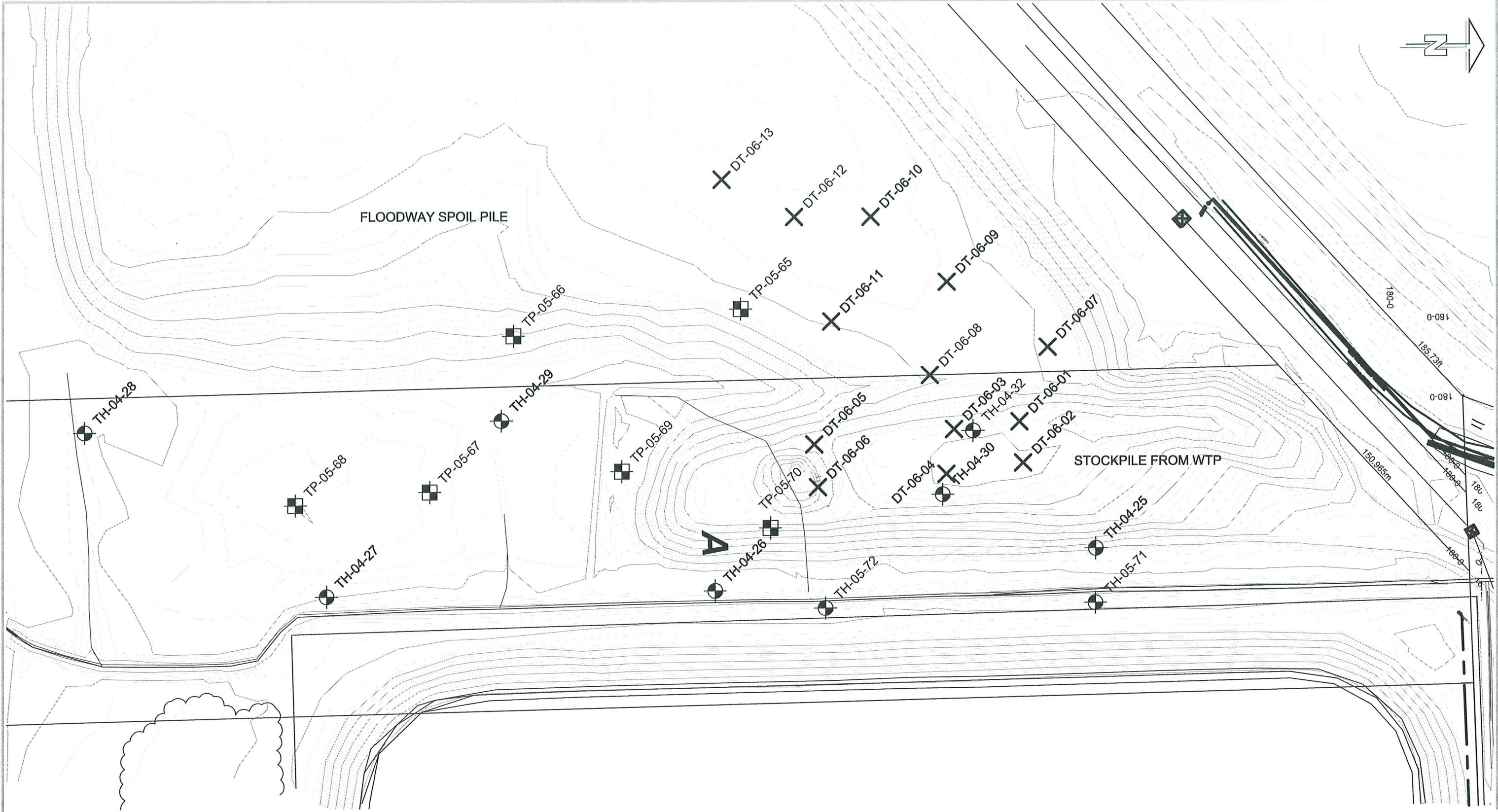


B SIZE 11" x 17" (279.4mm x 431.8mm)

