BY: AEL						SHEET 2 OF 24
DRILLING CONTR.: Traut							
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING
BORING DEPTH: 360 FT BGS							START / FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL		WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME	1200	~1515	0930	0800	1300 / 1000
COMMENTS: Northing: 4977584.33 Easting: 513957.884		DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE / DATE
		CASING DEPTH	100'	230'	260'	360'	10-12-20 / 10-16-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16		SILT, low plasticity, soft, trace sand, fine (5%), sub-rounded, trace gravel, fine (2%), sub-rounded, trace cobbles (5%) @ 13' bgs; dry, 10YR 5/4	
			17			
			18		SILT, low plasticity, soft, sand, fine to coarse (10%), well-rounded, trace clay (5%), trace gravel, fine (3%), sub-rounded; dry, 7.5YR 5/4 to 7.5YR 4/4	
			19		SILT, low plasticity, soft, trace sand, medium (5%), sub-rounded, trace clay (5%), trace gravel, fine (2%), sub-rounded; dry to trace moist, 7.5YR 5/4 to 7.5YR 4/4	
			20		SILT, low plasticity, soft, with sand, fine (15-20%), sub-rounded, trace clay (5%); dry to trace moist, 7.5YR 4/4	Grout (neat cement) (0'-346' bgs)
			21			
			22			
			23		SILT, low plasticity, soft to medium stiff, trace gravel, fine to coarse (5%), sub-rounded, trace sand, fine (5%), sub-rounded, trace clay (3%); dry, 7.5YR 4/4, yellowish mottling	
			24			
			25			4" LC Steel Casing (0'-350' bgs)
			26			
			27			
			28			
			29		SILT, low plasticity, soft, with sand, fine to medium (15%), sub-rounded, with clay (10%); dry, 10YR 5/3, trace mottling	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 3 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML			SILT, low plasticity, soft, sand, fine (10%), sub-rounded, with clay (10%); dry, 7.5YR 4/4	
		SW	31		SAND, fine to coarse (10% fine, 30% medium, 30% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 20% medium), angular to sub-angular; dry, 7.5YR 5/6	
			32			
		SP	33		SAND, fine to coarse (40% fine, 40% medium, coarse 5%), sub-rounded, poorly graded, with gravel, medium (15%), sub-rounded; dry, 7.5YR 7/8	
			34		SAND, fine to coarse (5% fine, 50% medium, 10% coarse), sub-rounded, poorly graded, with gravel, fine to medium (5% fine, 30% medium), sub-rounded; dry, 10YR 5/8, 2" dark to orange interval @ 34' bgs	Grout (neat cement) (0'-346' bgs)
		ML	35		SILT, low plasticity, stiff, with clay (10%); dry, 7.5YR 4/3	
		SW	36		SAND, fine to coarse (15% fine, 45% medium, 25% coarse), sub-rounded, well graded, with gravel (lithic fragments), medium (15%), angular to sub-angular; dry, 10YR 6/6	
DISCRETE	MW12A-SOIL 38-39.75	SP	37		SAND, fine to coarse (30% fine, 60% medium, 5% coarse), sub-rounded, poorly graded, trace 2" lense of lithic fragments (5%) @ 37.5' bgs; dry 10YR 5/8	
		SW	38		SAND, fine to coarse (10% fine, 30% medium, 55% coarse), sub-rounded, well graded, trace silt (5%), trace 2" clay lense @ 38' bgs; dry, 7.5YR 5/8	
		CL	39		CLAY, low plasticity, stiff, with silt (20%); dry, 7.5YR 5/8	4" LC Steel Casing (0'-350' bgs)
		SC	40		CLAY, medium plasticity, stiff, mottled, with gravel - weathered bedrock (40%), trace sand, fine (5%); dry, 10YR 5/6	
			41		CLAYEY SAND, fine (50%), sub-rounded, with gravel - weathered bedrock (30%), clay (20%); dry, 10YR 5/6	
		CL	42		CLAY, medium plasticity, medium stiff, with gravel - weathered bedrock (25%), trace sand, fine (5%); dry, 10YR 6/3	
	St. Peter Fm. @ 44' bgs		43			
		Os	44		SANDSTONE, poorly cemented, weathered, fine to medium (70% fine, 20% medium), sub-rounded, with clay (10%); 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 4 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW12A-SOIL 48.5-49.5 Shakopee Fm. @ 50' bgs	Os	46		SANDSTONE, well cemented, fine (98%), sub-rounded to well-rounded, trace clay (2%); 5Y 7/1, trace mottling	
			47		SANDSTONE, moderately cemented, very fine (100%), well-rounded; 10YR 8/1	
			48		SANDSTONE, moderately cemented, weathered, fine (90%), well-rounded, dolostone lithic fragments, coarse (10%); 10YR 6/4	
			49		SANDSTONE, moderately cemented, fine to medium (85% fine, 15% medium), well-rounded; 10YR 7/1	
			50		SANDSTONE, moderately cemented, fine to medium (60% fine, 13% medium), well-rounded, dolostone lithic fragments, coarse (25%), trace clay (2%); 10YR 7/1	Grout (neat cement) (0'-346' bgs)
		Ops	51		DOLOSTONE, moderately competent, sand, fine (25%), 1-2mm vugs (10%), trace thin fractures (1%); 10YR 6/2	
			52		DOLOSTONE, not competent, weathered, silt/clay (25%), trace dendritic manganese staining (5%); 10YR 8/2	
			53		DOLOSTONE, not competent, clay (30%), sand, very fine (10%), trace fine grained dolomitic precipitate (5%); 10YR 6/4	
			54			
			55		DOLOSTONE, moderately competent, fine to coarse (rhombs) dolomitic precipitate (15%), malachite/glauconitic staining (5-10%), trace oolitic texture (5%); 10YR 6/1	4" LC Steel Casing (0'-350' bgs)
			56			
			57		DOLOSTONE, competent, dendritic manganese staining (5-10%), thin fractures (5%); 10YR 8/2	
			58			
			59		DOLOSTONE, not competent, weathered, sand, fine to medium (30-40%), clay (20%); 10YR 7/2	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 5 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly cemented, fine to medium (87% fine, 10% medium), sub-rounded, trace clay (3%); 10YR 8/1	
			61		DOLOSTONE, moderately competent, massive iron staining, small (<1mm) vugs (10%), trace malachite/glauconitic staining (3%); 10YR 6/4	
			62			
			63			
			64			
			65		DOLOSTONE, not competent, weathered, sand, fine (15%), sub-rounded; 10YR 7/2, clay observed	Grout (neat cement) (0'-346' bgs)
			66		DOLOSTONE, moderately competent, weathered, trace sand, fine (5%); 10YR 8/3, clay observed	
		Ops	67			
			68		DOLOSTONE, moderately competent, weathered, chert (10%), sand, fine (10%), trace oxidation (5%), trace manganese staining (3%); 10YR 8/1 to 10YR 6/4, clay observed	
			69			
			70		DOLOSTONE, moderately competent, trace small (<1mm) vugs (5%), trace dendritic manganese staining (3%); 10YR 6/3 to 10YR 6/4	4" LC Steel Casing (0'-350' bgs)
			71		DOLOSTONE, competent, faint iron staining (5-10%), trace dendritic manganese staining (5%); 10YR 6/2	
			72		DOLOSTONE, not competent, massive iron staining, sand, fine (15%); 10YR 5/8, clay observed	
			73			
			74			
					SANDSTONE, moderately to well cemented, fine to	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 6 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					medium (85%), sub-rounded, dolostone lithic fragments (15%); 10YR 8/2	
			76		DOLOSTONE, competent, trace dendritic iron and manganese staining (3%), trace thin fractures (1%); 10YR 6/6	
			77		DOLOSTONE, not competent, weathered, sand, fine (15%), glauconitic staining (10%), trace iron staining (2%); 10YR 8/1 to GLEY 1 5G7/1	
			78		DOLOSTONE, moderately competent, sand, fine (10%), trace thin fractures (3%), trace vugs (2%); 10YR 5/8, clay observed	
			79			
			80		DOLOSTONE, competent, trace thin fractures (5%), trace dendritic manganese staining (3%); 10YR 7/1	Grout (neat cement) (0'-346' bgs)
			81		DOLOSTONE, not competent, fine grained dolomitic precipitate (15%), trace vugs (1%); 10YR 5/8, clay observed	
		Ops	82		DOLOSTONE, not competent, weathered, trace manganese staining (5%), trace glauconitic staining (2%), trace chert (1%); 10YR 5/2, clay observed	
			83			
			84		DOLOSTONE, not competent, weathered, massive iron staining, sand, fine (15%), trace fine grained dolomitic precipitate (5%); 10YR 5/8, clay observed	
			85			4" LC Steel Casing (0'-350' bgs)
			86			
			87		DOLOSTONE, moderately competent, faint iron staining (20%), trace thin fractures (5%), trace dendritic manganese staining (2%), trace quartz precipitate (3%); 10YR 7/3, clay observed	
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 7 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW12A-GW 96-100	Ops	91		DOLOSTONE, not to moderately competent, iron staining (10%), trace fine to medium grained dolomitic precipitate (5%), trace vugs (5%), trace glauconitic staining (3%); 10YR 5/4 to 10YR 5/6	
			92			
			93		DOLOSTONE, moderately competent, faint iron staining (20%), fine to medium grained dolomitic precipitate (10%), trace glauconitic staining (5%), trace manganese staining (1%); 10YR 6/2	
			94			
			95			Grout (neat cement) (0'-346' bgs)
			96			
			97		DOLOSTONE, competent, banded sand, fine (10%), fractures (5%), iron staining along horizontal fractures (5%); 10YR 7/1 to 10YR 7/2	
			98			
			99			
			100		DOLOSTONE, moderately competent, sand, fine to medium (10%), iron staining (10%), trace fine grained dolomitic precipitate (5%); 10YR 8/2, clay observed	4" LC Steel Casing (0'-350' bgs)
			101			
			102		DOLOSTONE, not competent, weathered, trace fine grained dolomitic precipitate (5%); 5Y 6/1, clay observed	
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 8 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	106		DOLOSTONE, competent, sand, fine to medium (20%), iron staining (10-15%), trace fine to coarse dolomitic precipitate (3%); 10YR 7/3	
			107		DOLOSTONE, not to moderately competent, iron staining (30-40%), coarse (rhombs) dolomitic precipitate (5-10%); 5Y 6/1, clay observed	
			108			
			109			
			110		DOLOSTONE, not competent, fine to coarse (rhombs) dolomitic precipitate (20-25%), trace sand, fine (5%), faint iron staining (4%), trace vugs (3%); 10YR 6/3	Grout (neat cement) (0'-346' bgs)
			111			
			112			
			113			
			114			
			115		DOLOSTONE, moderately competent, medium grained dolomitic precipitate (15%), trace iron staining (5%), trace (up to 3cm) vugs (4%), trace sand, fine (2%); 10YR 6/4	4" LC Steel Casing (0'-350' bgs)
			116			
			117			
			118		DOLOSTONE, not competent, weathered, fine grained dolomitic precipitate (30%), trace 1 cm vugs (1%), trace manganese and glauconitic staining (1%); 10YR 6/2, clay observed	
			119		DOLOSTONE, not competent, fine to coarse dolomitic precipitate (10-20%), oolites and oolitic	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 9 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		texture (10%), gastropod fossils - partially replaced by calcite (5-10%); 10YR 5/6 DOLOSTONE, not competent, chert (40%), iron staining (15%), thin fractures (5-10%); 2.5Y 7/4	
			122		DOLOSTONE, not competent, heavily weathered, massive iron staining, chert (25%), fine to coarse grained dolomitic precipitate (15%), trace small vugs (5%); 10YR 7/8, clay observed	
			123			
			124			
			125		DOLOSTONE, not to moderately competent, iron staining (30%), fine grained dolomitic precipitate (10%), thin fractures (10%), manganese staining (5-10%); 2.5Y 6/6, clay observed	Grout (neat cement) (0'-346' bgs)
			126			
		Ops	127		DOLOSTONE, moderately competent to competent, iron staining (50%), sand, fine (15%), fine grained dolomitic precipitate (5-10%), trace faint manganese staining (5%); 2.5Y 6/4	
			128			
			129			
			130		DOLOSTONE, moderately competent, chert (30%), medium grained dolomitic precipitate (15%), trace manganese staining (5%), trace sand, fine (4%); 10YR 7/2	4" LC Steel Casing (0'-350' bgs)
			131			
			132		DOLOSTONE, competent, massive faint iron staining, fine to medium grained dolomitic precipitate (25%), ~3mm vugs (10-15%), trace bioturbation (5%), trace oolitic texture (5%), trace thin fractures (2%), trace glauconitic staining (2%); 10YR 6/4	
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 10 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, competent, massive faint iron staining, fine to medium grained dolomitic precipitate (25%), ~3mm vugs (10-15%), trace bioturbation (5%), trace oolitic texture (5%), trace thin fractures (2%), trace glauconitic staining (2%); 10YR 6/4	
			136			
			137			
			138		DOLOSTONE, moderately competent, sand, medium to coarse (10%), trace manganese staining (5%); 10YR 7/3	
			139			
			140		DOLOSTONE, not competent, weathered, massive faint iron staining, sand, fine (35%), darker iron staining and manganese staining (5-10%); 10YR 6/6, clay observed	Grout (neat cement) (0'-346' bgs)
		Ops	141			
			142			
			143			
			144			
			145		DOLOSTONE, not to moderately competent, faint iron staining (30%), oolites and oolitic texture (10%), sand, fine (5-10%), trace fractures (2%); 10YR 6/3, clays observed	4" LC Steel Casing (0'-350' bgs)
			146			
			147			
			148			
			149		DOLOSTONE, competent, faint iron staining (30%), fine grained dolomitic precipitate (10%), trace oolitic texture (5%), trace small (<1mm) vugs (5%); 10YR 6/2	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 11 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, competent, massive dolomitic precipitate, small vugs (15-20%); 10YR 6/4	
			151			
			152		DOLOSTONE, moderately competent, massive iron staining, dolomitic precipitate (15%), trace small vugs (5%); 2.5Y 6/4	
		Ops	153			
			154		DOLOSTONE, not to moderately competent, weathered, iron stained dolomitic precipitate (40%), sand, fine to medium (30%), trace glauconitic staining (5%); 10YR 6/8	
			155		DOLOSTONE, not competent, white to red banded chert (15%), sand, fine (10%); 2.5Y 6/8, 2" silty sand lense @ 156' bgs	Grout (neat cement) (0'-346' bgs)
	Oneota Fm. @ 157' bgs		156			
			157		DOLOSTONE, competent, massive dolomitic precipitate, massive vuggy texture; 2.5Y 6/4	
			158			
			159			
			160		DOLOSTONE, competent, massive faint iron staining, dolomitic precipitate (20%), 1-10mm vugs (10%), trace fractures (5%); 10YR 7/3	4" LC Steel Casing (0'-350' bgs)
		Opo	161			
			162			
			163		DOLOSTONE, very competent, massive iron staining, 1-8mm vugs (40%), dolomitic precipitate (15%); 10YR 6/6	
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 12 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		DOLOSTONE, very competent, massive iron staining, 1-8mm vugs (40%), dolomitic precipitate (15%); 10YR 6/6	
			167		DOLOSTONE, very competent, massive faint iron staining, 1-5mm vugs (15-20%), trace fine to medium grained dolomitic precipitate (5%); 10YR 7/2	
			168			
			169			
			170		DOLOSTONE, not to moderately competent, massive dolomitic precipitate, small vugs (30%); 10YR 7/6	Grout (neat cement) (0'-346' bgs)
			171			
			172		DOLOSTONE, very competent, dolomitic precipitate (50%), small to medium vugs (10-15%), trace quartz precipitate (5%); 10YR 6/4	
		Opo	173			
			174		DOLOSTONE, moderately competent, oxidized dolomitic precipitate (20-30%), small vugs (10%), trace manganese staining (1-2%); 10YR 6/2 to 10YR 6/6	
			175			4" LC Steel Casing (0'-350' bgs)
			176			
			177		DOLOSTONE, not competent, massive medium to coarse grained dolomitic precipitate, slickenline texture ~177' bgs, small vugs (10%), trace glauconite (1%); 10YR 7/3	
GRAB	MW12A-GW 176-180		178		DOLOSTONE, moderately competent, massive dolomitic precipitate, trace quartz precipitate (2%); 10YR 6/6	
			179		DOLOSTONE, not to moderately competent, oxidized dolomitic precipitate (70%), quartz	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 13 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					precipitate (10%), trace glauconitic staining (2%); 10YR 6/6	
			181		DOLOSTONE, moderately competent, massive iron staining, 1mm vugs (10%), dolomitic precipitate (5%), fractures (3%); 10YR 6/1 to 10YR 6/8	
			182			
			183			
			184		DOLOSTONE, not competent, iron staining (50%), trace dolomitic precipitate (5%); 10YR 6/8 (184'-185'), 10YR 6/1 (185'-186')	
			185			Grout (neat cement) (0'-346' bgs)
			186		DOLOSTONE, not competent, massive orange to red iron staining, quartz/calcite precipitate (10%), trace manganese staining (5%); 7.5YR 4/4 to 10YR 7/8	
		Opo	187		DOLOSTONE, not competent, massive banded iron staining, trace dolomitic precipitate (5%); 10YR 6/6	
			188		DOLOSTONE, moderately competent, 1-5mm vugs (15%), trace fractures (5%), trace glauconitic staining (4%), trace dolomitic precipitate (2%); 10YR 6/4 to 10YR 7/4	
			189			
			190		DOLOSTONE, not competent, 1-6mm vugs (10%), trace calcite nodules (4%), thin fractures (2%), dolomitic precipitate (2%); 10YR 6/6	4" LC Steel Casing (0'-350' bgs)
			191			
			192			
			193			
			194			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 14 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not competent, 1-6mm vugs (10%), trace calcite nodules (4%), thin fractures (2%), dolomitic precipitate (2%); 10YR 6/6	
			196		DOLOSTONE, competent, 1-10mm vugs (5-10%), trace iron staining (5%), trace dolomitic precipitate (2%), trace calcite precipitate (1%); 10YR 6/3 to 10YR 6/6	
			197		DOLOSTONE, not competent, heavily weathered; 2.5Y 7/4, clay observed	
			198		DOLOSTONE, moderately competent, iron staining (30%), fractures with secondary precipitate (5-10%), trace dolomitic precipitate (5%), trace manganese staining in fractures (5%); 10YR 6/2 to 10YR 6/8	
			199			
			200		DOLOSTONE, moderately competent, iron staining (20%), dolomitic precipitate (20%), fractures along bedding (10%); 10YR 6/2 to 10YR 6/8	Grout (neat cement) (0'-346' bgs)
			201			
	Coon Valley Fm. @ 202' bgs		202		SANDY DOLOSTONE, not competent, massive iron staining, sand, fine to medium (30%), dark manganese/iron staining (10%), trace glauconitic sand (1%); 5YR 3/4 to 5YR 3/3	
		Opo	203			
			204			
			205			4" LC Steel Casing (0'-350' bgs)
			206			
			207		SANDSTONE, well cemented, weathered, fine to coarse (50%), well-rounded, dolomitic cement (50%); 10YR 7/2 to 10YR 6/6	
			208			
			209		SANDSTONE, moderately cemented, weathered, massive iron staining, fine to medium (50%), well-rounded, dolomitic cement (50%); 10YR 6/6 to 7.5YR 4/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 15 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SANDY DOLOSTONE, not competent, weathered, patchy and banded iron staining (50%), sand, fine to medium (30%), trace dolomitic precipitate (5%); 10YR 7/3 to 7.5YR 2.5/3, clay observed	
			212			
			213			
			214			
			215		SANDSTONE, moderately to well cemented, weathered, fine to coarse (33% fine, 33% medium, 33% coarse), well-rounded; 10YR 4/6	Grout (neat cement) (0'-346' bgs)
			216			
		Opo	217			
			218			
			219		DOLOSTONE, not competent, fractures (10%), trace quartz/calcite precipitate (5%), trace dolomitic precipitate (3%), trace iron staining (1%); 10YR 6/6	
			220		DOLOSTONE, moderately competent, iron staining (30-40%), trace dolomitic precipitate (2%), trace sand, fine to medium (1%); 10YR 6/4	4" LC Steel Casing (0'-350' bgs)
			221		DOLOSTONE, very competent, massive iron staining, banded sand, coarse (10%), trace vugs (2%); 10YR 7/4	
			222		SANDY DOLOSTONE, not competent, dolomitic lithic fragments (50%), sand, fine to coarse (50%), well-rounded; 10YR 7/1 to 10YR 5/6 to GLEY 1 7/5GY, clays observed	
	Jordan Fm. @ 224' bgs (MGS gamma log puts contact @ 229' bgs)		223			
		Cj	224		SANDSTONE, moderately to well cemented, fine to medium (20% fine, 80% medium), angular; 10YR 8/1	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 16 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW12A-GW 226-230	Cj	226		SANDSTONE, moderately to well cemented, fine to medium (20% fine, 80% medium), angular; 10YR 8/1	
			227		SANDSTONE, moderately to well cemented, fine to medium (10% fine, 90% medium), well-rounded; 2.5Y 9/2	
COMP	MW12A-SOIL 226-230 +DUP+MS/MSD		228			
			229			
			230		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 6/6	Grout (neat cement) (0'-346' bgs)
			231			
			232		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 5/8	
			233			
			234			
			235			4" LC Steel Casing (0'-350' bgs)
			236		SANDSTONE, poorly to moderately cemented, medium (100%), well-rounded; 10YR 3/6	
			237		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 7/6	
			238		SANDSTONE, moderately cemented, fine to medium (20% fine, 80% medium), sub-rounded; 10YR 9/2 to 2.5Y 8/2	
			239			
					SANDSTONE, moderately cemented, fine to	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 17 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					medium (30% fine, 65% medium), sub-rounded, trace ~1mm silt lense (5%); 2.5Y 8.5/2	
			241		SANDSTONE, poorly cemented, medium (100%), well-rounded; 2.5Y 8/2	
			242			
			243			
			244		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 7/6	
			245		SANDSTONE, poorly cemented, medium (100%), well-rounded; 10YR 8/4	Grout (neat cement) (0'-346' bgs)
			246			
		Cj	247			
			248			
			249			
			250		SANDSTONE, moderately cemented, fine to medium (10% fine, 90% medium), well-rounded; 2.5Y 8/2	4" LC Steel Casing (0'-350' bgs)
			251		SANDSTONE, poorly cemented, medium (100%), sub-rounded to well-rounded; 2.5Y 8/2 SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), well-rounded; 2.5Y 8.5/1	
			252			
			253			
			254			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 18 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW12A-GW 256-260 +DUP+MS/MSD	Cj	256		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), well-rounded; 2.5Y 8.5/1	
					SANDSTONE, poorly cemented, fine to medium (10% fine, 90% medium), well-rounded; 10YR 7/6	
			257		SANDSTONE, poorly to moderately cemented, fine to medium (15% fine, 85% medium), well-rounded; 7.5YR 8/2, pink/orange hue @ 258'/259.5' bgs, (more competent sandstone - drillers)	
COMP	MW12A-SOIL 256-260		258			
			259			
			260		SANDSTONE, poorly cemented, fine (80%), well-rounded, silt (20%); white N/8	Grout (neat cement) (0'-346' bgs)
			261		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded, trace iron staining (5%); 10YR 8/2 to 10YR 6/4	
			262		SANDSTONE, poorly cemented, fine (100%), well-rounded; 7.5YR 8/2	
			263		SANDSTONE, poorly cemented, very fine (100%), well-rounded; 7.5YR 8/1	
			264			
			265			4" LC Steel Casing (0'-350' bgs)
			266			
			267			
			268		SANDSTONE, well cemented, fine (100%), well-rounded, iron staining @ 270' bgs (10%); 2.5Y 8/1 to 10YR 5/8	
			269			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 19 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			271		SANDSTONE, moderately cemented, massive iron staining (red to trace purple), very fine to medium (45% v. fine, 45% fine, 10% medium), well-rounded; 10YR 6/8	
			272			
			273			
			274			
			275		SANDSTONE, moderately to well cemented, fine to medium (50% fine, 50% medium), well-rounded, trace iron staining (5%); 10YR 7/6 to 10YR 8/1	Grout (neat cement) (0'-346' bgs)
			276			
		Cj	277			
			278			
			279		SANDSTONE, well cemented, very fine (90%), well-rounded, silt (10%); 10YR 8/1 to 10YR 6/6	
			280		SANDSTONE, well cemented, very fine (90%), well-rounded, silt (10%); 10YR 8/1	4" LC Steel Casing (0'-350' bgs)
			281			
			282			
			283			
			284			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 20 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW12A-SOIL 284-288	Cj	286		SANDSTONE, well cemented, very fine (90%), well-rounded, silt (10%); 10YR 8/1	
			287			
			288		SANDSTONE, poorly to well cemented, weathered, very fine (80%), well-rounded, silt/clay (20%); 10YR 5/8	
			289		SANDSTONE, well cemented, very fine (90%), well-rounded, silt (10%); 10YR 7/3	
			290		SHALE, moderately compacted, massive iron staining, well cemented sand, very fine (50%), well-rounded, trace glauconitic staining (5%), trace vugs (5%); 10YR 6/5	Grout (neat cement) (0'-346' bgs)
			291			
			292			
			293			
			294			
			295		SHALE, well compacted, iron staining (50%), trave 1-10mm vugs (2%), trace glauconitic staining (1%); 10YR 6/8 to 10YR 7/2	4" LC Steel Casing (0'-350' bgs)
			296			
			297		SHALE, moderately compacted, iron staining (50%), calcite precipitate (7%), trace vugs (3%); 10YR 7/6 to GLEY 1 7/5GY	
			298		SANDSTONE, well cemented, very fine (60%), well-rounded, silt (20%), shale lithic fragments (20%), iron staining (25%); 10YR 6/8 to 10YR 7/2	
			299			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 21 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS								
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Lawrence Fm. @ 300' bgs (MGS gamma log puts contact @ 301' bgs)	Cs	301 302 303 304 305 306 307 308 309 310 311 312 313 314		SHALE, poorly to moderately compacted, glauconitic staining (15%), fractures (5%); GLEY 2 7/10G, clay observed SHALE, poorly to moderately compacted, trace glauconitic staining (3%), trace vugs (1%); GLEY 1 5/N SHALE, poorly to moderately compacted, trace thin glauconitic banding observed (5%), trace vugs (2%), trace fractures (2%); GLEY 1 4/N, clay observed	Grout (neat cement) (0'-346' bgs) 4" LC Steel Casing (0'-350' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 22 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cs	316		SHALE, poorly to moderately compacted, trace thin glauconitic banding observed (5%), trace vugs (2%), trace fractures (2%); GLEY 1 4/N, clay observed	
			317			
			318			
			319		SHALE, moderately compacted, reworked clasts and/or bioturbation (50%), trace fractures and glauconite along bedding (2%); GLEY 1 4/N to GLEY 1 6/N	
			320		SHALE, moderately to well compacted, reworked clasts @321' bgs (25%), ~ 20mm vugs (2%); GLEY 1 4/N	Grout (neat cement) (0'-346' bgs)
			321			
			322		SHALE, moderately compacted, platy (20%), trace <1mm vugs (1%); GLEY 1 5/10Y	
			323			
			324			
			325		SHALE, poorly compacted; GLEY 1 5/N, clay observed	4" LC Steel Casing (0'-350' bgs)
			326		SHALE, moderately compacted, fractures along bedding; GLEY 1 4/10Y to GLEY 1 5/10Y	
			327			
			328			
			329		SHALE, poorly compacted; GLEY 1 4/N, clay observed	
					SHALE, moderately compacted, bedding observed,	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 23 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					trace fractures (2%), trace <5mm vugs (2%); GLEY 1 4/N	
			331		SHALE, moderately compacted, conchoidal fracturing, fracturing along bedding; GLEY 1 4/N, clay oberved	
			332			
			333		SHALE, poorly compacted, extremely weathered; GLEY 1 5/10GY, clay observed	
			334			
			335			Grout (neat cement) (0'-346' bgs)
			336			
			337		SHALE, moderately compacted, thin banding observed, glauconitic staining (50%), trace reworked clasts (5%), trave vugs (3%); GLEY 1 4/10GY to GLEY 1 4/N	
		Cs	338			
			339			
			340		SHALE, not compacted, trace bedding observed (5%), trace conchoidal fracturing (5%); GLEY 1 5/N to GLEY 1 5/10GY	4" LC Steel Casing (0'-350' bgs)
			341			
			342			
			343		SHALE, moderately compacted; GLEY 1 5/N to GLEY 1 5/10GY	
			344			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW12A [850553]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 24 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 360 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 894.860 FT AMSL			WATER LEVEL	74.8'	78.6'	78.5'	74'	TIME 1300	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1200	~1515	0930	0800		
COMMENTS: Northing: 4977584.33 Easting: 513957.884			DATE	10-13-20	10-14-20	10-15-20	10-19-20	DATE 10-12-20	DATE 10-16-20
			CASING DEPTH	100'	230'	260'	360'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			346		SHALE, moderately compacted; GLEY 1 5/N to GLEY 1 5/10GY	Grout (neat cement) (0'-346' bgs) 4" LC Steel Casing (0'-350' bgs)
		Cs	347			2' Fine Sand (346'-348' bgs)
			348			
			349		SHALE, moderately coompacted, vugs (10%), trace glauconitic sand (5%), trace fine grained dolomitic precipitate (5%); GLEY 1 5/10GY toGLEY 1 5G3/1	Sand filter pack (348'-360' bgs)
	Lone Rock Fm. @ 350' bgs		350		SILTSTONE, moderately compacted, glauconitic sand, fine (15-20%), well-rounded; GLEY 1 6/10Y	
			351			
			352			
			353			
			354		SANDSTONE, poorly cemented, glauconitic sand, fine (50%), well-rounded, silt (50%); GLEY 2 5/10B	
		Ct	355			Screened interval (0.010" slot) (350'-360' bgs)
			356		SILTSTONE, moderately compacted, glauconitic sand, fine (30%), well-rounded; GLEY 2 5/10B	
			357			
			358		SANDSTONE, poorly cemented, glauconitic sand, fine (60%), well-rounded, silt(40%); GLEY 2 5/10B	
			359		SILTSTONE, moderately compacted, glauconitic sand, fine (30%), well-rounded; GLEY 2 5/10B E.O.B. @ 360' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 1 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–4		SAND, fine to medium (60% fine, 25% medium), sub-rounded, poorly graded, trace clay (5%), trace silt (5%), trace organics (5%); moist, 10YR 4/4	
		SP	2–4		SAND, fine to medium (62% fine, 35% medium), sub-angular to sub-rounded, poorly graded, trace silt (3%); moist, 10YR 4/4	
		SW	4–6		SAND, fine to coarse (40% fine, 40% medium, 10% coarse), sub-angular to sub-rounded, well graded, with clay (8%), trace gravel, medium (2%); moist, 10YR 4/4, 3" clay layer at 4' and 6' bgs	Grout (neat cement) (0'-350' bgs)
		SP	6–7		SAND, fine to coarse (5% fine, 5% medium, 90% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 4/3	
		SW	7–10		SAND, fine to medium (50% fine, 50% medium), sub-angular, poorly graded; moist, 10YR 5/4 SAND, fine to coarse (35% fine, 30% medium, 30% coarse), sub-rounded, well graded, trace silt (5%); moist, 10YR 5/3	
		SP	10–13		SAND, fine to coarse (70% fine, 25% medium, 3% coarse), sub-angular, poorly graded, trace gravel, fine (2%); moist, 10YR 4/3	4" LC Steel Casing (0'-350' bgs)
		SP	13–14		SAND, medium to coarse (70% medium, 30% coarse), sub-rounded, poorly graded; moist, 10YR 4/3	
		SC	14		CLAYEY SAND, fine to coarse (30% fine, 25% medium, 25% coarse), sub-rounded, clay (20%); moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 2 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	16		CLAYEY SAND, fine to coarse (30% fine, 25% medium, 25% coarse), sub-rounded, clay (20%); moist, 10YR 4/4	
		CL	17		CLAY, medium plasticity, soft; moist, 10YR 5/3	
		SW	18		SAND, fine to coarse (40% fine, 40% medium, 20% coarse), sub-angular to sub-rounded, well graded; moist, 10YR 4/3	
		CL	19		SANDY SILT, low plasticity, soft, sand, fine to medium (30%), sub-rounded; moist, 10YR 4/3, 1" oxidized sand layer	
		SP	20		SAND, fine to medium (60% fine, 35% medium), sub-angular, poorly graded, trace silt (5%); dry, 10YR 5/4	Grout (neat cement) (0'-350' bgs)
		SP	21		SAND, fine to medium (60% fine, 35% medium), sub-angular, poorly graded, trace silt (5%); moist, 10YR 5/4	
		SW	22		SAND, fine to coarse (45% fine, 45% medium, 10% coarse), sub-angular to well-rounded, well graded; wet, 10YR 5/3	
		SW	23			
		SW	24			
		SP	25		SAND, fine to coarse (5% fine, 60% medium, 30% coarse), sub-angular, poorly graded, trace gravel, fine (4%), trace silt (1%); moist, 10YR 5/4	4" LC Steel Casing (0'-350' bgs)
		SP	26			
		SP	27			
		SP	28		SAND, medium to coarse (45% medium, 40% coarse), sub-angular to sub-rounded, poorly graded, gravel, fine to medium (10% fine, 2% medium), trace silt (3%); moist, 7.5YR 4/4, 2-4" fine sand at 30' bgs	
		SP	29			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 3 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	31		SAND, medium to coarse (25% medium, 45% coarse), sub-rounded to well-rounded, poorly graded, with gravel, fine to medium (25% fine, 5% medium), sub-rounded; wet, 10YR 5/6	
		SW	32		SAND, fine to coarse (15% fine, 50% medium, 30% coarse), sub-rounded, well graded, trace gravel, fine (5%); moist to wet, 10YR 4/4	
		SP	33		SAND, medium to coarse (25% medium, 50% coarse), sub-rounded, poorly graded, with gravel, fine to medium (20% fine, 5% medium), sub-angular to sub-rounded; moist to wet, 10YR 4/4, 0.5" coarse gravel seam at 37.5' bgs	Grout (neat cement) (0'-350' bgs)
		CL	38		CLAY, low to medium plasticity, soft; dry to moist, 10YR 3/2	4" LC Steel Casing (0'-350' bgs)
			40		CLAY, low plasticity, soft, with sand, fine (15%), well-rounded, with gravel, medium to coarse (10% medium, 5% coarse), sub-rounded; dry to moist, 10YR 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 4 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL		WATER LEVEL	TIME 1500 / TIME 1500
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979807.846 Easting: 508221.325		DATE / CASING DEPTH	DATE 06-04-20 / DATE 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	46		SAND, fine to coarse (50% fine, 25% medium, 20% coarse), well-rounded, well graded, trace gravel, fine (5%); moist, 10YR 5/2	
		GP	47		GRAVEL, fine to coarse (85% fine, 5% coarse); sub-rounded to well-rounded, poorly graded, sand, coarse (10%), sub-rounded; moist to wet, 10YR 4/2	
			48			
			49			
		SP			SAND, fine to medium (60% fine, 30% medium), sub-rounded, poorly graded, gravel, fine (10%), well-rounded; moist to wet, 10YR 4/2	
		GW	50		GRAVEL, fine to coarse (40% fine, 15% medium, 20% coarse), sub-angular to well-rounded, well graded, with sand, coarse (25%), sub-rounded; moist to wet, 10YR 4/2,	Grout (neat cement) (0'-350' bgs)
			51			
		SP	52		SAND, medium to coarse (50% medium, 20% coarse), sub-rounded, poorly graded, with gravel, fine (30%), well-rounded; moist to wet, 10YR 4/2	
			53			
		GW	54		GRAVEL, fine to coarse (35% fine, 25% medium, 10% coarse), well-rounded, well graded, with sand, coarse (25%), sub-rounded, trace cobbles (5%); moist to wet, 10YR 4/3, 2" fine sand seam at 53' bgs	
			55			4" LC Steel Casing (0'-350' bgs)
			56			
			57			
			58			
		SW	59		SAND, fine to coarse (30% fine, 30% medium, 20% coarse), sub-rounded, well graded, with gravel, fine to coarse (15% fine, 3% medium, 2% coarse), sub-rounded; moist to wet, 10YR 5/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 5 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML			SILT, low plasticity, soft; dry, 10YR 5/2	
		SM	61		SILTY SAND, fine to coarse (45% fine, 15% medium, 20% coarse), sub-rounded, silt (15%), trace gravel, medium (5%); moist, 10YR 4/2	
		ML	62 63 64		SANDY SILT, low plasticity, soft, sand, fine to coarse (30%), sub-rounded, clay (15%); moist, 10YR 5/2	
		CL	65 66 67		CLAY, low plasticity, medium stiff, with sand, medium to coarse (20%), sub-rounded, trace gravel, medium (2%); moist, 10YR 5/3	Grout (neat cement) (0'-350' bgs)
			68		CLAY, low plasticity, medium stiff, with sand, medium (20%), sub-rounded, trace gravel, fine to medium (4%); moist, 10YR 5/3	
			69		CLAY, low plasticity, very stiff; dry, 10YR 3/1	
		CH	70 71 72 73 74		SANDY CLAY, low plasticity, stiff, sand, fine to medium (30%), sub-rounded; dry, 10YR 5/2 CLAY, high plasticity, very stiff, sand, fine (10%), well-rounded, trace gravel, fine (2%); dry, 7.5YR 4/6 CLAY, high plasticity, very soft, trace sand, fine (2%), orangle mottling; dry, 10Y-5GY 4/2	4" LC Steel Casing (0'-350' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 6 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	76		CLAY, low plasticity, soft, with silt (10%), gray to orange mottling; dry, 10YR 3/2	
			77		CLAY, low plasticity, soft, with silt (10%); dry, 10YR 3/2	
			78		CLAY, low plasticity, soft, with silt (10%), gray mottling; dry, 10YR 3/2	
			79			
			80		CLAY, low plasticity, stiff, with silt (10%), heavy mottling (green/gray/orange/black); dry, 10YR 6/2	Grout (neat cement) (0'-350' bgs)
			81			
			82			
			83			
			84		CLAY, low plasticity, stiff, with silt (20%), with sand, fine (15%), sub-rounded; dry, 7.5YR 3/4 to 7.5YR 2.5/1	
			85			4" LC Steel Casing (0'-350' bgs)
		SW	86		SAND, fine to coarse (30% fine, 45% medium, 20% coarse), sub-rounded, well graded, trace silt (5%); moist, 10YR 5/2	
		CL			CLAY, low plasticity, medium stiff, with silt (10%), trace sand, fine (5%), trace gravel, medium (2%); dry, 10Y-5GY 5/5 GY	
		SW	87		SAND, fine to coarse (25% fine, 60% medium, 13% coarse), sub-rounded, well graded, trace gravel, fine (2%); moist, 10YR 4/2	
			88			
		SP	89		SAND, fine to medium (30% fine, 68% medium), sub-rounded, poorly graded, trace gravel, fine (2%); moist, 10YR 5/2, grades coarser towards 90' bgs	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 7 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	91–94		SAND, fine to medium (70% fine, 30% medium), well-rounded, poorly graded; moist to wet, 5Y 4/1	
		SP	94–96		SAND, fine to medium (50% fine, 50% medium), well-rounded, poorly graded; moist to wet, 5Y 4/2	Grout (neat cement) (0'-350' bgs)
		ML	96–98		SILT, no plasticity, soft, trace clay (5%); dry, 5Y 4/2	
		CL	98–100		CLAY, low to medium plasticity, soft, trace gravel, fine (5%), orange mottling in bands; dry, 10YR 6/6	
		SP	100–103		SAND, fine to medium (50% fine, 50% medium), well-rounded, poorly graded; wet, 10YR 4/6	4" LC Steel Casing (0'-350' bgs)
		SP	103–104		SAND, fine to coarse (5% fine, 45% medium, 45% coarse), well-rounded, poorly graded, trace gravel, fine to coarse (5%); wet, 2.5Y 4/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 8 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP			SAND, fine to medium (65% fine, 35% medium), sub-rounded to well-rounded, poorly graded; moist, 2.5Y 5/2	
		SW	106		SAND, fine to coarse (10% fine, 70% medium, 20% coarse), sub-angular to sub-rounded, well graded; moist, 2.5Y 5/2	
		SP	107 108 109		SAND, fine to coarse (30% fine, 63% medium, 5% coarse), sub-rounded, poorly graded, trace gravel, fine (2%); moist, 2.5Y 5/2	
		SW	110 111		SAND, fine to coarse (25% fine, 60% medium, 25% coarse), sub-rounded, well graded; dry to moist, 2.5Y 5/2	Grout (neat cement) (0'-350' bgs)
		SP	112 113 114 115 116 117 118		SAND, fine to medium (40% fine, 60% medium), sub-rounded, poorly graded; dry, 2.5Y 5/2	4" LC Steel Casing (0'-350' bgs)
			119		SAND, medium to coarse (50% medium, 50% coarse), sub-angular, poorly graded; dry, 2.5Y 5/2	
					SAND, fine to medium (80% fine, 20% medium), sub-angular, poorly graded; dry, 2.5Y 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 9 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	121		SAND, fine to medium (70% fine, 30% medium), well-rounded, poorly graded; wet, 2.5Y 4/3	
		SW	122		SAND, fine to coarse (33% fine, 33% medium, 34% coarse), sub-rounded to well-rounded, well graded; wet, 2.5Y 4/3	
		SP	123		SAND, very fine to fine (70% v. fine, 30% fine), well-rounded, poorly graded; moist to wet, 10YR 5/3	
			124			
		ML	125		SILT, no plasticity, soft, trace clay (5%), trace orange oxidation/mottling; moist, 10YR 5/4	Grout (neat cement) (0'-350' bgs)
			126			
			127			
			128		SILT, no plasticity, soft, clay (10%); moist, 10YR 5/6, 1" coarse sand seam at 129' bgs	
			129			
		SW	130		SAND, fine to coarse (25% fine, 30% medium, 30% coarse), sub-rounded to well-rounded, well graded, gravel, fine to medium (10% fine, 5% medium), sub-angular to sub-rounded; moist to wet, 10YR 4/4	4" LC Steel Casing (0'-350' bgs)
			131			
		SP	132		SAND, fine to medium (25% fine, 30% medium), sub-rounded, poorly graded, with gravel, fine to medium (30% fine, 15% medium), sub-angular to sub-rounded; moist to wet, 10YR 4/4	
			133		SAND, fine to coarse (50% fine, 45% medium, 5% coarse), well-rounded, poorly graded; moist, 10YR 5/4	
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 10 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME 1500 / TIME 1500
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE 06-04-20 / DATE 06-09-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	136		SAND, fine to coarse (20% fine, 75% medium, 5% coarse), sub-angular, poorly graded; moist, 7.5YR 5/4	
			136		SAND, fine to medium (50% fine, 50% medium), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/4	
			137		SAND, fine to medium (50% fine, 50% medium), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/3	
			138			
			139		SAND, fine to medium (75% fine, 20% medium), sub-angular to sub-rounded, poorly graded, trace silt (5%); dry, 10YR 6/3 to 7.5YR 5/3	
			140		SAND, fine to medium (20% fine, 80% medium), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/3	Grout (neat cement) (0'-350' bgs)
			141			
			142			
			143		SAND, very fine to fine (50% v. fine, 50% fine), sub-angular to sub-rounded, poorly graded; dry, 10YR 5/4	
			144			
			145			4" LC Steel Casing (0'-350' bgs)
			146		SAND, fine to medium (80% fine, 20% medium), sub-angular to sub-rounded, poorly graded; dry to moist, 10YR 5/4	
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 11 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SAND, fine (95%), well-rounded, poorly graded, trace silt (5%); wet, 10YR 5/6	
			152			
			153			
			154		SAND, fine to medium (80% fine, 20% medium), well-rounded, poorly graded; moist to wet, 10YR 5/6	
		SP	155		SAND, fine (95%), well-rounded, poorly graded, trace silt (5%); wet, 10YR 5/6	Grout (neat cement) (0'-350' bgs)
			156			
			157			
			158		SAND, fine to medium (80% fine, 20% medium), well-rounded, poorly graded; moist, 10YR 5/6	
			159			
			160		SILT, no plasticity, soft, trace clay (5%); moist to wet, 10YR 5/6	4" LC Steel Casing (0'-350' bgs)
		ML	161		SAND, fine to medium (50% fine, 50% medium), well-rounded, poorly graded; moist to wet, 10YR 5/6	
			162			
		SP	163		SAND, fine (100%), well-rounded, poorly graded; moist to wet, 10YR 5/6	
			164			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 12 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	166–168		SAND, fine to medium (80% fine, 20% medium), well-rounded, poorly graded; moist to wet, 10YR 5/6	
		ML	168–170		SILT, no plasticity, soft, trace sand (5%); moist to wet, 10YR 5/6, 2" silty sand seam at 169' bgs	
		SP	170–175		SAND, fine (100%), well-rounded, poorly graded; moist, 10YR 4/3	Grout (neat cement) (0'-350' bgs) 4" LC Steel Casing (0'-350' bgs)
		ML	175–177		SILT, low to no plasticity, soft, trace clay (5%); dry to moist, 10YR 6/4	
			177–178		SILT, no plasticity, soft, trace clay (5%); dry, 10YR 6/4	
		SP	179		SAND, fine to medium (70% fine, 30% medium), well-rounded, poorly graded; dry to moist, 2.5Y 5/6	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 13 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	181		SAND, fine to medium (60% fine, 40% medium), sub-rounded to well-rounded, poorly graded; moist, 10YR 5/6	
			182		SAND, fine to coarse (30% fine, 50% medium, 20% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 4/6	
			183			
			184			
			185			Grout (neat cement) (0'-350' bgs)
		SW	186			
			187			
			188			
			189			
			190		SAND, fine to coarse (70% fine, 25% medium, 5% coarse), well-rounded, poorly graded; moist, 10YR 6/4	4" LC Steel Casing (0'-350' bgs)
			191			
			192			
		SP	193			
			194			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 14 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	196–199		SAND, fine to coarse (40% fine, 40% medium, 20% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 6/4	
		SW	200–201		SAND, fine to coarse (40% fine, 40% medium, 20% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 5/4	Grout (neat cement) (0'-350' bgs)
		SP	202–203		SAND, fine to medium (60% fine, 40% medium), sub-rounded, poorly graded; moist, 10YR 5/4	
		SW	204		SAND, fine to coarse (40% fine, 30% medium, 30% coarse), sub-rounded, well graded; moist, 10YR 5/4	
		SW	205–209		SAND, fine to coarse (20% fine, 20% medium, 30% coarse), sub-rounded, well graded, with gravel, fine (30%), angular; moist, 2.5Y 5/6	4" LC Steel Casing (0'-350' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN						
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW13A [848626]		
LOGGED BY: AS/AEL/JM	CHECKED BY: AS							SHEET 15 OF 25		
DRILLING CONTR.: Traut										
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING		
BORING DEPTH: 370 FT BGS								START	FINISH	
GROUND SURFACE ELEVATION: 911.211 FT AMSL			WATER LEVEL					TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME					1500	1500	
COMMENTS: Northing: 4979807.846 Easting: 508221.325			DATE					DATE	DATE	
			CASING DEPTH					06-04-20	06-09-20	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	211		SAND, fine to coarse (60% fine, 35% medium, 5% coarse), sub-rounded to well-rounded, poorly graded; moist, 10YR 6/4	
			212		SAND, fine to coarse (30% fine, 50% medium, 20% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 6/4	
			213			
			214			
			215		SAND, fine to coarse (30% fine, 30% medium, 35% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine to medium (5%); moist, 10YR 6/4	Grout (neat cement) (0'-350' bgs)
			216			
			217			
			218			
		SW	219			
			220		SAND, fine to coarse (30% fine, 45% medium, 20% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine (5%); moist, 10YR 4/3	4" LC Steel Casing (0'-350' bgs)
			221			
			222			
			223			
			224			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS			SHEET 16 OF 25
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 370 FT BGS				
GROUND SURFACE ELEVATION: 911.211 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325		DATE		DATE / DATE
		CASING DEPTH		06-04-20 / 06-09-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	226–230		SAND, fine to coarse (20% fine, 45% medium, 30% coarse), sub-rounded, well graded, trace gravel, fine to medium (5%); moist to wet, 10YR 5/2	Grout (neat cement) (0'-350' bgs)
		SW	230–231		SAND, fine to coarse (20% fine, 25% medium, 15% coarse), sub-rounded, well graded, with gravel, fine to medium (20% fine, 20% medium), sub-rounded to well-rounded; wet, 10YR 5/6	
		SP	232–235		SAND, fine to coarse (60% fine, 35% medium, 5% coarse), sub-rounded to well-rounded, poorly graded; moist, 10YR 5/3	4" LC Steel Casing (0'-350' bgs)
		SW	235–239		SAND, fine to coarse (30% fine, 40% medium, 30% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 5/6	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 17 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	241		SAND, fine to coarse (30% fine, 40% medium, 30% coarse), sub-rounded to well-rounded, well graded; moist, 10YR 5/6	
			242		SAND, fine to coarse (45% fine, 45% medium, 5% coarse), sub-rounded, poorly graded; moist, 10YR 6/2	
			243			
			244			
			245			Grout (neat cement) (0'-350' bgs)
			246		SAND, fine to medium (55% fine, 40% medium), sub-rounded, poorly graded, trace clay at 246.5' bgs (2%), trace gravel, fine (3%), trace iron staining; moist, 7.5YR 4/6	
		SP	247		SAND, fine to coarse (65% fine, 25% medium, 5% coarse), sub-rounded, poorly graded, trace gravel, medium (5%); moist, 10YR 6/4	
			248			
			249			
			250			4" LC Steel Casing (0'-350' bgs)
			251			
			252		SAND, fine to coarse (30% fine, 40% medium, 25% coarse), sub-rounded, well graded, trace gravel, fine (5%); moist, 10YR 6/2	
		SW	253			
			254			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW13A [848626]	
LOGGED BY: AS/AEL/JM	CHECKED BY: AS			SHEET 18 OF 25	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 370 FT BGS					
GROUND SURFACE ELEVATION: 911.211 FT AMSL		WATER LEVEL		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1500	1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325		DATE		DATE 06-04-20	DATE 06-09-20
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			256		SAND, fine to medium (70% fine, 30% medium), well-rounded, poorly graded; moist, 10YR 7/1	
		SP	257		SAND, fine to coarse (60% fine, 35% medium, 5% coarse), well-rounded, poorly graded; moist, 10YR 7/1	
			258			
			259			
			260		SAND, fine to coarse (10% fine, 20% medium, 20% coarse), well-rounded, well graded, with gravel, fine to coarse (5% fine, 15% medium, 30% coarse), well-rounded; moist, 10YR 4/3	Grout (neat cement) (0'-350' bgs)
			261			
		SW	262			
			263			
			264			
			265		SAND, fine to coarse (40% fine, 55% medium, 5% coarse), sub-rounded to well-rounded, poorly graded; moist, 10YR 5/6	4" LC Steel Casing (0'-350' bgs)
			266			
			267			
		SP	268			
			269			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 19 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	271		SAND, fine to coarse (25% fine, 65% medium, 5% coarse), sub-rounded to well-rounded, poorly graded, trace lithic fragments (5%); dry to moist, 10YR 5/4	
		SC	272		CLAYEY SAND, fine to medium (35% fine, 35% medium), sub-rounded, clay (30%); moist, 10YR 6/4	
			273			
			274			
		LF	275		LITHIC FRAGMENTS, not competent dolostone, very weathered, sand, medium to coarse (25%), sub-rounded, lithic fragments of shale/sandy shale (25%), oxidized; 10YR 7/2	Grout (neat cement) (0'-350' bgs)
			276		LITHIC FRAGMENTS, not competent dolostone, reworked clasts (10-20%), sand, coarse (10-20%), oolitic texture (10%), trace dolomitic precipitate (5%); 10YR 6/3	
			277		LITHIC FRAGMENTS, not competent dolostone, fine dolomitic precipitate (30%), sand, fine (15%), iron staining (10%); 10YR 8/1	
	Jordan Fm. @ 278' bgs		278		LITHIC FRAGMENTS, not competent dolostone, orange to dark red iron staining (15%); 10YR 7/3	
			279		SHALE, moderately competent, sugary texture, trace sand (3%), trace vugs (2%); GLEY2 4/10BG, beginning of Jordan	
			280		SANDSTONE, moderately cemented, fine to medium (85% fine, 5% medium), sub-rounded, trace iron staining (3%); 10YR 5/6 to 10YR 5/4	4" LC Steel Casing (0'-350' bgs)
		Cj	281			
			282			
			283			
			284		SHALE, competent, sand, very fine (10%); GLEY1 5/10GY	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 20 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL		WATER LEVEL	TIME 1500 / TIME 1500
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979807.846 Easting: 508221.325		DATE / CASING DEPTH	DATE 06-04-20 / DATE 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW13A-GW 286-290	Cj	286		SHALE, competent, sand, very fine (10%); GLEY1 5/10GY	
			286		SANDSTONE, poorly cemented, fine to medium (85% fine, 5% medium), sub-rounded, trace iron staining (3%); 10YR 5/6 to 10YR 5/4	
			287			
			288			
			289			
			290		SHALE, competent, bioturbation (10-15%), sand, very fine (5-10%); GLEY1 5/10GY	Grout (neat cement) (0'-350' bgs)
			290		SANDSTONE, poorly cemented, fine to medium (40% fine, 55% medium), sub-rounded to well-rounded, trace lithic shale fragments (5%); 10YR 6/3	
			291			
			292			
			293		SANDSTONE, poorly cemented, fine to medium (40% fine, 60% medium), sub-rounded to well-rounded; 10YR 6/8	
			294			
			295			4" LC Steel Casing (0'-350' bgs)
			296			
			297			
			298		SANDSTONE, poorly cemented, fine to medium (20% fine, 70% medium), sub-rounded, lithic shale fragments (10%); 10YR 5/2	
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 21 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			301		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), sub-rounded; 10YR 5/2	
			302			
			303			
			304			
		Cj	305		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), sub-rounded; 5Y 6/1	Grout (neat cement) (0'-350' bgs)
			306			
			307			
			308			
			309			
	St. Lawrence Fm. @ 310' bgs		310		SHALE, not to moderately competent, very weathered, trace green staining (3%), trace bioturbation (2%), trace sand, very fine (1%); GLEY2 5/10BG, clay observed, beginning of St. Lawrence	4" LC Steel Casing (0'-350' bgs)
			311			
			312			
		Cs	313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 22 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL		WATER LEVEL	TIME 1500 / TIME 1500
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4979807.846 Easting: 508221.325		DATE / CASING DEPTH	DATE 06-04-20 / DATE 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			316		SHALE, not to moderately competent, very weathered, trace green staining (3%), trace bioturbation (2%), trace sand, very fine (1%); GLEY2 5/10BG, clay observed	
			317			
			318			
			319			
			320		SHALE, not competent, trace precipitate (2%); GLEY1 5/N	Grout (neat cement) (0'-350' bgs)
			321			
			322			
		Cs	323		SHALE, not competent, very weathered (clay); GLEY1 4/N	
			324			
			325			4" LC Steel Casing (0'-350' bgs)
			326			
			327		SHALE, not competent, very weathered (clay), glauconite/chlorite (25%), bioturbation (10%); GLEY1 5/10GY	
			328			
			329		SHALE, moderately competent, weathered, sand, very fine (20%), trace thin fractures (2%); GLEY1 6/10Y, clay observed	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW13A [848626]	
LOGGED BY: AS/AEL/JM	CHECKED BY: AS							SHEET 23 OF 25	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START / FINISH	
BORING DEPTH: 370 FT BGS									
GROUND SURFACE ELEVATION: 911.211 FT AMSL			WATER LEVEL					TIME 1500	TIME 1500
DATUM: NAD 83 UTM 15 (meters)			TIME						
COMMENTS: Northing: 4979807.846 Easting: 508221.325			DATE					DATE 06-04-20	DATE 06-09-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cs	331		SHALE, moderately competent, sand, fine (20%), precipitate (5-10%), trace manganese staining (5%); GLEY1 5/10Y	
			332			
			333			
			334			
			335		SHALE, moderately competent, glauconite/chlorite (40%); GLEY1 5/10GY	Grout (neat cement) (0'-350' bgs)
			336			
			337		SHALE, moderately competent, glauconite/chlorite (40%), sand, fine to medium (25%), dark manganese staining on sand (10%); GLEY1 5/5GY	
			338		SHALE, not competent, very weathered (clay), lithic fragments (25%); GLEY1 5/10GY	
			339		SHALE, not to moderately competent, weathered, glauconite (50-60%), trace sand, fine (5%); GLEY1 7/10Y to GLEY1 5/10GY	
			340		SHALE, moderately competent to competent, glauconite (20-30%), sand, fine (5-10%), trace vugs (5%), trace interlayered silt (5%); GLEY1 6/10GY	4" LC Steel Casing (0'-350' bgs)
			341			
			342			
			343			
			344			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 24 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Lone Rock Fm. @ 345' bgs	Ct	346		SANDSTONE, poorly to moderately cemented, fine to medium, sub-rounded, dolomitic precipitate (10%), trace glauconite (5%), trace dark manganese staining (5%); GLEY2 4/10G, beginning of Tunnel City	Grout (neat cement) (0'-350' bgs)
			347			
			348			4" LC Steel Casing (0'-350' bgs)
			349			
			350		SANDSTONE, poorly to moderately cemented, fine to medium, well-rounded, dolomitic cement (10%); GLEY2 5/10BG to GLEY2 5/10G	Grout Basket (350' bgs)
			351			
			352			
			353			
			354			
			355			7" Open Hole (350'-370' bgs)
			356			
			357			
			358			
			359			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13A [848626]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 25 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 370 FT BGS			
GROUND SURFACE ELEVATION: 911.211 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 1500
COMMENTS: Northing: 4979807.846 Easting: 508221.325	DATE		DATE / DATE
	CASING DEPTH		06-04-20 / 06-09-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly to moderately cemented, fine to medium, well-rounded, dolomitic cement (10%), vugs (10%); GLEY1 5/N, clay observed	
		Ct	361			
			362			
			363			
			364			
			365			7" Open Hole (350'-370' bgs)
			366			
			367			
			368			
			369			
			370		E.O.B. @ 370' bgs, no refusal	
			371			
			372			
			373			
			374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 1 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	MW13B-SOIL 11-14	SP	1–7		SAND, fine to medium (50% fine, 45% medium), sub-rounded, poorly graded, trace clay (5%); wet, 10YR 6/6 SAND, fine to coarse (55% fine, 35% medium, 5% coarse), sub-rounded, poorly graded, trace clay (5%); moist, 10YR 6/6 SAND, medium to coarse (60% fine, 40% medium), sub-rounded, poorly graded; dry, 10YR 4/6	Grout (neat cement) (0'-291' bgs)
		SW	9		SAND, fine to coarse (45% fine, 40% medium, 10% coarse), sub-rounded, well graded, trace silt (5%); moist to wet, 10YR 4/6	4" LC Steel Casing (0'-295' bgs)
		SC	10		CLAYEY SAND, fine to coarse (20% fine, 50% medium, 10% coarse), sub-rounded, well graded, clay (20%); moist, 10YR 4/4	
		SP	11–13		SAND, fine to coarse (15% fine, 70% medium, 5% coarse), sub-rounded, poorly graded, with clay (10%); moist, 10YR 4/4	
		CL	14		CLAY, low to medium plasticity, soft, with sand, fine to medium (20%), sub-rounded; moist, 10YR 5/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 2 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SAND, fine to medium (60% fine, 40% medium), sub-rounded, poorly graded; dry, 10YR 5/6	
			17			
			18			
DISCRETE	MW13B-SOIL 20-22	SP	19		SAND, fine to coarse (10% fine, 80% medium, 5% coarse), sub-rounded, poorly graded, trace clay (5%); dry, 10YR 5/3	
			20			Grout (neat cement) (0'-291' bgs)
DISCRETE	MW13B-SOIL 22-24		21		SAND, fine to medium (30% fine, 70% medium), sub-rounded, poorly graded; dry, 10YR 5/6	
			22			
GRAB	MW13B-GW 22-24	SW	23		SAND, fine to coarse (20% fine, 50% medium, 20% coarse), sub-rounded, well graded, with clay (10%); moist, 10YR 4/3, clay lense @ 22.5' bgs	
			24			
			25			4" LC Steel Casing (0'-295' bgs)
			26		SAND, fine to coarse (10% fine, 60% medium, 20% coarse), sub-angular to sub-rounded, well graded, with clay (10%); dry to moist, 10YR 5/6 to 10YR 5/4, clay lense @ 27' bgs	
			27			
			28			
			29			
		SP			SAND, medium to coarse (70% medium, 30% coarse), sub-rounded, poorly graded; moist, 10YR 4/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 3 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31		SAND, fine to coarse (30% fine, 30% medium, 30% coarse), sub-rounded to well-rounded, well graded, gravel, fine (10%), sub-angular; moist to wet, 10YR 4/3	
		GW	32		GRAVEL, fine to coarse (50% fine, 20% medium, 20% coarse), sub-angular to sub-rounded, well graded, sand, coarse (10%), sub-rounded; moist to wet, 10YR 4/2	
			33			
			34			
		CL	35		CLAY, low plasticity, medium stiff, gravel, coarse (5-10%), sub-rounded, trace cobbles (5%); dry to moist, 10YR 5/2, 1" wet sand seams @ 35', 35.5', and 36' bgs	Grout (neat cement) (0'-291' bgs)
			36			
			37			
			38			
		SC	39		CLAYEY SAND, fine to medium (50% fine, 20% medium), well-rounded, clay (25%), trace gravel, coarse (5%); wet, 10YR 4/1	
		CL	40		CLAY, low plasticity, medium stiff, gravel, coarse (5-10%), sub-rounded, trace cobbles (5%); dry to moist, 10YR 5/2	4" LC Steel Casing (0'-295' bgs)
			41		SANDY CLAY, low plasticity, soft to medium stiff, sand, fine to medium (40%), gravel, fine to medium (5-10%); dry, 10YR 3/1	
			42			
			43			
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 4 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW13B-SOIL 46-50	SP	46–50		SAND, medium to coarse (35% medium, 35% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (20%), with clay (10%); moist, 5Y 4/1	
GRAB	MW13B-GW 46-50	SP	46–50		SAND, medium to coarse (18% medium, 80% coarse), sub-rounded to well-rounded, poorly graded, trace gravel, medium (2%); dry to moist, 5Y 4/1	
		SW	50–55		SAND, fine to coarse (10% fine, 30% medium, 40% coarse), sub-angular to sub-rounded, well graded, with gravel, fine to medium (15% fine, 5% medium), sub-angular to sub-rounded; moist to wet, 10YR 4/3, 3" fine gravel seam @ 54' bgs	Grout (neat cement) (0'-291' bgs)
		SW	55–56		SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-rounded to well-rounded, well graded; moist to wet, 10YR 4/2	4" LC Steel Casing (0'-295' bgs)
		GP	56–59		GRAVEL, fine to medium (60% fine, 25% medium), sub-angular to sub-rounded, poorly graded, with sand, coarse (15%), well-rounded; moist to wet, 10YR 4/2	
		SW	59		SAND, fine to coarse (20% fine, 55% medium, 20% coarse), sub-rounded to well-rounded, well graded, trace gravel, fine (5%); moist, 10YR 4/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW13B [848625]	
LOGGED BY: AS/AEL/JM	CHECKED BY: AS							SHEET 5 OF 21	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 310 FT BGS									
GROUND SURFACE ELEVATION: 910.219 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1000	1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148			DATE					DATE	DATE
			CASING DEPTH					06-15-20	06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	61		CLAY, low plasticity, soft, with sand, fine to medium (15%), sub-rounded, trace gravel, coarse (5%); moist, 10YR 4/2	
		SP			SAND, fine to medium (47% fine, 47% medium), sub-rounded, poorly graded, trace gravel, coarse (5%), trace cobbles (1%); moist, 10YR 4/2	
		CL	62		CLAY, medium plasticity, stiff, trace sand, coarse (5%), trace gravel, medium (5%); dry to moist, 10YR 4/2	
		SP	63		SAND, medium to coarse (25% medium, 50% coarse), sub-rounded, poorly graded, with gravel, medium to coarse (10% medium, 15% coarse), sub-angular to sub-rounded; wet, 10YR 4/3	
			64		SAND, fine to medium (45% fine, 45% medium), sub-rounded, poorly graded, with clay (10%); moist, 10YR 4/3	
			65		CLAY, low to medium plasticity, very stiff, trace gravel, fine (5%); dry, 10YR 5/4	Grout (neat cement) (0'-291' bgs)
		CL	66			
			67			
			68		CLAY, medium to high plasticity, stiff, trace sand, coarse (5%), trace gravel, fine (5%); moist, 10YR 5/4	
		CH	69			
			70		CLAY, medium plasticity, stiff, very mottled (gray, red, orange, green), silt (10%); dry, 5Y 5/1	4" LC Steel Casing (0'-295' bgs)
			71			
			72			
		CL	73			
			74			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 6 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	76–79		CLAY, medium plasticity, stiff, very mottled (gray, red, orange, green), silt (10%); dry, 5Y 5/1	
			79–80		CLAY, low plasticity, soft, very weathered; dry, 7.5YR 3/3	
		CH	80–87		CLAY, high plasticity, soft to medium stiff, mottled, trace sand, fine (3%); dry, 10YR 6/3	Grout (neat cement) (0'-291' bgs) 4" LC Steel Casing (0'-295' bgs)
		SP	87–89		SAND, fine to coarse (5% fine, 80% medium, 10% coarse), sub-rounded, poorly graded, trace clay (3%), trace gravel, fine to medium (2%); moist, GLEY1 4/10Y	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN
PROJECT: Project 1007		DRILLING METHOD: Sonic	BORING NO.: MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET: 7 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 1000 FINISH: 1300
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL		WATER LEVEL / TIME / DATE / CASING DEPTH	TIME: 1000 / TIME: 1300 / DATE: 06-15-20 / DATE: 06-17-20
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4979807.128 Easting: 508216.148			

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW13B-SOIL 91-95 +DUP+MS/MSD	SW	91–96		SAND, fine to coarse (30% fine, 60% medium, 10% coarse), sub-rounded, well graded; moist, GLEY1 4/10Y	Grout (neat cement) (0'-291' bgs)
GRAB	MW13B-GW 91-95 +DUP+MS/MSD					
		SP	97–99		SAND, fine to medium (10% fine, 90% medium), sub-rounded, poorly graded; moist, 10YR 5/2 SAND, fine to medium (30% fine, 70% medium), sub-rounded, poorly graded; moist, 10YR 5/6	
		CL	100		SANDY CLAY, low plasticity, stiff, sand, fine (30%), sub-rounded, trace gravel, fine (5%); dry, 10YR 5/6	4" LC Steel Casing (0'-295' bgs)
		GP	101		COBBLES, sub-angular to sub-rounded; dry to moist, 10YR 5/6	
		SP	102–104		SAND, medium (90%), sub-rounded, poorly graded, with silt (10%); moist to wet, 7.5YR 4/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 8 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SAND, medium (90%), sub-rounded, poorly graded, with silt (10%); moist to wet, 7.5YR 4/1	
			107		SAND, medium to coarse (45% medium, 40% coarse), sub-angular to sub-rounded, poorly graded, gravel, fine to medium (10%), trace silt (5%); moist, 7.5YR 4/1	
			108		SAND, fine to coarse (20% fine, 70% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, trace silt (5%); moist to wet, 7.5YR 4/1	
			109			
			110			Grout (neat cement) (0'-291' bgs)
		SP	111		SAND, medium to coarse (60% medium, 40% coarse), sub-rounded to well-rounded, poorly graded; moist, 10YR 5/2	
			112		SAND, fine to medium (60% fine, 37% medium), sub-angular to sub-rounded, poorly graded, trace silt (3%); moist, 10YR 5/2	
			113			
			114			
			115			4" LC Steel Casing (0'-295' bgs)
			116			
			117		SILT, low plasticity, soft, sand, fine to medium (10%), sub-rounded, trace clay (5%); dry to moist, 10YR 5/4	
		ML	118			
			119			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET: 9 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: TIME 1000 / DATE 06-15-20
BORING DEPTH: 310 FT BGS			DRILLING FINISH: TIME 1300 / DATE 06-17-20
GROUND SURFACE ELEVATION: 910.219 FT AMSL		WATER LEVEL / TIME / DATE / CASING DEPTH	
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS: Northing: 4979807.128 Easting: 508216.148			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW13B-SOIL 121-125		121		SAND, medium to coarse (70% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, with clay (9%), trace gravel, coarse (1%); moist, 7.5YR 4/4	
			122			
GRAB	MW13B-GW 121-125		123		SAND, fine to coarse (25% fine, 70% medium, 5% coarse), sub-rounded, poorly graded; dry to moist, 7.5YR 5/3	
			124			
		SP	125		SAND, medium to coarse (50% medium, 35% coarse), sub-angular to sub-rounded, poorly graded, gravel, fine to coarse (10%), sub-angular, trace silt (5%); moist, 7.5YR 4/4	Grout (neat cement) (0'-291' bgs)
			126		SAND, fine to medium (70% fine, 30% medium), sub-rounded, poorly graded; dry to moist, 7.5YR 5/6	
			127			
			128			
			129			
		SW	130		SAND, fine to coarse (10% fine, 60% medium, 30% coarse), sub-rounded, well graded; dry to moist, 7.5YR 6/6	4" LC Steel Casing (0'-295' bgs)
			131		SILTY SAND, fine (85%), sub-rounded, silt (15%); dry, 7.5YR 5/6	
			132			
		SM	133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 10 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	136		SILTY SAND, fine (85%), sub-rounded, silt (15%); dry, 7.5YR 5/6	
		SP	137		SAND, fine to medium (85% fine, 15% medium), sub-rounded, poorly graded; dry to moist, 7.5YR 5/6	
			140		SAND, fine to medium (80% fine, 20% medium), sub-rounded, poorly graded; moist to wet, 10YR 4/4	Grout (neat cement) (0'-291' bgs)
			145			4" LC Steel Casing (0'-295' bgs)
			148		SAND, fine to medium (80% fine, 20% medium), sub-rounded, poorly graded; moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 11 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	151–157		SAND, fine to medium (80% fine, 15% medium), sub-rounded, poorly graded, trace silt (5%); dry to moist, 10YR 4/4	Grout (neat cement) (0'-291' bgs)
		ML	157–160		SILT, low plasticity, soft, with sand, fine (15%), sub-rounded; dry, 10YR 5/4	4" LC Steel Casing (0'-295' bgs)
		SP	160–163		SAND, fine to medium (78% fine, 20% medium), sub-rounded, poorly graded, trace silt (2%); moist, 10YR 5/4	
		ML	163–164		SILT, low plasticity, soft, sand, fine (10%), sub-rounded; wet, 10YR 4/4	
		SP	164		SAND, fine to medium (85% fine, 5% medium), sub-rounded, poorly graded, with silt (10%); moist, 10YR 5/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 12 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	166–168		SAND, fine to medium (85% fine, 5% medium), sub-rounded, poorly graded, with silt (10%); moist, 10YR 5/4	
		ML	168–170		SILT, low plasticity, soft to medium stiff, trace sand, fine (5%); dry, 10YR 5/4	
		SP	170–176		SAND, fine to medium (80% fine, 15% medium), sub-rounded, poorly graded, trace silt (5%); moist to wet, 10YR 4/4	Grout (neat cement) (0'-291' bgs) 4" LC Steel Casing (0'-295' bgs)
		ML	176–179		SANDY SILT, low plasticity, soft, sand, fine to medium (30%), sub-rounded; moist, 10YR 5/4	
		SP	179		SAND, fine to medium (49% fine, 49% medium), sub-rounded, poorly graded, trace silt (2%); dry to moist, 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 13 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: TIME 1000 / FINISH: TIME 1300
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW13B-SOIL 181-185	SP	181		SAND, fine to coarse (25% fine, 70% medium, 5% coarse), sub-angular to sub-rounded, poorly graded; dry to moist, 10YR 5/4	
GRAB	MW13B-GW 181-185		182			
			183			
			184			
			185		SAND, fine to coarse (55% fine, 40% medium, 5% coarse), sub-rounded, poorly graded; dry to moist, 10YR 5/6	Grout (neat cement) (0'-291' bgs)
			186			
			187			
			188			
			189			
			190			4" LC Steel Casing (0'-295' bgs)
			191			
			192			
			193			
			194			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 14 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	196		SAND, medium to coarse (30% medium, 50% coarse), sub-rounded, poorly graded, with gravel, fine (20%), sub-rounded; moist to wet, 10YR 5/6	
			197			
			198			
			199		SAND, fine to medium (70% fine, 30% medium), sub-rounded to well-rounded, poorly graded; moist to wet, 10YR 5/6	
			200			Grout (neat cement) (0'-291' bgs)
			201		SAND, fine to medium (85% fine, 15% medium), well-rounded, poorly graded; moist, 10YR 5/6	
			202			
			203			
			204			
			205		SAND, fine to coarse (5% fine, 55% medium, 40% coarse), sub-angular to sub-rounded, poorly graded; dry, 10YR 4/3	4" LC Steel Casing (0'-295' bgs)
			206			
			207			
			208			
			209			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS			SHEET 15 OF 21
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 310 FT BGS				
GROUND SURFACE ELEVATION: 910.219 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148		DATE		DATE / DATE
		CASING DEPTH		06-15-20 / 06-17-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	211		SAND, fine to coarse (40% fine, 50% medium, 10% coarse), sub-rounded, well graded; dry, 10YR 5/3	
			212			
			213			
			214		SAND, fine to coarse (10% fine, 40% medium, 50% coarse), sub-rounded, well graded; dry, 10YR 5/4	
			215		SAND, fine to coarse (10% fine, 30% medium, 60% coarse), sub-angular to sub-rounded, well graded; dry to moist, 10YR 5/4	Grout (neat cement) (0'-291' bgs)
			216			
			217			
			218			
			219			
COMP	MW13B-SOIL 221-225 (+DUP)		220			4" LC Steel Casing (0'-295' bgs)
			221			
			222			
GRAB	MW13B-GW 221-225 (+DUP)		223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 16 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	226–230		SAND, fine to coarse (10% fine, 70% medium, 20% coarse), sub-angular to sub-rounded, well graded; dry, 10YR 5/4	Grout (neat cement) (0'-291' bgs)
		SW	227–230		SAND, fine to coarse (25% fine, 63% medium, 10% coarse), sub-angular to sub-rounded, well graded, trace gravel, fine (2%); dry, 10YR 4/4	
		SP	230–235		SAND, fine to coarse (5% fine, 65% medium, 30% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 5/4	
		SP	235–239		SAND, fine to coarse (5% fine, 55% medium, 40% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 5/4	4" LC Steel Casing (0'-295' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 17 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	241		SAND, fine to coarse (30% fine, 65% medium, 5% coarse), sub-angular to sub-rounded, poorly graded; moist, 10YR 4/4	
			242			
			243			
			244			
			245		SAND, fine to medium (45% fine, 50% medium), sub-rounded, poorly graded, trace silt (3%), trace gravel, fine (2%); moist, 10YR 5/4	Grout (neat cement) (0'-291' bgs)
			246			
			247		SAND, fine to coarse (15% fine, 50% medium, 20% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (12%), sub-angular, trace cobbles (3%); moist, 10YR 5/4	
			248			
			249			
		SW	250		SAND, fine to coarse (40% fine, 30% medium, 25% coarse), sub-rounded, well graded, trace gravel, fine (3%), trace cobbles (2%); moist, 10YR 5/4	4" LC Steel Casing (0'-295' bgs)
			251			
			252			
			253			
			254			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 18 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	256		SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-rounded, well graded; moist, 2.5Y 6/4	
		SP	257		SAND, fine (90%), well-rounded, poorly graded, with silt (10%); dry, 2.5Y 5/3	
			258			
			259			
		SW	260		SAND, fine to coarse (30% fine, 55% medium, 10% coarse), sub-rounded, well graded, trace lithic fragments (5%); moist to wet, 2.5Y 6/4	Grout (neat cement) (0'-291' bgs)
		GP	261		GRAVEL, medium to coarse (60% medium, 25% coarse), sub-angular to well-rounded, poorly graded, sand, coarse (10%), well-rounded, trace silt (5%); wet, 10YR 3/3	
			262			
			263			
			264			
			265			4" LC Steel Casing (0'-295' bgs)
			266			
		SP	267		SAND, fine to medium (20% fine, 80% medium), sub-rounded, poorly graded; moist, 10YR 4/6	
			268			
			269		SAND, fine to medium (65% fine, 30% medium), sub-rounded, poorly graded, trace silt (5%); dry to moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 19 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		LF	271		LITHIC FRAGMENTS, not competent dolostone, very weathered, sand, fine (30%); 10YR 6/3, clay observed	
			272			
			273			
			274			
			275		LITHIC FRAGMENTS, not competent dolostone, very weathered, sand, fine (30%); 10YR 6/3, clay observed, coarser fragments than 270'-275' bgs	Grout (neat cement) (0'-291' bgs)
			276			
			277			
			278			
			279			
			280		LITHIC FRAGMENTS, not to moderately competent dolostone, sand, medium to coarse (30%), dolomitic precipitate (30%), oxidized; 2.5Y 5/4	4" LC Steel Casing (0'-295' bgs)
			281			
			282			
			283		LITHIC FRAGMENTS, not to moderately competent dolostone, sand, medium to coarse (30%), dolomitic precipitate (30%), oolitic texture (15%), vugs (15%); 10YR 5/3	
			284			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 20 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1300
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE / DATE
	CASING DEPTH		06-15-20 / 06-17-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 285' bgs	Cj	286		SANDSTONE, moderately competent, interlayered shale; GLEY 5/10B to 2.5Y 5/4, beginning of Jordan	Grout (neat cement) (0'-291' bgs)
			288		SHALE, not competent, dolomitic precipitate (15%); GLEY1 5/10GY	4" LC Steel Casing (0'-295' bgs)
			290		SANDSTONE, poorly cemented, fine to medium (90% fine, 10% medium), sub-rounded; 10YR 6/8	
			292		SANDSTONE, poorly cemented, fine to medium (85% fine, 15% medium), sub-rounded; 10YR 6/8	2' Fine Sand (291'-293' bgs)
			293			Sand filter pack (293'-305' bgs)
			294			
			295			
			296			
			297			
			298			
			299		SANDSTONE, poorly cemented, fine (100%), sub-rounded; 10YR 6/8 to GLEY1 7/2	Screened interval (0.010" slot) (295'-305' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13B [848625]
LOGGED BY: AS/AEL/JM	CHECKED BY: AS		SHEET 21 OF 21
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 310 FT BGS			
GROUND SURFACE ELEVATION: 910.219 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1300
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979807.128 Easting: 508216.148	DATE		DATE 06-15-20 / DATE 06-17-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			301		SANDSTONE, poorly cemented, fine to medium (80% fine, 20% medium), sub-rounded; GLEY1 7/2	
			302		SANDSTONE, poorly cemented, fine to medium (80% fine, 20% medium), sub-rounded, trace shale (5%); GLEY1 7/1, 1" shale seam @ 304' bgs	Sand filter pack (293'-305' bgs) Screened interval (0.010" slot) (295'-305' bgs)
		Cj	303			
			304			
			305			
			306			
			307			Sluff Backfill (305'-310' bgs)
			308			
			309			
			310		E.O.B. @ 310' bgs, no refusal	
			311			
			312			
			313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 1 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME 1100 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE 11-2-20 / DATE 11-2-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–3		SAND, fine to medium (fine 25%, medium 60%), sub-rounded, poorly graded, trace organics (5%), trace clay (5%), trace silt (5%); moist, 10YR 3/3.	
		SP	3–4		SAND, fine to medium (fine 25%, medium 60%), sub-rounded, poorly graded, trace gravel (5%), trace clay (5%), trace silt (5%); moist, 10YR 4/4.	
		SP	4–12		SAND fine to coarse (fine 35%, medium 45%, coarse 5%), poorly graded, with silt (10%), trace clay (5%); moist, 10YR 4/4.	Grout (neat cement) (0'-110' bgs) 2" Black Iron Casing (0'-115' bgs)
		SW	12–14		SAND, fine to coarse (fine 40%, medium 30%, coarse 20%), sub-rounded, well graded, trace clay (5%), trace silt (5%); moist 10YR 4/4.	
		CL	14		CLAY, medium plasticity, soft, with sand (fine 10%), with silt (10%); moist, 10YR 4/4.	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 2 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME: 1100 / 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE: 11-2-20 / 11-2-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SAND, medium (95%), sub-rounded, poorly graded, trace clay (5%); moist, 10YR 5/6.	
			17			
			18			
			19		SAND, medium (90%), sub-rounded, poorly graded, with clay (10%); moist, 10YR 4/4.	
		SP	20		SAND, medium to coarse (medium 20%, coarse 80%), sub-rounded, poorly graded; dry to moist, 7.5YR 4/6.	Grout (neat cement) (0'-110' bgs)
			21			
			22		SAND, medium to coarse (medium 20%, coarse 75%), sub-rounded, poorly graded, trace clay (5%); dry to moist, 7.5YR 4/6.	
			23		SAND, medium to coarse (fine 30%, medium 70%), sub-rounded, poorly graded; dry to moist, 10YR 4/4.	
			24			
			25		CLAY, medium plasticity, soft, with sand (fine 10%, medium 10%); moist, 10YR 5/2.	2" Black Iron Casing (0'-115' bgs)
		CL	26		SAND, medium to coarse (medium 30%, coarse 70%), sub-rounded, poorly graded; dry to moist, 10YR 5/3.	
			27			
			28			
			29			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 3 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME: 1100 / 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE: 11-2-20 / 11-2-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	31–35		SAND, fine to coarse (fine 5%, medium 20%, coarse 70%), round to sub-rounded, trace gravel (fine 5%), sub-angular; moist, 10YR 5/2.	Grout (neat cement) (0'-110' bgs)
		SP	35–37		SAND, medium to coarse (medium 10%, coarse 60%), round to sub-rounded, poorly graded, with gravel (fine 20%, medium 10%), sub-angular; moist, 10YR 5/2.	
		CL	37–40		SANDY CLAY, low plasticity, stiff, with sand (fine 30%, medium 10%), round, with silt (10%), trace large cobbles >4" diameter, strong organic odor; moist, 10YR 4/2.	
		SP	40–41		SAND, fine to medium (fine 80%, medium 10%), round, poorly graded, with silt (10%); wet, 10YR 4/2.	2" Black Iron Casing (0'-115' bgs)
		SP	41–42		SAND, fine to coarse (fine 2%, medium 3%, coarse 60%), sub-rounded, poorly graded, with gravel (fine 20%, medium 10%), angular, trace silt (5%); wet, 10YR 4/2.	
		SP	42–44		SAND, fine to medium (fine 70%, medium 10%), round, poorly graded, with clay (10%), trace silt (5%), trace cobbles 1" diamenter, slight organic odor; moist, 10YR 3/1.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 4 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME 1100 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE 11-2-20 / DATE 11-2-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46–49		SAND, fine to medium (fine 70%, medium 10%), round, poorly graded, with clay (10%), trace silt (5%), trace cobbles 1" diamenter, slight organic odor; moist, 10YR 3/1.	
		SP	49–50		SAND, coarse (70%), sub-rounded, poorly graded, with gravel (fine 15%, medium 5%), sub-angular, trace silt (5%), trace cobbles 2" diameter; moist 10YR 3/1.	
		SW	50–53		SAND, fine to coarse (fine 20%, medium 10%, coarse 50%), sub-rounded, well graded, with gravel (fine 10%), with rock clasts (10%); moist, 10YR 4/1.	Grout (neat cement) (0'-110' bgs)
		SW	53–57		SAND, fine to coarse (fine 10%, medium 20%, coarse 50%), sub-rounded, well graded, with gravel (fine 10%, medium 10%), sub-angular; moist, 10YR 4/2.	2" Black Iron Casing (0'-115' bgs)
		SP	57–59		SAND, fine to medium (fine 70%, medium 5%), round, poorly graded, with clay (20%), trace silt (5%); wet, 10YR 4.2.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 5 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1100 / 1720
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE / DATE
	CASING DEPTH		11-2-20 / 11-2-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	61		CLAYEY SAND, medium to coarse (medium 15%, coarse 40%), clay (25%), with gravel (fine 10%), sub-angular, with silt (10%), slight organic odor; moist, 10YR 4/2.	
		GW	62		GRAVEL, fine to coarse (fine 10%, medium 20%, coarse 20%), sub-angular, well graded, with sand (medium 10%, coarse 20%), sub-rounded, with rock clasts >1" (15%), trace silt (5%); moist 7.5YR 3/1.	
			63		CLAY, high plasticity, very stiff, with sand (fine 10%, medium 10%), sub-angular, with gravel (fine 10%), sub-rounded; moist, 7.5YR 4/6.	
			64			
			65			Grout (neat cement) (0'-110' bgs)
			66			
			67			
			68			
		CH	69			
			70		CLAY, high plasticity, very stiff, red mottling, black mottling, yellow mottling, oxidation; moist, 10YR 3/1, 5YR 4/6, 10YR 2/2.	2" Black Iron Casing (0'-115' bgs)
			71			
			72			
			73			
			74		CLAY, high plasticity, very stiff, red mottling, black mottling, yellow mottling, oxidation; moist, GLEY 1 7/10Y, GLEY 1 7/5G-2, 5YR 4/6.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 6 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME 1100 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE 11-2-20 / DATE 11-2-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		CLAY, high plasticity, very stiff, red mottling, black mottling, yellow mottling, oxidation; moist, GLEY 1 7/10Y, GLEY 1 7/5G-2, 5YR 4/6.	
			77		CLAY, high plasticity, very stiff, red mottling, black mottling, yellow mottling, oxidation; moist, GLEY 1 7/10Y, 5YR 4/6, 10YR 2/2.	
			78			
		CH	79			
			80		CLAY, high plasticity, very stiff, trace sand (fine 5%), red mottling, black mottling, yellow mottling, oxidation; moist, GLEY 1 7/10Y, 5YR 4/6, 10YR 2/2.	Grout (neat cement) (0'-110' bgs)
			81			
			82			
			83		SAND, fine to coarse (fine 85%, medium 5%, coarse 5%), sub-rounded, poorly graded, trace rock clasts 1" diameter (5%); moist, GLEY 2 3/10G.	
			84			
			85			2" Black Iron Casing (0'-115' bgs)
			86			
		SP	87			
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW13C [854546]	
LOGGED BY: CK	CHECKED BY: JM							SHEET 7 OF 9	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 125 FT BGS									
GROUND SURFACE ELEVATION: 909.851 FT AMSL			WATER LEVEL					TIME 1100	TIME 1720
DATUM: NAD 83 UTM 15 (meters)			TIME						
COMMENTS: Northing: 4979810.137 Easting: 508215.68			DATE					DATE 11-2-20	DATE 11-2-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	91–97		SAND, fine to medium (fine 70%, medium 30%), round, poorly graded; moist, 10YR 5/1.	Grout (neat cement) (0'-110' bgs)
		CL	97–98		CLAY, medium plasticity, medium stiffness, with sand (fine 15%, medium 5%), trace oxidation; moist, 10YR 6/6.	
		SP	98–99		SAND, fine to medium (fine 70%, medium 30%), round, poorly graded; moist, 10YR 6/6.	
		CL	100–103		CLAY, medium plasticity, medium stiffness, with sand (fine 15%), well-rounded; moist 10YR 5/4.	2" Black Iron Casing (0'-115' bgs)
		SP	103–104		SAND, fine to medium (fine 20%, medium 75%), round to sub-rounded, poorly graded, trace clay (5%), 104'-105' bgs green sand GLEY 3/5G/2; moist, 10YR 5/1.	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 8 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME 1100 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE 11-2-20 / DATE 11-2-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	106–110		SAND, fine to medium (fine 20%, medium 75%), round to sub-rounded, poorly graded, trace clay (5%), 104'-105' bgs green sand GLEY 3/5G/2; moist, 10YR 5/1.	Grout (neat cement) (0'-110' bgs)
		SP	110–114		SAND, fine to medium (fine 25%, medium 70%), round, poorly graded, trace clay (5%); moist, 10YR 5/1.	3/8" Bentonite Chips (110'-112' bgs); Sand filter pack (112'-125' bgs); 2" Black Iron Casing (0'-115' bgs)
		CL	114–116		CLAY, medium plasticity, medium stiffness, with sand (fine 20%); moist, 10YR 5/6.	
		SW	116–119		SAND, fine to coarse (fine 10%, medium 10%, coarse 75%), round to sub-rounded, well graded, trace gravel (fine 5%), sub-angular; moist, 10YR 5/6.	2" LC Stainless Iron Screen (115'-125' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW13C [854546]
LOGGED BY: CK / CHECKED BY: JM			SHEET 9 OF 9
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 125 FT BGS			
GROUND SURFACE ELEVATION: 909.851 FT AMSL	WATER LEVEL		TIME 1100 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979810.137 Easting: 508215.68	DATE		DATE 11-2-20 / DATE 11-2-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	121–125		SAND, fine to coarse (fine 10%, medium 10%, coarse 75%), round to sub-rounded, well graded, trace gravel (fine 5%), sub-angular; moist, 10YR 5/6.	Sand filter pack (112'-125' bgs) 2" LC Stainless Steel Screen (115'-125' bgs)
			125		E.O.B. @125' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW13D [833402]
LOGGED BY: JM / CHECKED BY: AS			SHEET 1 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad / EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 25 FT BGS			
GROUND SURFACE ELEVATION: 910.851 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1400
COMMENTS: Northing: 4979811.167 Easting: 508220.623	DATE		DATE / DATE
	CASING DEPTH		10-15-20 / 10-15-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0–1		SILT, topsoil, organics; dry, 10YR 2/1.	
		SM	1–2		SILTY SAND, fine to medium (fine 75%, medium 10%), silt (15%), cohesive; moist, 10YR 2/1.	
		SP	2–5		SAND, fine to medium (fine 80%, medium 10%), round to sub-rounded, poorly graded, with silt (10%); moist, 10YR 4/3.	
		SP	5–10		SAND, fine to coarse (fine 75%, medium 20%, coarse 2%), round to sub-rounded, poorly graded, trace silt (3%); moist, 10YR 4/3.	Grout (neat cement) (0'-10' bgs)
		SW	10–12		SAND, fine to coarse (fine 20%, medium 60%, coarse 20%), angular to sub-rounded, well graded; wet, 10YR 4/2.	2" PVC Casing (0'-15' bgs) 3/8" Bentonite Chips (10'-13' bgs)
		SP	12–14		SAND, fine to medium (fine 95%, medium 5%), round to sub-rounded, poorly graded; moist, 10YR 4/2.	Sand filter pack (13'-25' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. MW13D [833402]
LOGGED BY: JM / CHECKED BY: AS			SHEET 2 OF 2
DRILLING CONTR.: Dakota			
DRILLER: Cody Eyestad / EQUIP.: Geoprobe 7822	SAMPLING METHOD: 5' liners		DRILLING START / FINISH
BORING DEPTH: 25 FT BGS			
GROUND SURFACE ELEVATION: 910.851 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1330 / 1400
COMMENTS: Northing: 4979811.167 Easting: 508220.623	DATE		DATE / DATE
	CASING DEPTH		10-15-20 / 10-15-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16–20		SAND, fine to coarse (fine 85%, medium 10%, coarse 5%), round to sub-rounded, poorly graded, 2" low plasticity clay at 16' bgs; moist to wet, 10YR 5/3.	
		SW	20–22		SAND, fine to coarse (fine 20%, medium 40%, coarse 30%), sub-rounded to angular, well graded, with gravel (medium 10%), 2" low plasticity clay at 21' bgs; saturated, 10YR 4/2.	Sand filter pack (13'-25' bgs)
		SW	22–25		SAND, fine to coarse (fine 40%, medium 40%, coarse 20%), sub-rounded to angular, well graded; saturated, 10YR 4/3.	2" PVC Screen (15'-25' bgs)
			25		E.O.B. @25' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 1 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Hydrovac, sandy clay w/ gravel	Grout (neat cement) (0'-312' bgs)
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
		SC	10		CLAYEY SAND, fine to medium (65%), well rounded, poorly graded, clay (25%), coarse gravel (10%); moist, 10YR 4/2	4" LC Steel Casing (0'-316' bgs)
			11			
		SW	12		SAND, fine (20%), medium (53%), coarse (10%), well rounded, well graded, clay (7%), gravel, fine to coarse (10%); dry, 10YR 5/4	
			13			
			14			
		SW			SAND, fine (5%), medium (60%), coarse (30%),	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 2 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–19		subrounded, well graded, fine to medium gravel (5%); dry, 10YR 5/4	
		SP	19–20		SAND, fine (40%) to medium (20%), subrounded, poorly graded, silt (40%), low plasticity; dry, 10YR 5/4	Grout (neat cement) (0'-312' bgs)
		ML	21–24		SANDY SILT, silt (60%), low plasticity, fine to medium sand (30%), subrounded, clay (5%), fine to medium gravel (5%); moist, 10YR 5/4	
		SM	24–28		SILTY SAND, fine (40%) to medium (20%), subrounded, poorly sorted, silt (40%), low plasticity; moist, 10YR 5/4	4" LC Steel Casing (0'-316' bgs)
		ML	28–29		SILT, low plasticity, soft, fine to medium sand (25%); moist, 10YR 4/4	
		SP	29		SAND, fine (10%), medium (70%), coarse (5%), well rounded, poorly graded, clay (10%), fine to medium gravel (5%); moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 3 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31–32		SANDY SILT, low to medium plasticity, soft, sand, fine to coarse (35%), subrounded, fine to medium gravel (5%); wet, 10YR 4/4	
		CL	33–36		CLAY, medium plasticity, medium stiffness, sand, medium to coarse (35%), subrounded, fine gravel (5%); moist, 10YR 4/4, cobble @ 36.5	Grout (neat cement) (0'-312' bgs)
	St. Peter Fm. @ 37' bgs		37			
		Os	37–40		SANDSTONE, poorly cemented, fine (20%) to medium (80%), subrounded to well rounded; moist, 10YR 7/8	
		Os	40–41		SANDSTONE, poorly cemented, fine (60%) to medium (40%), well rounded; dry, 2.5Y 8/8	4" LC Steel Casing (0'-316' bgs)
		Os	41–43		SANDSTONE, poorly cemented, fine (40%) to medium (60%), well rounded; dry, 2.5Y 8/3	
		Os	43–44		SANDSTONE, poorly cemented, fine (75%) to medium (25%), well rounded; dry, 2.5Y 8/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 4 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	46		SANDSTONE, poorly cemented, fine (75%) to medium (25%), well rounded; dry, 2.5Y 8/4	
			47			
			48		SANDSTONE, poorly cemented, fine (45%) to medium (55%), well rounded; dry, 2.5Y 8/2	
			49			
			50		SANDSTONE, poorly cemented, fine (75%) to medium (15%), well rounded, silt (10%), massive iron mottling (51-56'); dry to moist, 2.5Y 8/1 to 5YR 6/6	Grout (neat cement) (0'-312' bgs)
			51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-316' bgs)
			56		SANDSTONE, poorly cemented, fine (90%) to medium (10%), well rounded; dry to moist, 10YR 7/6	
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW14A [850557]		
LOGGED BY: AL	CHECKED BY: BK								SHEET 5 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 330 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 963.448 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						0830	1700	
COMMENTS: Northing: 4982094.888 Easting: 504393.721			DATE						DATE	DATE	
			CASING DEPTH						12/04/20	12/10/20	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61		SANDSTONE, poorly cemented, fine (90%) to medium (5%), well rounded, silt (5%), massive iron staining; 10YR 7/8	
			62			
			63			
			64			
			65			Grout (neat cement) (0'-312' bgs)
			66		SANDSTONE, poorly cemented, fine (100%), well rounded, massive iron staining; 10YR 7/8	
			67			
			68		SANDSTONE, poorly cemented, fine (100%), well rounded, massive iron staining; 10YR 6/8	
			69			
			70		SANDSTONE, poorly cemented to trace moderate cementing, fine (95%) to medium (5%), well rounded, faint iron staining, trace silt; 10YR 2/1 to 10YR 6/6	4" LC Steel Casing (0'-316' bgs)
			71			
			72			
			73			
			74			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 6 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly cemented to trace moderate cementing, fine (95%) to medium (5%), well rounded, faint iron staining, trace silt; 10YR 2/1 to 10YR 6/6	
			77			
			78			
			79			
			80		SANDSTONE, poorly cemented, fine (95%), silt (5%), well rounded, dark orange mottling (25%); 2.5Y 7/8 to 5YR 5/6	Grout (neat cement) (0'-312' bgs)
			81			
			82			
		Os	83		SANDSTONE, poorly to moderately cemented, fine (97%) to medium (3%), well rounded, faint iron staining (50%); 2.5Y 8/4	
			84			
			85			4" LC Steel Casing (0'-316' bgs)
			86			
			87		SANDSTONE, poorly cemented, fine (97%) to medium (3%), subrounded to well rounded; 2.5Y 8/3	
			88			
			89			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 7 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine (97%) to medium (3%), subrounded to well rounded; 2.5Y 8/3	
			92		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; 10YR 6/8	
			93		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; 2.5Y 8/4	
			94			
			95			Grout (neat cement) (0'-312' bgs)
			96		SANDSTONE, moderately cemented, fine (100%), well rounded to subrounded; 2.5Y 8/2 to 2.5 8/4	
		Os	97			
			98		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; 2.5Y 8/3	
			99			
			100		SANDSTONE, poorly cemented, fine (97%), subrounded to well rounded, trace silt (3%), iron staining (5%); 2.5Y 7/2 to 2.5Y	4" LC Steel Casing (0'-316' bgs)
			101			
			102		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; 2.5Y 8/1	
			103			
			104			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 8 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly to moderately cemented, fine (100%), subrounded to well rounded, iron staining @ 107' bgs; 2.5Y 8/2	
			107			
			108			
			109			
			110		SANDSTONE, poorly cemented, fine (85%), well rounded, silt (15%), iron staining (10%); 2.5 8/6	Grout (neat cement) (0'-312' bgs)
			111			
		Os	112			
			113			
			114		SANDSTONE, poorly cemented, fine (95%), well rounded, silt (5%), iron staining (50%); 2.5Y 7/5 to 2.5Y 6/8	
			115			4" LC Steel Casing (0'-316' bgs)
			116		SANDSTONE, poorly to moderately cemented, fine (97%), well rounded, silt (3%), faint iron staining (5%); 2.5Y 7/3	
GRAB	MW14A-GW 116-120		117			
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 9 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	121		SANDSTONE, poorly to moderately cemented, very fine (100%), well rounded, iron staining (5%); 2.5 8/1 to 10YR 8/2	Grout (neat cement) (0'-312' bgs)
			122			
			123			
			124			
			125			
			126			
			127			
			128			
			129			
			130		SANDSTONE, poorly cemented, fine (97%), subrounded to well rounded, trace silt (3%), iron staining (10%); 2.5Y 8/2	4" LC Steel Casing (0'-316' bgs)
			131			
			132			
			133		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; 2.5Y 8/3	
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 10 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; 2.5Y 8/3	
			137		SANDSTONE, poorly to moderately cemented, fine (100%), subrounded to well rounded; 2.5Y 7/2	
			138			
			139			
			140			Grout (neat cement) (0'-312' bgs)
			141		SANDSTONE, poorly cemented, fine (97%), trace silt (3%), iron staining (10%); 2.5Y 7/6 to 2.5Y 6/8	
			142			
		Os	143			
			144			
			145			4" LC Steel Casing (0'-316' bgs)
			146		SANDSTONE, moderately cemented, fine (100%), massive iron staining; 7.5YR 7/8	
			147		SANDSTONE, poorly cemented, fine (97%), trace silt (3%), iron staining (5%); 2.5Y 8/1	
GRAB	MW14A-GW 146-150		148			
			149			
					SANDSTONE, poorly cemented, fine (100%), iron	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 11 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		staining (70%); 2.5Y 6/8 SANDSTONE, poorly cemented, fine (95%), trace silt (5%), iron staining (5%); 2.5Y 7/3	
			152			
			153		SANDSTONE, poorly cemented, fine (97%), trace silt (3%), subrounded to well rounded, massive iron staining; 7.5YR 5/8	
			154			
			155			Grout (neat cement) (0'-312' bgs)
			156		SANDSTONE, poorly cemented, fine (97%), trace silt (3%), subrounded to well rounded, iron staining (3%); 2.5Y 8/1	
		Os	157			
			158			
			159			
			160		SANDSTONE, poorly cemented, fine (50%) to medium (50%), well rounded, iron staining (5%); 2.5Y	4" LC Steel Casing (0'-316' bgs)
			161		SANDSTONE, moderately to well cemented, fine (100%), subrounded to well rounded; 5Y 8/1	
			162		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded, iron staining (5%); 2.5Y 7/2	
			163		SANDSTONE, poorly cemented, fine (75%) to medium (25%), subrounded to well rounded, iron staining (20%); 2.5Y 7/2	
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 12 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		SANDSTONE, poorly cemented, fine (75%) to medium (25%), subrounded to well rounded, iron staining (20%); 2.5Y 7/2	
			167		SANDSTONE, poorly to well cemented, fine (80%) to medium (20%), subrounded to well rounded, iron staining (5%); 2.5Y 6/4	
			168			
			169			
			170		SANDSTONE, poorly cemented, fine (20%) to medium (70%), silt (10%), well rounded, massive iron staining; 10YR 6/3 to 10YR 5/6	Grout (neat cement) (0'-312' bgs)
		Os	171			
			172			
			173		SANDSTONE, moderately cemented, fine (35%), medium (25%), coarse (25%), well rounded, silt (15%), massive iron staining, dark iron stain (10%); 7.5YR 6/4 to 7.5YR 4/4	
			174			
			175			4" LC Steel Casing (0'-316' bgs)
			176			
			177		SHALE, well compacted, fine interbeds, sand (15%); GLEY1 5/N	
			178			
	Shakopee Fm. @ 178.5' bgs	Ops	179		DOLOSTONE, moderately competent, vugs (25%), precipitates (10%); 7.5YR 6/2	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 13 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW14A-GW 286-290	Ops	181		DOLOSTONE, not competent, shale interbeds, chert (20%), sand (15%), small vugs (10%); 2.5Y 6/4	
			182			
			183			
			184			
			185		DOLOSTONE, not competent, some shale observed, vugs (15%), sand (10%), oolitic texture (5%), chert precipitates (5%); 7.5YR 5/4	Grout (neat cement) (0'-312' bgs)
			186			
			187			
			188			
			189			
			190		DOLOSTONE, moderately competent, vugs (20%), precipitate (15%), manganese and iron staining (5%), fractures (1%); 10YR 6/2	4" LC Steel Casing (0'-316' bgs)
			191		DOLOSTONE, competent, precipitate (10%), vugs (5%); 10YR 6/6	
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW14A [850557]		
LOGGED BY: AL	CHECKED BY: BK								SHEET 14 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 330 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 963.448 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						0830	1700	
COMMENTS: Northing: 4982094.888 Easting: 504393.721			DATE						DATE	DATE	
			CASING DEPTH						12/04/20	12/10/20	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW14A-GW 196-200	Ops	196		DOLOSTONE, moderately competent to competent, sand (15%), reworked chert clasts (15%), vugs (5%), thin fractures (3%); 10YR 6/4	
			197		DOLOSTONE, not competent to competent, fine to medium precipitate (20%), thin bed parallel fractures (10%), sand (10%), small vugs (3%), vertical fractures; 10YR 7/2	
			198			
			199			
			200		DOLOSTONE, not to moderately competent, iron staining (25%), fractures (15%), sand (5%), precipitate (5%), clay observed; 2.5Y 6/8, 3" shale @ 204'	Grout (neat cement) (0'-312' bgs)
			201			
			202			
			203			
			204			
			205		DOLOSTONE, competent, sand (15%), manganese staining (5%); 2.5Y 6/4	4" LC Steel Casing (0'-316' bgs)
			206		DOLOSTONE, not competent, precipitate (25%), sand (10%), massive iron staining; 2.5Y 6/4	
			207		DOLOSTONE, moderately competent to competent, sand (25%), dendritic manganese staining (10%), iron staining (5%), precipitate (10%), fractures (3%), vugs (2%); 2.5Y 6/4	
			208			
			209			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 15 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	211		DOLOSTONE, moderately competent, precipitate (15%), iron and manganese staining (15%), small vugs (10%), thin fracturing (10%), trace bioturbation and wavy bedding (3%), trace malachite (2%); 10YR 6/2	
			212			
			213			
			214			
			215			Grout (neat cement) (0'-312' bgs)
			216			
			217		DOLOSTONE, competent, iron and malachite staining (35%), precipitate (20%), vugs (10%), trace bioturbation (5%); 10YR 6/4, clay observed	
			218			
			219			
			220		DOLOSTONE, not competent, iron and malachite staining (10%), sand (5%); 10YR 6/3	4" LC Steel Casing (0'-316' bgs)
			221			
			222		DOLOSTONE, not competent, malachite (10%), manganese staining (10%), sand (5%), precipitate (1%); 10YR 5/6, clay observed	
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW14A [850557]	
LOGGED BY: AL	CHECKED BY: BK			SHEET 16 OF 22	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 330 FT BGS					
GROUND SURFACE ELEVATION: 963.448 FT AMSL		WATER LEVEL		TIME 0830	TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME			
COMMENTS: Northing: 4982094.888 Easting: 504393.721		DATE		DATE 12/04/20	DATE 12/10/20
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not competent, malachite (10%), manganese staining (10%), sand (5%), precipitate (1%); 10YR 5/6, clay observed	
			226		DOLOSTONE, not competent, precipitate (10%), faint bioturbation (5%), trace sand (3%), trace fractures (3%); 10YR 6/4	
			227			
			228		DOLOSTONE, poorly to moderately competent, precipitate (5%), fractures (2%), massive iron staining; 7R 6/1	
			229			
			230			Grout (neat cement) (0'-312' bgs)
			231			
		Ops	232			
			233			
			234			
			235			4" LC Steel Casing (0'-316' bgs)
			236			
			237		DOLOSTONE, moderately competent to competent, precipitate (25%), vugs (20%), sand (15%), iron staining (5%); 7.5YR 6/2 to 7.5YR 4/4	
			238			
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 17 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0830 / 1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE / DATE
	CASING DEPTH		12/04/20 / 12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, moderately competent, sand (15%); 10YR 6/4	
			242		SHALE, well compacted, fine dolomitic interbedding; GLEY1 6/10GY	
			243		DOLOSTONE, competent, iron banding (15%), precipitate (15%), sand (10%), small vugs, trace chert @ 244', bioturbation @ 247'; 10YR 6/6	
			244			
			245			Grout (neat cement) (0'-312' bgs)
			246			
		Ops	247			
			248			
			249			
			250		DOLOSTONE, competent, precipitate (25%), sand (15%), cross bedding (10%); 10YR 6/4	4" LC Steel Casing (0'-316' bgs)
			251			
			252		SHALE, well compacted, iron and manganese staining (15%), sand (5%); GLEY1 6/10GY	
			253			
			254		DOLOSTONE, moderately competent, iron staining (20%), sand (10%), precipitate (10%), trace malachite staining; 10YR 6/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 18 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			256		DOLOSTONE, moderately competent, iron staining (20%), sand (10%), precipitate (10%), trace malachite staining; 10YR 6/4	
			257			
			258		DOLOSTONE, moderately competent to competent, vugs (20%), green malachite staining (20%), iron staining (15%), sand (10%), fractures (3%); 10YR 6/2	
		Ops	259			
			260		DOLOSTONE, moderately competent to competent, iron staining (50%), precipitate (20%), sand (5%), trace fossils; 10YR 6/4 to 10YR 6/8 to 10YR 7/2	Grout (neat cement) (0'-312' bgs)
			261			
			262			
	Oneota Fm. @ 263' bgs		263		DOLOSTONE, moderately competent to competent, vugs (30%), precipitate (10%), trace iron staining; 10YR 8/2	
			264			
			265			4" LC Steel Casing (0'-316' bgs)
			266			
		Opo	267			
			268			
			269			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 19 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	271		DOLOSTONE, moderately competent to competent, vugs (10%), fine to coarse precipitate (10%), trace glauconitic staining (2%), clay observed; 10YR 7/8	
			272			
			273		DOLOSTONE, faint iron staining (25%), fine precipitate (5%), manganese staining (5%), trace fractures, vugs (1%); 10YR 8/3	
			274			
			275			Grout (neat cement) (0'-312' bgs)
			276			
			277		DOLOSTONE, very competent, trace manganese staining (3%), bed parallel fractures (2%), trace vugs (2%), trace green staining (1%); 10YR 8/2	
			278			
			279			
			280			4" LC Steel Casing (0'-316' bgs)
			281			
			282		DOLOSTONE, moderately competent to competent, iron staining (25%), precipitate (25%), vugs (20%), bioturbation (5%); 10YR 6/2	
			283			
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW14A [850557]	
LOGGED BY: AL	CHECKED BY: BK									SHEET 20 OF 22	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 330 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 963.448 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						0830	1700
COMMENTS: Northing: 4982094.888 Easting: 504393.721				DATE						DATE	DATE
				CASING DEPTH						12/04/20	12/10/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	286		DOLOSTONE, competent, small vugs (35%), precipitate (20%), trace iron staining; 10YR 6/1	
			287		DOLOSTONE, moderately competent to competent, iron staining (25%), precipitate (25%), vugs (20%), bioturbation (5%); 10YR 6/2	
			288			
			289			
			290		DOLOSTONE, moderately competent to competent, small vugs (10%), trace precipitate (<5%), massive iron staining, small fracturing; 10YR 5/6	Grout (neat cement) (0'-312' bgs)
			291			
			292			
			293		DOLOSTONE, competent, precipitate (20%), some iron staining (15%), trace green staining (<5%), small trace fractures; 10YR 5/3	
			294			
			295			4" LC Steel Casing (0'-316' bgs)
			296			
			297			
			298			
			299		DOLOSTONE, competent, glauconitic staining (30%), iron staining in spots (10%), small vugs (<5%), trace sand (1%), massive faint glauconite staining; 10YR 6/6	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 21 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			301		DOLOSTONE, competent, vugs (5%), iron staining (5%), manganese staining (3%), trace chert; 10YR 6/6	
			302		DOLOSTONE, moderately competent to competent, coarse sand (25%), glauconite (25%), precipitate (15%); GLEY1 5G4/1 to 10YR 6/4	
			303			
			304		DOLOSTONE, not to moderately competent, vugs (5%), iron staining (5%), manganese staining (3%), trace chert; 10YR 6/6	
		Opo	305			Grout (neat cement) (0'-312' bgs)
			306		DOLOSTONE, competent to moderately competent, sand (20%), iron staining (10%), vugs (3%), glauconitic staining (2%); 10YR 7/4	
			307			
			308		No recovery, drilled soft according to driller - implies sandstone	
			309			
	Jordan Fm. @ 310' bgs		310		SANDSTONE, poorly to moderately cemented, fine (65%) to medium (30%), well rounded, silt (5%); 10YR 6/6	4" LC Steel Casing (0'-316' bgs)
			311			
			312			
		Cj	313			2' Fine Sand (312'-314' bgs)
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14A [850557]
LOGGED BY: AL / CHECKED BY: BK			SHEET 22 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 330 FT BGS			
GROUND SURFACE ELEVATION: 963.448 FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982094.888 Easting: 504393.721	DATE		DATE 12/04/20 / DATE 12/10/20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			316		SANDSTONE, poorly to moderately cemented, fine (65%) to medium (30%), well rounded, silt (5%); 10YR 6/6	
		Cj	317		SANDSTONE, poorly cemented, fine (20%) to medium (80%), well rounded; 10YR 8/1	
			318			
			319			
			320		No recovery	Grout (neat cement) (0'-312' bgs)
			321			Sand filter pack (314'-326' bgs)
			322			
			323			Screened interval (0.010" slot) (316'-326' bgs)
			324			
			325			4" LC Steel Casing (0'-316' bgs)
			326			
			327			
			328			Backfill by natural collapse (326-330')
			329		E.O.B. @ 330' bgs, no refusal	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14B [850558]
LOGGED BY: AL / CHECKED BY: BK			SHEET 1 OF 5
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 67 FT BGS			
GROUND SURFACE ELEVATION: 963.280 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1730
COMMENTS: Northing: 4982089.686 Easting: 504393.787	DATE		DATE / DATE
	CASING DEPTH		12/15/20 / 12/15/20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	10		SANDY CLAY, low plasticity, soft, clay (50%), sand, fine to medium (30%), subrounded, drillers pellets (15%), fine to medium gravel (5%), subrounded; 7.5YR 3/4	Grout (neat cement) (0'-56' bgs); 4" LC Steel Casing (0'-60' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14B [850558]
LOGGED BY: AL / CHECKED BY: BK			SHEET 2 OF 5
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 67 FT BGS			
GROUND SURFACE ELEVATION: 963.280 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1730
COMMENTS: Northing: 4982089.686 Easting: 504393.787	DATE		DATE / DATE
	CASING DEPTH		12/15/20 / 12/15/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDY CLAY, low plasticity, soft, clay (50%), sand, fine to medium (30%), subrounded, drillers pellets (15%), fine to medium gravel (5%), subrounded; 7.5YR 3/4	
		CL	16			
			17			
			18			
			19			
			20			Grout (neat cement) (0'-56' bgs)
			21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-60' bgs)
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14B [850558]
LOGGED BY: AL / CHECKED BY: BK			SHEET 3 OF 5
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 67 FT BGS			
GROUND SURFACE ELEVATION: 963.280 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1730
COMMENTS: Northing: 4982089.686 Easting: 504393.787	DATE		DATE / DATE
	CASING DEPTH		12/15/20 / 12/15/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW14B-SOIL COMP-30-37 -01-121520	CL	31–37		SANDY CLAY, low plasticity, soft, thin layer of drillers pellets, sand, fine to medium (40%), subrounded to well rounded, fine to coarse gravel (10%), subangular to subrounded; 7.5YR 2.5/3 to 7.5YR 3/3	Grout (neat cement) (0'-56' bgs)
		SW	37–39		SAND, fine (30%), medium (20%), coarse (20%), subrounded to well rounded, fine to medium gravel (20%), subangular, silt (10%); 7.5YR 4/4	
	St. Peter Fm. @ 37' bgs		39–40		SANDSTONE, poorly cemented, fine (85%) to medium (15%), subrounded; 10YR 8.5/1 to 2.5Y 7/6	4" LC Steel Casing (0'-60' bgs)
			40–41		SANDSTONE, poorly cemented, fine (95%) to medium (5%), subrounded, massive faint iron staining; 2.5Y 7/6	
		Os	41–44		SANDSTONE, poorly cemented, fine (97%) to medium (3%), subrounded to well rounded, 1" iron staining @ 44'; 10YR 8/1	
			44		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; 10YR 8/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14B [850558]
LOGGED BY: AL / CHECKED BY: BK			SHEET 4 OF 5
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 67 FT BGS			
GROUND SURFACE ELEVATION: 963.280 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1730
COMMENTS: Northing: 4982089.686 Easting: 504393.787	DATE		DATE / DATE
	CASING DEPTH		12/15/20 / 12/15/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	46		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; 10YR 8/1	
			47		SANDSTONE, poorly cemented, fine (100%), well rounded; 10YR 8/2	
			48			
			49			
			50		SANDSTONE, poorly cemented, fine (95%), subrounded to well rounded, silt (5%), faint iron staining (50%); 10YR 8/4	Grout (neat cement) (0'-56' bgs)
			51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-60' bgs)
			56		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded, massive iron staining; 10YR 7/4	
			57			2' Fine Sand (56'-58' bgs)
			58			
			59			Sand filter pack (58'-70' bgs)
					SANDSTONE, poorly cemented, fine (100%),	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14B [850558]
LOGGED BY: AL / CHECKED BY: BK			SHEET 5 OF 5
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 67 FT BGS			
GROUND SURFACE ELEVATION: 963.280 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1730
COMMENTS: Northing: 4982089.686 Easting: 504393.787	DATE		DATE / DATE
	CASING DEPTH		12/15/20 / 12/15/20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			61		subrounded to well rounded, massive iron staining; 10YR 5/6 SANDSTONE, poorly cemented, fine (97%), silt (3%), massive iron staining; 10YR 7/4	
			62		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; 10YR 8/1	
		Os	63			
			64			
			65			Sand filter pack (58'-70' bgs)
			66			
			67		SANDSTONE, poorly cemented, fine (97%), subrounded, silt (3%), massive iron staining; 10YR 8/1	Screened interval (0.010" slot) (60'-70' bgs)
			68			
			69			
			70		E.O.B. @ 70' bgs, no refusal	
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14C [854438]
LOGGED BY: AL / CHECKED BY: BK			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 963.117 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1600
COMMENTS: Northing: 4982087.879 Easting: 504393.641	DATE		DATE / DATE
	CASING DEPTH		04/19/21 / 04/19/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		No recovery - air knife excavation to 9' bgs.	Grout (neat cement) (0'-126' bgs)
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9		GRAVELLY SAND, medium to coarse (5% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (30% fine, 5% medium), well-rounded to sub-rounded; moist to wet, 10YR 3/4, 3.5" cobble at 10' bgs	
			10			4" LC Steel Casing (0'-130' bgs)
		SP	11		SAND, fine to medium (30% fine, 60% medium), sub-rounded, poorly graded, with silt (10%); moist, 10YR 3/4	
			12		SAND, coarse (50%), sub-rounded, poorly graded, with gravel, fine to coarse (30% fine, 5% medium, 5% coarse), sub-rounded fine to medium, sub-rounded to sub-angular coarse, with silt (10%), 10YR 3/4, 0.75-inch coarse gravel	
			13		SAND, medium to fine (70%), with cobble (10%), 3.5-4", 10YR 3/4	2' Fine Sand (12'-14' bgs)
		ML	14		SAND, medium to coarse (50% medium, 30% coarse), with gravel (20%), fine, rounded, moist to	Sand filter pack (14'-36' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14C [854438]
LOGGED BY: AL / CHECKED BY: BK			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 963.117 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1600
COMMENTS: Northing: 4982087.879 Easting: 504393.641	DATE		DATE / DATE
	CASING DEPTH		04/19/21 / 04/19/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		wet, 10YR 3/4 SILT, with clay (10%), dry to moist, 10YR 3/6 SAND, fine (70%), with silt (15-20%), with gravel, medium to coarse (10%), sub-angular, moist to dry, 10YR 3/6	
		SM	19		SAND, fine, with silt (15-20%), with clay (10%), with gravel, coarse (5%), 2", sub-angular to angular, 10YR 3/6	
			20		SAND, fine (65%), medium to coarse gravel (5%), sub-angular to sub-rounded, 0.5-1", with silt (20%), with cobbles (5%), sub-angular, moist to dry, 10YR 3/6	← Sand filter pack (14'-36' bgs)
			24		SANDY CLAY, low plasticity (65%), with sand, fine (20%), trace medium to coarse gravel (5%), sub-angular, moist, 10YR 3/6	
		CL	26			← Screened interval (0.010" slot) (16'-36' bgs)
			29		SANDY CLAY, low plasticity (80%), with sand, coarse (10%), with gravel, fine to medium (5% fine, 5% medium), subrounded; 10YR 3/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW14C [854438]
LOGGED BY: AL / CHECKED BY: BK			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 963.117 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1600
COMMENTS: Northing: 4982087.879 Easting: 504393.641	DATE		DATE / DATE
	CASING DEPTH		04/19/21 / 04/19/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 36' bgs	CL	31–33		SILTY CLAY, clay (65%), low to medium plasticity, silt (15%), fine sand (10%), fine gravel (5%), moist, 7.5YR 4/4 CLAY, clay (55%), low plasticity, with silt (20%), with fine sand (10%), with gravel, fine to medium (5% fine, 5% medium), sub-angular; moist to dry CLAY, clay (60%), low plasticity, with fine sand (15%), with silt (15%), with fine gravel (10%), sub-angular to angular; moist to wet, 10YR 4/4	Sand filter pack (14'-36' bgs) Screened interval (0.010" slot) (16'-36' bgs)
		Os	36–40		SANDSTONE, fine to coarse (5% fine, 70% medium, 20% coarse), with gravel, fine to medium (5%), sub-angular to sub-rounded; 10YR 4/6, weathered SANDSTONE, fine to medium (70% fine, 30% medium, orange staining; 2.5Y 8/2	Backfill sand (36-40' bgs)
			40		E.O.B. at 40', no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Geoprobe 7822DT		BORING NO. MW14D [855330]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 2
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Geoprobe 7822DT	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 21 FT BGS			
GROUND SURFACE ELEVATION: 975.160 FT AMSL	WATER LEVEL		TIME: 1030 / 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982340.521 Easting: 503989.624	DATE		DATE: 04/27/21 / 04/27/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–1		SILTY CLAY, low plasticity, soft, with organics (grasses, 10%), trace fine sand (5%); dry to moist, 10YR 3/1	Grout (neat cement) (0'-4' bgs)
		CL	1–3		SILTY CLAY, low plasticity, soft, with organics (roots, 5%), with fine sand (15%); dry to moist, 10YR 3/2	
		CL	3–5		CLAY, medium plastificity, stiff, trace fine sand (5%); dry, 10YR 4/4	2" LC Steel Casing (0'-6' bgs) 1' Fine Sand (4'-5' bgs)
		SC	5–9		CLAYEY SAND, fine to coarse (10% fine, 50% medium, 40% coarse), sub-rounded, with fine to coarse gravel (20%), sub-angular to sub-rounded, with clay (20%); moist, 10YR 4/4	Sand filter pack (5'-21' bgs)
		SC	9–13		CLAYEY SAND, fine to coarse (15% fine, 50% medium, 5% coarse), sub-rounded, clay (25%), with gravel, fine to medium (5%), sub-angular; moist, 10YR 4/3	Screened interval (0.010" slot) (16'-21' bgs)
		SC	13–14		CLAYEY SAND, fine to coarse (15% fine, 45% medium, 5% coarse), sub-rounded, clay (15%), with silt (15%), trace gravel, fine to medium (5%), sub-angular; moist, 10YR 4/3	
		SC	14–21		CLAYEY SAND, fine to medium (50%), sub-rounded, clay (45%), trace fine gravel (5%); dry	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN
PROJECT: Project 1007		DRILLING METHOD: Geoprobe 7822DT	BORING NO. MW14D [855330]
LOGGED BY: AS	CHECKED BY: BK		SHEET 2 OF 2
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal	EQUIP.: Geoprobe 7822DT	SAMPLING METHOD:	DRILLING START / FINISH
BORING DEPTH: 21 FT BGS			
GROUND SURFACE ELEVATION: 975.160 FT AMSL		WATER LEVEL	TIME: 1030 / 1600
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4982340.521 Easting: 503989.624		DATE	DATE: 04/27/21 / 04/27/21
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	16		to moist, 10YR 4/4, trace mottling	Sand filter pack (5'-21' bgs)
		CL	17		SANDY CLAY, low plasticity, soft, sand, fine (30%), trace fine gravel (3%); dry, 10YR 5/4	
		SP	18		SAND, medium to coarse (45% medium, 25% coarse), well-rounded, with gravel, fine to medium (20%), with clay (10%); moist, 10YR 4/4	Screened interval (0.010" slot) (16'-21' bgs)
		SC	19		CLAYEY SAND, fine to medium (52% fine, 20% medium), sub-rounded, with clay (25%), trace fine gravel (3%); moist, 10YR 5/4	
			20		CLAYEY SAND, fine to coarse (10% fine, 20% medium, 40% coarse), sub-rounded to well-rounded, with clay (20%), with fine gravel (10%); moist, 10YR 4/4, grades finer towards 21'	
			21		E.O.B. at 21' bgs, no refusal	
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 1 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	1		SANDY SILT, low plasticity, soft, sand, fine to coarse (30%), well-rounded, with clay (30%), trace organics (5%); moist, 10YR 4/2	
		SM	2		SILTY SAND, fine to coarse (30% fine, 20% medium, 30% coarse), well-rounded, well graded, silt (18%), trace gravel, coarse (2%); dry, 10YR 4/2	
		SW	4		SAND, fine to coarse (19% fine, 60% medium, 20% coarse), sub-rounded to well-rounded, well graded, trace silt (1%); dry, 10YR 5/3	Grout (neat cement) (0'-326' bgs)
		SP	10		SAND, medium to coarse (10% fine, 75% medium), sub-rounded, poorly graded; with gravel, fine (15%), sub-rounded; moist, 10YR 5/2	4" LC Steel Casing (0'-330' bgs)
			13		SAND, fine to medium (20% fine, 78% medium), sub-rounded, poorly graded, trace gravel, fine (2%), sub-rounded; dry, 10YR 6/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 2 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 350 FT BGS								
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'		TIME 0900	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20		DATE 10-21-20	DATE 10-27-20
			CASING DEPTH	300'	340'			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16		SAND, fine to medium (20% fine, 78% medium), sub-rounded, poorly graded, trace gravel, fine (2%), sub-rounded; dry, 10YR 6/2	
			17		SAND, fine to medium (30% fine, 70% medium), sub-rounded to well-rounded, poorly graded; dry, 10YR 6/2	
			18			
			19			
			20		SAND, fine to coarse (5% fine, 65% medium, 30% coarse), sub-rounded to well-rounded, poorly graded; moist, 10YR 6/3	Grout (neat cement) (0'-326' bgs)
			21			
			22			
			23		SAND, medium to coarse (5% medium, 60% coarse), well-rounded, poorly graded, with gravel, fine to coarse (30% fine, 5% coarse), sub-angular to sub-rounded; moist to wet, 10YR 5/3	
			24			
			25			4" LC Steel Casing (0'-330' bgs)
			26			
			27		SAND, fine to coarse (5% fine, 20% medium, 60% coarse), well-rounded, poorly graded, with gravel, medium to coarse (10% medium, 5% coarse), sub-angular to sub-rounded; moist to wet, 10YR 4/3	
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 3 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	31–34		SAND, medium to coarse (10% medium, 50% coarse), sub-rounded, poorly graded, with gravel, fine (40%), sub-rounded; moist, 10YR 5/3	
		SW	34–36		SAND, fine to coarse (15% fine, 30% medium, 43% coarse), sub-rounded to well-rounded, well graded, gravel, fine to medium (5% medium, 5% coarse), sub-rounded, trace cobbles (2%); dry, 10YR 6/2	Grout (neat cement) (0'-326' bgs)
		SW	36–37		SAND, fine to coarse (20% fine, 50% medium, 15% coarse), sub-rounded, well graded, with gravel, fine to medium (10% fine, 5% medium), sub-rounded; dry, 10YR 6/2	
		SW	37–40		SAND, fine to coarse (15% fine, 40% medium, 10% coarse), sub-rounded, well graded, with gravel, fine to coarse (5% fine, 5% medium, 10% coarse), sub-angular, with cobbles (10%), trace silt/clay (5%); dry to moist, 10YR 5/2, cobbles mix of chemical sed. and volcanic rocks	
		GP	40–41		GRAVEL, medium to coarse (60% medium, 20% coarse), angular to sub-angular, poorly graded, cobbles (10%), trace sand, coarse (5%), trace silt (5%); wet, 10YR 4/1, cobbles include volcanic and chemical sed. rocks	4" LC Steel Casing (0'-330' bgs)
		GP	42		GRAVEL, fine to coarse (60% fine, 10% coarse), angular to sub-rounded, poorly graded, with sand (25%), angular, trace silt (5%); wet, 10YR 5/3	
		GP	43–44		GRAVEL, fine to coarse (25% fine, 30% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, with sand, coarse (40%), sub-angular; dry, 10YR 5/2, gravel is volcanic	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 4 OF 24	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 350 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'		TIME 0900	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20		DATE 10-21-20	DATE 10-27-20
			CASING DEPTH	300'	340'			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		GRAVEL, fine to coarse (25% fine, 30% medium, 5% coarse), sub-angular to sub-rounded, poorly graded, with sand, coarse (40%), sub-angular; dry, 10YR 5/2, gravel is volcanic	
		GP	47			
			48		GRAVEL, fine to coarse (5% fine, 60% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, with clay (10%), trace cobbles (5%); dry to moist, 10YR 4/2, cobbles are volcanic	
			49			
			50		SAND, medium to coarse (40% medium, 20% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (5% fine, 10% medium, 15% coarse), sub-angular, with silt (10%); moist, 10YR 5/3	Grout (neat cement) (0'-326' bgs)
		SP	51			
	Jordan Fm. @ 52' bgs		52		SANDSTONE, poorly cemented, fine (95%), sub-rounded to well-rounded, trace silt (5%), trace iron staining (5%); 10YR 8/1	
			53		SANDSTONE, poorly cemented, fine (95%), sub-rounded to well-rounded, trace silt (5%), iron staining (5-15%); 10YR 6/6	
			54			
			55		SANDSTONE, poorly cemented, fine (95%), sub-rounded to well-rounded, trace silt (5%), trace iron staining (5%); 10YR 7/3	4" LC Steel Casing (0'-330' bgs)
		Cj	56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW15A [850551]
LOGGED BY: AS / CHECKED BY: AEL			SHEET 5 OF 24
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 350 FT BGS			
GROUND SURFACE ELEVATION: 860.431 FT AMSL	WATER LEVEL: 87.8' / 98.5'		TIME: 0900 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME: 1545 / 1330		
COMMENTS: Northing: 4978461.835 Easting: 516759.789	DATE: 10-26-20 / 10-27-20		DATE: 10-21-20 / 10-27-20
	CASING DEPTH: 300' / 340'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			61		SANDSTONE, poorly cemented, very fine (95%), sub-rounded to well-rounded, trace silt (5%), iron staining - more from 60'-64' bgs (50%); 2.5Y 6/6 to 2.5Y 7/1	
			62			
			63			
			64			
		Cj	65			Grout (neat cement) (0'-326' bgs)
			66			
			67			
			68		SANDSTONE, moderately cemented, fine (100%), sub-rounded; white 8/N	
			69			
	St. Lawrence Fm. @ 70' bgs		70		SANDSTONE, poorly to moderately cemented, very fine (70%), well-rounded, silt (25,%), trace shale partings (5%), trace iron staining (5%); 10YR 8/2	4" LC Steel Casing (0'-330' bgs)
			71		SILTSTONE, poorly compacted, massive iron staining, sand, very fine (25%), well-rounded, trace clay (5%); 10YR 5/6	
			72			
		Cs	73			
			74			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 6 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SILTSTONE, poorly compacted, massive iron staining, sand, very fine (25%), well-rounded, trace clay (5%); 10YR 5/6	
			77		SILTSTONE, moderately to well compacted, sand ~77'-77.5' bgs, very fine (15%), well-rounded, thin banded iron staining observed; 10YR 5/6 to 10YR 5/4	
			78			
			79			
			80		SHALE, moderately to well compacted, very weathered (stiff clay), trace glauconitic sand (5%); 10YR 6/4	Grout (neat cement) (0'-326' bgs)
			81			
			82			
		Cs	83			
			84		SHALE, moderately compacted, conchoidal fracturing, thin orange/gray bedding; 5Y 4/1 to 10YR 6/4, clay observed	
			85			4" LC Steel Casing (0'-330' bgs)
			86			
			87		SHALE, moderately compacted, very weathered (stiff clay); 5Y 5/1	
			88			
			89			
					SHALE, moderately compacted, weathered, less	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 7 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					compacted from 83.5'-87'; 5Y 4/1, clay observed	
			91		SILTSTONE, moderately to well compacted, weathered (stiff clay), trace shale partings (5%); 5Y 5/1, clay observed	
			92			
			93			
			94			
			95		SILTSTONE, moderately compacted, sand, very fine (30%), well-rounded; 10YR 7/1, clay observed	← Grout (neat cement) (0'-326' bgs)
			96			
			97		SILTSTONE, moderately to well compacted, massive fracturing, sand, very fine (10%), faint iron staining observed, thin banding observed, trace glauconitic sand (5%); 10YR 7/4	
		Cs	98			
			99			
			100		SANDSTONE, moderately to well cemented, massive banded iron staining, trace glauconitic grains (5%); 10YR 7/2 to 10YR 7/4	← 4" LC Steel Casing (0'-330' bgs)
			101		SILTSTONE, moderately to well compacted, weathered (stiff clay), massive faint iron staining; 10YR 7/2	
			102			
			103			
			104			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 8 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cs	106		SILTSTONE, moderately to well compacted, weathered (stiff clay), massive faint iron staining; 10YR 7/2	
	Tunnel City (Mazomanie finger) @ 110' bgs (MGS gamma log confirmed, despite evidence (e.g. glauconite) that would suggest a contact closer to 95' bgs)		108		SANDSTONE, moderately to well cemented, weathered, massive faint glauconitic staining, glauconitic sand (15%), trace dolomitic cement/precipitate (5%); 10YR 6/4	
			110		SILTSTONE, moderately to well compacted, weathered, sand, very fine (25%), well-rounded, glauconitic staining (25%), faint iron staining (25%), glauconitic sand (15%); 10YR 6/3 to GLEY 1 6/5GY	Grout (neat cement) (0'-326' bgs)
		Ct	112		SANDSTONE, moderately to well cemented, weathered, very fine to medium (90% v. fine, 10% medium), well-rounded, trace glauconitic grains (5%), trace dolomitic precipitate (5%), trace glauconitic staining (3%); 10YR 5/2	4" LC Steel Casing (0'-330' bgs)
			116		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace dolomitic precipitate/cement (5%), trace well cemented sandstone @ 119' bgs; 10YR 5/4 to GLEY 1 6/5GY	
			118			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 9 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly cemented, fine (90%), well-rounded, silt (10%); 10YR 4/3	
			121		SANDSTONE, poorly cemented, fine (85%), well-rounded, silt (10%), trace clay (5%), trace well cemented sandstone (2%); 10YR 6/4	
			122			
			123			
			124		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 5/4	
			125		SANDSTONE, moderately cemented, very fine (80%), well-rounded, silt (20%); 2.5Y 6/6	Grout (neat cement) (0'-326' bgs)
			126			
			127			
		Ct	128		SANDSTONE, moderately to well cemented, very fine (90%), well-rounded, silt (10%); 2.5Y 6/3	
			129		SANDSTONE, well cemented, fine (90%), well-rounded, dolomitic/quartz precipitate (10%), glauconitic sand (5-10%); 10YR 4/4	
			130			4" LC Steel Casing (0'-330' bgs)
			131			
			132		SANDSTONE, poorly to moderately cemented, fine (95%), well-rounded, trace silt (5%); 2.5Y 6/6	
			133			
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 10 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Transition from Mazomanie to Lone Rock @ 140' bgs	Ct	136		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 5Y 7/4	
			137			
			138		SANDSTONE, moderately cemented, very fine (85%), well-rounded, silt (15%); 5Y 6/6	
			139			
			140		SANDSTONE, moderately cemented, weathered, fine (55%), well-rounded, silt (40%), trace clay (5%); GLEY 1 5G3/1 to GLEY 1 6/5GY, trace pink staining near core edges, dark green from 143'-144' bgs, clay observed	Grout (neat cement) (0'-326' bgs)
			141			
			142			
			143			
			144		SANDSTONE, moderately cemented, fine (80%), sub-rounded, silt (20%), trace iron staining (5%); GLEY 1 5/5GY, light green to orange	
			145			4" LC Steel Casing (0'-330' bgs)
			146			
			147		SANDSTONE, moderately cemented, fine (80%), sub-rounded, silt (20%); GLEY 1 5/10GY to 10YR 6/2, mostly tan, 6" green layer @ 147.5' bgs	
			148			
			149			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 11 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Transition from Lone Rock to 2nd Mazomanie finger @ 158' bgs	Ct	151		SANDSTONE, moderately cemented, fine (90%), well-rounded, silt (10%); GLEY 1 5G4/1, 2" darker green layer @ 153' bgs	
			153		SANDSTONE, moderately cemented, fine (90%), well-rounded, silt (10%); GLEY 1 5G4/1	Grout (neat cement) (0'-326' bgs)
			158		SANDSTONE, moderately cemented, fine (75%), well-rounded, silt (25%); 10YR 5/6	
			160		SANDSTONE, poorly cemented, fine (100%), well-rounded; GLEY 1 5/10Y to GLEY 1 4/5GY	4" LC Steel Casing (0'-330' bgs)
			162		SANDSTONE, moderately to well cemented, very fine (85%), well-rounded, silt (15%); 10YR 6/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 12 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Transition from 2nd Mazomanie finger to Lone Rock @168' bgs	Ct	166		SANDSTONE, poorly to moderately cemented, very fine (90%), well-rounded, silt (10%); 5Y 6/4	Grout (neat cement) (0'-326' bgs)
			168		SILTSTONE, poorly to moderately compacted, very weathered (stiff clay), clay/silt (90%), sand, very fine (10%), well-rounded; GLEY 1 5/5GY	
			170		SANDSTONE, moderately cemented, fine (95%), well-rounded, trace silt (5%); GLEY 1 5G 4/2	
			171		SANDSTONE, moderately to well cemented, very fine (85%), well-rounded, silt (15%); GLEY 1 6/5GY	
			175			4" LC Steel Casing (0'-330' bgs)
			179		SANDSTONE, well cemented, fine (80%), well-rounded, silt (20%); GLEY 1 6/10GY	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 13 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		SILTSTONE, moderately compacted, sand, fine (15%), well-rounded, trace clay (5%); GLEY 1 5G5/1	
			182		SANDSTONE, moderately cemented, very fine (80%), well-rounded, silt (18%), trace clay (2%); GLEY 1 3/5GY	
			183		SANDSTONE, poorly to moderately cemented, very fine (80%), well-rounded, silt (20%); 10YR 6/3	
			184		SANDSTONE, poorly to moderately cemented, very fine (85%), well-rounded, silt (15%); GLEY 1 5/5GY	
			185			Grout (neat cement) (0'-326' bgs)
			186			
			187		SANDSTONE, poorly to well cemented, massive glauconitic sand, very fine/fine (85%), well-rounded, clay (10%), trace silt (5%); GLEY 1 5G5/1, poorly cemented and GLEY 1 5G4/1 from 189.75'-190' bgs	
		Ct	188			
			189			
			190		SANDSTONE, poorly to moderately cemented, fine (80%), well-rounded, silt (20%), trace iron staining (5%); GLEY 1 4/10GY	4" LC Steel Casing (0'-330' bgs)
			191			
			192			
			193		SILTSTONE, moderately compacted; GLEY 1 5/10Y	
			194		SANDSTONE, moderately cemented, finely bedded silt/sand, fine (75%), well-rounded, silt (25%), iron staining (5-10%); GLEY 1 5G3/1 to GLEY 1 5/10GY	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 14 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					to 10YR 5/6, trace siltstone @ 196' bgs	
			196		SANDSTONE, moderately cemented, finely bedded silt/sand, fine (75%), well-rounded, silt (25%), iron staining (5-10%); GLEY 1 5G3/1 to GLEY 1 5/10GY to 10YR 5/6, trace siltstone @ 196' bgs	
			197			
			198			
			199		SANDSTONE, poorly to moderately cemented, fine (70%), well-rounded, silt (20%), clay (10%); GLEY 1 4/10GY	
			200		SANDSTONE, moderately cemented, very fine to fine (60% v. fine, 40% fine), well-rounded, glauconitic sand (50%); 10YR 6/8	Grout (neat cement) (0'-326' bgs)
			201		SANDSTONE, moderately to well cemented, very fine to fine (80% v. fine, 20% fine), well-rounded, glauconitic sand (80%); GLEY 1 5GY 5/2	
		Ct	202		SILTSTONE, moderately compacted, weathered (stiff clay), interbedded sand/shale, sand, very fine (30%), well-rounded, glauconitic, shale partings (5-10%); 5GY 5/2	
			203			
			204			
			205		SILTSTONE, poorly compacted, weathered (stiff clay), sand, very fine (10%), well-rounded, glauconitic; 5G 4/2	4" LC Steel Casing (0'-330' bgs)
			206			
			207		SILTSTONE, poorly to well compacted, weathered (stiff clay), interbedded sand/shale, sand, very fine to fine (15%), well-rounded, trace shale partings (5%); GLEY 1 5/10Y to GLEY 1 5G4/2	
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 15 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SILTSTONE, moderately to well compacted, sand, fine (15%), well-rounded, glauconitic, trace silt bedding (5%); GLEY 1 6/10Y to GLEY 1 4/N, clay observed	
			212		SANDSTONE, poorly to moderately cemented, fine (75%), well-rounded, glauconitic, silt (25%); GLEY 1 6/5GY	
			213			
			214			
			215		SANDSTONE, poorly cemented, fine (90%), well-rounded, glauconitic, silt (10%); GLEY 1 6/10GY	Grout (neat cement) (0'-326' bgs)
			216		SANDSTONE, poorly to moderately cemented, fine (80%), well-rounded, glauconitic, silt (20%); GLEY 1 5/10Y	
		Ct	217			
			218			
			219		SANDSTONE, moderately to well cemented, fine (100%), well-rounded, glauconitic, thin bedding (25%), trace cross bedding (5%), trace iron staining/precipitate (5%); GLEY 1 5/10GY to GLEY 1 7/10Y	
			220			4" LC Steel Casing (0'-330' bgs)
			221		SANDSTONE, well cemented, very fine (60%), well-rounded, glauconitic, silt (40%), trace vugs (5%); GLEY 1 5/5GY, clay observed	
			222			
			223		SILTSTONE, moderately to well compacted, intermittent bedded sand, fractures along basal planes, sand, fine (25%), well-rounded, glauconitic, trace silt/sand cross bedding (5%); GLEY 1 4/N, clay observed	
			224			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 16 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		SILTSTONE, moderately to well compacted, intermittent bedded sand, fractures along basal planes, sand, fine (25%), well-rounded, glauconitic, trace silt/sand cross bedding (5%); GLEY 1 4/N, clay observed	
			227			
			228		SANDSTONE, well cemented, very fine (70%), well-rounded, glauconitic, siltstone/shale partings (30%), thin cross bedding (50%); GLEY 1 6/10Y	
			229			
			230		SANDSTONE, well cemented, very fine (90%), well-rounded, glauconitic sand (40%), fine bedding (20%), clay (10%), trace bioturbation (5%); GLEY 1 6/10Y, clay observed	Grout (neat cement) (0'-326' bgs)
	Clay observed from 232'-346' bgs		231			
		Ct	232		SANDSTONE, well cemented, weathered, very fine (50%), well-rounded, clay (30%), shale partings (20%), glauconitic sand (30%), trace vugs (5%); GLEY 1 6/10Y to 10YR 7/2, clay observed	
			233			
			234			
			235		SANDSTONE, moderately to well cemented, weathered, very fine (60%), well-rounded, shale partings (10%), clay (30%), glauconitic sand (20-30%), cross bedding (10%); GLEY 1 7/10Y to 10YR 7/2, more cemented towards 240' bgs, clay observed	4" LC Steel Casing (0'-330' bgs)
			236			
			237			
			238			
			239			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 17 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		SILTSTONE, moderately to well compacted, very weathered (clay), shale partings (25%), sand, very fine (20%), well-rounded, clay (30-40%); GLEY 1 6/10Y	
			242			
			243			
			244			
			245			Grout (neat cement) (0'-326' bgs)
			246		SANDSTONE, moderately to well cemented, weathered, very fine (90%), well-rounded, faint thin cross bedding (20%), clay (10%), fractures (10%), shale partings (10%); GLEY 1 6/5GY	
		Ct	247			
			248			
			249			
			250		SILTSTONE, well cemented, weathered, sand, fine (40%), well-rounded, glauconitic, cross bedded, clay (20%), dolomitic precipitate in beds/clasts (10%), trace iron staining (2%); GLEY 1 5/10GY to slightly yellowish/reddish	4" LC Steel Casing (0'-330' bgs)
			251			
			252			
			253		SILTSTONE, moderately cemented, weathered, sand, fine (25%), well-rounded, glauconitic, clay (15%), trace mottling (5%); GLEY 1 5G 4/2, clay observed	
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 18 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			256		SILTSTONE, moderately cemented, weathered, sand, fine (25%), well-rounded, glauconitic, clay (15%), trace mottling (5%); GLEY 1 5G 4/2, clay observed	
			257		SANDSTONE, moderately cemented, fine (80%), well-rounded, silt/clay (15%), glauconitic sand (50%); GLEY 1 5G4/2	
			258			
			259			
			260			Grout (neat cement) (0'-326' bgs)
			261		SILTSTONE, poorly compacted, sand, fine (30%), well-rounded, glauconitic, clay (15%); GLEY 1 5G 4/2	
			262		SANDSTONE, moderately cemented, fine (85%), well-rounded, silt (15%), glauconitic sand (70%); GLEY 1 6/5G, clay observed	
		Ct	263			
			264			
			265			4" LC Steel Casing (0'-330' bgs)
			266			
			267		SANDSTONE, well cemented, weathered, fine (85%), well-rounded, silt (15%), glauconitic sand (70%); GLEY 1 5/10Y to black, clay observed	
			268			
			269		SANDSTONE, moderately cemented, fine (85%), well-rounded, silt (15%), glauconitic sand (70%); GLEY 1 6/10GY, clay observed	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 19 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			271		No Recovery. Fine sands/silts saturated with water over 48 hours.	
			272			
			273			
			274			
			275			Grout (neat cement) (0'-326' bgs)
			276			
			277			
		Ct	278			
			279			
			280		SANDSTONE, poorly to well cemented, fine to medium (50% fine, 25% medium), well-rounded, silt/clay (20%), trace glauconitic sand (5%); GLEY 1 5/10Y to GLEY 1 3/10Y, clay observed, includes possible sluff from 270'-280'	4" LC Steel Casing (0'-330' bgs)
			281			
			282			
			283			
	Wonewoc Fm. @ 285' bgs (MGS gamma log puts contact @ 286' bgs)		284			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 20 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW15A-SOIL 270-289	Cw	286		SANDSTONE, poorly to moderately cemented, fine to coarse (20% fine, 50% medium, 20% coarse), well-rounded, silt (10%); GLEY 1 5/5GY, includes possible sluff from 270'-280'	
			287			
			288			
			289		SILTSTONE, moderately compacted, weathered, sand, fine to medium (25%), well-rounded, trace glauconitic sand (5%), trace bioturbation (5%); GLEY 1 5/5GY to GLEY 1 6/10Y	
			290		SANDSTONE, poorly to moderately cemented, fine to medium (25% fine, 65% medium), well-rounded, silt (10%); GLEY 1 7/5GY	Grout (neat cement) (0'-326' bgs)
			291			
			292			
			293			
			294			
			295		SANDSTONE, moderately to well cemented, fine to medium (30% fine, 70% medium), well-rounded; GLEY 1 6/5GY	4" LC Steel Casing (0'-330' bgs)
			296		SANDSTONE, poorly cemented, fine to coarse (10% fine, 70% medium, 20% coarse), well-rounded; GLEY 1 8/N	
COMP	MW15A-SOIL 296-300		297			
			298			
GRAB	MW15A-GW 296-300		299		SANDSTONE, poorly cemented, fine to medium (30% fine, 60% medium), well-rounded, silt (10%); GLEY 1 7/5GY	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 21 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 350 FT BGS									
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME 0900	TIME 1200
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330				
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE 10-21-20	DATE 10-27-20
			CASING DEPTH	300'	340'				

