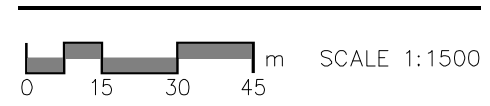
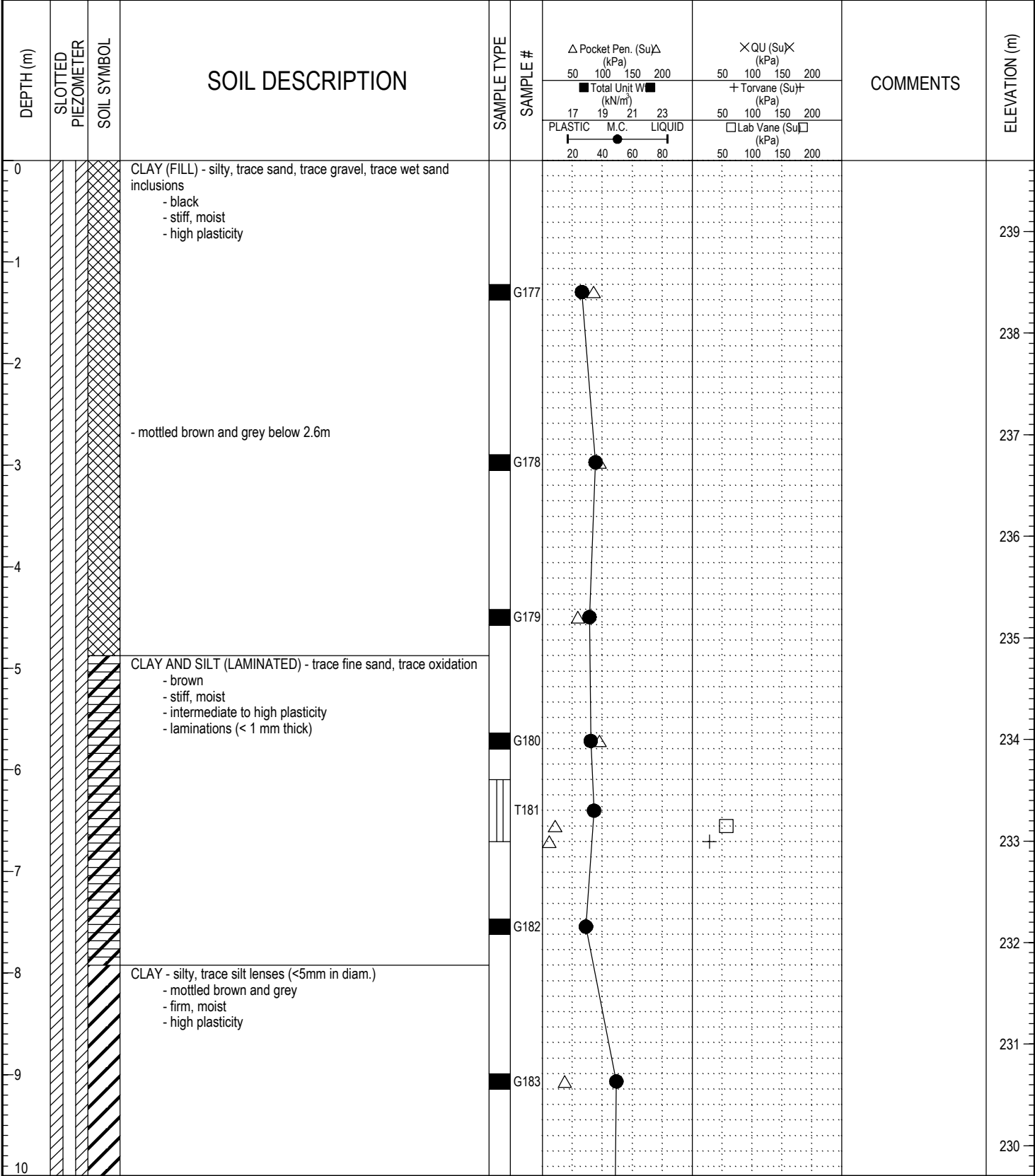


- TESTHOLES
- ⊕ TESTHOLES BY OTHERS



PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-01
LOCATION: WTP - N 5524018.031 E 647939.000		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 239.7
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

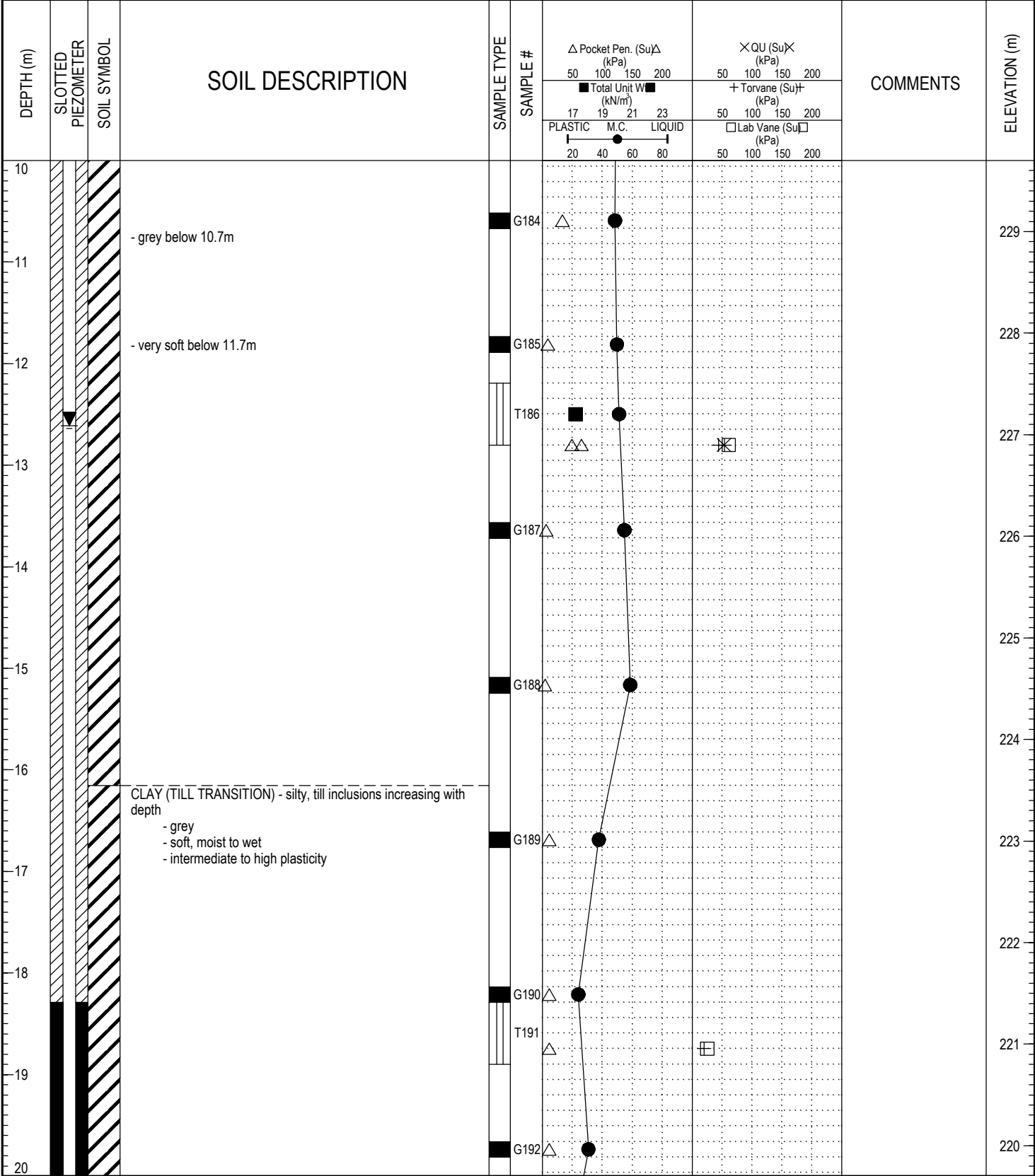


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 23.77 m
REVIEWED BY:	COMPLETION DATE: 5/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-01
LOCATION: WTP - N 5524018.031 E 647939.000		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 239.7
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

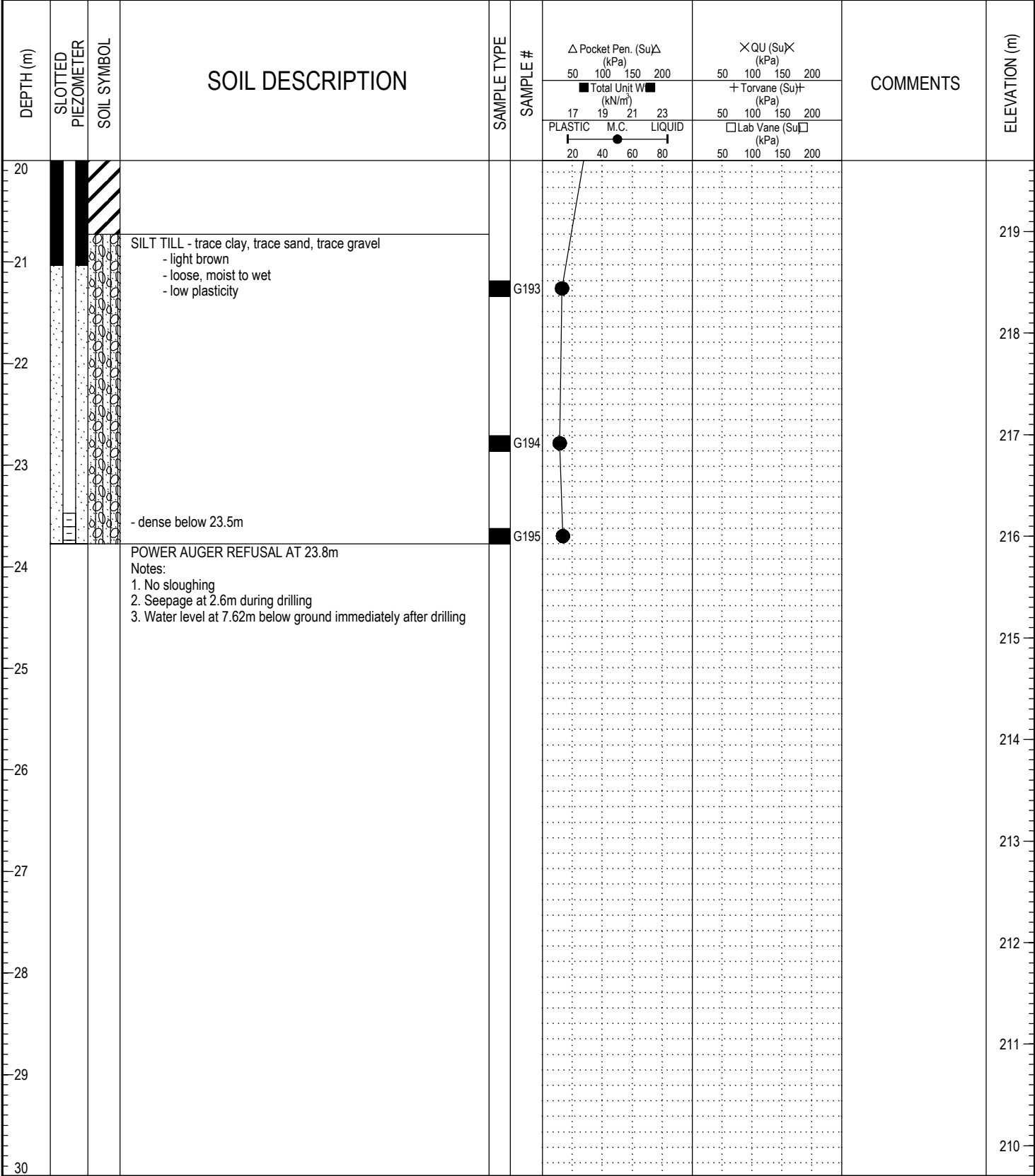


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 23.77 m
REVIEWED BY:	COMPLETION DATE: 5/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-01
LOCATION: WTP - N 5524018.031 E 647939.000		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 239.7
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



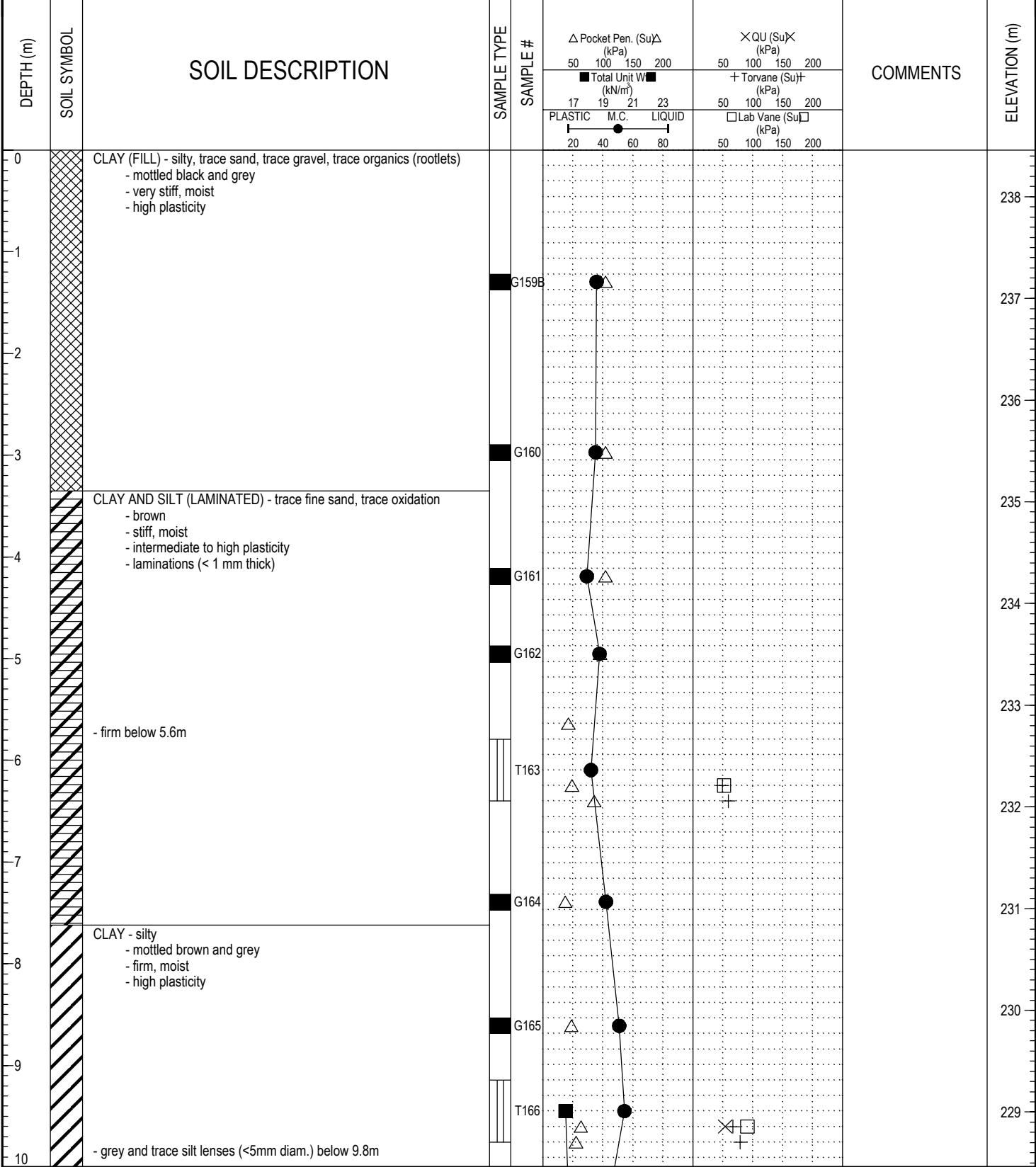
LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 23.77 m
REVIEWED BY:	COMPLETION DATE: 5/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-02
LOCATION: WTP - N 5524039.025 E 648058.040		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

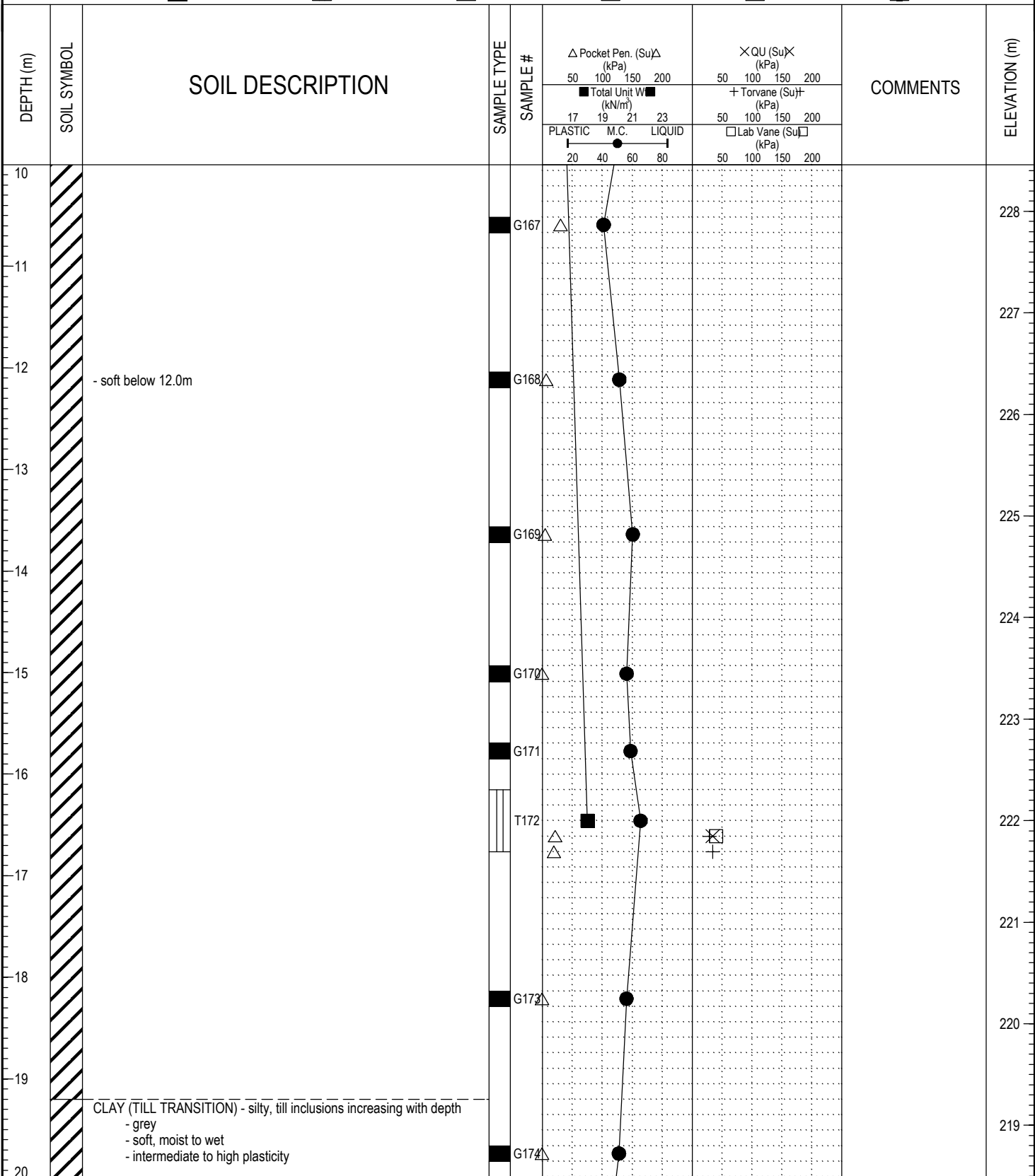


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-02
LOCATION: WTP - N 5524039.025 E 648058.040		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-02
LOCATION: WTP - N 5524039.025 E 648058.040		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458
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

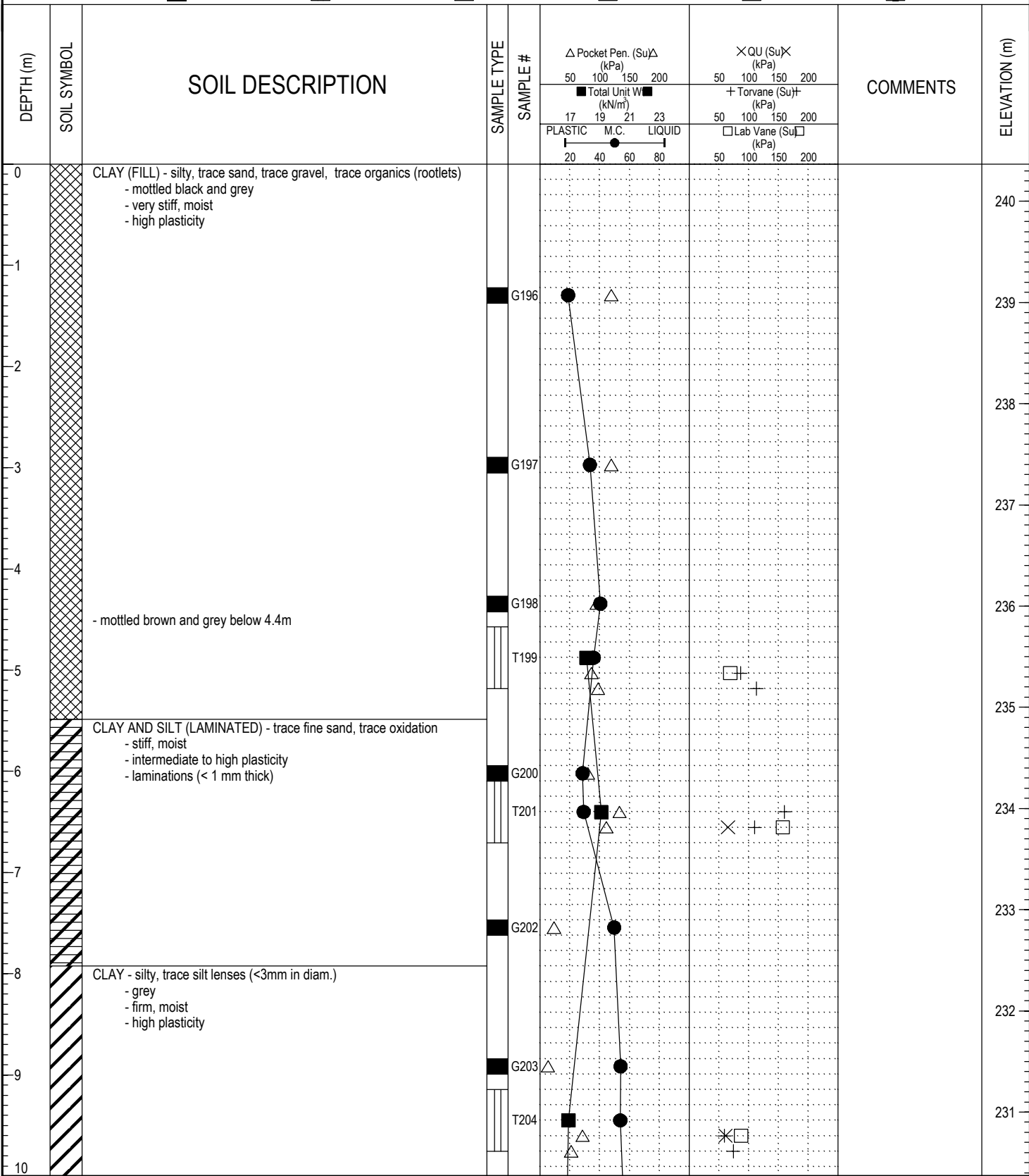
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Penetration Test Results		COMMENTS	ELEVATION (m)
					△ Pocket Pen. (Su)△ (kPa) 50 100 150 200 ■ Total Unit W (kN/m ²) 17 19 21 23 PLASTIC M.C. LIQUID 20 40 60 80	× QU (Su)× (kPa) 50 100 150 200 + Torvane (Su)+ (kPa) 50 100 150 200 □ Lab Vane (Su)□ (kPa) 50 100 150 200		
20								218
21								217
22		SILT TILL - trace to some gravel, trace clay, trace sand - light grey - loose, moist to wet - low plasticity		G175				216
23		POWER AUGER REFUSAL AT 22.9m Notes: 1. No sloughing 2. Seepage at 22.9m 3. Water level at 4.88m below ground immediately after drilling		G176				215
24								214
25								213
26								212
27								211
28								210
29								209
30								209

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-03
LOCATION: WTP - N 5524091.980 E 647959.997		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 240.367
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 23.77 m
REVIEWED BY:	COMPLETION DATE: 5/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant CLIENT: City of Winnipeg (Earth Tech Canada Ltd.) TESTHOLE NO: **04-03**
 LOCATION: WTP - N 5524091.980 E 647959.997 PROJECT NO.: 3398-055-00-01-00
 CONTRACTOR: Paddock Drilling Ltd. METHOD: RM 30 - 125 mm Solid Stem Augers ELEVATION (m): 240.367

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

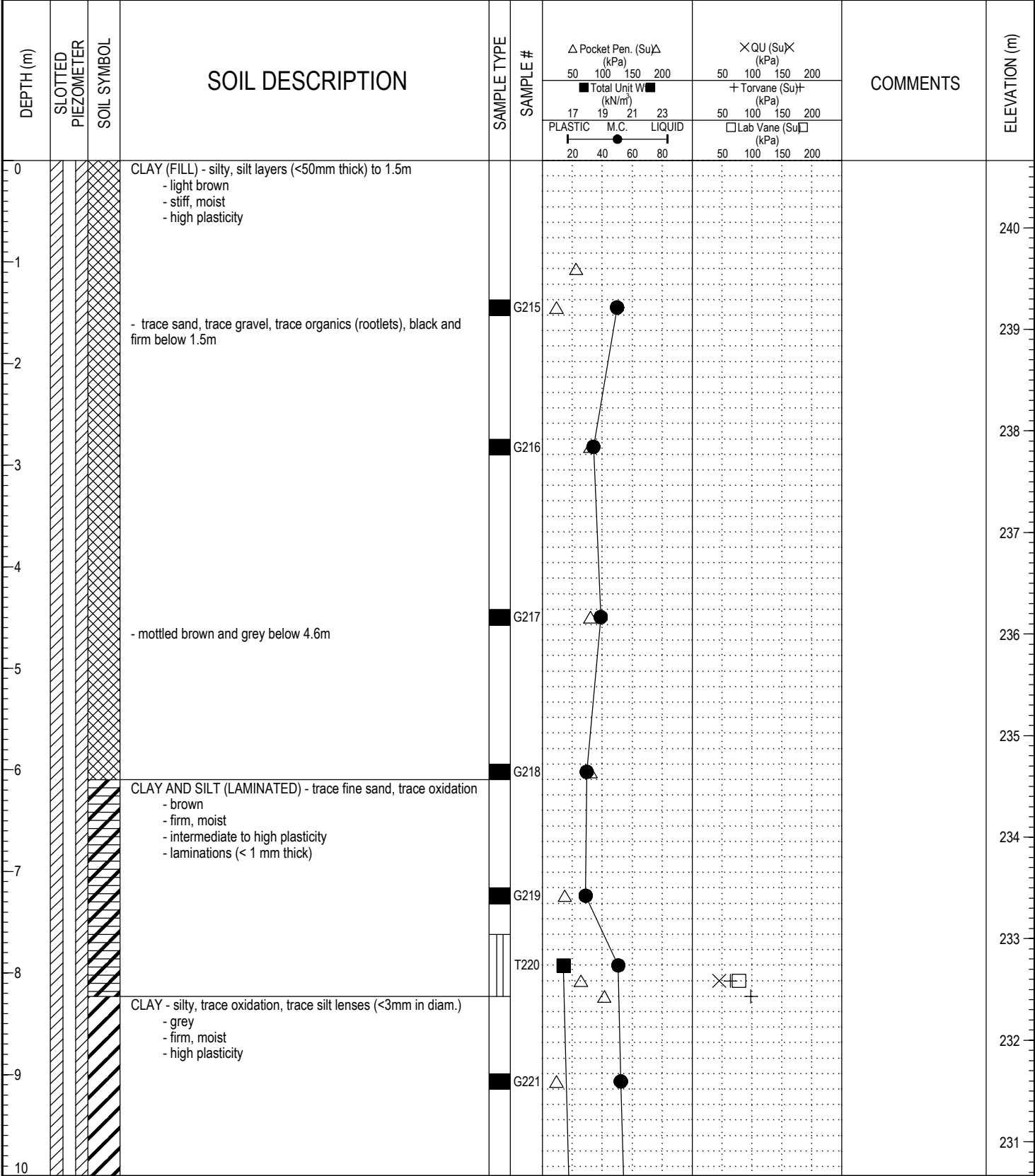
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Pocket Pen. (Su) Δ (kPa)		QU (Su) \times (kPa)		COMMENTS	ELEVATION (m)
					50	100	150	200		
20										220
21										219
22		SILT TILL - trace clay, trace sand, trace gravel - light brown - loose to compact, moist - low plasticity		G213 Δ	50 100 150 200		50 100 150 200			218
23		- some gravel below 22.9m		G214 ●	50 100 150 200		50 100 150 200			217
24		POWER AUGER REFUSAL AT 23.8m Notes: 1. No sloughing, seepage at 6.1m 2. Water level at 7.62m below ground immediately after drilling								216
25										215
26										214
27										213
28										212
29										211
30										210