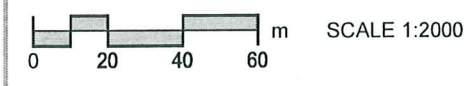
PLOT: 06-02-22 3:01:18 PM

Saved By: mhadfiel

UMA FILE NAME: 3398-055-00\_00-B-F003\_RX.dwg



# PLAN

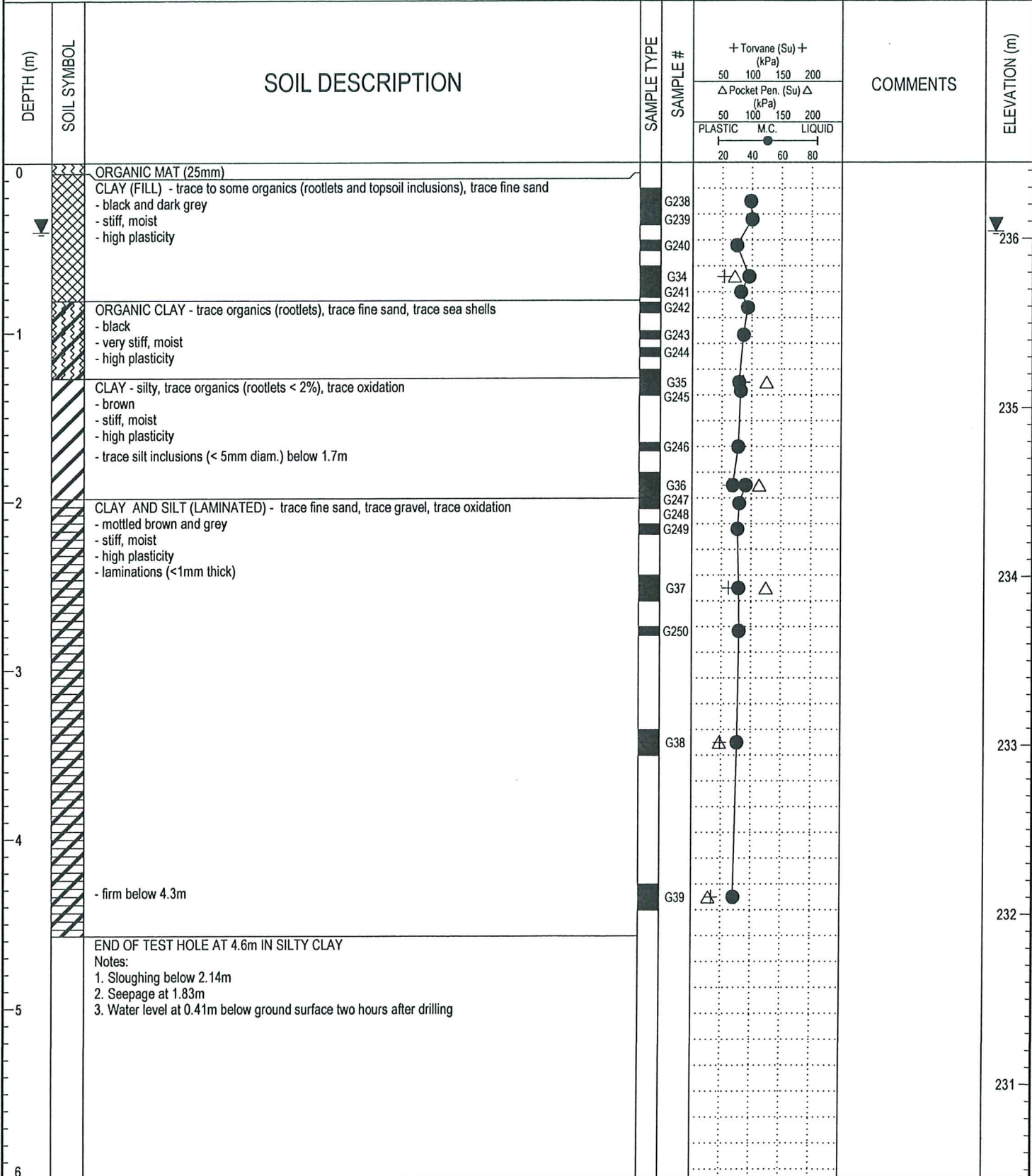


- TEST HOLES
- TEST PITS
- DENSITY TESTS

Earth Tech Canada Ltd.  
 Winnipeg Water Treatment Plant  
 Freeze Thaw Ponds

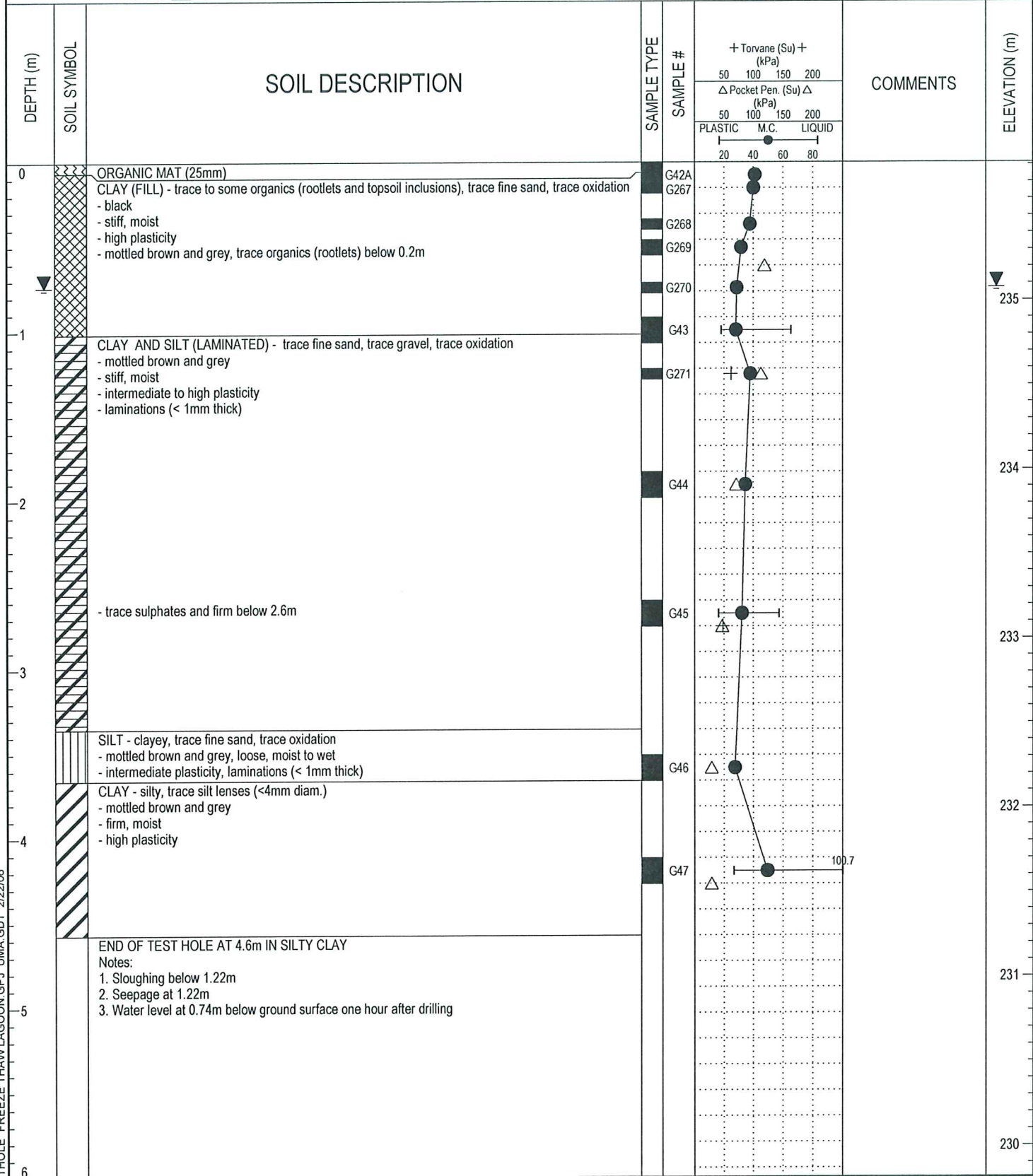
## Test Hole Location Plan

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-25
LOCATION: Freeze/Thaw Lagoon - N 5523678.036 E 647727.041		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker RM5 125mm Solid Stem Augers	ELEVATION (m): 236.448
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



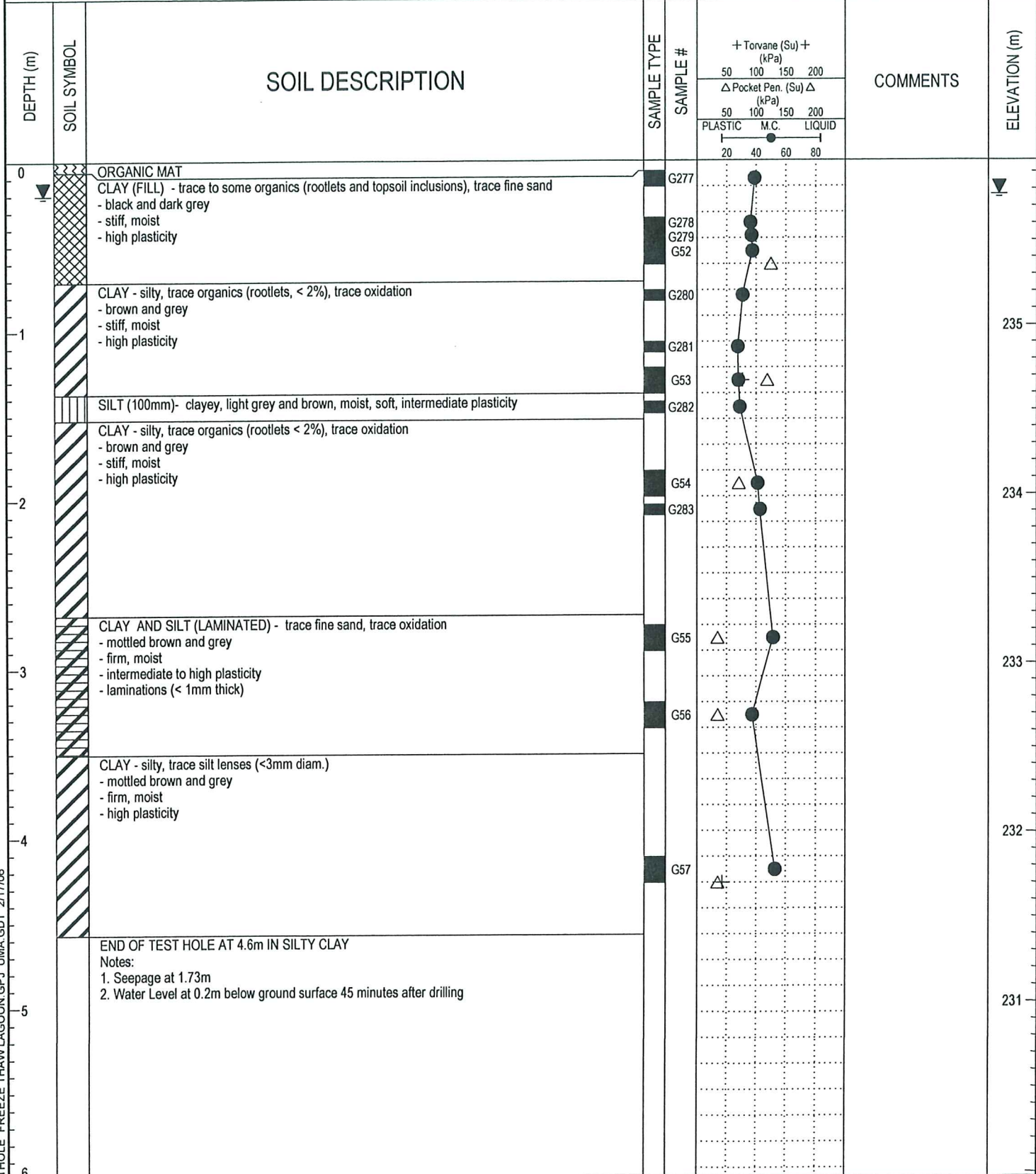
LOG OF TESTHOLE FREEZE THAW LAGOON.GPJ UMA.GDT 2/17/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-26
LOCATION: Freeze/Thaw Lagoon - N 5523473.747 E 647749.616		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker RM5 125mm Solid Stem Augers	ELEVATION (m): 235.813
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