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly to moderately cemented, fine to coarse (10% fine, 60% medium, 30% coarse), well-rounded; GLEY 1 6/10Y	
			301			
			302			
			303			
			304		SANDSTONE, poorly to well cemented, fine to coarse (10% fine, 30% medium, 60% coarse), sub-rounded to well-rounded; GLEY 1 6/N, trace well cemented sandstone	
			305			Grout (neat cement) (0'-326' bgs)
			306			
			307			
		Cw	308		SANDSTONE, poorly to moderately cemented, fine to coarse (20% fine, 50% medium, 30% coarse), sub-rounded to well-rounded; GLEY 1 6/10Y, trace moderately cemented sandstone	
			309		SANDSTONE, moderately to well cemented, very fine to fine (80%), well-rounded, silt (20%); GLEY 1 4/10Y, well cemented from 309.5'-310' bgs	
			310		SANDSTONE, poorly cemented, fine to coarse (30% fine, 50% medium, 15% coarse), sub-rounded, trace silt (5%); 10YR 5/1	4" LC Steel Casing (0'-330' bgs)
			311			
			312		SANDSTONE, poorly to moderately cemented, fine to coarse (45% fine, 40% medium, 10% coarse), sub-rounded, trace bedded silt (5%); GLEY 1 5/10Y	
			313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 22 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	MW15A-SOIL 320-325	Cw	316		SANDSTONE, poorly to moderately cemented, fine to coarse (45% fine, 40% medium, 10% coarse), sub-rounded, trace bedded silt (5%); GLEY 1 5/10Y	Grout (neat cement) (0'-326' bgs)
			317			
			318			
			319		SANDSTONE, poorly to moderately cemented, fine to coarse (25% fine, 50% medium, 20% coarse), sub-rounded, trace silt (5%); GLEY 1 5/10Y	
			320		SANDSTONE, poorly cemented, fine to coarse (5% fine, 85% medium, 10% coarse), well-rounded; GLEY 1 5G 5/1	
			321			
			322			
			323			
			324			
			325		SANDSTONE, poorly cemented, fine to coarse (10% fine, 75% medium, 15% coarse), sub-rounded to well-rounded; GLEY 1 6/10Y	4" LC Steel Casing (0'-330' bgs)
			326			2' Fine Sand (326'-328' bgs)
			327			
			328			Sand filter pack (328'-340' bgs)
			329		SANDSTONE, poorly to moderately cemented, fine to medium (60% fine, 20% medium), well-rounded, silt (20%); GLEY 1 5/10Y	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 23 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			331		SANDSTONE, well cemented, fine (60%), sub-rounded, silt (35%), trace clay (5%); GLEY 1 6/10Y	Sand filter pack (328'-340' bgs)
			332			
			333			Screened interval (0.010" slot) (330'-340' bgs)
			334			
			335		SANDSTONE, moderately to well cemented, very fine to fine (50% v. fine, 25% fine), well-rounded, silt (23%), trace shale partings (2%), trace glauconitic sand (2%); GLEY 1 6/10Y	
COMP	MW15A-SOIL 336-340	Cw	336			
			337			
			338		SANDSTONE, moderately to well cemented, very fine (80%), well-rounded, silt (20%), trace glauconitic sand (2%); GLEY 1 6/10Y, trace well cemented sandstone	
GRAB	MW15A-GW 336-340		339			
			340		SILTSTONE, moderately compacted, weathered; GLEY 1 2.5/5GY	
			341		SANDSTONE, moderately to well cemented, weathered, very fine (75%), well-rounded, silt (20%), trace clay (5%), trace glauconitic sand (1%), trace shale partings @ 345' bgs; GLEY 1 2.5/N, well cemented from 344'-345' bgs and 348'-349' bgs	
			342			Backfill (neat cement) (340'-350' bgs)
			343			
			344			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15A [850551]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 24 OF 24	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 350 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.431 FT AMSL			WATER LEVEL	87.8'	98.5'			TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1545	1330			0900	1200
COMMENTS: Northing: 4978461.835 Easting: 516759.789			DATE	10-26-20	10-27-20			DATE	DATE
			CASING DEPTH	300'	340'			10-21-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
DISCRETE	Eau Claire Fm. @ 345' bgs (MGS gamma log puts contact @ 346' bgs) MW15A-SOIL 348-348.5	Ce	346 347 348 349		SANDSTONE, moderately to well cemented, weathered, very fine (75%), well-rounded, silt (20%), trace clay (5%), trace glauconitic sand (1%), trace shale partings @ 345' bgs; GLEY 1 2.5/N, well cemented from 344'-345' bgs and 348'-349' bgs SANDSTONE, well cemented, very fine (95%), well-rounded, trace shale partings (5%), trace fractures (5%), cross bedding (50%); GLEY 1 5/10Y	Backfill (neat cement) (340'-350' bgs)
			350		E.O.B. @ 350' bgs, no refusal	
			351 352 353 354 355 356 357 358 359			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 1 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 230 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010	0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE	DATE
			CASING DEPTH	70'	90'	160'	10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0		TOPSOIL, organics (33%), silt (33%), sand, fine (33%); moist, 10YR 3/3	
		SM	1		SANDY SILT, low plasticity, soft, sand, fine to coarse (30%), sub-rounded, trace gravel, fine (5%); moist, 10YR 3/3	
			4		SAND, fine to coarse (15% fine, 40% medium, 35% coarse), sub-rounded, well graded, gravel, fine to coarse (8%), trace silt (2%); dry, 10YR 4/4	Grout (neat cement) (0'-211' bgs)
		SW	8		SAND, fine to coarse (25% fine, 50% medium, 15% coarse), sub-rounded, well graded, gravel, fine to coarse (8%), trace silt (2%); dry, 10YR 4/4	
		SP	10		SAND, medium to coarse (20% medium, 60% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (18%), sub-angular to sub-rounded, trace silt (2%); moist, 10YR 3/4	4" LC Steel Casing (0'-215' bgs)
		SW	14		SAND, fine to coarse (15% fine, 35% medium, 35% coarse), sub-rounded, well graded, with gravel, fine (10%), trace silt (5%); dry to moist, 10YR 4/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 2 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SAND, fine to coarse (15% fine, 35% medium, 35% coarse), sub-rounded, well graded, with gravel, fine (10%), trace silt (5%); dry to moist, 10YR 4/3	
			17			
			18		SAND, fine to coarse (20% fine, 60% medium, 18% coarse), sub-rounded, well graded, trace gravel, medium (2%); dry, 10YR 4/4	
			19			
			20		SAND, fine to coarse (10% fine, 30% medium, 35% coarse), sub-rounded, well graded, with gravel, fine to coarse (15% fine, 8% coarse), sub-rounded to well-rounded, trace silt (2%); moist, 10YR 4/3	Grout (neat cement) (0'-211' bgs)
			21			
			22			
		SW	23			
			24			
			25			4" LC Steel Casing (0'-215' bgs)
			26			
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 3 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	31–35		SAND, fine to coarse (5% fine, 15% medium, 40% coarse), sub-rounded, poorly graded, with gravel, fine to coarse (10% fine, 10% medium, 10% coarse), sub-rounded to well-rounded, trace silt (5%), trace cobbles (5%); moist, 10YR 4/2	
		GP	35–40		COBBLES/BOULDERS, granitic, sand, fine to coarse (20%), with silt (10%), with gravel (lithic fragments), fine to coarse (20%); wet (drilling water), 10YR 5/1	Grout (neat cement) (0'-211' bgs)
		GW	40–42		GRAVEL, fine to coarse (25% fine, 35% medium, 25% coarse), sub-angular to sub-rounded, well graded, with silt (10%), trace sand, fine to medium (5%); wet (drilling water), 10YR 5/3	4" LC Steel Casing (0'-215' bgs)
		SW	42–44		SAND, fine to coarse (10% fine, 20% medium, 30% coarse), sub-rounded to well-rounded, well graded, with gravel, fine to coarse (10% fine, 5% medium, 10% coarse), with silt (10%), trace cobbles (5%); dry to moist, 10YR 5/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 4 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	46–49		SAND, fine to coarse (10% fine, 20% medium, 30% coarse), sub-rounded to well-rounded, well graded, with gravel, fine to coarse (10% fine, 5% medium, 10% coarse), with silt (10%), trace cobbles (5%); dry to moist, 10YR 5/3	
		GW	50–51		GRAVEL, fine to coarse (30% fine, 20% medium, 10% coarse), sub-rounded, with sand, fine to coarse (10% fine, 10% medium, 10% coarse), sub-rounded, trace silt (5%), trace clay (5%); moist, 10YR 4/2	Grout (neat cement) (0'-211' bgs)
	Jordan Fm. @ 52' bgs (MGS gamma log puts contact @ 55' bgs)	Cj	52–59		SANDSTONE, poorly cemented, very fine (85%), well-rounded, silt (15%), iron staining (30%); 10YR 6/6 (52'-56'), 10YR 7/3 (56'-58.5'), 10YR 5/8 (58.5'-60')	4" LC Steel Casing (0'-215' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 5 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			61		SANDSTONE, poorly cemented, very fine (85%), sub-rounded to well-rounded, silt (15%); 10YR 8/2	
			62			
			63		SANDSTONE, poorly to moderately cemented, very fine (80%), sub-rounded to well-rounded, silt (20%); 10YR 5/3, clay observed	
		Cj	64			
			65			Grout (neat cement) (0'-211' bgs)
			66		SANDSTONE, poorly to moderately cemented, very fine (90%), well-rounded, silt (10%); 10YR 8/2	
COMP	MW15B-SOIL 66-70		67			
			68			
GRAB	MW15B-GW 66-70 St. Lawrence Fm. @ 70' bgs (MGS gamma log puts contact @ 76' bgs)		69		SILTSTONE, poorly compacted, with sand, very fine (25%), well-rounded; 10YR 5/6	
			70		SILTSTONE, poorly compacted to trace well compacted, massive iron staining, very fine sand (25-50%), well-rounded; 10YR 5/6	4" LC Steel Casing (0'-215' bgs)
		Cs	71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 6 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	MW15B-GW 80-90	Cs	76		SILTSTONE, poorly compacted to trace well compacted, massive iron staining, very fine sand (25-50%), well-rounded; 10YR 5/6	
			77			
			78			
			79		SILTSTONE, moderately compacted, massive mottling, sand, very fine (25-50%), well-rounded; 10YR 5/6 to 10YR 6/3	
			80		SHALE, moderately to well compacted/cemented, weathered, bedded, intermixed sand, very fine (50%), clay (20%-30%); 10YR 5/8 to GLEY 1 3/10Y, clay observed	Grout (neat cement) (0'-211' bgs)
			81			
			82			
			83			
			84			
			85			4" LC Steel Casing (0'-215' bgs)
			86			
			87		SHALE, moderately compacted, weathered, iron staining (50%), clay (20%-30%); GLEY 1 4/5GY to 2.5Y 6/6 (89.5'-90'), clay observed	
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 7 OF 16	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 230 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20		DATE	DATE
			CASING DEPTH	70'	90'	160'		10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Lawrence bedrock appears more competent overall compared with MW15A	Cs	91		SHALE, moderately compacted/cemented, weathered, intermixed sand, very fine (50%), well-rounded, glauconitic sand (10%); GLEY 1 4/10Y, clay observed	
			92			
			93		SANDSTONE, moderately cemented to well compacted (shale), massive faint iron staining, very fine (50%), well-rounded, silt (45%), trace shale partings (5%), trace bioturbation @ 97' bgs (5%); 10YR 6/4, clay observed	
			94			
			95			Grout (neat cement) (0'-211' bgs)
			96			
			97		SANDSTONE, moderately to well cemented, very fine (85%), well-rounded, silt (15%), glauconitic sand (15%); 10YR 5/4	
			98			
			99			
			100		SANDSTONE, moderately to well cemented, very fine (85%), well-rounded, glauconitic sand and staining (30%), silt (10%), iron staining (5-10%), trace clay (5%), trace fractures (5%); 10YR 6/2	4" LC Steel Casing (0'-215' bgs)
			101			
			102			
			103			
			104			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 8 OF 16	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 230 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20		DATE	DATE
			CASING DEPTH	70'	90'	160'		10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, well cemented, very fine (75%), well rounded, silt (20%), glauconitic sand/staining (10-20%), trace clay (5%), trace small vugs (3%), trace fractures (1%); 10YR 7/2	
		Cs	107			
			108			
	Tunnel City (Mazomanie finger) @ 110' bgs (MGS gamma log puts contact @ 114' bgs)		109		SANDSTONE, moderately to well cemented, very fine (60%), well-rounded, silt (20%), glauconitic sand (40%), dolomitic cement (10%), clay (10%), trace iron staining (3%); GLEY 1 7/10GY to GLEY 1 5G4/2	
			110		SANDSTONE, well cemented, very fine (60%), well-rounded, silt (20%), dolomitic cement (20%), glauconitic sand (15%), trace iron staining (5%); 10YR 5/4	Grout (neat cement) (0'-211' bgs)
			111			
			112			
			113			
			114		SANDSTONE, poorly to moderately cemented, fine to medium (80% fine, 10% medium), well-rounded, silt (10%); 10YR 5/4	
		Ct	115			4" LC Steel Casing (0'-215' bgs)
			116			
COMP	MW15B-SOIL 116-120 +DUP+MS/MSD		117			
			118			
GRAB	MW15B-GW 116-120 +DUP+MS/MSD		119		SANDSTONE, moderately to well cemented, very fine to fine (85%), well-rounded, silt (10%), trace clay (5%), trace fractures (1%); 10YR 5/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 9 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SANDSTONE, poorly to moderately cemented, very fine to fine (95%), well-rounded, glauconitic sand (30%), trace silt (5%); GLEY 1 6/10Y	
			122		SANDSTONE, poorly to moderately cemented, fine (95%), well-rounded, trace silt (5%), trace glauconitic sand (5%), trace faint iron staining (5%); 10YR 6/2	
			123			
			124			
			125			Grout (neat cement) (0'-211' bgs)
			126		SANDSTONE, poorly to well cemented, very fine to fine (85%), well-rounded, dolomitic cement (10%), glauconitic sand (10%), trace silt (5%); 10YR 6/4	
		Ct	127			
			128		SANDSTONE, poorly to moderately cemented, massive glauconitic staining/faint iron staining, very fine to fine (85%), well-rounded, silt (10%), trace clay (5%); 10YR 5/6	
			129			
			130		SANDSTONE, poorly cemented, massive faint iron staining, very fine (80%), well-rounded, silt (15%), trace clay (5%); 10YR 6/6 to 10YR 5/6, clay observed ~ 130' bgs	4" LC Steel Casing (0'-215' bgs)
			131			
			132			
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 10 OF 16	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 230 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20		DATE	DATE
			CASING DEPTH	70'	90'	160'		10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly to well cemented, fine to medium (85% fine, 5% medium), well-rounded, glauconitic sand (25%), silt (10%), trace fractures (2%); 10YR 6/3	
	Transition from Mazomanie to Lone Rock @ 139.5' bgs	Ct	140		SANDSTONE, moderately cemented, fine (75%), well-rounded, glauconitic sand (40%), silt (15%), clay (10%); GLEY 1 6/5GY SANDSTONE, moderately cemented, very fine to medium (80%), well-rounded, silt/clay (20%), glauconitic sand (90%), mottled, dark green bedded silt; GLEY 1 5G4/1 to GLEY 1 6/5GY to 10YR 5/6	Grout (neat cement) (0'-211' bgs) 4" LC Steel Casing (0'-215' bgs)
			146		SANDSTONE, moderately to well cemented, very fine to fine (85%), well-rounded, glauconitic sand (30-40%), silt (15%); GLEY 1 6/10Y to GLEY 1 4/10GY to 10YR 6/3, more glauconitic sand from 146'-147' and 149'-150'	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 11 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Transition from Lone Rock to 2nd Mazomanie finger @ 154' bgs		151 152 153 154		SANDSTONE, poorly to moderately cemented, fine (85%), well-rounded, glauconitic sand (20-30%), silt (15%), trace glauconitic banding (5%); GLEY 1 4/5GY	
COMP	MW15B-SOIL 156-160	Ct	155 156 157		SANDSTONE, poorly to well cemented, fine (90%), well-rounded, iron staining (15%), silt (10%), trace bioturbation (5%), trace glauconitic sand (3%); 10YR 5/6 to 10YR 8/1	Grout (neat cement) (0'-211' bgs)
GRAB	MW15B-GW 156-160		158 159 160			4" LC Steel Casing (0'-215' bgs)
			161 162 163 164		SANDSTONE, poorly to moderately cemented, massive mottling, very fine to fine (85%), well-rounded, silt (15%), 3" fine sand @ 162.5' bgs; 2.5Y 6/4 to 10YR 5/8 to GLEY 1 6/10Y	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL							SHEET 12 OF 16	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS									
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'		TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010			
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20		DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		SANDSTONE, poorly to moderately cemented, massive mottling, very fine to fine (85%), well-rounded, silt (15%), 3" fine sand @ 162.5' bgs; 2.5Y 6/4 to 10YR 5/8 to GLEY 1 6/10Y	
			167			
			168			
	Transition from 2nd Mazomanie finger to Lone Rock @169' bgs		169		SANDSTONE, moderately cemented, fine (50%), well-rounded, silt (50%), glauconitic sand/silt banding (5-15%), trace clay (5%); GLEY 1 5G4/1	
			170		SANDSTONE, moderately cemented, massive bedded silt, very fine to fine (75%), well-rounded, silt (25%), glauconitic sand (15-20%); GLEY 1 4/10GY to GLEY 1 6/10GY, low recovery	Grout (neat cement) (0'-211' bgs)
		Ct	171			
			172			
			173			
			174			
			175			4" LC Steel Casing (0'-215' bgs)
			176			
			177			
			178			
			179			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 13 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ct	181		SANDSTONE, moderately cemented, fine (87%), well-rounded, silt (10%), trace clay (3%), glauconitic sand (20%); GLEY 1 5G5/1	
			182			
			183		SANDSTONE, moderately cemented, massive bedded silt, fine (70%), well-rounded, silt (25%), trace clay (5%), glauconitic sand (35%), mottled (15%); GLEY 1 5G4/1 to GLEY 1 5G3/1	
			184			
			185			Grout (neat cement) (0'-211' bgs)
			186		SANDSTONE, moderately cemented, very fine (55%), well-rounded, silt (40%), trace clay (5%), glauconitic sand (10%); GLEY 1 4/10GY	
			187			
			188			
			189		SANDSTONE, moderately cemented, massive bedded silt, fine (60%), well-rounded, silt (25%), clay (15%), glauconitic sand (60%), trace mottled (5%); GLEY 1 5G 4/2 to GLEY1 3/5GY	
			190		SANDSTONE, moderately cemented, fine (60%), well-rounded, silt (25%), glauconitic sand (25%), weathered shale partings (15%); GLEY 1 3/5GY to GLEY 1 5/10Y	4" LC Steel Casing (0'-215' bgs)
			191			
			192		SANDSTONE, moderately cemented, very fine to fine (70%), well-rounded, silt/clay (30%), glauconitic sand (20%), mottled (15%); GLEY 1 5/5GY to 10YR 6/3	
			193			
			194			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 14 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 230 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010	0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE	DATE
			CASING DEPTH	70'	90'	160'	10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ct	196		SANDSTONE, moderately cemented, fine (80%), well-rounded, silt (20%), glauconitic sand (25%), trace faint banding @ 195' bgs (5%), trace iron staining (5%); GLEY 1 5/5GY	
			197			
			198			
			199			
			200		SANDSTONE, moderately cemented, fine (40%), well-rounded, silt (30%), shale partings (20%), clay (10%), glauconitic sand (50%), trace iron staining on shale (5%); GLEY 1 5G4/1 to GLEY 1 3/5GY	Grout (neat cement) (0'-211' bgs)
			201			
			202			
			203			
			204			
			205		SANDSTONE, moderately to well cemented, fine (70%), well-rounded, silt (25%), trace clay (5%), trace thin bedding (5%), glauconitic sand (50%); GLEY 1 6/5G to GLEY 1 5G4/1	4" LC Steel Casing (0'-215' bgs)
			206			
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 15 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING	
BORING DEPTH: 230 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010	0730	1600
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE	DATE
			CASING DEPTH	70'	90'	160'	10-30-20	11-03-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SANDSTONE, poorly cemented, fine (73%), well-rounded, silt (25%), trace clay (2%) trace glauconitic sand (5%), trace well cemented gray sandstone (5%); GLEY 1 6/5GY	Grout (neat cement) (0'-211' bgs) 4" LC Steel Casing (0'-215' bgs) 2' Fine Sand (211'-213' bgs)
			212			
			213		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 15% medium), well-rounded, silt (15%), glauconitic sand (5-10%); GLEY 1 6/10GY	Sand filter pack (213'-225' bgs)
			214			
			215			
			216			
			217			Screened interval (0.010" slot) (215'-225' bgs)
		Ct	218		SANDSTONE, moderately to well cemented, fine to medium (70% fine, 15% medium), well-rounded, silt (15%), glauconitic sand (5-10%); GLEY 1 5/10Y	
			219			
			220		SANDSTONE, moderately to well cemented, fine (75%), well-rounded, silt (15%), shale partings (10%), glauconitic sand (10%); GLEY 1 6/10GY	
			221			
			222		SANDSTONE, moderately to well cemented, very fine (50%), well-rounded, silt (25%), clay (15%), shale partings near 228' bgs (10%); GLEY 1 5/10GY	
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. MW15B [850552]	
LOGGED BY: AS	CHECKED BY: AEL						SHEET 16 OF 16	
DRILLING CONTR.: Traut								
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 230 FT BGS								
GROUND SURFACE ELEVATION: 860.589 FT AMSL			WATER LEVEL	65.2'	66'	96.5'	TIME 0730	TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME	1045	1130	1010		
COMMENTS: Northing: 4978458.526 Easting: 516760.987			DATE	10-30-20	11-02-20	11-03-20	DATE 10-30-20	DATE 11-03-20
			CASING DEPTH	70'	90'	160'		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ct	226		SANDSTONE, moderately to well cemented, very fine (50%), well-rounded, silt (25%), clay (15%), shale partings near 228' bgs (10%); GLEY 1 5/10GY	Backfill (neat cement) (340'-350' bgs)
			227			
			228		SANDSTONE, moderately to well cemented, very fine (50%), well-rounded, silt (20%), clay (15%), shale partings (15%), glauconitic sand (25%); GLEY 1 6/5GY	
			229			
			230		E.O.B @ 230' bgs, no refusal	
			231			
			232			
			233			
			234			
			235			
			236			
			237			
			238			
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–6		SANDY CLAY, low plasticity (65%), soft to medium stiff, sand, fine (30%), sub-rounded, trace organics (3%), trace gravel, fine (2%), trace mottling (1%); dry, 10YR 4/3	Grout (neat cement) (0'-226' bgs)
		ML	6–10		SANDY SILT, low plasticity (40%), soft, sand, fine to coarse (15% fine, 10% medium, 10% coarse), with clay (20%), trace gravel (5%); dry, 10YR 5/4	
		CL	10–12		SILTY CLAY, low plasticity (85%), soft, gravel, fine to medium (5% fine, 5% medium), trace sand (5%); moist, 10YR 5/5, mottled	4" LC Steel Casing (0'-230' bgs)
		SM	12–14		SILTY SAND, fine to coarse (30% fine, 40% medium, 10% coarse), well-rounded, silt (20%); moist, 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–17		GRAVELLY SAND, fine to coarse (10% fine, 20% medium, 30% coarse), sub-rounded, gravel, fine to coarse (10% fine, 10% medium, 10% coarse), sub-angular to sub-rounded, silt (10%); moist, 10YR 4/3	
		CH	17–20		CLAY, medium to high plasticity, stiff, trace gravel, fine (2%); dry, 7.5YR 4/3 to 7.5YR 4/4, trace coarse gravel @ 14' bgs	
		ML	20–29		SILT, low plasticity, soft, with sand, fine (30%), gravel, fine to medium (5% fine, 5% medium), angular to sub-rounded; dry to moist, 7.5YR 5/4	Grout (neat cement) (0'-226' bgs) 4" LC Steel Casing (0'-230' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31–39		SILT, low plasticity, soft to medium stiff, with sand, fine (20%), gravel, fine to coarse (4% fine, 3% medium, 3% coarse); dry, 7.5YR 4/3 SILT, low plasticity, soft to medium stiff, with sand, fine (10%), gravel, fine to coarse (4% fine, 3% medium, 3% coarse), clay (10%); dry, 7.5YR 4/2	Grout (neat cement) (0'-226' bgs)
		SP	39–44		SAND, medium to coarse (20% medium, 75% coarse), well-rounded, poorly graded, trace gravel (5%); moist, 7.5YR 4/4 SAND, fine to coarse (70% fine, 25% medium, 5% coarse), sub-rounded to well-rounded, poorly graded; dry to moist, 7.5YR 5/4 SAND, medium to coarse (15% medium, 70% coarse), well-rounded, poorly graded, with gravel, fine to coarse (5% fine, 5% medium, 5% coarse); moist, 10YR 5/4	4" LC Steel Casing (0'-230' bgs)
		SW	44		SAND, fine to coarse (10% fine, 40% medium, 20% coarse), sub-angular, well graded, with gravel, medium to coarse (17% medium, 8% coarse), trace	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	46		silt (5%); moist, 10YR 5/4	
		SP	47		SAND, medium to coarse (40% medium, 45% coarse), angular, poorly graded, with gravel, fine to medium (5% fine, 10% medium); moist, 10YR 5/3	
		SM	48		SILTY SAND, fine to medium (60% fine, 15% medium), well-rounded, poorly graded, silt (15%); moist, 10YR 5/3	
		SW	49		SAND, fine to coarse (30% fine, 35% medium, 15% coarse), sub-rounded, well graded, gravel, fine to medium (10% fine, 2% medium), silt (8%); moist, 10YR 5/4	
		SP	50		SAND, fine to coarse (5% fine, 50% medium, 20% coarse), sub-angular, poorly graded, with gravel, fine to medium (15% fine, 6% medium), trace silt (4%); moist, 7.5YR 4/4	Grout (neat cement) (0'-226' bgs)
			53		SAND, fine to coarse (5% fine, 75% medium, 10% coarse), sub-rounded, poorly graded, gravel, fine (7%), trace silt (3%); moist; 7.5YR 4/4	
			54		SAND, medium to coarse (60% medium, 20% coarse), sub-rounded, poorly graded, with gravel, fine to medium (8% fine, 9% medium), trace silt (3%); moist, 10YR 5/4	4" LC Steel Casing (0'-230' bgs)
			57		SAND, fine to medium (25% fine, 75% medium), sub-rounded, poorly graded; dry to moist, 10YR 6/4	
		CH	58		GRAVELLY CLAY, medium to high plasticity, stiff, gravel, fine to coarse (15% fine, 15% medium, 10% coarse), sub-rounded, sand, fine to coarse (3% fine, 3% medium, 4% coarse); moist to wet, 2.5YR 4/4	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61		CLAY, medium to high plasticity, soft, sand, fine (10%), trace gravel (5%); dry to moist, 10YR 5/3 to 10YR 5/6, mottled	
			62		CLAY, high plasticity, medium stiff, trace gravel (3%); dry, 10YR 5/3, thin banded mottling @ 68' bgs	
			63			
			64			
			65			Grout (neat cement) (0'-226' bgs)
			66			
			67			
			68			
			69			
			70		CLAY, high plasticity, medium stiff, trace gravel (2%); dry, 10YR 5/3	4" LC Steel Casing (0'-230' bgs)
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		CLAY, high plasticity, medium stiff, trace gravel (2%); dry, 10YR 3/1	
			77			
			78			
			79			
			80		CLAY, high plasticity, medium stiff; dry, 10YR 3/1, trace mottling	Grout (neat cement) (0'-226' bgs)
			81			
		CH	82			
			83		CLAY, medium to high plasticity, medium stiff, massive mottling, with silt (20%); 10YR 5/8, grades to silt @ 88' bgs	
			84			
			85			4" LC Steel Casing (0'-230' bgs)
			86			
			87			
	St. Peter Fm. @ 88' bgs		88		SANDSTONE, poorly to moderately cemented, very fine (85%), well-rounded, mottling (25%), silt (15%); 10YR 8/1	
		Os	89			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine to medium (10% fine, 90% medium), well-rounded; 10YR 5/8	
			92		SANDSTONE, poorly to moderately cemented, fine to medium (15% fine, 80% medium), well-rounded, massive iron staining, trace silt (5%); 10YR 6/8	
			93			
			94			
			95		SANDSTONE, poorly cemented, fine to medium (20% fine, 75% medium), well-rounded, trace silt (5%); 10YR 5/6, trace iron staining	Grout (neat cement) (0'-226' bgs)
			96		SANDSTONE, moderately cemented, fine to medium (15% fine, 80% medium), trace silt (5%); 10YR 7/2, trace mottling	
		Os	97			
			98			
			99			
			100		SILTY CLAY, low to medium plasticity, soft, massive mottling, sand, fine (10-20%)	4" LC Steel Casing (0'-230' bgs)
			101			
			102			
			103		CLAY, medium plasticity, medium stiff, massive mottling, sand, fine (10%), silt (10%); dry, 10YR 5/6 to 10YR 7/2	
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 108' bgs	Os	106		CLAY, medium plasticity, medium stiff, massive mottling, sand, fine (10%), silt (10%); dry, 10YR 5/6 to 10YR 7/3	
			107			
			108		SANDSTONE, moderately to well cemented, weathered (40%), silt and clay (35%), low plasticity, soft, chert and sandy dolostone (25%); moist, 10YR 6/4	
			109			
			110		DOLOSTONE, not competent, heavily weathered, manganese staining (15%), iron staining (10%), fractures (10%), sand (10%), trace glauconitic staining (2%); 10YR 6/3, heavy clay observed @ 110', 114' and 120' bgs	Grout (neat cement) (0'-226' bgs)
			111			
			112			
			113			
			114			
		Ops	115			4" LC Steel Casing (0'-230' bgs)
			116			
			117			
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 9 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			121		DOLOSTONE, moderately competent, dolomitic precipitate (20%), sand (15%), manganese staining (10%), trace iron staining (5%), trace fractures (3%); 10YR 6/3	
			122			
			123			
			124			
			125			Grout (neat cement) (0'-226' bgs)
			126		DOLOSTONE, not competent, manganese/iron staining (20%), sand (10%), dolomitic precipitate (10%); 10YR 5/8 to GLEY 1 7/10Y, clay observed, weathered, slatey, dolostone into clay @ 126'-129' bgs	
		Ops	127			
			128			
			129			
			130		DOLOSTONE, not competent, weathered, manganese staining (10%), iron staining (10%), sand (5-10%), trace vugs (1%); 10YR 6/4	4" LC Steel Casing (0'-230' bgs)
			131			
			132			
			133			
			134		DOLOSTONE, heavily weathered, massive iron staining, sand (24%), clay (25%), trace manganese staining (1%); 10YR 6/6	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 10 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		DOLOSTONE, not competent, weathered, manganese staining (10%), iron staining (5-10%), trace sand (1%), trace vugs (1%); 10YR 7/4	
			137			
			138			
			139			
			140		DOLOSTONE, not competent to moderately competent, manganese/iron staining (10%), sand (5-10%), trace dolomitic precipitate (5%), trace vugs (5%), trace oolitic texture (3%); 10YR 6/2 to 10YR 7/2, clay observed	Grout (neat cement) (0'-226' bgs)
			141			
			142			
		Ops	143		DOLOSTONE, not competent, weathered, sand (25%), iron staining (15%), dolomitic precipitate (5-10%); 10YR 5/2	
			144		DOLOSTONE, moderately competent, iron staining (15%), trace vugs (5%), trace dolomitic precipitate (5%), trace fractures (3%), trace chert (5%); 7.5YR 7/1, trace bedding observed, 0.5' shale @ 146.5' bgs, chert @ 148' bgs GLEY 1 5/N	
			145			4" LC Steel Casing (0'-230' bgs)
			146			
			147			
GRAB	MW17A-GW 146-150		148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		DOLOSTONE, not competent, iron staining (20%), fractures (10%), trace dolomitic precipitate (5%), trace sand (3%), trace vugs (3%); 10YR 7/2, trace green tint @ 152' bgs	
			152		DOLOSTONE, not competent to competent, iron staining (25%), sand (10%), trace dolomitic precipitate in vugs (5%), trace fractures (2%); 10YR 7/4, clay observed @ 155' bgs	
			153			
			154			
			155			Grout (neat cement) (0'-226' bgs)
			156		DOLOMITIC SHALE, well compacted, fractures (15%), sand (5-10%), trace manganese staining (5%), trace iron staining (5%); GLEY 1 7/5GY	
		Ops	157			
			158			
			159		DOLOSTONE, moderately competent, iron staining (15-20%), trace vugs (5%), trace sand (2-3%), trace dolomitic precipitate (2-3%), trace oolitic texture (1%); 7.5YR 7/3, faint iron banding @ 160' bgs	
			160		DOLOSTONE, competent, iron staining (25%), sand (15%), dolomitic precipitate (10%), trace vugs (5%), trace oolitic texture (3%), trace manganese staining (2%); 10YR 7/3 to 10YR 7/1, trace reworked clasts @ 164' bgs	4" LC Steel Casing (0'-230' bgs)
			161			
			162			
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 12 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		DOLOSTONE, very competent, trace dolomitic precipitate filled vugs (5%), trace sand (5%), trace oolitic texture (5%), trace vugs (2%); 10YR 5/6, iron banding observed @ 165' bgs	
			167		DOLOMITIC SHALE, well compacted, wavy shale/dolostone interbeds (15%), manganese staining (10%), sand (5-10%); GLEY 1 8/5GY	
			168			
			169		DOLOSTONE, moderately competent, sand (10%), oolitic texture (10%), manganese staining (5-10%), trace iron staining (5%), trace vugs (2%), trace fractures (2%); 10YR 7/1	
			170			Grout (neat cement) (0'-226' bgs)
		Ops	171		DOLOSTONE, competent, oolitic texture (20%), trace green staining (5%), trace vugs (3%), trace dolomitic precipitate (3%), trace iron staining (2%); 10YR 7/3	
			172		DOLOSTONE, moderately competent, dolomitic precipitate (10%), iron staining (10%), fractures (10%), vugs (5-10%), trace oolitic texture (5%), trace green staining (5%), trace sand (3%); 10YR 7/3	
			173			
			174			
			175			4" LC Steel Casing (0'-230' bgs)
	Oneota @ 176' bgs		176		DOLOSTONE, not competent to moderately competent, iron staining (30%), dolomitic precipitate (20%), vugs (10%), trace oolitic texture (5%), trace green staining (3%); 10YR 6/1	
			177			
		Opo	178		DOLOSTONE, competent, vugs (10-15%), trace oolitic texture (3%), trace dolomitic texture (2%), trace sand (1%); WHITE 10YR 5/1	
			179		DOLOSTONE, moderately competent, iron staining (30%), vugs (25%), trace sand (5%), trace fractures (5%), trace dolomitic precipitate in vugs (5%); 10YR	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 13 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					7/2, clay observed DOLOSTONE, moderately competent, vugs (20%), dolomitic precipitate (15%), iron staining (10%), trace fractures (3%); 10YR 7/1 to 10YR 7/2	
			181			
			182			
			183			
			184			
			185		DOLOSTONE, moderately competent, iron staining along fractured surfaces (10%), vugs (510%), dolomitic precipitate (5-10%); 10YR 7/1 to 10YR 6/2, less competent @ 185'-189.5' bgs, competent @ 190' bgs	Grout (neat cement) (0'-226' bgs)
			186			
		Opo	187			
			188			
			189			
			190		DOLOSTONE, moderately competent to competent, vugs (15%), trace iron staining (5%), trace dolomitic precipitate (5%), trace fractures (3%); 10YR 6/2	4" LC Steel Casing (0'-230' bgs)
			191			
			192			
			193			
			194		DOLOSTONE, not competent to moderately competent, fractures (10%), trace vugs (3%), trace manganese staining (3%), trace dolomitic precipitate	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 14 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					(3%); 10YR 7/3	
			196		DOLOSTONE, competent, iron staining along fractures (10%), trace vugs (5%), trace dolomitic precipitate (5%), trace fractures (3%); 10YR 7/2	
			197			
			198			
			199			
			200		DOLOSTONE, not competent to competent, iron staining (25%), dolomitic precipitate (15%), vugs (10%); 10YR 7/1, clay observed	Grout (neat cement) (0'-226' bgs)
			201			
		Opo	202			
			203			
			204		DOLOSTONE, moderately competent to competent, iron staining along fractures, (20%), dolomitic precipitate (10%), vugs (5-10%), trace fractures (3%); 10YR 7/2	
			205			4" LC Steel Casing (0'-230' bgs)
			206			
			207			
GRAB	MW17A-GW 206-210		208			
			209		DOLOSTONE, weathered, clay (50%), dolomitic precipitate (50%), iron staining (15%), vugs (10%); 10YR 6/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 15 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE 02/03/21 / DATE 02/16/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		DOLOSTONE, not competent to competent, banded dolomitic precipitate (30-40%), vugs (25%), trace fractures (2%); 10YR 5/6, precipitate may be slightly oxidized	
			212			
			213			
			214		DOLOSTONE, moderately competent to competent, iron staining (25%), dolomitic precipitate (10-15%), trace malachite staining (5%), trace vugs (5%); 7.5YR, thin wavy iron staining @ 220' bgs, not to less competent @ 218' bgs	
			215			Grout (neat cement) (0'-226' bgs)
			216			
		Opo	217			
			218			
			219			
			220		DOLOSTONE, not competent to moderately competent, sand (10%), iron staining along fractures (10%), trace dolomitic precipitate (5%), trace vugs (5%), trace fractures (3%); 7.5YR 5/6	4" LC Steel Casing (0'-230' bgs)
	Coon Valley @ 222' bgs		221			
			222		SANDSTONE, poorly cemented, medium to coarse, wavy iron banding (15%), dolostone (20%), sandy (30%); 10YR 6/5	
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS / CHECKED BY: BK			SHEET 16 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 915.346 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986	DATE		DATE / DATE
	CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 228' bgs	Opo	226		SANDSTONE, poorly cemented, medium to coarse, wavy iron banding (15%), dolostone (20%), sandy (30%); 10YR 6/5	Grout (neat cement) (0'-226' bgs)
			227			2' Fine Sand (226'-228' bgs)
			228		SANDSTONE, poorly to moderately cemented, fine to coarse (20% fine, 30% medium, 25% coarse), sub-rounded, iron staining (25%), silt (15%); 10YR 5/8 to 10YR 6/8	
			229			4" LC Steel Casing (0'-230' bgs)
			230		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 25% medium), sub-rounded, trace silt (5%); 5Y 8/5	
			231		SANDSTONE, poorly cemented, massive iron staining, fine to medium (10% fine, 90% medium), sub-rounded to well-rounded; 5Y 6/8	
		Cj	232		SANDSTONE, poorly cemented, fine to medium (5% fine, 95% medium), sub-rounded to well-rounded; 5Y 8/8	
			233			
			234			
			235			Screened interval (0.010" slot) (230'-240' bgs)
			236			Sand filter pack (228'-240' bgs)
			237			
			238			
			239		SANDSTONE, poorly to moderately cemented, fine to medium (10% fine, 85% medium), sub-rounded to well-rounded, trace silt (5%); 5Y 5/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW17A [850556]
LOGGED BY: AS	CHECKED BY: BK			SHEET 17 OF 17
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS				
GROUND SURFACE ELEVATION: 915.346 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1215 / 1400
COMMENTS: Northing: 4982534.981 Easting: 506085.986		DATE		DATE / DATE
		CASING DEPTH		02/03/21 / 02/16/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					E.O.B. @ 240' bgs, no refusal	Backfill by natural collapse (240'-245' bgs)
		Cj	241 242 243 244 245 246 247 248 249 250 251 252 253 254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 1 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE 02/18/21 / DATE 02/18/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0–5		SILT, low to medium plasticity, soft to medium hard, sand, fine to medium (10%), gravel, fine to medium (5%), clay (5%); moist, 10YR 5/3, organics (10%) from 0-2'	
		ML	5–10		SANDY SILT, low to medium plasticity, soft, sand, fine (30%), clay (10%), gravel, fine to medium (5%), mottling (25%); dry to moist, 10YR 5/4, 2" sand seam @ 9.5'	Grout (neat cement) (0'-86' bgs)
		SM	10–12		SILTY SAND, fine to medium (60% fine, 10% medium), subrounded, poorly graded, silt (27%), gravel, fine (3%); wet, 10YR 5/4	2" LC Steel Casing (0'-90' bgs)
		SW	12–14		GRAVELLY SAND, fine (40%), gravel, fine to coarse (30%), subangular to subrounded, silt (30%); moist, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 2 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL		WATER LEVEL	TIME: 1215 / 1830
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4982533.173 Easting: 506083.638		DATE	DATE: 02/18/21 / 02/18/21
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		GRAVELLY SAND, fine (40%), gravel, fine to coarse (30%), subangular to subrounded, silt (30%); moist, 10YR 4/4	
		CL	17–20		CLAY, medium plasticity, medium density, sand, fine (5%), gravel, fine (5%); dry, 10YR 4/4	
		ML	20		SANDY SILT, low plasticity, soft to medium density, sand, fine to medium (40%), gravel, medium to coarse (5%), clay (5%); dry, 10YR 3/3, cobble @ 23'	Grout (neat cement) (0'-86' bgs)
			23–25		SILT, low plasticity, soft to medium density, sand, fine to medium (30%), gravel, medium to coarse (5%), clay (1%); dry, 10YR 3/4, cobble @ 26'	2" LC Steel Casing (0'-90' bgs)
			26–29		SILT, low plasticity, soft, sand, fine to medium (20%), gravel, fine (3%); dry, 10YR 3/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK / CHECKED BY: BK			SHEET 3 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1215 / 1830
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE / DATE
	CASING DEPTH		02/18/21 / 02/18/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31–35		SILT, low plasticity, medium to high density, sand, fine to medium (25%), gravel, fine to coarse (5-10%); dry, 10YR 5/4	
		ML	35–39		SILT, low plasticity, medium density, sand, fine to medium (30%), gravel, fine to medium (5%), clay (5%); dry, 10YR 4/4 to 10YR 5/3	Grout (neat cement) (0'-86' bgs)
		SP	40		SAND, fine to coarse (57% fine, 19% medium, 19% coarse), subrounded, poorly graded, gravel, fine to medium (5%); moist, 10YR 5/4	2" LC Steel Casing (0'-90' bgs)
		SW	41–44		SAND, fine to coarse (38% fine, 38% medium, 19% coarse), subrounded, well graded, gravel, fine to coarse (5%); moist, 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 4 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE 02/18/21 / DATE 02/18/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SAND, medium to coarse (20% medium, 80% coarse), subangular to subrounded, gravel, fine (10-15%); moist, 10YR 5/3	
			47		SAND, fine to medium (75% fine, 15% medium), subrounded; moist, 10YR 5/4, silt (10%) in 3" lense @ 48.5-49'	
			48			
		SP	49			
			50		SAND, fine to medium (30% fine, 60% medium), subrounded, poorly graded, gravel (5%), silt (5%); moist, 10YR 3/4	Grout (neat cement) (0'-86' bgs)
			51			
			52			
			53		SILTY SAND, fine to coarse (20% fine, 20% medium, 10% coarse), angular, gravel, fine to coarse (18% fine, 13% medium, 5% coarse), silt (12%), cobbles (2%); moist, 10YR 3/4	
			54			
			55			2" LC Steel Casing (0'-90' bgs)
			56			
		SM	57			
			58		SILTY SAND, fine to medium (65% fine, 15% medium), subrounded, poorly graded, silt (15%), gravel, fine to medium (4% fine, 1% medium), angular; moist, 10YR 4/4	
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 5 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE 02/18/21 / DATE 02/18/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61–74		CLAY, high plasticity, soft from 60-64', medium density from 64-70', silt (10%), gravel, fine to coarse (3%), trace sand (2%); dry, 10YR 5/4 to 10YR 5/8, 4" lense of medium sand @ 69.5' CLAY, high plasticity, medium to high density, gravel, fine to coarse (5%), sand, fine (3%); 10YR 4/4	Grout (neat cement) (0'-86' bgs) 2" LC Steel Casing (0'-90' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 6 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE 02/18/21 / DATE 02/18/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		CLAY, high plasticity, medium to high density, gravel, fine to coarse (5%), sand, fine (3%); 10YR 4/4	
			77			
			78			
			79			
			80		CLAY, high plasticity, medium density; dry, 10YR 3/2	Grout (neat cement) (0'-86' bgs)
		CH	81			
			82			
			83		CLAY, high plasticity, high density, mottled (15%); dry, 10YR 3/2	
			84			
			85			2" LC Steel Casing (0'-90' bgs)
			86			
	St. Peter Fm. @ 87' bgs		87		SANDSTONE, poorly to moderately cemented, fine (80%), rounded, silt (20%), mottled (20%); moist, 10YR 5/4 to 10YR 3/2	2' Fine Sand (86'-88' bgs)
			88			
		Os	89			Sand filter pack (88'-100' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW17B [854409]
LOGGED BY: AS/BK	CHECKED BY: BK		SHEET 7 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 915.386 FT AMSL	WATER LEVEL		TIME 1215 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982533.173 Easting: 506083.638	DATE		DATE 02/18/21 / DATE 02/18/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), rounded; moist, 10YR 5/8	
			92			
			93		SANDSTONE, moderately cemented, fine to medium (80% fine, 20% medium); moist, 10YR 5/8 to 10YR 7/1	
		Os	94			Sand filter pack (88'-100' bgs)
			95			
			96			Screened interval (0.010" slot) (90'-100' bgs)
			97		CLAY, weathered, high plasticity, soft, sand,, fine to medium (10% fine, 5% medium); 10YR 4/6	
			98			
		CH	99			
			100		E.O.B. @ 100' bgs, no refusal	
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Probe/HSA		BORING NO. MW17C [855329]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 4
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Probe/HSA	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: 915.475 FT AMSL	WATER LEVEL		TIME 1400 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982531.991 Easting: 506086.313	DATE		DATE 04/28/21 / DATE 04/29/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1		SANDY CLAY, low plasticity, stiff, with medium to coarse sand (30%), sub-rounded, with organics (grass, 10%); dry, 10YR 4/2	
		CL	2		CLAY, low to medium plasticity, soft, with medium sand (10%), trace mottling; 10YR 5/4	
		ML	4		SILT, low plasticity; dry, 10YR 3/1, organic odor	
		SC	5		CLAYEY SAND, with clay (40%), with sand, fine to medium (25% fine, 25% medium), with medium gravel (10%); moist, 10YR 5/4	Grout (neat cement) (0'-34.5' bgs)
		SC	6		CLAYEY SAND, fine to coarse (20% fine, 60% medium, 20% coarse), sub-rounded, with gravel, fine to medium (10%); moist, 10YR 5/3, 1" clay lens at 7'	
		ML	8		SILT, low plasticity, with sand, fine to medium (20%); dry, 10YR 4/4	
		CL	9		SANDY CLAY, low plasticity, with sand, fine to medium (30-40%), with fine gravel (10%); wet, 10YR 5/4	
		SC	10		CLAY, low plasticity, soft, with sand, fine to medium (10%); wet, 10YR 5/4	2" LC Steel Casing (0'-38.5' bgs)
		SW-SC	11		CLAYEY SAND, very fine, sub-rounded, with clay (20%); wet, 10YR 5/4	
		SW-SC	12		CLAY, SAND, GRAVEL, fine to coarse (33%), gravel, fine to coarse (33%), clay (33%); wet, 10YR 5/4	
		SW-SC	13		CLAY, SAND, GRAVEL, fine to coarse (33%), gravel, fine to coarse (33%), clay (33%); wet, 10YR 5/4, with 1-2"	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Probe/HSA		BORING NO. MW17C [855329]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 4
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Probe/HSA	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: 915.475 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1400
COMMENTS: Northing: 4982531.991 Easting: 506086.313	DATE		DATE / DATE
	CASING DEPTH		04/28/21 / 04/29/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW-SC	16		CLAY, SAND, GRAVEL, fine to coarse (33%), gravel, fine to coarse (33%), clay (33%); wet, 10YR 5/4, with 1-2"	
		SW	17		SAND, medium to coarse, sub-rounded, with gravel, fine to coarse (15-20%), with clay (5-10%); moist, 10YR 5/3	
			18			
		CH	19		CLAY, medium to high plasticity, stiff, with fine sand (5-10%); dry, 10YR 4/4, reddish color	
			20			Grout (neat cement) (0'-34.5' bgs)
			21			
			22			
			23			
		CL	24		CLAY, low plasticity, medium hard, with fine sand (5-10%); dry to moist, 10YR 5/3	
			25			2" LC Steel Casing (0'-38.5' bgs)
			26			
			27		SANDY CLAY, low plasticity, soft to medium hardness, sand, fine to coarse (30%); moist, 10YR 5/4	
			28		No recovery, likely pushing rock through clay	
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Probe/HSA		BORING NO. MW17C [855329]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 4
DRILLING CONTR.: Stevens			
DRILLER: John Tokkesdal / EQUIP.: Probe/HSA	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: 915.475 FT AMSL	WATER LEVEL		TIME 1400 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982531.991 Easting: 506086.313	DATE		DATE 04/28/21 / DATE 04/29/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
			31		No recovery, likely pushing rock through clay	Grout (neat cement) (0'-34.5' bgs)
			32		SANDY CLAY, low plasticity, medium hardness, fine sand (30%); dry to moist, 10YR 4/3	
			33			2" LC Steel Casing (0'-38.5' bgs)
			34		CLAY, low plasticity, medium hard, with fine sand (10-20%); dry, 10YR 4/3, 0.25" sand lens at 35.5'	
		CL	35			2' Fine Sand (34.5'-36.5' bgs)
			36		CLAY, low to medium plasticity, stiff, with fine sand (15%), trace medium gravel (5%); dry, 10YR 4/3	
			37			
			38			
		SP	39		SAND, medium to coarse (20% fine, 80% coarse), sub-rounded, with gravel, fine to medium (10-15%); wet, 10YR 5/2	
			40		Refusal of 2" probe at 40' due to heaving sand; HSA was advanced to 48.5' with no recovery after confirming that there was sand from ~40-50' in MW17A and MW17B	Sand filter pack (36.5'-48.5' bgs)
			41			
			42			
			43			Screened interval (0.010" slot) (38.5'-48.5' bgs)
			44			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Probe/HSA						BORING NO. MW17C [855329]	
LOGGED BY: AS	CHECKED BY: BK									SHEET 4 OF 4	
DRILLING CONTR.: Stevens											
DRILLER: John Tokkesdal	EQUIP.: Probe/HSA			SAMPLING METHOD:						DRILLING	
BORING DEPTH: 48.5 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 915.475 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						1400	1400
COMMENTS: Northing: 4982531.991 Easting: 506086.313				DATE						DATE	DATE
				CASING DEPTH						04/28/21	04/29/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46			Sand filter pack (36.5'-48.5' bgs)
			47			
			48			Screened interval (0.010" slot) (38.5'-48.5' bgs)
			49			
			50			
			51			
			52			
			53			
			54			
			55			
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 1 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0–3		SILT, low plasticity, soft, with clay (10%), trace sand, fine to medium (5-10%), trace organics (5-10%); dry, 10YR4/6	
		SM	3–8		SILTY SAND, fine to medium (57% fine, 3% medium), silt (37%), trace gravel, fine to coarse (3%), trace mottle; dry, 7.5YR 4/4	Grout (neat cement) (0'-348' bgs)
			8–10		SILT, low plasticity, soft, trace sand, fine to medium (5%), trace gravel, coarse (5%); dry, 10YR 5/4	
		ML	10–14		SILT, no to low plasticity, stiff, gravel, fine to coarse (13%), trace sand, fine (5%), trace clay (3%); dry, 7.5YR 4/6	4" LC Steel Casing (0'-352' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 2 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME 1200 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE 12/13/21 / DATE 12/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SILT, no to low plasticity, stiff, gravel, fine to coarse (13%), trace sand, fine (5%), trace clay (3%); dry, 7.5YR 4/7	
		ML	17		SILT, stiff to very stiff, with gravel, fine to coarse (10%), sub-angular to sub-rounded, trace cobble (2%); 3" sand lens @ 18'	
			18			
			19			
			20			Grout (neat cement) (0'-348' bgs)
		SP	21		SAND, medium to coarse (50% medium, 20% coarse), sub-angular to sub-rounded, poorly graded, with fine gravel (25%), sub-angular, trace silt (5%); moist, 10YR 4/3	
		CL	22		CLAY, low plasticity, soft, trace sand, fine to medium (5-10%), trace gravel, coarse (5-10%); dry, 10YR 4/6	
			23			
		SM	24		SILTY SAND, fine to medium (70% fine, 30% medium), sub rounded, silt (25%), with gravel, fine to coarse (30%); dry, 2.5Y 4/1	
		CL	25		CLAY, low plasticity, soft, with sand, fine to medium, (15%fine, 5% medium), with gravel, coarse (15%); dry, 7.5YR 5/6	4" LC Steel Casing (0'-352' bgs)
			26			
			27			
			28		SAND, fine to coarse (40% fine, 29% medium, 19% coarse), sub-angular to sub-rounded, well graded, with gravel, fine to coarse (10%), trace silt (1%), trace clay (1%); dry to moist, 7.5YR 5/6	
		SW	29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 3 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL		WATER LEVEL	TIME: 1200 / 1700
DATUM: NAD 83 UTM 15 (meters)		TIME	
COMMENTS: Northing: 4983117.565 Easting: 504205.827		DATE	DATE: 12/13/21 / 12/15/21
		CASING DEPTH	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	31–33		CLAY, low to medium plasticity, stiff; moist, 7.5YR 5/6, 4" cobble	
		SW	33–35		SAND, fine to coarse (40% fine, 50% medium, 7% fine), well graded, trace gravel, fine (3%); dry, 7.5YR 6/6	Grout (neat cement) (0'-348' bgs)
		ML	35–40		SILT, with clay (15%), with gravel, fine to coarse (15%), sub-angular to sub-rounded, with sand, fine to coarse (15%), trace mottling (5%); wet, 10YR 4/6 SILT, with clay (15%), with gravel, fine to coarse (15%), sub-angular to sub-rounded, trace mottling (5%); moist, 10YR 5/6, 4" cobble @ 39.9' bgs	4" LC Steel Casing (0'-352' bgs)
	Platteville Fm. @ 43' bgs	CL	40–43		CLAY, medium plasticity, stiff, trace gravel, fine (5-10%); dry to moist, 7.5YR 4/6	
		Opg	43–44		SHALE, transition from Quaternary clay to bedrock; dry, yellow LIMESTONE, not competent to competent, crushed shale (70%), iron staining (15%), trace burrows (10%), trace black shells (5-10%),trace fractures (3%); 2.5Y 5/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 4 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		LIMESTONE, not competent to competent, crushed shale (70%), iron staining (15%), trace burrows (10%), trace black shells (5-10%),trace fractures (3%); 2.5Y 5/2	
			47		LIMESTONE, not competent to moderately competent, iron staining (25%), manganese staining (15%), trace black shells (5%), trace fractures (2%); 2.5Y 4/1	
			48		LIMESTONE, not competent to moderately competent, iron staining (20%), black shells (10-15%), trace pyrite (1%); 2.5Y 5/1, grey to dark grey patches	
			49			
			50		LIMESTONE, moderately competent to competent, bedding observered, trace iron staining (10%), trace black shells (5%), trace calcite vein in fractures (3%); GLEY 1 4/10Y	Grout (neat cement) (0'-348' bgs)
		Opg	51			
			52			
			53		LIMESTONE, not competent to moderately competent, burrows (15%), trace black shells (5%), trace fractures (1%); GLEY 2 5/10B	
			54			
			55			4" LC Steel Casing (0'-352' bgs)
			56			
	Glenwood Fm. @ 57' bgs		57		SHALE, moderately to well compacted, trace silt; GLEY 1 4/5GY, green to light green	
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK			SHEET 5 OF 25	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS					
GROUND SURFACE ELEVATION: 1003.926 FT AMSL		WATER LEVEL		TIME 1200	TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME			
COMMENTS: Northing: 4983117.565 Easting: 504205.827		DATE		DATE 12/13/21	DATE 12/15/21
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 62' bgs	Opg	61		SANDSTONE, poorly to well cemented, medium, well-rounded, shale, moderately compacted, mottling (30%); sandstone, 5Y 6/3, shale, GLEY 1 7/10Y	
			62		SANDSTONE, poorly to moderately cemented, fine to medium (fine 30%, medium 70%), iron staining (15%); 2.5Y 7/2	
			63			
			64		SANDSTONE, poorly to well cemented, fine to medium (fine 30%, medium 70%), clay (10%), trace iron staining (5%); 10YR 6/2	
			65		SANDSTONE, poorly to moderately cemented, fine to medium (fine 30%, medium 70%), iron staining (1%); 2.5Y 8/1	Grout (neat cement) (0'-348' bgs)
			66		SANDSTONE, poorly to moderately cemented, fine to medium (fine 30%, medium 70%), massive iron staining; 2.5Y 6/6	
			67			
		Os	68		SANDSTONE, poorly to well cemented, fine to medium (fine 50%, medium 50%), massive iron staining; 2.5Y 6/6	
			69			
			70		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2.5Y 8/2	4" LC Steel Casing (0'-352' bgs)
			71			
			72			
			73		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2.5Y 8/1 to 8/3	
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007			DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK				SHEET 6 OF 25
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 360 FT BGS					
GROUND SURFACE ELEVATION: 1003.926 FT AMSL			WATER LEVEL		TIME: 1200 / 1700
DATUM: NAD 83 UTM 15 (meters)			TIME		
COMMENTS: Northing: 4983117.565 Easting: 504205.827			DATE		DATE: 12/13/21 / 12/15/21
			CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2.5Y 8/1 to 8/4	
			77		SANDSTONE, poorly cemented, fine to medium (fine 95%, medium 5%), well-rounded, trace iron staining (5%); 2.5Y 8/2	
			78			
			79			
			80		SANDSTONE, poorly to well cemented, fine (100%), iron staining (10%); 10YR 8/1	Grout (neat cement) (0'-348' bgs)
			81			
			82			
		Os	83			
			84			
			85		SANDSTONE, poorly to well cemented, fine (100%), trace iron staining (5%); 10YR 8/1	4" LC Steel Casing (0'-352' bgs)
			86			
			87			
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 7 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	91		SANDSTONE, poorly cemented, fine to medium (fine 95%, medium 5%), trace iron staining (5%), trace silt (1%); 10YR 7/8 @90'-92' bgs, 2.5Y 8/3 @ 92'-100' bgs.	
			92			
			93			
			94			
			95			Grout (neat cement) (0'-348' bgs)
			96			
			97			
			98			
			99			
			100		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 7/6	4" LC Steel Casing (0'-352' bgs)
			101			
			102			
			103		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace silt (2%); 2.5Y 8/2	
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 8 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	106		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace silt (2%); 2.5Y 8/3	
			107			
			108			
			109			
			110		SANDSTONE, poorly cemented, fine (100%), well-rounded, massive iron staining; 2.5Y 8/4	Grout (neat cement) (0'-348' bgs)
			111			
			112			
			113			
			114			
			115		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (5%); 2.5Y 8/2	4" LC Steel Casing (0'-352' bgs)
			116			
			117			
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 9 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME 1200 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE 12/13/21 / DATE 12/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (3%); 2.5Y 7/1	
			122			
			123			
			124			
			125		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%); 2.5Y 8/1	Grout (neat cement) (0'-348' bgs)
			126			
		Os	127			
			128			
			129			
			130		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (1%); 2.5Y 8/1	4" LC Steel Casing (0'-352' bgs)
			131			
			132		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%), trace iron staining (1%); 2.5Y 8/1	
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK									SHEET 10 OF 25	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 360 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 1003.926 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						1200	1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827				DATE						DATE	DATE
				CASING DEPTH						12/13/21	12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%), trace iron staining (1%); 2.5Y 8/2	
			137		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%), trace iron staining (1%); 2.5Y 7/1	
			138			
			139			
			140		SANDSTONE, poorly cemented, fine (100%), sub-rounded, trace iron staining (5%); 2.5Y 8/3 to 2.5Y 8/1	Grout (neat cement) (0'-348' bgs)
			141			
			142			
		Os	143			
			144			
			145			4" LC Steel Casing (0'-352' bgs)
			146		SANDSTONE, poorly cemented, fine (100%), sub-rounded, trace iron staining (2%); 2.5Y 8/4 to 2.5Y 8/1	
			147			
			148		SANDSTONE, poorly cemented, fine (90%), well-rounded, silt (10%); 2.5Y 7/2	
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 11 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SANDSTONE, poorly cemented, fine (60%), well-rounded, silt (40%), iron staining (15%), intermittent banding; 2.5Y 7/1	
			152			
			153			
			154			
			155			Grout (neat cement) (0'-348' bgs)
			156			
			157			
		Os	158		SANDSTONE, poorly cemented, fine (50%), well-rounded, silt (50%); 2.5Y 7/2	
			159			
			160		SILTSTONE, moderately compacted, massive iron mottling; 2.5Y 7/6	4" LC Steel Casing (0'-352' bgs)
			161			
			162			
			163			
			164			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 12 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		SILTSTONE, moderately compacted, massive iron mottling; 2.5Y 7/7	
			167		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded, iron staining (25%); 2.5Y 7/3	
			168			
			169			
			170		SANDSTONE, poorly to moderately cemented, fine (95%), well-rounded, silt (5%), iron staining (25%); 2.5Y 8/4, 2" iron band @ 83.5' bgs	Grout (neat cement) (0'-348' bgs)
			171			
		Os	172			
			173			
			174		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (2%); 2.5Y 8/1	
			175			4" LC Steel Casing (0'-352' bgs)
			176			
			177			
			178		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (3%); 2.5Y 8/1 to 2.5Y 7/6	
			179			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK							SHEET 13 OF 25	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS									
GROUND SURFACE ELEVATION: 1003.926 FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1200	1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827			DATE					DATE	DATE
			CASING DEPTH					12/13/21	12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		SANDSTONE, poorly cemented, fine (100%), well-rounded, massive iron staining, mottling (20%); 2.5Y 7/4	
			182			
			183			
			184			
			185			Grout (neat cement) (0'-348' bgs)
			186			
			187			
		Os	188		SANDSTONE, poorly cemented, fine to medium (80% fine, 10% medium), well-rounded, silt (10%); 2.5Y 7/2	
			189			
			190			4" LC Steel Casing (0'-352' bgs)
			191			
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 14 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			196		SANDSTONE, moderately cemented, very fine (50%), well-rounded, silt (50%); 2.5Y 7/1	
			197			
			198			
			199			
			200		SANDSTONE, poor to moderately cemented, fine to medium (50% fine, 25% medium), well-rounded, silt/clay (25%), iron staining (40%); 2.5Y 7/4	Grout (neat cement) (0'-348' bgs)
		Os	201			
			202			
			203			
			204		SANDSTONE, poor to moderately cemented, fine to medium (60% fine, 15% medium), well-rounded, silt (25%), iron staining (25%); 2.5Y 7/2	
			205			4" LC Steel Casing (0'-352' bgs)
			206			
			207			
			208		SANDSTONE, moderately cemented, fine to coarse (30% fine, 20% medium, 20% coarse), well-rounded, massive iron staining, silt (30%); 2.5Y 6/6	
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK			SHEET 15 OF 25	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS					
GROUND SURFACE ELEVATION: 1003.926 FT AMSL		WATER LEVEL		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1200	1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827		DATE		DATE 12/13/21	DATE 12/15/21
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SHALE, not compacted, weathered, clay (50%), silt (25%), sandstone (25%), moderately cemented, fine, massive mottling; 2.5Y 6/6	
	Shakopee Fm. @ 214' bgs	Os	212			
			213			
			214		DOLOSTONE, not competent to competent, fine to coarse dolomitic precipitate (10%), iron staining (50%), small vugs (15%), glauconitic staining (10%); 5YR 4/2, horizontal and vertical fractures (5%)	
			215			Grout (neat cement) (0'-348' bgs)
			216			
			217		DOLOSTONE, not competent to moderately competent, with sand, fine (30%), iron staining (20%), trace vugs (5%), trace manganese staining (1%); 10YR 6/5 to 5YR 5/2	
			218			
			219			
		Ops	220		DOLOSTONE, not competent to moderately competent, dolomitic precipitate (25%), sand (10%), trace iron staining (5%), trace manganese staining (3%); 5 YR 5/2	4" LC Steel Casing (0'-352' bgs)
			221			
			222		DOLOSTONE, not competent to moderately competent, iron staining (20%), dendritic manganese staining (15%), trace sand (5%), trace fractures (5%); 10YR 6/3	
			223			
			224			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK									SHEET 16 OF 25	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 360 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 1003.926 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						1200	1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827				DATE						DATE 12/13/21	DATE 12/15/21
				CASING DEPTH							

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	226		DOLOSTONE, not competent to moderately competent, iron staining (20%), dendritic manganese staining (15%), trace sand (5%), trace fractures (5%); 10YR 6/4	
			227		DOLOSTONE, not competent to competent, oolitic texture (25%), shale (15%), iron staining (15%), dendritic manganese staining (5-10%), trace sand (5%), oolites (5%); 10YR 5/2	
			228			
			229			
			230		DOLOSTONE, not competent to competent, shale (20%), dolomitic precipitate (10%), iron staining (10%), trace fractures (3%), trace manganse staining (2%), trace glauconitic staining (2%); 10YR 6/3, shale lenses @ 243', 245', 247'	Grout (neat cement) (0'-348' bgs)
			231			
			232			
			233			
			234			
			235			4" LC Steel Casing (0'-352' bgs)
			236			
			237			
			238		DOLOSTONE, moderately competent to competent, iron staining (30%), fractures (11%), sand (10%), trace dolomitic precipitate (5%), trace iron staining (3%), trace vugs (1%); 10YR 6/4	
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 17 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, moderately competent, bedding observed, dolomitic precipitate (15%), iron staining (15%), vugs (5-10%), trace sand (5%), trace glauconitic staining (2%); 10YR 5/2	
			242			
			243			
			244			
			245			Grout (neat cement) (0'-348' bgs)
			246			
		Ops	247		DOLOSTONE, moderately competent, iron staining (10%), calcite nodule (10%), trace manganese staining (3%), trace fractures (2%); 2.5Y 7/5	
			248			
			249		DOLOSTONE, moderately competent, iron staining (10%), calcite nodule (10%), trace manganese staining (3%), trace fractures (2%); 10YR 5/8	
			250		DOLOSTONE, not competent to competent, massive iron staining, dolomitic precipitate (10%), vugs (10%), trace sand (5%); 10YR 6/6 to 10YR 6/2	4" LC Steel Casing (0'-352' bgs)
			251			
			252			
			253			
			254			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753	LOCATION: East Metro, MN						
PROJECT: Project 1007				DRILLING METHOD: Sonic					BORING NO. MW18A [854525]		
LOGGED BY: AS/LL	CHECKED BY: BK								SHEET 18 OF 25		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags					DRILLING		
BORING DEPTH: 360 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 1003.926 FT AMSL				WATER LEVEL					TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)				TIME					1200	1700	
COMMENTS: Northing: 4983117.565 Easting: 504205.827				DATE					DATE	DATE	
				CASING DEPTH					12/13/21	12/15/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	256 257 258 259 260 261 262 263 264 265 266 267 268 269		DOLOSTONE, not competent to competent, dolomitic precipitate (25%), glauconitic staining (25%), vugs (10%), trace sand (5%), trace fractures (5%); 10YR 6/5 DOLOSTONE, not competent to moderately competent, iron staining (60%), dolomitic precipitate (15%), vugs (5-10%), trace fractures (5%), trace glauconitic staining (3%), trace manganse staining (2%), trace sand (1%); 10YR 5/3 to 10YR 5/4	Grout (neat cement) (0'-348' bgs) 4" LC Steel Casing (0'-352' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 19 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	271		DOLOSTONE, competent, sand (25%), trace manganese staining (5%), trace fractures (3%), reworked clasts (3%); 7.5YR 6/6, 1 cm chert band	Grout (neat cement) (0'-348' bgs)
			272		DOLOSTONE, competent, trace fractures (5%), trace iron staining (5%); 10YR 7/3	
			273		DOLOSTONE, not competent to competent, iron staining (50%), vugs (15%), cherty inclusions (10%), trace dolomitic precipitate (5%), trace manganese staining (2%); 10YR 6/2	
			274			
			275			
			276		DOLOSTONE, moderately competent to competent, iron staining (60%), dolomitic precipitate (20%), trace oolites/oolitic texture (5%), trace vugs (5%), trace sand (5%), trace manganese staining (2%), glauconitic staining (1%); 7.5YR 6/1	
			277			
			278			
			279			
			280		DOLOSTONE, moderately competent, sand (10%), trace fractures (5%); 10YR 7/3	4" LC Steel Casing (0'-352' bgs)
			281		SHALE, well compacted, manganese staining (15%), dolomitic intervals; GLEY 1 7/5GY	
			282			
			283		DOLOSTONE, moderately competent to competent, oolitic texture/oolites (15%), iron staining (15%), sand (15%), dolomitic precipitate (5-10%), trace shale (5%); 7.5YR 6/2	
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 20 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			286		DOLOSTONE, moderately competent to competent, oolitic texture/oolites (15%), iron staining (15%), sand (15%), dolomitic precipitate (5-10%), trace shale (5%); 7.5YR 6/3	
			287		DOLOSTONE, competent, bedding observed, sand (25%), oolitic texture (10%), trace dolomitic precipitate (5%), trace reworked clasts (3%), trace iron staining (2%); 10YR 6/4, cherty inclusion @ 297' bgs	
			288			
			289			
			290			Grout (neat cement) (0'-348' bgs)
			291		SHALE, well compacted, manganese staining (20%), iron staining (10%); GLEY 1 7/10Y	
			292		DOLOSTONE, moderately competent, iron staining (25%), sand (20%), dolomitic precipitate (15%), trace oolitic texture (5%), trace glauconite staining (1%); 7.5YR 6/4	
		Ops	293			
			294			
			295		DOLOSTONE, not competent to moderately competent, bedding observed, iron staining (10%), trace sand (5%); 10YR 6/1	4" LC Steel Casing (0'-352' bgs)
			296		DOLOSTONE, not competent to moderately competent, iron staining (75%), trace dolomitic precipitate (5%), trace glauconitic staining (5%), trace sand (3%), trace oolites (3%); 10YR 7/3	
			297			
			298			
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 21 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 301' bgs	Ops	301		DOLOSTONE, moderately competent, vugs (15%), dolomitic precipitate (10%), trace iron staining (5%); 10YR 7/2	
			302		DOLOSTONE, not competent to competent, rubbly texture, manganese staining (20%), dolomitic precipitate (10%); 10YR 6/1 to 10YR 7/2, coarse precipitate in vugs @ 303' bgs	
			303			
			304			
			305			Grout (neat cement) (0'-348' bgs)
			306			
			307			
		Opo	308			
			309			
			310		DOLOSTONE, moderately competent to competent, vugs (15%), shale (10%), manganese staining (3%), iron staining (2%); variable colors, 7.5YR 6/6 to 10YR 6/1 to 10YR 7/6 to 2.5Y 6/3	4" LC Steel Casing (0'-352' bgs)
			311			
			312			
			313			
			314		DOLOSTONE, very competent, high density, dolomitic precipitate (10%), trace vugs (5%), trace fractures (1%), trace manganese staining (1%);	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW18A [854525]	
LOGGED BY: AS/LL	CHECKED BY: BK			SHEET 22 OF 25	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 360 FT BGS					
GROUND SURFACE ELEVATION: 1003.926 FT AMSL		WATER LEVEL		TIME 1200	TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME			
COMMENTS: Northing: 4983117.565 Easting: 504205.827		DATE		DATE 12/13/21	DATE 12/15/21
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	316		10YR 7/1 DOLOSTONE, very competent, high density, dolomitic precipitate (10%), trace vugs (5%), trace fractures (1%), trace manganese staining (1%); 10YR 7/1	
			317			
			318			
			319			
			320		DOLOSTONE, competent, bedding observed, rubbly texture, vugs (15%), dolomitic precipitate (5-10%), trace shale (3%), trace manganese staining (2%); 7.5YR 6/4 to 10YR 6/1	Grout (neat cement) (0'-348' bgs)
			321			
			322			
			323		DOLOSTONE, moderately competent to competent, vugs (15%), trace dolomitic precipitate (3%), trace manganese staining (1%); 2.5Y 7/4 to 2.5YR 5/6	
			324			
			325			4" LC Steel Casing (0'-352' bgs)
			326			
			327		DOLOSTONE, competent, dolomitic precipitate (15%), trace manganese staining (5%), trace fractures (3%); 2.5YR 5/6 to 10YR 6/1	
			328			
			329			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 23 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE / DATE
	CASING DEPTH		12/13/21 / 12/15/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			331		DOLOSTONE, competent, dolomitic precipitate (15%), trace manganese staining (5%), trace fractures (3%); 2.5YR 5/6 to 10YR 6/2	
			332		DOLOSTONE, competent to very competent, dolomitic precipitate (50%), vugs (15%), trace cherty interbeds (5%), trace fractures (3%); 2.5Y 6/2 to 10YR 5/4	
			333			
			334			
			335			Grout (neat cement) (0'-348' bgs)
			336			
			337			
		Opo	338			
			339		DOLOSTONE, not competent to moderately competent, dolomitic precipitate (15%), iron staining (10%), manganese staining (10%); 7.5YR 5/4	
			340			4" LC Steel Casing (0'-352' bgs)
			341			
			342		DOLOSTONE, not competent to moderately competent, sand (25-40%), iron staining (10%), trace shale (5%), trace glauconitic staining (2%)	
			343			
			344			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK		SHEET 24 OF 25
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 360 FT BGS			
GROUND SURFACE ELEVATION: 1003.926 FT AMSL	WATER LEVEL		TIME 1200 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983117.565 Easting: 504205.827	DATE		DATE 12/13/21 / DATE 12/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 346' bgs	Opo	346		DOLOSTONE, not competent to moderately competent, sand (25-40%), iron staining (10%), trace shale (5%), trace glauconitic staining (2%)	Grout (neat cement) (0'-348' bgs)
			347		SANDSTONE, poorly to well cemented, fine to medium (90% fine, 10% medium), well-rounded; 10YR 7/3	4" LC Steel Casing (0'-352' bgs)
			348		SANDSTONE, poorly to well cemented, fine to medium (50% fine, 50% medium), well-rounded, trace iron staining (1%); 10YR 6/4	
			349			2' Fine Sand (348'-350' bgs)
			350		E.O.B. @ 362', no refusal, blind drilled to 362' bgs	
			351			
			352			
		Cj	353			
			354			
			355			
			356			Sand filter pack (350'-362' bgs)
			357			Screened interval (0.010" slot) (352'-362' bgs)
			358			
			359			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW18A [854525]
LOGGED BY: AS/LL	CHECKED BY: BK			SHEET 25 OF 25
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 360 FT BGS				
GROUND SURFACE ELEVATION: 1003.926 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		1200 / 1700
COMMENTS: Northing: 4983117.565 Easting: 504205.827		DATE		DATE / DATE
		CASING DEPTH		12/13/21 / 12/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	361		E.O.B. @ 362', no refusal, blind drilled to 362' bgs	Sand filter pack (350'-362' bgs) Screened interval (0.010" slot) (352'-362' bgs)
			362			
			363			
			364			
			365			
			366			
			367			
			368			
			369			
			370			
			371			
			372			
			373			
			374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		GP	1–9		No Recovery. Boulders from 3'-7' bgs.	Grout (neat cement) (0'-221' bgs)
		CL	10–13		CLAY, low plasticity, soft, with fine to medium sand (10-20%), well rounded, trace gravel (5%); dry, 7.5YR 4/6	4" LC Steel Casing (0'-225' bgs)
		SP	14		SAND, fine to medium (83% fine, 13% medium), well rounded, poorly graded, trace gravel (2%), trace silt (2%); dry, 7.5YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16–20		CLAY, low plasticity, soft, with fine to medium sand (10-20%), well rounded, fine to coarse gravel (5%); dry, 7.5YR 4/6	
		CL	20–28		CLAY, low to medium plasticity, soft, with fine to medium sand (10%), fine to coarse gravel (5-10%)	Grout (neat cement) (0'-221' bgs); 4" LC Steel Casing (0'-225' bgs)
		SW	28–29		SAND, fine to coarse (25% fine, 25% medium, 25% coarse), well rounded, well graded, with gravel, fine to medium (15%), with silt (10%); dry, 7.5YR 5/4 to 7.5YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	31		CLAY, medium plasticity, medium stiff, with silt (25%), with gravel, fine to coarse (10%), trace sand, fine (5%); dry, 7.5YR 4/, 3" lense of silt and fine to medium sand @ 39.5' bgs	
			32		SAND, fine to coarse (20% fine, 20% medium, 20% coarse), sub rounded, well graded, with fine to coarse gravel (20% fine, 10% medium, 10% coarse); dry, 7.5Y 4/5	
			33			
			34			
			35			Grout (neat cement) (0'-221' bgs)
		SW	36			
			37			
			38			
			39			
			40		CLAY, medium to high plasticity, soft, with fine sand (10%), trace gravel (5%); dry, 7.5YR 4/4	4" LC Steel Casing (0'-225' bgs)
			41			
		CL	42			
			43			
	Platteville Fm. @ 44' bgs		44			
		Opg			LIMESTONE, not competent to moderately competent, weathered, bedding observed, iron staining (10%), trace pyrite (5%), trace black shells	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					(5%), trace reworked clasts (5%); 2.5Y4/1	
			46		LIMESTONE, not competent to moderately competent, weathered, bedding observed, iron staining (10%), trace pyrite (5%), trace black shells (5%), trace reworked clasts (5%); 2.5Y4/1	
			47			
			48		LIMESTONE, moderately competent, chert inclusion (10%), trace black shells (5%); 2.5Y 5/1	
			49			
			50		LIMESTONE, moderately competent, iron staining (20%), trace black shells (5%), trace phosphate grains (5%); GLEY 1 4/5GY	Grout (neat cement) (0'-221' bgs)
		Opg	51			
			52			
			53			
			54		LIMESTONE, competent, massive iron staining on fractures, bedding observed, trace burrows (5%), trace black shells and black lithic fragments (5%), trace pyrite (1%); GLEY 1 5/10Y, less competent at 53.5' + 57' bgs	
			55			4" LC Steel Casing (0'-225' bgs)
			56			
	Glenwood Fm. @ 57' bgs		57		SHALE, moderately to well compacted; GLEY 1 5/N, end of core @ 60' bgs	
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 61' bgs	Opg	61		Blind drill to 240' bgs, shale to 61' bgs per driller's comment	
					Blind drill to 240' bgs, sandstone from 61' to 75' per geology from MW18A	
			62			
			63			
			64			
			65			Grout (neat cement) (0'-221' bgs)
			66			
			67			
		Os	68			
			69			
			70			4" LC Steel Casing (0'-225' bgs)
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS	CHECKED BY: BK			SHEET 6 OF 16
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS				
GROUND SURFACE ELEVATION: 1003.468 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383		DATE		DATE / DATE
		CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 75' to 90' per geology from MW18A	
		Os	76			
			77			
			78			
			79			
			80			Grout (neat cement) (0'-221' bgs)
			81			
			82			
			83			
			84			
			85			4" LC Steel Casing (0'-225' bgs)
			86			
			87			
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME 800 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE 01/12/22 / DATE 1/13/2022
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 90' to 105' per geology from MW18A	
		Os	91			
			92			
			93			
			94			
			95			Grout (neat cement) (0'-221' bgs)
			96			
			97			
			98			
			99			
			100			4" LC Steel Casing (0'-225' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 105' to 120' per geology from MW18A	
GRAB	MW18B-GW 116-120	Os	106 107 108 109 110 111 112 113 114 115 116 117 118 119			Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 9 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 120' to 135' per geology from MW18A	
		Os	121 122 123 124 125 126 127 128 129 130 131 132 133 134			Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. MW18B [860259]	
LOGGED BY: AS		CHECKED BY: BK								SHEET 10 OF 16	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen		EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING	
BORING DEPTH: 240 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 1003.468 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						800	1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383				DATE						DATE	DATE
				CASING DEPTH						01/12/22	1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	136 137 138 139 140 141 142 143 144 145 146 147 148 149		Blind drill to 240' bgs, sandstone from 135' to 150' per geology from MW18A	Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 150' to 165' per geology from MW18A	
		Os	151			Grout (neat cement) (0'-221' bgs)
			152			
			153			
			154			
			155			
			156			
			157			
			158			
			159			
			160			4" LC Steel Casing (0'-225' bgs)
			161			
			162			
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 12 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 165' to 180' per geology from MW18A	
GRAB	MW18B-GW 176-180	Os	166 167 168 169 170 171 172 173 174 175 176 177 178 179			Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 13 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 180' to 195' per geology from MW18A	
		Os	181 182 183 184 185 186 187 188 189 190 191 192 193 194			Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007			DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS	CHECKED BY: BK				SHEET 14 OF 16
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS					
GROUND SURFACE ELEVATION: 1003.468 FT AMSL			WATER LEVEL		TIME 800 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)			TIME		
COMMENTS: Northing: 4983116.923 Easting: 504208.383			DATE		DATE 01/12/22 / DATE 1/13/2022
			CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					Blind drill to 240' bgs, sandstone from 195' to 210' per geology from MW18A	
		Os	196 197 198 199 200 201 202 203 204 205 206 207 208 209			Grout (neat cement) (0'-221' bgs) 4" LC Steel Casing (0'-225' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 15 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		800 / 1600
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE / DATE
	CASING DEPTH		01/12/22 / 1/13/2022

SURFACE CONDITIONS: Grass

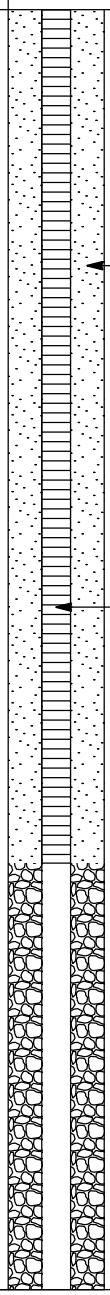
SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	211		Blind drill to 240' bgs, sandstone from 210' to 214' per geology from MW18A	
	Shakopee Fm. @ 214' bgs		214		Blind drill to 240' bgs, dolostone from 214' to 225' per geology from MW18A	
		Ops	219			Grout (neat cement) (0'-221' bgs)
			220			4" LC Steel Casing (0'-225' bgs)
			222			2' Fine Sand (221'-223' bgs)
			224			Sand filter pack (223'-235' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW18B [860259]
LOGGED BY: AS / CHECKED BY: BK			SHEET 16 OF 16
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 240 FT BGS			
GROUND SURFACE ELEVATION: 1003.468 FT AMSL	WATER LEVEL		TIME 800 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4983116.923 Easting: 504208.383	DATE		DATE 01/12/22 / DATE 1/13/2022
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	226 227 228 229 230 231 232 233 234 235 236 237 238 239		Blind drill to 240' bgs, dolostone from 225' to 240' per geology from MW18A E.O.B. @ 240' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW20A [867664]	
LOGGED BY: GG	CHECKED BY: BK							SHEET 1 OF 10	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 140 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1400	1815
COMMENTS: Northing: Easting:			DATE					DATE	DATE
			CASING DEPTH					09/26/22	09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1		CLAY, low plasticity, low density, silt (10%), gravel, medium to coarse (5% medium, 15% coarse), organics (3%, roots); 7.5YR 3/3	
		SP	2		SAND, fine to coarse (5% fine, 40% medium, 40% coarse), subrounded, poorly graded, gravel, fine to coarse (2% fine, 3% medium, 5% coarse), silt (5%); dry, 7.5YR 4/6	
			3			
			4			
			5			Grout (neat cement) (0'-126' bgs)
		ML	6		GRAVELLY SILT, low plasticity, low density, gravel, fine to coarse (10% fine, 12% medium, 8% coarse), clay (10%); dry, 7.5YR 4/4	
			7			
			8			
			9			
		CH	10		CLAY, high plasticity, medium density, gravel, fine to coarse (5% fine, 7% medium, 7% coarse), silt (7%); dry, 7.5YR 4/4, cobble @ 11'	4" LC Steel Casing (0'-130' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20A [867664]
LOGGED BY: GG / CHECKED BY: BK			SHEET 2 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1815
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/26/22 / 09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	16–27		CLAY, high plasticity, medium density, gravel, fine to coarse (5% fine, 7% medium, 7% coarse), silt (7%); dry, 7.5YR 4/4, cobble @ 11'	Grout (neat cement) (0'-126' bgs) 4" LC Steel Casing (0'-130' bgs)
		CL	27–29		SILTY CLAY, medium plasticity, low density, silt (25%), gravel, medium to coarse (5% medium, 15% coarse); dry, 7.5Y 4/4, granite cobble @ 27'	
			29		No recovery	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20A [867664]
LOGGED BY: GG / CHECKED BY: BK			SHEET 3 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 1400 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE 09/26/22 / DATE 09/28/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					No recovery	Grout (neat cement) (0'-126' bgs); 4" LC Steel Casing (0'-130' bgs)
	St. Peter Fm. @ 41' bgs	Os	41		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), subrounded to rounded; 10YR 7/8	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW20A [867664]	
LOGGED BY: GG	CHECKED BY: BK							SHEET 4 OF 10	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 140 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1400	1815
COMMENTS: Northing: Easting:			DATE					DATE	DATE
			CASING DEPTH					09/26/22	09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), subrounded to rounded; 10YR 7/8	
			47		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), subrounded to rounded; 10YR 7/2	
			48		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), subrounded to rounded, iron staining (8%); 10YR 7/6	
			49		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), subrounded to rounded; 10YR 7/3	
			50		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subrounded, iron staining (4%); 5Y 7/1	Grout (neat cement) (0'-126' bgs)
		Os	51			
			52			
			53			
			54			
			55		SANDSTONE, poorly cemented, fine to medium (45% fine, 55% medium), subrounded, iron staining (3%); 10YR 6/6	4" LC Steel Casing (0'-130' bgs)
			56			
			57		SANDSTONE, poorly to moderately cemented, fine to medium (55% fine, 45% medium); 10YR 6/6	
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW20A [867664]	
LOGGED BY: GG	CHECKED BY: BK							SHEET 5 OF 10	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 140 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1400	1815
COMMENTS: Northing: Easting:			DATE					DATE	DATE
			CASING DEPTH					09/26/22	09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, moderately cemented, fine to medium (70% fine, 30% medium), subrounded to rounded; 5Y 7/2	
			61		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 30% medium), subrounded to rounded, iron staining (10%); 10YR 7/8	
			62			
			63			
			64		SANDSTONE, poorly cemented, fine to medium (70% fine, 30% medium), subrounded to rounded, iron staining (5%); 10YR 6/8	
			65		SANDSTONE, poorly cemented, fine to medium (70% fine, 30% medium), subrounded to rounded, iron staining (4%); 10YR 6/6	Grout (neat cement) (0'-126' bgs)
			66			
			67		SANDSTONE, poorly cemented, fine to medium (70% fine, 30% medium), subrounded to rounded; 5Y 7/2	
		Os	68		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 30% medium), subrounded to rounded, iron staining (3%); 2.5Y 7/3	
			69			
			70		SANDSTONE, moderately cemented, fine to medium (65% fine, 35% medium), subrounded; 10YR 6/8	4" LC Steel Casing (0'-130' bgs)
			71			
			72		SANDSTONE, moderately cemented, fine to medium (70% fine, 30% medium), subrounded, iron staining; 10YR 7/4 to 10YR 6/6	
			73			
			74		SANDSTONE, poorly to moderately cemented, fine to medium (75% fine, 25% medium), subrounded, iron staining (1%); 5Y 7/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW20A [867664]	
LOGGED BY: GG	CHECKED BY: BK							SHEET 6 OF 10	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING	
BORING DEPTH: 140 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					1400	1815
COMMENTS: Northing: Easting:			DATE					DATE	DATE
			CASING DEPTH					09/26/22	09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly to moderately cemented, fine to medium (75% fine, 25% medium), subrounded, iron staining (1%); 5Y 7/2	
			77		SANDSTONE, poorly cemented, fine to medium (75% fine, 25% medium), subrounded; 2.5Y 7/3	
			78			
			79			
			80		SANDSTONE, moderately cemented, fine to medium (80% fine, 20% medium), subrounded, iron staining (25%), mottling; 10YR 7/6 to 10YR 6/8	Grout (neat cement) (0'-126' bgs)
			81			
			82			
		Os	83			
			84			
			85			4" LC Steel Casing (0'-130' bgs)
			86		SANDSTONE, moderately cemented, fine to medium (80% fine, 20% medium), subrounded, iron staining (20%); 10YR 6/2 to 10YR 6/8	
			87			
			88		SANDSTONE, poorly to moderately cemented, fine to medium (80% fine, 20% medium), subrounded, iron staining (10%); 10YR 7/1	
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW20A [867664]		
LOGGED BY: GG	CHECKED BY: BK								SHEET 7 OF 10		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 140 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						1400	1815	
COMMENTS: Northing: Easting:			DATE						DATE	DATE	
			CASING DEPTH						09/26/22	09/28/22	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, moderately cemented, fine to medium (85% fine, 15% medium), subrounded; 5YR 5/6	
			92		SANDSTONE, moderately cemented, fine to medium (85% fine, 15% medium), subrounded; 7.5YR 6/6 to 5Y 7/3	
			93		SANDSTONE, poorly to moderately cemented, fine to medium (90% fine, 10% medium), subrounded; 7.5YR 5/6	
		Os	94			
			95		SANDSTONE, moderately cemented, fine to medium (90% fine, 10% medium), subrounded; 5Y 6/1	Grout (neat cement) (0'-126' bgs)
			96			
			97		SANDSTONE, poorly cemented, fine to medium (90% fine, 10% medium), subrounded; 7.5YR 6/6	
	Shakopee Fm. @ 99' bgs		98			
			99		DOLOSTONE, moderately competent, massive iron staining, fractures (10%) some filled with calcite; 10YR 5/8	
			100		DOLOSTONE, moderately competent, manganese staining (15%), iron staining (3%), fractures (1%); 10YR 6/6	4" LC Steel Casing (0'-130' bgs)
		Ops	101			
			102		SHALE, not compacted, soft; GLEY1 6/10Y	
			103		DOLOSTONE, moderately competent, iron staining (15%), sand (10%), black shells (1%); 10YR 6/6	
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW20A [867664]
LOGGED BY: GG / CHECKED BY: BK			SHEET: 8 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1815
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/26/22 / 09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		DOLOSTONE, moderately competent, iron staining (15%), sand (10%), black shells (1%); 10YR 6/6	
			107		SHALE, not compacted, soft; GLEY1 6/10Y	
			108		DOLOSTONE, not competent to moderately competent, dendritic manganese staining (10%), iron staining (3%), fractures (2%); 10YR 6/4	
			109		SHALE, not compacted, soft; GLEY1 6/10Y	
			110		DOLOSTONE, not competent to moderately competent, rip-up clasts (15%), glauconite (12%), vugs (8%), sand (3%); 10YR 6/4	Grout (neat cement) (0'-126' bgs)
			111		DOLOSTONE, not competent to moderately competent, sand (10%), iron staining (3%), fractures (2%), glauconite (2%); 10YR 6/6	
			112			
			113			
			114			
			115		DOLOSTONE, moderately competent, glauconite (7%), manganese staining (4%), iron staining (2%); 10YR 6/3	4" LC Steel Casing (0'-130' bgs)
			116			
			117		SHALE, not compacted, soft; GLEY1 6/5GY	
			118		DOLOSTONE, moderately competent, glauconite (5%) iron staining (5%), vugs (3%), precipitate (3%); 10YR 6/3	
			119			
					DOLOSTONE, not competent, vugs (2%), glauconite	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20A [867664]
LOGGED BY: GG / CHECKED BY: BK			SHEET 9 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1815
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/26/22 / 09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		(1%), iron staining (1%); 10YR 5/4 DOLOSTONE, not competent, iron staining (8%), manganese staining (3%), glauconite (3%), fractures (2%); 10YR 7/2	
			122		DOLOSTONE, not competent to moderately competent, rip-up clasts (15%), precipitate (10%), vugs (5%), sand (4%); 10YR 6/3	
			123			
			124			
			125			Grout (neat cement) (0'-126' bgs)
			126		DOLOSTONE, competent, vugs (8%), glauconite (3%), precipitate (7%); 10YR 6/2	
			127			2' Fine Sand (126'-128' bgs)
			128		DOLOSTONE, not competent to moderately competent, glauconite (10%), iron staining (5%), fractures (4%), precipitate (3%), rubbly texture; 10YR 7/4	
			129			
			130			4" LC Steel Casing (0'-130' bgs)
			131		DOLOSTONE, moderately competent, sand (5%), iron staining (3%), fractures (3%), precipitate (3%), vugs (2%); 10YR 6/4	
			132			
			133			
			134		DOLOSTONE, not competent, sand (4%), iron staining (2%), sand (2%); 10YR 7/1	Sand filter pack (128'-140' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20A [867664]
LOGGED BY: GG / CHECKED BY: BK			SHEET 10 OF 10
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1400 / 1815
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/26/22 / 09/28/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		DOLOSTONE, not competent, sand (4%), iron staining (2%), sand (2%); 10YR 7/1	Screened interval (0.010" slot) (130'-140' bgs)
			137		DOLOSTONE, not competent to moderately competent, iron staining (5%), manganese staining (4%), glauconite (2%), precipitate (2%), fractures (1%); 10YR 6/4	
			138			
			139		DOLOSTONE, moderately competent, iron staining (10%), precipitate (5%), manganese staining (3%), sand (2%); 10YR 6/6	
			140		SANDSTONE, poorly cemented, subrounded to rounded, fine to medium (40% fine, 60% medium); 10YR 5/3	
			141			
			142			
			143		DOLOSTONE, not competent, manganese staining (7%), glauconite (3%), iron staining (2%), sand (2%), small fractures (1%); 10YR 7/2	Backfill by natural collapse (140-145' bgs)
			144			
			145		E.O.B. @ 145' bgs, no refusal	
			146			
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 1 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1130
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/26/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0		SILTY CLAY, silt (10%), low plasticity, with roots; dry, 10YR 4/6, friable	
		CL	1		SILTY CLAY, low plasticity, silt (10%), sand, fine (5%), gravel, fine (3%), subangular; 10YR 4/6	
		CL	2–4			
		CL	5		SILTY CLAY, low plasticity, sand, fine (15%), silt (5%), gravel, fine (5%), subangular; 10YR 4/6	Grout (neat cement) (0'-86' bgs)
		CL	6–7			
		SC	8		CLAYEY SAND, fine to coarse (5% fine, 25% medium, 10% coarse), gravel, medium (10%), subangular, fines (5%); 10YR 4/6	
		SC	9		CLAYEY SAND, fine to coarse (5% fine, 25% medium, 10% coarse), gravel, medium (10%), subangular, fines (5%); 10YR 4/6	
		SC	10		CLAYEY SAND, fine to coarse (7% fine, 19% medium, 59% coarse), gravel, coarse (15%); 10YR 3/3	4" LC Steel Casing (0'-90' bgs)
		SC	11			
		SP	12		SAND, coarse (85%), gravel, coarse (15%), subangular; 10YR 4/2	
	St. Peter Fm. @ 14' bgs	SC	13		CLAYEY SAND, fine to medium (51% fine, 34% medium), fines (10%), gravel, medium (5%), subangular; dry, 10YR 4/4	
		Os	14		SANDSTONE, poorly cemented, weathered, fine (100%); moist, 2.5Y 6/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 2 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1300 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE: 09/22/22 / 09/26/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	16		SANDSTONE, poorly cemented, weathered, fine (100%); moist, 2.5Y 6/6	
			17			
			18			
			19			
			20			Grout (neat cement) (0'-86' bgs)
			21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-90' bgs)
			26		SANDSTONE, poorly cemented, fine (100%), manganese oxide staining (3%); 2.5Y 8/1	
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 3 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1130
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/26/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	31		SANDSTONE, moderately cemented, fine (100%); dry, 2.5Y 8/1	Grout (neat cement) (0'-86' bgs)
			36		SANDSTONE, moderately cemented, fine (100%); dry, 2.5Y 8/3	
			40		SANDSTONE, moderately cemented, fine (100%); dry, 2.5Y 7/1	4" LC Steel Casing (0'-90' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 4 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1300 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE: 09/22/22 / 09/26/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	46		SANDSTONE, moderately cemented, fine (100%); dry, 2.5Y 7/1	
			47			
			48			
			49		SANDSTONE, well cemented, fine (100%), yellow oxidized nodules (15%); 2.5Y 8/4	
			50		SANDSTONE, moderately cemented, fine (100%), weathered; moist, 2.5Y 8/4	Grout (neat cement) (0'-86' bgs)
			51		SANDSTONE, moderately cemented, fine (100%); moist, 2.5Y 8/2	
			52			
			53		SANDSTONE, moderately cemented, fine (100%), weathered, heavily oxidized; moist, 2.5Y 8/8	
			54			
			55			4" LC Steel Casing (0'-90' bgs)
			56			
			57			
			58		SANDSTONE, moderately cemented, fine (100%), oxidized nodules (3%); 2.5Y 7/1	
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 5 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1300 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE: 09/22/22 / 09/26/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61–74		SANDSTONE, moderately cemented, fine (100%), oxidized nodules (3%); 2.5Y 7/1	Grout (neat cement) (0'-86' bgs) 4" LC Steel Casing (0'-90' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 6 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1130
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/26/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	76		SANDSTONE, poorly to moderately cemented, fine (100%), oxidized nodules (2%); wet, 2.5Y 8/1	
			77			
			78		SANDSTONE, poorly to moderately cemented, fine (100%); wet, 2.5Y 8/2	
			79			
			80			Grout (neat cement) (0'-86' bgs)
			81			
			82			
			83			
			84			
			85			4" LC Steel Casing (0'-90' bgs)
			86		SANDSTONE, poorly to moderately cemented, fine (100%), weathered, highly oxidized; wet, 2.5Y 8/8	
			87			2' Fine Sand (86'-88' bgs)
			88			
			89			Sand filter pack (88'-100' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW20B [867665]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 7 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1300 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE: 09/22/22 / 09/26/22
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	91–104		SANDSTONE, poorly to moderately cemented, fine (100%); wet, 2.5Y 8/1 E.O.B. @ 100' bgs, no refusal	Sand filter pack (88'-100' bgs) Screened interval (0.010" slot) (90'-100' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–8		SANDY CLAY, medium plasticity, low density, clay (30%), silt (30%), sand, fine (30%), gravel (5%), cobbles (5%), orange mottling 7-8'; moist, 5YR 4/3	Grout (neat cement) (0'-406' bgs)
		SM	8–14		SILTY SAND, fine to medium (60%), silt (15%), clay (15%), gravel (10%); moist, 5YR 4/6 SILTY SAND, fine to medium (50%), silt (20%), clay (15%), gravel (10%), cobbles (5%); moist, 5YR 4/4	4" LC Steel Casing (0'-410' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	16–26		SILTY SAND, fine to medium (45%), silt (30%), clay (10%), gravel (10%), cobbles (5%); moist, 5YR 4/2	Grout (neat cement) (0'-406' bgs) 4" LC Steel Casing (0'-410' bgs)
		CL	27		CLAY, low plasticity, medium density, silt (13%), sand, fine to coarse (12%), gravel (12%); moist, 2.5YR 4/2	
		SW	28–29		SAND, fine to medium (60% fine, 20% medium), silt (10%), gravel (5%), cobbles (5%); wet, 5YR 4/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE 06/13/22 / DATE 06/20/22
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	31–35		SILTY SAND, fine to medium (50%), silt (20%), clay (20%), gravel, fine to medium (5%), cobbles (5%); wet, 5YR 5/2	Grout (neat cement) (0'-406' bgs)
		CL	35–37		SILTY CLAY, medium plasticity, high density, silt (30%), sand, fine grained (15%), gravel, fine (5%); moist, 5YR 4/4	
		SP	38–44		SAND, fine to coarse (25% fine, 70% medium, 5% coarse), poorly graded, subrounded; wet, 7.5YR 4/1	4" LC Steel Casing (0'-410' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	46–50		SAND, fine to coarse (25% fine, 70% medium, 5% coarse), poorly graded, subrounded; wet, 7.5YR 4/1	
		SM	50–51		SILTY SAND, sand, fine grained (50%), silt (50%), low plasticity, low to medium density; wet, 10YR 4/2	Grout (neat cement) (0'-406' bgs)
		CL	51–52		CLAYEY SILT, medium plasticity, high density, clay (30%), sand, fine grained (10%); moist, 10YR 3/3	
		SP	52–53		SAND, fine to medium (30% fine, 70% medium); wet, 5YR 3/3	
		SM	53–54		SILTY SAND, sand, fine grained (50%), silt (50%), low plasticity, low to medium density; wet, 10YR 4/2	
		CH	54–59		SILTY CLAY, clay (30%), high plasticity, medium density, silt (30%), sand, fine to medium (10% fine, 10% medium), gravel, fine (5%), cobbles (5%); moist, 5YR 3/1	4" LC Steel Casing (0'-410' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61		SILTY CLAY, clay (30%), high plasticity, high density, silt (30%), sand, fine to medium (10% fine, 10% medium), gravel, fine (5%), cobbles (5%); moist, 5YR 3/1	
		SP	62		CLAYEY SAND, medium to coarse (15% medium, 15% coarse), clay (25%), silt (25%), gravel, fine (10%), cobbles (10%); moist, 10YR 4/1	
		SW	63		SAND, fine to coarse (27% fine, 36% medium, 27% coarse), gravel, fine (10%); wet, 10YR 5/1	
			64			
			65		SANDY CLAY, clay (45%), medium plasticity, high density, silt (30%), sand, medium (20%), gravel (5%), orange mottling; dry	← Grout (neat cement) (0'-406' bgs)
			66			
		CL	67		SANDY CLAY, clay (40%), medium plasticity, high density, silt (30%), fine to coarse (9% fine, 12% medium, 9% coarse), orange mottling; dry, 5YR 4/3	
			68			
			69			
			70			← 4" LC Steel Casing (0'-410' bgs)
		SW	71		CLAYEY SAND, sand, fine to coarse (16% fine, 12% medium, 12% coarse), clay (40%), low plasticity, high density, silt (30%), orange mottling; dry	
			72			
		SM	73		SILTY SAND, sand, fine to coarse (40%), silt (30%), low plasticity, high density, clay (20%), gravel, fine (10%), orange mottling; moist, 10YR 3/4	
		SW	74		SAND, fine to coarse (70%), clay (10%), silt (10%), gravel, fine (10%); wet, 10YR 3/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Regolith Platteville Fm. @ 82' bgs	SW	76–78		SAND, fine to coarse (70%), clay (10%), silt (10%), gravel, fine (10%); wet, 10YR 3/2	
		SM	78–79		SILTY SAND, fine (70%), silt (30%); wet, 5YR 4/1	
		SM	79–80		SILTY SAND, sand, fine to coarse (50%), clay (20%), silt (20%), gravel, fine (10%), orange mottling; wet, 10YR 3/6	
		SW	80–82		SAND, fine to coarse (35% fine, 21% medium, 14% coarse), gravel, fine to coarse (10% fine, 5% medium, 5% coarse), silt (10%); wet, 10YR 4/2	Grout (neat cement) (0'-406' bgs)
		Opg	82–86		SHALE, poorly to well compacted, weathered clay, orange and grey mottling; moist, 10YR 5/6	4" LC Steel Casing (0'-410' bgs)
		Opg	86–89		SHALE, poorly to well compacted, weathered clay, orange and grey mottling; dry, 2.5Y 6/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SHALE, weathered clay, orange; 2.5Y 6/6	
	Platteville Fm. @ 93' bgs		92			
			93		LIMESTONE, moderately competent, small black shells (15%), iron staining (10%), trace burrow (3%); GLEY 5/10Y	
			94			
			95		LIMESTONE, moderately competent to competent, horizontal bedding plane fractures (15%), burrows (5%), black shells (3%); GLEY1 5/10Y	Grout (neat cement) (0'-406' bgs)
			96			
			97		LIMESTONE, moderately competent to competent, burrows (10%), black shells (10%), pyrite (3%), precipitation filled fractures @ 100'; GLEY1 5/10Y	
		Opg	98			
			99			
	Glenwood Fm. @ 100' bgs		100		SHALE, moderately to well compacted, sand (3%), burrows (2%); GLEY1 5G4/1	4" LC Steel Casing (0'-410' bgs)
			101			
			102			
		Opg	103			
			104			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 106' bgs	Opg	106		SHALE, moderately to well compacted, sand (3%), burrows (2%); GLEY1 5G4/1	
			107		SANDSTONE, poorly cemented, fine to medium (25% fine, 50% medium), silt (25%); GLEY1 7/5GY	
			108		SANDSTONE, poorly to moderately cemented, fine to medium (50% fine, 50% medium), well rounded; GLEY1 6/N	
			109			
			110		SANDSTONE, poorly to trace moderately cemented, medium (85%), silt (15%), well rounded; GLEY1 5G6/1	Grout (neat cement) (0'-406' bgs)
			111			
			112		SANDSTONE, poorly cemented to trace moderately cemented, fine to medium (50% fine, 50% medium), well rounded; 7.5YR 6/1	
		Os	113			
			114			
			115			4" LC Steel Casing (0'-410' bgs)
			116			
			117			
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 9 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	121		SANDSTONE, poorly cemented, fine to medium (50% fine, 50% medium), poorly graded, rounded; 7.5YR 7/1	Grout (neat cement) (0'-406' bgs)
			130		SANDSTONE, poorly cemented, fine to medium (75% fine, 25% medium), well rounded; 7.5YR 7/1	4" LC Steel Casing (0'-410' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007			DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS	CHECKED BY: BK				SHEET 10 OF 28
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS					
GROUND SURFACE ELEVATION: 995.152 FT AMSL			WATER LEVEL		TIME: 1300 / 1700
DATUM: NAD 83 UTM 15 (meters)			TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377			DATE		DATE: 06/13/22 / 06/20/22
			CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		SANDSTONE, poorly cemented, fine to medium (75% fine, 25% medium), well rounded; 7.5YR 7/1	
			137			
			138			
			139			
			140		SANDSTONE, poorly cemented, fine to medium (70% fine, 25% medium), well rounded, silt (5%); GLEY1 7/N	Grout (neat cement) (0'-406' bgs)
			141		SANDSTONE, poorly cemented, fine to medium (98% fine, 2% medium), well rounded; 2.5Y 8/1	
		Os	142			
			143			
			144			
			145			4" LC Steel Casing (0'-410' bgs)
			146			
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	151		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; 2.5Y 8/1	Grout (neat cement) (0'-406' bgs)
			160		SANDSTONE, poorly cemented, fine (97%), well rounded, silt (3%); GLEY1 7/N	4" LC Steel Casing (0'-410' bgs)
			163		SANDSTONE, poorly cemented, fine (100%), well rounded; GLEY1 6/N to GLEY1 7/N	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS	CHECKED BY: BK			SHEET 12 OF 28
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS				
GROUND SURFACE ELEVATION: 995.152 FT AMSL		WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377		DATE		DATE 06/13/22 / DATE 06/20/22
		CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly cemented, fine (100%), well rounded; GLEY1 6/N to GLEY1 7/N	
			166			
			167			
			168			
			169			
			170		SANDSTONE, poorly cemented, very fine to fine (20% very fine, 80% fine), well rounded; GLEY1 6/N	Grout (neat cement) (0'-406' bgs)
			171			
		Os	172			
			173			
			174			
			175			4" LC Steel Casing (0'-410' bgs)
			176			
			177			
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 13 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	181		SANDSTONE, poorly cemented, fine (100%), rounded; 7.5YR 7/1	
			183		SANDSTONE, poorly cemented, fine (100%), rounded; GLEY1 5/N	
			185		SANDSTONE, poorly cemented, fine (100%), rounded; GLEY1 7/N	Grout (neat cement) (0'-406' bgs)
			187		SANDSTONE, poorly cemented, fine (100%); WHITE N/8	
			190		SANDSTONE, poorly cemented, fine to medium (98% fine, 2% medium), well rounded; WHITE 8/N	4" LC Steel Casing (0'-410' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 14 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE 06/13/22 / DATE 06/20/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			196		SANDSTONE, poorly cemented, fine to medium (98% fine, 2% medium), well rounded; WHITE 8/N	
			197			
			198			
			199			
			200		SANDSTONE, poorly cemented, very fine to fine (50% very fine, 50% fine), rounded; 7.5YR 6/1	Grout (neat cement) (0'-406' bgs)
		Os	201			
			202			
			203			
			204			
			205			4" LC Steel Casing (0'-410' bgs)
			206			
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 15 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	211		SANDSTONE, well cemented, very fine (100%), well rounded; GLEY1 4/N	
					SANDSTONE, poorly cemented, fine (100%); WHITE 8/N	
			212			
			213			
			214			
			215			Grout (neat cement) (0'-406' bgs)
			216			
			217			
			218			
			219			
			220		SANDSTONE, poorly to moderately cemented, very fine (98%), well rounded, silt (2%); GLEY1 3/N	4" LC Steel Casing (0'-410' bgs)
			221		SANDSTONE, poorly to moderately cemented, very fine (98%), well rounded, silt (2%); GLEY1 6/N	
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007			DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS	CHECKED BY: BK				SHEET 16 OF 28
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS					
GROUND SURFACE ELEVATION: 995.152 FT AMSL			WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)			TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377			DATE		DATE 06/13/22 / DATE 06/20/22
			CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		SANDSTONE, poorly to moderately cemented, very fine (98%), well rounded, silt (2%); GLEY1 6/N	
			227			
			228		SANDSTONE, poorly cemented, very fine (100%), well rounded; GLEY1 6/N	
			229		SANDSTONE, poorly cemented, very fine (100%), well rounded; GLEY1 3/N	
			230		SANDSTONE, moderately cemented, very fine to fine (90% very fine, 5% fine), well rounded, silt (5%); GLEY1 6/N to GLEY1 4/N	Grout (neat cement) (0'-406' bgs)
			231			
			232		SANDSTONE, poorly to moderately cemented, fine (100%), well rounded; GLEY1 6/N	
		Os	233			
			234			
			235		SANDSTONE, poorly cemented, very fine to fine (92% very fine, 5% fine), well rounded, silt (3%); GLEY1 6/N	4" LC Steel Casing (0'-410' bgs)
			236			
			237			
			238			
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 17 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	241		SHALE, moderately to well compacted, medium to coarse (30%), subrounded to well rounded, pyrite (5%), fractures and vugs (5%); 5Y 2.5/2, interbedded sand	Grout (neat cement) (0'-406' bgs)
			242			
			243			
			244			
			245			
			246			
			247			
			248			
			249			
			250		SANDSTONE, poorly to moderately cemented, fine to medium (25% fine, 70% medium), subrounded to well rounded, silt (5%); GLEY1 5/10Y to GLEY1 7/N, trace siltstone layers	4" LC Steel Casing (0'-410' bgs)
			251			
			252			
			253		SHALE, moderately to well compacted, sand, medium (25%), vugs (5%), pyrite (2%); GLEY1 6/N	
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN		
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW21A [877381]	
LOGGED BY: AS	CHECKED BY: BK			SHEET 18 OF 28	
DRILLING CONTR.: Traut					
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START	DRILLING FINISH
BORING DEPTH: 420 FT BGS					
GROUND SURFACE ELEVATION: 995.152 FT AMSL		WATER LEVEL		TIME 1300	TIME 1700
DATUM: NAD 83 UTM 15 (meters)		TIME			
COMMENTS: Northing: 4982280.229 Easting: 501609.377		DATE		DATE 06/13/22	DATE 06/20/22
		CASING DEPTH			

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Shakopee Fm. @ 261' bgs	Os	256		SHALE, moderately to well compacted, sand, medium (25%), vugs (5%), pyrite (2%); GLEY1 6/N	
			257		SANDSTONE, poorly cemented, medium (95%), silt (5%), subrounded to well rounded; WHITE 8/N, 2" clay lens @ 259.5', high plasticity	
			258			
			259			
			260			Grout (neat cement) (0'-406' bgs)
			261		DOLOSTONE, not competent, sand (10%), precipitate (10%), pyrite (5%), vugs (2%), massive iron staining; 10R 5/6	
		Ops	262			
			263		DOLOSTONE, moderately to not competent, iron staining (10%), precipitate (5%), pyrite (2%); 2.5YR 6/3 to 2.5YR 4/2	
			264			
			265		DOLOSTONE, not competent, precipitate (15%), shell (3%); 2.5YR 4/1 to 10YR 5/4	4" LC Steel Casing (0'-410' bgs)
			266		DOLOSTONE, moderately competent, glauconite (5%), fractures (1%); 10YR 5/4	
			267		DOLOSTONE, not competent, iron staining (40%), vugs (5%), coarse precipitate (2%), glauconite (2%); 10YR 5/4	
			268		DOLOSTONE, not competent, sand (10%), oolitic texture (10%), glauconite (3%), vugs (3%), rip-up clasts (2%)	
			269			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 19 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			271		DOLOSTONE, not competent, iron staining (3%), glauconite (2%), precipitate (2%), fractures (1%); 5YR 5/3	
			272		DOLOSTONE, not competent to competent, sand, medium (30%), iron staining (5%), precipitate (5%), fractures (2%), vugs (1%); 7.5YR 5/4 to 7.5YR 4/1	
			273			
			274			
			275			Grout (neat cement) (0'-406' bgs)
			276		DOLOSTONE, not competent, iron staining (30%), precipitate (5%), glauconite (5%), vugs (5%); 7.5YR 6/1, 2" clay lens @ 279'	
		Ops	277			
			278			
			279			
			280		DOLOSTONE, not competent to competent, precipitate (5%), iron staining (5%), sand (4%), vugs (2%), glauconite (1%), manganese staining (1%), fractures (1%); 10YR 5/3	4" LC Steel Casing (0'-410' bgs)
			281			
			282			
			283			
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 20 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	286		DOLOSTONE, not competent to competent, precipitate (5%), iron staining (5%), sand (4%), vugs (2%), glauconite (1%), manganese staining (1%), fractures (1%); 10YR 5/3	
			287			
			288		DOLOSTONE, not competent to competent, iron staining (8%), precipitate (6%), vugs (5%), glauconite (4%), sand (3%); 10YR 5/3	
			289			
			290		DOLOSTONE, moderately competent to competent, iron staining (15%), vugs (5%), precipitate (3%), glauconite (1%); 10YR 5/1	Grout (neat cement) (0'-406' bgs)
			291			
			292			
			293			
			294		DOLOSTONE, moderately competent to competent, iron staining (30%), precipitate (15%), malachite (5%), vugs (5%), glauconite (2%); 10YR 6/2	
			295			4" LC Steel Casing (0'-410' bgs)
			296			
			297		DOLOSTONE, moderately competent, iron staining (5%), precipitate (5%), vugs (2%); 10YR 6/1	
			298			
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. MW21A [877381]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 21 OF 28		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags						DRILLING		
BORING DEPTH: 420 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 995.152 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						1300	1700	
COMMENTS: Northing: 4982280.229 Easting: 501609.377			DATE						DATE	DATE	
			CASING DEPTH						06/13/22	06/20/22	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, moderately competent to competent, glauconite (25%), precipitate (5%), vugs (2%); 10YR 6/2	
			301		DOLOSTONE, competent, vugs (15%), precipitate (5%), coarse precipitate (2%); 10YR 5/4 to 10YR 7/4	
			302			
			303			
			304		DOLOSTONE, moderately competent to competent, glauconite (25%), vugs (10%), precipitate (5%), iron staining (5%); 10YR 7/2	
			305			Grout (neat cement) (0'-406' bgs)
			306		DOLOSTONE, not competent to moderately competent, iron staining (15%), precipitate (15%), glauconite (3%), sand (2%); 10YR 6/3	
		Ops	307			
			308			
			309			
			310		DOLOSTONE, not competent to moderately competent, iron staining (5%), oolitic texture (5%), precipitate (3%), sand (3%); 10YR 5/3	4" LC Steel Casing (0'-410' bgs)
			311			
			312			
			313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 22 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			316		DOLOSTONE, competent, green shale (25%), well compacted, sand (11%); 10YR 7/1 to GLEY1 6/10GY	
			317		DOLOSTONE, not competent to moderately competent, vugs (4%), precipitate (4%), iron staining (3%), sand (3%); 10YR 6/2	
			318			
			319			
			320		DOLOSTONE, not competent to moderately competent, iron staining (15%), sand (10%), precipitate (8%), oolitic texture (3%), glauconite (3%), malachite (1%); 10YR 6/2	Grout (neat cement) (0'-406' bgs)
		Ops	321			
			322			
			323		DOLOSTONE, not competent to moderately competent, sand (40%), clay (10%), glauconite (2%); 10YR 7/1 to 7.5R 6/3	
			324			
			325			4" LC Steel Casing (0'-410' bgs)
			326		DOLOSTONE, not competent to moderately competent, glauconite (7%), sand (6%), precipitate (3%), manganese staining (2%), vugs (2%); 5Y 5/3 to 5Y 5/1	
			327			
			328			
			329			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 23 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	331		DOLOSTONE, not competent to moderately competent, sand (5%), vugs (4%), precipitate (2%); 7.5YR 6/2 to 7.5YR 6/3	
			332			
			333		DOLOSTONE, not competent, sand (70%), pyrite (1%), oolitic texture; 7.5YR 7/2	
			334			
			335		DOLOSTONE, not competent to moderately competent, green shale (50%), sand (10%), glauconite (1%), oolitic texture (1%); 7.5YR 6/3 and 5Y 7/1	Grout (neat cement) (0'-406' bgs)
			336		DOLOSTONE, not competent to moderately competent, sand (10%), iron staining (5%), glauconite (2%), precipitate (2%), rip-up clasts (2%), fractures (1%), oolitic texture; 7.5YR 6/2 to 7.5YR 6/1, 2" shale @ 340'	
			337			
			338			
			339			
			340		DOLOSTONE, competent, malachite (10%), sand (5%); 10YR 6/1	4" LC Steel Casing (0'-410' bgs)
			341		DOLOSTONE, not competent to moderately competent, iron staining (15%), precipitate (10%), malachite (3%), sand (3%), pyrite (1%); 10YR 5/4	
			342			
			343		DOLOSTONE, moderately competent to competent, precipitate (11%), vugs (10%), sand (2%); 10YR 6/2	
			344			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 24 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 347' bgs	Ops	346		DOLOSTONE, moderately competent to competent, precipitate (11%), vugs (10%), sand (2%); 10YR 6/2	
			347		DOLOSTONE, competent, vugs (15%), burrows (10%); 10YR 5/2	
			348			
			349			
			350		DOLOSTONE, moderately competent to competent, precipitate (10%), vugs (8%), sand (3%), glauconite (1%), rubbly texture; 7.5YR 5/3	Grout (neat cement) (0'-406' bgs)
			351			
			352			
		Opo	353			
			354			
			355			4" LC Steel Casing (0'-410' bgs)
			356			
			357		DOLOSTONE, competent, glauconite (2%), precipitate (2%), vugs (1%); 7.5YR 6/1 to 7.5YR 5/4	
			358			
			359			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 25 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, moderately competent, iron staining (5%), glauconite (2%), precipitate (2%), vugs (1%); 5YR 6/4	
			361		DOLOSTONE, moderately competent to competent, vugs (2%), pyrite (1%), precipitate (1%); 2.5Y 7/1	
			362			
			363		DOLOSTONE, not competent to competent, precipitate (8%), vugs (5%); 2.5Y 5/2	
			364			
			365			Grout (neat cement) (0'-406' bgs)
			366			
			367		DOLOSTONE, not competent, precipitate (25%); 7.5YR 6/3	
		Opo	368			
			369		DOLOSTONE, not competent to moderately competent, precipitate (50%), vugs (1%); 7.5YR 5/3	
			370		DOLOSTONE, not competent to competent, precipitate (10%), fractures (5%), vugs (3%), glauconite (3%); 10YR 5/3	4" LC Steel Casing (0'-410' bgs)
			371			
			372		DOLOSTONE, not competent to competent, glauconitic shale (20%), fractures (11%), precipitate (3%), sand (2%), vug (1%); 10YR 7/1	
			373		DOLOSTONE, not competent to competent, precipitate (15%), iron staining (5%), burrows (5%), glauconite (4%), vugs (3%); 10YR 5/2	
			374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 26 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1700
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE / DATE
	CASING DEPTH		06/13/22 / 06/20/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			376		DOLOSTONE, not competent to competent, precipitate (15%), iron staining (5%), burrows (5%), glauconite (4%), vugs (3%); 10YR 5/2	
			377		DOLOSTONE, not competent, iron staining (15%), precipitate (10%), glauconite (3%), sand (1%); 10YR 5/4	
			378			
			379			
			380		DOLOSTONE, not competent to competent, massive iron staining, vugs (5%), precipitate (5%); 10YR 7/1	Grout (neat cement) (0'-406' bgs)
			381			
			382		DOLOSTONE, competent to very competent, iron staining (20%), vugs (20%), precipitate (10%); 2.5Y 5/4	
		Opo	383			
			384			
			385		DOLOSTONE, not competent, iron staining (15%), precipitate (5%), glauconite (3%), fossil (2%); 7.5YR 5/6	4" LC Steel Casing (0'-410' bgs)
			386		DOLOSTONE, competent to very competent, vugs (15%), iron staining (15%), glauconite (15%), precipitate (7%), burrows (3%); 10YR 6/5	
			387			
			388			
			389		DOLOSTONE, moderately competent to competent, sand (10%), glauconite (5%), vugs (3%), manganese staining (3%); 10YR 6/3	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 27 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE 06/13/22 / DATE 06/20/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 392' bgs	Opo	391		SANDSTONE, well cemented, iron staining (10%), vugs (2%); GLEY1 N/8.5	
			392		DOLOSTONE, competent, sand, fine to coarse (30%), iron staining (30%), glauconite (3%), vugs (3%); 5YR 5/6	
			393		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), well rounded, iron staining (4%); 10YR 7/4, 1/4" lens of sand dolostone @ 395'	
			394			
			395		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), well rounded, glauconite (4%), iron staining (2%); 2.5Y 7/4	Grout (neat cement) (0'-406' bgs)
			396			
			397		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), well rounded, iron staining (10%), glauconite (3%); 10YR 7/4	
			398		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), well rounded, iron staining (5%), glauconite (3%); 2.5Y 7/3	
		Cj	399			
			400		Blind drill to 420', no refusal	4" LC Steel Casing (0'-410' bgs)
			401			
			402			
			403			
			404			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW21A [877381]
LOGGED BY: AS / CHECKED BY: BK			SHEET 28 OF 28
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 420 FT BGS			
GROUND SURFACE ELEVATION: 995.152 FT AMSL	WATER LEVEL		TIME 1300 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4982280.229 Easting: 501609.377	DATE		DATE 06/13/22 / DATE 06/20/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	406		Blind drill to 420', no refusal	Grout (neat cement) (0'-406' bgs)
			407			2' Fine Sand (406'-408' bgs)
			408			
			409			
			410			
			411			
			412			
			413			
			414			Sand filter pack (408'-418' bgs)
			415			
			416			Screened interval (0.010" slot) (408'-418' bgs)
			417			
			418			
			419			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 1 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Hydrovac 0-4', no recovery	
			2			
			3			
			4			
		ML	5		SANDY SILT, silt (50%), low plasticity, organics (25%), sand, fine to medium (25%), subrounded; dry, 5YR 3/1	Grout (neat cement) (0'-425' bgs)
			6			
		CH	7		CLAY, high plasticity, sand, fine (10%), gravel, fine (5%); 7.5YR 3/4 to 5YR 3/1, cobble @ 6.5' bgs	
			8			
			9			
		SP	10		SAND, fine to medium (73% fine, 22% medium), well rounded, poorly graded, silt (5%); moist, 7.5YR 4/4	4" LC Steel Casing (0'-429' bgs)
		SW	11		SAND, fine to coarse (10% fine, 55% medium, 30% coarse), well rounded, silt (5%); moist, 7.5YR 4/4	
			12		SANDY SILT, low plasticity, sand, fine to medium (30%), well rounded, clay (20%), gravel, fine to medium (5%); dry to moist, 10YR 3/4, 50% sand @ 11.5' and 17'	
		ML	13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 2 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16–20		SANDY SILT, low plasticity, sand, fine to medium (30%), well rounded, clay (20%), gravel, fine to medium (5%); dry to moist, 10YR 3/4, 50% sand @ 11.5' and 17'	
		SW	20–22		SAND, fine to coarse (50% fine, 20% medium, 15% coarse), well rounded, well graded, silt (15%); moist, 10YR 3/6	Grout (neat cement) (0'-425' bgs)
		CH	22–23		CLAY, medium to high plasticity, sand, fine to medium (20%), well rounded; dry, 10YR 3/3, cobble @ 23'	
		SP	23–25		SAND, fine to medium (80% fine, 10% medium), well rounded, silt (10%); moist, 10YR 3/4	
		ML	25–27		SANDY SILT, low plasticity, sand, fine to coarse (40%), well rounded; 10YR 3/4	4" LC Steel Casing (0'-429' bgs)
		SW	27–29		SAND, fine to coarse (10% fine, 30% medium, 45% coarse), silt (15%); 10YR 3/4 SAND, fine to coarse (29% fine, 15% medium, 29% coarse), gravel, fine (15%), cobbles (10%), clay (2%); moist, 10YR 3/3, gravel lens @ 29.5	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 3 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31–37		SILT, low plasticity, sand, fine (15%), well rounded, clay (15%), gravel, fine to coarse (10%); dry, 10YR 4/4	Grout (neat cement) (0'-425' bgs)
		SM	37–38		SILTY SAND, fine to coarse (10% fine, 50% medium, 10% coarse), well rounded, silt (30%); dry to moist, 10YR 4/4, cobble @ 37'	
		ML	38–40		SANDY SILT, low plasticity, sand, fine to coarse (25%), well rounded, clay (15%), gravel, fine to coarse (10%); dry, 10YR 4/4	
		SW	40–44		SAND, fine to coarse (40% fine, 40% medium, 15% coarse), rounded, silt (5%); moist, 10YR 4/4	4" LC Steel Casing (0'-429' bgs)
			44		SAND, fine to coarse (30% fine, 30% medium, 20% coarse), rounded, gravel, fine to coarse (10%), silt (10%); moist, 10YR 3/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 4 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	46		SAND, fine to coarse (30% fine, 30% medium, 20% coarse), rounded, gravel, fine to coarse (10%), silt (10%); moist, 10YR 3/4	
		CL	46–50		CLAY, medium plasticity, high density, gravel, fine to medium (5%); 10YR 4/6	
		GP	50–59		Low recovery, mix of sand, fine to coarse, gravel, fine to coarse, 4" clay lens, 4" cobble	Grout (neat cement) (0'-425' bgs) 4" LC Steel Casing (0'-429' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 5 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61–67		CLAY, high plasticity, high density, gravel, fine to medium (10%), subrounded; dry, 10YR 2/1	Grout (neat cement) (0'-425' bgs)
		SC	67–68		CLAYEY SAND, fine to medium (60% fine, 15% medium), subrounded, clay (25%); 10YR 3/4	
		SP	68–70		SAND, fine to medium (5% fine, 95% medium), subrounded to well rounded, poorly graded; moist, 5Y 4/3	
		SP	70–73		SAND, fine to medium (10% fine, 90% medium), subrounded to well rounded, poorly graded; moist, 2.5Y 6/2	4" LC Steel Casing (0'-429' bgs)
		SP	73–74		SAND, fine to medium (10% fine, 90% medium), subrounded to well rounded, poorly graded; moist, 2.5Y 4/5	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 6 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	76		SAND, fine to medium (10% fine, 90% medium), subrounded to well rounded, poorly graded; moist, 2.5Y 4/5	
		CH			CLAY, high plasticity, high density; moist, 10YR 3/3	
			77		SAND, fine (95%), silt (5%), well rounded, poorly graded; moist, 10YR 3/3	
		SP	78		SAND, fine (100%), well rounded, poorly graded; moist, 2.5Y 3/2	
			79			
			80		SILTY SAND, fine (80%), subrounded, silt (20%); dry to moist, GLEY1 3/5GY	Grout (neat cement) (0'-425' bgs)
			81			
			82			
			83			
			84			
		SM	85			4" LC Steel Casing (0'-429' bgs)
			86			
			87			
			88			
	Decorah Fm. @ 89' bgs		89		SHALE, well compacted, fossiliferous; dry	
		Opg				

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET: 7 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME: 0700 / 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE: 05/24/22 / 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Platteville Fm. @ 93' bgs	Opg	91		SAND, fine (80%), subrounded, silt (20%); GLEY1 3/10Y	
			92			
			93		LIMESTONE, not competent, coarse calcite precipitate (20%), small black shells (10%), pyrite (3%); GLEY1 4/10Y	
			94			
			95			Grout (neat cement) (0'-425' bgs)
			96		LIMESTONE, competent, glauconite (5%); GLEY1 3/5GY, fossil @ 96'	
			97			
			98			
		Opg	99		LIMESTONE, competent, shells (30%), fine grained precipitate (25%); GLEY1 3/10Y	
			100		LIMESTONE, competent, black shells (10%), pyrite (1%), rip up clasts; GLEY1 3/10Y	4" LC Steel Casing (0'-429' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 8 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		LIMESTONE, competent, black shells (10%), pyrite (1%), rip up clasts; GLEY1 3/10Y	
			107			
			108		LIMESTONE, moderately competent, black shells (5%); GLEY1 4/10Y	
			109			
			110			Grout (neat cement) (0'-425' bgs)
			111			
			112			
		Opg	113			
			114			
			115			4" LC Steel Casing (0'-429' bgs)
			116		LIMESTONE, weathered clay, shale pieces; GLEY1 5/6Y	
			117		LIMESTONE, competent, trace black shells (2%); GLEY1 3/10Y	
	Glenwood Fm. @ 118' bgs		118		SHALE, not compacted to well compacted, friable; GLEY1 3/10Y	
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 9 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SHALE, not compacted to well compacted, friable; GLEY1 3/10Y	
		Opg	122		SHALE, not compacted, sandy; GLEY1 4/5GY	
	St. Peter Fm. @ 124' bgs		123			
			124		SANDSTONE, poorly cemented, very fine to medium (50% very fine, 50% medium), well rounded; GLEY1 5/N to GLEY1 6/N	Grout (neat cement) (0'-425' bgs)
			125			
			126			
			127			
			128			
			129			
		Os	130		SANDSTONE, poorly cemented, fine (100%), well rounded; GLEY1 7/N	4" LC Steel Casing (0'-429' bgs)
			131			
			132			
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 10 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly cemented, fine (100%), well rounded; GLEY1 7/N	
		Os	136			
			137			
			138			
			139			
			140			Grout (neat cement) (0'-425' bgs)
			141			
			142			
			143			
			144			
			145			4" LC Steel Casing (0'-429' bgs)
			146			
			147			
			148			
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 11 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	151		SANDSTONE, poorly cemented, fine (100%), subrounded; WHITE 8/N	Grout (neat cement) (0'-425' bgs)
			152			
			153			
			154			
			155			
			156			
			157			
			158			
			159			
			160		SANDSTONE, poorly cemented, fine (100%), subrounded; GLEY2 7/5PB	4" LC Steel Casing (0'-429' bgs)
			161			
			162		SANDSTONE, poorly cemented, fine (100%), subrounded; WHITE 8/N	
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 12 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	166		SANDSTONE, poorly cemented, fine (100%), subrounded; WHITE 8/N	
			167			
			168			
			169			
			170		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; GLEY2 7/5PB	Grout (neat cement) (0'-425' bgs)
			171			
			172			
			173			
			174			
			175			4" LC Steel Casing (0'-429' bgs)
			176			
			177			
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 13 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	181		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; GLEY2 7/5PB	Grout (neat cement) (0'-425' bgs)
			182			
			183			
			184			
			185			
			186			
			187			
			188			
			189			
			190		SANDSTONE, poorly cemented, fine (95%), subrounded to well rounded, silt (5%); GLEY1 6/N to GLEY1 7/N	4" LC Steel Casing (0'-429' bgs)
			191			
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 14 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	196		SANDSTONE, poorly cemented, fine (100%), subrounded to well rounded; GLEY1 7/N to GLEY1 6/N	Grout (neat cement) (0'-425' bgs)
			197			
			198			
			199			
			200		SANDSTONE, poorly cemented, fine (100%), subrounded; GLEY1 7/N	
			201			
			202			
			203			
			204			
			205			4" LC Steel Casing (0'-429' bgs)
			206			
			207			
			208		SANDSTONE, poorly cemented, very fine to fine (30% very fine, 70% fine), subrounded to well rounded; GLEY1 6/N	
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 15 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			211		SANDSTONE, poorly cemented, very fine (95%), well rounded, silt (5%); GLEY 7/N	
			212			
			213		Thin silt lense @ 213'	
			214			
			215			Grout (neat cement) (0'-425' bgs)
			216			
		Os	217			
			218			
			219			
			220		SANDSTONE, poorly to moderately cemented, very fine (50%), well rounded, silt (50%); GLEY1 5/N	4" LC Steel Casing (0'-429' bgs)
			221			
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 16 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		SANDSTONE, poorly to moderately cemented, very fine (50%), well rounded, silt (50%); GLEY1 5/N	
			227			
			228			
			229			
			230		SANDSTONE, poorly cemented, fine (100%), well rounded; GLEY1 6/N	Grout (neat cement) (0'-425' bgs)
			231			
			232			
		Os	233		SANDSTONE, poorly cemented, fine (100%), well rounded; 5Y 6/1	
			234			
			235		SANDSTONE, moderately cemented, fine (70%), well rounded, silt (30%); GLEY1 5/N	4" LC Steel Casing (0'-429' bgs)
			236			
			237			
			238		SANDSTONE, poorly cemented, very fine to fine (75% very fine, 25% fine), well rounded; GLEY1 5/N	
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET: 17 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME: 0700 / 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE: 05/24/22 / 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	241		SANDSTONE, poorly cemented, fine (95%), silt (5%), well rounded; GLEY1 6/N	
			242			
			243			
			244		SANDSTONE, poorly cemented, very fine to fine (50% very fine, 30% fine), well rounded, silt (20%); GLEY1 6/N to GLEY1 7/N	
			245		SANDSTONE, poorly cemented, very fine to fine (50% very fine, 20% fine), well rounded, silt (30%); GLEY1 7/N, 2 mm clay layer	Grout (neat cement) (0'-425' bgs)
			246		SANDSTONE, poorly cemented, very fine to fine (45% very fine, 20% fine), well rounded, silt (35%); GLEY1 5/N, 2 mm clay layer	
			247			
			248		SANDSTONE, poorly cemented, very fine to fine (60% very fine, 35% fine), well rounded, silt (5%); GLEY1 7/N	
			249			
			250		SANDSTONE, poorly cemented, very fine to fine (80% very fine, 10% fine), well rounded, silt (10%); GLEY1 6/10Y	4" LC Steel Casing (0'-429' bgs)
			251			
			252			
			253			
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 18 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	256		SANDSTONE, poorly cemented, very fine to fine (80% very fine, 10% fine), well rounded, silt (10%); GLEY1 6/10Y	
			257			
			258		SILTSTONE, moderately compacted, fine sand (50%); GLEY1 6/N	
			259			
			260		SANDSTONE, poorly to moderately cemented, very fine to medium (30% very fine, 30% fine, 15% medium), siltstone (25%); GLEY1 5/10Y	Grout (neat cement) (0'-425' bgs)
			261			
			262			
			263			
			264			
			265			4" LC Steel Casing (0'-429' bgs)
			266			
			267			
			268			
			269			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET: 19 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME: 0700 / TIME: 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE: 05/24/22 / DATE: 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			271		SILTSTONE, moderately to well compacted, sand, medium to coarse (25%); 5Y 2.5/1	
			272		DOLOSTONE, not competent, iron staining (30%), precipitate (10%), pyrite (3%), vugs (3%); 5YR 5/4	
			273			
			274			
			275			Grout (neat cement) (0'-425' bgs)
			276			
	Shakopee Fm. @ 277' bgs		277		DOLOSTONE, not to moderately competent, iron staining (5%), glauconite (5%), precipitate (2%); 5YR 5/1	
			278			
			279			
			280		DOLOSTONE, competent, sand (15%), shale (10%), bedding observed, vugs (5%); 5YR 5/2	4" LC Steel Casing (0'-429' bgs)
		Ops	281			
			282			
			283		DOLOSTONE, not to moderately competent, shale (30%), sand (10%), pyrite (5%), precipitate (5%); GLEY1 5/10Y	
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 20 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	286		DOLOSTONE, not to moderately competent, faint iron staining (50%), precipitate (10%), vugs (5%), shale (5%), sand (3%), pyrite (2%), glauconite (1%); 5Y 6/2	
			287			
			288			
			289			
			290		DOLOSTONE, not competent, pyrite (2%), oolitic texture (2%); 5Y 6/2	Grout (neat cement) (0'-425' bgs)
			291		DOLOSTONE, not to moderately competent, glauconite (5%), pyrite (5%), sand (5%), rip up clasts (3%); 7.5YR 6/1	
			292			
			293			
			294			
			295			4" LC Steel Casing (0'-429' bgs)
			296			
			297			
			298			
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 21 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			301		DOLOSTONE, not competent, sand (10%), precipitate (5%), glauconite (5%), iron staining (1%), vugs (1%); 2.5Y 5/1	
			302		DOLOSTONE, competent, sand (5%), glauconite (2%), iron staining (2%), shaley interbeds; GLEY1 6/10Y	
			303			
			304			
			305		DOLOSTONE, competent, vugs (30%), iron staining (5%), sand (5%), pyrite (3%); 3.5Y 6/1	Grout (neat cement) (0'-425' bgs)
			306		DOLOSTONE, not competent to moderately competent, iron staining (60%), oolitic texture (10%), sand (5%), manganese staining (1%), fractures (1%); 10YR 7/1	
		Ops	307			
			308		DOLOSTONE, not competent, iron staining (10%), vugs (3%), glauconite (2%), sand (2%), precipitate (2%), fractures (1%); 7.5YR 6/2	
			309			
			310		DOLOSTONE, not to moderately competent, iron staining (5%), sand (2%), vugs (2%), precipitate (2%), glauconite (1%); 10R 6/1	4" LC Steel Casing (0'-429' bgs)
			311			
			312			
			313			
			314			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 22 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			316		DOLOSTONE, not to moderately competent, iron staining (6%), glauconite (3%), precipitate (3%), vugs (3%), fractures (2%), sand (1%), manganese staining (1%); 7.5YR 6/2	
			317			
			318			
			319			
			320		DOLOSTONE, not competent, iron staining (7%), precipitate (5%), glauconite (4%), fine grained precipitate (2%), manganese staining (1%), sand (1%); 5Y 5/2	Grout (neat cement) (0'-425' bgs)
		Ops	321			
			322			
			323			
			324			
			325		DOLOSTONE, not competent to competent, iron staining (15%), precipitate (4%), glauconite (2%), vugs (2%), fine grained precipitate (1%), sand (1%), oolitic texture (1%); 10YR 6/2	4" LC Steel Casing (0'-429' bgs)
			326			
			327			
			328			
			329			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET: 23 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME: 0700 / TIME: 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE: 05/24/22 / DATE: 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	331		DOLOSTONE, moderately competent to competent, iron staining (10%), sand (10%), manganese staining (5%), fractures (5%), banded iron staining (3%), precipitate (3%), vugs (1%); 7.5YR 6/2, 0.5" shale lens	
			332		DOLOSTONE, not to moderately competent, quartz and calcite precipitate (25%), iron staining (15%), glauconite (5%), vugs (3%), precipitate (3%), sand (1%); 5YR 5/2	
			333			
			334			
			335			Grout (neat cement) (0'-425' bgs)
			336		DOLOSTONE, moderately competent to competent, fine to coarse precipitate (15%), glauconite spots (10%), iron staining (7%), vugs (3%), sand (1%); 7.5YR 5/1	
			337			
			338			
			339			
			340		DOLOSTONE, not to moderately competent, sand (15%), iron staining (5%), precipitate (5%), glauconite (1%); 5YR 6/1	4" LC Steel Casing (0'-429' bgs)
			341			
			342		DOLOSTONE, moderately to very competent, with shale interbeds, sand (10%); GLEY1 6/10GY to GLEY1 6/N	
			343		DOLOSTONE, competent, sand (5%), precipitate (5%), pyrite (2%), ooids (2%), oolitic texture (2%), iron staining (2%), glauconite (1%); 7.5YR 6/2	
			344			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 24 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			346		DOLOSTONE, competent, sand (5%), precipitate (5%), pyrite (2%), ooids (2%), oolitic texture (2%), iron staining (2%), glauconite (1%); 7.5YR 6/2	
			347			
			348		DOLOSTONE, not competent to competent, sand (10%), iron staining (10%), vugs (5%), fine to medium precipitate (3%), glauconite (2%); 10YR 6/8	
			349			
			350		DOLOSTONE, moderately competent to competent, sand (20%), precipitate (10%), oolitic texture (10%), vugs (1%), massive iron staining; 10YR 6/6	Grout (neat cement) (0'-425' bgs)
			351			
			352		SHALE, well compacted, iron staining, dendritic manganese staining (5%); GLEY2 6/10G	
		Ops	353		DOLOSTONE, moderately competent to competent, iron staining (15%), sand (5%), vugs (3%), precipitate (3%), glauconite (2%); 5YR 6/1 to 2.5Y 6/8	
			354			
			355			4" LC Steel Casing (0'-429' bgs)
			356			
			357			
			358		DOLOSTONE, moderately competent to competent, iron staining (20%), precipitate (10%), vugs (5%), glauconite (2%), sand (2%); 5YR 4/2 to GLEY1 6/N	
			359			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 25 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1900
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE / DATE
	CASING DEPTH		05/24/22 / 06/01/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 360' bgs	Opo	361		DOLOSTONE, moderately competent to competent, iron staining (5%), glauconite (4%), vugs (3%), precipitate (2%); 10YR 6/1 to 10YR 5/1	
			362		DOLOSTONE, competent, vugs (2%), iron staining (1%); 2.5Y 6/3	
			363			
			364		DOLOSTONE, not to moderately competent, quartz precipitate (10%), vugs (8%), iron staining (2%), rubbly texture; 10YR 6/3	
			365			Grout (neat cement) (0'-425' bgs)
			366		DOLOSTONE, competent, vugs (5%), iron staining (1%), rubbly texture; 2.5Y 6/3	
			367			
			368		DOLOSTONE, competent, vugs (8%), precipitate (4%), iron staining (3%), manganese (2%); 10YR 6/4	
			369			
			370		DOLOSTONE, moderately competent to competent, precipitate (10%), manganese staining (7%), vugs (5%), iron staining (2%), trace worm fossil; 2.5Y 6/2	4" LC Steel Casing (0'-429' bgs)
			371			
			372		DOLOSTONE, moderately competent, precipitate (5%), dendritic manganese staining (4%), iron staining (3%); 2.5Y 7/2	
			373		DOLOSTONE, competent, precipitate (5%), iron staining (5%), manganese staining (3%), fractures (1%); 2.5Y 6/2	
			374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 26 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			376		DOLOSTONE, moderately competent, dendritic manganese staining (10%), precipitate (5%), vugs (3%), iron staining (2%); 2.5Y 7/2	
			377			
			378			
			379			
			380		DOLOSTONE, competent, iron staining (20%), precipitate (3%), manganese staining (1%), vugs (1%); 10YR 7/2	Grout (neat cement) (0'-425' bgs)
			381			
			382			
		Opo	383			
			384			
			385		DOLOSTONE, not competent, iron staining (60%), precipitate (40%); 10YR 6/8	4" LC Steel Casing (0'-429' bgs)
			386			
			387		DOLOSTONE, not competent, vugs (2%), iron staining (1%); 10YR 7/3	
			388			
			389		DOLOSTONE, not competent to competent, precipitate (50%), iron staining (50%); 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 27 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	391		DOLOSTONE, moderately competent to competent, iron staining (20%), precipitate (5%), vugs (2%); 10YR 6/4	
			392		DOLOSTONE, not to moderately competent, iron staining (15%), precipitate (15%), vugs (3%), spotty manganese staining (2%), rubbly texture; 10YR 6/3 to 10YR 6/8	
			393			
			394		DOLOSTONE, not to moderately competent, iron staining (10%), precipitate (10%), glauconite staining (4%), rubbly texture; 10YR 6/3	
			395		DOLOSTONE, competent, precipitate (15%), iron staining (10%), vugs (4%), glauconite staining (1%); 10YR 5/4	Grout (neat cement) (0'-425' bgs)
			396			
			397			
			398			
			399		DOLOSTONE, moderately competent to competent, precipitate (30%), iron staining (10%), sand (2%); 10YR 6/6	
			400		DOLOSTONE, competent, precipitate (15%), iron staining (10%), vugs (4%), glauconite staining (1%); 10YR 5/1	4" LC Steel Casing (0'-429' bgs)
			401		DOLOSTONE, moderately competent to competent, vugs (5%), iron staining (2%); 10YR 7/3	
			402			
			403		DOLOSTONE, competent, manganese staining (3%), sand (3%), glauconite (2%), vugs (1%); 10YR 6/4	
			404		DOLOSTONE, not to moderately competent, glauconite (3%), iron staining (3%), manganese staining (2%); 10YR 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 28 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			406		DOLOSTONE, not competent, iron staining (20%), precipitate (20%), glauconite (5%); 10YR 6/6	
		Opo	407		DOLOSTONE, not to moderately competent, sand (10%), precipitate (10%), iron staining (10%), vugs (4%), scale iron banding; 10YR 6/3	
	Coon Valley Fm. @ 408' bgs		408		SANDSTONE, poorly to well cemented, fine to medium (73% fine, 22% medium), rounded, poorly graded, silt (3%); 10YR 5/8	
			409			
			410		DOLOSTONE, competent, interbedded shale	Grout (neat cement) (0'-425' bgs)
		Opo	411		SANDSTONE, poorly cemented, fine to medium (45% fine, 45% medium), shale (10%), iron staining (25%); 10YR 6/6	
			412			
	Jordan Fm. @ 413' bgs		413		SANDSTONE, poorly cemented, fine to medium (60% fine, 30% medium), silt (10%); 2.5Y 6/3, shale lenses @ 218'	
			414			
			415			4" LC Steel Casing (0'-429' bgs)
			416			
		Cj	417			
			418			
			419			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK		SHEET 29 OF 30
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 439 FT BGS			
GROUND SURFACE ELEVATION: 1027.825 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501	DATE		DATE 05/24/22 / DATE 06/01/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, blind drill due to sand locking	Grout (neat cement) (0'-425' bgs) 4" LC Steel Casing (0'-429' bgs) 2' Fine Sand (425'-427' bgs) Sand filter pack (427'-439' bgs) Screened interval (0.010" slot) (429'-439' bgs)
		Cj	421 422 423 424 425 426 427 428 429 430 431 432 433 434			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. MW22A [876344]
LOGGED BY: AS/NP/GG	CHECKED BY: BK			SHEET 30 OF 30
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 439 FT BGS				
GROUND SURFACE ELEVATION: 1027.825 FT AMSL		WATER LEVEL		TIME 0700 / TIME 1900
DATUM: NAD 83 UTM 15 (meters)		TIME		
COMMENTS: Northing: 4980345.154 Easting: 502792.501		DATE		DATE 05/24/22 / DATE 06/01/22
		CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Cj	436 437 438 439			Sand filter pack (427'-439' bgs) Screened interval (0.010" slot) (429'-439' bgs)
			439 440		E.O.B. @ 440' bgs, no refusal	Backfill by natural collapse (439-440')
			441 442 443 444 445 446 447 448 449			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 1 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1820
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE / DATE
	CASING DEPTH		06/03/22 / 06/07/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0–1		TOPSOIL, clay (35%), low plasticity, sand, medium to coarse (30%), gravel (30%), fine to medium, subangular to subrounded, silt (5%), organics (2%); 10YR 4/4, 3" gravel lens	
		CL	1–9		CLAY, medium plasticity, stiff clay, mottling; dry to moist, 10YR 2/2	Grout (neat cement) (0'-286' bgs)
		SM	9–10		SILTY SAND, fine to coarse (65% fine, 10% medium, 10% coarse), silt (15%); 10YR 4/4	4" LC Steel Casing (0'-290' bgs)
		CL	10–11		CLAY, medium plasticity, roots (5%), gravel, fine to medium (5%), angular; moist, 10YR 3/4	
		SM	11–14		SILTY SAND, fine to coarse (50% fine, 10% medium, 10% coarse), silt (20%), clay (5%), gravel (5%), fine to medium, subangular to subrounded; 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 2 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1820
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE 06/03/22 / DATE 06/07/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	16–17		SILTY SAND, fine to coarse (50% fine, 10% medium, 10% coarse), silt (20%), clay (5%), gravel (5%), fine to medium, subangular to subrounded; 10YR 4/4	
		SM	17–20		SILTY SAND, fine to coarse (45% fine, 5% medium, 5% coarse), silt (20%), gravel (10%), fine to coarse, clay (5%); 10YR 3/4	
			20		No recovery, per driller - large cobble pushed down through borehole	Grout (neat cement) (0'-286' bgs) 4" LC Steel Casing (0'-290' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 3 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1820
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE / DATE
	CASING DEPTH		06/03/22 / 06/07/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	31–37		SILTY SAND, fine to coarse (30% fine, 15% medium, 10% coarse), silt (20%), gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subangular to subrounded, clay (10%); 10YR 3/3	Grout (neat cement) (0'-286' bgs)
		SM	38–39		SILTY SAND, fine to coarse (20% fine, 20% medium, 10% coarse), silt (20%), clay (15%), low plasticity, gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subangular to subrounded; 10YR 3/3	
		SM	39–40		SILTY SAND, fine to coarse (20% fine, 30% medium, 30% coarse), gravel, fine to coarse (5% fine, 10% medium, 5% coarse), subangular to subrounded, silt (10%); 10YR 4/3	4" LC Steel Casing (0'-290' bgs)
		SW	40–44		SAND, fine to coarse (20% fine, 20% medium, 30% coarse), subangular to subrounded, gravel, fine to coarse (10% fine, 10% medium, 10% coarse), subangular to subrounded, silt (5%); 10YR 4/3	
		CL	44		CLAY, low plasticity, high density, silt (15%); 10YR 3/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 4 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1820
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE 06/03/22 / DATE 06/07/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					CLAY, low plasticity, high density, silt (15%); 10YR 3/2	
			46		CLAY, medium plasticity, high density, gravel, fine to coarse; 10YR 3/4, sand lens @ 49'	
			47			
			48			
			49			
			50		CLAY, medium plasticity, high density, gravel, fine to medium; 5Y 2.5/2, gravel lens @ 54'	Grout (neat cement) (0'-286' bgs)
			51			
			52			
		CL	53			
			54		CLAY, medium to high plasticity, high density, gravel, fine to coarse (5%); dry, GLEY1 8/10Y	
			55			4" LC Steel Casing (0'-290' bgs)
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 5 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1820
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE / DATE
	CASING DEPTH		06/03/22 / 06/07/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	61–67		CLAY, low plasticity, high density, gravel, fine to medium (10%), sand, fine (5%); dry, 10YR 2/1	Grout (neat cement) (0'-286' bgs)
		ML	67–68		SILT, no plasticity, low density, gravel, fine to coarse (5% fine, 3% coarse), mottling; 5Y 4/3 to 5Y 4/1	
		SP	68–70		SAND, fine to medium (20% fine, 80% medium), subrounded, poorly graded; moist, 5Y 4/2	
		SP	70–74		SAND, fine to medium (10% fine, 90% medium), rounded, poorly graded; wet, 10YR 3/4	4" LC Steel Casing (0'-290' bgs)
		CL	74		CLAY, medium plasticity, high density; dry, 5Y 3/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 6 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1820
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE 06/03/22 / DATE 06/07/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	76		SAND, fine to coarse (80% fine, 20% coarse), rounded, poorly graded; 10Y 3/3	
		CL	77		CLAY, low plasticity, high density; 2.5Y 3/2	
		SP	78		SAND, medium to coarse (60% medium, 40% coarse), subrounded, poorly graded; 10YR 3/3	
		SM	79		SILTY SAND, fine (60%), silt (40%); wet, GLEY1 3/5GY	
		SP	80		SAND, fine (90%), silt (10%); wet, GLEY1 3/5GY	Grout (neat cement) (0'-286' bgs)
	Decorah Fm. @ 88' bgs	Opg	88		CLAY, low plasticity, high density, sand (10%), fine to medium, fossils (10%); dry, GLEY1 2.5/5GY	4" LC Steel Casing (0'-290' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 7 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1820
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE / DATE
	CASING DEPTH		06/03/22 / 06/07/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Platteville Fm. @ 92' bgs	Opg	91		CLAY, low plasticity, high density, sand (10%), fine to medium; dry, GLEY1 2.5/5GY	
			92		LIMESTONE, not to moderately competent, small black shells (20%), burrows (5%), iron staining; GLEY1 4/N	
			93			
			94		LIMESTONE, competent, burrows (5%), large shells (5%), small black shells (5%); GLEY1 3/10Y	
			95		LIMESTONE, competent to very competent, 0.25" shells (15%), burrow (10%), calcite replacement on fossils (5%); GLEY1 5/10Y	Grout (neat cement) (0'-286' bgs)
			96			
			97			
			98			
		Opg	99			
			100			4" LC Steel Casing (0'-290' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW22B [876345]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 8 OF 8
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 1027.302 FT AMSL	WATER LEVEL		TIME 1000 / TIME 1820
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980344.465 Easting: 502789.023	DATE		DATE 06/03/22 / DATE 06/07/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		Blind drill to 300' bgs, well log abbreviated Platteville Limestone from 92'-118' bgs, per drillers	Grout (neat cement) (0'-286' bgs)
			107			
			108		Glenwood Shale from 88'-92' bgs, per drillers	4" LC Steel Casing (0'-290' bgs)
			109			
			110			2' Fine Sand (286'-288' bgs)
			111		St. Peter Sandstone from 124'-277' bgs, per drillers	
			112			
			113			
			114		Shakopee Dolostone from 277'-300' bgs, per drillers	
			115			Sand filter pack (288'-300' bgs)
			116			
			117		E.O.B. @ 300' bgs, no refusal	
			118			Screened interval (0.010" slot) (290'-300' bgs)
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW22C [877378]
LOGGED BY: GG / CHECKED BY: BK			SHEET: 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 170 FT BGS			
GROUND SURFACE ELEVATION: 1026.733 FT AMSL	WATER LEVEL		TIME: 0950 / 1745
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980343.752 Easting: 502785.282	DATE		DATE: 06/09/22 / 06/09/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 170' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-156' bgs)
			3		Unconsolidated Material from 0'-88' bgs, per drillers	
			4			4" LC Steel Casing (0'-160' bgs)
			5		Decorah Shale from 88'-92' bgs, per drillers	
			6			2' Fine Sand (156'-158' bgs)
			7		Platteville Limestone from 92'-118' bgs, per drillers	
			8			Sand filter pack (158'-170' bgs)
			9		Glenwood Shale from 118'-124' bgs, per drillers	
			10			
			11		St. Peter Sandstone from 124'-170' bgs, per drillers	
			12			
			13			Screened interval (0.010" slot) (160'-170' bgs)
			14		E.O.B. @ 170' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 1 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					CLAY, low plasticity, soft, sand, fine (10%), organics (10%), gravel, fine to medium (5%); dry, 10YR 3/3	
			1		CLAY, low plasticity, soft, sand, fine to medium (15%), gravel, fine to medium (5%); 10YR 3/3	
			2			
			3			
			4			
			5		CLAY, low plasticity, soft, sand, fine to medium (15%), gravel, fine to medium (5%); 10YR 2/2	Grout (neat cement) (0'-376' bgs)
		CL	6			
			7			
			8		CLAY, medium plasticity, soft, silt (25%), sand, medium (5%); moist, 10YR 2/1, trace plastic (1%)	
			9		CLAY, medium plasticity, soft, sand, fine to medium (10%), mottled; dry, 5YR 4/6	
			10		CLAY, medium plasticity, soft, silt (5%); wet (from drill), 7.5YR 3/2	4" LC Steel Casing (0'-380' bgs)
			11		CLAY, high plasticity, soft, sand, fine to medium (10%), silt (5%), mottled; dry, 10YR 4/4 to 5Y 5/1	
		CH	12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 2 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	16		CLAY, high plasticity, soft, sand, fine to medium (10%), silt (5%), mottled; dry, 10YR 4/4 to 5Y 5/2	
			16		CLAY, medium plasticity, soft, gravel, fine to medium (5%), sand, fine (5%), cobbles (2%), mottled; dry, 10YR 3/2 to 5Y 4/1, pieces of wood @ 18'	
			17			
			18			
			19			
			20		CLAY, low plasticity, soft, silt (40%), sand, fine to medium (25%) from 24-26', rounded cobbles (5%), mottled; 5Y 3/1	Grout (neat cement) (0'-376' bgs)
		CL	21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-380' bgs)
			26		SANDY CLAY, low plasticity, medium density, sand, fine to medium (30%), gravel, fine to coarse (15%), mottled; dry, 10YR 4/2, trace limestone @ 30'	
			27			
		SC	28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 3 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31		SAND, fine to coarse (15% fine, 30% medium, 10% coarse), well graded, gravel, fine to coarse (15% fine, 5% medium, 10% coarse), silt (15%); wet, 10YR 3/3	
		SP	32–35		GRAVELLY SAND, medium to coarse (6% medium, 54% coarse), subangular to subrounded, poorly graded, gravel, fine to coarse (15% fine, 15% medium, 10% coarse), subangular, silt (5%); moist, 10YR 4/2	Grout (neat cement) (0'-376' bgs)
		CL	35–39		CLAY, medium plasticity, sand, fine (10%), gravel, fine to medium (10%), rounded; 10YR 4/4, cobble @ 37'	
		CL	39		CLAY, low plasticity, high density, dry; 10YR 4/1	
		CL	40–43		CLAY, low plasticity, high density, gravel, medium to coarse (5% medium, 4% coarse), subangular to subrounded; dry, 10YR 3/1, 3.5" igneous cobble @ 43'	4" LC Steel Casing (0'-380' bgs)
		CL	43–44		CLAY, low plasticity, high density, gravel, medium to coarse (6% medium, 8% coarse), subangular to subrounded; dry, 10YR 3/2	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 4 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	46–59		CLAY, low plasticity, high density, gravel, medium to coarse (6% medium, 8% coarse), subangular to subrounded; dry, 10YR 3/3 CLAY, medium plasticity, medium density, gravel, fine (2%); dry, 2.5Y 4/2 CLAY, low to medium plasticity, high density, sand, fine (5%), gravel, medium to coarse (3% medium, 4% coarse), iron staining @ 56'; dry, 2.5Y 4/2 CLAY, low to medium plasticity, high density, gravel, fine to medium (4% fine, 5% medium); dry, 2.5Y 4/3	Grout (neat cement) (0'-376' bgs) 4" LC Steel Casing (0'-380' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 5 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	61–74		CLAY, medium to high plasticity, high density, gravel, fine to medium (5% fine, 3% medium), sand, fine to medium (5% fine, 2% medium); dry, 2.5Y 4/2 CLAY, medium to high plasticity, high density, gravel, fine to medium (5% fine, 3% medium), sand, fine to medium (5% fine, 2% medium); dry, 2.5Y 3/1	Grout (neat cement) (0'-376' bgs) 4" LC Steel Casing (0'-380' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 6 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	76–89		CLAY, medium to high plasticity, high density, gravel, fine to medium (5% fine, 3% medium), sand, fine to medium (5% fine, 2% medium); dry, 2.5Y 3/2 CLAY, medium to high plasticity, high density, gravel, fine to medium (2% fine, 1% medium); dry, 2.5Y 3/2	Grout (neat cement) (0'-376' bgs) 4" LC Steel Casing (0'-380' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 7 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	91–95		CLAY, medium to high plasticity, high density, gravel, fine to medium (2% fine, 1% medium), trace organics (wood); dry, 2.5Y 3/2	Grout (neat cement) (0'-376' bgs)
		CL	98–99		CLAY, low plasticity, high density, sand, fine (20%), iron staining (25%), mottling; 2.5Y 6/3, iron banding observed	
		CH	100		CLAY, medium plasticity, high density, gravel, fine (2%); 2.5Y 4/4	4" LC Steel Casing (0'-380' bgs)
	St. Peter Fm. @ 102' bgs	CL	101		SANDY CLAY, low plasticity, sand, fine (30%), iron staining (7%); 2.5Y 5/3	
		Os	102–104		SANDSTONE, poorly to moderately cemented, fine to coarse (40% fine, 35% medium, 20% fine), iron staining (10%), clay (5%); 2.5Y 6/4 to 10YR 7/1, 2" clay lense @ 104'	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 8 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	106		SANDSTONE, poorly cemented, fine (100%), subrounded; 2.5Y 7/1	
			107		SANDSTONE, poorly cemented, fine (100%), subrounded, iron staining (5%); 2.5Y 7/2	
			108			
			109			
			110		SANDSTONE, poorly cemented, fine (100%), subrounded, iron staining (3%); 2.5Y 2/1	Grout (neat cement) (0'-376' bgs)
			111			
			112		SANDSTONE, poorly cemented, fine (100%), subrounded; 2.5Y 7/1	
			113			
			114		SANDSTONE, poorly cemented, fine (100%), subrounded, iron staining (2%); 2.5Y 7/2	
			115			4" LC Steel Casing (0'-380' bgs)
			116		SANDSTONE, poorly to moderately cemented, fine (100%), subrounded; 2.5Y 2/1	
			117			
			118		SANDSTONE, poorly cemented, fine (100%), subrounded; 2.5Y 6/2	
			119			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 9 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SANDSTONE, poorly cemented, fine (100%), subrounded to rounded; 2.5Y 7/1	
			122		SANDSTONE, poorly cemented, fine (100%), subrounded to rounded, iron staining (2%); 2.5Y 7/1	
			123			
			124		SANDSTONE, poorly cemented, very fine to fine (20% very fine, 80% fine), subrounded to rounded, iron staining (2%); 2.5Y 7/2	
			125			Grout (neat cement) (0'-376' bgs)
			126			
			127			
		Os	128		SANDSTONE, poorly cemented, very fine to fine (25% very fine, 75% fine), subrounded to rounded; 2.5Y 7/3	
			129			
			130		SANDSTONE, moderately cemented to cemented, very fine to fine (25% very fine, 75% fine), subrounded to rounded, massive iron staining; 2.5Y 6/6 to 10YR 6/8	4" LC Steel Casing (0'-380' bgs)
			131			
			132			
			133			
			134			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 10 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			136		SANDSTONE, poorly cemented, very fine to fine (30% very fine, 70% fine), subrounded to rounded, iron staining (5%); 2.5Y 7/1	
			137			
			138			
			139		SANDSTONE, poorly cemented, very fine to fine (20% very fine, 70% fine), subrounded to rounded; 2.5Y 6/8	
			140		SANDSTONE, moderately cemented, very fine to fine (50% very fine, 50% fine), subrounded to rounded, iron staining (10%); 2.5Y 7/3	Grout (neat cement) (0'-376' bgs)
			141			
		Os	142			
			143			
			144		SANDSTONE, poorly cemented, very fine to fine (50% very fine, 50% fine), subrounded to rounded, iron staining (15%); 10YR 6/6	
			145			4" LC Steel Casing (0'-380' bgs)
			146		SANDSTONE, poorly cemented, very fine to fine (60% very fine, 40% fine), subrounded to rounded, iron staining (7%); 2.5Y 7/1	
			147			
			148		SANDSTONE, poorly cemented, very fine to fine (80% very fine, 20% fine), subrounded to rounded; 2.5Y 7/1	
			149			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 11 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SANDSTONE, poorly cemented, very fine to fine (80% very fine, 20% fine), subrounded to rounded; 2.5Y 7/2	
			152		SANDSTONE, poorly to moderately cemented, very fine to fine (90% very fine, 10% fine), subrounded to rounded, iron staining (5%); 2.5Y 7/2	
			153			
			154			
			155			Grout (neat cement) (0'-376' bgs)
			156			
			157			
		Os	158		SANDSTONE, poorly to moderately cemented, very fine to fine (90% very fine, 10% fine), subrounded to rounded, iron staining (15%); 2.5Y 7/2 to 10YR 6/6	
			159			
			160		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded; 2.5Y 6/6	4" LC Steel Casing (0'-380' bgs)
			161			
			162		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, iron staining (2%); 2.5Y 6/3	
			163			
			164			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 12 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded; 2.5Y 7/1	
			166		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, iron staining (5%); 2.5Y 6/8	
			167			
			168			
			169			
			170		SANDSTONE, moderately cemented, very fine (100%), subrounded to rounded, massive iron staining from 170-173', orange to dark orange; 2.5Y 6/2 to 10YR 6/8	Grout (neat cement) (0'-376' bgs)
			171			
		Os	172			
			173			
			174			
			175		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, iron staining (5%); 10YR 6/1	4" LC Steel Casing (0'-380' bgs)
			176			
			177		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 7/3 to 10YR 6/6	
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 13 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	181		SANDSTONE, moderately cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 6/2 to 10YR 6/8	
			182		SANDSTONE, poorly to moderately cemented, very fine (100%), iron staining (7%), subrounded to rounded; 2.5Y 7/3	
			183			
			184			
			185		SANDSTONE, moderately cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 6/2 to 10YR 6/6	Grout (neat cement) (0'-376' bgs)
			186			
			187			
			188			
			189		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 6/3 to 10YR 6/6	
			190		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, iron staining (3%) @ 90-90.5'; 10YR 7/2	4" LC Steel Casing (0'-380' bgs)
			191			
			192			
			193		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 6/2 to 10YR 6/6	
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 14 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	196		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, iron staining (15%); 2.5Y 7/3	Grout (neat cement) (0'-376' bgs)
			197		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, iron staining (15%); 2.5Y 7/2	
			198		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, massive iron staining; 10YR 7/6 to 10YR 6/8	
			199			
			200		SANDSTONE, moderately cemented, very fine (100%), subrounded to rounded, iron staining (5%); 2.5Y 7/2	
			201			
			202			
			203			
			204			
			205			4" LC Steel Casing (0'-380' bgs)
			206			
			207		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, massive iron staining; 2.5Y 7/3 to 10YR 6/6	
			208		SANDSTONE, poorly cemented, very fine (100%), subrounded to rounded, iron staining (10%); 2.5Y 6/3	
			209		SANDSTONE, poorly to moderately cemented, very fine (100%), subrounded to rounded, iron staining (20%), mottling (5%); 2.5Y 6/4 to 10YR 6/6	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ_6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 15 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	211		SANDSTONE, moderately to well cemented, very fine to fine (50% very fine, 35% fine), subrounded to rounded, clay (15%), GLEY 4/10GY	Grout (neat cement) (0'-376' bgs)
			212			
			213			
			214			
			215			
			216			
			217			
			218			
			219			
			220		SANDSTONE, moderately to well cemented, fine to coarse (15% fine, 15% medium, 60% coarse), subrounded to rounded, silt (10%), glauconite (3%); GLEY 1 5/10Y	4" LC Steel Casing (0'-380' bgs)
			221			
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 16 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SANDSTONE, moderately to well cemented, fine to coarse (15% fine, 15% medium, 60% coarse), subrounded to rounded, silt (10%), glauconite (3%); GLEY 1 5/10Y	
	Shakopee Fm. @ 230' bgs	Os	226			
			227			
			228			
			229			
			230		DOLOSTONE, moderately competent, vugs (8%), precipitate (7%), sand (6%), shale (5%), burrows (5%); 7.5YR 4/5	Grout (neat cement) (0'-376' bgs)
			231			
			232			
			233			
			234		DOLOSTONE, moderately competent to competent, sand (5%), pyrite (3%); 2.5Y 6/1	
		Ops	235		DOLOSTONE, moderately competent, shale (5%), sand (5%), pyrite (1%); 2.5Y 5/2	4" LC Steel Casing (0'-380' bgs)
			236			
			237			
			238		DOLOSTONE, moderately competent to competent, vugs (10%), rip-up clasts (10%), sand (3%), pyrite (2%); 2.5Y 5/2	
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 17 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	241		DOLOSTONE, not competent to moderately competent, shale (5%), sand (4%), pyrite (2%); 2.5Y 6/2, rubbly texture	
			242		DOLOSTONE, moderately competent to competent, vugs (8%), shale (7%), pyrite (3%); 7.5YR 6/4	
			243			
			244			
			245			Grout (neat cement) (0'-376' bgs)
			246		DOLOSTONE, moderately competent to competent, vugs (10%), glauconite (9%), precipitate (5%), 2.5Y 7/2	
			247			
			248			
			249			
			250		DOLOSTONE, moderately competent to competent, iron staining in fractures and bedding (7%), dendritic manganese staining (5%), shale (2%); 5Y 7/3	4" LC Steel Casing (0'-380' bgs)
			251		DOLOSTONE, moderately competent to competent, iron staining (!0%), sand (8%), precipitate (5%), manganese staining (3%); 7.5YR 4/4	
			252			
			253		DOLOSTONE, moderately competent to competent, iron staining (1)%), sand (10%), precipitate (8%), vugs (5%), glauconite; 10YR 6/4	
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 18 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	256		DOLOSTONE, moderately competent to competent, iron staining (1)%), sand (10%), precipitate (8%), vugs (5%), glauconite; 10YR 6/5	
			257			
			258		DOLOSTONE, moderately competent to competent, massive iron staining, fractures (7%), glauconite (2%); 2.5Y 6/2 to 5YR 4/4	
			259		DOLOSTONE, moderately competent to competent, vugs (15%), iron staining (8%), precipitate (5%); 2.5Y 6/1	
			260		DOLOSTONE, moderately competent to competent, vugs (7%), iron staining (5%), precipitate (5%); 10YR 6/2	Grout (neat cement) (0'-376' bgs)
			261		DOLOSTONE, competent, manganese staining (3%), glauconite (3%), vugs (2%); 10YR 7/2	
			262			
			263			
			264			
			265		DOLOSTONE, moderately competent to competent, iron staining (10%), glauconite (10%, most prevalent @ 270'), manganese staining (5%), vugs (4%); 2.5Y 5/2	4" LC Steel Casing (0'-380' bgs)
			266			
			267			
			268			
			269		DOLOSTONE, competent, iron staining (6%), precipitate (5%), vugs (3%), sand (3%); 10YR 6/4	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 19 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	271		DOLOSTONE, moderately competent to competent, precipitate (5%), vugs (3%), iron staining (2%), sand (2%); 7.5YR 6/4	
			272			
			273		DOLOSTONE, moderately competent to competent, vugs (3%), precipitate (3%), glauconite (3%); 7.5YR 6/2	
			274			
			275			Grout (neat cement) (0'-376' bgs)
			276		DOLOSTONE, moderately competent, iron staining (6%), precipitate (5%), vugs (4%), manganese staining (3%), glauconite (3%); 5YR 6/4	
			277		DOLOSTONE, not competent, precipitate (8%), iron staining (6%), manganese staining (4%), some coarse sand; 2.5YR 6/2	
			278			
			279			
			280		DOLOSTONE, not competent to moderately competent, iron staining (15%), precipitate (10%), manganese staining (7%); 5YR 5/4, rubbly texture	4" LC Steel Casing (0'-380' bgs)
			281			
			282			
			283			
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 20 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	286		DOLOSTONE, moderately competent, iron staining (8%), precipitate (6%), manganese staining (5%), sand (5%), pyrite (2%); 10YR 6/4	
			287			
			288		DOLOSTONE, not competent to moderately competent, fractures (7%), iron staining (7%), orange to dark red, manganese staining (4%); 10YR 6/6 to 5YR 4/6	
			289			
			290			Grout (neat cement) (0'-376' bgs)
			291		DOLOSTONE, moderately competent to competent, iron staining (8%), precipitate (7%), glauconite (2%); 2.5Y 6/2	
			292		DOLOSTONE, competent, precipitates (6%), manganese staining (4%), vugs (2%), glauconite (2%); 5YR 5/4	
			293			
			294			
			295			4" LC Steel Casing (0'-380' bgs)
			296		DOLOSTONE, moderately competent to competent, massive iron staining, sand (9%), vugs (2%), glauconite (1%); 5YR 5/5 to 7.5YR 6/3	
			297			
			298		DOLOSTONE, moderately competent, layers of shale, precipitate (10%), sand (6%), iron staining (4%), manganese staining (4%); 2.5Y 7/2 to GLEY 1 6/10Y	
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 21 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	301		DOLOSTONE, competent, bedding observed, vugs (8%), precipitate (7%), sand (3%), manganese staining (2%); 10YR 6/6	
			302		DOLOSTONE, moderately competent to competent, iron staining (7%), sand (4%), manganese staining (3%), vugs (3%), precipitate (2%), glauconite (1%); 10YR 6/4	
			303			
			304			
			305			Grout (neat cement) (0'-376' bgs)
			306			
			307			
	Oneota Fm. @ 308.5' bgs		308		DOLOSTONE, competent, sand (5%), vugs (4%), manganese staining (1%); 2.5Y 7/1	
			309		DOLOSTONE, moderately competent, sand (4%), manganese staining (2%), iron staining (1%), shale lense @ 309'; 2.5Y 6/3	
			310			4" LC Steel Casing (0'-380' bgs)
			311			
		Opo	312			
			313			
			314		DOLOSTONE, not competent to moderately competent, glauconite (7%), iron staining (4%), vugs (3%), precipitate (3%), fractures (1%); 5Y 6/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 22 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					DOLOSTONE, not competent to moderately competent, glauconite (7%), iron staining (4%), vugs (3%), precipitate (3%), fractures (1%); 5Y 6/3	
			316		DOLOSTONE, not competent to moderately competent, glauconite (10%), vugs (5%), precipitate (4%); 2.5Y 7/2 to 2.5Y 5/2, rubbly texture	
			317			
			318			
			319		DOLOSTONE, not competent to moderately competent, iron staining (8%), vugs (5%), precipitate (2%), 2.5Y 6/4	
			320		DOLOSTONE, not competent to moderately competent, vugs (6%), iron staining (4%), manganese staining (2%), pyrite (1% @ 322'); 2.5Y 6/2	Grout (neat cement) (0'-376' bgs)
			321			
			322		DOLOSTONE, not competent to moderately competent, vugs (8%), precipitate (3%), manganese staining (1%); 2.5Y 5/2, rubbly texture	
		Opo	323			
			324			
			325			4" LC Steel Casing (0'-380' bgs)
			326			
			327		DOLOSTONE, moderately competent to competent, vugs (10%), precipitate (2%), glauconite (2% @ 329'); 2.5Y 6/2, rubbly texture	
			328			
			329			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 23 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	331		DOLOSTONE, moderately competent to competent, vugs (10%), precipitate (2%), glauconite (2% @ 329'); 2.5Y 6/2, rubbly texture DOLOSTONE, moderately competent to competent, vugs (7%), glauconite (3%); 10YR 7/2	
			332			
			333			
			334		DOLOSTONE, competent to very competent, vugs (4%), glauconite (3%), precipitate (3%), manganese staining (1%); 10YR 7/1	
			335			Grout (neat cement) (0'-376' bgs)
			336			
			337			
			338			
			339			
			340		DOLOSTONE, competent, vugs (7%), precipitate (5%), glauconite (4%), fractures (1%); 10YR 6/2	4" LC Steel Casing (0'-380' bgs)
			341		DOLOSTONE, competent to very competent, vugs (4%), glauconite (3%), precipitate (3%), manganese staining (1%); 10YR 7/1	
			342			
			343		DOLOSTONE, competent, glauconite (10%), vugs (4%), manganese staining (3%); 10YR 6/1	
			344			
					DOLOSTONE, competent, vugs (6%), manganese	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 24 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1420 / 1700
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE / DATE
	CASING DEPTH		07/14/22 / 7/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			346		staining (4%), glauconite (2%), black shells (2%); 10YR 6/2	
			347			
			348			
			349			
			350		DOLOSTONE, competent to very competent, vugs (4%), iron staining (2%); 10YR 6/8	Grout (neat cement) (0'-376' bgs)
			351		DOLOSTONE, moderately competent to competent, vugs (5%), glauconite (2%, increases toward 355'); 10YR 6/3	
		Opo	352			
			353			
			354			
			355		DOLOSTONE, moderately competent to competent, vugs (4%), iron staining (3%), pyrite (2%); 5YR 7/1	4" LC Steel Casing (0'-380' bgs)
			356			
			357			
			358			
	Coon Valley @ 360' bgs		359		DOLOSTONE, moderately competent, massive iron staining (some in fractures, orange to dark red), manganese staining (2%), vugs (2%), precipitate	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET: 25 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME: 1420 / TIME: 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE: 07/14/22 / DATE: 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					(1%); 6YR 6/6	
	Jordan Fm. @ 364' bgs	Opo	361 362 363		DOLOSTONE, moderately competent, massive iron staining (some in fractures, orange to dark red), manganese staining (2%), vugs (2%), precipitate (1%); 6YR 6/7	
			364		SANDSTONE, poorly to moderately cemented, fine to medium (30% fine, 70% medium), subrounded to rounded; 10YR 7/1	
			365			Grout (neat cement) (0'-376' bgs)
			366		SANDSTONE, poorly to moderately cemented, fine to medium (20% fine, 80% medium), rounded, iron staining (5%); 2.5Y 6/1	
		Cj	367 368 369			
			370		Blind drill to 390' bgs	4" LC Steel Casing (0'-380' bgs)
			371 372 373 374			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26A [877391]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 26 OF 26
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 390 FT BGS			
GROUND SURFACE ELEVATION: 1008.185 FT AMSL	WATER LEVEL		TIME 1420 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981304.071 Easting: 503948.447	DATE		DATE 07/14/22 / DATE 7/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			376			2' Fine Sand (376'-378' bgs)
			377			
			378			
			379			
			380			
			381			
			382		Blind drill to 390' bgs	Sand filter pack (377'-390' bgs)
			383			
			384			
			385			Screened interval (0.010" slot) (377'-387' bgs)
			386			
			387			
			388			Backfill by natural collapse (387-390' bgs)
			389		E.O.B. @ 390', no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26B [877392]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 259 FT BGS			
GROUND SURFACE ELEVATION: 1007.798 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0630 / 1500
COMMENTS: Northing: 4981308.792 Easting: 503948.665	DATE		DATE / DATE
	CASING DEPTH		07/21/22 / 07/25/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–8		CLAY, low plasticity, soft, sand, fine (10%), organic (roots, 10%), gravel, fine to medium (5%); dry, 10YR 3/3 CLAY, low plasticity, soft, sand, fine to medium (15%), gravel, fine to medium (5%); dry, 10YR 3/3 to 10YR 2/3	Grout (neat cement) (0'-246' bgs)
			8–9		CLAY, medium plasticity, soft, silt (25%), medium sand (5%); dry, 10YR 2/1, 2" cobble @ 9'	
			9–10		CLAY, medium plasticity, soft, sand, fine to medium (10%); 5YR 4/6	
			10–11		CLAY, medium plasticity, soft, silt (5%); dry, 7.5YR 3/2	4" LC Steel Casing (0'-249' bgs)
		CH	11–14		CLAY, high plasticity, soft, sand, fine to medium (10% fine, 5% medium), silt (5%), mottled; 10YR 4/4 to 5Y 5/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26B [877392]
LOGGED BY: GG / CHECKED BY: BK			SHEET 2 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 259 FT BGS			
GROUND SURFACE ELEVATION: 1007.798 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0630 / 1500
COMMENTS: Northing: 4981308.792 Easting: 503948.665	DATE		DATE / DATE
	CASING DEPTH		07/21/22 / 07/25/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	16		CLAY, high plasticity, soft, sand, fine to medium (10% fine, 5% medium), silt (5%), mottled; 10YR 4/4 to 5Y 5/1	
			17		CLAY, medium plasticity, soft, sand, fine (5%), cobbles (4% @ 17' and 19.5'), wood pieces @ 18.5', mottled; 10YR 3/2 to 5Y 4/1	
			18			
			19			
			20		CLAY, low plasticity, soft, silt (40%), sand, fine to medium (24-26'), cobbles (3%); dry, 5Y 3/1	Grout (neat cement) (0'-246' bgs)
		CL	21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-249' bgs)
			26		SANDY CLAY, low plasticity, medium density, sand, fine to medium (30%), gravel, fine to coarse (15%); 10YR 8/2	
			27			
		SC	28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26B [877392]
LOGGED BY: GG / CHECKED BY: BK			SHEET 3 OF 18
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 259 FT BGS			
GROUND SURFACE ELEVATION: 1007.798 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0630 / 1500
COMMENTS: Northing: 4981308.792 Easting: 503948.665	DATE		DATE / DATE
	CASING DEPTH		07/21/22 / 07/25/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31		GRAVELLY SAND, fine to coarse (15% fine, 30% medium, 10% coarse), gravel, fine to coarse (15% fine, 5% medium, 10% coarse), silt (15%); wet, 10YR 3/3	4" LC Steel Casing (0'-249' bgs)
			32		GRAVELLY SAND, medium to coarse (6% medium, 54% coarse), subangular to subrounded, gravel, fine to coarse (13% fine, 13% medium, 9% coarse), silt (5%)	
			33			Grout (neat cement) (0'-246' bgs)
			34			
			35		Blind drill to 259' bgs, well log abbreviated	2' Fine Sand (245'-247' bgs)
			36			
			37		Unconsolidated Material from 0' - 102' bgs, per drillers	
			38			
			39		St. Peter Sandstone from 102' - 230' bgs, per drillers	Sand filter pack (247'-259' bgs)
			40			
			41		Shakopee Formation from 230' - 259' bgs, per driller	
			42			Screened interval (0.010" slot) (249'-259' bgs)
			43		E.O.B. @ 259' bgs, no refusal	
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW26C [877393]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 140 FT BGS			
GROUND SURFACE ELEVATION: 1007.328 FT AMSL	WATER LEVEL		TIME 0800 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981313.375 Easting: 503948.847	DATE		DATE 07/26/22 / DATE 07/27/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 140' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-126' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-102' bgs, per drillers	4" LC Steel Casing (0'-130' bgs)
			5			
			6			2' Fine Sand (126'-128' bgs)
			7		St. Peter Sandstone from 102'-140' bgs, per drillers	
			8			Sand filter pack (128'-140' bgs)
			9			
			10		E.O.B. @ 140' bgs, no refusal	
			11			
			12			
			13			Screened interval (0.010" slot) (130'-140' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–2		SANDY CLAY, medium plasticity, high density, sand, fine to coarse (5% fine, 5% medium, 5% coarse), gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subrounded to rounded; dry, 10YR 4/6	
		SM	2–12		SILTY SAND, fine to coarse (30% fine, 40% medium, 5% coarse), subrounded to rounded, poorly graded, silt (15%), gravel, fine to coarse (5% fine, 3% medium, 2% coarse); dry, 10YR 3/6, cobble @ 90'	Grout (neat cement) (0'-217' bgs) 4" LC Steel Casing (0'-221' bgs)
			12–14		SILTY SAND, fine to coarse (20% fine, 15% medium, 5% coarse), silt (45%), low to medium plasticity, medium density, gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subangular to subrounded; dry, 10YR 4/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET: 2 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME: 1500 / TIME: 2100
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE / CASING DEPTH		DATE: 06/22/22 / DATE: 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SILTY SAND, fine to coarse (20% fine, 15% medium, 5% coarse), silt (45%), low to medium plasticity, medium density, gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subangular to subrounded; dry, 10YR 4/4	
			17		SILTY SAND, fine to coarse (15% fine, 30% medium, 5% coarse), subangular to subrounded, silt (35%), gravel, fine to coarse (5% fine, 5% medium, 5% coarse), subangular to subrounded; 10YR 5/4	
		SM	18			
			19			
			20			Grout (neat cement) (0'-217' bgs)
			21		CLAY, low plasticity, high density, iron staining (10%); dry, 10YR 4/4 to 10YR 4/6	
			22			
			23		CLAY, low plasticity, high density; dry, 10YR 5/2, iron concentrated @ 25'	
		CL	24			
			25			4" LC Steel Casing (0'-221' bgs)
			26		CLAY, low plasticity, sand, fine to medium, iron staining (40%); dry, 10YR 4/4 to 10YR 5/8	
			27			
			28			
		ML			SILT, low plasticity, medium density, iron staining (10%); 10YR 5/8	
	Platteville Fm. @ 29.5' bgs	SC	29		CLAYEY SAND, medium to coarse, subrounded to well-rounded, clay (40%), medium plasticity, massive iron staining; dry, 10YR 4/6	
		Opg			LIMESTONE, not competent, massive iron staining,	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 3 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		massive manganese staining; 10YR 4/6 LIMESTONE, not competent, shaley and clayey, manganese staining (15%); 2.5Y 6/4	
			32			
			33			
			34			
			35			Grout (neat cement) (0'-217' bgs)
			36			
			37			
		Opg	38		LIMESTONE, not competent, iron staining, manganese staining; GLEY 5/10Y	
			39			
			40		LIMESTONE, not competent to moderately competent, small black shells (15%), iron staining (10%), manganese staining (5%), burrows (5%); GLEY1 4/N	4" LC Steel Casing (0'-221' bgs)
			41			
			42			
			43			
	Glenwood Fm. @ 44' bgs		44		SHALE, not compacted to moderately compacted, iron staining (20%); GLEY1 5/N	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 4 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		LIMESTONE, competent, burrows (5%), black shells (2%); GLEY1 3/10Y	
			47		SHALE, not compacted to moderately compacted, well compacted from 48.5-49', iron staining at base; GLEY1 4/N	
	St. Peter Fm. @ 50' bgs	Opg	48			
			49			
			50		SANDSTONE, moderately cemented, fine to medium (20% fine, 65% medium), well rounded, silt (15%), iron staining (15%); 10YR 5/6 to 10YR 5/5	Grout (neat cement) (0'-217' bgs)
			51			
			52		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), well rounded, iron staining (10%); 2.5Y 7/2	
			53			
			54			
		Os	55			4" LC Steel Casing (0'-221' bgs)
			56			
			57			
			58		SANDSTONE, moderately cemented, fine to medium (20% fine, 70% medium), well rounded, silt (10%), iron staining (15%); 5Y 6/4	
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 5 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61		SANDSTONE, poorly cemented, fine to medium (25% fine, 70% medium), well rounded, silt (5%), iron staining (15%); 2.5Y 8/3	Grout (neat cement) (0'-217' bgs)
			62		SANDSTONE, moderately cemented, fine to medium (40% fine, 55% medium), well rounded, silt (5%); 2.5Y 7/2	
			63		SANDSTONE, poorly cemented, fine to medium (30% fine, 67% medium), well rounded, silt (3%), iron staining (10%); 2.5Y 7/6	
			64			
			65			
			66			
			67			
			68			
			69		SANDSTONE, poorly to trace moderately cemented, fine to medium (35% fine, 60% medium), well rounded, silt (5%); 2.5Y 7/3	
			70		SANDSTONE, poorly cemented to trace moderately cemented, fine to medium (93% fine, 2% medium), well rounded, silt (5%); 2.5Y 7/1	4" LC Steel Casing (0'-221' bgs)
			71			
			72			
			73			
			74			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 6 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		SANDSTONE, poorly cemented, fine to medium (95% fine, 2% medium), well rounded, silt (3%); 2.5Y 8/1	
			77		SANDSTONE, poorly to moderately cemented, fine to very fine (90% fine, 5% very fine), well rounded, silt (5%); 2.5Y 7/4	
			78			
			79			
			80		SANDSTONE, poorly cemented, fine (95%), well rounded, silt (5%), massive iron staining; 5Y 7/6	Grout (neat cement) (0'-217' bgs)
			81		SANDSTONE, poorly cemented, fine (95%), silt (5%), well rounded; 5Y 7/4	
			82			
		Os	83		SANDSTONE, poorly cemented, fine (97%), well rounded, silt (3%), iron staining (15%); 10YR 7/4	
			84			
			85			4" LC Steel Casing (0'-221' bgs)
			86			
			87			
			88			
			89		SANDSTONE, poorly cemented, fine (98%), well rounded, silt (2%), iron staining (1%); 5Y 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 7 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	91		SANDSTONE, poorly cemented, fine (95%), well rounded, silt (5%), iron staining (40%); 2.5Y 7/4	
			92		SANDSTONE, poorly cemented, fine (98%), well rounded, silt (2%), iron staining (10%) more prevalent from 91-94'; 2.5Y 7/2	
			93			
			94			
			95			Grout (neat cement) (0'-217' bgs)
			96			
			97			
			98			
			99			
			100		SANDSTONE, poorly cemented, fine (100%), well rounded; 2.5Y 3/1	4" LC Steel Casing (0'-221' bgs)
			101			
			102			
			103		SANDSTONE, poorly cemented, fine (100%), well rounded, iron staining (20%), faint massive iron staining; 2.5Y 7/1	
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 8 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	106		SANDSTONE, poorly cemented, fine (100%), well rounded, iron staining (20%), faint massive iron staining; 2.5Y 7/1	
			107		SANDSTONE, poorly cemented, very fine to fine (2% very fine, 83% fine), well rounded, silt (15%), iron staining (10%); 2.5Y 7/2	
			108		SANDSTONE, poorly cemented, fine (85%), well rounded, silt (15%), iron staining (45%); 2.5Y 7/4	
			109		SANDSTONE, poorly cemented, fine (95%), silt (5%), well rounded; 2.5Y 7/3	
			110		SANDSTONE, poorly cemented, fine (95%), subrounded to rounded, silt (5%), iron staining (50%); 2.5Y 7/3	Grout (neat cement) (0'-217' bgs)
			111			
			112		SANDSTONE, poorly cemented, fine (98%), rounded to well rounded, silt (2%), iron staining (10%); 10YR 8/1	
			113			
			114		SANDSTONE, poorly cemented, fine (97%), rounded to well rounded, silt (3%), 10YR 8/1, iron staining (3%); 10YR 8/1	
			115			4" LC Steel Casing (0'-221' bgs)
			116			
			117			
			118		SANDSTONE, poorly cemented, fine (97%), rounded to well rounded, silt (3%), iron staining (1%); 7.5YR 8/2	
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 9 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	121		SANDSTONE, poorly cemented, very fine to fine (30% very fine, 60% fine), subrounded to rounded, silt (10%), iron staining (25%); 7.5YR 6/6	
			122		SANDSTONE, poorly cemented, very fine to fine (35% very fine, 55% fine), subrounded to rounded, silt (10%); 5Y 7/2	
			123			
			124			
			125			Grout (neat cement) (0'-217' bgs)
			126		SANDSTONE, poorly cemented, fine (95%), rounded, silt (5%), iron staining (40%); 10YR 6/6	
			127			
			128			
			129		SANDSTONE, poorly cemented, fine (97%), rounded, silt (3%); GLEY1 6/10Y	
			130		SANDSTONE, poorly cemented, very fine to fine (10% very fine, 90% fine), subrounded, iron staining (3%); 7.5YR 7/1	4" LC Steel Casing (0'-221' bgs)
			131			
			132			
			133			
			134			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. MW27A [877383]	
LOGGED BY: GG	CHECKED BY: BK							SHEET 10 OF 17	
DRILLING CONTR.: Traut									
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD: 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 231 FT BGS									
GROUND SURFACE ELEVATION: 996.78 FT AMSL			WATER LEVEL					TIME 1500	TIME 2100
DATUM: NAD 83 UTM 15 (meters)			TIME						
COMMENTS: Northing: 4981547.25 Easting: 504832.217			DATE					DATE 06/22/22	DATE 06/27/22
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	136		SANDSTONE, poorly cemented, very fine to fine (10% very fine, 90% fine), subrounded, iron staining (3%); 7.5YR 7/1	
			137			
			138		SANDSTONE, poorly cemented, fine (95%), silt (5%), massive iron staining; 10YR 6/6	
			139			
			140		SANDSTONE, poorly cemented, very fine to fine (15% very fine, 80% fine), subrounded to rounded, silt (5%), iron staining (5%); 2.5Y 6/6	Grout (neat cement) (0'-217' bgs)
			141		SANDSTONE, poorly cemented, very fine to fine (70% very fine, 20% fine), rounded, silt (10%), banded iron staining (20%); 2.5Y 6/8	
			142			
			143		SANDSTONE, poorly cemented, very fine to fine (10% very fine, 85% fine), subrounded to rounded, silt (5%), iron staining (30%); 2.5Y 7/6	
			144			
			145			4" LC Steel Casing (0'-221' bgs)
			146		SANDSTONE, poorly cemented, very fine to fine (77% very fine, 20% fine), well rounded, silt (3%), iron staining (1%); 2.5Y 7/1	
			147			
			148		SANDSTONE, poorly cemented, very fine to fine (18% very fine, 80% fine), silt (2%), iron staining (20%); 2.5Y 6/4	
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET: 11 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME: 1500 / TIME: 2100
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE: 06/22/22 / DATE: 06/27/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	151		SANDSTONE, poorly cemented, fine (97%), subrounded to rounded, silt (3%), iron staining (25%); 10YR 6/8	
			152			
			153		SANDSTONE, poorly cemented, very fine to fine (11% very fine, 85% fine), subrounded to rounded, silt (4%), iron staining (10%); 10YR 7/1	
			154			
			155			Grout (neat cement) (0'-217' bgs)
			156		SANDSTONE, poorly cemented, fine (95%), subrounded to rounded, silt (5%), iron staining (2%), 2.5Y 7/2	
			157			
			158		SANDSTONE, poorly cemented, fine (98%), subrounded to rounded, silt (2%), iron staining (2%), 2.5Y 7/3	
			159			
			160		SANDSTONE, poorly to moderately cemented, fine (85%), subrounded, silt (15%); 2.5Y 7/4	4" LC Steel Casing (0'-221' bgs)
			161			
			162			
			163		SANDSTONE, poorly to moderately cemented, fine (92%), silt (8%), iron staining (15%); 2.5Y 7/2	
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 12 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		SANDSTONE, poorly to moderately cemented, fine (92%), silt (8%), iron staining (15%); 2.5Y 7/2	
			167		SANDSTONE, poorly to moderately cemented, very fine to fine (20% very fine, 75% fine), silt (5%), iron staining (45%); 2.5Y 7/3, iron stain is 2.5Y 7/8	
			168			
			169			
			170		SANDSTONE, poorly to moderately cemented, fine (90%), well rounded, silt (10%), mottling, iron staining (60%); 2.5Y 7/3	Grout (neat cement) (0'-217' bgs)
			171			
		Os	172			
			173			
			174			
			175			4" LC Steel Casing (0'-221' bgs)
			176			
			177		SANDSTONE, poorly to moderately cemented, fine (98%), well rounded, silt (2%), iron staining (30%); 2.5Y 8/1	
			178			
			179			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 13 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		SANDSTONE, poorly cemented, very fine (85%), silt (15%), fain iron staining (5%); 2.5Y 7/1	
			182			
			183			
			184		SANDSTONE, poorly cemented , very fine (80%), silt (20%), iron staining (10%) light to dark orange; 2.5Y 7/6	
			185		SANDSTONE, poorly to moderately cemented, very fine (70%), silt (30%), massive iron staining; 10YR 6/6	Grout (neat cement) (0'-217' bgs)
			186			
			187		SANDSTONE, moderately cemented, very fine (90%), silt (10%), iron staining (7%); 2.5Y 7/3	
		Os	188			
			189			
			190		SANDSTONE, poorly to moderately cemented, very fine to medium (15% very fine, 60% fine, 10% medium), silt (15%), massive iron staining; 10YR 6/6	4" LC Steel Casing (0'-221' bgs)
			191			
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 14 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			196		SANDSTONE, poorly to moderately cemented, very fine (70%), silt (30%), iron staining (5%); 5Y 7/4	
			197		SANDSTONE, poorly cemented, fine to medium (67% fine, 30% medium), silt (3%); 5Y 6/1	
			198		SANDSTONE, poorly cemented, very fine to fine (20% very fine, 77% fine), silt (3%), faint iron staining (3%); 5Y 6/1	
			199		SANDSTONE, moderately cemented, very fine (80%), silt (20%), iron staining (15%); 5Y 6/1	
		Os	200		SANDSTONE, poorly to moderately cemented, very fine to medium (20% very fine, 20% fine, 30% medium), well rounded, silt (30%), faint iron staining and mottling (20%); 2.5Y 6/2	Grout (neat cement) (0'-217' bgs)
			201			
			202			
			203			
			204		DOLOSTONE, moderately competent, shale (50%), not to well compacted, iron staining (10%), fractures (3%), pyrite (3%), manganese staining (3%), bedding observed; dolostone: 2.5Y 6/2, shale: GLEY1 5G5/1	4" LC Steel Casing (0'-221' bgs)
			205			
		Os	206			
			207			
	Shakopee Fm. @ 208' bgs		208		DOLOSTONE, not to moderately competent, small vugs (5%), precipitate (5%), glauconite (5%), malachite (3%), pyrite (3%), sand (2%), fractures (1%); 2.5Y 5/2	
		Ops	209			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 15 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	211		DOLOSTONE, moderately competent to competent, vugs (10%), iron staining (8%); 10YR 6/1	
			212			
			213		DOLOSTONE, competent, precipitate (10%), vugs (5%), iron staining (5%), sand (3%), burrows (2%), glauconite (1%); 2.5YR 4/3	
			214			
			215		DOLOSTONE, not competent to competent, iron staining (7%), sand (3%), shale (2%), manganese staining (1%); 5Y 5/3	Grout (neat cement) (0'-217' bgs)
			216			
			217			
			218		DOLOSTONE, not competent to competent, vugs (10%), precipitate (10%), burrows (3%), fractures (1%), massive iron staining; 10YR 5/4, iron banding @ 28'	2' Fine Sand (217'-219' bgs)
			219			
			220		DOLOSTONE, not competent to competent, iron staining (10%), precipitate (7%), rip-up clasts (5%), oolitic texture (4%), vugs (3%), malachite (1%); 2.5Y	4" LC Steel Casing (0'-221' bgs)
			221			
			222		DOLOSTONE, moderately competent to competent, iron staining (12%), precipitate (5%), some iron staining along fractures; 2.5Y 6/3	
			223			
			224		DOLOSTONE, moderately competent to competent, iron staining (10%), precipitate (5%), vugs (4%), manganese staining (2%), malachite (2%); 2.5Y 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 16 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1500 / 2100
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE / DATE
	CASING DEPTH		06/22/22 / 06/27/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		DOLOSTONE, moderately competent to competent, iron staining (10%), precipitate (5%), vugs (4%), manganese staining (2%), malachite (2%); 2.5Y 5/4	
			227		DOLOSTONE, moderately competent to competent, iron staining (15%), vugs (5%), malachite (2%); 10YR 6/4	Sand filter pack (219-231' bgs)
			228		DOLOSTONE, not competent, not compacted shale (5%), iron staining (3%)	
			229			Screened interval (0.010" slot) (221-231' bgs)
			230		DOLOSTONE, not competent to moderately competent, iron staining (4%), precipitate (3%)	Screen collapse from 222-231'
			231			
		Ops	232		DOLOSTONE, moderately competent, precipitate (7%), manganese staining (5%), iron staining (3%), malachite (1%); 2.5Y 6/4	
			233			
			234			
			235		DOLOSTONE, not competent to moderately competent, precipitate, iron staining (2%), fractures (1%), manganese (1%); 2.5Y 5/4	Backfill by natural collapse (231-240' bgs)
			236			
			237			
			238		DOLOSTONE, not competent to moderately competent, iron staining (10%), manganese staining (5%, some dendritic), oolitic texture (3%); 10YR 7/3	
			239		DOLOSTONE, moderately competent, rubbly texture, precipitate (4%), iron staining (3%), vugs (3%), fractures (1%); 10YR 6/4	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27A [877383]
LOGGED BY: GG / CHECKED BY: BK			SHEET 17 OF 17
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 231 FT BGS			
GROUND SURFACE ELEVATION: 996.78 FT AMSL	WATER LEVEL		TIME 1500 / TIME 2100
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981547.25 Easting: 504832.217	DATE		DATE 06/22/22 / DATE 06/27/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
					E.O.B. @ 240' bgs, no refusal	