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Kate Franklin COMPLETION DEPTH: 23.77 m
 REVIEWED BY: COMPLETION DATE: 5/10/04
 PROJECT ENGINEER: Ken Skafffeld Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-04
LOCATION: WTP - N 5524124.018 E 647902.002		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 240.662
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

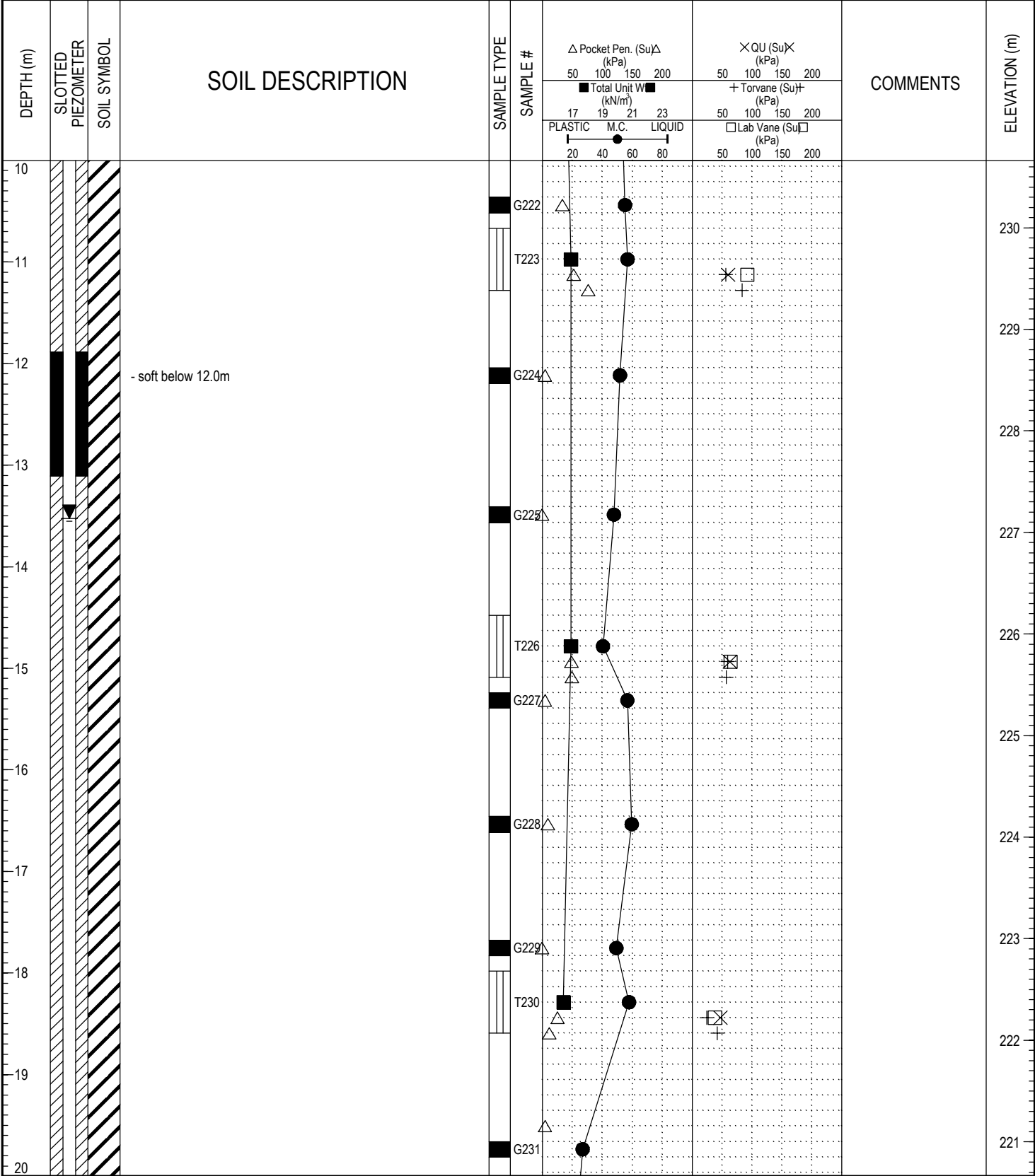


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 29.41 m
REVIEWED BY:	COMPLETION DATE: 6/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 4

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-04
LOCATION: WTP - N 5524124.018 E 647902.002		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 240.662
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

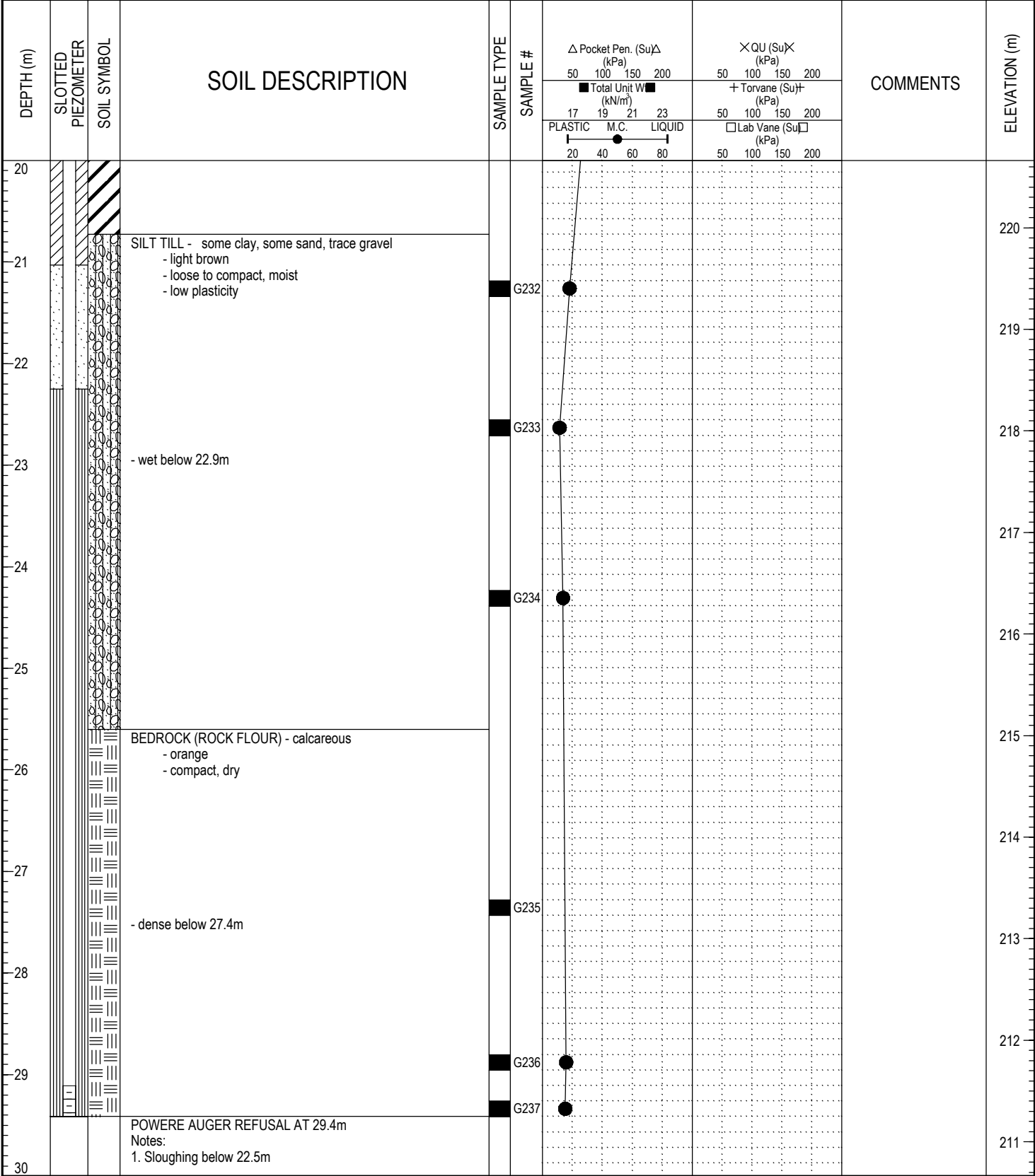


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 29.41 m
REVIEWED BY:	COMPLETION DATE: 6/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 4

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-04
LOCATION: WTP - N 5524124.018 E 647902.002		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 240.662
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 29.41 m
REVIEWED BY:	COMPLETION DATE: 6/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 4

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-04
LOCATION: WTP - N 5524124.018 E 647902.002		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 240.662
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND

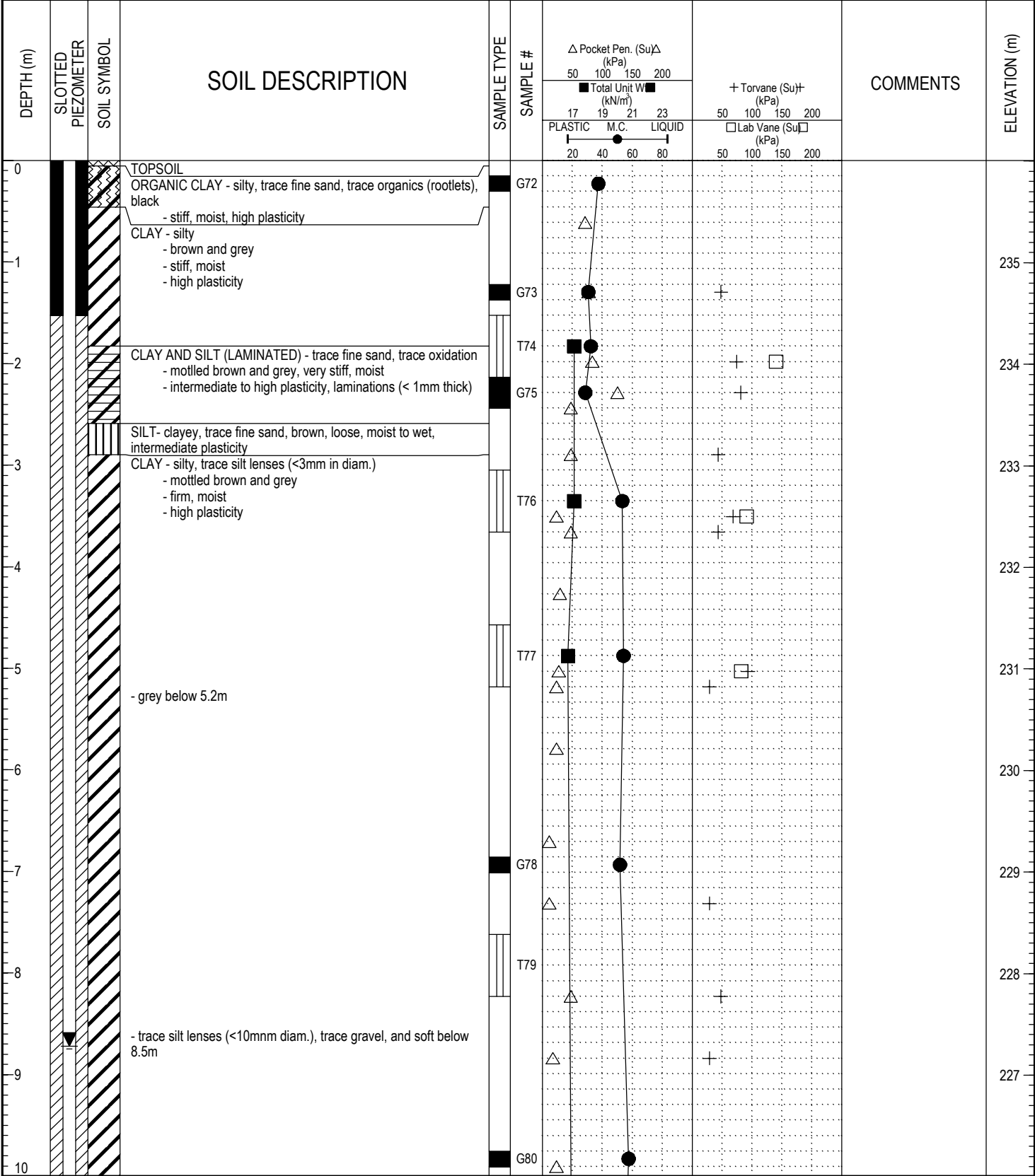
DEPTH (m)	SLOTTED PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Penetration Test Results		COMMENTS	ELEVATION (m)
						Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 <input checked="" type="checkbox"/> Total Unit W (kN/m ²) 17 19 21 23 PLASTIC M.C. LIQUID 20 40 60 80	× QU (Su)× (kPa) 50 100 150 200 + Torvane (Su)+ (kPa) 50 100 150 200 <input type="checkbox"/> Lab Vane (Su) (kPa) 50 100 150 200		
30			2. Seepage at 3.1m 3. Water level at 11.89m below ground immediately after drilling						240.662
31									240.562
32									240.462
33									240.362
34									240.262
35									240.162
36									240.062
37									239.962
38									239.862
39									239.762
40									239.662

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 29.41 m
REVIEWED BY:	COMPLETION DATE: 6/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 4 of 4

PROJECT: Winnipeg Water Treatment Plant		CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)		TESTHOLE NO: 04-05		
LOCATION: WTP - N 5524149.497 E 647855.683				PROJECT NO.: 3398-055-00-01-00		
CONTRACTOR: Paddock Drilling Ltd.			METHOD: Nodwell		ELEVATION (m): 236.006	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	NO RECOVERY	CORE
BACKFILL TYPE	BENTONITE	GRAVEL	SLOUGH	GROUT	CUTTINGS	SAND

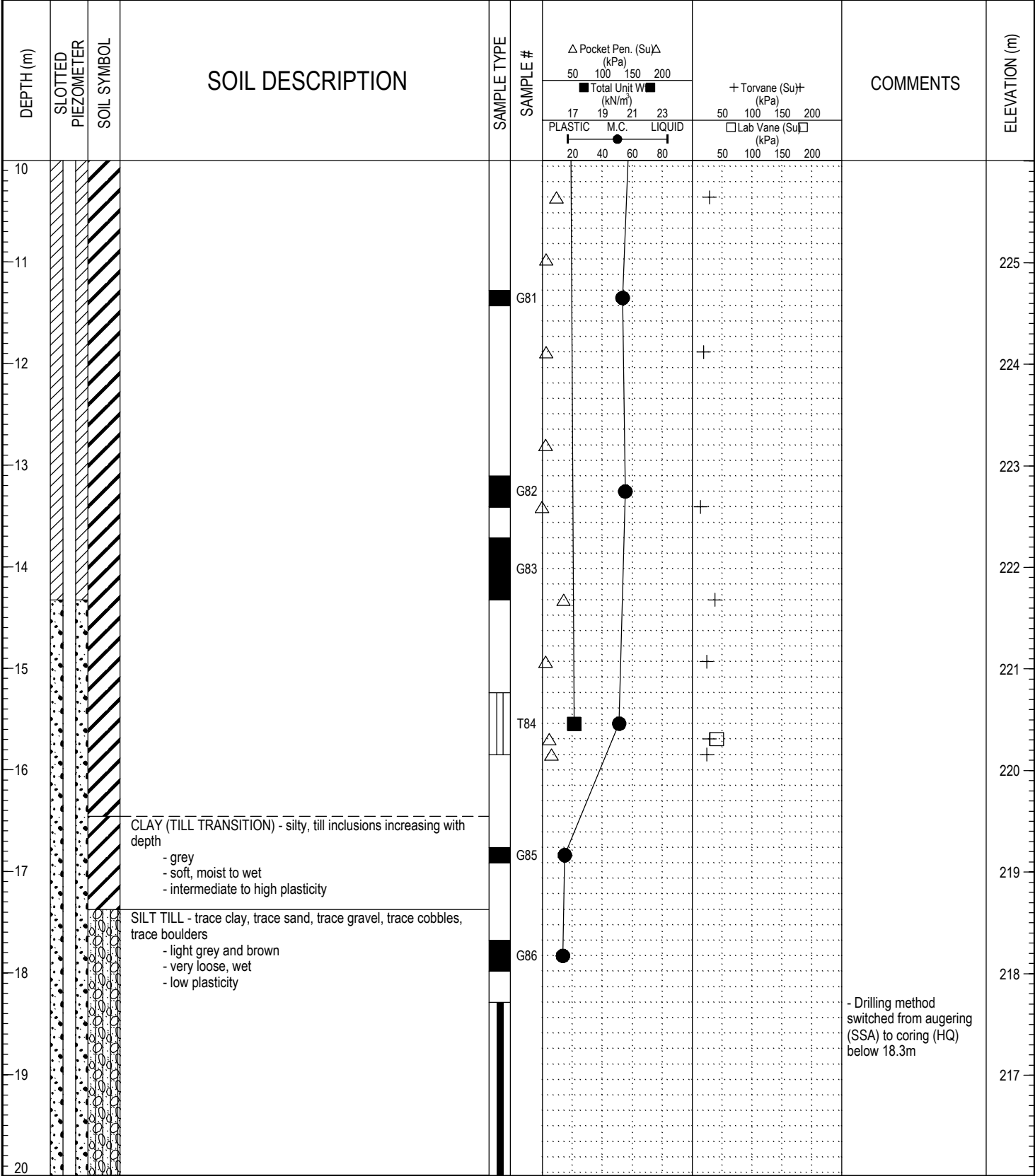


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.70 m
REVIEWED BY:	COMPLETION DATE: 15/9/04
PROJECT ENGINEER: Ken Skafffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-05
LOCATION: WTP - N 5524149.497 E 647855.683		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Nodwell	ELEVATION (m): 236.006
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.70 m
REVIEWED BY:	COMPLETION DATE: 15/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-05
LOCATION: WTP - N 5524149.497 E 647855.683		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Nodwell	ELEVATION (m): 236.006
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND

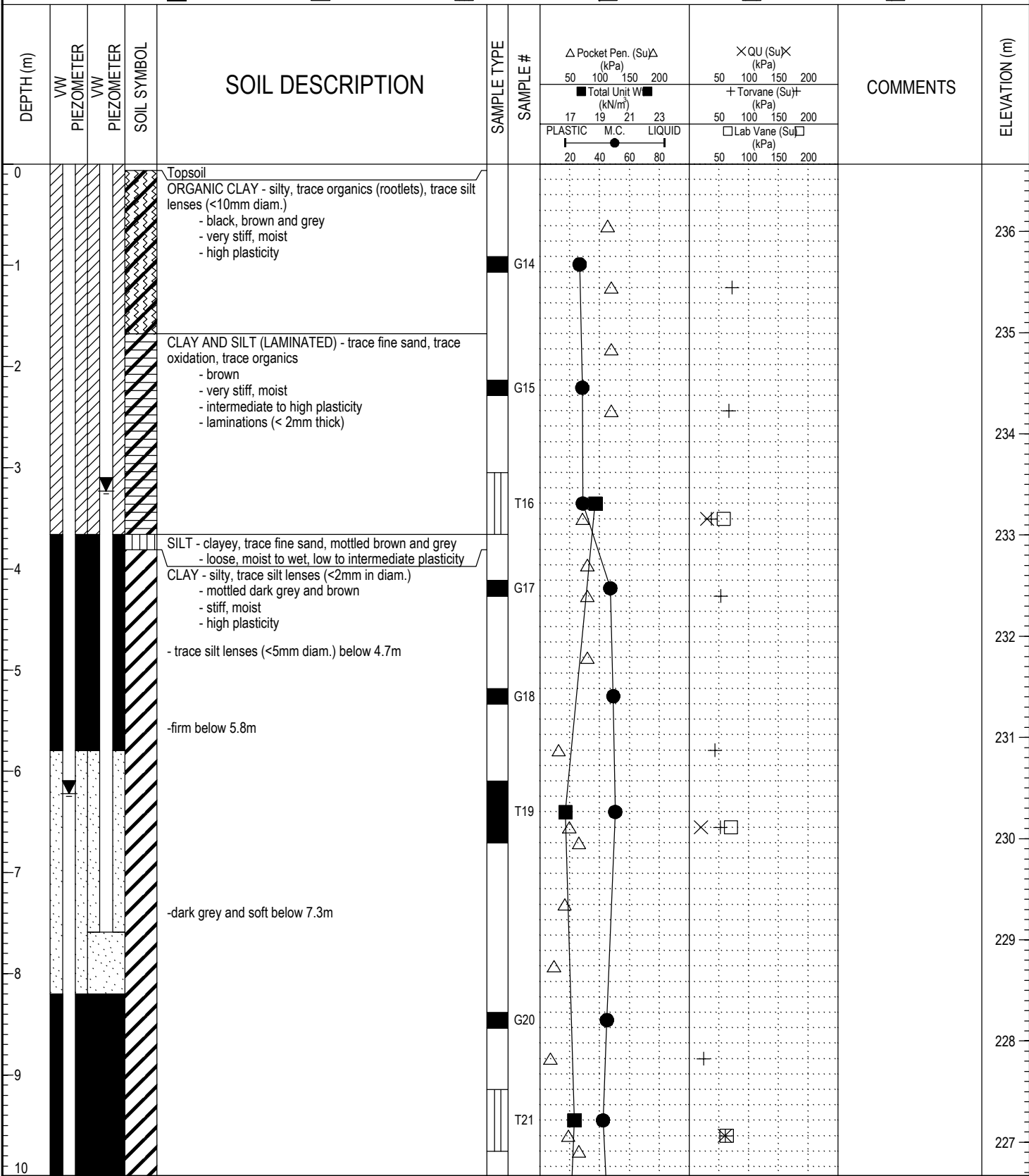
DEPTH (m)	SLOTTED PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Pocket Pen. (Su)Δ (kPa)		+ Torvane (Su)† (kPa)	COMMENTS	ELEVATION (m)
						50	100			
20			LIMESTONE BEDROCK - 150mm fracture at 20.4m							
21										215
22										214
23			END OF TEST HOLE AT 22.7m in LIMESTONE BEDROCK Notes: 1. No sloughing 2. Seepage at 2.61m 3. Standpipe SP-5 installed - Tip for SP-5 at Elevation 213.31m							213
24										212
25										211
26										210
27										209
28										208
29										207
30										

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.70 m
REVIEWED BY:	COMPLETION DATE: 15/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-06
LOCATION: WTP - N 5524161.864 E 647862.951	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.665
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

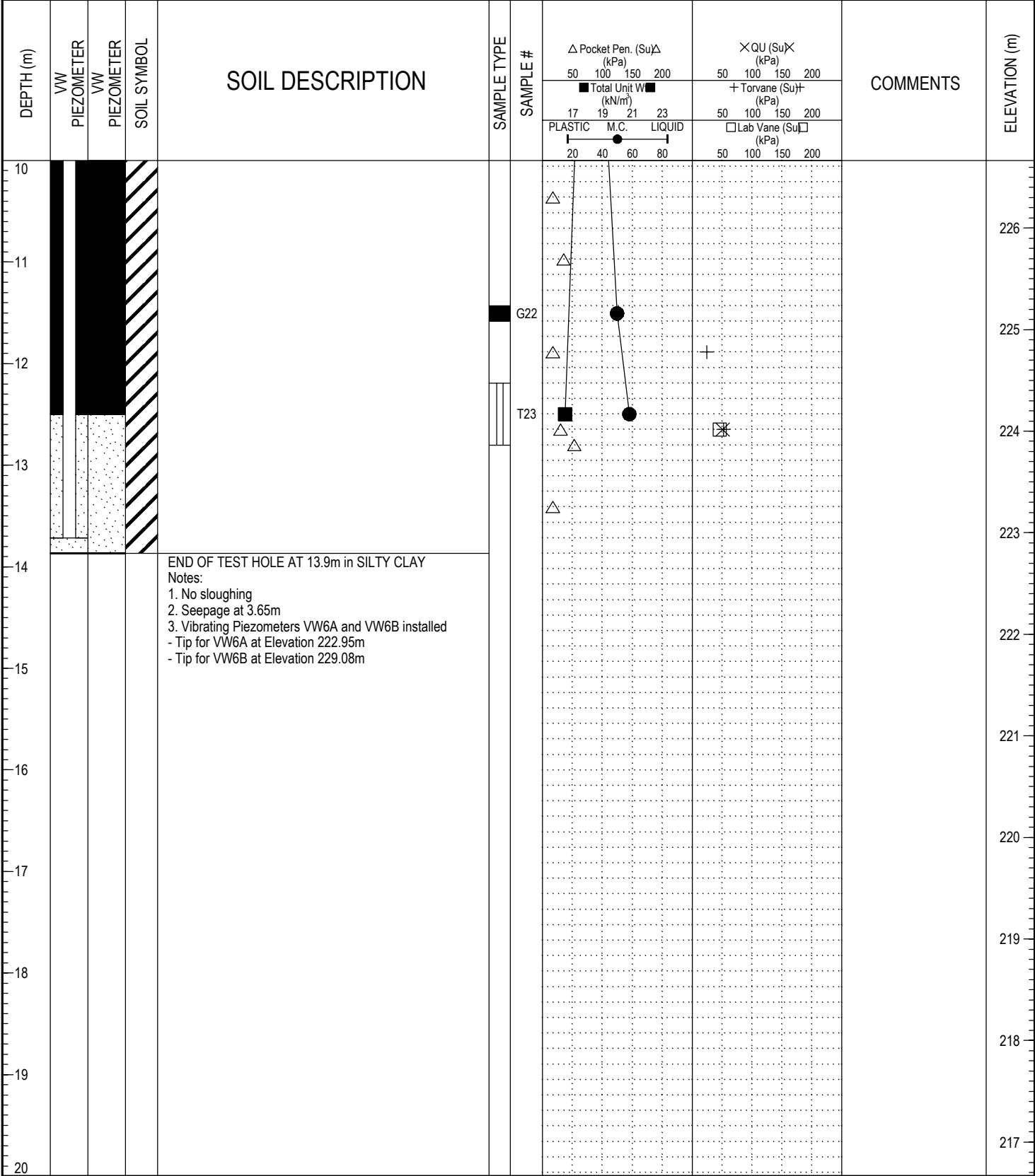


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 13.90 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-06
LOCATION: WTP - N 5524161.864 E 647862.951	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.665
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