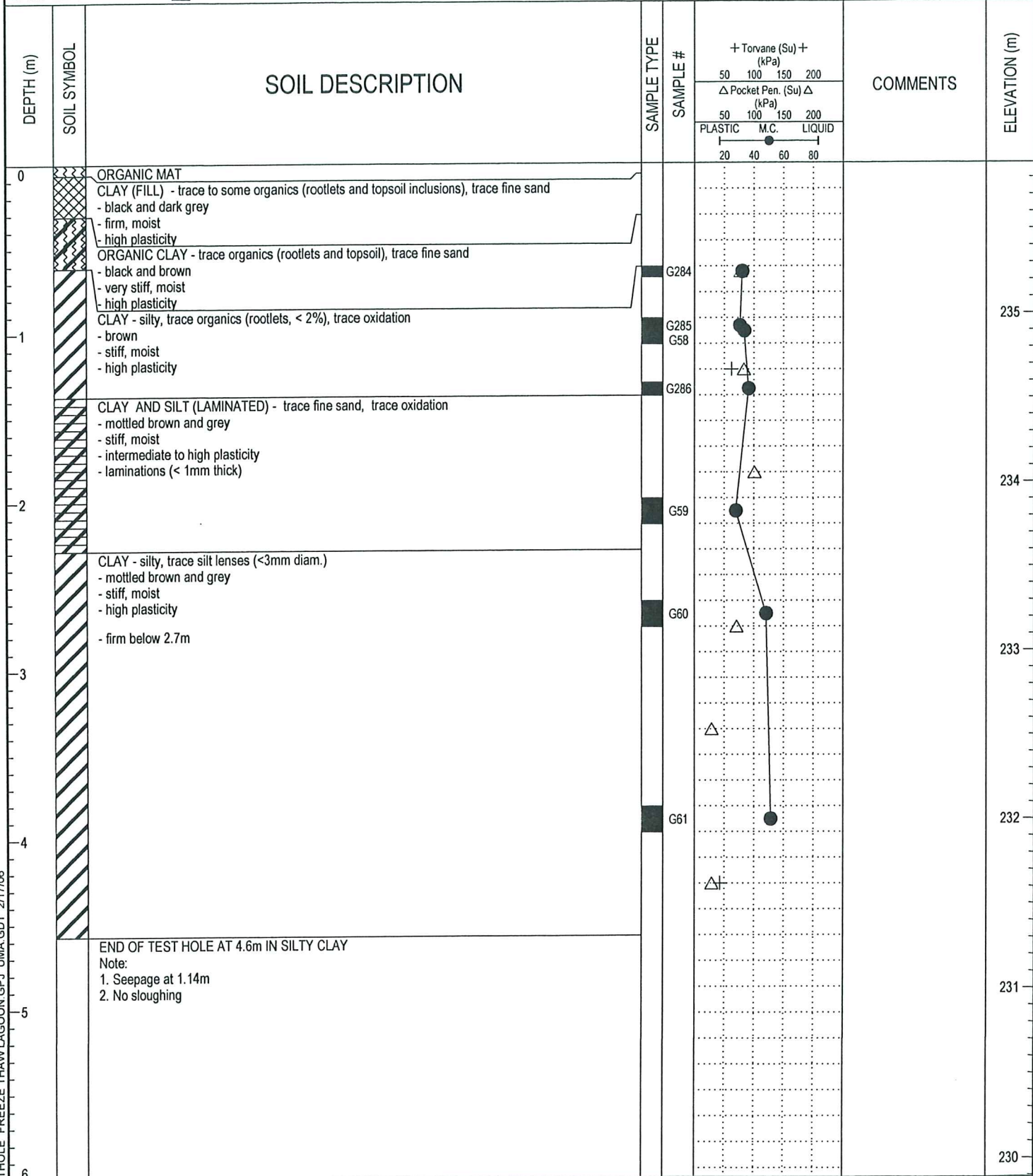
LOG OF TESTHOLE FREEZE THAW LAGOON.GPJ UMA.GDT 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-27
LOCATION: Freeze/Thaw Lagoon - N 5523265.177 E 647752.426		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker RM5 125mm Solid Stem Augers	ELEVATION (m): 235.97
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