241 242 243 244 245 246 247 248 249 250 251 252 253 254

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27B [877384]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 1 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 130 FT BGS			
GROUND SURFACE ELEVATION: 997.386 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1805
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981542.246 Easting: 504833.143	DATE		DATE 06/29/22 / DATE 06/29/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–7		CLAY, low plasticity, medium density, silt (20%), trace organics, trace cobbles; dry, 10YR 5/4 SANDY CLAY, clay (60%), low plasticity, low density, sand, fine to coarse (10% fine, 10% medium, 5% coarse), subrounded, gravel, fine to coarse (5% fine, 5% medium, 5% coarse); dry, 7.5YR 4/4	Grout (neat cement) (0'-116' bgs)
		ML	7–13		SANDY SILT, silt (50%), low plasticity, low density, sand, fine to coarse (20% fine, 10% medium, 5% coarse), subrounded, gravel, fine to coarse (5% fine, 5% medium, 5% coarse); dry, 7.5YR 4/4	4" LC Steel Casing (0'-120' bgs)
		CL	13–14		SILTY CLAY, clay (52%), low plasticity, medium density, silt (25%), sand, fine to medium (10% fine, 5% medium), well rounded, gravel, fine to coarse (3% fine, 3% medium, 2% coarse); dry, 7.5YR 4/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27B [877384]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 2 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 130 FT BGS			
GROUND SURFACE ELEVATION: 997.386 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1805
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981542.246 Easting: 504833.143	DATE		DATE 06/29/22 / DATE 06/29/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	16–18		SILTY CLAY, clay (52%), low plasticity, medium density, silt (25%), sand, fine to medium (10% fine, 5% medium), well rounded, gravel, fine to coarse (3% fine, 3% medium, 2% coarse); dry, 7.5YR 4/6	
		ML	18–20		SANDY SILT, low plasticity, low density, sand, fine to coarse (25% fine, 20% medium, 5% coarse), well rounded, gravel, fine to coarse (7% fine, 5% medium, 5% coarse), well rounded, trace cobbles; dry, 10YR 4/4	Grout (neat cement) (0'-116' bgs)
		CL	20–26		CLAY, low plasticity, high density, iron staining (8%); dry, 10YR 4/4	4" LC Steel Casing (0'-120' bgs)
			26–27		CLAY, low plasticity, high density, massive iron staining; dry, 10YR 4/3	
		SW	27–29		SAND, fine to coarse (20% fine, 30% medium, 20% coarse), subrounded, well graded, clay (30%), iron staining (10%); 10YR 6/6, clay prevalent @ 29-30', clay and silty lenses	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27B [877384]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 3 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 130 FT BGS			
GROUND SURFACE ELEVATION: 997.386 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1805
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981542.246 Easting: 504833.143	DATE		DATE 06/29/22 / DATE 06/29/22
	CASING DEPTH		

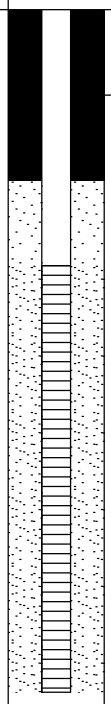
SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Platteville Fm. @ 30' bgs	Opg	31–44		LIMESTONE, Platteville regolith, not competent to moderately competent, platey shale pieces @ 31', more competent from 35-36'; 10YR 5/6 LIMESTONE, not competent to moderately competent, black shells (15%), manganese staining (5%), burrows (5%), larger shells (3%); GLEY1 3/5GY LIMESTONE, not competent to competent, black shells (15%), manganese staining (5%), iron staining @ 40.5' and 43'; GLEY 4/5GY	Grout (neat cement) (0'-116' bgs) 4" LC Steel Casing (0'-120' bgs) Sand filter pack (118'-130' bgs) Screened interval (0.010" slot) (120'-130' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. MW27B [877384]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 4 OF 4
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 130 FT BGS			
GROUND SURFACE ELEVATION: 997.386 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1805
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981542.246 Easting: 504833.143	DATE		DATE 06/29/22 / DATE 06/29/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		Blind drill to 130' bgs, well log abbreviated	
			47		Glenwood Shale from 45'-50' bgs, per drillers	
			48			
			49		St. Peter Sandstone from 50'-130' bgs, per drillers	
			50			
			51		E.O.B. @ 130' bgs, no refusal	
			52			
			53			
			54			
			55			
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CH	1–2		CLAY, medium to high plasticity, stiff; moist, 10YR 4/4	
		CL	3–4		CLAY, low to medium plasticity, silt (10%), gravel, fine to medium (5%), rounded; dry to moist, 10YR 4/4	
		SW	5–6		SAND, fine to coarse (13% fine, 64% medium, 8% coarse), rounded, well graded, gravel, fine to medium (10%), rounded, silt (5%); dry, 10YR 5/4	Grout (neat cement) (0'-306' bgs)
		SP	7		SAND, fine to coarse (5% fine, 76% medium, 14% coarse), gravel, fine (5%); dry, 10YR 5/4 to 10YR 10YR 5/6	
		CL	8–14		CLAY, low plasticity, silt (20%), sand, fine (15%), gravel, fine to coarse (15%), trace cobbles (<1%), round, igneous; dry to moist at 16', 7.5YR 4/4	4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		CLAY, low plasticity, silt (20%), sand, fine (15%), gravel, fine to coarse (15%), trace cobbles (<1%), round, igneous; dry to moist at 16', 7.5YR 4/4	
			17			
			18			
			19			
			20		CLAY, low plasticity, soft, sand, fine (10%), gravel, fine to coarse (10%), trace mottling (1%); dry, 7.5YR 4/4, 4" lense of fine to medium sand with fine to medium gravel (20%) @ 24'bgs	Grout (neat cement) (0'-306' bgs)
		CL	21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-310' bgs)
			26			
			27		SAND, fine to coarse (83% fine, 10% medium, 2% coarse), rounded, poorly graded, trace gravel, fine to medium (5%); dry, 10YR 5/8	
		SP	28			
			29		SAND, fine to coarse (70% fine, 22% medium, 3% coarse), rounded, poorly graded, trace silt (3%), trace gravel, fine (2%); dry, 10YR 5/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		SAND, fine to medium (15% fine, 60% medium), angular to sub-rounded, poorly graded, with gravel, fine to coarse (10% fine, 10%, 5% coarse), angular to sub-rounded; dry, 10YR 5/6	
			32			
			33			
		SP	34		SAND, medium to coarse (10% medium, 50% coarse), poorly graded, with gravel, fine to coarse (15% fine, 10% medium, 15% coarse), angular to sub-rounded	
			35			Grout (neat cement) (0'-306' bgs)
			36			
			37		SAND, fine to coarse, (10% fine, 30% medium, 30% coarse), poorly graded, with gravel, fine to medium (10% fine, 20% medium), sub-angular to sub-rounded; 10YR 4/4	
	St. Peter Fm. @ 38' bgs		38		SANDSTONE, poorly cemented, very fine (100%); dry, 5Y 8/1	
			39			
			40		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8/1	4" LC Steel Casing (0'-310' bgs)
		Os	41			
			42			
			43			
			44			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8/1	
			47			
			48			
			49			
			50		SANDSTONE, poorly cemented, fine (98%), well-rounded, trace banded iron staining (5%), trace gravel (2%); 10YR 8/1 to 7.5YR 8/1	Grout (neat cement) (0'-306' bgs)
		Os	51			
			52			
			53			
			54			
			55			4" LC Steel Casing (0'-310' bgs)
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61–74		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (1%); 2.5Y 8/1 SANDSTONE, poorly cemented, fine (100%), rounded; dry, 10YR 7/6 SANDSTONE, poorly cemented, fine (100%), rounded; 10YR 8/3	Grout (neat cement) (0'-306' bgs) 4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	76		SANDSTONE, poorly cemented, fine (100%), rounded; 10YR 8/3	
			77		SANDSTONE, poorly cemented, fine (100%), rounded; 10YR 7/6	
			78			
			79			
			80		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 7/4	Grout (neat cement) (0'-306' bgs)
			81		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8/1	
			82			
			83			
			84			
			85			4" LC Steel Casing (0'-310' bgs)
			86		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 7/4	
			87			
			88		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 8/2	
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			91		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 8/2	
			92			
			93			
			94			
			95			Grout (neat cement) (0'-306' bgs)
			96			
			97		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 8/3	
		Os	98			
			99			
			100		SANDSTONE, poorly cemented, fine (100%), well-rounded, iron mottling (20%); 10YR 8/3	4" LC Steel Casing (0'-310' bgs)
			101			
			102			
			103			
			104		SANDSTONE, poorly cemented, fine (100%), rounded, iron staining (10%); 2.5Y 8/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly cemented, fine (100%), rounded, iron staining (10%); 2.5Y 8/1	
			107		SANDSTONE, poorly cemented, fine (100%), well-rounded; 2.5Y 7/6	
			110		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR to 2.5Y 7/6	Grout (neat cement) (0'-306' bgs)
		Os	115			4" LC Steel Casing (0'-310' bgs)

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 9 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			121		SANDSTONE, poorly to moderately cemented, fine (100%), trace silt (3%); 10YR 7/6 to 10YR 5/8	
			122		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2.5Y 8/1 to 10YR 7/4	
			123			
			124		SANDSTONE, poorly to moderately cemented, very fine (100%), well rounded, mottled iron spots (20%); 2.5Y 7/2	
			125			Grout (neat cement) (0'-306' bgs)
			126			
			127			
		Os	128		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 7/8	
			129			
			130		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2,5Y 7/6	4" LC Steel Casing (0'-310' bgs)
			131			
			132			
			133		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 6/8	
			134		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%), trace iron mottling (5%); 2.5Y 8/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 10 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	136		SANDSTONE, poorly cemented, fine (95%), well-rounded, trace silt (5%), trace iron mottling (5%); 2.5Y 8/1	
			137		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 10YR 8/1	
			138			
			139			
			140		SANDSTONE, poorly cemented, fine (100%), well-rounded, iron staining (15%); 2.5Y 8/4	Grout (neat cement) (0'-306' bgs)
			141			
			142			
			143		SANDSTONE, moderately to well cemented, very fine to silt (97%), well-rounded, trace coarse sand (3%), iron staining (15%); 2.5Y 8/2, red staining @ 144' and 146' bgs	
			144			
			145			4" LC Steel Casing (0'-310' bgs)
			146			
			147			
			148		SANDSTONE, poor to moderately cemented, fine (100%), well-rounded, iron staining (20%); 2.5Y 8/1, well cemented @ 148' bgs	
			149			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SANDSTONE, poorly to moderately cemented, fine to coarse (80% fine, 5% medium, 5% coarse), well-rounded, silt (10%); 2.5Y 7/2	
			152		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 25% medium), well-rounded, trace silt (5%); 10YR 5/8, mottled, purple staining @ 152' bgs	
			153			
			154			
			155		SILTSTONE, moderately compacted, weathered, silt (65%), sand, fine to medium (30% fine, 5% medium), well-rounded; 7.5YR 5/8, trace mottled @ 156' bgs	Grout (neat cement) (0'-306' bgs)
			156			
		Os	157			
			158		SILTSTONE, moderately compacted, sand, fine to medium (20% fine, 20% medium), well-rounded; 5YR 5/6 to 5YR 4/6	
			159			
			160		SANDY SILTSTONE, poorly to well compacted, weathered contact zone, sand, fine to coarse (20% fine, 20% medium, 10% coarse), well-rounded, trace iron stained sand grains in siltstone (5%); 2.5Y 7/8	4" LC Steel Casing (0'-310' bgs)
			161			
			162			
			163			
			164			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 12 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			166		SANDY SILTSTONE, poorly to well compacted, weathered contact zone, sand, fine to coarse (20% fine, 20% medium, 10% coarse), well-rounded, trace iron stained sand grains in siltstone (5%); 2.5Y 7/8	
			167			
			168			
			169			
			170			Grout (neat cement) (0'-306' bgs)
			171			
			172		DOLOSTONE, moderately competent to competent, small vugs (25%), trace dolomitic precipitate (3%); 10YR 6/4	
		Os	173			
			174			
	Shakopee Fm. @ 175' bgs		175		DOLOSTONE, competent, green shale (10%), iron staining (10%), dolomitic precipitate (10%), trace sand (5%), trace spots/dendritic manganese staining (5%), trace thin fractures (2%), trace rip-up clasts (2%); 10YR 6/3	4" LC Steel Casing (0'-310' bgs)
			176			
			177			
		Ops	178			
			179			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 13 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			181		DOLOSTONE, not competent, trace sand (5%), trace dendritic manganese staining (5%), trace thin fractures (2%), trace iron banding (1%); 10YR 5/6 to 10YR 7/3	
			182			
			183			
			184			
			185			Grout (neat cement) (0'-306' bgs)
			186			
		Ops	187		DOLOSTONE, not competent to competent, weathered shale (20%), dolomitic precipitate (15%), trace vugs (3%), trace iron staining (3%), trace thin fractures (1%); 10YR 5/2, irregular bedding (rip-up clasts)	
			188			
			189			
			190			4" LC Steel Casing (0'-310' bgs)
			191		DOLOSTONE, not competent, iron staining (10%), sand (5-10%), trace dolomitic precipitate (5%), trace oolitic texture (5%); 10YR 7/6, shaley dolostone @ 192' bgs	
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. OW20J-1 [860283]	
LOGGED BY: AS	CHECKED BY: BK									SHEET 14 OF 22	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD: 10' acetate bags						DRILLING START	DRILLING FINISH
BORING DEPTH: 320 FT BGS											
GROUND SURFACE ELEVATION: 966.653 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						0900	1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509				DATE						DATE 10/04/21	DATE 10/06/21
				CASING DEPTH							

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	196		DOLOSTONE, not competent to moderately competent, trace thin fractures (3%), trace fine grain dolomitic precipitate (3%), trace thin iron banding (2%), trace manganese staining (2%), trace glauconite (1%); 10YR 4/4	
			197			
			198		DOLOSTONE, moderately competent, iron staining along fractures (15%), sand (10%), shale (10%), trace fine to medium grain dolomitic precipitate (5%), trace vugs (5%), trace manganese staining (2%); 10YR 7/4, bedding observed	
			199			
			200		DOLOSTONE, competent, dolomitic precipitate (25%), vugs (5-10%), trace sand (3%), trace shale (2%), trace fractures (1%); 10YR 6/3	Grout (neat cement) (0'-306' bgs)
			201			
			202			
			203			
			204		DOLOSTONE, moderately competent, shale (15%), dendritic manganese staining along fractures (10%), fractures (5-10%), trace iron staining (5%); 10YR 7/2	
			205			4" LC Steel Casing (0'-310' bgs)
			206		DOLOSTONE, not competent to competent, trace sand (5%), trace glauconite (5%), trace dolomitic precipitate (3%), trace manganese/iron staining (2%), trace vugs (2%); 10YR 6/3 to 10YR 5/2	
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 15 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	211		DOLOSTONE, moderately competent, dolomitic precipitate (5-10%), trace vugs (5%), trace fractures (2%); 10YR 6/2	Grout (neat cement) (0'-306' bgs)
			213		DOLOSTONE, not competent, dolomitic precipitate (25%), shale (15%), iron staining (5-10%), trace sand (5%); 10YR 7/2	
			215		DOLOSTONE, not competent to competent, iron staining (15%), trace faint manganese staining (5%), trace dolomitic precipitate (5%), trace sand (5%), trace vugs (3%), trace shale (2%); 10YR 6/3	
			220		DOLOSTONE, moderately competent, iron staining (15%), sand (10%), fractures (5-10%), trace manganese staining (3%); 10YR 6/3, large bedding fracture with dolomitic sand replacement @ 224' bgs	4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 16 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			226		DOLOSTONE, not competent, massive iron staining, trace small vugs (5%), trace oolitic texture (3%), trace fractures (2%); 10YR 5/3	
			227		DOLOSTONE, moderately competent to competent, iron staining (20%), fractures (10%), dolomitic precipitate (10%), trace spotted glauconitic staining (5%), trace sand (3%); 10YR 6/2, wavy thin iron staining @ 230' bgs	
			228			
			229			
			230		DOLOSTONE, moderately competent to competent, thin wavy iron staining (20%), sand (15%), dolomitic precipitate (15%), trace vugs (3%), trace reworked clasts (3%), trace fractures (2%); 10YR 5/6	Grout (neat cement) (0'-306' bgs)
			231			
			232		SHALE, well compacted, manganese staining (10%), trace sand (5%); GLEY 1 7/5GY	
		Ops	233			
			234		DOLOSTONE, moderately competent to competent, iron staining (10%), dolomitic precipitate (10%), oolitic texture (5-10%); 10YR 5/6, wavy bedding observed @ 234' bgs	
			235			4" LC Steel Casing (0'-310' bgs)
			236			
			237			
			238		DOLOSTONE, competent, sand (20%), dolomitic precipitate (15%), trace iron staining (5%); 10YR 7/4, thin shaley clasts/layers, wavy bedding	
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 17 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, not competent to very competent, oolitic texture (25%), dolomitic precipitate (20%), sand (10%), trace cherty clasts (5%), trace vertical fractures (2%), trace iron staining (2%); 10YR 6/6	
			242		SHALE, well compacted, dendritic manganese staining (10%); GLEY 1 6/10GY	
			243			
			244			
			245		DOLOSTONE, moderately competent, sand (15%), iron staining (15%), dolomitic precipitate (10%), trace oolitic texture (5%), trace glauconitic staining (2%); 10YR 6/6, orange/gray and vuggy @ 250' bgs	Grout (neat cement) (0'-306' bgs)
		Ops	246			
			247			
			248			
			249			
			250		DOLOSTONE, moderately competent to competent, vugs (20%), trace fractures (5%), trace glauconitic staining (3%), trace sand (2%); 10YR 5/2 to 10YR 7/6, rubbly texture, orange/gray and vuggy	4" LC Steel Casing (0'-310' bgs)
			251			
			252			
	Oneota @ 253' bgs		253		DOLOSTONE, very competent, small vugs (10%), trace iron staining (5%); 10YR 6/2	
		Opo	254			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 18 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1720
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE / DATE
	CASING DEPTH		10/04/21 / 10/06/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	256		DOLOSTONE, not competent to competent, vugs (20%), trace horizontal fractures (2%); 10YR 6/1	
			257			
			258			
			259		DOLOSTONE, competent, dolomitic precipitate (15%), vugs (10%), trace manganese spots (5%), trace shale (1%); 10YR 6/5	
			260		DOLOSTONE, moderately competent to competent, vugs (15%), dolomitic precipitate (15%), iron staining (10%), shaley (1%); 10YR 6/2 to 10YR 7/4	Grout (neat cement) (0'-306' bgs)
			261			
			262			
			263			
			264			
			265		DOLOSTONE, not competent to competent, manganese spots/dedritic staining (5-10%), trace small vugs (2%); 10YR 6/8 to 10YR 7/3, weathered clay observed	4" LC Steel Casing (0'-310' bgs)
			266			
			267			
			268			
			269		DOLOSTONE, competent, thin wavy layers of iron banding (30%), trace manganese spots (5%); 2.5Y 7/6	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 19 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	271		DOLOSTONE, not competent to moderately competent, iron staining and banding (20%), dendritic manganese staining (10%), trace thin fractures (2%); 2.5Y 7/4	
			272		DOLOSTONE, competent to very competent, iron staining and banding (15%), manganese staining/spots (5-10%), trace dolomitic precipitate (5%), trace vugs (5%); 2.5Y 7/3	
			273			
			274			
			275		DOLOSTONE, not competent to competent, iron staining (50%), dolomitic precipitate (25%), trace vugs (5%), trace manganese staining (2%), trace dark red iron spots (2%); 2.5Y 5/2	Grout (neat cement) (0'-306' bgs)
			276			
			277			
			278			
			279			
			280		DOLOSTONE, not competent to moderately competent, iron staining (10%), trace manganese staining (4%), trace fractures (3%), trace vugs (2%), trace dolomitic precipitate (1%); 2.5Y 6/2	4" LC Steel Casing (0'-310' bgs)
			281			
			282			
			283			
			284		DOLOSTONE, moderately competent, iron staining (15%), dolomitic precipitate (15%), vugs (10%), trace glauconitic staining (3%); 2.5Y 6/3	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 20 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	286		DOLOSTONE, moderately competent, iron staining (15%), dolomitic precipitate (15%), vugs (10%), trace glauconitic staining (3%); 2.5Y 6/3	
			287		DOLOSTONE, moderately competent to competent, dolomitic precipitate (50%), iron staining along fractures (20%), trace vugs (5%), trace manganese staining (4%), trace fractures (1%); 2.5Y 6/2 to 10YR 6/2	
			288			
			289			
			290		DOLOSTONE, not competent to competent, dolomitic precipitate (50%), variable iron staining (up to 100% on precipitate), trace manganese staining (5%), trace glauconitic staining (5%), fracturing (2%), vugs (15%); 2.5Y 6/3	Grout (neat cement) (0'-306' bgs)
			291			
			292			
			293		DOLOSTONE, not competent, massive iron staining, dolomitic precipitate (20%), glauconitic staining (5-10%), trace fractures (2%), trace vugs (1%), trace manganese spotting (1%); 7.5YR 5/6	
			294			
			295			4" LC Steel Casing (0'-310' bgs)
			296		DOLOSTONE, not competent to competent, manganese spotting (5-10%), trace dolomitic precipitate (5%), trace vugs (3%), trace fractures (1%); 7.5YR 6/6	
	Coon Valley @ 299' bgs		297			
			298			
			299		DOLOSTONE, competent, sand, fine to medium (15% fine, 15% medium), trace dolomitic precipitate (5%), trace glauconitic staining (5%), trace fractures	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 21 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Jordan Fm. @ 302' bgs	Opo	301		(1%); 7.5YR 6/6 SANDY DOLOSTONE, moderately competent to competent, massive iron staining, sand, fine to coarse (20% fine, 20% medium, 20% coarse), glauconitic staining (15-20%), trace vugs (2%); 7.5YR 5/8	Grout (neat cement) (0'-306' bgs)
			302		SANDSTONE, well cemented, fine to coarse (35% fine, 35% medium, 30% coarse), iron staining (10%); 2.5Y 7/2	
			303		SANDSTONE, poorly to moderately cemented, fine to coarse (5% fine, 65% medium, 30% coarse); 2.5Y 6/4 to 2.5Y 5/4 to 2.5Y 8/3	
			304			
			305			4" LC Steel Casing (0'-310' bgs)
			306			
			307			2' Fine Sand (306'-308' bgs)
		Cj	308		SANDSTONE, poorly to moderately cemented, fine to coarse (5% fine, 60% medium, 35% coarse); 2.5Y 7/4	
			309			
			310		SANDSTONE, poorly to moderately cemented, fine to coarse (5% fine, 60% medium, 35% coarse); 2.5Y 8/1	
			311		SANDSTONE, poorly to moderately cemented, fine to coarse (5% fine, 65% medium, 30% coarse); 2.5Y 7/3, thin lense of green shale @ 311' bgs	
			312			Screened interval (0.010" slot) (310'-320' bgs)
			313			
			314			Sand filter pack (308'-320' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-1 [860283]
LOGGED BY: AS / CHECKED BY: BK			SHEET 22 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 320 FT BGS			
GROUND SURFACE ELEVATION: 966.653 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1720
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980776.554 Easting: 505387.509	DATE		DATE 10/04/21 / DATE 10/06/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
			316		SANDSTONE, poorly to moderately cemented, fine to coarse (5% fine, 65% medium, 30% coarse); 2.5Y 7/3, thin lense of green shale @ 311' bgs	
			317		SANDSTONE, poorly cemented, fine to coarse (10% fine, 70% medium, 20% coarse); 2.5Y 6/8, thin lense of green shale @ 316' bgs	Screened interval (0.010" slot) (310'-320' bgs)
			318		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 30% medium); 2.5Y 8/1	Sand filter pack (308'-320' bgs)
			319		SANDSTONE, poorly cemented, fine to coarse (25% fine, 50% medium, 25% coarse); 2.5Y 7/4	
			320		E.O.B. @ 326' bgs, no refusal	
		Cj	321			
			322			
			323			Sand filter pack backfill (320-326')
			324			
			325			
			326			
			327			
			328			
			329			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 1 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–2		SAND, medium to coarse (62% medium, 30% coarse), well-rounded, poorly graded, trace fine to coarse gravel (5%), trace silt (3%); dry, 10YR 4/4	
		CL	2–5		CLAY, low to medium plasticity, soft, with silt (15%), trace fine to medium gravel (3%); dry, 7.5YR 4/3	Grout (neat cement) (0'-306' bgs)
		SP	5–6		SAND, fine to medium (67% fine, 15% medium), well-rounded, poorly graded, with medium to coarse gravel (15%), trace silt (3%); dry, 10YR 4/3	
		ML	6–10		SANDY SILT, low plasticity, soft, sand, fine (30%), with clay (30%), trace medium to coarse gravel (5%); dry, 7.5YR 5/4	
		ML	10–14		SANDY SILT, low plasticity, medium stiff, silt (30%), sand, fine (20%), fine to coarse gravel (5-10%), angular; dry, 7.5YR 5/4	4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 2 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16		SANDY SILT, low plasticity, medium stiff, silt (30%), sand, fine (20%), fine to coarse gravel (5-10%), angular; dry, 7.5YR 5/4	
		SP	17		SAND, fine (100%), sub-rounded, poorly graded; dry, 10YR 7/2	
		SM	18 19 20		SILTY SAND, very fine (75%), well-rounded, poorly graded, silt (25%); moist to wet, 10YR 6/4, wet @ 20' bgs	Grout (neat cement) (0'-306' bgs)
		SP	21		SAND, fine to coarse (85% fine, 10% coarse), sub-rounded, poorly graded, trace fine gravel (5%); dry, 10YR 7/3	
		ML	22 23 24		SANDY SILT, low plasticity, soft, with fine to medium sand (30%), trace medium gravel (5%); dry; 10YR 6/4 to 10YR 5/6, crumbly texture	
		SM	25 26 27		SILTY SAND, fine (72%), sub-rounded, poorly graded, silt (25%), trace fine to medium gravel (3%); dry, 10YR 5/6	4" LC Steel Casing (0'-310' bgs)
		ML	28 29		SILT, low plasticity, medium stiff, sand, medium (10-15%), trace medium gravel (5%), trace mottling (1%); 10YR 5/4	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 3 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE 09/14/21 / DATE 09/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31		SANDY SILT, low plasticity, soft to medium stiff, sand, fine to coarse (30-40%), trace medium gravel (5%); wet, 10YR 5/3	
		SP	32–37		SAND, fine to medium (65% fine, 30% medium), well-rounded, poorly graded, trace fine to coarse gravel (5%); dry to moist, 10YR 6/4	Grout (neat cement) (0'-306' bgs)
		CL	37–40		CLAY, low plasticity, soft, with silt (25%), with sand, fine (15%), trace red mottling (1%); dry to moist, 10YR 5/4	
		ML	40–44		SILT, low plasticity, soft, with sand, fine to medium (20-30%), with clay (15%), trace fine to coarse gravel (5%), trace cobbles (2%); dry to moist, 10YR 5/6 to 7.5YR 5/3, cobbles @ St. Peter contact @ 49' bgs	4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 4 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	46–49		SILT, low plasticity, soft, with sand, fine to medium (20-30%), with clay (15%), trace fine to coarse gravel (5%), trace cobbles (2%); dry to moist, 10YR 5/6 to 7.5YR 5/3, cobbles @ St. Peter contact @ 49' bgs	
	St. Peter Fm. @ 49.5' bgs	Os	50–59		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (1%); 10YR 8/1 SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded; 2.5Y 8/1	Grout (neat cement) (0'-306' bgs) 4" LC Steel Casing (0'-310' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 5 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8.5/2	
			62		SANDSTONE, poorly cemented, fine (100%), well-rounded, trace iron staining (1%); 10YR 8/1	
			63			
			64			
			65			Grout (neat cement) (0'-306' bgs)
			66			
			67			
			68			
			69			
			70		SANDSTONE, poorly cemented, sub-rounded, fine (97%), trace clay (3%); 10YR 8/1	4" LC Steel Casing (0'-310' bgs)
			71			
			72			
			73			
			74		SANDSTONE, poorly cemented, fine (100%), sub-rounded, massive iron staining/mottling; 10YR 8/2	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 6 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	76		SANDSTONE, poorly cemented, fine (100%), well-rounded, massive faint iron staining; 10YR 7/4	
			77		SANDSTONE, poorly cemented, fine (100%), well-rounded, massive iron staining; 2.5Y 8/2	
			78			
			79		SANDSTONE, poorly cemented, fine (99%), well-rounded, massive iron staining, trace lithic fragments (1%); 10YR 6/6	
			80		SANDSTONE, poorly cemented, fine (98%), well-rounded, massive iron staining, trace clay (2%); 10YR 6/4, mottled @ 85' bgs	Grout (neat cement) (0'-306' bgs)
			81			
			82			
			83			
			84			
			85		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded, massive iron staining; 10YR 7/3	4" LC Steel Casing (0'-310' bgs)
			86			
			87			
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 7 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE 09/14/21 / DATE 09/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	91		SANDSTONE, poorly cemented, fine (100%), well-rounded, massive iron staining; 10YR 7/2	
			92			
			93			
			94		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 8/1	
			95			Grout (neat cement) (0'-306' bgs)
			96			
			97			
			98			
			99			
			100		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 6/4 SANDSTONE, poorly cemented, fine (100%), sub-rounded, iron mottling (30%); 10YR 8/1	4" LC Steel Casing (0'-310' bgs)
			101			
			102			
			103			
			104			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 8 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			106		SANDSTONE, poorly cemented, fine (100%), sub-rounded, iron mottling (30%); 10YR 8/1	
			107		SANDSTONE, poorly cemented, fine (100%), well-rounded; 10YR 6/3	
			108			
			109			
			110		SANDSTONE, poorly cemented, fine (100%), well-rounded, iron staining/mottling (20%); 10YR 8/1	Grout (neat cement) (0'-306' bgs)
			111			
		Os	112			
			113			
			114			
			115			4" LC Steel Casing (0'-310' bgs)
			116			
			117		SANDSTONE, poorly to oderately cemented, fine (100%), well-rounded; massive iron staining; 10YR 7/6	
			118			
			119			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753	LOCATION: East Metro, MN						
PROJECT: Project 1007				DRILLING METHOD: Sonic					BORING NO. OW20J-2 [860284]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 9 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD:					DRILLING		
BORING DEPTH: 300 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 970.732 FT AMSL				WATER LEVEL					TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)				TIME					0900	1700	
COMMENTS: Northing: 4980790.146 Easting: 505458.014				DATE					DATE	DATE	
				CASING DEPTH					09/14/21	09/15/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	121		SANDSTONE, poorly to moderately cemented, fine (97%), well-rounded, massive iron staining, trace clay (3%)	Grout (neat cement) (0'-306' bgs)
			122			
			123			
			124			
			125			
			126		SANDSTONE, moderately to well cemented, very fine to fine (100%), mottled and banded dark iron staining (80%)	
			127			
			128			
			129		SANDSTONE, moderately cemented, very fine (100%), well-rounded, trace iron staining (5%)	
			130		SANDSTONE, poorly to moderately cemented, fine (100%), well-rounded, iron staining (20%); 10YR 8/1	4" LC Steel Casing (0'-310' bgs)
			131			
			132			
			133			
			134		SANDSTONE, poorly to moderately cemented, very fine to fine (97%), well-rounded, trace silt (3%), trace iron staining (2%); 10YR 8/1 to 10YR 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 10 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	136		SANDSTONE, poorly to moderately cemented, very fine to fine (97%), well-rounded, trace silt (3%), trace iron staining (2%); 10YR 8/1 to 10YR 7/1	Grout (neat cement) (0'-306' bgs)
			137			
			138			
			139			
			140			
			141			
			142			
			143			
			144			
			145			4" LC Steel Casing (0'-310' bgs)
			146		SANDSTONE, moderately cemented, very fine (95%), well-rounded, massive iron staining, trace silt (5%); 10YR 6/6	
			147			
			148			
			149		SANDSTONE, moderately cemented, very fine (85%), well-rounded, bright red iron mottling (30%), with silt (15%); 10YR 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 11 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			151		SANDSTONE, moderately cemented, fine to medium (75% fine, 25% medium), well-rounded, silt (10%), iron staining (10%); 10YR 7/1, trace well cemented siltstone/sandstone @ 154' bgs	
			152			
			153			
			154			
			155			Grout (neat cement) (0'-306' bgs)
			156		SANDSTONE, poorly to moderately cemented, fine to coarse (75% fine, 15% medium, 5% coarse), massive iron staining, silt (10%); 10YR 7/6	
		Os	157			
			158			
			159			
			160		SANDSTONE, poorly to moderately cemented, fine to medium (45% fine, 40% medium), well-rounded, massive iron staining, with silt (15%); 7.5YR 5/6 to 7.5YR 4/4	4" LC Steel Casing (0'-310' bgs)
			161			
			162			
			163			
			164		SILTSTONE, moderately compacted, low plasticity, sandstone, weathered, massive iron staining, sand, fine to medium (25%), clay (15%); 10YR 6/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 12 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					SILTSTONE, moderately compacted, low plasticity, sandstone, weathered, massive iron staining, sand, fine to medium (25%), clay (15%); 10YR 6/6	
			166		SANDSTONE, moderately to well cemented, fine to medium (60% fine, 25% medium), well-rounded, with silt/clay (15%), iron staining (30%); 10YR 7/1	
		Os	167			
			168		SILTSTONE, low plasticity, medium density, weathered, fine sand (15%), massive green tint, dark mottled iron staining (10%); 10YR 5/4 to 5Y 5/3	
	Shakopee Fm. @ 169' bgs		169		DOLOSTONE, not competent to competent, very weathered, dolomitic precipitate (15%), manganese staining (10%); 7.5YR 6/3	
			170		DOLOSTONE, moderately competent, iron staining (25%), sand, medium (10%), trace glauconitic staining (3%), trace dolomitic precipitate (1%); 10YR 5/6, dark iron band @ 172.5' bgs, clay @ 171' bgs	Grout (neat cement) (0'-306' bgs)
			171			
			172			
			173			
			174			
		Ops	175			4" LC Steel Casing (0'-310' bgs)
			176		DOLOSTONE, not competent to moderately competent, iron staining (25%), dolomitic precipitate (10%), trace sand (5%), trace glauconitic staining (5%); 10YR 6/4	
			177			
			178			
			179		DOLOSTONE, competent, dendritic manganese staining (15%), trace thin fractures (5%), trace iron staining (5%); 10YR 7/3	
					SANDY DOLOSTONE, sand (20%), shale,	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. OW20J-2 [860284]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 13 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD:						DRILLING		
BORING DEPTH: 300 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 970.732 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						0900	1700	
COMMENTS: Northing: 4980790.146 Easting: 505458.014			DATE						DATE	DATE	
			CASING DEPTH						09/14/21	09/15/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					weathered, manganese staining (15%), mottled orange and green; 10YR 7/3	
			181		DOLOSTONE, not competent to moderately competent, iron staining (15%), dolomitic precipitate (10%), manganese staining (5%), glauconitic staining (5%); 10YR 6/2	
			182			
			183			
			184		DOLOSTONE, moderately competent, massive iron staining, trace oolitic texture and oolites (5%); 10YR 6/6	
			185		DOLOSTONE, not competent to moderately competent, sand (10%), iron staining (10%), trace thin fractures (2%); 10YR 7/4	Grout (neat cement) (0'-306' bgs)
			186			
		Ops	187			
			188			
			189		DOLOSTONE, competent, vugs (25%), dolomitic precipitate (10%), trace sand (5%); 10YR 6/3	
			190		DOLOSTONE, not competent, clay and shale (20%), dolomitic precipitate (10%); 10YR 6/2	4" LC Steel Casing (0'-310' bgs)
			191		DOLOSTONE, not competent to moderately competent, iron staining (25%), dolomitic precipitate (10%), trace sand (5%), trace manganese staining (5%), trace thin fractures (2%); 10YR 6/2	
			192			
			193			
			194			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA				JOB NO.: 60618753		LOCATION: East Metro, MN					
PROJECT: Project 1007				DRILLING METHOD: Sonic						BORING NO. OW20J-2 [860284]	
LOGGED BY: AS	CHECKED BY: BK									SHEET 14 OF 22	
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic			SAMPLING METHOD:						DRILLING	
BORING DEPTH: 300 FT BGS										START	FINISH
GROUND SURFACE ELEVATION: 970.732 FT AMSL				WATER LEVEL						TIME	TIME
DATUM: NAD 83 UTM 15 (meters)				TIME						0900	1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014				DATE						DATE	DATE
				CASING DEPTH						09/14/21	09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	196		DOLOSTONE, moderately competent to competent, thinly banded iron staining (40%), manganese staining (25%), trace vugs (5%), trace thin fractures (2%); 10YR 7/2	
			197		DOLOSTONE, not competent to moderately competent, dolomitic precipitate (20%), iron staining (15%), trace oolitic texture and oolites (5%), trace glauconitic staining (3%), trace sand (3%); 10YR 7/3 to 7.5YR 6/2	
			198			
			199			
			200		DOLOSTONE, moderately competent to competent, dolomitic precipitate (20%), iron staining (15%), trace oolitic texture and oolites (5%), trace sand (3%); 10YR 7/3 to 7.5YR 6/2	Grout (neat cement) (0'-306' bgs)
			201			
			202			
			203		DOLOSTONE, moderately competent, massive iron staining, manganese staining (25%), sand (10%), trace mm-scale iron banding (2%); 10YR 6/4	
			204			
			205		DOLOSTONE, not competent, sand (40%), iron staining (25%), dolomotic precipitate (10%); 10YR 6/4	4" LC Steel Casing (0'-310' bgs)
			206		DOLOSTONE, competent, dolomitic precipitate (25%), iron staining (15%), manganese staining (10%), trace shale (5%), trace thin fractures (5%), trace mm-scale iron banding (5%), trace sand (3%), trace vugs (2%); 10YR 7/2 to 7.5YR 6/1	
			207			
			208			
			209			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. OW20J-2 [860284]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 15 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD:						DRILLING		
BORING DEPTH: 300 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 970.732 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						0900	1700	
COMMENTS: Northing: 4980790.146 Easting: 505458.014			DATE						DATE	DATE	
			CASING DEPTH						09/14/21	09/15/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	211		DOLOSTONE, not competent to moderately competent, iron staining (20%), dolomitic precipitate (20%), glauconitic staining (10%), sand (5-10%); 10YR 5/1	
			212			
			213			
			214			
			215		DOLOSTONE, not competent to moderately competent, dolomitic precipitate (35%), shale/clay (20%), trace glauconitic staining (5%), trace vugs (5%); 10YR 6/2	Grout (neat cement) (0'-306' bgs)
			216			
			217			
			218			
			219			
			220		DOLOSTONE, moderately competent, dolomitic precipitate (25%), iron staining (25%), sand (10%), trace oolitic texture (3%), trace quartz/calcite band (1%); 10YR 6/3, iron and dolomitic banding @ 220-221' bgs	4" LC Steel Casing (0'-310' bgs)
			221			
			222			
			223			
			224			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 16 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Ops	226		DOLOSTONE, moderately competent, dolomitic precipitate (25%), iron staining (25%), sand (10%), trace oolitic texture (3%), trace quartz/calcite band (1%); 10YR 6/3, iron and dolomitic banding @ 220-221' bgs	
			227		DOLOSTONE, not competent to competent, iron staining (25%), sand (15%), chert (10%), trace glauconitic staining (5-10%), trace vugs and small fractures (5%); 10YR 6/4, iron staining @ 230' bgs, iron bands along fractures @ 229-230' bgs	
			228			
			229			
			230		DOLOSTONE, moderately competent, iron staining (15%), sand (5-10%), trace dolomitic precipitate (5%), trace manganese staining (2%), trace glauconitic staining (2%); 10YR 5/3, reworked dolostone @ 235' bgs	Grout (neat cement) (0'-306' bgs)
			231			
			232			
			233			
			234			
			235		SHALE, well compacted, sand (15%), trace manganese staining (5%); GLEY 1 6/5GY	4" LC Steel Casing (0'-310' bgs)
			236			
			237			
			238		DOLOSTONE, moderately competent to competent, iron staining (30%), dolomitic precipitate (10%), trace shale (5%), trace manganese staining (2%); 10YR 5/6	
			239			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 17 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			241		DOLOSTONE, competent, iron staining (20%), sand (15%), dolomitic precipitate (10%), trace oolitic texture (5%), trace vugs (3%), trace galuconitic staining (2%); GLEY1 6/5GY, chert inclusions @ 245-246' bgs	
			242			
			243			
			244			
			245			Grout (neat cement) (0'-306' bgs)
			246		SHALE, well compacted, sand (15%), iron/manganese staining (15%); GLEY 1 6/5GY	
		Ops	247			
			248		DOLOSTONE, competent, sand (25%), glauconitic staining (10%), iron staining (10%), dolomitic precipitate (5-10%), trace reworked clasts (5%), trace oolitic texture (5%), trace vugs (5%), trace fractures (1%); 10YR 7/4	
			249			
			250		DOLOSTONE, not competent to moderately competent, iron staining (10%), sand (5-10%), trace dolomitic precipitate (5%), trace glauconitic staining (5%); 10YR 6/2 to 10YR 6/6	4" LC Steel Casing (0'-310' bgs)
			251			
			252			
			253		DOLOSTONE, moderately competent, dolomitic precipitate (10%), vugs (10%), trace sand (5%); 10YR 6/4, trace shale @ 256' bgs, gray/orange splotches, rubbly texture	
			254			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 18 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE 09/14/21 / DATE 09/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	Oneota Fm. @ 256' bgs	Ops	256		DOLOSTONE, moderately competent, dolomitic precipitate (10%), vugs (10%), trace sand (5%); 10YR 6/4, trace shale @ 256' bgs, gray/orange splotches, rubbly texture	
			257		DOLOSTONE, competent, dolomitic precipitate (10%), trace vugs (2%), trace quartz/calcite inclusions (1%); 10YR 7/2	
			258			
			259			
			260			Grout (neat cement) (0'-306' bgs)
			261		DOLOSTONE, not competent, dolomitic precipitate (10-15%), vugs (10%); 10YR 7/4, rubbly texture	
			262			
		Opo	263			
			264			
			265		DOLOSTONE, moderately competent to competent, vugs (10%), dolomitic precipitate (10%), trace manganese staining (5%), trace quartz/calcite nodules (1%); 10YR 6/2 to 10YR 7/4	4" LC Steel Casing (0'-310' bgs)
			266			
			267			
			268			
			269			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 19 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	271		DOLOSTONE, moderately competent, mm-scale iron banding (15%), manganese staining (5-10%), trace dolomitic precipitate (5%), trace thin fractures (2%), trace quartz/calcite nodules (1%); 10YR 7/6	
			272			
			273			
			274			
			275		DOLOSTONE, moderately competent to competent, trace faint manganese staining (5%), trace small vugs (3%); 10YR 7/2, layering observed	Grout (neat cement) (0'-306' bgs)
			276			
			277			
			278			
			279		DOLOSTONE, competent, mm-scale iron banding (20%), inch-scale vugs (10%), trace dolomitic precipitate (3%), trace manganese staining (3%); 10YR 7/4	
			280		DOLOSTONE, not competent, dolomitic precipitate (30%), manganese staining (10%); 10YR 6/6, rubbly texture, weathered into clays from 283-285' bgs	4" LC Steel Casing (0'-310' bgs)
			281			
			282			
			283			
			284			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN							
PROJECT: Project 1007			DRILLING METHOD: Sonic						BORING NO. OW20J-2 [860284]		
LOGGED BY: AS	CHECKED BY: BK								SHEET 20 OF 22		
DRILLING CONTR.: Traut											
DRILLER: Dan Pflipsen	EQUIP.: Sonic		SAMPLING METHOD:						DRILLING		
BORING DEPTH: 300 FT BGS									START	FINISH	
GROUND SURFACE ELEVATION: 970.732 FT AMSL			WATER LEVEL						TIME	TIME	
DATUM: NAD 83 UTM 15 (meters)			TIME						0900	1700	
COMMENTS: Northing: 4980790.146 Easting: 505458.014			DATE						DATE	DATE	
			CASING DEPTH						09/14/21	09/15/21	

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Opo	286		DOLOSTONE, competent, vugs (10%), trace spots and dendritic manganese staining (5%), trace thin fractures (2%); 10YR 6/2	
			287			
			288		DOLOSTONE, not competent, dolomitic precipitate (30%), trace vugs (5%), trace manganese staining (2%); 10YR 6/4	
			289			
			290		DOLOSTONE, moderately competent, dolomitic precipitate (30%), iron staining (15%), vugs (10%), manganese staining (10%); 10YR 6/3	Grout (neat cement) (0'-306' bgs)
			291			
			292			
			293			
			294			
			295			4" LC Steel Casing (0'-310' bgs)
			296		DOLOSTONE, moderately competent to competent, dolomitic precipitate (50%), vugs (15%), iron staining (10%); 10YR 7/4	
			297		DOLOSTONE, not competent to moderately competent, iron staining (30%), dolomitic precipitate (10-15%), trace manganese staining (5%), trace glauconitic staining (5%), trace sand (2%); 10YR 6/8, iron stains include mm-scale banding	
			298			
			299			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS / CHECKED BY: BK			SHEET 21 OF 22
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS			
GROUND SURFACE ELEVATION: 970.732 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014	DATE		DATE / DATE
	CASING DEPTH		09/14/21 / 09/15/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			301		DOLOSTONE, not competent to moderately competent, iron staining (30%), dolomitic precipitate (10-15%), trace manganese staining (5%), trace glauconitic staining (5%), trace sand (2%); 10YR 6/8, iron stains include mm-scale banding	Grout (neat cement) (0'-306' bgs)
	Jordan Fm. @ 305' bgs		305			4" LC Steel Casing (0'-310' bgs)
			310		Blind drill (305-320' bgs)	2' Fine Sand (306'-308' bgs)
			312			Screened interval (0.010" slot) (310'-320' bgs)
			314			Sand filter pack (308'-320' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. OW20J-2 [860284]
LOGGED BY: AS	CHECKED BY: BK			SHEET 22 OF 22
DRILLING CONTR.: Traut				
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD:		DRILLING START / FINISH
BORING DEPTH: 300 FT BGS				
GROUND SURFACE ELEVATION: 970.732 FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		0900 / 1700
COMMENTS: Northing: 4980790.146 Easting: 505458.014		DATE		DATE / DATE
		CASING DEPTH		09/14/21 / 09/15/21

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
			316		Blind drill (305-320' bgs)	Screened interval (0.010" slot) (310'-320' bgs)
			317			
			318			Sand filter pack (308'-320' bgs)
			319			
			320		E.O.B. @ 320' bgs, no refusal	
			321			
			322			
			323			
			324			
			325			
			326			
			327			
			328			
			329			

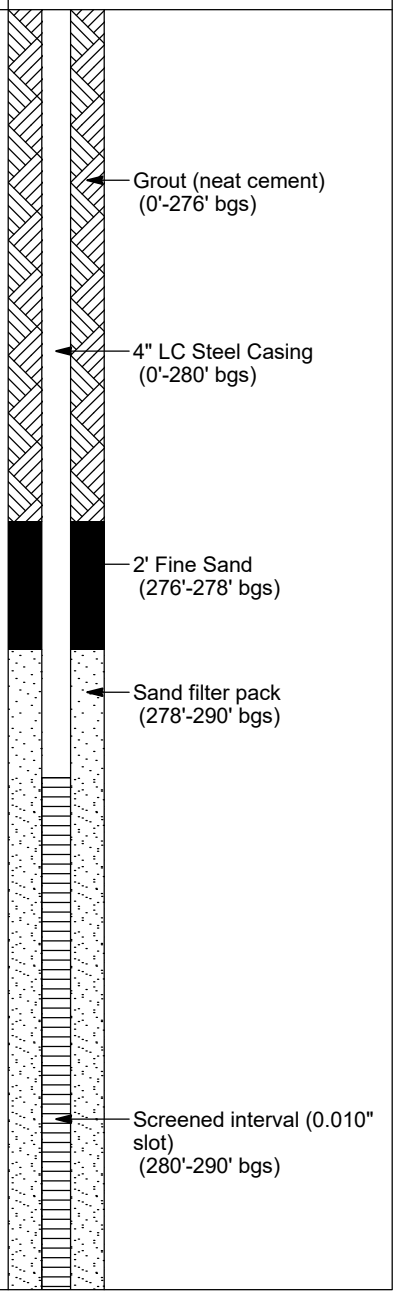
ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20J-3 [860285]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 290 FT BGS			
GROUND SURFACE ELEVATION: 943.344 FT AMSL	WATER LEVEL		TIME 0745 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980867.846 Easting: 505626.03	DATE		DATE 09/17/21 / DATE 09/21/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 290' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-276' bgs)
			3		Unconsolidated Material from 0'-5' bgs, per drillers	
			4			4" LC Steel Casing (0'-280' bgs)
			5		St. Peter Sandstone from 5'-136' bgs, per drillers	
			6			2' Fine Sand (276'-278' bgs)
			7		Prairie du Chien from 136'-274' bgs, per drillers	
			8			Sand filter pack (278'-290' bgs)
			9		Jordan Sandstone from 274'-290' bgs, per drillers	
			10			
			11			
			12			
			13		E.O.B. @ 290' bgs, no refusal	Screened interval (0.010" slot) (280'-290' bgs)
			14			



ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20P-1 [867657]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 160 FT BGS			
GROUND SURFACE ELEVATION: 968.293 FT AMSL	WATER LEVEL		TIME: 1020 / 1820
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980782.718 Easting: 505390.383	DATE		DATE: 09/14/22 / 09/14/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 160' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-146' bgs)
			3		Unconsolidated Material from 0'-38' bgs, per drillers	
			4			4" LC Steel Casing (0'-150' bgs)
			5		St. Peter Sandstone from 38'-160' bgs, per drillers	
			6			
			7			2' Fine Sand (146'-148' bgs)
			8			Sand filter pack (148'-150' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 160' bgs, no refusal	Screened interval (0.010" slot) (150'-160' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20S-1 [860282]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 200 FT BGS			
GROUND SURFACE ELEVATION: 967.558 FT AMSL	WATER LEVEL		TIME: 0730 / 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980779.624 Easting: 505388.756	DATE		DATE: 10/12/21 / 10/13/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 200' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-186' bgs)
			3		Unconsolidated Material from 0'-38' bgs, per drillers	
			4			4" LC Steel Casing (0'-190' bgs)
			5			
			6		St. Peter Sandstone from 38'-175' bgs, per drillers	
			7			2' Fine Sand (186'-188' bgs)
			8			Sand filter pack (188'-200' bgs)
			9		Shakopee Dolostone from 175'-200' bgs, per drillers	
			10			
			11			
			12			
			13		E.O.B. @ 200' bgs, no refusal	Screened interval (0.010" slot) (190'-200' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20S-2 [867658]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 971.804 FT AMSL	WATER LEVEL		TIME: 0700 / 1810
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980794.092 Easting: 505457.281	DATE		DATE: 09/16/22 / 09/19/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 210' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-196' bgs)
			3		Unconsolidated Material from 0'-49' bgs, per drillers	
			4			4" LC Steel Casing (0'-200' bgs)
			5			
			6		St. Peter Sandstone from 49'-169' bgs, per drillers	
			7			2' Fine Sand (196'-198' bgs)
			8			Sand filter pack (198'-210' bgs)
			9		Shakopee Dolostone from 169'-210' bgs, per drillers	
			10			
			11			
			12			
			13		E.O.B. @ 210' bgs, no refusal	Screened interval (0.010" slot) (200'-210' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20S-3 [867659]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 175 FT BGS			
GROUND SURFACE ELEVATION: 943.039 FT AMSL	WATER LEVEL		TIME: 0930 / 1030
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980863.746 Easting: 505625.643	DATE		DATE: 09/20/22 / 09/21/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 180' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-161' bgs)
			3		Unconsolidated Material from 0'-5' bgs, per drillers	
			4			4" LC Steel Casing (0'-165' bgs)
			5			
			6		St. Peter Sandstone from 5'-136' bgs, per drillers	
			7			2' Fine Sand (161'-163' bgs)
			8			Sand filter pack (163'-175' bgs)
			9		Shakopee Dolostone from 136'-175' bgs, per drillers	
			10			
			11			
			12			Screened interval (0.010" slot) (165'-175' bgs)
			13		E.O.B. @ 180' bgs, no refusal	
			14			Backfill by natural collapse (175-180' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW20T-1 [867660]
LOGGED BY: ML/NP	CHECKED BY: BK		SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 108 FT BGS			
GROUND SURFACE ELEVATION: 968.882 FT AMSL	WATER LEVEL		TIME 0700 / TIME 1815
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980785.006 Easting: 505391.156	DATE		DATE 09/15/22 / DATE 09/15/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 110' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-94' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-38' bgs, per drillers	4" LC Steel Casing (0'-98' bgs)
			5			
			6			2' Fine Sand (94'-96' bgs)
			7		St. Peter Sandstone from 38'-108' bgs, per drillers	
			8			Sand filter pack (96'-98' bgs)
			9			
			10			
			11			
			12			Screened interval (0.010" slot) (98'-108' bgs)
			13		E.O.B. @ 110' bgs, no refusal	
			14			Backfill by natural collapse (108-110' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW5J-1 [854556]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 238 FT BGS			
GROUND SURFACE ELEVATION: 923.477 FT AMSL	WATER LEVEL		TIME 1200 / TIME 1200
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980902.65 Easting: 508619.466	DATE		DATE 07/22/21 / DATE 07/26/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 240' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-224' bgs)
			3		Unconsolidated Material from 0'-72' bgs, per drillers	
			4			4" LC Steel Casing (0'-228' bgs)
			5			
			6		Prairie du Chien from 72'-221' bgs, per drillers	
			7			2' Fine Sand (224'-226' bgs)
			8			Sand filter pack (226'-238' bgs)
			9		Jordan Sandstone from 221'-240' bgs, per drillers	
			10			
			11			
			12			Screened interval (0.010" slot) (228'-238' bgs)
			13		E.O.B. @ 240' bgs, no refusal	
			14			Backfill by natural collapse (238-240' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW5J-2 [854558]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 225 FT BGS			
GROUND SURFACE ELEVATION: 912.596 FT AMSL	WATER LEVEL		TIME 0730 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980942.681 Easting: 508573.746	DATE		DATE 07/29/21 / DATE 07/30/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 230' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-211' bgs)
			2			
			3		Unconsolidated Material from 0'-70' bgs, per drillers	4" LC Steel Casing (0'-215' bgs)
			4			
			5		Prairie du Chien from 70'-206' bgs, per drillers	2' Fine Sand (211'-213' bgs)
			6			
			7		Coon Valley Sandy Dolomite from 206'-210' bgs, per drillers	Sand filter pack (213'-225' bgs)
			8			
			9		Jordan Sandstone from 210'-230' bgs, per drillers	Screened interval (0.010" slot) (215'-225' bgs)
			10			
			11			
			12			
			13		E.O.B. @ 230' bgs, no refusal	Backfill by natural collapse (225-230')
			14			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW5J-3 [854559]
LOGGED BY: AL / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 225 FT BGS			
GROUND SURFACE ELEVATION: 911.48 FT AMSL	WATER LEVEL		TIME: 1025 / 1730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4981031.515 Easting: 508461.031	DATE		DATE: 08/03/21 / 08/04/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 225' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-211' bgs)
			3		Unconsolidated Material from 0'-62' bgs, per drillers	
			4			4" LC Steel Casing (0'-215' bgs)
			5		Prairie du Chien from 62'-204' bgs, per drillers	
			6			2' Fine Sand (211'-213' bgs)
			7		Coon Valley Sandy Dolomite from 204'-210' bgs, per drillers	
			8			Sand filter pack (213'-225' bgs)
			9		Jordan Sandstone from 210'-225' bgs, per drillers	
			10			
			11			
			12			
			13		E.O.B. @ 225' bgs, no refusal	Screened interval (0.010" slot) (215'-225' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW5O-1 [854557]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 210 FT BGS			
GROUND SURFACE ELEVATION: 923.537 FT AMSL	WATER LEVEL		TIME 0730 / TIME 1640
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980903.919 Easting: 508616.871	DATE		DATE 07/27/21 / DATE 07/28/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 210' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-196' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-75' bgs, per drillers	4" LC Steel Casing (0'-200' bgs)
			5			
			6			2' Fine Sand (196'-198' bgs)
			7		Prairie du Chien from 75'-210' bgs, per drillers	
			8			Sand filter pack (198'-210' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 210' bgs, no refusal	Screened interval (0.010" slot) (200'-210' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW7Q-1 [877390]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: 884.958 FT AMSL	WATER LEVEL		TIME 0955 / TIME 1330
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979422.192 Easting: 511212.107	DATE		DATE 08/23/22 / DATE 08/23/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 74' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-60' bgs)
			2			
			3			
			4			4" LC Steel Casing (0'-64' bgs)
			5			
			6		Unconsolidated Material from 0'-74' bgs, per drillers	2' Fine Sand (60'-62' bgs)
			7			
			8			Sand filter pack (62'-74' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 74' bgs, no refusal	Screened interval (0.010" slot) (64'-74' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW7S-1 [877387]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: 885.048 FT AMSL	WATER LEVEL		TIME: 0930 / 1515
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979426.792 Easting: 511214.474	DATE		DATE: 08/22/22 / 08/22/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 100' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-86' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-77' bgs, per drillers	4" LC Steel Casing (0'-90' bgs)
			5			
			6			2' Fine Sand (86'-88' bgs)
			7		Shakopee Dolostone from 77'-100' bgs, per drillers	
			8			Sand filter pack (88'-100' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 100' bgs, no refusal	Screened interval (0.010" slot) (90'-100' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW7S-2 [877388]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 110 FT BGS			
GROUND SURFACE ELEVATION: 884.682 FT AMSL	WATER LEVEL		TIME: 1330 / 0730
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979388.696 Easting: 511208.292	DATE		DATE: 08/23/22 / 08/24/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 110' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-96' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-76' bgs, per drillers	4" LC Steel Casing (0'-100' bgs)
			5			
			6			2' Fine Sand (96'-98' bgs)
			7		Shakopee Dolostone from 76'-110' bgs, per drillers	
			8			Sand filter pack (98'-110' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 110' bgs, no refusal	Screened interval (0.010" slot) (100'-110' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. OW7S-3 [877389]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 110 FT BGS			
GROUND SURFACE ELEVATION: 881.854 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1600
COMMENTS: Northing: 4979343.262 Easting: 511154.198	DATE		DATE / DATE
	CASING DEPTH		08/24/22 / 08/24/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 110' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-96' bgs)
			2			
			3			
			4		Unconsolidated Material from 0'-74' bgs, per drillers	4" LC Steel Casing (0'-100' bgs)
			5			
			6			2' Fine Sand (96'-98' bgs)
			7		Shakopee Dolostone from 74'-110' bgs, per drillers	
			8			Sand filter pack (98'-110' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 110' bgs, no refusal	Screened interval (0.010" slot) (100'-110' bgs)
			14			

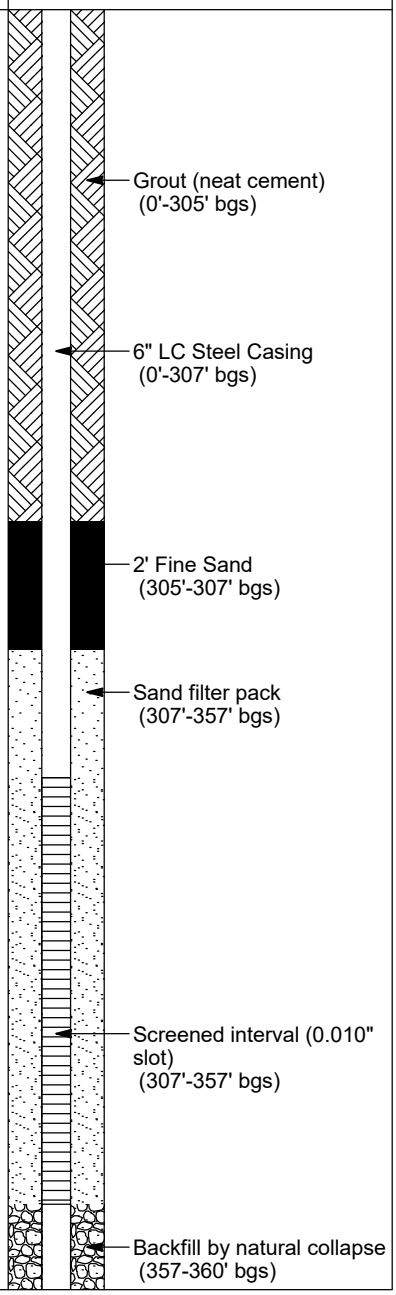
ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PW20J-1 [860281]
LOGGED BY: AS/GG	CHECKED BY: BK		SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 358 FT BGS			
GROUND SURFACE ELEVATION: 963.657 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1830
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980727.743 Easting: 505379.286	DATE		DATE 09/23/21 / DATE 09/29/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 358' bgs, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-305' bgs)
			3		Unconsolidated Material from 0'-51' bgs, per drillers	
			4			6" LC Steel Casing (0'-307' bgs)
			5		St. Peter Sandstone from 51'-164' bgs, per drillers	
			6			2' Fine Sand (305'-307' bgs)
			7		Prairie du Chien from 164'-299' bgs, per drillers	
			8			Sand filter pack (307'-357' bgs)
			9		Jordan Sandstone from 299'-360' bgs, per drillers	
			10			
			11			
			12			Screened interval (0.010" slot) (307'-357' bgs)
			13		E.O.B. @ 360' bgs, no refusal	
			14			Backfill by natural collapse (357-360' bgs)



ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PW20S-1 [867656]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 250 FT BGS			
GROUND SURFACE ELEVATION: 964.953 FT AMSL	WATER LEVEL		TIME 0900 / TIME 1500
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980728.458 Easting: 505374.652	DATE		DATE 09/12/22 / DATE 09/13/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 250' bgs, 252'-260' bgs natural collapse, 250'-252' bgs seal, well log abbreviated - see well diagram for accurate depths	
			2			Grout (neat cement) (0'-196' bgs)
			3			
			4		Unconsolidated Material from 0'-51' bgs, per drillers	6" LC Steel Casing (0'-200' bgs)
			5			
			6			2' Fine Sand (196'-198' bgs)
			7		St. Peter Sandstone from 51'-164' bgs, per drillers	
			8			Sand filter pack (198'-250' bgs)
			9			
			10		Shakopee Dolostone from 164'-250' bgs, per drillers	
			11			
			12			
			13		E.O.B. @ 250' bgs, 252'-260' bgs natural collapse, 250'-252' bgs seal, no refusal	Screened interval (0.010" slot) (200'-250' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PW5J-1 [854555]
LOGGED BY: CK / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 280 FT BGS			
GROUND SURFACE ELEVATION: 927.972 FT AMSL	WATER LEVEL		TIME 0730 / TIME 1845
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980878.492 Easting: 508645.676	DATE		DATE 07/14/21 / DATE 07/15/21
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 280' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-226' bgs)
			2			
			3		Unconsolidated Material from 0'-77' bgs, per drillers	
			4			6" LC Steel Casing (0'-210' bgs)
			5		Prairie du Chien from 77'-218' bgs, per drillers	
			6			2' Fine Sand (226'-228' bgs)
			7		Coon Valley Sandy Dolomite from 218'-222' bgs, per drillers	
			8			Sand filter pack (228'-280' bgs)
			9		Jordan Sandstone from 222'-280' bgs, per drillers	
			10			
			11			
			12			
			13		E.O.B. @ 280' bgs, no refusal	Screened interval (0.010" slot) (230'-280' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PW7S-1 [877386]
LOGGED BY: GG / CHECKED BY: BK			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 150 FT BGS			
GROUND SURFACE ELEVATION: 885.073 FT AMSL	WATER LEVEL		TIME 0950 / TIME 1745
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979424.297 Easting: 511237.706	DATE		DATE 07/11/22 / DATE 07/12/22
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			1		Blind drill to 150' bgs, well log abbreviated - see well diagram for accurate depths	Grout (neat cement) (0'-96' bgs)
			2			
			3		Unconsolidated Material from 0'-74' bgs, per drillers	
			4			4" LC Steel Casing (0'-100' bgs)
			5		Weathered Shakopee from 74'-78' bgs, per drillers	
			6			2' Fine Sand (96'-98' bgs)
			7		Shakopee from 78'-150' bgs, per drillers	
			8			Sand filter pack (98'-150' bgs)
			9			
			10			
			11			
			12			
			13		E.O.B. @ 150' bgs, no refusal	Screened interval (0.010" slot) (100'-150' bgs)
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 1 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START: 0700 FINISH: 1830
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 13' bgs	CL	0–5		CLAY, low plasticity, low density, organics; dry, 10YR 4/4, large cobble @ 3'	
			3–5		SANDY CLAY, low plasticity, high density, sand, fine to coarse (20% fine, 35% medium, 37% coarse), subrounded, gravel (5%), subangular to subrounded, silt (3%); dry, 10YR 4/3	
			5–10		SANDY CLAY, low plasticity, medium density, sand, fine to coarse (15% fine, 35% medium, 40% coarse), subangular to subrounded, gravel (10%), fine to medium); 10YR 4/3	Grout (neat cement) (0'-86' bgs)
		SW	10–12		SAND, fine to coarse (20% fine, 30% medium, 37% coarse), subangular to subrounded, well graded, gravel, fine to coarse (3% fine, 5% medium, 2% coarse), silt (3%); 7.5YR 4/3	4" LC Steel Casing (0'-90' bgs)
		CL	12–13		SANDY CLAY, medium plasticity, low density, sand, fine to coarse (7% fine, 7% medium, 10% coarse); dry, 7.5YR 3/3	
		Os	13–14		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), subangular to subrounded, iron staining (2%); 10YR 7/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 2 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	16		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), subangular to subrounded, iron staining (2%); 10YR 7/1	Grout (neat cement) (0'-86' bgs)
			17			
			18		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), subangular to subrounded, iron staining (7%); 10YR 7/4	
			19		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), subangular to subrounded; WHITE 7.5YR 8.5/1	
			20		SANDSTONE, poorly cemented, fine to medium (25% fine, 75% medium), subangular to subrounded, iron staining (2%); 5Y 7/1, 1" band @ 21' 5Y 7/3	
			21		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subangular to subrounded; 5Y 6/4	
			22			
			23		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subangular to subrounded, iron staining (1%); 10YR 8/1	
			24		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; N 8.5	
			25		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subangular to subrounded; 10YR 7/8	4" LC Steel Casing (0'-90' bgs)
			26		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subangular to subrounded; 10YR 7/2	
			27			
			28		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; 10YR 8/4	
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML / CHECKED BY: BK			SHEET 3 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	31		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; 10YR 8/4	
			32		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; 10YR 6/6	
			33			
			34			
			35		SANDSTONE, poorly cemented, fine to medium (40% fine, 60% medium), subangular to subrounded; 10YR 7/6	Grout (neat cement) (0'-86' bgs)
			36			
			37			
			38		SANDSTONE, poorly cemented, fine to medium (40% fine, 60% medium), subangular to subrounded; 10YR 7/3	
			39			
			40		SANDSTONE, poorly to moderately cemented, fine to medium (50% fine, 50% medium), subangular to subrounded; GLEY1 8/10Y	4" LC Steel Casing (0'-90' bgs)
			41			
			42			
			43			
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 4 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SANDSTONE, poorly to moderately cemented, fine to medium (50% fine, 50% medium), subangular to subrounded; GLEY1 8/10Y	
			47		SANDSTONE, poorly to moderately cemented, fine to medium (50% fine, 50% medium), subangular to subrounded, iron staining (7%); 10YR 7/2	
			48		SANDSTONE, poorly to moderately cemented, fine to medium (45% fine, 55% medium), subangular to subrounded, iron staining (10%); 10YR 7/6	
			49			
			50		SANDSTONE, poorly to moderately cemented, fine to medium (45% fine, 55% medium), subrounded; 10YR 7/1	Grout (neat cement) (0'-86' bgs)
		Os	51			
			52			
			53			
			54		SANDSTONE, poorly cemented, fine to medium (50% fine, 50% medium), subrounded; 5Y 7/3	
			55			4" LC Steel Casing (0'-90' bgs)
			56		SANDSTONE, poorly cemented, fine to medium (55% fine, 45% medium); 5Y 7/1	
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 5 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	61		SANDSTONE, poorly to moderately cemented, fine to medium (60% fine, 40% medium), subrounded; 5Y 7/1	Grout (neat cement) (0'-86' bgs)
			66		SANDSTONE, poorly to moderately cemented, fine to medium (65% fine, 35% medium), subrounded, iron staining (3%); 5Y 8/1	
			70		SANDSTONE, moderately to well cemented, fine to medium (70% fine, 30% medium), subrounded, iron staining (5%); 2.5Y 7/2	4" LC Steel Casing (0'-90' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 6 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	76		SANDSTONE, poorly to moderately cemented, fine to medium (70% fine, 30% medium), iron staining (2%); 2.5Y 7/3	
			77			
			78			
			79			
			80		SANDSTONE, moderately to well cemented, fine to medium (80% fine, 20% medium), subrounded, iron staining (5%); 2.5Y 7/2	Grout (neat cement) (0'-86' bgs)
			81			
			82			
			83			
			84			
			85		SANDSTONE, moderately cemented, fine to medium (80% fine, 20% medium), subrounded; 2.5Y 7/2	4" LC Steel Casing (0'-90' bgs)
			86			
			87			2' Fine Sand (86'-88' bgs)
			88			
			89			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-1 [867661]
LOGGED BY: GG/ML	CHECKED BY: BK		SHEET 7 OF 7
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 100 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0700 / 1830
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/22/22 / 09/22/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	91		SANDSTONE, moderately to well cemented, fine to medium (85% fine, 15% medium), subrounded; 7.5YR 7/1	
			92			
			93		SANDSTONE, moderately to well cemented, fine to medium (85% fine, 15% medium), subrounded; 10YR 7/1	
			94			Sand filter pack (88'-100' bgs)
			95			
			96		SANDSTONE, moderately to well cemented, fine to medium (90% fine, 10% medium), subrounded; 2.5Y 7/2	
			97		SANDSTONE, moderately cemented, fine to medium (90% fine, 10% medium), subrounded, massive iron staining; 2.5Y 7/1 to 5YR 6/3	Screened interval (0.010" slot) (90'-100' bgs)
			98		SANDSTONE, poorly cemented, fine to medium (90% fine, 10% medium), subrounded; 10YR 6/1	
			99		SANDSTONE, moderately to well cemented, fine to medium (95% fine, 5% medium), subrounded, massive iron staining; 10YR 6/4 to 5YR 5/8	
			100		E.O.B. @ 100' bgs, no refusal	
			101			
			102			
			103			
			104			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-2 [867662]
LOGGED BY: AS/ML	CHECKED BY: BK		SHEET 1 OF 4
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 50 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1430 / 1630
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/20/22 / 09/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0		TOPSOIL, silt with grass; dry, 10YR 4/6	
		SC	1–5		CLAYEY SAND, fine to medium (60% fine, 25% medium), clay (10%), gravel, fine (3%), subangular; 10YR 4/6	Grout (neat cement) (0'-36' bgs)
			5		SANDY CLAY, sand, fine (15%), gravel, fine (5%), subangular; 10YR 3/4	
		CL	9		SANDY CLAY, sand, fine (10%), black sandy organics (10%), gravel (5%), fine, subangular; 10YR 3/4	
			10		SANDY CLAY, sand, fine (15%), gravel, fine (10%), subangular; moist, 10YR 4/4	4" LC Steel Casing (0'-40' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-2 [867662]
LOGGED BY: AS/ML	CHECKED BY: BK		SHEET 2 OF 4
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 50 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1430 / 1630
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/20/22 / 09/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 25' bgs	CL	16		SANDY CLAY, sand, fine (15%), gravel, fine (10%), subangular; moist, 10YR 4/4	
		SM	16		SILTY SAND, sand, medium (60%), gravel, coarse (10%); 10YR 4/4	
		CL	17		SANDY CLAY, sand, fine to medium (15% fine, 5% medium), gravel, fine to medium (3% fine, 7% medium), subangular; moist, 10YR 4/3	
			18			
			19			
			20			Grout (neat cement) (0'-36' bgs)
			21			
			22			
			23			
			24			
			25			4" LC Steel Casing (0'-40' bgs)
		Os	25		SANDSTONE, poorly cemented, fine (100%); moist, 2.5Y 8/1	
			26			
			27			
			28			
			29			
			29		SANDSTONE, poorly cemented, fine (100%), iron staining (10%); moist, 2.5Y 7/6	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-2 [867662]
LOGGED BY: AS/ML	CHECKED BY: BK		SHEET 3 OF 4
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 50 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1430 / 1630
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/20/22 / 09/20/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	31–33		SANDSTONE, poorly cemented, fine to medium (30% fine, 70% medium), subangular to subrounded; 2.5Y 8/2	Grout (neat cement) (0'-36' bgs)
			33–37		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; 2.5Y 7/4	4" LC Steel Casing (0'-40' bgs)
			37–40		SANDSTONE, poorly cemented, fine to medium (35% fine, 65% medium), subangular to subrounded; 2.5Y 8/2	2' Fine Sand (36'-38' bgs)
			40–44		SANDSTONE, poorly cemented, fine to medium (40% fine, 60% medium), subangular to subrounded; 2.5Y 8/2	Sand filter pack (38'-50' bgs); Screened interval (0.010" slot) (40'-50' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-2 [867662]
LOGGED BY: AS/ML	CHECKED BY: BK		SHEET 4 OF 4
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 50 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 1430 / TIME 1630
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE 09/20/22 / DATE 09/20/22
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	46–49		SANDSTONE, poorly cemented, fine to medium (40% fine, 60% medium), subangular to subrounded; 2.5Y 8/2	Sand filter pack (38'-50' bgs); Screened interval (0.010" slot) (40'-50' bgs)
			50		E.O.B. @ 50' bgs, no refusal	
			51–59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-3 [867663]
LOGGED BY: ML / CHECKED BY: BK			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1630
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/19/22 / 09/19/22

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0		TOPSOIL, silt with grass; 10YR 5/4	
			1		SILTY CLAY, silt (10%), friable; dry, 10YR 5/4	
			2			
			3			
			4			
		CL	5		SILTY CLAY, silt (5%), friable; dry, 10YR 5/4	Grout (neat cement) (0'-31' bgs)
			6			
			7			
			8			
			9		SANDY CLAY, sand (15%), gravel (5%), coarse, subangular, soft; moist, 10YR 5/6	
		GW	10		GRAVEL, medium to coarse, silt (10%); 10YR 5/6	4" LC Steel Casing (0'-35' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-3 [867663]
LOGGED BY: ML / CHECKED BY: BK			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1300 / 1630
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: Easting:	DATE		DATE: 09/19/22 / 09/19/22
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		GW	16–18		GRAVEL, medium to coarse, silt (10%); 10YR 5/6	
		SM	18–20		SILTY SAND, fine to medium (20%), gravel, fine to medium (10% fine, 1% medium), subangular; moist, 10YR 4/5	Grout (neat cement) (0'-31' bgs)
		CL	20–26		SANDY CLAY, sand, medium (20%), gravel, medium (10%), subangular; 10YR 4/3	4" LC Steel Casing (0'-35' bgs)
	St. Peter Fm. @ 29' bgs		26–29		SANDY CLAY, sand, fine to medium (20% fine, 5% medium), subangular; moist, 10YR 4/4	
		Os	29		SANDSTONE, poorly cemented, fine (100%); 2.5Y 8/1	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZH-3 [867663]
LOGGED BY: ML / CHECKED BY: BK			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1300 / 1630
COMMENTS: Northing: Easting:	DATE		DATE / DATE
	CASING DEPTH		09/19/22 / 09/19/22

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	31		SANDSTONE, poorly cemented, fine (100%), iron staining (5%); moist, 2.5Y 8/1	Grout (neat cement) (0'-31' bgs) 4" LC Steel Casing (0'-35' bgs) 2' Fine Sand (31'-33' bgs)
			32			
			33			
			34			
			35		SANDSTONE, poorly cemented, gravel, fine (2%) to medium (3%), iron staining (5%); wet, 2.5Y 8/1	Screened interval (0.010" slot) (35'-40' bgs)
			36			
			37			Sand filter pack (33'-40' bgs)
			38			
			39			
			40		E.O.B. @ 40' bgs, no refusal	
			41			
			42			
			43			
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_2ND_HALF.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZAD [854537]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 26 FT BGS			
GROUND SURFACE ELEVATION: 904.450 FT AMSL	WATER LEVEL		TIME: 1200 / 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980894.419 Easting: 506429.42	DATE		DATE: 10-22-20 / 10-22-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–10		SAND, fine (95%), poorly graded, trace gravel (fine), sub-rounded; dry, 5YR 4/4.	Grout (neat cement) (0'-16' bgs)
			10		SAND, fine to medium (fine 50%, medium 45%), trace gravel (fine 5%); dry, 10YR 4/4.	2" Black Iron Casing (0'-21' bgs)
		ML	10–14		SILT, with sand (fine 10%); wet, 10YR 4/4.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZAD [854537]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 26 FT BGS			
GROUND SURFACE ELEVATION: 904.450 FT AMSL	WATER LEVEL		TIME 1200 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980894.419 Easting: 506429.42	DATE		DATE 10-22-20 / DATE 10-22-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16		SILT, with sand (fine 10%); wet, 10YR 4/4.	Grout (neat cement) (0'-16' bgs)
		SP	17–21		SAND, fine to medium (fine 50%, medium 20%), poorly graded, with gravel (coarse 30%); wet, 10YR 4/4.	3/8" Bentonite Chips (16'-18' bgs); 2" Black Iron Casing (0'-22' bgs)
		ML	21–23		SILT, with clay (40%), trace gravel (fine 5%); wet, 10YR 4/4.	Sand filter pack (18'-27' bgs)
		SW	23–27		SAND, fine to coarse (fine 50%, medium 10%, coarse 10%), well graded, with gravel (fine 10%, medium 10%, coarse 10%), sub-rounded; wet, 10YR 3/2.	2" Stainless Steel Screen (22'-27' bgs)
			27		E.O.B. @ 27' bgs, no refusal	
			28–29			

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZAS [854536]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 16 FT BGS			
GROUND SURFACE ELEVATION: 904.801 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1430 / 1700
COMMENTS: Northing: 4980897.009 Easting: 506431.288	DATE		DATE / DATE
	CASING DEPTH		10-21-20 / 10-21-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	1–10		SAND, fine (95%), poorly graded, trace gravel (fine 5%), sub-rounded; moist, 5YR 4/4. Poor recovery from 5'-10' bgs.	Grout (neat cement) (0'-3' bgs) 2" Black Iron Casing (0'-6' bgs) 3/8" Bentonite Chips (3'-4.5' bgs)
		ML	10–12		SILT, with fine sand (10%); 10YR 4/4.	2" Stainless Iron Screen (6'-17' bgs)
		SW	12–14		SAND, fine to coarse (fine 30%, medium 15%, coarse 20%), with gravel (medium 15%, coarse 20%); wet, 10YR 4/4.	Sand filter pack (4.5'-17' bgs)

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZAS [854536]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 16 FT BGS			
GROUND SURFACE ELEVATION: 904.801 FT AMSL	WATER LEVEL		TIME 1430 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980897.009 Easting: 506431.288	DATE		DATE 10-21-20 / DATE 10-21-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 30%, medium 15%, coarse 20%), with gravel (medium 15%, coarse 20%); wet, 10YR 4/4.	Sand filter pack (4.5'-17' bgs) 2" Stainless Steel Screen (7'-17' bgs)
			17		E.O.B. @ 17' bgs, no refusal	
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. PZBD [854539]	
LOGGED BY: SW	CHECKED BY: JM						SHEET 1 OF 2	
DRILLING CONTR.: Traut								
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags				DRILLING	
BORING DEPTH: 21 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 897.830 FT AMSL			WATER LEVEL	3.0'	2.6		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1400	1500		1300	1500
COMMENTS: Northing: 4981032.677 Easting: 506654.836			DATE	10-26-20	10-26-20		DATE	DATE
			CASING DEPTH				10-26-20	10-26-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	1		SILT, with organic matter and roots (10%), with sand (fine 10%); moist, 10YR 3/2.	
		CH	4		CLAY, high plasticity; wet, GLEY 2 5/10B.	
		SW	10		SAND, fine to coarse (fine 60%, medium 20%, coarse 20%), well graded; wet, 10YR 4/4. Standing water in hole at 3'bgs.	Grout (neat cement) (0'-11' bgs)
			14		SAND, fine to coarse (fine 40%, medium 20%, coarse 20%), with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; wet, 10YR 4/4.	2" Black Iron Casing (0'-16' bgs) 3/8" Bentonite Chips (11'-13' bgs) Sand filter pack (13'-21' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. PZBD [854539]	
LOGGED BY: SW	CHECKED BY: JM						SHEET 2 OF 2	
DRILLING CONTR.: Traut								
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags				DRILLING	
BORING DEPTH: 21 FT BGS							START	FINISH
GROUND SURFACE ELEVATION: 897.830 FT AMSL			WATER LEVEL	3.0'	2.6		TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1400	1500		1300	1500
COMMENTS: Northing: 4981032.677 Easting: 506654.836			DATE	10-26-20	10-26-20		DATE	DATE
			CASING DEPTH				10-26-20	10-26-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–19		SAND, fine to coarse (fine 40%, medium 20%, coarse 20%), with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; wet, 10YR 4/4.	2" Black Iron Casing (0'-16' bgs) Sand filter pack (13'-21' bgs) 2" Stainless Steel Screen (16'-21' bgs)
		ML	20		SILT, dense, with sand (fine 20%); wet, 10YR 4/4. SILT, dense, with sand (fine 20%); wet, 10YR 4/2.	
			21		E.O.B. @ 21' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZBS [854538]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 1 OF 1	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 11 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 897.790 FT AMSL			WATER LEVEL	2.8'				TIME 1500	TIME 1730
DATUM: NAD 83 UTM 15 (meters)			TIME	1700					
COMMENTS: Northing:4981030.104 Easting: 506653.955			DATE	10-26-20				DATE 10-26-20	DATE 10-26-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	1		SILT, with organic matter and roots (10%), with sand (fine 10%); moist, 10YR 3/2.	
		CH	2		CLAY, high plasticity; wet, GLEY 2 5/10B.	Grout (neat cement) (0'-3' bgs) 2" Black Iron Casing (0'-6' bgs) 3/8" Bentonite Chips (3'-4.5' bgs)
		SW	5		SAND, fine to coarse (fine 50%, medium 20%, coarse 20%), well graded, with gravel (fine 5%, medium 5%), sub-angular to sub-rounded; wet, 10YR 4/4.	Sand filter pack (4.5'-11' bgs) 2" Stainless Steel Screen (6'-11' bgs)
			11		E.O.B. @ 11' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Son					BORING NO. PZCD [854541]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 1 OF 2	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 21 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 895.950 FT AMSL			WATER LEVEL	1.2				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1500				0800	1445
COMMENTS: Northing: 4980856.886 Easting: 506897.387			DATE	10-27-20				DATE	DATE
			CASING DEPTH					10-27-20	10-27-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–1		SAND, fine (60%), poorly graded, with organic matter and roots (40%); wet, 10YR 2/1.	
		SM	1–2		SILTY SAND, fine to medium (fine 60%, medium 20%), silt (20%); moist, 10YR 3/3.	
		SM	2–3		SILTY SAND, fine to medium (fine 50%, medium 20%), silt (20%), with gravel (fine 5%, medium 5%), sub-angular to sub-rounded; moist, 10YR 3/3.	
		SC	3–4		CLAYEY SAND, fine (50%), clay (30%), silt (20%); wet, 7.5YR 4/4.	
		SC	4–6			Grout (neat cement) (0'-11' bgs)
		SW	6–9		SAND, fine to coarse (fine 60%, medium 15%, coarse 15%), well graded, with silt (10%); wet, 10YR 3/3.	
		SW	9–12		SAND, fine to coarse (fine 25%, medium 25%, coarse 30%), well graded, with gravel (20%), sub-rounded; wet, 10YR 4/3.	2" Black Iron Casing (0'-16' bgs) 3/8" Bentonite Chips (11'-13' bgs)
		SW	12–14		SAND, fine to coarse (fine 45%, medium 15%, coarse 15%), well graded, with gravel (fine 15%, medium 10%), sub-angular to sub-rounded; wet, 10YR 4/3.	Sand filter pack (13'-21' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Son		BORING NO. PZCD [854541]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 21 FT BGS			
GROUND SURFACE ELEVATION: 895.950 FT AMSL	WATER LEVEL: 1.2		TIME: 0800 / 1445
DATUM: NAD 83 UTM 15 (meters)	TIME: 1500		
COMMENTS: Northing: 4980856.886 Easting: 506897.387	DATE: 10-27-20		DATE: 10-27-20 / 10-27-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–17		SAND, fine to coarse (fine 45%, medium 15%, coarse 15%), well graded, with gravel (fine 15%, medium 10%), sub-angular to sub-rounded; wet, 10YR 4/3.	2" Black Iron Casing (0'-16' bgs); Sand filter pack (13'-21' bgs)
		SC	18–19		CLAYEY SAND, fine 60%, clay (35%), trace silt (5%); wet, 10YR 4/2.	2" Stainless Steel Screen (16'-21' bgs)
		SW	19–21		SAND, fine to coarse (fine 20%, medium 20%, coarse 35%), well graded, with gravel (fine 5%, medium 10%, coarse 10%), sub-angular to sub-rounded; wet, 10YR 4/2.	
			21		E.O.B. @ 21' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZCS [854540]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 11 FT BGS			
GROUND SURFACE ELEVATION: 896.301 FT AMSL	WATER LEVEL: 1.5'		TIME: 1500 / 1600
DATUM: NAD 83 UTM 15 (meters)	TIME: 1600		
COMMENTS: Northing: 4980856.009 Easting: 506900.322	DATE: 10-27-20		DATE: 10-27-20 / 10-27-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0–1		SAND, fine (70%), poorly graded, with organic matter and roots (30%); moist, 10YR 2/1.	
		SM	1–2		SILTY SAND, fine to medium (fine 60%, medium 20%), silt (20%); moist, 10YR 2/2.	Grout (neat cement) (0'-3' bgs)
		SM	2–3		SILTY SAND, fine to medium (fine 50%, medium 20%), silt (20%), with gravel (fine 5%, medium 5%), sub-angular to sub-rounded; moist, 10YR 3/3.	2" Black Iron Casing (0'-6' bgs)
		SM	3–4		SILTY SAND, fine (60%), silt (35%), trace clay (5%); wet, 7.5YR 4/4.	3/8" Bentonite Chips (3'-4.5' bgs)
		SM	4–5			
		SM	5–6			
		SW	6–7		SAND, fine to coarse (fine 60%, medium 15%, coarse 15%), well graded, silt (10%); wet, 10YR 3/3.	Sand filter pack (4.5'-11' bgs)
		SW	7–8			
		SW	8–9			2" Stainless Steel Screen (6'-11' bgs)
		SW	9–10		SAND, fine to coarse (fine 40%, medium 20%, coarse 30%), well graded, with gravel (fine 3%, medium 4%, coarse 3%), sub-rounded; wet, 10YR 4/3.	
		SW	10–11			
			11		E.O.B. @ 11' bgs, no refusal	
			12–14			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZDD [854545]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 1 OF 3	
DRILLING CONTR.: Traut									
DRILLER: Dan Karasch	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 40 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 919.611 FT AMSL			WATER LEVEL	23.7'				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1200				1640	1100
COMMENTS: Northing: 4980638.66 Easting: 507422.287			DATE	10-28-20				DATE	DATE
			CASING DEPTH					10-27-20	10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	0–4		CLAY, medium plasticity, with organic matter (25%), with sand (fine 25%); moist, 10YR 3/3. CLAY, medium plasticity, with sand (fine 10%); moist, 10YR 4/4.	
		SW	4–6		SAND, fine to coarse (fine 30%, medium 10%, coarse 15%), well graded, with gravel (fine 10%, medium 10%, coarse 25%), sub-angular to sub-rounded; moist, 10YR 4/6.	Grout (neat cement) (0'-30' bgs)
		SM	6–7		SILTY SAND, fine to medium (fine 50%, medium 15%), silt (25%), with gravel (fine 10%), sub-rounded; moist, 10YR 4/6.	
		SP	7–9		SAND, fine (95%), poorly graded, trace gravel (fine 5%), sub-rounded; moist, 10YR 4/3.	
		SM	9–10		SILTY SAND, fine (80%), silt (20%); moist, 10YR 4/3.	
		SM	10–14		SILTY SAND, fine (60%), silt (20%), with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; moist, 10YR 4/4.	2" Black Iron Casing (0'-35' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZDD [854545]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 919.611 FT AMSL	WATER LEVEL: 23.7'		TIME: 1640 / 1100
DATUM: NAD 83 UTM 15 (meters)	TIME: 1200		
COMMENTS: Northing: 4980638.66 Easting: 507422.287	DATE: 10-28-20		DATE: 10-27-20 / 10-28-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	16		SILTY SAND, fine (60%), silt (20%), with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; moist, 10YR 4/4.	
			16–22		SAND, fine to coarse (fine 50%, medium 25%, coarse 10%) well graded, with gravel (fine 5%, medium 5%, coarse 5%), sub-angular to sub-rounded; moist, 10YR 6/6.	Grout (neat cement) (0'-30' bgs)
		SW	22–24		SAND, fine to coarse (fine 25%, medium 25%, coarse 25%), well graded, with gravel (fine 10%, medium 10%, coarse 5%), sub-rounded; moist; 10YR 6/6.	
			24–25		SAND, fine to coarse (fine 25%, medium 25%, coarse 25%), well graded, with gravel (fine 10%, medium 10%, coarse 5%), sub-rounded; wet; 10YR 6/6.	2" Black Iron Casing (0'-35' bgs)
			25–29		SAND, fine to coarse (fine 50%, medium 15%, coarse 15%), well graded, with gravel (fine 10%, medium 10%), sub-angular to sub-rounded, 3" diameter cobbles at 25.5' bgs; wet, 10YR4/4.	
			29		SAND, fine to coarse (fine 15%, medium 15%,	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZDD [854545]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 3 OF 3	
DRILLING CONTR.: Traut									
DRILLER: Dan Karasch	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 40 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 919.611 FT AMSL			WATER LEVEL	23.7'				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1200				1640	1100
COMMENTS: Northing: 4980638.66 Easting: 507422.287			DATE	10-28-20				DATE	DATE
			CASING DEPTH					10-27-20	10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		coarse 35%), well graded, with gravel (fine 5%, medium 5%, coarse 15%), sub-angular to sub-rounded; wet, 10YR 3/3.	3/8" Bentonite Chips (30'-32' bgs)
			32			2" Black Iron Casing (0'-35' bgs)
			33		SAND, fine to coarse (fine 30%, medium 20%, coarse 25%), with gravel (fine 5%, medium 10%, coarse 10%); wet, 10YR 4/6.	Sand filter pack (32'-40' bgs)
		SW	34			
			35			
			36			
			37			2" Stainless Steel Screen (35'-40' bgs)
			38			
			39			
			40		E.O.B. @ 40' bgs, no refusal	
			41			
			42			
			43			
			44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZDS [854544]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 1 OF 2	
DRILLING CONTR.: Traut									
DRILLER: Dan Karasch	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 30 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 919.890 FT AMSL			WATER LEVEL	24.1'				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1415				1150	1400
COMMENTS: Northing: 4980636.259 Easting: 507423.861			DATE	10-28-20				DATE	DATE
			CASING DEPTH					10-28-20	10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	1–2		CLAY, medium plasticity, with organic matter and roots (25%), with sand (fine 25%); moist 10YR 4/4. CLAY, medium plasticity, with sand (fine 10%); moist, 10YR 4/4.	
		SW	3–5		SAND, fine to coarse (fine 10%, medium 20%, coarse 20%), well graded, with gravel (fine 15%, medium 10%, coarse 10%), with cobbles (15%), sub-angular to sub-rounded; moist, 7.5YR 4/6.	Grout (neat cement) (0'-15' bgs)
		SM	6–8		SILTY SAND, fine (50%), silt (25%), gravel (coarse 20%), trace cobbles (5%); moist, 7.5YR 4/6.	
		SP	9		SAND, fine to medium (fine 70%, medium 25%), poorly graded, trace gravel (fine 5%), sub-rounded; moist, 10YR 5/4.	
		SM	10–12		SILTY SAND, fine (60%), silt (30%), with gravel (fine 5%, medium 5%), sub-rounded; moist, 10YR 4/4.	2" Black Iron Casing (0'-20' bgs)
		SW	13–14		SAND, fine to coarse (fine 35%, medium 35%, coarse 15%), well graded, with gravel (fine 5%, medium 5%, coarse 5%), sub-angular to sub-rounded; moist, 10YR 6/6.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN				
PROJECT: Project 1007			DRILLING METHOD: Sonic				BORING NO. PZDS [854544]	
LOGGED BY: SW	CHECKED BY: JM						SHEET 2 OF 2	
DRILLING CONTR.: Traut								
DRILLER: Dan Karasch	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags				DRILLING START	DRILLING FINISH
BORING DEPTH: 30 FT BGS								
GROUND SURFACE ELEVATION: 919.890 FT AMSL			WATER LEVEL	24.1'			TIME 1150	TIME 1400
DATUM: NAD 83 UTM 15 (meters)			TIME	1415				
COMMENTS: Northing: 4980636.259 Easting: 507423.861			DATE	10-28-20			DATE 10-28-20	DATE 10-28-20
			CASING DEPTH					

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–19		SAND, fine to coarse (fine 35%, medium 35%, coarse 15%), well graded, with gravel (fine 5%, medium 5%, coarse 5%), sub-angular to sub-rounded; moist, 10YR 6/6.	3/8" Bentonite Chips (15'-17' bgs) 2" Black Iron Casing (0'-20' bgs)
		SW	20–22		SAND, fine to coarse (fine 10%, medium 15%, coarse 40%), well graded, with gravel (fine 15%, medium 10%, coarse 10%), 2"-4" cobbles @ 21.5' bgs, mottled; moist, 10YR 6/6.	
		SW	22		SAND fine to coarse (fine 20%, medium 30%, coarse 40%), well graded, with gravel (fine 5%, medium 5%); moist, 10YR 6/6.	
		SP	23		SAND, fine (100%), poorly graded; moist, 10YR 6/4.	
		SW	23–29		SAND, fine to coarse (fine 25%, medium 20%, coarse 25%), with gravel (fine 10%, medium 5%, coarse 5%), with cobbles (10%), sub-angular to sub-rounded; wet, 10YR 4/4. E.O.B. @ 30' bgs, no refusal	Sand filter pack (17'-30' bgs) 2" Stainless Steel Screen (20'-30' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZED [854527]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 21 FT BGS			
GROUND SURFACE ELEVATION: 895.950 FT AMSL	WATER LEVEL		TIME 0730 / TIME 1020
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980267.626 Easting: 507434.944	DATE		DATE 10-15-20 / DATE 10-15-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	1		TOPSOIL, organic matter (50%), with silt (30%), with sand (fine 15%), trace gravel (medium 5%), rounded; moist, 10YR 3/2.	
		SM	2		SILTY SAND, fine to coarse (fine 20%, medium 20%, coarse 20%), with gravel (medium 20%), sub-angular, silt (20%); very wet, 10YR 3/2.	
		ML	3		SILT, low plasticity, medium stiffness, with sand (fine 20%), with clay (15%); wet, 10YR 3/2.	
		SP	4–9		SAND, fine to medium (fine 50%, medium 35%), poorly graded, with gravel (fine 10%), sub-angular, trace silt (5%), soft; very wet, 10YR 3/1.	Grout (neat cement) (0'-11' bgs)
		ML	9		SANDY SILT, medium stiffness, sand (very fine 40%); wet, 10YR 3/3.	
		SW	10–11		SAND, fine to coarse (fine 35%, medium 25%, coarse 25%), well graded, with gravel (fine 10%), sub-angular, trace silt (5%); wet, 10YR 3/2.	2" Black Iron Casing (0'-16' bgs)
		SP	12		SAND, very fine (100%), poorly graded; wet, 10YR 3/2.	3/8" Bentonite Chips (11'-13' bgs)
		CL	12		CLAY, medium plasticity, with silt (20%), with sand (fine 20%); wet, 10YR 3/2.	
		SM	13		SILTY SAND, coarse (80%), silt (20%); wet, 10YR 3/2.	
		CL	13–14		CLAY, medium plasticity, trace sand (fine 5%), trace silt (5%); wet, 10YR 3/2.	Sand filter pack (13'-21' bgs)
		SW	14		SAND, fine to coarse (fine 25%, medium 30%, coarse 30%), with gravel (10%), rounded, trace silt (5%); wet, 10YR 3/2.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZED [854527]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 21 FT BGS			
GROUND SURFACE ELEVATION: 895.950 FT AMSL	WATER LEVEL		TIME 0730 / TIME 1020
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980267.626 Easting: 507434.944	DATE		DATE 10-15-20 / DATE 10-15-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–21		SAND, fine to coarse (fine 25%, medium 30%, coarse 30%), with gravel (10%), rounded, trace silt (5%); wet, 10YR 3/2.	2" Black Iron Casing (0'-16' bgs); Sand filter pack (13'-21' bgs); 2" Stainless Steel Screen (16'-21' bgs)
			21		E.O.B. @ 21' bgs, no refusal	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZES [854526]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 1
DRILLING CONTR.: Traut			
DRILLER: Dan Pflipsen / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 11 FT BGS			
GROUND SURFACE ELEVATION: 895.832 FT AMSL	WATER LEVEL		TIME: 1030 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980264.912 Easting: 507433.944	DATE		DATE: 10-15-20 / 10-15-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0–1		TOPSOIL, organic matter (50%), with silt (30%), with sand (fine 10%, medium 5%, coarse 5%); moist, 10YR 3/2.	
		SM	1–4		SILTY SAND, fine to coarse (fine 25%, medium 25%, coarse 20%), silt (15%), with gravel (15%), round to sub-rounded; moist 10YR 3/2.	Grout (neat cement) (0'-3' bgs) 2" Black Iron Casing (0'-6' bgs) 3/8" Bentonite Chips (3'-4.5' bgs)
		SW	4–5		SAND, fine to coarse (fine 20%, medium 20%, coarse 30%), well graded, with gravel (20%), sub-angular, with silt (10%); moist, 10YR 4/2.	
		ML	5–6		SILT, medium stiffness, with sand (fine 20%), with clay (10%); wet, 10YR 3/2.	
		SM	6–7		SILTY SAND, fine to coarse (fine 10%, medium 20%, coarse 35%), with gravel (medium 20%), silt (15%); wet, 10YR 3/2.	
		ML	7–8		SILT, soft, with sand (fine 25%); wet, 10YR 3/2.	
		SP	8–9		SAND, fine (90%), poorly graded, with gravel (fine 10%); wet, 10YR 3/2.	Sand filter pack (4.5'-11' bgs) 2" Stainless Steel Screen (6'-11' bgs)
		CL	9–11		CLAY, medium plasticity, with sand (fine 10%); wet, 10YR 3/2.	
			11		E.O.B. @ 11' bgs, no refusal	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZFD [854529]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 38 FT BGS			
GROUND SURFACE ELEVATION: 916.691 FT AMSL	WATER LEVEL		TIME 1415 / TIME 1740
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980074.839 Easting: 507313.915	DATE		DATE 10-15-20 / DATE 10-15-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		TOPSOIL, organic matter and roots (50%), with sand (fine 40%), with gravel (fine 3%, medium 4%, coarse 3%); dry, 10YR 5/6.	
			1		SAND, fine to coarse (fine 50%, medium 25%, coarse 10%), well graded, with gravel (fine 5%, medium 5%, coarse 5%); dry, 10YR 5/6.	
			2			
			3		SAND, fine to coarse (fine 15%, medium 15%, coarse 55%), well graded, with gravel (fine 10%, medium 5%), round to sub-rounded; dry, 10YR 4/4.	
			4			
			5			Grout (neat cement) (0'-28' bgs)
			6			
			7			
		SW	8			
			9		SAND, fine to coarse (fine 50%, medium 15%, coarse 10%), well graded, with gravel (fine 5%, medium 5%, coarse 5%), with cobbles (10%), round to sub-rounded; dry, 10YR 5/6.	
			10			2" Black Iron Casing (0'-33' bgs)
			11			
			12			
			13			
			14			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZFD [854529]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 38 FT BGS			
GROUND SURFACE ELEVATION: 916.691 FT AMSL	WATER LEVEL		TIME 1415 / TIME 1740
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980074.839 Easting: 507313.915	DATE		DATE 10-15-20 / DATE 10-15-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 50%, medium 15%, coarse 10%), well graded, with gravel (fine 5%, medium 5%, coarse 5%), with cobbles (10%), round to sub-rounded; dry, 10YR 5/6.	
		ML			SILT, medium stiffness, with sand (fine 10%); dry, 7.5YR 4/6.	
		SW	17		SAND, fine to coarse (fine 30%, medium 10%, coarse 10%), with gravel (fine 10%, medium 5%, coarse 5%), with cobbles (30%); dry, 10YR 5/6.	
			18			
		ML	19		SANDY SILT, loose, sand (fine 15%, medium 15%), with gravel (fine 10%, medium 5%, coarse 5%), with cobbles (20%); dry, 10YR 4/6.	
			20			Grout (neat cement) (0'-28' bgs)
		SW	21		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel (fine 5%, medium 5%), sub-angular; wet, 10YR 4/6.	
			22			
			23			
			24			
			25			2" Black Iron Casing (0'-33' bgs)
			26			
		ML	27		SILT, medium stiffness; wet, 10YR 4/4.	
		SW	28		SAND, fine to coarse (fine 50%, medium 20%, coarse 20%), well graded, with gravel (fine 5%, medium 5%); wet, 10YR 4/4.	
		ML			SILT, medium stiffness, with sand (fine 15%); wet, 10YR 4/4.	
		SW	29		SAND, fine to coarse (fine 70%, medium 15%, coarse 15%), well graded; wet, 10YR 4/4.	3/8" Bentonite Chips (28'-30' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZFD [854529]
LOGGED BY: SW / CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 38 FT BGS			
GROUND SURFACE ELEVATION: 916.691 FT AMSL	WATER LEVEL		TIME 1415 / TIME 1740
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980074.839 Easting: 507313.915	DATE		DATE 10-15-20 / DATE 10-15-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–34		SAND, fine to coarse (fine 15%, medium 15%, coarse 70%), well graded; very wet, 10YR 3/2 and 10YR 4/4.	Sand filter pack (38'-30' bgs)
			33–34		SAND, fine to coarse (fine 40%, medium 20%, coarse 40%), well graded; wet, 10YR 3/2 and 10YR 4/4.	
		SP	35–36		SAND, fine (100%), poorly graded; very wet, 10YR 4/4. SAND, fine (60%), poorly graded, with cobbles (25%), sub-angular, with gravel (medium 10%, coarse 5%); very wet, 10YR 4/4.	2" Stainless Steel Screen (33'-38' bgs)
		SM	37		SILTY SAND, fine to coarse (fine 10%, medium 15%, coarse 40%), with gravel (fine 10%, medium 5%, coarse 5%), round to sub-rounded, silt (15%); very wet, 10YR 4/4.	
			38		E.O.B. @ 38' bgs, no refusal	
			39–44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZFS [854528]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 28 FT BGS			
GROUND SURFACE ELEVATION: 917.170 FT AMSL	WATER LEVEL		TIME: 0730 / 1030
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4980072.222 Easting: 507313.716	DATE		DATE: 10-16-20 / 10-15-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		TOPSOIL, organic matter and roots (50%), with sand (fine 40%), with gravel (fine 5%, medium 5%), sub-angular; moist, 10YR 5/6.	
			1		SAND, fine to coarse (fine 50%, medium 20%, coarse 10%), with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; dry, 10YR 4/4.	
			2			
			3			
			4			
			5			Grout (neat cement) (0'-13' bgs)
			6			
			7			
		SW	8		SAND, fine to coarse (fine 45%, medium 10%, coarse 10%), with cobbles (20%), with gravel (15%), sub-rounded; dry, 10YR 5/6.	
			9			
			10			2" Black Iron Casing (0'-18' bgs)
			11			
			12			
			13			
			14			3/8" Bentonite Chips (13'-15' bgs)

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZFS [854528]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 28 FT BGS			
GROUND SURFACE ELEVATION: 917.170 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0730 / 1030
COMMENTS: Northing: 4980072.222 Easting: 507313.716	DATE		DATE / DATE
	CASING DEPTH		10-16-20 / 10-15-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16–18		SAND, fine to coarse (fine 30%, medium 10%, coarse 10%), with cobbles (30%), sub-angular, with gravel (fine 10%, medium 5%, coarse 5%); dry, 10YR 5/6.	2" Black Iron Casing (0'-18' bgs); Sand filter pack (15'-28' bgs)
		SP	19–21		SAND, fine to coarse (fine 60%, medium 10%, coarse 10%), with gravel (fine 10%, medium 5%, coarse 5%); dry, 10YR 5/6. SAND, fine to coarse (fine 5%, medium 15%, coarse 75%), poorly graded, trace gravel (fine 3%, medium 2%), sub-rounded; dry, 10YR 6/4.	
		SW	22–24		SAND, fine to coarse (fine 30%, medium 30%, coarse 40%), well graded; moist, 10YR 5/4. SAND, fine to coarse (fine 60%, medium 20%, coarse 20%), well graded; moist, 10YR 5/4.	2" Stainless Steel Screen (18'-28' bgs)
		SP	25		SAND, fine to coarse (fine 5%, medium 60%, coarse 35%), poorly graded; wet, 10YR 4/4.	
		SW	26–27		SAND, fine to coarse (fine 60%, medium 15%, coarse 15%), well graded, with gravel (10%), sub-rounded; wet, 10YR 4/6.	
			28		E.O.B. @ 28' bgs, no refusal	
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZGD [854531]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 910.900 FT AMSL	WATER LEVEL: 15.8'		TIME: 1000 / 1400
DATUM: NAD 83 UTM 15 (meters)	TIME: 1400		
COMMENTS: Northing: 4979696.972 Easting: 507375.839	DATE: 10-19-20		DATE: 10-19-20 / 10-19-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		TOPSOIL, organic matter and roots (80%), with sand (fine 20%); moist, 10YR 3/2.	
		CL	1		CLAY, medium plasticity, with sand (fine 10%); moist, 10YR 3/2.	
		SW	2–10		SAND, fine to coarse (fine 20%, medium 20%, coarse 50%), well graded, with gravel (10%), sub-rounded; moist, 10YR 4/4.	Grout (neat cement) (0'-30' bgs) 2" Black Iron Casing (0'-35' bgs)
		SP	11		SAND, coarse (80%), poorly graded, with gravel (20%), sub-rounded; moist, 10YR 3/2.	
		SW	12–14		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel (10%), sub-rounded; moist, 10YR 4/6.	
		ML			SILT, with sand (fine 15%), with gravel (10%),	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZGD [854531]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 2 OF 3	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 40 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 910.900 FT AMSL			WATER LEVEL	15.8'				TIME 1000	TIME 1400
DATUM: NAD 83 UTM 15 (meters)			TIME	1400					
COMMENTS: Northing: 4979696.972 Easting: 507375.839			DATE	10-19-20				DATE 10-19-20	DATE 10-19-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					sub-angular, trace clay (5%); moist, 10YR 4/6.	
		ML	16		SILT, with sand (fine 15%), with gravel (10%), sub-angular, trace clay (5%); moist, 10YR 4/6.	
			17		SILT, with sand (fine 15%), with gravel (10%), sub-angular, trace clay (5%); moist, 10YR 4/6.	
			18			
			19			
			20			Grout (neat cement) (0'-30' bgs)
			21			
			22			
			23			
			24		SILTY SAND, fine to medium (fine 40%, medium 10%), silt (40%), medium stiffness, with gravel (10%), sub-rounded; wet, 10YR 4/6.	
		SM	25			2" Black Iron Casing (0'-35' bgs)
			26			
			27			
			28		SAND, fine to medium (fine 30%, medium 20%), poorly graded, with cobbles (30%), sub-rounded, with gravel (fine 10%, medium 5%, coarse 5%), sub-rounded; wet, 10YR 4/6.	
		SP	29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZGD [854531]
LOGGED BY: SW / CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: 910.900 FT AMSL	WATER LEVEL: 15.8'		TIME: 1000 / 1400
DATUM: NAD 83 UTM 15 (meters)	TIME: 1400		
COMMENTS: Northing: 4979696.972 Easting: 507375.839	DATE: 10-19-20		DATE: 10-19-20 / 10-19-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–40		SAND, fine to coarse (fine 10%, medium 30%, coarse 20%), well graded, with gravel (20%), sub-rounded, with cobbles (20%); wet, 10YR 4/4.	3/8" Bentonite Chips (30'-32' bgs) 2" Black Iron Casing (0'-35' bgs) Sand filter pack (32'-40' bgs) 2" Stainless Steel Screen (35'-40' bgs)
			40		E.O.B. @ 40' bgs, no refusal	
			41–44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZGS [854530]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 30 FT BGS			
GROUND SURFACE ELEVATION: 910.500 FT AMSL	WATER LEVEL		TIME: 1430 / 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979693.615 Easting: 507376.26	DATE		DATE: 10-19-20 / 10-19-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		TOPSOIL, organic matter and roots (80%), with sand (fine 20%); moist, 10YR 3/2.	
		CL	1		CLAY, medium plasticity, with sand (fine 10%); moist, 10YR 4/4.	
		SW	2		SAND, fine to coarse (fine 20%, medium 20%, coarse 50%), well graded, with gravel (10%), sub-rounded; moist, 10YR 4/4.	Grout (neat cement) (0'-15' bgs)
			12		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel 10%, sub-rounded; moist, 10YR 4/6.	2" Black Iron Casing (0'-20' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZGS [854530]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 30 FT BGS			
GROUND SURFACE ELEVATION: 910.500 FT AMSL	WATER LEVEL		TIME 1430 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Northing: 4979693.615 Easting: 507376.26	DATE		DATE 10-19-20 / DATE 10-19-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel 10%, sub-rounded; moist, 10YR 4/6.	3/8" Bentonite Chips (15'-17' bgs)
					SILT, with gravel (10%), trace clay (5%), trace sand (fine 5%); moist, 10YR 4/6.	
			17			
			18			2" Black Iron Casing (0'-20' bgs)
			19			
		ML	20			
			21			Sand filter pack (17'-30' bgs)
			22			
			23			
			24		SILTY SAND, fine to medium (fine 40%, medium 10%), silt (40%), medium stiffness, with gravel (10%), sub-rounded; wet, 10YR 4/6.	
			25			2" Stainless Steel Screen (20'-30' bgs)
		SM	26			
			27			
			28		SAND, fine to coarse (fine 30%, medium 20%), poorly graded, with cobbles (30%), sub-rounded, with gravel (fine 10%, medium 5%, coarse 5%); wet, 10YR 4/6.	
		SP	29		E.O.B. @ 30' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZHD [854533]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 26 FT BGS			
GROUND SURFACE ELEVATION: 901.849 FT AMSL	WATER LEVEL: 6.0'		TIME: 0700 / 1000
DATUM: NAD 83 UTM 15 (meters)	TIME: 1000		
COMMENTS: Northing: 4979725.732 Easting: 506993.184	DATE: 10-20-20		DATE: 10-20-20 / 10-20-20
	CASING DEPTH:		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0–3		SILT, medium stiffness, with sand (fine 25%), mottled; dry, 10YR 5/3.	
		SP	3–9		SAND, fine to medium (fine 75%, medium 25%), poorly graded; moist, 7.5YR 4/4.	Grout (neat cement) (0'-16' bgs)
		SM	9–10		SILTY SAND, very fine (75%), silt (25%); moist, 7.5YR 4/4.	
		SM	10–13		SILTY SAND, very fine (75%), silt (25%); wet, 7.5YR 4/4.	2" Black Iron Casing (0'-21' bgs)
		SC	13–14		CLAYEY SAND, very fine (50%), clay (25%), with gravel (coarse 15%), with cobbles (10%); wet, 7.5YR 4/4.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZHD [854533]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 2 OF 2	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 26 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 901.849 FT AMSL			WATER LEVEL	6.0'				TIME 0700	TIME 1000
DATUM: NAD 83 UTM 15 (meters)			TIME	1000					
COMMENTS: Northing: 4979725.732 Easting: 506993.184			DATE	10-20-20				DATE 10-20-20	DATE 10-20-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	16–20		CLAYEY SAND, very fine (50%), clay (25%), with gravel (coarse 15%), with cobbles (10%); wet, 7.5YR 4/4.	Grout (neat cement) (0'-16' bgs) 3/8" Bentonite Chips (16'-18' bgs)
		SW	20–21		SAND, fine to coarse (fine 10%, medium 20%, coarse 30%), well graded, with gravel (fine 10%, medium 20%, coarse 10%), mottled; wet, 10YR 4/4.	2" Black Iron Casing (0'-21' bgs)
		ML	21–26		SILT, with sand (fine 25%), trace gravel (5%); moist, 10YR 4/4.	Sand filter pack (18'-26' bgs) 2" Stainless Steel Screen (21'-26' bgs)
			26		E.O.B. @ 26' bgs, no refusal	

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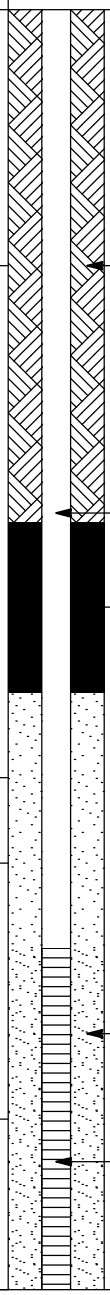
ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZHS [854532]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 16 FT BGS			
GROUND SURFACE ELEVATION: 901.101 FT AMSL	WATER LEVEL: 5.5'		TIME: 1010 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME: 1200		
COMMENTS: Northing: 4979724.443 Easting: 506996.072	DATE: 10-20-20		DATE: 10-20-20 / 10-20-20
	CASING DEPTH:		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION
		ML	0–3		SILT, medium stiffness, with sand (fine 25%), mottled; dry, 10YR 5/3.
		SP	3–9		SAND, fine to medium (fine 75%, medium 25%), poorly graded; moist, 7.5YR 4/4.
		SM	9–10		SILTY SAND, very fine (75%), silt (25%); moist, 7.5YR 4/4.
		SP	10–13		SAND, fine (100%), poorly graded; wet, 7.5YR 4/4.
		SC	13–14		CLAYEY SAND, fine (60%), clay (25%), with gravel (fine 15%); wet, 7.5YR 4/4.

WELL DIAGRAM



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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZHS [854532]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 16 FT BGS			
GROUND SURFACE ELEVATION: 901.101 FT AMSL	WATER LEVEL: 5.5'		TIME: 1010 / 1200
DATUM: NAD 83 UTM 15 (meters)	TIME: 1200		
COMMENTS: Northing: 4979724.443 Easting: 506996.072	DATE: 10-20-20		DATE: 10-20-20 / 10-20-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	16		CLAYEY SAND, fine (60%), clay (25%), with gravel (fine 15%); wet, 7.5YR 4/4.	Sand filter pack (8'-16' bgs)
					E.O.B. @ 16' bgs, no refusal	2" Stainless Steel Screen (11'-16' bgs)
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZID [854535]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 27 FT BGS			
GROUND SURFACE ELEVATION: 905.979 FT AMSL	WATER LEVEL: 9.2'		TIME: 0930 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME: 1120		
COMMENTS: Northing: 4980150.521 Easting: 506747.377	DATE: 10-21-20		DATE: 10-21-20 / 10-21-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–1		SILTY SAND, fine (60%), with organic matter (25%), silt (15%); moist, 10YR 3/4.	
		ML	1–3		SILT, loose, with sand (fine 20%), with gravel (fine 10%, medium 5%, coarse 5%), sub-angular; dry, 10YR 5/6.	
		SP	3–5		SAND, fine (90%), poorly graded, with gravel (fine 5%, medium 5%); dry, 7.5YR 4/4.	
		ML	5–10		SILT, medium stiffness, mottled; dry, 10YR 5/2.	Grout (neat cement) (0'-17' bgs)
		SP	9–10		SAND, fine (90%), poorly graded, with gravel (fine 5%, medium 5%); dry, 7.5YR 4/4.	2" Black Iron Casing (0'-22' bgs)
		SW	10–14		SAND, fine to coarse (fine 70%, medium 15%, coarse 15%), well graded; moist to wet, 10YR 3/3.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZID [854535]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 2 OF 2	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 27 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 905.979 FT AMSL			WATER LEVEL	9.2'				TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME	1120				0930	1130
COMMENTS: Northing: 4980150.521 Easting: 506747.377			DATE	10-21-20				DATE	DATE
			CASING DEPTH					10-21-20	10-21-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 70%, medium 15%, coarse 15%), well graded; moist to wet, 10YR 3/3.	
			17		SILTY SAND, very fine (70%), silt (20%), with gravel (medium 5%, coarse 5%); moist to wet, 10YR 3/3.	Grout (neat cement) (0'-17' bgs)
			18			3/8" Bentonite Chips (17'-19' bgs)
			19			
			20		SILTY SAND, very fine (70%), silt (20%), with gravel (medium 5%, coarse 5%), 0.5" coarse sand lense at 26.5' bgs; wet, 10YR 3/3.	
		SM	21			2" Black Iron Casing (0'-22' bgs)
			22			
			23			Sand filter pack (19'-27' bgs)
			24			2" Stainless Steel Screen (22'-27' bgs)
			25			
			26			
			27		E.O.B. @ 27' bgs, no refusal	
			28			
			29			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. PZIS [854534]	
LOGGED BY: SW	CHECKED BY: JM							SHEET 1 OF 2	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING	
BORING DEPTH: 17 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: 906.130 FT AMSL			WATER LEVEL	9.8'				TIME 1250	TIME 1415
DATUM: NAD 83 UTM 15 (meters)			TIME	1400					
COMMENTS: Northing: 4980147.642 Easting: 506747.535			DATE	10-21-20				DATE 10-21-20	DATE 10-21-20
			CASING DEPTH						

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0		SILT, with roots; dry, 10YR 4/6.	
			1		SILT, with roots, with gravel (coarse 15%), with cobbles (15%), sub-angular; dry, 10YR 4/6.	Grout (neat cement) (0'-3' bgs)
		SP	2		SAND, fine (70%), poorly graded, with gravel (30%), sub-rounded; dry, 7.5YR 4/4.	
			3		SAND, fine (95%), poorly graded, trace gravel (fine 5%); dry, 10YR 4/4.	2" Black Iron Casing (0'-7' bgs)
			4			
			5			3/8" Bentonite Chips (3'-5' bgs)
		SW	6		SAND, fine to coarse (fine 40%, medium 20%, coarse 20%), well graded, with gravel (fine 20%); moist, 7.5YR 4/4.	
			7			
			8			
			9			2" Stainless Steel Screen (7'-17' bgs)
		ML	10		SILT, medium stiffness, mottled; moist, 10YR 5/2.	
					SILT, with sand (fine 25%), trace gravel (fine 5%), sub-rounded; wet, 7.5YR 3/4.	
			11		SANDY SILT, fine to medium (fine 20%, medium 10%), with gravel (fine 10%); moist 7.5YR 3/4.	
			12		SILT, with sand (fine 25%), trace gravel (fine 5%), sub-rounded; wet, 7.5YR 3/4.	Sand filter pack (5'-17' bgs)
		SW	13		SAND, fine to coarse (fine 30%, medium 20%, coarse 30%), poorly graded, with gravel (fine 10%, medium 10%), mottled; wet.	
		ML	14		SILT, with sand (fine 25%), trace gravel (fine 5%), sub-rounded; wet, 7.5YR 3/4.	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZIS [854534]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 17 FT BGS			
GROUND SURFACE ELEVATION: 906.130 FT AMSL	WATER LEVEL: 9.8'		TIME: 1250 / 1415
DATUM: NAD 83 UTM 15 (meters)	TIME: 1400		
COMMENTS: Northing: 4980147.642 Easting: 506747.535	DATE: 10-21-20		DATE: 10-21-20 / 10-21-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	16		SILT, with sand (fine 25%), trace gravel (fine 5%), sub-rounded; wet, 7.5YR 3/4.	Sand filter pack (5'-17' bgs) 2" Stainless Steel Screen (7'-17' bgs)
			17		E.O.B. @ 17' bgs, no refusal	
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZJD [854543]
LOGGED BY: SW / CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 35 FT BGS			
GROUND SURFACE ELEVATION: 912.301 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1800
COMMENTS: Northing: 4980609.097 Easting: 507218.626	DATE		DATE / DATE
	CASING DEPTH		10-28-20 / 10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–7		SILTY SAND, fine (50%), silt (25%), with gravel (fine 15%), sub-rounded, with organic mattter and roots (10%); moist, 10YR 3/3.	Grout (neat cement) (0'-25' bgs)
		SM	0–7		SILTY SAND, fine (50%), silt (25%), with gravel (fine 10%, medium 10%, coarse 5%), sub-angular; moist, 7.5YR 4/4.	
		SW	7–10		SAND, fine to coarse (fine 65%, medium 15%, coarse 10%), with gravel (fine 5%, medium 5%), sub-angular to sub-rounded; moist, 10YR 5/4.	2" Black Iron Casing (0'-30' bgs)
		ML	10–14		SANDY SILT, fine (40%), with gravel (fine 5%, medium 10%, coarse 5%), sub-angular; moist, 10YR 4/4.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZJD [854543]
LOGGED BY: SW / CHECKED BY: JM			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 35 FT BGS			
GROUND SURFACE ELEVATION: 912.301 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1800
COMMENTS: Northing: 4980609.097 Easting: 507218.626	DATE		DATE / DATE
	CASING DEPTH		10-28-20 / 10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	PZJD-SOIL 17-20	SW	16–17		SAND, fine to coarse (fine 70%, medium 10%, coarse 10%), well graded, with gravel (fine 5%, medium 5%), sub-rounded; moist, 10YR 4/4.	Grout (neat cement) (0'-25' bgs)
			17–27		SAND, fine to coarse (fine 10%, medium 30%, coarse 50%), well graded, with gravel (10%), sub-angular, mottled; wet, 10YR 5/4.	2" Black Iron Casing (0'-30' bgs); 3/8" Bentonite Chips (25'-27' bgs)
			27–29		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel (10%), sub-angular to sub-rounded; wet, 10YR 5/4.	Sand filter pack (27'-35' bgs)

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZJD [854543]
LOGGED BY: SW / CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 35 FT BGS			
GROUND SURFACE ELEVATION: 912.301 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1530 / 1800
COMMENTS: Northing: 4980609.097 Easting: 507218.626	DATE		DATE / DATE
	CASING DEPTH		10-28-20 / 10-28-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31–33		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, trace gravel (fine 2%, medium 2%, coarse 1%), sub-angular to sub-rounded, trace cobble (5%), angular; wet, 10YR 5/4.	Sand filter pack (27'-35' bgs) 2" Stainless Steel Screen (30'-35' bgs)
		ML	33–35		SILT, medium stiffness, with sand (fine 10%), mottled; wet, 10YR 5/4.	
			35		E.O.B. @ 35' bgs, no refusal	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZJS [854542]
LOGGED BY: JM / CHECKED BY: AS			SHEET 1 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 25 FT BGS			
GROUND SURFACE ELEVATION: 912.501 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1100
COMMENTS: Northing: 4980610.97 Easting: 507215.496	DATE		DATE / DATE
	CASING DEPTH		10-29-20 / 10-29-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	0–1		SILTY SAND, fine (50%), silt (25%), with gravel (fine 15%), sub-rounded, with organic mattter and roots (10%); moist, 10YR 3/3.	
		CL	1–2		CLAY, low plasticity, with sand (fine 20%), sub-angular, with silt (10%), trace organics (5%); dry, 7.5YR 4/3.	
		SW	2–6		SAND, fine to coarse (fine 40%, medium 25%, coarse 10%), well graded, with gravel (fine 15%), angular to sub-rounded, with silt (10%); moist, 7.5YR 5/3.	Grout (neat cement) (0'-10' bgs)
		SW	6–8		SAND, fine to coarse (fine 10%, medium 35%, coarse 30%), well graded, with gravel (fine 20%), angular to sub-rounded, trace rock clasts (5%), 2" clay seam at 8'bgs; moist, 7.5YR 5/3.	
		SW	8–12		SAND, fine to coarse (fine 20%, medium 30%, coarse 30%), well graded, with gravel (fine 10%, medium 10%), angular to sub-rounded; moist, 7.5YR 5/4.	2" Black Iron Casing (0'-15' bgs) 3/8" Bentonite Chips (10'-12' bgs)
		CL	12–14		SANDY CLAY, low plasticity, sand (fine 20%, medium 10%, coarse 10%), with gravel (fine 5%, medium 5%), angular to sub-rounded; moist, 7.5YR 4/3.	Sand filter pack (12'-25' bgs)
		SW	14–25		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel (fine 10%), angular to sub-rounded; moist to wet, 7.5YR 5/3.	