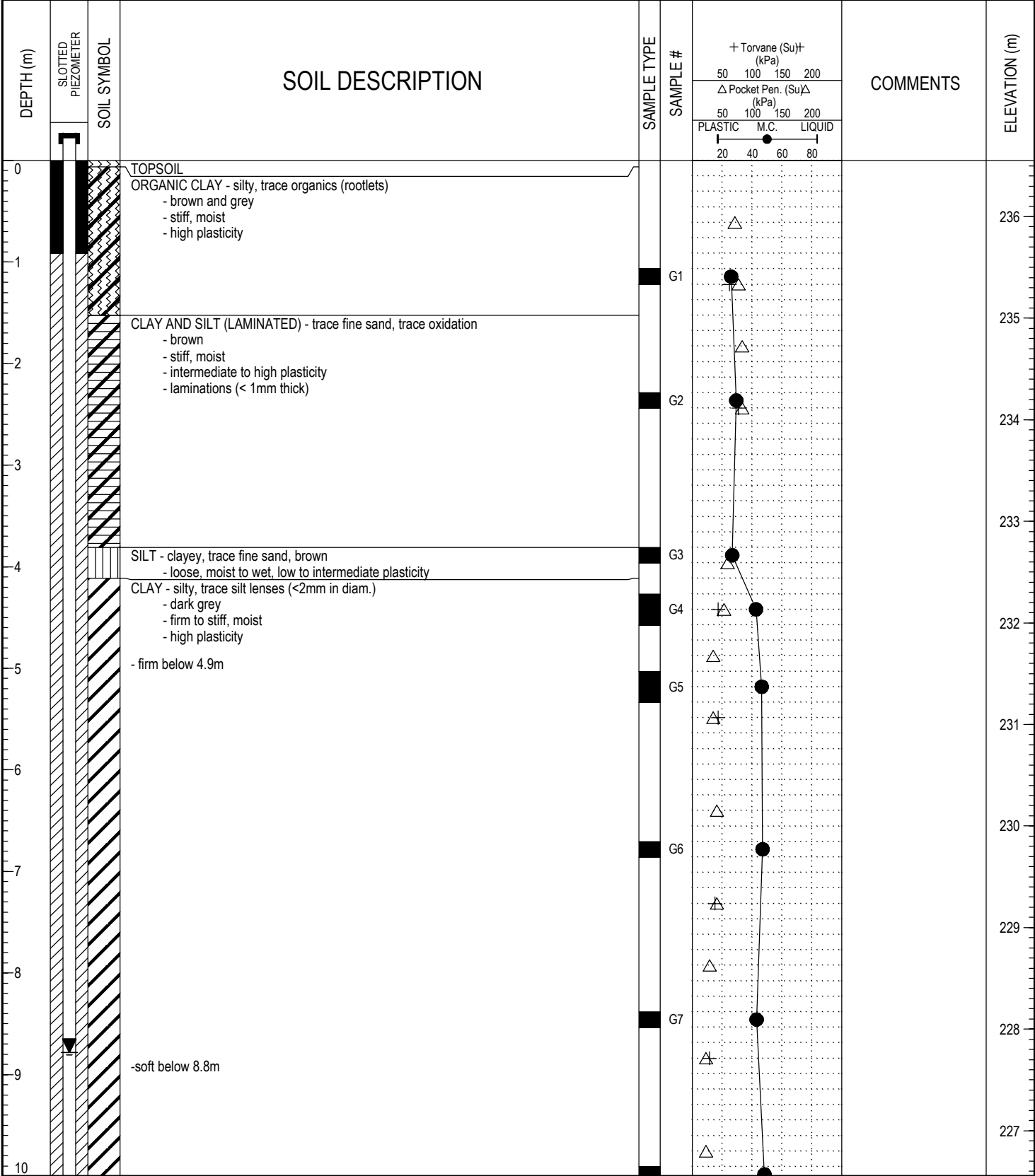


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 13.90 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-07
LOCATION: WTP - N 5524176.733 E 647870.72		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.552
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

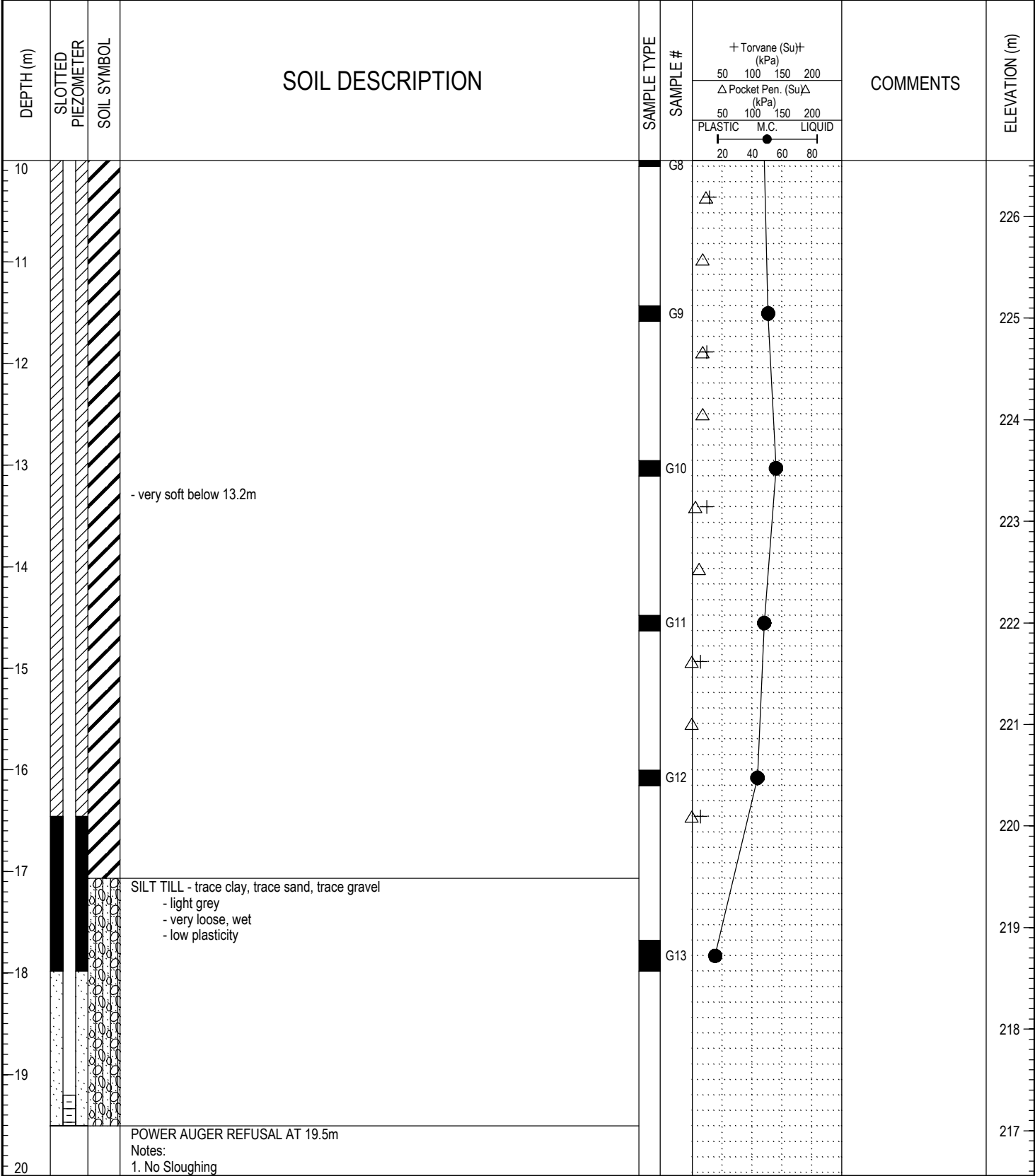


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 19.51 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-07
LOCATION: WTP - N 5524176.733 E 647870.72	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.552
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 19.51 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-07
LOCATION: WTP - N 5524176.733 E 647870.72	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.552
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT	<input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND

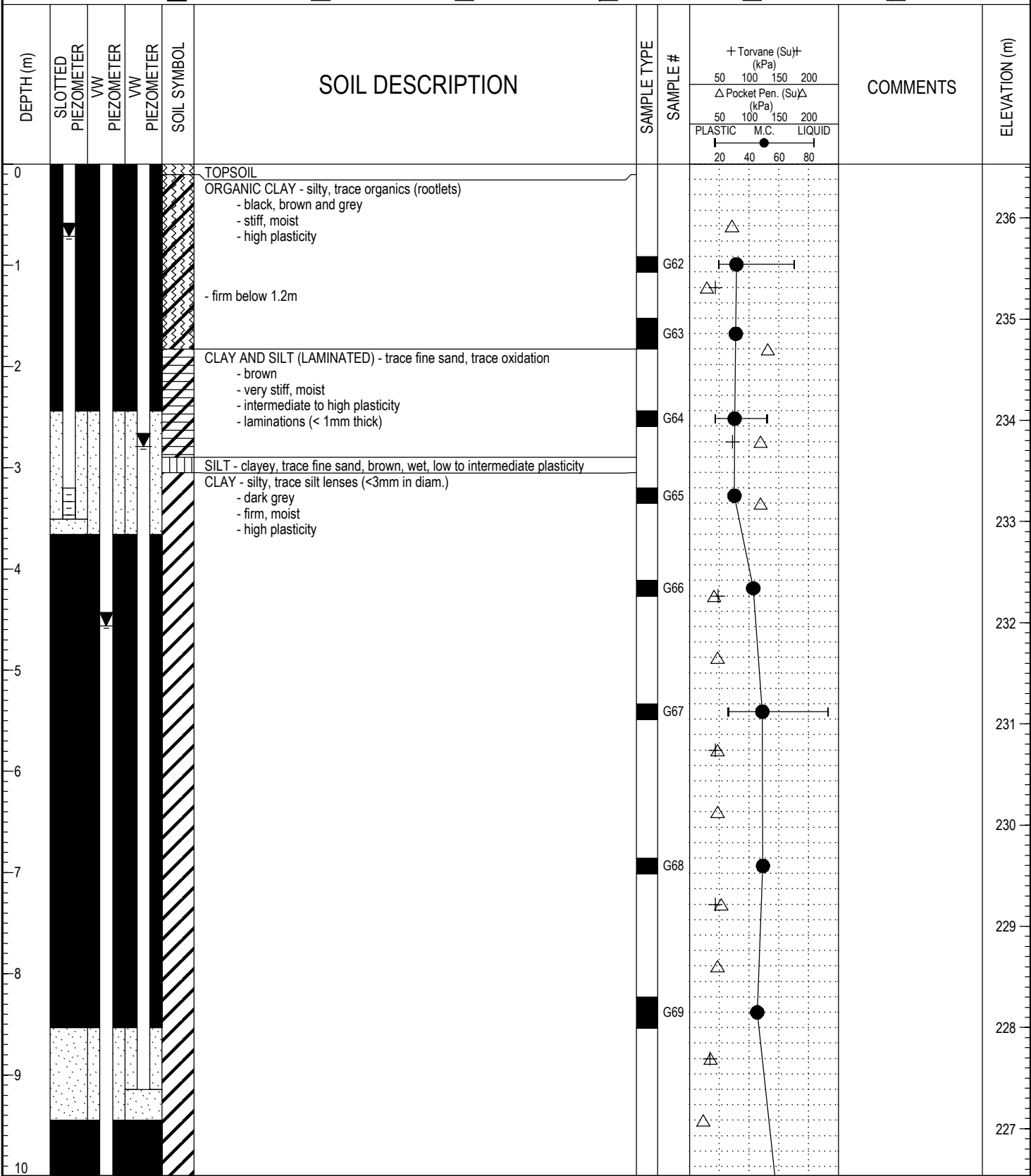
DEPTH (m)	SLOTTED PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	+ Torvane (Su) [†] (kPa)		COMMENTS	ELEVATION (m)
						50	100		
						△ Pocket Pen. (Su)△ (kPa)			
						50	100		
						PLASTIC M.C. LIQUID			
						20	40	60	80
20			2. Seepage at 3.80m and 17.10m below ground 3. Water level at 7.90m below ground immediately after drilling 4. Standpipe SP-7 installed at Elevation 217.05m						216
21									215
22									214
23									213
24									212
25									211
26									210
27									209
28									208
29									207
30									207

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 19.51 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-08
LOCATION: WTP - N 5524190.678 E 647878.442	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.531
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 12.19 m
REVIEWED BY:	COMPLETION DATE: 9/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-08
LOCATION: WTP - N 5524190.678 E 647878.442	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 236.531
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

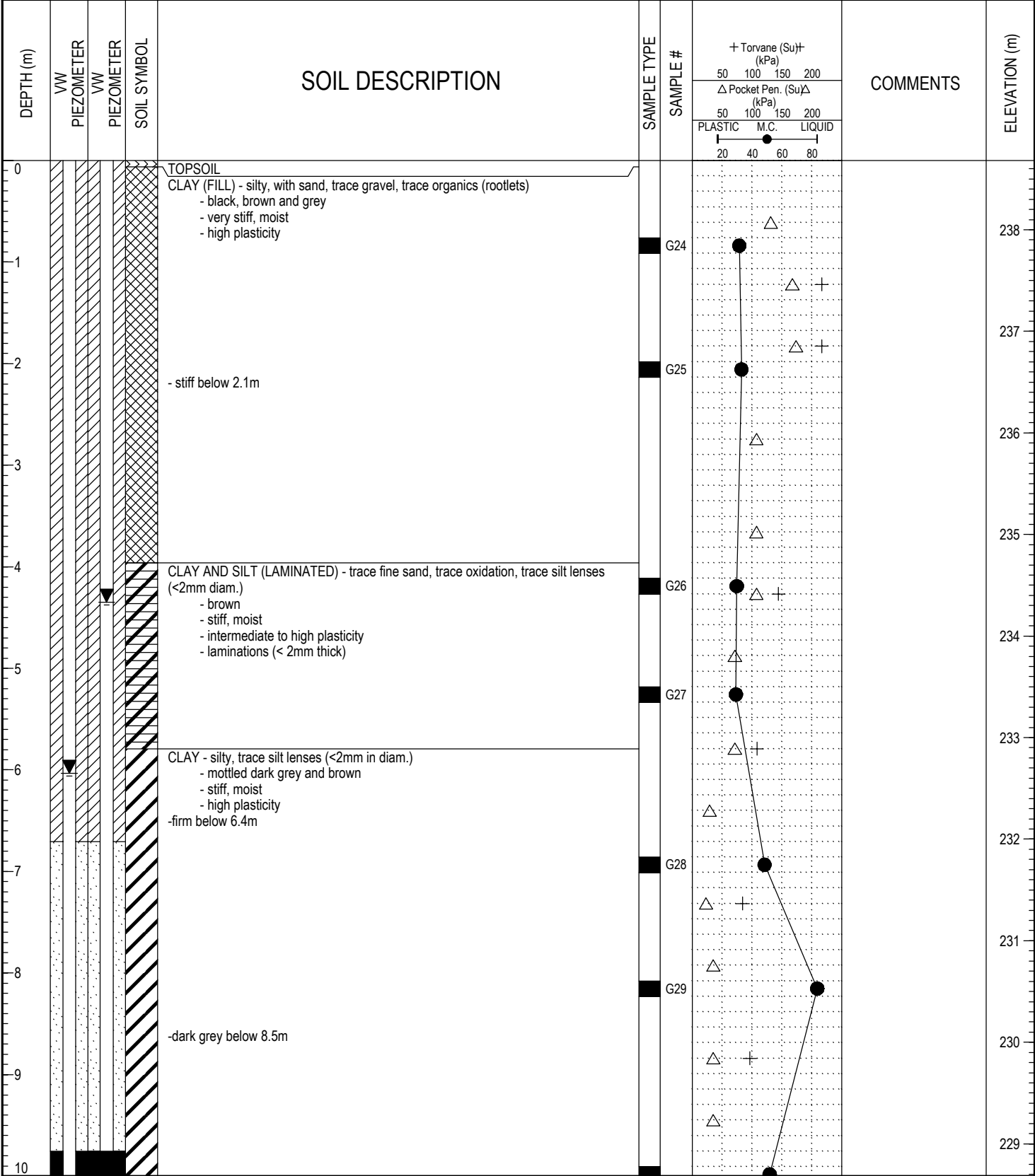
DEPTH (m)	SLOTTED PIEZOMETER	VW PIEZOMETER	VW PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	+ Torvane (Su) [†] (kPa)		COMMENTS	ELEVATION (m)	
								50	100			
								Δ Pocket Pen. (Su)Δ (kPa)				
								50	100	150	200	
								PLASTIC M.C.		LIQUID		
								20	40	60	80	
10							G70					226
11												
12							G71					225
13					END OF TEST HOLE AT 12.2m in SILTY CLAY							224
14					Notes:							223
15					1. No sloughing							222
16					2. Seepage at 3.10m							221
17					3. Standpipe SP-8 and Vibrating Piezometers VW8A and VW8B installed							220
18					- Tip for SP-8 at Elevation 233.02m							219
19					- Tip for VW8A at Elevation 224.49m							218
20					- Tip for VW8B at Elevation 227.39m							217

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 12.19 m
REVIEWED BY:	COMPLETION DATE: 9/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-09
LOCATION: WTP - N 5524134.541 E 647846.631	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 238.682
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

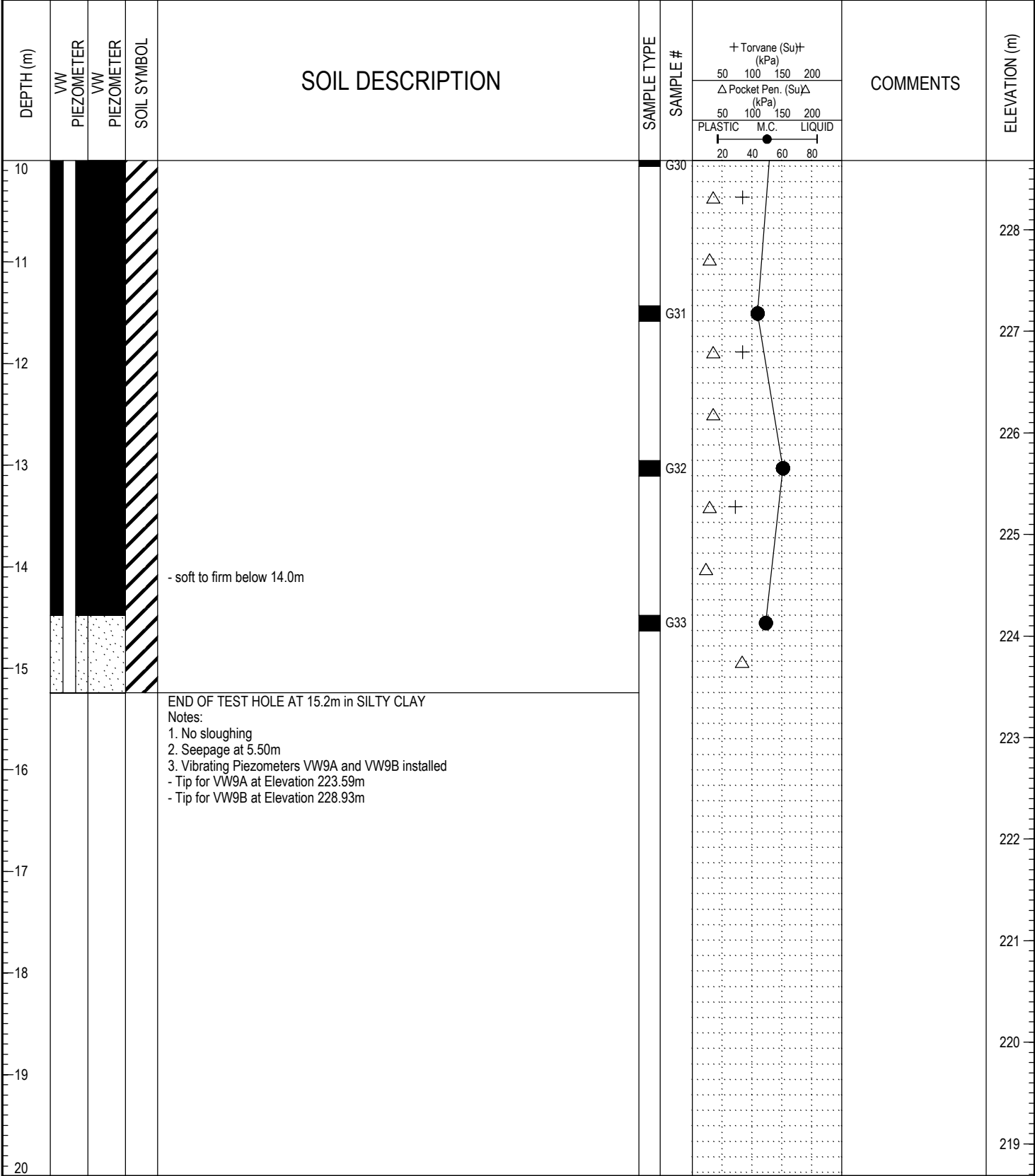


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 15.24 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-09
LOCATION: WTP - N 5524134.541 E 647846.631		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Acker - RM 5 - 125 mm Solid Stem Augers	ELEVATION (m): 238.682
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

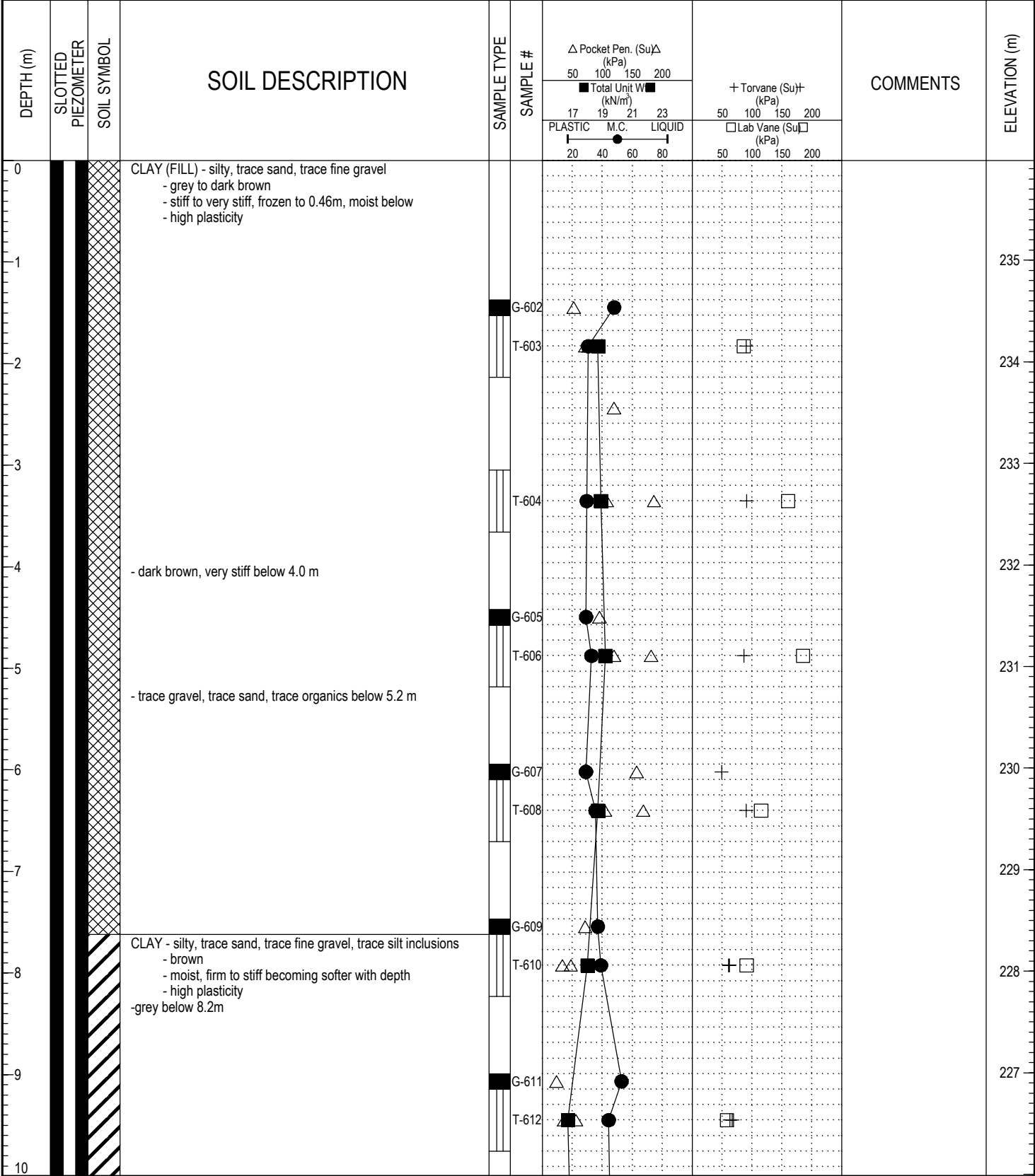


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 15.24 m
REVIEWED BY:	COMPLETION DATE: 8/9/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-10
LOCATION: WTP - N 5524085.998 E 647717.370		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 235.982
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