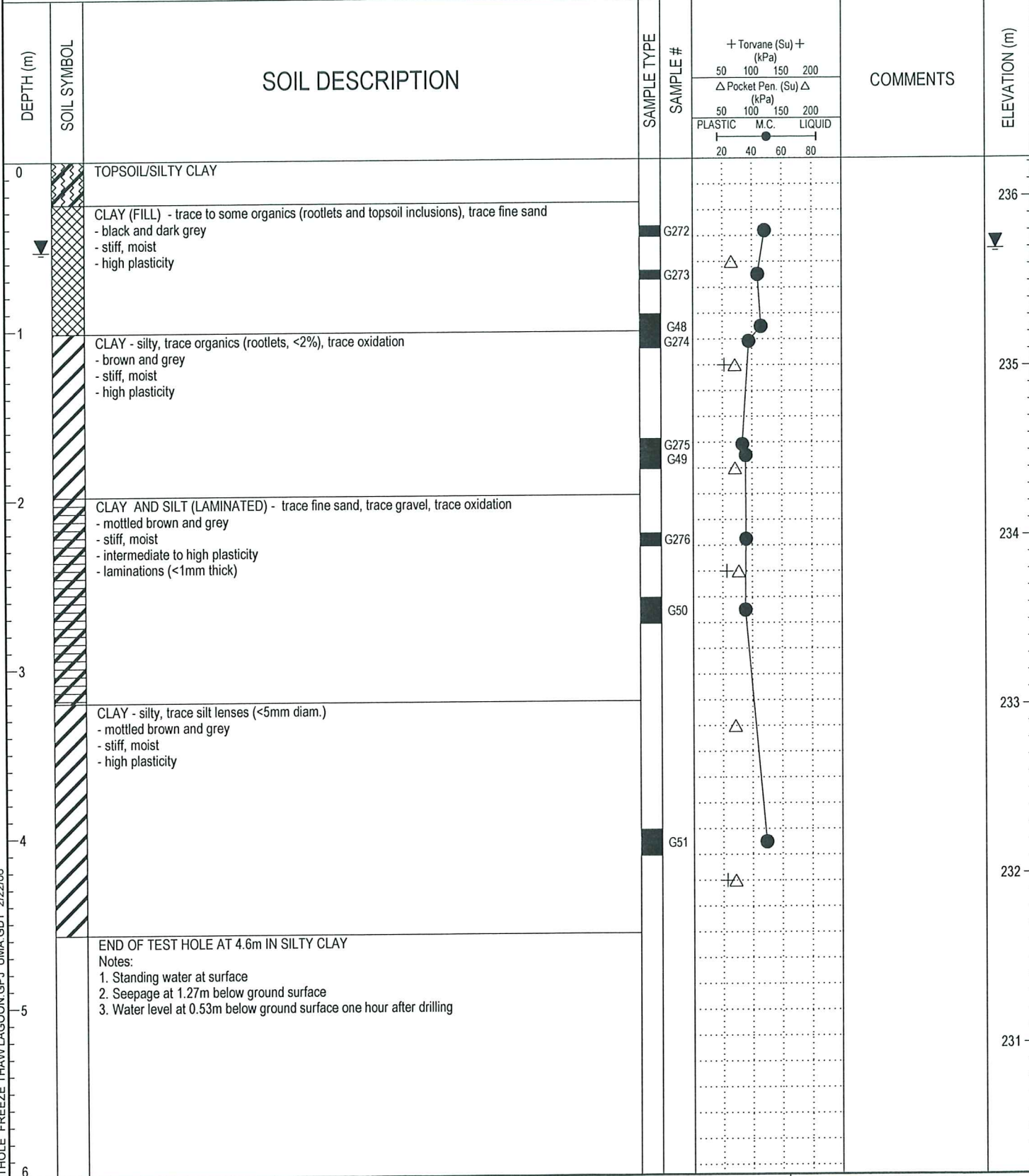
LOG OF TESTHOLE FREEZE THAW LAGOON.GPJ UMA.GDT 2/17/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-28
LOCATION: Freeze/Thaw Lagoon - N 5523134.985 E 647663.995		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker RM5 125mm Solid Stem Augers	ELEVATION (m): 235.887
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



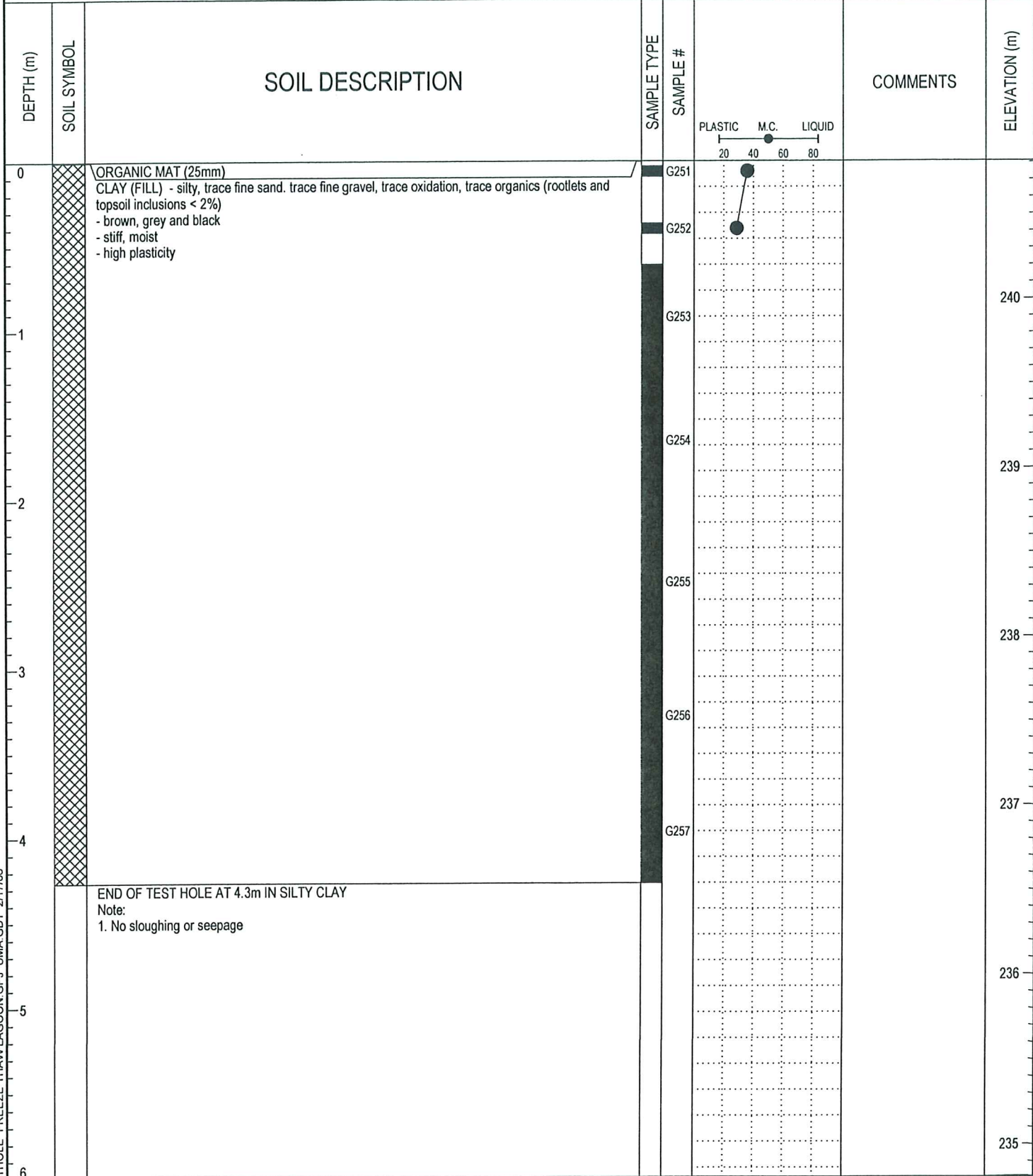
LOG OF TESTHOLE FREEZE THAW LAGOON.GPJ UMA.GDT 2/17/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-29
LOCATION: Freeze/Thaw Lagoon - N 5523359.007 E 647658.037		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker RM5 125mm Solid Stem Augers	ELEVATION (m): 236.226
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE FREEZE THAW LAGOON GP.J UMA.GDT. 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 04-32
LOCATION: Spoil Pile West of Freeze/Thaw Lagoon - N 5523616 E 647663		PROJECT NO.: 3398-055-00-01
CONTRACTOR: UMA Engineering	METHOD: 50 mm Hand Auger	ELEVATION (m): 240.81
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE
	<input checked="" type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> BULK
	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> CORE