ENVIRONMENTAL_1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ_RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. PZJS [854542]
LOGGED BY: JM / CHECKED BY: AS			SHEET 2 OF 2
DRILLING CONTR.: Traut			
DRILLER: Dan Karasch / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 25 FT BGS			
GROUND SURFACE ELEVATION: 912.501 FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1000 / 1100
COMMENTS: Northing: 4980610.97 Easting: 507215.496	DATE		DATE / DATE
	CASING DEPTH		10-29-20 / 10-29-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 30%, medium 30%, coarse 30%), well graded, with gravel (fine 10%), angular to sub-rounded; moist to wet, 7.5YR 5/3.	
		SP			SAND, fine to medium (fine 80%, medium 10%), angular to sub-rounded, poorly graded, with silt (10%); wet, 7.5YR 6/3.	
		CL	17		SANDY CLAY, low plasticity, sand (fine 20%, medium 15%, coarse 5%), angular to sub-rounded; 7.5YR 6/2.	
			18		SAND, fine to coarse (fine 10%, medium 20%, coarse 55%), well graded, with gravel (fine 15%), sub-rounded; wet, 7.5YR 3/3.	
			19			
			20			2" Stainless Steel Screen (15'-25' bgs)
			21			
		SW	22			Sand filter pack (12'-25' bgs)
			23		SAND, fine to coarse (fine 10%, medium 50%, coarse 30%), well graded, with gravel (fine 10%), sub-rounded; wet, 7.5YR 4/2.	
			24		SAND, fine to coarse (fine 40%, medium 45%, coarse 15%), well graded; wet, 7.5YR 4/2.	
			25		SAND, fine to coarse (fine 10%, medium 50%, coarse 30%), well graded, with gravel (fine 10%), sub-rounded; wet, 7.5YR 4/2.	
			26		E.O.B. @ 25' bgs, no refusal	
			27			
			28			
			29			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPA
LOGGED BY: JM/AS/RF — CHECKED BY: JM			SHEET 1 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl — EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 52 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0845 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-01-20 / DATE 10-01-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0		TOPSOIL, organics; 10YR 5/2.	
		SC	1		SILTY SAND, fine to medium (fine 75%, medium 5%), sub-rounded to round, silt (15%), trace organics (5%); dry, 10YR 4/2.	
		SP	3		SAND, fine to medium (fine 85%, medium 10%), sub-rounded to round, poorly graded, trace silt (5%); moist, 10YR 5/4.	
		SC	4		SILTY SAND, fine to medium (fine 85%, medium 10%), sub-rounded to round, silt (15%), cohesive; moist, 5YR 3/4.	
		SP	7		SAND, fine to medium (fine 85%, medium 10%), sub-rounded, poorly graded, trace silt (5%); moist, 10YR 5/6.	
GRAB COMP	VAPA-GW 6-10 VAPA-SOIL 7-10	SW	8		SAND, fine to coarse (fine 30%, medium 50%, coarse 15%), sub-rounded to round, well graded, trace silt (5%), trace gravel (fine 5%); wet, 10YR 5/6.	
		SP	9		SAND, fine to medium (fine 90%, medium 5%), subrounded to round, poorly graded, trace silt (5%); wet, 10YR 4/3.	
		CL	10		CLAY, low plasticity, soft, with sand (fine 10%); saturated, 10YR 5/4.	
		ML	12		SILT, low plasticity, soft, with sand (fine 15%), subrounded; saturated, 10YR 5/4.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPA
LOGGED BY: JM/AS/RF — CHECKED BY: JM			SHEET 2 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl — EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 52 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0845 / 1800
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		10-01-20 / 10-01-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	16		SAND, fine to coarse (fine 10%, medium 50%, coarse 20%), sub-angular to sub-rounded, well graded, with gravel (fine to medium 10%), with silt 10%; moist, 10YR 4/4.	
		ML	17		SILT, low plasticity, soft, with sand (fine 15%), subrounded, with clay (10%); saturated, 10YR 5/4.	
			18		SANDY SILT, low plasticity, soft, sand (medium to coarse 35%), sub-rounded, with gravel (fine 10%), trace clay (5%); moist, 10YR 5/6.	
			19		SAND, fine to coarse (fine 20%, medium 40%, coarse 20%), sub-rounded, well graded, with gravel (fine 10%), with silt (10%), trace clay (5%) in 1" layer at 19.5' bgs; moist 10YR 4/4.	
		SW	20		SAND, fine to coarse (fine 15%, medium 50%, coarse 25%), sub-rounded, well graded, with gravel (fine 5%, medium and coarse 5%), agular to sub-angular, poor recovery 1.5'/4'; moist 10YR 3/6.	
GRAB	VAPA-GW 22-26		21			
			22			
			23			
			24		SANDY SILT, low plasticity, soft, sand (medium to coarse 35%), sub-rounded, trace clay (5%), poor recovery 0.5'/4'; moist, 10YR 5/6.	
		ML	25			
			26			
			27			
		SW	28		SAND, fine to coarse (fine 10%, medium 40%, coarse 35%), sub-rounded, well graded, with gravel (fine 15%), with silt (10%); moist, 7.5YR 4/2.	
		ML	29		SANDY SILT, low plasticity, soft, fine to coarse (fine 25%, medium 30%, coarse 5%), sub-angular to sub-rounded, trace gravel (fine 5%); moist, 7.5YR	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: GeoProbe					BORING NO. VAPA	
LOGGED BY: JM/AS/RF	CHECKED BY: JM							SHEET 3 OF 4	
DRILLING CONTR.: Traut									
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610		SAMPLING METHOD: 4' liners					DRILLING	
BORING DEPTH: 52 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					0845	1800
COMMENTS:			DATE					DATE	DATE
			CASING DEPTH					10-01-20	10-01-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	31		4/2. SANDY SILT, low plasticity, soft, fine to coarse (fine 25%, medium 30%, coarse 5%), sub-angular to sub-rounded, trace gravel (fine 5%); moist, 7.5YR 4/2.	
		SP	32		SAND, fine to coarse (fine 35%, medium 40%, coarse 5%), sub-rounded, poorly graded, trace clay (10%), trace silt (5%), trace gravel (fine 5%), sub-rounded; moist, 7.5YR 4/3.	
			33		SAND, fine to coarse (fine 28%, medium 70%, coarse 2%), sub-rounded, poorly graded; moist, 10YR 4/3.	
		SC	34		SAND, fine to coarse (fine 75%, medium 15%, coarse 5%), well-rounded, poorly graded, with silt 8%, trace gravel (fine 2%), sub-rounded; moist, 10YR 3/4.	
		SP	35		CLAYEY SAND, fine to medium (fine 60%, medium 13%), sub-rounded, poorly graded, clay (20%), trace silt (5%), trace gravel (2%), sub-angular; moist, 10YR 3/4.	
			36		SAND, fine to medium (fine 25%, medium 75%), rounded, poorly graded; moist, 10YR 4/4.	
			37		NO RECOVERY	
			38			
			39			
		SP	40		SAND, fine to coarse (fine 25%, medium 65%, coarse 5%), sub-rounded, poorly graded, trace silt (5%); moist, 2.5YR 5/4.	
		SM	41		SILTY SAND, fine to coarse (fine 30%, medium 20%, coarse 5%), sub-rounded, silt (42%), trace gravel (3%), sub-rounded; moist, 7.5YR 4/4.	
			42			
			43			
		SM	44		SILTY SAND, fine to coarse (fine 30%, medium 40%, coarse 5%), round, silt (20%), trace clay (5%); moist, 7.5YR 5/4	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPA
LOGGED BY: JM/AS/RF	CHECKED BY: JM		SHEET 4 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners	DRILLING START / FINISH
BORING DEPTH: 52 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0845 / TIME 1800
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-01-20 / DATE 10-01-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SM	46		SILTY SAND, fine to coarse (fine 30%, medium 40%, coarse 5%), round, silt (20%), trace clay (5%); moist, 7.5YR 5/4	
			47		SANDY SILT, low plasticity, medium stiffness, sand (fine 10%, medium 18%, coarse 3%), round, trace gravel (5%), trace clay (4%), rock fragments at 48' bgs; moist, 7.5YR 5/4.	
COMP	VAPA-SOIL 48-50	ML	48		SILT, low plasticity, medium stiff, with sand (20% fine, 7% medium), sub-rounded, trace clay (5%), trace gravel, fine (3%), well-rounded; moist, 7.5YR 5/4.	
GRAB	VAPA-GW 48-52		49			
			50		SILT, low plasticity, stiff, with sand (fine 15%, medium 5%, coarse 3%), sub-rounded, trace clay (5%), trace gravel (fine 2%), well-rounded; moist, 7.5YR 5/4.	
		CL	51		SANDY CLAY, low plasticity, stiff, sand (fine 25%, medium 15%, coarse 5%), sub-rounded, trace silt (5%); moist, 7.5YR 5/4.	
			52		No visible bedrock - refusal @ 52' bgs.	
			53			
			54			
			55			
			56			
			57			
			58			
			59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPC
LOGGED BY: JM/RF — CHECKED BY: JM			SHEET 1 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl — EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START: TIME 0800 / DATE 10-02-20 — FINISH: TIME 1700 / DATE 10-02-20
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL / TIME / DATE / CASING DEPTH		
DATUM: NAD 83 UTM 15 (meters)			
COMMENTS:			

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OH	0–1		TOPSOIL, organics, 10YR 2/1.	
GRAB COMP	VAPC-GW 0-5 VAPC-SOIL 1-5	ML	1–3		SILTY SAND, fine to coarse (fine 35%, medium 40%, coarse 10%), angular to sub-rounded, silt (15%), cohesive; moist, 10YR 3/1.	
					SILTY SAND, fine to coarse (fine 40%, medium 40%, coarse 5%), angular to sub-rounded, silt (15%), cohesive; wet, 10YR 4/2.	
		SC	3–4		CLAYEY SAND, fine to coarse (fine 35%, medium 40%, coarse 2%), sub-rounded to round, clay (23%); saturated, 10YR 5/1.	
		SP	4–6		SAND, fine to coarse (fine 40%, medium 45%, coarse 5%), sub-rounded to round, poorly graded, trace silt (5%), trace gravel (fine 5%), 1" clay lens at 6.4' bgs; saturated, 10YR 5/2.	
		SC	6–7		CLAYEY SAND, fine to medium (fine 35%, medium 35%), round, clay 30%; saturated, 10YR 5/4.	
			7–8		CLAYEY SAND, fine to medium (fine 60%, medium 20%), round, clay 30%; saturated, 10YR 5/3.	
		SW	8–9		SAND, fine to coarse (fine 40%, medium 35%, coarse 15%), angular to sub-rounded, well graded, trace gravel (fine 5%), trace silt 5%; saturated, 10YR 3/2.	
			9–12		SAND, fine to coarse (fine 35%, medium 40%, coarse 15%), angular to sub-rounded, well graded, trace gravel (fine 5%), trace silt (5%); saturated, 10YR 3/2.	
GRAB	VAPC-GW 12-16					
COMP	VAPC-SOIL 12-16		12–14		SAND, fine to coarse (fine 18%, medium 50%, coarse 25%), angular to sub-rounded, well graded, trace gravel (fine (5%), trace silt (2%); saturated, 10YR 3/2.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: GeoProbe					BORING NO. VAPC	
LOGGED BY: JM/RF	CHECKED BY: JM							SHEET 2 OF 4	
DRILLING CONTR.: Traut									
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610		SAMPLING METHOD: 4' liners					DRILLING	
BORING DEPTH: 48.5 FT BGS								START	FINISH
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					0800	1700
COMMENTS:			DATE					DATE	DATE
			CASING DEPTH					10-02-20	10-02-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
GRAB	VAPC-GW 22-26	SW	16		SAND, fine to coarse (fine 35%, medium 40%, coarse 15%), sub-rounded, well graded, trace gravel (fine 5%), trace silt (5%); saturated, 10YR 3/2.	
		SP	17		SAND, fine to coarse (fine 30%, medium 65%, coarse 2%), sub-rounded, poorly graded, trace silt (3%); saturated, 10YR 3/1.	
		SW	18 19		SAND, fine to coarse (fine 25%, medium 45%, coarse 20%), round to sub-rounded, well graded, trace gravel (fine 5%), trace silt (5%); saturated, 10YR 3/1.	
		CL	20 21 22 23		NO RECOVERY. CLAY, with gravel (driller comment).	
			24 25 26		CLAY, low plasticity, soft, with sand (fine 15%); saturated, 10YR 4/1.	
		SW	27		SAND, fine to coarse (fine 15%, medium 35%, coarse 25%), angular to rounded, well graded, with gravel (fine 20%, medium 15%), sub-rounded; saturated, 10YR 3/1.	
		SP	28		SAND, fine to coarse (fine 40%, medium 50%, coarse 5%), rounded to sub-rounded, poorly graded, trace silt (5%); saturated, 10YR 4/3.	
			29		SAND, fine to medium (fine 45%, medium 50%), rounded, poorly graded, trace gravel (medium 5%) at 30' bgs; saturated, 10YR 5/2.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPC
LOGGED BY: JM/RF	CHECKED BY: JM		SHEET 3 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners	DRILLING START / FINISH
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0800 / 1700
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		10-02-20 / 10-02-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			31		SAND, medium to coarse (medium 17%, coarse 80%), well-rounded, poorly graded, trace gravel (fine 3%), angular to sub-rounded; moist, 10YR 5/2.	
			32			
			33		SAND, fine to medium (fine 65%, medium 33%), sub-rounded to well-rounded, poorly graded, trace gravel (2%), angular; moist, 10YR 5/2. Some heaving sands.	
			34		NO RECOVERY. Only from drillers top of shoe (SAND, fine to coarse (fine 30, medium 30%, coarse 30%), trace gravel (fine 10%). Bottom of shoe (SAND, fine to medium (fine 50%, medium 50%).	
			35			
			36			
			37		NO RECOVERY. Only little bit in drillers shoe (SAND, fine to medium (fine 70%, medium 25%), well-rounded, poorly graded, trace gravel, coarse (5%); moist, 10YR 5/5.	
		SP	38			
			39			
			40			
			41		SAND, fine to medium (fine 80%, medium 20%), well-rounded, poorly graded; moist to saturated, 10YR 6/4	
			42			
COMP	VAPC-SOIL 43-45		43		SAND, fine to medium (fine 75%, medium 20%), well-rounded, poorly graded, trace gravel (fine to coarse 5%), sub-angular; moist to saturated, 10YR 6/4.	
GRAB	VAPC-GW 43-47		44			
					SAND, fine to medium (fine 60%, medium 20%),	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPC
LOGGED BY: JM/RF	CHECKED BY: JM		SHEET 4 OF 4
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners	DRILLING START / FINISH
BORING DEPTH: 48.5 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0800 / 1700
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		10-02-20 / 10-02-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 45' bgs	Os	46–48		well-rounded, poorly graded, with gravel (fine 10%, medium 10%); moist, 10YR 3/6. SANDSTONE, poorly to moderately cemented, very fine to fine (very fine 80%, fine 20%), well-rounded; moist to wet, white to orange, dolomitic near 48.5' bgs. 45-47' bgs: wet, poorly cemented. 47-48.5' bgs: moist, moderately cemented.	
			49		E.O.B. @ 48.5' bgs, refusal.	
			50–59			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPE-A
LOGGED BY: AS / CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 34 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1500
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		10-05-20 / 10-05-20

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
COMP GRAB	VAPE-SOIL 1-5 VAPE-GW 1-5	OL	1		SILT, organics (30-40%), sand (10%); dry to moist, 10YR 3/1.	
		ML	2		SILT, low plasticity, soft, with organic roots, with sand (fine 10%), sub-rounded to well-rounded, with clay (10%), trace gravel (coarse 5%); moist, 10YR 3/1.	
			5		SILT, low plasticity, soft, with organic roots, with sand (fine 10%), sub-rounded to well-rounded, with clay (10-15%), trace gravel (coarse 5%); moist, 10YR 3/1.	
		SW	6		SAND, fine to coarse (fine 25%, medium 25%, coarse 25%), well graded, with clay (10%), with gravel (fine 10%, medium 2%, coarse, 1%), trace organics (grass 2%); wet, 2.5YR 4/2.	
		CL	9		CLAY, medium plasticity, trace sand (fine 5%); dry to moist, 5Y 5/1.	
		SW	10		SAND, fine to coarse (fine 55%, medium 30%, coarse 5%), sub-round to round, well graded, with clay (10%); moist to wet, 2.5Y 4/2.	
		SP	11		SAND, fine to medium (fine 40%, medium 20%), sub-rounded, poorly graded, with silt (20%), with clay (15%), trace gravel (5%), sub-rounded; wet, 10YR 4/1.	
		CL	13		CLAY, medium plasticity, soft, with gravel (fine 10%); dry to moist, 10YR 5/1.	
		SP	14		SAND, fine to medium (fine 30%, medium 50%), sub-rounded, poorly graded, with gravel (fine 10%, coarse 5%), trace clay (5%); moist, 10YR 4/3.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO.: VAPE-A
LOGGED BY: AS / CHECKED BY: JM			SHEET: 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START: 1230 / FINISH: 1500
BORING DEPTH: 34 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE: 10-05-20 / DATE: 10-05-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SC	16		CLAYEY SAND, medium to coarse (medium 20%, coarse 40%), sub-rounded, clay (30%), with gravel (fine 10%); moist, 10YR 4/3.	
GRAB	VAPE-GW 16-20	SP	17–18		SAND, medium to coarse (medium 20%, coarse 55%), sub-rounded, with gravel (fine 12% to coarse 13%), sub-rounded; moist, 10YR 4/1.	
		ML	19		SANDY SILT, low plasticity, medium stiffness, sand (fine 17% to medium 18%), sub-rounded, trace cobbles (3%); dry to moist, 10YR 4/3.	
		CL	20–21		SANDY CLAY, low plasticity, soft, sand (fine 10%, medium 10%, coarse 10%), sub-rounded, trace gravel (fine 5%), sub-angular to sub-rounded; moist, 10YR 4/3.	
		SW	22		SAND, fine to medium (fine 30%, medium 60%), sub-rounded to well-rounded, poorly graded, trace clay (5%), trace silt (5%); moist, 10YR 5/2.	
		CL	23–24		CLAY, low plasticity, medium stiffness, trace gravel (medium 5%), trace cobble (3%); dry to moist 10YR 4/3.	
COMP	VAPE-SOIL 25-29 +DUP +MS/MSD	CL	25–26		CLAY, low to medium plasticity, medium stiffness, with sand (fine 15%); moist, 10YR 4/3.	
GRAB	VAPE-GW 25-29 +DUP +MS/MSD		27–28		CLAY, low plasticity, soft, with sand (coarse 20%), sub-rounded to well-rounded, with gravel (medium 10%, coarse 5%); moist, 10YR 4/3.	
	St. Peter Fm. @ 29.5' bgs		29		CLAY, medium plasticity, soft, with sand (medium 20%), sub-rounded, trace gravel (medium 5%), sub-rounded, 3" of medium to coarse sand at 28' bgs, 2" of medium to coarse sand at 29.5' bgs. trace yellow/orange mottling; moist, 10YR 4/3 to 10YR 4/1.	
		Os			SANDSTONE, white sand (100%); moist.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPE-A
LOGGED BY: AS / CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 34 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		1230 / 1500
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		10-05-20 / 10-05-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		Os	31–33		SANDSTONE, white sand (100%); moist.	
			34		E.O.B @ 34' bgs, no refusal	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: Sonic		BORING NO. VAPE-B
LOGGED BY: AS	CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut				
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS				
GROUND SURFACE ELEVATION: FT AMSL		WATER LEVEL		TIME: 1100 / 1130
DATUM: NAD 83 UTM 15 (meters)		TIME		
COMMENTS: Blind Drill 5-10 ft SW of VAPE-A (along shore)		DATE		DATE: 10-08-20 / 10-08-20
		CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
					BLIND DRILL TO 30' bgs	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPE-B
LOGGED BY: AS / CHECKED BY: JM			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 1100 / 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Blind Drill 5-10 ft SW of VAPE-A (along shore)	DATE		DATE: 10-08-20 / 10-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
					BLIND DRILL TO 30' bgs	

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AECOM

ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPE-B
LOGGED BY: AS / CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 40 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 1100 / TIME 1130
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS: Blind Drill 5-10 ft SW of VAPE-A (along shore)	DATE		DATE 10-08-20 / DATE 10-08-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		CL	31–33		CLAY, medium plasticity, medium stiffness, trace gravel (fine 5%), sub-rounded; dry, GREY 1 4/5GY.	
	St. Peter Fm. @ 33.5' bgs	Os	34–37		SANDSTONE, fine to coarse (fine 20%, medium 40%, coarse 5%), sub-rounded to well-rounded, weathered, with clay (25%); moist, GLEY 1 5/5GY.	
COMP GRAB	VAPE-SOIL 36-40 VAPE-GW 36-40		38–39		SANDSTONE, fine (100%), sub-rounded, partially cemented; dry to moist, white 8/N.	
			40		E.O.B. at 40' bgs, no refusal.	
			41–44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPF
LOGGED BY: AS/RF / CHECKED BY: JM			SHEET 1 OF 5
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck / EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags		DRILLING START / FINISH
BORING DEPTH: 70 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 0915 / 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE: 10-06-20 / 10-06-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	0		SAND, fine to medium (fine 55%, medium 15%), sub-rounded, poorly graded, with organics (20%), with silt (10%); dry, 10YR 5/3.	
		SW	1		SAND, fine to coarse (fine 30%, medium 50%, coarse 10%), sub-rounded, well graded, with gravel (fine 10%); dry, 10YR 5/8.	
			2			
			3			
			4			
			5		SAND, fine to coarse (fine 40%, medium 60%, coarse 10%), rounded, well graded, trce gravel (fine 5%), trace silt (5%); dry, 10YR 4/6.	
			6		SAND, fine to coarse (fine 40%, medium 30%, coarse 15%), sub-angular to sub-rounded, well graded, with gravel (fine 8%, medium 2%), trace silt (5%); dry, 10YR 5/6.	
			7		SAND, fine to coarse (fine 10%, medium 65%, coarse 15%), rounded, well graded, trace gravel (fine 4%, medium 1%), trace silt (5%), 1" layer; dry, 10YR 5/4.	
			8			
		SP	9		SAND, fine to coarse (fine 10%, medium 70%, coarse 5%), sub-rounded, poorly graded, with gravel (fine 6%, medium 4%, coarse 5%); dry, 10YR 5/4.	
			10			
			11		SAND, fine to coarse (fine 30%, medium 45%, coarse 5%), rounded, poorly graded, with gravel (fine 3%, medium 5%, coarse 7%), angular; dry, 7.5YR 5/4.	
			12			
			13			
			14		SAND, fine to coarse (fine 25%, medium 55%, coarse 2%), sub-rounded, poorly graded, with silt (25%), trace gravel (fine 3%); slightly moist, 7.5YR	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPF
LOGGED BY: AS/RF	CHECKED BY: JM		SHEET 2 OF 5
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 70 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0915 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-06-20 / DATE 10-06-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
					4/6.	
			16		SAND, fine to coarse (fine 25%, medium 55%, coarse 2%), sub-rounded, poorly graded, with silt (25%), trace gravel (fine 3%); slightly moist, 7.5YR 4/6.	
			17		SAND, fine to coarse (fine 25%, medium 55%, coarse 5%), sub-rounded, poorly graded, with silt (10%), trace gravel (fine 4%, medium 1%); dry, 7.5YR 5/4.	
		SP	18		SAND, fine to medium (fine 55%, medium 30%), sub-rounded, poorly graded, with silt clumps (5%), trace gravel (fine 2%, medium 3%), angular; dry, 7.5YR 4/6.	
			19		SAND, fine to coarse (fine 25%, medium 40%, coarse 5%), sub-rounded, poorly graded, with silt clumps (20%), with gravel (fine 3%, medium 7%), angular; dry, 7.5YR 4/6.	
			20		SAND, fine to coarse (fine 10%, medium 50%, coarse 30%), sub-rounded, well graded, with gravel (fine 8%, medium 2%), sub-angular; moist, 7.5YR 5/4.	
			21		SAND, fine to coarse (fine 25%, medium 50%, coarse 15%), sub-rounded, well graded, with gravel (fine 5%, medium 3%), sub-angular, trace silt (2%); moist, 10YR 6/4.	
			22			
			23			
			24		SAND, fine to coarse (fine 5%, medium 30%, coarse 45%), sub-angular, poorly graded, with gravel (fine 15%, medium 5%), angular; moist, 10YR 4/3.	
		SW	25			
			26		SAND, fine to coarse (fine 25%, medium 50%, coarse 15%), sub-angular to sub-rounded, well graded, trace gravel (fine 3%, medium 2%), sub-angular, trace silt (5%), 1" layer of silt at 29' bgs; moist, 7.5YR 4/6 to 10YR 5/4.	
COMP	VAPF-SOIL 26-30 + DUP		27			
			28			
GRAB	VAPF-GW 26-30 + DUP		29		SAND, fine to coarse (fine 65%, medium 15%, coarse 20%), sub-angular to sub-rounded, well graded, trace gravel (fine 5%, medium 2%), 1" of	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPF
LOGGED BY: AS/RF	CHECKED BY: JM		SHEET 3 OF 5
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 70 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0915 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-06-20 / DATE 10-06-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31		coarse sand layer at 29' bgs, 2" of coarse sand and gravel layer at 30' bgs, fine sand mostly from 29.25' to 29.75'	
		CL	32		SAND, fine to coarse (fine 15%, medium 40%, coarse 25%), sub-rounded, well graded, with gravel (fine 5%, medium 5%), sub-angular to sub-rounded, trace silt (5%), trace clay (5%); moist to wet.	
			33		SANDY CLAY, low plasticity, soft, sand (fine 20%, medium 10%), not evenly distributed, trace silt (5%), trace gravel, fine (3%); wet.	
		SW	34		SAND, fine to coarse (fine 10%, medium 45%, coarse 25%), sub-rounded, well graded, with silt (15%), trace gravel (fine 4%, medium 1%), trace cobble (5%); wet.	
			35			
			36			
			37			
GRAB	VAPF-GW 36-39		38			
			39		CLAY, medium plasticity, soft to medium, with sand (20% coarse sand), sub-rounded, with silt (10%), trace gravel (medium 2%), orange to gray mottling; dry to moist.	
			40		CLAY, medium plasticity, medium stiffness, trace sand (medium 5%), trace gravel (fine 5%), mottling orange (15%); dry, 10YR 5/6 to 10YR 4/5.	
		CL	41			
			42			
COMP	VAPF-SOIL 40-45		43		CLAY, medium plasticity, soft to medium, trace sand (fine 3%, medium 2%), trace gravel (fine 2%, medium 1%); dry, 10YR 6/2 to 10YR 4/6.	
			44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPF
LOGGED BY: AS/RF	CHECKED BY: JM		SHEET 4 OF 5
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 70 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0915 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-06-20 / DATE 10-06-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		CLAY, medium plasticity, soft to medium, trace sand (fine 3%, medium 2%), trace gravel (fine 2%, medium 1%); dry, 10YR 6/2 to 10YR 4/6.	
			47		CLAY, low plasticity, medium stiffness, with sand (medium 5%, coarse 5%), trace gravel (fine 2%), mottled orange; dry, 10YR 5/3.	
		CL	48		CLAY, low to medium plasticity, medium stiffness, trace gravel (fine 5%), trace sand (fine 3%); dry, 10YR 5/1.	
			49			
			50		CLAY, low to medium plasticity, medium stiffness, trace sand (fine 5%), mottled orange; moist, 10YR 5/4.	
			51			
			52			
		SP	53		SAND, fine to medium (fine 75%, medium 15%), well-rounded, poorly graded, with clay (10%); wet, 10YR 5/6.	
			54		CLAY, medium plasticity, medium stiffness, trace gravel (fine 5%), trace sand (fine 2%), mottled orange; 10YR 5/1.	
			55			
			56			
		CL	57		CLAY, low plasticity, medium stiffness, trace sand (fine 3%); 10YR 5/1 to 10YR 4/1.	
			58			
			59			
					CLAY, no plasticity, stiff, very oxidized, weathered;	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPF
LOGGED BY: AS/RF	CHECKED BY: JM		SHEET 5 OF 5
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 70 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0915 / TIME 1600
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-06-20 / DATE 10-06-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
COMP	VAPF-SOIL 60-62 St. Peter Fm. @ 62' bgs	SP	61		dry, 7.5YR 4/4 to 10YR 5/1. SAND, fine to medium (fine 30%, medium 50%), sub-rounded, poorly graded, with clay (15%), trace cobbles (5%), weathered bedrock at bottom of unconsolidated; moist to wet, 10YR 5/8.	
			62		SANDSTONE, poorly to moderately cemented, massive iron staining, fine to medium (fine 80%, medium 20%), sub-rounded, poorly graded; moist, 10YR 7/1 to 7/5YR 4/6 (white to orange).	
			63			
			64			
			65		SANDSTONE, moderately cemented, fine to medium (fine 80%, medium 20%), sub-rounded to well-rounded, poorly graded, trace iron staining (5%); moist, 10YR 8.5/1.	
		Os	66		SANDSTONE, poorly cemented, massive iron staining, fine to coarse (fine 55%, medium 35%, coarse 5%), sub-rounded, well graded, trace gravel (fine 3%, medium 2%), trace clay (5%); moist, 10YR 5/6.	
			67			
GRAB COMP	VAPF-GW 66-70 VAPF-SOIL 66-70		68		SANDSTONE, moderately cemented, fine to medium (fine 70%, medium 30%), sub-rounded; moist, White 8/N, white to orange SANDSTONE, poorly cemented, weathered, fine to medium (fine 70%, medium 25%), sub-rounded, trace silt (5%); moist, 10YR 5/4 to 2.5Y 6/3	
			69			
			70		E.O.B @ 70' bgs, no refusal.	
			71			
			72			
			73			
			74			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPH
LOGGED BY: AS / CHECKED BY: JM			SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl / EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 30.5 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 09-29-20 / DATE 09-29-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	1		TOPSOIL, silt (15%), organic wood/roots, no plasticity; dry, 10YR 3/4.	
		ML	2		SILT, no plasticity, soft to stiff, with sand, medium (15%), with clay (10%); dry, 10YR 5/3.	
			3			
			4		SILT, low plasticity, soft to medium stiffness, with clay (20%) with sand (10% medium, 5% coarse); dry, 10YR 4/6.	
			5			
		SP	6		SAND, fine to medium (fine 30%, medium 60%), sub-rounded, poorly graded, trace silt (5-10%), trace gravel (fine 5%), trace 1" fine gravel with sand at 6' bgs; dry to moist, 5YR 4/6, mottled.	
			7			
			8		SAND, fine to medium (fine 48%, medium 40%), sub-rounded, poorly graded, trace clay (5%), trace silt (5%), trace gravel (fine 2%); moist, 7.5YR 4/6.	
			9		SAND, medium to coarse (medium 55%, coarse 55%), sub-rounded, poorly graded, trace gravel (5% fine), trace silt (5%); moist to wet, 7.5YR 5/3.	
COMP	VAPH-SOIL 8-12	SC	10		CLAYEY SAND, fine to coarse (fine 40%, medium 25%, coarse 10%), sub-rounded, clay (30%), more clay from 10'-11' bgs, trace gravel (fine 2%); moist, 7.5YR 5/3.	
GRAB	VAPH-GW 8-12		11			
			12		CLAYEY SAND, fine to coarse (fine 25%, medium 25%, coarse 20%), sub-rounded, clay (20%), with silt (7%), trace gravel (medium 3%); moist, 7.5YR 4/4.	
			13			
		SP	14		SAND, medium to coarse (medium 20%, coarse 45%), sub-angular to sub-rounded, poorly graded, with gravel (fine 17%, medium 18%); moist, 10YR	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPH
LOGGED BY: AS / CHECKED BY: JM			SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl / EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 30.5 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0830 / TIME 1700
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 09-29-20 / DATE 09-29-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass / MATERIAL DESCRIPTION	WELL DIAGRAM
		SP	16		3/3. SAND, medium to coarse (medium 20%, coarse 45%), sub-angular to sub-rounded, poorly graded, with gravel (fine 17%, medium 18%); moist, 10YR 3/3.	
		SW	17 18 19		SAND, fine to coarse (fine 25%, medium 60%, coarse 12%), sub-rounded, well graded, trace gravel (fine 3%); moist, 7.5YR 4/6.	
			20		SAND, fine to coarse (fine 10%, medium 35%, coarse 40%), sub-angular to well-rounded, well graded, with gravel (fine to coarse 13%), trace silt (2%); moist, 7.5YR 4/6.	
GRAB	VAPH-GW 20-24	SP	21 22 23		SAND, medium to coarse (medium 35%, coarse 20%), sub-angular to sub-rounded, poorly graded, with gravel (fine 25%, medium 15%, coarse 5%); moist, 5YR 5/6. Very low recovery - pushing down cobble (0.5-1').	
COMP	VAPH-SOIL 24-27	CL	24 25 26		SANDY CLAY, low plasticity, medium stiffness, sand (fine 25%, medium 5%), trace gravel (fine 2%); dry, 7.5YR 4/4.	
GRAB	VAPH-GW 27-30		27		SANDY CLAY, low plasticity, medium stiffness, sand (fine 15%, medium 15%), trace gravel (fine 3%); dry to moist, 7.5YR 3/2.	
COMP	VAPH-SOIL 28-30	SW	28		SAND, fine to coarse (fine 10%, medium 40%, coarse 10%), sub-angular to sub-rounded, with gravel (fine 15%, medium 15%), trace silt (5%), trace clay (5%); moist, 7.5YR 5/4.	
		CL	29		CLAY, low plasticity, medium stiffness, with sand (fine 10%, medium 10%, course 5%), trace gravel	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: GeoProbe		BORING NO. VAPH
LOGGED BY: AS	CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut				
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 30.5 FT BGS				
GROUND SURFACE ELEVATION: FT AMSL		WATER LEVEL		TIME / TIME
DATUM: NAD 83 UTM 15 (meters)		TIME		0830 / 1700
COMMENTS:		DATE		DATE / DATE
		CASING DEPTH		09-29-20 / 09-29-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
	St. Peter Fm. @ 30' bgs	Os	31		(fine to medium 3%); dry to moist, 10YR 3/4. SANDSTONE, poorly cemented, sand (fine 75%, medium 25%), sub-rounded, poorly graded; moist, 2.5Y 8/1. E.O.B @ 30.5' bgs, refusal	
			32			
			33			
			34			
			35			
			36			
			37			
			38			
			39			
			40			
			41			
			42			
			43			
			44			

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPI
LOGGED BY: AS/CK	CHECKED BY: JM		SHEET 1 OF 3
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners	DRILLING START: TIME 0815 / FINISH: TIME 1415
BORING DEPTH: 39 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 09-30-20 / DATE 09-30-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		OL	0		TOPSOIL, fine sand, grass, silt; dry, 10YR5/3.	
			1		SAND, fine to very fine (95%), sub-rounded, poorly graded, trace silt (5%); dry, 10YR 5/3.	
			2			
			3			
		SP	4		SAND, fine and coarse (fine 80%, coarse 10%), with gravel (medium 10%); dry, 10YR 5/4.	
			5		SAND, medium to coarse (medium 70%, coarse 20%), sub-rounded to well-rounded, poorly graded, with gravel/lithic fragments (fine to medium 10%); dry, 10YR 5/3.	
			6			
			7		SAND, medium to coarse (medium 20%, coarse 70%), sub-rounded to well-rounded, poorly graded, with gravel (fine 10%); dry, 10YR 5/3.	
		ML	8		SILT, low plasticity, soft, with sand (fine 20%); dry, 10YR 5/3.	
			9		CLAY, medium plasticity, soft, with sand (fine 10%); dry, 10YR 5/3.	
		CL	10			
			11			
		SW	12		SAND, fine to coarse (fine 40%, medium 40%, coarse 15%), sub-angular to sub-rounded, well graded, trace gravel (5% fine); dry, 10YR 4/4.	
COMP	VAPI-SOIL 12-16					
		CL	13		SANDY CLAY, low plasticity, medium stiffness, sand (fine to coarse 30%); moist, 10YR 4/4.	
GRAB	VAPI-GW 12-16					
		SP	14		SAND (medium 90%), sub-rounded, poorly graded, trace silt (5%), trace gravel (5%) at 14' bgs; moist, 10YR 4/4.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: GeoProbe		BORING NO. VAPI
LOGGED BY: AS/CK	CHECKED BY: JM		SHEET 2 OF 3
DRILLING CONTR.: Traut			
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners	DRILLING START / FINISH
BORING DEPTH: 39 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0815 / TIME 1415
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 09-30-20 / DATE 09-30-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			16		SAND (medium 90%), sub-rounded, poorly graded, trace silt (5%), trace gravel (5%) at 14' bgs; moist, 10YR 4/4.	
		SP	17		SLUFF, coarse sand and fine gravel.	
			18		SANDY CLAY, low plasticity, medium stiffness, sand (fine to medium 30%), 4" sand medium to coarse sand interval at 19.5' bgs; moist, 10YR 4/4.	
			19			
			20		SANDY CLAY, low plasticity, medium stiffness, sand (fine to medium 30%), with silt (15%), trace gravel (medium 2%); moist, 10YR 4/6.	
			21			
			22		CLAY, low to medium plasticity, medium stiffness, with sand (fine 20%), 2" of medium sand at 22' bgs; moist to wet, 10YR 4/4.	
			23			
		CL	24		SANDY CLAY, low plasticity, soft, sand (fine 30%), with gravel (fine to medium 10%); moist to wet, 10YR 4/4.	
			25			
COMP GRAB	VAPI-SOIL 24-28 VAPI-GW 24-28		26		SANDY CLAY, low plasticity, medium stiffness, sand (fine 20%), with silt (10%), trace gravel (fine 3%); dry to moist, 10YR 4/4.	
			27			
			28		SANDY CLAY, low plasticity, soft, sand (fine 20%, medium 10%), sub-rounded, trace gravel (fine 5%, medium 2%), sub-angular; moist, 10YR 4/6.	
			29		SANDY CLAY, low plasticity, soft, sand (fine 25%, medium 5%), sub-rounded, trace gravel (fine 3%) sub-angular; moist, 10YR 4/6.	

ENVIRONMENTAL 1007_GINT_LOGS_WORKING_FILE_BK_02_27_23.GPJ RANDOLPH.GPJ 6/23/23

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA		JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007		DRILLING METHOD: GeoProbe		BORING NO. VAPI
LOGGED BY: AS/CK	CHECKED BY: JM			SHEET 3 OF 3
DRILLING CONTR.: Traut				
DRILLER: Tammy Wahl	EQUIP.: GeoProbe 6610	SAMPLING METHOD: 4' liners		DRILLING START / FINISH
BORING DEPTH: 39 FT BGS				
GROUND SURFACE ELEVATION: FT AMSL		WATER LEVEL		TIME 0815 / TIME 1415
DATUM: NAD 83 UTM 15 (meters)		TIME		
COMMENTS:		DATE		DATE 09-30-20 / DATE 09-30-20
		CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
COMP GRAB	VAPI-SOIL 36-39 VAPI-GW 36-39	CL	31		SANDY CLAY, low plasticity, soft, sand (fine 25%, medium 5%), sub-rounded, trace gravel (fine 3%) sub-angular; moist, 10YR 4/6.	
			32		SANDY CLAY, low plasticity, soft, sand (fine 15%, medium 15%, coarse 5%), sub-rounded, with gravel (fine 5%, medium 10%), sub-angular; moist, 10YR 4/6.	
			33		SANDY CLAY, low plasticity, soft, sand (fine 10%, medium 20%), sub-rounded, with gravel (fine 5%, medium 15%), sub-angular; moist, 10YR 4/4.	
			34			
			35			
			36		CLAY, low plasticity, soft, with sand (fine 10%, medium 10%) sub-rounded, trace gravel (fine 5%) sub-angular; moist, 10YR 4/4.	
		SP	37		SAND, fine to coarse (fine 5%, medium 10%, coarse 60%), poorly graded, trace clay; moist, 10YR 4/4.	
		GP	38		GRAVEL, fine (80%), poorly graded, with sand (coarse 20%), angular to sub-rounded; wet, 10YR 4/2.	
		GW	39		GRAVEL, fine to medium (fine 20%, medium 50%), sub-angular, poorly graded, with sand (coarse 30%), with lithic fragments (weathered bedrock); wet, 10YR 4/2.	
			40		GRAVEL, fine to coarse (fine 30%, medium 20%, coarse 10%), sub-angular, well graded, with sand (coarse 40%), sub-rounded; wet, 10YR 4/4.	
			41		E.O.B. @ 39' bgs, refusal	
			42			
			43			
			44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPJ
LOGGED BY: AS/AL	CHECKED BY: JM		SHEET 1 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0920 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-07-20 / DATE 10-07-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		ML	0		SANDY SILT, topsoil, organics (grass/roots); 10YR 5/3.	
		SP	1–2		SAND, fine (95%), sub-rounded, poorly graded, trace silt (5%); dry, 10YR 5/6.	
		ML	2–5		SILT, low plasticity, soft, clumpy, with sand (fine 30%), with gravel (fine 5%, medium 5%), trace clay (5%) near 5' bgs; dry, 10YR 5/4.	
		SW	5–7		SAND, fine to coarse (fine 10%, medium 70%, coarse 10%), sub-rounded, well graded, trace clay (3%), trace cobbles (2%) at 7' bgs, trace gravel (fine 5%); dry to moist, 10YR 5/4.	
		ML	7–10		SILT, low plasticity, soft, trace clay (5%), trace sand (fine 3%); dry, 10YR 4/4.	
		ML	10–14		SILT, low plasticity, soft, trace sand (fine 3%), sub-rounded, trace gravel (medium 2%), sub-angular; dry to moist, 10YR 4/4. Low recovery 10-20' bgs. 3'/10' recovered.	
		SW	14		SAND, fine to coarse (fine 15%, medium 40%, coarse 27%), well-rounded, well graded, with clay (15%), 2" clay layer at 18' bgs, trace gravel (fine	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPJ
LOGGED BY: AS/AL	CHECKED BY: JM		SHEET 2 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 0920 / 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE: 10-07-20 / 10-07-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
					3%); moist, 10YR 4/3.	
			16		SAND, fine to coarse (fine 15%, medium 40%, coarse 27%), well-rounded, well graded, with clay (15%), 2" clay layer at 18' bgs, trace gravel (fine 3%); moist, 10YR 4/3.	
		SW	17			
			18		SAND, fine to coarse (fine 35%, medium 25%, coarse 10%), sub-rounded, well graded, with silt (28%), trace gravel (fine 2%); dry to moist, 10YR 4/3.	
			19			
			20		SAND, fine to coarse (fine 5%, medium 30%, coarse 40%), sub-rounded to well-rounded, poorly graded, with clay (15%), gravel (fine 3%, medium 3%, coarse 4%); moist, 10YR 4/4.	
			21		SAND, medium to coarse (medium 15%, coarse 70%), sub-rounded to well-rounded, poorly graded, with gravel (fine 3%, medium 3%, coarse 4%), sub-rounded, trace cobbles (5%) at 21.5' bgs; moist, 10YR 5/3 to 10YR 5/4.	
COMP GRAB	VAPJ-SOIL 21-25 VAPJ-GW 21-25		22			
			23		SAND, fine to coarse (fine 5%, medium 75%, coarse 10%), sub-rounded to well-rounded, poorly graded, with gravel (medium 10%); moist, 10YR 4/4.	
		SP	24			
			25		SAND, medium to coarse (medium 10%, coarse 90%), well-rounded, poorly graded, with gravel, fine to medium (fine 20%, medium 1%), sub-rounded; moist, 10YR 5/3	
			26			
			27		SAND, fine to medium (fine 85%, medium 15%), sub-rounded, poorly graded; moist, 10YR 5/4.	
GRAB	VAPJ-GW 28-32		28			
		SW	29		SAND, fine to coarse (fine 70%, medium 10%, coarse 10%), sub-rounded, well graded, trace gravel (fine 5%), trace clay (5%) at 30' bgs; moist, 10YR 5/4.	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPJ
LOGGED BY: AS/AL	CHECKED BY: JM		SHEET 3 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START: 0920 FINISH: 1400
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME
DATUM: NAD 83 UTM 15 (meters)	TIME		0920 / 1400
COMMENTS:	DATE		DATE 10-07-20 / DATE 10-07-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
		SW	31		SAND, fine to coarse (fine 70%, medium 10%, coarse 10%), sub-rounded, well graded, trace gravel (fine 5%), trace clay (5%) at 30' bgs; moist, 10YR 5/4.	
		SP	32		SAND, medium to coarse (medium 5%, coarse 70%), sub-rounded to well-rounded, poorly graded, with gravel (fine 10%, medium 10%, coarse 5%), sub-rounded to sub-angular; moist, 10YR 5/4.	
			33		CLAY, low to medium plasticity, medium stiffness, trace sand (fine 5%), trace silt (5%), massive mottling, oxidized orange; dry, 10YR 5/3 to 10YR 5/8.	
			34			
			35		CLAY, low to medium plasticity, medium stiffness, with silt (30%), with sand (fine 10%, coarse 5%), gravel (fine 5%), round, massive mottling; moist, 10YR 5/8 and 10YR 4/6.	
		CL	36		36' bgs: 3" medium sand seam, moist to wet.	
			37		CLAY, low to medium plasticity, medium stiffness, with silt (30%), with sand (fine 5%, coarse 5% in pockets), mottling throughout; moist, 10YR 5/8 and 10YR 4/6.	
			38		CLAY, low plasticity, medium stiffness, trace silt (8%), trace gravel (fine 5%, medium 2%), sub-angular to sub-rounded, trace sand (fine 2%, medium 2%, coarse 1%); dry to moist.	
			39			
		ML	40		SILT, low plasticity, medium stiffness, with clay (30%), with sand (fine 10%), mottling; moist.	
		SP	41		SILT, low plasticity, medium stiffness, with clay (20%), with sand (fine 10%), with gravel (fine 10%), sub-angular to sub-rounded, mottling; moist, 10YR 5/8.	
			42		SAND, fine to medium (fine 40%, medium 60%); wet, 10YR 4/6.	
DISCRETE	VAPJ-SOIL 41-43	ML	43		SILT, low plasticity, soft (50%), clay (35%), trace gravel (fine 5%), sub-angular; moist, 10YR 5/6 to 10YR 4/4. 49.5': 2" sand seam (fine 50%, medium 50%); wet.	
			44			

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA			JOB NO.: 60618753	LOCATION: East Metro, MN					
PROJECT: Project 1007			DRILLING METHOD: Sonic					BORING NO. VAPJ	
LOGGED BY: AS/AL	CHECKED BY: JM							SHEET 4 OF 6	
DRILLING CONTR.: Traut									
DRILLER: Andy Kritzeck	EQUIP.: Sonic		SAMPLING METHOD: 5' and 10' acetate bags					DRILLING START	DRILLING FINISH
BORING DEPTH: 74 FT BGS									
GROUND SURFACE ELEVATION: FT AMSL			WATER LEVEL					TIME	TIME
DATUM: NAD 83 UTM 15 (meters)			TIME					0920	1400
COMMENTS:			DATE					DATE	DATE
			CASING DEPTH					10-07-20	10-07-20

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			46		SILT, low plasticity, soft (50%), clay (35%), trace gravel (fine 5%), sub-angular; moist, 10YR 5/6 to 10YR 4/4. 49.5': 2'' sand seam (fine 50%, medium 50%); wet.	
			47			
			48			
			49			
		ML	50		SILT, low plasticity, medium stiffness, with sand (fine25%), with clay (20%), orange mottling - oxidation; dry, 10YR 5/1 to 10YR 4/6.	
			51			
			52			
			53			
			54			
		SP	55		SAND, fine (90%), sub-rounded, poorly graded, with clay (10%); moist, 10YR 5/1 to 10YR 4/6.	
			56		SILT, low plasticity, medium stiffness, with sand (fine 25%), with clay (20%), orange mottling - oxidation; dry, 10YR 5/1 to 10YR 4/6.	
			57			
		ML	58			
			59			
		SP			SAND, fine to medium (fine 65%, medium 15%),	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPJ
LOGGED BY: AS/AL	CHECKED BY: JM		SHEET 5 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME 0920 / TIME 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE 10-07-20 / DATE 10-07-20
	CASING DEPTH		

SURFACE CONDITIONS: Grass

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
COMP GRAB	VAPJ-SOIL 60-62 VAPJ-GW 60-62	SP	61		sub-rounded, poorly graded, with silt (35%); moist, 10YR 5/1 to 10YR 4/6. SAND, fine to medium (fine 80%, medium 20%), poorly graded, grain size increases with depth; wet, 10YR 5/6.	
		ML	62		SILT, low plasticity, stiff, with sand, fine (15%), grain size reduced with depth; dry, 10YR 4/1.	
			63			
			64		SILT, low plasticity, stiff, with sand, fine (15%); dry, 10YR 4/6.	
	St. Peter Fm. @ 65' bgs	SM			SILTY SAND, fine (75%), silt (25%); moist, 10YR 5/6.	
			65		SANDSTONE, poorly cemented, fine to medium (20% fine, 80% medium), well-rounded; moist, white to orange	
			66			
			67		SANDSTONE, poorly to moderately cemented, massive mottling, fine to coarse (90% fine, 5% medium, 5% coarse), well-rounded; moist, 10YR 7/1 to 10YR 5/8 to white 8/N, 4" coarse sand seam @ 68' bgs	
			68			
			69			
		Os	70		SANDSTONE, poorly to moderately cemented, massive iron staining, fine (90%), well-rounded, silt/clay (10%); moist, 10YR 5/6	
			71			
COMP GRAB	VAPJ-SOIL 70-74 VAPJ-GW 70-74		72		SANDSTONE, poorly to moderately cemented, medium to coarse (15% medium, 85% coarse), well-rounded; moist, 10YR 8/1	
			73		SILTSTONE, moderately compacted, extremely weathered (very stiff clay), massive iron staining; dry, 10YR 5/8	
			74		SANDSTONE, poorly to moderately cemented, massive iron staining, fine (83%), well-rounded, clay (15%), trace cobbles @ 74' bgs (2%); moist, 10YR	

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ENVIRONMENTAL BORING LOG

CLIENT: MPCA	JOB NO.: 60618753	LOCATION: East Metro, MN	
PROJECT: Project 1007	DRILLING METHOD: Sonic		BORING NO. VAPJ
LOGGED BY: AS/AL	CHECKED BY: JM		SHEET 6 OF 6
DRILLING CONTR.: Traut			
DRILLER: Andy Kritzeck	EQUIP.: Sonic	SAMPLING METHOD: 5' and 10' acetate bags	DRILLING START / FINISH
BORING DEPTH: 74 FT BGS			
GROUND SURFACE ELEVATION: FT AMSL	WATER LEVEL		TIME: 0920 / 1400
DATUM: NAD 83 UTM 15 (meters)	TIME		
COMMENTS:	DATE		DATE: 10-07-20 / 10-07-20
	CASING DEPTH		

SAMPLE TYPE	SAMPLE LOCATION	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: Grass MATERIAL DESCRIPTION	WELL DIAGRAM
			76		5/9 E.O.B. @ 74' bgs, no refusal, Prairie du Chien @ 74' bgs.	
			77			
			78			
			79			
			80			
			81			
			82			
			83			
			84			
			85			
			86			
			87			
			88			
			89			

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Attachment C-2
Drilling Daily Logs

AECOM

Day/Date Mon, May 11, 2026

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 10-20°, cloudy (~10-15 mph)
Client MPCA

Arrive Job 0805
Depart Job 1830
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW6A
Golf Course

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0715 - Leave 0730 - Marie 0805 - arrive onsite
0945 - travel onsite 0805 - 0930 - geology kickoff
1000 - 1045 - safety tailgate w/ MPCA, MPH & Tec.
1130 - 1200 - lunch
1400 - travel finished setting up, leave for water
1515 - water onsite, drilling start @ MW6A
1600 - daily onsite
1700 - daryl & rebecca offsite

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): PID, dust monitor

☐ Calibrate PID
☑ Pictures of site & cores
Picture Location(s): MW6A Golf Course
☐ Video Logging

Footage Drilled (feet): 0 - 110
Location(s) Drilled (MW #'s): MW6A

Shipping

International Waybill #:
Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
☐ Gamma Log ☐ Commercial Invoice (S / W)
☐ Caliper Log ☐ Commercial Invoice (S / W)
☐ Multi-Parameter E-Log ☐ Commercial Invoice (S / W)
☐ EM Flow Meter Log ☐ Commercial Invoice (S / W)

Print Name: Amanda Iannuzzi
Signature:
Title: Geologist II

AECOM

Tuesday

Day/Date Nov. 12, 2019

ENVIRONMENTAL FIELD REPORT

2 of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60608807

Task Number ___

Weather/Temp. Simple → 10's

Client MPCA

Arrive Job 0810

Depart Job 1830

Hours on Job 10.5

Travel Time ~1½ hr

Project Coordination ___

Total Chargeable Hours ___

Mileage ___

Area Sampled MW6A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0730 - AM leave. 0740 - Make 0810 - arrive onsite, safety
0900 - start drilling NOON - lunch
1430 - Jim Felton onsite
1600 - Tony w/ MDS onsite for Dirk. Connect
1700 - Tony off site / Drillers - flush for video
1830 - Everyone offsite

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☑ Calibrate PID
- ☑ Pictures of site & cores
- Picture Location(s): ___
- ☐ Video Logging

Footage Drilled (feet): 110-170: 60 feet

Location(s) Drilled (MW #'s): MW6A

Shipping

International Waybill #: ___

Comm. Invoice Checklist & Type (S-Soil, W-Water)

- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Geophysical Logging

- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

Print Name Amanda Lanning

Signature ___

Title Geologist III

AECOM

Day/Date Wednesday MAY 13, 2015

ENVIRONMENTAL FIELD REPORT

3 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 20's, snow in afternoon
Client MPCA

Arrive Job 0800
Depart Job 1800
Hours on Job 10hrs

Travel Time ~1½hr
Project Coordination
Total Chargeable Hours
Mileage

-2 -2
Cut+2
Area Sampled
MW6A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0720- AM leave 0730- Pickup Mackie 0800- arrive onsite 0810- safety
0830- begin videoing 0900- video @ 110' bgs/bedrock
11- continue drilling 12- lunch Water level @ 9' bgs (true water level)
1330- hit jordan @ 181
-case down to 180
1530- Jim F. onsite
1600- Rebecca, Tony, Draw onsite to observe cuttings
~~1700~~ 1640- offsite, continue drilling
1700- end of boring @ 200' bgs; MW6A begin flushing for morning video

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): Drill ex video

☐ Calibrate PID
☐ Pictures of site & cores
Picture Location(s):

☐ Video Logging (TKillit- OK)

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): 170 200 30A

Location(s) Drilled (MW #'s): MW6A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name: Amanda Lanny
Signature:
Title: Geologist III

Video Logging 11/13/19

@ 110 - 117 : More sign of oxidation, dark red/black rock fragments & red staining

@ 144 - possible shale sheen (drill mud could ~ every ten/ten feet from 120 take up) look for coincident gamma peaks at these layers @ 155 - drilling mud obscuring sidewalls

@ 157.7 : 2 large holes

Video stop at 159.4 Memory collapse @ 160/162

154.4ft : 4-6inch-tall horizontal fracture; particles visibly moving into large fracture; acts as a "shelf" where sand grains collect; orange colored oxidized rock faces also visible on "shelf"

Open hole to be set at : 140/150 - 160 (shallow hole)

DVD with DCW

AECOM

Day/Date Thursday, Nov. 14, 2019

ENVIRONMENTAL FIELD REPORT

1 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 20's/30's
Client MPCA

Arrive Job 0810
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW06A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0720 - At Lease 0730 - Meet 0810 - onsite, safety
0820 - begin videoing, MGS onsite,
0930 - finish videoing, Steve at drill & down to
1130 - finish drilling continue logging due to need for Admin to sign MGS contract
1200 - lunch
1300 - driller begin pulling up casing & cleaning hole for geophysical

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☑ Calibrate PID
- ☑ Pictures of site & cores
- Picture Location(s): MW06A/video
- ☐ Video Logging (Trout DIC)

Footage Drilled (feet): 200-210: 10ft
Location(s) Drilled (MW #'s): MW06A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
- ☐ Gamma Log — ☐ Commercial Invoice (S / W)
- ☐ Caliper Log — ☐ Commercial Invoice (S / W)
- ☐ Multi-Parameter E-Log — ☐ Commercial Invoice (S / W)
- ☐ EM Flow Meter Log — ☐ Commercial Invoice (S / W)

Print Name Amanda Lannier
Signature
Title Geologist II

(MGS - on standby until admin signature)

AECOM

Day/Date Friday, Nov. 15, 2019

5 of ___

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60608807

Task Number

Weather/Temp. 30's

Client MPCA

Arrive Job 0845

Depart Job 1515

Hours on Job 6.5

Travel Time ~1.5

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled MW6A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0805 - AM leave 0815 - Maxfield

0845 - on site, 0900 - geophysics (Julian & Andrew) onsite, safety

1030 - finish up geophysics, develop plan for open hole & casing depths

1100 lunch 1130 - begin casing down to 185'

1245 - final okay from MDH for casing plan

1500 - finish casing & cement up to ~ 185 to 160

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ~~Calibrate PID~~
- ~~Pictures of site & cores~~

Picture Location(s): MW6A

- Video Logging

Geophysical Logging

- ~~Gamma Log~~
- ~~Caliper Log~~
- ~~Multi-Parameter E-Log~~
- EM Flow Meter Log

Footage Drilled (feet): None

Location(s) Drilled (MW #'s): MW6A

Shipping

International Waybill #:	Comm. Invoice Checklist & Type (S-Soil, W-Water)
	Commercial Invoice (S / W)
	Commercial Invoice (S / W)
	Commercial Invoice (S / W)
	Commercial Invoice (S / W)

Print Name Amanda Lanning

Signature

Title Geologist III

*electrical tape

182-185: 7.5 ← 182 - 9", change 185

187 - 16.5" [illegible]

Call w/ Alex Martell/MDH
@1200, 11/13/18

Special Well:
20' thick neat cement above basket

-here no approval letter for MWs A + B

Scenario 1:
casing down to
185

~~Over~~
Layer
178
Coon
182
18
#1
Caradoc
187
16.5'
#3
Unknown
192.7 bottom

11/15/19

MW6A
847058

9am – MGS arrived on-site for geophysical logging

1:20am – The gamma logging tool was dropped into the hole; the tool is 6.7ft long; 1.5in diameter

1:30am – Gamma logging started

9:40am – Tool stopped @ 188ft bgs, logging tool was removed; Gamma: Coon Valley is only ~2ft thick

9:54am – Caliper tool was dropped into the hole; approx. 7.23ft long; ~2.5in diam.

- MGS verified that the software does account for the length of the tool + where zero is located; the TOP of the tool is placed at ground surface where "zero" of the log starts

Static water level @ 9ft bgs

IDW

- CH drum pickup around 10am
- ACOM or MPCA needs to sign BOL
- 5 drums total, 55 gal
- JB adding Haz waste labels to all drums
- Jason – CH driver
- ★ CH will drop off 6 drums to landfill empty

160, 8"(9")

tools measure flow to tenth of a liter

180, 8"(9")

194, 6"(7")

AECOM

Day/Date Monday, Nov. 18, 2019

ENVIRONMENTAL FIELD REPORT

6 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 30's
Client MPCA

Arrive Job 0930
Depart Job ~~1800~~ 1815
Hours on Job

Travel Time N/S
Project Coordination
Total Chargeable Hours
Mileage

Area ~~Sampled~~ MW6A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0850 - leave 0930 - arrive onsite, ~~start~~ set up & start ~~~~ (0925), 1015 - travel back w/ water, safety
1030 - begin grouting MW6A
1100 AM create well constr. diagrams for MW6A & B
1230 - travel lunch
1400 - clean pipes, catching water in tarps
1440 - ~~take~~ Patrick w/ MDH onsite, Borden hole developing up 1000 gal H2O + 400 sal sand/G + collapsed to casing (@ 185'-195') mud

Samples Collected: None 1600 - Clean harbors, onsite to vac waste after that, set RISER & protop, move on to shallow well.

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

~~Calibrate PID~~

~~Pictures of site & cores~~

Picture Location(s): Amanda Phone MW6A

☐ Video Logging

Footage Drilled (feet): None

Location(s) ~~Drilled~~ (MW #'s): MW6A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
☐ Gamma Log ☐ Commercial Invoice (S / W)
☐ Caliper Log ☐ Commercial Invoice (S / W)
☐ Multi-Parameter E-Log ☐ Commercial Invoice (S / W)
☐ EM Flow Meter Log ☐ Commercial Invoice (S / W)

Print Name Amanda Canning
Signature
Title Ecologist ~~EIT~~

ENVDAILY.DOC

$150

$176 per person, private 4 wineries

159.50 3 wineries per person
lunch, wine tastings, cheese
↑
TBD

- book soon, email coming w/ flyer etc
30% non-refundable deposit at time of booking
balance due 1 week

Containment
1000 gall / 6 minute water
400 gal sand / 6 minute
← Terry out now

IDW pickup - 1600 to heated shop 11/18/19
1,000 gall water 400 gal sand

AECOM

Day/Date Tuesday Nov. 19, 2019

ENVIRONMENTAL FIELD REPORT

7 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. Low-mid 30s
Client MPCA

Arrive Job 0750
Depart Job 1800
Hours on Job

Travel Time 1.5
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW6B (847059)

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0700 - MM/Camile leave 0715 - pick up Maeve
0745 - onsite safety
0840 - begin drilling 0840 - begin WT sample
0923 - ambient WT @ 10.8' 1000 - begin 36-40 sample 1200 - lunch
1330 - ambient WT @ 13' bgs
1345 - BI-05 sample
1520 - finish water, drill onto 11D
@1530, calibrated YSI: 9.45; 6.97; 380; conductivity out of range due to temp.
1649 - grab/collect 10 & 11D samples
@1715 1800 - leave site
(discreete) @0820 @0830

Samples Collected: MW6B-SOIL-6-7-01-111919; EQ-PUMP-111919 @0830
~~EQ-PUMP-111919~~ MW6B-SOIL-10-13-01-111919; MW6B-SOIL-36-40-01-111919
MW6B-GW-11-13-01-111919; MW6B-SOIL-37-38-01-111919 @1045
MW6B-SOIL-8.5-10-01-111919; MW6B-SOIL-38-39-01-111919 @1050
@0930

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

On back

☐ ~~Calibrate PID~~
☐ ~~Pictures of site & cores~~
Picture Location(s):

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): None
Location(s) Drilled (MW #'s): MW6B

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Amanda Lanning
Signature
Title Geologist III

samples collected:

MW6B-6W-36-40-01-111919 @ 1105 ✓
MW6B-6W-36-40-02-111919 @ 1110 ✓
MW6B-6W-36-40-03-111919 @ 1115 ✓ MS
MW6B-6W-36-40-03-111919 @ 1120 ✓ MSD
MW6B-SOIL-46-47-01-111919 @ 1320 ✓
MW6B-SOIL-46-47-02-111919 @ 1325 ✓
MW6B-SOIL-46-47-03-111919 @ 1330 ✓
MW6B-SOIL-81-85-01-111919 @ 1335 ✓
MW6B-6W-81-85-01-111919
MW-6B-SOIL-106-110-111919 @ 1520 ✓
@ 1649 ✓ composite

EQ-PUMP-111919 @ 0820
EQ-DRILLBIT-111919 @ 1645 ✓

Trip Blank: 8125 4333 1205 ✓, 11/19/19

AECOM

Day/Date Wednesday, November 20, 2019

ENVIRONMENTAL FIELD REPORT

8 of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number:
Weather/Temp: Overcast, 30's
Client: MPCA

Arrive Job: 0730
Depart Job: 1815
Hours on Job: 11.75
Travel Time: 1 hr
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled: MW6B (847059)

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0655 - AM Leave 0730 - AM onsit, safety ~~0800~~ 0745 - drive
0830 - Alex onsite
0800 - drillers begin for water at 106-110
0930 - collect 106-110 water sample / prep + check cooler
0945 - drew took cooler to ship
1130 - finally pulled up core to 133, spacial to 132.6
1400 - additional VAP sample @ new bedrock contact
1430 - Makie + AL onsite
@ 1800 calibrate) YSI 10: 10.25 7.00: 7.46
4: 3.21, / conductivity auto? sure

Samples Collected:
MW6B-GW-106-110-01-112019 @ 0930
MW6B-SOIL-129-133-01-112019 @ 1145

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☐ Calibrate PID
- ☐ Pictures of site & cores
  Picture Location(s): Amanda's Makie Phone
- ☐ Video Logging

Geophysical Logging
- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

Footage Drilled (feet): 110-140 (30ft)
Location(s) Drilled (MW #'s): MW6B
Shipping (shipped 11/21)
International Waybill #: 8125 4333 1205
Manifesto 7782-1938-1002
Comm. Invoice Checklist & Type (S-Soil, W-Water)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name: Amanda Lamm
Signature:
Title: Geologist III

AECOM

Day/Date Thursday, November 21, 2019

ENVIRONMENTAL FIELD REPORT

9 of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number:
Weather/Temp.: Snow/30's
Client: MPCA

Arrive Job: 0830
Depart Job: 1500
Hours on Job: 9.5
Travel Time: 1 hr
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled (847059) MW6B + EP16 + EP12

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0750 - AM Leave
0830 - onsite, safety; MGS onsite start geophysics
1030 - geophysics done; AM, HT, & AS surface/sed @ EP16
1100 - AS/HT surface/sed @ EP12 1100 ~~drilling~~ start + purging @ 136-140
1230 - driller lunch
1230 - grab sample (VAP) @ 136-140
1545 - AM offsite, JM onsite
drillers grouted well
1800 - Blackstone offsite

Samples Collected: MW6B-GW-136-140-01-112119 @ 1230
EP16-WAT-SUR-01-112119 @ 1050 EP16-WAT-SUR-02-112119 @ 1045
EP16-SED-0-6-01-112119 @ 1100 EP16-SED-0-6-02-112119 @ 1105
~~PFAS~~ EP12-WAT-SUR-01-112119 @ EP12-SED-0-6-01-112119
@ 1140

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): 135
→ + Trip Blank: "8125433311 3" ~~11/19~~ 11/20/19

- [x] Calibrate PID
- [x] Pictures of site & cores
- Picture Location(s): MW6B-AM Phone + EP16 EP12-phone
- [x] Video Logging

Geophysical Logging
- [x] Gamma Log
- [x] Caliper Log
- [x] Multi-Parameter E-Log
- [x] EM Flow Meter Log — N/A, tool being repaired

Footage Drilled (feet): 140-150 (10 ft)
Location(s) Drilled (MW #'s): MW6B
Shipping (shipped 11/24)
International Waybill #: 8125 4333 1113 ↓ changed: 778219299847
Comm. Invoice Checklist & Type (S-Soil, W-Water)
- [ ] Commercial Invoice (S / W)
- [ ] Commercial Invoice (S / W)
- [ ] Commercial Invoice (S / W)
- [ ] Commercial Invoice (S / W)

Print Name: Amanda Lonnin
Signature:
Title: Geologist III

Video Notes

Measured bottom @ 141.2 + 4-6", so probably 0ft

139.9 - fracture, possible flow

138.3 - fracture, not all the way around

137.2 - fractures, maybe a couple inches wide each

136.9 - fracture

136.6 - fracture w/ possible flow

135.8/.7 = casing

Gamma:

Nothing notable

Caliper

7½ → 8½ at the casing

↓

borehole

small peaks @ fractured zones, nothing major

AECOM

Day/Date Friday, November 22, 2019

ENVIRONMENTAL FIELD REPORT

10 of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60608807

Task Number 20's

Weather/Temp. ___

Client MPCA

Arrive Job 0815

Depart Job 1400

Hours on Job ___

Travel Time 1 hr

Project Coordination 0640-0720 (lab stuff)

Total Chargeable Hours ___

Mileage ___

Area Sampled MW6B B54

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0720 - AM leave, get gas etc 0815 - arrive onsite safety
0830 - 0945 - drillers develop MW6B - purge 400 gals
1000 - 1130 - finish up @ site + do paperwork
1130 - drive onsite, unload tint & pick up
1230 - Site recon at B54
1400 - offsite
1430 - back home

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID

☐ Pictures of site & cores

Picture Location(s): Amanda

☐ Video Logging

Footage Drilled (feet): None

Location(s) Drilled (MW #'s): ___

Shipping

International Waybill #: ___

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging

☐ Gamma Log ___ ☐ Commercial Invoice (S / W)

☐ Caliper Log ___ ☐ Commercial Invoice (S / W)

☐ Multi-Parameter E-Log ___ ☐ Commercial Invoice (S / W)

☐ EM Flow Meter Log ___ ☐ Commercial Invoice (S / W)

Print Name Amanda Lannin

Signature ___

Title Geologist III

Trucks, vehicles etc block trails vs. meadow

AECOM

Day/Date Monday, Nov. 25, 2019

ENVIRONMENTAL FIELD REPORT

11 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60608807
Task Number
Weather/Temp. Cool, partly sunny low 40s
Client MPCA

Arrive Job 0930
Depart Job 1642
Hours on Job 7
Travel Time 1 hour
Project Coordination
Total Chargeable Hours
Mileage 2015 Ford F-150; 090TWN 51870-
Area Sampled MW6A / Royal Golf Club

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0850 - departed for site (MGD)
0930 - arrived on-site (MGD); D. Tarara arrived shortly afterwards; D. Pflipsen was already on-site; driller's helpers were enroute from getting water from Lakeland
1030 - safety tailgate; overview of days activities
1110 - drillers left site for lunch
1150 - drillers return from lunch; DK arrived with new employee to train; MGD reviewed site-specific safety hazards with Trant helper
1245 - D. Tarara + DK meeting
1335 - drillers able to install a 7-foot screen, bottom of screen @ 192 ft bgs; will begin to develop MW6A - completed @ ~1510
1530 - Clean Harbors pumping IDW water into tank; D. Tarara meeting CH @ Sunbelt site
1630 - drillers leave site; 1642 - MGD left site

Samples Collected: NONE

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): N/A

MGD

☐ Calibrate PID N/A
☑ Pictures of site & cores
Picture Location(s): Marie's phone
☐ Video Logging N/A

Footage Drilled (feet): ~~N/A~~ 7-foot screen into Jordan
Location(s) Drilled (MW #'s): N/A

Shipping

International Waybill #:

Geophysical Logging N/A N/A
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Marie DelosSantos
Signature Marie DelA
Title Geologist

AECOM

Day/Date Monday, December 2 2019

ENVIRONMENTAL FIELD REPORT

12 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. Teens - 20's, Sunny
Client MPCA

Arrive Job 0945
Depart Job 1600
Hours on Job 6.25

Travel Time 1½ hr
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW4A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0840 - Leave 0900 - Maria 0945 - onsite, empty pad
1000 - Alex + Drew onsite
1400 - Lunch
1345 - start drilling ~~MW4A~~ MW5A
1600 - leave for day
1640 - Home

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☑ Calibrate PID
- ☑ Pictures of site & cores
- Picture Location(s): Amanda's Phone
- ☐ Video Logging

Footage Drilled (feet): 0-70 (70')
Location(s) Drilled (MW #'s): ~~MW4A~~ MW5A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name Amanda Lannin
Signature
Title Geol. Tit

AECOM

Day/Date Tuesday, December 3, 2019

ENVIRONMENTAL FIELD REPORT

13 of ___

Project Name Project 1007 | Project Number 60608807

Location Saint Paul East Metro, MN | Task Number

Weather/Temp. 20-30's, sunny

Client MPCA

Arrive Job 0850 | Travel Time ~2.25hrs | Area Sampled MW5A

Depart Job 1900 | Project Coordination

Hours on Job 10, 10 min | Total Chargeable Hours

Mileage

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0740 - leave 0820 - hanna 0830 - AS onsite
0850 - AL & HT onsite (started drilling @ 0840)
1140 - lunch ; 1400 - MGD onsite ; 1735 - MHB offsite
1830 - done drilling
1900 - offsite
2000 - AL back home

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☐ ~~Calibrate PID~~
- ☐ ~~Pictures of site & cores~~
- Picture Location(s): 100-190 (AL camera) 60-100 (AS camera)
- ☐ Video Logging

Footage Drilled (feet): 60-190 (130')

Location(s) Drilled (MW #'s): MW5A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging

- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name Amanda Lanny

Signature

Title Geol III

AECOM

Day/Date Wednesday, December 4, 2019

ENVIRONMENTAL FIELD REPORT

14 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 20's/30's Sunny
Client MPCA

Arrive Job 0800
Depart Job 1800
Hours on Job 10hr

Travel Time 1½hr
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW5A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0715 - Leave 0800 - arrive onsite 0925 - MGS (Julia) onsite
0845 - Set up video 1030 - finish video 1100 - MGS offsite
1045 - drew onsite; drill ~~started~~ to 210 offsite
1200 - lunch 1330 - Alex onsite drew wells & drillers began casing hole
1430 - Alex leave w/ waste
1600 - Alex back on site & leaves.
1800 - leave site, call drew & AL
1900 - home

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☑ Calibrate PID
- ☑ Pictures of site & cores
  Picture Location(s): Amanda Phone
- ☑ Video Logging (Noted on back)

Footage Drilled (feet): 190 - 210 (20 ft) → 220ft?
Location(s) Drilled (MW #'s): MW5A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
- ☐ Gamma Log — ☐ Commercial Invoice (S / W)
- ☐ Caliper Log — ☐ Commercial Invoice (S / W)
- ☐ Multi-Parameter E-Log — ☐ Commercial Invoice (S / W)
- ☐ EM Flow Meter Log — ☐ Commercial Invoice (S / W)

Print Name: Amanda Lanning
Signature:
Title: Geologist III

Shore!

Green-clay: Paleozoic clay deposited on rock; rock oxidized due to iron content in rock vs clay

Video Log Notes 12/4/17 MGS, Julia

19.5 - WL

6" @ 62' bgs

8" @ 70' bgs - 7" hole down to 190, open to 187'

minor fractures @ 80.7/81 78.6 - cavity

81.5/6 bedding plane fracture, no flow

83.7 "rubble zone

84.3 - ~~84.7~~ 86.4 = vertical fracture on both sides of hole (flow affected slightly)

88.5 - bedding, horizontal minor fracs all the way around

@ 89.7 - very weathered, "rubbly"

Cavity @ 90.5 ("rubbly")

@ 95.7 - rubbly, BPF/shelf all the way around flow not affected

@ 96.6 - BPF (all around)

@ 100.3 - fracture, probably what we saw @ 102

@ 104.8 - fracture (not all the way around)

@ 112.7 - BPF

@ 115.6 - open cavity (common in L)

118.5 - BPF, enough to affect flow

@ 123.9 - cavity (per Julia, flow appears to [illegible])

@ 128.9, BPF then [illegible] letting water in

@ 131.6 - fracture (not all way around)

@ 135.6 - couple minor fractures

@ 139.2 - BPF + 139.9

@ 142.5 - BPF

@ 144.2 - fracture / cavity

@ 157.1 Cavity (water economy)

@ 158.0 BPF, minor

@ 172.3 fractured

@ 179.6 fracture w/ extra flow

@ 119.2, cavity; vertical-ish fracture

AECOM

Day/Date Thursday December 5, 2019

ENVIRONMENTAL FIELD REPORT

1 of 6

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 20's-30's, snowy
Client MPCA

Arrive Job 0800
Depart Job 1715
Hours on Job 9.25

Travel Time ~1.25
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW5A
Lakeland Water (Municipal)

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0715 - Amanda Leave 0800 - onsite, safety 0915 - Alex onsite
1030, calibrate YSI pH 10: 9.98 pH 7: 7.16 pH 4: 3.53
1100 - All back, discuss sample depths & well construction
1200 - site recon at new BS4 w/ Dan
1300 - Alex offsite 1315 - Amanda leaves w/ Diz to grab source water samples (Lakeland)
1345 - sample grab
1430 - back at site
1715 - off site

Samples Collected:
EQ-LAKELANDWATER-120519 @ 1345

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☑ Calibrate PID
- ☐ Pictures of site & cores
  Picture Location(s):
- ☐ Video Logging

Footage Drilled (feet): None
Location(s) Drilled (MW #'s):

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
- ☐ Gamma Log — ☐ Commercial Invoice (S / W)
- ☐ Caliper Log — ☐ Commercial Invoice (S / W)
- ☐ Multi-Parameter E-Log — ☐ Commercial Invoice (S / W)
- ☐ EM Flow Meter Log — ☐ Commercial Invoice (S / W)

Print Name: Amanda Lannig
Signature:
Title: Geologist II

AECOM

Day/Date Mon. Dec 9, 201

ENVIRONMENTAL FIELD REPORT

Page 1 of 5

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. Cold windy 19-2
Client MPCA

Arrive Job 1200
Depart Job 1900
Hours on Job 7

Travel Time ~2 hrs
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MWSB-BSS-Lake Elmo Park Reserve Fishing Pier

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

1200 - MG arrived on-site; HT arrived @ BSS, few setup
1245 - drillers left to get water
1310 - AS arrived on-site
1400 - began drilling MWSB
~1550 - pump failure; drillers repair pump for 2nd VAP GW sample
1815-1825 - collected 2nd VAP GW sample
1830 - drillers left site; 1845 - AS + HT left site; 1900 - MG left site

MGD NOTE: ALL DISCRETE SOIL INTERVALS LISTED BELOW:

Samples Collected: MWSB-SOIL-8-9-01-120919(1410); MWSB-SOIL-48-49-01-120 (160
MWSB-SOIL-16-18-01-120919(1420); MWSB-SOIL-18-20-01-120919(1425);
MWSB-SOIL-28-30-01-120919(1540); MWSB-SOIL-28-30-02-120919(1545);
MWSB-SOIL-28-30-03-120919(1550); MWSB-GW-31-35-01-120919(1530);

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): MWSB-SOIL-31-32-01-120919(1605)
MWSB-SOIL-34-35-01-120919(1608); EQ-REGULARPUMP(1615) on back

☑ Calibrate PID

Footage Drilled (feet): 0-55' (55ft total)

☐ Pictures of site & cores
Picture Location(s): samples - Marie's phone; cores - Alex's phone

Location(s) Drilled (MW #'s): MWSB

☐ Video Logging N/A

Shipping

International Waybill #: see 12/10/19 field report

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
☐ Gamma Log N/A
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Marie De los Santos
Signature
Title Geologist

MW5B-SOIL-45-49-01-120919 (1645) - discrete

MW5B-SOIL-5054-01-120919 (1700) - composite

MW5B-GW-51-55-01-120919 (1815) - discrete

MW5B-GW-51-55-02-120919 (1820) - discrete

MW5B-GW-51-55-03-120919 (1825) - discrete

~~MW5B-SOIL-55-56-01-~~

AECOM

Day/Date Tues. Dec. 10, 2019

ENVIRONMENTAL FIELD REPORT

9 of 15

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60608807
Task Number
Weather/Temp. Cold, breezy 1-3°F
Client MPCA

VAP 55-58'

Arrive Job 0840
Depart Job 1750
Hours on Job 9
Travel Time ~1.5hrs
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled MW5B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0840 – MT) arrived on-site; drillers already on-site, en route back from getting decon water
~0930 – safety tailgate; drillers begin clearing snow along trail
~0945 – begin water quality (YSI) measurements; JM arrived on-site
1020 – collected 3rd VAP GW sample; continued drilling into bedrock
1130 – drillers leave for lunch; stopped @ 70' (Quat/bedrock interface @ 58')
1200 – CH pumped out wastewater tank; AECOM left for lunch, returned @1315; Continued drilling @1330, HT departed site
~1615 – reached 120'; drillers prepped for setting well; 1725 – Trautt left site

Samples Collected: MW5B-SOIL-55-58-01-121019 (0915, composite); MW5B-GW-55-58-01-121019 (1020) – will ship out tomorrow

1750 – AECOM left site

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID
☐ Pictures of site & cores
Picture Location(s): cores – Marie's phone; MW5C – Al's phone
☐ Video Logging N/A

Geophysical Logging
☐ Gamma Log N/A
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): 55' – 120' (65 ft total)
Location(s) Drilled (MW #'s): MW5B

Shipping

International Waybill #: AXYS Samples ONLY 812543331146

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☑ Commercial Invoice (S/W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Marie De los Santos
Signature Marie De los Santos
Title Geologist

AECOM

Day/Date Wed. Dec 11, 2019

ENVIRONMENTAL FIELD REPORT

19 ~~DRO~~ of

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. Cold, 0°F
Client MPCA

Arrive Job 0920
Depart Job 1545
Hours on Job ~~6.50~~ 6.5

Travel Time ~1.5 hrs
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW5B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0915 - JM arrived on-site
0920 - MGD arrived on-site; drillers begin work after safety tailgate
1145 - drillers left for lunch; DT arrived to pick up coolers for shipment; JM + DT left for lunch
1500 - Traut left site
1530 - James + Alex left site
1545 - Mark left site
~~1615~~
1415 - 1440 : MDH on site

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ ~~Calibrate~~ PID

☐ ~~Pictures~~ of site & cores
Picture Location(s): Shipping docs - Manifolds

☐ Video Logging

Geophysical Logging
☐ Gamma Log N/A
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): None

Location(s) Drilled (MW-#'s):

Shipping

International Waybill #: SEE 12/10/19 field report

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Serjeem

Signature

Title Geologist

AECOM

Day/Date Thurs, Dec 12th, 2019

ENVIRONMENTAL FIELD REPORT

20 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. snowy, 17°F
Client MPCA

Arrive Job 0945
Depart Job 1600
Hours on Job 8.25

Travel Time ~2 hrs (snow)
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW-5B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0945 - AS arrive on site, drillers left to get water - snow on roads caused delay
1130 - all staff left for lunch
1300 - safety tailgate; drillers prep for well development
1430 - Clean harbors trucks pipes frozen, 1000 gallons in drillers tank
1745 - Trant off site; clean harbors took water
1800 - AS off site

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID
☐ Pictures of site & cores
Picture Location(s):

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): None

Location(s) Drilled (MW #'s):

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Serjeant
Signature
Title Geologist

AECOM

Day/Date Friday Dec. 13, 2019

ENVIRONMENTAL FIELD REPORT

22 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. Cold, 18°F
Client MPCA

Arrive Job 0720
Depart Job 1400
Hours on Job

Travel Time ~1.5hrs
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW4A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

†0720 5M on-site to prep for drilling, ~~dri~~ Trout warming up equipment & getting heater.
†0830 Safety meeting
- 900 started drilling
- hit bedrock at 90' around 1200
- lunch 1245 Heard rumors on site
- Packed up for weekend
- 1400 Drillers left for weekend

Samples Collected:
see back

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID
☐ Pictures of site & cores
Picture Location(s): Hanna phone
☐ Video Logging

Footage Drilled (feet): 0-90 (90 ft)
Location(s) Drilled (MW #'s): MW4A

Shipping
International Waybill #:

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

To be shipped following week

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Hanna Terwilliger
Signature
Title Env Eng

Sample list

Name	Time	Rationale
MW4A-soil-8-8.5-01-121319	905	clay lense in between sand ~~layers~~ very small amount.
MW4A-SOIL-20-21-01-121319	0940	wet med/coarse sand above silty sand layer
MW4A-SOIL-21-23-01 121319	~~09~~ 945	wet silty sand ~~at water table~~
MW 4A-soil-31-32-01-121319	955	clay sand (more clay than previous)
MW 4A-soil-37-38-01-121319	1000	more clay content as move deeper
MW4A-soil-38-40-01-121319	1005	Sand just below competent clay sand
MW4A-soil-50-52-01-121319	1018	Fine Sand - collected to cover next 10 feet
MW4A-soil-60-62-01-121319	1019	next 10 feet - more gravel
MW4A soil.-68-70-01 121319	1021	Fining up of sand grain
MW4A-soil-74-75-01-121319	1035	Sand composite
MW4A-soil-74-75-02-121319	1037	Dup
MW4A-Soil-74-75-03121319	1040	MS/MSD
MW4A-SOIL-80-81-01-121319	1115	weathered Bedrock above sand
MW4A-SOIL-85-86-01-121319	1120	fine sand lens between weathered bedrock
MW4A-SOIL-88-89-01-121319	1125	weathered bedrock beneath sand

above weathered bedrock

AECOM

Day/Date Monday, December 16, 2019

ENVIRONMENTAL FIELD REPORT

2 of 2

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number 20's/teens, $20's
Weather/Temp. Cloudy
Client MPCA

Arrive Job 0945
Depart Job 1630
Hours on Job

Travel Time 1½ hr
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW4A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0830 - hanna onsite
0835 - AL leave (uber) to get truck 0900 - get truck
0945 - AL onsite & drillers start up, load stuff in tent
1145 - when 1230 begin drilling at MW4A
1500 - finish drilling at 160' bgs, begin flushing hole
1600 - end flushing, discuss samples
1630 - drew onsite, AL & hanna offsite
1515 - AL home

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID

☐ Pictures of site & cores
Picture Location(s): Amanda Phone MW4A

☐ Video Logging

Footage Drilled (feet): 110-160 (50ft)

Location(s) Drilled (MW #'s): MW4A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Amanda Lanning

Signature

Title Geol. III

AECOM

Day/Date Tuesday, December 17, 2019

ENVIRONMENTAL FIELD REPORT

Page 23 of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number: ___
Weather/Temp.: Teens
Client: MPCA

Arrive Job: 0745
Depart Job: 1515
Hours on Job: ___
Travel Time: 1 hr
Project Coordination: ___
Total Chargeable Hours: ___
Mileage: ___
Area Sampled: MW4A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0710 - AL leave 0745 - AL onsite
0800 - MGS + Hanna safe
0930 - drew arrive
1000 - finish w/ MGS (video notes on back)
1100 - lunch
1145 - set well
1430 - drew offsite with cooler
1500 - drillers offsite
1515 - AL offsite
1600 - AL home

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID
☑ Pictures of site & cores
Picture Location(s): ___
☑ Video Logging

Geophysical Logging
☑ Gamma Log
☑ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log
— hole too muddy

Footage Drilled (feet): None
Location(s) Drilled (MW #'s): ___

Shipping
International Waybill #: 8099 6432 5864
Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name: Amanda Lanning
Signature: ___
Title: Ecologist II

ENVDAILY.DOC

146- starts to get
152- gets really cloudy, 153.1=bottom

46.7 - vertical fracture, iron stained, flow likely affected
-145.3
43.0 - BPF, flow no affected

36.4 - minor fracture, flow not affected
1337. - fracture around hole, flow going in
132 - shakopee-like bedding
129.9 - minor fracture, flow not affected
129.0 - cavity, weathered, flow possibly affected
128.4 - minor fractures/bedding features?
126.4 - fracture (minor)
~~125.1~~ 124.5 - 125.8 - clear bedding
24.2 - minor fractures, rubbly
123.5 - rubbly
119.4 - fracture across hole diameter
16-132 - weathered, rocky
10 - rubbly, cavities
1035 - rubbly
15.3 - cavity, rubbly

AECOM

Day/Date Wednesday, December 18, 2019

ENVIRONMENTAL FIELD REPORT

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number:
Weather/Temp: Single Digits -> Teen, 10 mph wind
Client: MPCA

Arrive Job	1200	Travel Time	1.5 hr	Area Sampled	MW4A
Depart Job	1730	Project Coordination			
Hours on Job	5.5	Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

1120 - AL leave
1200 - AL onsite 1222 - AL called Clean Harbors to come to site within an hour - hour
1330 - AL follow up w/ Terry - he says he is and a half an hour out
1450 - AL follow up w/ Terry - flat tire, 20 minutes out
1530 - AL follow up w/ Terry - traffic, 20 minutes out
1555 - Clean Harbors onsite
1610 - Leave site to Sunbelt 1625 - Arrive at Sunbelt
1650 - head back to site 1730 - Terry + Trent + AL offsite (loaded truck of remaining location from dumpster)
1815 - home

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID

☐ Pictures of site & cores
Picture Location(s):

☐ Video Logging

Footage Drilled (feet): None

Location(s) Drilled (MW #'s):

Shipping

Geophysical Logging	International Waybill #:	Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Gamma Log		☐ Commercial Invoice (S / W)
☐ Caliper Log		☐ Commercial Invoice (S / W)
☐ Multi-Parameter E-Log		☐ Commercial Invoice (S / W)
☐ EM Flow Meter Log		☐ Commercial Invoice (S / W)

Print Name: Amanda Lanning
Signature:
Title: Geologist III

AECOM

Day/Date 12/19/19

ENVIRONMENTAL FIELD REPORT

25 of ___

Project Name Project 1007 | Project Number 60608807

Location Saint Paul East Metro, MN | Task Number ___

Weather/Temp. ___

Client MPCA

Arrive Job 800 | Travel Time 30 min | Area Sampled BS4, staging area

Depart Job 1200 | Project Coordination ___

Hours on Job ___ | Total Chargeable Hours ___

Mileage ___

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

800 arrive on site, Drillers started developing MW5B

930 finished developing
Packed up tent and put items into pod
Off loaded water for disposal

1045 Drillers left for lunch they will return for trucks

1055 clear markers on site for drums

1200 - offsite

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID

☐ Pictures of site & cores

Picture Location(s): None

☐ Video Logging

Geophysical Logging

☐ Gamma Log

☐ Caliper Log

☐ Multi-Parameter E-Log

☐ EM Flow Meter Log

Footage Drilled (feet): None

Location(s) Drilled (MW #'s): ___

Shipping

International Waybill #: | Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

Print Name Amanda Lanning

Signature [signature]

Title Geol III

AECOM

Day/Date Monday, January 6, 2020

ENVIRONMENTAL FIELD REPORT

26 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60608807
Task Number
Weather/Temp. 20-30's, sunny
Client MPCA

Arrive Job 0930
Depart Job 1815
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area ~~Sampled~~ MW3 + staging area

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0840 - Leave 0930 - At onsite w/ staging area
0935 - Travel onsite 0940 - Drew + Clean Harbors onsite
0945 - 1115 PJ007 meeting (phone)
1100 - Alex onsite 1115 - break for lunch
1215 - set up in tent 1530 - start drilling MW3A
1700 - hit bedrock @ 74-80' bgs
1800 - Alex offsite
1815 - Amanda + drillers offsite

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☐ ~~Calibrate PID~~
- ☐ ~~Pictures of site & cores~~
- Picture Location(s): Alex phone 1 pic on AM phone of operators
- ☐ Video Logging

Footage Drilled (feet): 0-80
Location(s) Drilled (MW #'s): MW3A

Shipping
International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name Amanda Canning
Signature
Title Geol. III

ENVDAILY.DOC

Meeting Action Items

- Surface micro-layer - find ~~more~~ newer/resolution image
- Complex Problem slide - update
  - Map, Marie task
- ~~Marie add~~ Amanda - check B-B' background data
- Drew to forward slide deck
- Determine who's presenting what for 14/15th meeting
- Drew to follow up w/ ~~Alex~~ Lab
  - Marie + Amanda to put together bullet points for inventory
- Tuesday
  - Monday - public notice
  - Tuesday - 60 minute politicians + work group @ cottage group
    - 12th morning (20-?s)
    - ~~Tuesday~~ 12th afternoon
    - ~~Wednesday~~ 13th - 30 minute to public
      - ↳ Camille ~~+ James~~ availability
      - Hanna + Alex

Thursday → Drew + Marie here w/ drone
Amanda in office w/ All

- next drill sites, 20 days for Admin Process
  preferably Hadley + Menards
  V.S. perception of not doing west with more impacts
  BUT access + weather delays
- inventory? still waiting from Barr
- groundwater sampling - Marie to dig into

AECOM

Day/Date Tuesday Jan 7, 2020

ENVIRONMENTAL FIELD REPORT

2 of

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0835
Depart Job 1810
Hours on Job

Travel Time 1.5
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW3A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0750 - AL leave
0835 - AL onsite 0900 - Alex onsite

1230 - lunch

1800 - finish
1810 - leave

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID
☐ Pictures of site & cores
Picture Location(s): Alex + Amanda
☐ Video Logging

Footage Drilled (feet): MW3A
Location(s) Drilled (MW #'s): 180-210 (130')

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Amanda Lamm
Signature
Title Geol. II

AECOM

Day/Date Wednesday 1-8-2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number:
Weather/Temp.: 2°F
Client: MPCA

Arrive Job: 0715
Depart Job: 1815
Hours on Job: 11
Travel Time: 1.5
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled: MW3A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0715 - AM onsite 0730 - MGS onsite
0745 - Hanna onsite, DP30 AS onsite
1050 - MGS offsite, AZ onsite 0930
1115 Drillers left for lunch returned 1200
1200 started drilling, ended at 250 feet (Tordem at 221)
1500 started casing (case to 230 feet, open 230-250)
1600 started setting the well (no grouting)
1815 - Drillers + AS off site

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID

☑ Pictures of site & cores
Picture Location(s): Hanna Phone

☑ Video Logging — notes on back

Geophysical Logging
☑ Gamma Log
☑ Caliper Log
☑ Multi-Parameter E-Log (1:1 water to grout)
☐ EM Flow Meter Log — not done

Footage Drilled (feet): 210 - 250'
Location(s) Drilled (MW #'s): MW3A

Shipping

International Waybill #:	Comm. Invoice Checklist & Type (S-Soil, W-Water)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)

Print Name: Amanda Lannin
Signature:
Title: Geol III

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Video Notes

only one flow affected fracture at ~88.9-89.0

*88.9-89.0 - possible optic might be the source of the silt layer

looks like ~~bottom~~ top of coring @ 84.5 + ~~217.0~~ - may be off depth-wise

bottom fracture

217.1

208.0 - fracture, no flow affected

202.8 - bedding planes, no flow affected

186.9 - thin fractures horizontal

173.8 - horizontal fracture, no flow affected

still okay w/ 170 as the contact; 170-180 oxidized dolom. precip

166.1 - h. fract., vuggy

161.7 - green/gray silt (in the w/ "platy" core at

158.5 - horizont. fracture, no flow affected

157.9 - fracture visible; down-flow observed (not related to fracture)

155 - rubbly, weathered

-154.5

114.3 - fracture

110.3 - cavern

151.2 - rubbly, small cavity (no flow affected

107.7 - cavity

103.9 - fract.

149.8 - thin fracture

149.9 - thin fracture

101.7 - rubbly, heavily weathered

148.1 - vuggy fracture zone

145.4 - vuggy zone

95.4 loose

147.8 - rubbly + fracture zone

-.6

+144.0

90.1 - fract. rubbly zone

147.0 - vugs/cavities (small, no flow aff)

89.4 flow in the zone

143.4 - rubbly, fractures

-143.1

142.7 - thin fracture / vuggy zone

*could be the fractures here don't affect ambient flow but will take in water under pressure

141.8 - NO switch

40.1 - rubbly/fracture zone

136.0 - rubbly/fracture zone ← doesn't look like

89.0 Thin fracture, some loose

132.1 - vugs 131.4 - fracture, weathered area

120.3 - fracture, no visible

123.1 - fracture, iron oxidized

115.8 - cavern, possible contra

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Day/Date Thursday 1-9-20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60608807
Task Number
Weather/Temp. 32°F
Client MPCA

Arrive Job 0815
Depart Job 1700
Hours on Job 8.75
Travel Time 1.5
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled N/A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0815 - AS arrives on site, drillers on site setting up
0900 - tailgate meeting
0915 - Drillers begin cementing the well (MW3A)
1045 - Drillers set up equipment in parking lot + break for lunch
1100 - 1145 - AS out for lunch
1230 - Drillers begin 2nd round of cement for well
1700 - drillers + AS off site

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID

☐ Pictures of site & cores
Picture Location(s): None

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): none
Location(s) Drilled (MW #'s): MW3A

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Senjem
Signature
Title Geologist I

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AECOM

Day/Date Friday 1-10-20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 20°F
Client MPCA

Arrive Job 0815
Depart Job 1415
Hours on Job 6 hrs

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW3A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0815 - AS arrived on site, drillers out getting water
930 - Drillers grouting MW3A,
1100 - Drillers left for lunch
1200 - Amanda onsite, Alex leave for lunch
1415 - Drillers finish developing MW3A (project Amanda offsite; Alex left 2-3 well volumes w/ clean harbors to take water to frac tank (and picked up bottles at pace)

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☑ Calibrate PID

☐ Pictures of site & cores
Picture Location(s):
None

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): none

Location(s) Drilled (MW #'s): MW3A

Shipping

International Waybill #: NA

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Amanda Lamnitz
Signature
Title Geologist III

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AECOM

Day/Date Monday, January 13, 2020 ___ of ___

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60608807
Task Number
Weather/Temp. 20's
Client MPCA

Arrive Job 0910
Depart Job 1815
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled MW3B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0830 - AEL left 0900 - picked up Hanna
0910 - Aux onsite 0930 - drillers arrive
0935 - Amanda + Hanna onsite
1005 - calibrate YSI 4: 3.83 7: 7.09 10: 9.99
conductivity
MW3B-SOIL-41-42-01-011320@1440 MW3B-SOIL-31-35-01-011320@1310
MW3B-SOIL-51-53-01-011320 @1625 MW3B-SOIL-44-45-01-011320@1455 MW3B-SOIL-31-35-02-011320@1320
MW3B-GW-41-45-01-011320@1515 MW3B-SOIL-31-35-03-011320@1325
MW3B-SOIL-53-55-01-011320@1630
MW3B-GW-51-55-01-011320@1725
(@ 30 mins)
1900 - end of day

Samples Collected: EQ-MIXING BOWL-011320@1145 MW3B-GW-16.5-19-01-011320@1130
MW3B-SOIL-15-16.5-01-011320@1120 1400 @MW3B-GW-31-35-01-011320
MW3B-SOIL-16.5-19-01-011320@1125 MW3B-GW-31-35-02-011320@1405
calibration 1750 4: 4.08 7: 6.99 10: 10.04 MW3B-GW-31-35-03-011320@1410

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

- ☐ Calibrate PID
- ☐ Pictures of site & cores
- Picture Location(s): Amanda Lanning
- ☐ Video Logging
- Geophysical Logging: NA
- ☐ Gamma Log
- ☐ Caliper Log
- ☐ Multi-Parameter E-Log
- ☐ EM Flow Meter Log

Footage Drilled (feet): 0-55' bgs
Location(s) Drilled (MW #'s): MW3B

Shipping

International Waybill #: See daily for Thursday

Comm. Invoice Checklist & Type (S-Soil, W-Water)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name Amanda Lanning
Signature
Title Geologist II

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open wait 48 hrs down 100' conference # Bladder pump ⇒ QED for 200

Sampling Rationale Plan

Actual

15-16.5

~~17.5-19~~, soil (above water table) → (or fine layer above WT)

~~16.5-19~~

~~18-20~~, ~~sand~~ GW (water table) →

~~19~~ 16.5-19

~~19-20~~, soil (@ water table) →

dup & MS/MSD

31-35: GW "above" possible confining unit

corresponding: composite OR 2 discrete samples if soil site variation

dup/MS/MSD

~~36.5-37 soil, continuity with~~ Not present

41-45 soil (comp) + GW ~~"below" confining unit~~ periodic GW sample

soil 41-42 soil 44-45

51-55: soil + GW - same composite unless variation

51-53

53-55

~~dup & MS/MSD~~ in trip blk soil

66.5-68.5 → silty sand discrete sample (move according to soil profile = SM)

71-75: GW + soil, composite above bedrock

- move if bedrock not there
- if bedrock is greater than 10' below this spot, take an additional soil at the 71-75

5 total GW; 8 soil → 1 dup + 1 MS/MSD

1 MS/MSD

1 dup

EQ-MIXINGBOWL-011320 @1145

AECOM Imagine it. Delivered.

JOB TITLE _____

PROJECT/JOB NO. _____ CALCULATION NO. _____

COMPUTED BY _____ DATE _____

VERIFIED BY _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

1/13/20 added sample list

- MW3B-SOIL-15-16.5-01-011320 @ 1120
  just above water table
- MW3B-SOIL-16.5-19-01-011320 @ 1125
  just below water table, downspout over water sample
- EQ-Mixing bowl-011320 @ 1145
- MW3B-GW-16.5-19-01-011320 @ 1130
  Water table GW sample
- MW3B-SOIL-31-35-01-011320 @ 1315
  -02- @ 1320
  -03- @ 1325
  soil sample corresponding to a GW sample above confining layer
- MW3B-GW-31-35-01-011320 @ 1400
  -02- @ 1405
  -03- @ 1410
  ground water above thin clay confining layer
  -clay confining not observed
- MW3B-SOIL-41-~~45~~ 42-01-011320 @ 1450
  periodic soil sample corresponds to water table course grain sand/gravel sediment
- MW3B-SOIL-44-45-01-011320 @ 1455
  periodic soil corresponds to water table soil sample fine grain sediment ~~@ 1455~~
- MW3B-GW-41-45-01-011320 @ 1545
  periodic gw sample
- ~~MW3B-SOIL~~ -

MW3B-SOIL-51-53-01-011320 @ 1625

Periodic sample course grain unit in gw sample

MW3B-SOIL-53-55-011320 @1630

Periodic sample, fine grain unit in gw sample

MW3B-GW-51-55-01-011320 @ 1725

Periodic GW sample

1/14/20

MW3B-SOIL-74-75-01-011420 @ 935

Fine grain sand interval (w/silt)

MW3B-SOIL-75-79-01-011420 @945

Composite sample to match above bedrock GW sample

MW3B-GW-75-79-01-011420

above bedrock

AECOM

Day/Date Tuesday, January 14, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60608807
Task Number:
Weather/Temp.:
Client: MPCA

Arrive Job: 0835
Depart Job: 1830
Hours on Job:
Travel Time:
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled: MW3B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0835 - Hanna, Alex, Amanda onsite
0915 - Bedrock at 79 ft
0930 - Started purging well for bedrock sample
1045 - took ↓ sample (GW)
starting drilling
1130 lunch
1400 Finished drilling (130 ft bgs)
started setting well
1730 travel off site
1830 AECOM off site

Samples Collected: MW3B-SOIL-74-75-01-011420 @ 925
MW3B-SOIL-75-79-01-011420 @ 945
MW3B-GW-75-79-01-011420 @ 1000
~~EQ SAMPLE BOTTLE-011420 @ 1700~~ EQ-SCISSORS-011420 @ 1700

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Calibrate PID
☐ Pictures of site & cores
Picture Location(s): Alex Phone

Footage Drilled (feet): ~~79~~ 55 75' 130 (~~81~~')
Location(s) Drilled (MW #'s): MW3B

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Shipping

International Waybill #: None

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

AEL, 01/20/20
Print Name: Amanda Lanier
Signature:
Title: ~~Geologist~~ III

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AECOM

Day/Date Wed, January 15th

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 10° F
Client MPCA

Arrive Job 0830
Depart Job 1700
Hours on Job 8.5

Travel Time 1.5
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0830 - HT arrived on site
0830 to 0900 Drillers start setting the well (MW3B)
(putting casement in)
1130 - Drillers off site for lunch back to St. Cloud until afternoon
1200 - HT off site
1515 - AS on site
1530 - Drillers back on site - finish setting MW3B
1630 - Drillers offsite, HT + AL back on site
1700 - AS, AL, HT offsite

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☒ Calibrate PID

☐ Pictures of site & cores
Picture Location(s):

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet):

Location(s) Drilled (MW #'s): MW3B

Shipping

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Sexton

Signature

Title Geologist I

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AECOM

Day/Date Thursday Jan 16

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60608807
Task Number
Weather/Temp. 0°F
Client MPCA

Arrive Job 1015
Depart Job 1530
Hours on Job

Travel Time ~~1.5~~
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
~~BG~~ BS3

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

1015 - AS + AL arrived on site, drillers developing well + finishing some grouting
1115 - drillers, AS + AL leave for lunch
51-55 = dark brown 34-79 = ~~dk~~ cloudy, dark brown
1215 - drillers finishing grouting, packing up equipment
1430 - Drillers leave site
1530 - AS + AL leave site
1545 - ~~Fedex~~ Ice + tape 1600 - Fedex
1700 - Leave Fedex

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☒ Calibrate PID

☐ Pictures of site & cores
Picture Location(s):

☐ Video Logging

Geophysical Logging
☐ Gamma Log
☐ Caliper Log
☐ Multi-Parameter E-Log
☐ EM Flow Meter Log

Footage Drilled (feet): None

Location(s) Drilled (MW #'s): MW3B

Shipping

International Waybill #:	Comm. Invoice Checklist & Type (S-Soil, W-Water)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)
	☐ Commercial Invoice (S / W)

Print Name Alex Seidler
Signature
Title Geologist I

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EQ = 2 500 ml

GW = 2 500 + 2 60

TRIP = 1 - L

Soil = 1 jar

AECOM

Monday, June

soil, above WT at dry fine? ~19-20
soil at WT (compl water)
Sat w/ all water

BS13 Bedrock Valley VAP Plan

First Hole (Deep Hole)					
	Depth to Bedrock				
	225	250	275	300	
Oneota (encountered)	get 10 feet in	get 5 feet in	immediately	immediately	
St Lawrence	get 10 feet in and grab				

Second Hole (Shallow Hole) if bottom is 300								
	Every 35 Feet					Every 30 feet		
Depth Water Encountered	20	25	30	35	40*	45	50	55
1st Sample	XX-22	XX-27	XX-32	XX-37	XX-42	XX-47	XX-52	XX-57
2nd Sample	55	60	65	70	75	75	80	85
3rd Sample	90	95	100	105	110	105	110	115
4th Sample	125	130	135	140	145	135	140	145
5th Sample	160	165	170	175	180	165	170	175
6th Sample	195	200	205	210	215	195	200	205
7th Sample	230	235	240	245	250	225	230	235
8th Sample (move to bottom if Opo is encountered)	265	270	275	280	285	255	260	265
9th Sample (not collected if Opo is encountered in first hole)	300 or bottom	305 or bottom	310 or bottom	315 or bottom	320 or bottom	285 or bottom	290 or bottom	295 or bottom

*could move the 8th to the bottom and add in an extra one between water level and second depth

Second Hole (Shallow Hole) if bottom is 275								
	35 Feet	Every 30 Feet						
Depth Water Encountered	20*	25	30	35	40	45	50*	55*
1st Sample	XX-22	XX-27	XX-32	XX-37	XX-42	XX-47	XX-52	XX-57
2nd Sample	50	55	60	65	70	75	80	85
3rd Sample	85	85	90	95	100	105	110	115
4th Sample	120	115	120	125	130	135	140	145
5th Sample	155	145	150	155	160	165	170	175
6th Sample	190	175	180	185	190	195	200	205
7th Sample	225	205	210	215	220	225	230	235
8th Sample (move to bottom if Opo is encountered)	260	235	240	245	250	255	260	265
9th Sample (not collected if Opo is encountered in first hole)	300 or bottom	265 or bottom	270 or bottom	275 or bottom	280 or bottom	285 or bottom	290 or bottom	295 or bottom

*could move the 8th to the bottom and add in an extra one between water level and second depth

extra soil at fine separation

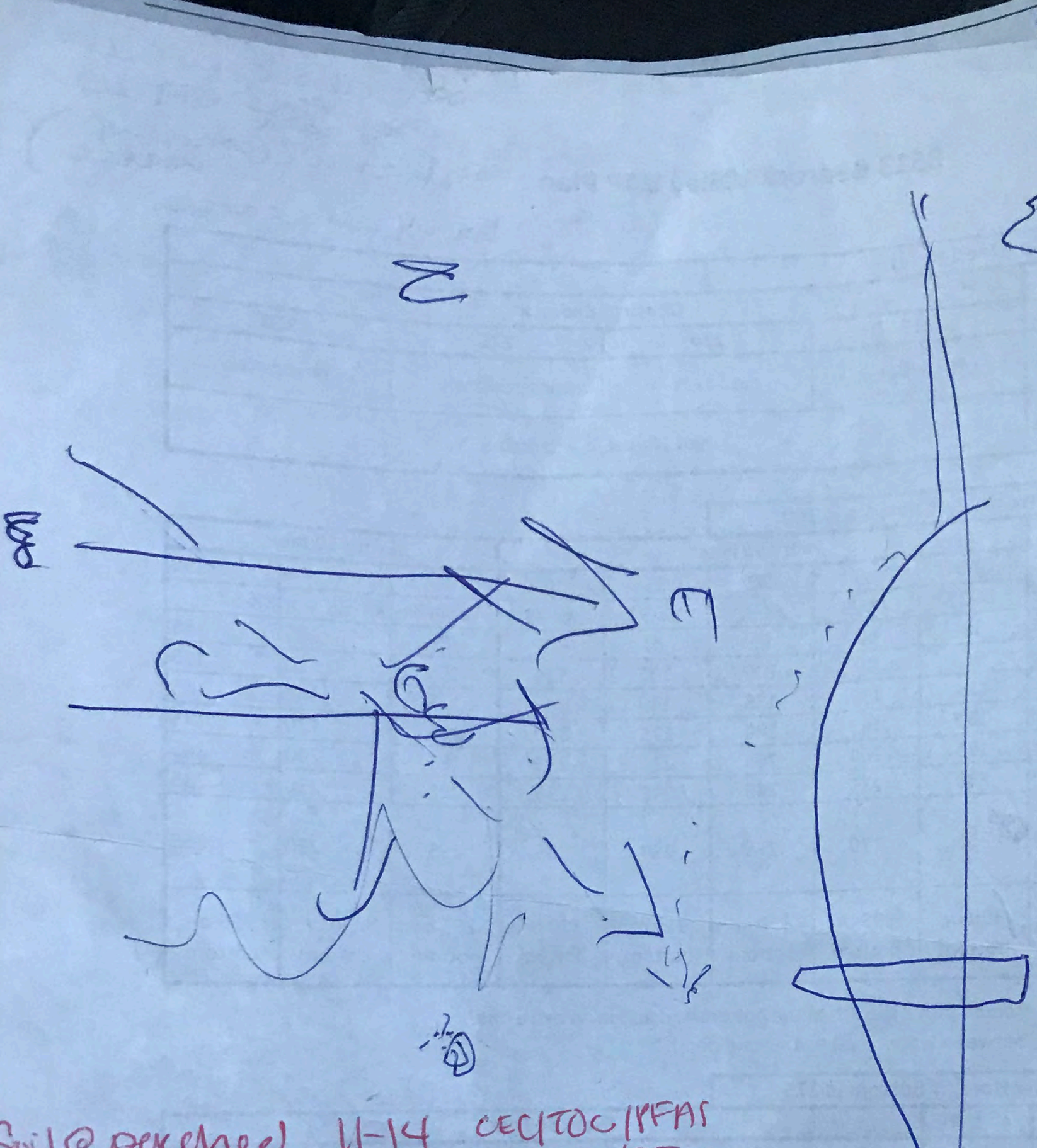
41-50
86-90
120-125
156-160
180-184
grab attempt fine

286-290 grabbed = top of "Jordan", also calling the "bottom" sample

Attempted at St. Lawrence, couldn't grab

8 VAP's at MW13B

Monday, Ju



Soil @ perched 11-14 CEC/TOC/PFAS
Soil above WT 20-22 CEC/TOC/PFAS

1) WT + soil 22-24 ANICAT; ANIONS; ISOTOPE
2) 46-50" below clay (38-45) *Needs to NOT be clay ; water + soil / TOYA
3) ~~86-90~~ 91-95" below "stiff clay dry (65-85) PLUS extra soil ~~dupe this~~ ~~MS~~ ; water + soil half kits plus
4) 121-125, ~~periodic~~ sample - full kits plus TOYA *Needs to not be clay
5) 150 X 160, ~~periodic~~ coulant grab sample ← water/mud will start to be dry / dry to moist
6) 180-185 IF fines are encountered 160-178.5
below daylight smear fines ; If NOT, move down to 190-194 + call periodic
7) ~~220-224~~, ~~dupe~~ periodic / well graded sand ← half kit + dup
8) ~~260-265~~, 221-225 periodic / jump to gravels. If gravels not seen, go down to 266-270 ← full kit
266-270, @260

VAP Plan: Beta Well Installation - Round II

Beta Site Area	Anticipated Depths of Each Formation	VAP Plan	VAP Depth Stratgey	Well Specs	Soil Samples	MGS and Video Interval
BS7	Os: not likley but possible within 65 feet Ops: 70-100 Cj: 200-220	6 downhole VAP samples (3-4 in Quat Layers, 1 in St Peter if encountered (trade for 4th Q), 1 in Shak, 1 in Oneota)	**Quat** VAP: 1) At water table 2) 26-30 3) 46-50 4) **Bottom quat or St Peter** (60-70) 5) **Ops** VAP: As soon as hit 6) **Opo** VAP: As soon as hit	8" Jordan Well: MW7A Open Hole in Cj: 230-250	~~6~~ 5 Total 1 above wt 1 at wt 2 with water samples 1 at bottom Q	70-200 (PDC interval)
BS9A	Os: not likley but possible within 30-45 feet Ops: 30-65 Cj: 133-195	3 VAP samples: 2 in Quat Layers 1 in St Peter (if encountered)	**Quat** VAP: 1) At water table 2) Middle (10 feet before antidipated bottom, ~20/25) 3) **St Peter or Bottom** of Quat VAP: As soon as hit	8" Shakopee Well: MW9A Open Hole in Ops: 75-95	~~3~~ 4 Total 1 above wt 1 at wt 1 with water sample 1 at bottom Q	30-95 (PDC interval until bottom)
BS13	Ops: 135 (may not hit if in BV) Cj: 300 Csl: 340 Ctc: 375 anticipated bedrock at ~300'	Shallow Hole: 10 total VAP samples (9 in Quat Layers - 8 if Oneota is encountered, which should mean we have a shallow BR) Deep Hole: 1 in Csl if possible, 1 at Oneota if encountered This will leave us one extra to use at BS2	Deep Hole: 1) Oneota if encountered 2) Csl if possible Q Vap: 1) 1 at Water Level 2) 8 every 30 or 35 feet depending on water level and depth to BR (7 if Opo is encountered)	8" Shallow Well: MW13B Open Hole in Cj: 250-270 8" Deep Well: MW13A Open Hole in Ctc: 400-420	~~10~~ 11 Total 1 above wt 1 at wt 8 with water samples 1 at bottom Q	135-300 (if PDC is encountered, PDC interval to be video'd and MGS) AND 340-420 (Csl and Ctc interval)
BS2	Plat/Glen: possibly within 20 feet Os: 20-25 Ops: 130 Cj: 280	6 downhole VAP samples (2 in the quat layers; 2 in shallow bedrock, Glen/Plat/St Peter; 2 in Ops, 1 in Opo) ~~1 in lower Ops if we have extra VAP budget~~	**Quat** Vap: 1) At Water Level 2) Bottom of Quat 3) **Glennwood** - within it 4) **St Peter** within it 5) **Upper Ops** 6) **Lower Ops** 7) **Opo** - within it	8" Deep Well: BS2A Open Hole in Cj: 300-320	~~4~~ 3 Total 1 above wt 1 at wt 1 at bottom Q	130-280 (PDC interval)

6 water
+2 TOPA
4 soil
+1 dup
+1 MS/MSD

4 soil
1 topa soil
1 dup soil
1 ms/msd soil
3 wat
1 topa wat

11 water
2 dup.
1 MS/MSD
2 TOPA wat
11 soil
+2 dup soil
+1 MS/MSD soil
+2 topa soil

7 water
1 topa wat
3 soil + 1 TOPA soil

6 + 3 + 11 + 7 = 22 wat
2 + 1 + 2 + 1 = 6 wat TOPA
1 + 2 + 1 = 4 dup water
1 + 1 = 2 MS/MSD water

4 + 4 + 11 + 3 = 22 soil
1 + 2 + 1 = 4 TOPA soil
1 + 2 = 3 soil dup
1 + 1 = 2 soil MS/MSD

AECOM

Day/Date Tuesday, May 26, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 0930
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: BST - MW7A

Summary of Technical and/or Engineering services performed.

MW7A-SOIL-~~14-16~~ 10-12-01-052620 / PFAS ~~, Anions~~, TOC, CEC @ 1045
MW7A-SOIL-~~16-18~~ 12-14-01-052620 - PFAS, TOC, CEC / Anions @ 1100
MW7A-GW-~~17-00~~ 12-16-01-052620 @ ~~1130~~ 1200 PFAS/TOC/~~EEC~~ QUAL/AN/Cat/Isotope
MW7A-SOIL-COMP-26-30-01-052620 @ 1230 PFAS/TOC/CEC
MW7A-GW-2630-01-052620 @ 1330 PFAS/QUAL/TOC
MW7A-GW-4650-01-052620 @ 1500 PFAS/QUAL/TOC/An/Cat
MW7A-GW-4650-02-052620 @ 1515 PFAS only

Samples Collected: MW7A-GW-4650-03-052620 @ 1530 PFAS (8 bottles)
MW7A-SOIL-COMP-4650-01-052620 @ 1430
WLS-WAT-BULK-01-052620 @ 1400, Isotope only
MW7A-GW-7377-01-052620 @ 17~~00~~45 TOPA, PFAS, TOC/QUAL

Calibration Log PID: Date/Time: ~~5/26/20~~ 0945 Serial (if multiple):
Results: 100.0:

Calibration Log YSI: Date/Time: N/A Serial (if multiple):
Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: 0-80
Location(s) of Picture:		Footage Drilled:

Print Name Amanda Lannin
Signature
Title Geologist III

AECOM

Day/Date Wednesday, May 27, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job 0730 | Sub Contractor _____ | Area Sampled

Depart Job _____ | Sub Arrive Job _____ | _____

Travel Time _____ | Sub Depart Job _____ | _____

Summary of Technical and/or Engineering services performed.

0800 - truck onsite. 0730 - AL onsite, safety
0845 - AS onsite. 0945 - Camille onsite

MW7A-GW-8C-90-01-052720 @ 1000 PFAS/TOC/QUAL/ANIONS/CAT/TOPA
~~MW7A-GW~~

Delays: Bearing broke in rig - have to swap out keys until part is replaced (should be next Tuesday)

Samples Collected:

Calibration Log PID: Date/Time: 0745 Serial (if multiple): _____

Results: 100.0: _____

Calibration Log YSI: Date/Time: 0745 Serial (if multiple): _____

Results: 10.00: 9.67 7.00: 6.93 4.00: 4.33

Pictures	Shipping	Drilling
Location Pictured: Alex	International Waybill(s) #:	Location Drilled: 90-130
Location(s) of Picture:		Footage Drilled: MW7A

Print Name Amanda Lanning

Signature _____

Title Geologist III

AECOM

Day/Date Thursday. May 28. 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60618753
Weather/Temp.:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW7A

Summary of Technical and/or Engineering services performed.

0945 - AL onsite
1045 - AJT onsite

Samples Collected: MW7A-GW-156-160-01-052820 @ 1500
PFAS, TOC/DOC

Calibration Log PID: Date/Time: ✓ 1000 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: 1000 Serial (if multiple):

Results: 10.00: 10.08 7.00: 7.03 4.00: 3.65

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW7A
Location(s) of Picture:		Footage Drilled: 130-220

Print Name Amanda Lannin

Signature

Title Geologist II

AECOM

Day/Date Friday, May 29, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60618753
Weather/Temp. Sunny, 70's
Client MPCA

Arrive Job
Depart Job
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
MW7A + frac tanks

Summary of Technical and/or Engineering services performed.

FRAC-WT1-052920 1515 Waste Profile
FRAC-WT2-052920 1530 Waste Profile

MW5 80-185 (see back)

Samples Collected:

Calibration Log PID: Date/Time: 5/1/20 0945 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Amanda Lanner

Signature

Title Geologist III

Video Log Notes

5/29/20 @0830

80.2' = end of casing

81.8 = rubbly

96.7 cool fracture

99.7 Rubbly

100.9 some turbulent flow

102.3 Rubby bedding plane fracture zone

~107.0 Vuggy

118.8 more vugs

120.3 cavity on side wall

121.5 Vertical fracture

125.9 Continuation of vertical fracture + horizontal ones

126.1 end of vert. fracture

127.1 thin, horizontal fractures

133.1 very Rubbly Zone – Open to contact? – continues to 136 Rubbly

144.1 smooth surfaces

145.6 more rubble, Potential vertical fracture

147.7 thin vertical fracture

148.6 horizontal Fracture

80.4 ← fractured zone Blocky Side walls

150.1 water coming up above? particles settling slower still rubbly

151.4 vertical fracture ends

156.8 thin horizontal fractures

159.4 "

164.5 fairly smooth

174.1 horizontal fracture, slight rubble

177.0 thin fracture - horizontal

180.2 Vuggy,

180.6 vertical fracture

183.7 oblong vertical cavity

184.7 some Dolomite sands in cavity

188 beginning of flowing Jordan

AECOM

Day/Date Monday 6/1/20 ___ of ___

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff AEL, AS

Project Number 60618753
Weather/Temp. Sunny 70s
Client MPCA

Arrive Job ____ Sub Contractor ____
Depart Job ____ Sub Arrive Job ____
Travel Time ____ Sub Depart Job ____

Area Sampled
MW7A

Summary of Technical and/or Engineering services performed.

- AEL onsite @ 0930, Trout onsite @ 0945, AS onsite 1000
- Safety meeting @ 1000
- Trout begins ~~well development~~ grouting the well @ 1005, break for lunch @ 1136
- Trout starts developing the well @ 1200
- done w/ well development @ 1430, Dan K. offsite
-

Samples Collected: —

Calibration Log PID: Date/Time: 0945 6/1/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW7A
Location(s) of Picture:		Footage Drilled:

Print Name

Signature

Title

AECOM

Day/Date Tuesday, June 2, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp. Sunny, 80's

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled
MW9A

discrete

Summary of Technical and/or Engineering services performed.

discrete
MW9A-SOIL- 3-5-01-060220 @0830 PFAS, TOC/CEC
MW9A-SOIL- 5-7.01-060220 @0845 PFAS, TOC/CEC, AMOND
MW9A-GW-6-10-01-060220 @.0900 PFAS, ISO, QUAL/TOC
MW9A-SOIL-COMP-16-22-01-060220 @.0930 PFAS, TOPA, TOC
MW9A-SOIL-COMP-16-20-02-060220 @0945 PFAS only (DUP)
MW9A-SOIL-COMP 16-20-03-060220 @1000 PFAS only (MS/MSD-1 bottle
MW9A-GW-16-20-01-060220 @ 1045 PFAS, TOPA, QUAL/TOC, AN/CAT
MW9A-SOIL-~~G~~COMP-96-100-01-060220 @ 1315 PFAS, TOC/CEC,

Samples Collected: MW9A-GW-96-100-01-060220 @ 1445 PFAS, ISO, TOPA QUAL/TOC
EQ-BLADDER-060220 @1730 (2 bottles, PFAS)
EQ-PUMP-060220 @1745
WU1-WAT-BULK-01-060220 @1630 ISOTOPE only

Calibration Log PID: Date/Time: Yes 0745 6/2/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: 6/2/20 0830 Serial (if multiple): 97074

Results: 10.00: 10.14 7.00: 6.87 4.00: 4.11

Pictures	Shipping	Drilling
Location Pictured: Flex phone	International Waybill(s) #:	Location Drilled: MW9A
Location(s) of Picture: MW9A		Footage Drilled: ① -

Print Name Amanda Canning

Signature

Title Geologist III

AECOM

Wednesday, June 3 2020
Day/Date

ENVIRONMENTAL FIELD REPORT

__ of __

Project Name: Project 1007
Location: Saint Paul East Metro, MN

Project Number: 60618753
Task Number:
Weather/Temp.: 80s sunny
Client: MPCA

Arrive Job: 800
Depart Job:
Hours on Job:

Travel Time: 45 min
Project Coordination:
Total Chargeable Hours:
Mileage:

Wells Sampled: MW5A, MW5B, MW3A, MW3B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

sampled Bedrock aquifer wells, pulled hydrasleeve bags and sampled, sumpled surface water near wells for isotope
On MW5A → hydrasleeve check valve may not have closed properly when was pulled from well, still submerged
On MW3B → top hydrasleeve bag was tangled and did not fill, bottom filled and was sampled
Calibrated pH meter

Samples Collected:

SEE BACK

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name
Amanda Lanning

Signature

Title
Ecologist II

ENVDAILY.DOC

MW3B-GW-HYDRA-110-130-01-060320 @ ~~0830~~ 1030
PFAS

MW5B-GW-HYDRA-110-120-01-060320 @ ~~1315~~ 900
PFAS

MW5A-GW-HYDRA-210-220-01-060320 @ 930
PFAS

MW5A-GW-210-220-01-060320 @ 1120 ✓
PFAS Quality/TOC Cations/Anions Isotope

MW5B-GW-110-120-01-060320 @ 1345
PFAS TOPA Quality/TOC Cations/Anions Isotope

MW3A-GW-230-250-01-060320 @ 1610
PFAS TOPA Quality/TOC Cations/Anions Isotope

MW3B-GW-110-130-01-060320 @ 1820
PFAS Quality/TOC Cations/Anions but not Lapels checked Isotope

EP9-WAT-BULK-01-060320 @ 1300
Isotope

EP3-WAT-BULK-01-060320 @ 1545
Isotope

MW9A-SOIL-COMP-127.131-01-060320 @ 0815 ✓
TOC/CEC/PFAS

EP16-WAT-BULK-01-060320 @ ~~1630~~ 1700
Isotope only

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Thursday, June 4th 2020 of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730
Depart Job 1945
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW7A, MW9A (develop) MW3A (drill)

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- AL on site @ 0730, KR on site @ 806, AS on site 0815
- Drillers developing well in AM, then offsite by 0930 + move to ~~MW~~ MW3
-

Samples Collected: MW7A-GW-200-240-01-060488 @ 1100

1500 - start drilling at MW3A
Footage drilled: 0-150' bgs

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Amanda Conroy

Signature

Title Geologist III

AECOM

Day/Date Friday, June 5, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 0730
Depart Job: 1600
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW13A

Summary of Technical and/or Engineering services performed.

Samples Collected: No samples collected at drill site

Calibration Log PID: Date/Time: 6/5/20 0745 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: James McCoy Drive Location(s) of Picture:	International Waybill(s) #:	Location Drilled: MW13A Footage Drilled: 150-280

Print Name Amanda Lanning

Signature

Title Geologist II

ENVDAILY.DOC

Attachment D2: Drilling Daily Logs

AECOM

Day/Date Monday, June 8, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60618753
Weather/Temp.: 80-90's, sunny, humid, 10 mph
Client: MPCA

Arrive Job: 0930
Depart Job: 1900
Travel Time:
Sub Contractor: 0900
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW13A

Summary of Technical and/or Engineering services performed.

Hanna + Paul - conductivity testing, no sampling
Amanda, Alex, + Drew drilling + VAP at MW13A

Samples Collected: MW13A-GW-200-290-01-06082020 @ 1500
PFAS/QUAL/TOC/AN/CA/ISOT

Calibration Log PID: Date/Time: 6/8/20 0930 Serial (if multiple):
Results: 100.0:

Calibration Log YSI: Date/Time: 6/8/20 1330 Serial (if multiple): 87074
Results: 10.00: 10.02 7.00: 7.03 4.00: 3.98

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13A
Location(s) of Picture:		Footage Drilled: 180-

Print Name Amanda Cannizzo

Signature

Title Geologist III

Attachment C: Project 1007 Remedial Investigation Report
Project 1007 Feasibility Study_v_March2021
Minnesota Pollution Control Agency

AECOM

Day/Date Tuesday, June 9, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60618753
Location: Saint Paul East Metro, MN | Weather/Temp.:
AECOM Staff: | Client: MPCA

Arrive Job: 0730 | Sub Contractor: | Area Sampled: MW13A
Depart Job: 1715 | Sub Arrive Job:
Travel Time: | Sub Depart Job:

Summary of Technical and/or Engineering services performed.

Alex + Amanda
Drilled at MW13A, attempted St. Lawrence VAP at 346-350, pulled in pres + clogged screen so couldn't get water out

Hanna, Paul, + Seth → hydraulic conductivity testing (slug test)
11-1230
Maesey + Al out at ~~0930~~ 11 to observe slug test + drill site

Samples Collected:
Rebecca onsite at 0815 - 1030

Calibration Log PID: Date/Time: 0800 6/9/20 Serial (if multiple):
Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple): 87074
Results: 10.00: 10.0 / 7.00: 7.02 4.00: 3.98

Pictures	Shipping	Drilling
Location Pictured: Alex + Amanda Phone	International Waybill(s) #:	Location Drilled: ~~280~~ 320-370
Location(s) of Picture:		Footage Drilled: MW13A

Print Name Amanda Lannigan
Signature
Title Geologist

AECOM

Day/Date Wednesday June 10, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60618753
Weather/Temp.: 50/60's rain - AM
Client: MPCA 60's, sunny - windy PM

Arrive Job: 0730
Depart Job: ~~0991~~ 1900
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW3A, MW3B

Summary of Technical and/or Engineering services performed.

~~MW3B-GW-H~~ MOS out to video, gamma, caliper + flow
MW3A
Grout well

Samples Collected: MW3B-~~GW~~-HYDRA-110-130-01-061020 @ 1430
PFAS only, keep run w/out 48-hr wait

Calibration Log PID: Date/Time: 6/10/20 0800 Serial (if multiple):
Results: 100.0:
Calibration Log YSI: Date/Time: N/A Serial (if multiple):
Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: None Drilled
Location(s) of Picture:		Footage Drilled:

Print Name Amanda Gannon

Signature

Title Geologist III

Attachment C-2: Drilling Daily Logs

6/10/20 - MGS Video, water level static: 24.1' bps

Casing at 316.2

365.6 thin horizontal fracture

362.8 green sand layers

353.7 some oxidation?

349.1 some fine, thin bedding

346.8 small intensity - wider dark/dk green
→ contact Tunnel City

341.4 glauconitic bedding w/ St Lawrence
sof sed. def'm

338.3 fracture apparent - horizontal

335.6 bedding apparent

335.3 ~~stability?~~ more bedding

331.2 lots of bedding

329.7 thin fracture - not any flow

329.3 v. small fracture

326.3 large bands/bedding

324.1 fracture → potential flow

322.7 small fracture

321.2 thin horizontal bedding

316.8 @ Casing

ENVIRONMENTAL FIELD RE... Day/Date Monday, June 29 2020

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Monday, June 15, 2020 ___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60618753
Weather/Temp. Sunny (60-80's)
Client MPCA

Arrive Job 0900
Depart Job 2000
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
MW13B
BP1

Summary of Technical and/or Engineering services performed.

MW13B-SOIL-11-13-01-061520 @0915, PFAS, CEC/TOC, discrete, screened aquifer zon,
MW13B-SOIL-20-22-01-061520 @1020 PFAS/CEC/TOC (no water/MI/Alk
MW13B-SOIL-22-24-01-061520 @1030, PFAS/CEC/TPC/ANIONS
MW13B-GW-22-24-01-061520 @1100, PFAS, CAT/AN/CHEM
MW13B-SOIL-COMP-46-50-01-061520 @1145 PFAS/TOC/CEC (TOC, 1SS TOPA)
MW13B-GW-46-50-01-061520 @1330 PFAS/QUAL/TOPA [TOPA]
MW13B-GW-91-95-01-061520 PFAS/QUAL/TOC @1630

Samples Collected: MW13B-GW-91-95-02-061520 @1645 PFAS
MW13B-GW-91-95-03-061520 @1700 PFAS
MW13B-SOIL-COMP-91-95-01-061520 PFAS/TOC/CEC @1445
MW13B-SOIL-COMP-91-95-02-061520 @1500 PFAS
MW13B-SOIL-COMP-91-95-03-061520 @1515 PFAS

Calibration Log PID: Date/Time: 6/15/20 0945 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

MW13B-SOIL-COMP-121-125-01-061520 @ 1730 PFAS, TOPA, CEC, TOC

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13B
Location(s) of Picture:		Footage Drilled: 0-125

Print Name Amanda Lemm

Signature

Title ~~Geologist III~~

MW13B-GW-121-125-01-061520 @ 1900 PFAS, TOPA, TOC, ANCAT, QUAL
BP1-WAT-BULK-01-061520 @ 1930 Isotopes only

AECOM

Day/Date Tuesday, June 16, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 Project Number 60618753

Location Saint Paul East Metro, MN Weather/Temp. _____

AECOM Staff _____ Client MPCA

Arrive Job 0730 Sub Contractor _____ Area Sampled

Depart Job 1900 Sub Arrive Job _____ MWBB

Travel Time _____ Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

MW13B-SOIL-COMP-181-185-01-061620 @ 1015 PFAS/CEC/TOC
MW13B-GW-181-185-01-061620 @ 1130 PFAS/~~CEC~~/QUAL/ANIONS/CATI
↳ did a full run D/C 156-160 CAS no fnd TOC
EQ-WESTLAKELAND-061620@1230, PFAS only PWL Water
MW13B-GW-221-225-01-061620 @ 1530 ~~PFAS~~/TOC/QUAL
MW13B-SOIL-COMP-221-225-01-061620 @ 1430 PFAS/TOC/CEC
MW13B-SOIL-COMP-221-225-02-061620 @ 1445 PFAS only
MW13B GW-221-225-02-061620 @ 1545 PFAS only

Samples Collected:

MW13B-SOIL-COMP-266-270-01-061620 @ 1800 PFAS/TOC/CEC

Calibration Log PID: Date/Time: 6/16/20 0745 Serial (if multiple):

Results: 100.0: ~~10.35~~

Calibration Log YSI: Date/Time: 6/16/20 0815 Serial (if multiple):

Results: 10.00: 10.35 7.00: 6.99 4.00: 3.99

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13B
Location(s) of Picture: ~~Alex + Amanda~~ phone		Footage Drilled: 225-270

Print Name ~~Amanda Lamm~~

Signature

Title ~~Geologist III~~

AECOM

Day/Date Wednesday, June 17, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job 0730 | Sub Contractor _____ | Area Sampled MW13B

Depart Job 1845 | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

Drilled down to 310, set well

- ~~well~~ water coming out of casing @ 1800, some heavy sand

- off site @ 1845

Samples Collected: No samples collected, ~~attempted~~ a VAP at 266-270 but pump got sand clogged

Calibration Log PID: Date/Time: 6/17/20 0735 Serial (if multiple): _____

Results: 100.0:

Calibration Log YSI: Date/Time: 6/17/20 0745 Serial (if multiple): _____

Results: 10.00: 9.67 7.00: 6.99 4.00: 4.04

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13B
Location(s) of Picture: Alex + Amanda phone		Footage Drilled: 270-310

Print Name Amanda Lamky

Signature

Title Geologist III

AECOM

Day/Date Thursday / 6/18/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp. Overcast 80's—humid

Client MPCA

Arrive Job 0730

Depart Job 1800

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled MW13B

Summary of Technical and/or Engineering services performed.

- ~~Con~~ Set up after pack to grouting AM the am
- Site mobilization to finish grouting AM the afternoon

Samples Collected: - well set at 295-305
- water level fluctuating from 6ft to high 20's

Calibration Log PID: Date/Time: 0800 6/18/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13B
Location(s) of Picture:		Footage Drilled:

Print Name Alex Sanders

Signature

Title Geologist I

AECOM

Day/Date Friday, 6/19/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60618753

Task Number ~~0~~ 01

Weather/Temp. cloudy 70s-

Client MPCA

Arrive Job 0715

Depart Job 1400

Hours on Job _____

Travel Time _____

Project Coordination _____

Total Chargeable Hours _____

Mileage _____

Area Sampled

MW13B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- onsite @ 0715
- site mobilization + well development (MW13B)

- 21.6' is static water level

Samples Collected:

PID: calibrated @ 0730, 6/19/20

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

Alex Phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

Print Name

Alex Seijas

Signature

Title

Geologist I

AECOM

Day/Date Monday, June 22, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60618753
Weather/Temp. _____
Client MPCA

Arrive Job 0845
Depart Job 2015
Travel Time _____

Sub Contractor _____
Sub Arrive Job _____
Sub Depart Job _____

Area Sampled
MW2A
RC14 RC21

0900- michelle onsite

Summary of Technical and/or Engineering services performed.

MW2A-SOIL-8-10-01-062220 @ 1030 PFAS/TOC/CEC - discrete
MW2A-SOIL-11-12-01-062220 @1045 PFAS/TOC/CEC/ANIONS/TOC - discrete
MW2A-GW-11-12-01-062220 @ 1130 PFAS/TOC/QUAL/ISO
RC14-WAT-BULK-01-062220 @ 1200 ISO only @ 1700
RC21-WAT-BULK-01-062220 @1230 ISO only
MW2A-SOIL-COMP-36-40-01-062220 @1230 PFAS/CEC/TOC
MW2A-GW-36-40-01-062220 @1400 PFAS/TOC/ANICAT/QUAL/ISO4
MW2A-GW-36-40-02-062220 @1430 PFAS dup

Samples Collected: MW2A-SOIL-COMP-66-70-01-062220 @1530 PFAS/CEC/TOC
MW2A-GW-66-70-01-062220 @1645 PFAS/QUAL/TOC

1700- Michelle offsite

MW2A-GW-86-90-01-062220 @1930 PFAS/QUAL/TOC/ANICAT

Calibration Log PID: Date/Time: 6/22/20 @ 0900 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A - fresh from lab Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: MW2A	International Waybill(s) #:	Location Drilled: MW2A
Location(s) of Picture: Amanda Phone		Footage Drilled: 0-90

Print Name Amanda Lennier

Signature

Title Geologist III

AECOM

Day/Date Tuesday, June 23, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job 0730

Depart Job 1930

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled
MW2A

Summary of Technical and/or Engineering services performed.

@1100
MW2A-GW-116-120-01-062320 PFAS/TOC/QUAL/ISO
MW2A-GW-136-140-01-062320 @ 1445, PFAS/TOC/QUAL/ANICAT

Samples Collected:

Calibration Log PID: Date/Time: 6/23/20 0745 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: 6/23/20 0800 Serial (if multiple):

Results: 10.00: 10.04 7.00: 7.14 4.00: 4.61

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW2A
Location(s) of Picture: Amanda Phone		Footage Drilled: 90-210

Print Name Amanda Lanning

Signature

Title Geologist III

AECOM

Day/Date Wednesday, June 24, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:

Project Number: 60618753
Weather/Temp.: Sunny, 60's-70's
Client: MPCA

Arrive Job: 0715
Depart Job:
Travel Time:

Sub Contractor:
Sub Arrive Job:
Sub Depart Job:

Area Sampled: MW21

3104

Summary of Technical and/or Engineering services performed.

Samples Collected:
EQ-DRILLERPUMP-062420 @ 0745, 2 500-mL PFAS
MW2A-GW-196-200-01-062420 @ 1000 PFAS/TOC/QUALL/ANION/CAT

Calibration Log PID: Date/Time: 6/24/20 0720 Serial (if multiple):
Results: 100.0:

Calibration Log YSI: Date/Time: 6/24/20 0730 Serial (if multiple):
Results: 10.00: 10.01 7.00: 711 4.00: 4.22

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW2A
Location(s) of Picture: Amanda phone		Footage Drilled: 210-260

Print Name Amanda Cannity

Signature

Title Geologist III

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Thursday, June 25, 2020

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled
MWDA

Summary of Technical and/or Engineering services performed.

Pedrilia glacial rivers thought to have carved out valley ^ could be bedrock joint but N->S isn't really the correct orientation for that which makes you think that it had to have been a greater force to go in a weird orientation & being so narrow (so not as likely to be a simple river) but could have been lobe of

Samples Collected: None

141.2-141.6 - vugs/cavities/rubbly zone
137.8 - rubbly zone
136.0 - BPF, rubbly
134.6 - cavity
106.3 ~~106.6~~ - BPF + shale
132.8 - shale (131.2 → (125.0)
126.6 - cavity/pf
112.6 - BPF - 5 (multiple)
all of the 3 x's

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture: Amanda Phone		Footage Drilled: None

Print Name Amanda Lanning

Signature

Title Geologist III

6/25/20
MGS Downhole Video Log

*=correct depth no correction needed

105.7* = bottom of casing
water moving in or out at base of casing

148.2* - downflow, gaping cavern ← footage reset to zero a 148.2 ~~pullout~~ manually reset; then zero'd again by accident - pulled up to casing + manually reset again
(faster than at casing)
146.6* - BP (not hydraulically significant)

142.6* - cavity — 150 - murky again/bad visibility
157.3 - rubbly zone
159.6* - hydraul sign? BPF, particles also look ~140.X BPF, water coming in like they you can see from above are going up? - but only a none si-
160 - rubbly zone
162.3 hydraul. sign. BPF (water coming in) @ ~140, 150 BPF probably
(@ 150.1*, camera ends up in cavity and on shelf
visibility poor at 167 (due to murky water)
170.5 - BPF, possibly hydr. sign.
~179.C
180.7 BP and what looks like bowl shape all the way around
183.7 (182.1) BPF + 183.0 (181.4) BPF's (multiple) + rubbly but NOT as in a contact
188 (186.4) "looked sandy"
194.8 - 197 looks "lumpy" (193.2 - 195.4)
199.3 (197.7) Rubbly zone + BPF (not hydr. sign)
~207-210 (205.4 - 208.4) Rubbly w/ BPF ← where sampled
208.7* Rubbly zone (207.1) + BPF
240.1 - shift from red to gray rock (actual 238.5) - perlogs, color change was at 236
actual
242.5 (240.9) - Jordan contact
242.6 - worm burrows
250 - 254 - mud to coarse
252.1 - shale layer ~cm or two
255
~~260~~ - 263 - mud to fine, mostly fine, orange/oxidized color
263.6 - bottom of hole, downflow visible

AECOM

Day/Date Friday, June 26, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 Project Number 60618753

Location Saint Paul East Metro, MN Weather/Temp. _____

AECOM Staff _____ Client MPCA

Arrive Job 0810 Sub Contractor _____ Area Sampled

Depart Job _____ Sub Arrive Job _____ WL6

Travel Time _____ Sub Depart Job _____ _____

Summary of Technical and/or Engineering services performed.

Drillers finished off cement
Amanda packed up site + site room WL6

Samples Collected: N/A

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: WL6	International Waybill(s) #:	Location Drilled: MW
Location(s) of Picture: Amanda Phone		Footage Drilled:

Print Name Amanda Lanning

Signature

Title Geologist III

AECOM

Day/Date Thursday 10/15/20

ENVIRONMENTAL FIELD REPORT

1 of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60638005

Weather/Temp. 38-48° pt. cloudy

Client MPCA

Arrive Job	0700	Sub Contractor	Treut	Area Sampled	
Depart Job		Sub Arrive Job	0730		PZE
Travel Time	40 min	Sub Depart Job			PZF

Summary of Technical and/or Engineering services performed.

PZED - Installed
PZES - Installed
PZFD - Installed

Samples Collected:

None

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
	NA	PZED, PZES
Location(s) of Picture:		PZFD
		Footage Drilled:
		70ft

Print Name Seth Hilson

Signature

Title Worker

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Friday 10/16/20

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff Seth Hilson

Project Number 60638005

Weather/Temp. 34°

Client MPCA

Arrive Job 0655

Depart Job 1500

Travel Time 40 min

Sub Contractor Trout

Sub Arrive Job 0730

Sub Depart Job 1500

Area Sampled PZFS

Summary of Technical and/or Engineering services performed.

PZFS - Installed

Staged equipment by PZG locations

Samples Collected:

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZFS
Location(s) of Picture:		Footage Drilled: 20ft

Print Name Seth Hilson

Signature

Title PM

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Monday 10/19/20

Page 1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: Seth Wilson
Project Number: 60638005
Weather/Temp.: 34°
Client: MPCA

Arrive Job: 0900
Depart Job: 1920
Travel Time: 45 min

Sub Contractor: Test
Sub Arrive Job: 0700
Sub Depart Job: 1920

Area Sampled: PZG

Summary of Technical and/or Engineering services performed.

PZGS - Install
PZGD - Install

Samples Collected:

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZGS, PZGD
Location(s) of Picture:		Footage Drilled: 70

Print Name Seth Wilson

Signature

Title PM

ENVDAILY.DOC

AECOM

Day/Date Tuesday 10/20/15

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Project Number 60638005
Location Saint Paul East Metro, MN
Weather/Temp.
AECOM Staff Seth Wilson
Client MPCA

Arrive Job	0700	Sub Contractor	Trust	Area Sampled	PZHD
Depart Job	~~1645~~ 1045	Sub Arrive Job	0700		PZHS
Travel Time	140 min	Sub Depart Job	1045		

Summary of Technical and/or Engineering services performed.

Drilled PZHD
Drilled PZHS
Developed PZHD
Developed PZHS
Developed PZFS
Developed PZFD
Developed PZGD
Developed PZGS

Samples Collected:

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZHS, PZHG
Location(s) of Picture:		Footage Drilled: 42 ft

Print Name Seth Wilson

Signature

Title PM

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Wed 10/21/20

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: Seth Hilson
Project Number: 60638005
Weather/Temp.:
Client: MPCA

Arrive Job: 0730
Depart Job: 1750
Travel Time: 45
Sub Contractor: Trout
Sub Arrive Job: 0730
Sub Depart Job: 1750
Area Sampled: PZID, PZIS

Summary of Technical and/or Engineering services performed.

Installed PZID
Installed PZIS
Moved equipment to PZA
~~Perched aquifer~~: PZID-SOIL- . -01-~~102820~~
~~Det water table~~: ~~PZ VAPS~~ PZID-SOIL-#-#-01-102820
~~If different soil~~, SOIL-COMP-#-#....

Samples Collected: (1)

~~PZID~~-SOIL-17-~~20~~-102820 — Time 1545 — ~~ANALYSIS~~ ~~CEC, TOC, PFAS~~ CEC, TOC, ~~PFAS~~

This should be on Wed 10/28/20

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZID, PZIS
Location(s) of Picture:		Footage Drilled: 44ft

Print Name: Seth Hilson

Signature:

Title: PM

Attachment C-2: Drilling Daily Logs

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Thursday 10/22/20

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff Seth Wilson

Project Number 60638005

Weather/Temp. 0700 Snow 53°

Client MPCA

Arrive Job 0700

Depart Job 1930

Travel Time 40min

Sub Contractor Trzut

Sub Arrive Job 0700

Sub Depart Job 1930

Area Sampled PZA

Summary of Technical and/or Engineering services performed.

Moved support truck to parking lot
Installed PZAD
Installed PZAS

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZAD PZAS
Location(s) of Picture:		Footage Drilled: 42 ft

Print Name Seth Wilson

Signature

Title PM

ENVDAILY.DOC

Attachment C: Project 1007 Remedial Investigation Report
Project 1007 Feasibility Study Work Plan

Minnesota Pollution Control Agency

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Friday 10/23/20

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff ~~Seth~~ Seth Wilson

Project Number 60638005

Weather/Temp. 35°, snow

Client MPCA

Arrive Job 0700

Depart Job 1500

Travel Time 40min

Sub Contractor Trent

Sub Arrive Job 0700

Sub Depart Job 1900

Area Sampled

Summary of Technical and/or Engineering services performed.

Site Restrator

Samples Collected:

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Seth Wilson

Signature

Title PM

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date 10/26/20 Monday

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: Seth Wilson
Project Number: 60638005
Weather/Temp.: 27° Sun
Client: MPCA

Arrive Job	0950	Sub Contractor	Trust	Area Sampled	
Depart Job	1800	Sub Arrive Job	0956	PZBS	
Travel Time	40 min	Sub Depart Job	1800		

Summary of Technical and/or Engineering services performed.

PZBS - Install
PZBD - Install

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZBD, PZBS
Location(s) of Picture:		Footage Drilled: 32

Print Name Seth Wilson

Signature

Title PM

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Tuesday 6/27/23

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff Seth Wilson

Project Number 60638005

Weather/Temp. 17°, Sun

Client MPCA

Arrive Job	0745	Sub Contractor	Trust	Area Sampled	
Depart Job	2110	Sub Arrive Job	0750	PZC	
Travel Time	45 min	Sub Depart Job	2030		

Summary of Technical and/or Engineering services performed

Unable to get rig started until around noon
Installed PZCD
Installed PZCS
Drilled PZDD - Well not installed
Silt fence @ PZC, PZB
Add Unique IDs to all wells

Samples Collected:

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZCD, PZCS PZDD
Location(s) of Picture:		Footage Drilled: 72 ft

Print Name Seth Wilson

Signature

Title PM

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Wed 10/28/20

1 of 1

Project Name Project 1007

Project Number 60638005

Location Saint Paul East Metro, MN

Weather/Temp. 31°

AECOM Staff Seth Wilson

Client MPCA

Arrive Job 0650

Sub Contractor Trout

Area Sampled

Depart Job

Sub Arrive Job 0830

PZD

Travel Time 45 min

Sub Depart Job

PZJ

Summary of Technical and/or Engineering services performed

Set PZDD
Installed PZDS
Drilled ~~Installed~~ PZJD - set inner casing
~~Drilled PZ~~
Mobed pr to potty back to parking lot

Samples Collected:

	Time	Analysis
PZJD-SOIL-17-20-102820	collected @ 1545	CEC, TOC, PFAS

Calibration Log PID: Date/Time: NA Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZDD, PZDS, PZJD
Location(s) of Picture:		Footage Drilled: 65 ft

Print Name Seth Wilson

Signature

Title PM

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date 10/29/20 ___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: James McCoy
Project Number: 60638005
Weather/Temp: 32°F
Client: MPCA

Arrive Job: 0700
Depart Job: ~~0550~~ 1745
Travel Time: 40 min

Sub Contractor: Trout
Sub Arrive Job: 0700
Sub Depart Job: 1745

Area Sampled: NA

Summary of Technical and/or Engineering services performed.

-Trout had a mechanic out to fix rig for 45Amin-1hr
-Started warming up rig @ ~~0800~~ 815
-Be Finished setting PZ5D
-Drilled PZ5S, set PZ5S
+Crew swap @ ~~1030~~ 1300
+New crew showed @ 1400
+Pads for MW13 brought out to ~~[illegible]~~ site
+Developed ~~PZ~~ PZ series- ~~[illegible]~~ H, I, AB
~~Samples Collected:~~ +Andy (Trout) smoothed out trail, in areas that got tore up. Areas that were very wet/muddy ~~[illegible]~~ were hard to smooth with skid loader

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: PZ5S
Location(s) of Picture:		Footage Drilled: 258

Print Name James McCoy

Signature

Title Geology I

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date 10/30/20

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: James McCoy

Project Number: 60638005
Weather/Temp.:
Client: MPCA

Arrive Job: 0700
Depart Job: ~~1700~~ 1145
Travel Time: 40-45 min

Sub Contractor: Traut
Sub Arrive Job: 0725
Sub Depart Job: 1145

Area Sampled:

Summary of Technical and/or Engineering services performed.

- Set pads on trail to get rig to MW13
- Developed PZ-C, D, S
- Moved rig over by MW13
- Pads used for low spots were moved off trail onto the side
  - Pads will be placed back on trail Monday morning
- Removed dirt clumps on main road from tracking rig on it.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name James McCoy

Signature

Title Geologist

ENVDAILY.DOC

AECOM

Day/Date 11/2/2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60638005
Location: Saint Paul East Metro, MN
Weather/Temp.: 40° SUN
AECOM Staff:
Client: MPCA

Arrive Job: 9:00 am
Sub Contractor: Traut
Area Sampled:
Depart Job: 5:45 pm
Sub Arrive Job: 0900
Travel Time:
Sub Depart Job: ~~0845~~ 5:45 pm

Summary of Technical and/or Engineering services performed.

Set more padding on trail
Development started @ 11 am after getting water
Drillers reached 125" (bottom)
will set screen tomorrow.

Logs on binder

Samples Collected:

None

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name CAM KARNATZ

Signature

Title Scientist II

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date 11/3/20

1 of 1

Project Name: Project 1007

Location: Saint Paul East Metro, MN

Project Number: 60638005

Task Number:

Weather/Temp.:

Client: MPCA

Arrive Job: 0700

Depart Job: 1500

Hours on Job:

Sobi, Traut 0700 1600

Travel Time: 45 min

Project Coordination:

Total Chargeable Hours: 90

Mileage: 90

Area Sampled:

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Installed MW13C
- Safety meeting
- Well construction on Boring Log & Also sent to AL

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

Print Name James McCoy

Signature

Title Geologist

ENVDAILY.DOC

AECOM

Day/Date September 29, 202

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

TOC, CEC, PFAS

8-12: VAPH-GW-8-12-01-092920-PFAS only VAPH-SOIL-8-12-01-092

20-24 – PFAS + full (no ISO) VAPH-GW-20-24-01-092920, full kit

40-44 - PFAS only VAPH-SOIL-24-27-01-092920 PFAS, TOC,

BOTTOM - PFAS + full (no ISO) VAPH-GW-27-30-01-092920 full) CE

VAPH-SOIL-28-30-01-092920 PFAS, CEC, TOC

RC23-SED-0-6-01-092820

RC23-GW-WAT-BULK-01-092820

Samples Collected:

started + VAPH complete 9/24/20, EOB @ 30.5 ft bgs, refusal (0.5 ft into bedrock)

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Results: 100.0: _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAP-H
Location(s) of Picture:		Footage Drilled: 0-30.5

Print Name Amanda Cannon

Signature _____

Title Geologist III

ENVDAILY.DOC

AECOM

Day/Date Wed. 9/30/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled
Depart Job		Sub Arrive Job		
Travel Time		Sub Depart Job		

Summary of Technical and/or Engineering services performed.

- VAPI-GW-12-16-01-093020 @0850 PFAS/Quad/Anion/~~[illegible]~~/ISO
- VAPI-SOIL-Comp-12-16-01-093020 @0835 PFAS/TOC/CEC
- VAPI-GW-24-~~[illegible]~~28-01-093020 @1150 PFAS
- VAPI-SOIL-COMP-24-28-01-093020 @1050 PFAS/TOC/CEC
- VAPI-GW-36-39-01-093020 @1525 PFAS/Quad/Anion/ISO
- VAPI-SOIL-COMP-36-39-01-0930 @1445 PFAS/TOC/CEC (Chrysler)

starkest

VAPI Complete 9/30/20, EOB @ 39' bgs, refusal

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAPI
Location(s) of Picture:		Footage Drilled: 0-39'

Print Name Alex Seigen

Signature

Title Geologist

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Fri 10/2/20 ___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60618753
Weather/Temp.: Cloudy 50's
Client: MPCA

Arrive Job: 0700
Depart Job: 1830
Travel Time: 1:00
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: VAPC

Summary of Technical and/or Engineering services performed.

- VAPC started + complete 10/2/20
- VAPC-GW-0-5-01-100220 @ 0835 PFAS/Qual/Anion
- VAPC-SOIL-Comp-1-5-01-100220 @ 0840 PFAS/TOC/CEC
- VAPC-GW-12-16-01-100220 @ 1000 PFAS
- VAPC-SOIL-Comp-12-16-01-100220 @ 0945 PFAS/TOC/CEC
- VAPC-GW-22-26-01-100220 @ 1200 PFAS
- VAPC-GW-43-47-01-100220 @ 1730 PFAS/Qual/Anion
- VAPC-SOIL-43-45-01+00220 @ 1655 PFAS/TOC/CEC

Samples Collected:

Calibration Log PID: Date/Time: 10/01/20 Serial (if multiple):
Results: 100.0:

Calibration Log YSI: Date/Time: 10/01/20 Serial (if multiple):
Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: ~~VAPC~~ SOIL	International Waybill(s) #:	Location Drilled: VAPC
Location(s) of Picture: A5		Footage Drilled: 0-48.5'

Print Name Alex Senjum

Signature

Title Geologist

AECOM

Day/Date Thurs. 10/1/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled
Depart Job		Sub Arrive Job		
Travel Time		Sub Depart Job		

Summary of Technical and/or Engineering services performed.

- VAPA-SOIL-7-10-01-100120 @ 0800, PFAS/TOC/CEC
- VAPA-GW-6-10-01-100120 @ 0830, PFAS, Qual/Anion/Isotope
- VAPA-GW-22-26-01-100120 @ 1010, PFAS
- VAPA-SOIL-48-50-01-100120 @ 1500, PFAS/TOC/CEC
- VAPA-GW-48-52-01-100120 @ 1600, PFAS/Qual/Anion/Isotope

start 1t
VAPA Complete, EOB @ 52' bgs, refusal
10/1/20

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAPA
Location(s) of Picture:		Footage Drilled: 0-52'

Print Name Alex Shiem

Signature

Title Geologist

AECOM

Day/Date Mon, 10/5/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

VAPE-SOIL-COMP-25-29-01-100520 1730
VAPE-SOIL-COM 02 1735 PFAS only - dup
03 1740 PFAS only - MS/MSD

VAPE-GW-1-5-01-100520 @1530 PFAS, TOC, CEC
VAPE-SOIL-COM-1-5-01-100520 @1545 PFAS, GRAIN, TOC, AM, CAT, ISO

Samples Collected: VAPE-GW-16-20-01-100520@ 1635 PFAS only
VAPE-SOIL-COMP-25-29-01-100520@ 1730 PFAS/TOC/CEC
VAPE-GW-~~25-29~~-01-100520@ 1755 PFAS, GRAIN, TOC/AM/CAT/IS
VAPE-GW-~~25-29~~-02-100520@ 1750 PFAS - DUP
VAPE-GW-~~25-29~~-03-100520@ 1800 PFAS - MS/MSD

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Results: 100.0: _____

Calibration Log YSI: Date/Time: 10/5/20 1500 Serial (if multiple): _____

Results: 10.00: 9.99 7.00: 7.30 4.00: 4.26

Pictures	Shipping	Drilling
Location Pictured: are VAPE	International Waybill(s) #:	Location Drilled: VAPE
Location(s) of Picture: AS		Footage Drilled: 5 - 40

Print Name Amanda Lanning

Signature _____

Title Geologist III

AECOM

Day/Date Tues, Oct 6, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.: _____

AECOM Staff: _____ | Client: MPCA

Arrive Job: _____ | Sub Contractor: _____ | Area Sampled: _____

Depart Job: _____ | Sub Arrive Job: _____

Travel Time: _____ | Sub Depart Job: _____

Summary of Technical and/or Engineering services performed.

ML1-WAT-BULK-01-100620 @ 0745, isotope only

BP1-WAT-BULK-01-100620 @ 08000, isotope only decided to rem

RC3NORTH-WAT-BULK-01-100620 @ 0830 PFAS, TOC, QUAL, AN CAT in PFAS +

VAPF-GW-26-30-01-100620 @ 1140; PFAS, TOC, QUAL, An Cat, ISO

VAPF-GW-26-30-02-100620 @ 1145; PFAS Dup

VAPF-SOIL-COMP-26-30-01-100620 @ 1200; PFAS, TOC, CEC

VAPF-SOIL-COMP-26-30-02-100620 @ 1205; PFAS Dup

VAPF-GW-36-39-01-100620 @ 1330; PFAS

~~Sample Collected:~~ VAPF-SOIL-COMP-40-45-01-100620; PFAS, TOC, CEC @ 1400 (Continuous tube

VAPF-SOIL-60-62-01-100620 @ 1450; PFAS, TOC, CEC (Dot unconsol/Top of BR

VAPF-GW-66-70-01-100620 @ 1600; PFAS, TOC, QUAL, An/Cat, ISO, St. Peter

VAPF-SOIL-COMP-66-70-01-100620 @ 1620; PFAS, TOC, CEC

- Seepage meter installed near VAPE

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Results: 100.0: _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

10.16 7.15 4.36

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAPF
Location(s) of Picture:		Footage Drilled: 0-70

Print Name: Alex Smyem

Signature: _____

Title: Geologist I

AECOM

Day/Date Wednesday, October 7, 2020

ENVIRONMENTAL FIELD REPORT 1007!

___ of ___

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.: _____

AECOM Staff: _____ | Client: MPCA

Arrive Job: _____ | Sub Contractor: _____ | Area Sampled: _____

Depart Job: _____ | Sub Arrive Job: _____

Travel Time: _____ | Sub Depart Job: _____

* Full list = Query/TOC/Cation/Anion

Summary of Technical and/or Engineering services performed.

EP26A-WAT-BULK-01-100720 @ 0715, isotope only

PP1-WAT-BULK-01-100720 @ 0745, isotope only

VAPJ-GW-21-25-01-100720 @ 1130, PFAS, Full list, Isotope

VAPS-SOIL-Comp-21-25-01-100720 @ 1145 PFAS/TOC/CEC

VAPS-GW-28-32-01-100720 @ 1145 PFAS only

VAPS-SOIL-41-43-01-100720 @ 1515 PFAS/TOC/CEC (confirm)

VAPJ-GW-60-62-01-100720 @ 1645 PFAS/Full list/Isotope (water or camel 60-6

VAPJ-SOIL-60-62-01-100720 @ 1610 PFAS/CEC/TOC

Samples Collected: EQ-AUGER-01-100720 @ 1515, PFAS only

EQ-PAIL-01-100720 @ 1520, PFAS only

EQ-TUBE-01-100720 @ 1525, PFAS only

VAPJ-SOIL-COMP-70-74-01-100720 @ 1800 PFAS/CEC/TOC

VAPJ-GW-70-74-01-100720 @ 1835 PFAS/Full list/Isotope

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Results: 100.0: — Seepage meter install near VAP 6

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: 10.00 | 7.00: 7.34 | 4.00: 4.23

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAPJ
Location(s) of Picture:		Footage Drilled: 0-74'

Print Name Amanda Lanning

Signature _____

Title Geologist II

AECOM

Day/Date Thurs. 10/8/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job _____ | Sub Contractor _____ | Area Sampled RC3 + VAPE

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed

RC3MAN-WAT-BULK-01-100820 @1015 PFAS only
ODD-WAT-BULK-01-100820 @1040 PFAS, TOC/ALKALINITY/CHLORIDE
ODD=dup
VAPE-SOIL-3640-01-100820 1150 PFAS/TOC/ALKALINITY/CHLORIDE
VAPESOIL-3640-01-100820 1130 PFAS/TOC/CL
RC3CELL-WAT-BULK-01-100820 1230, PFAS/TOC/ALKALINITY

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 10.02 7.00: 7.40 4.00: 4.40

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: VAPE, offset 6 feet to the North
Location(s) of Picture:		Footage Drilled: 0-40

Print Name Alex Seelman

Signature

Title Geologist

AECOM

Day/Date Monday, October 12, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

MW12A-SOIL-38-39.75-01-101220 @1420 PFAS, TOC, CEC
MW12A-SOIL-48.5-49.5-01-101220 @1530 PFAS, TOC, CEC
~~MW12A-GW-66-70-01-101220@1800 PFAS, TOC, QUALAMCAT~~
~~EQ-DRUMWAT-01-101220@ 1805 PFAS, TOC, QUAL, AMCAT~~

Samples Collected:

Calibration Log PID: Date/Time: 10/12/2020 0800 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: 10/12/20 @1500 Serial (if multiple):

Results: 10.00: 9.96 7.00: 7.13 4.00: 4.19

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW12A
Location(s) of Picture:		Footage Drilled: 0 – 70

Print Name Amanda Lanna

Signature

Title Geologist III

AECOM

Day/Date Tues, 10/13/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 Project Number 60618753

Location Saint Paul East Metro, MN Weather/Temp. _____

AECOM Staff _____ Client MPCA

Arrive Job _____ Sub Contractor _____ Area Sampled

Depart Job _____ Sub Arrive Job _____ _____

Travel Time _____ Sub Depart Job _____ _____

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW12A-GW-96-100-01-101320 @1200 PFAS/Qual/TOC/Cat/An/iso

MW12A-GW-170-180-01-101320 @1910 PFAS/Qual/TOC/Cat/An

Calibration Log PID: Date/Time: 925 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: ~~EA~~ Serial (if multiple):

Results: 10.00: 10.04 7.00: 7.41 4.00: 4.23

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW12A
Location(s) of Picture:		Footage Drilled: 70'-180'

Print Name Alex Sievers

Signature

Title Geologist I

Minnesota Pollution Control Agency

AECOM

Day/Date Wednesday Oct 14, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled MW12A

Summary of Technical and/or Engineering services performed.

Top of Job

MW12A-GW-226-230-01-101420	1515	PFAS, TOC, QUAL, ANICAT ISOTOPE
MW12A-SOIL-COMP-226-230-01-101420	1335	PFAS, TOC, CEC
MW12A-SOIL-COMP-226-230-02-101420	1340	DUP, PFAS
MW12A-SOIL-COMP-226-230-03-101420	1345	MS/MSD, PFAS
MW12A-SOIL-COMP-256-260-01-101420	@ 1350	PFAS, TOC, CEC

Bottom of Boring

Samples Collected:

Calibration Log PID: Date/Time: 10/14/20 0900 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 9.87 7.00: 7.11 4.00: 4.47

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW12A
Location(s) of Picture:		Footage Drilled: 180-260

Print Name Amanda Lamm

Signature

Title Geologist III

AECOM

Day/Date Thurs, 10/15/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60618753

Task Number _____

Weather/Temp. _____

Client MPCA

Arrive Job _____

Depart Job _____

Hours on Job _____

Travel Time _____

Project Coordination _____

Total Chargeable Hours _____

Mileage _____

Area Sampled

_____

_____

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

MW12A-GW-256-260-01-101520 @ 0930 PFAS/Qual/TOC/Cat/An

MW12A-GW-256-260-02-101520 @ 0935 PFAS only

MW12A-GW-256-260-03-101520 @ 0940 PFAS only

MW12A-SOIL-284-288-01-101520 @ 1420 PFAS/TOC/CEC

Samples Collected:

calibration VSI

10.22, 7.60, 4.49

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

_____

_____

International Waybill #:

Comm. Invoice Checklist &

Type (S-Soil, W-Water)

□ Commercial Invoice (S / W) _____

□ Commercial Invoice (S / W) _____

□ Commercial Invoice (S / W) _____

□ Commercial Invoice (S / W) _____

Print Name Alex Sexton

Signature

Title Geologist I

Footage: 260'-340'.

Drilled MW12A

AECOM

Day/Date Fri, October 16, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60618753
Task Number:
Weather/Temp.:
Client: MPCA

Arrive Job:
Depart Job:
Hours on Job:
Travel Time:
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled:

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Developed MW2C and MW13D part - equipment blank at MW2C of pump that fell in well

Samples Collected:

MW12A:
Dulled 340-360, MCL video + gamma, caliper
170 → 340 (gamma entire hole

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

International Waybill #:

Comm. Invoice Checklist &
Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Amanda Lantz

Signature

Title Geologist III

AECOM

Day/Date Mon, 10/19

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60618753

Task Number

Weather/Temp.