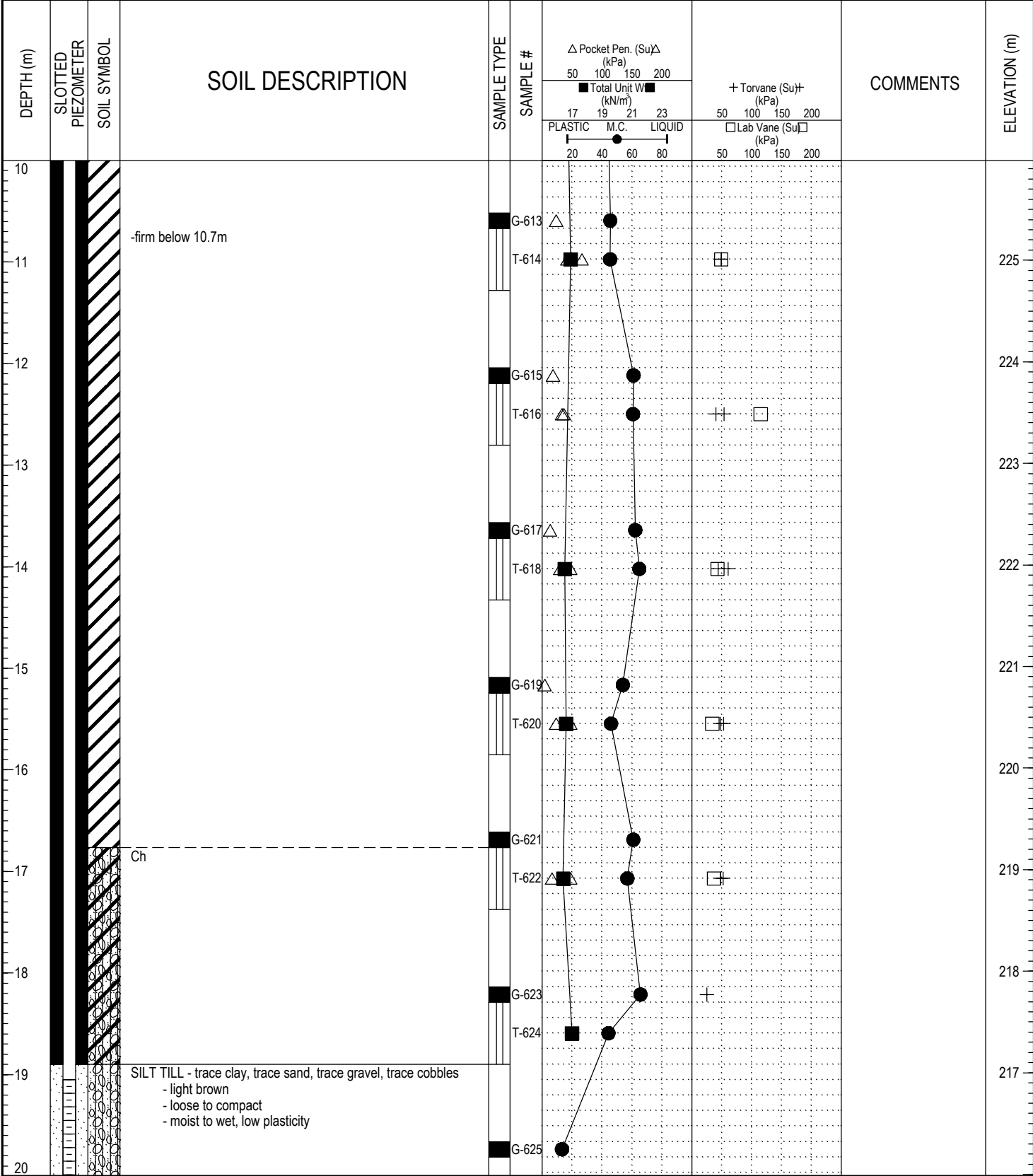


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 20.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-10
LOCATION: WTP - N 5524085.998 E 647717.370		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 235.982
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 20.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-10
LOCATION: WTP - N 5524085.998 E 647717.370		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 235.982
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE		
BACKFILL TYPE <input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND		

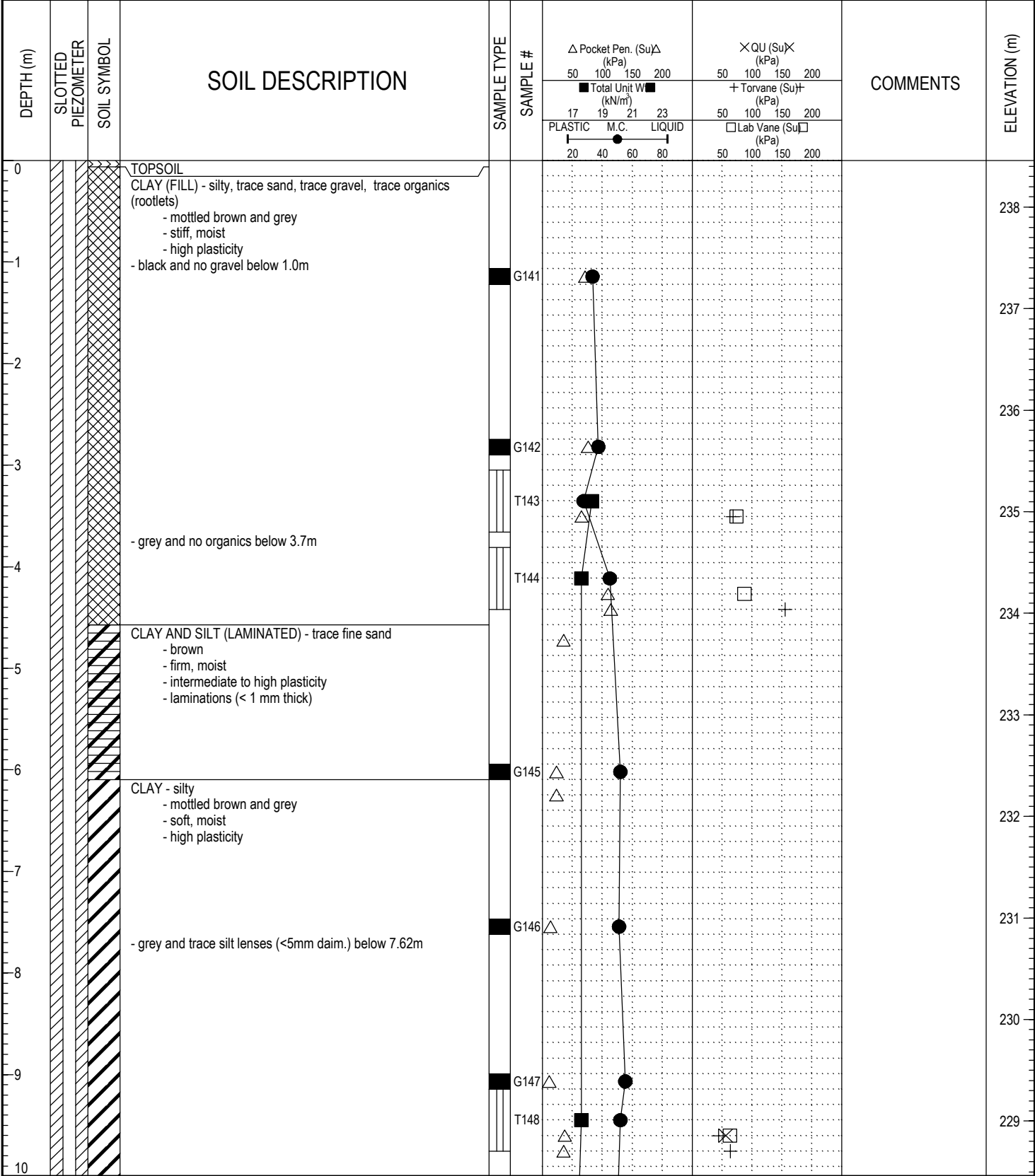
DEPTH (m)	SLOTTED PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 <input checked="" type="checkbox"/> Total Unit W (kN/m ²) 17 19 21 23 PLASTIC M.C. LIQUID 20 40 60 80 + Torvane (Su)+ (kPa) 50 100 150 200 <input type="checkbox"/> Lab Vane (Su) (kPa)	COMMENTS	ELEVATION (m)
20								
21			POWER AUGER REFUSAL AT 20.6 m Notes: 1. Sloughing below 18.9m 2. Seepage at 20.5m 3. Water level at 8.5m		G-626			215
22								214
23								213
24								212
25								211
26								210
27								209
28								208
29								207
30								

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



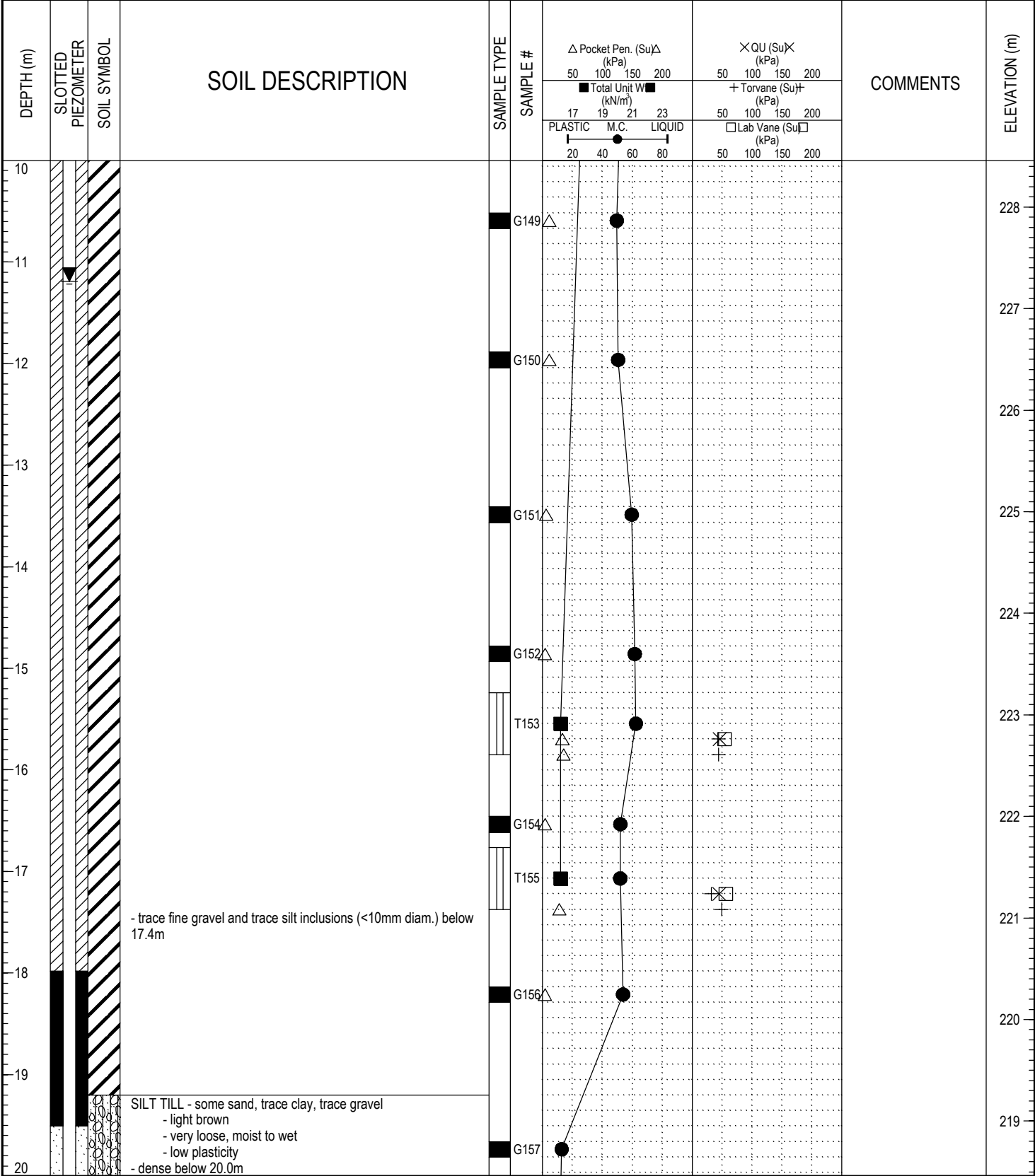
LOGGED BY: Kate Franklin	COMPLETION DEPTH: 20.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-12
LOCATION: WTP - N 5524116.025 E 647832.961		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-12
LOCATION: WTP - N 5524116.025 E 647832.961		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-12
LOCATION: WTP - N 5524116.025 E 647832.961		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 238.458
SAMPLE TYPE	<input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND	

DEPTH (m)	SLOTTED PIEZOMETER	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Penetration Test Results		COMMENTS	ELEVATION (m)
						Δ Pocket Pen. (Su) Δ (kPa) 50 100 150 200 ■ Total Unit W (kN/m ²) 17 19 21 23 PLASTIC M.C. LIQUID 20 40 60 80	\times QU (Su) \times (kPa) 50 100 150 200 + Torvane (Su)+ (kPa) 50 100 150 200 □ Lab Vane (Su) (kPa) 50 100 150 200		
20									218
21					G158				217
22					G159				216
23			POWER AUGER REFUSAL AT 22.9m						215
24			Notes: 1. No sloughing 2. Seepage at 22.9m 3. Standpipe SP-12 installed - Tip for SP-12 at Elevation 215.60m						214
25									213
26									212
27									211
28									210
29									209
30									

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 4/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-13
LOCATION: WTP - N 5524133.038 E 647799.960		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 237.271
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0		CLAY (FILL) - silty, trace fine sand, trace gravel, trace organics - black, brown and grey - stiff, moist - high plasticity					237
1		-some organics (topsoil) at 1.2m - black and brown and no gravel below 1.5m	<input checked="" type="checkbox"/>	G105			236
2			<input checked="" type="checkbox"/>	G106			235
3		CLAY AND SILT (LAMINATED) - brown - firm to stiff, moist - intermediate to high plasticity - laminations (< 1 mm thick)	<input checked="" type="checkbox"/>	G107			234
4			<input checked="" type="checkbox"/>	G108			233
5		END OF TEST HOLE AT 4.6m IN SILTY CLAY Notes: 1. No seepage or sloughing					232
6							231
7							230
8							229
9							228
10							228

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

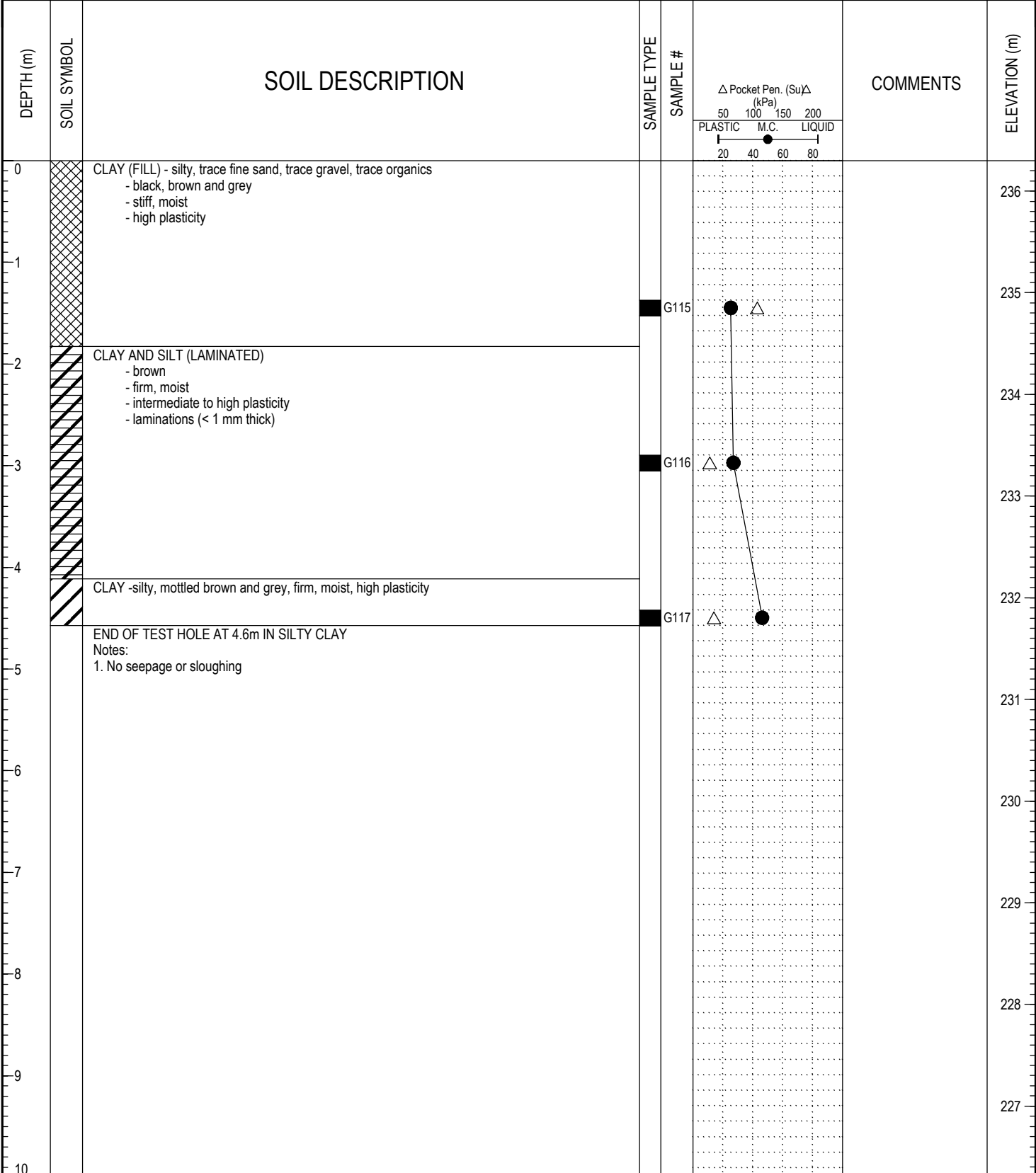
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-14
LOCATION: WTP - N 5524147.035 E 647773.020		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 236.317

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Pocket Pen. (Su) (kPa)	COMMENTS	ELEVATION (m)
0		CLAY (FILL) - silty, trace fine sand, trace gravel, trace organics - black, brown and grey - stiff, moist - high plasticity					236
1		CLAY AND SILT (LAMINATED) - mottled brown and grey - firm to stiff, moist - intermediate to high plasticity - laminations (< 1 mm thick)	<input checked="" type="checkbox"/>	G102	●		235
2			<input checked="" type="checkbox"/>	G103	●		234
3		END OF TEST HOLE AT 3.0m IN SILTY CLAY Notes: 1. No seepage or sloughing	<input checked="" type="checkbox"/>	G104	△		233
4							232
5							231
6							230
7							229
8							228
9							227
10							227

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-15
LOCATION: WTP - N 5524166.008 E 647735.023		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 236.299
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

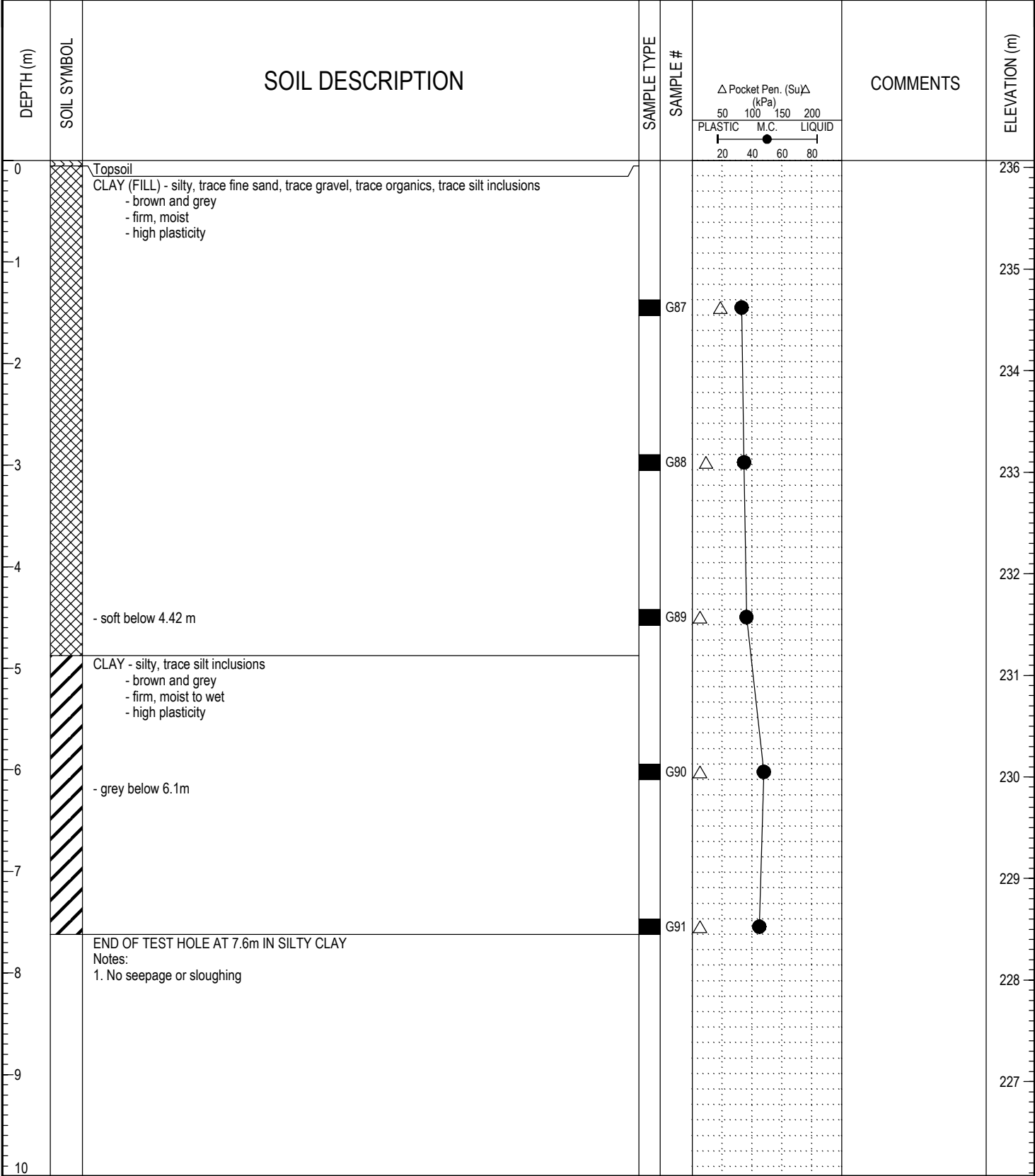


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-16
LOCATION: WTP - N 5524139.981 E 647752.000		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 236.069
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05

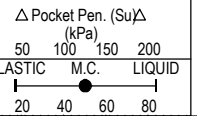


LOGGED BY: Kate Franklin	COMPLETION DEPTH: 7.62 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-17
LOCATION: WTP - N 5524113.008 E 647806.004		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 237.339

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0		CLAY (FILL) - silty, trace fine sand, trace gravel, trace organics - black, brown and grey - firm to stiff, moist - high plasticity				237
1		- some organics (topsoil) at 1.2 m - brown and no gravel below 1.5m				236
2						235
3						234
4		CLAY AND SILT (LAMINATED) - brown - stiff, moist - intermediate to high plasticity - laminations (< 1 mm thick)				234
4.3		CLAY - silty, mottled brown and grey, firm, moist, high plasticity - firm, mottled brown and grey below 4.3m				233
4.6		END OF TEST HOLE AT 4.6m IN SILTY CLAY Notes: 1. No seepage or sloughing				232
5						231
6						230
7						229
8						228
9						
10						



G109

G110

G111

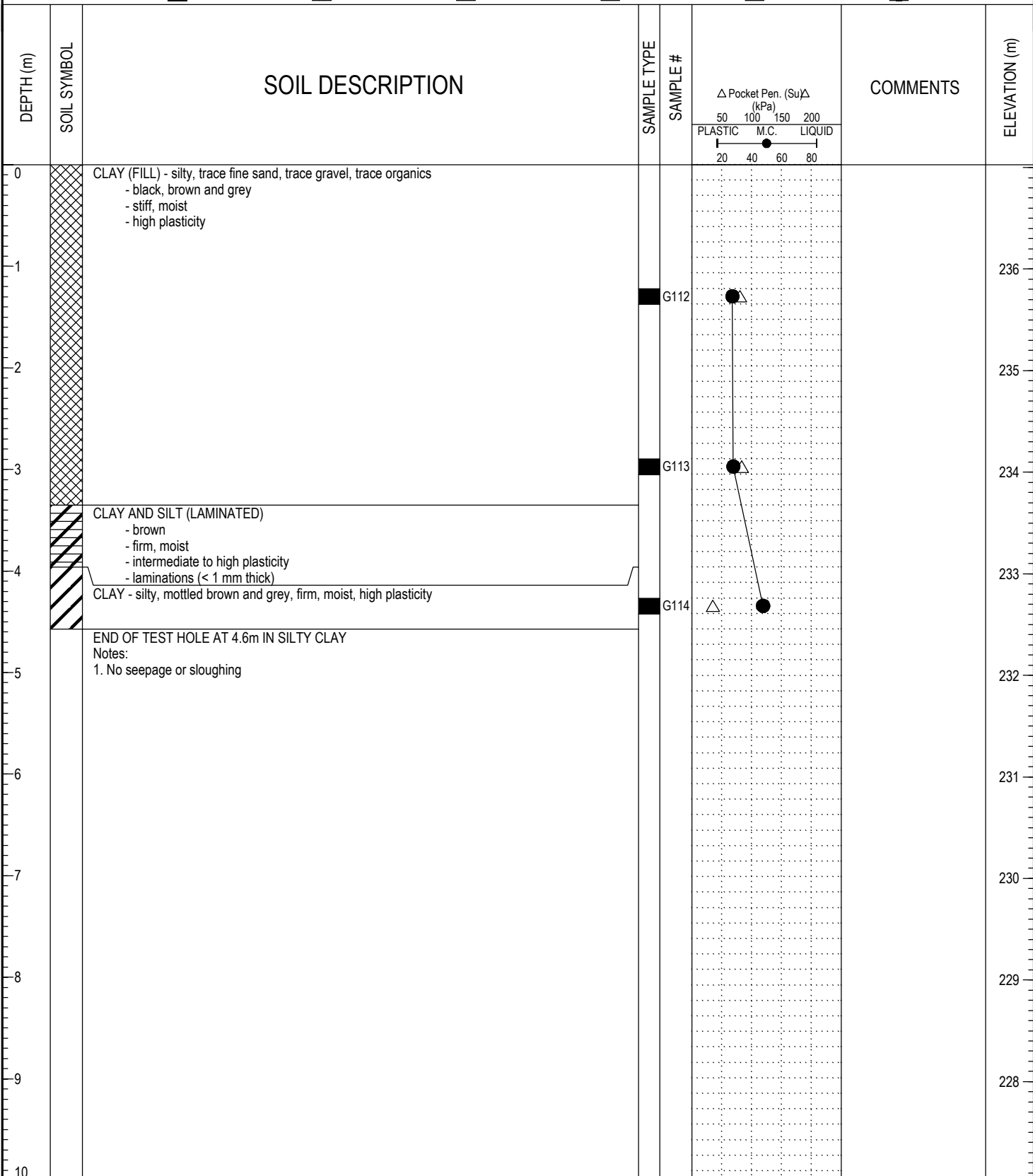
LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-18
LOCATION: WTP - N 5524094.878 E 647805.042		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 237.027