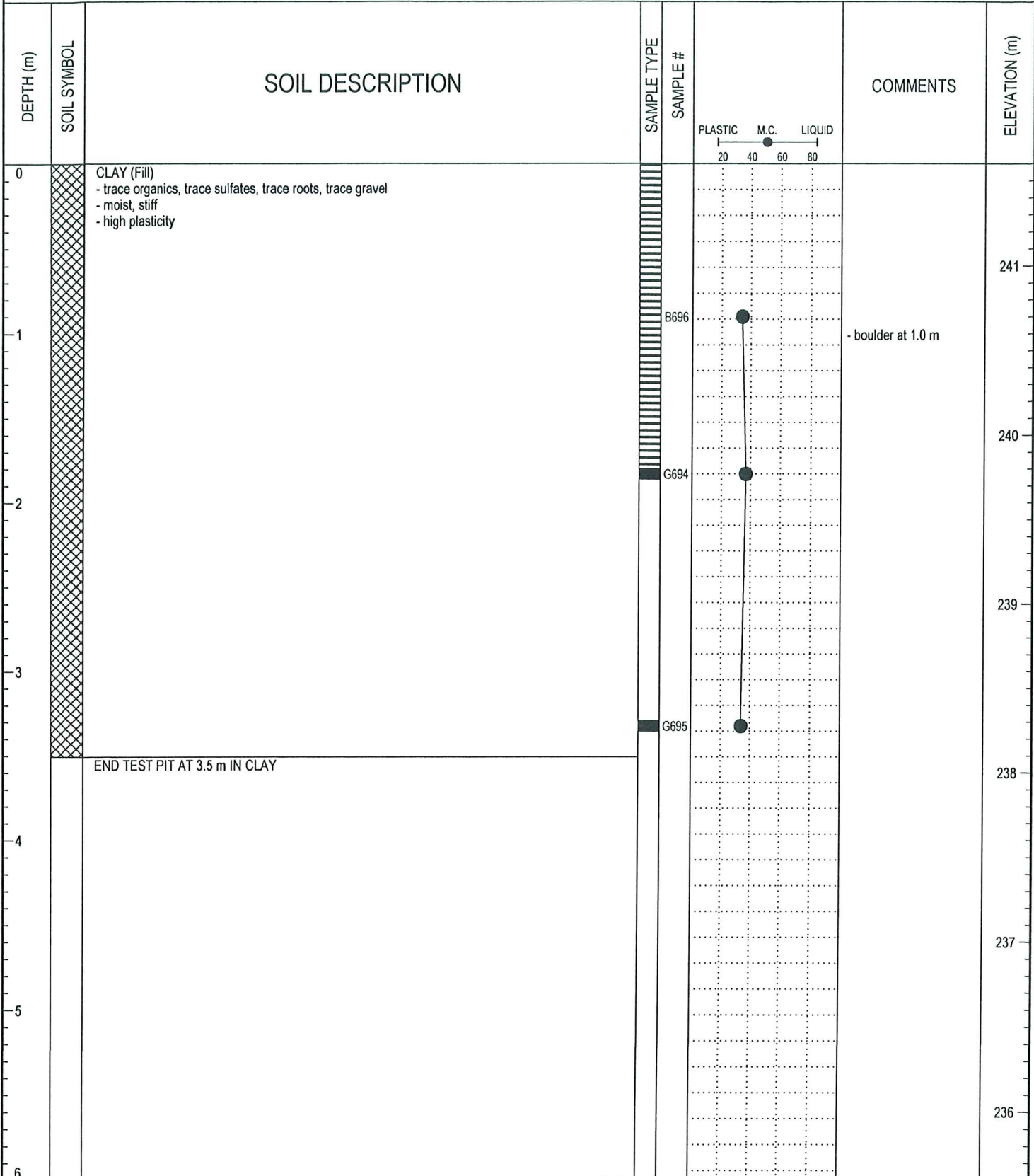


ORGANIC MAT (25mm)  
 CLAY (FILL) - silty, trace fine sand, trace fine gravel, trace oxidation, trace organics (rootlets and topsoil inclusions < 2%)  
 - brown, grey and black  
 - stiff, moist  
 - high plasticity

END OF TEST HOLE AT 4.3m IN SILTY CLAY  
 Note:  
 1. No sloughing or seepage

LOG OF TESTHOLE - FREEZE THAW LAGOON GP.J UMA GDT 2/17/06

PROJECT: Winnipeg Water Treatment Plant		CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTPIT NO: 05-65
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01	
CONTRACTOR: Munro		METHOD: Excavator JD 610	ELEVATION (m): 241.6
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE	<input checked="" type="checkbox"/> SPLIT SPOON
		<input type="checkbox"/> BULK	<input type="checkbox"/> NO RECOVERY
			<input type="checkbox"/> CORE



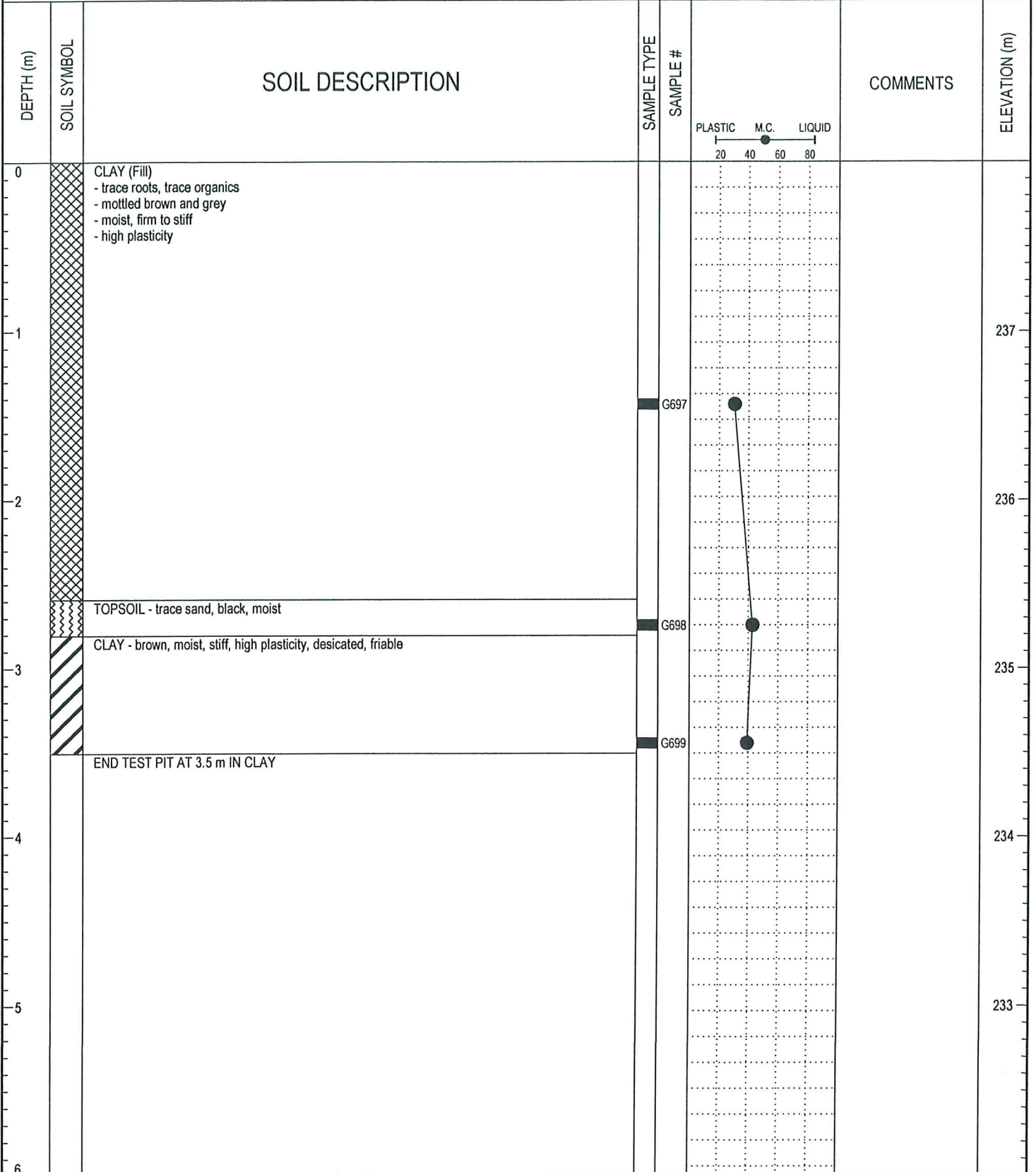
LOG OF TEST PIT FREEZE THAW LAGOON.GPJ, UMA.GDT, 2/22/06