Client MPCA

Arrive Job 0830

Depart Job 1800

Hours on Job

Travel Time

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Setting MW16A (2)
- Screen set @ 350'-360'
- Water level ~74

Samples Collected:

PID calibrated at 0800 10/19/20

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

Print Name Alex Serbin

Signature

Title Geologist

ENVDAILY.DOC

AECOM

Day/Date Tues 10/20/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed

- site mobilization to B5 ~~W~~15
- well development MWRA

Samples Collected:

Calibration Log PID: Date/Time: 10/20/20 1200 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Shriver

Signature

Title Geologist I

AECOM

Day/Date October 21, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60638005
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 0830
Depart Job: 1830
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW15A - drilling

Summary of Technical and/or Engineering services performed.

This happened on 10/22/20
Julia will MBS came from 1215-1300
- think the 52 - 97 is regolith/weathered bk of units.
97 - ~140: Hamonane Okpm (100K) Elie sandstone
140 - ~155: lone rock ~155-170: m2 170- : lr
Contact btwn TC and Wonewoc will be coarse sand shale - ↓ ref Cwerk BR
- could remain grey blue through, also look for brachiood shells

Samples Collected: None - "block" sand = glauconite grains
Contact btwn ~~tc~~ wonewoc & eauclaire will be start of shale
contact btwn eauclaire & Mt. Simon will be start of ~~sand~~ COARSE sand but you probably want to set well a little deeper

Calibration Log PID: Date/Time: 0845 10/21/21 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: Core Platter	International Waybill(s) #:	Location Drilled: MW15A
Location(s) of Picture: AS		Footage Drilled: 0 - 180'

Print Name AMANDA LANNING

Signature

Title Geologist III

ENVDAILY.DOC

AECOM

Day/Date October 22, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60618753

Task Number

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Hours on Job

Travel Time

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

MGS came onsite - notes on previous 10/21 daily

Samples Collected: calibrated PID @ 0800

Dehood 180-230

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations

Picture Location(s): AS phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

☐ Commercial Invoice (S / W)

Print Name Alex Seifert

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Fri, 10/23/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff _____

Project Number 60638005

Weather/Temp. _____

Client MPCA

Arrive Job _____

Depart Job _____

Travel Time _____

Sub Contractor _____

Sub Arrive Job _____

Sub Depart Job _____

Area Sampled _____

Summary of Technical and/or Engineering services performed

Footage Drilled: 230' - 270' bgs

Samples Collected: None

Calibration Log PID: Date/Time: Yes, 10/23/20 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: AS phone Location(s) of Picture:	International Waybill(s) #:	Location Drilled: MW15A Footage Drilled: 230-270'

Print Name Alex Senjem

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Mon, 10/26/20

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW15A-SOIL-COMP-~~285~~ 270-289-01-102620 @1300 PFAS/CEC/TOC

MW15A-SOIL-COMP-296-300-01-102620 @1400 PFAS/CEC/TOC

MW15A-GW-296-300-01-102620 @ 1545 PFAS/QUATS/CAT/AM/ISO

→ MW12A-GW-350-360-01-102620 @ 1630 PFAS/ISO/AN/Ai/NT~~S~~/PH

(will get 2nd)

Calibration Log PID: Date/Time: Yes 10/26/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 9.96 7.00: 7.27 4.00: 4.35

Pictures	Shipping	Drilling
Location Pictured: Asphalt	International Waybill(s) #:	Location Drilled: MW15A
Location(s) of Picture:		Footage Drilled: 50' 270-320'

Print Name Alex Semjen

Signature

Title Geologist I

AECOM

Day/Date Tues/10/27/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60618753

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW15A-SOIL-Comp-320-325-01-102720 @ 0930 PFAS/TOC/CEC

MW15A-GW-335-340-01-102720 @ 1330 PFAS/Qual/TOC/Anion/Cat./Isotope

MW15A-SOIL-Comp-335-340-01-102720 @ 1340 PFAS/TOC/CEC

MW15A-SOIL-348-348.5-01-102720 @ 1530 PFAS only

Calibration Log PID: Date/Time: yes. 10/27/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 10.18 7.00: 7.49 4.00: 4.47

Pictures	Shipping	Drilling
Location Pictured: A5 phone	International Waybill(s) #:	Location Drilled: MW15A
Location(s) of Picture:		Footage Drilled: 30' 320' to 350'

Print Name Alex Sendelbach

Signature

Title Geologist I

AECOM

ENVIRONMENTAL FIELD REPORT

1 of 2

Day/Date Wed 10/28/20

(MGS notes on 2 of 2)

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff

Project Number 60638005

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Travel Time

Sub Contractor

Sub Arrive Job

Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed

67.5 water level, was at 70' night before
MGS onsite 0815 until
DK onsite ~1230, Amanda to meet

- MW12A-640350-360-01-102820 Metals, Qual, TOC, CPFAS, ISO, anions, + NH4/Ph collected @1030 (second bay) all collected on 102620 4 first bay
- MGS offsite 1345

Samples Collected:

- Drillers begin setting wells @ 1400 Jordan 52'
St. Lawrence 80'
Mazomanie 98'
Lone Rock 140'
Mazomanie Aquifer 158-168' 170
Lone Rock: 170-220'

Calibration Log PID: Date/Time: yes, 10/28/20 Serial (if multiple): Wonewoc 290-340

Calibration Log YSI: Date/Time: n/a Serial (if multiple): Eau Claire 340-350'

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW15A
Location(s) of Picture:		Footage Drilled: 0'

Print Name Alex Sendorn

Signature

Title Geologist I

AECOM

Day/Date 20 of 22 October 28, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.:

AECOM Staff: | Client: MPCA

Arrive Job: | Sub Contractor: | Area Sampled:

Depart Job: | Sub Arrive Job:

Travel Time: | Sub Depart Job:

MGS NOTES → see back

Summary of Technical and/or Engineering services performed.

MGS: onsite at 0815, water level at 67.5 and casing dn2 180 (182) Start @ 0840

@335, lot of suspended fines somewhat cleared at 335, downflow

@317.8, upward flow @314.8, rock, not hydraulically similar (still downflow)

@313.3 downward flow, unclear

@302.2, downward flow

→ fracture right at 317.8/9 but not really seen, other 1, particles moving into hole

Samples Collected: *Could all be due to start of camera flow

Brownish circles/blotches throughout stoneware-ion of

@311.4, small fracture, not hydr sign. @ 303.3 fracture unclear if

Mineral looks largely the same from ~325 (when flow cleared) until 294.6 hydraulic s/s

Calibration Log PID: Date/Time: Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name

Signature

Title

9

@294.6, shale/grave. start 294.0 back to wtr.
@290.2, shale 293.6 shale
283.7, shale
276.5, shale.

very clear tunnel City once at 269
but murky + lots of drilling mud (tan) of
side wall distortion view
@263.5, minor fracture, not hydro sig
@260.0, very clear blue/green clay CTC
259.0-259.6 - red oxidized zone
255.1, glauconite-rich bed
248.1, glauc bed, 247.9, etc
259.6, Bed plane fracture, slight input of water
233.0, significant fracture ~ maybe at well or VOT here?
229.0, cross bedding see clearly
215.6, glauco -rich bed, no flow change
208 - 203
clear glauconite beds
200.7 - glauconite-rich bed
185.5

182.0 = casing How coming in from annular space
head is higher somewhere with the cased off portion v.s. inside borehole

GAMMA
52-70: Jordane
70-110: St Lawrence
110-170, probably magnonic area

294 - top of Ironton, 286 alt. start
344 - top of Eau Claire (~82 feet)

155-171

Caliper possible fracture at 290 (but resist + temp unchanged)
184 possible fracture

MW15B

VAP: 52-70, whereever possible 61-65, Jordan water + soil

maybe a sand in St Lawrence

126-130, top mazomanie

~~161-165~~ 165-169, lower finger mazomanie

216-220, okay lone cook for VAP

fracture at 233.1, ~~no~~ no video
slight temp twist.

18

AECOM

Day/Date Thursday 10-29-20

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp. High 30s °F, Overcast
Client MPCA

Arrive Job	0700	Travel Time	—	Area Sampled	
Depart Job	1315	Project Coordination	—	Drilled at 1315	
Hours on Job	6.25	Total Chargeable Hours	—		
		Mileage	—		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Trout Drilling resume grouting activities at ~~MW15B~~ MW15A (GS) via tremie pipe and neat cement. (Type 1 Portland Cement)
1000: Start well development with air compressor & tremie pipe
1030: Tanner w/ Trout off site to Lakeland, MN to refill Water Truck
1140: Well Development complete / Water truck back on-site
1310: Trout moved sonic rig and set-up drilling equipment at MW15B to resume tomorrow (10-30-20).
-Pro Cover set-up at MW15A, labled w/ unique well Number 850551
1315: All off-site

Samples Collected:

No Samples Collected

GS

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s): —

International Waybill #: —

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W) —
□ Commercial Invoice (S / W) —
□ Commercial Invoice (S / W) —
□ Commercial Invoice (S / W) —

Print Name Garret Schacht

Signature Garret Schacht

Title Environmental Scientist

ENVDAILY.DOC

AECOM

Day/Date Fri, 10/30/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job 0700 | Sub Contractor _____ | Area Sampled MW15B

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed

Samples Collected:

MW15B-SOIL-COMP-66-70-01-103020 @ 1145 (3) PFAS/TOC/CEC

MW15B-GW-66-70-01-103020 @ 1045 PFAS/An/Cat/Qual/TOC/150

EQ-DECONWAT-01-103020 @ 1300 PFAS only

Calibration Log PID: Date/Time: yes, 10/30/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 9.89 7.00: 7.00 4.00: 4.11

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW15B
Location(s) of Picture:		Footage Drilled: ~~0-80'~~ 0-90'

Print Name Alex Sestern

Signature

Title Geologist

AECOM

Day/Date Mon, 11/02/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0930
Depart Job 1800
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled MW15B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

PID: calibrated 11/02/20
VOA: 10.08, 7.39, 4.13
MW15B
90' to 150' drilled

Samples Collected:

MW15B-GW-PID-90-01-110220 @ 1130 PFAS/Qual/TOC/An/Cat/isotope
MW15B_SOIL-COMP-116-120-01-110220 @ 1330 PFAS/TOC/CEC
MW15B-SOIL-COMP-116-120-02-110220 @ 1335 PFAS only
MW15B-SOIL-COMP-116-120-03-110220 @ 1340 PFAS only
MW15B-GW-116-120-01-110220 @ 1535 PFAS/Qual/TOC/An/Cat
MW15B-GW-116-120-02-110220 @ 1540 PFAS only

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

MW15B-GW-116-120-03-110220 @ 1545 PFAS only

Shipping

☐ Pictures of sample locations
Picture Location(s): Cores: AS phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Senjem
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Tues, 11/03/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled MW15B

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW15B-GW-156-160-01-110320 @1010 PFAS/Aux/TOC/Anl/Cat/Isotope

MW15B-SOIL-Comp-156-160-01-110320 @0845 PFAS/TOL/LEC

Calibration Log PID: Date/Time: yes, 11/03/20 | Serial (if multiple):

Calibration Log YSI: Date/Time: | Serial (if multiple):

Results: 10.00: 9.97 7.00: 7.40 4.00: 4.36

Pictures	Shipping	Drilling
Location Pictured: ATS Phone	International Waybill(s) #:	Location Drilled: MW15B
Location(s) of Picture:		Footage Drilled: 80' 150'-230'

Print Name Alex Senjem

Signature

Title Geologist I

AECOM

Day/Date Wed, 11/04/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 Project Number 60618753

Location Saint Paul East Metro, MN Weather/Temp. _____

AECOM Staff _____ Client MPCA

Arrive Job _____ Sub Contractor _____ Area Sampled

Depart Job _____ Sub Arrive Job _____ _____

MVISB Travel Time _____ Sub Depart Job _____ _____

850552

Summary of Technical and/or Engineering services performed.

- MGS on site @ 8 am

- Maggie on site @ 8am
- AS off site ~1030
- MGS off site ~1300

- Trout / Maggie off site ~1700

Samples Collected:

Calibration Log PID: Date/Time: 45 11/04/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Erickson

Signature

Title Geologist

AECOM

Day/Date Tues November 17, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.: ____

AECOM Staff: ____ | Client: MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	BS1
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

- Begin MW1A @ 1230 - on site @ 10am for set up & clean up weigh station
- Down to 80' bgs end of day 11/17/20

Samples Collected: None

Calibration Log PID: Date/Time: 11/17/20 @ 1030 Serial (if multiple): ____

Results: 100.0: ____

Calibration Log YSI: Date/Time: N/A Serial (if multiple): ____

Results: 10.00: ____ 7.00: ____ 4.00: ____

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW1A
Location(s) of Picture:		Footage Drilled: 0-80'

Print Name: Amanda Lannin

Signature: ____

Title: Geologist III

ENVDAILY.DOC

AECOM

Day/Date Wed, 11/18/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	BS1
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

MW1A-SOIL-COMP-116-120-01-111820 @ 1000 PFAS, CEC, TOC
MW1A-SOIL-COMP-116-120-02-111820 @ 1015 PFAS (DUP)
MW1A-GW-116-120-01-111820 @ 1130 PFAS/TOC/QUAL/ANIC
MW1A-GW-116-120-02-111820 @ 1135 PFAS (DUP)
EQ-SCISSORS-01-111820 @ 1030 PFAS
MW1A-SOIL-COMP-156-160-01-111820 @ 1430 PFAS/TOC/CEC
MW1A-GW-156-160-01-111820 @ 1645 PFAS/TOC/QUAL/AN

Samples Collected:

Calibration Log PID: Date/Time: yes 11/18/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 9.95 7.00: 7.00 4.00: 4.28

Pictures	Shipping	Drilling
Location Pictured: AS phone MW1A	International Waybill(s) #:	Location Drilled: MW1A
Location(s) of Picture:		Footage Drilled: 80 – 180'

Print Name Alex Sanders

Signature

Title Geologist I

AECOM

Day/Date Thurs. 11/19/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW1A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drilled: 180'-280'

Samples Collected: MW1A-GW-226-230-01-111920 @ 1250 PFAS/TOC/Qual/An/Cat/ISO

PID = calibrated 11/19/20
ISI 10: 9.93 7: 7.08 4: 4.48

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☑ Pictures of sample locations
Picture Location(s): AS phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)
- ☐ Commercial Invoice (S / W)

Print Name Alex Sersen
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Fri 11/20/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled
Depart Job	____	Sub Arrive Job	____	____
Travel Time	____	Sub Depart Job	____	____

Summary of Technical and/or Engineering services performed.

Samples Collected: None

Calibration Log PID: Date/Time: yes, 11/20/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: [illegible] 7.00: [illegible] 4.00: [illegible]

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW1A
Location(s) of Picture:		Footage Drilled: 280-320

Print Name Alex Sendorn

Signature [signature]

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Mon 11/23/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled MW1A

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW1A-GW-316-320-01-112320 @ 1115 PFAS/Qua/Tot/Cat/An

Calibration Log PID: Date/Time: Yes 11/23/20 | Serial (if multiple): ____

Results: 100.0: ____

Calibration Log YSI: Date/Time: ____ | Serial (if multiple): ____

Results: 10.00: 9.89 7.00: 7.10 4.00: 4.54

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW1A
Location(s) of Picture:		Footage Drilled: 320'-370'

Print Name Alex Sievers

Signature

Title Geologist I

AECOM

Day/Date Tues, 11/24/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ___

AECOM Staff ___ | Client MPCA

Arrive Job	___	Sub Contractor	___	Area Sampled	___
Depart Job	___	Sub Arrive Job	___		___
Travel Time	___	Sub Depart Job	___		___

MGS

Summary of Technical and/or Engineering services performed.

- MGS on site ~ 830 - ~~1330~~ 1330
- AS off site ~ 1430
- James Meloy with Drillers White casing / setting MW1A

Samples Collected: none

Calibration Log PID: Date/Time: yes, 11/24/20 Serial (if multiple): ___

Results: 100.0: ___

Calibration Log YSI: Date/Time: n/a Serial (if multiple): ___

Results: 10.00: ___ 7.00: ___ 4.00: ___

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW1A
Location(s) of Picture:		Footage Drilled: —

Print Name Alex Sexton

Signature ___

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wed 11/25/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed

James McCoy on site while drillers continue setting well/grouting

on site ~ 730 - 1300

Samples Collected: None

Calibration Log PID: Date/Time: 11/25/20 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name

Signature

Title

ENVDAILY.DOC

AECOM

Day/Date Mon 11/30/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job _____ | Sub Contractor _____ | Area Sampled MW1B

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

onsite ~ 0930, drillers start developing MW1B

MW1B-GW-12-45-01-113020 @ 1405 PFAS/Qual/TOC/AN/CAT

MW1B SOIL-COMP-12-15-01-113020 @ 1410 PFAS/TOC/CEC

MW1B SOIL-25-27-01-113020 @ 1500 PFAS/TOC/CEC only (contin

MW1B-GW-41-45-01-113020 @ 1615 PFAS/Qual/TOC/cat/AN

Samples Collected:

Calibration Log PID: Date/Time: 4:53, 11/30/20 | Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: | Serial (if multiple):

Results: 10.00: 9.75 7.00: 7.03 4.00: 4.51

Pictures	Shipping	Drilling
Location Pictured: AS Phone	International Waybill(s) #:	Location Drilled: MW1B
Location(s) of Picture:		Footage Drilled: 0-45'

Print Name Alex Sedam

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Tues 12/1/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job	_____	Sub Contractor	_____	Area Sampled
Depart Job	_____	Sub Arrive Job	_____	_____
Travel Time	_____	Sub Depart Job	_____	_____

Summary of Technical and/or Engineering services performed.

MGS on site in afternoon

Samples Collected: none

Calibration Log PID: Date/Time: ✓ Serial (if multiple):

Calibration Log YSI: Date/Time: N/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW13
Location(s) of Picture:		Footage Drilled: 45-80

Print Name Amanda Landby

Signature X

Title Geologist III

ENVDAILY.DOC

AECOM

Day/Date Wed 12/2/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed

- Washington City Trust hydrovacing @ 1300 to 1600 onsite during hydrovac
- RKey on site 8am to 1600
- Drillers finishing up MW1B@ in the morning ~8am

Samples Collected: none

Calibration Log PID: Date/Time: yes, 12/2/20 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Serdar

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Thurs 12/03/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	RC5
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

- Drillers attempt development w/ whale pump @ 815
- only 3" of water in well, essentially a dry well
- mob to #BS14 in afternoon

Samples Collected: RC5-WAT-BULK-01-120320 @ 0830 Isotope only

Calibration Log PID: Date/Time: yes, 12/03/20 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Seriem

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Fri, 12/04/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW14A

Summary of Technical and/or Engineering services performed.

Samples Collected:

MW14A-SOIL-COMP-66-70-01-120420 @ 1255 PFAS only
MW14A-SOIL-COMP-76-80-01-120420 @ 1305 PFAS only

Calibration Log PID: Date/Time: Yes, 12/4/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 10.02 / 9.84 7.00: 7.35 / 7.24 4.00: 4.13 / 4.35

Pictures	Shipping	Drilling
Location Pictured: AS Phone	International Waybill(s) #:	Location Drilled: MW14A
Location(s) of Picture:		Footage Drilled: 0-80'

Print Name Alex Sedlacek

Signature

Title Geologist I

AECOM

Day/Date Mon, 12/7/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW14A

Summary of Technical and/or Engineering services performed

- Put MDH also on site

Samples Collected:

- MW14A-GW-76-80-01-120720 @1145 PFAS/TOC/Anion/Cat/An
- MW14A-GW-116-120-01-120720 @1505 PFAS/TOC/Anion/Cat/An

Calibration Log PID: Date/Time: ~~12/7/20~~ 12/7/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 9.44 7.00: 7.38 4.00: 4.57

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: B514
Location(s) of Picture:		Footage Drilled: 80 – 140

Print Name: Alex Sorsen
Signature:
Title: Geologist I

ENVDAILY.DOC

AECOM

Day/Date Tues 12/8/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled B514

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed.

- Washington City on site @ 10am.

Samples Collected:

MW14A-GW-146-150-01-120820 @ 1015 PFAS/TOC/Anions/Mn/Cat

Calibration Log PID: Date/Time: 905 12/8/20 Serial (if multiple): ____

Results: 100.0: ____

Calibration Log YSI: Date/Time: ____ Serial (if multiple): ____

Results: 10.00: 10.10 7.00: 7.05 4.00: 4.02

Pictures	Shipping	Drilling
Location Pictured: Asphalt	International Waybill(s) #:	Location Drilled: MW14A
Location(s) of Picture:		Footage Drilled: 140 – 180

Print Name Alex Swisher

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wed, 12/9/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled B514

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed

- Washington City on site this morning.

Samples Collected:

MW14A-GW-196-200-01-120920 @ 1230 PFAS/Qm1/TOC/Am1/Cat/Is6
MW14A-GW-196-200-02-120920 @ 1235 PFAS
MW14A-GW-196-200-03-120920 @ 1240 PFAS

Calibration Log PID: Date/Time: Yes, 12/9/20 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 10.00 7.00: 7.41 4.00: 4.49

Pictures	Shipping	Drilling
Location Pictured: AS shown	International Waybill(s) #:	Location Drilled: MW14A
Location(s) of Picture:		Footage Drilled: 260'

Print Name Alex Erickson

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Thurs 12/10/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	B514
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Samples Collected: MW14A-GW-286-290-01-121020 @1230 PFAS/TOC/Equip/Cat
RC23-WAT-BULK-01-121020 @1300 Isotope Only

Calibration Log PID: Date/Time: YES. 12/10/20 Serial (if multiple): _____

Results: 100.0: _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: 9.97 7.00: 7.32 4.00: 4.24

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW14A
Location(s) of Picture:		Footage Drilled: 260'-330'

Print Name Alex Sexton

Signature

Title Geologist

ENVDAILY.DOC

AECOM

Day/Date Fri 12/11/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ___

AECOM Staff ___ | Client MPCA

Arrive Job	___	Sub Contractor	___	Area Sampled	
Depart Job	___	Sub Arrive Job	___		
Travel Time	___	Sub Depart Job	___		

Summary of Technical and/or Engineering services performed.

~~MW~~ -MW/4ft collapsed in 12/10/20 + monday of 12/11/20 forcing drillers to set the well today and skip MG5

-Re-drilled to 330' / continued collapsing occuring after re-drill

316-326'

Bedrock

312-001
314

Samples Collected:

Calibration Log PID: Date/Time: 925 / 12/11/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled: Re-drill to 330'

Print Name Alex Serjem

Signature

Title Geologist I

AECOM

Day/Date Mon 12/14/2020

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. 15°F cloudy

AECOM Staff | Client MPCA

Arrive Job		Sub Contractor	TRAUT	Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

- Drillers continue to set + remove casing + grout
- TROUBLE GROUTING - SEEMED THAT CEMENT IS BEING TAKEN INTO FRACTURES; STOPPED GROUTING @ 90% WILL MEASURE AND CONTINUE GROUTING IN MORNING

Samples Collected:

Calibration Log PID: Date/Time: yes, 12/14/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW14A
Location(s) of Picture:		Footage Drilled:

Print Name MAGGIE SCHLOGEN

Signature

Title ENV. ENGINEER II

ENVDAILY.DOC

AECOM

Day/Date Tuesday, Dec. 15, 2020

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.: ____

AECOM Staff: ____ | Client: MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	BS14
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

Grout + develop MW14A
Drill + sample MW14B

Samples Collected:

MW14B-SOIL-Comp-56-60-01-121520 @ 1200 PFAS only
MW14B-SOIL-Comp-10-30-01-121520 @ 1425 PFAS/TOL/LEC
MW14B-SOIL-Comp-30-37-01-121520 @ 1430 PFAS/TOL/LEC
~~MW14B~~-MW14B-SOIL-Comp-30-37-02-121520 @ 1435 PFAS only
MW14B-SOIL-Comp-30-37-03-121520 @ 1440 PFAS only
MW14B-GW-29-37-01-121520 @ 1515 PFAS/Qual/TOL/Anion/Cat/ISO

Calibration Log PID: Date/Time: Yes 12/15/20 Serial (if multiple):

Results: 100.0:

Calibration Log YSI: Date/Time: N/A (new) Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: IAS phone	International Waybill(s) #:	Location Drilled: MW14B
Location(s) of Picture:		Footage Drilled: 0-78

Print Name AMANDA [illegible]

Signature

Title Geologist

ENVDAILY.DOC

AECOM

Day/Date Wed, 12/16/20

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled ____

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed.

- Hole collapsed to 54' after being drilled to 72' bgs on 12/15/20

- Set MW14B to round
- ~~Set~~ Development 12/17/20

Samples Collected:

Calibration Log PID: Date/Time: yes, 12/16/20 | Serial (if multiple):

Calibration Log YSI: Date/Time: n/a | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled: Re Drill 59-70'

Print Name Alex Sorensen

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date THURS. 12/17/20

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60638005
Location: Saint Paul East Metro, MN
Weather/Temp.: 20's °F OVERCAST
AECOM Staff:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor: TRAUT
Sub Arrive Job:
Sub Depart Job:
Area Sampled:

Summary of Technical and/or Engineering services performed.

- DRILLERS CONTINUE TO REMOVE CASTING & GROUTING
STATIC H_2O @ 55.6, CLEAN

Samples Collected:

Calibration Log PID: Date/Time: YES, 12/17/20 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW14B
Location(s) of Picture:		Footage Drilled:

Print Name
MAGGIE SCHLOSSEN

Signature

Title
ENV. ENGINEER II

Minnesota Pollution Control Agency

AECOM

Day/Date Wed, 2/3/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job _____ | Sub Contractor _____ | Area Sampled none - B517

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

Drill to 140'

8 inch down to 140'

Notes from 2/3+2/4: 8 inch down to 140' (32') from top of shakopee to keep a good seal at the bottom of the hole and ensure stability due to the high volume of clay-ey weathered intervals - this was to prevent collapses like at the MW14A

Samples Collected: none

Shakopee + overlying St. Peter very weathered. Mottled/thin St. Peter w/ some silts + clays in it.

heavy clays → Weathered shakopee mostly from 108'-136' (according to Drillers as well) chert sediment observed in the 130-140' interval. Clays prevented VAP sampl pre-calibrated MW 146'-150'

Calibration Log PID: Date/Time: n/a - Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: AO Phase	International Waybill(s) #:	Location Drilled: MW17A
Location(s) of Picture:		Footage Drilled: 0-140'

Print Name Alex Sergun

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Thurs 2/4/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ___

AECOM Staff ___ | Client MPCA

Arrive Job	___	Sub Contractor	___	Area Sampled	MW17A
Depart Job	___	Sub Arrive Job	___		
Travel Time	___	Sub Depart Job	___		

Summary of Technical and/or Engineering services performed.

Samples Collected:

✓ MW17A-GW-146-150-01_020421 @ 1400 PFAS/Qual/TOC/Cat/An/ISO

Calibration Log PID: Date/Time: yes | Serial (if multiple): ___

Calibration Log YSI: Date/Time: n/a | Serial (if multiple): ___

Results: 10.00: ___ 7.00: ___ 4.00: ___

Pictures	Shipping	Drilling
Location Pictured: AS Above	International Waybill(s) #:	Location Drilled: MW17A
Location(s) of Picture:		Footage Drilled: 140'-210'

Print Name Alex Stetson

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Mon, 2/15/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60638005
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled BS17

Summary of Technical and/or Engineering services performed.

✓

Samples Collected: MW17A-GW-206-210-01-02152 PFAS/TOC/Anal/Cat/An @1530

Calibration Log PID: Date/Time: n/a Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: n/a	International Waybill(s) #:	Location Drilled: MW17A
Location(s) of Picture:		Footage Drilled: n/a

Print Name Alex Sanders
Signature
Title Geologist

AECOM

Day/Date Tues, 2/16/24

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	BS17
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.



Samples Collected: None

Calibration Log PID: Date/Time: yes 2/16/24 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: AS None	International Waybill(s) #:	Location Drilled: MW17A
Location(s) of Picture:		Footage Drilled: 215'-240'

Print Name Alex Sexton

Signature

Title Geologist I

Alex, Kelly, Drillers on site

ENVDAILY.DOC

AECOM

Day/Date Wed 2/17/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60638005
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Static Water MW7A 2/17/21 :15.1'

MGS out - comments on back two

MGS, slight downflow of lay GL/mh upflow around the 147' fracture

Samples Collected:

Drill to 245', collapse to 244'
Backfill w/sand filter pack to 240'
Screen 230'-240'

Calibration Log PID: Date/Time: yes Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Sedam

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date 2/18/21 - 2/19/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff AS, RF

Project Number 60638005
Weather/Temp. Cloud 10°F
Client MPCA

Arrive Job
Depart Job
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
BSC7

Summary of Technical and/or Engineering services performed.

Samples Collected:

2/18/21
- MW17B-SOIL-COMP-10-17-01-021821 @ 1300; PFAS, TOC, CEC
- MW17B-SOIL-COMP-6-10-01-021821 @ 1310; PFAS, TOC, CEC
- MW17B-GW-10-17-01-021821 @ 1320; PFAS, Qual, Cat/An, TOC
- MW17B-GW-46-50-01-021821 @ 1640; PFAS, Qual, Cat/An, TOC

2/19/21
- MW17B-GW-94-98-01-[redacted]021921 @ 1030; PFAS, Qual, Cat/An, TOC

Calibration Log PID: Date/Time: yes 2/18/21 + 2/19/21 Serial (if multiple):

Calibration Log YSI: Date/Time: yes, 8am 2/18 + 2/19 Serial (if multiple):

Results: 10.00: 10.24 7.00: 7.32 4.00: 4.36
2/19/21: 10.28 7.29 4.32

Pictures	Shipping	Drilling
Location Pictured: AS phone MW17B	International Waybill(s) #:	Location Drilled: MW17B
Location(s) of Picture:		Footage Drilled: 2/18: 0-100'

Print Name Alex Sanders
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date 2/22/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

AECOM Staff BK

Project Number 60638005

Weather/Temp. 26° F / clear

Client MPCA

Arrive Job 0845

Depart Job 1605

Travel Time ~30 each way

Sub Contractor Traut

Sub Arrive Job 0830

Sub Depart Job 1600

Area Sampled NA

Summary of Technical and/or Engineering services performed.

Well development and "setting" well, screen, filter pack, seal w bentonite, locked/covered well.

- water level before development: 15.2 ft
  water level after development: 15.2 ft

Samples Collected: NA

Calibration Log PID: Date/Time: Yes, 2/22/21 Serial (if multiple):

Calibration Log YSI: Date/Time: NA Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: NA	International Waybill(s) #: NA	Location Drilled: BS17, MW17B
Location(s) of Picture: NA		Footage Drilled: NA

Print Name Brayden Kuester

Signature Brayden

Title Environmental Scientist

ENVDAILY.DOC

AECOM

Day/Date Mon, 4/19/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW1B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Overshoot MW1B 1h am
- Drill to 120', pump water out of column
- 1h ~2 hrs, WL drops from ~15' to 50' after 500 gallons purged from hole
- Assumed that water is flowing from fractured cement surrounding the platteville — daily re-drill

Samples Collected:

- If drilling water completely purged, WL should be below at least 80' if platteville not having an impact on well.
- hole left til am, if WL is still elevated, drill 10' more + set 20' screen

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☒ Pictures of sample locations
Picture Location(s): A5

Print Name Alex Senjem
Signature
Title Geologist I

AECOM

Day/Date Monday, April 19, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job (CAMILLE) 1030
Depart Job 1755
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW14C

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0900 - DM onsite to meet w/ Dan & Brad & Seth
MW14C-SOIL-COMP-9-15-01-041921 @ 1500 PFAS
MW14C-SOIL-COMP-15-20-01-041921 @ 1525 "
MW14C-SOIL-COMP-20-24-01-041921 @ 1535 "
MW14C-SOIL-COMP-24-30-01-041921 @ 1540 "
MW14C-SOIL-COMP-30-36-01-041921 @ 1600 "

Samples Collected: Drilled MW14C @ 0-40' bgs
(air knifed 0-9)
well to be set 16-36' bgs
& backfill 36-40'
Camille offsite @ 1755

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):
PID calibrated at 1030

☐ Pictures of sample locations
Picture Location(s):

Print Name Amanda Lanning
Signature
Title Geologist III

AECOM

Day/Date Tuesday, April 20, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0800
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
BS1

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Finish drilling at MW1B (kept it at 120' bgs)
set well + grout 20' screen 100-120

Began drilling MW1C at 1300
0-40' bgs

Finish drilling @ 1530, cleaned up site + finished
logging MW1C

Samples Collected:

PID calibrated @ 0800 AM

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

□ Pictures of sample locations
Picture Location(s):

Print Name Amanda Landry
Signature
Title GEOLOGIST II

ENVDAILY.DOC

AECOM

Day/Date 4/20/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp. 35° partly cloudy
Client MPCA

Arrive Job 0730
Depart Job 1715
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drilling oversight in Ideal Ave. - completed at MW14C - setting well no actual drilling moved drilling equipment to Tablyn Park

Samples Collected: N/A

PID calibrated at 0745 4/20/21

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Kaitlyn Ruth
Signature
Title Environmental Scientist

ENVDAILY.DOC

AECOM

Day/Date Wed, 4/21/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730
Depart Job 1530
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW1C

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

@1530 Kaitlyn took over for Alex to oversee well setting -off site @ 1730

Samples Collected:

MW1C-GW-51-55-01-042121 @ 1045 PFAS/TOC/Anion/Cat/Alk turb, no ~~turbidity~~

Drilled 40-55', MGS out, then set well (MW1C)

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

PID: calibrated, YSI: 10:9.79 7:7.62 4:4.06

☐ Pictures of sample locations
Picture Location(s):

Print Name Alex Serbus
Signature
Title Geologist I

AECOM

Day/Date 4/21/21 Wednesday

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp. 34°F Sun
Client MPCA

Arrive Job 1:20 Camille
Depart Job 18:00pm
Hours on Job
Travel Time one hour
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled MW2E

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

SONIC DRILLED MW2E AT TABLYN PARK
DRILLED DOWN TO 90 FEET. ~~[illegible]~~ 60-90 FEET LOGGED.
ST. PETER SANDSTONE HIT AT 61 FEET AND CONTINUED THROUGH 90 FEET
SCREEN TO BE SET AT 80-90 FT BGS. (10 FOOT)

Samples Collected: NO SAMPLES TAKEN!

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):
Camille

Print Name CAMILLE KARNATZ
Signature
Title ESII

ENVDAILY.DOC

AECOM

Day/Date Thurs, 4/22/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW9B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drill to 100' at MW9B; 0-100'
- Set + grout
- @ 1700, surface water sample w/ Amand

2 1700, calibrate YSI
10.11, 6.97, 4.01

Samples Collected: - n/a

RC2-WAT-BULK-01-042221 @ 1715 *TDS/PFAS
EP17-WAT-BULK-01-042221 @ 1830 TDS/PFAS
EP9-WAT-BULK-01-042221 @ 1800 TDS/PFAS

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

PID calibrated

Pictures of sample locations

Picture Location(s):
AG phone

Print Name Alex Sexton
Signature
Title Geologist I

AECOM

Day/Date Thursday, April 22, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730 (Camille) + 1200 (Kaitlyn)
Depart Job 1700
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

@ Finish develop @ MW2E
Sampled MW1C
Flow at DO HORSESHOE #1 + DO HORSESHOE #2
Dropped bag at MW2E
Dropped bag at MW1B

Samples Collected:

MW1C-GW-40-45-01-042221 @ 1625
TDS/TSS/pH/PFAS

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s): Unknown - Camille or Kaitlyn

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Amanda Cannon
Signature
Title Geologist III

(Completed for Camille + Kaitlyn)

ENVDAILY.DOC

AECOM

Day/Date Friday, April 23, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. ___

AECOM Staff ___ | Client MPCA

Arrive Job 0730/0800 | Sub Contractor ___ | Area Sampled ___

Depart Job 1830 | Sub Arrive Job ___ | ___

Travel Time Alex @ MW9B | Sub Depart Job ___ | ___

Amanda + Camille @ PAP for sampling

Summary of Technical and/or Engineering services performed.

MW14C-GW-16-36-01-042321 @1200, TDS, TSS, pH, TOC, PFAS

MW9B-GW-90-100-01-042321 @1530

MW12A-GW-350-360-01-042321 @1620 (overfilled 250mL), 1 PFAS bottle

flow @ Confl #1, Confl #2, + EPL + Lake Elmo Pipes

@ MW9B: Developed MW9B, final water level 21.2 bTS

Samples Collected: Sample Name | Time | Analytes

Calibration Log PID: Date/Time: 4/23/21 0745 ✓ Serial (if multiple): ___

Results: 100.0: ___

Calibration Log YSI: Date/Time: ___ Serial (if multiple): ___

Results: 10.00: ___ 7.00: ___ 4.00: ___

Pictures	Shipping	Drilling
Location Pictured: Flow @ Confl #1, #2, + EPL/LE	International Waybill(s) #:	Location Drilled: N/A
Location(s) of Picture: Amanda Phone		Footage Drilled:

Print Name Amanda Canning

Signature ___

Title Geologist III

AECOM

Day/Date Monday, April 27, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60638005
Task Number:
Weather/Temp.:
Client: MPCA

Arrive Job: 0900
Depart Job:
Hours on Job:
Travel Time:
Project Coordination:
Total Chargeable Hours:
Mileage:
Area ~~Sampled~~ Drilled: MW14D

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Stephens (Andy) onsite, moving to MW14D
Alex + Amanda clearing up around B51 (left over
Drilled MW14D 0-21' bgs + set + develop development
Set up at MW10C - will start drilling sediment +
Tomorrow) cement)

Deployed 9A
MW14D → 37.23 - 2.51 = 34.72' bgs 4/26
37.82 - 2.51 = 35.31' bgs 4/27

Samples Collected:

MW14D WL before develop: 8.41 bgs
after: 8.52' bgs

PID calibrated @ 0905

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Alex Senjem
Signature
Title Geologist I

AECOM

Day/Date Wednesday, April 28, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730
Depart Job
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled MW10C

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0730 - safety, set up 0740 - start drilling MW10C
1500 Finish probe ~~MW~~17C Finish LOC, Drill 0-20' (Continue + HSA)
Drill to 0-40' MW~~17~~17C

~~Post~~ Pre-develop WL MW10C 12.91' bgs post develop 13.01' bgs.

Samples Collected:

PID calibrated @0735 4/28/21

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):
AS phone

Print Name Alex Skrabis
Signature
Title Geologist I

AECOM

Day/Date Thurs, 4/29/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- HSA MW17C @ 730
- Sand heave, hole plug not at existing HSA, remove well + refill
- well set in afternoon, 12 ft filter pack, 2 ft seal, grout in am.
- pre-develop : 13.95' bgs
post-develop : 13.95' bgs

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Alex Sevilla
Signature
Title Geologist I

AECOM

Day/Date Fri, 4/3/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job		Travel Time		Area Sampled
Depart Job		Project Coordination		
Hours on Job		Total Chargeable Hours		
		Mileage		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drillers flush grouting MW17C
- ~~Screen~~ Shifted down to 38.5-48.5 overnight

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Garret Eabaugh

Signature ✓

Title

AECOM

Day/Date Mon, 5/3/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Brayden / Alex On site to gauge wells + flush sampling

Samples Collected:

G-21-01-050321 @ 0930 PFAS/TSS/TDS/pH/TOC
- MW14D-GW-~~[illegible]~~
- MW17C-GW-38.5-48.5-01-050321 @ 1100 PFAS/TSS/TDS/pH/TOC
- MW10C-GW-10-20-01-050321 @ 1140 PFAS/TSS/TDS/pH/TOC

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

□ Pictures of sample locations
Picture Location(s):

Print Name Alex Scrizzi
Signature
Title Geologist I

AECOM

Day/Date 7/14/21 Wednesday

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp. 70 Rain
Client MPCA

Arrive Job	7:30	Travel Time	100min	Area Sampled
Depart Job	4:00pm	Project Coordination		
Hours on Job		Total Chargeable Hours		
		Mileage		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

- DRILLED PWSJ-1 to 90 FEET (FISHING PIER)
  THEN DRILL RIG MOTOR BROKE @ 1pm
- TRAVT LEFT FOR SPARE PART
- RAINED TOO HEAVY TO CONTINUE, AECOM OFFSITE @ 4:10pm
- TRAVT FIXED DRILL & 7pm (text CONFIRMATION

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name CAMILLE KARNATZ
Signature
Title Env Scientist II

ENVDAILY.DOC

AECOM

Day/Date Thursday 7/15/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730
Depart Job 1845
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

0800 - Commenced drilling at RWSJ-1
0900 - Rebecca and Al arrived on site to observe drilling
1015 - James and Laura pull transducer data and deploy hydrosleeves at MW5A, MW5B and MW4

1645 8" to 200'
4", 6" casing advanced to 280'
Samples Collected: 8" casing to 200'

- Dan commented how he needed "Band-aid" fixes to rig today + might replace for next week

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Gerdes
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wednesday 7/21/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp. 80° Hazy Sun
Client MPCA

Arrive Job 0730
Depart Job 1815
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

Safety tailgate at 0730
Started welding around 0800
Began casing well at 0815
Started grouting around 1315
Drillers complete setting and grouting at 1800

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Env. Field Technician

ENVDAILY.DOC

AECOM

Day/Date Thursday 7/22/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0730
Depart Job 1820
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

Safety tailgate at 0730
Begin cleanup of site of PWSJ-1
Began drilling of OWSJ-1
Stopped drilling at 200ft

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Env. Field Technician

ENVDAILY.DOC

AECOM

Day/Date Friday 7/23/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job		Travel Time		Area Sampled	
Depart Job		Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

- Drill to 240' on OWSS-1
- Set 4" well on Monday

Samples Collected:

Footage drilled: 40'

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Sevlen
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Monday July 26, 2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. Partly cloudy 89°

AECOM Staff | Client MPCA

Arrive Job 1000 | Sub Contractor | Area Sampled

Depart Job 1700 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

- Safety tailgate at 1005
- Clean out drilling hole (collapsed over the weekend).
- Set well OW5J-1
- Small grass fire occurred at 1135 due to sparks from welding. Was quickly contained by Dan and crew.
- Hit fracture at 188'. Waiting about 30 minutes to let cement harden.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Technici

ENVDAILY.DOC

AECOM

Day/Date Tuesday 7/27/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. Hot

AECOM Staff | Client MPCA

Arrive Job 0730 | Sub Contractor | Area Sampled

Depart Job | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

- Finish developing well OWSJ-1
- Safety tailgate at 0740
- Began drilling well OW50-1 at 1000
- Stopped drilling at 1730. Reached depth of 200ft.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Env. Field Technician

ENVDAILY.DOC

AECOM

Day/Date 7/28/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff | Client MPCA

Arrive Job | Sub Contractor | Area Sampled

Depart Job 1640 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Drill 200 - 210'

TRANSDUCER DATA FROM: ~~MW5A~~ MW5A
~~MW5B~~ MW5B
MW4A

Samples Collected:

EQUIPMENT BLANKS: EQ - DIPPER - 01 07282 1 @ 1120
EQ - BUCKET - 01 - 072821 @ 1125
~~EQ - BUCKET~~
EQ - AUGER - 01 - 072821 @ 1130

Calibration Log PID: Date/Time: Yes 7/28/21 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Snider

Signature

Title Geologist I

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AECOM

Day/Date Thursday 7/29/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. Overcast 80°

AECOM Staff | Client MPCA

Arrive Job	0730	Sub Contractor		Area Sampled	
Depart Job	1800	Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

- Develop well OW50-1
- Begin drilling well OW50-2
- Stopped drilling at 1800. Reached depth of 180 ft.
- Downloaded transducer data from MW-5A, MW-5B and MW-4A.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Env. Field Technician

ENVDAILY.DOC

AECOM

Day/Date Friday 7/30/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff | Client MPCA

Arrive Job 0730 | Sub Contractor | Area Sampled OWSJ-2

Depart Job | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

- Resume drilling of OWSJ-2.
- 182 ft: lost circulation due to fracture per driller.
- Coon Valley: 204-210 (208-210 - silty fine cemented sand but sandy dolostone @ 210')
- Jordan: 240' bgs

Samples Collected:

Calibration Log PID: Date/Time: 7/30/21 0730 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title ENV. Field Tech

ENVDAILY.DOC

AECOM

Day/Date TUESDAY 8/3/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60618753
Weather/Temp. 80°F MOSTLY SUNNY
Client MPCA

Arrive Job 0730
Depart Job
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

- ~~DEVELOP~~ ~~PURGE~~ WELL OWSJ-2
- CLEANUP = MOVE LOCATIONS, SETUP FOR DRILLING WELL OWSJ-3
- BEGAN DRILLING WELL OWSJ-3 @ 1025

Drilled down '210

@180' - fracture ~ 203-? possibly 21

Samples Collected:

Calibration Log PID: Date/Time: 8/3/21 0730 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name
Signature
Title Geol. I

AECOM

Day/Date August 4, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60618753

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job _____ | Sub Contractor _____ | Area Sampled OW5J-3

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed

OW5J-3, drilling last 20 feet (down to 230') then will set well
Coon valley determined @ 210' 203-
setting well @ 215-225' bgs

(side: top of BR/PDC @ (0' bgs)

Samples Collected:

Calibration Log PID: Date/Time: 8/4/21 0730 Serial (if multiple):

Calibration Log ~~VSI~~: ~~Date/Time:~~ Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Carlson

Signature

Title

ENVDAILY.DOC

AECOM

Day/Date 05/05/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.: Overcast/rain 70°F
AECOM Staff: Cade Kowalczak
Client: MPCA

Arrive Job	0715	Sub Contractor	Trout	Area Sampled	
Depart Job	1620	Sub Arrive Job	0715		
Travel Time		Sub Depart Job	1020		

Summary of Technical and/or Engineering services performed.

- Develop well
- Site cleanup

Samples Collected: —

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name: Cade Kowalczak

Signature:

Title: Env. Technician

ENVDAILY.DOC

AECOM

Day/Date ~~10/11/21~~ 11/1/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60618753
Location: Saint Paul East Metro, MN
Weather/Temp.: Sunny 82°
AECOM Staff: Alex Larson
Client: MPCA

Arrive Job	7:20 am	Sub Contractor	Trust	Area Sampled	
Depart Job		Sub Arrive Job	7:10 am		
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed

- Finish Drilling in AM
- set well

Samples Collected: —

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Larson

Signature

Title Env. Scientist

ENVDAILY.DOC

AECOM

Day/Date Friday 9-10-21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60618753
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0900
Depart Job
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Traut will reset pump

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name

Signature

Title

ENVDAILY.DOC

AECOM

Day/Date 9/14/21, Tues.

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number 60638005

Task Number

Weather/Temp.

Client MPCA

Arrive Job

Depart Job

Hours on Job

Travel Time

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled OW205-2

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drilling OW205-2

- Drilled from 0' to 170'

Samples Collected: none

PID: calibrated to -FEI

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

□ Pictures of sample locations

Picture Location(s):

Print Name Alex Sensen

Signature

Title Geologist I

AECOM

Day/Date 9/15/21 Wed

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Task Number _____

Weather/Temp. _____

Client MPCA

Arrive Job	_____	Travel Time	_____	Area Sampled	
Depart Job	_____	Project Coordination	_____	_____	
Hours on Job	_____	Total Chargeable Hours	_____	_____	
		Mileage	_____		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drilling ~~OW205~~ OW205-2

170' to 300' (130' today)

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): PID calibrated

☐ Pictures of sample locations

Picture Location(s):

_____

_____

Print Name Alex Sergeev

Signature

Title Geologist I

AECOM

Day/Date 9/16/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.: Sunny 85
AECOM Staff: James McCoy
Client: MPCA

Arrive Job	0730	Sub Contractor	Trust	Area Sampled	
Depart Job	1730	Sub Arrive Job	700		
Travel Time	≈ 1.25 round trip	Sub Depart Job	1730, ish		

OW 705-2

Summary of Technical and/or Engineering services performed.

- Safety meeting
- Drilled from 300 to 320
- Set well @ 320 screen 310-320
- Driller went for water & lunch after ≈ 1015
- Set well @ 1700
- Loosing grout @ 104, going to sit overnight & see if it helps

Samples Collected: N/A

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name James McCoy

Signature

Title Geologist

AECOM

Day/Date 9/10/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.: Sunny 75
AECOM Staff: James McCoy
Client: MPCA

Arrive Job	0745	Sub Contractor	0715	Area Sampled
Depart Job	1100	Sub Arrive Job		
Travel Time	2 1 0.25 round trip	Sub Depart Job		

OW205-2

Summary of Technical and/or Engineering services performed.

+Safety meeting conducted
+860284 - well ID
+Finished grouting/cementing
+Moved over to next location
+Pipeline locate guy coming today

Samples Collected: N/A

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name James McCoy

Signature

Title Geol.

AECOM

Day/Date Tuesday, 9-21-21

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job	0700	Travel Time	15 min.	Area Sampled
Depart Job	1830	Project Coordination		
Hours on Job		Total Chargeable Hours		
		Mileage		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Blind drilling of well OW20T-3
Reached depth of 291
Drillers set wells, will finish setting the well tomorrow.

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech

AECOM

Day/Date Wednesday 9-22-21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff G. Goodwin | Client MPCA

Arrive Job	0730	Sub Contractor	_____	Area Sampled	
Depart Job	1810	Sub Arrive Job	_____	_____	
Travel Time	_____	Sub Depart Job	_____	_____	

Summary of Technical and/or Engineering services performed.

Finish grouting and development of well OW20J-3.

Samples Collected:

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date 9/23/21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff G. Goodwin, A. Senjem | Client MPCA

Arrive Job	0900	Sub Contractor	_____	Area Sampled
Depart Job	1625	Sub Arrive Job	_____	_____
Travel Time	_____	Sub Depart Job	_____	_____

Summary of Technical and/or Engineering services performed

Drilling of well PW20J-1.

Samples Collected:

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Tuesday 9-28-21

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 1015 | Sub Contractor | Area Sampled

Depart Job 1820 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

~~Development~~ of well PW20S-1
Drilling
Reached depth of 300'

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Wednesday 9-29-2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0705 | Sub Contractor | Area Sampled

Depart Job 1830 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Continued Drilling of PW20J-1
Gauged and downloaded transducer data for wells:

MW4A MW5A MW5B PW5J-1 OW5J-1 OW5O-1
OW5J-2 OW5J-3

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Thursday 9-30-2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0700 | Sub Contractor _____ | Area Sampled _____

Depart Job _____ | Sub Arrive Job _____ | _____

Travel Time _____ | Sub Depart Job _____ | _____

Summary of Technical and/or Engineering services performed.

Attempt to set and finish well PW20J-1

Samples Collected:

Calibration Log PID: Date/Time: _____ Serial (if multiple): _____

Calibration Log YSI: Date/Time: _____ Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Monday, October 4, 2021

ENVIRONMENTAL FIELD REPORT

__ of __

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job		OW20J-1	
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

0900 - Laura + Amanda onsite, to pull transducers
0930 - travel onsite
1030 - start drilling OW20J-1

Samples Collected:

OW20J1-GW-86-90-01-100421 @ 1600 PFAS/TOC/TOS/ANC

Calibration Log PID: Date/Time: 101421 0900 Serial (if multiple):

Calibration Log YSI: Date/Time: ~~10/4/21~~ FBI calibrated Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: ~~OW20J~~ OW20J-1
Location(s) of Picture:		Footage Drilled: 0-110

Print Name Alex Sanjon

Signature

Title Geologist I

AECOM

Day/Date Oct. 5, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 Project Number 60663338

Location Saint Paul East Metro, MN Weather/Temp. _____

AECOM Staff _____ Client MPCA

Arrive Job	_____	Sub Contractor	_____	Area Sampled
Depart Job	_____	Sub Arrive Job	_____	_____
Travel Time	_____	Sub Depart Job	_____	_____

Summary of Technical and/or Engineering services performed.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: 10/4/21 1800 Serial (if multiple):

Results: 10.00: 9.98 7.00: 6.93 4.00: 4.18

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name _____

Signature _____

Title _____

ENVDAILY.DOC

AECOM

Day/Date 10/5/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job ____ | Sub Contractor ____ | Area Sampled BS20

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed.

Drilled to 220' on OW205-1 (Prairie)

Samples Collected:

OW205I-GW-146-150-01-10052| @1230 PFAS, TOC, Alk, Cat/An

OW205I-GW-146-150-02-10052| @1235 PFAS only

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: Yes | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: At phone	International Waybill(s) #:	Location Drilled: OW205-1
Location(s) of Picture:		Footage Drilled: 110'

Print Name Alex Sinclair

Signature

Title Geologist I

AECOM

Day/Date Wednesday, October 6, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60663338

Location: Saint Paul East Metro, MN | Weather/Temp.: ____

AECOM Staff: ____ | Client: MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	OW20J-1
Depart Job	____	Sub Arrive Job	____		
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

Alex onsite @ 0730
Amanda onsite @ 1115, offsite @ 1700
Laura onsite @ 1245, offsite @ 1700
Alex L onsite @ 1500, offsite @ 1900

Samples Collected: ____

Calibration Log PID: Date/Time: 0730 10/6/21 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: OW20J-1
Location(s) of Picture:		Footage Drilled: 220-

Print Name Alex Senjem

Signature

Title Geologist I

AECOM

Day/Date Thursday 10/7/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.: _____
AECOM Staff: _____
Client: MPCA

Arrive Job: 0700
Depart Job: 1630
Travel Time: _____
Sub Contractor: _____
Sub Arrive Job: _____
Sub Depart Job: _____
Area Sampled: OW2-0J-1

Summary of Technical and/or Engineering services performed

Alex L onsite @ 0700
Amanda onsite @ 0830
MSG onsite @ 0830
set the well

Samples Collected:

Calibration Log PID: Date/Time: [illegible] Serial (if multiple): _____

Calibration Log YSI: Date/Time: N/A Serial (if multiple): _____

Results: 10.00: _____ 7.00: _____ 4.00: _____

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: OW2-0J-1
Location(s) of Picture:		Footage Drilled:

Print Name Alex Larson

Signature

Title Env. Scien.

ENVDAILY.DOC

AECOM

Day/Date Friday 10/08/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job 0730 | Sub Contractor ____ | Area Sampled OW20J-1

Depart Job ____ | Sub Arrive Job ____

Travel Time ____ | Sub Depart Job ____

Summary of Technical and/or Engineering services performed

Alex onsite @ 0730
- Set well
- Prepare for Monday

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: OW20J-1
Location(s) of Picture:		Footage Drilled:

Print Name Alex Larson

Signature

Title Env. Scien.

ENVDAILY.DOC

AECOM

Day/Date Monday 10/11/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name	Project 1007			Project Number	60663338
Location	Saint Paul East Metro, MN			Weather/Temp.	
AECOM Staff				Client	MPCA
Arrive Job	0945	Sub Contractor	Trout 0930	Area Sampled	
Depart Job	1715	Sub Arrive Job	1715		
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed

Alex onsite @ 9:45am
well Development

Samples Collected:

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Larson

Signature

Title Env. Scien.

ENVDAILY.DOC

AECOM

Day/Date Tuesday 10/12/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name	Project 1007			Project Number	60663338
Location	Saint Paul East Metro, MN			Weather/Temp.	
AECOM Staff	Alex Larson			Client	MPCA
Arrive Job	0730	Sub Contractor	Trac 0700	Area Sampled	
Depart Job	~~1815~~	Sub Arrive Job	~~1815~~		
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Alex onsite @ 0730

Well Development

Samples Collected:

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Alex Larson

Signature

Title Env. Sci.

AECOM

Day/Date wednesday 10/13/2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 1300
Depart Job 1830
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

Alex onsite @ 1300

well Development

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

N/A

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Alex Larson

Signature

Title Env. Sci.

ENVDAILY.DOC

AECOM

Day/Date Thursday Nov 18, 2021

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job		Travel Time		Area Sampled	
Depart Job		Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

MGS onsite @ 0700 (LL, AR onsite 0745)
-see back for MGS Notes
1200 - started setting screen
1330 - sand/bulk 1405 grout
Work complete 1655

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name [illegible]
Signature
Title Geologist III

ENVDAILY.DOC

MGS-Video MW10A 11/18/21
- casing down to 125' bgs, bottom @ 285' bgs
- quad: 0-84', St. Peter: 84-122' Shak: 122-214' Oneota: 214-263' Jordan: 263-285'

Camera bottom at 290.4' (~5 feet

238.9 - bpf, all the way around, possibly taking in water
238.1 - bpf, " , video cleared up above fracture so definitely hydr.

16.1 - bpf

10.1 - green shale interlayer

09.2: Bpf, hydrol. sign. but can't really tell if coming in or going out

03.7 - bpf, NA hydr. sign.

00.3 - bpf, not hydr sign

168 - bpf + cuttings zone, not hydr sign.

153.7 - very cuttings > per driller, loss circulation zone 170-190, especially 180-190

180

168 - quartzarenite

130

100.3 - bpf, not hydr. sign

92.7 - bpf, not hydro. sign

75.8 - bpf

39.7 - bpf, not hydr. sign

19.4 - casing

AECOM

Day/Date 12/13/21 Mon

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Task Number

Weather/Temp.

Client MPCA

Arrive Job		Travel Time		Area Sampled	
Depart Job		Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

~ Drilling MW18A

0' - [redacted]

120'

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☑ Pictures of sample locations

Picture Location(s): AS photo

International Waybill #:	Comm. Invoice Checklist & Type (S-Soil, W-Water)
	□ Commercial Invoice (S / W)
	□ Commercial Invoice (S / W)
	□ Commercial Invoice (S / W)
	□ Commercial Invoice (S / W)

Print Name Alex Erickson

Signature

Title Geologist I

AECOM

Day/Date Tues 12/14/24

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job		Travel Time		Area Sampled	
Depart Job		Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drilling MW18A ~~150~~ 120 - 260'

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

calibrate PID

Shipping

☐ Pictures of sample locations

Picture Location(s): AS phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Serjan

Signature

Title Geologist I

AECOM

Day/Date 12/15/21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. _____

AECOM Staff _____ | Client MPCA

Arrive Job	_____	Sub Contractor	_____	Area Sampled	
Depart Job	_____	Sub Arrive Job	_____	_____	
Travel Time	_____	Sub Depart Job	_____	_____	

Summary of Technical and/or Engineering services performed.

Drilling MW18A : ~~260~~ 100' drilled (260'-360')

350-360' blind drilled

Samples Collected: —

Calibration Log PID: Date/Time: Yes 12/15/21 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: B518
Location(s) of Picture: AS phone		Footage Drilled: 100'

Print Name Alex Eerisman

Signature

Title Geologist I

ENVDAILY.DOC

Drilling 12-16-2021

onsite
Kester, Andrew, Jordan - onsite 0820 - MGS off site 1010

- screen set At 1230

Primary HAZARDS:

- Drill / Heavy Equiptment
- Cold Stress
- Ice / Slips Trips Falls

KESTER OFFSITE: 1800

STATIC WATER Level - 50.2

- Lost Circulation Zone At ~200 Ft
- Difficulty Cementing Over 1 yard Gravel Used As Lost Circulation Agent

LAMCRA Log NOTES:

- WATER IS TURBULENT AT WATER Level (50.2)
- 51 - 55 High WATER Flow into Bore
- 70.8 RUBBLE Zone w/ TURBULENCE
- 88 Void
- 100 Karst zone
- 186.7 Void
- 195.8 Void
- 207 RUBBLEZone - Lost Circulation zone
- 235 - Significat void with Flow
- 271.4 - FRACTURE
- 294 - Joint
- 298.7 - Karst

[217 - RUBBLEZONE]

319 - FRACTURE - Flow IN TO WALL
337 - Bedding Flow
347 - [illegible] 75° FRAC/Joint
350 - Cloudy, Flow stop

AECOM

Day/Date Friday / 12-17-21

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0720
Depart Job 1305
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated

Drilling oversight. MW18A

Completed development of well.

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Wed 1/12/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Task Number ____

Weather/Temp. ____

Client MPCA

Arrive Job	____	Travel Time	____	Area Sampled	f
Depart Job	____	Project Coordination	____		
Hours on Job	____	Total Chargeable Hours	____		
		Mileage	____		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drilling MW18B 0'-180

Samples Collected: MW18B-GW-116-120-01-011222 @ 1530
PFAS/TOC/cat/An/TDS/Alk

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s): ____

International Waybill #: ____

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W) ____
□ Commercial Invoice (S / W) ____
□ Commercial Invoice (S / W) ____
□ Commercial Invoice (S / W) ____

Print Name Alex Sedia

Signature

Title Geologist I

AECOM

Day/Date Tues, Jan 13, 2022

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job
Depart Job 1730
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled BS18 MW18B

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

MW18B-GW-176-180-01-011322 @1005, PFAS, TDS, alk, anions, cations, TOC
(VAP-Lower St. Peter)

Drilled 180 - 235
set screen started cementing

Samples Collected:

0740 - YSI calib.
4.00, 7.10, 10.04

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name A. Lamson
Signature
Title Geologist III

AECOM

Day/Date 1-14-2026

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0800
Depart Job 1000
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled N/A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Cementing And Developing MW15B
well Developed - 27 GPM

EQT onsite Due To Road conditions

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name MacKenzie Kesler
Signature
Title Geologist II

AECOM

Day/Date Tues, 5/24/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60663338
Weather/Temp.:
Client: MPCA

Arrive Job: 0700
Depart Job: 1900
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled:

Summary of Technical and/or Engineering services performed.

- Drill to 150'
- Nathan, Geoff, Alex on site

Samples Collected: None

Calibration Log PID: Date/Time: From RI Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW22A
Location(s) of Picture:		Footage Drilled: 0-150'

Print Name: Alex Sheism

Signature:

Title: Geologist I

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Wed, 5/25/22

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60663338
Weather/Temp. Rain in AM, 45°
Client MPCA

Arrive Job 0200
Depart Job 1830
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

- Drill to 220'
- Alex, Nathan, Geoff on-site

Samples Collected: None

Calibration Log PID: Date/Time: ✓ Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: At shore	International Waybill(s) #:	Location Drilled: MW22A
Location(s) of Picture:		Footage Drilled: 70' (150-220')

Print Name Alex Serjem

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Thurs 5/26/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60663338
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0700
Depart Job 1630
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW22A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drill to 320' @ MW22A
(220' - 320' drilled)
- Nathan, Geoff, Alex on site

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):
PID cal ✓, PSI cal n/a

Shipping

☐ Pictures of sample locations
Picture Location(s): MS phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Sievers
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Tues, 5/31/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60663338
Task Number
Weather/Temp.
Client MPCA

Arrive Job 0750
Depart Job 1900
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled MW22A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

- Drilling MW22A
  - Drill 320' - 370' (50')

Samples Collected:

MW22A - GW - 326 - 330 - 01 - 053122 @ 1345 PFAS / TOC / Qual / Cat / AM[redacted]

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

PID ✓ PSI cal: n/a
cal

Shipping

☐ Pictures of sample locations
Picture Location(s): As Phone

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Servien
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wed, 6/1/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 0700
Depart Job: 1900
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW22A

Summary of Technical and/or Engineering services performed

Drilling @ MW22A

370' - 438' drilled
(18' blind drill)

Samples Collected:

MW22A-GW-386-390-01-060122 @ 1150 PFAS/TOC/Anions/Metals

Calibration Log PID: Date/Time: 6/1/22 Serial (if multiple):

Calibration Log YSI: Date/Time: 6-1-22 / 0745 Serial (if multiple):

Results: 10.00: 10.04 7.00: 7.29 4.00: 4.33

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW22A
Location(s) of Picture: Asphalt		Footage Drilled: 68'

Print Name: Alex Sevigny
Signature:
Title: Geologist I

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Thurs. 6/2/22

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff N. Pukal, A. Sejem, G. Goodwin

Project Number 60663338
Weather/Temp. Sunny 71°F
Client MPCA

Arrive Job 0700
Depart Job 1900
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

- MGS down hole geophysical MW22A, onsite @ 0800 offsite @ 1300
- setting MW22A
- Per Dan, screen settled at 439', screen is 429' - 439'
- Geoff / Nathan / Alex onsite

Samples Collected: None

Calibration Log PID: Date/Time: 6/2/22 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW22A
Location(s) of Picture:		Footage Drilled: 0'

Print Name Alex Sejem

Signature

Title Geologist I

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AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Friday 6-3-22

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60663338
Weather/Temp. Sunny, windy 71°
Client MPCA

Arrive Job 0650
Depart Job 1230
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Drillers finish setting and developing MW22A. Completed well @ 0910
DTW @ 0940: 151.8

Began drilling of MW22B, drilled to 60'

Samples Collected: None

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW22A, MW22B
Location(s) of Picture:		Footage Drilled: 60'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

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AECOM

Day/Date 6/6/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff:
Project Number: 60663338
Weather/Temp.:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW22B

Summary of Technical and/or Engineering services performed

Drilling MW22B 60' - 120'

Samples Collected:

MW22B-GW-68-70-01-060622 @ 1215	PFAS/TOC/Alk/Anal/Cat/Ani.
MW22B-SED-68-70-01-060622 @ 1220	PFAS only
MW22B-GW-96-100-01-060622 @ 1715	PFAS/TOC/Alk/Anal
MW22B-GW-96-100-02-060622 @ 1720	PFAS dup
MW22B-GW-96-100-03-060622 @ 1725	~~PFAS~~ PFAS MS/MSD

Calibration Log PID: Date/Time: cal 6/6/22 ✓ Serial (if multiple):

Calibration Log YSI: Date/Time: ~~cal~~ cal 6/6/22 Serial (if multiple):

Results: 10.00: 10.04 7.00: 7.14 4.00: 4.43

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW22B
Location(s) of Picture:		Footage Drilled: 60'

Print Name: Alex Seiden
Signature:
Title: Geologist I

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AECOM

Day/Date Thursday 6/9/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp. Sunny 76°F
Client MPCA

Arrive Job	0700	Travel Time	15 minutes	Area Sampled	
Depart Job	1745	Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage	18 miles		

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Develop and complete MW22B
Begin drilling of MW22C @ 0950, reached depth of 170'

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): N/A

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Technician

ENVDAILY.DOC

AECOM

Day/Date Friday 6/10/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp. Mostly sunny 66°F
Client MPCA

Arrive Job	0650	Travel Time		Area Sampled	
Depart Job	1100	Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drillers setting MW22C

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): N/A

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Technician

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AECOM

Day/Date 6/13/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff Nathan Pukal

Project Number 60663338
Weather/Temp. 65°F, Rainy/Overcast
Client MPCA

Arrive Job 9:15
Depart Job 17:15
Travel Time

Sub Contractor Traut
Sub Arrive Job 9:15
Sub Depart Job 17:15

Area Sampled

Summary of Technical and/or Engineering services performed.

- Traut Developed MW22C, wrapped up site (BS22).
- Move to BS21, setup Rig and gear; Drill to 30 ft, will wait until tomorrow to attempt to get water Sample.

Samples Collected:

Calibration Log PID: Date/Time: ✓ 6/13/22 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW21A
Location(s) of Picture:		Footage Drilled: 30 ft

Print Name Nathan Pukal
Signature
Title Geologist II

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AECOM

Day/Date 6/14/22, Tues

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number
Weather/Temp. 90°F, Humid, Sunny
Client MPCA

Arrive Job 7:00
Depart Job 18:45
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
BS-21

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drilling MW21A 30-110' (80' today)

Nathan + Alex on site

Samples Collected:

MW21A-GW-20-26-01-061422 @0820 PFAS, TOC, Cat/An, Qual
MW21A-GW-76-80-01-061422 @1125 PFAS, TOC, Cat/An, Qual
MW21A-GW-96-100-01-061422 @1650 PFAS, TOC, Cat/An, Qual
MW21A-SED-Comp.-76-80-01-061422 @1300 PFAS only

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

PID calibrated 6/14/22: pH 7.0 ~ 7.33, pH 4.0 ~ 4.36, pH 10.0 ~ 9.95

Shipping

☐ Pictures of sample locations
Picture Location(s):
AS photo

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Alex Sorlien
Signature
Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wed, 6/15/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 7:00
Depart Job: 19:00
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: BS21

Summary of Technical and/or Engineering services performed.

- Drilling MW21A
- Drill 110 – 240'

Alex + Nathan on-site

Samples Collected:

MW21A-GW-156-160-01-061522 @ 1215 PFAS/TOC/Nat/An/Qual

Calibration Log PID: Date/Time: ✓ 6/15/22 Serial (if multiple):

Calibration Log YSI: Date/Time: ✓ 6/15/22 9:50 Serial (if multiple):

Results: 10.00: 10.05 7.00: 7.45 4.00: 4.75

Pictures	Shipping	Drilling
Location Pictured: AS phone	International Waybill(s) #:	Location Drilled: MW21A
Location(s) of Picture:		Footage Drilled: 130'

Print Name: Alex Serjeant

Signature:

Title: Geologist I

ENVDAILY.DOC

AECOM

Day/Date Thurs, 6/16/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job: 700
Depart Job: 1950
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: B521

Summary of Technical and/or Engineering services performed.

Drilling MW21A

Drilled (240'-330')

Samples Collected:

MW21A-GW-286-290-01-061622@1440 PFAS/TOC (Analyt/Dual)

Calibration Log PID: Date/Time: ✓ 6/16/22 7:15 Serial (if multiple):

Calibration Log YSI: Date/Time: ✓ 6/16/22 7:20 Serial (if multiple):

Results: 10.00: 9.96 7.00: 7.41 4.00: 4.42

Pictures	Shipping	Drilling
Location Pictured: AS+NS above	International Waybill(s) #:	Location Drilled: MW21A
Location(s) of Picture:		Footage Drilled: 90'

Print Name: Alex Sexton

Signature:

Title: Geologist I

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AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date [redacted] 6/7/22

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Nathan Pukal

Project Number: 60638005
Task Number:
Weather/Temp: Overcast
Client: MPCA

Arrive Job: 7:00
Depart Job: ~~6:20~~ 18:20
Hours on Job:

Travel Time:
Project Coordination:
Total Chargeable Hours:
Mileage:

Area Sampled:

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Continue Drilling MW22B; Blind Drill to 210', Collect VAP Sample ~~210-214~~

~~VOLD214~~ 120'-300' Drilled

Samples Collected:

EQ-DRILLWAT-01-060722 @ 12:00 (PFAS)
MW22B-GW-216-220-01-060722 @ 14:00 (PFAS, TDS, TOC, Anions meters)

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

YSI Calibrated: pH → 7.0 → 7.42, 4.0 → 4.46, 10.0 → 10.03
reading reading reading

PID Calibrated 06/07/22

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name: Nathan Pukal
Signature:
Title: Geologist II

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AECOM

Day/Date 6/8/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff Nathan Pukal

Project Number 60663338
Weather/Temp. Sunny, 70°F
Client MPCA

Arrive Job 7:00
Depart Job 17:40
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Begin Setting well MW22B.
Finished setting well MW22B

Samples Collected: N/A

Calibration Log PID: Date/Time: 6/8/22 7:20 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Nathan Pukal

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Fri, 6/17/22

ENVIRONMENTAL FIELD REPORT

Project Name: Project 1007 | Project Number: 60618753

Location: Saint Paul East Metro, MN | Weather/Temp.:

AECOM Staff: | Client: MPCA

Arrive Job: 0700 | Sub Contractor: | Area Sampled: BG1

Depart Job: 1345 | Sub Arrive Job:

Travel Time: | Sub Depart Job:

Summary of Technical and/or Engineering services performed

Drilling 330' - 380'

Nathan + Alex on site

Samples Collected: ~~None~~

Calibration Log PID: Date/Time: ✓ 6/17/22 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: AS + NP phone	International Waybill(s) #:	Location Drilled: MW21A
Location(s) of Picture:		Footage Drilled: 50'

Print Name Alex Sertsen

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Monday June 20, 20

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff A. Sexjem, G. Goodwin

Project Number 60663338
Weather/Temp. Sunny 87°F
Client MPCA

Arrive Job 0930
Depart Job 1700
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Continue Drilling of MW21A

Drill 380 – 420' (Blind Drill last 20')

Samples Collected: None

Calibration Log PID: Date/Time: cal 6/20/22 Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Tuesday June 21, 2c

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number [redacted]-6066333
Task Number Mostly sunny 81°f
Weather/Temp. _____
Client MPCA

Arrive Job 0700
Depart Job 1930
Hours on Job _____

Travel Time _____
Project Coordination _____
Total Chargeable Hours _____
Mileage _____

Area Sampled _____

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

MGS onsite at 0830
Drillers set well MW21A

Samples Collected: - 01
EQ-DRILLPUMP-062122 for PFAS @ 1000

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s): _____

International Waybill #: _____

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Wednesday 6-22-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number ~~60633005~~ 6066333

Task Number

Weather/Temp. Partly cloudy 77°F

Client MPCA

Arrive Job	0645	Travel Time		Area Sampled	
Depart Job	1645	Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drillers set and develop well MW21A
Mobilized to B527, started drilling MW27A
Reached 40'

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Thursday 6-23-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number ~~60600006~~ 606633
Task Number
Weather/Temp. Sunny 88°F
Client MPCA

Arrive Job 0645
Depart Job 1845
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Continue drilling of MW27A
Failed VAP sample @ 1530 (see SIF for details)

- Alex + Geoff on-site

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

PID cal, 6/23/22 VSI 10→10.00 ~~4.88~~ 7.28→7.00 4.44→4.00

cal.

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Fri, 6/24/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff | Client MPCA

Arrive Job 0700 | Sub Contractor | Area Sampled B527

Depart Job 1230 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Drill 160 - 220'

Geof + Alex on-site

Samples Collected: None

Calibration Log PID: Date/Time: 6/24/22 Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: A5 phone	International Waybill(s) #:	Location Drilled: MW27A
Location(s) of Picture:		Footage Drilled: 60

Print Name Alex Skrivan

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Monday 6-27-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. Sunny . 65°F

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0930 | Sub Contractor | Area Sampled

Depart Job 2100 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Finish Drilling MW27A, reached depth of 240'

Samples Collected: None

Calibration Log PID: Date/Time: YES Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW27A
Location(s) of Picture:		Footage Drilled: 240'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Tuesday 6-28-22

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60663338
Weather/Temp. Cloudy 63°F
Client MPCA

Arrive Job 0700
Depart Job 1730
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Drillers setting and developing MW27A

Samples Collected:

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: 6/28/22 @930 Serial (if multiple):

Results: 10.00: 10.06 7.00: 7.43 4.00: 4.53

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW27A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Wednesday 6-29-

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. Sunny 57° F

AECOM Staff G. Goodwin, A. Sayjem | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1805	Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Begin Drilling MW27B, logged core to 45'
Attempted VAP sample, Platteville was dry
Drillers set well

Samples Collected: None

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: 6-29-22 0906 | Serial (if multiple):

Results: 10.00: 10.11 7.00: 7.50 4.00: 4.78

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW27B
Location(s) of Picture:		Footage Drilled: 130'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Thursday 6-30-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60638005

Location Saint Paul East Metro, MN | Weather/Temp. Rain 68°F

AECOM Staff G. Goodwin | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled
Depart Job	1030	Sub Arrive Job		
Travel Time		Sub Depart Job		

Summary of Technical and/or Engineering services performed

Drillers Logging MW27B
Mobilize to B57

Samples Collected: None

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Monday 7-11-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff

Project Number 60663338
Weather/Temp. Mostly cloudy 77°
Client MPCA

Arrive Job 0950
Depart Job 1840
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled MW27A

Summary of Technical and/or Engineering services performed

Took VAP sample at MW27A
Began drilling PW75-1 : 74'-78' weathered area, 78'-80' more competent limestone.
Reached depth of 120'

Samples Collected:

MW27A-GW-221-222-01-071122 for PFAS, Metals, TOC, CAT/ANIONS @ 1115

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: 7/11/22 1000 Serial (if multiple):

Results: 10.00: ~~9.52~~ 7.00: 7.06 4.00: 4.69

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: B57 : PW75-1
Location(s) of Picture:		Footage Drilled: 120'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tec

AECOM

Day/Date Tuesday 7/12/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60663338
Weather/Temp. Sunny 65°F
Client MPCA

Arrive Job 0645
Depart Job 1745
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Continue drilling PW75-1
Tim Parkos from Washington County stopped by the site to inquire about a permit for the temporary access road Drillers set the well.

Samples Collected:

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: BST PW75-1
Location(s) of Picture:		Footage Drilled: 30' (120'-150')

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Wednesday 7/13/22

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. Partly cloudy 60°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0700 | Sub Contractor | Area Sampled

Depart Job 1700 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Drillers will develop PW7S-1. Left drill site at 1035

Downloaded transducer data from the following locations:

RC Wetlands 1, RC Wetlands 2, Pond System #2, RC Intermittent #1, RC Intermittent #3, RC Confluence #1, RC Confluence #2, DG Eagle #3

Samples Collected:

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Thursday 7-14-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60663338
Task Number
Weather/Temp. Sunny 80°
Client MPCA

Arrive Job	1315	Travel Time		Area Sampled	
Depart Job	1900	Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Begin drilling MW26A. Reached depth of 105'

G. Goodwin and A. Sanjum on site.

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Friday 7/15/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60638005
Task Number Mostly cloudy 66'
Weather/Temp. _____
Client MPCA

Arrive Job 0700
Depart Job 1300
Hours on Job _____

Travel Time _____
Project Coordination _____
Total Chargeable Hours _____
Mileage _____

Area Sampled _____

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Continue Drilling MW26A - Reached Depth of 200'

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s): _____

International Waybill #: _____

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin

Signature _____

Title Environmental Field Tec

ENVDAILY.DOC

AECOM

Day/Date Monday 7/18/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin, Nathan Pukal

Project Number 60663338
Weather/Temp. Sunny 80°
Client MPCA

Arrive Job 0930
Depart Job 1915
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed.

Drill well MW26A; 200' to 280'

Samples Collected: NONE

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MS26
Location(s) of Picture:		Footage Drilled: 200'-280'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Tuesday 7/19/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60663338
Task Number
Weather/Temp. Cloudy 74°
Client MPCA

Arrive Job 0700
Depart Job 1900
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Continue drilling MW26A. Reached depth of 390'
Logged core to 370', blind drilled to 390'

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Wednesday 7/20/2022

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff Nathan Pukal

Project Number 60663338
Weather/Temp.
Client MPCA

Arrive Job 7:00
Depart Job 1800
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed

MGS onsite to Collect Video Record of MW26A Borehole.

Trout setting well MW26A.

Samples Collected: NONE

Calibration Log PID: Date/Time: Yes 7/20/22 7:05 Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: MW26A
Location(s) of Picture:		Footage Drilled:

Print Name Nathan Pukal

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Thursday 7/21/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60668731
Weather/Temp. Mostly cloudy 72°
Client MPCA

Arrive Job 0630
Depart Job 1800
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
MW26B

Summary of Technical and/or Engineering services performed.

Drillers develop MW26A, begin drilling of MW26B
Took VAP samples from quaternary (screen set at 31'-35') at 1300 & 1308
Reached depth of 160'

Samples Collected:

MW26B-SED-COMP-30-35-01-072122 @1115 for PFAS
MW26B-GW-31-35-01-072122 @1300 for PFAS, TOC, cations & anions
MW26B-GW-31-35-02-072122 @1308 for PFAS, TOC, cations & anio.

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: 7/21/22 1120 Serial (if multiple):

Results: 10.00: 9.97 7.00: 7.38 4.00: 4.99

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: BS 26 MW26B
Location(s) of Picture:		Footage Drilled: 160'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Friday 7/22/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60663338
Weather/Temp. Sunny 72°
Client MPCA

Arrive Job 0645
Depart Job 1000
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
No samples collected

Summary of Technical and/or Engineering services performed

Drillers continue to drill MW26B, reached depth of 240'

Samples Collected: None

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: B526 MW26B
Location(s) of Picture:		Footage Drilled: 80' (160' - 240')

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Monday 7/25/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number [redacted] 606873
Task Number
Weather/Temp. Sunny 66°
Client MPCA

Arrive Job 0905
Depart Job 1900
Hours on Job

Travel Time
Project Coordination
Total Chargeable Hours
Mileage

Area Sampled
MW22C

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Pulled hydrosleeve at MW22C: G. Goodwin + N. Pakal
Finish drilling MW26B, drilled to 260', set well

Samples Collected:

MW22C-GW-160-170-01-072522 @ 0847 for PFAS & TDS

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc): N/A

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Tuesday 7/26/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number [redacted] 60687318

Task Number

Weather/Temp. Cloudy 63°

Client MPCA

Arrive Job 0645

Depart Job 1815

Hours on Job

Travel Time

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drillers develop MW26B

Begin drilling MW26C, reached depth of 144'

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

□ Commercial Invoice (S / W)

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date Wednesday 7/27/2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. Sunny 61°

AECOM Staff G. Goodwin, A. Tarara | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1600	Sub Arrive Job		N/A	
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed

Drillers set MW26C

Clean Harbors onsite @ 0820 to haul away water/sludge

Samples Collected: None

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled: B526 MW26C
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Thursday 7/28/22

ENVIRONMENTAL FIELD REPORT

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp. Sunny 58°
Client MPCA

Arrive Job 0645
Depart Job 1100
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled N/A

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drillers developed MW26C

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Geoff Goodwin
Signature
Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Monday 8/15/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number ~~60663938~~ 6668T3

Task Number Partly cloudy 67

Weather/Temp. _____

Client MPCA

Arrive Job 0930

Depart Job _____

Hours on Job _____

Travel Time _____

Project Coordination _____

Total Chargeable Hours _____

Mileage _____

Area Sampled _____

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Begin Drilling MW8A 0-110
ML + AL onsite 1130
GG offsite 1530

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations

Picture Location(s): _____

International Waybill #: _____

Comm. Invoice Checklist & Type (S-Soil, W-Water)

□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech

ENVDAILY.DOC

AECOM

Day/Date August 16, 2025

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Location: Saint Paul East Metro, MN
AECOM Staff: Matt Carson
Arrive Job: 0708
Depart Job:
Travel Time: 30 min
Sub Contractor: Trust
Sub Arrive Job: 0700
Sub Depart Job: 1900
Project Number: 60687318
Weather/Temp.: 71, cloudy
Client: MPCA
Area Sampled:

Summary of Technical and/or Engineering services performed.

continue drilling MW8A
ML onsite w/ Trust at 0708

Create VAP: MW8A-GW-166-170-01-081622 @ 1515
PFAS, TDS, ORP, dissolved/total TOC

1800 - Dave coring for day, limestone bridged at 86 bgs, attempting to remove.
1900 Drilled to 215' today, only cored to 200'

Samples Collected:

Check sensor error, continue calibration
Hanna cal @ 1240
4.0: 4.99 7.0: 7.12 10.0:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Thurs, 8/18/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 74, Sunny

AECOM Staff | Client MPCA

Arrive Job	0715	Sub Contractor		Area Sampled	
Depart Job	1630	Sub Arrive Job			
Travel Time	~~0330~~	Sub Depart Job			

Summary of Technical and/or Engineering services performed

0845 - Done developing MW8A, starting to set-up for MW8B.

0900 - Amanda L onsite

0915 - NO VAP, not enough water

1100 - Amanda L leaves. Rest of day will be grouting MW8B + setting up at PFAS

1615 - MW8B grouted. Screen set 50-60' bgs.

Samples Collected:

2/000 EQ-DRILLERTOOL-01-081822

2/005 EQ-DRILLERTOOL-02-081822 (DUP) } PFAS only

2/010 EQ-DRILLWATER-01-081822

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: 8/16/22, 0945 NOTE: Cal fail due to sensor error, return to field Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: MW8B
Location(s) of Picture:	Footage Drilled: 60 bgs

Print Name Matt Larson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

ENVIRONMENTAL FIELD REPORT

Day/Date Wednesday, August 17, 2022 of ___

Project Name: Project 1007 | Project Number: 60687318

Location: Saint Paul East Metro, MN | Weather/Temp.: 81, overcast

AECOM Staff: | Client: MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1530	Sub Arrive Job			
Travel Time	30	Sub Depart Job			

Summary of Technical and/or Engineering services performed

0700 - Matt onsite
0800 - MGS + Amanda onsite
1200 - Amanda leaves site
↳ rest of day will be oversight while Tvast installs MW8A
1530 - offsite due to incoming weather.
↳ MW8A Grouted today

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geologist II

MGS Video Notes →

AECOM

Day/Date Fri, 8/19/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 63 +Sunny

AECOM Staff | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time	30	Sub Depart Job			

Summary of Technical and/or Engineering services performed.

0730 - Begin developing MW 8B.
0857 - Finish developing MW8B
1050 - started OW
1230 - offsite

Drill Summary:
OW75-1, drilled to 70' bgs, still in Qat.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Mon, 8/22/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60663338
Task Number
Weather/Temp. 84 + Sunny
Client MPCA

Arrive Job 0930
Depart Job
Hours on Job
Travel Time
Project Coordination
Total Chargeable Hours
Mileage
Area Sampled

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0930 - Crews installing OW75-1
1020 - Bedrock at 77' bgs for OW75-1.
1515 - OW75-1
to screen 90'-100' Total depth = 100'
Bedrock at 77' bgs.
1530 - Begin grouting OW75-1

Samples Collected:

1730 - Grout done, off site.

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

☐ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)
☐ Commercial Invoice (S / W)

Print Name Matt Cox
Signature
Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Tues, 8/23/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN

Project Number 60663338
Task Number
Weather/Temp. 81 + Sunny
Client MPCA

Arrive Job	0700	Travel Time	1	Area Sampled
Depart Job	1930	Project Coordination		
Hours on Job	12.5	Total Chargeable Hours	13.5	
		Mileage	100	

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

0700 - check gwl on OW75-5
0730 - Plan is to drill at the Quest well, screen set at 72' bgs

0955 - drilled out OW70-1 (877390)
to screen from 64-74
bentonite 74-76
bedrock at 76

1330 - set-up at OW75-2

Samples Collected: to Drilled to depth (~110', screen at (100-110')
to bedrock at 76 bgs

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

Shipping

□ Pictures of sample locations
Picture Location(s):

International Waybill #:

Comm. Invoice Checklist & Type (S-Soil, W-Water)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)
□ Commercial Invoice (S / W)

Print Name Matt Larson
Signature [signature]
Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Thurs, 8/25/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 68 + overcast

AECOM Staff Matt Lawson | Client MPCA

Arrive Job 0700 | Sub Contractor _____ | Area Sampled _____

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

0715 - Begin developing OW75-3.
to Trust begins picking up side.

0830 - Done w/ side, pat up + leave.

Samples Collected:

Calibration Log PID: Date/Time: | Serial (if multiple):

Calibration Log YSI: Date/Time: | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Lawson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Wed, 8/24/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 73 ☀overcast

AECOM Staff Matt Larson | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1730	Sub Arrive Job			
Travel Time	1	Sub Depart Job			

Summary of Technical and/or Engineering services performed.

0725 - Developing OW7S-2.

1005 - Start drilling OW7S-3
↳ Bedrock at 74' bgs
Screen 100'-110', total depth 110'

1600 - OW7S-3 grated, developing OW7S-1 now.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Fri, Sept 2, 2022

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 74 + Sunny

AECOM Staff | Client MPCA

Arrive Job	0900	Sub Contractor		Area Sampled	
Depart Job	1100	Sub Arrive Job			
Travel Time	1 hr	Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Propping hydra-sleeves at BSS. 2 will be ready to collect on 9/8/22

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Mon, 9/12/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 65, Sunny

AECOM Staff | Client MPCA

Arrive Job	0900	Sub Contractor		Area Sampled	
S-7.30 Depart Job	0645	Sub Arrive Job			
Travel Time	1.0	Sub Depart Job			

Summary of Technical and/or Engineering services performed

- Begin install at B520

PW205-1 : St Peter at 51' bgs
Shakopee at 164' bgs

1830 - 8" down to 260' but at ~70' bgs, sandstone collapsed & 8" is currently stuck.

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geo II

AECOM

Day/Date Tues, 9/13/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007
Location Saint Paul East Metro, MN
Project Number 60638005
Task Number
Weather/Temp. 53 + Sunny
Client MPCA

Arrive Job	0700	Travel Time	1.0	Area Sampled	
Depart Job	1800	Project Coordination			
Hours on Job		Total Chargeable Hours			
		Mileage			

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Continue w/ B520 drilling

PW20S-1: Grouted + complete screen 200'-250'. Up to 12 bgs, will finish + develop tomorrow.

Samples Collected:

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name Matt Larson
Signature
Title Geo II

AECOM

Day/Date Wed, 9/14/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 62 + Sunny

AECOM Staff Matt Larson | Client MPCA

Arrive Job	0700	Sub Contractor	0700 Drat	Area Sampled
Depart Job	1830	Sub Arrive Job		
Travel Time	1.0	Sub Depart Job	1830	

Summary of Technical and/or Engineering services performed.

0700 - last ~12' of PW20S-1 grouted

1020 - Set up at OW20P-1 + begin drilling

↳ 0-38 : Quat
38-160 : St. Peter
Screen 150-160

Samples Collected:

1820 ↳ Grat to 20ft logs, will finish 9/15/22 AM.

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geo II

AECOM

Day/Date Thurs, 9/15/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Location: Saint Paul East Metro, MN
Project Number: 60638005
Task Number:
Weather/Temp.: 84 + cloudy
Client: MPCA

Arrive Job: 0700
Depart Job: 1815
Hours on Job:
Travel Time: 1.0
Project Coordination:
Total Chargeable Hours:
Mileage:
Area Sampled:

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drilling Oversight - well OW20P-1 (867657) being Developed
- Begin Drilling OW20T-1 (867660)

OW20P-1 was developed, static water level measured at 74.1'. Screen was set at 150-160'. lost circulation at 123' and never came back.

Plan to set screen in OW20T-1 at 100-110'.

Samples Collected: N/A (↳ screen set 0-38': Qvat 38'-108': St. Peter)

Staff: Nathan Pukal, Matt Larson

NOTE: Screen is 98'-108', + 108'-102' is filled w/ sand from St. Peter.

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations
Picture Location(s):

Print Name: Matt Larson
Signature:
Title: Geo II

AECOM

Day/Date Fri, 9/16/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60663338
Location: Saint Paul East Metro, MN
Weather/Temp.: 84 + Sunny
AECOM Staff:
Client: MPCA

Arrive Job: 0900
Depart Job: 1315
Travel Time: 1.0
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled:

Summary of Technical and/or Engineering services performed.

- Survey B57
  B58
- change trans. cords at B57

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature

Title Geo II

AECOM

Day/Date Friday 9/16/22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007

Location Saint Paul East Metro, MN

Project Number ~~60638005~~ 60687318

Task Number

Weather/Temp. Cloudy 64°

Client MPCA

Arrive Job 0700

Depart Job 1105

Hours on Job

Travel Time

Project Coordination

Total Chargeable Hours

Mileage

Area Sampled BS20

No samples collected

Summary of Technical and/or Engineering services performed, including Field Test Data, Locations, Elevations and Depths are Estimated.

Drilling well OW205-2. Reached depth of 210' (4" rods)

Samples Collected: None

Equipment and Supplies Used (excluding PPE, baggies, coolers, ice, etc):

☐ Pictures of sample locations

Picture Location(s):

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Monday 9-19-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. Sunny 78°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job	0930	Sub Contractor		Area Sampled	
Depart Job	1810	Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Drillers finished Drilling ow205-2, set well

Screen: 200' - 210'
Unique ID # 967658
Top of St. Peter: 49'
Top of Shakopee: 169'
Bottom of well: 210'

Samples Collected: None

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: BS20 / OW205-2
Location(s) of Picture:	Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Tuesday 9-20-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Project Number 60687318
Location Saint Paul East Metro, MN
Weather/Temp. Partly cloudy 62°
AECOM Staff G. Goodwin
Client MPCA

Arrive Job 0700
Depart Job 1830
Travel Time
Sub Contractor
Sub Arrive Job
Sub Depart Job
Area Sampled: No samples collected

Summary of Technical and/or Engineering services performed.

Drillers developed well OW205-2, well completed @ 0925
Began Drilling well OW205-3, reached depth of 175'
Began setting the well

Samples Collected: None

Calibration Log PID: Date/Time: Yes Serial (if multiple): —

Calibration Log YSI: Date/Time: N/A Serial (if multiple): —

Results: 10.00: — 7.00: — 4.00: —

Pictures	Drilling
Location Pictured: N/A	Location Drilled: B520 OW205-3
Location(s) of Picture: N/A	Footage Drilled: 175'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Wednesday 9-21-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60687318
Weather/Temp. Partly cloudy 55°
Client MPCA

Arrive Job 0700
Depart Job 1900
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled
No Samples collected

Summary of Technical and/or Engineering services performed.

Drillers developed well OW205-3, well completed @ 1030
Began drilling PZH-1, reached depth of 100'

Samples Collected: None

Calibration Log PID: Date/Time: Yes Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: — 7.00: — 4.00: —

Pictures	Drilling
Location Pictured: PZH-1	Location Drilled: PZH-1
Location(s) of Picture: GG phone	Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

AECOM

Day/Date Mon, 9/19/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60687318
Location: Saint Paul East Metro, MN
Weather/Temp.: 67 + Sunny
AECOM Staff: Matt Larson
Client: MPCA

Arrive Job: 0900
Sub Contractor:
Area Sampled:
Depart Job:
Sub Arrive Job:
Travel Time: 1.0
Sub Depart Job:

Summary of Technical and/or Engineering services performed.

0930- Matt L. + Amanda L. meet Trest in Eagle Pt. Lake park lot

1300 - Trest begins set-up at PZH-3

1630 - PZH-3 advanced to 40' bgs. Will sit overnight + collect VAP in the morning

0-29 : Quartz
29-40 : St. Peter

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name: Matt Larson
Signature:
Title: Geo

ENVDAILY.DOC

AECOM

Day/Date Tues, 9/20/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Project Number 60687318 ~~60663338~~

Location Saint Paul East Metro, MN

Weather/Temp. _____

AECOM Staff Matt Larson, Alex Seyfarth

Client MPCA

Arrive Job 0730

Depart Job 2000

Travel Time _____

Sub Contractor _____

Sub Arrive Job _____

Sub Depart Job _____

Area Sampled _____

Summary of Technical and/or Engineering services performed.

1140 - Water level in PZH-3 is 29.0', Treat setting up pump to purge.

230 - Begin drilling PZH-2.

1630 - Advancing PZH-2 to ___ bgs + letting it sit overnight

Samples Collected:

1000 - PZH-3-GW-36-40-01-092022 ☆VAP☆
to for PFAS, TDS, Alkalinity, TOC, Cations/Anions

1620 - PZH-2-GW-36-40-01-092022 ☆VAP☆
to for PFAS, TDS, Alkalinity, TOC, Ions

640 - EQB-BOTTLE-01-092022
to for PFAS

1930 - PZH-2-GW-46-50-01-092022 only PFAS

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: *Fresh from FEL, no cal needed. Serial (if multiple): 06240051101

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature Matt

Title GeO

ENVDAILY.DOC

AECOM

Day/Date Tues, 9/20/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007

Project Number 60687318 ~~60663338~~

Location Saint Paul East Metro, MN

Weather/Temp. _____

AECOM Staff Matt Larson, Alex Seyfarth

Client MPCA

Arrive Job 0730

Depart Job 2000

Travel Time _____

Sub Contractor _____

Sub Arrive Job _____

Sub Depart Job _____

Area Sampled _____

Summary of Technical and/or Engineering services performed.

1140 - Water level in PZH-3 is 29.0', Treat setting up pump to purge.

230 - Begin drilling PZH-2.

1630 - Advancing PZH-2 to ___ bgs + letting it sit overnight

Samples Collected:

1000 - PZH-3-GW-36-40-01-092022 ☆VAP☆
to for PFAS, TDS, Alkalinity, TOC, Cations/Anions

1620 - PZH-2-GW-36-40-01-092022 ☆VAP☆
to for PFAS, TDS, Alkalinity, TOC, Ions

640 - EQB-BOTTLE-01-092022
to for PFAS

1930 - PZH-2-GW-46-50-01-092022 only PFAS

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: *Fresh from FEL, no cal needed. Serial (if multiple): 06240051101

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name Matt Larson

Signature Matt

Title GeO

ENVDAILY.DOC

AECOM

Day/Date Thursday 9-22-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. Clear 46°

AECOM Staff G. Goodwin, M. Larsen | Client MPCA

Arrive Job 0700 | Sub Contractor | Area Sampled

Depart Job | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Drillers set well PZH-1

M. Larsen onsite at 0900

1300 - Begin drilling MW-203
0-14: Qvat
14-100: St Peter
↳ will set screen + grout in morning

1830 - M. Larsen heads to BS7 to troubleshoot pump transducer

Samples Collected:

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: MW20B
Location(s) of Picture:	Footage Drilled: 100'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Fri, 9/23/22

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 51 + clear

AECOM Staff | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1400	Sub Arrive Job			
Travel Time	1.0	Sub Depart Job			

Summary of Technical and/or Engineering services performed.

0700 - Arrive at MW20B, screen set at 90-100 + grouted

1030 - Transducer instal at B57 + B520.

1400 - Leave site

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name M[illegible]

Signature Matt Larson

Title Geo II

ENVDAILY.DOC

AECOM

Day/Date Monday 9-26-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60663338

Location Saint Paul East Metro, MN | Weather/Temp. Sunny/windy 52°

AECOM Staff | Client MPCA

Arrive Job	0930	Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Drillers developed MW20B, well completed @ 1130
Traut mobilized to MW20A @ 1215
Began drilling MW20A @ 1400
- St. Peter @ 41'
- Shakopee @ 99(?)

Reached depth of 110'

Samples Collected:

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: MW20A	Location Drilled: MW20A
Location(s) of Picture: G. Goodwin phone	Footage Drilled: 110'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Tuesday 9-27-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. Sunny 39°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0700 | Sub Contractor | Area Sampled

Depart Job 1705 | Sub Arrive Job | No samples collected

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Continue drilling MW20A, reached depth of 145' @ 1130
Drillers began setting well @ 1220, screen set at 120' - 140'

Samples Collected: None

Calibration Log PID: Date/Time: Yes | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: MW20A	Location Drilled: MW20A
Location(s) of Picture: G. Goodwin phone	Footage Drilled: 35'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Tuesday 9-28-22

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. Foggy 33°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0700 | Sub Contractor | Area Sampled

Depart Job 1815 | Sub Arrive Job | No samples collected

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Drillers set well MW20A, well completed @ 0920
Mobilized to BS2 @ 0930
Began drilling well MW2F @ 1025, drilled to 150'
Pat from the MDH stopped by the drill site @ 1325
Unique ID: 867666

Samples Collected: None

Calibration Log PID: Date/Time: YES | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: N/A	Location Drilled: BS2 / MW2F
Location(s) of Picture:	Footage Drilled: 150'

Print Name Geoff Goodwin

Signature

Title Environmental Field Tech.

ENVDAILY.DOC

AECOM

Day/Date Thursday Sept 29, 2

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. ____

AECOM Staff ____ | Client MPCA

Arrive Job	____	Sub Contractor	____	Area Sampled	
Depart Job	____	Sub Arrive Job	____	2	
Travel Time	____	Sub Depart Job	____		

Summary of Technical and/or Engineering services performed.

ONSITE 0700 @ Tarlyn, gravity MW2F
Offsite 1615 -develop tomorrow

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled:

Print Name A. Lanner

Signature

Title Geologist IV

ENVDAILY.DOC

AECOM

Day/Date 9/30/22, Friday

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60638005
Location: Saint Paul East Metro, MN
Weather/Temp.:
AECOM Staff:
Client: MPCA

Arrive Job:
Depart Job:
Travel Time:
Sub Contractor:
Sub Arrive Job:
Sub Depart Job:
Area Sampled: MW2F

Summary of Technical and/or Engineering services performed

- Alex on site for well development oversight of MW2F @ 0645
- Air develop from 0700 to 0830 @ ~ 150 gal/min
- Drillers put down submersible pump, pump @ 8 gal/min for ~30 minutes
- Laura Lewis on site 0830-1015 to grab sample
- WL 19.31' TOC Post development + sample

Samples Collected:

- MW2F-GW-130-150-01-093022 @ 0930 PFAS, Alk, TSS, TDS, pH, turbidity, metals, oil + Grease, DOC, DRO, GRO, VOC's
- MW2F-EXP-GW-130-150-01-093022 @ 0935 PFAS (for N.C. Lab)

Calibration Log PID: Date/Time: n/a Serial (if multiple):

Calibration Log YSI: Date/Time: n/a Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: —	International Waybill(s) #: —	Location Drilled: ~~BS~~ BS2
Location(s) of Picture: —		Footage Drilled: —

Print Name Alex Seniem

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Mon, 5/15/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007
Project Number: 60687318
Location: Saint Paul East Metro, MN
Weather/Temp.: 61 + Sunny
AECOM Staff: Matt Larson
Client: MPCA

Arrive Job	0845	Sub Contractor	0900	Area Sampled	
Depart Job	0630	Sub Arrive Job			
Travel Time		Sub Depart Job	0630		

Summary of Technical and/or Engineering services performed.

0845 - Matt on site.
0900 - Tust on site, begin setting up on MW23A (screen 410-420' bgs)
Total Drilled = 130 ft. into upper St. Peter

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name

Signature

Title

ENVDAILY.DOC

AECOM

Day/Date Tues, 5/16/25

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 63 & Sunny

AECOM Staff Matt Larson | Client MPCA

Arrive Job ~~0700~~ 0645 | Sub Contractor _____ | Area Sampled _____

Depart Job 2010 | Sub Arrive Job _____ | _____

Travel Time _____ | Sub Depart Job ~~1900~~ | _____

Summary of Technical and/or Engineering services performed.

Cont'd drilling MW23A, ended day at 280 BGS
↳ Shut @ 278

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Matt L

Signature

Title GEO II

ENVDAILY.DOC

AECOM

Day/Date Wed, 5/17/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 60 + Sun

AECOM Staff Matt Cross | Client MPCA

Arrive Job 0645 | Sub Contractor _____ | Area Sampled _____

Depart Job _____ | Sub Arrive Job _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

Continued drilling MW23A, ended day @ 3810

- Per Dan, a lot of pressure + leakage from Plattsville, to VAP, need need to cement the plattsville, therefore no VAP for the Oneota planned

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name

Signature

Title

ENVDAILY.DOC

AECOM

Day/Date Thurs, 5/18/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 54° rain

AECOM Staff Matt Cross | Client MPCA

Arrive Job _____ | Sub Contractor _____ | Area Sampled _____

Depart Job _____ | Sub Arrive Job _____ | _____

Travel Time _____ | Sub Depart Job _____

Summary of Technical and/or Engineering services performed.

-Finished drilling MW23A

Total depth = 435BGS, but collapse to 432

to Screen from 422-432
Sand from 420-422
Seal from 418-420

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Matt Cross

Signature

Title GBO II

ENVDAILY.DOC

AECOM

Day/Date Fri, 5/19/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 57 + Cloudy

AECOM Staff Matt Larson, Alex Seifert | Client MPCA

Arrive Job		Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

- Grout + develop MW23A

Samples Collected:

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Matt Larson

Signature Matt

Title Geo II

ENVDAILY.DOC

AECOM

Day/Date 5/22/23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Project Number 60687318
Location Saint Paul East Metro, MN
Weather/Temp. 72°F Sunny
AECOM Staff Nathan Pukal
Client MPCA

Arrive Job 0900
Depart Job 1830
Travel Time
Sub Contractor
Sub Arrive Job
Sub Depart Job
Area Sampled

Summary of Technical and/or Engineering services performed

AECOM staff: Nathan Pukal

- Drilling MW23B 0'-200'
(Blind drilling)

0-96' Drift (Quat)
96-100' Weathered Limestone (weathered Platteville)
100-120' Platteville limestone
120-123' Shale (Glen)
123-200' Sandstone (St. Peter)

Samples Collected: N/A

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Nathan Pukal
Signature
Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date 5/23/23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff Nathan Pukal

Project Number 60638005
Weather/Temp. 60°F Sunny
Client MPCA

Arrive Job 0645
Depart Job 1845
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled

Summary of Technical and/or Engineering services performed

Drilling MW23B - 200' - 309' → Finish Drilling, will set tomorrow after MGS (Blind Drilling)

- Troubleshoot Centrifuge most of the Day

- Centrifuge running well at end of Day.

278' - Contact, Prairie du Chen limestone

280-283' seemed softer than Dan would have liked

99-309' currently open

Samples Collected: N/A

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Nathan Pukal
Signature
Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Wed, 5/24/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name: Project 1007 | Project Number: 60687318

Location: Saint Paul East Metro, MN | Weather/Temp.: 59 + lt 2

AECOM Staff: Matt Green | Client: MPCA

Arrive Job	0800	Sub Contractor		Area Sampled	
Depart Job		Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Set + grated MW23B. Will develop in morning (on 5/25/23)
(Screen 294-304
MGS came at, contacts varying to MGS (Base) on (Ground)

MW23A

0-96, Qwt	96-120, OPVL	120-125, OGWD	125-278, OSTP	278-410, OPDC	410-, CSDV

~~Developed~~ NA

Samples Collected:

MW23B

0-94, Qwt	94-120, OPVL	120-125, OGWD	125-278, OSTP	278-308 OPDC

~~Developed~~ NA

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name: Matt Green

Signature: Matt

Title: Geo II

see bzt

ENVDAILY.DOC

AECOM

Day/Date Thurs. 5/25/23

ENVIRONMENTAL FIELD REPORT

___ of ___

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. ___

AECOM Staff ___ | Client MPCA

Arrive Job 0700 | Sub Contractor ___ | Area Sampled B523

Depart Job ___ | Sub Arrive Job ___

Travel Time ___ | Sub Depart Job ___

Summary of Technical and/or Engineering services performed.

- Begin ~~drilling~~ drill of MW23C

- Per driller, B523 less fractured large head difference between platteville + St. Det / Shale / Sandstone shale ~~contact~~ local impermeability

- Developed MW23B @ 7/gmp from ~3 to 5 pm, water clear last 1/2 hour.

- Grated MW23C, sanded to 161 EOD, screen 151 to 161

Samples Collected:

- MW23C-GW-56-60-01-052523 @ 0925 PFAS/TDS/Alk/TOC/Anion/Cation/PFAS Plus scan
- MW23C-GW-56-60-02-052323 @ 0930 PFAS only
- MW23C-GW-~~FD~~ 56-60-03-052523 @ 0935 PFAS only
- EQ-DRILLWAT-052523 @ 1230 PFAS only
- POSTGAC DRILL-01-052523 @ 1250 TDS/TOC/PFAS
- MW23C-GW-106-110-01-052323 @ 1330 PFAS/TDS/Alk/TOC/An/cat.

Calibration Log PID: Date/Time: yes Serial (if multiple): ___

Calibration Log YSI: Date/Time: n/a Serial (if multiple): ___

Results: 10.00: ___ 7.00: ___ 4.00: ___

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Matt.

Signature [signature]

Title Geo II

AECOM

Day/Date Friday 5/26/23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. 75°F Sunny

AECOM Staff Nathan Pukel, BJ Bonin | Client MPCA

Arrive Job	0700	Sub Contractor		Area Sampled	
Depart Job	1000	Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed

- Develop well MW23C @ 5 gals/min for 70 mins;
  Approx. 350 gals purged.
  Depth to water after purging: 13.38' below TOC

- Drums labeled and Covered

Samples Collected: N/A

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured:	International Waybill(s) #:	Location Drilled:
Location(s) of Picture:		Footage Drilled:

Print Name Nathan Pukel

Signature

Title Geologist II

ENVDAILY.DOC

AECOM

Day/Date Wednesday / 5-31-2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Project Number 60687318
Location Saint Paul East Metro, MN
Weather/Temp. Sunny 85°
AECOM Staff G. Goodwin, K. Sundling
Client MPCA

Arrive Job 1030
Depart Job 1200
Travel Time
Sub Contractor
Sub Arrive Job
Sub Depart Job
Area Sampled N/A

Summary of Technical and/or Engineering services performed.

Deployed hydrosleeves at SS23:
MW23A @ 1113
MW23B @ 1122
MW23C @ 1131

Samples Collected: None

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: N/A	International Waybill(s) #:	Location Drilled: N/A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Friday / 6-2-23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp. Mostly sunny / 80

AECOM Staff G. Goodwin, K. Sundling | Client MPCA

Arrive Job	0900	Sub Contractor		Area Sampled	BS23
Depart Job	1300	Sub Arrive Job			
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Retrieved hydrosleeves at BS23. Hydrosleeve for MW23B had to be redeployed.

Changed bag filters at SAFF

Samples Collected:

MW23A-GW-422-432-01-060223 @ 0920 for PFAS + Rapid TAT

MW23C-GW-451-161-01-060223 @ 0925 for PFAS + Rapid TAT

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: N/A	International Waybill(s) #:	Location Drilled: N/A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Monday / 6-5-23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60687318

Location Saint Paul East Metro, MN | Weather/Temp.

AECOM Staff G. Goodwin, K. Sundling | Client MPCA

Arrive Job	0830	Sub Contractor		Area Sampled	
Depart Job	1430	Sub Arrive Job		BS23	
Travel Time		Sub Depart Job			

Summary of Technical and/or Engineering services performed.

Retrieved hydrosleeve at MW23B

Trout water treatment oversight at BS23

Samples Collected:

MW23B-GW-299-309-01-060523 @ 1026 for PFAS + Rapid TAT

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: N/A	International Waybill(s) #: N/A	Location Drilled: N/A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Tuesday / 6-6-23

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Project Number 60687318
Location Saint Paul East Metro, MN
Weather/Temp. Overcast / 72°
AECOM Staff G. Goodwin
Client MPCA

Arrive Job 1040
Depart Job 1515
Travel Time
Sub Contractor
Sub Arrive Job
Sub Depart Job
Area Sampled SAFF

Summary of Technical and/or Engineering services performed.

Arrived at SAFF around 1040. Alarm: POV1-21 Failed to close
Cleared alarm and fixed valve by hitting it with a wrench.
Took influent and effluent samples.
Brought SAFF samples along with B323 to FedEx, shipped to arrive at 1030 on Wednesday.
Picked up weed trimmer at Drew's residence.

Samples Collected:

SP1-02-T1-230606-R1 @1305 for Rapid TAT
SP2-01-EFF1-230606-R1 @1315 for Rapid TAT

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: N/A	International Waybill(s) #:	Location Drilled: N/A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Wednesday/ 6-7-2

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location Saint Paul East Metro, MN
AECOM Staff G. Goodwin

Project Number 60687318
Weather/Temp. Sunny / 72°
Client MPCA

Arrive Job 0830
Depart Job 1120
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled N/A

Summary of Technical and/or Engineering services performed

Arrive at SAFF @ 0830, noticed POV1-21 Failure to Close alarm
Tried several times to close value with no success
Cut the grass inside the fenced area
was able to close POV1-21 around 1030
Changed parameters on SAFF per Hanna's request

Samples Collected: None

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Shipping	Drilling
Location Pictured: N/A	International Waybill(s) #:	Location Drilled: N/A
Location(s) of Picture:		Footage Drilled:

Print Name Geoff Goodwin

Signature

Title Geologist I

ENVDAILY.DOC

AECOM

Day/Date Monday, July 22, 2024

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name: Project 1007
Project Number: 60734468
Location: East Metro, MN
Weather/Temp.: 91°F, sunny
AECOM Staff: Ben Kroll, Nathan Pukal
Client: MPCA
Arrive Job: 1000
Sub Contractor: Tract
Area Sampled: WC-6A soil
Depart Job: 1730
Sub Arrive Job:
Travel Time:
Sub Depart Job:

Summary of Technical and/or Engineering services performed.

Started drilling at WC-6A, 0-140 ft
QUAT SAMPLES:
WC-6A-SOIL-3-5-01-072224 @1030
WC-6A-SOIL-14-16-01-072224 @1045
WC-6A-SOIL-35-37-01-072224 @1100
WC-6A-SOIL-56-58-01-072224 @1115
WC-6A-SOIL-68-70-01-072224 @1235
WC-6A-SOIL-77-79-01-072224 @1250
WC-6A-SOIL-85-87-01-072224 @1300 ← DUP
WC-6A-SOIL-85-87-02-072224 @1305

Samples Collected: WC-6A-SOIL-85-87-01-072224 @ 1300
WC-6A-SOIL-85-87-02-072224 @ 1305

QUAT 0'-91'
OSTP 91'-130'
OPS 130'-

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: WC-6A
Location(s) of Picture:	Footage Drilled: 140

Print Name Ben Kroll

Signature Ben Kroll

Title Geologist II

AECOM

Day/Date Tuesday, July 23, 2024

ENVIRONMENTAL FIELD REPORT

Project Name: Project 1007
Project Number: 60734468
Location: East Metro, MN
Weather/Temp.: 70°F, overcast
AECOM Staff: Ben Kroll, Nathan Pukal
Client: MPCA

Arrive Job: 0745
Depart Job: 1915
Travel Time:
Sub Contractor: Traut
Sub Arrive Job:
Sub Depart Job:
Area Sampled:

Summary of Technical and/or Engineering services performed.

Continued drilling at WC-6A 140-250'
Took sample (GW) from Oneota w/ issues as described below

Contact w/ Opo @ ~222' bgs

Samples Collected:

WC-6A-VAP-236-240-01-072324 @ 1730
*Dan said there was no resistance sending the pipe down indicating there wasn't a seal between bedrock in OSTP and OPDC and the temporary casing. Water for the VAP sample was likely pulled from everything above the temporary screen, so the sample will be abandoned.

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: WC-6A
Location(s) of Picture:	Footage Drilled: 140-250'

Print Name
Ben Kroll

Signature
Ben Kroll

Title
Geologist II

AECOM

Day/Date Wednesday, July 24, 2024

ENVIRONMENTAL FIELD REPORT

Project Name: Project 1007
Project Number: 60734468
Location: East Metro, MN
Weather/Temp.: 76°F Sunny
AECOM Staff: Ben Kroll, Nathan Pukal
Client: MPCA
Arrive Job: 0715
Sub Contractor:
Area Sampled:
Depart Job: 1730
Sub Arrive Job:
Travel Time:
Sub Depart Job:

Summary of Technical and/or Engineering services performed.

Finished drilling at WC-6A 250-280'
Contact w/ CJDN @ 265' bgs

Set Well WC-6A

Samples Collected: OW75-3-GW-100-110-01-072424 @ 1200 PFAS + TDS
↳ Hydrasleeve sample from Quarterly Sampling

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled:
Location(s) of Picture:	Footage Drilled: 250'-280'

Print Name: Nathan Pukal
Signature:
Title: Geologist III

AECOM

Day/Date 7/25/24

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60734468

Location East Metro, MN | Weather/Temp. Sunny

AECOM Staff Nathan Pukal, Ben Kroll, Geoff Goodwin | Client MPCA

Arrive Job 815 | Sub Contractor | Area Sampled

Depart Job 1825 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Develop Well ~~MW~~ NP WC-6A

Setup and Begin Drilling Well WC-5A.

Drilled 0-160

QoAT: 0' - 119'

sPDC: 119' -

Samples Collected: WC-5A-SOIL-5-6-01-072524 @ 1045

WC-5A-SOIL-16-18-01-072524 @ 10:55

WC-5A-SOIL-20-22-01-072524 @ 11:00

WC-5A-SOIL-31-33-01-072524 @ 1110

WC-5A-SOIL-47-49-01-072524 @ 1150

WC-5A-SOIL-57-58-01-072524 @ 1215

WC-5A-SOIL-64-66-01-072524 @ 1305

WC-5A-SOIL-64-66-02-072524 @ 13

WC-5A-SOIL-76-78-01-072524 @ 132

WC-5A-SOIL-87-89-01-072524 @ 134

WC-5A-SOIL-98-100-01-072524 @ 1350

WC-5A-SOIL-98-100-02-072524 @ 1355

WC-5A-SOIL-101-103-01-072524 @ 1415

WC-5A-SOIL-118-119-01-072524 @ 1440

Calibration Log PID: Date/Time: Serial (if multiple):

Calibration Log YSI: Date/Time: Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured:	Location Drilled: WC-5A
Location(s) of Picture:	Footage Drilled: 0 - 160

Print Name Geoff Goodwin

Signature

Title Geologist II

AECOM

Day/Date Friday / 7-26-24

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007
Location East Metro, MN
AECOM Staff G. Goodwin

Project Number 60734468
Weather/Temp. Mostly cloudy / 63°
Client MPCA

Arrive Job 0645
Depart Job 1210
Travel Time

Sub Contractor
Sub Arrive Job
Sub Depart Job

Area Sampled N/A

Summary of Technical and/or Engineering services performed.

Continue Drilling WC-5A 160'-220'

Don mentioned they haven't had circulation since they hit limestone

OPDC: 119'-258'
CJDN: 258'-278'

Samples Collected: N/A

Calibration Log PID: Date/Time: N/A Serial (if multiple):

Calibration Log YSI: Date/Time: N/A Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: WC-5A	Location Drilled: WCL / WC-5A
Location(s) of Picture: Geoff's phone	Footage Drilled: 160-220

Print Name Geoff Goodwin

Signature

Title Geologist II

AECOM

Day/Date Thursday / 8-8-24

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60734468

Location East Metro, MN | Weather/Temp. Partly Cloudy / 62°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0905 | Sub Contractor | Area Sampled

Depart Job 1000 | Sub Arrive Job | N/A

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Haul dumpster offsite

Develop MW28C

Samples Collected: None

Calibration Log PID: Date/Time: N/A | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: N/A	Location Drilled: N/A
Location(s) of Picture: N/A	Footage Drilled: N/A

Print Name Geoff Goodwin

Signature

Title Geologist II

AECOM

Day/Date Monday / 7-29-24

ENVIRONMENTAL FIELD REPORT

1 of 1

Project Name Project 1007 | Project Number 60734468

Location East Metro, MN | Weather/Temp. Cloudy / 71°

AECOM Staff G. Goodwin | Client MPCA

Arrive Job 0845 | Sub Contractor | Area Sampled N/A

Depart Job 1740 | Sub Arrive Job

Travel Time | Sub Depart Job

Summary of Technical and/or Engineering services performed.

Continue drilling WC-5A, reached depth of 280' around 1435
Began constructing/setting well @ 1445
Screen from 260' - 278'

Samples Collected: None

Calibration Log PID: Date/Time: N/A | Serial (if multiple):

Calibration Log YSI: Date/Time: N/A | Serial (if multiple):

Results: 10.00: 7.00: 4.00:

Pictures	Drilling
Location Pictured: WC-5A	Location Drilled: WCL
Location(s) of Picture: Geoff's phone	Footage Drilled: 220 - 280

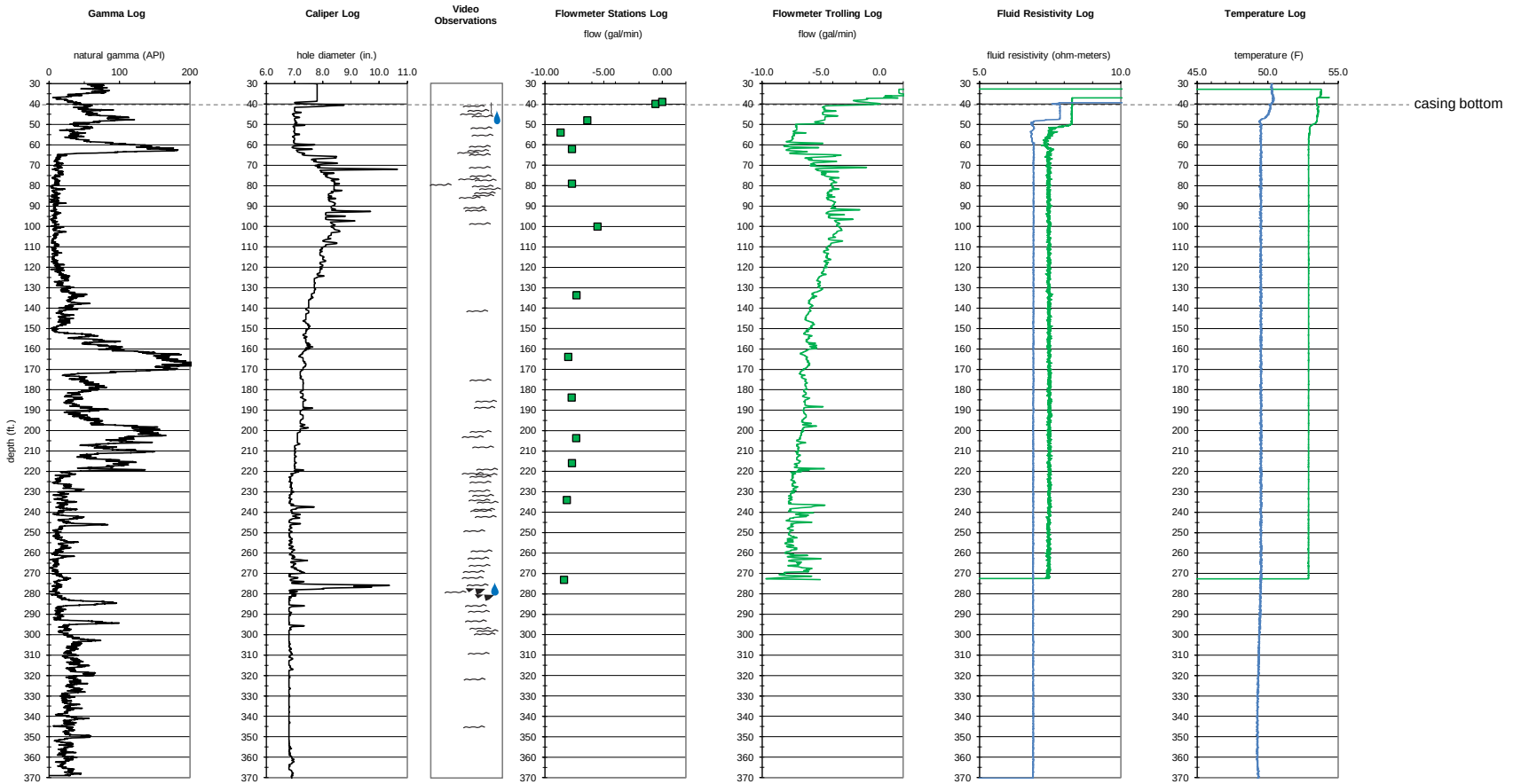
Print Name Geoff Goodwin

Signature

Title Geologist II

Attachment C-3
Downhole Geophysical Data

Well Name: MW1A
Unique Number: 850554
T-R-S: T29 R21 Section 17 CDAAAD



Geology:
0-37 QUUU, Quaternary sediments
37-61.2 OPVL, Platteville Limestone
37-44.9 OPMA Magnolia Member
44.9-49.7 OPHF Hidden Falls Member
49.7-60 OPMI Mifflin Member
60-61.2 OPPE Pecotonica Member
61.2-65 OGWD, Glenwood Formation
65-220 OSTP, St. Peter Sandstone
220-352 OPDC, Prairie Du Chien Group
220-302 OPSH, Shakopee Formation
302-352 OPOD Oneota Dolomite
349-352 OPCV Coon Valley Member
352-370+ CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Video observations and the caliper logs indicated 2 large fracture networks at 40-50' and 270-280'. Inflow was indicated at bottom of casing (40') on the video. Inflow was also observed at 50.2' on the video. This flow enters the borehole and flows downward towards the Jordan Sandstone. We believe much of this flow exits at the fracture network at 275-280'. There is a slight temperature shift below this interval supporting that there is less downward flow but the fluid resistivity has no shift. There also appears to be slightly enhanced downflow on the video near the bottom of the hole. We did not flow log past this point due to borehole conditions.

Logged by Minnesota Geological Survey
Logged on 11-24-2020
Video, Multi, Caliper, and Ambient Troll tools used

Preliminary Flowmeter Summary and Results

Well Name: MW1A
Unique Number: 850554
Date Logged: 11/24/2020

Note: This summary accompanies the logging data results figure.

Video observations and the caliper logs indicated 2 large fracture networks at 40-50' and 270-280'. Inflow was indicated at bottom of casing (40') on the video. Inflow was also observed at 50.2' on the video. This flow enters the borehole and flows downward towards the Jordan Sandstone. We believe much of this flow exits at the fracture network at 275-280'. There is a slight temperature shift below this interval supporting that there is less downward flow but the fluid resistivity has no shift. There also appears to be slightly enhanced downflow on the video near the bottom of the hole. We did not flow log past this point due to borehole conditions. Note video footage was off from about 0.5 feet near the upper part of the hole to as much as 5’ in the lower part of the hole. Features on the video log have been adjusted accordingly to match the rest of the logs on the summary figure.

Notable bedding plane fractures were observed throughout the borehole. They are concentrated in the Platteville (Magnolia, upper Mifflin, and base of the Platteville), upper St. Peter, lower St. Peter, and upper Shakopee (although much of the Shakopee had a rubbly appearance). Most bedding plane fractures are noted on the video log on the summary log sheet and on the notes pdf.

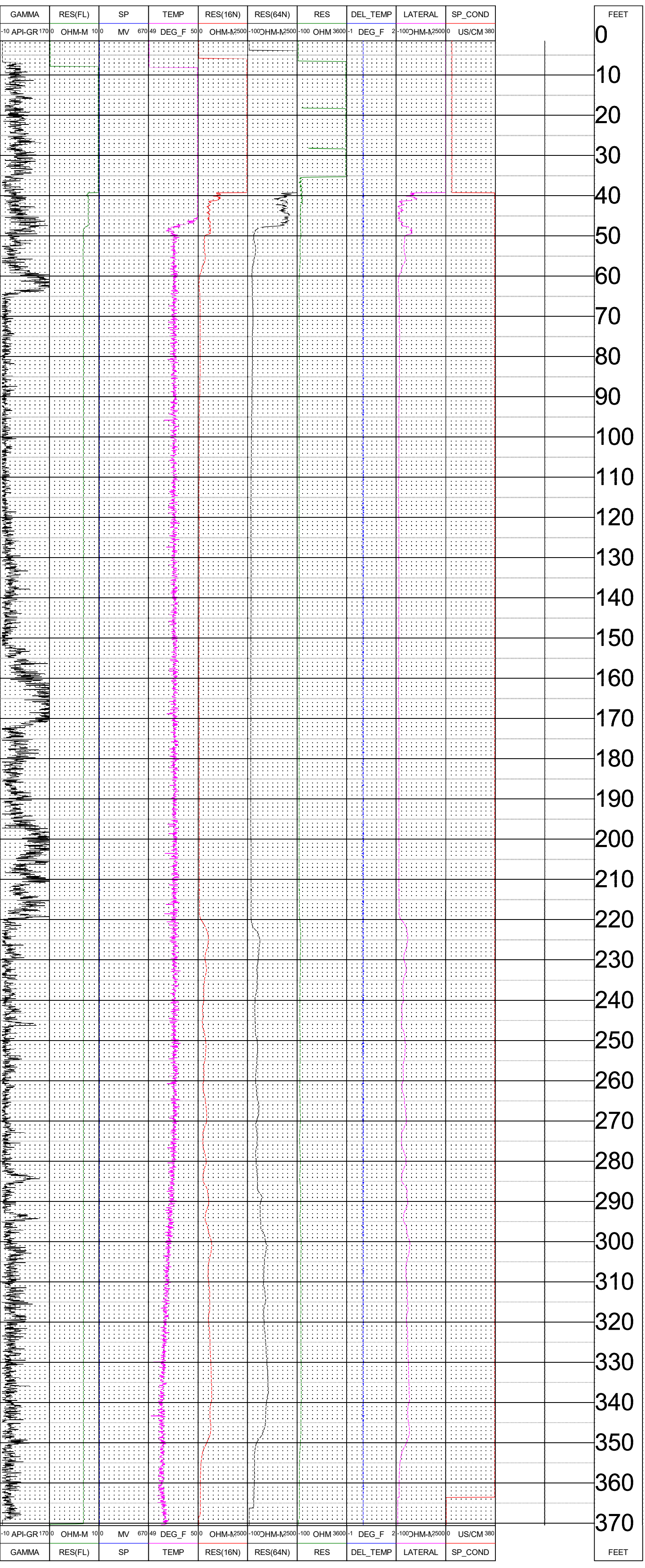
Station measurements and the trolling log show there is downflow originating at the bottom of casing in a rubble zone with vertical and horizontal fractures. Here we measured close to 7 gal/min downflow. There is a bedding plane fracture at ~51’ (50.2’ on video) that contributes more downhole flow. Here we measured 8.6 gal/min downflow. There are shifts on the temperature and resistivity logs here at 51’ to support the additional downhole flow contribution. The rest of the flow log and stations show downflow in the hole, variations in measurements are due to changes in the diameter of the borehole. They decrease slightly in the upper St. Peter but the caliper log also shows and increase in borehole diameter indicating not all flow is being captured by the tool. Lower in the hole station measurements increase where the diameter of the borehole wall is more consistently 7’’.

Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850554 MULTI

NAME	: MW1A			OTHER SERVICES:	
UNIQUE NUMBER	: 850554 MULTI				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/24/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 370.56	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.50	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/24/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:21:
				THRESH	: 2500
SWL	: 37				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

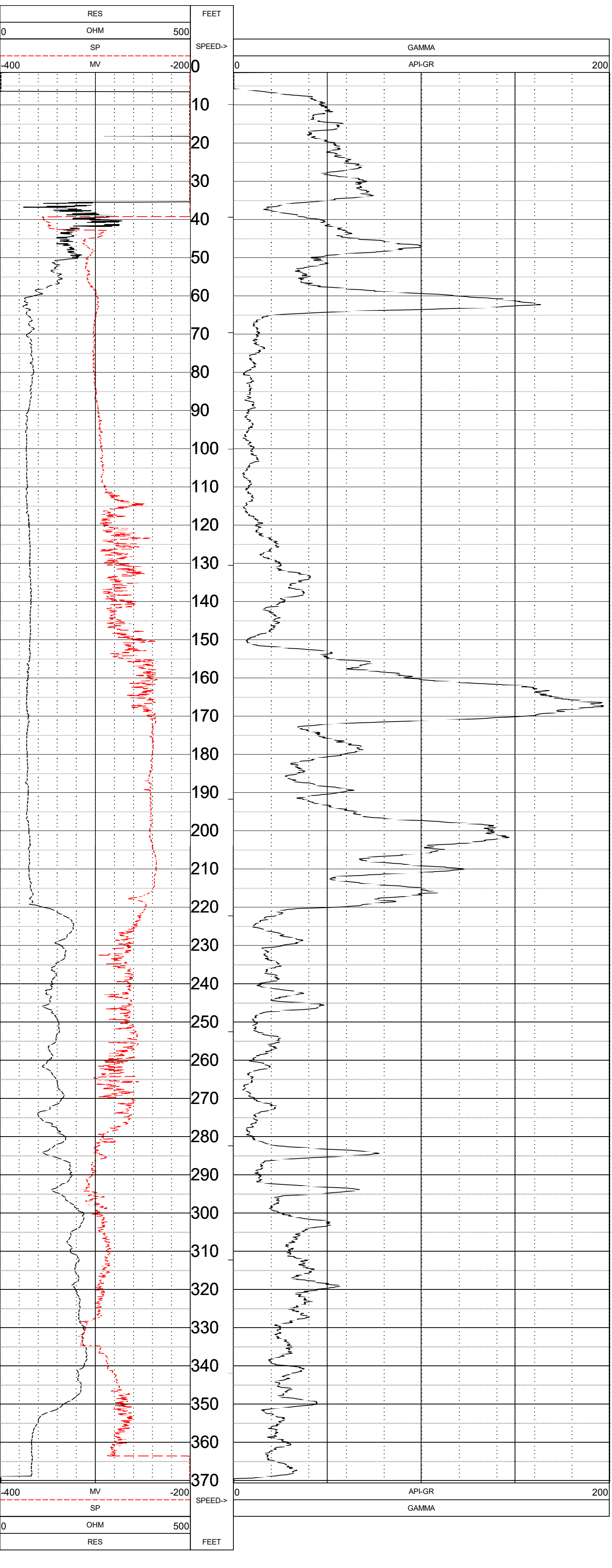


Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850554

NAME	: MW1A			OTHER SERVICES:	
UNIQUE NUMBER	: 850554				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/24/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 370.56	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.50	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/24/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:21:
				THRESH	: 2500
SWL	: 37				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

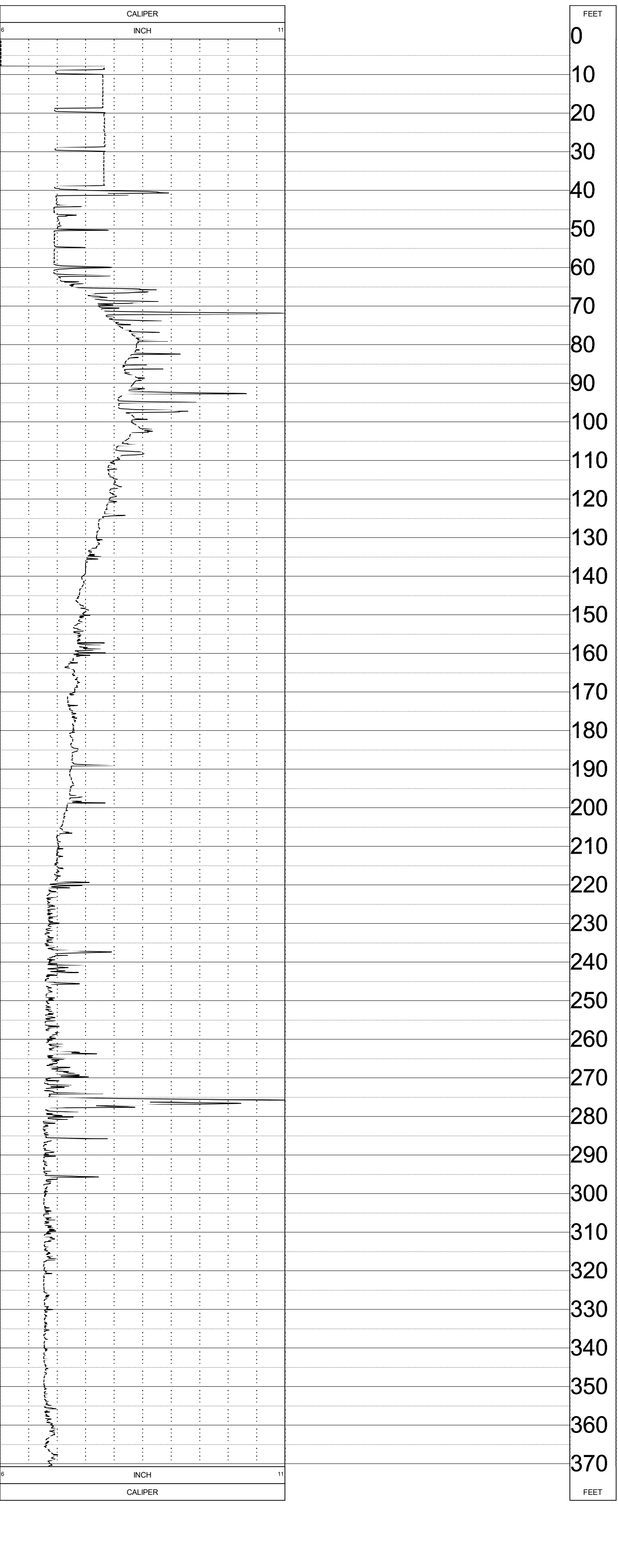


Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850554 CALIPER

NAME	: MW1A			OTHER SERVICES:	
UNIQUE NUMBER	: 850554 CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/24/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 370.66	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.84	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/24/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:49:
				THRESH	: 2500
SWL	: 37				
REMARKS	:				

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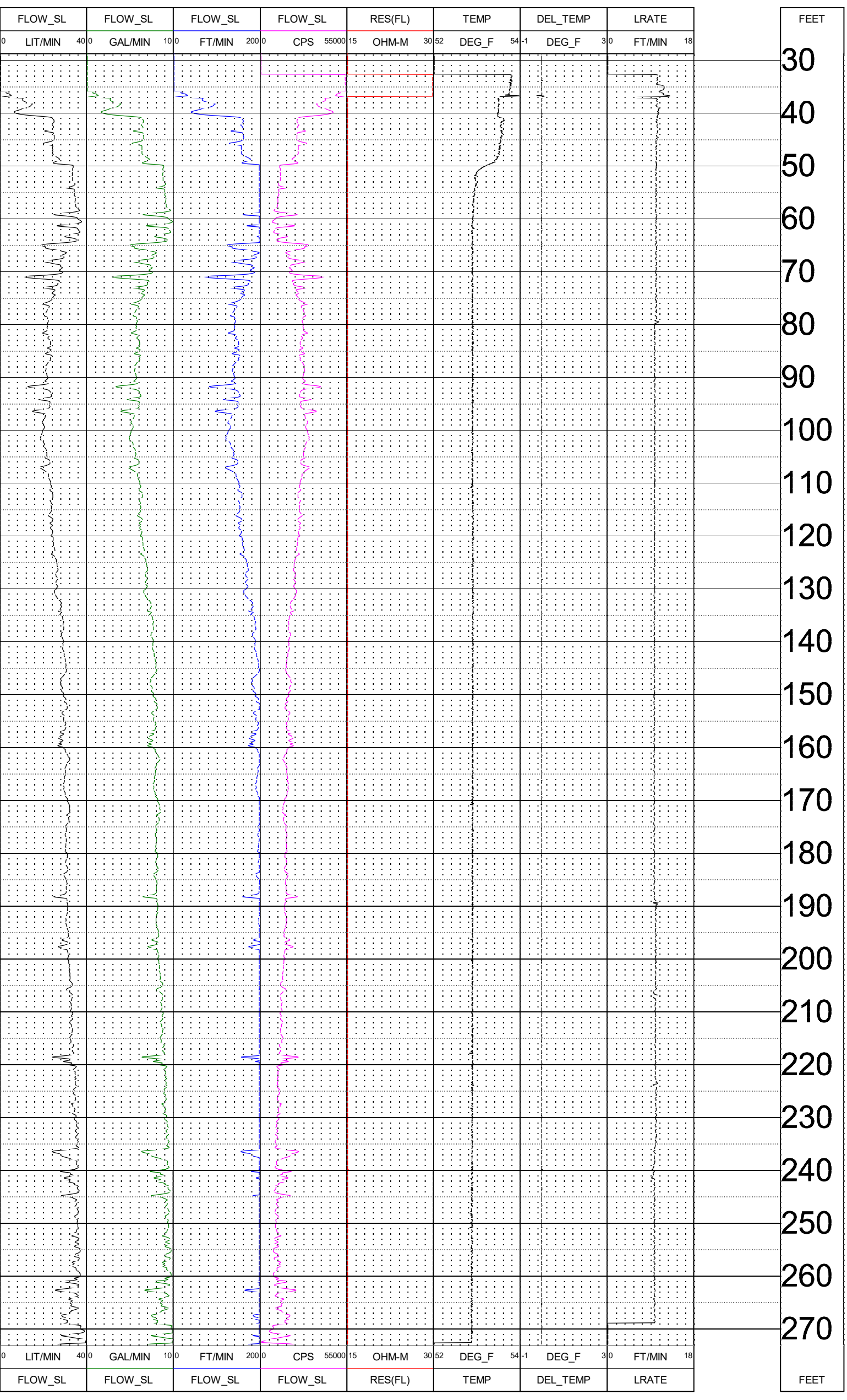


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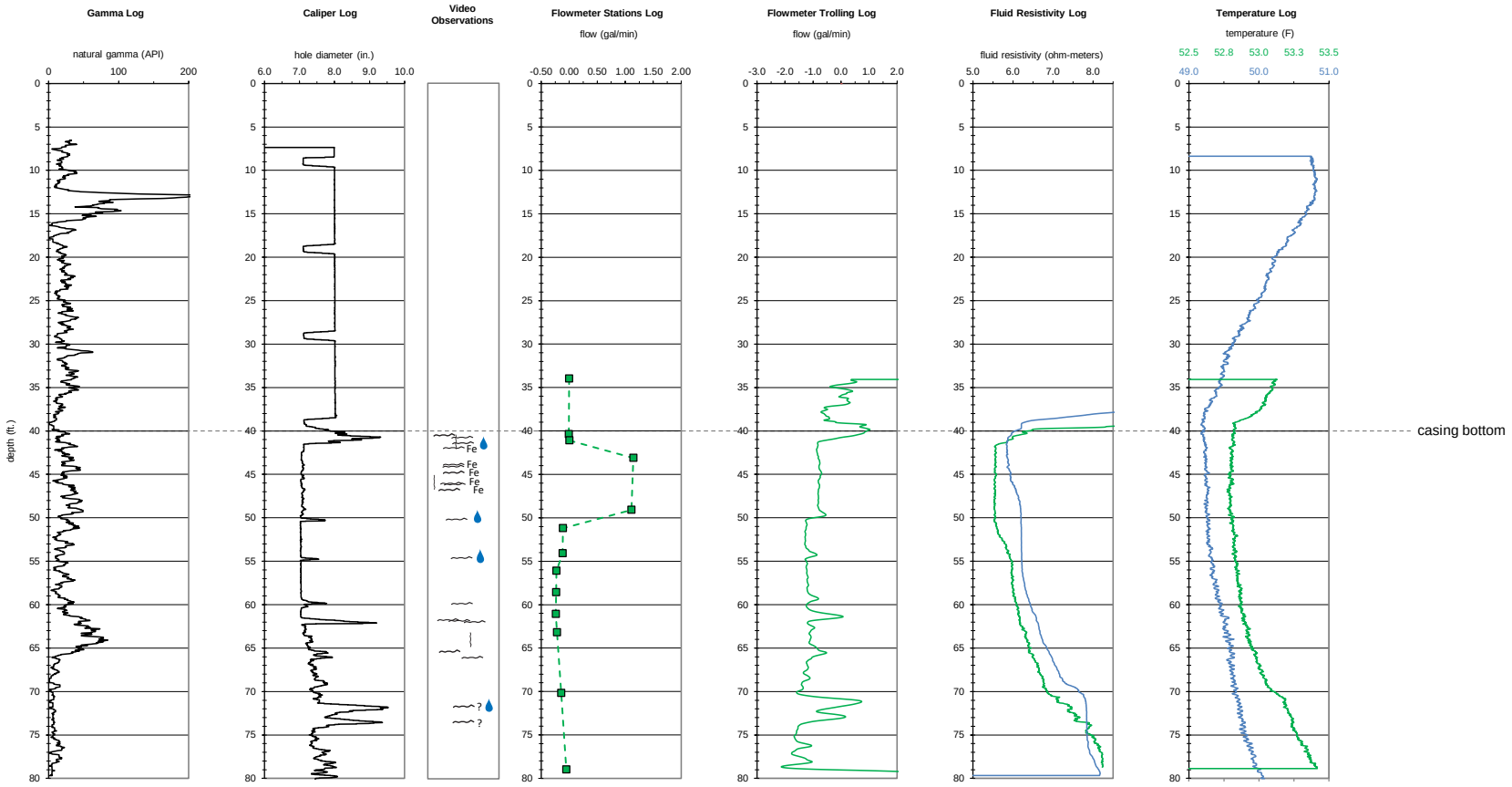
850554 AMBTROLL

NAME	: MW1A			OTHER SERVICES:	
UNIQUE NUMBER	: 850554 AMBTROLL				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/24/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 273.03	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 28.77	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/24/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:22:
				THRESH	: 2500
SWL	: 37				
REMARKS	:				

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Well Name: MW1B
Unique Number: 850555
T-R-S: T29 R21 Section 17 CDAADA



Geology:
0-37 QUUU, Quaternary sediments
37-46.6 OPMA, Magnolia Member, Platteville Fm
46.6-50.6 OPHF, Hidden Falls Member, Platteville Fm
50.6-61.1 OPMI, Mifflin Member, Platteville Fm
61.1-62.6 OPPE, Pecatonica Member, Platteville Fm
62.6-65.8 OGWD, Glenwood Shale
65.8-80+ OSTP, St. Peter Sandstone

(Based on gamma, video log, and core pieces)

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- Fe iron staining
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Caliper log shows additional large borehole zones (possible fractures?) below ~67 feet that could not be seen clearly in the video log. The largest of these appear at about 71.8 and 73.5 feet, and have been tentatively marked as BPFs on the video observations graph.

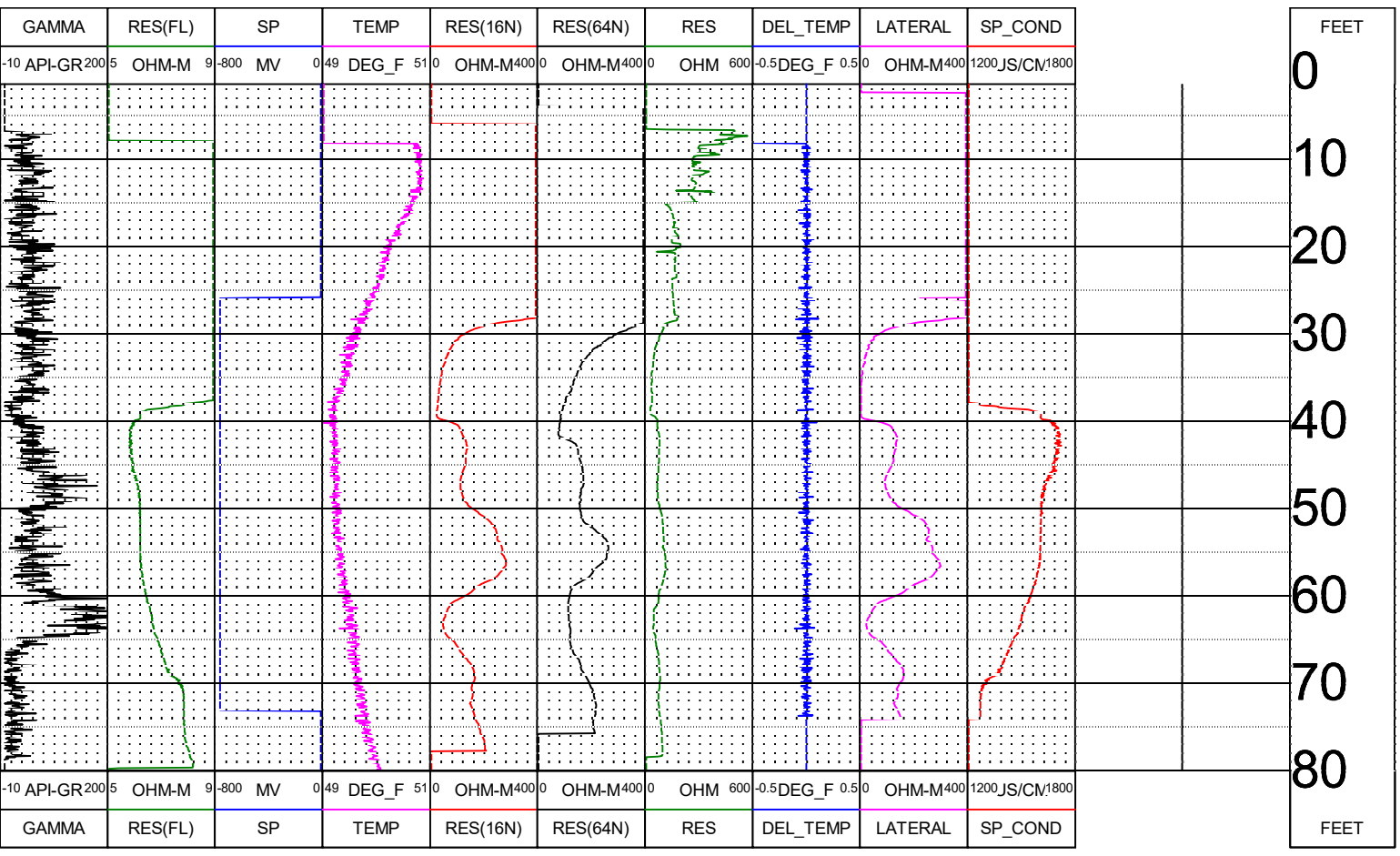
Logged by Minnesota Geological Survey
12/1/2020
Video, gamma, multitool, caliper, ambient flowmeter

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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850555

NAME	: MW1B			OTHER SERVICES:	
UNIQUE NUMBER	: 850555				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CDAADA				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 12/01/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40'			KB	:
LOG BOTTOM	: 80.02	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.44	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	12/01/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 16:23:
				THRESH:	2500
SWL	: 14'				
REMARKS	:				

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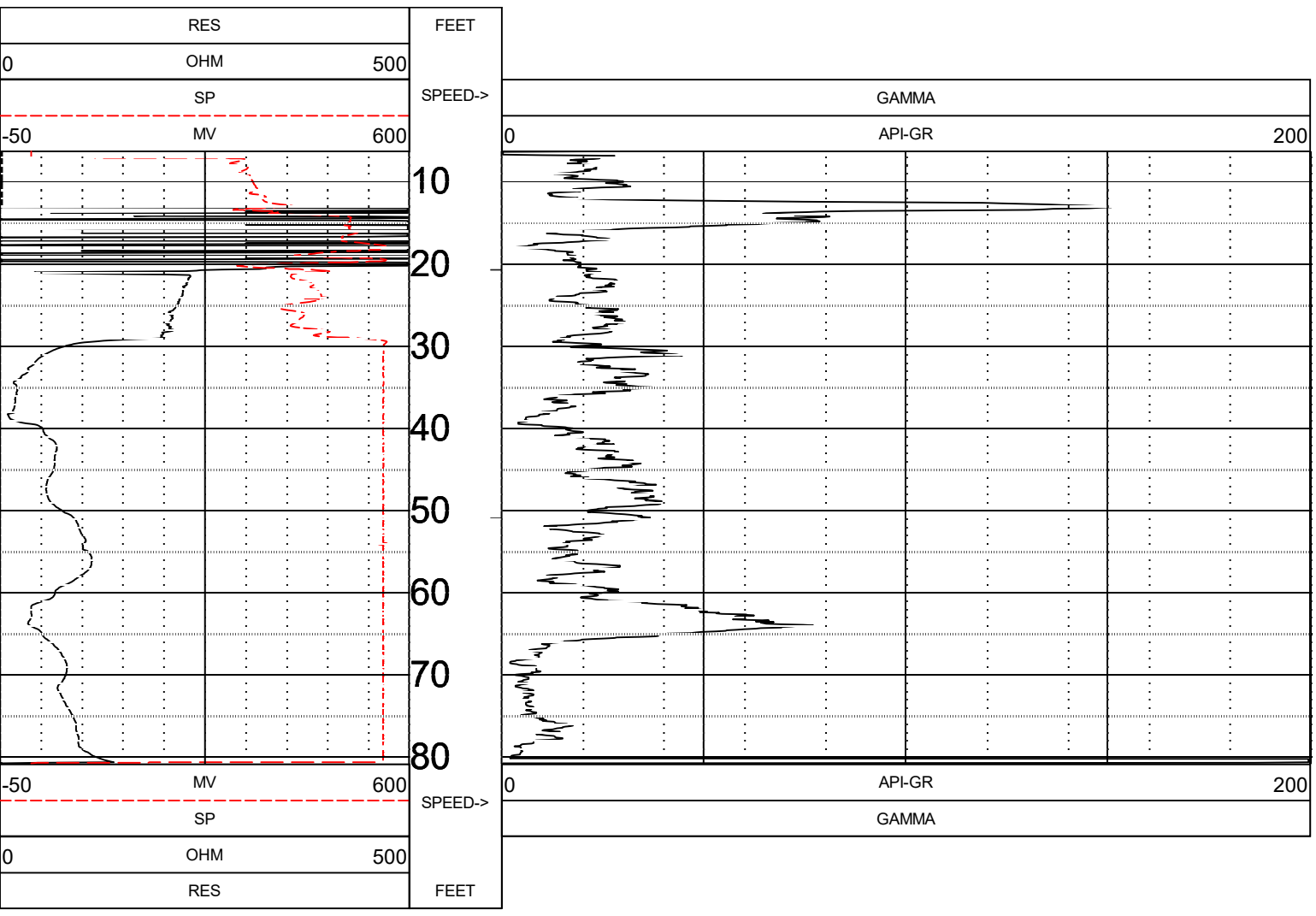


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Dept. Phone: (612)626-2969

850555

NAME	: MW1B			OTHER SERVICES:	
UNIQUE NUMBER	: 850555				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CDAADA				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 12/01/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 80.83	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 6.27	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/01/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 16:12:
				THRESH	: 2500
SWL	: 14'				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW1B
Unique Number: 850555

VIDEO LOG OBSERVATIONS

Logged By: Cicha (MGS), Retzler (MGS)
Date: 12/1/2020
Note: Zeroed in sideview. BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
13.9	sideview	SWL
40.1	sideview	bottom of 8"
40.2	sideview	rubbly Platteville top; iron oxidation
41.0	downview	heavily fractured; large rock on ledge
50.8	downview	BPF?
55.5	downview	BPF?
66.6	downview	possible BPF zone
81.0	downview	difficult to see; lots of sediment in water column
82.4	downview	bottom of hole?
66.5	sideview	thin BPF; clearer water than below
64.4	sideview	Glenwood-like strata
63.7	sideview	thin vertical fracture
63.1	sideview	rubbly; thin BPFs; hole open up a bit more
60.8	sideview	thin BPF; possible flow??
58.0	sideview	Mifflin-like strata
55.7	sideview	BPF; no obvious flow in video
51.1	sideview	rubbly zone and BPF; definite flow; looks like flow into hole and up
45.6	sideview	thin iron-oxidized parting
44.6	sideview	thin iron-oxidized parting
42.7	sideview	thin iron-oxidized parting
41.9	sideview	rubbly BPF zone; iron oxidation; slight upflow and possibly flow exiting borehole
41.6	sideview	very rubbly
40.8	sideview	stagnant water

Well Name: MW1B
Unique Number: 850555

FLOW LOG STATION MEASUREMENTS

Logged By: Retzler (MGS) and Cicha (MGS)
Date: 12/1/2020
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Corrected flow values are calculated using values measured in the casing (assumed to be zero).

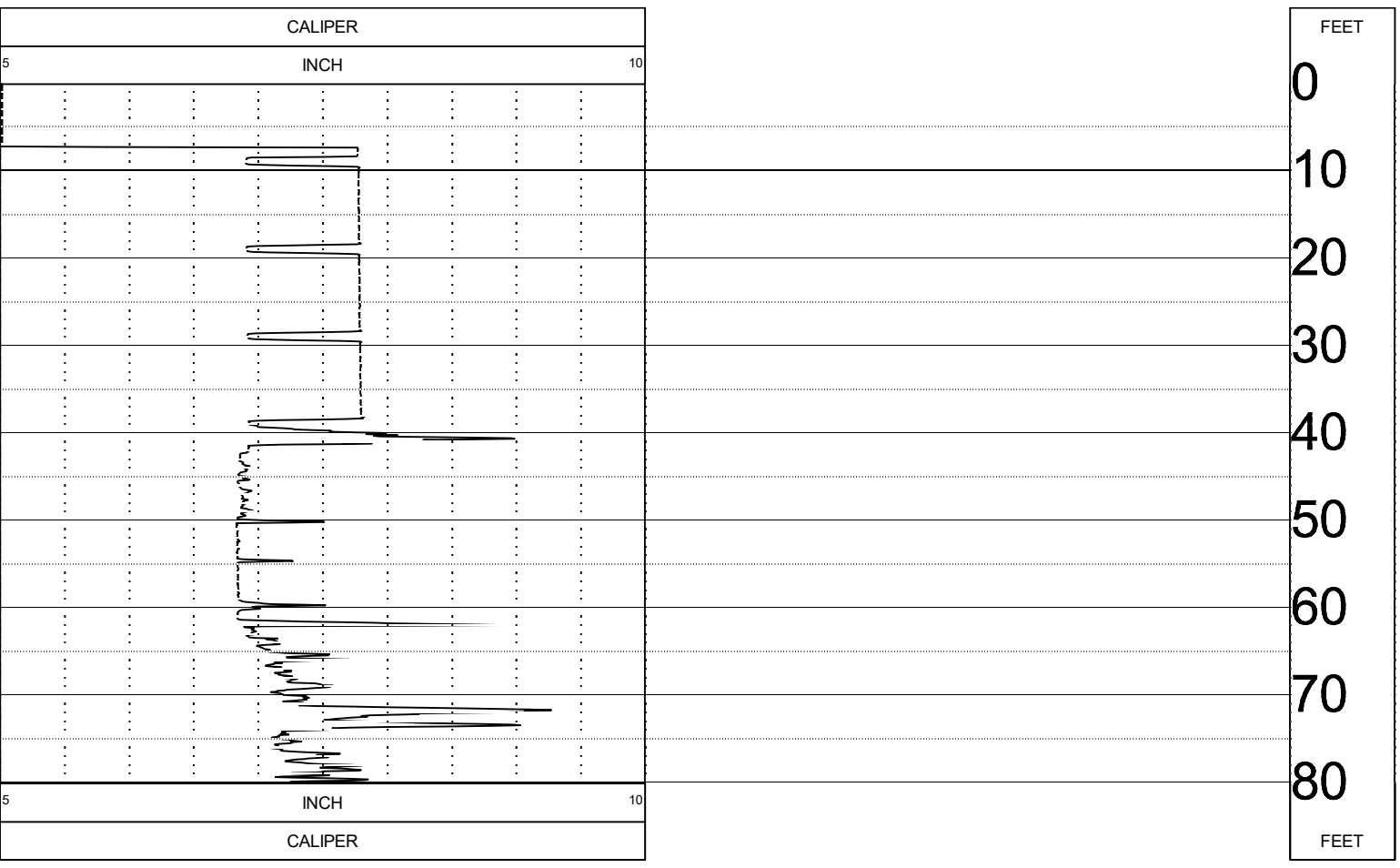
Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
34.0	-0.2637	0.0000	steady; casing measurement
40.4	-0.2879	-0.0242	steady
41.1	-0.2486	0.0151	steady
43.1	4.0700	4.3337	steady
49.1	3.9417	4.2054	steady
51.2	-0.6894	-0.4257	steady
54.1	-0.7124	-0.4487	steady
56.1	-1.1359	-0.8722	steady
58.6	-1.1555	-0.8918	steady
61.1	-1.1742	-0.9105	steady
63.2	-1.0857	-0.8220	steady
70.2	-0.8037	-0.5400	steady
79.0	-0.4521	-0.1884	steady

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Dept. Phone: (612)626-2969

850555

NAME	: MW1B			OTHER SERVICES:	
UNIQUE NUMBER	: 850555				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CDAADA				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 12/01/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40'			KB	:
LOG BOTTOM	: 80.08	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.14	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	12/01/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 16:35:
				THRESH:	2500
SWL	: 14'				
REMARKS	:				

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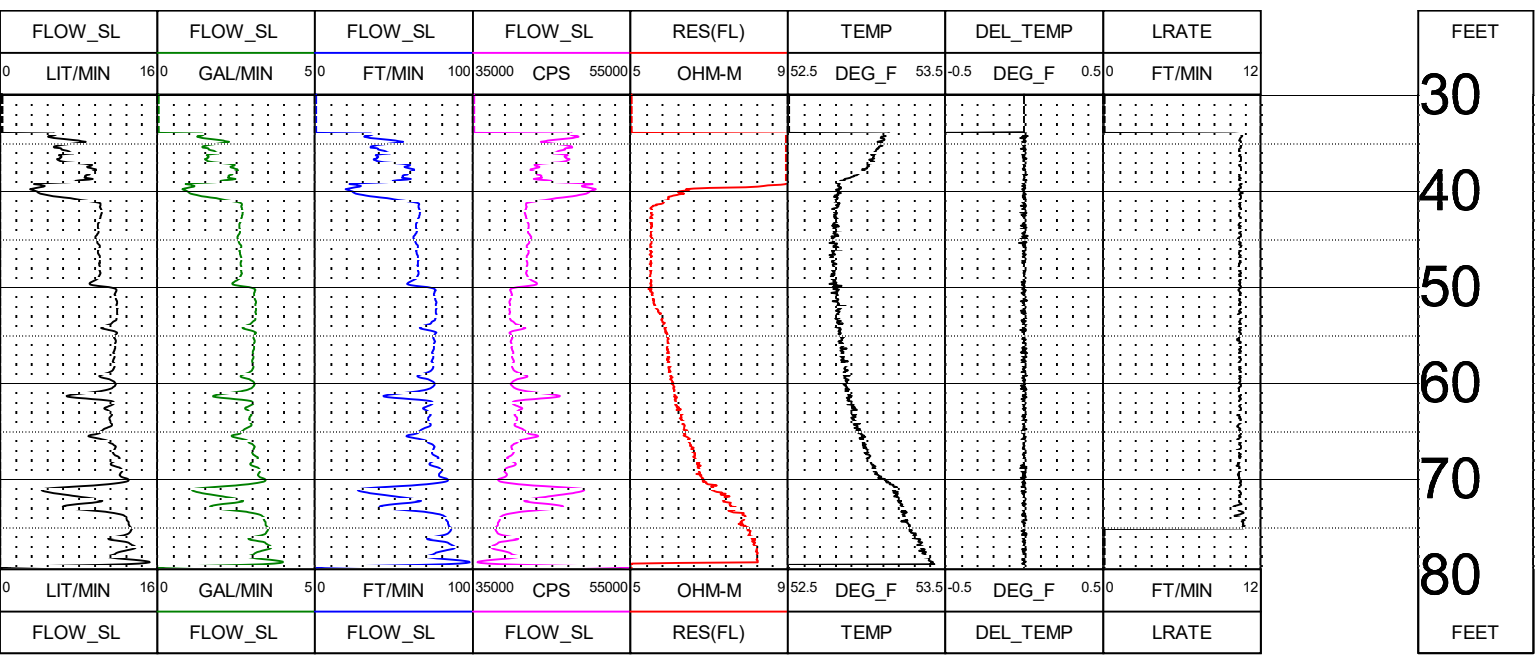


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St. Paul, MN 55114
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850555

NAME	: MW1B			OTHER SERVICES:	
UNIQUE NUMBER	: 850555				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CDAADA				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 12/01/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 40'			KB	:
LOG BOTTOM	: 79.26	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 29.93	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/01/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 16:53:
				THRESH	: 2500
SWL	: 14'				
REMARKS	: 8" SKIRT USED				

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Preliminary Flowmeter Summary and Results

Well Name: MW1B
Unique Number: 850555
Date Logged: 12/1/2020

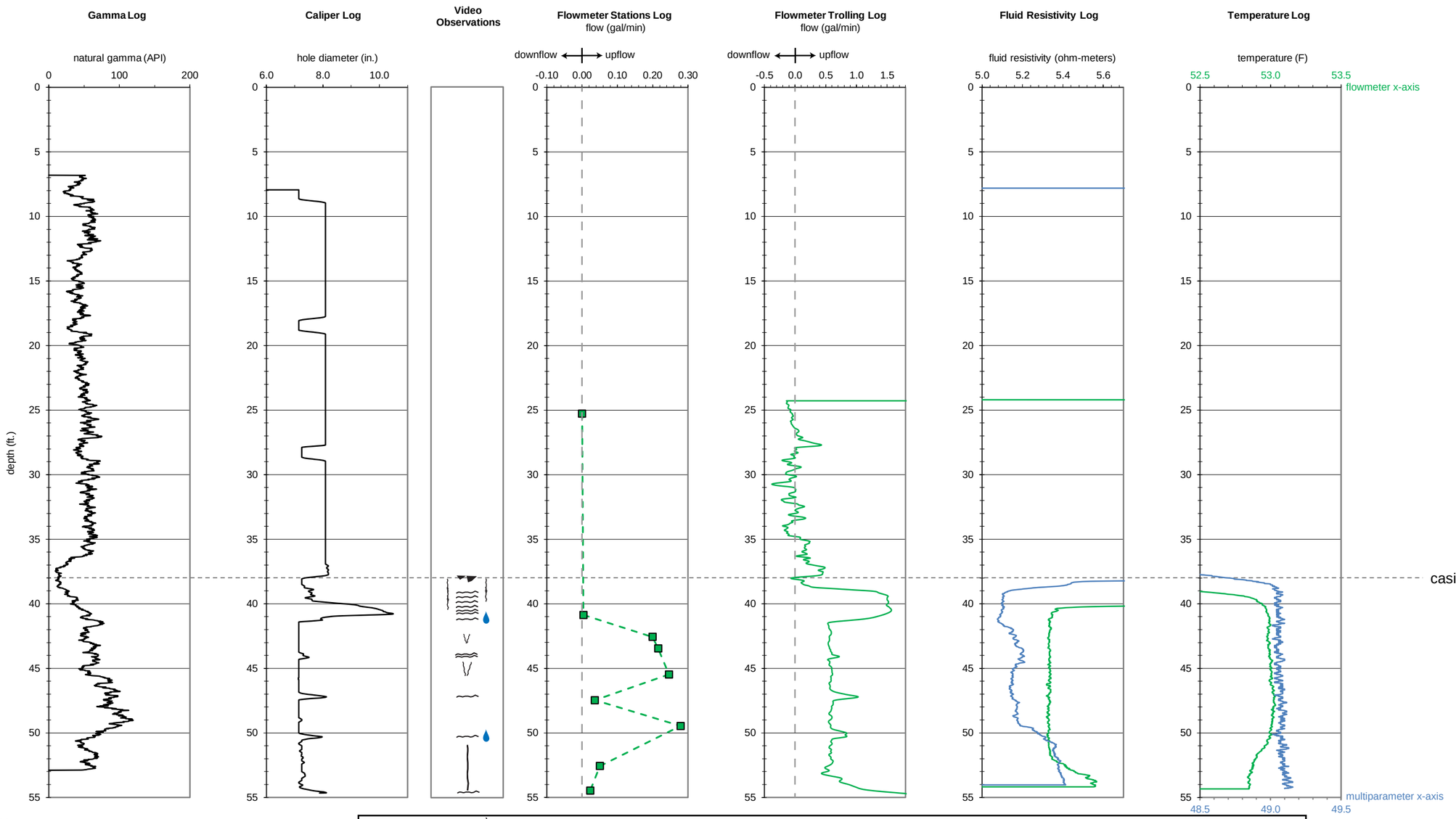
Note: This summary accompanies the logging data results figure.