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

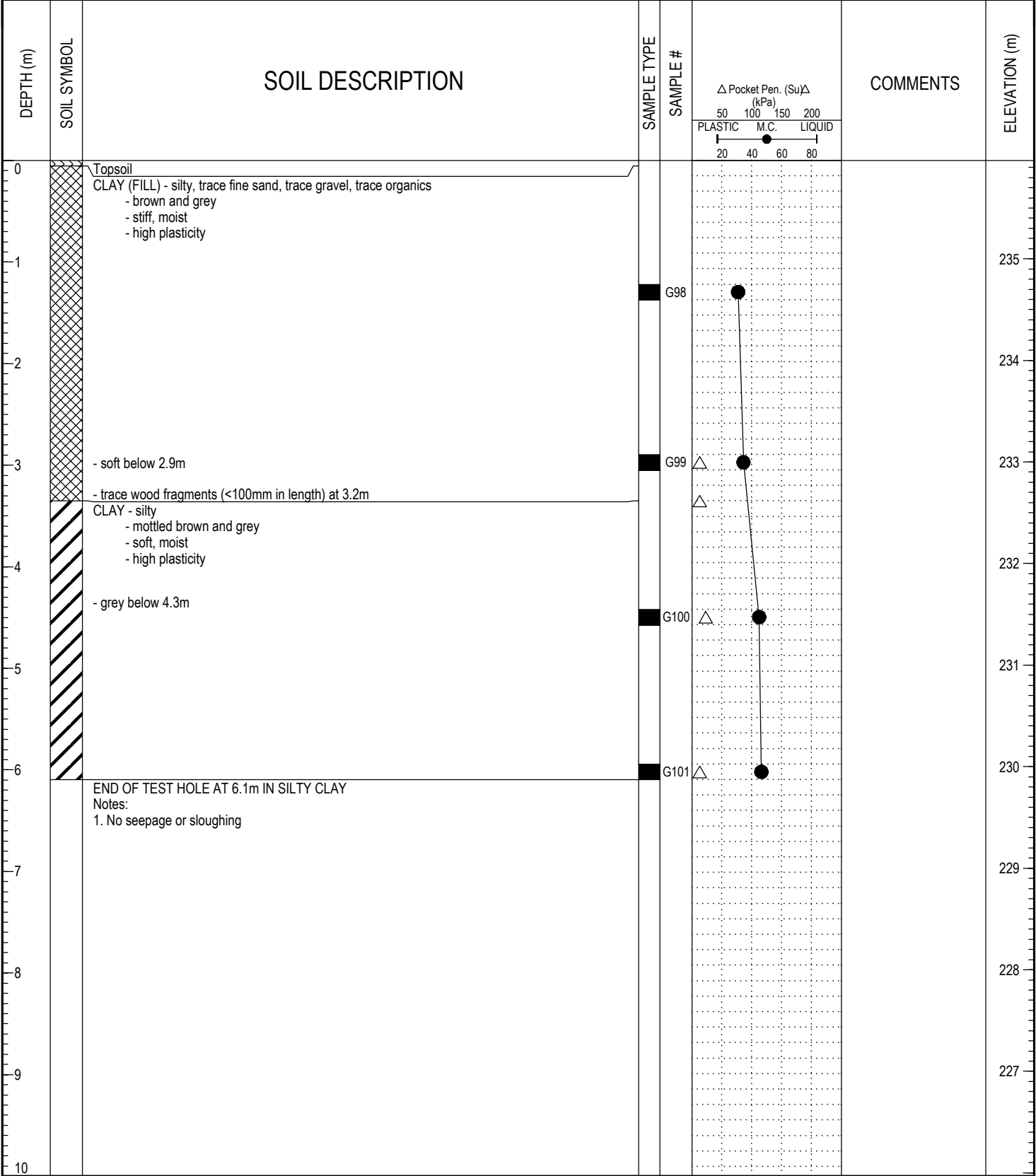


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-20
LOCATION: WTP - N 5524123.005 E 647759.997		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 235.968
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

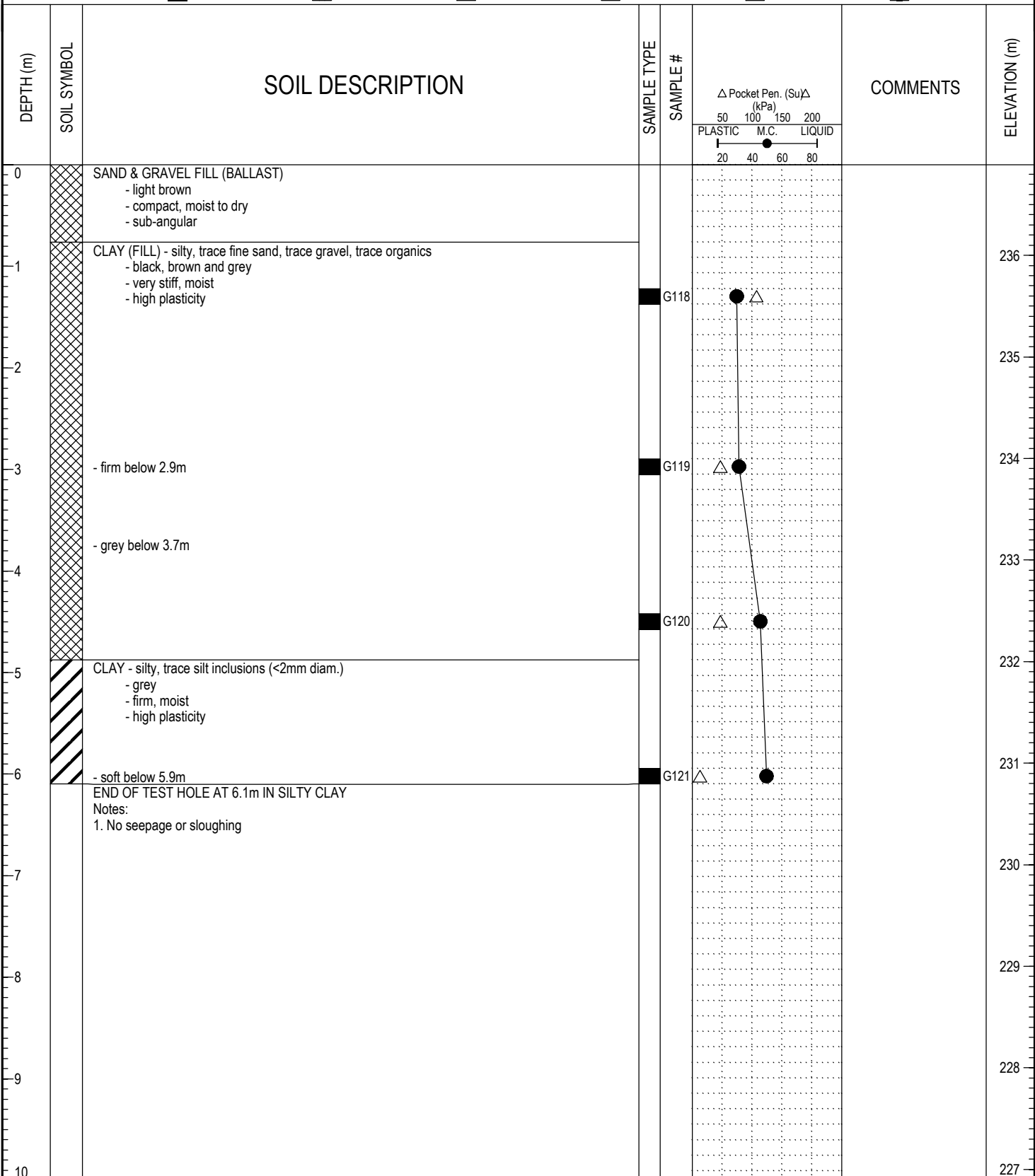


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 6.10 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-21
LOCATION: WTP - N 5524133.016 E 647733.030		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 236.892
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

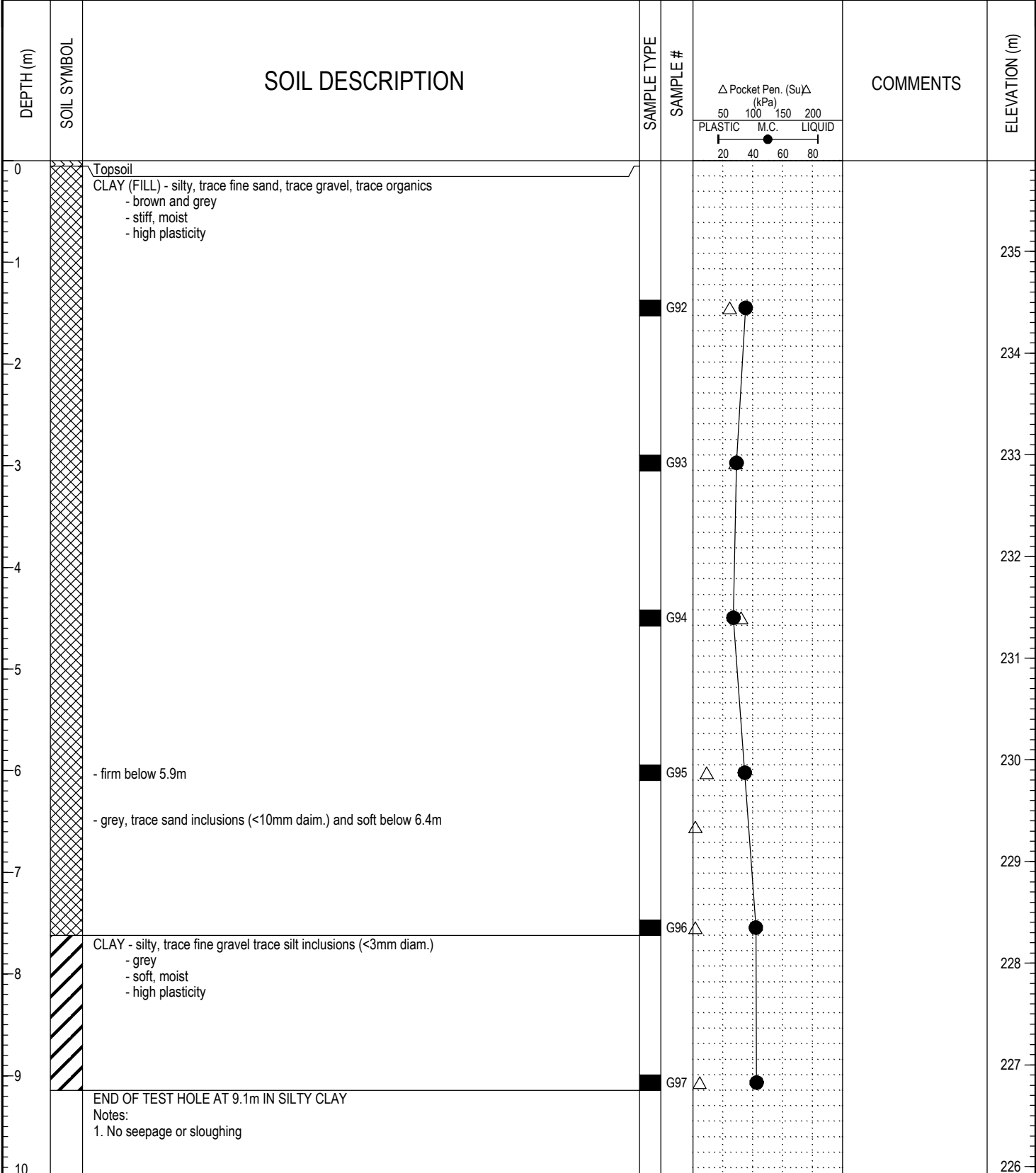


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 6.10 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-22
LOCATION: WTP - N 5524106.018 E 647749.981	PROJECT NO.: 3398-055-00-01-00	
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 235.893
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



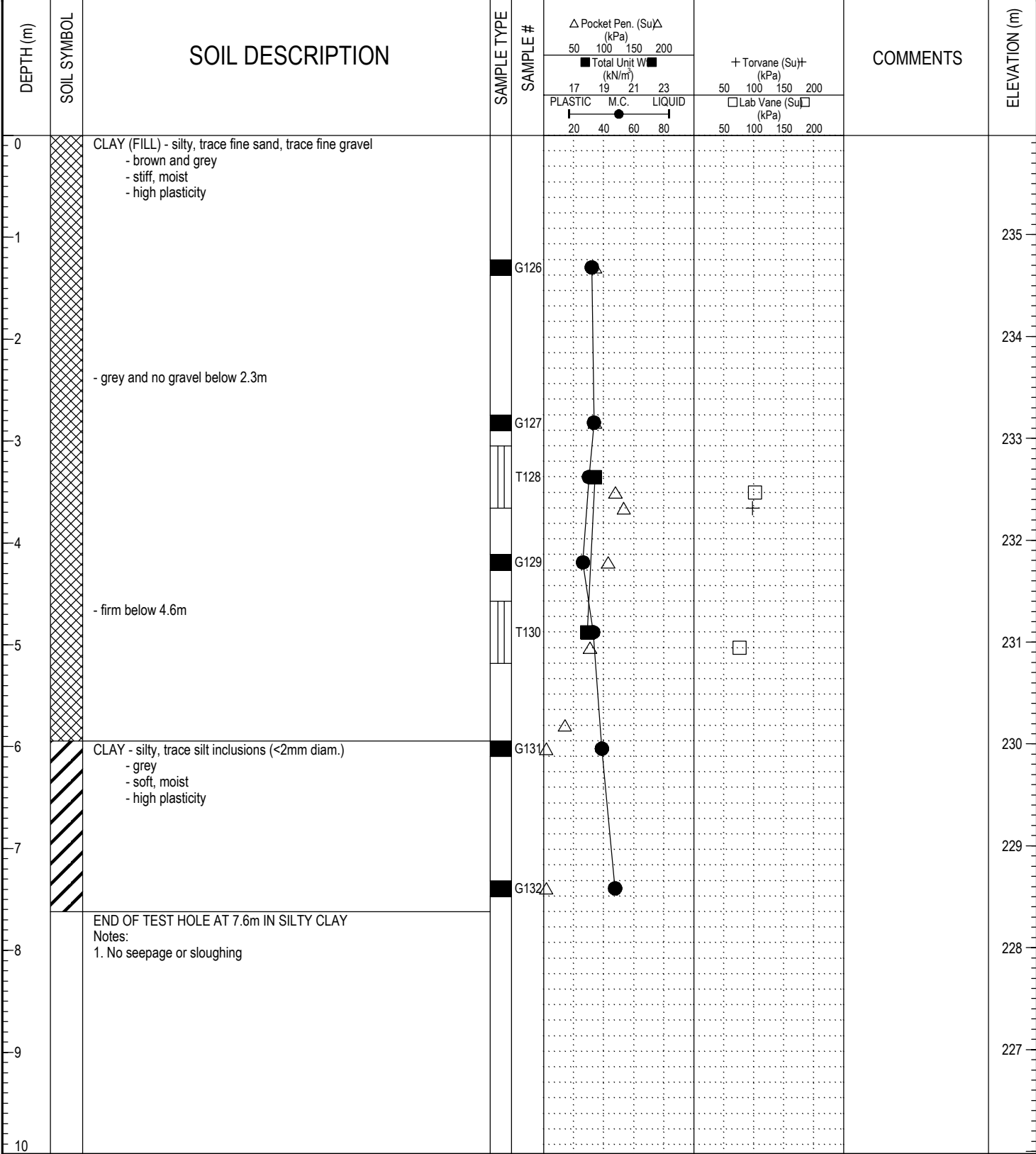
LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 7.62 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-23
LOCATION: WTP - N 5524091.975 E 647777.015		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 235.973

SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> BULK	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> CORE
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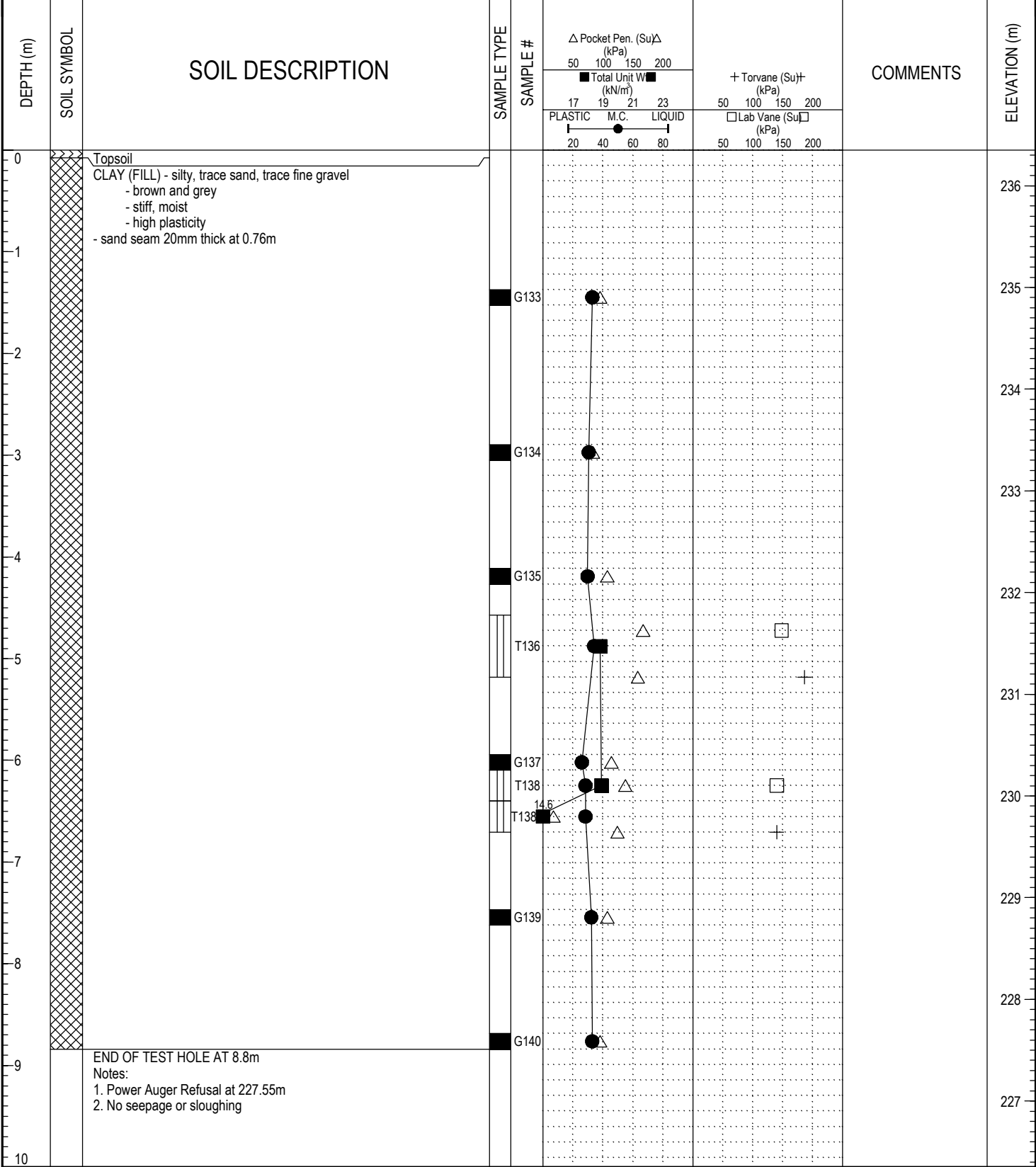
LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 7.62 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-24
LOCATION: WTP - N 5524089.009 E 647752.003		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Paddock Drilling Ltd.	METHOD: RM 30 - 125 mm Solid Stem Augers	ELEVATION (m): 236.35

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

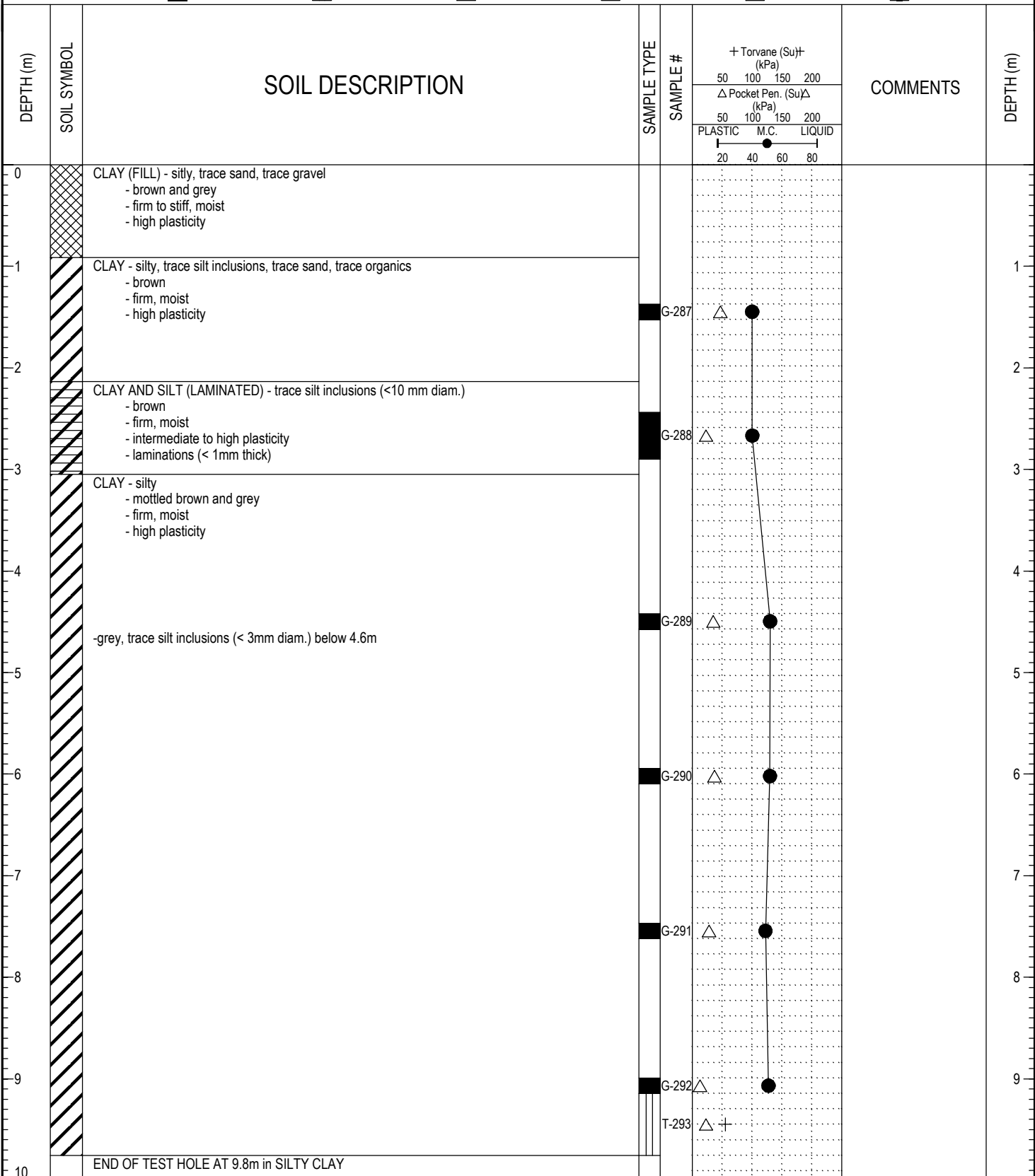


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 8.84 m
REVIEWED BY:	COMPLETION DATE: 1/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-31
LOCATION: At Pumping Well PW-1		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: B-40 - 125 mm Solid Stem Augers	ELEVATION (m):
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 9.75 m
REVIEWED BY:	COMPLETION DATE: 12/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-31
LOCATION: At Pumping Well PW-1		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: B-40 - 125 mm Solid Stem Augers	ELEVATION (m):
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE	<input checked="" type="checkbox"/> NO RECOVERY
	<input checked="" type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> CORE
	<input type="checkbox"/> BULK	

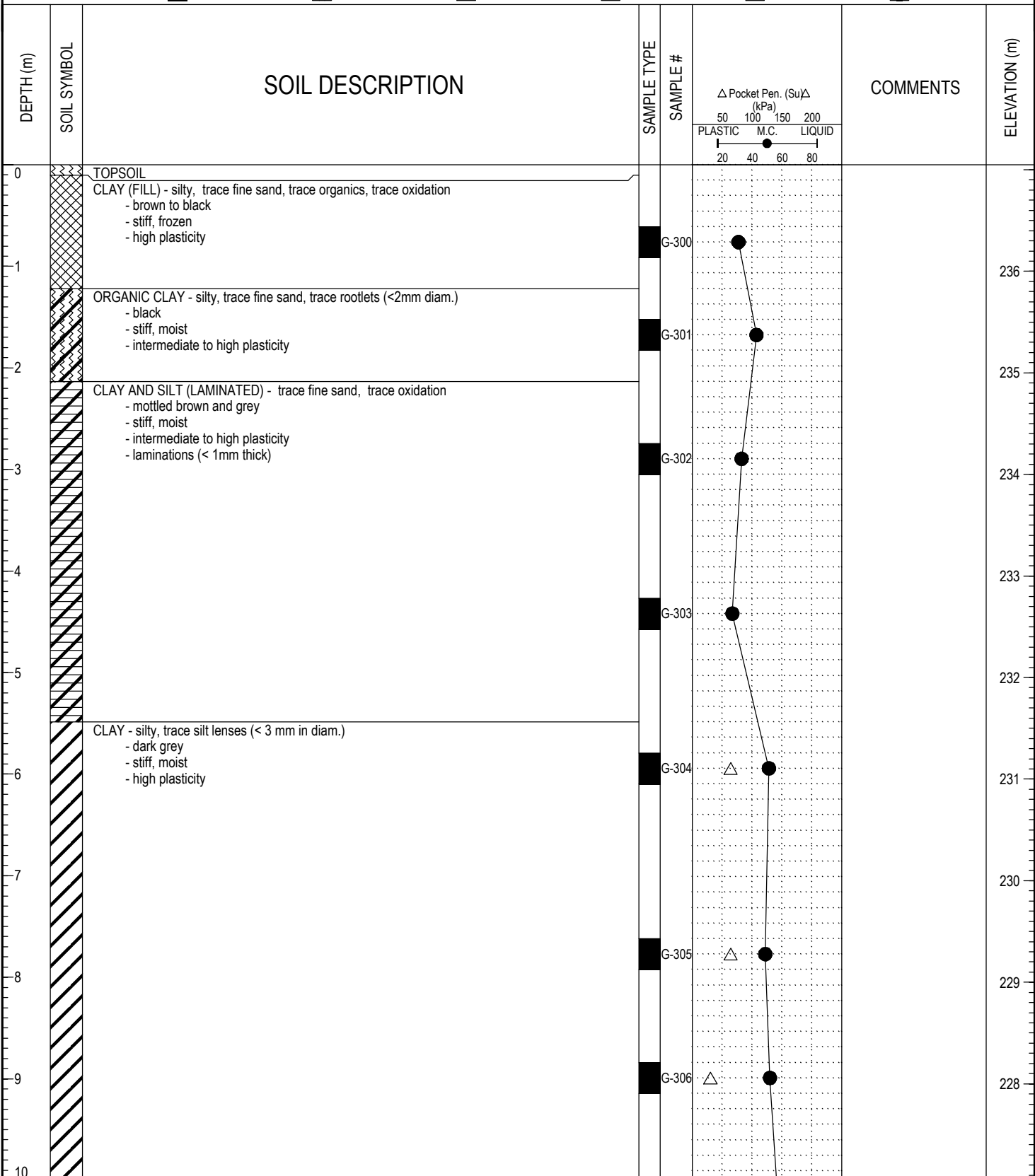
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	+ Torvane (Su) ⁺ (kPa) 50 100 150 200 Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	DEPTH (m)
10		Notes: 1. No sloughing or seepage 2. Vibrating Wire VW-31 installed - Tip for VW-31 at a depth of 10.7m					10
11							11
12							12
13							13
14							14
15							15
16							16
17							17
18							18
19							19
20							20