UMA | AECOM

LOGGED BY: Jeff Tallin	COMPLETION DEPTH: 3.51 m
REVIEWED BY: Jeff Tallin	COMPLETION DATE: 5/11/05
PROJECT ENGINEER: Ken Skafffeld	Page 1 of 1



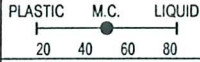
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTPIT NO: 05-66
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Excavator JD 610	ELEVATION (m): 238
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE



LOG OF TEST PIT FREEZE THAW LAGOON.GPJ UMA.GDT 2/22/06

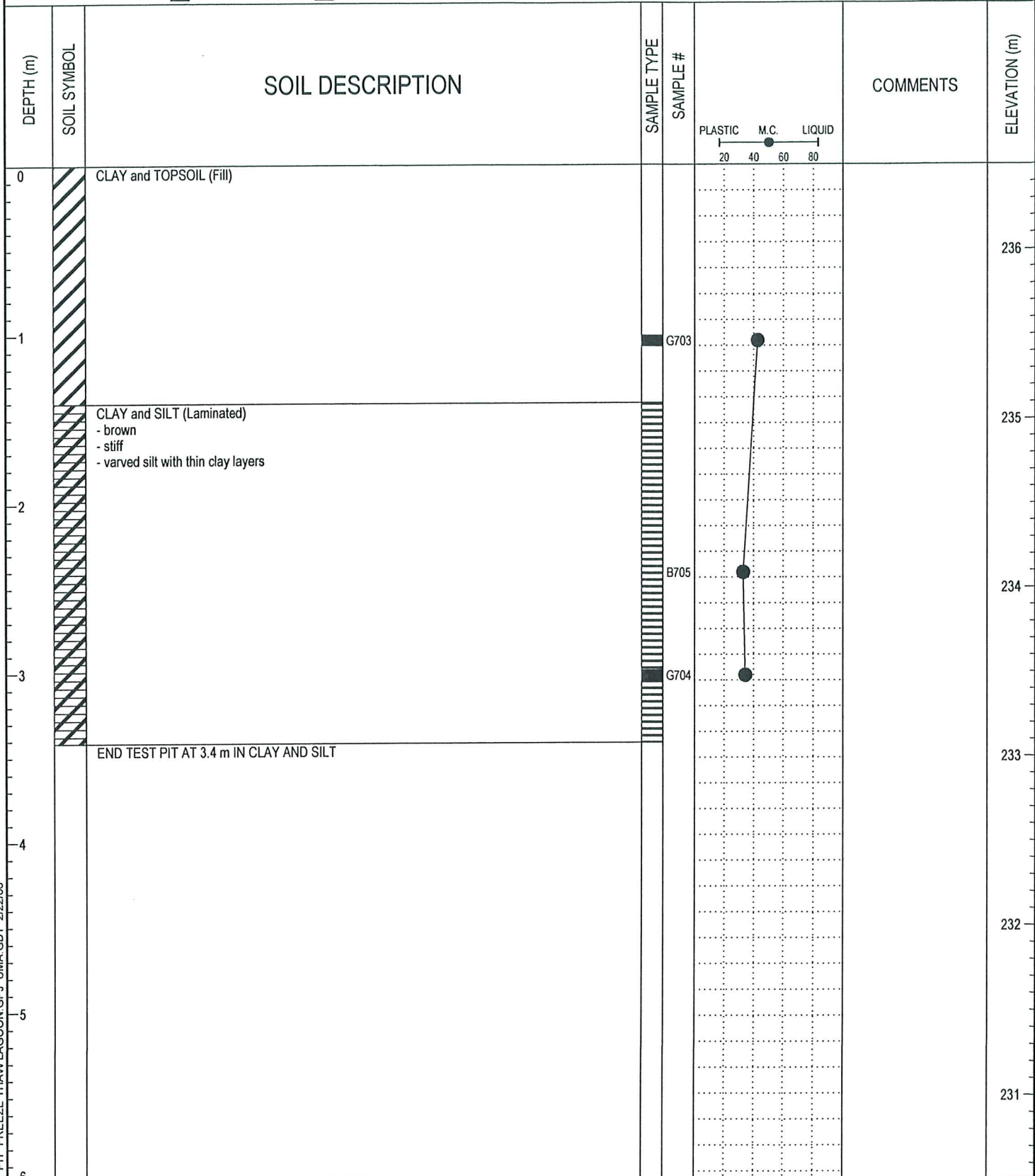
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 05-67
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Excavator JD 610	ELEVATION (m): 236.5
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0		CLAY and TOPSOIL (Fill) - pieces of wood, roots - black - moist to wet, stiff				236
1		CLAY - brown - moist, stiff - high plasticity		B702		235
2		CLAY - brown - moist, stiff - high plasticity		G700		235
3		END TEST PIT AT 2.7 m IN CLAY		G701		234
4						233
5						232
6						231



LOG OF TESTHOLE FREEZE THAW LAGOON.GPJ UMA.GDT 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTPIT NO: 05-68
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Excavator JD 610	ELEVATION (m): 236.5
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



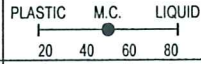
LOG OF TEST PIT - FREEZE THAW LAGOON.GPJ UMA.GDT 2/22/06

UMA | AECOM

LOGGED BY: Jeff Tallin	COMPLETION DEPTH: 3.41 m
REVIEWED BY: Jeff Tallin	COMPLETION DATE: 5/11/05
PROJECT ENGINEER: Ken Skafffeld	