The video and caliper logs indicate several bedding plane fractures and some rubbly zones between about 40’ and 46’ and at about 50.2’, 54.8’, 59.9’, 62.1’, 65.5’, 66.0’. Additionally, thin vertical fractures were noted at about 46’ and 64’. The caliper log shows additional large borehole zones between about 66’ and the bottom of the hole, but the presence of fractures could not be confirmed in the video due to poor visibility (lots of sediment in the water column). The largest of these zones on the caliper log occur at about 71.8’ and 73.5’. The video log showed obvious flow into the borehole and upwards at the fracture at about 50.2’. This flow appeared to slow or exit the borehole entirely at the facture at about 41.9’ in the video (corrected depth at about 41.3’ when considering the caliper log). While unclear, possible flow was noted in the video at about 60.8’.

The video log also shows several fractures within the 40’ to 46’ interval with zones of iron oxidation, a sign that these fractures may have been hydraulically active in the past.

The station measurements and trolling flowmeter results indicate flow entering the borehole at the fracture at about 50.2’ and travelling upwards at about 4 L/min (1 gal/min). This upwards flow appears to exit the borehole at about 41.3’ at a fracture. A very small fraction of the flow entering at about 50.2’ may also be travelling downwards at about 0.4 L/min (0.1 gal/min), based on the station measurements. Additionally, the station measurements seem to indicate added flow entering the borehole at the fracture at about 54.8’ and travelling downwards at about 0.9 L/min (0.2 gal/min). There appears to be a gradual loss of this flow over several feet below about 64’ and possibly a more discrete loss in flow at about 71’, as indicated by a shift in the fluid resistivity and temperature logs. This shift also aligns with the possible fracture noted in the caliper log (but not confirmed in video) at about 71.8’. Thus, the gradual loss may be through both intergranular porosity of the St. Peter Sandstone and one or more fractures. The video log also supports gradual loss of flow below about 64’ as evident by progressively cloudier water and poorer visibility with depth to the bottom of the hole.

Well Name: MW1C
Unique Number: 854439
T-R-S: T29 R21 Section 17 CDAAAD



Geology:
0-36.5 QUUU, Quaternary sediments
36.5-45.8 OPMA, Magnolia, Platteville Fm
45.8-49.8 OPHF, Hidden Falls, Platteville Fm
49.8-55+ OPMF, Mifflin, Platteville Fm

KEY:

- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Gamma log is taken from the multiparameter log. The gamma, caliper, video, and multiparameter logs were all adjusted by -0.31 feet based on a comparison between fractures identified in the caliper and video, as well as reported casing depth. Because the flowmeter tool was re-zeroed prior to logging, all flowmeter-derived logs were adjusted by -1.37 feet based on a comparison of the caliper and trolling results.

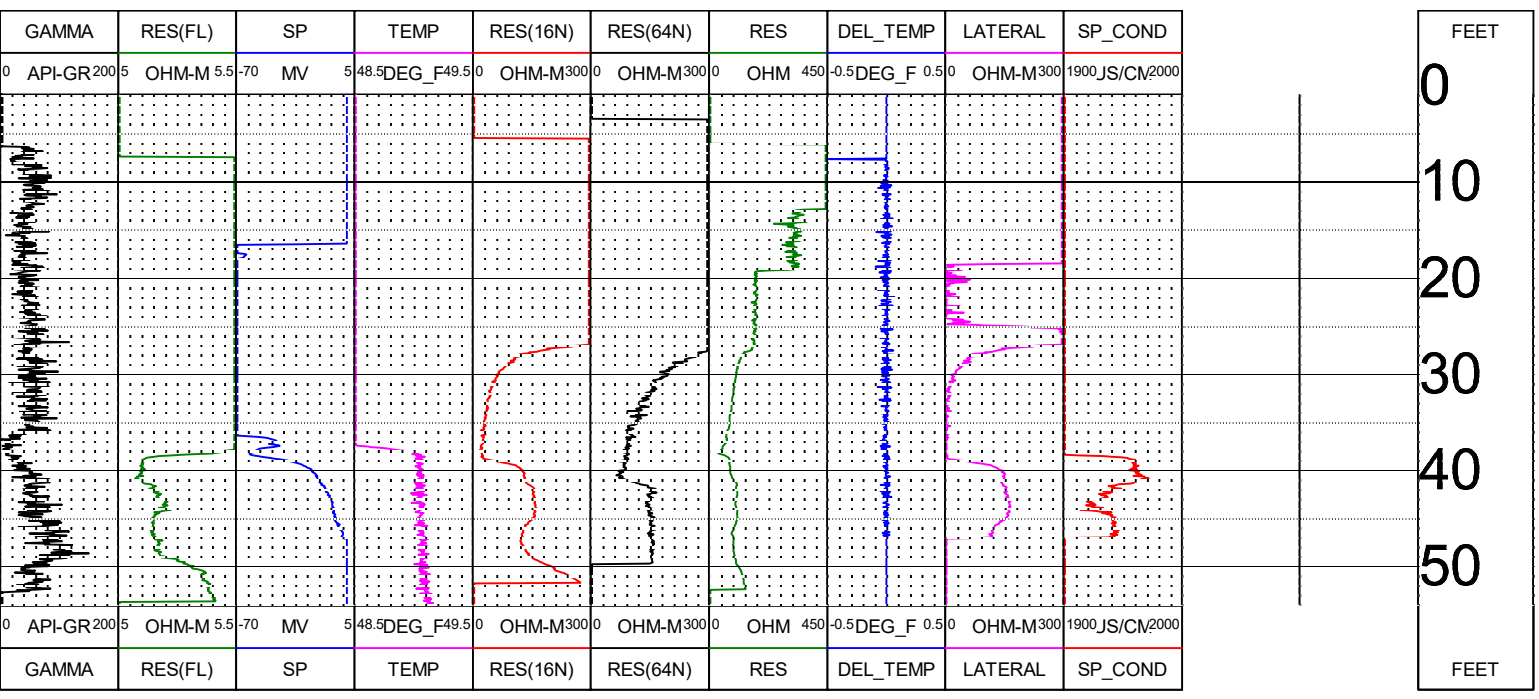
Logged by Minnesota Geological Survey
4/21/2021
Video, multiparameter, caliper, flowmeter

Minnesota Geological Survey
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2609 Territorial Road
St. Paul, MN 55114
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854439_MULTI

NAME	: MW1C			OTHER SERVICES:			
UNIQUE NUMBER	: 854439_MULTI						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: CDAAAD						
SECTION	: 17	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 04/21/21	MGS CUTTINGS #	:				
CASING BOTTOM	: 38'				KB	:	
LOG BOTTOM	: 54.01	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 0.88	DRL MEASURED FROM	:		GL	: 994 L1	
CASING DIAMETER	: 8"	LOG RATE	: 10FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: RETZLER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 8144A	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 04/21/21	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 13:29:	
					THRESH	: 2500	
SWL	: 13'						
REMARKS	:						

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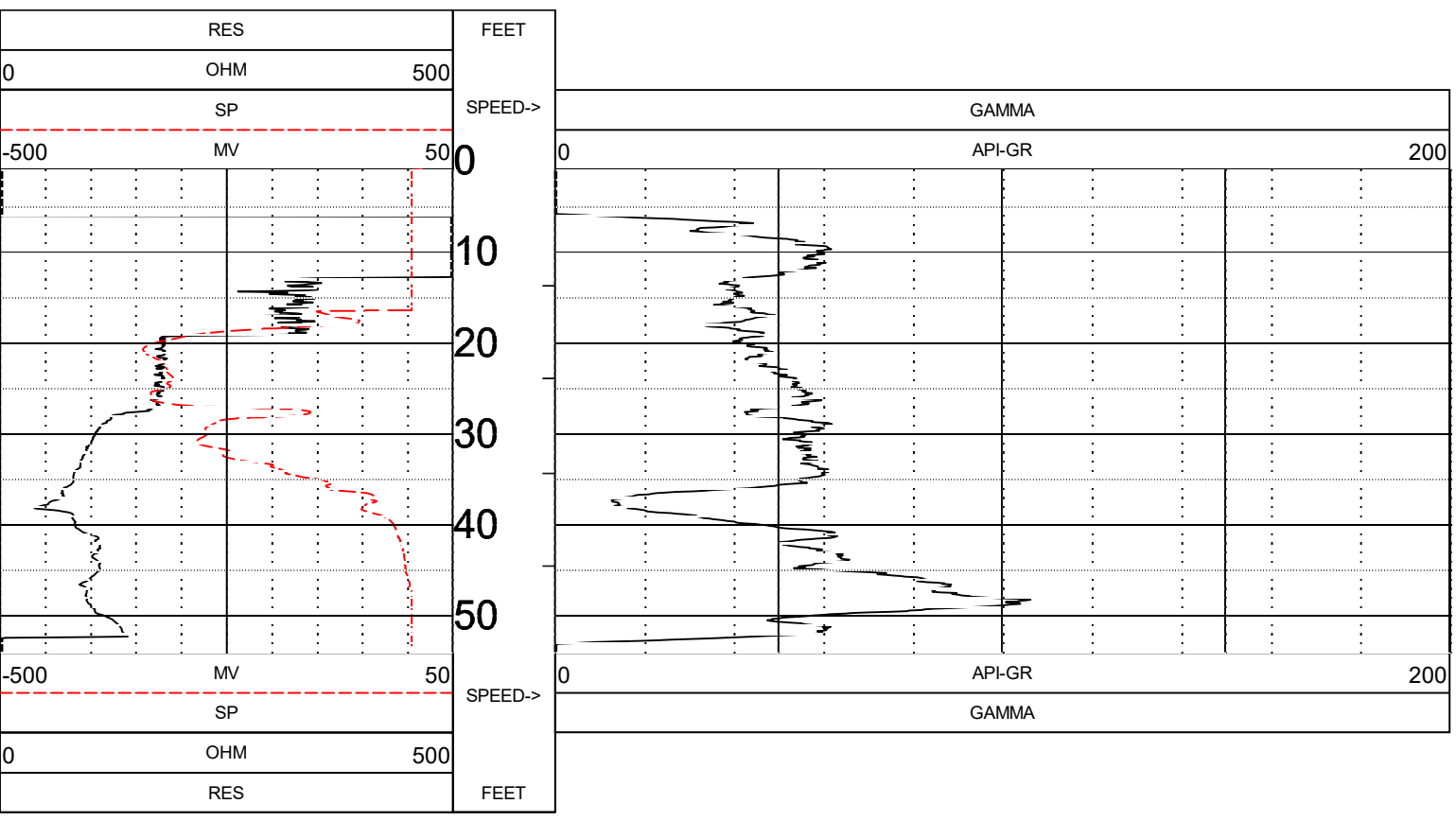


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St. Paul, MN 55114
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854439

NAME	: MW1C			OTHER SERVICES:	
UNIQUE NUMBER	: 854439				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 04/21/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 38'			KB	:
LOG BOTTOM	: 54.01	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.88	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 04/21/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 13:29:
				THRESH	: 2500
SWL	: 13'				
REMARKS	: GAMMA FROM MULTI				

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Well Name: MW1C
Unique Number: 854439

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 4/21/2021
Note: Video depths below are uncorrected. Zeroed in sideview. BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
13.0	sideview	SWL
39.0	sideview	bottom of casing
39.6	sideview	vertical fracture
40.6	sideview	BPF and rubbly zone
44.1	sideview	possible flow?
45.0	sideview	vertical fracture w/ oxidation
46.1	sideview	possible member contact
47.4	sideview	fracture zone
50.1	sideview	possible member contact
54.9	downview	bottom of hole

Well Name: MW1C
Unique Number: 854439

FLOW LOG STATION MEASUREMENTS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 4/21/2021
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Corrected flow values are calculated using values measured in the casing (assumed to be zero).
Station depths below are uncorrected.

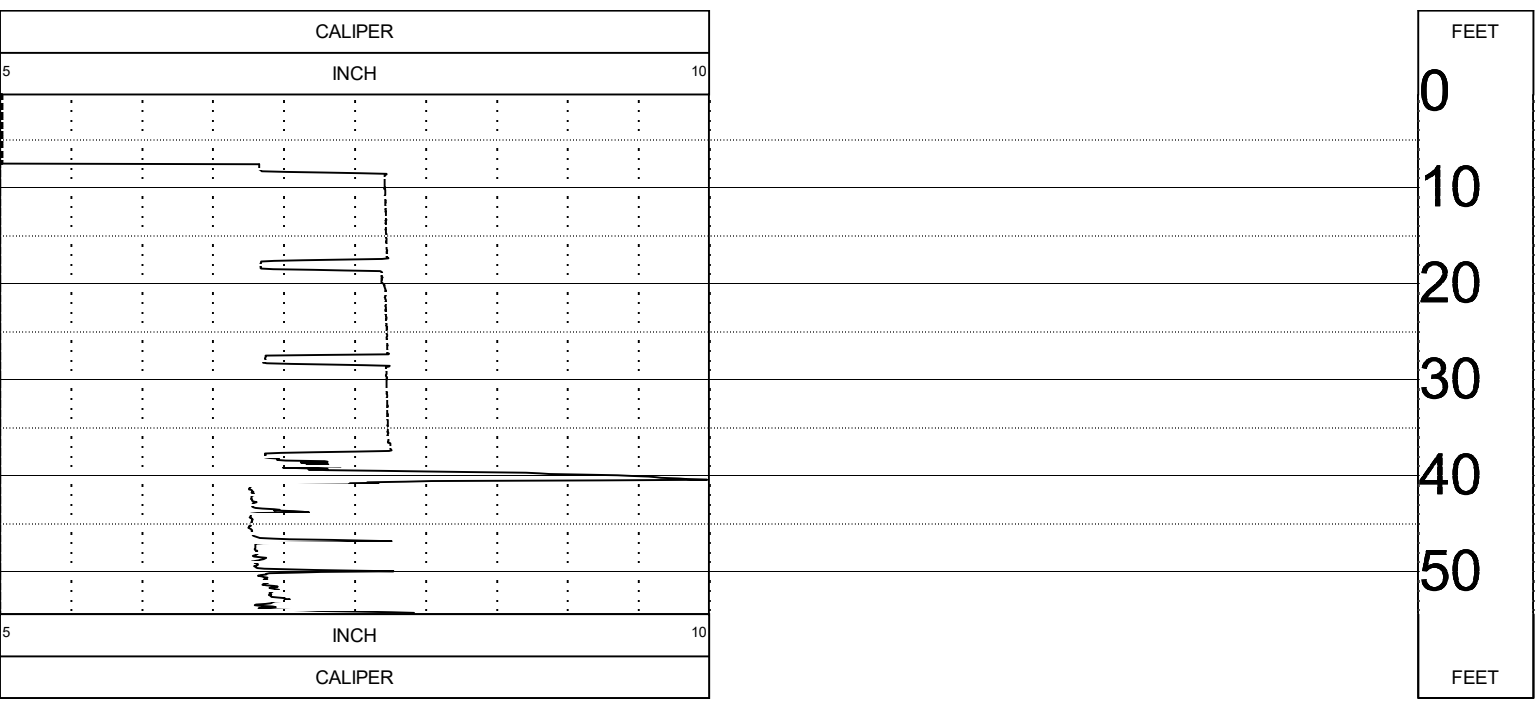
Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
23.9	-0.3171	0.0000	steady; casing measurement
39.5	-0.3049	0.0153	steady
41.2	0.2868	0.7549	steady
42.1	0.3368	0.8174	steady
44.1	0.4291	0.9328	steady
46.1	-0.2075	0.1370	steady
48.1	0.5277	1.0560	steady
51.2	-0.1647	0.1905	steady
53.1	-0.2469	0.0878	steady

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854439_CALIPER

NAME	: MW1C			OTHER SERVICES:	
UNIQUE NUMBER	: 854439_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 04/21/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 38'			KB	:
LOG BOTTOM	: 54.35	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.33	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 04/21/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 13:45:
				THRESH	: 2500
SWL	: 13'				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

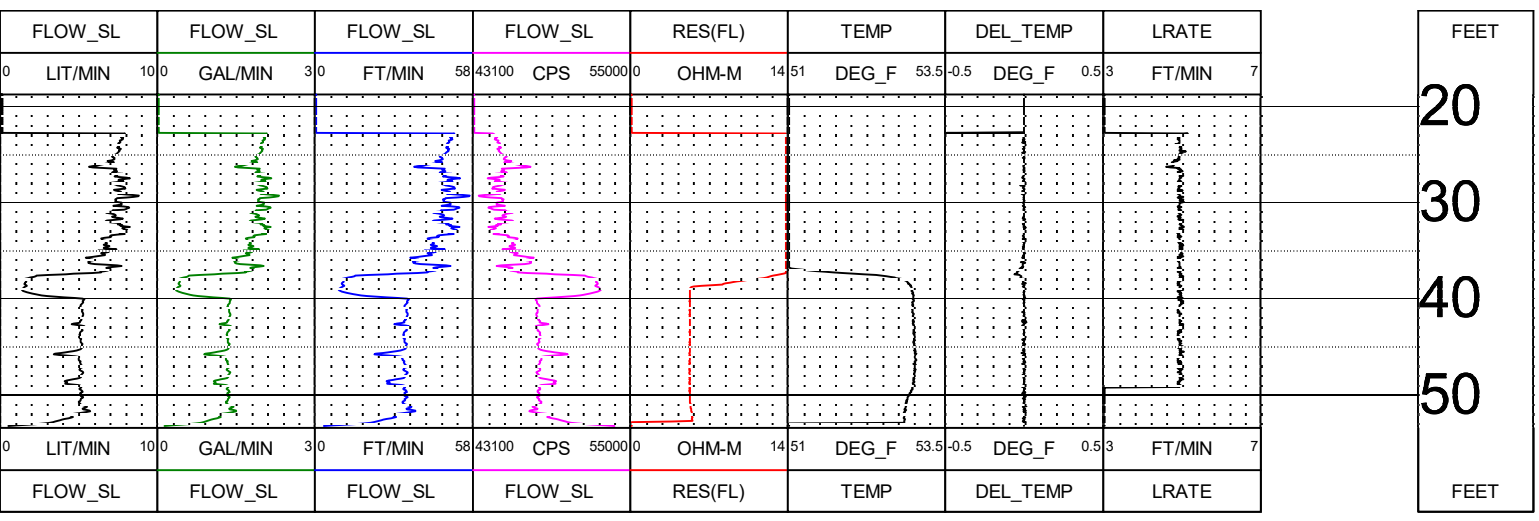


Minnesota Geological Survey
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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

854439_AMBTROLL_RUN2

NAME	: MW1C			OTHER SERVICES:	
UNIQUE NUMBER	: 854439_AMBTROLL_RUN2				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDAAAD				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 04/21/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 38'			KB	:
LOG BOTTOM	: 53.37	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 18.77	DRL MEASURED FROM	:	GL	: 994 L1
CASING DIAMETER	: 8"	LOG RATE	: 5FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 04/21/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:32:
				THRESH	: 2500
SWL	: 13'				
REMARKS	: 8" SKIRT				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

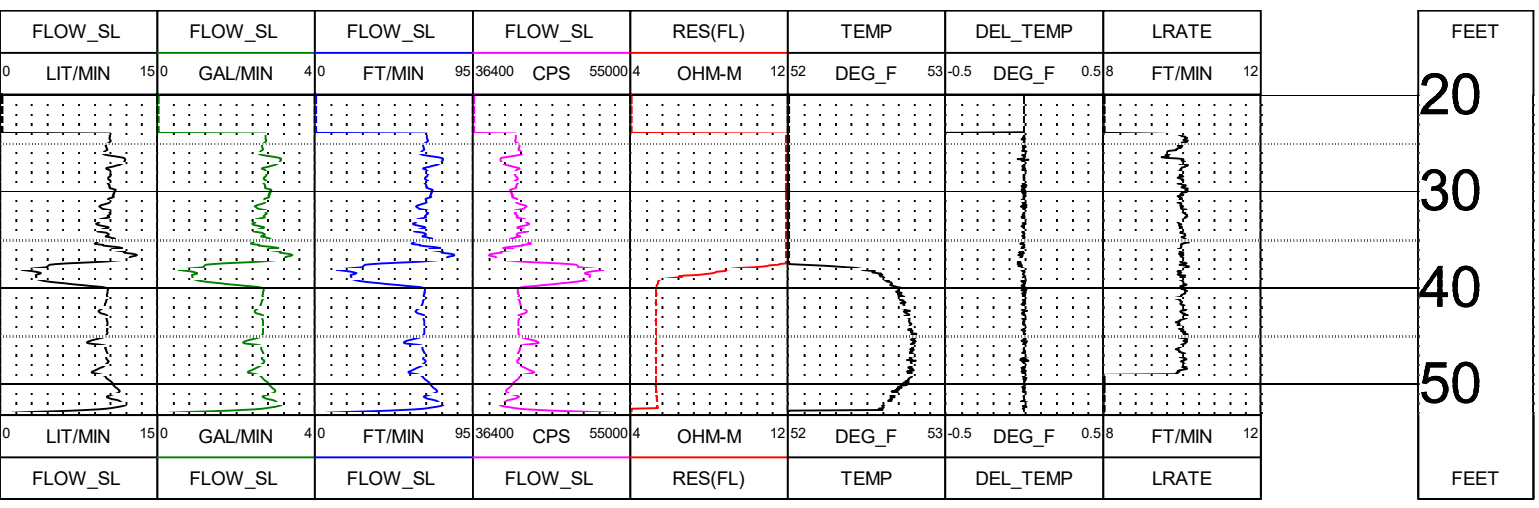


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854439_AMBTROLL

NAME	: MW1C			OTHER SERVICES:			
UNIQUE NUMBER	: 854439_AMBTROLL						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: CDAAAD						
SECTION	: 17	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 04/21/21	MGS CUTTINGS #	:				
CASING BOTTOM	: 38'				KB	:	
LOG BOTTOM	: 53.15	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 19.89	DRL MEASURED FROM	:		GL	: 994 L1	
CASING DIAMETER	: 8"	LOG RATE	: 10FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: RETZLER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 9721SL	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 04/21/21	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 14:00:	
					THRESH	: 2500	
SWL	: 13'						
REMARKS	: 8" SKIRT						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Preliminary Flowmeter Summary and Results

Well Name: MW1C
Unique Number: 854439
Date Logged: 4/21/2021

Note: This summary accompanies the logging data results figure and refers to the corrected depth values as noted on the figure.

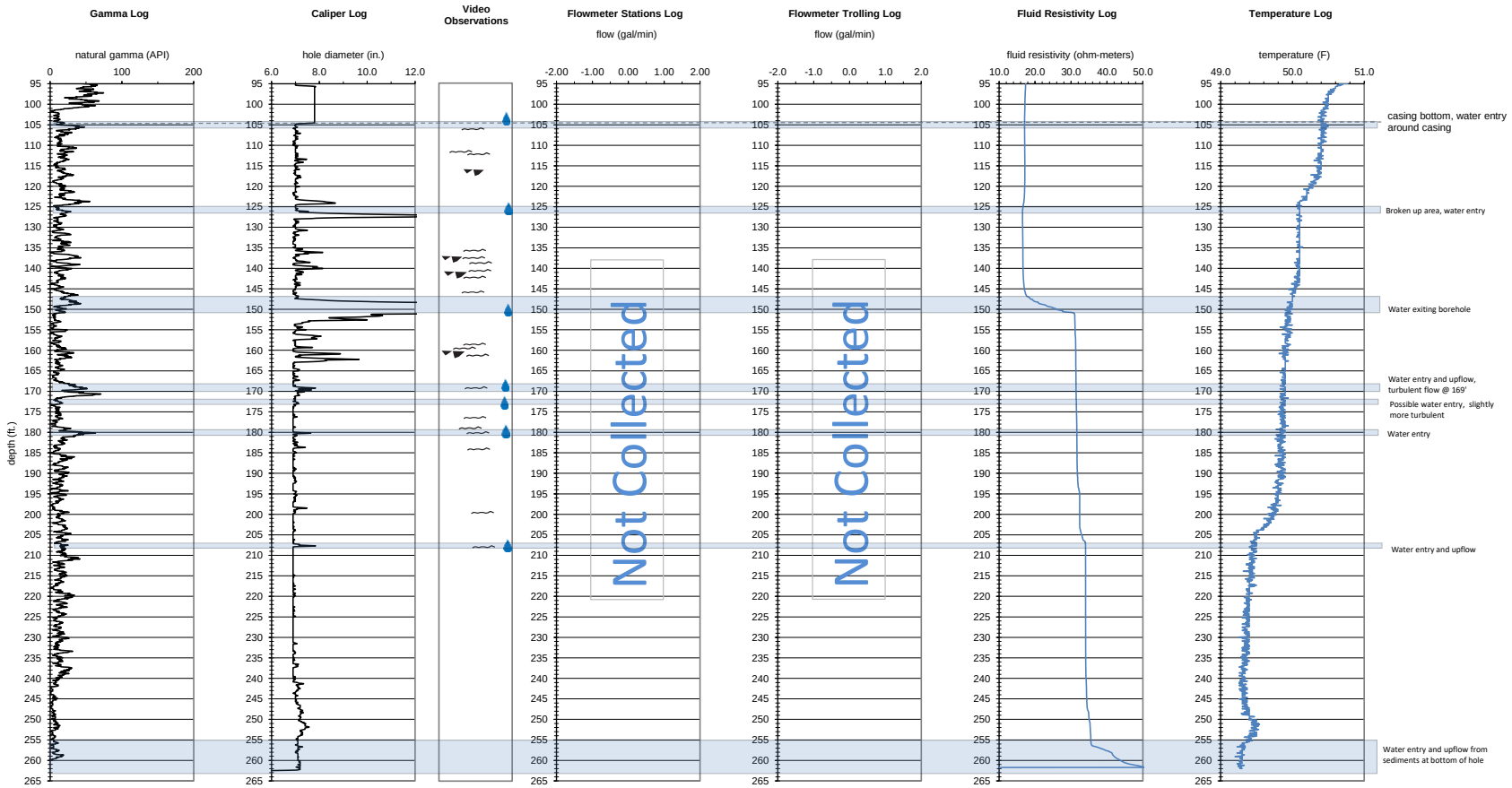
The video and caliper logs indicate several bedding plane fractures, rubbly zones, and some thin vertical fractures. Many of the bedding plane fractures are concentrated at the top of bedrock in the Magnolia Member. Bedding plane fractures were noted between about 39.0-41.2' and at 44.2', 47.2', 50.3', and 54.6'. Additionally, thin vertical fractures were noted between about 42.7-43.0', 44.9-45.7', and 51.0-54.6'. The largest borehole opening at about 10.5" in diameter occurs at about 40.6'. Some of the fractures noted above showed signs of iron oxidation in the video log.

It is difficult to discern flow from the video log alone. However, cloudier water and nearly stagnant suspended particles can be noted in the open hole above about 41.0' and between 51.7-55'. This is likely indicative of no flow intervals, while the interval between 41.0-51.7' is a bit clearer possibly due to the presence of flow. This is largely consistent with the other log data collected and described below.

The station measurements, more so than the trolling flowmeter results, indicate flow entering the borehole either at the bedding plane fracture or thin vertical fracture near about 50.3' and travelling upwards at about 1.1 L/min (0.28 gal/min). This flow appears to slightly diminish on its path upwards, possibly exiting partially into the fractures at 47.2' and 44.2', until exiting the borehole at a bedding plane fracture around 41.2'. The station measurement taken at about 47.5' may not be valid and has been ignored in this interpretation due to its proximity to a bedding plane fracture which may have prevented the flowmeter skirt from forming a proper seal around the borehole. The flowmeter fluid resistivity and temperature logs are also consistent with the above interpretation.

It should also be noted that this interpretation is largely consistent with the logging results for nearby MW1B (850555) which indicated flow entering the borehole at a fracture at about 50.2', travelling upwards at about 4 L/min (1 gal/min), and exiting at about 41.3' at a fracture.

Well Name: MW2A
Unique Number: 848623
T-R-S: T 29 R 21 Section 21 AABABB



Geology:
0-68 QUUU, Quaternary sediments
68 -102 OSTP, St. Peter Sandstone
102 - 240 OPDC, Prairie Du Chien
(102-186 Shakopee, 186-240 Oneota)
240 - 260+ CJDN, Jodran Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- multiparameter log

NOTE: Caliper and multi tool logs have been adjusted down 1.5 feet to match drillers description.

Logged by Minnesota Geological Survey
6/25/2020
Gamma, Multi, Caliper and video

Preliminary Geophysical Summary and Results

Well Name: MW2A
Unique Number: 848623
Date Logged: 6/25/2020

Note: This summary accompanies the geophysical results figure.

The video and caliper logs indicate a highly fractured, vuggy, cavernous, and broken up borehole in the Prairie du Chien. The video shows readily visible downflow and upflow in the open hole. This presence of this ambient flow is also supported by characteristics of the temperature and fluid conductivity logs. Based on the video observations in combination with the temperature and fluid resistivity logs we are confident of water entering the hole at casing bottom (105 ft) and at 126ft. The water entering from both of these intervals flows downhole and exits in a cavernous interval between approximately 147-150 ft. The origin of the upflow is from at least two intervals: from the Jordan Sandstone between about 263.6 ft and 255 ft, and from the Oneota at approximately 208 ft. Other possible intervals where upflow enters the hole are at 180.7 ft, 173.4 ft and 169.9 ft based on what may be enhanced turbulence observed at these footages in the video log. However, no corresponding deflections in the fluid resistivity and temperature logs are readily apparent. The upflow exits the hole out of the same interval that downflow exits, approximately 147-150 ft.

All entries and exits of flow within the Prairie du Chien are via bed parallel fractures/cavities. Entry of water through the Jordan appears to be in an intergranular fashion, although bed parallel "fractures" not visible on the video log may well be present and contributing water. The rate of flow could not be measured because the borehole conditions were too unstable to log with a flowmeter. Both downflow and upflow appeared turbulent in places on the video log, and included some subtle vortexed flow. Our experience with other holes that have been logged with both a camera and flowmeter is that these kinds of flow conditions are indicative of flow rates of over a gallon per minute.

Based on this interpretation, the lowest hydraulic head elevation in the open hole is in the vicinity of the 147-150 ft interval where water exits. Higher head elevations are in the Jordan and uppermost Prairie du Chien. Based on other OPCJ holes we have studied it is possible the highest head elevation is in the Jordan. The ambient flow in MW2a also requires the presence of at least two aquitards in the open hole interval. One somewhere between 126-147 ft, and another between 150-~255 ft.

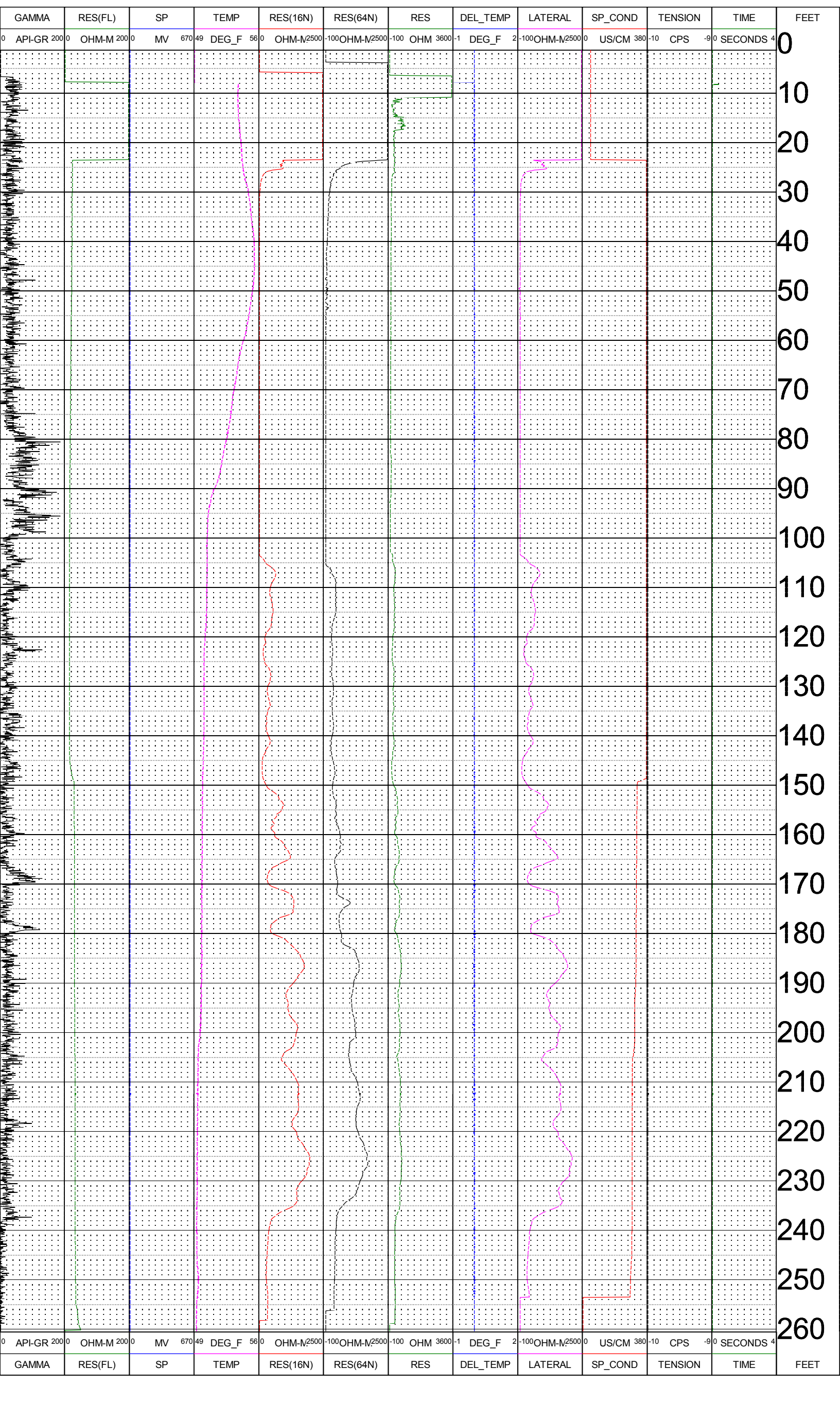
The conditions of both upflow and downflow in an OPCJ open hole, as well as the presence of multiple aquitards of at least local extent within the OPDC, is not unusual. We suggest having a look at Tipping et al, 2006. Ideally at least three additional monitor wells would be installed at this site to better understand the hydrogeologic conditions: E.g. one OPDC well with an open hole that encompasses the 147-150 ft interval, another OPDC well that includes 126 ft and higher interval, and at least one in the overlying Quat sediments. Something to consider in your future plans. These would provide quantification of the hydraulic head gradients (and identification of upward vs downward gradients) as well as provide water samples that could very well differ from one another in chemistry across the strat section.

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848623_MULTI

NAME	: MW2A			OTHER SERVICES:	
UNIQUE NUMBER	: 848623_MULTI				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	AABABB				
SECTION	: 21	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/25/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 105			KB	:
LOG BOTTOM	: 260.49	LOG MEASURED FROM:		DF	:
LOG TOP	: 1.30	DRL MEASURED FROM:		GL	: 912 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	06/25/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	11:08:
				THRESH:	2500
SWL	: 12				
REMARKS	:				

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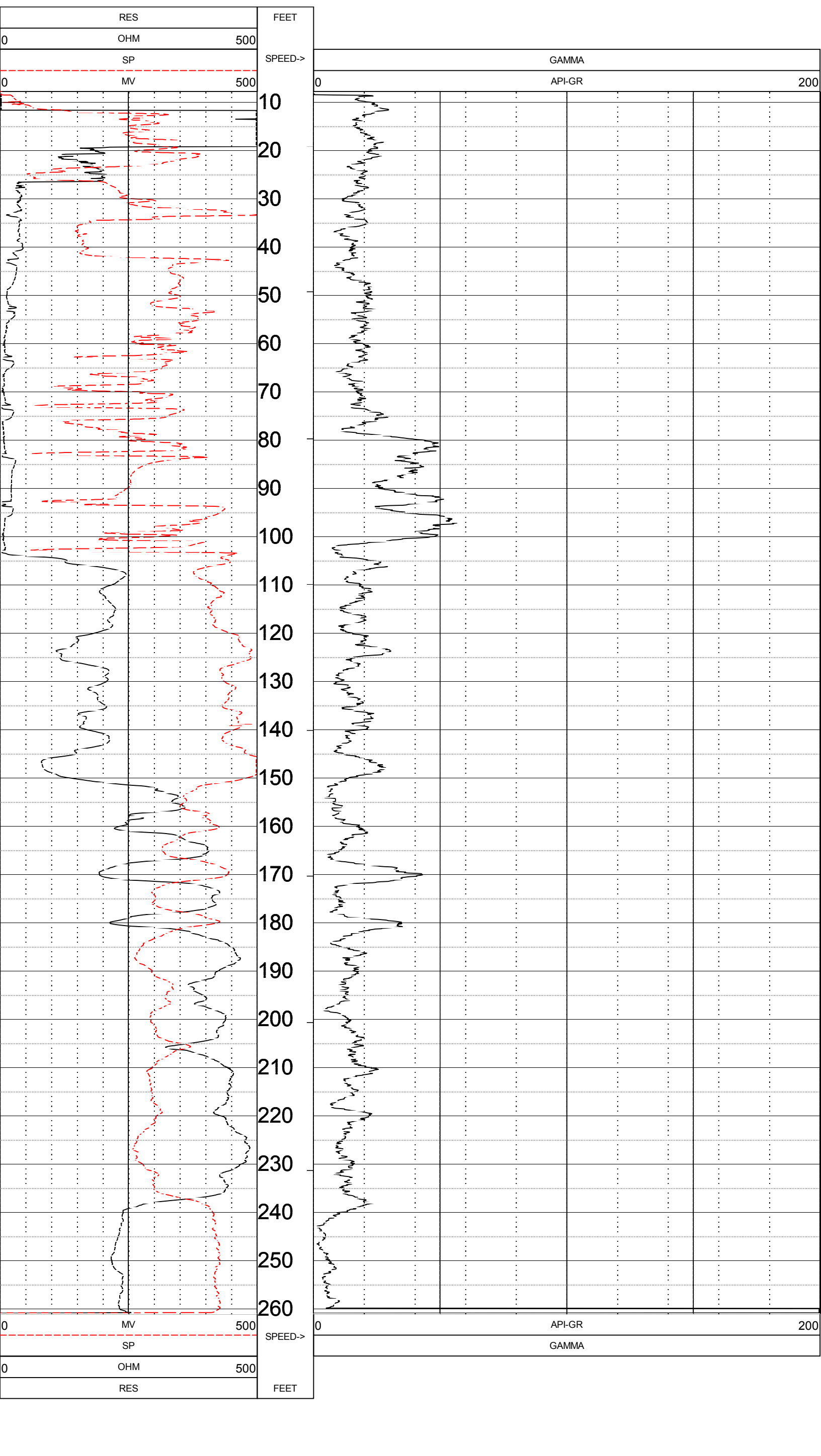


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848623

NAME	: MW2A			OTHER SERVICES:	
UNIQUE NUMBER	: 848623				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	AABABB				
SECTION	: 21	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/25/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 105			KB	:
LOG BOTTOM	: 260.91	LOG MEASURED FROM:		DF	:
LOG TOP	: 7.74	DRL MEASURED FROM:		GL	: 912 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
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NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	10:46:
				THRESH:	2500
SWL	: 12				
REMARKS	:				

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Date:	June 25, 2020
Well Name	MW2A
Un.no.	848623
logged by:	Steenberg, Mayer
camera	downview and sideview
swl measured	
swl camera	13
Depth correction	none
ambient conditions	Downhole and uphole ambient
general comments:	[ENTER COMMENTS]

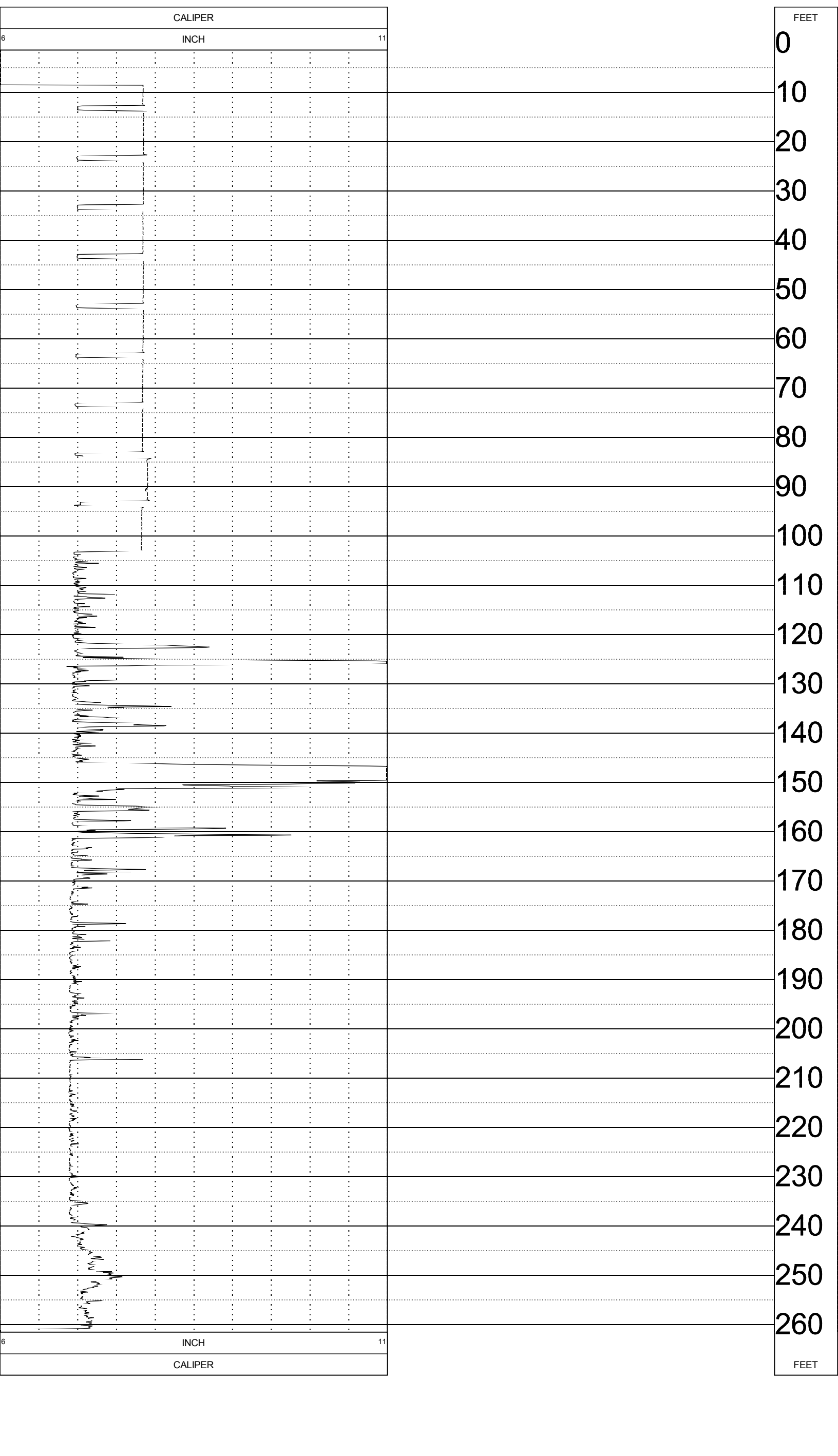
camera depth (ft)	camera view	logging direction	true depth (ft)	comments	time
[DEPTH]	SIDEVIEW	[DOWN OR UP]			
105.7	Sideview	down		casing bottom, water entering	
263.6	down view	down		bottom of hole	
242.6	sideview	up		slight up flow in CJDN	
235	sideview	up		broken up area	
233.1	sideview	up		slight up flow	
208.7	sideview	up		BPF, water entry and up flow, heavy particles moving down with gravity	
199.3	sideview	up		BPF, water entry and up flow, heavy particles moving down with gravity	
184	sideview	up		BPF	
182	sideview	up		horizontal bedding	
180.7	sideview	up		BPF, water entry	
178.8	sideview	up		minor BPF	
176.6	sideview	up		minor BPF	
173.4	sideview	up		rubbly zone, water entry	
172.3	sideview	up		horizontal bedding	
170.5	sideview	up		BPF, water entry	
169.9-169.3	sideview	up		turbulent flow, BPF water entry	
167.6	sideview	up		BPF, entry and up flow	
162.3-160.7	sideview	up		BPF, entry and up flow, large vug	
159.6	sideview	up		BPF	
155.2	sideview	up		Turbulent, murky, possible entry	
150.8	sideview	up		Water exiting borehole	
145.5	sideview	up		BPF	
143.9-136.0	sideview	up		Rubbly borehole BPFs and vuggy	
136	sideview	up		BPF	
132.8	sideview	up		shale bed	
130.2	sideview	up		Rubble. Broken up area	
127.3-125.7	sideview	up		Rubble. Broken up area, water entry	
117	sideview	up		vug	
112.6	sideview	up		BPF	
112.1	sideview	up		BPF	
106.6	sideview	up		BPF	
106.3	sideview	up		shale bed	
104.7	sideview	up		bottom of casing, water entry	

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848623_CALIPER

NAME	: MW2A			OTHER SERVICES:	
UNIQUE NUMBER	: 848623_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	AABABB				
SECTION	: 21	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/25/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 105			KB	:
LOG BOTTOM	: 261.45	LOG MEASURED FROM:		DF	:
LOG TOP	: 1.42	DRL MEASURED FROM:		GL	: 912 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	06/25/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	11:29:
				THRESH:	2500
SWL	: 12				
REMARKS	:				

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Preliminary Flowmeter Summary and Results

Well Name: BS3
Unique Number: 847052
Date Logged: 1/8/2020

Note: This summary accompanies the video log, video log notes, caliper log, and multitool log.

The video log depths appear to be about 4.5-5 ft. deeper than the actual borehole depths based on the depth of the casing bottom recorded on the video while logging downwards and upwards. However, please note that the video log depths may increase with increasing depth in the borehole since the depth of the bottom of the hole appears to be about 10-11 ft. deeper than that measured by the driller and our other geophysical logging tools. It is possible these errors are due to cable stretching during video logging or possibly by a tool malfunction with the counter reel of the video logging rig.

The fluid resistivity log indicates a change in slope at about 85 ft. depth that may be related to flow in or out of the borehole. This depth roughly corresponds to about 88.4 ft. depth (uncorrected) in the video while logging down, and about 88.9 ft. depth (uncorrected) in the video while logging up. The video indicates slight turbulent flow around this interval and may also show flow into the borehole from the fracture at about 85 ft. and flow downwards. Suspended particles in the video through this interval appear to move downwards more quickly than above and below this interval. For this reason, the water may be exiting the borehole at the fracture at about 90.5 ft. depth, which corresponds to another change in the slope of the fluid resistivity log.

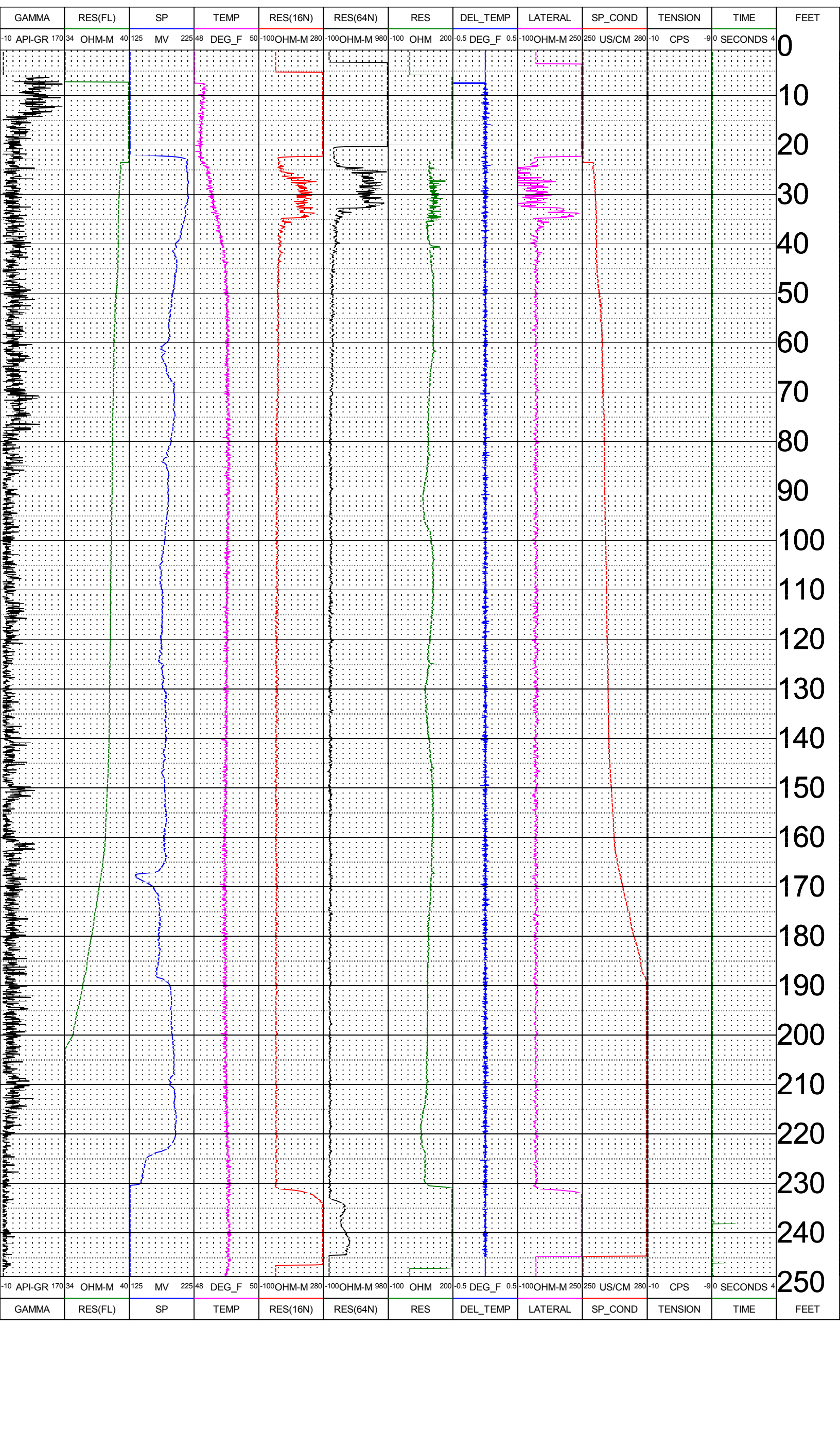
The fluid resistivity log also indicates a change in slope at the interval of about 186 to 195 ft. depth. This may also be related to flow in or out of the borehole at this interval. The borehole is very cloudy and the video log quality is poor along this interval, however, and does not provide any obvious evidence to support this interpretation.

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847052_MULTI

NAME	: MW3A			OTHER SERVICES:	
UNIQUE NUMBER	: 847052_MULTI				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 230'			KB	:
LOG BOTTOM	: 248.77	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.81	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:50:
				THRESH:	2500
SWL	: 23'				
REMARKS	: PROJECT 1007				

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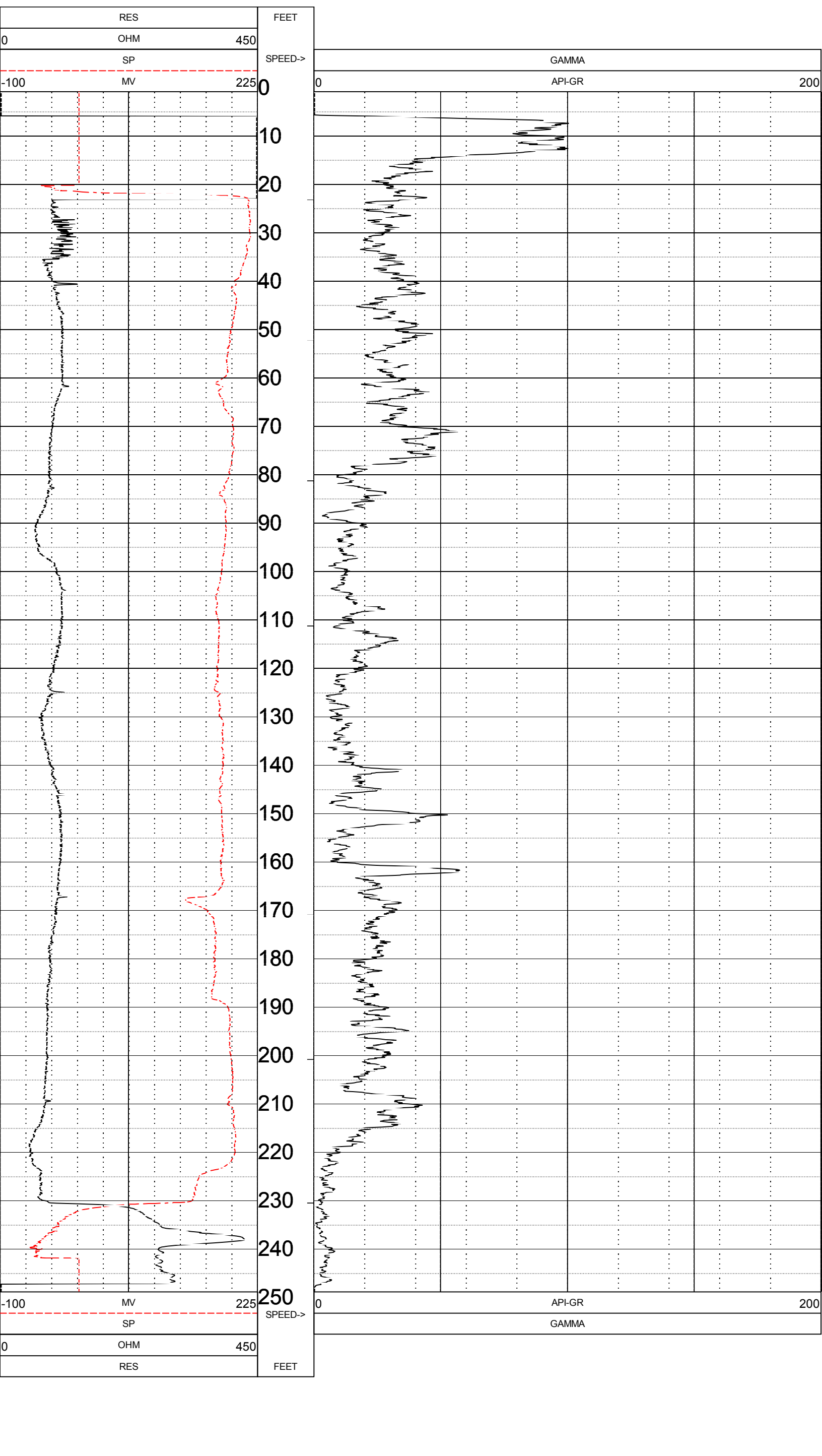


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847052_MULTIGAMMA

NAME	: MW3A			OTHER SERVICES:	
UNIQUE NUMBER	: 847052_MULTIGAMMA				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 230'			KB	:
LOG BOTTOM	: 248.77	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.81	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:50:
				THRESH	: 2500
SWL	: 23'				
REMARKS	: PROJECT 1007				

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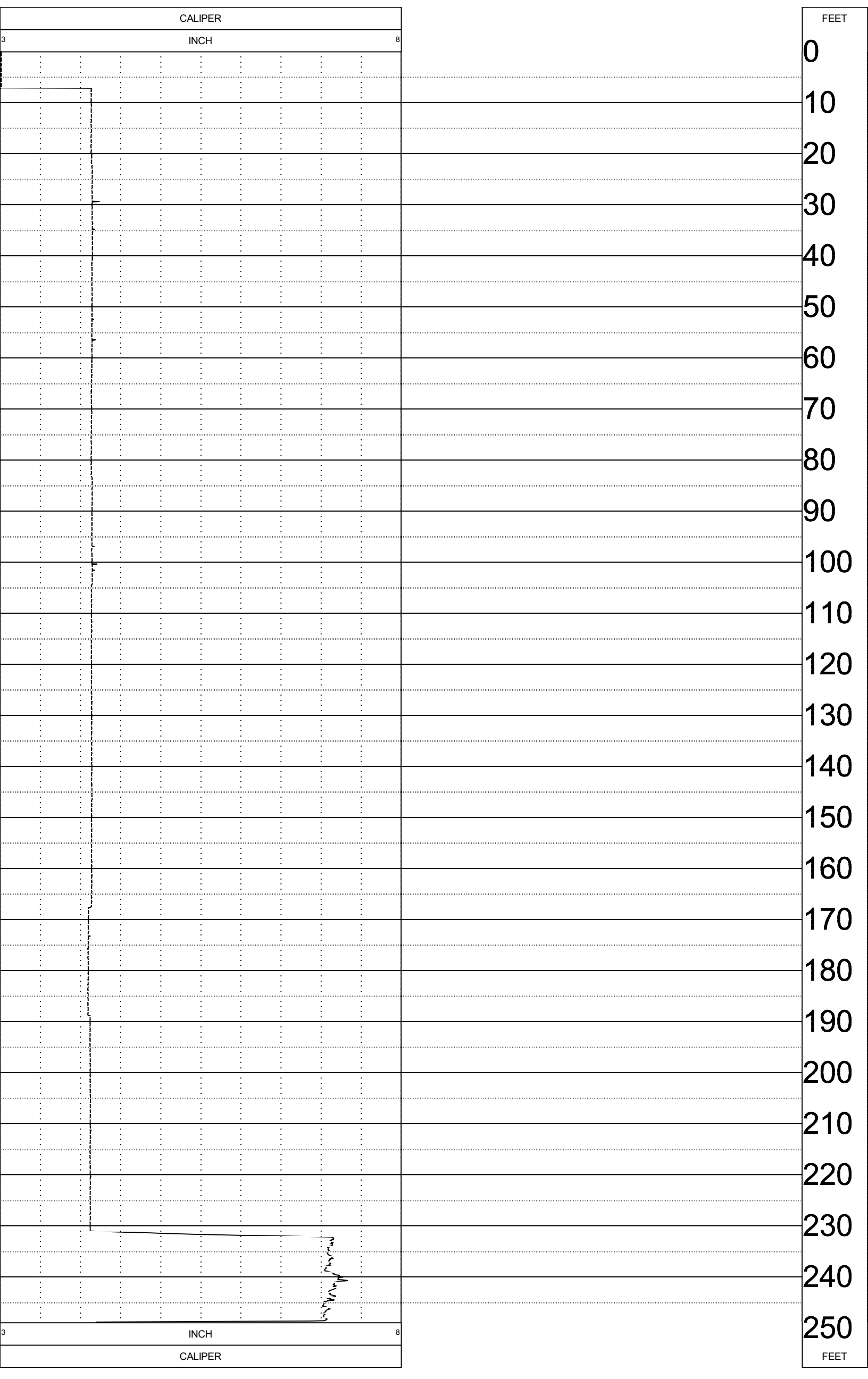


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847052_CALIPER

NAME	: MW3A			OTHER SERVICES:	
UNIQUE NUMBER	: 847052_CALIPER				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 230'			KB	:
LOG BOTTOM	: 248.87	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.05	DRL MEASURED FROM:		GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	13:09:
				THRESH:	2500
SWL	: 23'				
REMARKS	: PROJECT 1007				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW3A
Unique Number: 847052

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 5/15/2020
Note: Zeroed in sideview. Video log footages appear to be off by ~2.9' based on casing bottom depth.

Depth (ft.):	Camera View:	Observations:
22.0	sideview	SWL
232.9	sideview	Bottom of casing
239.6	sideview	Thin fracture, horizontal
240.3	sideview	Vertical, thin fracture
250.4	sideview	Very murky/mucky
280.6	sideview	Bottom of hole

Preliminary Flowmeter Summary and Results

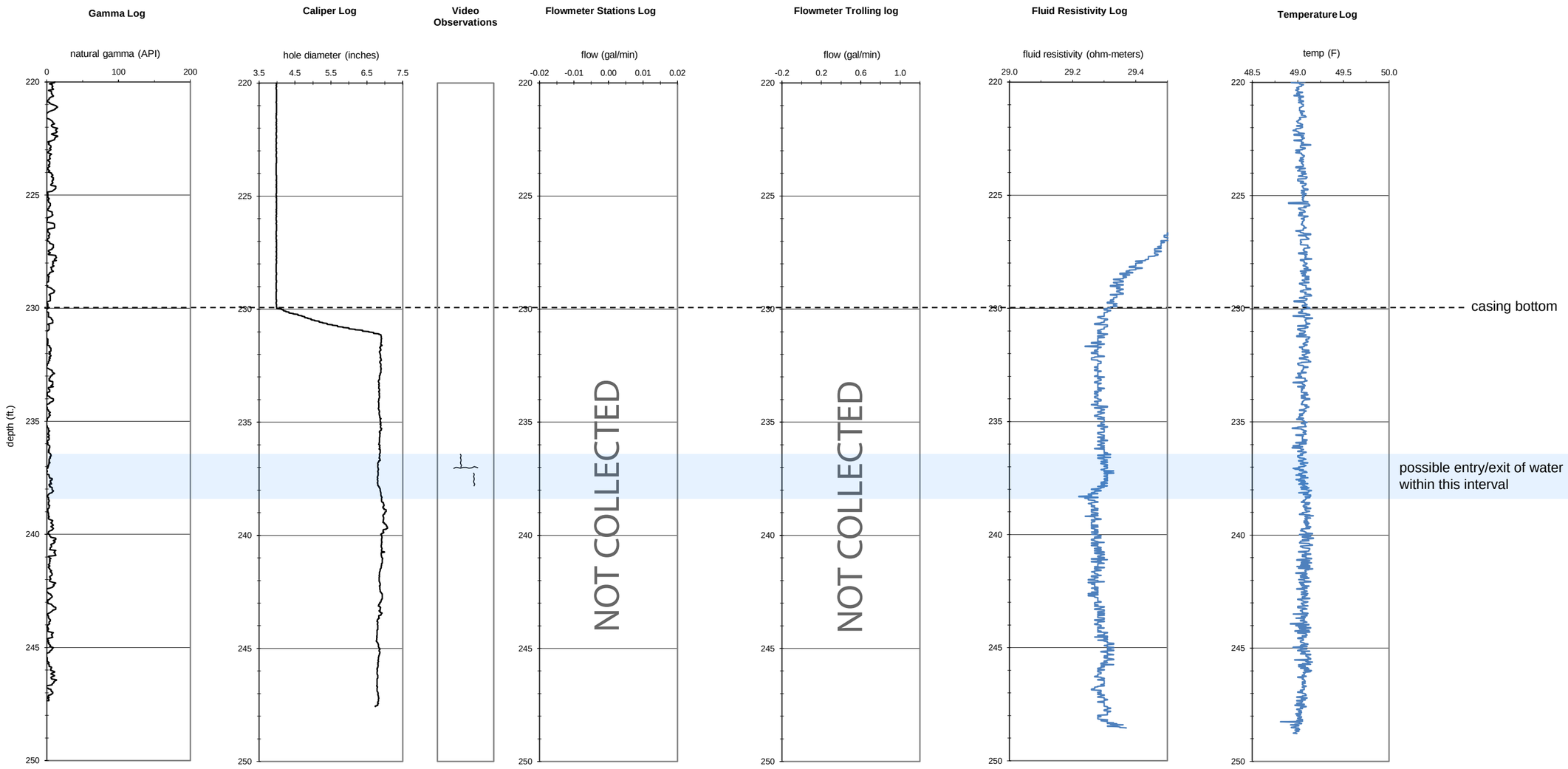
Well Name: MW3A
Unique Number: 847052
Date Logged: 5/15/2020

Note: This summary accompanies the flowmeter results figure. Also, please note that the footages in the accompanying video log are off by an additional 2.8 feet based on the actual depth to bottom of casing (230 feet). Video observations shown on the results figure take this into account.

The video and caliper logs indicate a relatively smooth Jordan Sandstone borehole with only a few thin fractures at around 237'. There were no obvious signs of flow in or out of the open borehole noted in the video logged under ambient conditions. Particles in the video appear to be slowly settling due to gravity after being dislodged/disrupted by the video logging tool.

The fluid resistivity log shows a slight baseline shift at about 238' depth, which appears to align with another very slight shift in the temperature log. This is also near the thin fractures observed on the video log. This may indicate two subtly distinct (in chemistry) waters in the borehole, with water possibly entering or exiting the hole at about 237-238' depth, but with any ambient flow being too slow to pick up on the video log.

Well Name: MW3A
Unique Number: 847052
T-R-S: T29 R21 Section 27 ADCDDC



Geology:
0-74 QUUU, Quaternary sediments
74-170 OPSH, Shakopee Formation
170-221 OPOD, Oneota Dolomite
221-250+ CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture
- other vugs/macropores
- multitool log

NOTE: The original caliper log depth was off by about 1.1 ft. based on bottom of casing depth (which should be 230') and has been corrected on this figure. The video log footages are off by an additional 2.8 ft. and the observations shown on this figure take this into account. All other logs are unmodified.

Logged by Minnesota Geological Survey
5/15/2020
Multitool, Caliper, Video

Well Name: BS3
Unique Number: 847052

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 1/8/2020
Note: Zeroed in sideview. Video depths do not match depths reported by the driller or measured in the caliper and multitool. The magnitude of the difference also appears to change with depth.

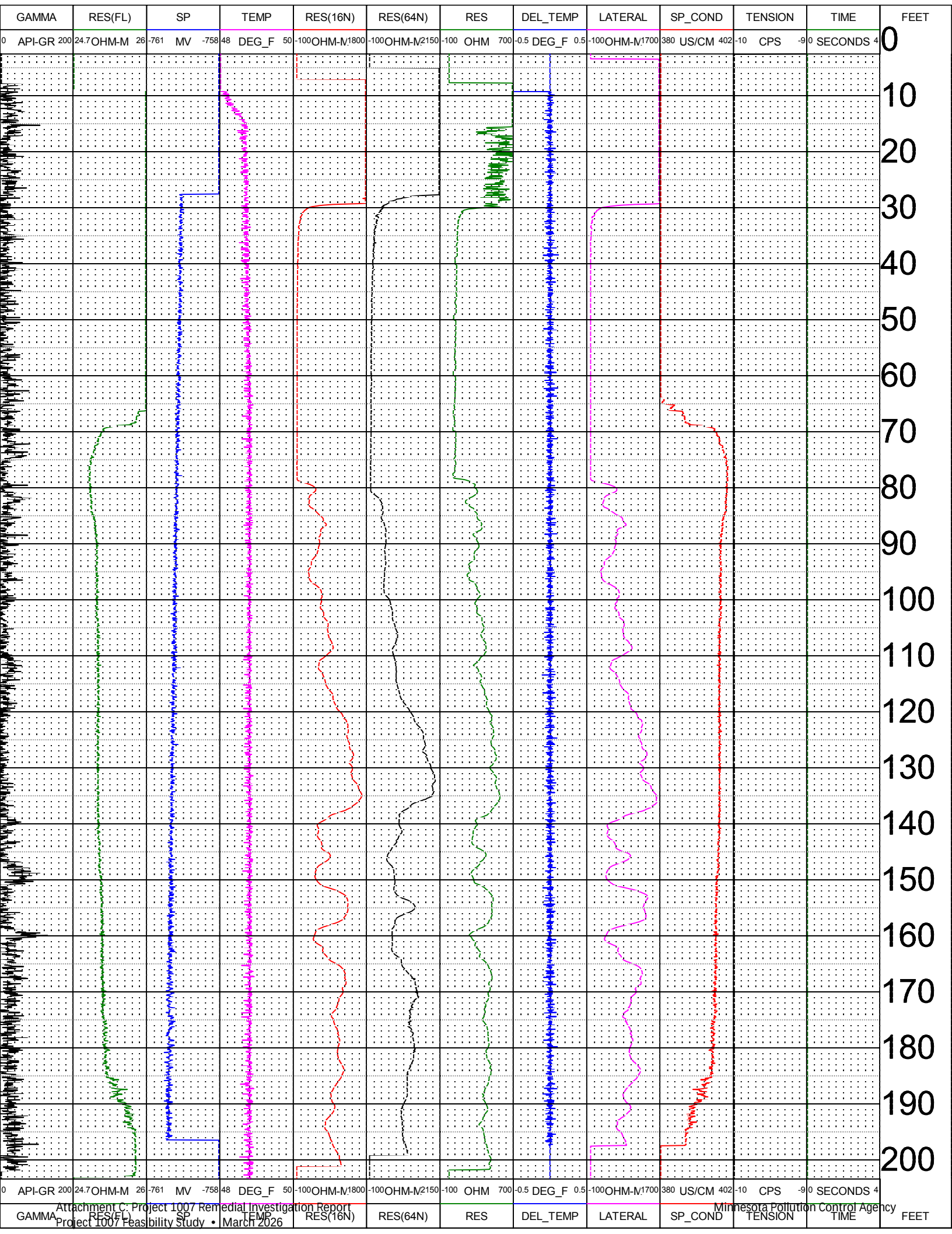
Depth (ft.):	Camera View:	Observations:
17.1	sideview	SWL
85.0	sideview	bottom of casing
88.0	downview	possible turbulent flow
146.9	downview	start of cloudier/murkier water
217.1	downview	bottom of hole, sandy bottom
208.0	sideview	thin fracture
202.8	sideview	fracture
186.9	sideview	group of thin fractures
173.8	sideview	thin fracture
166.1	sideview	vuggy fracture, thin fracture
165.8	sideview	thin fracture
160.8	sideview	group of thin fractures
158.5	sideview	particles indicate slight downflow or settling?
157.9	sideview	fracture and some loose material
157.4	sideview	fracture
154.8	sideview	rubbly zone with loose material
151.2	sideview	rubbly/cavernous
149.8	sideview	thin fracture
148.9	sideview	thin fracture
148.1	sideview	vuggy fracture zone
143.1	sideview	rubbly fracture zone
140.1	sideview	rubbly fracture zone
135.9	sideview	rubbly fracture zone
131.4	sideview	thin fracture
131	sideview	fracture rubbly zone
123.4	sideview	thin fracture
120.3	sideview	rubbly fracture
115.8	sideview	cavern
114.3	sideview	thin fracture
110.3	sideview	cavern
103.9	sideview	thin fracture
99.5	sideview	cavernous zone
95.4	sideview	loose rubbly zone and thin fracture
89.4	sideview	less downflow movement in particles; change in flow?
89	sideview	thin fracture; possible upflow
86.5	sideview	thin fracture
84.8	sideview	bottom of casing

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Dept. Phone: (612)626-2969

847052_MULTI

NAME	: BS3				OTHER SERVICES:		
UNIQUE NUMBER	: 847052_MULTI						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI:	ADCDDC						
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21		
DATE	: 01/08/20	MGS CUTTINGS #	:				
CASING BOTTOM	: 80'			KB	:		
LOG BOTTOM	: 203.38	LOG MEASURED FROM:	GL	DF	:		
LOG TOP	: 2.60	DRL MEASURED FROM	:	GL	: 909 L1		
CASING DIAMETER	: 6"	LOG RATE	: 30FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: RETZLER				
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED		
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A		
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 01/08/20		
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:16:		
				THRESH	: 2500		
SWL	: 16'						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

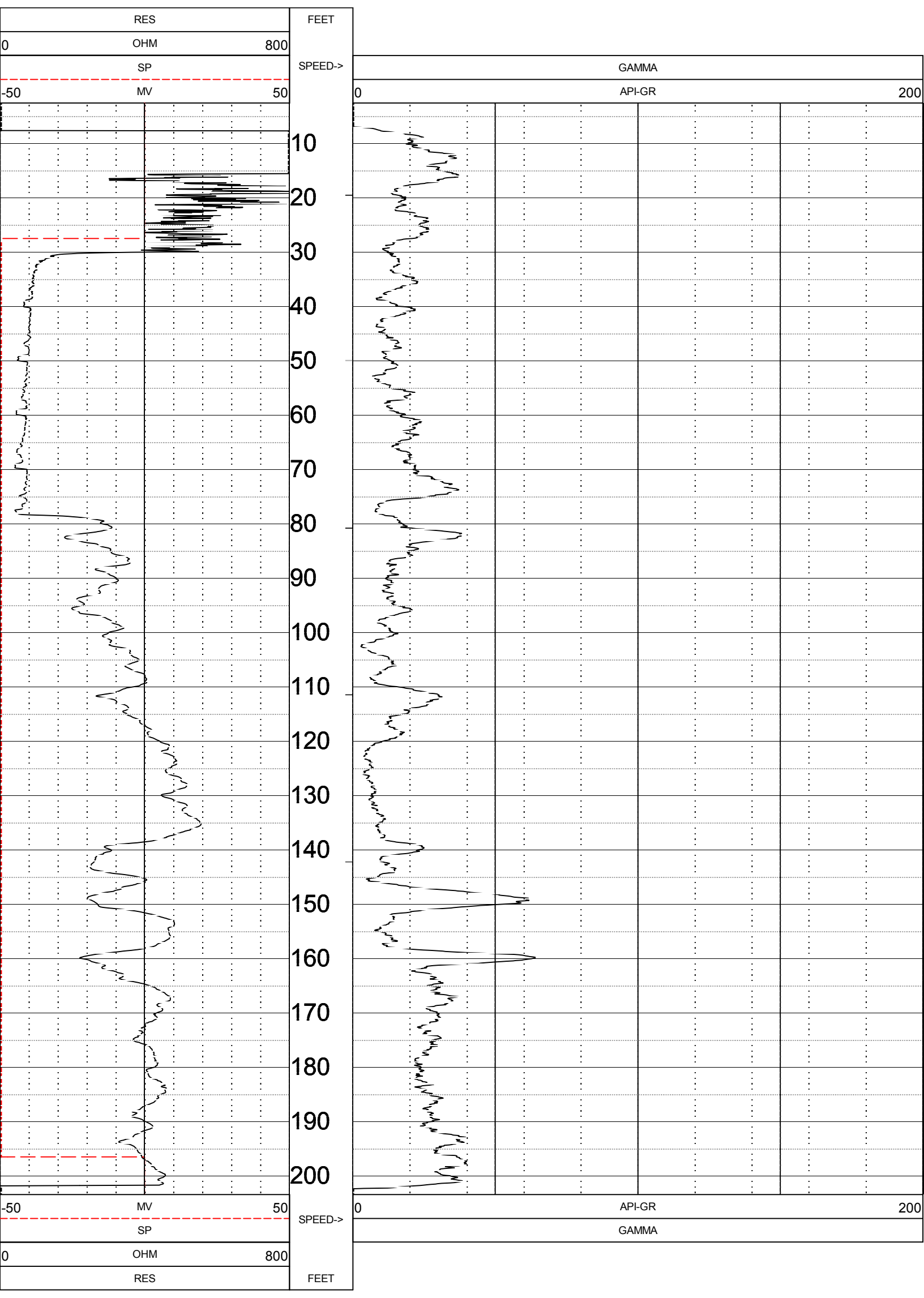


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847052_GAMMA

NAME	: BS3			OTHER SERVICES:	
UNIQUE NUMBER	: 847052_GAMMA				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 01/08/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80'			KB	:
LOG BOTTOM	: 203.38	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 2.60	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 6"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 01/08/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:16:
				THRESH	: 2500
SWL	: 16'				
REMARKS	: GAMMA FROM MULTI				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

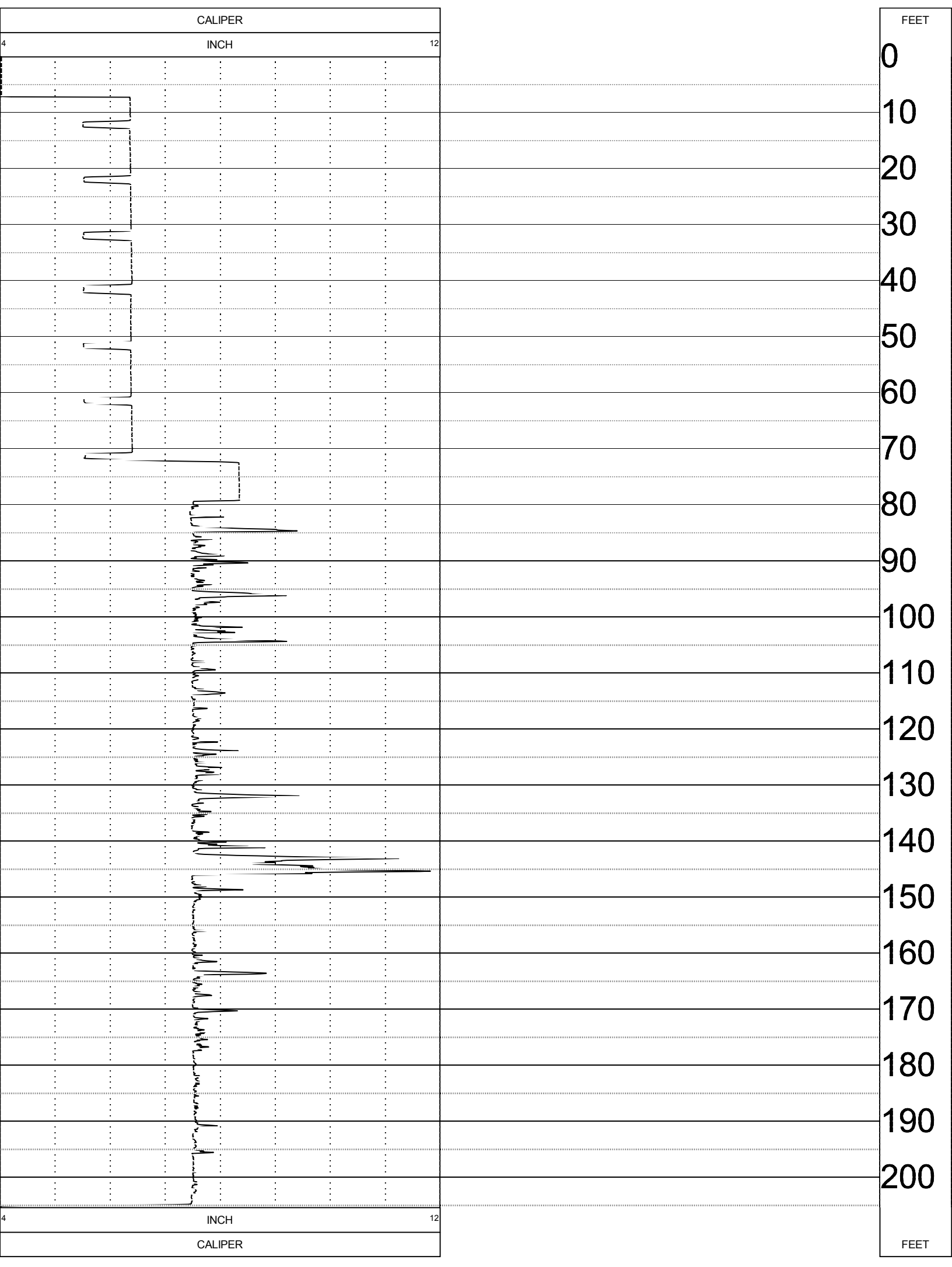


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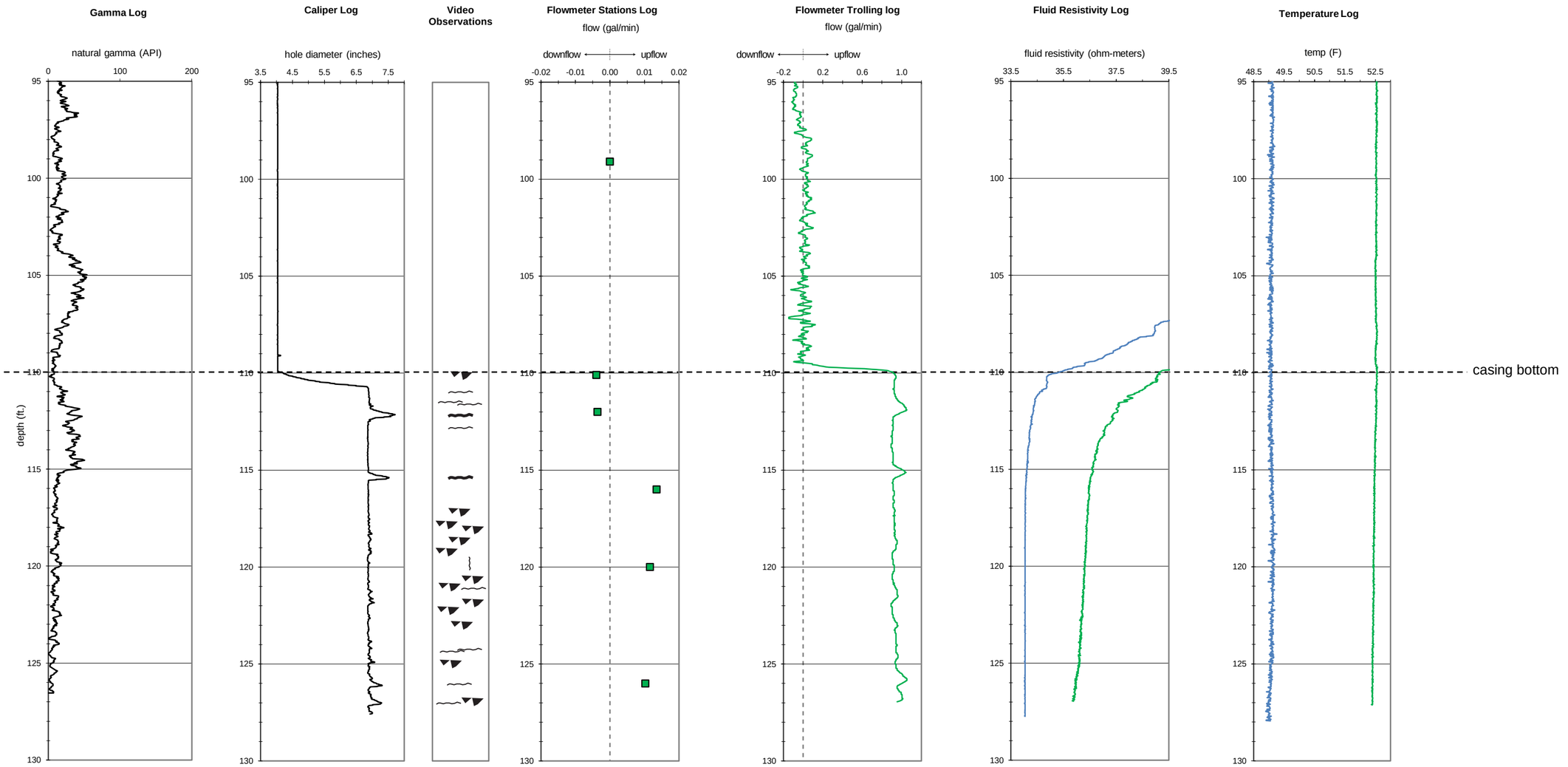
847052_CALIPER

NAME	: BS3			OTHER SERVICES:	
UNIQUE NUMBER	: 847052_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 01/08/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80'			KB	:
LOG BOTTOM	: 205.35	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.09	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 6"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 01/08/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:54:
				THRESH	: 2500
SWL	: 16'				
REMARKS	:				

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Well Name: MW3B
Unique Number: 847053
T-R-S: T29 R21 Section 27 ADCDDC



Geology:
0-79 QUUU, Quaternary sediments
79-130+ OPSH, Shakopee Formation

KEY:
- subvertical fracture
- bedding plane fracture
- other vugs/macropores
- ambient station (flowmeter log)
- ambient trolling (flowmeter log)
- multitool log

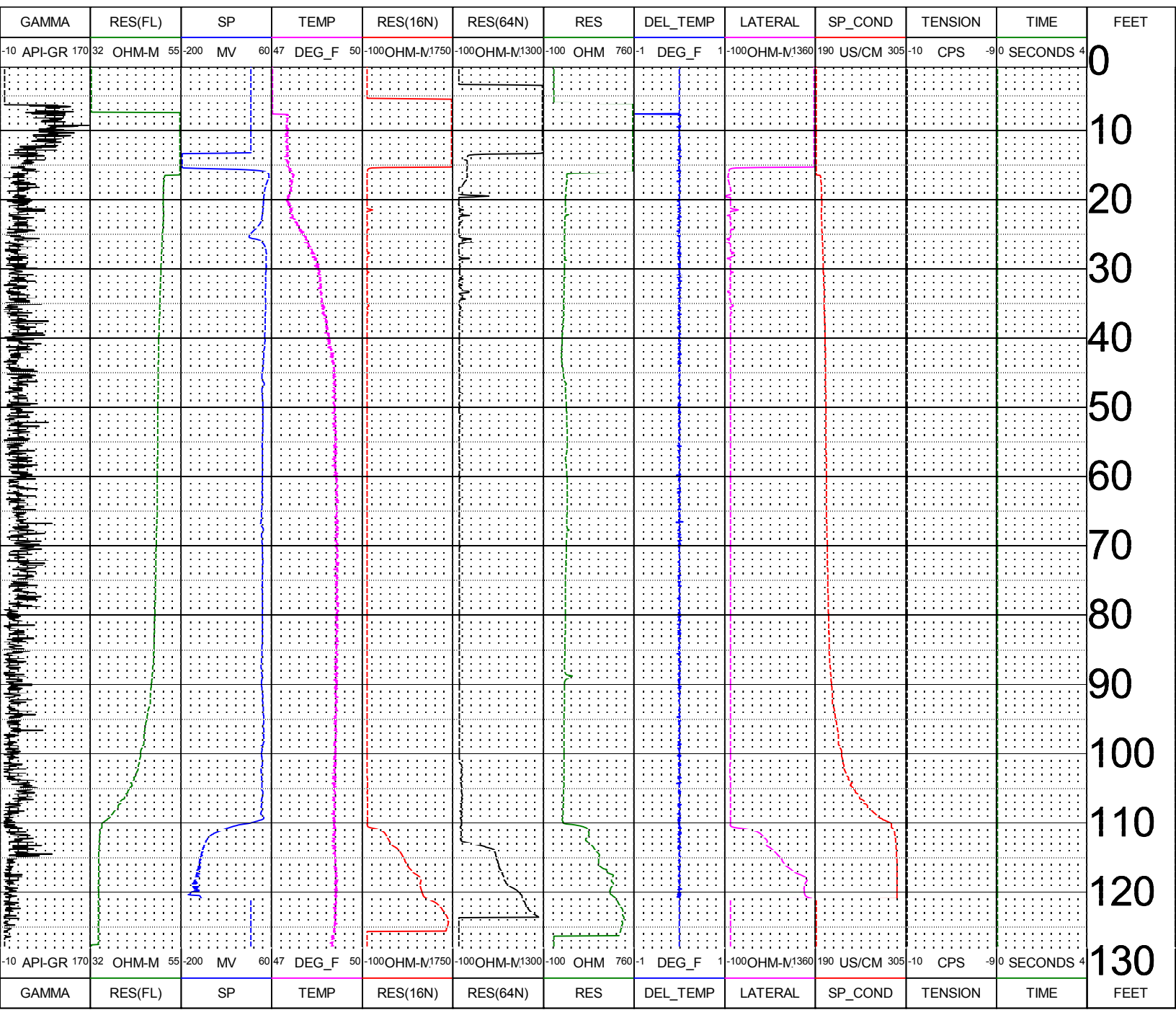
NOTE: The original caliper log depth was off by about 0.8 ft. based on bottom of casing depth (which should be 110') and has been corrected on this figure. The video log footages are off by an additional 2.0 ft. and the observations shown on this figure take this into account. All other logs are unmodified.

Logged by Minnesota Geological Survey
5/15/2020
Multitool, Caliper, Ambient Flowmeter, Video

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NAME	: MW3B			OTHER SERVICES:	
UNIQUE NUMBER	: 847053_MULTI				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 127.96	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.90	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 20FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:06:
				THRESH	: 2500
SWL	: 16'				
REMARKS	: PROJECT 1007				

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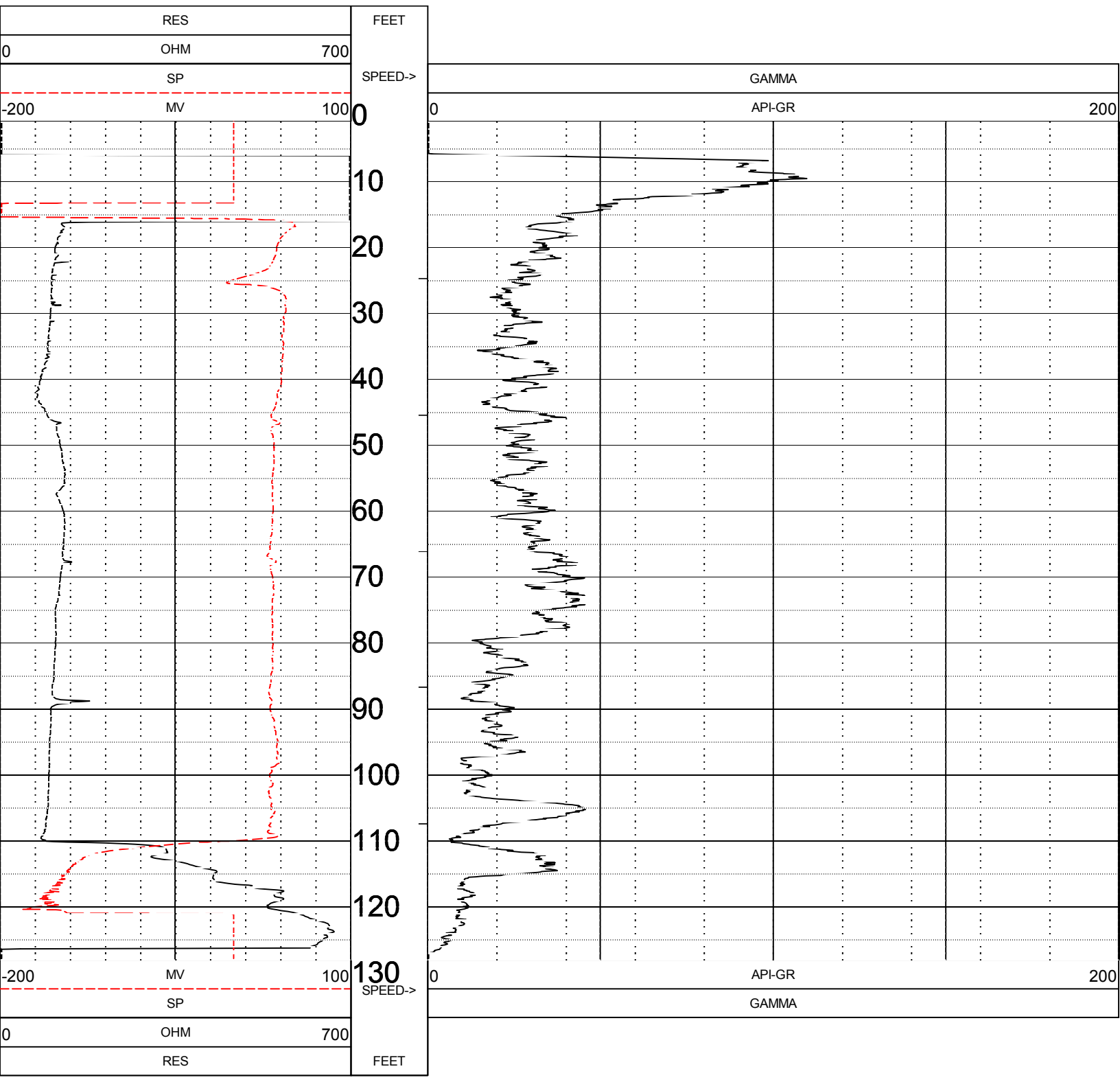


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847053_MULTIGAMMA

NAME	: MW3B			OTHER SERVICES:	
UNIQUE NUMBER	: 847053_MULTIGAMMA				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 127.96	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.90	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 20FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:06:
				THRESH	: 2500
SWL	: 16'				
REMARKS	: PROJECT 1007				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

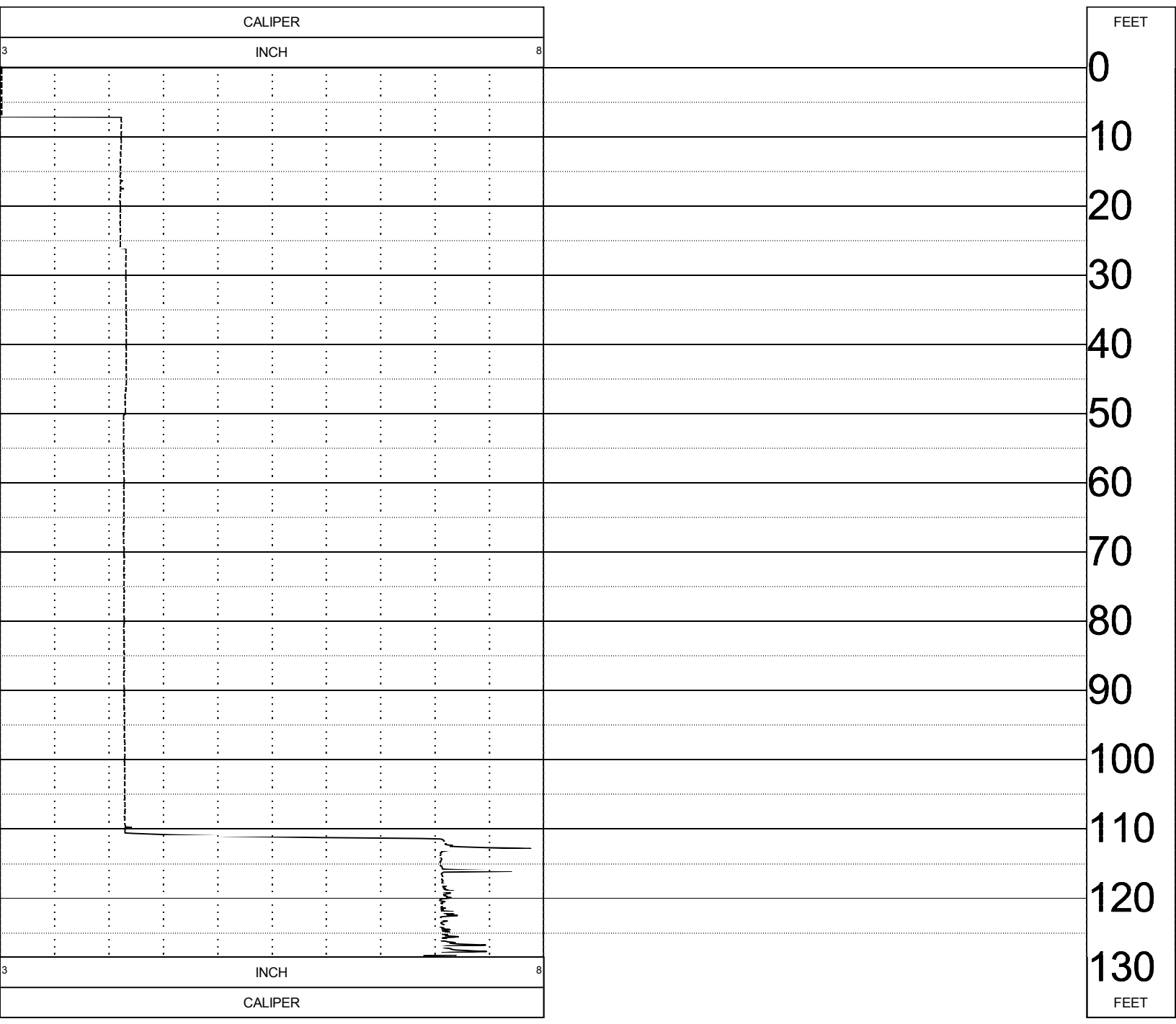


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847053_CALIPER

NAME	: MW3B			OTHER SERVICES:	
UNIQUE NUMBER	: 847053_CALIPER				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ADCDDC				
SECTION	: 27	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 128.43	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: -0.02	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 20FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:21:
				THRESH	: 2500
SWL	: 16'				
REMARKS	: PROJECT 1007				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

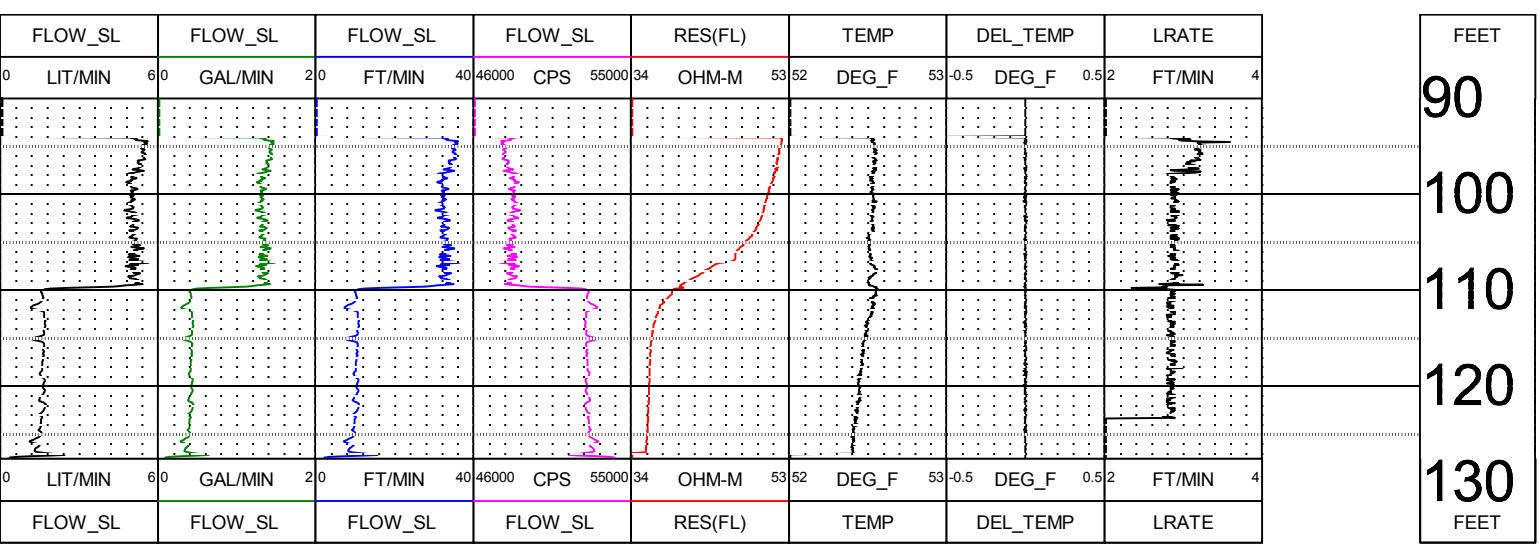


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

847053_AMBTROLL

NAME	: MW3B			OTHER SERVICES:			
UNIQUE NUMBER	: 847053_AMBTROLL						
QUADRANGLE	: 102B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: ADCDDC						
SECTION	: 27	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 05/15/20	MGS CUTTINGS #	:				
CASING BOTTOM	: 110'				KB	:	
LOG BOTTOM	: 127.46	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 90.04	DRL MEASURED FROM	:		GL	: 909 L1	
CASING DIAMETER	: 4"	LOG RATE	: 3FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: MAYER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 9721SL	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 05/15/20	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 10:39:	
					THRESH	: 2500	
SWL	: 16'						
REMARKS	: PROJECT 1007						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW3B
Unique Number: 847053

VIDEO LOG OBSERVATIONS

Logged By: Mayer (MGS), Retzler (MGS)
Date: 5/15/2020
Note: Zeroed in sideview. Video log footages appear to be off by ~2.0' based on casing bottom depth.

Depth (ft.):	Camera View:	Observations:
16.1	downview	SWL
16.4	sideview	SWL
112.0	sideview	Bottom of casing; vuggy at top
114.3	sideview	BPF zone; thin
117.5	sideview	BPF
119.1	sideview	Vuggy
120.4	sideview	Vuggy
121.1	sideview	Vuggy
123.1	sideview	Thin BPF
126.4	sideview	Thin BPF zone
129.2	sideview	Rubbly BPF zone
129.5	downview	Bottom of hole

Well Name: MW3B
Unique Number: 847053

FLOW LOG STATION MEASUREMENTS

Logged By: Mayer (MGS) and Retzler (MGS)
Date: 5/15/2020
Flow Tool Skirt Diameter (in.): 6
Note: (+) flow values = upflow; (-) flow values = downflow
Corrected flow values are calculated using values measured in the casing (assumed to be zero).

Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
99.1	-0.2620	0.0000	steady
110.1	-0.2740	-0.0150	steady
112.0	-0.2730	-0.0138	steady
116.0	-0.2210	0.0513	steady
120.0	-0.2270	0.0438	steady
126.0	-0.2310	0.0388	steady

Preliminary Flowmeter Summary and Results

Well Name: MW3B
Unique Number: 847053
Date Logged: 5/15/2020

Note: This summary accompanies the flowmeter results figure. Also, please note that the footages in the accompanying video log are off by an additional 2.0 feet based on the actual depth to bottom of casing (110 feet). Video observations shown on the results figure take this into account.

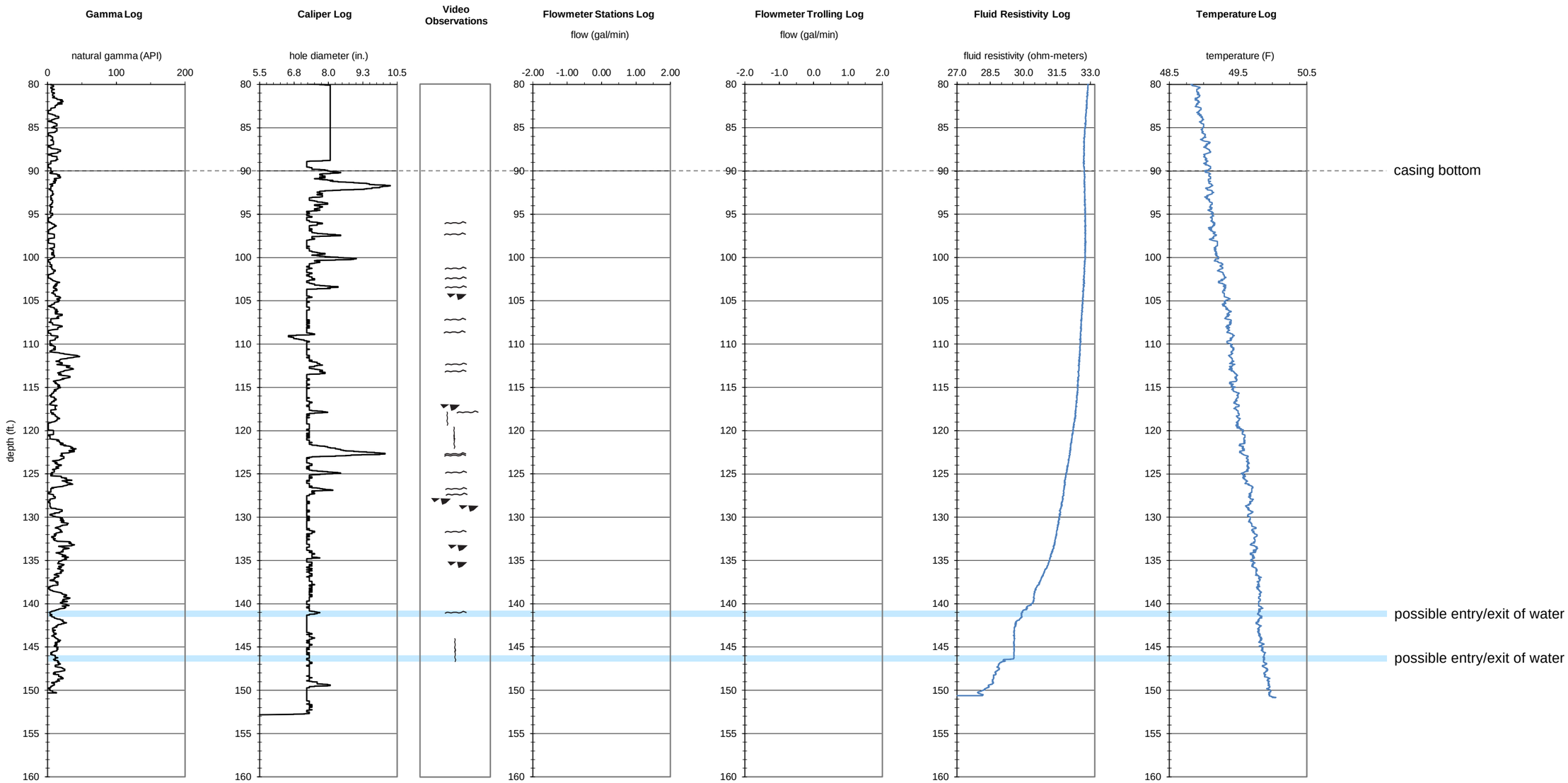
The video and caliper logs indicate a number of thin bedding plane fractures at about 112.3', 115.4', 121.1', 124.4', 126.0', and 127.0'. The borehole also has a number of vugs throughout. There were no obvious signs of flow in or out of the open borehole noted in the video logged under ambient conditions. Particles in the video appear to be slowly settling due to gravity after being dislodged/disrupted by the video logging tool.

The biggest change in flow illustrated in the trolling flowmeter data occurs at the bottom of casing at a depth of about 110 feet. This is artificial and due to a sharp change in hole diameter from a 7" open hole to a 4" casing while logging upwards. The other smaller changes noted in the trolling flowmeter log align with changes in the borehole diameter at or near fractures (as noted in the caliper log) and are most likely due to poorer sealing of the 7" borehole with the 6" skirt during logging. After taking the previously mentioned factors into account, the trolling flowmeter log does not show any obvious signs of flow in or out of the open borehole under ambient conditions.

The stations flowmeter data seem to indicate slight upflow (0.010 gal/min) from the bottom of the borehole that exits somewhere between station #4 (116.0') and station #3 (112.0'); however, these data are misleading because these values are likely below what our flowmeter tool is capable of measuring and these values have been corrected based on ambient flow measurements taken within the 4" casing that do not accurately apply to "no flow" values in the much larger 7" open borehole. With this in mind, the stations flowmeter data also do not show any obvious signs of flow in or out of the open borehole under ambient conditions.

The fluid resistivity and temperature logs may record a slight change in slope at about 125' and deeper, particularly on the flowmeter fluid resistivity log and the multitool temperature log. However, this change is VERY small and occurs near the beginning of the upwards logging. Oftentimes the first 1 to 2 feet of recorded data at the start of logging are skewed.

Well Name: MW4A
Unique Number: 847054
T-R-S: T29 R21 Section 23 DCCDAA



Geology:
0-90 QUUU, Quaternary sediments
90-133 OPSH, Shakopee Formation
133-160+ OPOD, Oneota Dolomite

KEY:

- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: The caliper log is off by about 0.91 ft. based on the reported depth to bottom of casing (90 ft.) and has been adjusted on this figure. The video log is off by about 1.0 ft. based on the reported depth to bottom of casing and the observation depths on this figure take that into account. Stratigraphic interpretation to the left is based on AECOM's drilling log data.

Logged by Minnesota Geological Survey
12/17/2019
Multiparameter, caliper, and video logged.
Gamma log taken from multiparameter.

Preliminary Flowmeter Summary and Results

Well Name: MW4A
Unique Number: 847054
Date Logged: 12/17/2019

Note: This summary accompanies the video log, video log notes, gamma log, caliper log, and multitool log.

The fluid resistivity log shows a change in slope (to a flat-line reading) from about 143.0 to 146.5 ft. depth. This may be indicative of flow (either upflow or downflow) in this portion of the borehole; however, observations from the video log cannot confirm possible flow within this interval. The temperature log also does not show any sharp deflections at these depths. It is possible that these readings are extraneous due to the addition of water into the borehole while video logging and prior to logging with the multitool.

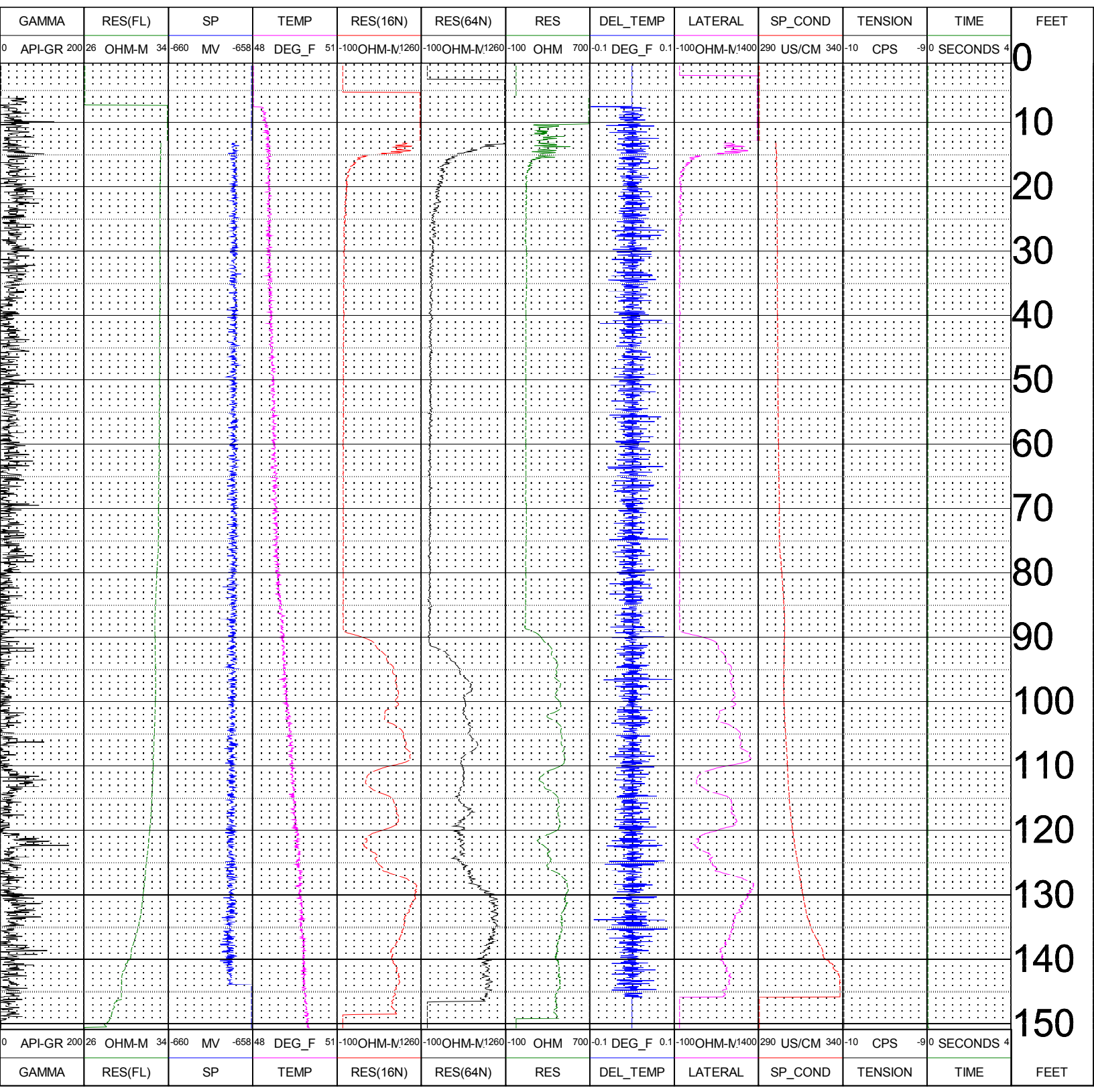
The video logging observations note a number of large cavities, horizontal fractures containing rubble/loose material, and iron staining along the borehole wall. Of note is a vertical fracture observed around 146.7 to 145.0 ft. depth with iron staining. This may be related to the possible interval of flow indicated in the fluid resistivity log. Iron staining along this fracture may indicate this fracture was or still is hydraulically active.

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847054_MULTI

NAME	: MW4A			OTHER SERVICES:	
UNIQUE NUMBER	: 847054_MULTI				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCCDAA				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21W
DATE	: 12/17/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 90'			KB	:
LOG BOTTOM	: 150.84	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.84	DRL MEASURED FROM	:	GL	: 889.1 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/17/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:59:
				THRESH	: 2500
SWL	: 1.3'				
REMARKS	: SWL FROM VIDEO				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

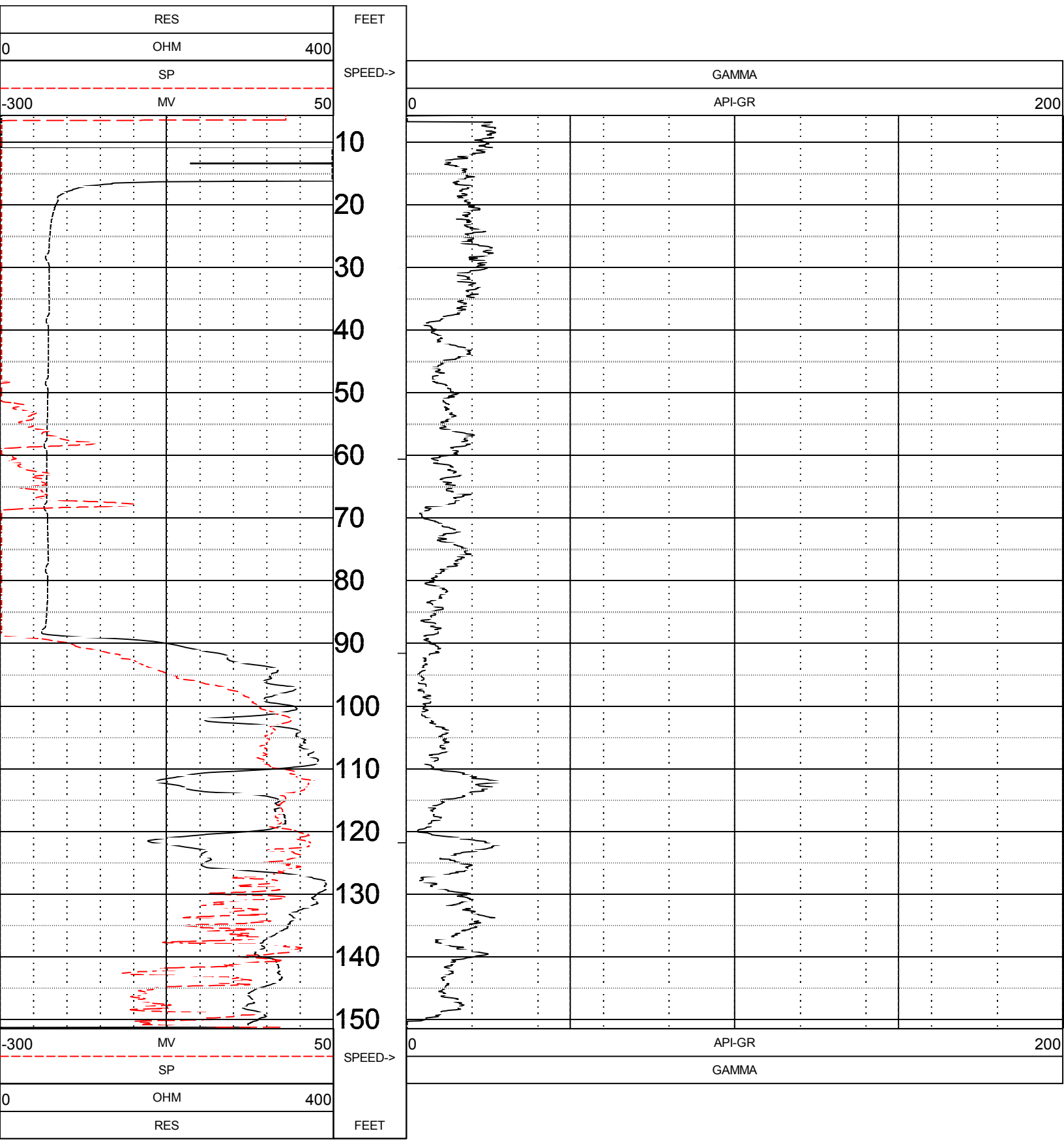


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St. Paul, MN 55114
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847054_GAMMA

NAME	: MW4A			OTHER SERVICES:	
UNIQUE NUMBER	: 847054_GAMMA				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DCCDAA				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21W
DATE	: 12/17/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 90'			KB	:
LOG BOTTOM	: 151.44	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 5.69	DRL MEASURED FROM	:	GL	: 889.1 L1
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CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
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MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/17/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:44:
				THRESH	: 2500
SWL	: 1.3'				
REMARKS	: SWL FROM VIDEO				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

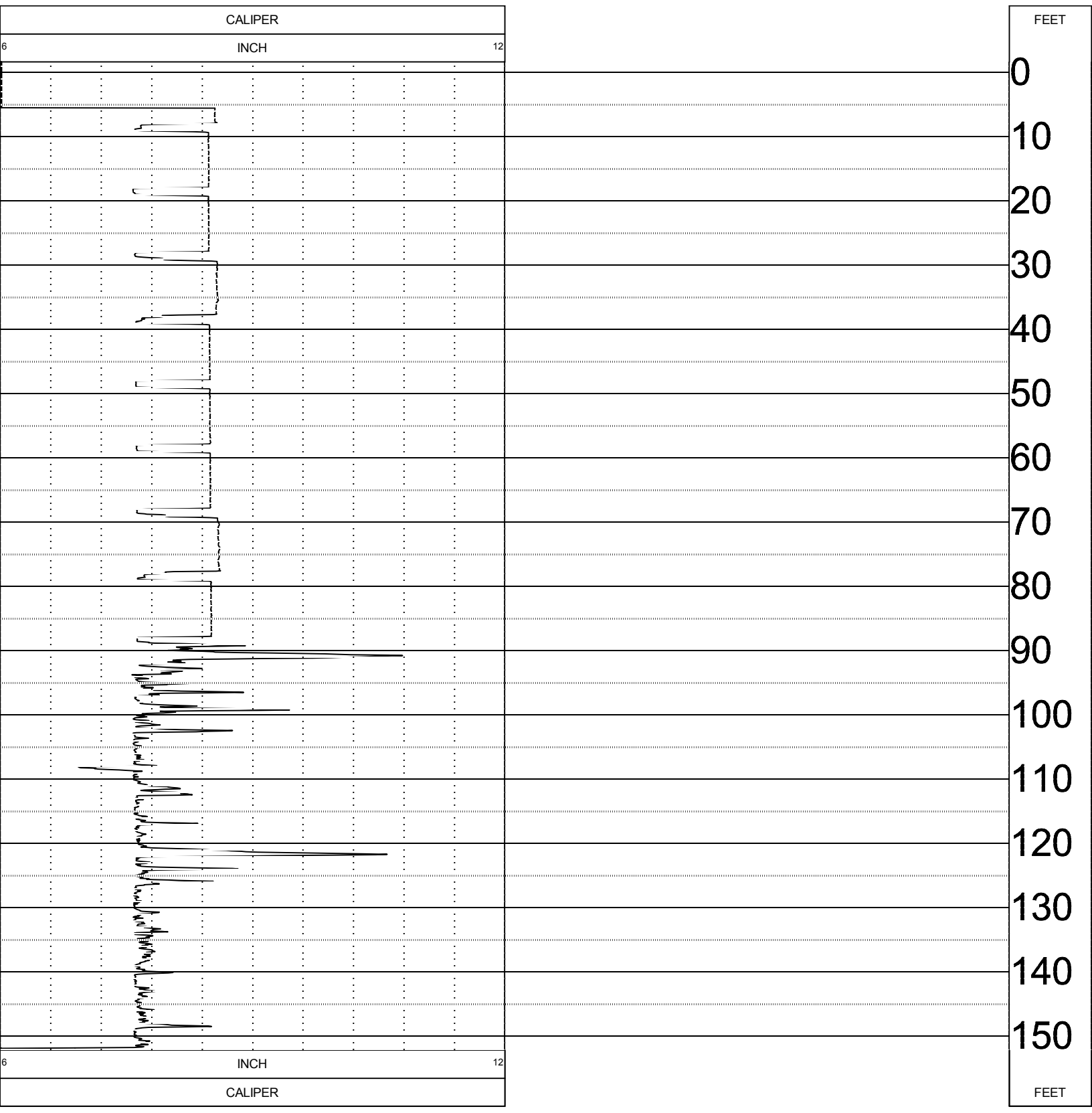


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847054_CALIPER

NAME	: MW4A			OTHER SERVICES:	
UNIQUE NUMBER	: 847054_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCCDAA				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21W
DATE	: 12/17/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 90'			KB	:
LOG BOTTOM	: 152.04	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: -1.63	DRL MEASURED FROM	:	GL	: 889.1 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/17/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:14:
				THRESH	: 2500
SWL	: 1.3'				
REMARKS	: SWL FROM VIDEO				

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Well Name: MW4A
Unique Number: 847054

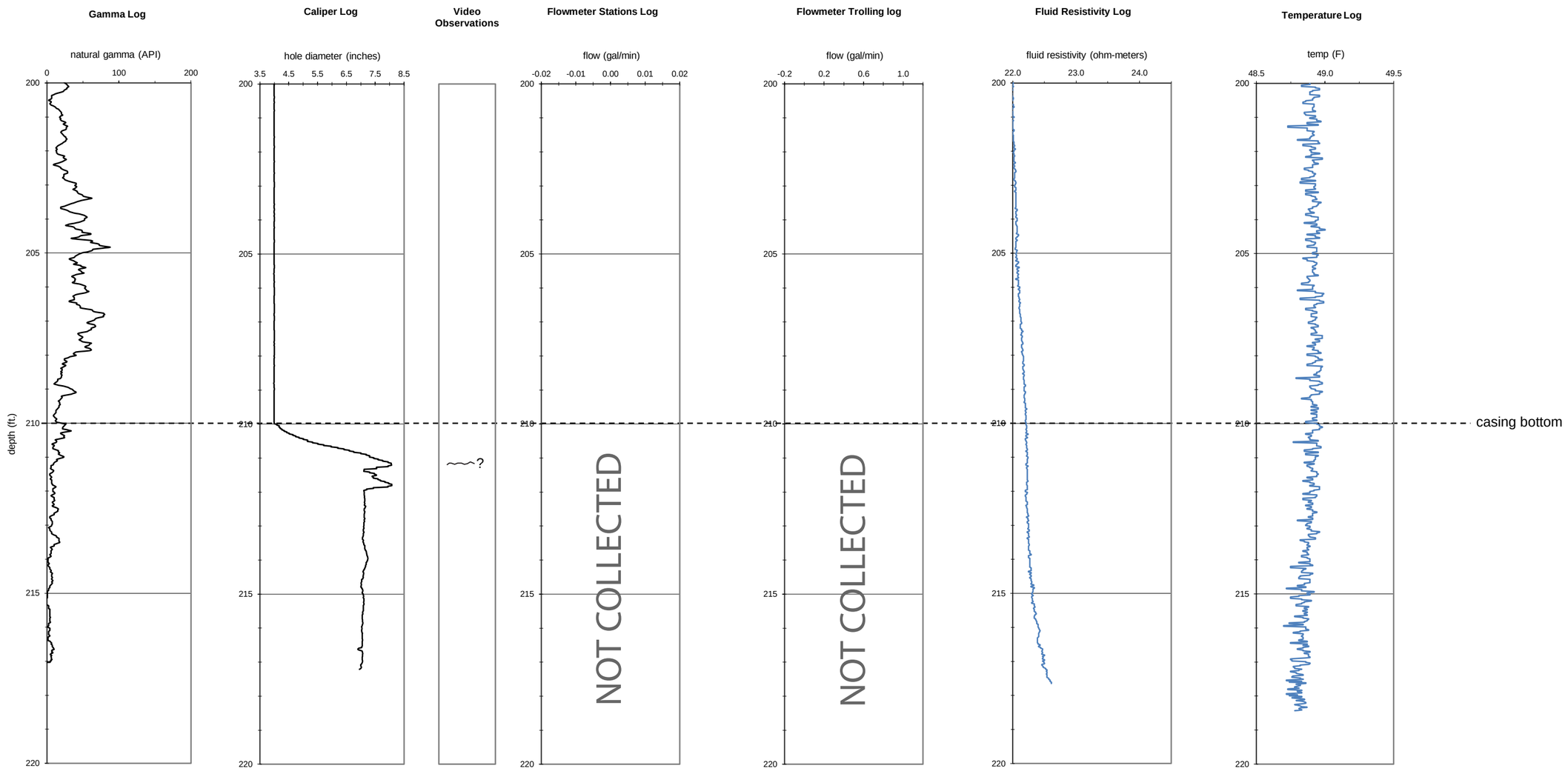
VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Cicha (MGS)
Date: 12/17/2019
Note: Zeroed in sideview.

Depth (ft.):	Camera View:	Observations:
1.3	sideview	SWL
91.0	sideview	bottom of 8" casing
153.1	downview	bottom of hole; drillers started adding water
146.7	sideview	vertical fracture with iron staining
145.0	sideview	vertical fracture (cont.) with iron staining
143.0	sideview	fracture; rubbly
142.1	sideview	vuggy
140.0	sideview	dolomitic precipitant
133.7	sideview	fracture
132.7	sideview	bedding
131.6	sideview	iron staining
129.9	sideview	fracture
129	sideview	cavern; fractures; rubbly
128.5	sideview	fracture zone
126.5	sideview	fracture zone
125.4	sideview	bedding
124.2	sideview	fractures; ledge
122.6	sideview	vertical fractures
119.4	sideview	fracture
118.2	sideview	vuggy
114.8	sideview	fracture
113.7	sideview	fracture zone; rubbly
113.4	sideview	color change; iron-stained to tan, gray
112.5	sideview	color change; tan, gray to iron-stained
110.4	sideview	rubbly, loose material
109.4	sideview	fracture
108.2	sideview	fracture
105.5	sideview	vuggy
104.7	sideview	fracture; ledge; loose material
103.5	sideview	fracture zone
102.4	sideview	fracture zone
101.3	sideview	rubbly
99	sideview	cavern
98.3	sideview	fracture zone
97.1	sideview	fracture zone
95.2	sideview	rubbly zone
93.2	sideview	rubbly zone

Depth (ft.):	Camera View:	Observations:
90.9	sideview	bottom of 8" casing

Well Name: MW5A
Unique Number: 847056
T-R-S: T29 R21 Section 23 DCABDB



Geology:
0-60 QUUU, Quaternary sediments
60-140 OPSH, Shakopee Formation
140-203 OPOD, Oneota Dolomite
203-220+ CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture
- other vugs/macropores
- multitool log

NOTE: The original caliper log depth was off by about 0.6 ft. based on bottom of casing depth (which should be 210') and has been corrected on this figure. The video log footages are off by an additional 3.0 ft. and the observations shown in this figure take this into account. All other logs are unmodified.

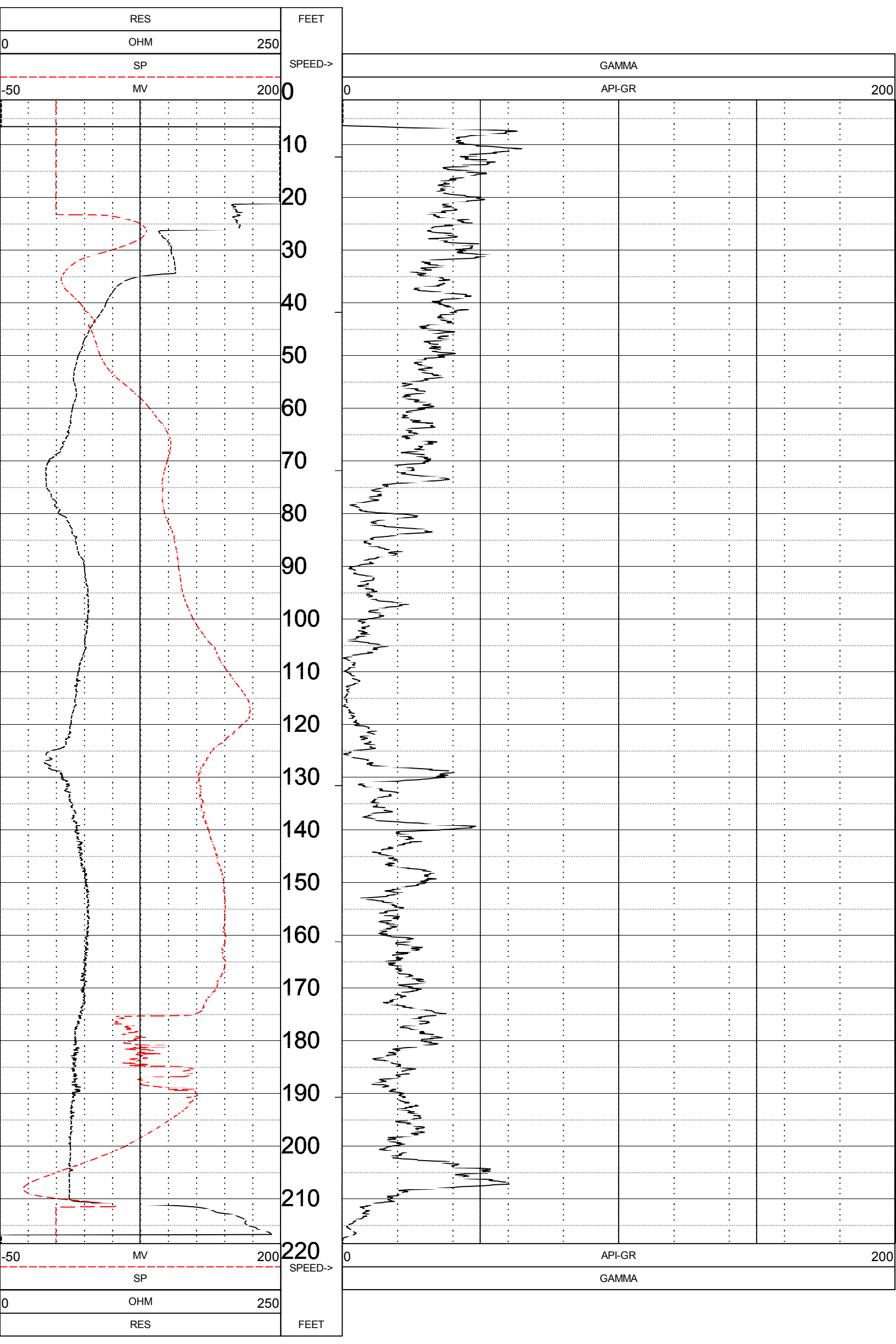
Logged by Minnesota Geological Survey
5/15/2020
Multitool, Caliper, Video

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St. Paul, MN 55114
Dept. Phone: (612)626-2969

847056_MULTIGAMMA

NAME	: MW5A			OTHER SERVICES:	
UNIQUE NUMBER	: 847056_MULTIGAMMA				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCABDB				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 210'			KB	:
LOG BOTTOM	: 218.44	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.53	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:07:
				THRESH:	2500
SWL	: 23'				
REMARKS	: PROJECT 1007				

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St. Paul, MN 55114
Dept. Phone: (612)626-2969

847056_CALIPER

NAME	: MW5A			OTHER SERVICES:	
UNIQUE NUMBER	: 847056_CALIPER				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCABDB				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 210'			KB	:
LOG BOTTOM	: 217.94	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.69	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:28:
				THRESH	: 2500
SWL	: 23'				
REMARKS	: PROJECT 1007				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW5A
Unique Number: 847056

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 5/15/2020
Note: Zeroed in sideview. Video log footages appear to be off by ~3.0' based on casing bottom depth.
BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
19.9	sideview	SWL
213.0	sideview	Bottom of casing
214.4	sideview	Steady downflow; probably tool-induced
215.8	sideview	Block of sandstone fell; loose material
219.8	sideview	Bottom of hole; murky from falling material

Preliminary Flowmeter Summary and Results

Well Name: MW5A
Unique Number: 847056
Date Logged: 5/15/2020

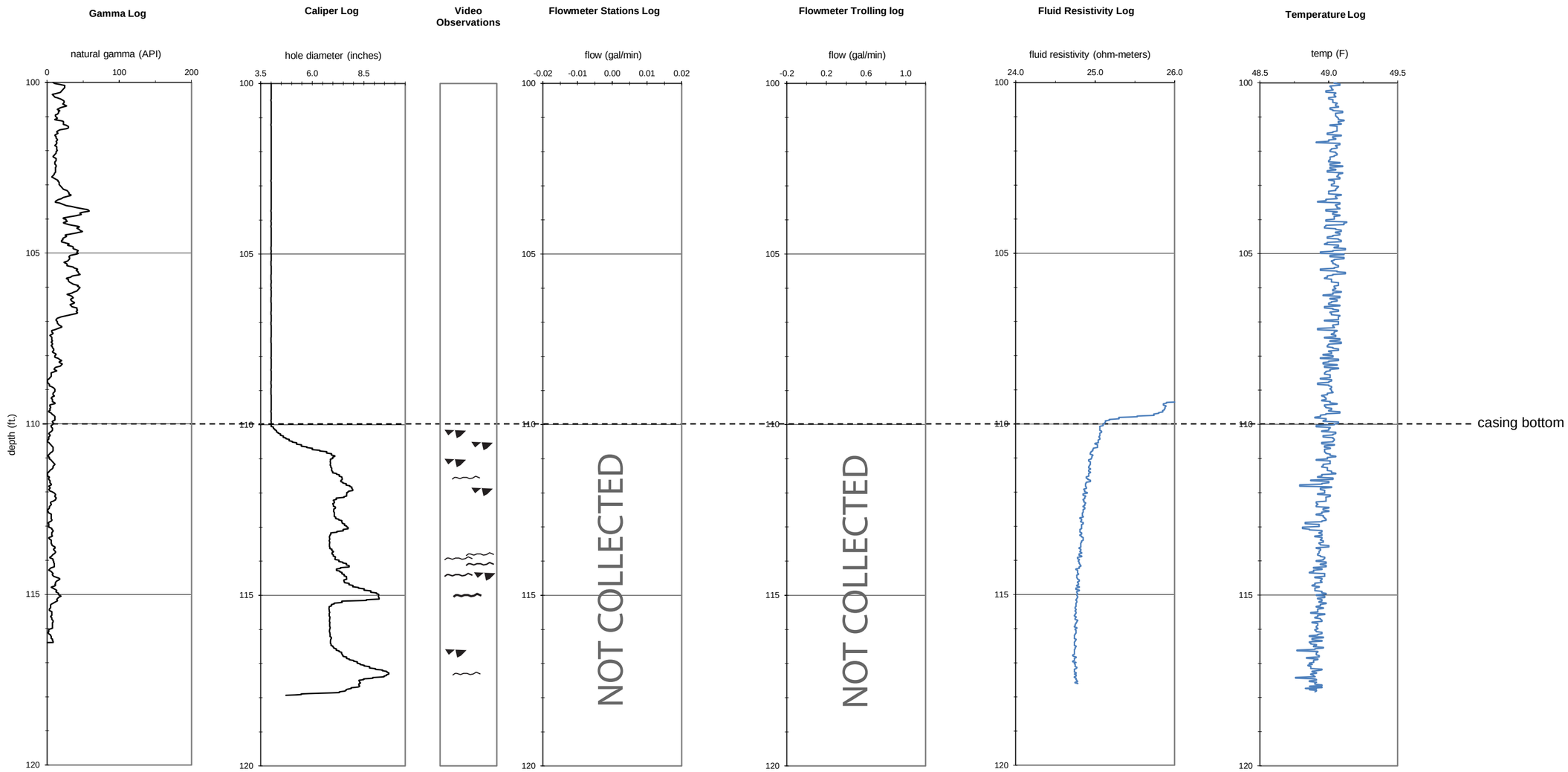
Note: This summary accompanies the flowmeter results figure. Also, please note that the footages in the accompanying video log are off by an additional 3.0 feet based on the actual depth to bottom of casing (210 feet). Video observations shown on the results figure take this into account.

The video and caliper logs indicate a fairly smooth Jordan Sandstone open borehole, with the exception of some larger void spaces at depths of about 211.0’ and 211.7’. There may be a very thin bedding plane fracture at the larger void space at 211.0’ depth. Some portions of the borehole appear to be weakly-cemented, indicated by loose Jordan Sandstone material falling during the video log. There were no obvious signs of flow in or out of the open borehole noted in the video logged under ambient conditions. Particles in the video appear to be slowly settling due to gravity after being dislodged/disrupted by the video logging tool.

The fluid resistivity and temperature logs show a steady gradient/slope across the open borehole interval, indicating there are no discrete intervals where water enters or exits.

With these data mind, there are no obvious signs of flow in or out of the open borehole under ambient conditions.

Well Name: MW5B
Unique Number: 847057
T-R-S: T29 R21 Section 23 DCABDB



Geology:
0-58 QUUU, Quaternary sediments
58-120+ OPSH, Shakopee Formation

KEY:
- subvertical fracture
- bedding plane fracture
- other vugs/macropores
- multitool log

NOTE: The video log footages are off by an additional 1.3 ft. and the observations shown on this figure take this into account. All other logs are unmodified.

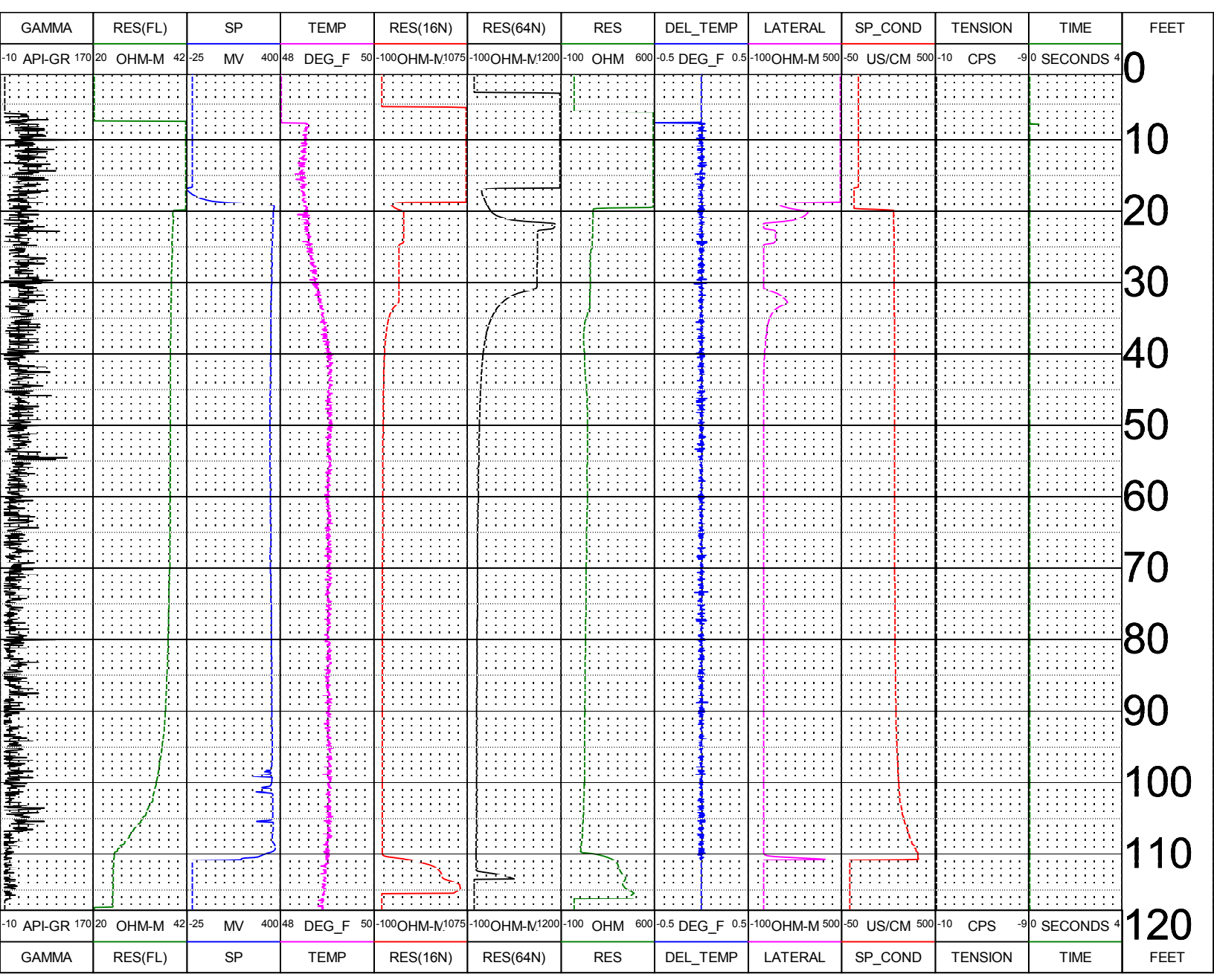
Logged by Minnesota Geological Survey
5/15/2020
Multitool, Caliper, Video

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847057_MULTI

NAME	: MW5B			OTHER SERVICES:	
UNIQUE NUMBER	: 847057_MULTI				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCABDB				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 117.83	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.91	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 15:19:
				THRESH	: 2500
SWL	: 19'				
REMARKS	: PROJECT 1007				

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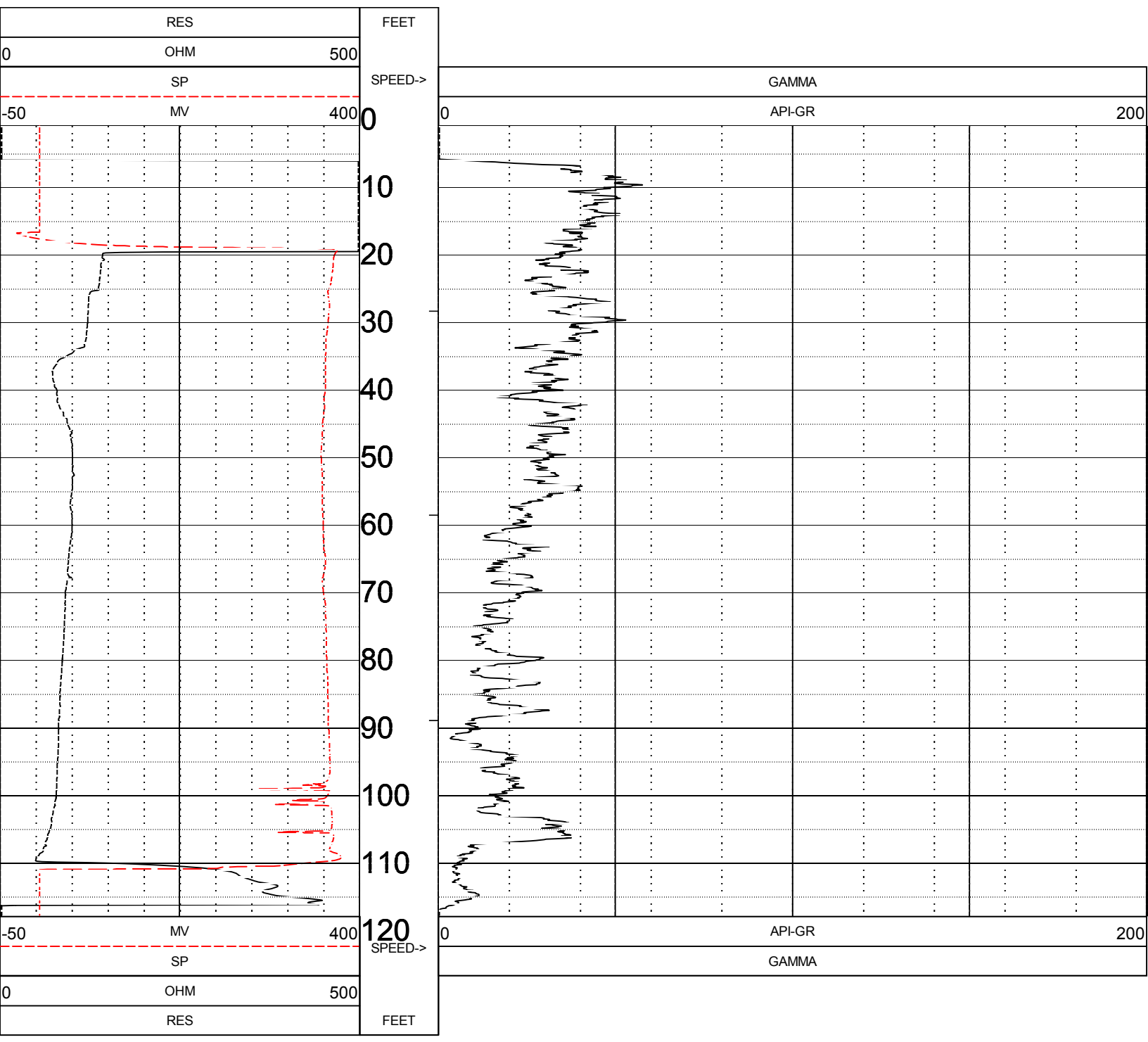


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847057_MULTIGAMMA

NAME	: MW5B			OTHER SERVICES:	
UNIQUE NUMBER	: 847057_MULTIGAMMA				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCABDB				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 117.83	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.91	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 15:19:
				THRESH:	2500
SWL	: 19'				
REMARKS	: PROJECT 1007				

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847057_CALIPER

NAME	: MW5B			OTHER SERVICES:	
UNIQUE NUMBER	: 847057_CALIPER				
QUADRANGLE	: 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	DCABDB				
SECTION	: 23	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/15/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 110'			KB	:
LOG BOTTOM	: 117.93	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.05	DRL MEASURED FROM	:	GL	: 909 L1
CASING DIAMETER	: 4"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/15/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 15:02:
				THRESH:	2500
SWL	: 19'				
REMARKS	: PROJECT 1007				

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Well Name: MW5B
Unique Number: 847057

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 5/15/2020
Note: Zeroed in sideview. Video log footages appear to be off by ~1.3' based on casing bottom depth.
BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
19.5	sideview	SWL
111.3	sideview	Bottom of casing
111.5	sideview	Vuggy
112.9	sideview	BPF and rubbly zone
114.2	sideview	Rubbly zone
115.1	sideview	Thin, rubbly BPF zone
115.4	sideview	Thin, rubbly BPF zone
115.7	sideview	Larger rubbly BPF zone
116.4	sideview	Ledgy, rubbly BPF zone
118.0	sideview	Thin, rubbly BPF zone
119.0	sideview	Bottom of hole

Preliminary Flowmeter Summary and Results

Well Name: MW5B
Unique Number: 847057
Date Logged: 5/15/2020

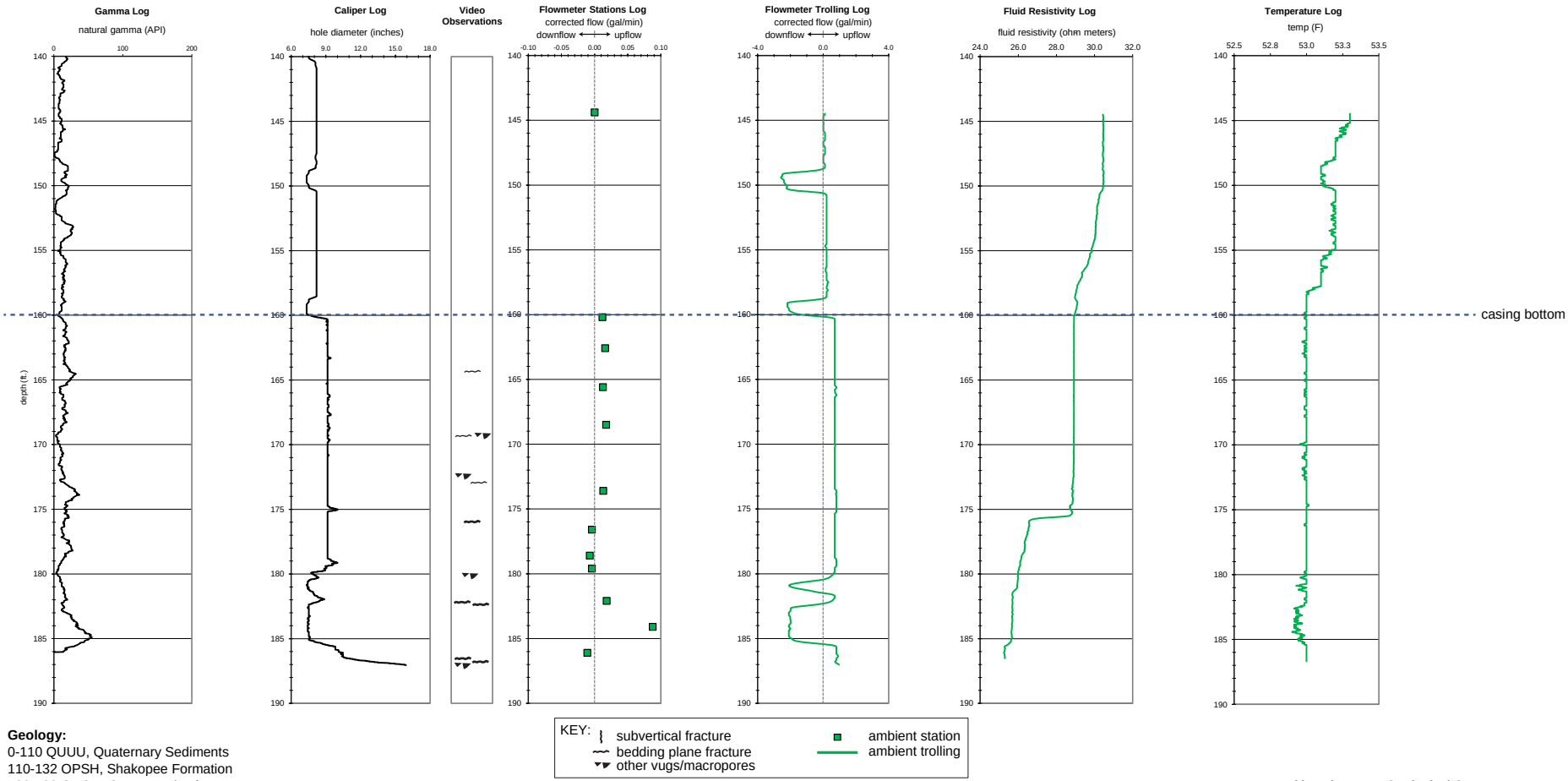
Note: This summary accompanies the flowmeter results figure. Also, please note that the footages in the accompanying video log are off by an additional 1.3 feet based on the actual depth to bottom of casing (110 feet). Video observations shown on the results figure take this into account.

The video and caliper logs indicate a very vuggy and rubbly Shakopee Formation open borehole with several notable bedding plane fractures at depths of about 111.6', 114.0', 114.5', 115.0', and 117.3'. There were no obvious signs of flow in or out of the open borehole noted in the video logged under ambient conditions. Particles in the video appear to be slowly settling due to gravity after being dislodged/disrupted by the video logging tool.

The fluid resistivity and temperature logs show a steady gradient/slope across the open borehole interval, indicating there are no discrete intervals where water enters or exits

With these data mind, there are no obvious signs of flow in or out of the open borehole under ambient conditions.

Well Name: MW6A
Unique Number: 847058
T-R-S: T29 R21 Section 25



Geology:
0-110 QUUU, Quaternary Sediments
110-132 OPSH, Shakopee Formation
132-182 OPOD, Oneota Dolomite
182-187 CJDN, Jordan Sandstone

NOTE: The gamma log depths may be off, as it suggests the top of the Jordan may be at 186 ft. The pick of 182 ft. is used here based on core and drillers descriptions. The depths of all other logs appear to be correct and in agreement with each other. Also note that the flow values reported and graphed have been corrected to compensate for logging speed and average values measured within the casing (assumed to be no flow).