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 9.75 m
REVIEWED BY:	COMPLETION DATE: 12/10/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 2

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-33
LOCATION: WTP - N 5524157.897 E 647801.041		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 237.049
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

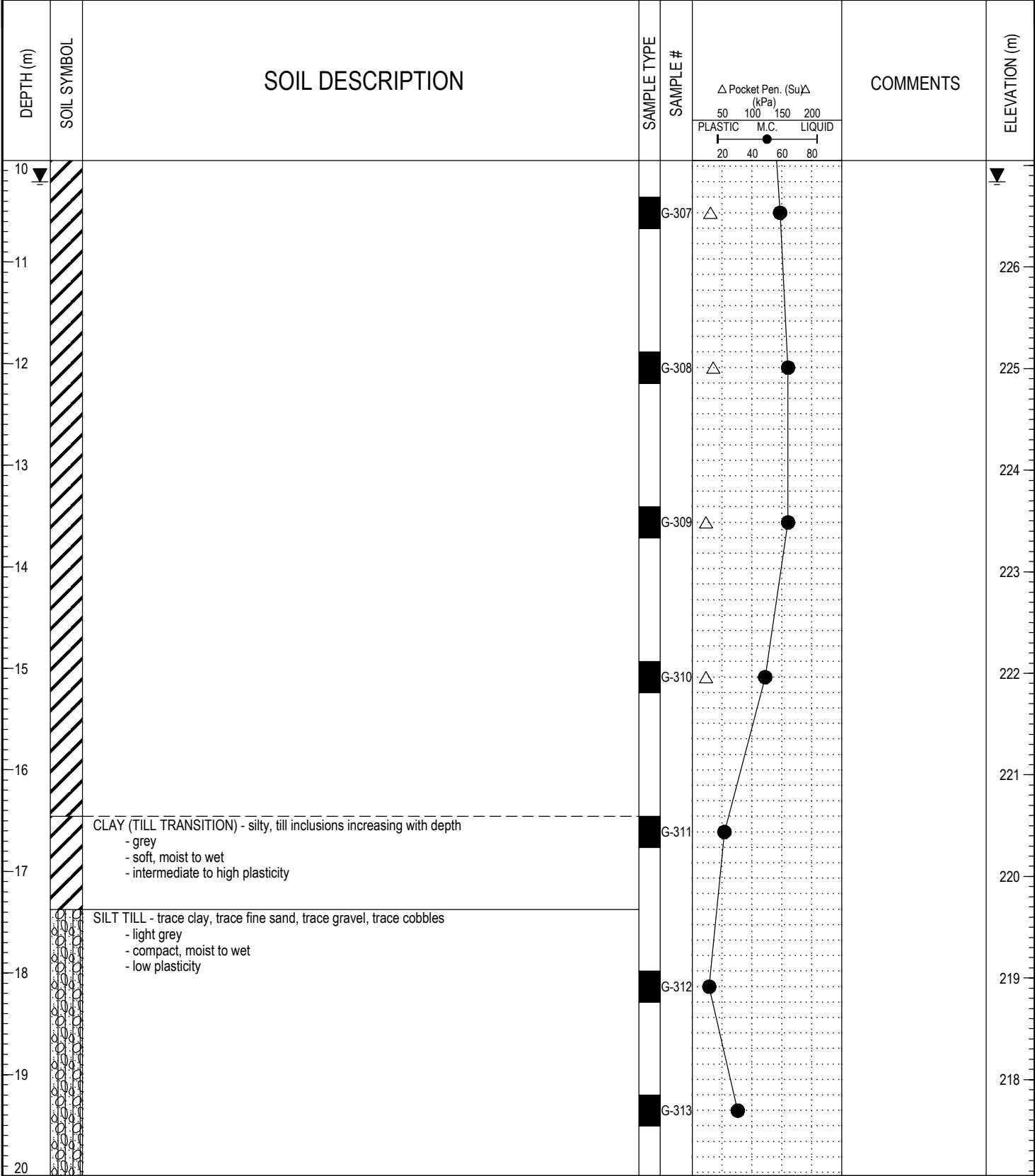


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-33
LOCATION: WTP - N 5524157.897 E 647801.041		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 237.049
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

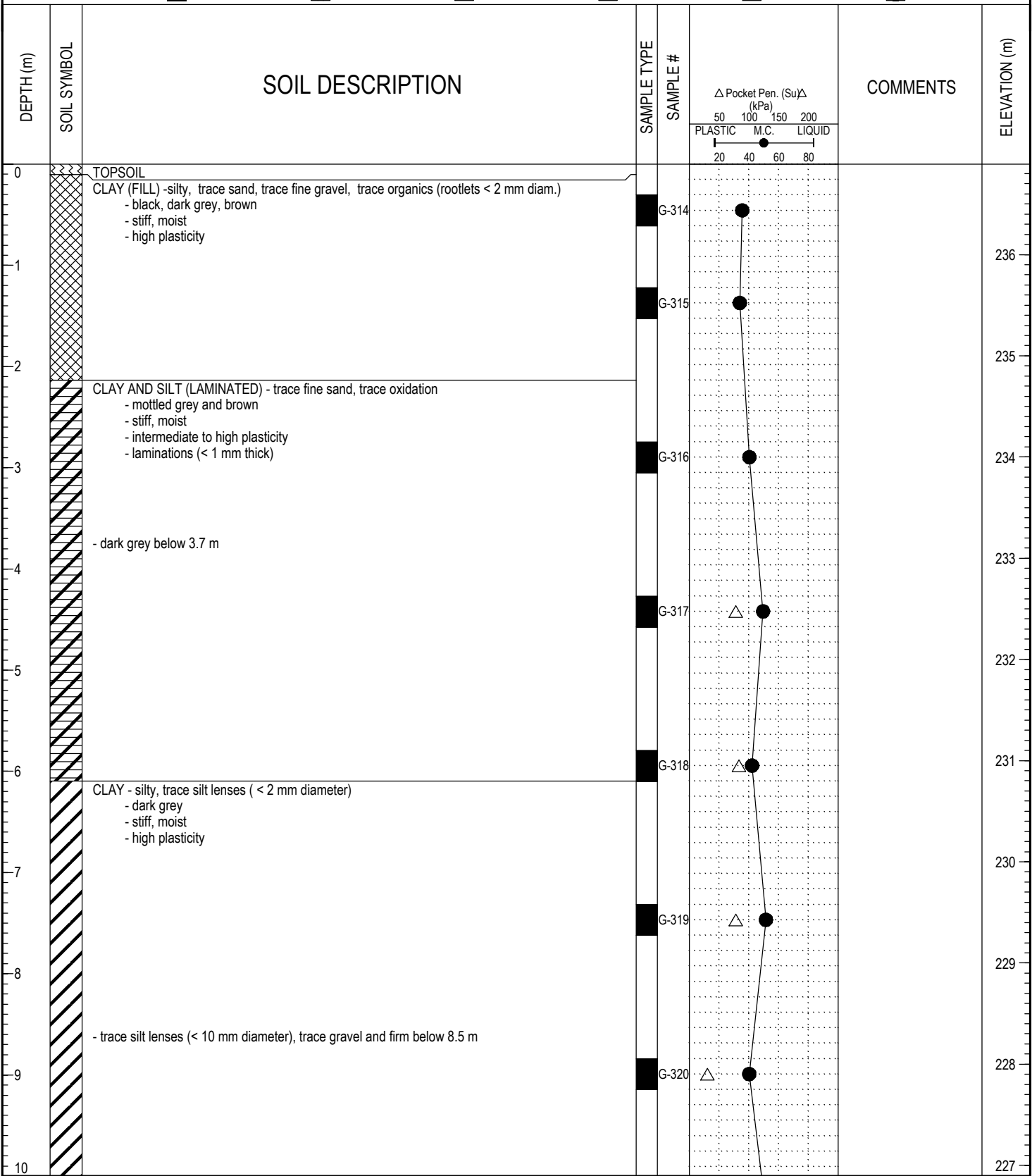
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-33
LOCATION: WTP - N 5524157.897 E 647801.041		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 237.049
SAMPLE TYPE <input checked="" type="checkbox"/> 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)
20	○					
21	○		<input checked="" type="checkbox"/>	G-314		216
22		POWER AUGER REFUSAL AT 21.3 m Notes: 1. Sloughing below 17.4m 2. Seepage at 19.8m 4. Water level at 10.2m below ground surface 3 hours after completion of drilling 5. Test hole grouted to 3.7m below ground surface and backfilled with cuttings to surface				215
23						214
24						213
25						212
26						211
27						210
28						209
29						208
30						

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05

	LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
	REVIEWED BY:	COMPLETION DATE: 13/12/04
	PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-34
LOCATION: WTP - N 5524132.146 E 647785.051		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.894
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



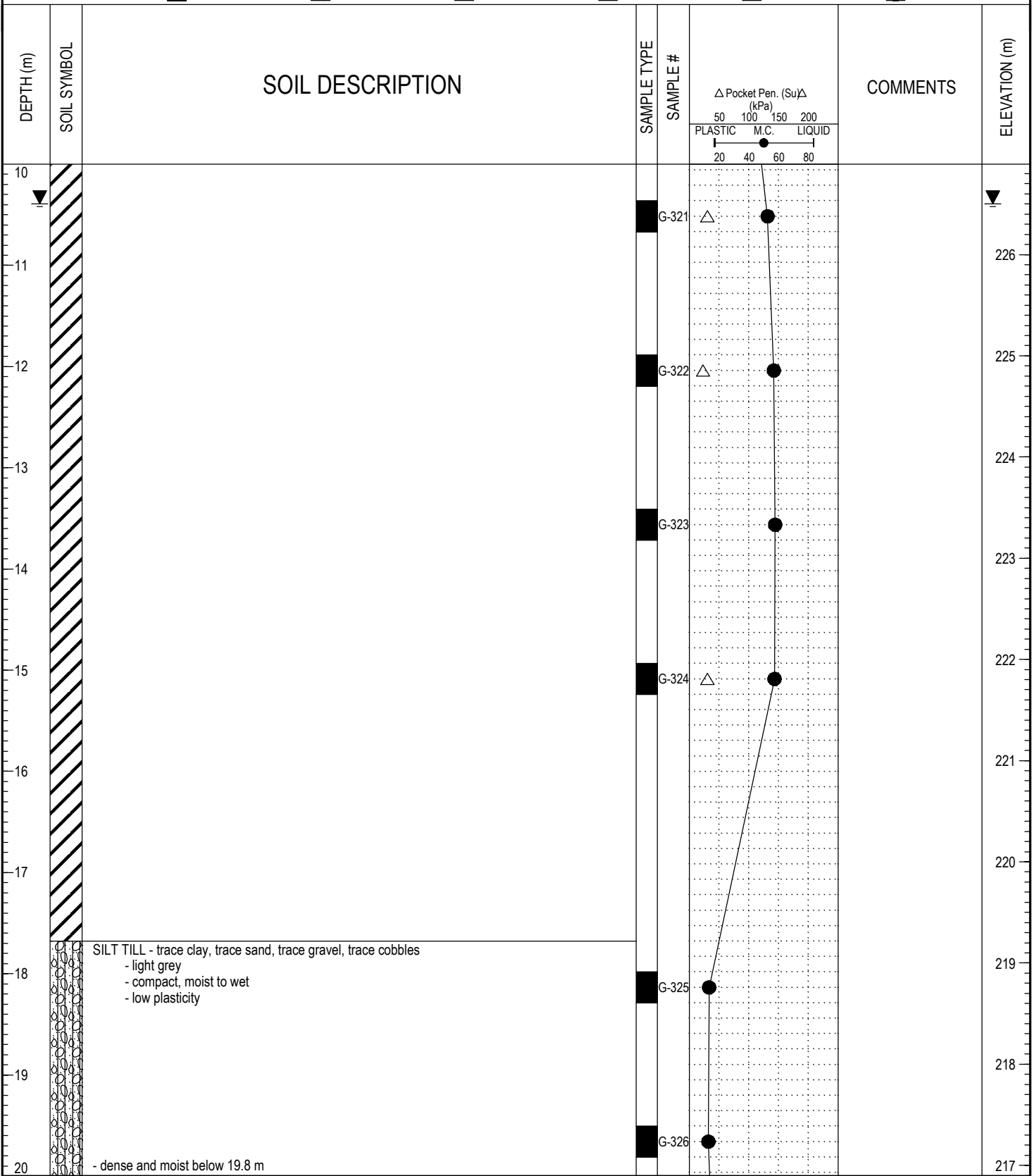
LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 24.38 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-34
LOCATION: WTP - N 5524132.146 E 647785.051		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.894

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 24.38 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-34
LOCATION: WTP - N 5524132.146 E 647785.051		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.894
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

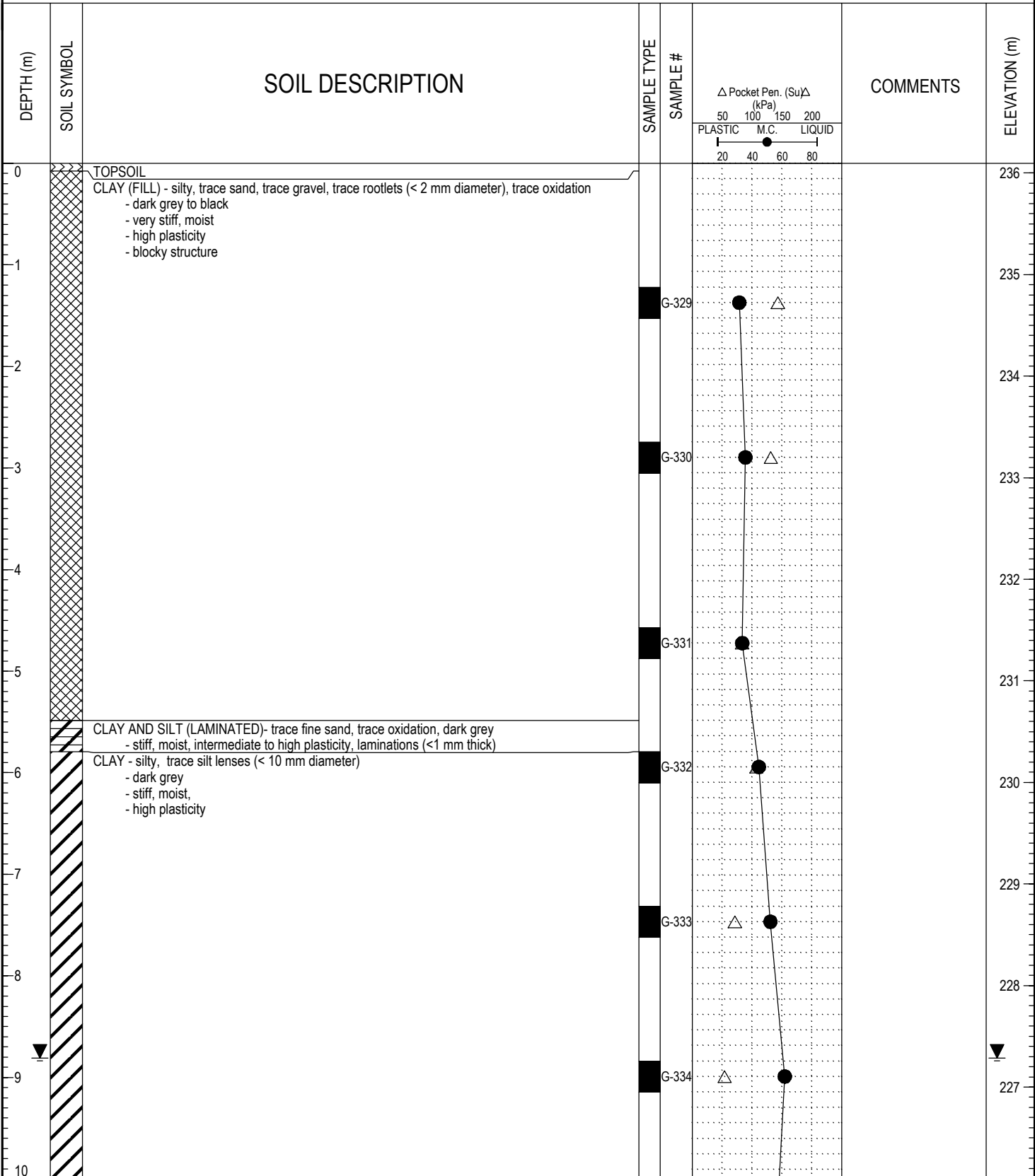
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
20				G-327			216
21				G-328			215
22							214
23							213
24							212
25		POWER AUGER REFUSAL AT 24.4 m Notes: 1. Sloughing below 22.3m 2. Seepage (heavy) at 22.3 m 4. Water level at 17.4m below ground surface immediately at completion of drilling 5. Water level at 10.4m below ground surface 2 hours after completion of drilling 6. Test hole grouted to ground surface				211	
26							210
27							209
28							208
29							207
30							207

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 24.38 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-35
LOCATION: WTP - N 5524103.892 E 647767.976		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.095
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

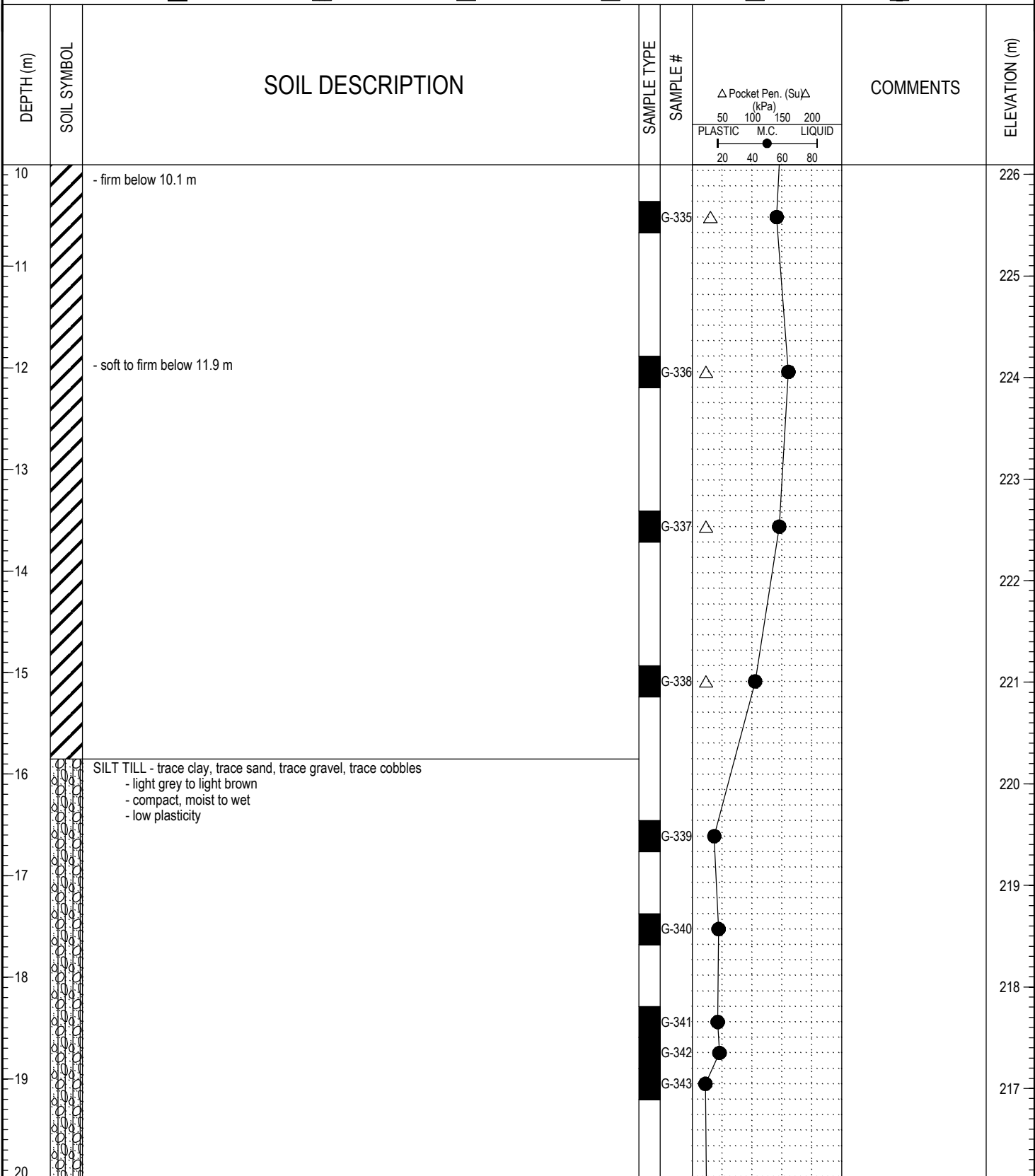


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-35
LOCATION: WTP - N 5524103.892 E 647767.976		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.095
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA GDT 17/2/05

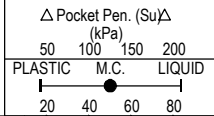


LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-35
LOCATION: WTP - N 5524103.892 E 647767.976		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 236.095
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

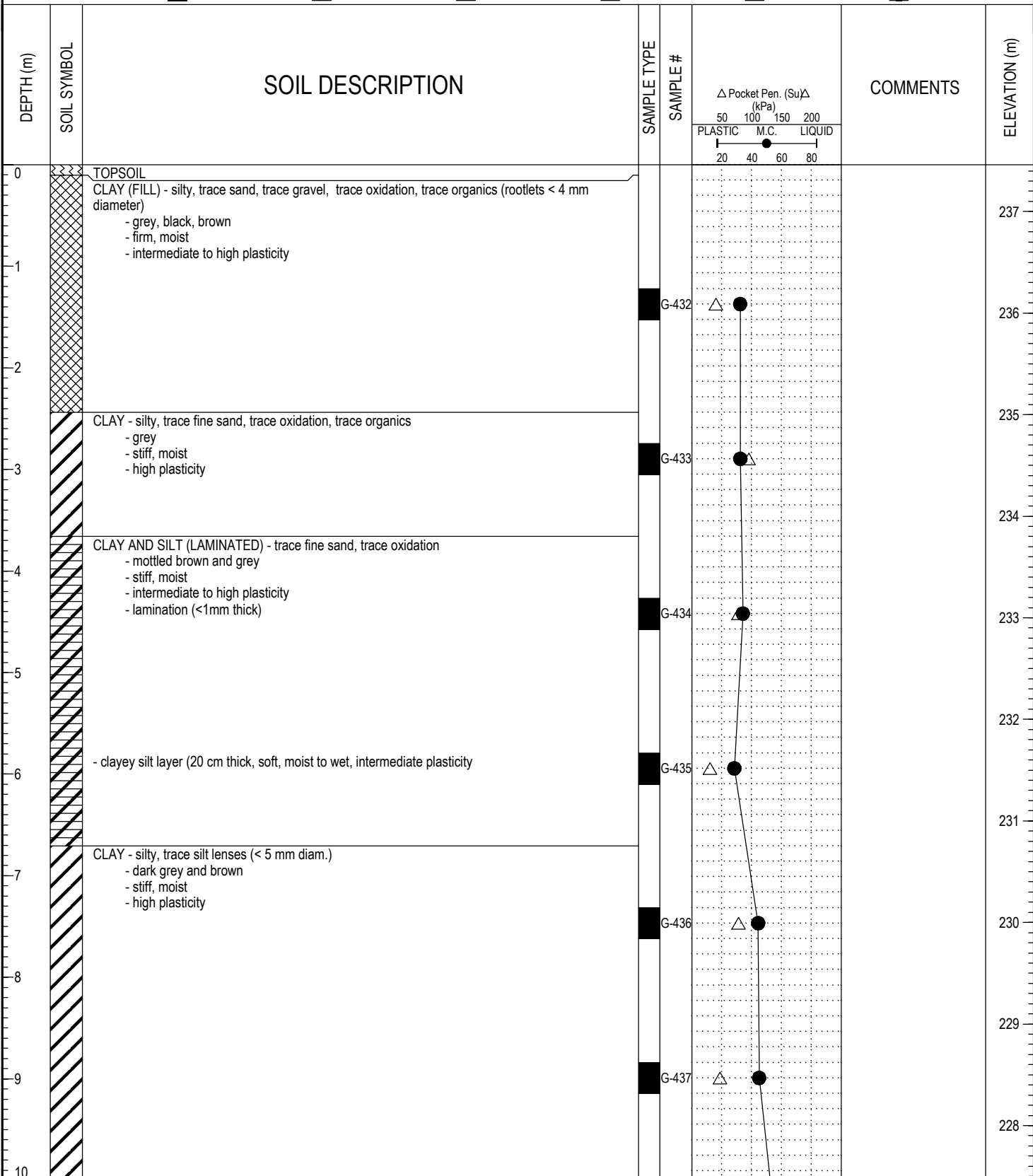
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
20						216
21			<input checked="" type="checkbox"/>	G-344		215
22		POWER AUGER REFUSAL AT 21.3 m Notes: 1. Sloughing below 30.5m 3. Seepage at 21.0m 4. Water level at 9.1m below ground surface 3 hours after completion of drilling 5. Test hole grouted to 3.7m below ground surface and backfilled with cuttings to surface				214
23						213
24						212
25						211
26						210
27						209
28						208
29						207
30						207

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.34 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-36
LOCATION: WTP - N 5524027.267 E 647809.570		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 237.461
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

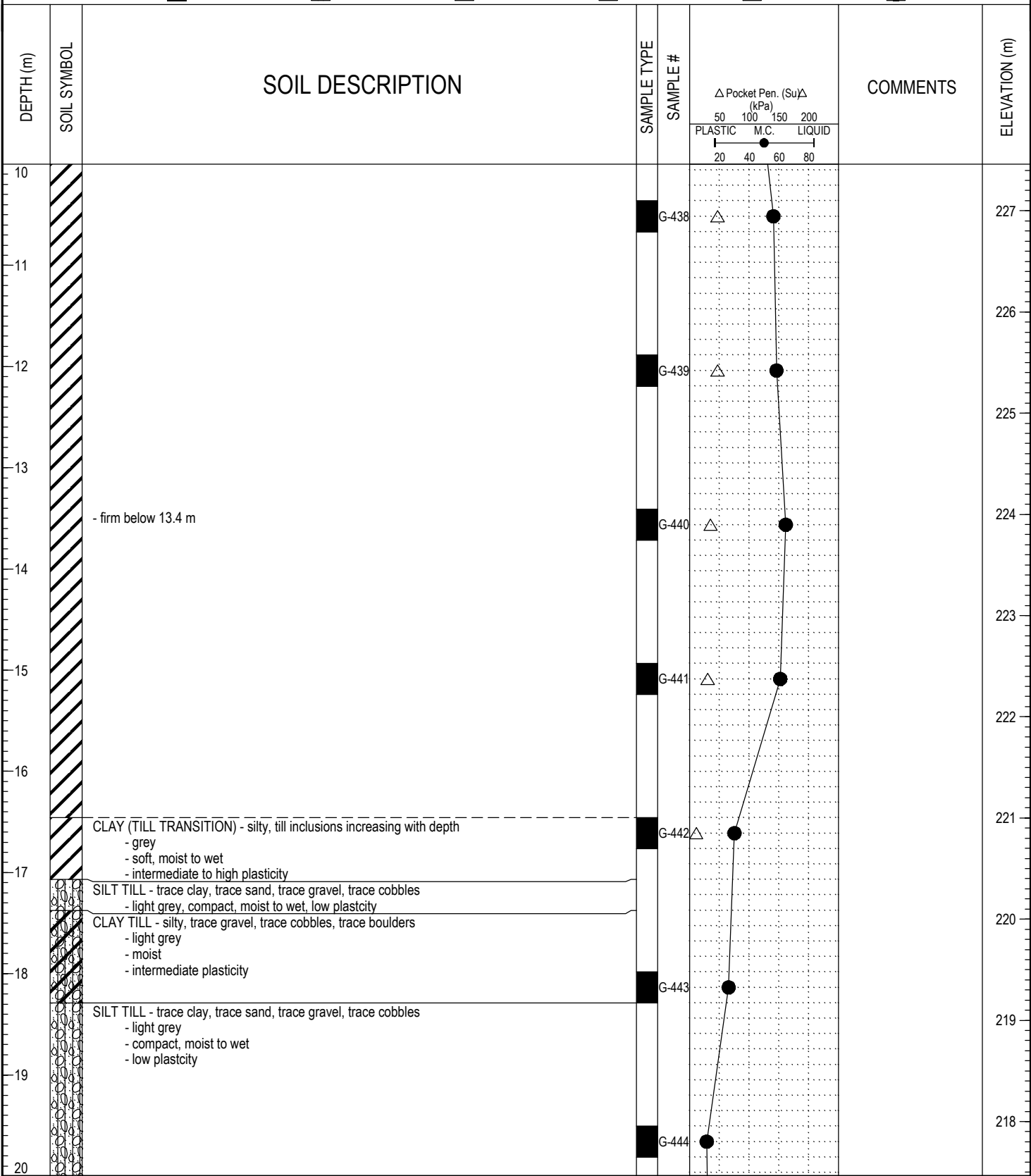


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.25 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-36
LOCATION: WTP - N 5524027.267 E 647809.570		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 237.461
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.25 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-36
LOCATION: WTP - N 5524027.267 E 647809.570		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 237.461
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

