

**CLIENT** CITY OF WINNIPEG  
**PROJECT** MONTCALM FORCE MAIN REPLACEMENT  
**SITE** MONTCALM FORCE MAIN  
**LOCATION** WEST SIDE, TOP OF BANK, 5529458.4 N 635652.3 E  
**DRILLING METHOD** 150 mm ø Solid Stem Auger, Nodwell and HQ Coring

**JOB NO.** 03-107-17  
**GROUND ELEV.** 229.40 m  
**WATER ELEV.** 221.62 m (14-Jan-04)  
**DATE DRILLED** 13-14-Jan-04

ELEVATION m (ft)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆		
	(m)	(ft)								PL	MC	LL
229.1				<b>SAND AND GRAVEL (FILL)</b> Very light brown/white, frozen to damp, loose.								
229				<b>SILT (NATIVE, ALLUVIUM, POINT BAR) (ML)</b> Grey, damp, stiff, low plasticity, trace clay.								
228	1	5		- Olive grey, wet, firm at 1.52 m.								
227	2	10		- Moist, layer of fine grained sand (75 mm thick) at 3.23 m. - Wet, hole squeezing or sloughing to 2.13 m.								
226	3	15		<b>SAND (SP)</b> - Brown, moist, compact.								
225.1	4	20		<b>SILT (ML)</b> - Olive brown, moist to wet, compact.								
225	5	25		<b>SAND (SP)</b> - Brown, moist, compact, trace silt.								
224	6	30		<b>CLAY (CL)</b> - Olive, saturated, stiff, low plasticity, silty.								
223.5	7			<b>SILT (ML)</b> - Brown, saturated, compact, some sand.								
223	8			<b>SAND (SM)</b> - Brown, saturated, compact, some silt.								
222.4	9			- Grey, saturated, compact, some silt at 7.92 m.								
222.2				- Brown at 8.84 m.								
222				- Free water visible 9.14 m.								
221.8												
221												
220												

SAMPLE TYPE Auger Grab Split Spoon Core Barrel

CONTRACTOR **Paddock Drilling Ltd.** INSPECTOR **J. McKAY**

APPROVED \_\_\_\_\_ DATE 19/01/04

ELEVATION m (ft)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆			
									PL	MC	LL	
								20 40 60	20 40 60 80			
219												
218.4	11		<b>CLAY (LACUSTRINE) (CH)</b> Grey, saturated, soft, high plasticity. One piece of subrounded white gravel (13 mm ø) at 10.97 m.			⊗		72	▲4		◆	
218												
217	12		- 25 mm ø piece of white gravel at 12.50 m. - Hole appears to be squeezing.			⊗		113	▲4		◆	
216												
215	14					⊗		156	▲4		◆	
214												
213	16					⊗		133	▲3		◆	
212.3	17		<b>SILT (TILL) (ML)</b> - Light brown, saturated, very dense, trace angular gravel, trace sand. - Harder to drill.									
212			<b>CLAY (TILL) (CL)</b> - HQ core set in HWT casing, viscosifier drilling fluid at 17.22 m. - Run 1 Recovered (17.22 to 17.45 m): Granitic boulder, Clay (Till) - Light brown, damp, hard, low plasticity, silty, trace angular gravel, no joints/massive. This clay till is tight and not saturated.			⊗		63	▲88		◆	For 0.25 m
211	18						R1	92				
210	19		- Run 2 Recovered (18.75 to 19.20 m): No pressure increase, no blockage during drilling, likely missing 1.07 m.				NR					
209	20						R2	30				
208	21		- Run 3 (20.27 to 21.34 m): Disturbed core, clay till, washed out gravel, one cobble. Core just fell out of barrel, sound top of barrel, not latched, sitting of core from Run 2. Pull drill rods and core barrel, 75 mm piece of granite was jammed preventing core barrel from latching.				NR					
							R3	29				
							NR					
							R4	17				
			- Run 4 Recovered (21.34 to 22.25 m): Recovered 0.10 m granite, 0.05 m clay till. Circulation has been very good.									

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									PL	MC	LL	
								20 40 60	20 40 60 80			
22			- Run 5 Recovered (22.25 to 25.76 m): Includes 0.20 m light brown clay till, 0.75 m grey clay till, 0.08 m cobbles, 0.10 m light brown silt till.			NR						
207						R5	17					
206.5	75		<b>SILT (TILL) (ML)</b> - Damp, hard, trace gravel, trace cobbles. - Driller says he is in silt till and mostly washing away. Circulation is still good. Hole staying open. Poor recovery. Description estimated from minimal returns and drilling characteristics.		22.9							
206												
205	80					NR						
204												
203	85		- Run 6 Recovered (25.76 to 26.82 m): 0.30 m recovery, several cobbles, 0.08 m of hard silt till. Circulation is still good.		26.2	R6	29					
202.3			- Run 7 Recovered (26.90 to 27.10 m): Washed gravel from silt till (bedrock keeps in barrel).		26.5	NR						
202	90		<b>LIMESTONE (BEDROCK)</b> - Very light brownish grey, very strong. - Run 8 Recovered (27.23 to 28.80 m): Joints 75-300 mm spacing, rough, irregular, horizontal. RQD = 95% - Slightly weathered on joint surfaces to 27.53 m.			R7	75					
201						NR						
200.6					28.8	R8	100					
200	95		<b>END OF HOLE AT 28.8 m</b>									
199	100		Notes: 1. Installed Casagrande standpipe at 26.52 m depth. Response zone from 22.9 to 28.8 m depth. 2. Lockable protective steel casing installed at ground surface. 3. Groundwater at 7.78 m depth upon completion.									
198												
197	105											
196	110											

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