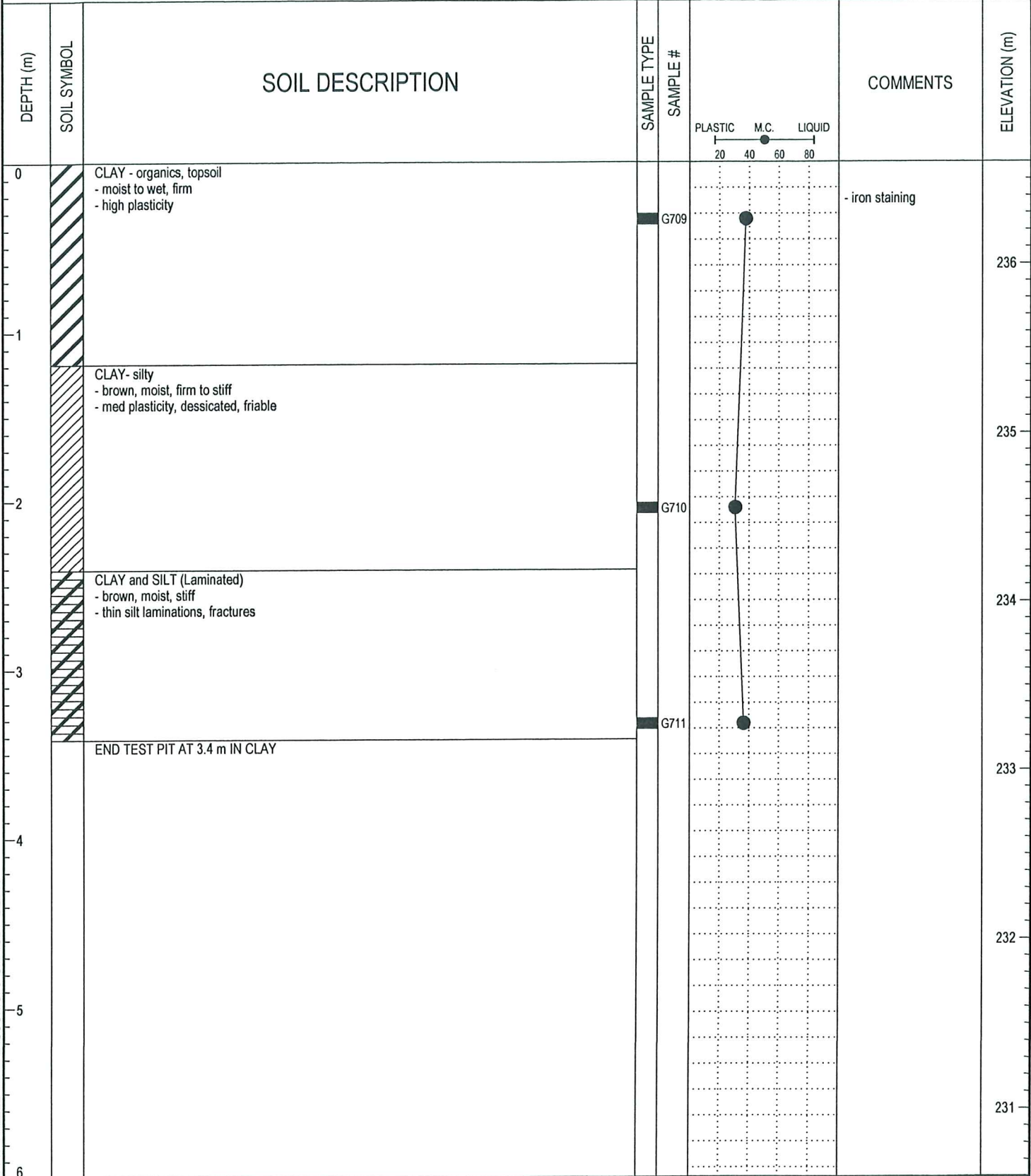
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTPIT NO: 05-69
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Excavator JD 610	ELEVATION (m): 236.6
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE		

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0		CLAY and TOPSOIL - organics, wood pieces, roots - black	<input checked="" type="checkbox"/>	G706		236
1		SILT - clayey - brown - moist, firm to stiff - low plasticity - friable, desiccated	<input type="checkbox"/>	G707		235
2						234
3				G708		233
4		END TEST PIT AT 3.4 m IN CLAY				232
5						231
6						




LOG OF TEST PIT - FREEZE THAW LAGOON GPJ UMA.GDT 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTPIT NO: 05-70
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Excavator JD 610	ELEVATION (m): 236.6
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	





LOG OF TEST PIT - FREEZE THAW/LAGOON.GPJ UMA.GDT 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 05-71
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Hand Auger	ELEVATION (m): 235.7
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0		CLAY - trace silt - brown, moist, stiff - high plasticity				235
1		END TEST HOLE AT 1.2 m IN CLAY				234
2						233
3						232
4						231
5						230
6						

LOG OF TESTHOLE - FREEZE THAW LAGOON.CPJ UMA.GDT 2/22/06

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Can Ltd)	TESTHOLE NO: 05-72
LOCATION: Water Treatment Plant Lime Settling Ponds		PROJECT NO.: 3398-055-00-01
CONTRACTOR: Munro	METHOD: Hand Auger	ELEVATION (m): 235.5
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0		CLAY - trace organics, trace topsoil, black, moist, stiff, high plasticity				235
1		CLAY - trace silt - brown, moist, stiff, high plasticity				234
1.19		END TEST HOLE AT 1.2 m IN CLAY				233
2						232
3						231
4						230
5						
6						

LOG OF TESTHOLE - FREEZE THAW LAGOON.GPJ UMA.GDT 2/22/06



MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada  
tel (204) 284-0580 fax (204) 475-3646