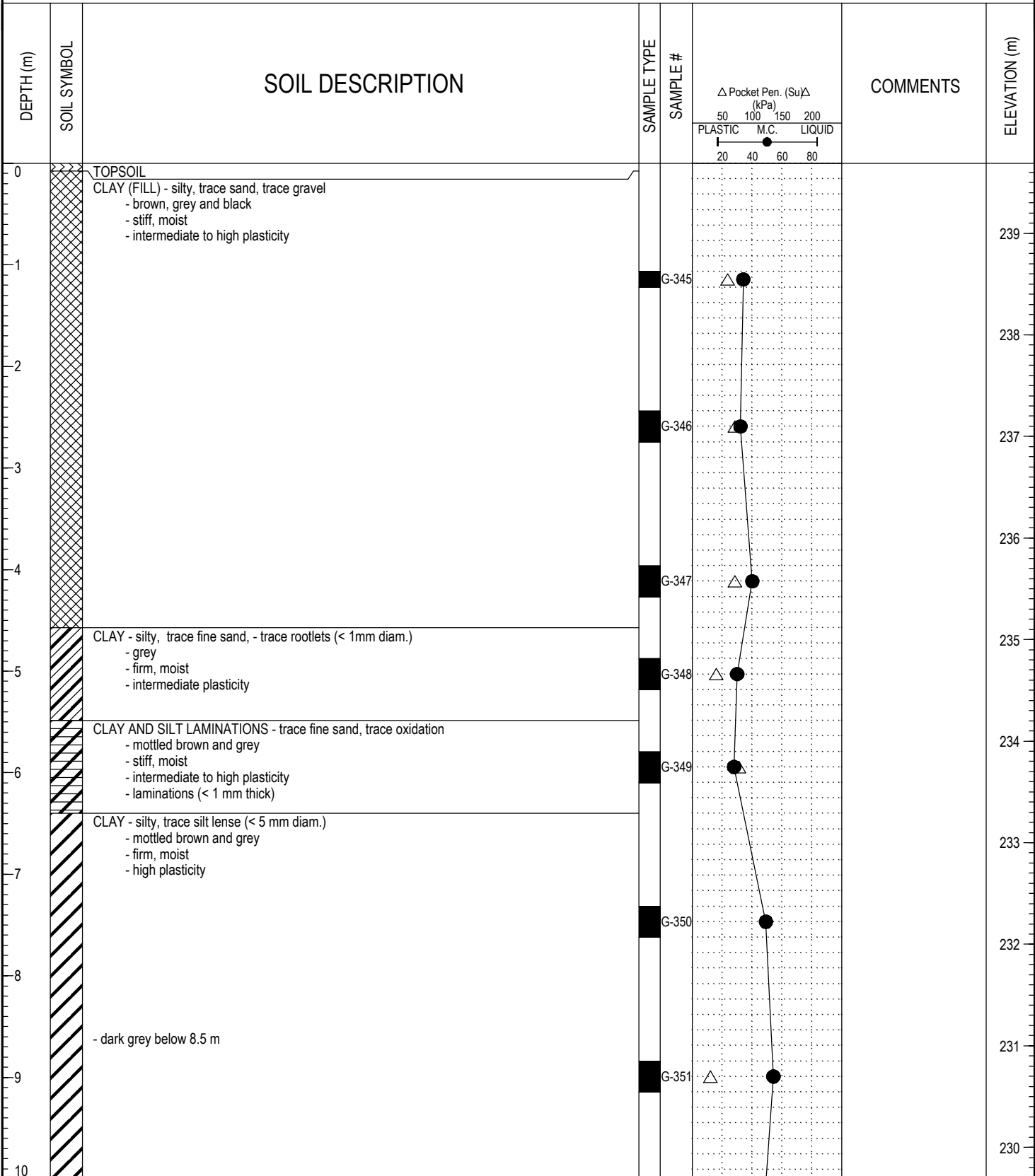
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
20				G-445 G-446		217
21						216
22		POWER AUGER REFUSAL AT 22.3m Notes: 1. Seepage at 22.3 m 2. Test hole grouted to 12.2m below ground surface and backfilled with cuttings to surface				215
23						214
24						213
25						212
26						211
27						210
28						209
29						208
30						208

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05



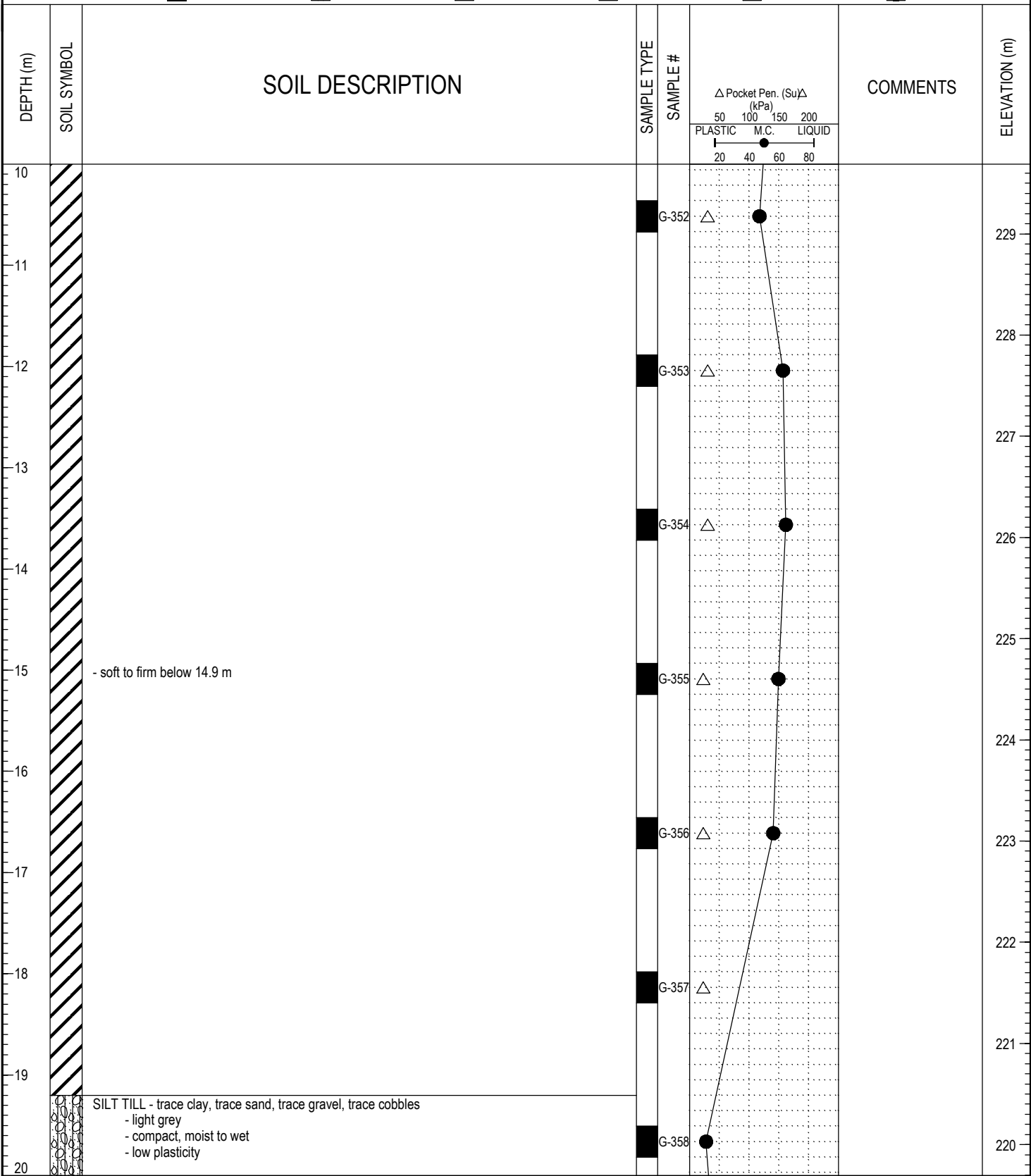
LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.25 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-37
LOCATION: WTP - N 5524100.010 E 647872.679		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.689
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-37
LOCATION: WTP - N 5524100.010 E 647872.679		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.689
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	








LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05

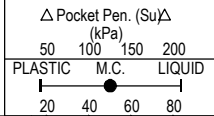


LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-37
LOCATION: WTP - N 5524100.010 E 647872.679		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.689
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

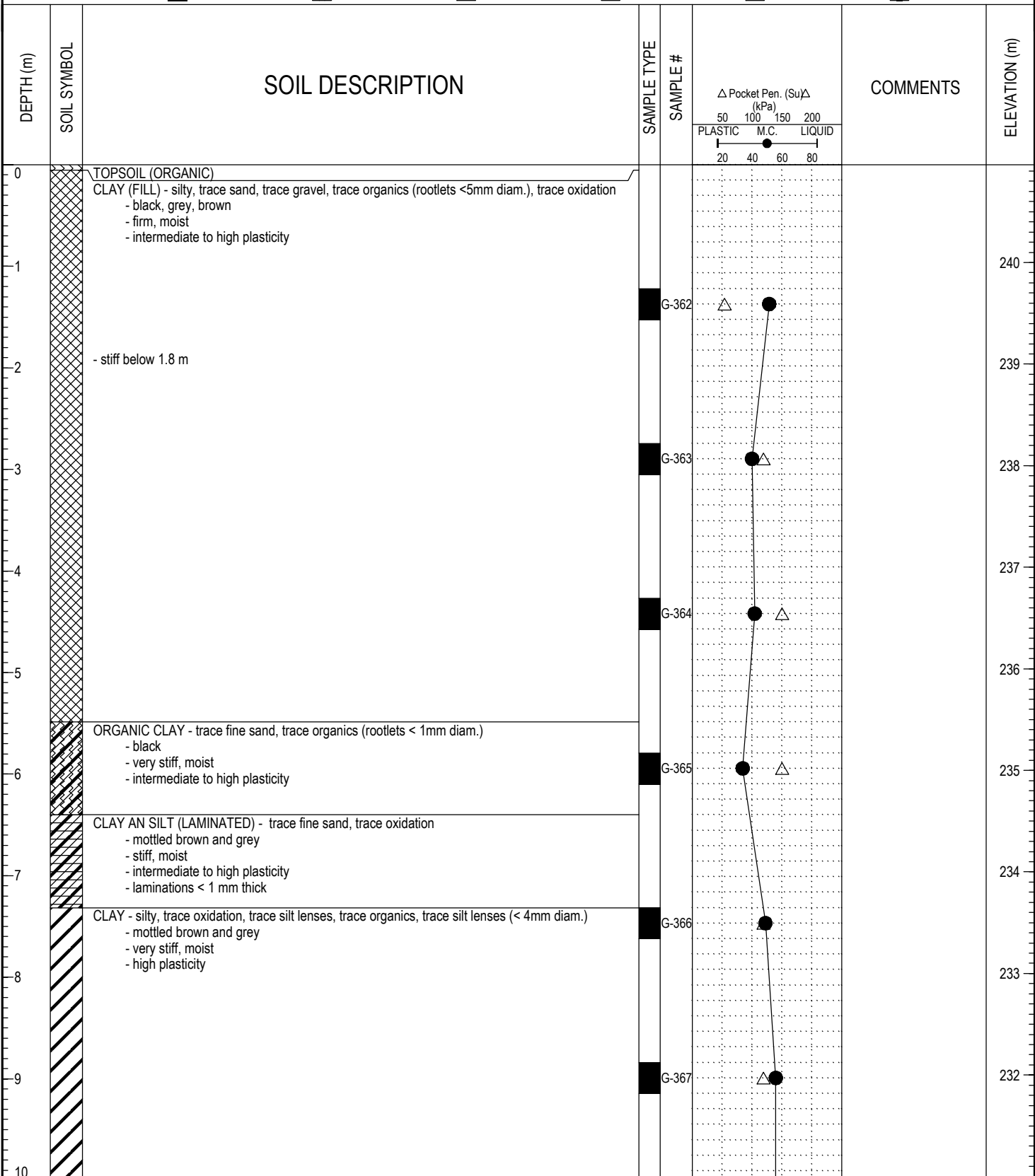
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
20		CLAY TILL - trace fine sand, trace gravel, trace cobbles - dark grey - firm, moist - intermediate plasticity				219
21			<input checked="" type="checkbox"/>	G-359		
22		SILT TILL - trace clay, trace sand, trace gravel, trace cobbles - light grey - compact, moist to wet - low plasticity				218
23			<input checked="" type="checkbox"/>	G-360		
24			<input checked="" type="checkbox"/>	G-361		217
25		POWER AUGER REFUSAL AT 25.0 m Notes: 1. Sloughing below 21.3m 2. Seepage at 22.3m 3. Test hole grouted to 8.5m below ground surface and backfilled with auger cuttings to surface				214
26						213
27						212
28						211
29						210
30						210

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 13/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-38
LOCATION: WTP - N 5524087.124 E 647893.710		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 240.963
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

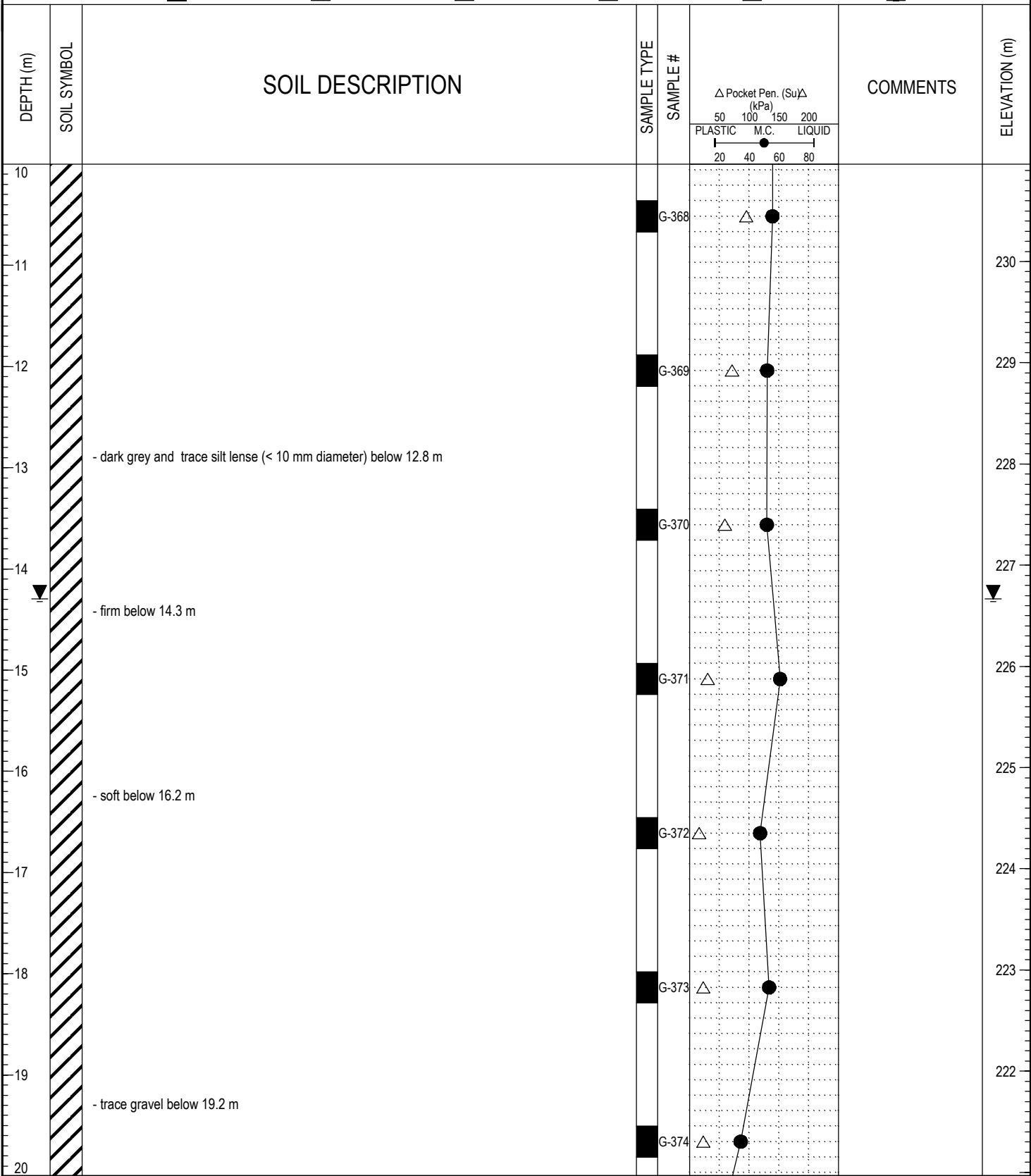


LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skafffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-38
LOCATION: WTP - N 5524087.124 E 647893.710		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 240.963
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

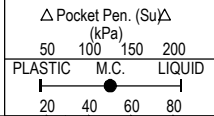


LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-38
LOCATION: WTP - N 5524087.124 E 647893.710		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 450mm Auger	ELEVATION (m): 240.963
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

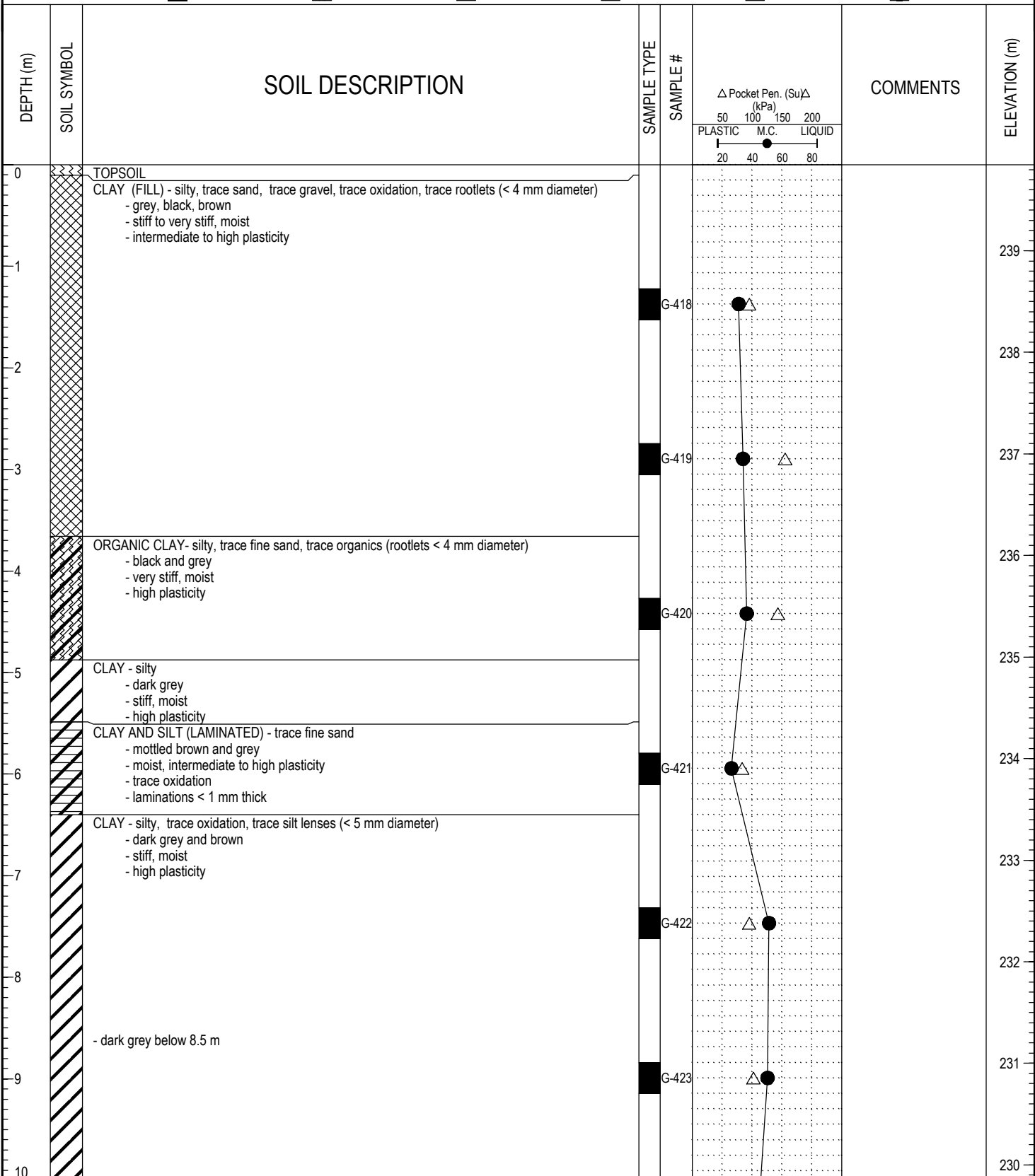
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
20						
21		SILT TILL - trace clay, trace sand, trace gravel, trace cobbles - light grey to light brown - compact, moist to wet - low plasticity	<input checked="" type="checkbox"/>	G-375		220
22		- moist below 21.9 m				219
		- seepage below 22.6 m				
23		END OF TEST HOLE AT 22.9 m IN TILL Notes: 1. Power auger refusal not reached due to excessive sloughing and seepage in till layer 2. Sloughing below 22.3 m 3. Seepage (heavy) at 22.6 m 4. Water level at 14.3 m below ground surface 2 hours after completion of drilling 4. Test hole grouted to 8.5 m below ground surface and backfilled with auger cuttings to surface	<input checked="" type="checkbox"/>	G-376		218
24						217
25						216
26						215
27						214
28						213
29						212
30						

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-39
LOCATION: WTP - N 5524057.650 E 647875.469		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.847
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

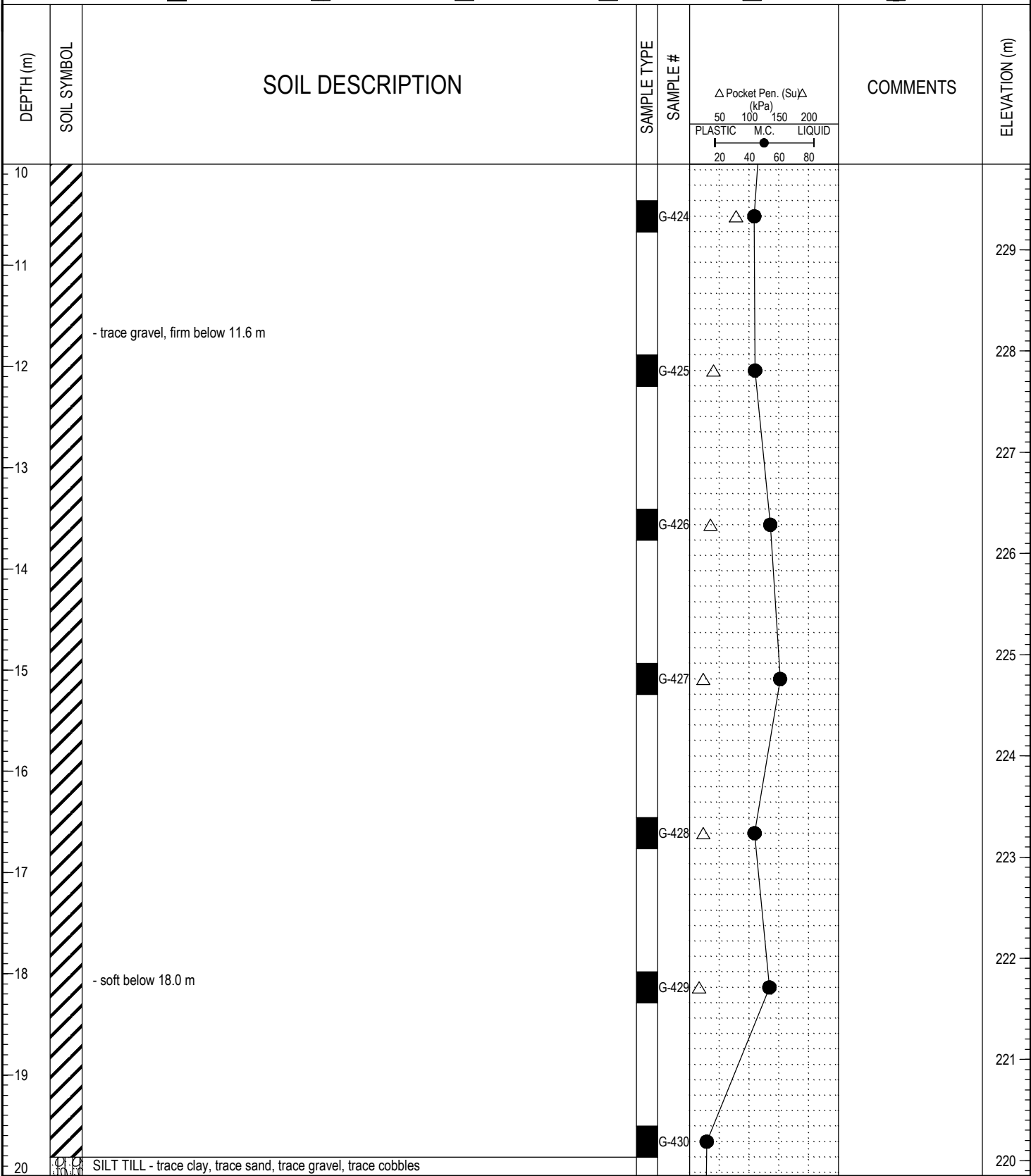


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-39
LOCATION: WTP - N 5524057.650 E 647875.469		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.847
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