Logged by Minnesota Geological Survey
11/15/2019
Gamma, Caliper, Ambient Flowmeter
Video by Traut; observed by MGS

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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

847058

NAME	: MW6A			OTHER SERVICES:	
UNIQUE NUMBER	: 847058				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCDDD				
SECTION	: 25	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/15/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 160			KB	:
LOG BOTTOM	: 187.42	LOG MEASURED FROM:		DF	:
LOG TOP	: 5.85	DRL MEASURED FROM	:	GL	: 889L1
CASING DIAMETER	: 6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/15/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:41:
				THRESH	: 2500
SWL	:				
REMARKS	:				

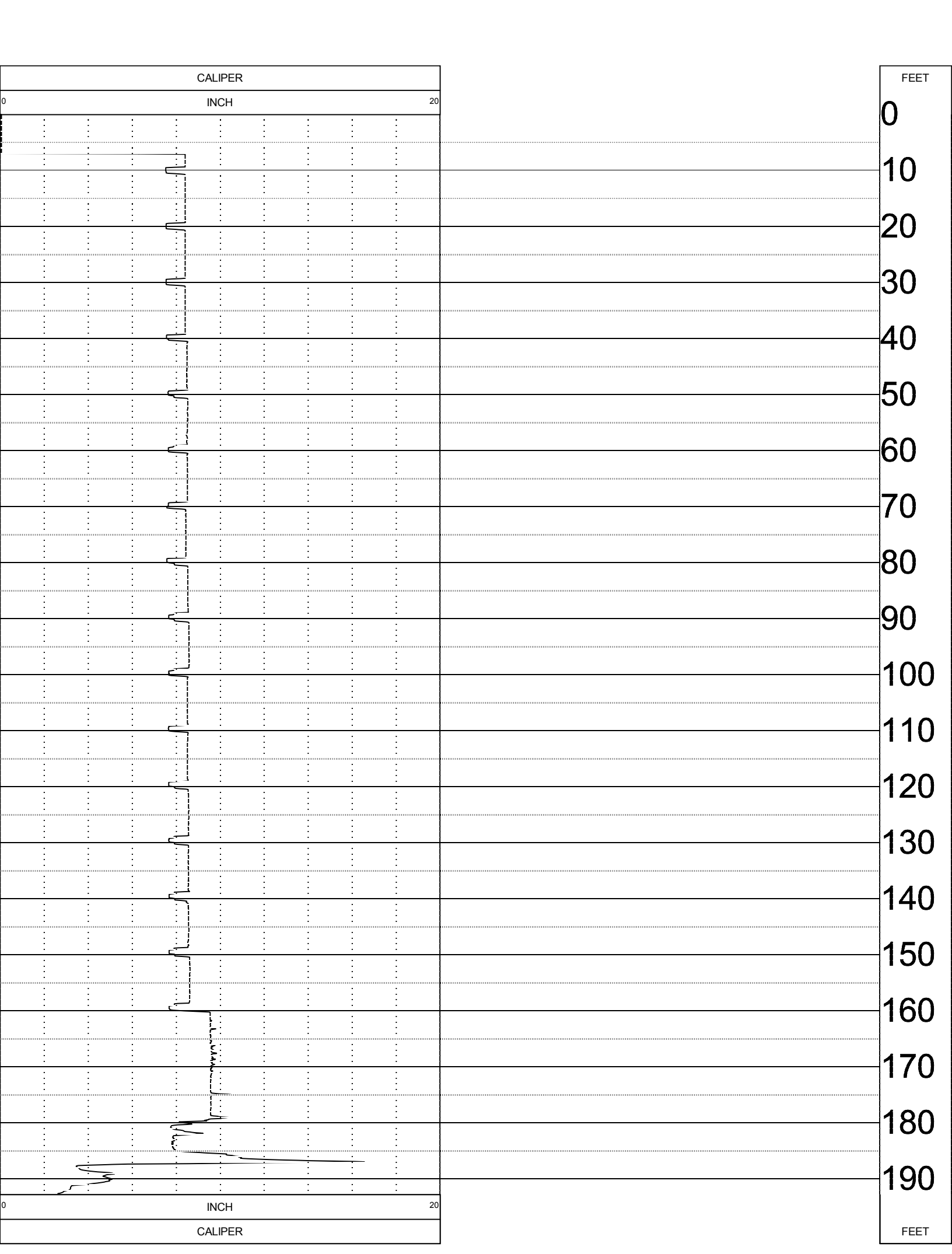
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St. Paul, MN 55114
Dept. Phone: (612)626-2969

847058-CALIPER

NAME	: MW6A			OTHER SERVICES:	
UNIQUE NUMBER	: 847058-CALIPER				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCDDD				
SECTION	: 29	TOWNSHIP	: 25	RANGE	: 21
DATE	: 11/15/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 160			KB	:
LOG BOTTOM	: 192.75	LOG MEASURED FROM:		DF	:
LOG TOP	: 0.07	DRL MEASURED FROM	:	GL	: 889L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/15/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:06:
				THRESH	: 2500
SWL	: 8				
REMARKS	:				

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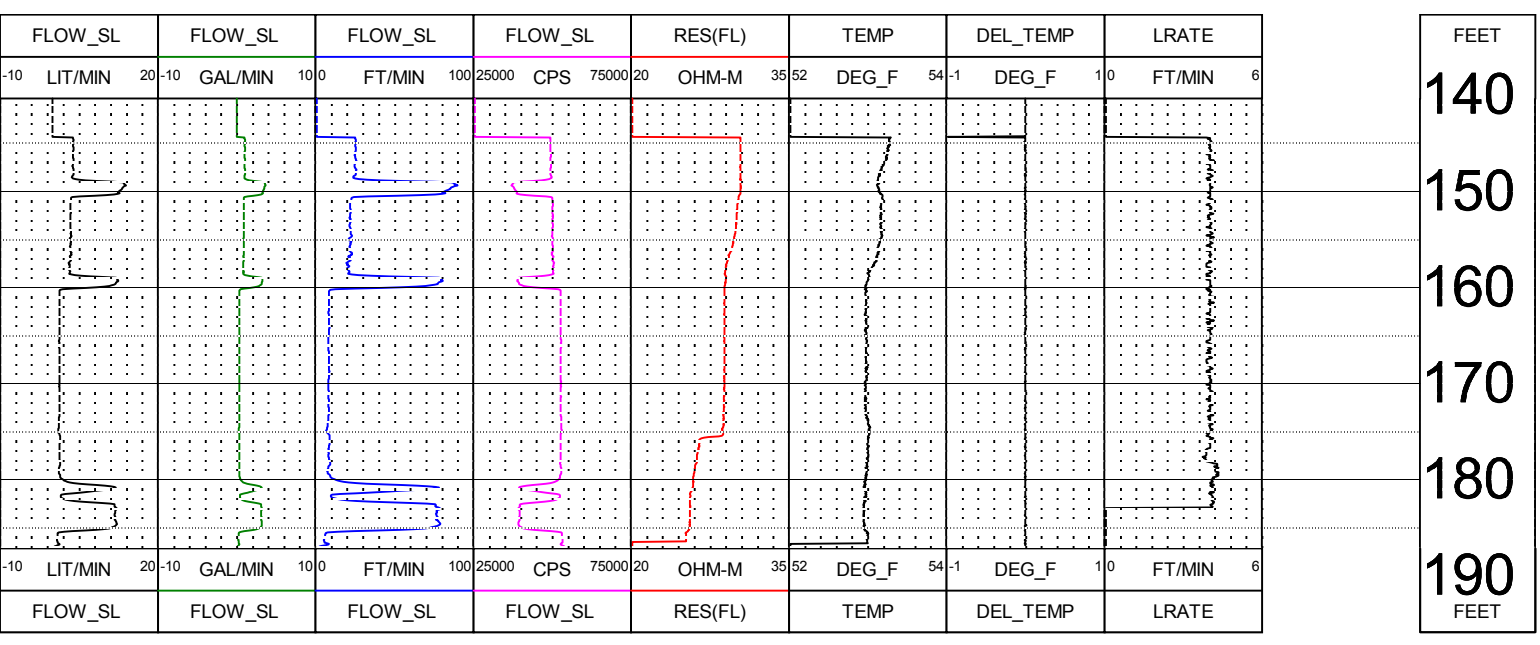


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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

847058_AMBTROLL

NAME	: MW6A			OTHER SERVICES:	
UNIQUE NUMBER	: 847058_AMBTROLL				
QUADRANGLE	: 102B-LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: BBCDDD				
SECTION	: 25	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/15/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 160			KB	:
LOG BOTTOM	: 187.08	LOG MEASURED FROM	:	DF	:
LOG TOP	: 140.34	DRL MEASURED FROM	:	GL	: 889 L1
CASING DIAMETER	: 6	LOG RATE	: 4 FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/15/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:47:
				THRESH	: 2500
SWL	: 8				
REMARKS	:				

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Well Name: MW6A
Unique Number: 847058

VIDEO LOG OBSERVATIONS

Logged By: Traut; Observations by Retzler (MGS)
Date: 11/14/2019
Note: Traut camera was zeroed in sideview.

Depth (ft.):	Camera View:	Observations:
164.4	sideview	thin bedding plane fracture (BPF); vuggy; microbial; Hager City
169.4	sideview	thin BPFs and vugs
172.5	sideview	very vuggy
172.9	sideview	thin BPF
176	sideview	large BPF; turbulent; possible flow?
180.1	sideview	large vuggy zone; looks like Coon Valley
182.2	sideview	blocky, fractured zone; possible outflow?
182.5	sideview	BPF; possible outflow?
182.9	sideview	suspended particles flowing upwards
183.1	sideview	borehole opens up
186.7	sideview	BPF and cavern area
187.1	sideview	cavern area
187.6	sideview	cavern area; bottom of hole

Well Name: MW6A
Unique Number: 847058

FLOW LOG STATION MEASUREMENTS

Logged By: Mayer (MGS) and Steenberg (MGS)
Date: 11/15/2019
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Corrected flow values are calculated using values measured in the casing (assumed to be zero).

Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
144.4	-0.2528	0.0000	casing
160.2	-0.2166	0.0453	casing
162.6	-0.2041	0.0609	steady
165.6	-0.2149	0.0474	steady
168.5	-0.2001	0.0659	steady
173.6	-0.2131	0.0496	steady
176.6	-0.2648	-0.0150	steady
178.6	-0.2748	-0.0275	
179.6	-0.265	-0.0153	
182.1	-0.1977	0.0689	steady
184.1	0.0131	0.3324	
186.1	-0.2859	-0.0414	cavern

Preliminary Flowmeter Summary and Results

Well Name: MW6A
Unique Number: 847058
Date Logged: 11/15/2019

Note: This summary accompanies the flowmeter results illustration.

The fluid resistivity log shows a sharp deflection between about 175-176 ft. depth. This likely indicates a contact between two chemically-distinct sources of water. Furthermore, we observed possible turbulent flow at about 176 ft. in the video, but these observations are inconclusive due to water being injected into the borehole during video logging. Nevertheless, two equally-plausible scenarios of flow originating from 175-176 ft. are possible given this fluid resistivity deflection, the video observation, and the other collected data:

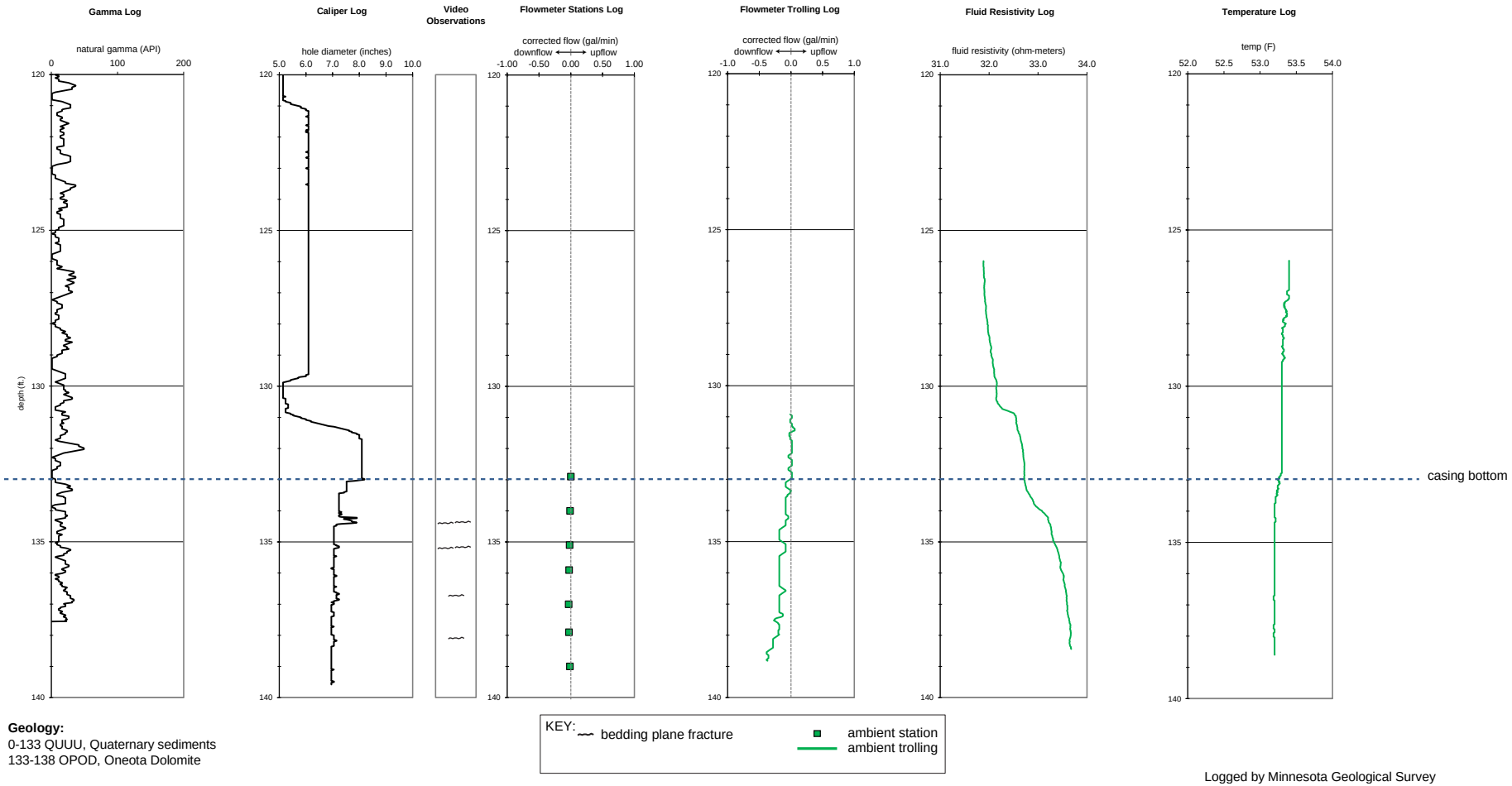
The first scenario is very minor upflow in the Oneota of about 0.013 gal/min (as indicated by the corrected station measurements) originating at about 175-176 ft. depth and exiting near casing bottom. It is important to also note that the fluid resistivity readings within this interval (~160-175.5 ft.) are very flat and consistent, which is often indicative of one chemically-distinct water source throughout that interval and lends support to this interpretation.

The second possible scenario is very minor downflow in the Oneota of about -0.004 gal/min (as indicated by the corrected station measurements) originating at about 175-176 ft. depth and exiting at about 182 ft. The fluid resistivity values along this stretch are more varied, showing a steady decrease in resistance downward.

Please note that the corrected station measurements for both of the above scenarios (from 160 to 180 ft.) are very low and within the range of possible error given the true borehole diameter (9”), the diameter of the skirt used (8”), and the precision of the flowmeter tool.

Lastly, corrected station measurements also indicate very minor upflow in the Jordan of about 0.088 gal/min measured at about 184 ft. depth and exiting at about 182 ft. Upflow at this rate is also likely occurring below 184 ft. and to the bottom of the hole, but could not be accurately measured due to a poor seal around the flowmeter skirt in this larger, more cavernous part of the borehole. This upflow and exit point interpretation is also supported by the observations made during video logging.

Well Name: MW6B
Unique Number: 847059
T-R-S: T29 R21W Section 25



Geology:
0-133 QUUU, Quaternary sediments
133-138 OPOD, Oneota Dolomite

Logged by Minnesota Geological Survey
11/21/2019
Gamma, Caliper, Ambient Flowmeter, and Video

NOTE: The caliper, stations, trolling, fluid resistivity, and temperature log depths have been adjusted downwards 1.8 feet to match the bottom of 8" casing value reported by the driller and measured on the gamma log of 133 feet. The video log observation depths have also been corrected to better match with the caliper results. Also note, the flow values reported and graphed have been corrected to compensate for logging speed and average values measured within the casing (assumed to be no flow).

Well Name: MW6B
Unique Number: 847059

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Cicha (MGS)
Date: 11/21/2019
Note: Zeroed in sideview.

Depth (ft.):	Camera View:	Observations:
9.6	sideview	SWL
135.8	sideview	bottom of 8"
141.2	downview	bottom of hole
139.9	sideview	fracture; turbulent flow?
138.3	sideview	fracture
137.2	sideview	fracture zone
136.6	sideview	fracture zone
135.7	sideview	bottom of 8"

Well Name: MW6B
Unique Number: 847059

FLOW LOG STATION MEASUREMENTS

Logged By: Retzler (MGS) and Cicha (MGS)
Date: 11/21/2019
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Corrected flow values are calculated using values measured in the casing (assumed to be zero).

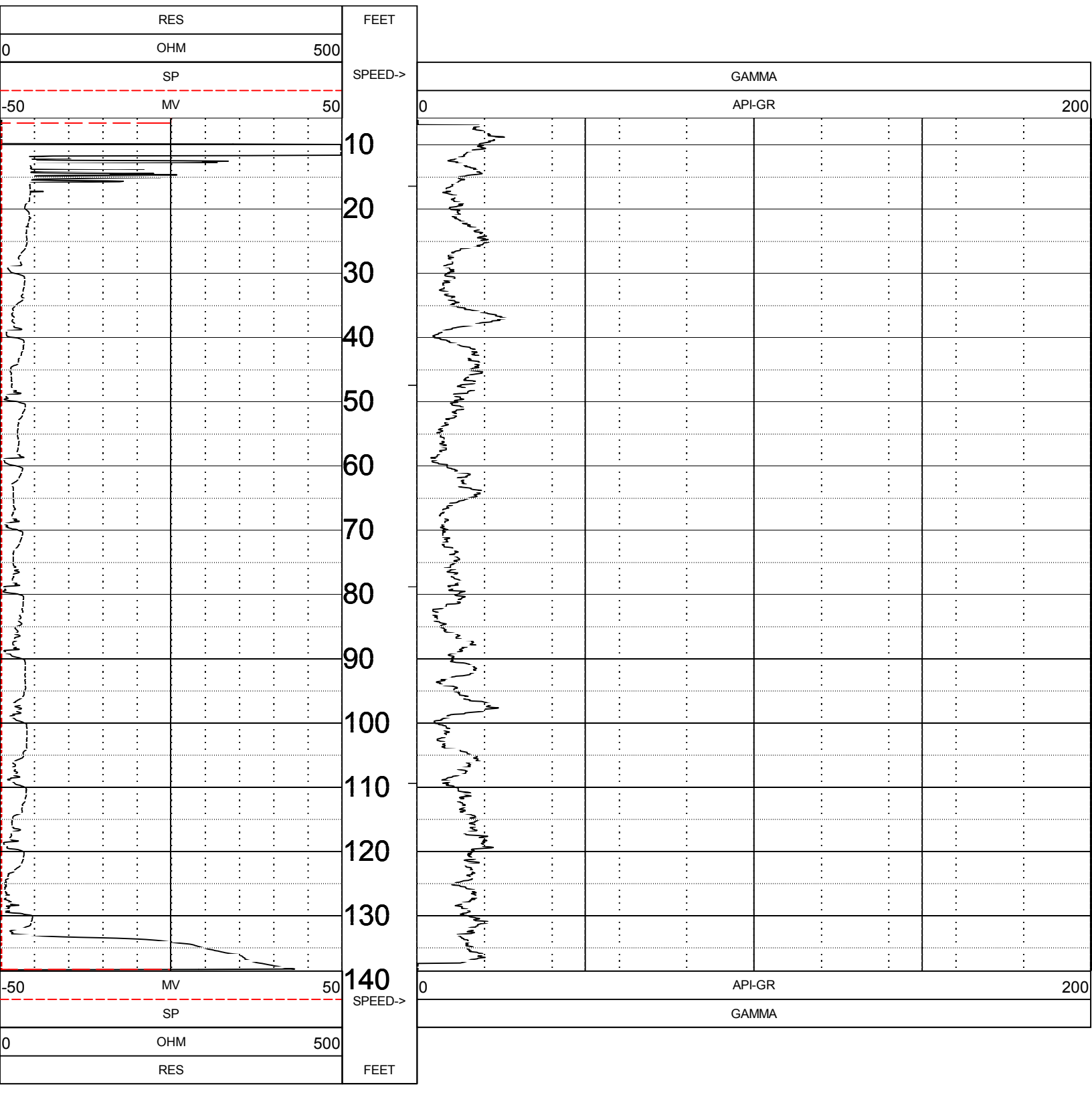
Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
137.2	-0.3057	-0.0149	steady
136.1	-0.3475	-0.0287	steady
135.2	-0.3591	-0.0326	steady
134.1	-0.3380	-0.0256	steady
133.1	-0.3144	-0.0178	steady
132.2	-0.2982	-0.0124	steady
131.1	-0.2605	0.0000	casing; steady

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847059

NAME	: MW6B			OTHER SERVICES:	
UNIQUE NUMBER	: 847059				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCDDD				
SECTION	: 25	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/21/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 133			KB	:
LOG BOTTOM	: 138.56	LOG MEASURED FROM:		DF	:
LOG TOP	: 5.91	DRL MEASURED FROM:		GL	: 889L1
CASING DIAMETER	: 6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	11/21/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	09:38:
				THRESH:	2500
SWL	: 9.6				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

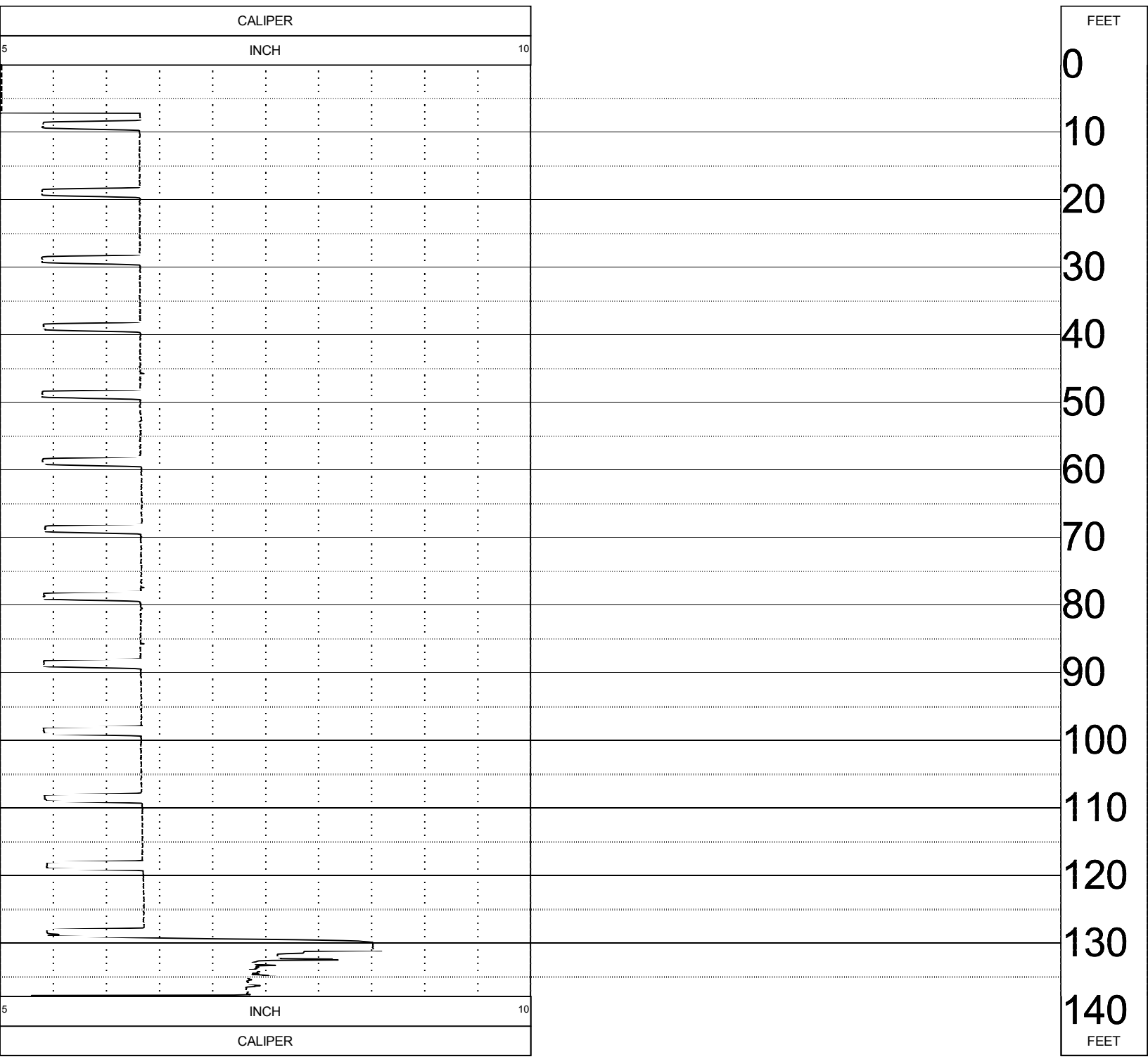


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St. Paul, MN 55114
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847059_CALIPER

NAME	: MW6B			OTHER SERVICES:	
UNIQUE NUMBER	: 847059_CALIPER				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCDDD				
SECTION	: 25	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/21/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 133			KB	:
LOG BOTTOM	: 137.83	LOG MEASURED FROM:		DF	:
LOG TOP	: 0.08	DRL MEASURED FROM	:	GL	: 889L1
CASING DIAMETER	: 8X6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/21/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:54:
				THRESH	: 2500
SWL	: 9.6				
REMARKS	:				

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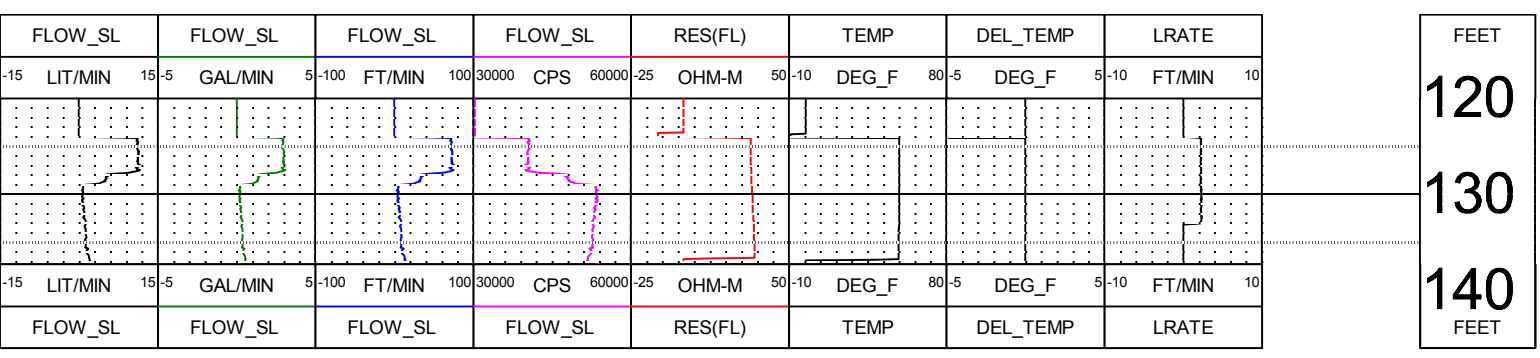


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847059_AMBTROLL

NAME	: MW6B			OTHER SERVICES:	
UNIQUE NUMBER	: 847059_AMBTROLL				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCDDD				
SECTION	: 25	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/21/19	MGS CUTTINGS #	:		
CASING BOTTOM	: 133			KB	:
LOG BOTTOM	: 137.19	LOG MEASURED FROM:		DF	:
LOG TOP	: 120.02	DRL MEASURED FROM	:	GL	: 889L1
CASING DIAMETER	: 8X6	LOG RATE	: 4FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/21/19
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:18:
				THRESH	: 2500
SWL	: 9.8				
REMARKS	:				

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Preliminary Flowmeter Summary and Results

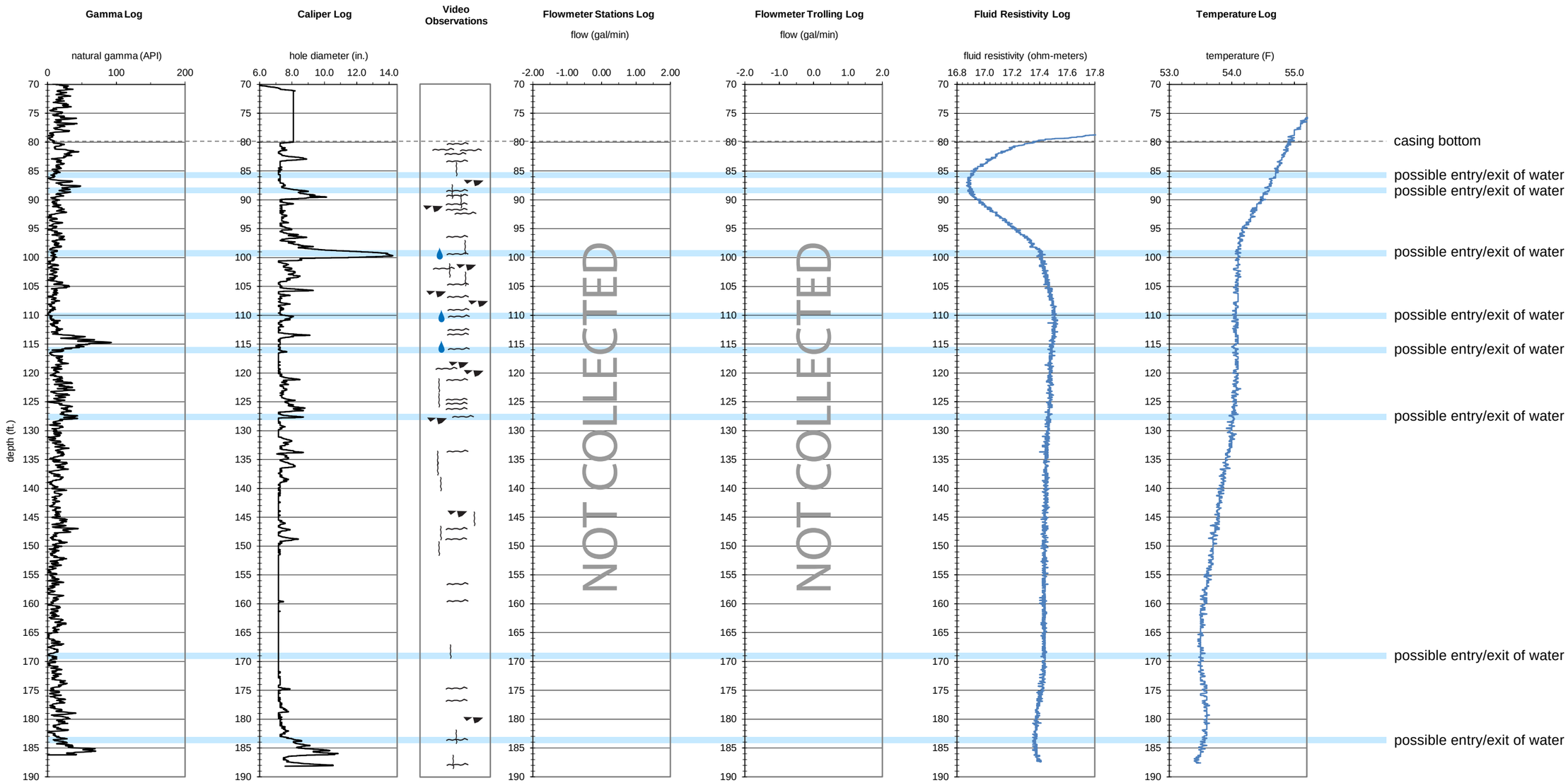
Well Name: MW6B
Unique Number: 847059
Date Logged: 11/21/2019

Note: This summary accompanies the flowmeter results illustration.

A slight deflection in the flowmeter stations and trolling logs, as well as in the fluid resistivity and temperature logs suggests very minor downflow in the Oneota of about -0.030 gal/min (as indicated by the corrected station measurements) originating from a fracture at about 134.2-134.5 ft. depth. This minor downflow appears to exit the borehole at a fracture around 138.2 ft. depth, as supported by the corrected flowmeter station measurements and video observations indicating turbulent flow and possible outflow of suspended particles. Note that the depths recorded in the video have been corrected to better correlate with depths reported by the driller and the other corrected logs. The depth of this observation in the raw video occurs at 139.9 ft.

Please also note that the corrected station measurements are very low and within the range of possible error given the precision of the flowmeter tool.

Well Name: MW7A
Unique Number: 848622
T-R-S: T29 R20 Section 30 CBDADD



Geology:
0-77 QUUU, Quaternary sediments
77-133 OPSH, Shakopee Formation
133-183 OOHC, Oneota Dolomite-Hager City
183-197 OOCV, Oneota Dolomite-Coon Valley
197-220 CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Caliper log depth was adjusted by 1.5' based on reported depth to casing of 80'. The video log observations have also been adjusted by 0.2' based on reported casing depth. All other logs are plotted as is. Stratigraphic interpretations to the left are based on AECOM's drilling log records.

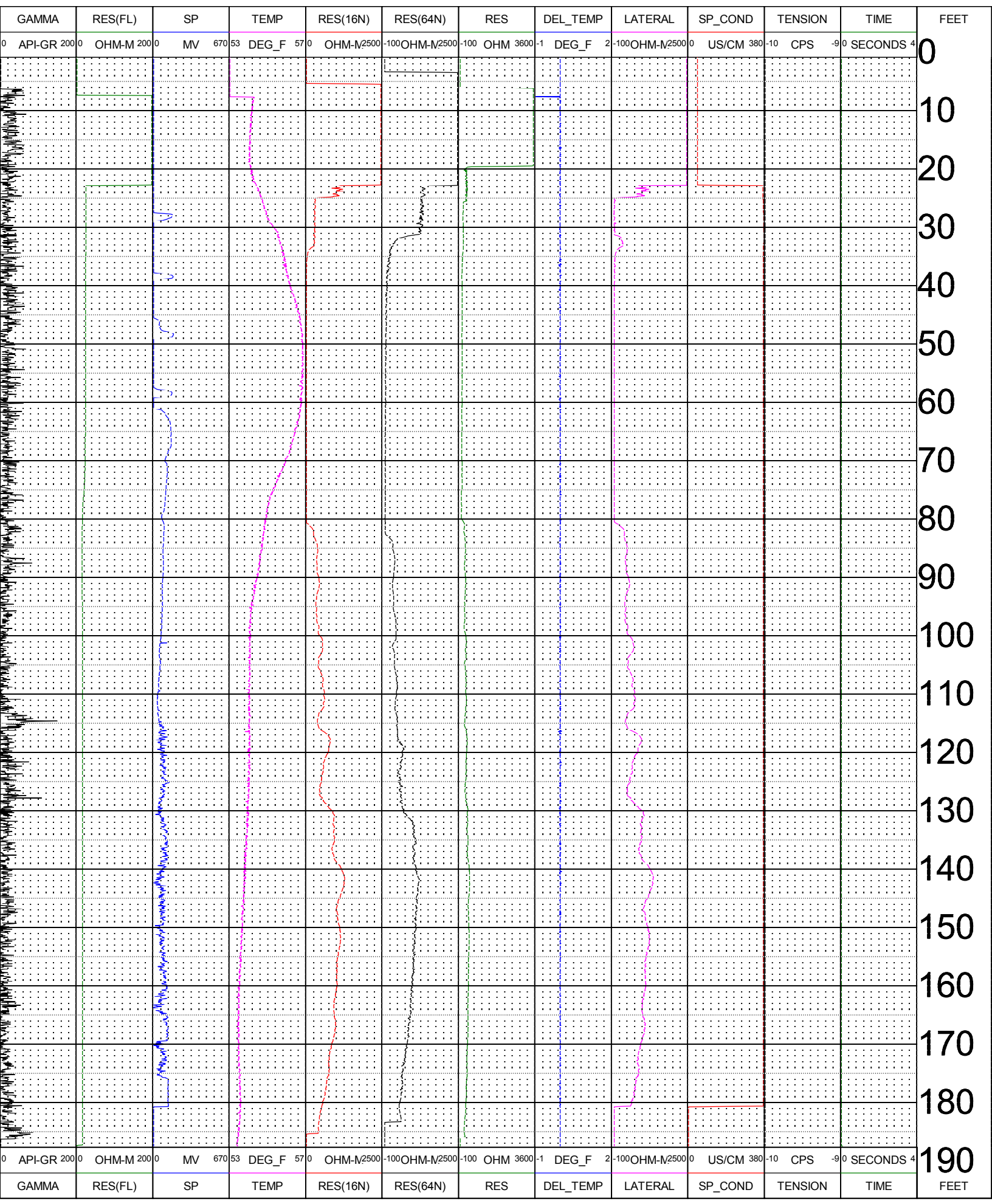
Logged by Minnesota Geological Survey
5/29/2020
Multitool, Caliper, & Video logs collected

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848622_MULTI

NAME	: 848622_MULTI			OTHER SERVICES:	
UNIQUE NUMBER	: 848622_MULTI				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CBDADD				
SECTION	: 30	TOWNSHIP	: 29	RANGE	:
DATE	: 05/29/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 187.60	LOG MEASURED FROM:		DF	:
LOG TOP	: 0.93	DRL MEASURED FROM:		GL	: 889 L1
CASING DIAMETER	: 8X6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	05/29/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	10:22:
				THRESH:	2500
SWL	: 19				
REMARKS	:				

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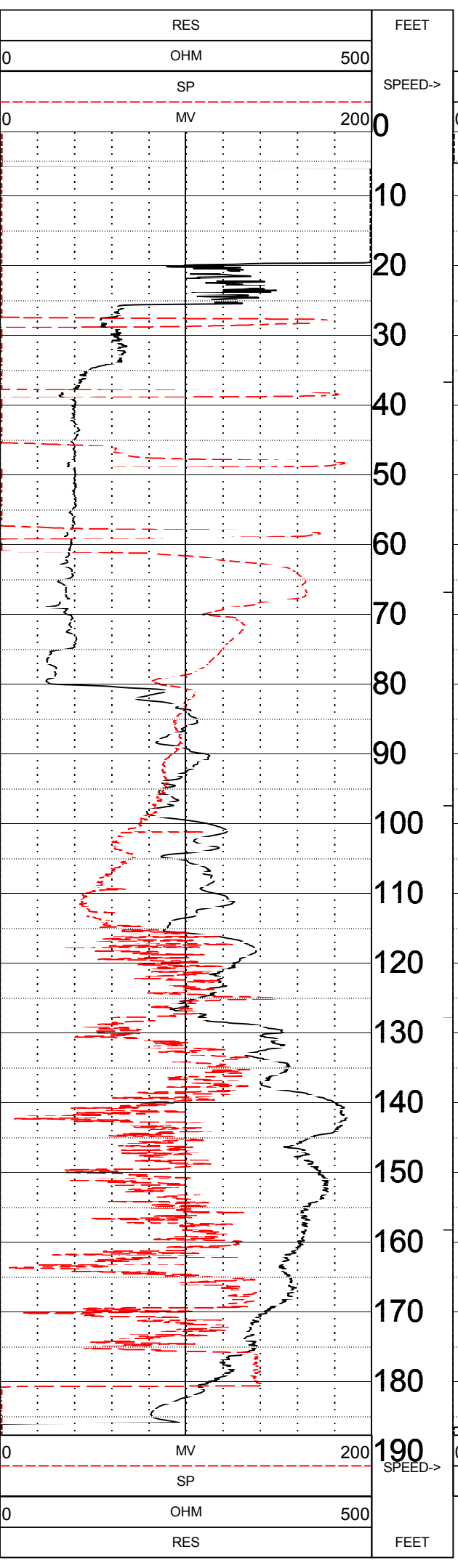


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848622

NAME	: 848622 - MULTIGAMMA			OTHER SERVICES:	
UNIQUE NUMBER	: 848622				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CBDADD				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 20
DATE	: 05/29/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 187.60	LOG MEASURED FROM	:	DF	:
LOG TOP	: 0.93	DRL MEASURED FROM	:	GL	: 889 L1
CASING DIAMETER	: 8X6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/29/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:22:
				THRESH	: 2500
SWL	: 19				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

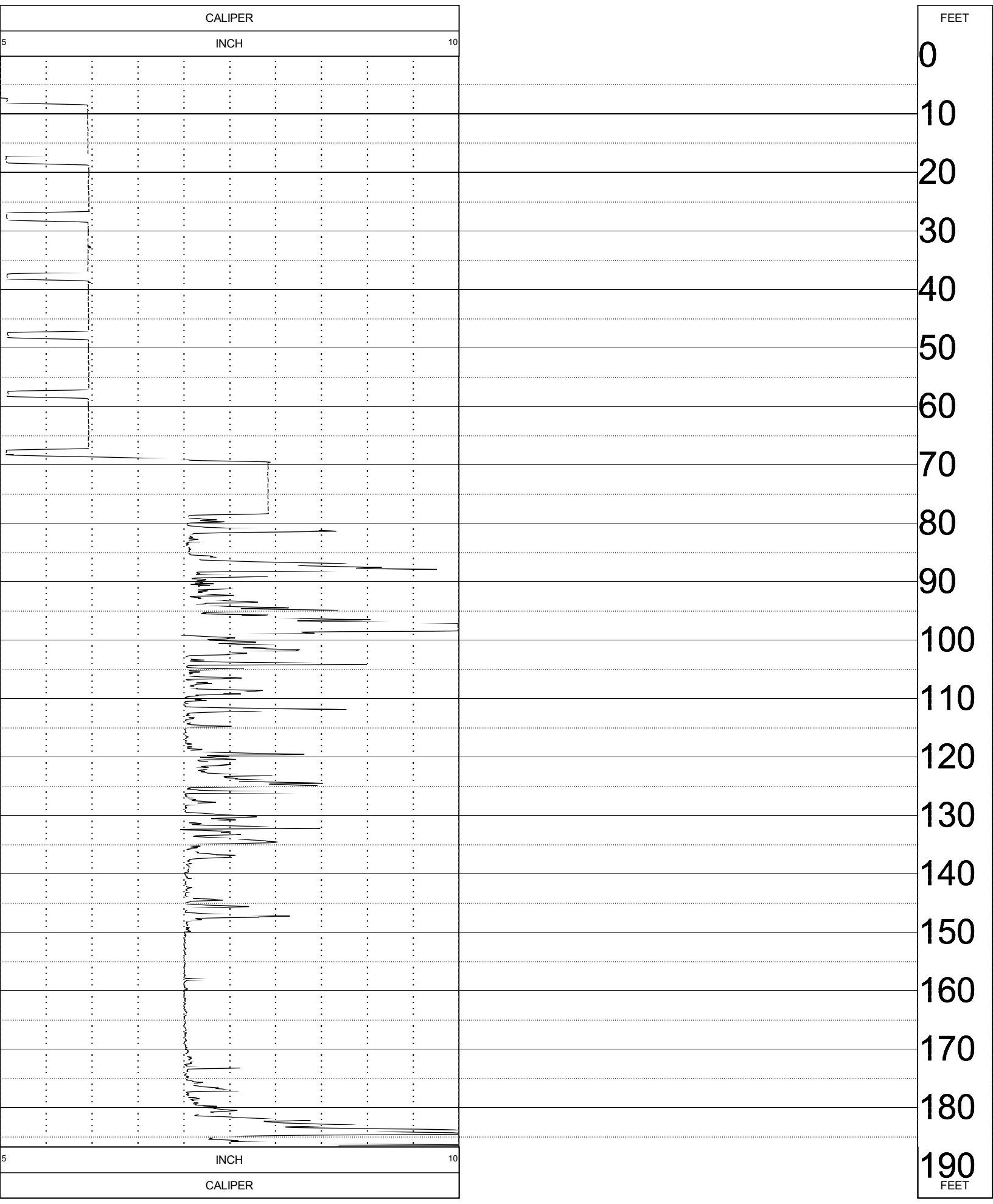


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848622_CALIPER

NAME	: 848622_CALIPER			OTHER SERVICES:	
UNIQUE NUMBER	: 848622_CALIPER				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CBDADD				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 20
DATE	: 05/29/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 186.66	LOG MEASURED FROM:		DF	:
LOG TOP	: 0.14	DRL MEASURED FROM:		GL	: 889 L1
CASING DIAMETER	: 8X6	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/29/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:39:
				THRESH	: 2500
SWL	: 19				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW7A
Unique Number: 848622

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Mayer (MGS)
Date: 5/29/2020
Note: Zeroed in sideview. Depths appear to be off by about 0.2' based on reported depth to casing.

Depth (ft.):	Camera View:	Observations:
18.6	sideview	SWL
80.2	sideview	Bottom of casing
80.6	sideview	BPF
81.5	sideview	Thin horizontal fracture
81.8	sideview	Thin rubbly fracture zone
83.6	sideview	Horizontal / vertical fracture. Horizontal fracture terminates @ 86.7
89.0	sideview	BPF
89.9	sideview	BPF
90.9	sideview	Horizontal fracture
91.1	sideview	BPF
92.7	sideview	Rubbly zone
96	sideview	Rubbly zone
96.7	sideview	BPF
97.1	sideview	Vertical fracture
98.2	sideview	BPF
99.1	sideview	Rubbly zone
99.7	sideview	Rubbly zone
100.5	sideview	Horizontal fracture
100.9	sideview	Possible faint flow from BPF into borehole
102.3	sideview	Rubbly fracture zone
104.2	sideview	BPF
104.9	sideview	BPF
106.8	sideview	Vuggy zone
108.4	sideview	Vuggy zone
109.5	sideview	BPF
112.5	sideview	BPF
115.8	sideview	BPF
118.8	sideview	Vuggy area
119.4	sideview	BPF
119.8	sideview	Cavern area that extends to 120.3
121.5	sideview	Vertical / horizontal fracture
123.8	sideview	Vertical fracture that terminates @ 126
126	sideview	Rubbly
127	sideview	Horizontal fracture
133.3	sideview	Rubbly Zone
145.5	sideview	Small vertical fracture, Rubbly zone

147	sideview	BPF
147.7	sideview	Thin vertical fracture
148.6	sideview	BPF
150	sideview	Vertical rubbly fracture that extends to 151.5. Particles appear to be settling slower.
156.8	sideview	BPF
159.4	sideview	BPF
174.7	sideview	BPF / rubbly
177	sideview	BPF
180.2	sideview	Vuggy
180.6	sideview	Vertical fracture
183.7	sideview	Small cavern
188	sideview	Bottom of hole. Fractures appear to be filled with Coon Valley or Jordan sand.

Preliminary Flowmeter Summary and Results

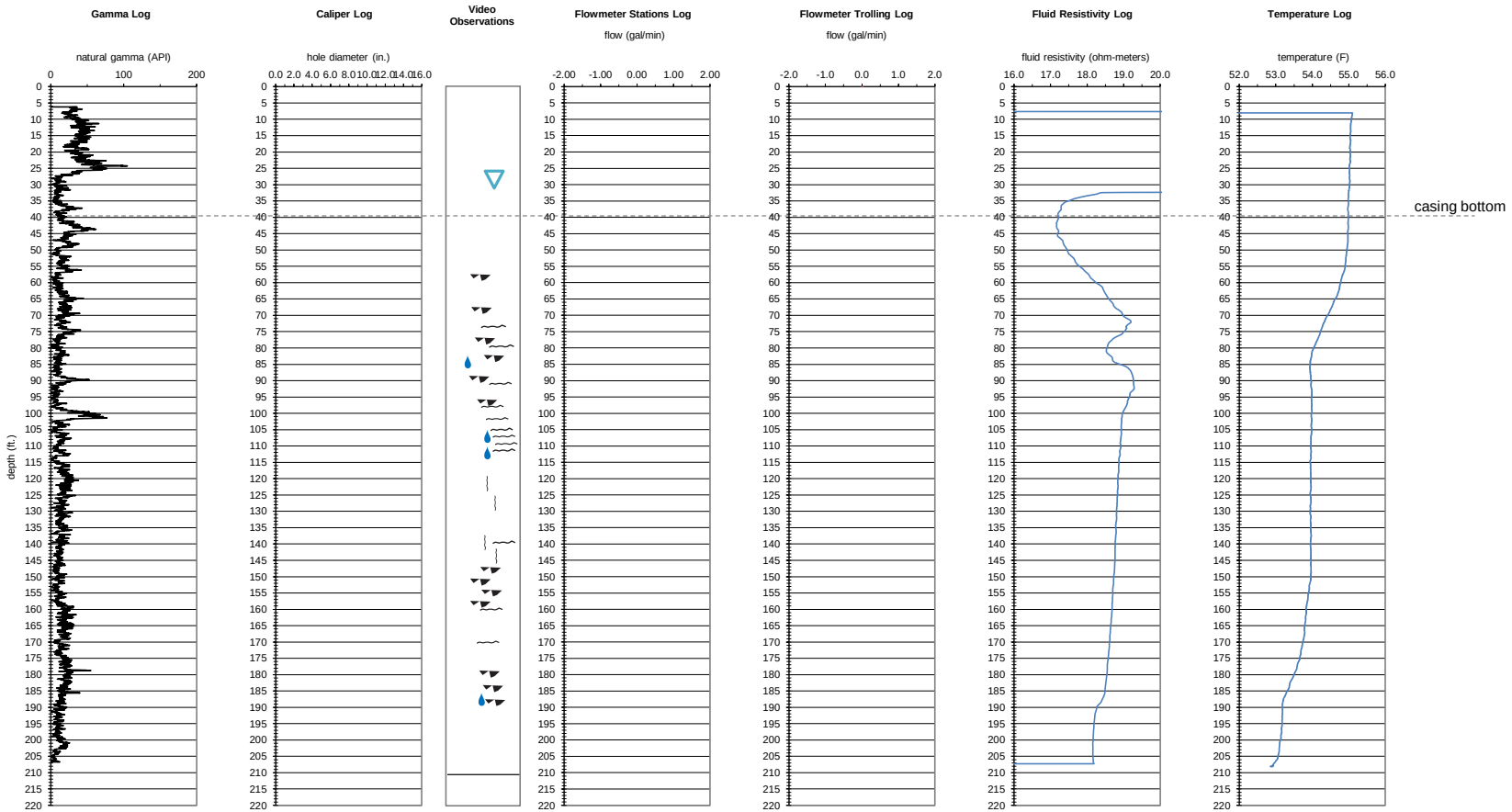
Well Name: MW7A
Unique Number: 848622
Date Logged: 5/29/2020

Note: This summary accompanies the flowmeter results figure. Also, please note that the footages in the accompanying video log are off by about 0.2 feet based on the actual depth to bottom of casing (80 feet). Video observations shown on the results figure take this into account.

The video and caliper logs indicate a heavily fractured, both horizontal and vertical, and vuggy Shakopee Formation, along with a relatively smoother and less fractured Oneota Dolomite, with the exception of the uppermost ~5 feet near the contact and the lowermost ~10 feet of open hole. While the borehole was drilled to a depth of 220 feet, we were only able to log to a depth of about 188 feet due to collapse within the sandier Coon Valley and Jordan Sandstone. Slight possibilities of flow are noted in the video log at depths of about 99.5, 110.0, and 116.0 feet; however, none of these intervals exhibited clear and obvious enough flow to confirm with a high degree of confidence. Overall, particles in the video appear to be slowly settling due to gravity after being dislodged/disrupted by the video logging tool.

The fluid resistivity and temperature logs indicate a number of inflection points (or baseline shifts in the data) that may indicate several subtly distinct (in chemistry) waters in the borehole. When considering these inflection points in combination with both the caliper and video log data, these possible entry/exit points of water roughly occur at 85.7, 88.4, 99.5, 110.0, 116.0, 127.6, 169.0, and 183.6 feet. If ambient flow is occurring at each of these intervals it is likely too slow to pick up on the video log.

Well Name: MW-8A
Unique Number: 867654
T-R-S: T29 R20 Section 30 DDDACB



Geology:
0-28 QUUU, Quaternary sediments
28-190 OPDC, Prairie du Chien
190-208 CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- water level
- multiparameter log

NOTE: From the video log, water clarity improves gradually (relative to higher in the hole) between about 77 ft and 90 ft, with a somewhat abrupt decrease in turbidity at about 83 ft. It appears that particles moving downhole are traveling downward at a more rapid rate at depths below about 90 feet, than they were higher in the hole. Stagnant, turbid water higher in the hole (roughly above 90 ft), and clearer, downflow in the hole below roughly 90 ft. This interpretation fits well with the temp and resistivity curves from the multitool. Water possibly enters at 109', 113' and 187' based on the video log. 187' also has a shift on the temp and resistivity curves. Its assumed all water is flowing down the hole to the Jordan, no evidence of up flow was seen on the video log in this hole.

Logged by Minnesota Geological Survey
8/17/2022
Multitool

Well Name: MW8A
Unique Number: 867654

Video Log Observations:

logged by: Steenberg (MGS)
Date: August 17, 2022
Notes:

A linear correction factor of __ was applied to correct the camera depth values.

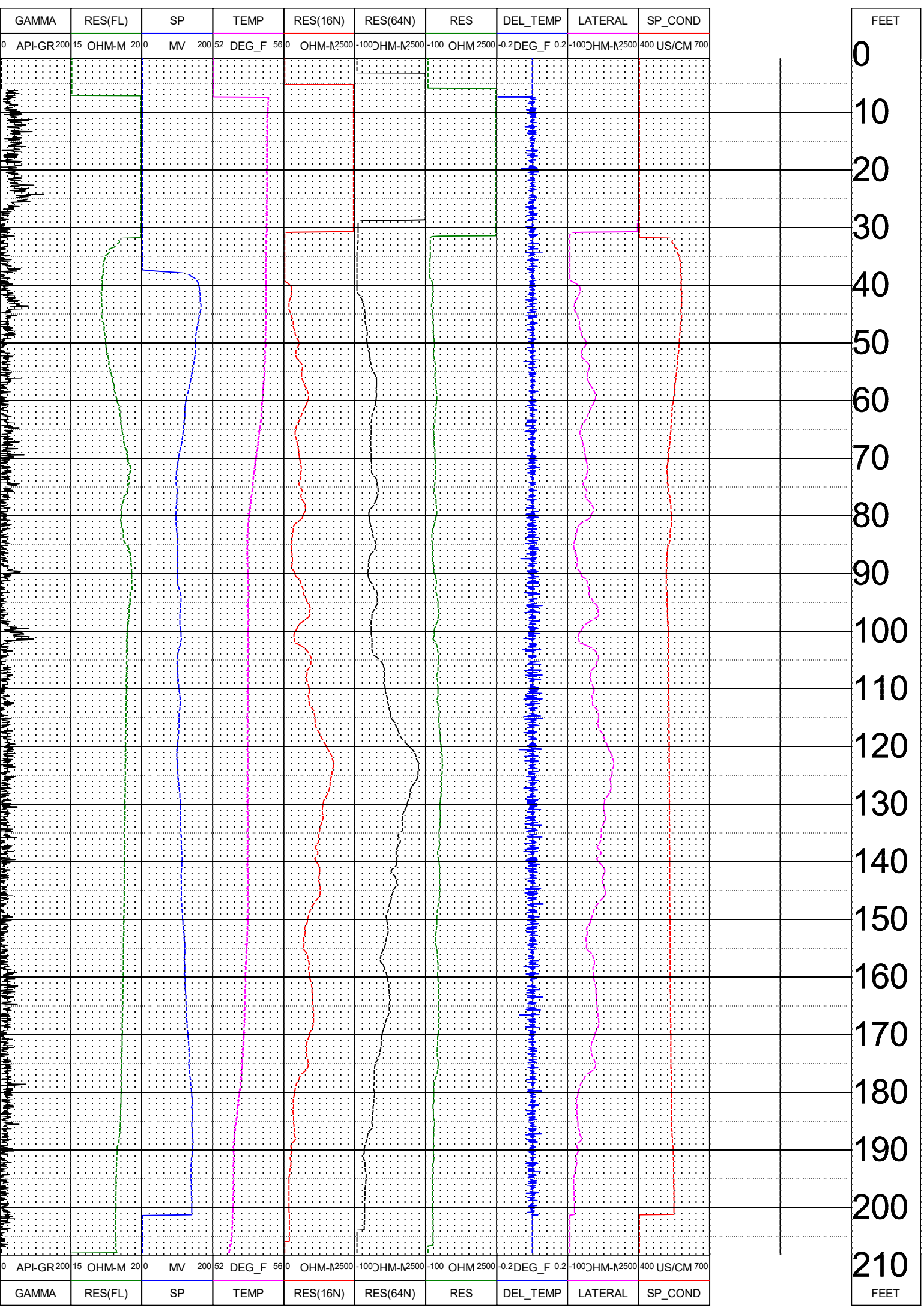
Camera Depth (ft.)	Camera View	True Depth (ft)	Observations
32.6	Side		SWL
39.8	Side		Casing Bottom
39.8-88.2	Down/side		Generally cloudy, some rubble zones, lots of drilling mud
77-97	Down		Cavernous
74	Side		BPF
80.1	Side		BPF
91	Side		BPFs
98.8	Side		Rubbly, possible BPF
102.8	Side		BPF, Shale bed
105	Side		BPF thin
107.7	Side		BPF
109.3	Side		BPF, possible water entry?
113.5	Side		BPF, possible water entry?
117.6	Side		Looks like slight down flow
119-131	Down		Vertical fractures common
137-146	Down		Vertical fractures common
139.8	Down/Side		BPF
147	Down		Rubble zone, possible BPF
150	Down		Rubble irregular borehole, no BPFs
153	Down		Rubble irregular borehole, no BPFs
155	Down		Rubble irregular borehole, no BPFs
157	Down		Rubble irregular borehole, no BPFs
161	Side		Thin BPF
163-179	Down		smooth borehole
170.9	Down/Side		BPF
179-191	Down		Rubble irregular borehole, no BPFs
211	Down		ended video, muck bottom, possbily sight down flow

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867654

NAME	: MW-8A			OTHER SERVICES:			
UNIQUE NUMBER	: 867654						
QUADRANGLE	: HUDSON 102-A						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: DDDACB						
SECTION	: 30	TOWNSHIP	: 29		RANGE	: 20	
DATE	: 08/17/22	MGS CUTTINGS #	:				
CASING BOTTOM	: 40				KB	:	
LOG BOTTOM	: 208.11	LOG MEASURED FROM	:		DF	:	
LOG TOP	: 0.68	DRL MEASURED FROM	:		GL	: 876	
CASING DIAMETER	: 9	LOG RATE	:				
CASING TYPE	:	FIELD OFFICE	: TRUCK				
CASING THICKNESS	: 0	RECORDED BY	: STEENBERG				
BIT SIZE	: 4	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 8144A	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 08/17/22	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 10:26:	
					THRESH	: 2500	
SWL	: 32.6						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

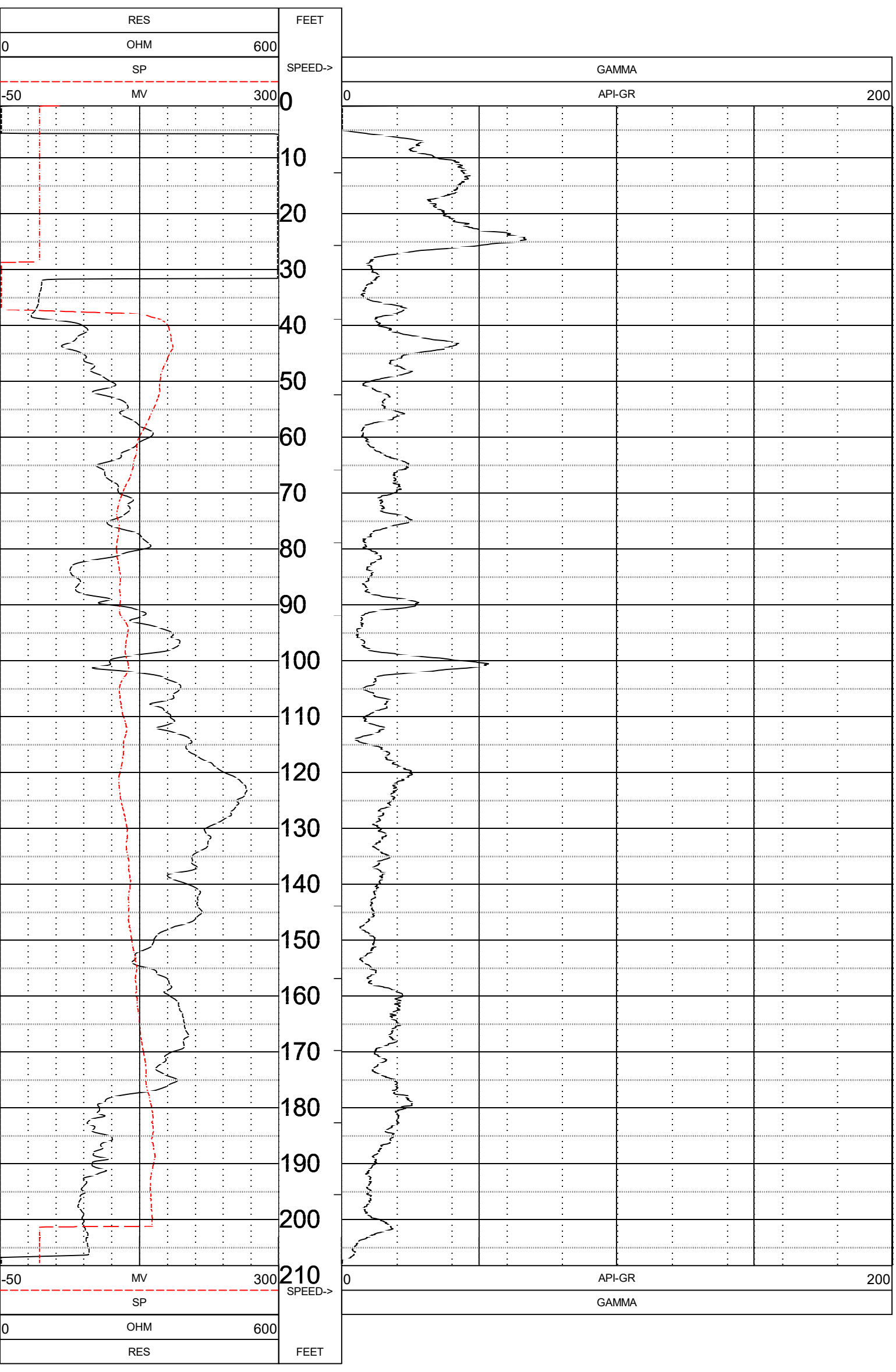


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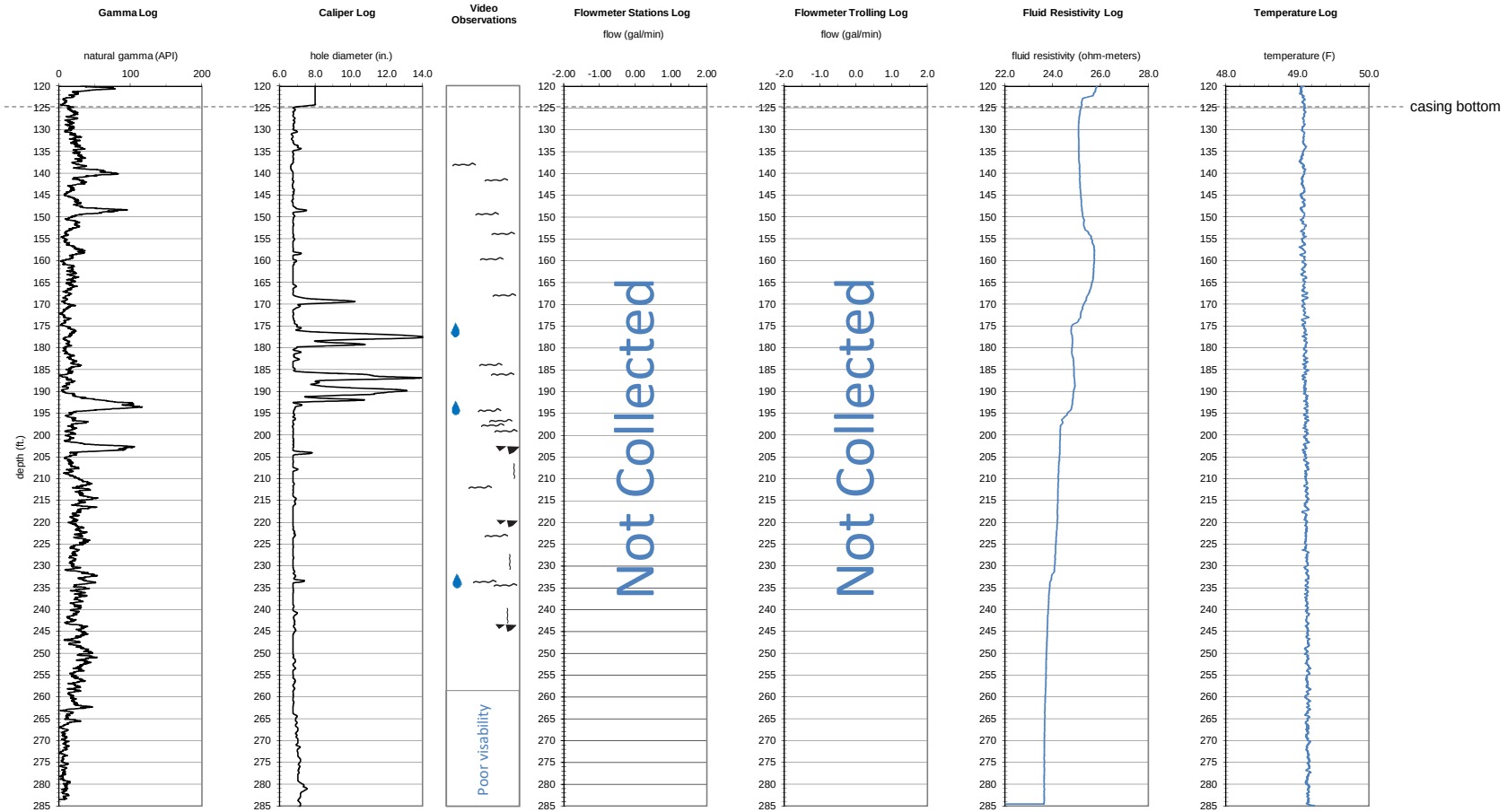
867654

NAME	: MW-8A			OTHER SERVICES:	
UNIQUE NUMBER	: 867654				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DDDACB				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 20
DATE	: 08/17/22	MGS CUTTINGS #	:		
CASING BOTTOM	: 40			KB	:
LOG BOTTOM	: 208.11	LOG MEASURED FROM	:	DF	:
LOG TOP	: 0.68	DRL MEASURED FROM	:	GL	: 876
CASING DIAMETER	: 9	LOG RATE	:		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: STEENBERG		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 08/17/22
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:26:
				THRESH	: 2500
SWL	: 32.6				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW10A
Unique Number: 860296
T-R-S: T29 R21 Section 15 ADADCD



Geology:
0-84 QUUU, Quaternary sediments
84-122 OSTP, St. Peter Sandstone
122-214 OPSH, Shakopee Formation
214-263 OPOD, Oneota Formation
263-285 CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Please see summary text.

Logged by Minnesota Geological Survey
11/18/2021
Video, Multi, and Caliper tools.

Well Name: MW10A
Unique Number: 860296

Video Log Observations:

logged by: Mayer (MGS)
Date: November 18th, 2021
Notes:

A linear correction factor of .981 was applied to correct the camera depth values.

Camera Depth (ft.)	Camera View	True Depth (ft)	Observations
76.6	side	75.2	Static Water Level
128	side	125.6	Bottom of Casing
290.4	side	285.0	Bottom of Hole
280.9	side	275.7	Stopped to observe possible flow, possible slight upflow
262.3	side	257.4	rock becomes a little more porous
255.9	side	251.1	visibility poor in the Jordan, clearing up as we exited the hole
249.3	side	244.7	dissoulution features
246.3	side	241.7	sub-verticle fracture
239.1	side	234.7	bedding place fracture
238.9	side	234.5	bedding place fracture, possibly accepting water. Little downflow below this point, downflow aparent just above this point.
234.7	side	230.3	sub-verticle fracture
227.3	side	223.1	bedding place fracture
224.4	side	220.2	dissoulution features (vuggy)
216.4	side	212.4	bedding plane fracture
212.8	side	208.8	sub vertivle fracture, broken up
209.2	side	205.3	bedding plane fracture
207.4	side	203.5	bedding plane fracture
206.7	side	202.9	vuggy zone
203.7	side	199.9	bedding plane fracture
201.2	side	197.5	bedding plane fracture
200.3	side	196.6	bedding plane fracture
198	side	194.3	bedding plane fracture
196	side	192.4	small cavern
193.7	side	190.1	cavernous area, down flow observed
195	side	191.4	strong downflow
189.5	side	186.0	bedding plane fracture
187.3	side	183.8	bedding plane fracture, slight downflow still visible
175.3	side	172.0	very little (if any) downflow visible
170.3	side	167.1	bedding plane fracture
164.5	side	161.4	rubbly zone
162.8	side	159.8	bedding plane fracture
156.9	side	154.0	bedding plane fracture
152.7	side	149.9	bedding plane fracture
145.8	side	143.1	bedding plane fracture

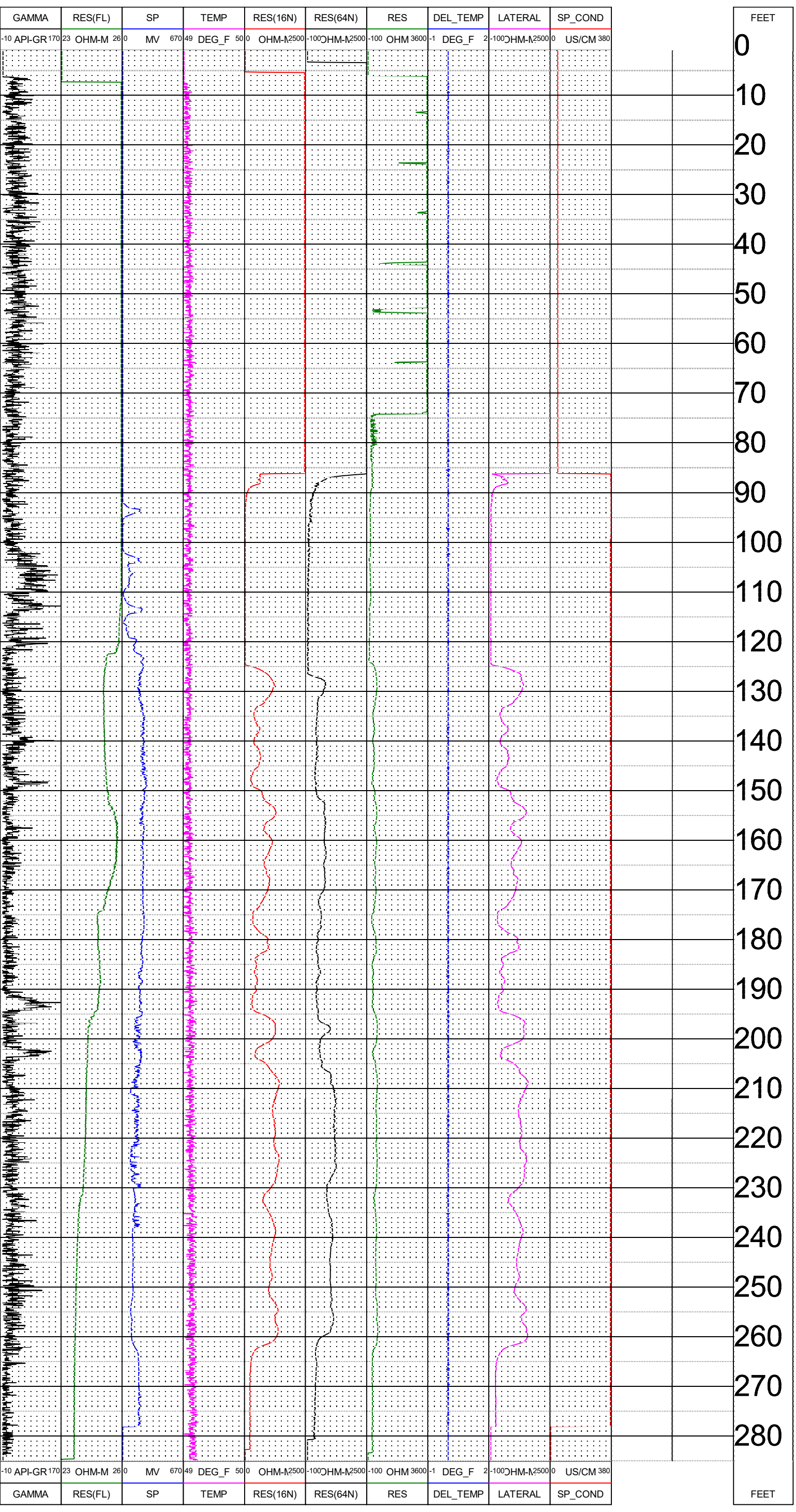
139.7	side	137.1	bedding plane fracture
138.5	side	135.9	rubble zone, no flow
129.4	side	127.0	bottom of casing

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Dept. Phone: (612)626-2969

860296_MULTI

NAME	: MW10A			OTHER SERVICES:	
UNIQUE NUMBER	: 860296_MULTI				
QUADRANGLE	: WHITE BEAR LAKE EAST 118-C				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ADADCD				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/18/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 125			KB	:
LOG BOTTOM	: 285.01	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.95	DRL MEASURED FROM	:	GL	: 971 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/18/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:37:
				THRESH	: 2500
SWL	: 75				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



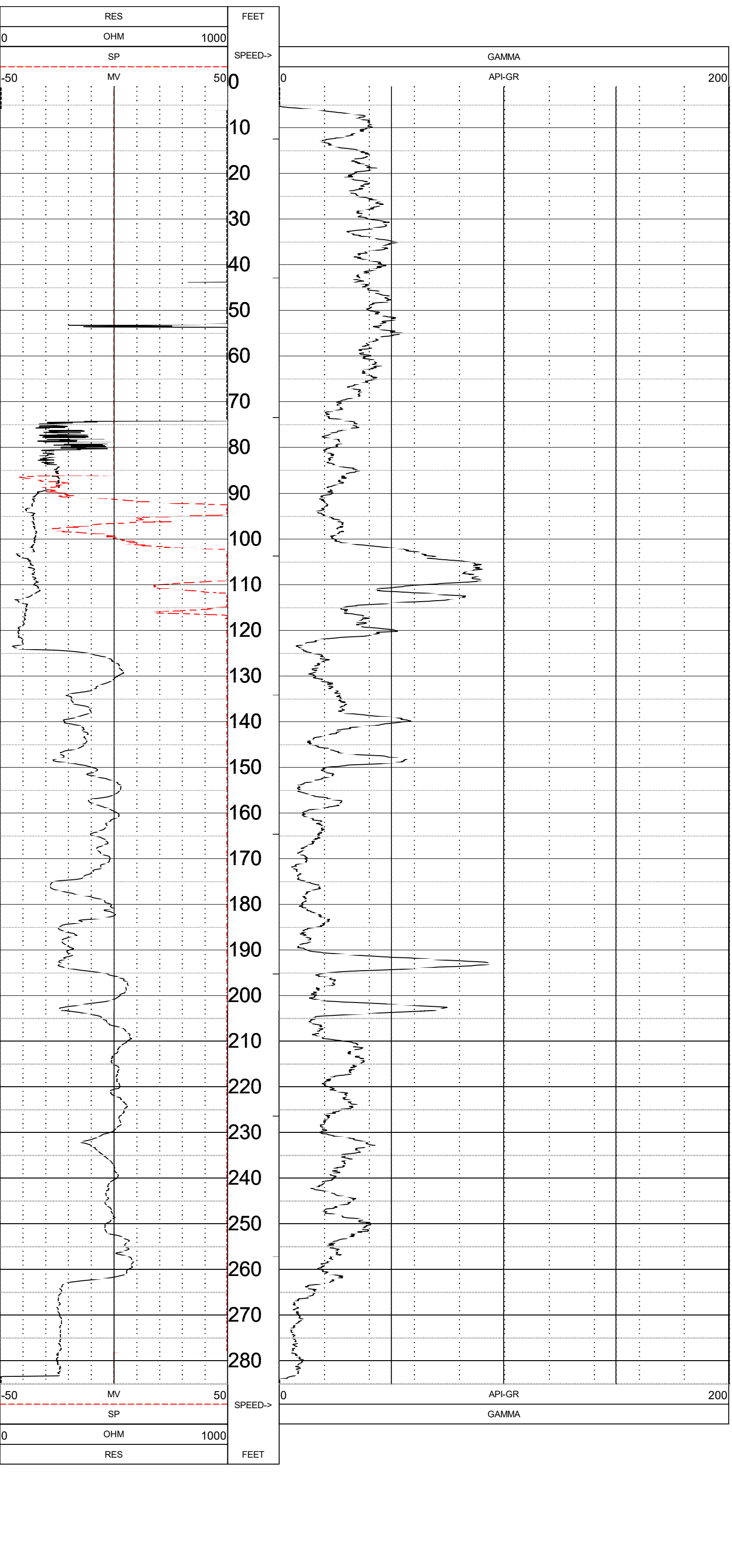
Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

860296

NAME	: MW10A			OTHER SERVICES:	
UNIQUE NUMBER	: 860296				
QUADRANGLE	: WHITE BEAR LAKE EAST 118-C				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ADADCD				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/18/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 125			KB	:
LOG BOTTOM	: 285.01	LOG MEASURED FROM	:	DF	:
LOG TOP	: 0.95	DRL MEASURED FROM	:	GL	: 971 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/18/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:37:
				THRESH	: 2500

SWL : 75
REMARKS :

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

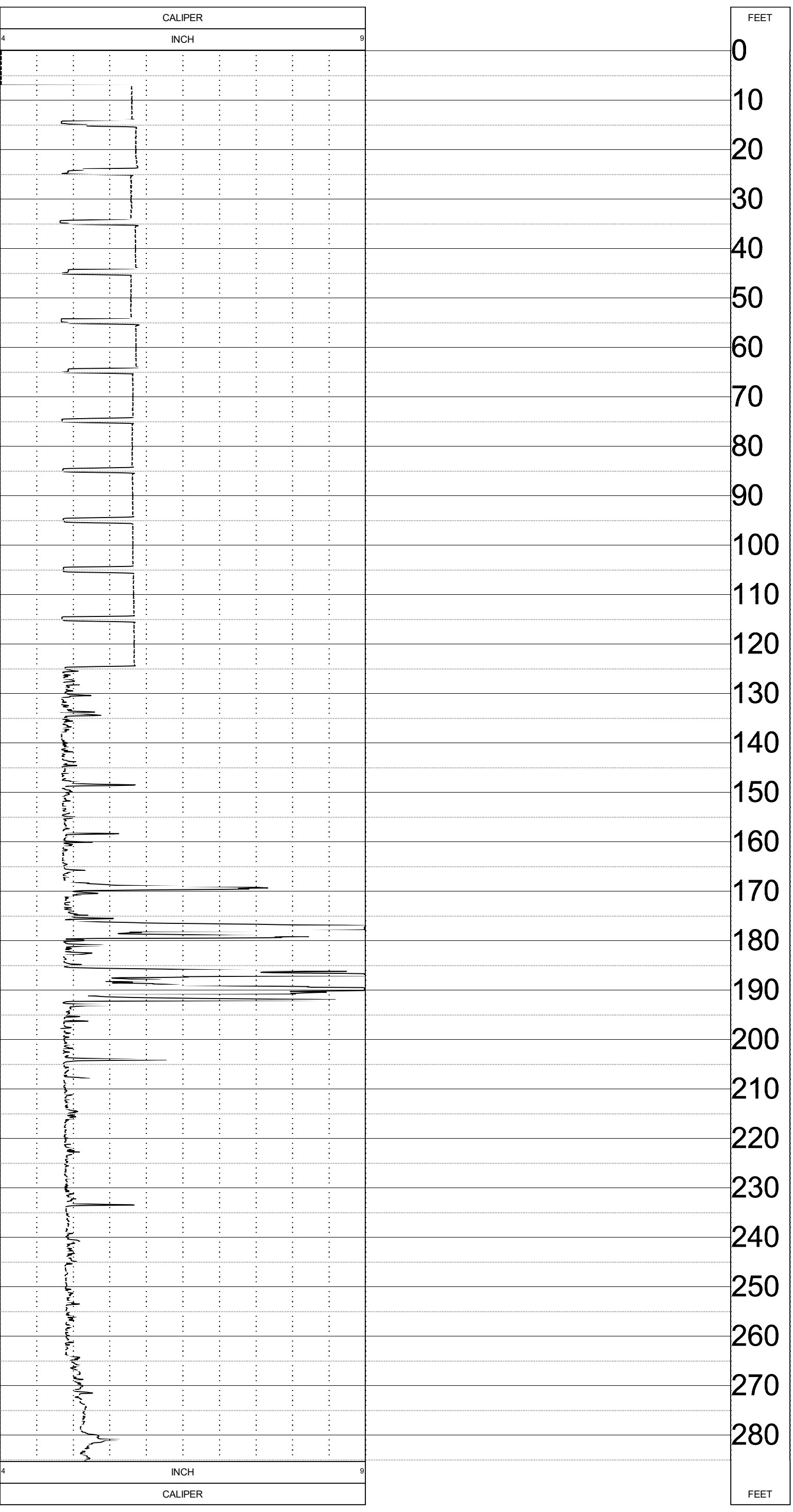


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860296_CALIPER

NAME	: MW10A			OTHER SERVICES:	
UNIQUE NUMBER	: 860296_CALIPER				
QUADRANGLE	: WHITE BEAR LAKE EAST 118-C				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ADADCD				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 11/18/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 125			KB	:
LOG BOTTOM	: 285.23	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: -0.13	DRL MEASURED FROM	:	GL	: 971 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/18/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:59:
				THRESH	: 2500
SWL	: 75				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Preliminary Flowmeter Summary and Results

Well Name: MW10A
Unique Number: 860296
Date Logged: 11/18/2021

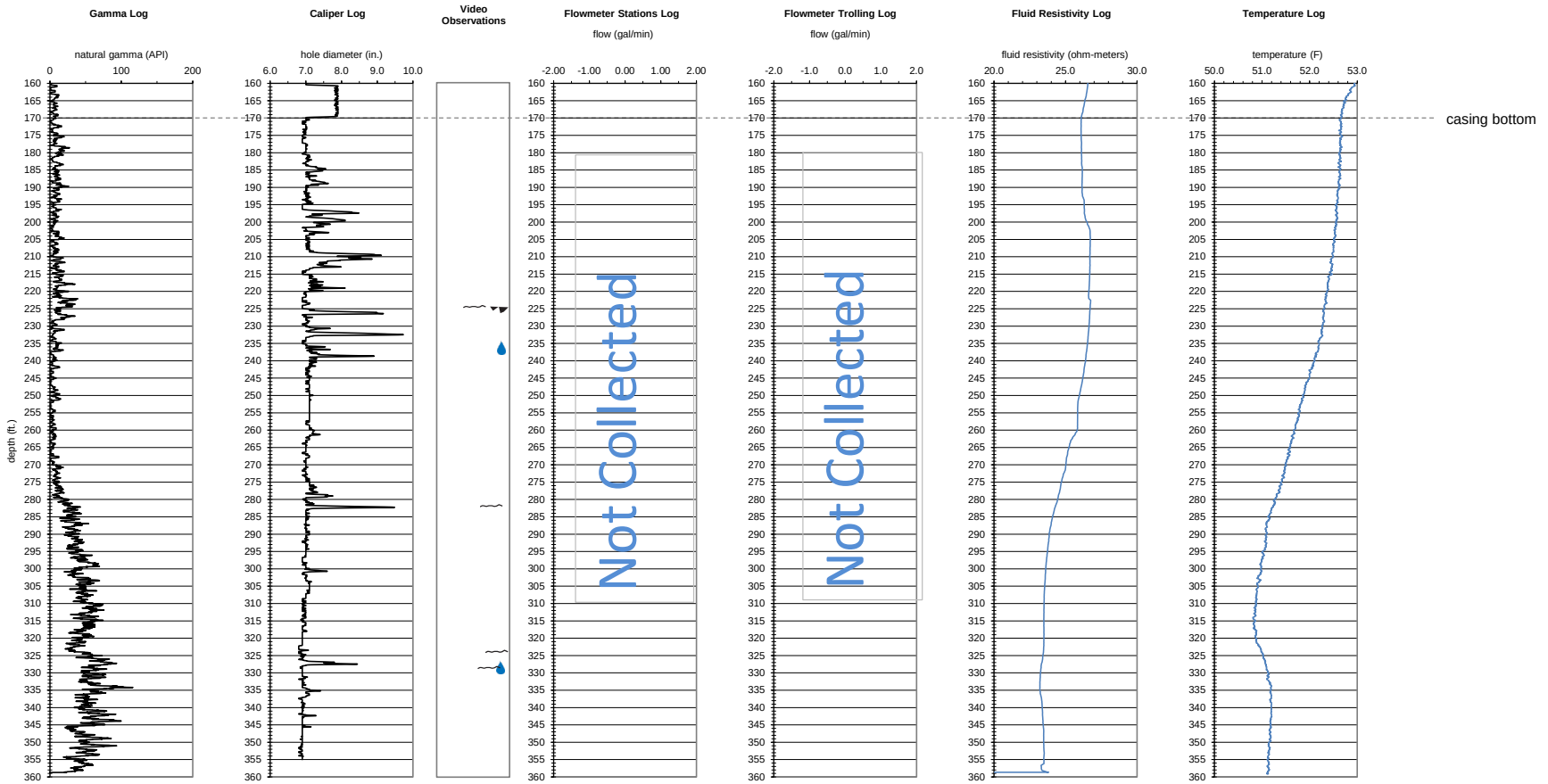
Note: This summary accompanies the logging data results figure.

Water clarity was good for the majority of the borehole. Visibility decreased at 260’ and was poor for the remainder of the borehole. Based on the poor visibility in the Jordan, it is inferred that there is little ambient flow in this portion of the borehole. All depths reported here are corrected depths. Notable bedding plane fractures were observed at 234.7’, 234.5’, 223.1’, 212.4’, 205.3’, 203.5’, 199.9’, 197.5’, 196.6’, 194.3’, 186’, 183.8’, 167.1’, 159.8’, 154’, 149.9’, 143.1’, and 137.1’ (all within the Prairie du Chien). Sub vertical fractures were observed at 241.7’, 230.3’, and 208.8’. Dissolution features/vuggy zones were observed at 244.7’, 220.2’, and 202.9’. Relatively large cavernous areas were observed at 186’-193’ and 176’-180’.

The bedding plane fractures at 234.7’ and 234.5’ appear to be accepting water in the video. This is supported by a change on the fluid resistivity curve. Down flow appears to be absent below these fractures and is apparent above them. Ambient down flow can be observed on the video at depths of 190.1’ and 183.8’ but appears to be non-existent above a depth of 172’. Three separate inflections in the fluid resistivity curve, one at 153’, one at 175’, one at 196’, might be inferring the addition of water into the borehole. These roughly coincide with the larger cavernous areas in the borehole which one could infer as hydrologically-active zones due to their size.

Overall, it appears water is entering the borehole somewhere around 175’, flowing down the borehole, and exiting around a depth of 235’. There could be an addition of water into the borehole around 195’ (based on the fluid resistivity plot). This would explain the greater down flow conditions lower in the borehole. Little information can be gleaned from the temperature plot.

Well Name: MW12A
Unique Number: 850553
T-R-S: T29 R20 Section 32 DDADBA



Geology:
0-44 QUUU, Quaternary sediments
44-50 OSTP, St. Peter Sandstone
50-157 OPSH, Shakopee Formation
157-202 OPOD, Oneota Formation
202-229 OOCV, Coon Valley
229-301 CJDN, Jordan Sandstone
301-350 CSTL, St. Lawrence Formation
350-360 CTCG, Tunnel City Group

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Drillers lost circulation in CJDN and CTCG when drilling. Driller's injected water prior to logging during video. Video log seems to support possible water exits at 329.3' and 237.5'. Upflow noted around 201'.

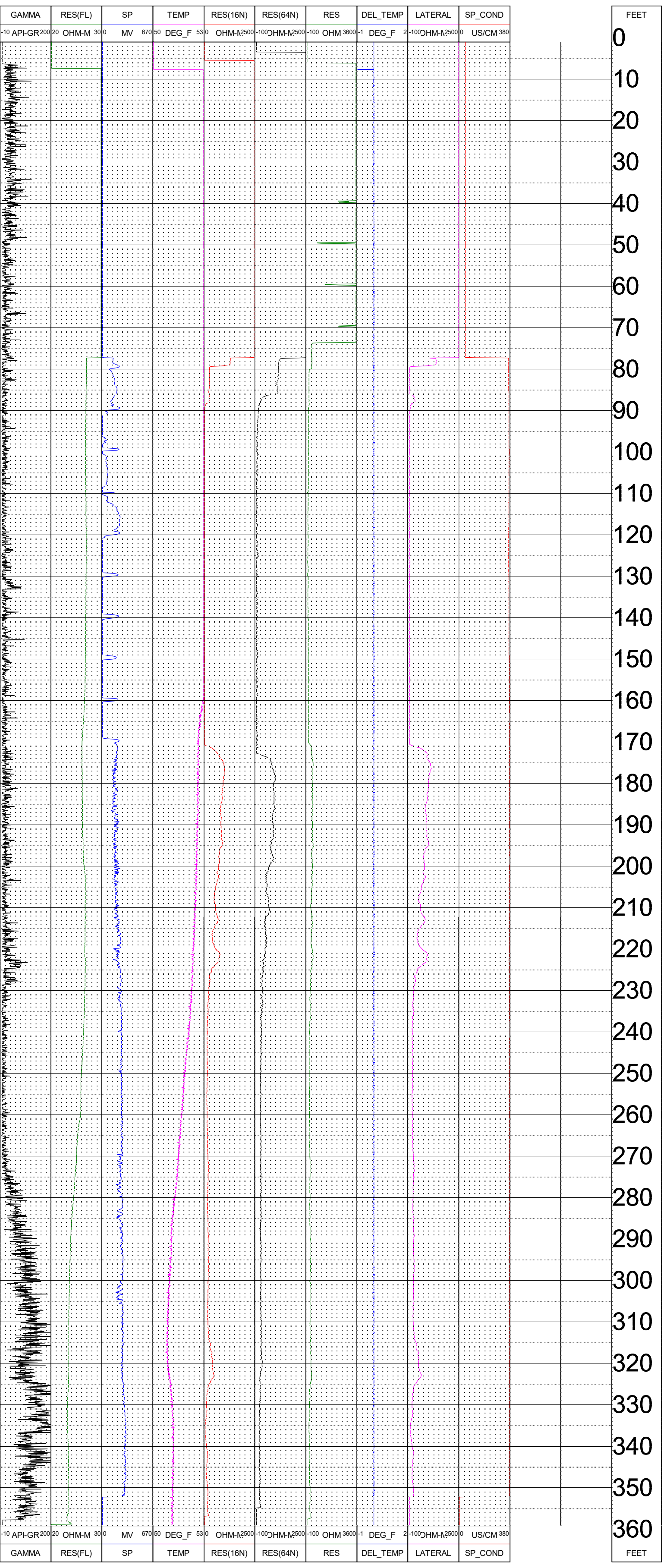
Logged by Minnesota Geological Survey
10/26/2020
Video, Gamma, Multi, and Caliper logged.

Minnesota Geological Survey
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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850553 MULTI

NAME	: MW12A			OTHER SERVICES:			
UNIQUE NUMBER	: 850553 MULTI						
QUADRANGLE	: HUDSON 102-A						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: DDADBA						
SECTION	: 32	TOWNSHIP	: 29		RANGE	: 20	
DATE	: 10/16/20	MGS CUTTINGS #	:				
CASING BOTTOM	: 170				KB	:	
LOG BOTTOM	: 359.12	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 1.05	DRL MEASURED FROM	:		GL	: 896 L1	
CASING DIAMETER	: 8	LOG RATE	: 30FPM				
CASING TYPE	:	FIELD OFFICE	: TRUCK				
CASING THICKNESS	: 0	RECORDED BY	: CICHA				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 8144A	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 10/16/20	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 15:10:	
					THRESH	: 2500	
SWL	: 72						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



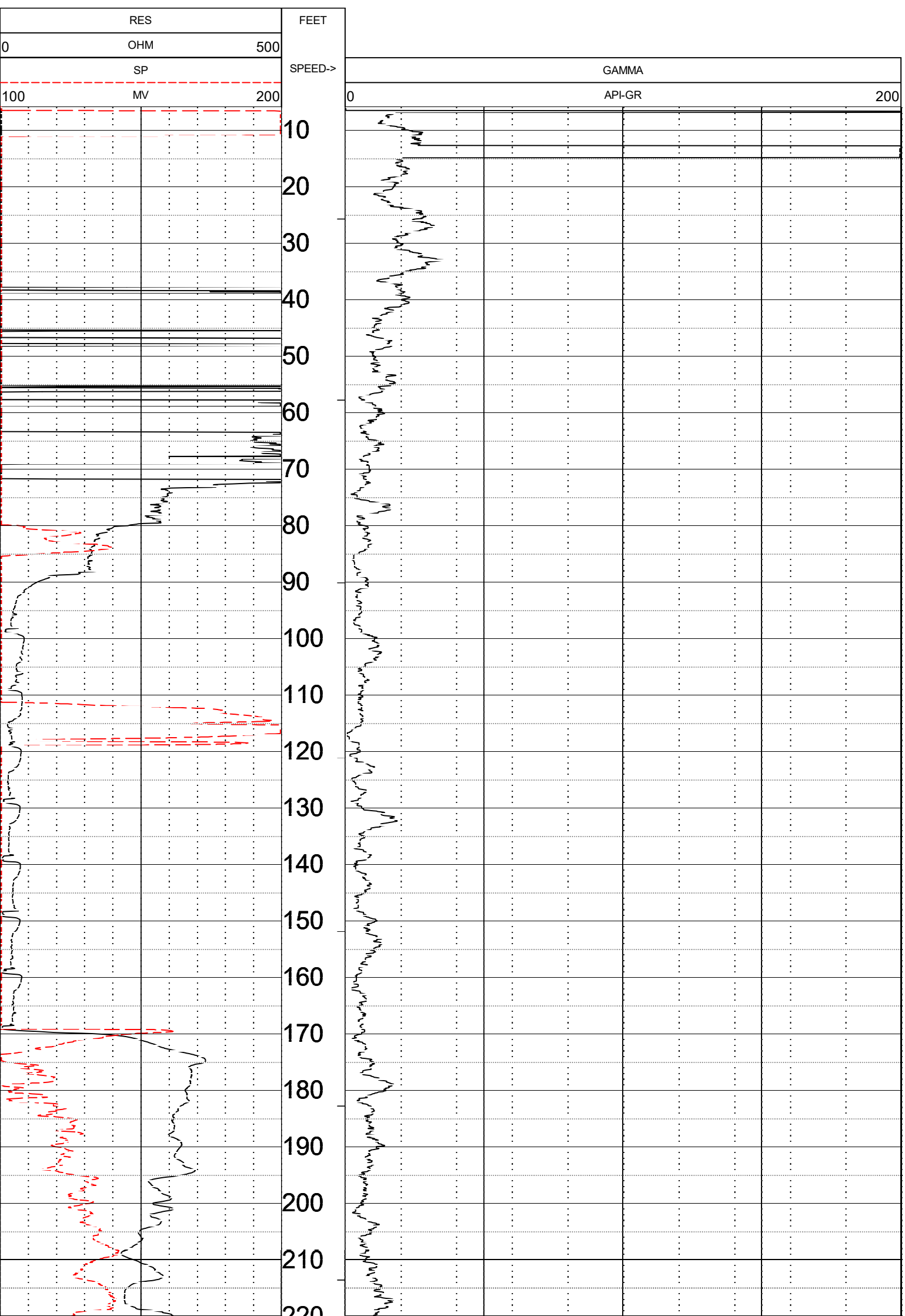
Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850553

NAME	: MW12A			OTHER SERVICES:	
UNIQUE NUMBER	: 850553				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DDADBA				
SECTION	: 32	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/16/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 170			KB	:
LOG BOTTOM	: 359.85	LOG MEASURED FROM	:	DF	:
LOG TOP	: 5.93	DRL MEASURED FROM	:	GL	: 896 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/16/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:44:
				THRESH	: 2500

SWL : 72
REMARKS :

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

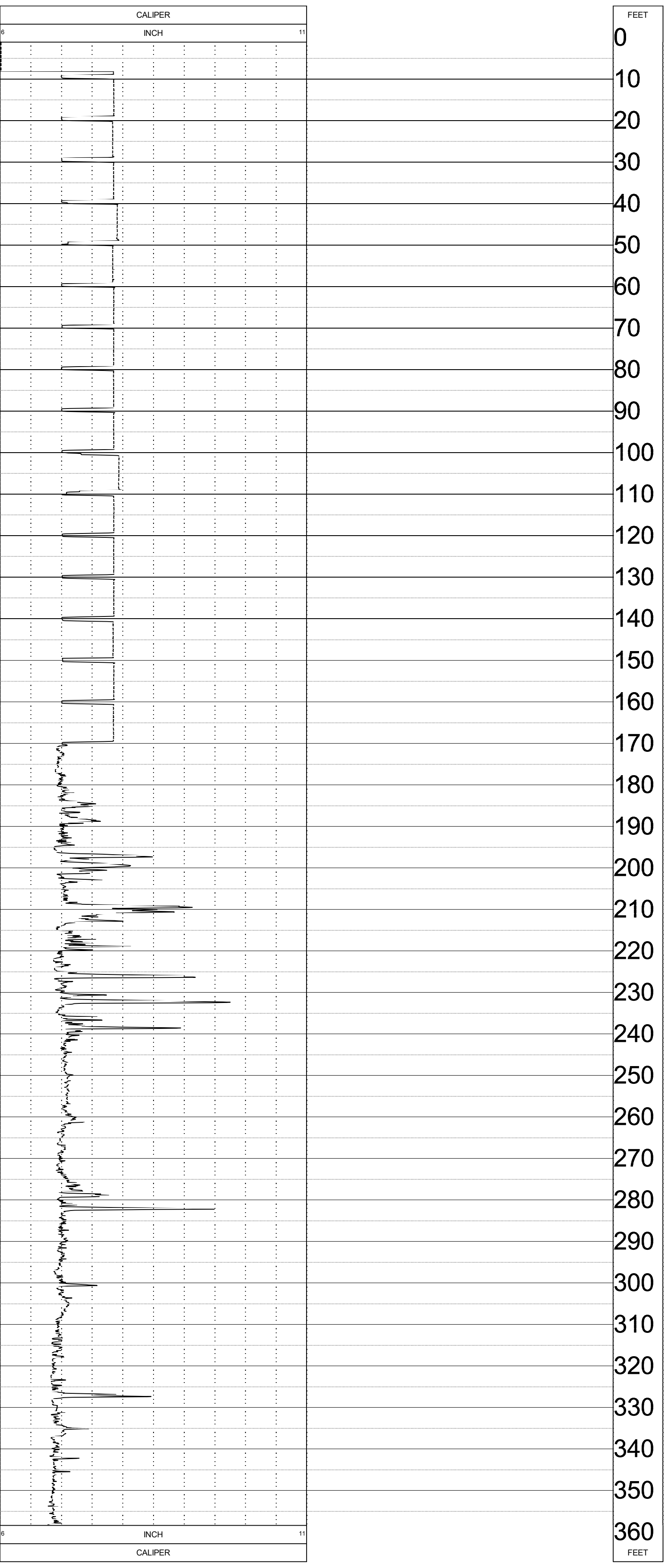


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

850553 CALIPER

NAME	: MW12A			OTHER SERVICES:	
UNIQUE NUMBER	: 850553 CALIPER				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DDADBA				
SECTION	: 32	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/16/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 170			KB	:
LOG BOTTOM	: 358.36	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.08	DRL MEASURED FROM	:	GL	:
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/16/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 15:39:
				THRESH	: 2500
SWL	: 72				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name MW12A

Unique Number 850553

Video Log Observations

logged by: Mayer (MGS), Cicha (MGS)

Date: 10/16/2020

Note: Driller reported losing circulation both in the Jordan and the Tunnel City. Due to this, this were not able to flush out the well. The well was cloudy and had a layer of bentonite on the borehole walls.

Depth (ft)	Camera View:	Observations:
74.2	SIDEVIEW	Static Water Level
171.5	SIDEVIEW	Bottom of casing. Gets cloudy. Drillers begin to add water to well. Turbulent flow?
180	SIDEVIEW	dark, cloudy. downflow
283.7	SIDEVIEW	BPF, downflow
291.8	SIDEVIEW	downflow
328.5	SIDEVIEW	BPF
329.3	SIDEVIEW	BPF, exit?
330	SIDEVIEW	driller runs out of water. Stops adding water to well
331.4	SIDEVIEW	Turbulent
336.8	SIDEVIEW	Suspended
224	SIDEVIEW	BPF, Cavern, Void
236.8	SIDEVIEW	Suspended particles
237.5	SIDEVIEW	turbulent
201.4	SIDEVIEW	Up flow? very brief, maybe just from tool movement

Preliminary Flowmeter Summary and Results

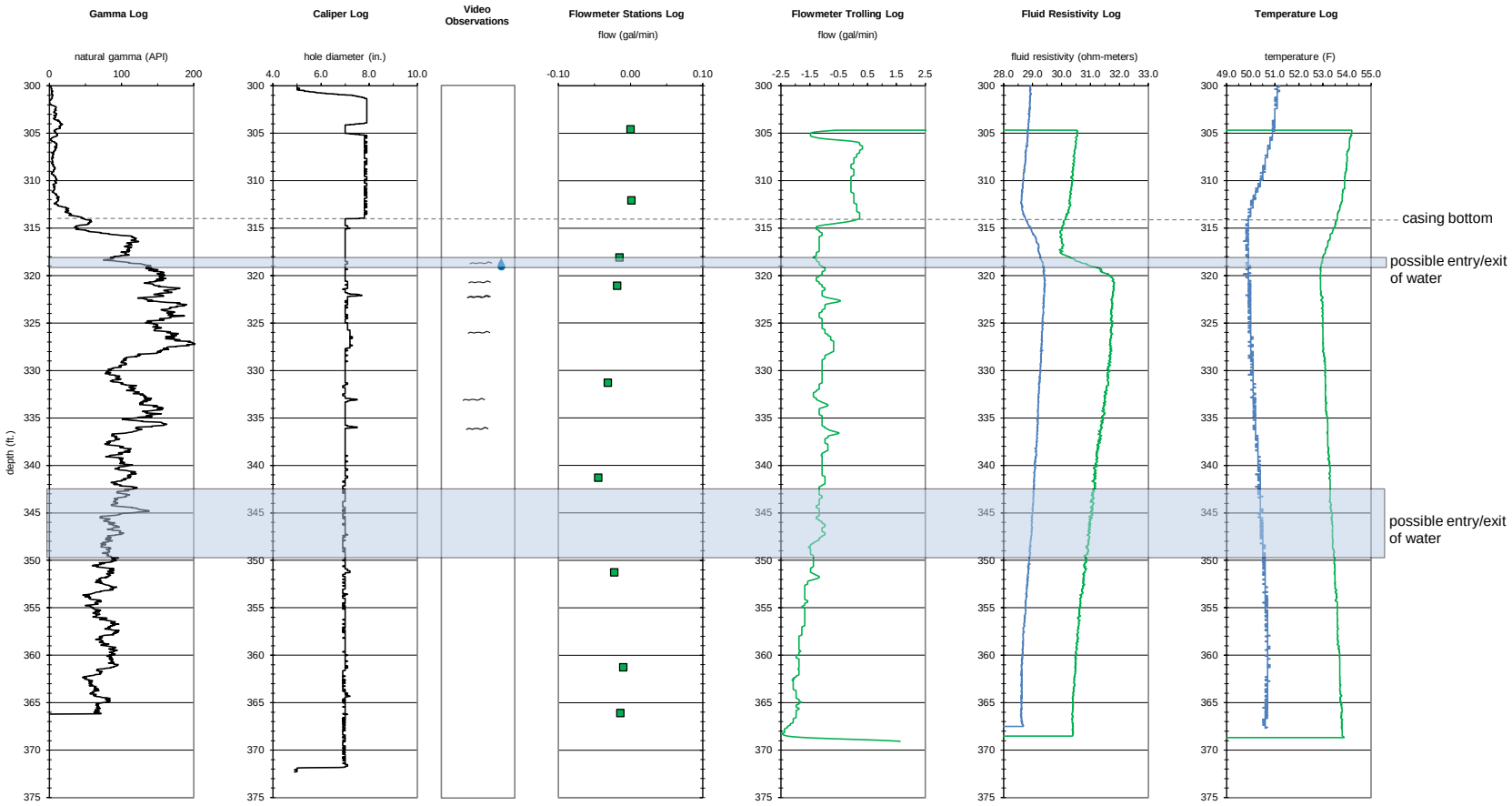
Well Name: MW12A
Unique Number: 850553
Date Logged: 10/16/2020

Note: This summary accompanies the logging data results figure.

The drillers indicated that they lost circulation in the CJDN and CTCG. This prevented them from flushing out the borehole after drilling was complete. The video log was murky and shows a film of bentonite (drilling mud) on the borehole wall which is a result of not being able to flush the well after competition. Due to this, video observations were difficult. The drillers injected water to help make the video clearer. This was done from 74.2’ to 330’ on the video. The video indicated bedding plane fractures at 224’, 283.7’, 328.5’, and 329.3’. The video seems to support possible water exits at 329.3’ and 237.5’. Possible up flow was noted around 236.8 and 201’. If present this may indicate an upward gradient from the Jordan through the Oneota.

Due to the murky video and uncertainty. It was decided not to flow log this well.

Well Name: MW13A
Unique Number: 848626
T-R-S: T29 R21 Section26 BBCADD



Geology:
0-278 QUUU, Quaternary sediments
278-310 CJDN, Jordan Sandstone
310-345 CSTL, St. Lawrence Formation
345-367+ CTCG, Tunnel City Group

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - ambient trolling log
- multiparameter log

NOTE: Caliper log was adjusted 0.7 feet up to align with driller reported casing depth. Note most footages on the video appear to be a 1.7' deeper than the geophysical logging tools. These adjustments are accounted for on this summary figure. All other logs are plotted as is. Stratigraphic interpretation is based on core and gamma log.

Logged by Minnesota Geological Survey
6/10/2020
Multi, caliper and flow tool

Date:	June 10, 2020
Well Name	MW13A
Un.no.	848626
logged by:	STEENBERG, CICHA
camera	downview and sideview
swl measured	[ENTER SWL MEAS.]
swl camera	23.7
Depth correction	[ENTER DEPTH CORRECTION]
ambient conditions	Downhole and uphole ambient
general comments:	[ENTER COMMENTS]

camera depth (ft)	camera view	logging direction	true depth (ft)	comments	time
[DEPTH]	[SIDEVIEW OR DOWNVIEW]	[DOWN OR UP]			
373.4	SIDEVIEW	UP		Bottom, true depth 370 according to AECOM/Traut	
373	SIDEVIEW	UP		Tunnel city, glaucanitic	
365	SIDEVIEW	UP		thin bedding	
364.1	SIDEVIEW	UP		bedding	
358	SIDEVIEW	UP		bedding	
349.1	SIDEVIEW	UP		bedding	
346.8	SIDEVIEW	UP		interclastic beds, contact	
341.4	SIDEVIEW	UP		interclastic bed	
338.2	SIDEVIEW	UP		Fractures	
337.2	SIDEVIEW	UP		Fractures	
335.6	SIDEVIEW	UP		Bedding plane, small fracture	
331.2	SIDEVIEW	UP		Bedding plane	
329.5	SIDEVIEW	UP		Fracture	
328.2	SIDEVIEW	UP		Small fracture	
324.1	SIDEVIEW	UP		Fracture	
322.7	SIDEVIEW	UP		Fracture	
321.2	SIDEVIEW	UP		Fracture	
317	SIDEVIEW	UP		Bottom of 8" casing	

Wednesday, June 10, 2020

MW3B

848626

Cicha

7" OPEN HOLE, 4" CASING

8" SKIRT USED

note: data recorded with MGS I (records downflow as positive)

These data have been converted by multiplying tool field note logging data by -1

AMBIENT

SWL: 23.7'

CASING: 317'

sensor depth (feet)	flow (liter/min)	std. dev	comments	time	height (in)
304.6	-0.2825		steady		
312.1	-0.2787		steady		
318.1	-0.3371		steady		
321.1	-0.3495		steady		
331.3	-0.3952		steady		
341.3	-0.4435		steady		
351.3	-0.3634		steady		
361.3	-0.3182		steady		
366.1	-0.3326		steady		

Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

848626 - MULTI TOOL

NAME	: MW13A			OTHER SERVICES:	
UNIQUE NUMBER	: 848626 - MULTI TOOL				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCADD				
SECTION	: 26	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/10/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 314			KB	:
LOG BOTTOM	: 367.71	LOG MEASURED FROM:		DF	:
LOG TOP	: 1.08	DRL MEASURED FROM:		GL	: 909 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/10/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:02:
				THRESH	: 2500
SWL	: 24				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

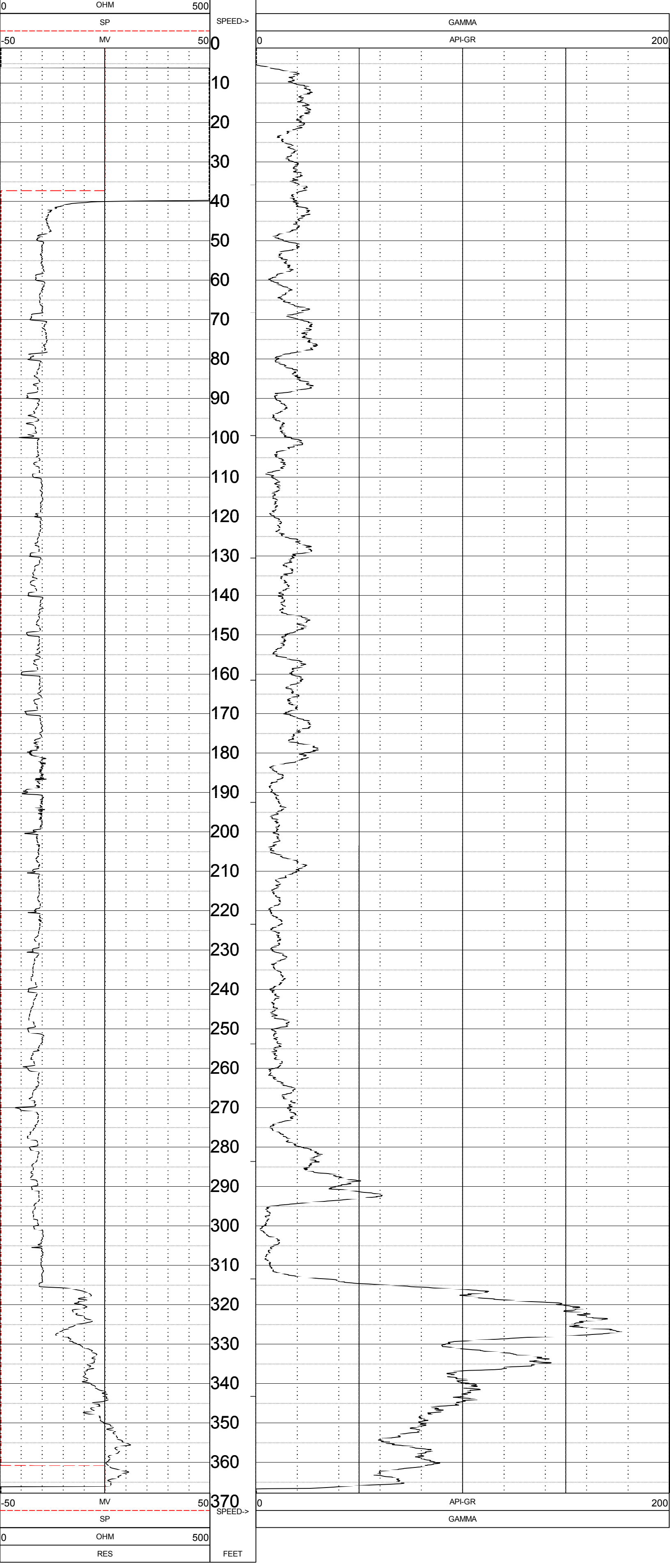


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848626

NAME	: MW13A			OTHER SERVICES:	
UNIQUE NUMBER	: 848626				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCADD				
SECTION	: 26	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/10/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 314			KB	:
LOG BOTTOM	: 367.71	LOG MEASURED FROM:		DF	:
LOG TOP	: 1.08	DRL MEASURED FROM:		GL	: 909 L1
CASING DIAMETER	: 8	LOG RATE	:		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE:	06/10/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME :	10:02:
				THRESH:	2500
SWL	: 24				
REMARKS	:				

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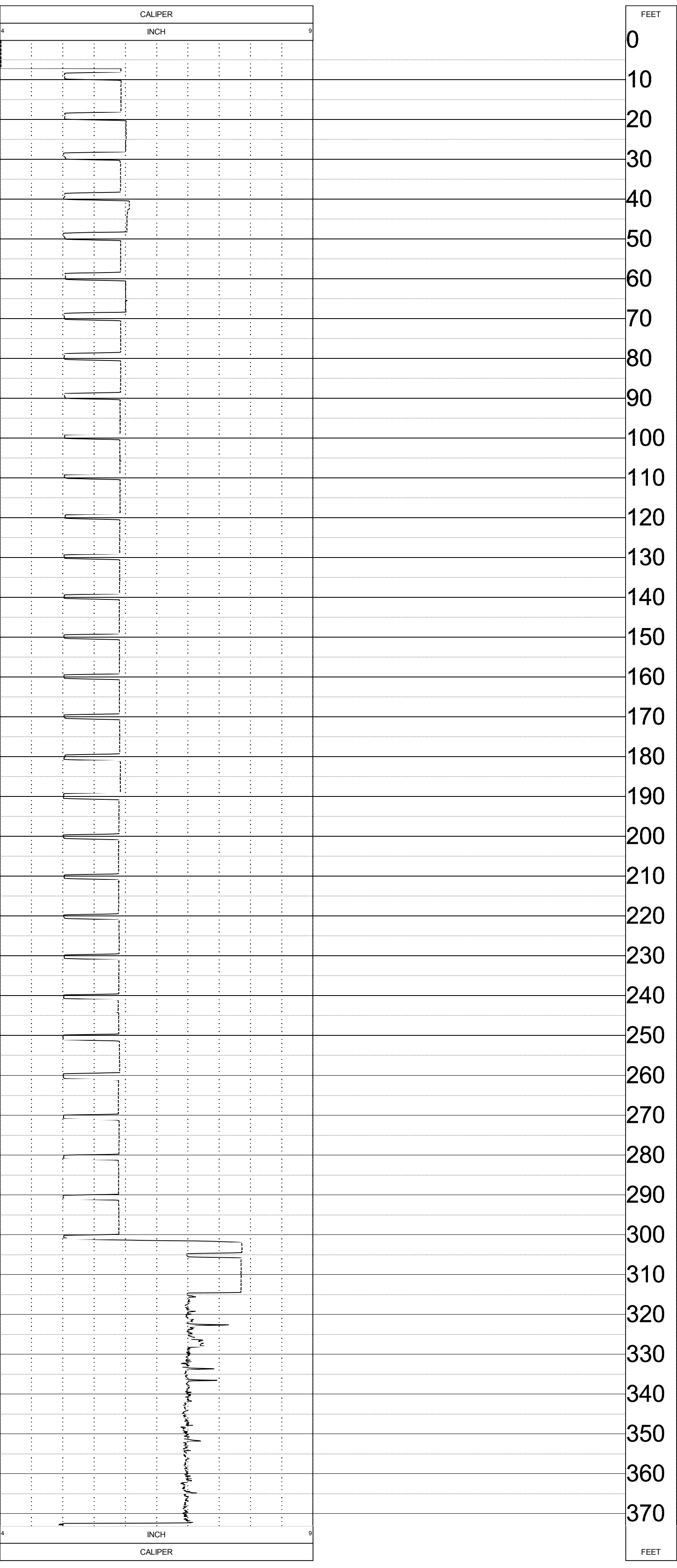


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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

848626 CALIPER

NAME	: MW13A			OTHER SERVICES:	
UNIQUE NUMBER	: 848626 CALIPER				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	BBCADD				
SECTION	: 26	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/10/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 314			KB	:
LOG BOTTOM	: 373.03	LOG MEASURED FROM:		DF	:
LOG TOP	: 0.17	DRL MEASURED FROM:		GL	: 909 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
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MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/10/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:34:
				THRESH	: 2500
SWL	: 24				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

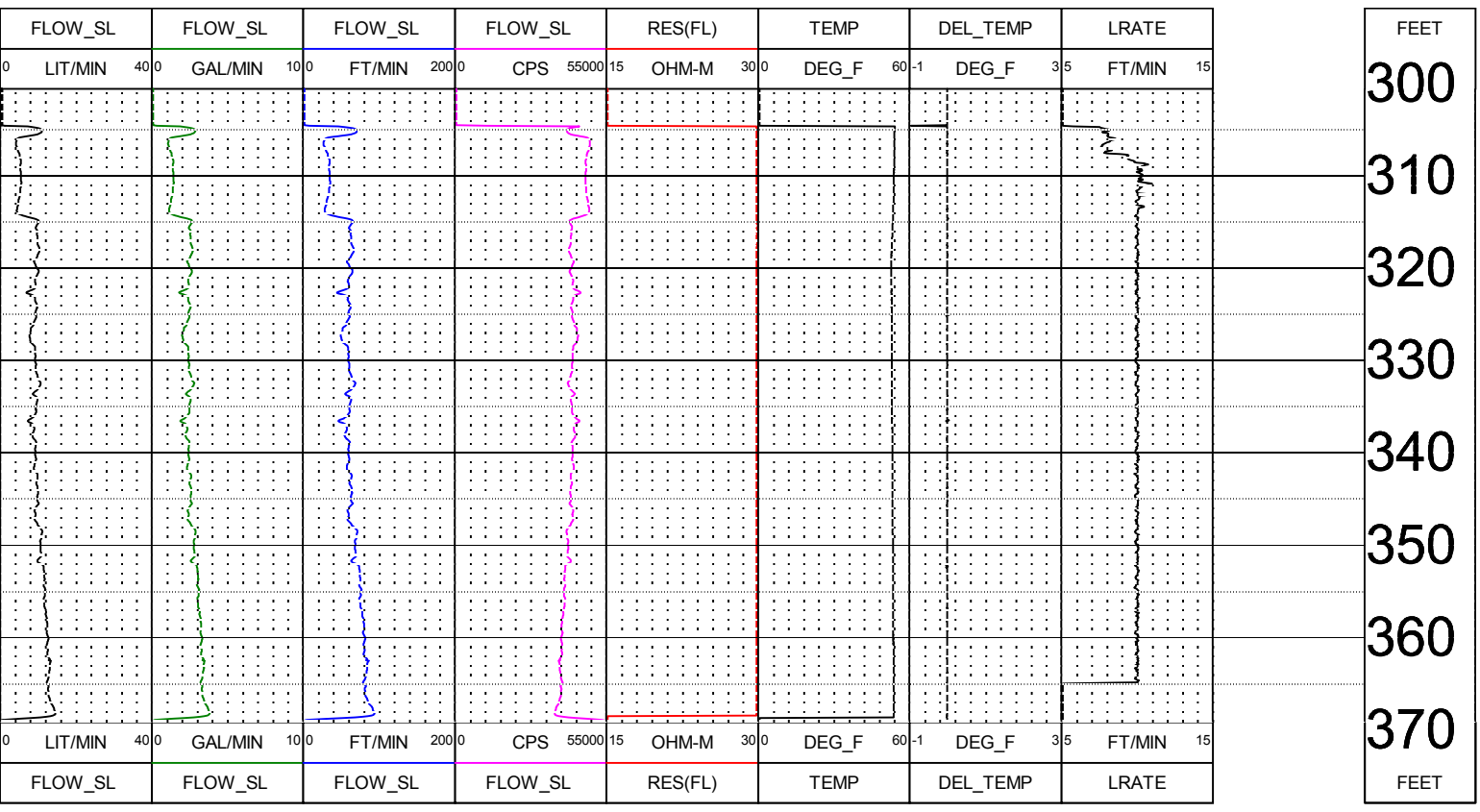


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

848626-AMBTRL

NAME	: MW13A			OTHER SERVICES:	
UNIQUE NUMBER	: 848626-AMBTRL				
QUADRANGLE	: 102B - LAKE ELMO				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: BDCADD				
SECTION	: 26	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/10/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 317			KB	:
LOG BOTTOM	: 369.09	LOG MEASURED FROM	:	DF	:
LOG TOP	: 300.56	DRL MEASURED FROM	:	GL	: 909L1
CASING DIAMETER	: 8	LOG RATE	: 10FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: CICHA		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/10/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:30:
				THRESH	: 2500
SWL	: 24				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Preliminary Flowmeter Summary and Results

Well Name: MW13A
Unique Number: 848626
Date Logged: 6/10/2020

Note: This summary accompanies the flowmeter results figure. Note most footages on the video appear to be a 1.7' deeper than the geophysical logging tools. These adjustments are accounted for on the summary figure.

The video and caliper logs indicate a well intact borehole. Horizontal bedding is visible throughout the borehole in the Tunnel City Group and the St. Lawrence Formation. There are 5 bedding planes that have large enough openings to see on the video and are noted as bedding plane fractures (338.2', 335.3', 328.2', 324.1', 322.7', and 321.2' actual depths on video). The borehole had microbial material suspended in the borehole. Most of it appeared to be moving down the borehole very slowly. Only one of these fractures had obvious flow at 321.2' (319.5' corrected). Turbulent water is seen in this area and appears to be moving downward. However, a distinct exit is not seen. The other fractures in the borehole did not have any visible flow.

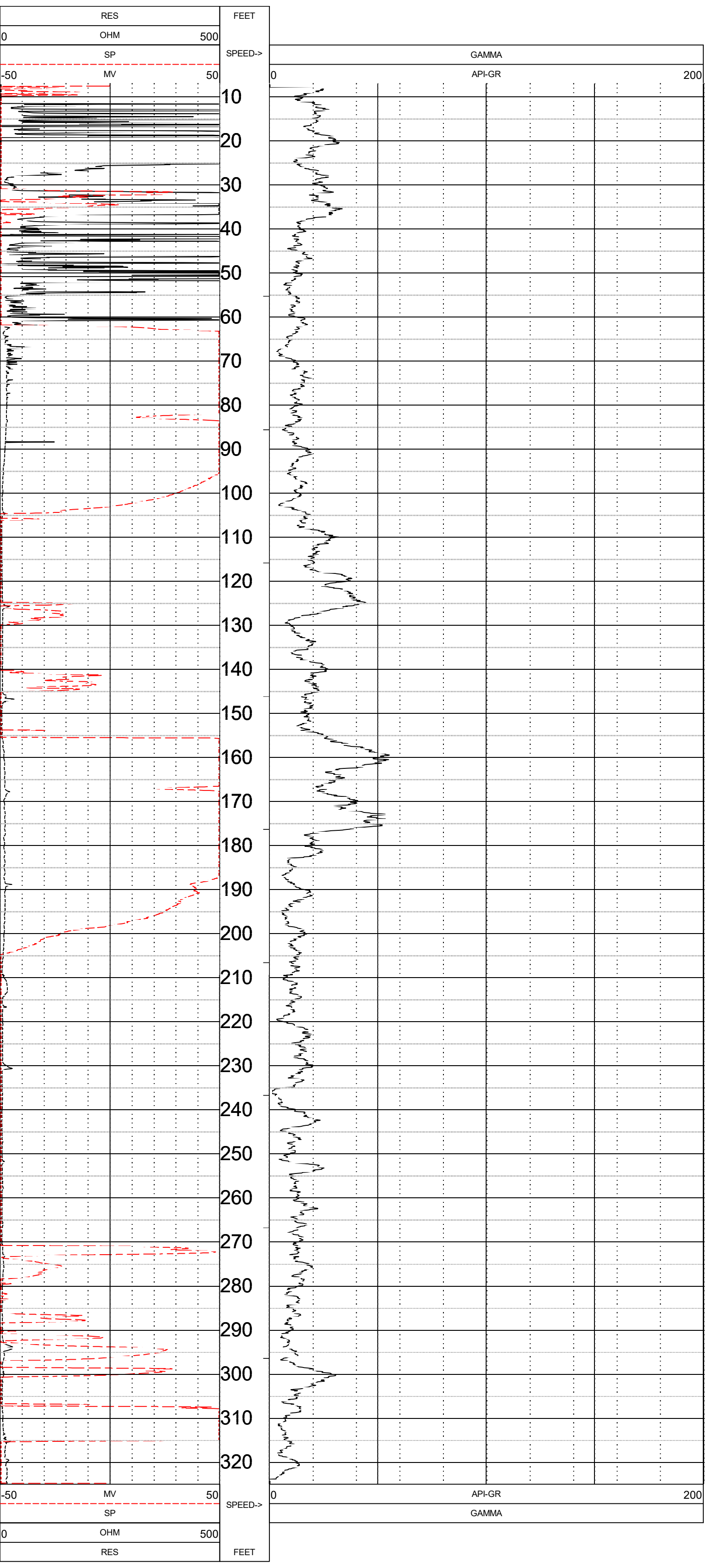
The flow station measurements indicate there is a small amount of downflow in the borehole on the order of -0.01 to -0.04 gal/min (negative equals down flow). The two largest measurements were near 331' and 341' with -0.03 and 0.04 gal/min measured respectively. These values are close to our detection limit. The fluid resistivity and temperature logs indicate at shift in temp and resistivity around 319'. Based on the video, station flow, temp and conductivity logs our interpretation is that water is entering the hole at ~319' travels downwards and exits in the upper Tunnel City on the order of 0.04gal/min.

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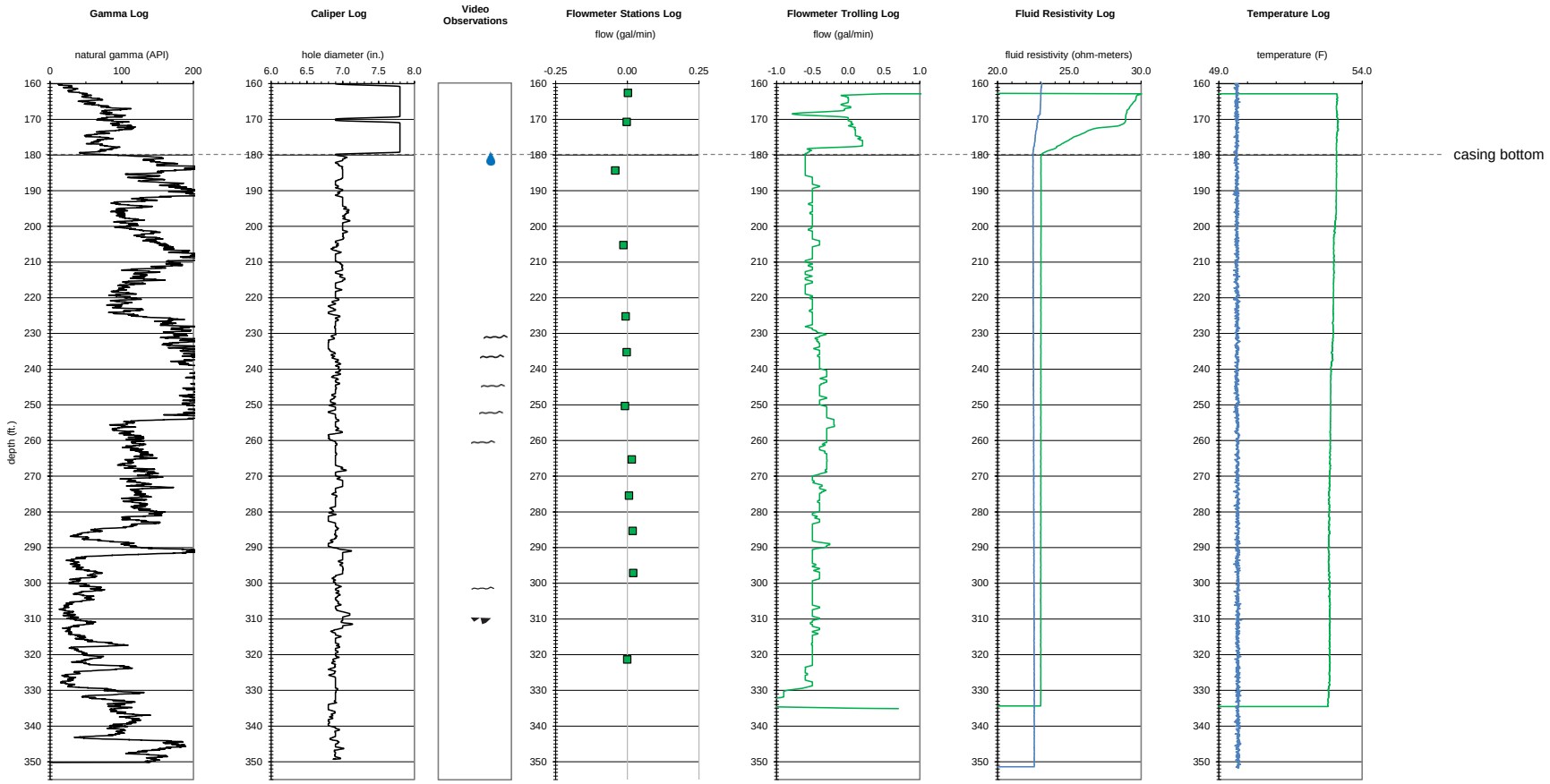
850557

NAME	: MW14A			OTHER SERVICES:	
UNIQUE NUMBER	: 850557				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DDDDDA				
SECTION	: 17	TOWNSHIP	: 29	RANGE	: 21
DATE	: 12/16/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 316			KB	:
LOG BOTTOM	: 324.91	LOG MEASURED FROM	:	DF	:
LOG TOP	: 6.95	DRL MEASURED FROM	:	GL	: 965 L1
CASING DIAMETER	: 4	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9060A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 12/16/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:25:
				THRESH	: 2500
SWL	: 61				
REMARKS	:				

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Well Name: MW15A
Unique Number: 850551
T-R-S: T29 R20 Section 34 ACAABC



Geology:
0-52 QUUU, Quaternary sediments
52-70 CJDN, Jordan Sandstone
70-110 CSTL, St. Lawrence Formation
110-286 CTCG, Tunnel City Group
286-342 CWOC, Wonewoc Sandstone
346-350+ CECR, Eau Claire Formation

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Water enters borehole at bottom of casing and travels down hole. Water exits intergranularly or through bedding plane partings we did not recognize on video in the upper Tunnel City (values are very low, less than 0.042 gal/min). Most if not all flow appears to exit by 230 to 240'. The temperature log shows a subtle change in slope at 240' then steady temp below 240'. There may be faint upflow in the CWOC (0.02 gal/min) at station measurement 297', but none was noted on video.

Logged by Minnesota Geological Survey
28-Oct-20
Gamma, Multi, Caliper, and ambient flow logged.

Well Name: MW15A

Unique Number: 850551

Video Log Observations:

logged by: Mayer (MGS), Steenberg (MGS)

Date: October 28th, 2020

Notes: Used 2" skirt on camera. This gave the appearance of upflow as we trolled upward. Depth was corrected (-2ft) based on casing observation.

Camera Depth (ft.)	Camera View	True Depth (ft)	Observations
68.7	Sideview	66.7	SWL
182.4	Sideview	180.4	Bottom of casing, water coming in
335	Sideview	333.0	soft bottom
317.8	Sideview	315.8	possible upflow, but probably just related to skirt
314.9	Sideview	312.9	possible void
314	Sideview	312.0	downflow
311.4	Sideview	309.4	possible void
303.3	Sideview	301.3	BPF
294.5	Sideview	292.5	color change, light to dark
263.5	Sideview	261.5	BPF
255.1	Sideview	253.1	Possible BPF (or bed?)
248.1	Sideview	246.1	Possible BPF (or bed?)
239.8	Sideview	237.8	BPF
233.1	Sideview	231.1	BPF (or bed?)
229	Sideview	227.0	bed, bedding structure
203	Sideview	201.0	bedding structures
182	Sideview	180.0	Bottom of casing, water entering.

Well Name: MW15A
Unique Number: 850551

Flow Log Station Measurements
Logged by: Steenberg(MGS), Mayer (MGS)
Date: 10/28/2020
Flow tool Skirt Diameter (in.): 8
Note: (-) flow values = downflow; (+) flow values = upflow
Values were corrected based on the average reading in the casing of 0.247 l/min.

Depth (ft.)	Flow (l/min)	Corrected Flow (l/min)	Comments:
162.6	0.238	0.0087	Steady
170.7	0.256	-0.0092	Steady
184.3	0.408	-0.1608	Steady
205.2	0.298	-0.0515	Steady
225.2	0.269	-0.0222	Steady
235.2	0.254	-0.0074	Steady
250.3	0.279	-0.0324	Steady
265.3	0.189	0.0582	Steady
275.4	0.2241	0.0226	Steady
285.3	0.1771	0.0696	Steady
297.1	0.1703	0.0764	Steady
321.3	0.2481	-0.0014	Steady

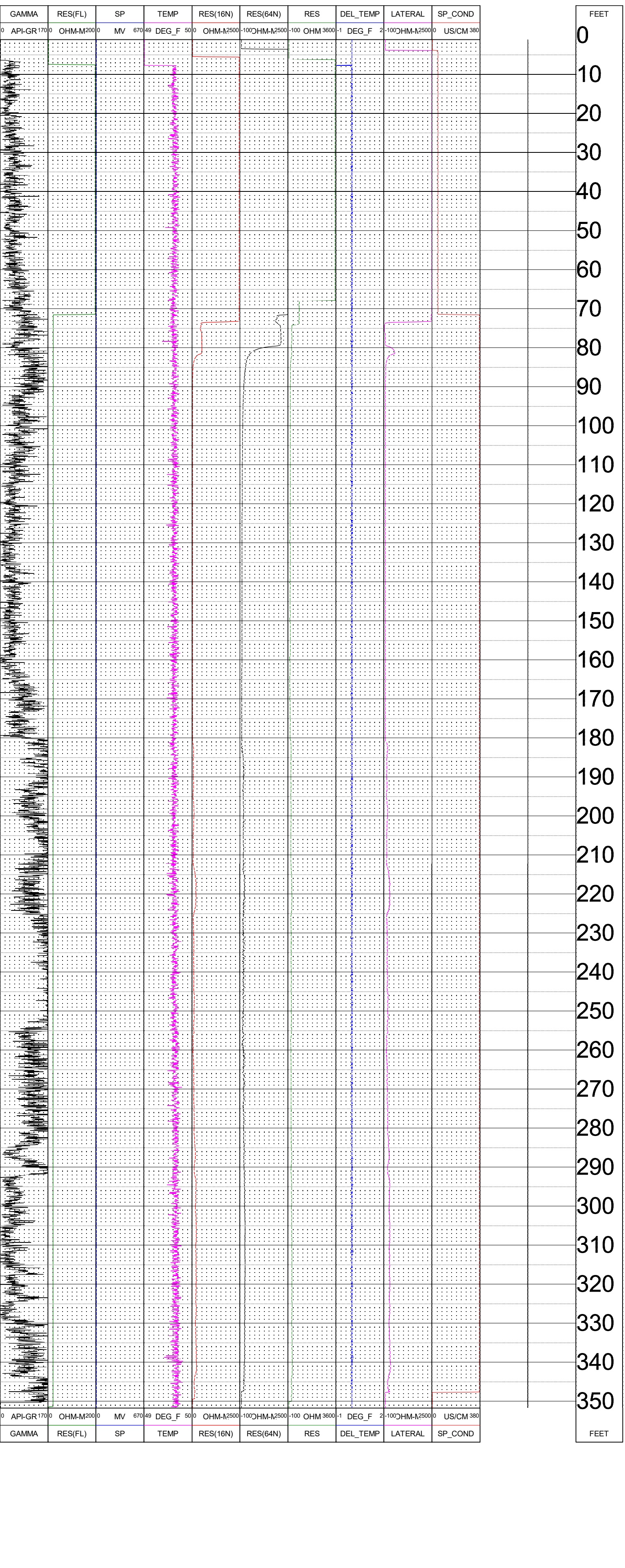
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St. Paul, MN 55114
Dept. Phone: (612)626-2969

850551_MULTI

NAME	: MW15A			OTHER SERVICES:	
UNIQUE NUMBER	: 850551_MULTI				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/28/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 180			KB	:
LOG BOTTOM	: 351.69	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.07	DRL MEASURED FROM	:	GL	: 860 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/28/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:51:
				THRESH	: 2500

SWL : 74
REMARKS : HOLES PLUGGED ON TOOL

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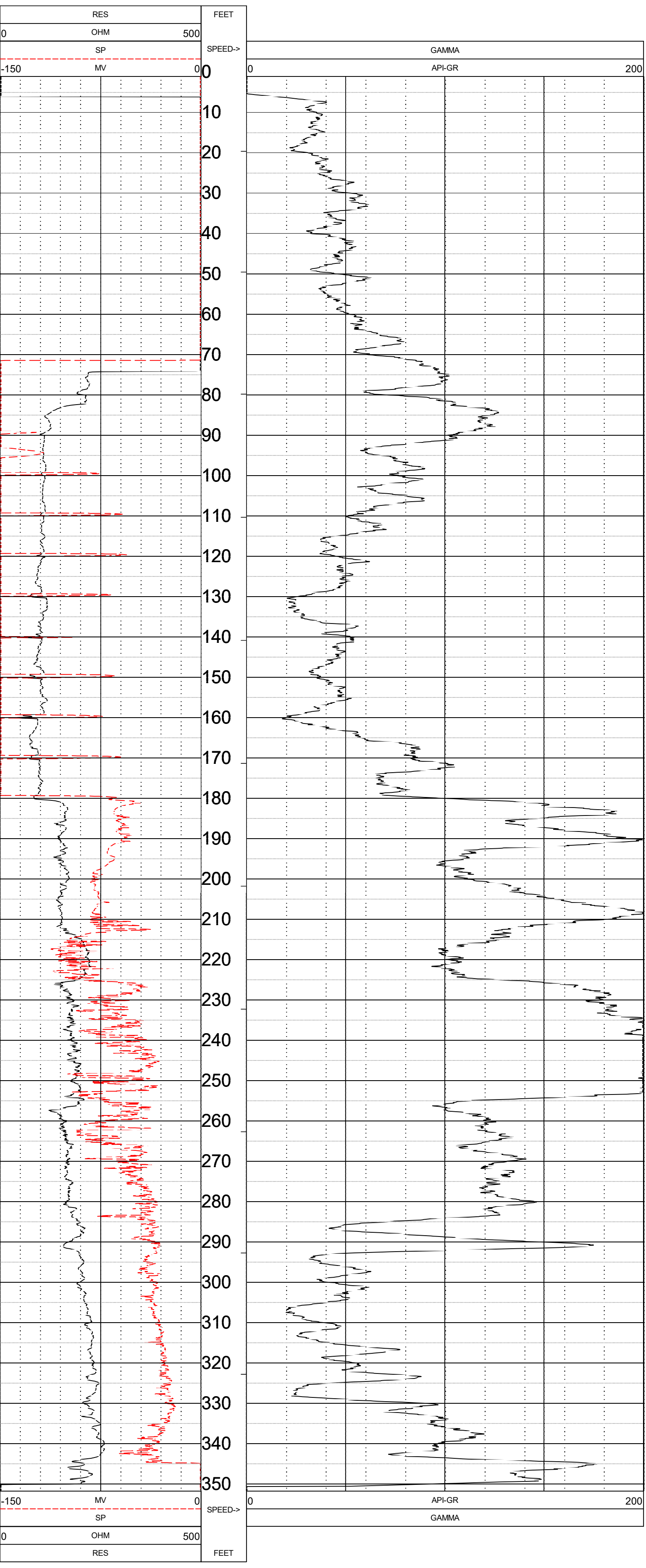


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850551

NAME	: MW15A			OTHER SERVICES:	
UNIQUE NUMBER	: 850551				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/28/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 180			KB	:
LOG BOTTOM	: 351.69	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.07	DRL MEASURED FROM	:	GL	: 860 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
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MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/28/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:51:
				THRESH	: 2500
SWL	: 74				
REMARKS	:				

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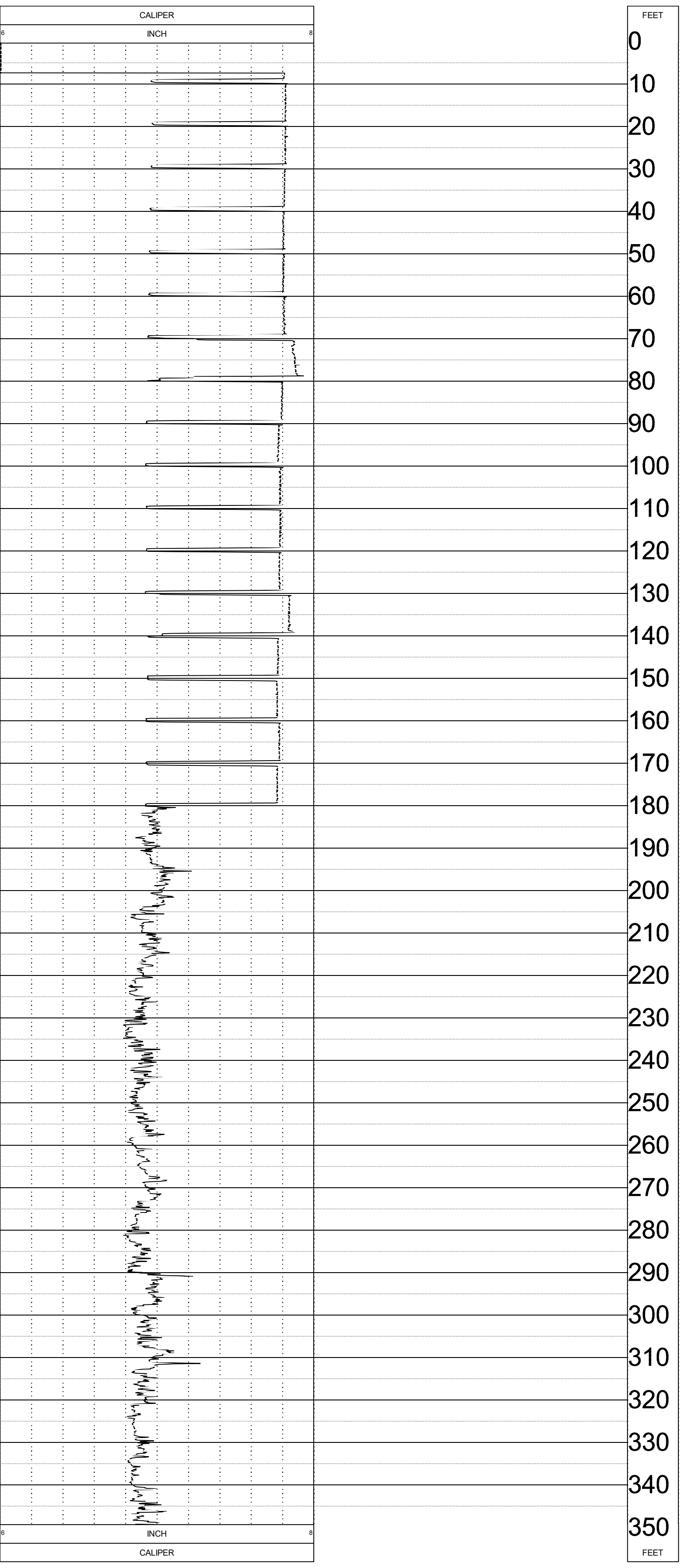


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850551_CALIPER

NAME	: MW15A			OTHER SERVICES:	
UNIQUE NUMBER	: 850551_CALIPER				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/28/20	MGS CUTTINGS #	:		
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LOG TOP	: 0.40	DRL MEASURED FROM	:	GL	: 860 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/28/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:20:
				THRESH	: 2500
SWL	: 74				
REMARKS	:				

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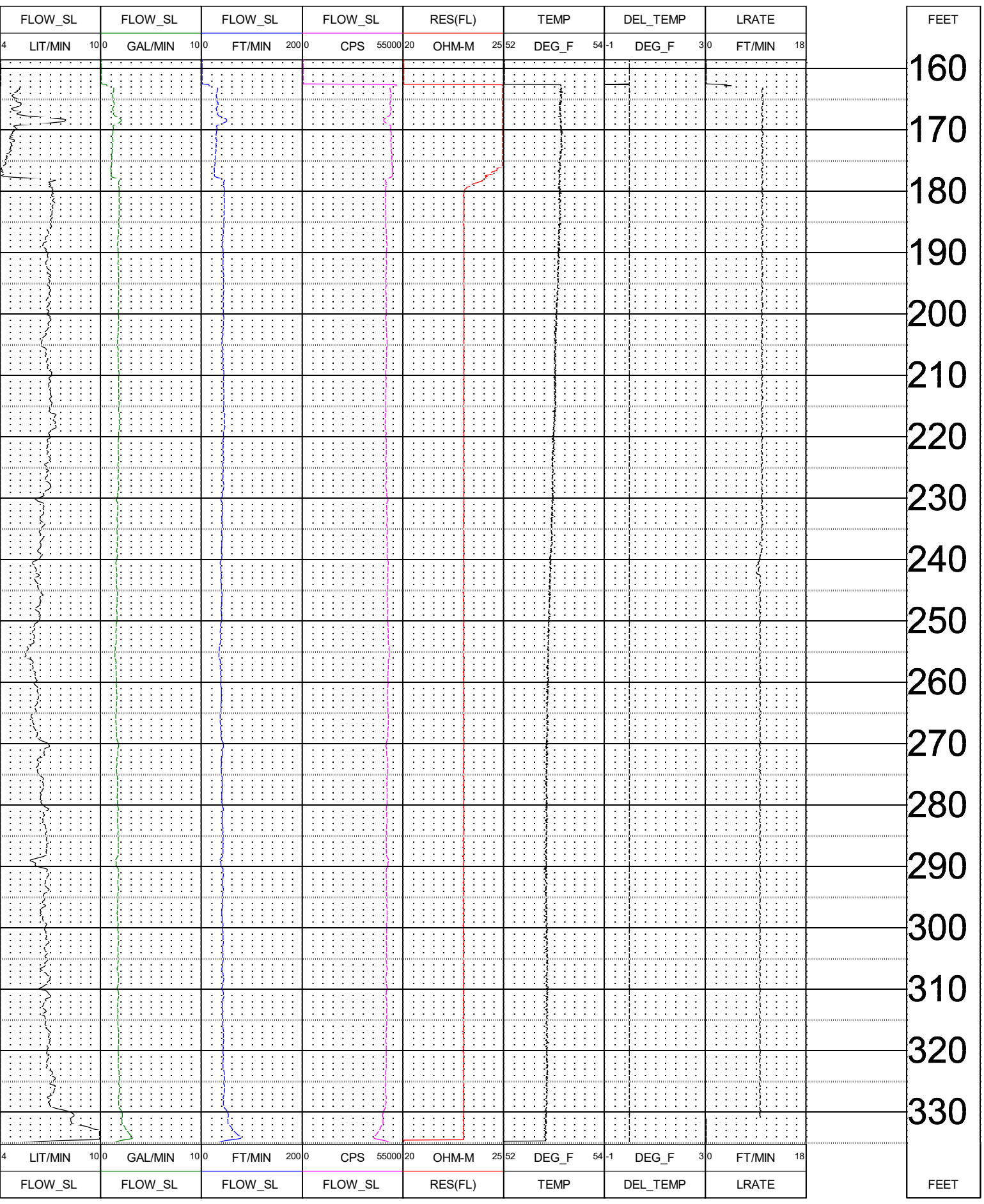


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

850551_AMBTROLL

NAME	: MW15A			OTHER SERVICES:	
UNIQUE NUMBER	: 850551_AMBTROLL				
QUADRANGLE	: HUDSON 102-A				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 10/28/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 180			KB	:
LOG BOTTOM	: 335.12	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 158.58	DRL MEASURED FROM	:	GL	: 860 L1
CASING DIAMETER	: 8	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: STEENBERG		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/28/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:10:
				THRESH	: 2500
SWL	: 74				
REMARKS	:				

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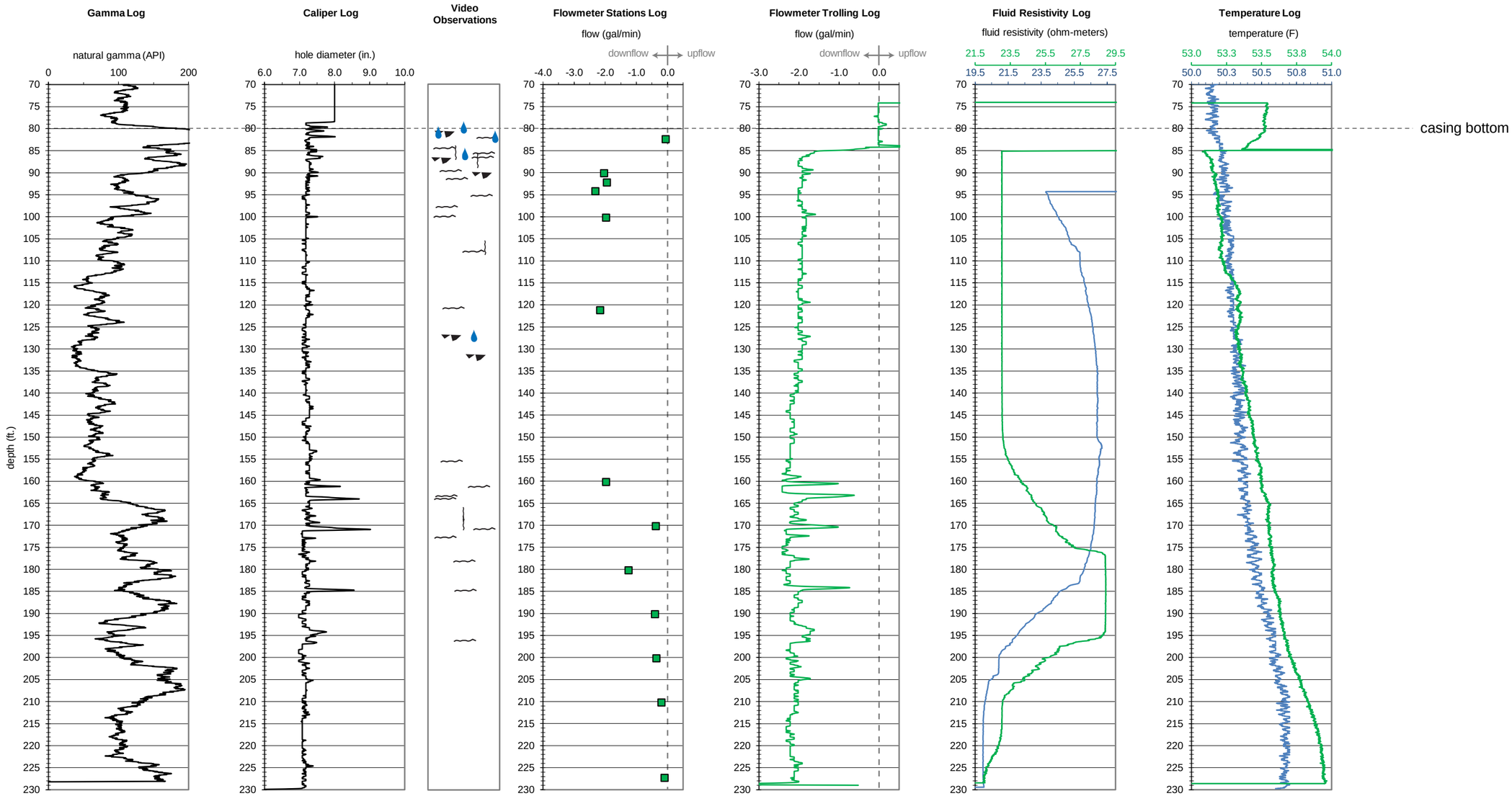
Preliminary Flowmeter Summary and Results

Well Name: MW15A
Unique Number: 850551
Date Logged: 10/28/2020

Note: This text accompanies the summary figure. Flow entering casing bottom is seen on video, one possible bedding plane fracture at 303' and vug at 311'. A 2” skirt was used while videoing, this made it appear to have up flow when first paused but after settling there was no flow seen.

Water enters the borehole at bottom of casing and travels down hole. The water appears to exit intergranularly in the upper Tunnel City (values are very low, less than 0.042 gal/min) or through bedding plane partings that were not discernable on the video log. Most or all of this flow exits the borehole by 230-240’. There is a slight change in slope on the temperature profile at 240’ and it is steady temperature below that. There may be faint up flow in the CWOC (0.02 gal/min). However, this is very close to our measuring limits and might be within the error of our tools.

Well Name: MW15B
Unique Number: 850522
T-R-S: T29 R20 Section 34 ACAABC



Geology:
0-59 QUUU, Quaternary sediments
59-78 CJDN, Jordan Sandstone
78-116 CSTL, St. Lawrence Formation
116-229+ CTCG, Tunnel City Group

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Video log indicates water entering behind the casing at 80' and cascading down the open borehole to the static water level at 88'. The multitool and flowmeter logs indicate that the static water level was raised to about 85' at the time of logging due to the addition of water while video logging back up the hole. We waited 10-15 minutes after the video log before proceeding with the multitool and other log collection so the borehole could return to near-ambient conditions.