**Client:** City Of Winnipeg

**Project:** Water Treatment Plant

**Lab No.** S05-36

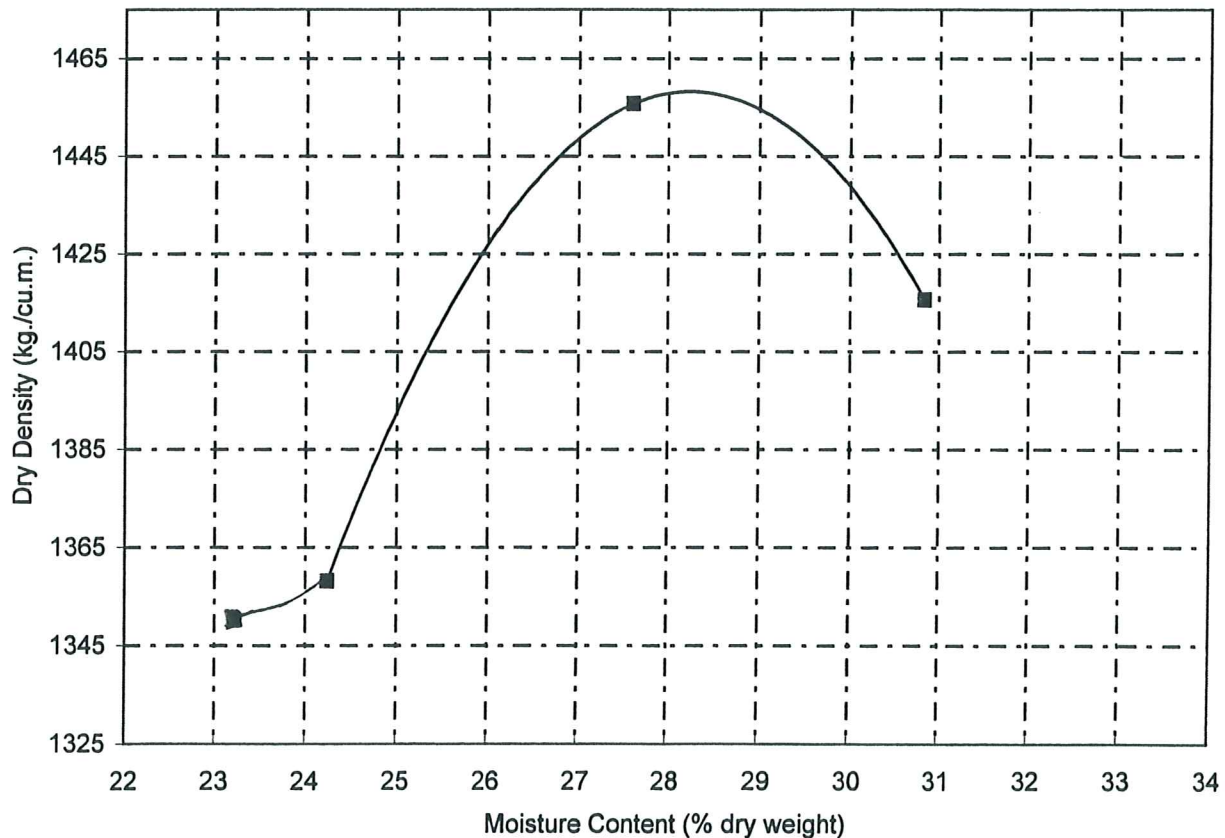
**Date Sampled/Tested** May 20, 2005

**Sample:** TP 05-65 Sample B696

**Source:** Delivered

TRIAL NUMBER	1	2	3	4	
Wet Unit Weight (kg/cu.m.)	1666	1687	1858	1852	
Dry Unit Weight (kg/cu.m.)	1353	1358	1456	1416	
Moisture Content (%)	23.2	24.2	27.6	30.8	

STANDARD PROCTOR  
ASTM D698, Method A



**Description:** Clay 100% passing No. 4  
Sample B696

**Maximum Dry Density:** 1458 kg/cu.m.

**Optimum Moisture:** 28.2 %

**PLAN NO:** P1130





MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada  
tel (204) 284-0580 fax (204) 475-3546

**Client:** City of Winnipeg

**Project:** Water Treatment Plant

**Lab No.** S05-36-A

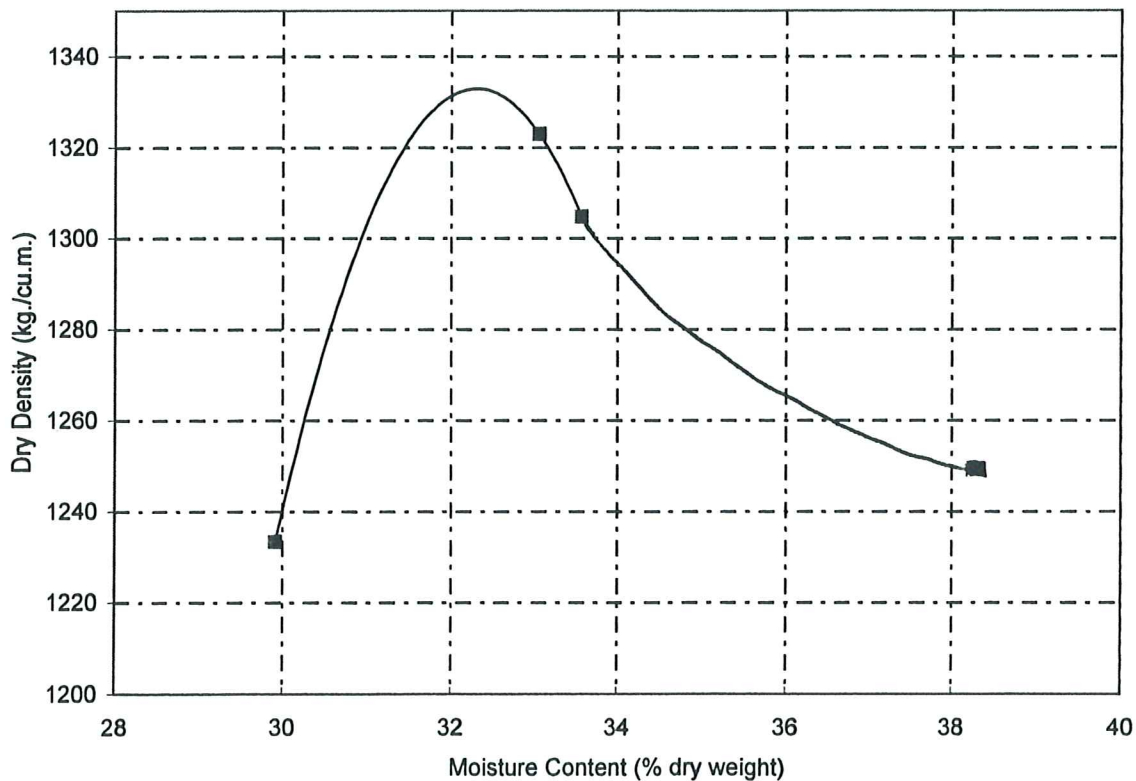
**Date Sampled/Tested** May 17/05

**Sample:** TP 05-67 Sample B702

**Source:** Delivered

TRIAL NUMBER	1	2	3	4
Wet Unit Weight (kg/cu.m.)	1602	1760	1743	1734
Dry Unit Weight (kg/cu.m.)	1233	1323	1305	1256
Moisture Content (%)	29.9	33.1	33.6	38.1

STANDARD PROCTOR  
ASTM D698, Method A



**Description:** Clay 100% passing No. 4  
Sample B702

**Maximum Dry Density:** 1333 kg/cu.m.

**Optimum Moisture:** 32.3 %

**PLAN NO:** P1129

## Field Density Report

UMA JOB No. 3398-055-0304  
 CLIENT: Earth Tech  
 PROJECT: Winnipeg Water Treatment Plant  
 CONTRACTOR: Mulder Construction and Materials Ltd.  
 Material Tested: Backfill Clay  
 Location: As per Plan

DATE TESTED: 2-Feb-06  
 TESTED BY: ML  
 Max. Dry Densit n/a kg/m<sup>3</sup>  
 Optimum Moistu n/a %  
 Plan No. Fig 01

TEST No.	TEST LOCATION	INSITU DRY DEN. (kg/m <sup>3</sup> )	WET DENSITY (kg/m <sup>3</sup> )	MOISTURE CONTENT (%)	AREA OF TEST
1	DT-06-01	1363	1763	29.3	WTP stock pile
2	DT-06-02	1467	1893	29.0	WTP stock pile
3	DT-06-03	1353	1844	36.3	WTP stock pile
4	DT-06-04	1399	1809	29.3	WTP stock pile
5	DT-06-05	1101	1581	43.6	WTP stock pile
6	DT-06-06	1124	1680	49.5	WTP stock pile
7	DT-06-07	1352	1918	41.9	Floodway spoil pile
8	DT-06-08	1278	1773	38.7	Floodway spoil pile
9	DT-06-09	1317	1816	37.9	Floodway spoil pile
10	DT-06-10	1266	1743	37.7	Floodway spoil pile
11	DT-06-11	1363	1773	30.1	Floodway spoil pile
12	DT-06-12	1404	1918	36.6	Floodway spoil pile
13	DT-06-13	1378	1902	38.0	Floodway spoil pile

**Note:** Refer to Figure 1- Freeze Thaw Ponds Test Hole Location Plan for test locations



MATERIALS LABORATORY  
 UMA | AECOM  
 1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada  
 tel (204) 284-0580 fax (204) 475-3646