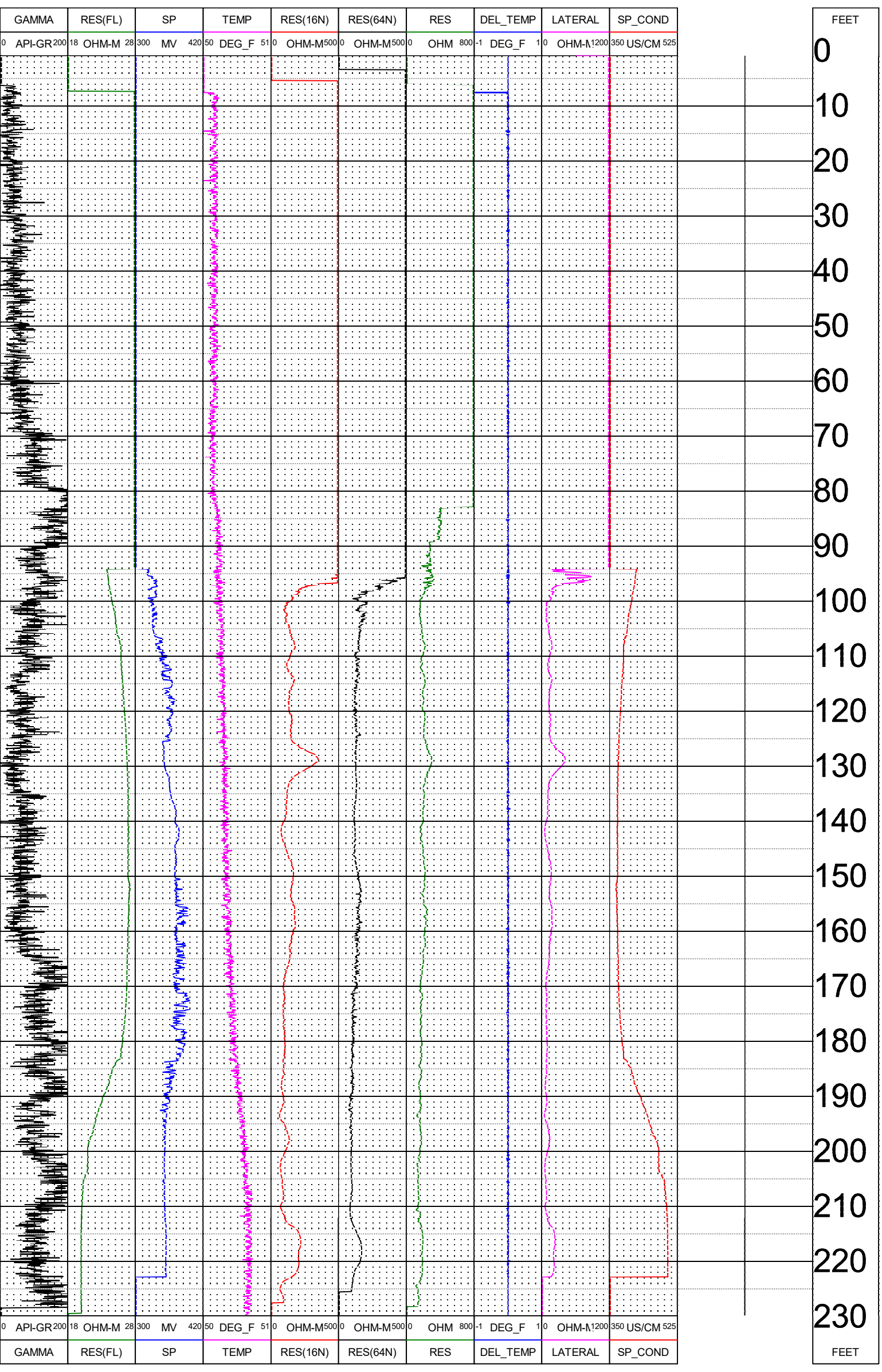
Logged by Minnesota Geological Survey
11/4/2020
Video, multitool, caliper, ambient flowmeter trolling, and ambient flowmeter stations

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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850552_MULTI

NAME	: MW15B			OTHER SERVICES:	
UNIQUE NUMBER	: 850552_MULTI				
QUADRANGLE	: 102A - HUDSON				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 11/04/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 229.77	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 0.92	DRL MEASURED FROM	:	GL	: 860L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/04/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:00:
				THRESH	: 2500
SWL	: 88				
REMARKS	:				

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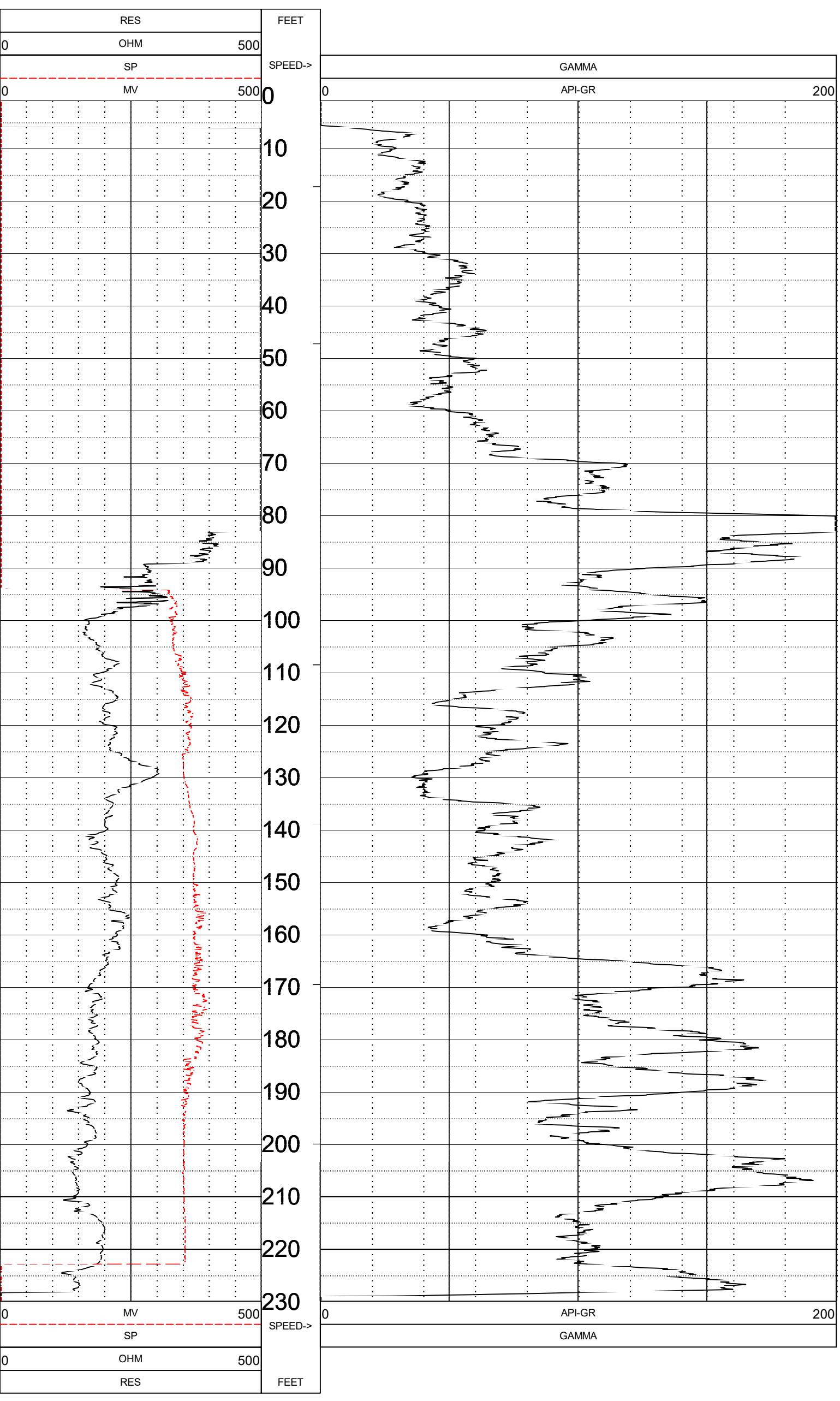
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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850552_GAMMA

NAME	: MW15B			OTHER SERVICES:	
UNIQUE NUMBER	: 850552_GAMMA				
QUADRANGLE	: 102A - HUDSON				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 11/04/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 229.77	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.92	DRL MEASURED FROM	:	GL	: 860L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/04/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:00:
				THRESH	: 2500

SWL : 88
REMARKS : GAMMA FROM MULTITOOL

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

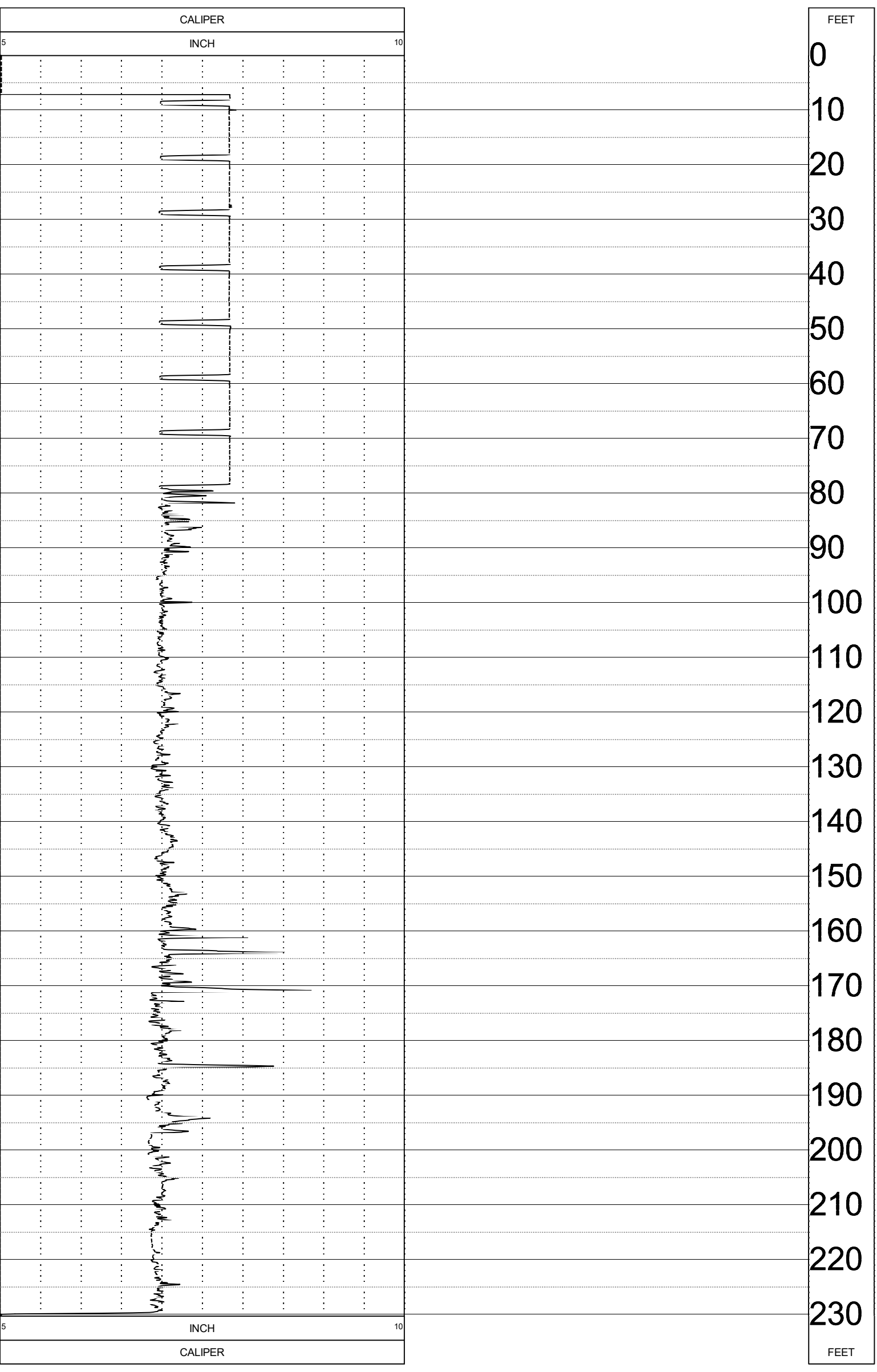


Minnesota Geological Survey
University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850552_CALIPER

NAME	: MW15B			OTHER SERVICES:	
UNIQUE NUMBER	: 850552_CALIPER				
QUADRANGLE	: 102A - HUDSON				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 11/04/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 230.26	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 0.10	DRL MEASURED FROM	:	GL	: 860L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/04/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:20:
				THRESH	: 2500
SWL	: 88				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

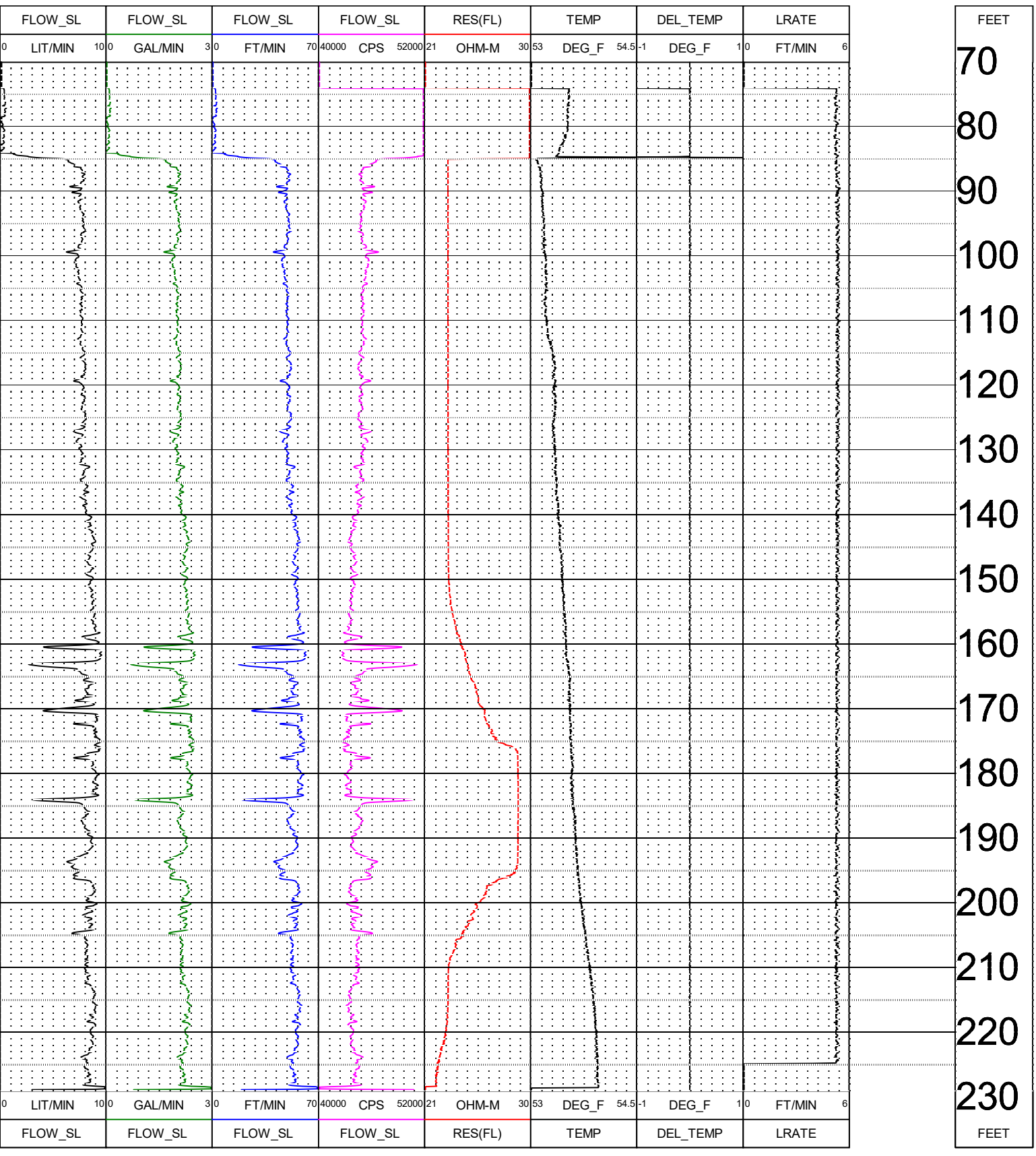


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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850552_AMBTROLL

NAME	: MW15B			OTHER SERVICES:	
UNIQUE NUMBER	: 850552_AMBTROLL				
QUADRANGLE	: 102A - HUDSON				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACAABC				
SECTION	: 34	TOWNSHIP	: 29	RANGE	: 20
DATE	: 11/04/20	MGS CUTTINGS #	:		
CASING BOTTOM	: 80			KB	:
LOG BOTTOM	: 229.01	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 70.09	DRL MEASURED FROM	:	GL	: 860L1
CASING DIAMETER	: 8	LOG RATE	: 5FPM		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 11/04/20
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:47:
				THRESH	: 2500
SWL	: 88				
REMARKS	: WATER ENTERING BEHIND CASING				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW15B
Unique Number: 850552

VIDEO LOG OBSERVATIONS

Logged By: Retzler (MGS), Cicha (MGS)
Date: 11/4/2020
Note: Zeroed in sideview. Depths have been corrected by -0.8 ft. based on bottom of casing reading.

Depth (ft.):	Camera View:	Observations:
80.0	sideview	bottom of casing; visible flow
80.0	sideview	BPF; flow
84.5	sideview	thin bedding plane; soft sediment deformation?
85.6	sideview	BPFs; flow
87.7	sideview	SWL
90.2	sideview	cavern
91.2	sideview	cavern; karstic
97.2	sideview	sandy/silty; more competent bedrock
99.2	sideview	vertical fracture
100.5	sideview	steady downflow still visible
105.2	sideview	vuggy
112.9	sideview	wavy bedding
120.2	sideview	thin BPF
127.2	sideview	vuggy
131.2	sideview	vuggy; steady downflow still visible
144.2	sideview	glauconitic
155.7	sideview	thin BPFs
164.6	sideview	thin BPFs
166.7	sideview	thin vertical fracture
174.2	sideview	thin BPFs; possible flow
179.6	sideview	thin BPF
198.6	sideview	vuggy
207.2	sideview	water becoming more cloudy
215.2	sideview	steady downflow still visible
225.2	downview	camera's downview setting starts working again
231.3	downview	bottom of hole; drillers begin injecting water for upwards logging
214.2	sideview	injected water flowing over top of well casing
163.2	sideview	cut injected water flow
67	sideview	new SWL; steadily dropping

Well Name: MW15B
Unique Number: 850552

FLOW LOG STATION MEASUREMENTS

Logged By: Retzler (MGS) and Cicha (MGS)
Date: 11/4/2020
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Values were not corrected because SWL was below casing; could not get an accurate ambient flow measurement within casing for correction.

Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
90.1	-7.7111	N/A	steady
92.2	-7.3560	N/A	steady
94.2	-8.7694	N/A	steady
100.2	-7.4636	N/A	steady
121.2	-8.2026	N/A	steady
160.2	-7.4621	N/A	steady
170.2	-1.4102	N/A	steady
180.2	-4.7355	N/A	steady
190.2	-1.5169	N/A	steady
200.2	-1.3381	N/A	steady
210.2	-0.7271	N/A	slowly increasing
227.3	-0.3593	N/A	steady increase in flow
82.4	-0.2338	N/A	variable

Preliminary Flowmeter Summary and Results

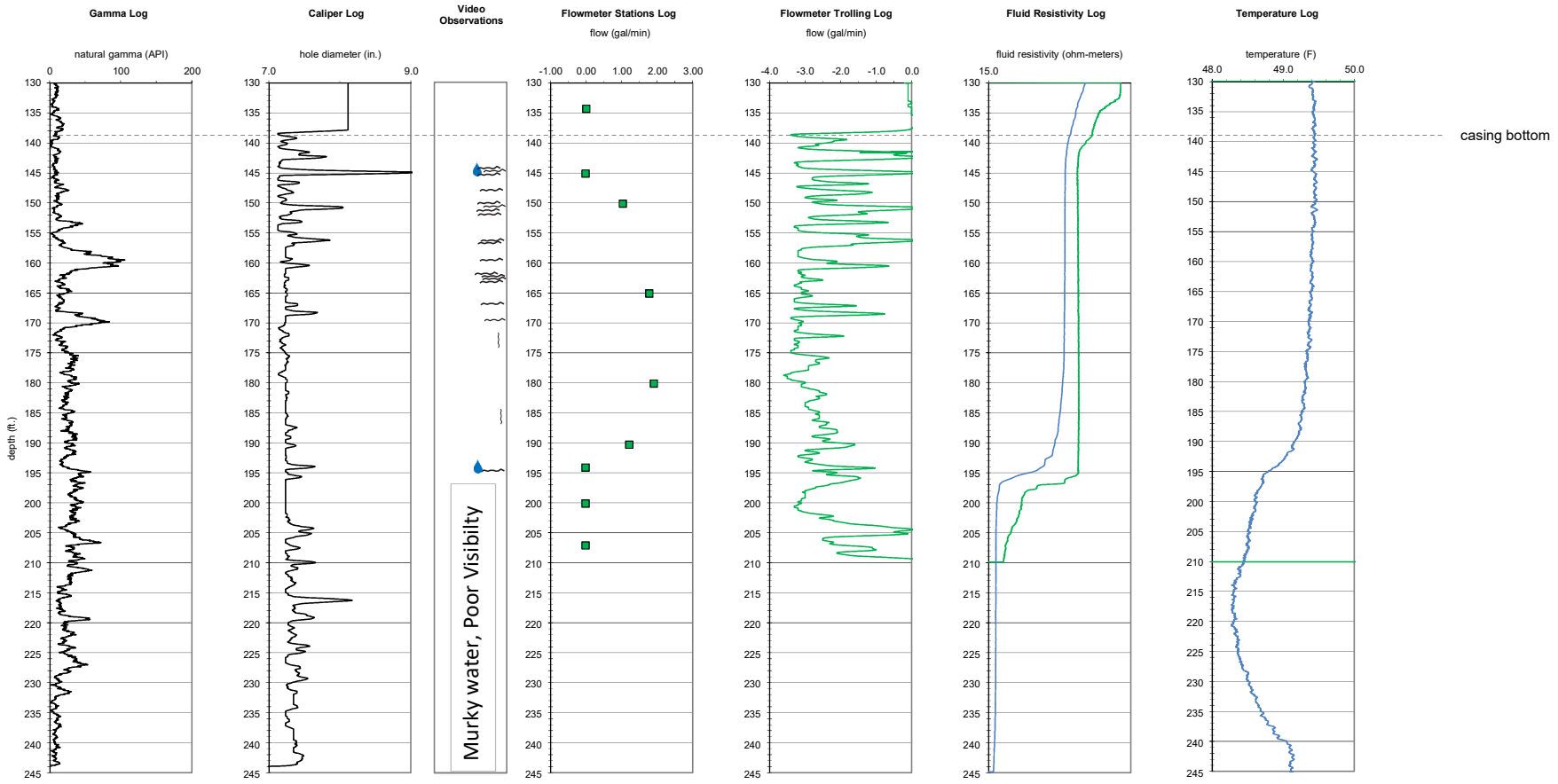
Well Name: MW15B
Unique Number: 850552
Date Logged: 11/4/2020

Note: This summary accompanies the logging data results figure. Also, please note that the footages in the accompanying video log are off by an additional 0.8 feet based on the actual depth to bottom of casing (80 feet). Video observations shown on the results figure take this into account.

The video and caliper logs indicate several thin bedding plane fractures at about 80.0', 84.5', 85.6', 120.2', 155.7', 164.6', 174.2', and 179.6'. Additionally, thin vertical fractures were noted at about 99.2' and 166.7'. There is obvious flow into the borehole from behind and right at the bottom of casing (80.0') within the St. Lawrence Formation that cascades down to the static water level at about 88'. Also, there appears to be one or more other bedding plane fractures below casing and above the static water level that may be contributing more flow to the borehole. Besides this portion of the borehole, there were no other obvious signs of flow in or out of the open borehole noted in the video except possibly around depths of about 127' and 174.2'. Particles throughout the video log show a steady downflow due to the water that enters the borehole between the bottom of the casing and the static water level.

The station measurements and trolling flowmeter results indicate steady downflow of about 2.0 gal/min throughout most of the borehole until below about 160'. If you look closely at the trolling flowmeter log, it appears there may be additional downflow added to the hole at about 140'; however, there is nothing to independently support this in the video, fluid resistivity, or temperature logs. We believe that the station measurement taken at about 170' showing little to no flow does not accurately measure or represent the flow at this depth because the skirt may have had a poor seal due to the presence of the bedding plane fracture located right at this depth. If you ignore the station measurement at 170', the simplest characterization of these data is a gradual loss in flow over several tens of feet below about 160'. This loss would most likely be through bedding plane fractures due to the low intergranular permeability typical of the Lone Rock Formation (Tunnel City Group). Considering the station measurements, most of the downflow appears to have exited the borehole by about 210'. While the fluid resistivity logs show quite a bit of variability, we cannot verify their authenticity as these readings may have been altered due to the addition of water to the borehole during video log collection.

Well Name: MW17A
Unique Number: 850556
T-R-S: T29 R21 Section 15 CBCCDB



Geology:
0-88 QUUU, Quaternary sediments
88-108 OSTP, St. Peter Sandstone
108-228 Prairie Du Chien Group
108-175 OPSH, Shakopee Dolomite
175-228 OPOD, Oneota Dolomite
228-245 CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

Note:

Logged by Minnesota Geological Survey
2/17/2021
Video, Multi, Caliper, and Flow logged.

Preliminary Flowmeter Summary and Results

Well Name: MW17A
Unique Number: 850556
Date Logged: 2/17/2021

Note: This summary accompanies the logging data results figure.

Video observations showed a sharp contact with cloudy water below 196.3'. Observations below this depth were difficult due to poor visibility. From this, one can infer little to no ambient flow below a depth of 196.3’ as the murkiness is indicative of stagnant water. A bedding plane fracture at 194.7’ shows water coming into the borehole and flowing upward. The video and caliper log show bedding plane fractures at 194.7’, 169.2’, 167.8’, 163.4’, 160.8’, 157.6’, 157.1’, 151’, 153.9’, and 147.6’. The video showed 2 rubbly zones, one at 165.8’ and one at 151.5’. Upflow of particles can be seen on the video at 181.1’ and 169.2’ indicating upflow. A void at 145.9’ appears to be accepting the upflow, as the water appears to be exiting the well at this void. There appears to be no flow above the void at 145.9’. Overall, the video showed water entering the borehole at a BPF at 194.7’, flowing upward, and exiting the borehole at a void at 145.9’.

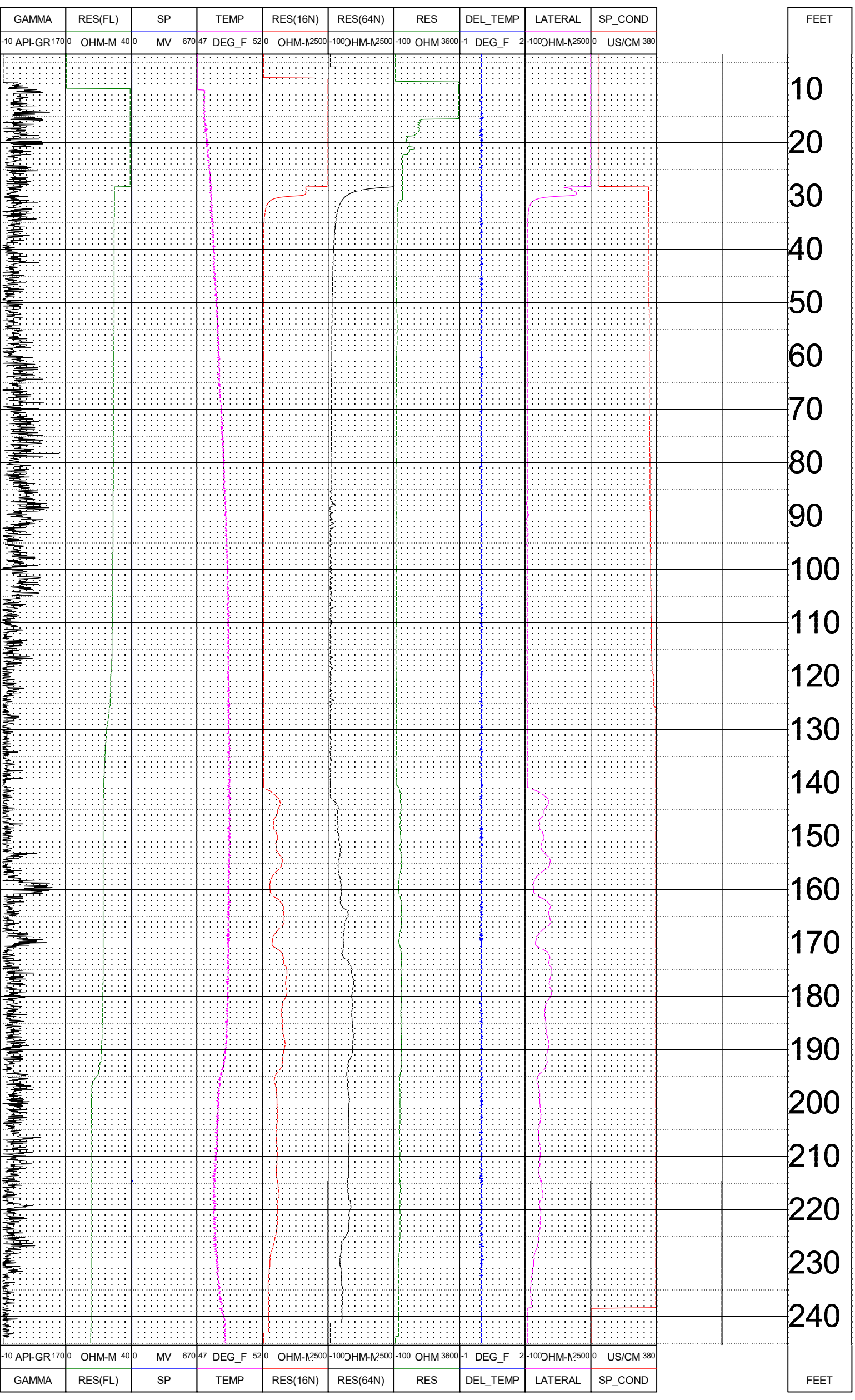
The fluid resistivity and temperature logs both kick around 195’ and stay steady above this depth. This implies a change in water at or around a depth of 195’. Station measurements show little to no flow below a depth of 195’. The station measurement at 150’ shows flow decreased by about 1 lit/min. Flow may be partially exiting at the fractures between 165’ and 145.9’. There is little to no flow above 146’. These data, along with video observations show water entering the borehole at a bedding plane fracture at 194.7’. This water then flows up the borehole and exits at a void at 145.9, some flow may be exiting in fractures below 145.9’. Little to no ambient flow is observed in the well below 197” or above 145’.

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Dept. Phone: (612)626-2969

850556_MULTI

NAME	: MW17A			OTHER SERVICES:			
UNIQUE NUMBER	: 850556_MULTI						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: CBCCDB						
SECTION	: 15	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 02/17/21	MGS CUTTINGS #	:				
CASING BOTTOM	: 140				KB	:	
LOG BOTTOM	: 245.33	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 3.45	DRL MEASURED FROM	:		GL	: 915 L1	
CASING DIAMETER	: 8	LOG RATE	: 30FPM				
CASING TYPE	:	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: MAYER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 8144A	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 02/17/21	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 10:26:	
					THRESH	: 2500	
SWL	: 31						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

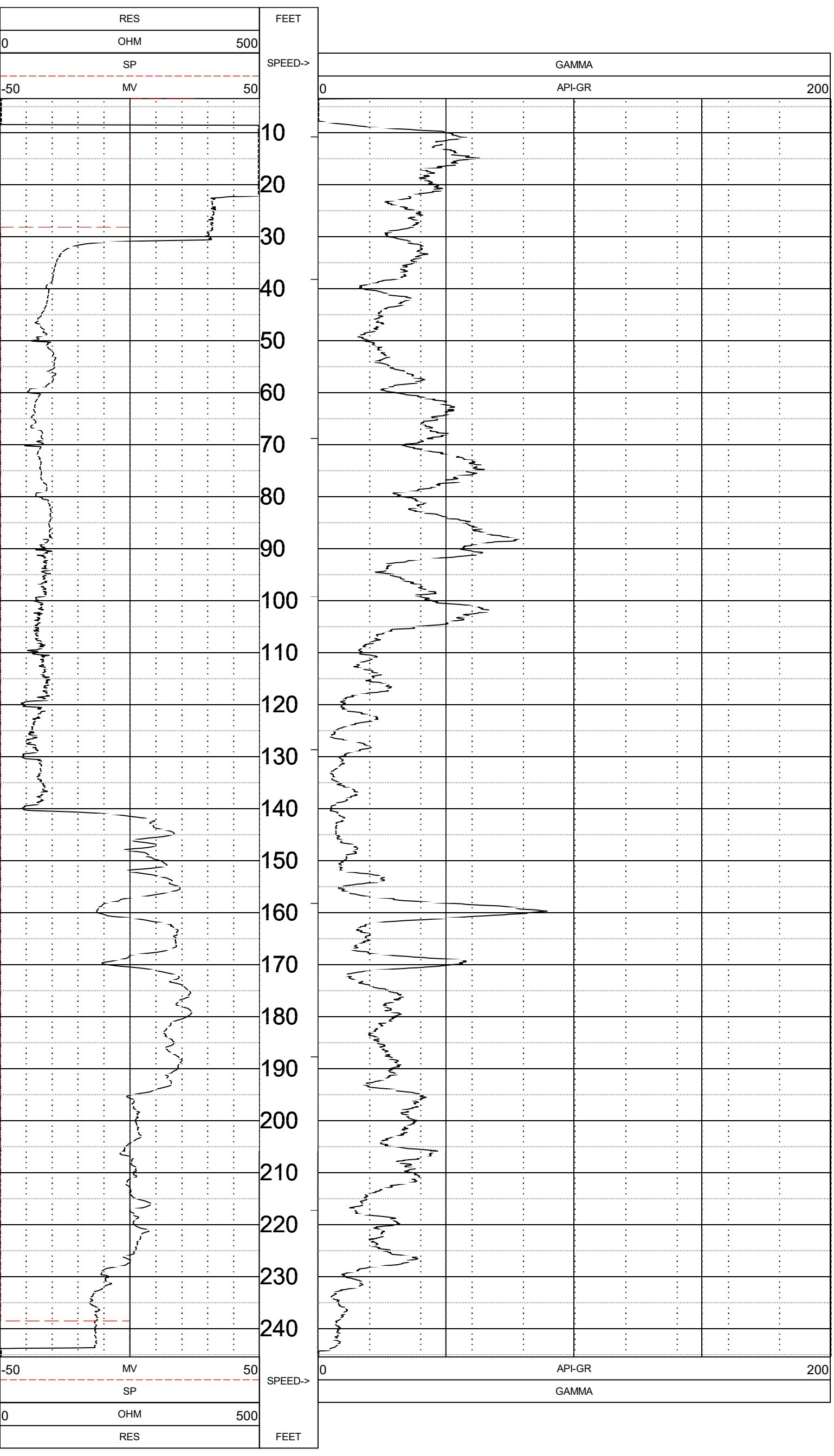


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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

850556

NAME	: MW17A			OTHER SERVICES:	
UNIQUE NUMBER	: 850556				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CBCCDB				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 02/17/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 140			KB	:
LOG BOTTOM	: 245.33	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 3.45	DRL MEASURED FROM	:	GL	: 915 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: ORIGINAL
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 02/17/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:26:
				THRESH	: 2500
SWL	: 31				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Well Name: MW17A
Unique Number: 850556

Flow Log Station Measurements
Logged by: Steenberg(MGS), Mayer (MGS)
Date: 2/17/2021
Flow tool Skirt Diameter (in.): 8
Note: (-) flow values = downflow; (+) flow values = upflow
Values were corrected based on the average reading in the casing of -.2544 l/min.

Depth (ft.)	Flow (l/min)	Corrected Flow (l/min)	Comments:
207.1	-0.3194	-0.0722	In cloudy water
200.1	-0.321	-0.0740	Steady
195.1	-0.319	-0.0718	Steady
190.3	3.877	4.5904	Steady
180.1	6.235	7.2104	Steady
165.1	5.805	6.7327	Steady
150.1	3.258	3.9027	Steady
145.1	-0.307	-0.0579	Steady
134.3	-0.2544	0.0000	Steady

Well Name: MW17A
Unique Number: 850556

Video Log Observations:

logged by: Mayer (MGS), Steenberg (MGS)
Date: February 17th, 2021
Notes:

Camera zeroed in side-view. Video footages corrected based on bottom of casing measurements.

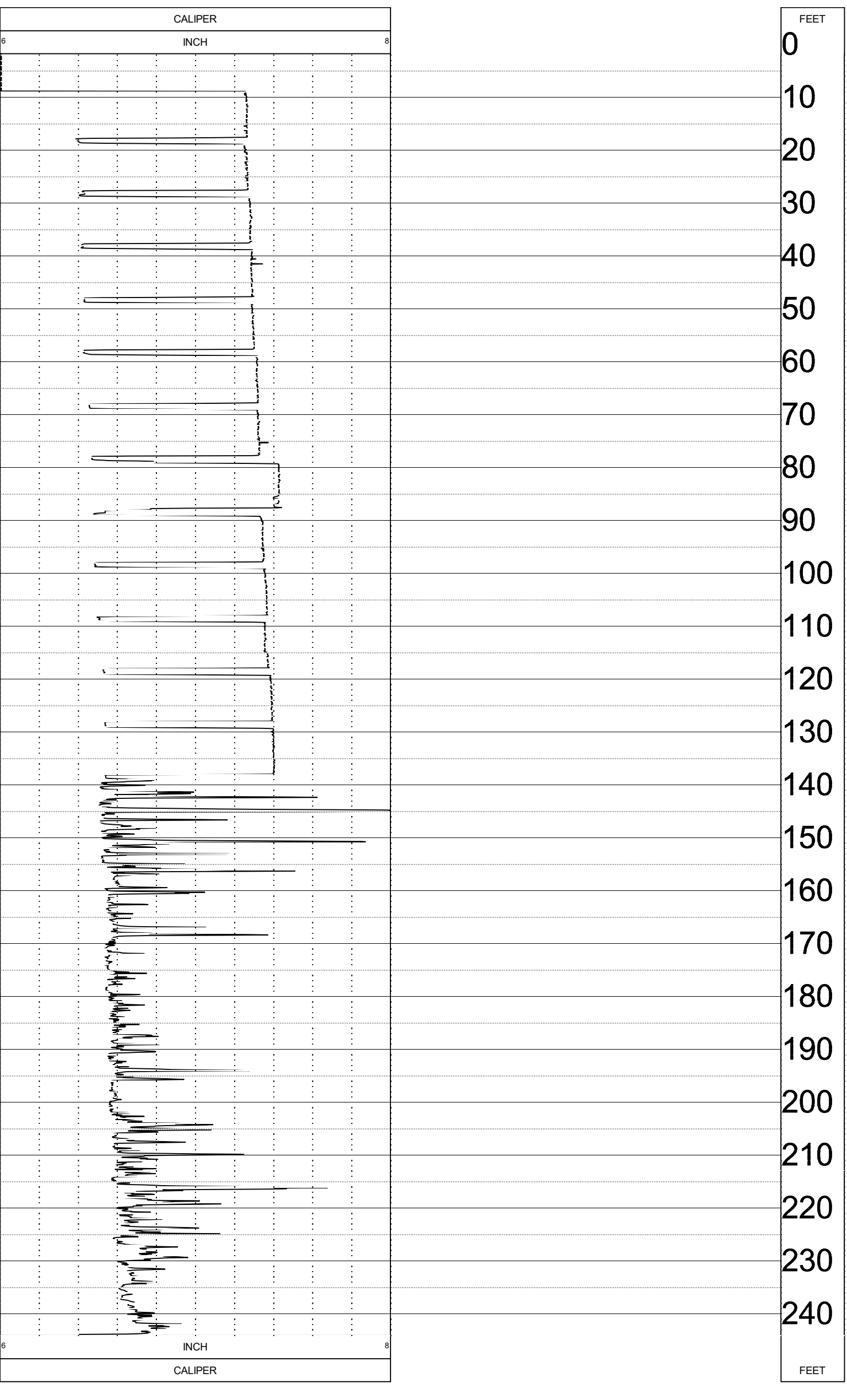
Camera Depth (ft.)	Camera View	True Depth (ft)	Observations
15.5	Sideview	15.3	SWL
141.8	Sideview	140.0	Bottom of casing
198.9	downview	196.3	murky water below, o-visability
197.3	Sideview	194.7	video starts to clear up. BPF, inflow-water coming in
189.4	Sideview	186.9	verticle fracture
183.5	Sideview	181.1	slight upflow of particles
175	Sideview	172.7	sub-verticle fracture
171.4	Sideview	169.2	BPF-aparent upflow
170	Sideview	167.8	BPF
168	Sideview	165.8	rubbly zone
165.6	Sideview	163.4	BPF
162.9	Sideview	160.8	BPF
159.7	Sideview	157.6	BPF
159.2	Sideview	157.1	BPF
153	Sideview	151.0	BPF
155.9	Sideview	153.9	BPF
153.5	Sideview	151.5	rubbly zone
149.5	Sideview	147.6	BPF
147.8	Sideview	145.9	void, possible Water exiting
144.3	Sideview	142.4	no aparent flow
141.9	Sideview	140.1	Bottom of casing

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St. Paul, MN 55114
Dept. Phone: (612)626-2969

850556 CALIPER

NAME	: MW17A			OTHER SERVICES:	
UNIQUE NUMBER	: 850556 CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CBCCDB				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 02/17/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 140			KB	:
LOG BOTTOM	: 243.97	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.78	DRL MEASURED FROM	:	GL	: 915 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 02/17/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:03:
				THRESH	: 2500
SWL	: 31				
REMARKS	:				

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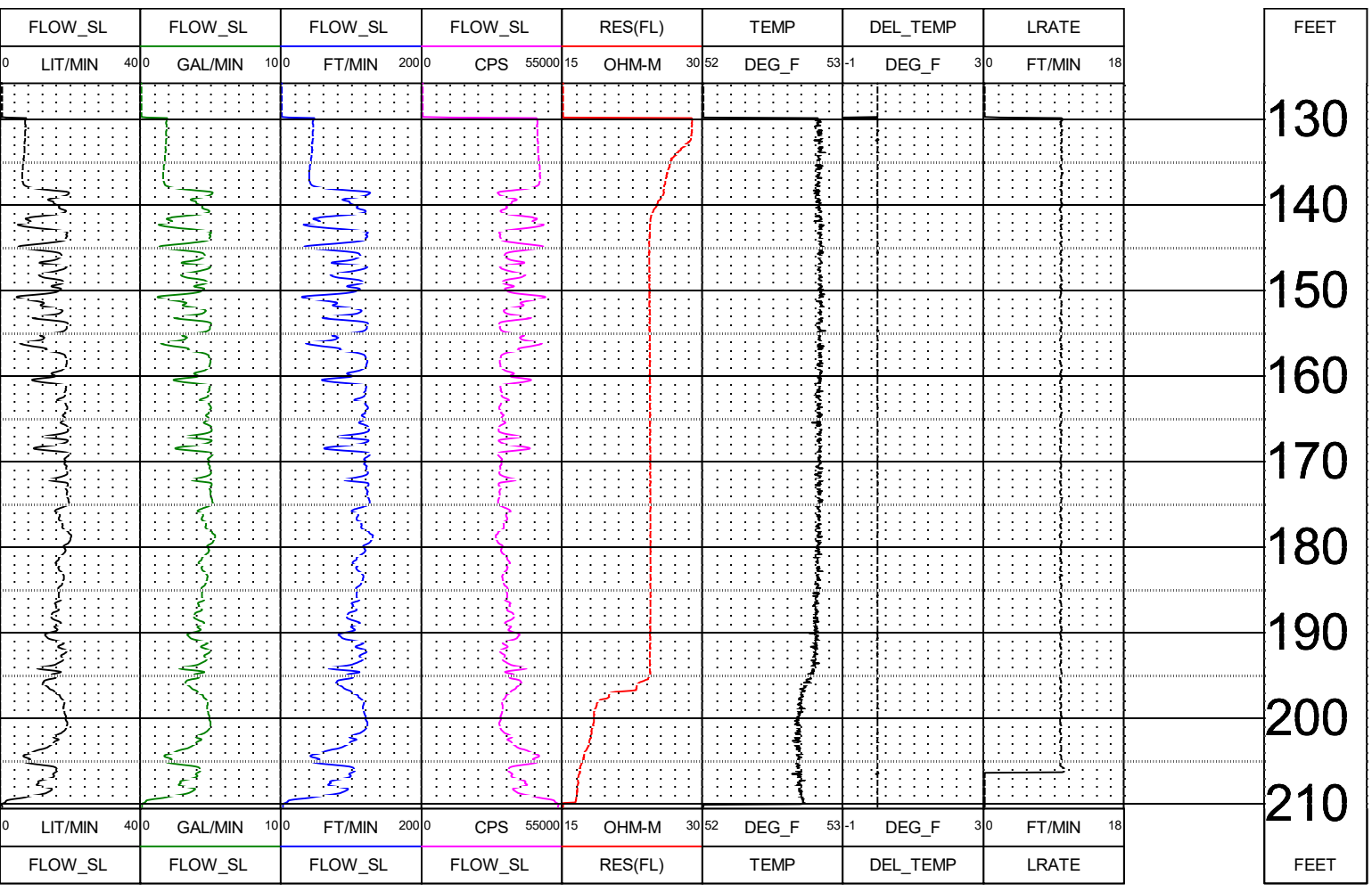


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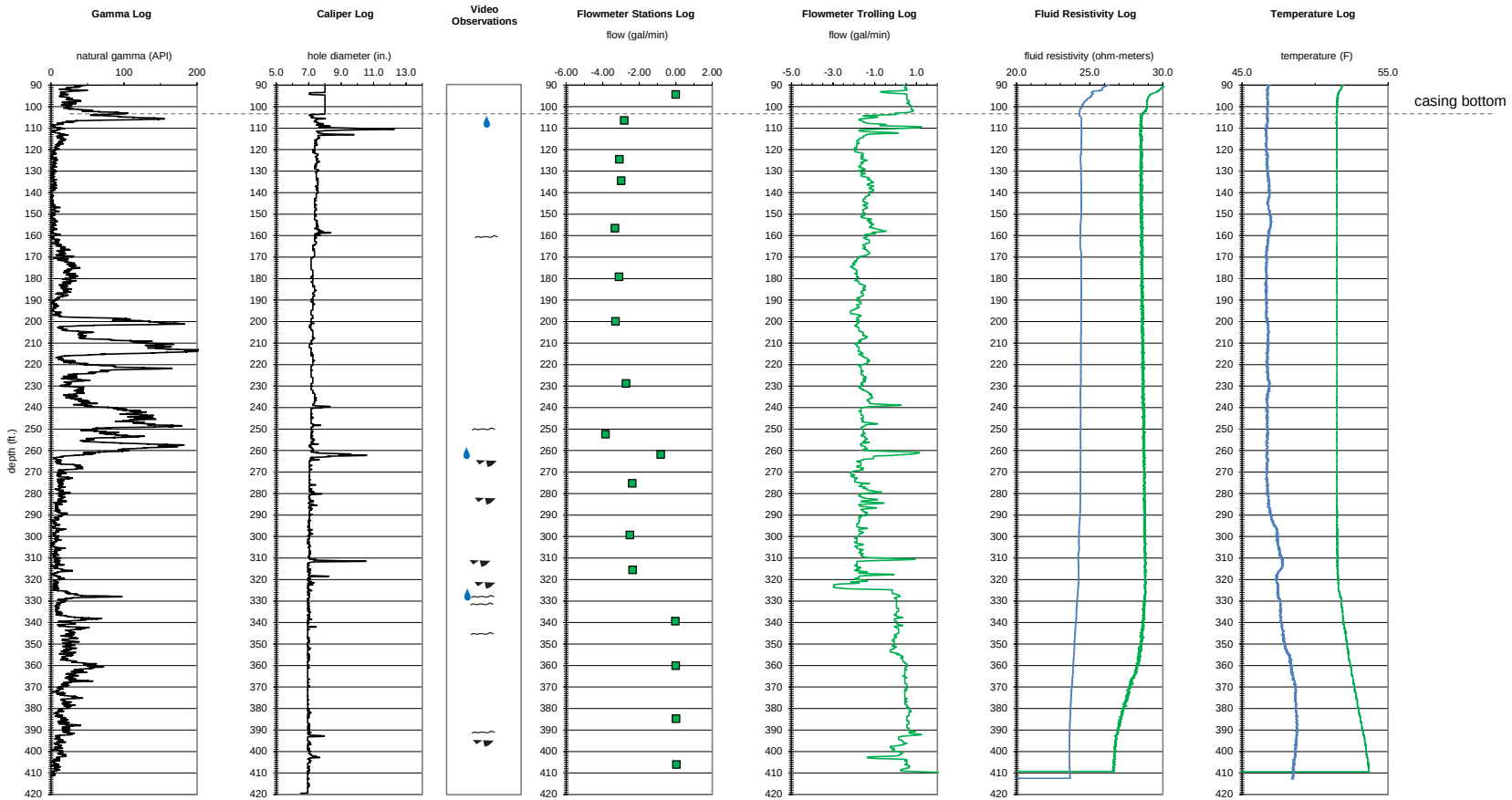
850556_AMBTROL

NAME	: MW17A			OTHER SERVICES:	
UNIQUE NUMBER	: 850556_AMBTROL				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CBCCDB				
SECTION	: 15	TOWNSHIP	: 29	RANGE	: 21
DATE	: 02/17/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 140			KB	:
LOG BOTTOM	: 210.46	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 125.80	DRL MEASURED FROM	:	GL	: 915 L1
CASING DIAMETER	: 8	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 02/17/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:03:
				THRESH	: 2500
SWL	: 31				
REMARKS	:				

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Well Name: MW21A
Unique Number: 877381
T-R-S: T29 R21 Section 18 CDCBBB



Geology:
0-82 QUUU, Quaternary sediments
82-93 UREG, very weathered OPVL
93-103 OPVL, Platteville Formation
103-107 OGWD, Glenwood Shale
107-262 OSTP, St. Peter Sandstone
262-344 OPSH, Shakopee Formation
344-393 OPOD, Oneota Dolomite
393-417 CJDN, Jordan Sandstone

*Based somehwat on AECOM core logging.

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Footages on the video and drillers descriptions of bottom of casing align, but appear off from the geophysical logging. No adjustments were made to the logs. Multi tool, Caliper and flow tool were ran. The video was run last and water was clear, no injection was needed.

Logged by Minnesota Geological Survey
6/21/2022
Multi, Caliper, Ambient Flow, Video

Well Name: MW21A
Unique Number: 877381

VIDEO LOG OBSERVATIONS

Logged By: Steenberg and Saarinen (MGS)
Date: 6/21/2022
Note: Zeroed in sideview; BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
104.8	sideview	Video lost footage, water turbulent
105.6	sideview	Bottom of casing, camera moving around
161	sideview	St. Peter BPFs?
266.6	sideview	Water exiting uppermost Shakopee, rubbel, cavernous
282.0	sideview	cavernous
313.3	sideview	cavernous
321.1	sideview	cavernous
335.0	sideview	water appears to mostly have exited by now
396.6	sideview	cavernous
391.7	sideview	BPF
345.5	sideview	BPF
331.8	sideview	BPF, shale bed
328.3	sideview	BPF, water exit
250.5	sideview	BPF

Well Name: MW21A
Unique Number: 877381

FLOW LOG STATION MEASUREMENTS

Logged By: Steenberg and Saarinen (MGS)
Date: 6/21/2022
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow

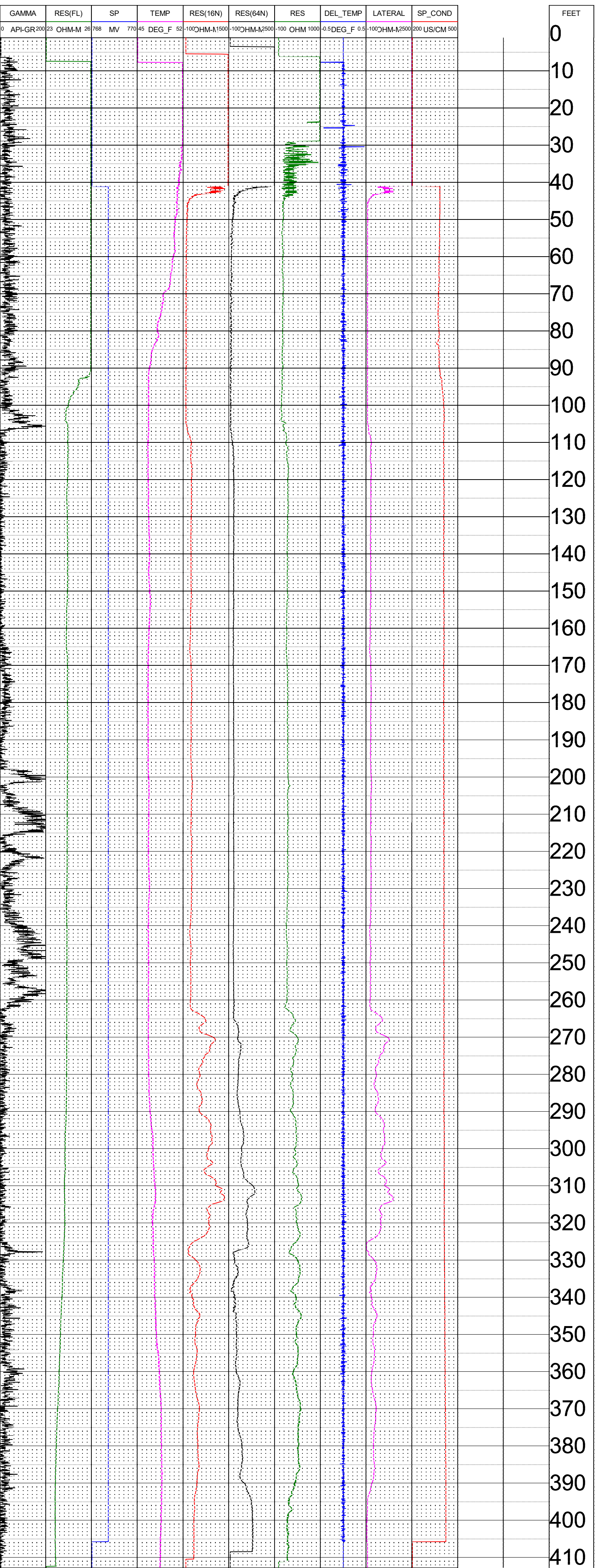
Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
72.3	-0.3221	0.0054	steady, casing
94.3	-0.3307	-0.0054	steady, casing
106.4	-8.8840	-10.6970	steady, open hole
124.4	-9.6928	-11.7080	steady, open hole
134.4	-9.3871	-11.3259	steady, open hole
156.5	-10.4335	-12.6339	steady, open hole
179.1	-9.7515	-11.7814	steady, open hole
199.8	-10.3222	-12.4948	steady, open hole
228.7	-8.5849	-10.3231	steady, open hole
252.3	-11.9800	-14.5670	open hole, flow slowing going down
261.8	-2.8150	-3.1108	steady, open hole
275.2	-7.5612	-9.0435	steady, open hole
299.2	-7.9279	-9.5019	steady, open hole
315.5	-7.5050	-8.9733	steady, open hole
339.3	-0.4050	-0.0983	steady, open hole
360.0	-0.3464	-0.0250	steady, open hole
384.7	-0.2860	0.0505	steady, open hole
406.0	-0.2392	0.1090	steady, open hole

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St. Paul, MN 55114
Dept. Phone: (612)626-2969

877381

NAME	: MW21A			OTHER SERVICES:	
UNIQUE NUMBER	: 877381				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDCBBB				
SECTION	: 18	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/21/22	MGS CUTTINGS #	:		
CASING BOTTOM	: 105			KB	:
LOG BOTTOM	: 412.75	LOG MEASURED FROM	:	DF	:
LOG TOP	: 1.09	DRL MEASURED FROM	:	GL	: 995
CASING DIAMETER	: 9	LOG RATE	:		
CASING TYPE	:	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: STEENBERG		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/21/22
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:16:
				THRESH	: 2500
SWL	: 30				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

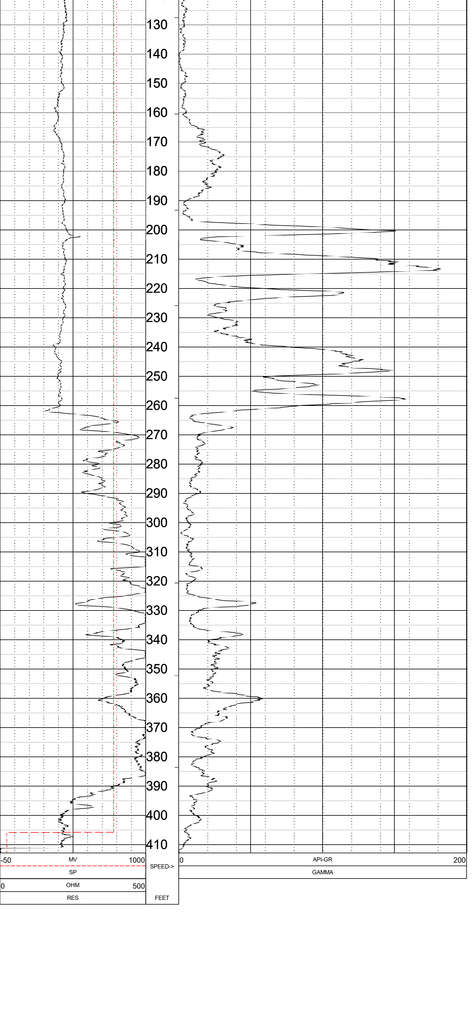


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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

877381

NAME	: MW21A			OTHER SERVICES:	
UNIQUE NUMBER	: 877381				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	CDCBBB				
SECTION	: 18	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/21/22	MGS CUTTINGS #	:		
CASING BOTTOM	: 105			KB	:
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MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/21/22
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 09:16:
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SWL	: 30				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

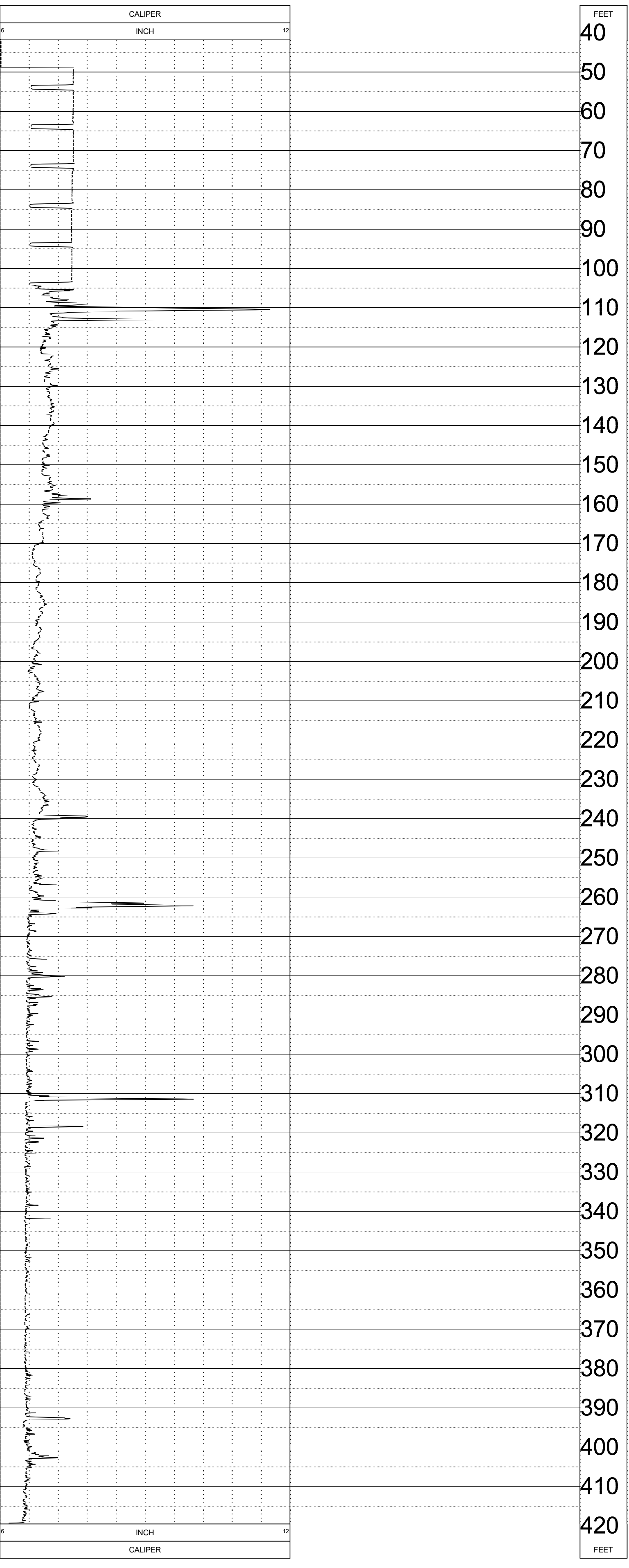


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

877381

NAME	: MW21A			OTHER SERVICES:	
UNIQUE NUMBER	: 877381				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: CDCBBB				
SECTION	: 18	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/21/22	MGS CUTTINGS #	:		
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SWL	:				
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

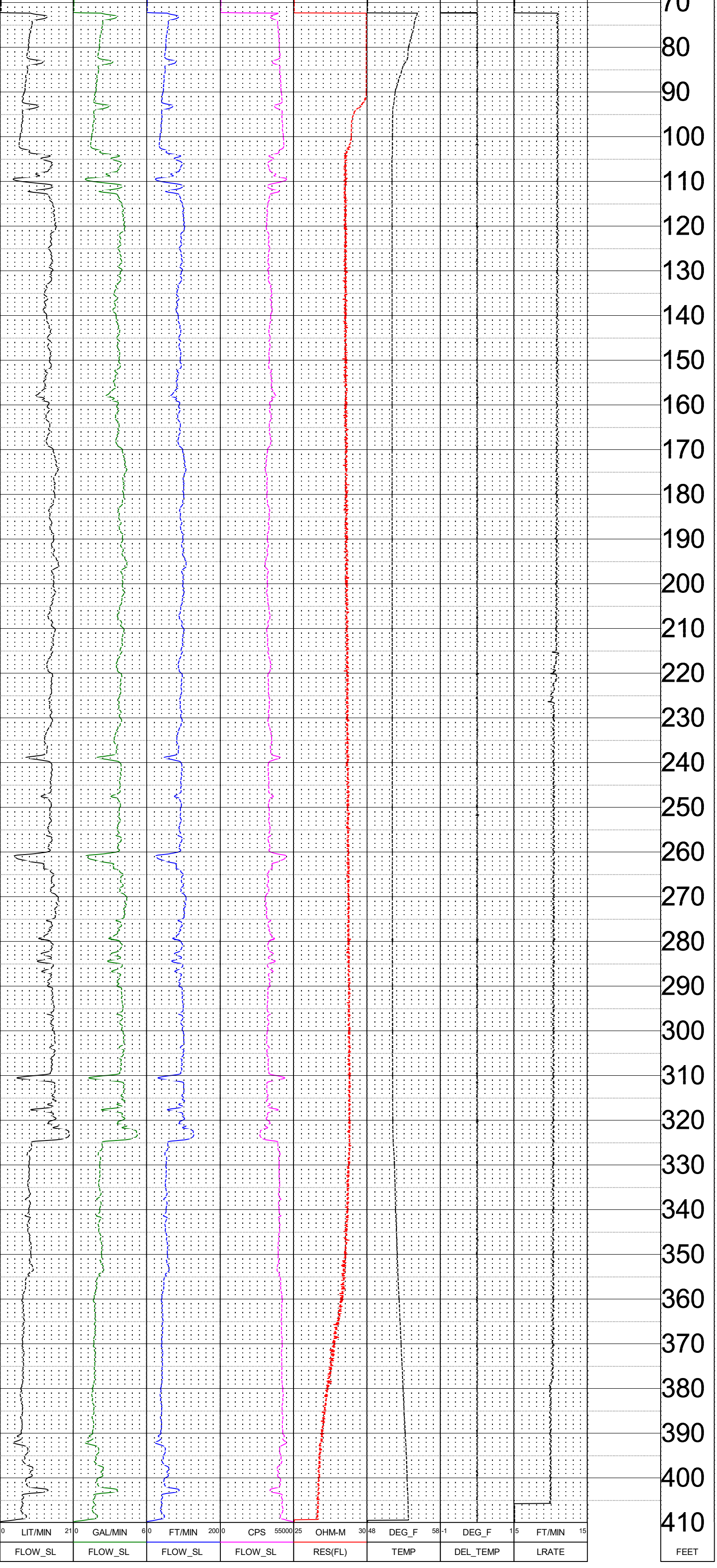


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877381 AMBTROLL

NAME	: MW21A			OTHER SERVICES:			
UNIQUE NUMBER	: 877381 AMBTROLL						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: CDCBBB						
SECTION	: 18	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 06/21/22	MGS CUTTINGS #	:				
CASING BOTTOM	: 105				KB	:	
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LOG TOP	: 68.41	DRL MEASURED FROM	:		GL	: 995	
CASING DIAMETER	: 8	LOG RATE	:				
CASING TYPE	:	FIELD OFFICE	: TRUCK				
CASING THICKNESS	: 0	RECORDED BY	: STEENBERG				
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					THRESH	: 2500	
SWL	: 30						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



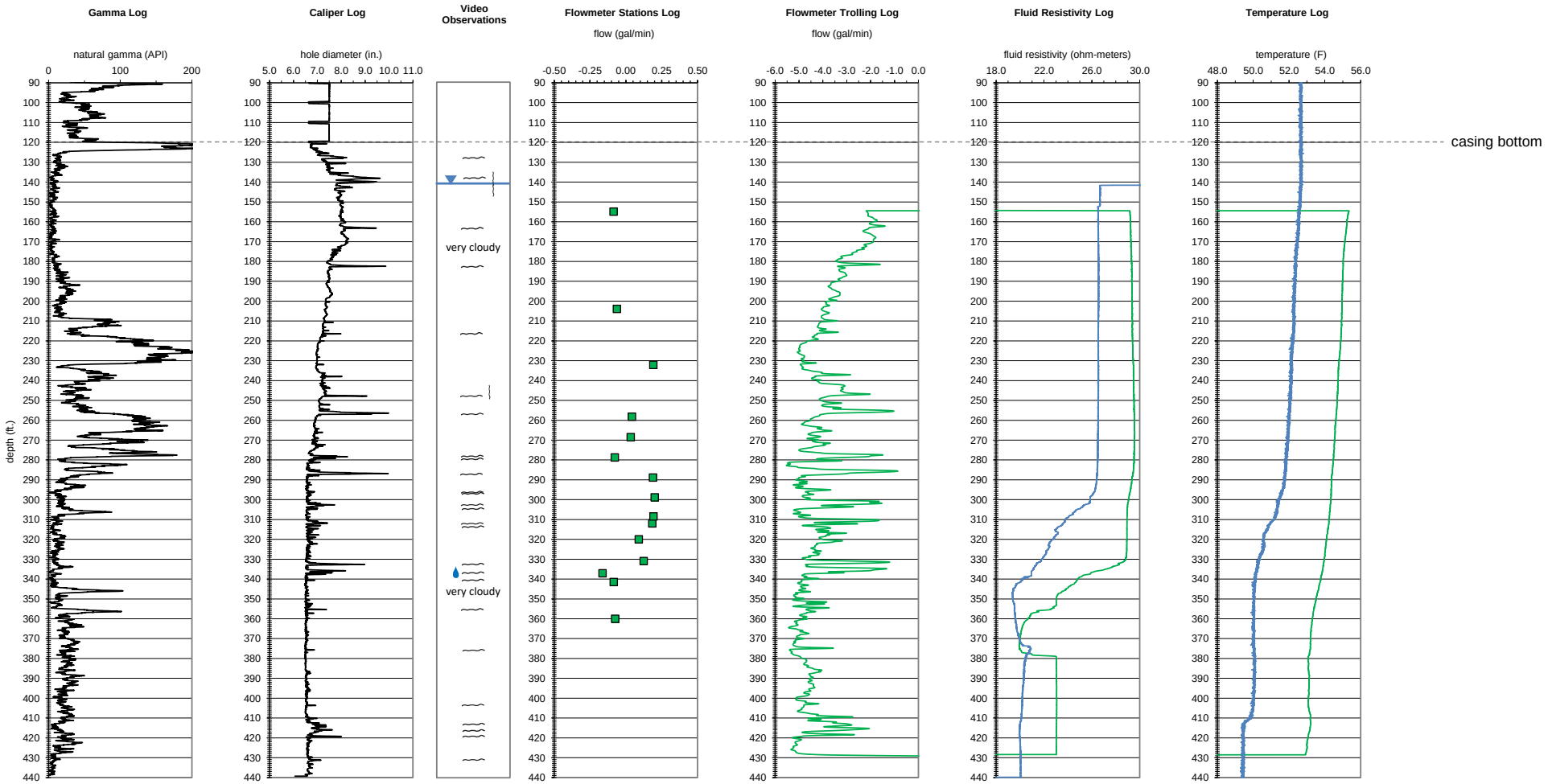
Preliminary Summary and Results

Well Name: MW21A
Unique Number: 877381
Date Logged: 6/21/2022

Note: This summary accompanies the logging data results figure. Video footage reset at 104.8', at casing bottom. To calculate actual footage below 104.8 on the video one needs to add 104.8 to the footage listed on the video. Footages reported here are already calculated for this error.

Flow conditions in this hole seem straight forward. Strong down hole flow (~3 gal/min) was noted at the bottom of casing and confirmed by the driller and video log. Flow is entering the hole at the bottom of casing from above (Platteville water) and flowing down the hole. Approximately a third of this water may be leaving at the fracture noted in the uppermost Shakopee (262') based on flow measured in the stations. Water that doesn't exit at this fracture continues to flow down hole and exits at a bedding plane fracture at approximately 325'. Below this depth there is little to no flow. The temperature and fluid resistivity from the multi-tool and flow tool appear to support these measurements with flat line curves through most of the borehole, specifically the temperature deflection at 325'. The video indicated several bedding plane fractures, and a few large rubbly zones. Water was seen exiting the borehole in the Shakopee Formation at a depth of about 328' on the video log. The water remained clear lower in the hole, but no other flow was measured.

Well Name: MW22A
Unique Number: 876344
T-R-S: T29 R21 Section 30 AAADAA



Geology:
0-89 QUUU, Quaternary sediments
89-95 ODCR, Decorah Shale
95-120 OPVL, Platteville Limestone
120-125 OGWD, Glenwood Shale
125-280 OSTP, St. Peter Sandstone
280-360* OPSH, Shakopee Formation
360-413* OPOD, Oneota Dolomite
413-437+ CJDN, Jordan Sandstone

*Based on AECOM core logging.

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Footages on the video appear off by about 1.3 ft. based on the reported bottom of casing at a depth of 120'. Recording of the video log was paused at a depth of 180.6 ft. (~14:44 timestamp) to have the driller's inject water and clear up the very cloudy borehole. After about 15-20 minutes, recording was resumed and water was continually injected throughout the rest of the video log. Flow measurements on the station and trolling log are raw, uncorrected values since static water level was below casing (preventing us from collecting a verified no flow measurement for correction).

Logged by Minnesota Geological Survey
6/2/2022
Video, Multitool, Caliper, Ambient Flowmeter

Well Name: MW22A
Unique Number: 876344

VIDEO LOG OBSERVATIONS

Logged By: Retzler and Mayer (MGS)
Date: 6/2/2022
Note: Zeroed in sideview; Corrected by 1.4 ft. based on casing depth; BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
120.0	sideview	Bottom of casing
141.4	sideview	SWL
163.6	downview	Very cloudy water
179.2	sideview	Paused video @ 14:42 to inject water
182.4	sideview	BPF
216.9	sideview	BPF
238.6	sideview	Sub-BPF
242.6	sideview	Sub-vertical fracture
248.5	sideview	Tight BPFs
267.0	sideview	BPF
279.0	sideview	Top of OPDC; BPFs
288.9	sideview	BPF zone; ledgy
294.9	sideview	Sub-BPFs
303.8	sideview	Rubble/cavern zone
305.2	sideview	BPF
311.0	sideview	Mineralized BPF; opens up @ 312.6'
315.2	sideview	Sub-vertical fracture
324.0	sideview	BPF
331.4	sideview	BPF
333.3	sideview	Rubble zone
337.0	sideview	BPF taking injected water
339.0	sideview	BPF
140.4	sideview	SWL during injection

Well Name: MW22A
Unique Number: 876344

FLOW LOG STATION MEASUREMENTS

Logged By: Retzler and Mayer (MGS)
Date: 6/2/2022
Flow Tool Skirt Diameter (in.): 8
Note: (+) flow values = upflow; (-) flow values = downflow
Flow values are uncorrected because SWL was below casing.

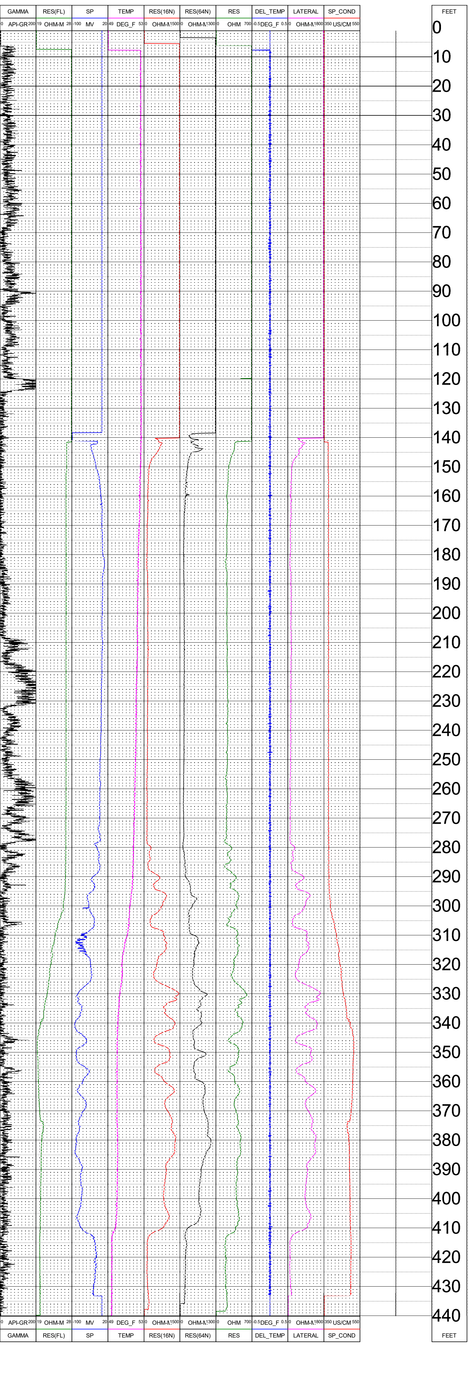
Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
154.9	-0.3231	N/A	steady
203.9	-0.2360	N/A	steady
232.1	0.7256	N/A	steady
258.2	0.1598	N/A	steady
268.5	0.1302	N/A	steady
278.7	-0.2897	N/A	steady
288.9	0.7150	N/A	steady
298.8	0.7624	N/A	steady
308.4	0.7314	N/A	steady
312.0	0.6982	N/A	steady
320.0	0.3415	N/A	steady
337.1	-0.6172	N/A	steady
330.9	0.4725	N/A	steady
341.5	-0.3212	N/A	steady
360	-0.2828	N/A	steady

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876344_MULTI

NAME	: MW22A			OTHER SERVICES:	
UNIQUE NUMBER	: 876344_MULTI				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: AAADAA				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/02/22	MGS CUTTINGS #	:		
CASING BOTTOM	: 120			KB	:
LOG BOTTOM	: 440.07	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.07	DRL MEASURED FROM:		GL	: 1027 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/02/22
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:05:
				THRESH:	2500
SWL	: 141'				
REMARKS	: INJECTED WATER PRIOR TO LOGGING				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

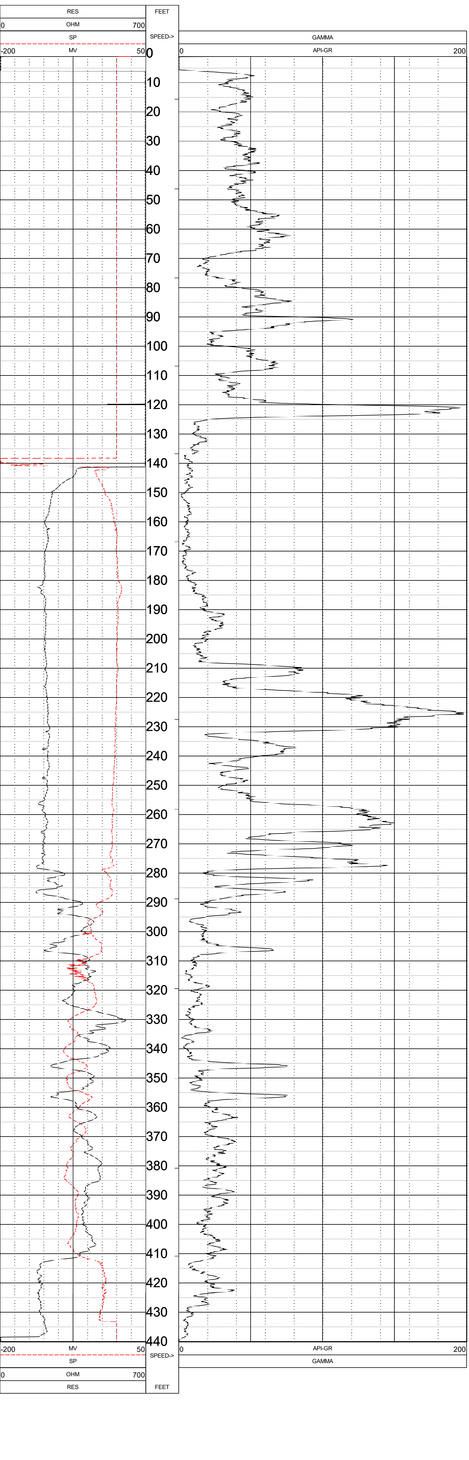


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St. Paul, MN 55114
Dept. Phone: (612)626-2969

876344_GAMMA

NAME	: MW22A			OTHER SERVICES:	
UNIQUE NUMBER	: 876344_GAMMA				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI:	AAADAA				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/02/22	MGS CUTTINGS #	:		
CASING BOTTOM	: 120			KB	:
LOG BOTTOM	: 440.07	LOG MEASURED FROM:	GL	DF	:
LOG TOP	: 1.07	DRL MEASURED FROM:		GL	: 1027 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
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MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/02/22
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:05:
				THRESH:	2500
SWL	: 141'				
REMARKS	: GAMMA FROM MULTITOOL				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

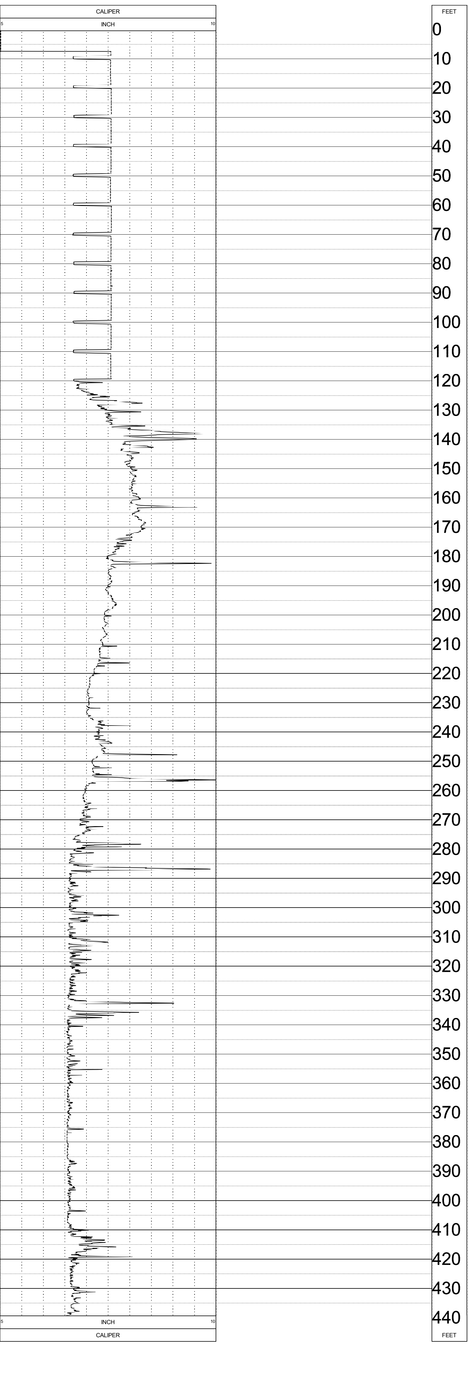


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St. Paul, MN 55114
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876344_CALIPER

NAME	: MW22A			OTHER SERVICES:	
UNIQUE NUMBER	: 876344_CALIPER				
QUADRANGLE	: LAKE ELMO 102-8				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: AADAA				
SECTION	: 30	TOWNSHIP	: 29	RANGE	: 21
DATE	: 06/02/22	MGS CUTTINGS #	:		
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LOG TOP	: 0.43	DRL MEASURED FROM:		GL	: 1027 L1
CASING DIAMETER	: 8"	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: RETZLER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
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SWL	: 141'				
REMARKS	:				

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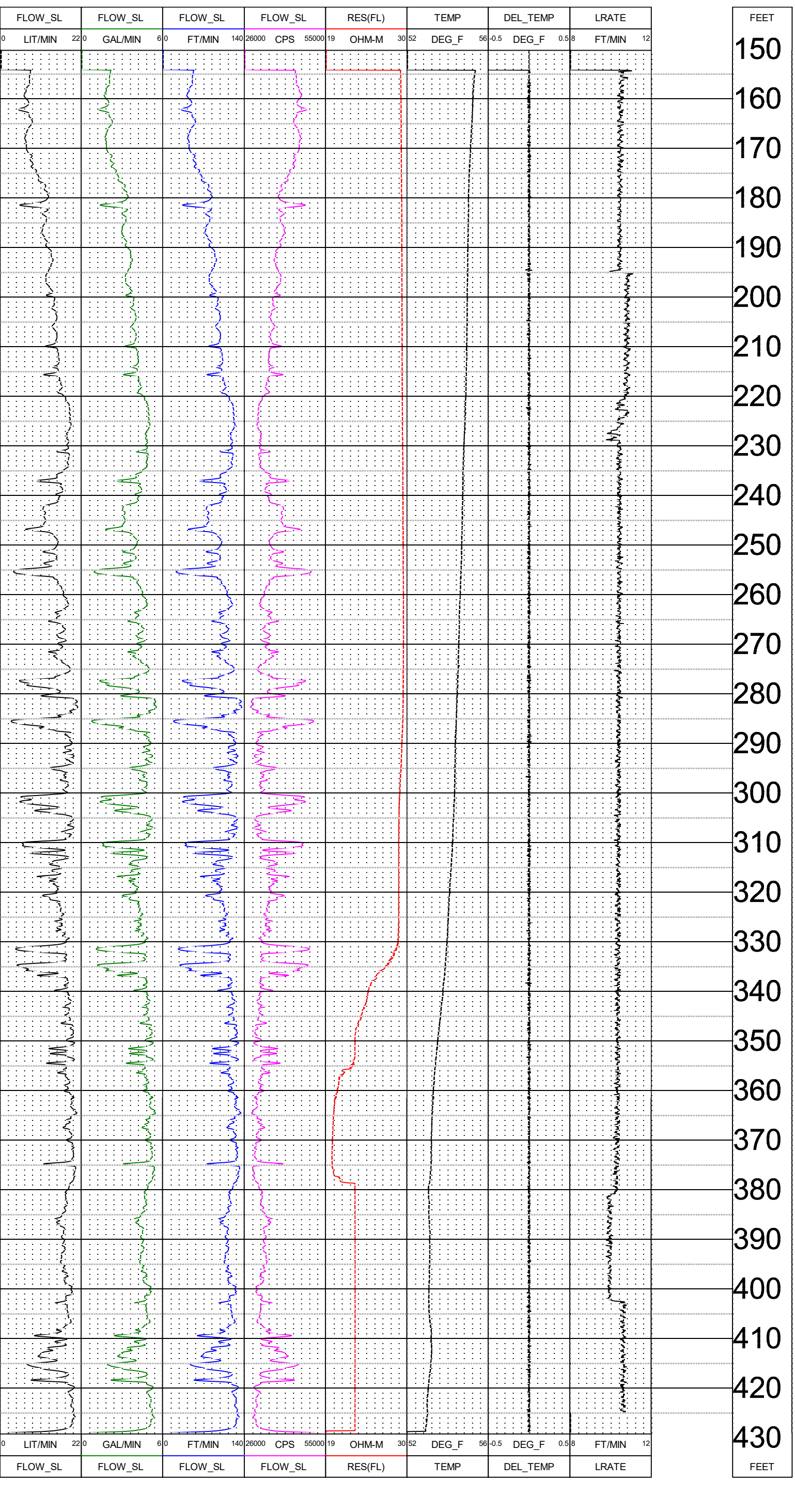
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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

876344_AMBTROLL

NAME	: MW22A			OTHER SERVICES:			
UNIQUE NUMBER	: 876344_AMBTROLL						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: AAADAA						
SECTION	: 30	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 06/02/22	MGS CUTTINGS #	:				
CASING BOTTOM	: 120'				KB	:	
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LOG TOP	: 150.24	DRL MEASURED FROM	:		GL	: 1027 L1	
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CASING THICKNESS	:	RECORDED BY	: RETZLER				
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					THRESH	: 2500	

SWL : 141'
REMARKS : INJECTED WATER DURING VIDEO, PRIOR TO LOGGIN

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Preliminary Summary and Results

Well Name: MW22A
Unique Number: 876344
Date Logged: 6/2/2022

Note: *A linear correction factor of -1.3 feet was applied to all reported video log depths based on the reported depth to casing bottom (120'). Flow rates stated below are raw, uncorrected values. We typically correct flow values based on known no-flow measurements within casing. Since static water level was below the bottom of casing, we could not establish a correction factor.*

Due to poor visibility, video recording was paused at a depth of 180.6 feet (~14:44 timestamp on video) and water was injected at an unknown rate. Water was continuously injected throughout the remainder of the video. After video collection, we ceased injecting water and waited approximately 20 minutes for the borehole to return to near-ambient conditions prior to collecting the other logs. The video indicated several bedding plan fractures, a few larger, rubbly zones, and some thin, near-vertical fractures. Water was seen exiting the borehole in the Shakopee Formation at a depth of about 337 feet. The water column again became very cloudy and visibility poor below this zone at a depth of about 345 feet. For this reason, video collection was stopped at a maximum depth of about 348 feet. No other obvious water entry/exit points were evident during video logging.

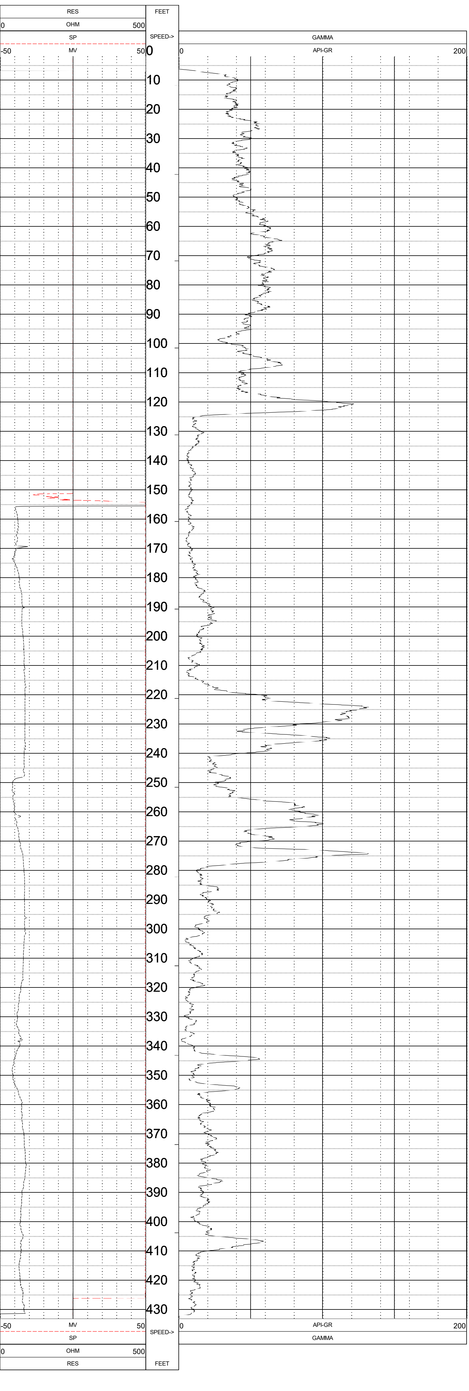
The flowmeter and multitool data suggest a more complex flow pattern in ambient conditions than captured on the injected video log. Flow station measurements indicate possible flow (~0.7 liters/min) into the borehole within the Shakopee Formation at a depth of 337 feet (the same fracture that showed water exiting the borehole during the injected video). This water then flows up the borehole and appears to exit at or near the Shakopee/St. Peter contact at a depth of about 280 feet where several bedding plane fractures are evident in the video and caliper logs. Presumably from another fracture within this zone at about 280 feet, more flow (~0.7 liters/min) appears to enter the borehole and travel upwards. This flow then appears to exit the borehole between a depth of about 230 to 210 feet, possibly in the fracture located at about 216 feet.

Presence of the lowermost flow regime (~337 to 280 feet) is bolstered by prominent deflections in both the fluid resistivity and temperature data. While less obvious, there appear to be very slight deflections in the flowmeter fluid resistivity and temperature data for the uppermost flow regime too (~280 to 216 feet). Some minor deflections even deeper in the borehole are also evident in the resistivity and temperature logs (~375 and 412 feet), but their cause is difficult to ascertain without video and flowmeter station data. Video and station measurements were not captured at these depths because of poor visibility and assumed no-flow while in the field.

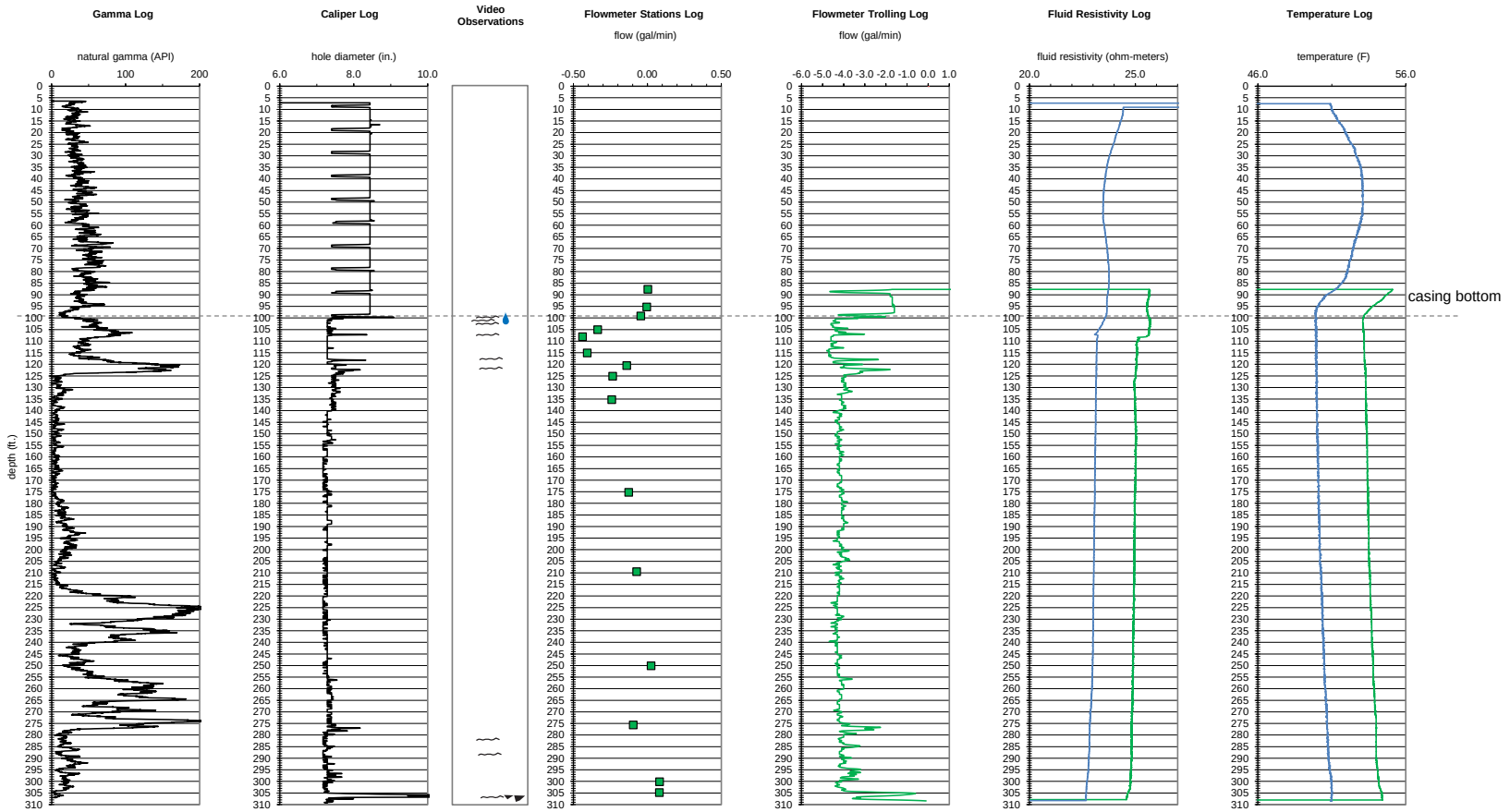
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University of Minnesota
2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

NAME	:		OTHER SERVICES:		
UNIQUE NUMBER	:	870299			
QUADRANGLE	:	LAKE ELMO 102-B			
COUNTY	:	WASHINGTON			
LOCATION/SUBSECTI:		ACCDDC			
SECTION	:	19	TOWNSHIP	: 29	RANGE : 21
DATE	:	05/24/23	MGS CUTTINGS #	:	
CASING BOTTOM	:	SCREENED			KB :
LOG BOTTOM	:	432.98	LOG MEASURED FROM:	GROUND	DF :
LOG TOP	:	1.94	DRL MEASURED FROM:		GL : 1021 L1
CASING DIAMETER	:	4	LOG RATE	: 30FPM	
CASING TYPE	:	STEEL	FIELD OFFICE	: TRUCK	
CASING THICKNESS	:	0	RECORDED BY	: MAYER	
BIT SIZE	:	4	BOREHOLE FLUID	: 0	FILE : PROCESSED
MAGNETIC DECL.	:	0	RM	: 0	TYPE : 8144A
MATRIX DENSITY	:	2.84	RM TEMPERATURE	: 0	LGDATE: 05/24/23
NEUTRON MATRIX	:	DOLOMITE	MATRIX DELTA T	: 44	LGTIME : 10:18:
					THRESH: 2500
SWL	:	150			
REMARKS	:				

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Well Name: MW23B
Unique Number: 870300
T-R-S: T29 R21 Section 19 ACCDDC



Geology:
0-94 QUUU, Quaternary sediments
94-120 Platteville, OPVL
94-102 Magnolia Member
102-109.5 Hidden Falls Member
109.5-118.5 Mifflin Member
118.5-120 Pecatonica Member
120-125 Glenwood, OGWD
125-278 St. Peter, OSTP
278-308 Prairie du Chien, OPDC

KEY:
subvertical fracture
bedding plane fracture (BPF)
other vugs/macropores
possible flow in/out of borehole
flowmeter - ambient station
flowmeter - ambient trolling log
multiparameter log

NOTE: Camera footage 2 feet lower than logging and driller. Water appears to be entering at casing bottom in a fractured broken up area, possible lateral flow or entry from one direction based on video. Additional water entry at BPF at 107' based on station measurments. I suspect poor seal at 120.5' station where water is still moving down hole, but water appears to also be exiting at BPFs 118' and 123'. Intergranular loss of downhole flow deeper into the St. Peter. No flow was measured in the lower St Peter at 250'. Slight down flow in the lowermost St. Peter measured at 275' based on the station measurment and slight uphole flow in the Shakopee measured at stations 300' and 305' but nearing the limits of the tool's accuracy and no exit is seen on the video.

Logged by Minnesota Geological Survey
5/24/2023
Multi, Caliper and Flow

Well Name:
Unique Number: 870300

VIDEO LOG OBSERVATIONS

Logged By: Steenberg and Mayer
Date: 5/24/23
Note: Zeroed in sideview; BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
7.2	Side	SWL
101.0	Side	Bottom of Casing possible lateral flow
101.2	Side	BPF
101.8	Side	BPF
103.8	Side	BPF
108.9	Side	BPF
109.9	Side	Top of Mifflin
120.0	Side	BPF
124.8	Side	Glenwood
126.1	Side	Mineralization in St. Peter
276-279	Side	OSTP/OPDC contact?
281.0	Side	Top of PDC
290.8	Side	BPF
309	Side	Rubble
313.4	Down	bottom

Well Name:
Unique Number: 870300

FLOW LOG STATION MEASUREMENTS

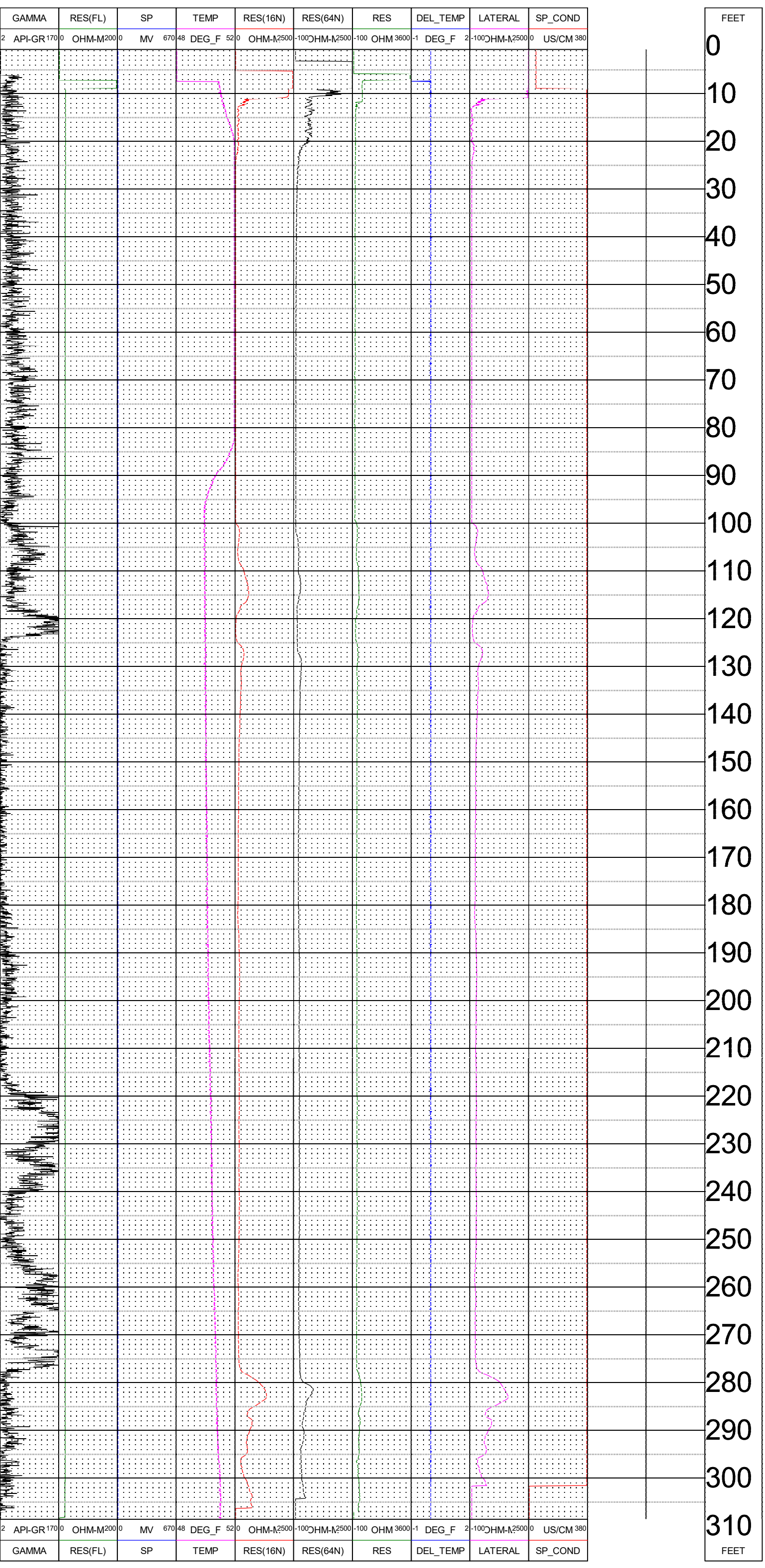
Logged By: Steenberg and Mayer
Date: 5/24/23
Flow Tool Skirt Diameter (in.):
Note: (+) flow values = upflow; (-) flow values = downflow

Depth (ft.):	Flow (l/min)	Corrected Flow (l/min):	Comments:
87.6	0.381	-0.381	in casing
95.2	0.4050	-0.4050	in casing
99.1	0.5270	-0.5270	at base of casing
105.0	1.4080	-1.4080	
108.1	1.7200	-1.7200	
115.1	1.6210	-1.6210	
120.5	0.8140	-0.8140	
125.1	1.1010	-1.1010	
135.2	1.1190	-1.1190	
175.2	0.7710	-0.7710	
209.5	0.6100	-0.6100	
250.1	0.3130	-0.3130	
275.6	0.6800	-0.6800	
300.1	0.1400	-0.1400	
304.8	0.1450	-0.1450	

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NAME	:				OTHER SERVICES:		
UNIQUE NUMBER	:	870300_MULTI					
QUADRANGLE	:	LAKE ELMO 102-B					
COUNTY	:	WASHINGTON					
LOCATION/SUBSECTI	:	ACCDDC					
SECTION	:	19	TOWNSHIP	: 29		RANGE	: 21
DATE	:	05/24/23	MGS CUTTINGS #	:			
CASING BOTTOM	:	99				KB	:
LOG BOTTOM	:	308.53	LOG MEASURED FROM	: GROUND		DF	:
LOG TOP	:	0.78	DRL MEASURED FROM	:		GL	: 1020 L1
CASING DIAMETER	:	8	LOG RATE	: 30FPM			
CASING TYPE	:	STEEL	FIELD OFFICE	: TRUCK			
CASING THICKNESS	:	0	RECORDED BY	: MAYER			
BIT SIZE	:	4	BOREHOLE FLUID	: 0		FILE	: PROCESSED
MAGNETIC DECL.	:	0	RM	: 0		TYPE	: 8144A
MATRIX DENSITY	:	2.84	RM TEMPERATURE	: 0		LGDATE	: 05/24/23
NEUTRON MATRIX	:	DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 10:49:
						THRESH	: 2500
SWL	:	11					
REMARKS	:						

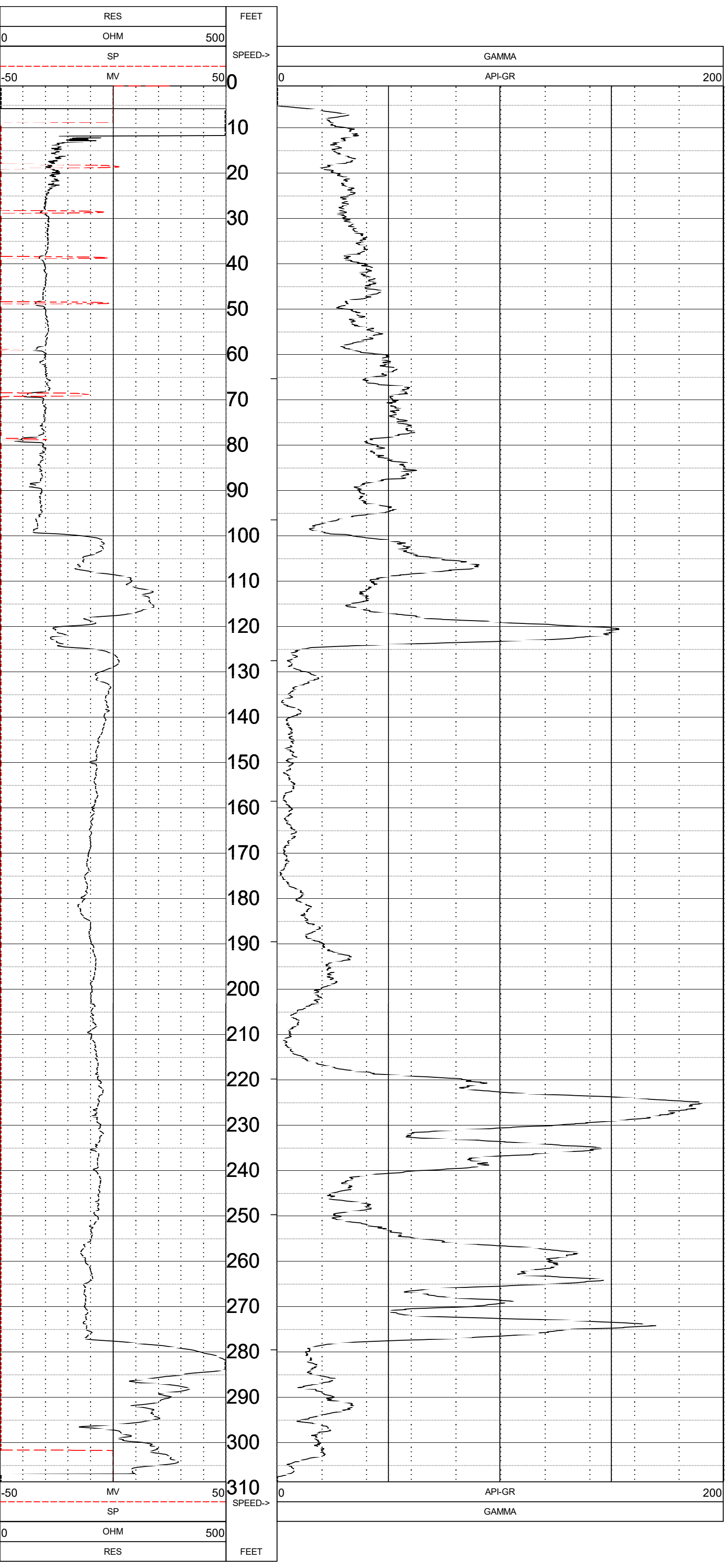
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NAME	:			OTHER SERVICES:	
UNIQUE NUMBER	: 870300				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACCDDC				
SECTION	: 19	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/24/23	MGS CUTTINGS #	:		
CASING BOTTOM	: 99			KB	:
LOG BOTTOM	: 308.53	LOG MEASURED FROM	: GROUND	DF	:
LOG TOP	: 0.78	DRL MEASURED FROM	:	GL	: 1020 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/24/23
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:49:
				THRESH	: 2500
SWL	: 11				
REMARKS	:				

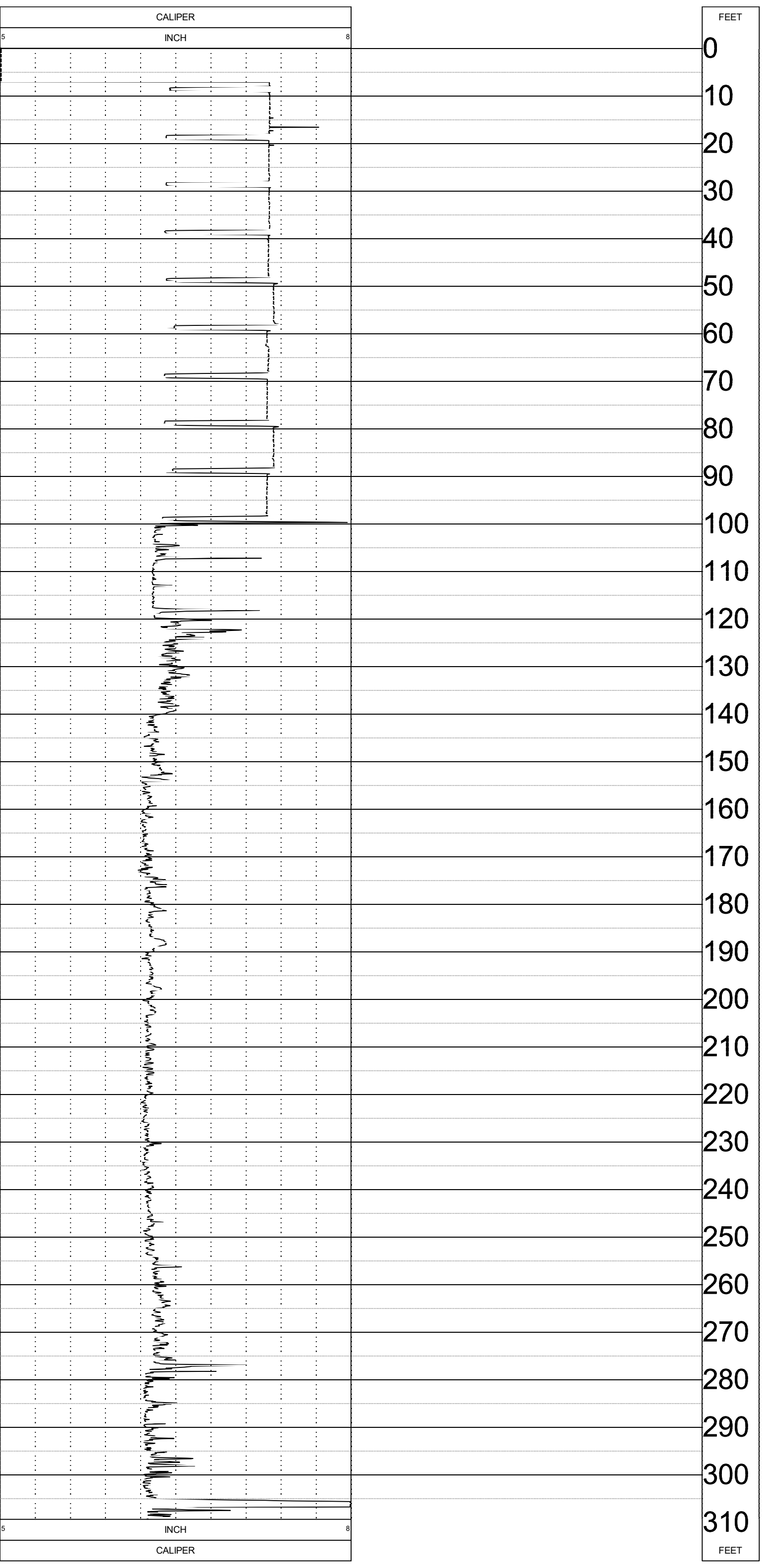
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NAME	:			OTHER SERVICES:	
UNIQUE NUMBER	: 870300_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: ACCDDC				
SECTION	: 19	TOWNSHIP	: 29	RANGE	: 21
DATE	: 05/24/23	MGS CUTTINGS #	:		
CASING BOTTOM	: 99			KB	:
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CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: MAYER		
BIT SIZE	: 4	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 05/24/23
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:11:
				THRESH	: 2500
SWL	: 11				
REMARKS	:				

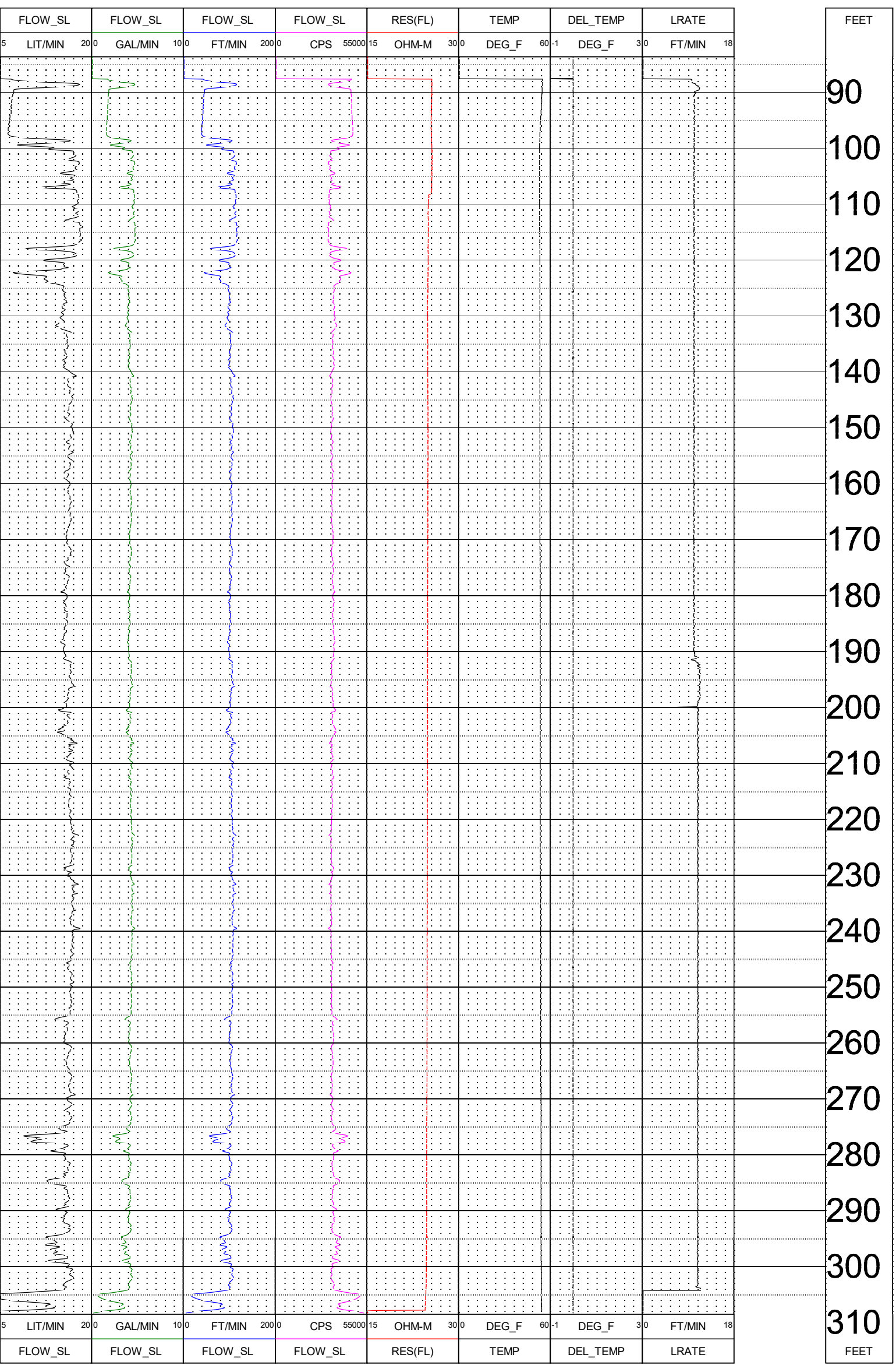
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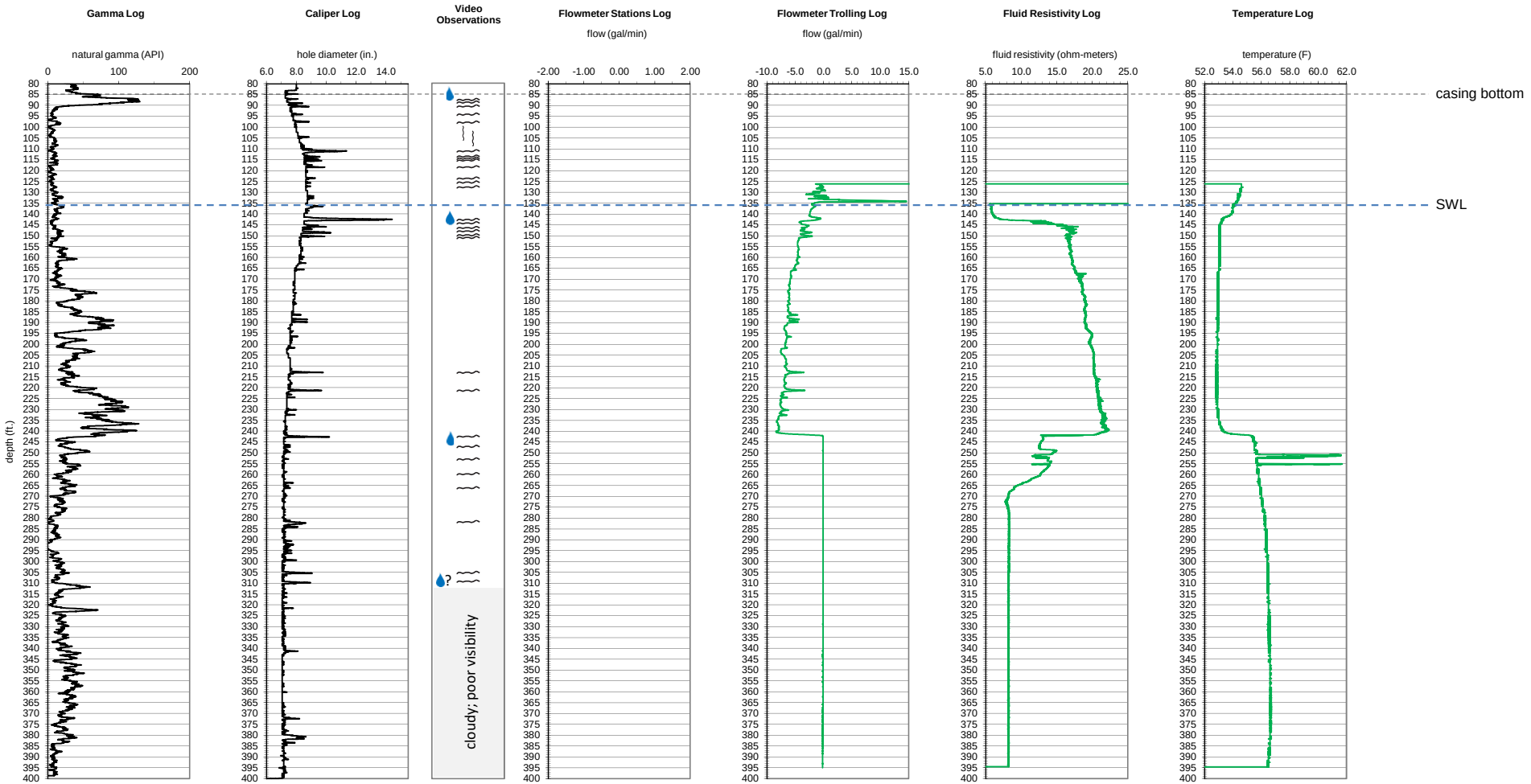
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St. Paul, MN 55114
Dept. Phone: (612)626-2969

NAME	:				OTHER SERVICES:		
UNIQUE NUMBER	:	870300_AMBTROLL					
QUADRANGLE	:	LAKE ELMO 102-B					
COUNTY	:	WASHINGTON					
LOCATION/SUBSECTI	:	ACCDDC					
SECTION	:	19	TOWNSHIP	: 29		RANGE	: 21
DATE	:	05/24/23	MGS CUTTINGS #	:			
CASING BOTTOM	:	99				KB	:
LOG BOTTOM	:	308.41	LOG MEASURED FROM	: GROUND		DF	:
LOG TOP	:	83.62	DRL MEASURED FROM	:		GL	: 1020 L1
CASING DIAMETER	:	8	LOG RATE	: 10FPM			
CASING TYPE	:	STEEL	FIELD OFFICE	: TRUCK			
CASING THICKNESS	:	0	RECORDED BY	: MAYER			
BIT SIZE	:	4	BOREHOLE FLUID	: 0		FILE	: PROCESSED
MAGNETIC DECL.	:	0	RM	: 0		TYPE	: 9721SL
MATRIX DENSITY	:	2.84	RM TEMPERATURE	: 0		LGDATE	: 05/24/23
NEUTRON MATRIX	:	DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 11:38:
						THRESH	: 2500
SWL	:	11					
REMARKS	:						

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Well Name: MW25A
Unique Number: 870303
T-R-S: T28 R21 Section 05 BBBCBC



Geology:
0-62 QUUU, Quaternary sediments
62-87 OPVL, Platteville Formation
87-91 OGWD, Glenwood Shale
91-240 OSTP, St. Peter Sandstone
240-332 OPSH, Shakopee Formation
332-377 OPOD, Oneota Dolomite
377-400 CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Water enters the borehole above SWL at a BPF at ~86.5' (lower Mifflin Mbr-Platteville) and cascades down. Several other BPFs and sub-vertical fractures are noted from here down to SWL at ~136', but it's difficult to tell whether they're also contributing water into the borehole with the cascading water obscuring the view. Additional water enters the borehole at a BPF within the St. Peter at ~143' and moves downward. Turbulent flow is seen in the video at a BPF at ~243' in the upper Shakopee where a portion of the water appears to exit the borehole. The remaining water appears to continue downward until exiting the borehole at a BPF at ~309' in the lower Shakopee (where the driller also noted a loss in circulation). Below this, the water column appears stagnant and very cloudy with little to no visibility.

Logged by Minnesota Geological Survey
06-22-2023 & 07-12-2023
Video, Caliper, Ambient Flowmeter, Gamma

Well Name: MW25A
Unique Number: 870303

VIDEO LOG OBSERVATIONS

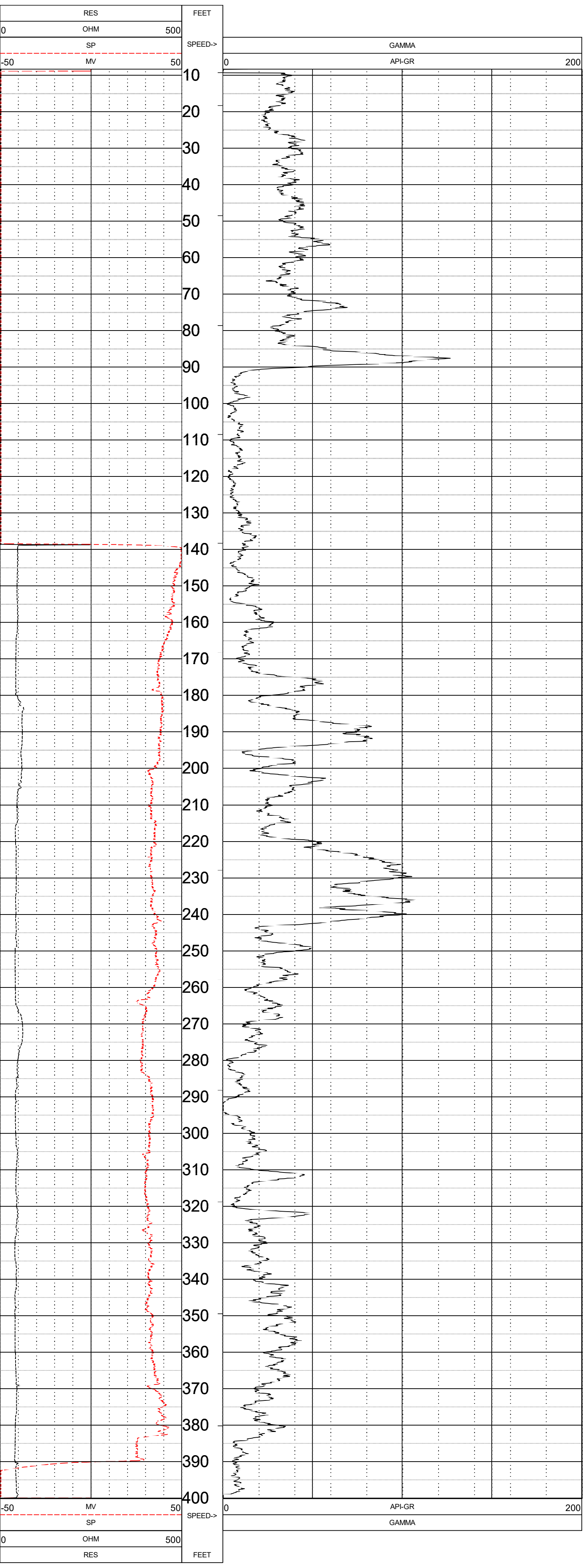
Logged By: Retzler & Mayer
Date: 06-22-2023
Note: Zeroed in sideview; BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
85.8	sideview	Bottom of casing
86.5	sideview	Water entering @ BPF
136.3	sideview	SWL
144.0	sideview	BPF; visible flow possibly into borehole
145.5	sideview	BPF
147.7	sideview	BPF
149.7	sideview	BPF
246.3	sideview	Turbulent flow; likely flow in or out of borehole here
308.0	-	Driller noted loss of circulation here; possible flow location?

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NAME	: MW25A			OTHER SERVICES:	
UNIQUE NUMBER	: 870303				
QUADRANGLE	: LAKE ELMO 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: BBBCBC				
SECTION	: 5	TOWNSHIP	: 28	RANGE	: 21
DATE	: 07/12/23	MGS CUTTINGS #	:		
CASING BOTTOM	: NA			KB	:
LOG BOTTOM	: 400.09	LOG MEASURED FROM	: GROUND	DF	:
LOG TOP	: 8.27	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 4	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: DIETRICH		
BIT SIZE	: 8	BOREHOLE FLUID	: 0	FILE	: PROCESSED
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MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 07/12/23
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 12:15:
				THRESH	: 2500
SWL	: 138				
REMARKS	:				

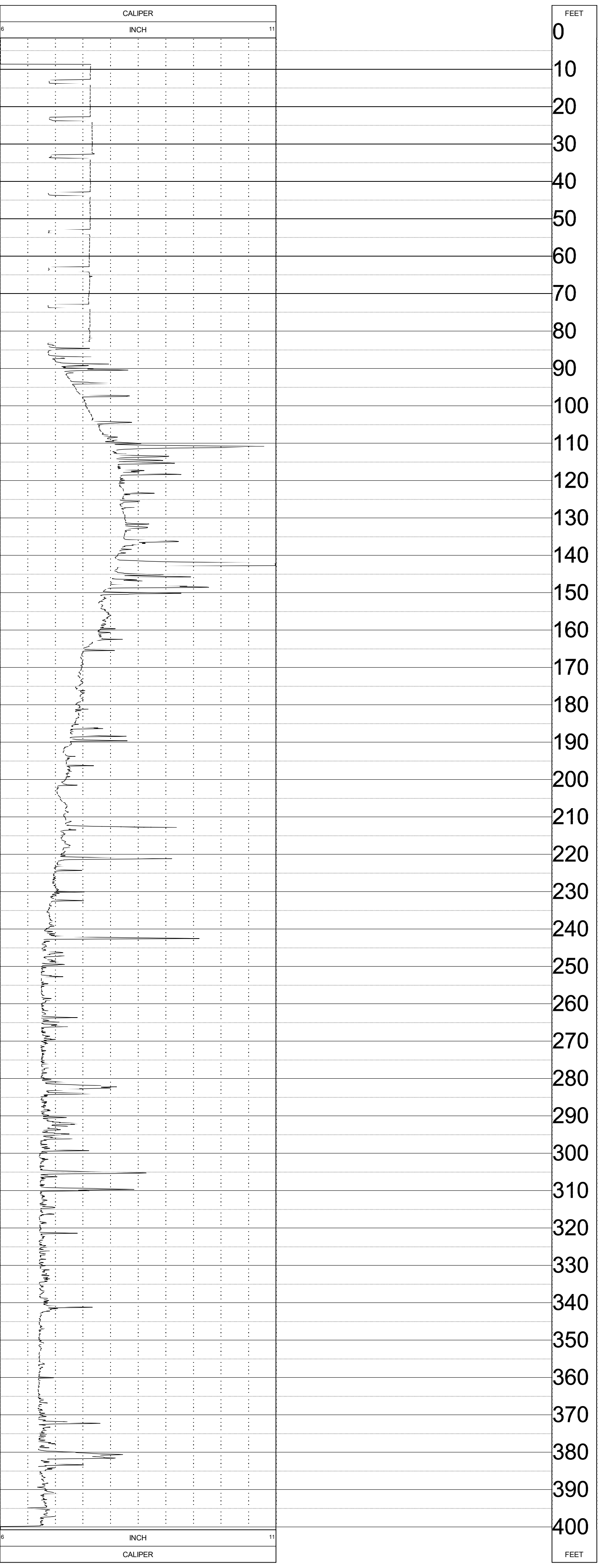
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NAME	: MW25A			OTHER SERVICES:	
UNIQUE NUMBER	: 870303_CALIPER				
QUADRANGLE	: LAKE ELMO 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: BBBCBC				
SECTION	: 5	TOWNSHIP	: 28	RANGE	: 21
DATE	: 06/22/23	MGS CUTTINGS #	:		
CASING BOTTOM	: 85			KB	:
LOG BOTTOM	: 400.67	LOG MEASURED FROM	: GROUND	DF	:
LOG TOP	: 1.61	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: RETZLER		
BIT SIZE	: 8	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/22/23
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:25:
				THRESH	: 2500
SWL	: 138				
REMARKS	:				

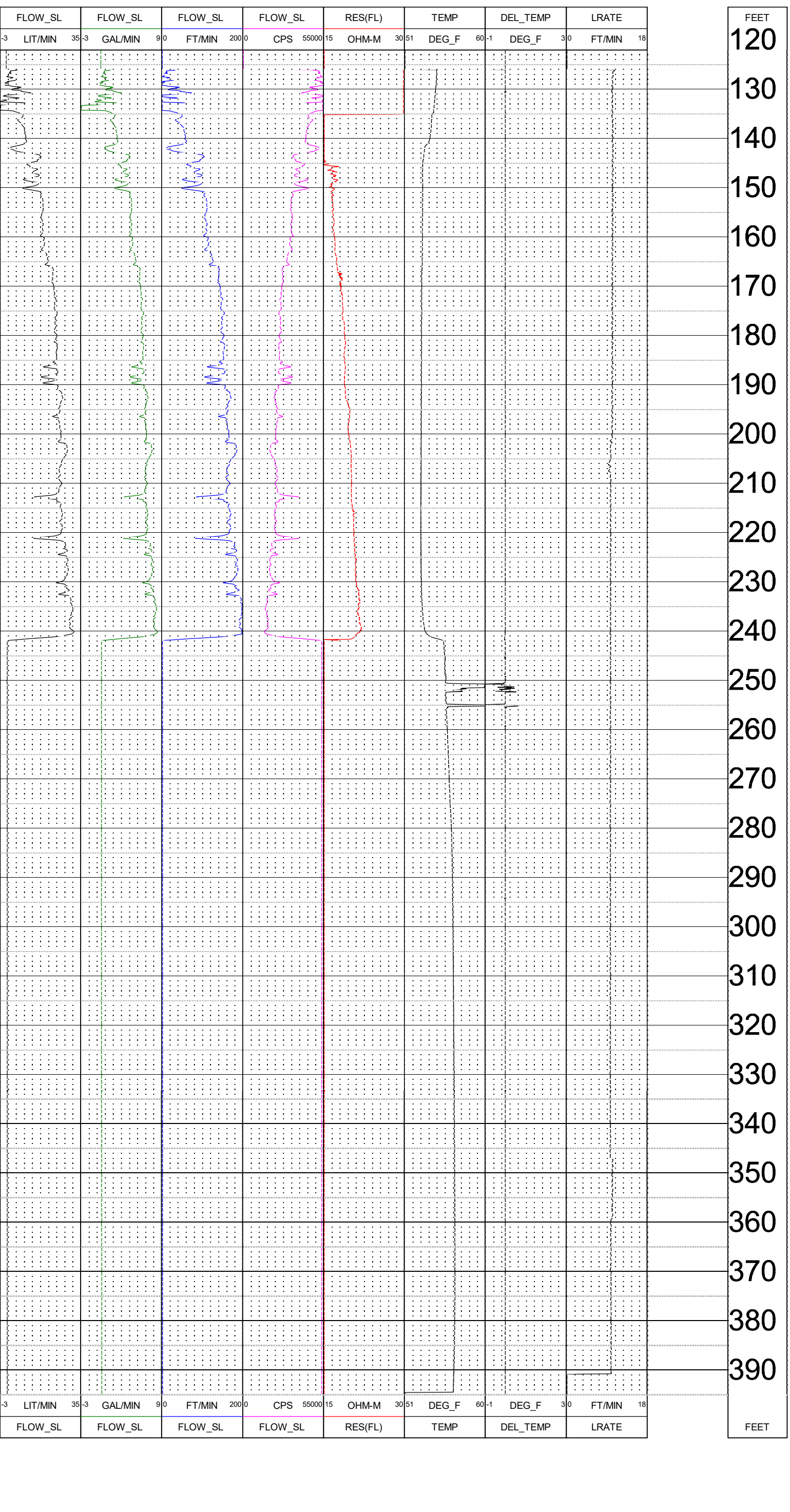
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NAME	:			OTHER SERVICES:	
UNIQUE NUMBER	: 870303_AMBFLOW				
QUADRANGLE	: LAKE ELMO 102B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: BBBCBC				
SECTION	: 5	TOWNSHIP	: 28	RANGE	: 21
DATE	: 06/22/23	MGS CUTTINGS #	:		
CASING BOTTOM	: 85			KB	:
LOG BOTTOM	: 394.96	LOG MEASURED FROM	: GROUND	DF	:
LOG TOP	: 122.13	DRL MEASURED FROM	:	GL	: 991 L1
CASING DIAMETER	: 8	LOG RATE	: 10FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	: 0	RECORDED BY	: RETZLER		
BIT SIZE	: 8	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9721SL
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 06/22/23
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 14:53:
				THRESH	: 2500
SWL	: 138				
REMARKS	:				

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Well Name: MW26A
Unique Number: 877391

VIDEO LOG OBSERVATIONS

Logged By: Mayer and Retzler (MGS)
Date: 7/20/2022
Note: Zeroed in sideview; BPF = bedding plane fracture

Depth (ft.):	Camera View:	Observations:
27.1	sideview	Static water level; water very cloudy/murky
107.9	sideview	Started injecting water to clear up visbility; borehole was not taking water fast enough and overfilling; after waiting several minutes, injected water was not clearing up visibility and so we abandoned injection and continued logging through the cloudy water
100.0	sideview	Bottom of casing, as reported by driller (not visible on video)
311.0	downview	Sediment in water column became noticeably larger and more globular
330.0	downview	Sediment looks more like suspended clay particles
348.4	sideview	Possibly slight downflow, but difficult to tell
390.0	downview	Bottom of hole, but soft and collapsed Jordan Sandstone (original depth reported at 400')
367.7	sideview	Glimpses at the borehole sidewall, but difficult to make out any detail; steady flow of particles downward faster than typical settling speeds in ambient conditions…must be downflow
337.9	sideview	Glimpse at possible vertical fracture
333.5	sideview	Finer, cloudy particles again
330.6	sideview	Possibly no flow around here and to ~337 feet based on particle movement/size??
325.6	sideview	Fine particles still moving downward, but possibly just settling??
109.5	sideview	Noticed DVD was full and had stopped recording video; there were no other important observations noted between here and last observation at 325.6'; captured video indicates that it stopped recording at a depth of 150.6'
44.0	downview	Possible clean water still at top of water column that we tried to inject
28.1	sideview	Static water level coming back up

Preliminary Summary and Results

Well Name: BS18A
Unique Number: 854525
Date Logged: 12/16/2021

Note: This summary is based solely on video log collection because our geophysical logging van was unavailable. We plan to collect a gamma log of this borehole later. A linear correction factor of 0.976' was applied to all reported video log depths based on the reported depth to casing bottom (49').

The video log indicates several bedding plane fractures, rubbly/cavernous zones, and some thin vertical fractures, as well as visible flow in a good portion of the borehole. It is difficult to discern the precise stratigraphic contacts from the video alone and we would like to view the core and gamma log results before confirming picks. However, it is clear from the video that the open hole interval starts in the Mifflin Member of the Platteville Formation and extends down to the Jordan Sandstone.

Bubbles and visible flow downwards can be seen starting right at casing bottom/static water level (49.0'). It is possible there is air or water entering the borehole in the annular space behind casing. Steady, mildly turbulent flow continues downwards until reaching a bedding plane fracture in the Mifflin Member at about 52.7' depth, whereby more flow can be seen entering the borehole and becoming very strongly turbulent. The turbulence begins to lessen a bit within the St. Peter at a depth of about 66.4', but fairly strong downward flow continues past this depth. A significant portion of this strong downward flow can be seen exiting the borehole in a cavernous zone at about 229.3' depth in the Shakopee Formation (Prairie du Chien Group). The remainder of the downward flow appears to progressively exit the borehole (possibly through more fractures and/or matrix pore space) through the Prairie du Chien and uppermost Jordan until becoming stagnant and cloudy near the Prairie du Chien-Jordan contact at about 342.4'. One possible exit point may be at a bedding plane fracture at a depth of about 311.6'; however, the video is unclear and it is difficult to tell if flow is exiting/entering at this location or simply that it is slightly more turbulent due to the downward flow moving across this larger borehole opening.

Well Name: BS-18A
Unique Number: 854525

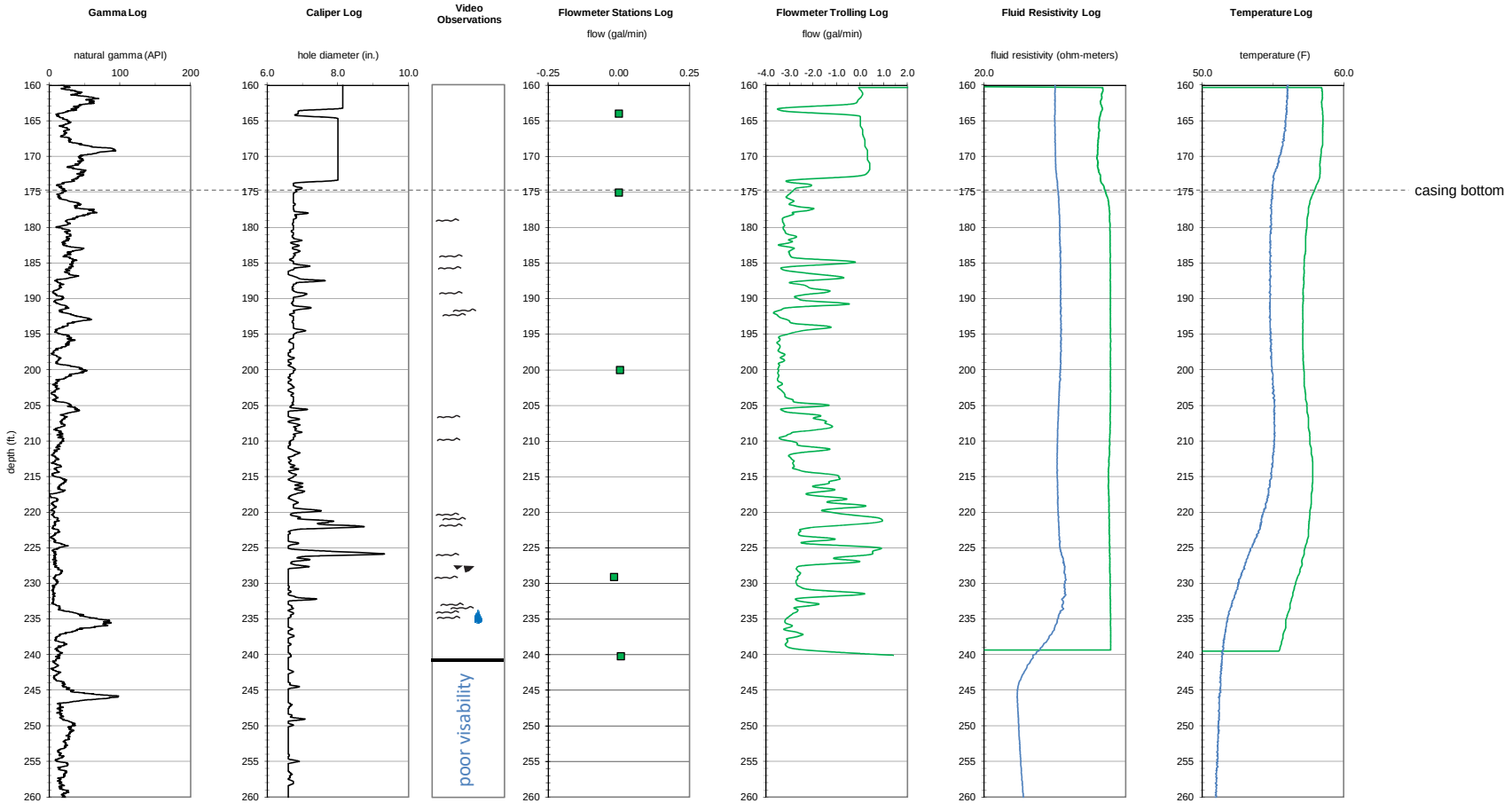
VIDEO LOG OBSERVATIONS

Logged By: Retzler and Mayer (MGS)
Date: 12/16/2021
Note: Zeroed in sideview. BPF = bedding plane fracture. Linear correction factor of 0.976 used to calculate true depths.

Depth (ft.):	True Depth (ft.):	Camera View:	Observations:
50.2	49.0	sideview	SWL; bottom of casing; bubbly
51.6	50.4	sideview	turbulent flow; camera shaking; very strong flow
186.7	182.2	sideview	BPF
237.0	231.3	sideview	flow seems to be reduced
350.8	342.4	sideview	cloudy; no flow
345.8	337.5	sideview	vertical fracture
337.0	328.9	sideview	BPF; little down flow
319.3	311.6	sideview	BPF; possibly slight flow in/out of borehole?
298.1	290.9	sideview	buggered up zone
296.5	289.4	sideview	BPF
294.2	287.1	sideview	thin, sub-vertical fracture
293.2	286.2	sideview	BPF
285.6	278.7	sideview	BPF
284.3	277.5	sideview	BPF
282.0	275.2	sideview	vuggy
280.4	273.7	sideview	BPF; buggered up
277.0	270.4	sideview	vuggy
275.1	268.5	sideview	BPF
272.9	266.4	sideview	vuggy cavern
271.4	264.9	sideview	vuggy
261.6	255.3	sideview	vuggy zone
249.8	243.8	sideview	rubbly zone
248.0	242.0	sideview	rubbly zone
239.6	233.8	sideview	rubbly zone
234.9	229.3	sideview	large cavern; looks to be accepting a large amount of water
226.0	220.6	sideview	BPF
224.6	219.2	sideview	large vugs
218.0	212.8	sideview	rubbly cavern
217.0	211.8	sideview	rubbly cavern
211.7	206.6	sideview	BPF
210.1	205.1	sideview	BPF
207.4	202.4	sideview	thin fracture
196.6	191.9	sideview	BPF; thin
195.6	190.9	sideview	BPF
194.1	189.4	sideview	BPF
185.8	181.3	sideview	BPF; open

Depth (ft.):	True Depth (ft.):	Camera View:	Observations:
177.0	172.8	sideview	BPF; open
170.9	166.8	sideview	BPF
169.0	164.9	sideview	BPF
168.3	164.3	sideview	fracture zone
165.7	161.7	sideview	BPF
151.5	147.9	sideview	BPF
147.2	143.7	sideview	BPF
130.4	127.3	sideview	BPF
126.8	123.8	sideview	BPF
125.2	122.2	sideview	BPF
120.4	117.5	sideview	small cavern
112.1	109.4	sideview	BPF
110.2	107.6	sideview	small cavern
93.1	90.9	sideview	BPF
88.1	86.0	sideview	BPF
85.2	83.2	sideview	BPF
82.6	80.6	sideview	BPF
78.0	76.1	sideview	BPF
74.0	72.2	sideview	BPF
72.3	70.6	sideview	BPF
70.9	69.2	sideview	fractured, cavernous zone
48.9	47.7	sideview	SWL

Well Name: OW20J-1
Unique Number: 860283
T-R-S: T29 R21 Section 21 DCBDAA



Geology:
0-38 QUUU, Quaternary sediments
38-175 OSTP, St. Peter Sandstone
175-302 OPDC, Prairie Du Chien Limestone
302-328+ CJDN, Jordan Sandstone

KEY:
- subvertical fracture
- bedding plane fracture (BPF)
- other vugs/macropores
- possible flow in/out of borehole
- flowmeter - ambient station
- flowmeter - injection/pumping station
- flowmeter - ambient trolling log
- flowmeter - injection/pumping trolling log
- multiparameter log

NOTE: Water clarity was initially good in the video but reduces to 0 visibility at a depth of 152'. The camera was lowered to a depth of 182' to see if the water cleared up once the camera exited casing. The visibility did not improve so water was injected into the well to try to increase visibility. Visibility did increase, but only to a depth of 241.2'. Visibility remained poor deeper than 241.2' even with injecting water into the borehole. As such, 241.2' was the deepest video observation. Multiple fractures were observed in the video, but none appeared to be transmitting water. Flow logging data supports these observations. See preliminary summary document for full summary.

Logged by Minnesota Geological Survey
Logged on 10-7-2021
Video, multi, caliper, ambient flow, and ambient station logged.

Well Name: OW20J-1

Unique Number: 860283

Video Log Observations:

logged by: Mayer (MGS), Cicha (MGS)

Date: October 7th, 2021

Notes: Water became cloudy at 152' (in casing). Water was injected into the well when camera was at 182' to try to improve visability. Visabilty increased. Injecting water did not increase visabilty below a depth of 241.2'. No correction factor was applies as not lower depth was established in order to calculate a correction factor.

Camera Depth (ft.)	Camera View	True Depth (ft)	Observations
71.9	side	71.9	Static water level
152	side	152.0	water became real cloudy
182	side	182.0	began to inject water in an effort to increase visibility
175.9	side	175.9	Bottom of casing
241.2	side	241.2	very cloudy below. Not clearing up even with injection of water. Did not video below this point.
235.5	side	235.5	fracture, possible inflow
234.2	side	234.2	fracture
229.4	side	229.4	fracture, extends back into rock
228	side	228.0	rubbly zone, fractured
226.3	side	226.3	Bedding plane fracture
223.8	side	223.8	cavernous hole, rubbly
217.6	side	217.6	sub-vertivle fracture, rubbly
210.1	side	210.1	Bedding plane fracture
207.2	side	207.2	Bedding plane fracture
192.8	side	192.8	Bedding plane fracture, Rubbly
188.1	side	188.1	Bedding plane fracture
186.8	side	186.8	rubbly zone, fractured
183.9	side	183.9	Bedding plane fracture
179.2	side	179.2	Bedding plane fracture
175.7	side	175.7	Bottom of casing
71.3	side	71.3	Static water level

Well Name: OW20J-1
Unique Number: 860283

Flow Log Station Measurements
Logged by: Cicha(MGS), Mayer (MGS)
Date: 10/7/2021
Flow tool Skirt Diameter (in.): 8
Note: (-) flow values = downflow; (+) flow values = upflow
Values were corrected based on the average reading in the casing of 0.3489 l/min.

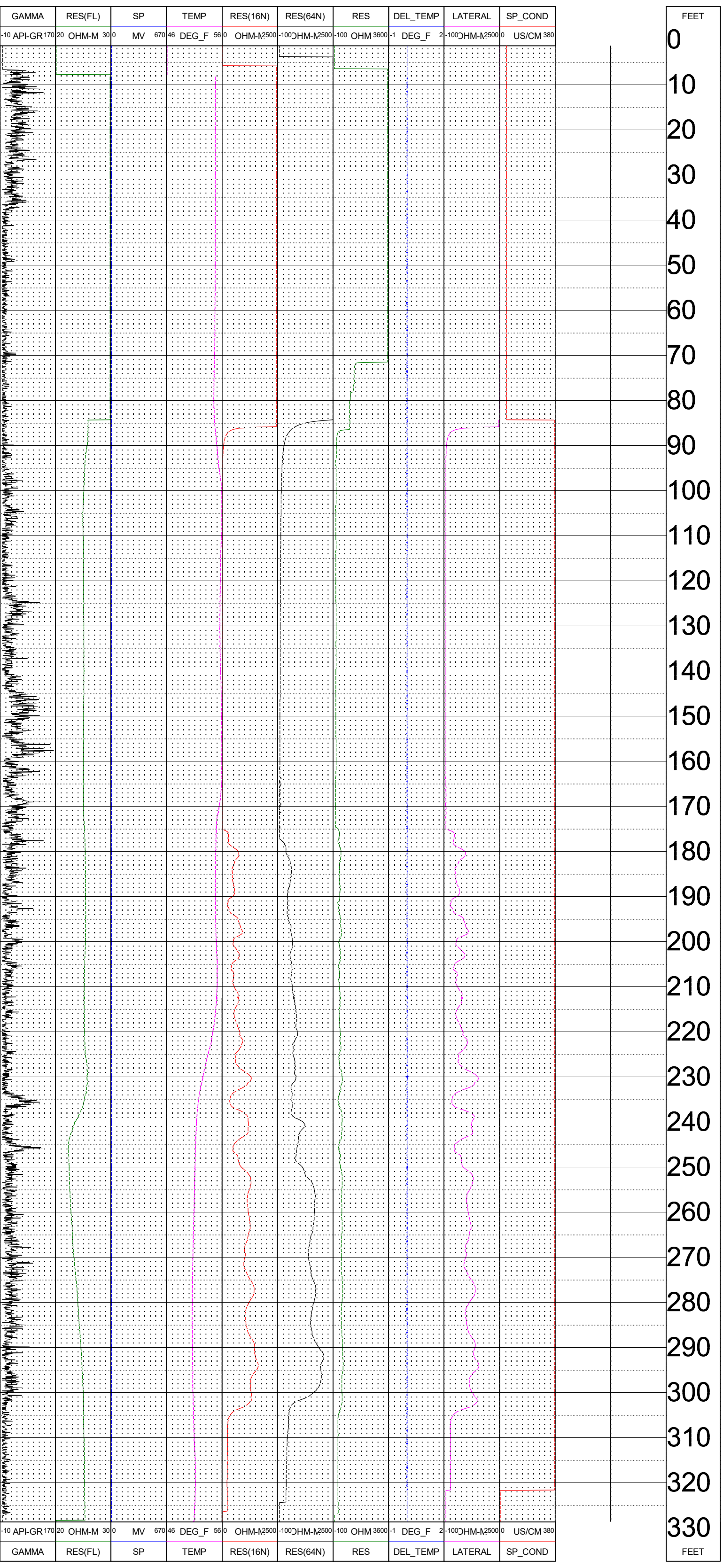
Depth (ft.)	Flow (l/min)	Corrected Flow (l/min)	Comments:
240.2	0.3272	-0.007	Steady
229.1	0.400	0.017	Steady
200.0	0.335	-0.005	Steady
175.1	0.348	-0.001	Steady
164.0	0.349	0	Steady

Minnesota Geological Survey
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2609 Territorial Road
St. Paul, MN 55114
Dept. Phone: (612)626-2969

860283 MULTI

NAME	: OW20J-1			OTHER SERVICES:			
UNIQUE NUMBER	: 860283 MULTI						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: DCBDAA						
SECTION	: 21	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 10/07/21	MGS CUTTINGS #	:				
CASING BOTTOM	: 175				KB	:	
LOG BOTTOM	: 328.61	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 1.39	DRL MEASURED FROM	:		GL	: 968 L1	
CASING DIAMETER	: 8	LOG RATE	: 30FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: MAYER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 8144A	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 10/07/21	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 10:39:	
					THRESH	: 2500	
SWL	: 86						
REMARKS	:						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

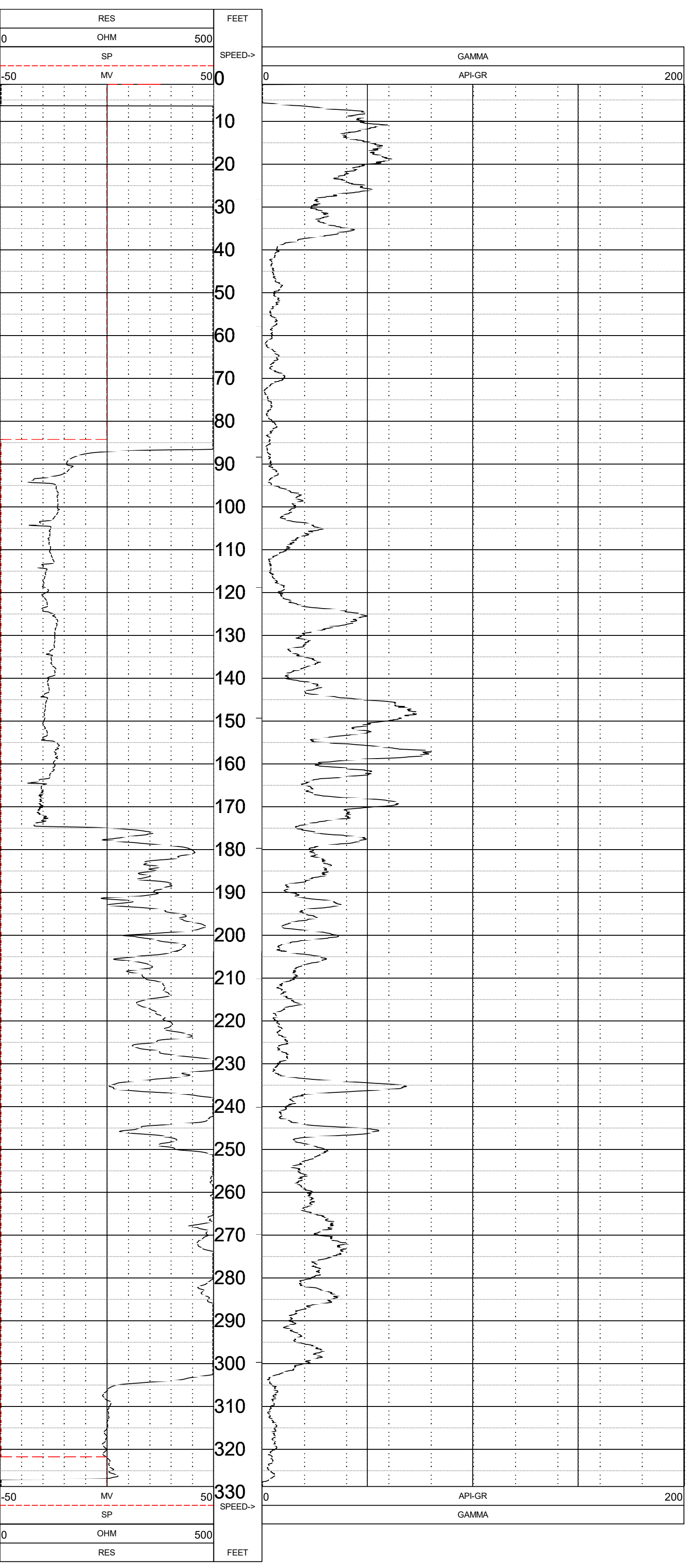


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860283

NAME	: OW20J-1			OTHER SERVICES:	
UNIQUE NUMBER	: 860283				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DCBDAA				
SECTION	: 21	TOWNSHIP	: 29	RANGE	: 21
DATE	: 10/07/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 175			KB	:
LOG BOTTOM	: 328.61	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 1.39	DRL MEASURED FROM	:	GL	: 968 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8144A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/07/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 10:39:
				THRESH	: 2500
SWL	: 86				
REMARKS	:				

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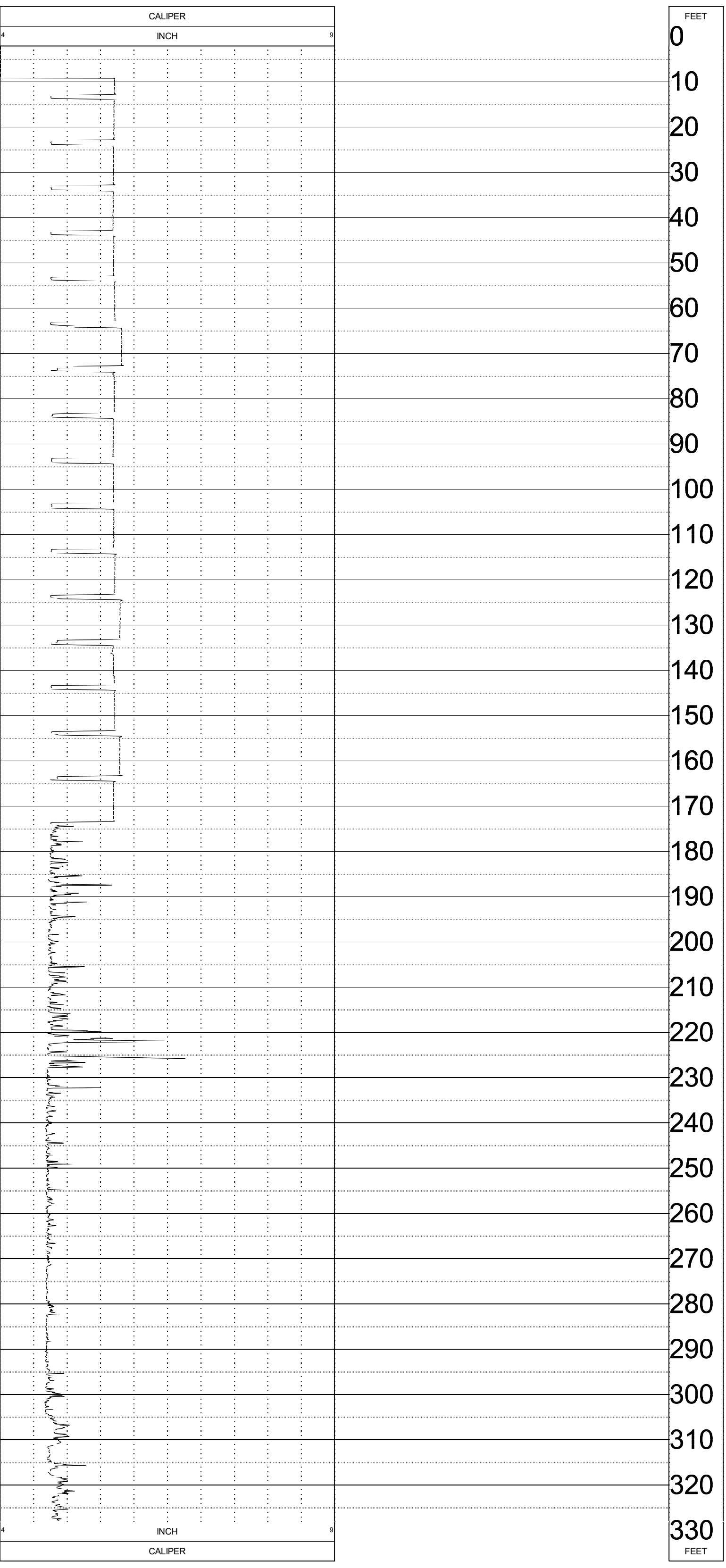


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860283_CALIPER

NAME	: OW20J-1			OTHER SERVICES:	
UNIQUE NUMBER	: 860283_CALIPER				
QUADRANGLE	: LAKE ELMO 102-B				
COUNTY	: WASHINGTON				
LOCATION/SUBSECTI	: DCBDAA				
SECTION	: 21	TOWNSHIP	: 29	RANGE	: 21
DATE	: 10/07/21	MGS CUTTINGS #	:		
CASING BOTTOM	: 175			KB	:
LOG BOTTOM	: 327.91	LOG MEASURED FROM	: GL	DF	:
LOG TOP	: 2.12	DRL MEASURED FROM	:	GL	: 968 L1
CASING DIAMETER	: 8	LOG RATE	: 30FPM		
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK		
CASING THICKNESS	:	RECORDED BY	: MAYER		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: PROCESSED
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 8074A
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0	LGDATE	: 10/07/21
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44	LGTIME	: 11:04:
				THRESH	: 2500
SWL	: 86				
REMARKS	:				

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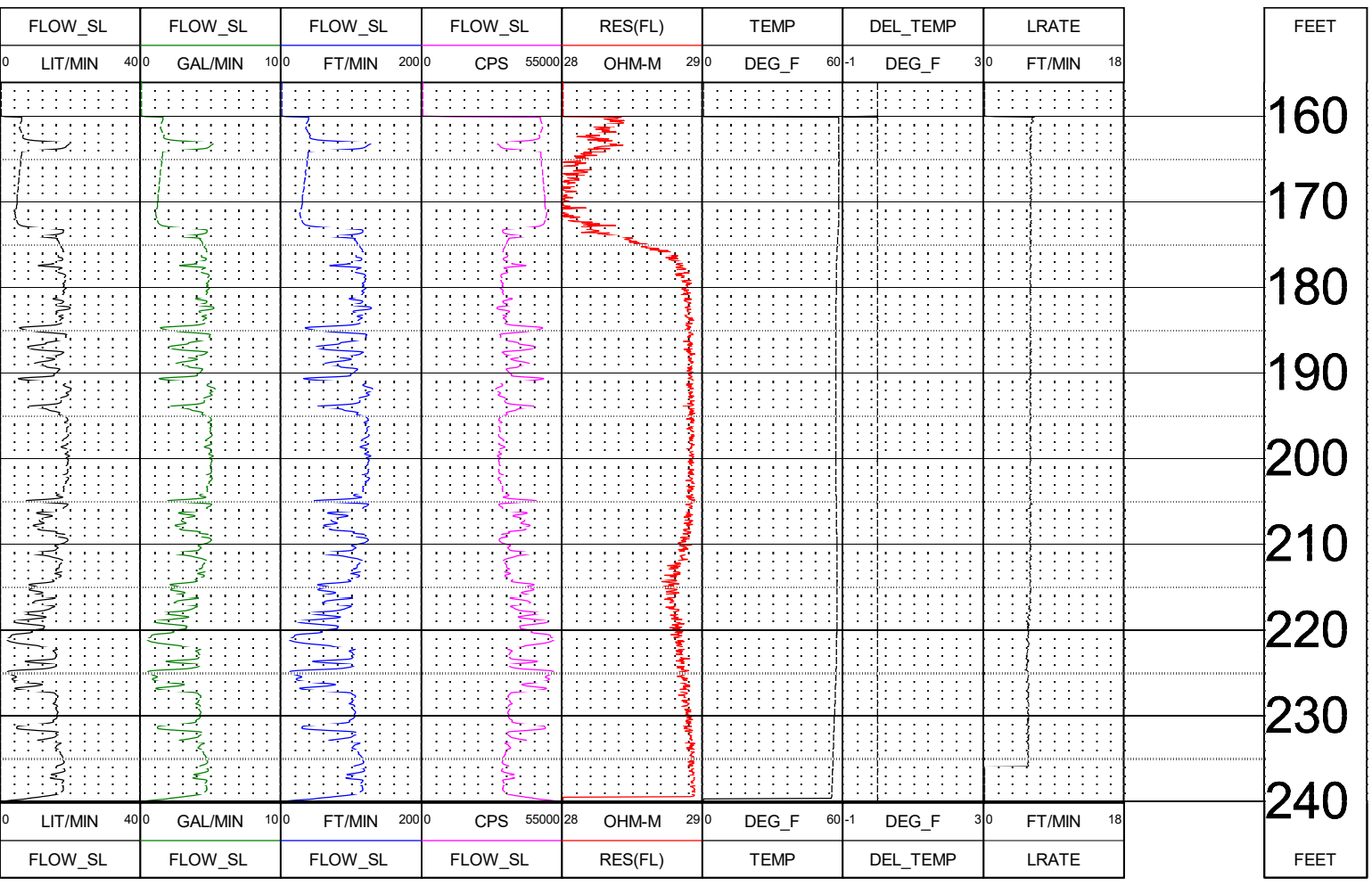


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860283 AMBTROLL

NAME	: OW20J-1			OTHER SERVICES:			
UNIQUE NUMBER	: 860283 AMBTROLL						
QUADRANGLE	: LAKE ELMO 102-B						
COUNTY	: WASHINGTON						
LOCATION/SUBSECTI	: DCBDAA						
SECTION	: 21	TOWNSHIP	: 29		RANGE	: 21	
DATE	: 10/07/21	MGS CUTTINGS #	:				
CASING BOTTOM	: 175				KB	:	
LOG BOTTOM	: 240.09	LOG MEASURED FROM	: GL		DF	:	
LOG TOP	: 156.04	DRL MEASURED FROM	:		GL	: 968 L1	
CASING DIAMETER	: 8	LOG RATE	: 5FPM				
CASING TYPE	: STEEL	FIELD OFFICE	: TRUCK				
CASING THICKNESS	:	RECORDED BY	: MAYER				
BIT SIZE	: 6	BOREHOLE FLUID	: 0		FILE	: PROCESSED	
MAGNETIC DECL.	: 0	RM	: 0		TYPE	: 9721SL	
MATRIX DENSITY	: 2.84	RM TEMPERATURE	: 0		LGDATE	: 10/07/21	
NEUTRON MATRIX	: DOLOMITE	MATRIX DELTA T	: 44		LGTIME	: 11:34:	
					THRESH	: 2500	
SWL	: 86						
REMARKS	: TROLLED AT 5 FPM						

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



Preliminary Flowmeter Summary and Results

Well Name: OW20J-1
Unique Number: 860283
Date Logged: 10/7/2021

Note: This summary accompanies the logging data results figure.

Water clarity was initially good in the video but reduces to 0 visibility at a depth of 152'. The camera was lowered to a depth of 182' to see if the water cleared up once the camera exited casing. The visibility did not improve so water was injected into the well to try to increase visibility. Visibility did increase, but only to a depth of 241.2'. Visibility remained poor deeper than 241.2' even with injecting water into the borehole. As such, 241.2' was the deepest video observation. Water injection was stopped when it was determined visibility would not improve below a depth of 241.2'. This allowed us to observe ambient conditions while video logging as we exited the borehole. Bedding plane fractures were observed at depth of 235.5', 234.2' 229.4' 226.3, 210.1', 207.2', 192.8', 188.1', 183.9', and 179.2'. There were rubbly / cavernous zones at 228', 217.6', 192.8' and 186.8'. There could have been possible inflow of water into the borehole from the fracture at 235.5', but it is difficult to discern on the video. Bottom of casing was observed at 175.7' on the video and static water level was at 71.9' on the way down and 71.3' on the way out of the borehole. No visible ambient flow was observed at bottom of casing. Caliper measurement coincided with many of the video observations. The caliper showed that the fracture zones at 223 and 226 are large and extend relatively deeply into the rock.

Due to low visibility, it is inferred that there was little ambient flow in the well prior to videoing/logging it. When water was injected into the well, visibility improved to a depth of 241.2'. It was difficult to ascertain where this water was exiting into the borehole. It is inferred that the borehole was not accepting the injected water at a depth below 241.2' because visibility was poor below that depth.

The resistivity plot shows a change in fluid resistivity starting at 245' and ending around 225'. It is likely this is measuring the change in the water chemistry of the injected water of the borehole. The temperature plot is similar in showing a change in temperature starting at 240' and ending at 210'. This supports the hypothesis that there is little ambient flow immediately below this depth. The ambient trolling flow log and ambient station measurements support that there is little to no ambient flow in the upper portion of the well (from bottom of casing to 241.2').