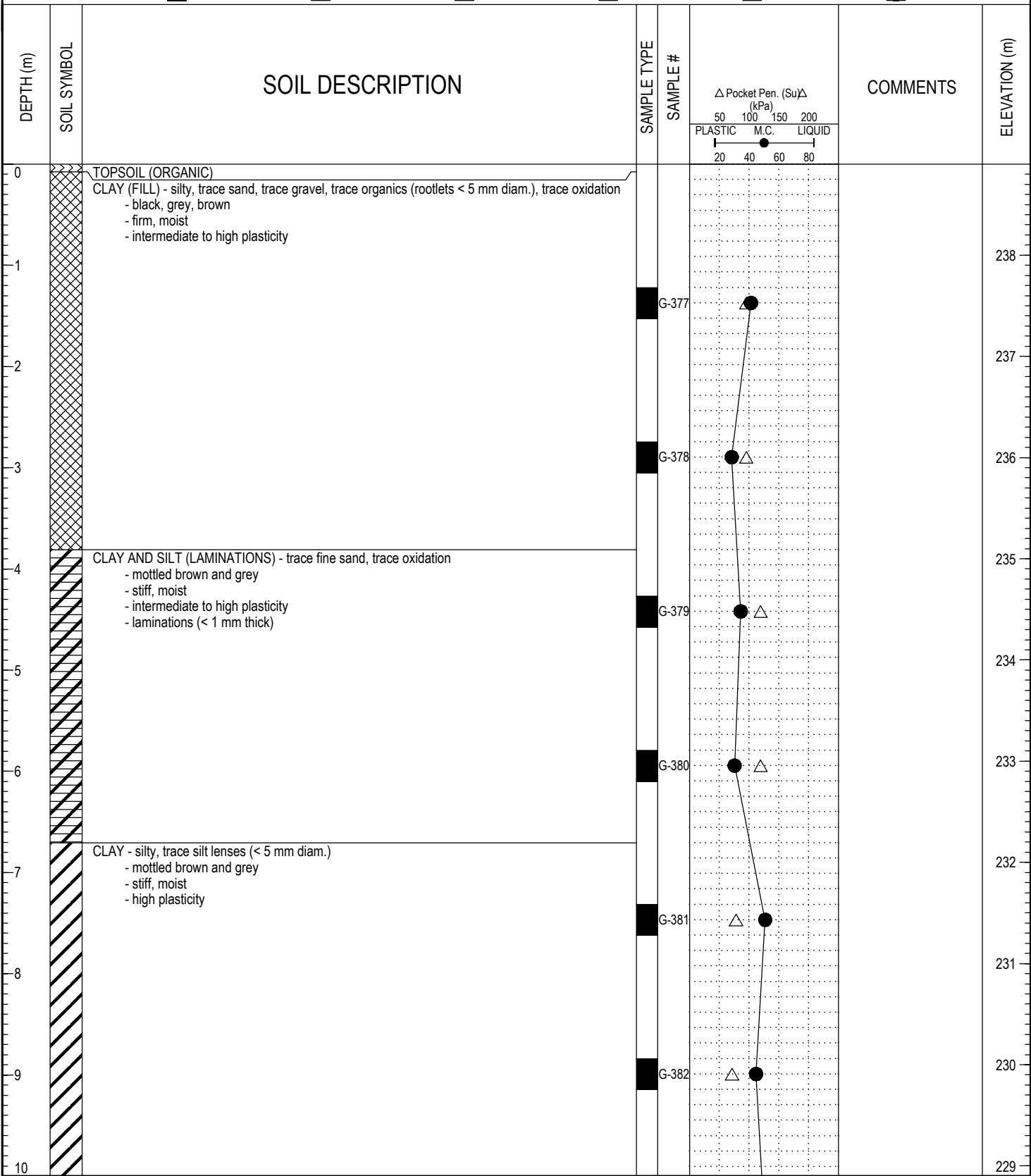
PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-39
LOCATION: WTP - N 5524057.650 E 647875.469		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.847
SAMPLE TYPE	<input checked="" type="checkbox"/> 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)
20		- light grey - compact, moist to wet - low plasticity				219
21				G-431		218
22						217
23		POWER AUGER REFUSAL AT 22.9 m Notes: 1. Sloughing below 21.9m 2. Water level at 12.8m below ground surface 1 hour after completion of drilling 3. Test hole grouted to 8.1m below ground surface and backfilled with cuttings to surface				216
24						215
25						214
26						213
27						212
28						211
29						210
30						210

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05

	LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.86 m
	REVIEWED BY:	COMPLETION DATE: 15/12/04
	PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-40
LOCATION: WTP - N 5524019.655 E 647854.567		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 238.899
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

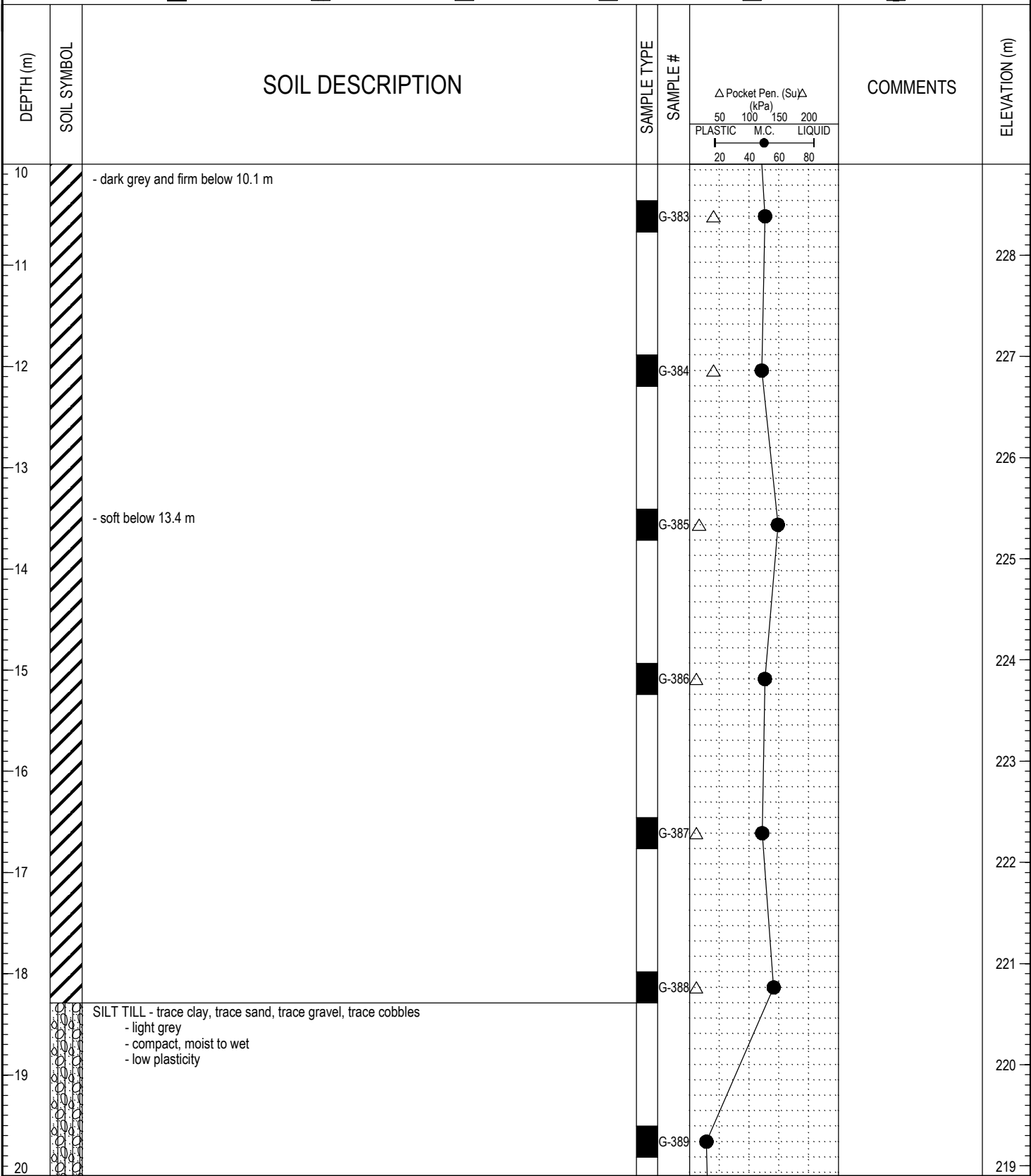


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.56 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-40
LOCATION: WTP - N 5524019.655 E 647854.567		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 238.899
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ - UMA.GDT - 17/2/05

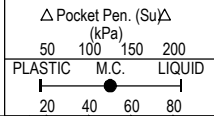


LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.56 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-40
LOCATION: WTP - N 5524019.655 E 647854.567		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 238.899
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)
20		- till is gravelly and cobbly below 21.9 m				218
21						217
22						216
23		END OF TEST HOLE AT 22.6 m IN SILT TILL Notes: 1. Power auger refusal not reached due to excessive sloughing and seepage in till layer 2. Sloughing below 22.3 m 3. Seepage at 3.8m (laminated clay) and at 20.7 m (silt till) 4. Water level at 12.2 m below ground surface 2 hours after completion of drilling 5. Test hole grouted to 8.5m below ground surface and backfilled with cuttings to surface				215
24						214
25						213
26						212
27						211
28						210
29						209
30						209

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



G-390



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 22.56 m
REVIEWED BY:	COMPLETION DATE: 14/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-41
LOCATION: WTP - N 5524018.150 E 647897.056		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.399
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

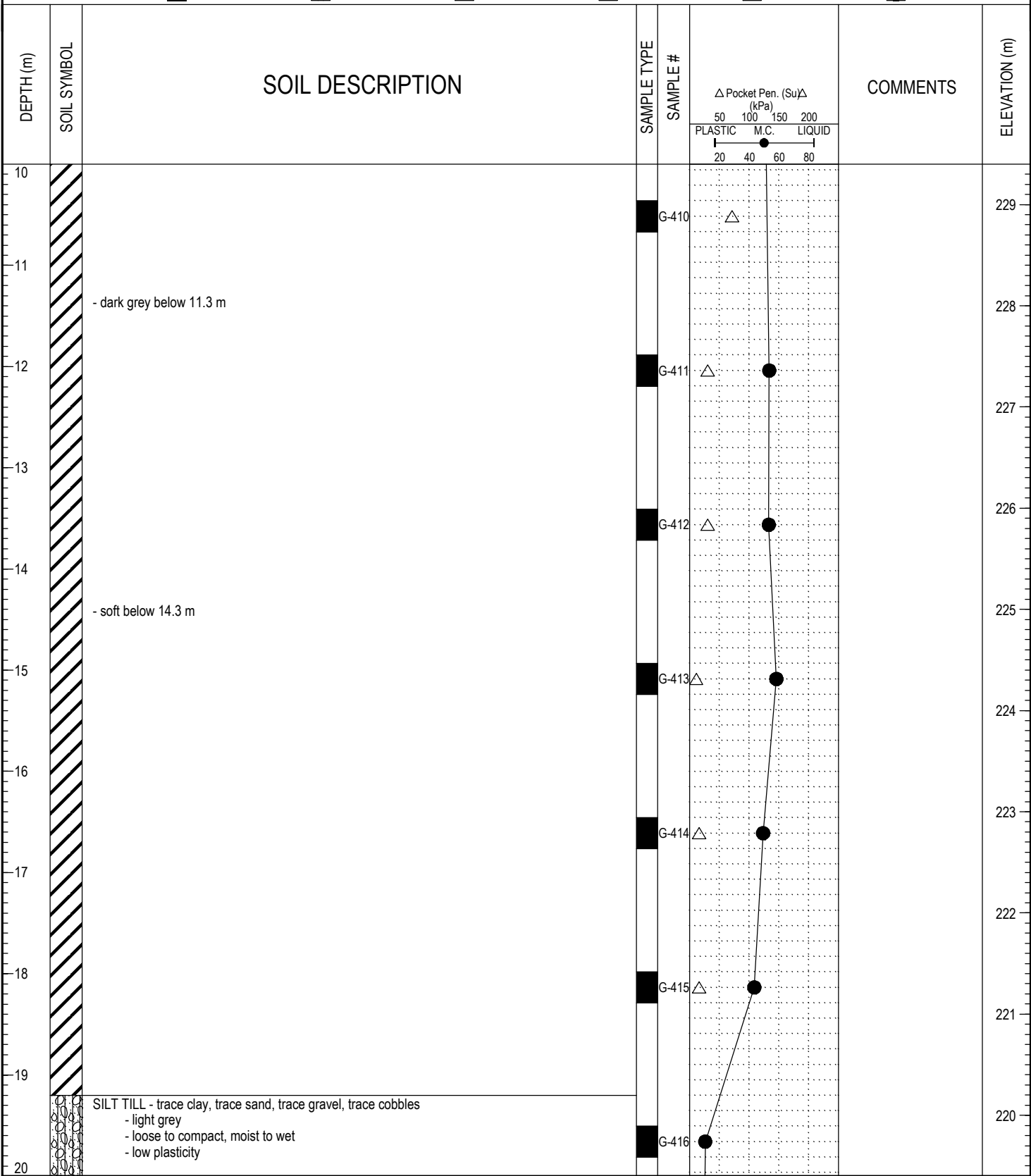
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0	TOPSOIL	CLAY (FILL) - silty, trace gravel, trace sand, trace oxidation, trace rootlets (< 4 mm diam.) - grey, black, brown - stiff, moist - intermediate to high plasticity					239
1				G-404	●		238
2							237
3		ORGANIC CLAY - silty, trace fine sand, trace organics (rootlets < 3 mm diam.) - black - stiff, moist - high plasticity		G-405	●		236
4		- dark grey, no rootlets below 3.7 m					
5		CLAY AND SILT (LAMINATED) - trace fine sand, trace to some oxidation - mottled brown and grey - stiff, moist - intermediate to high plasticity - laminations < 1 mm thick		G-406	●		235
6				G-407	●		233
7							
8		CLAY - silty, trace silt lenses (< 8 mm diameter) - dark grey and brown - stiff, moist - high plasticity		G-408	●		232
9				G-409	●		230

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.64 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-41
LOCATION: WTP - N 5524018.150 E 647897.056		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.399
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

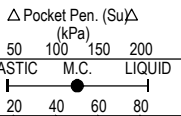


LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.64 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-41
LOCATION: WTP - N 5524018.150 E 647897.056		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 239.399
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

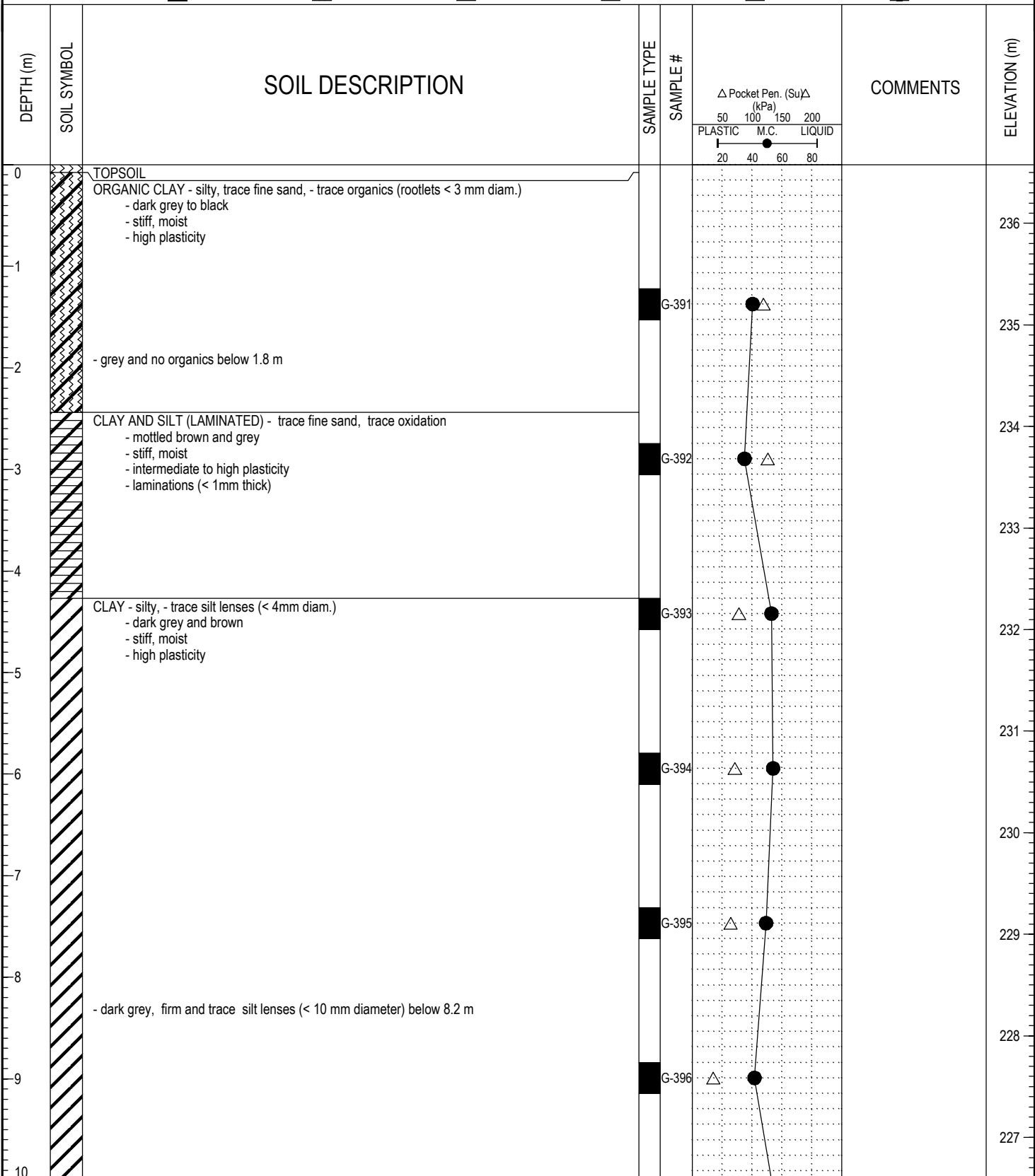
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
20						219
21						218
22		POWER AUGER REFUSAL AT 21.6 m Notes: 1. Sloughing below 21.5m 2. Seepage at 21.0m 3. Water level at 19.7m below ground surface 30 minutes after completion of drilling 4. Test hole grouted to 7.7m below ground surface and backfilled to surface	<input checked="" type="checkbox"/>	G-417		217
23						216
24						215
25						214
26						213
27						212
28						211
29						210
30						210

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 21.64 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-42
LOCATION: WTP - N 5523979.163 E 647888.166		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.577
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK	<input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE

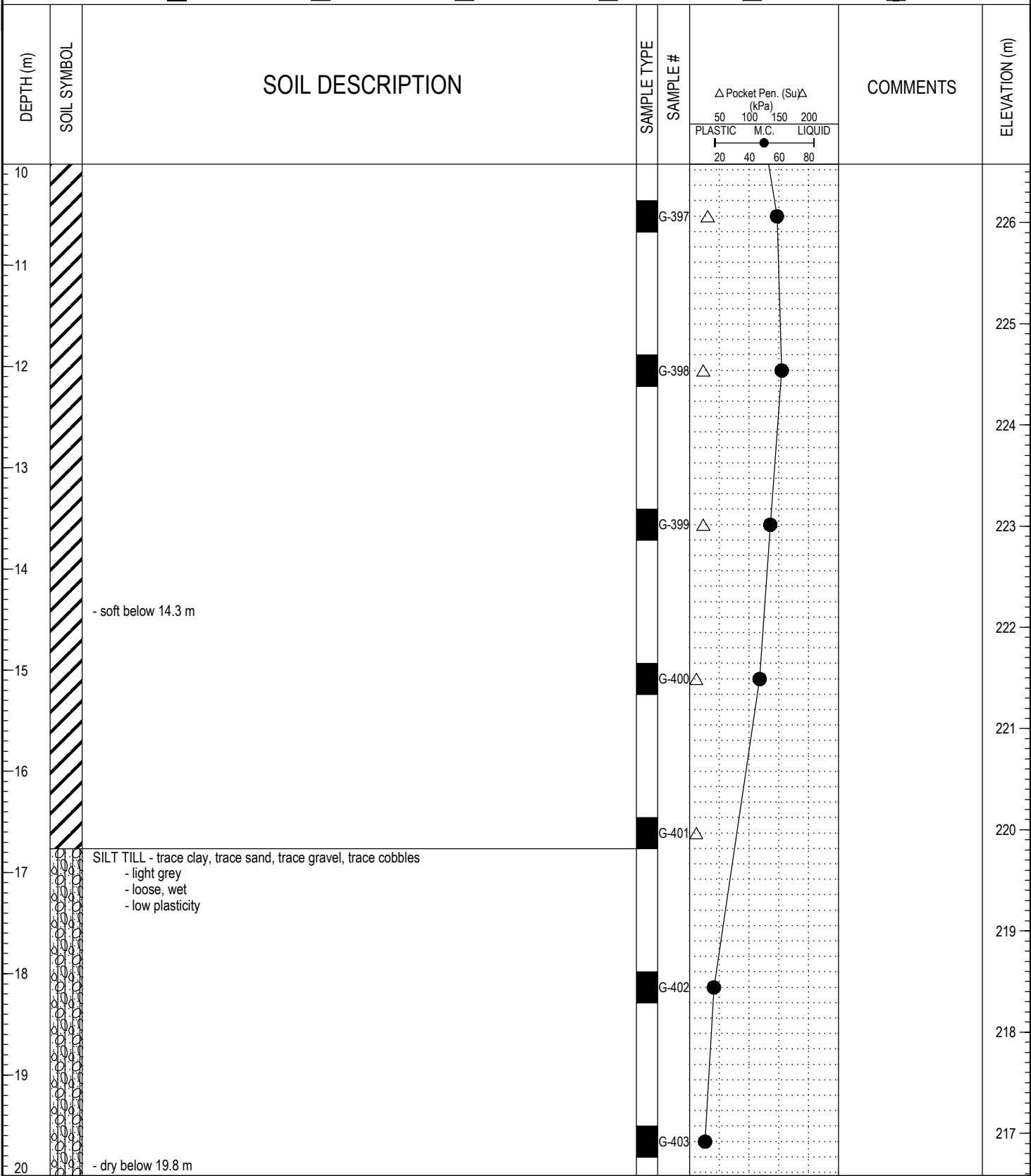


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 20.12 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-42
LOCATION: WTP - N 5523979.163 E 647888.166		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.577
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 20.12 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 2 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-42
LOCATION: WTP - N 5523979.163 E 647888.166		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.577

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

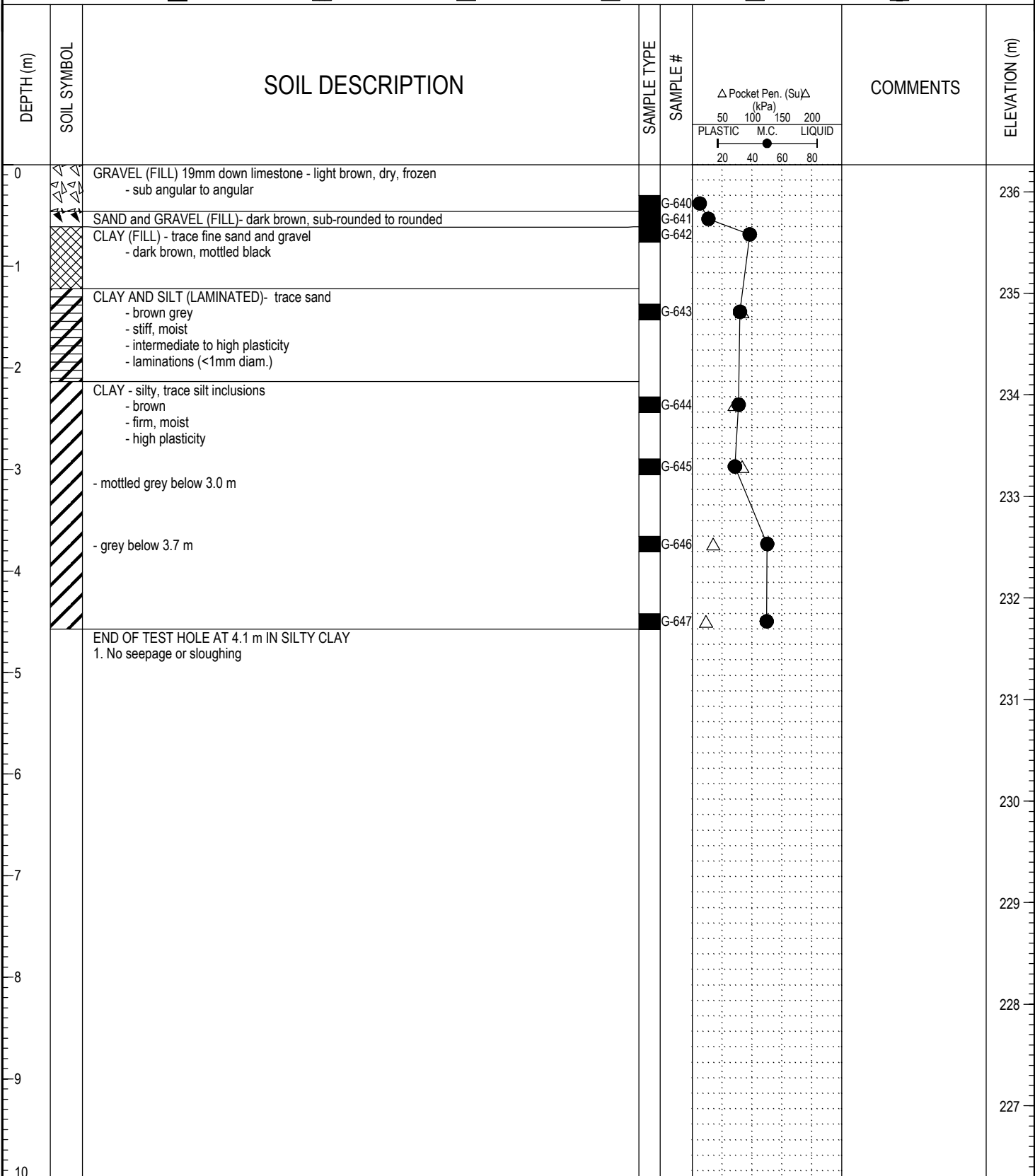
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Pocket Pen. (Su) (kPa)	COMMENTS	ELEVATION (m)
20		POWER AUGER REFUSAL AT 20.1 m Notes: 1. Sloughing below 19.2m 2. Seepage at 19.2m 3. Water level at 9.6m below ground surface 4.5 hours after completion of drilling 4. Test hole grouted to 5.4m below ground surface and backfilled to surface			50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80		236.577
21							236.577
22							236.577
23							236.577
24							236.577
25							236.577
26							236.577
27							236.577
28							236.577
29							236.577
30							236.577

LOG OF TESTHOLE - WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 20.12 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 3 of 3

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-43
LOCATION: Access Roads - N 5523918.260 E 647838.376		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 236.266
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	

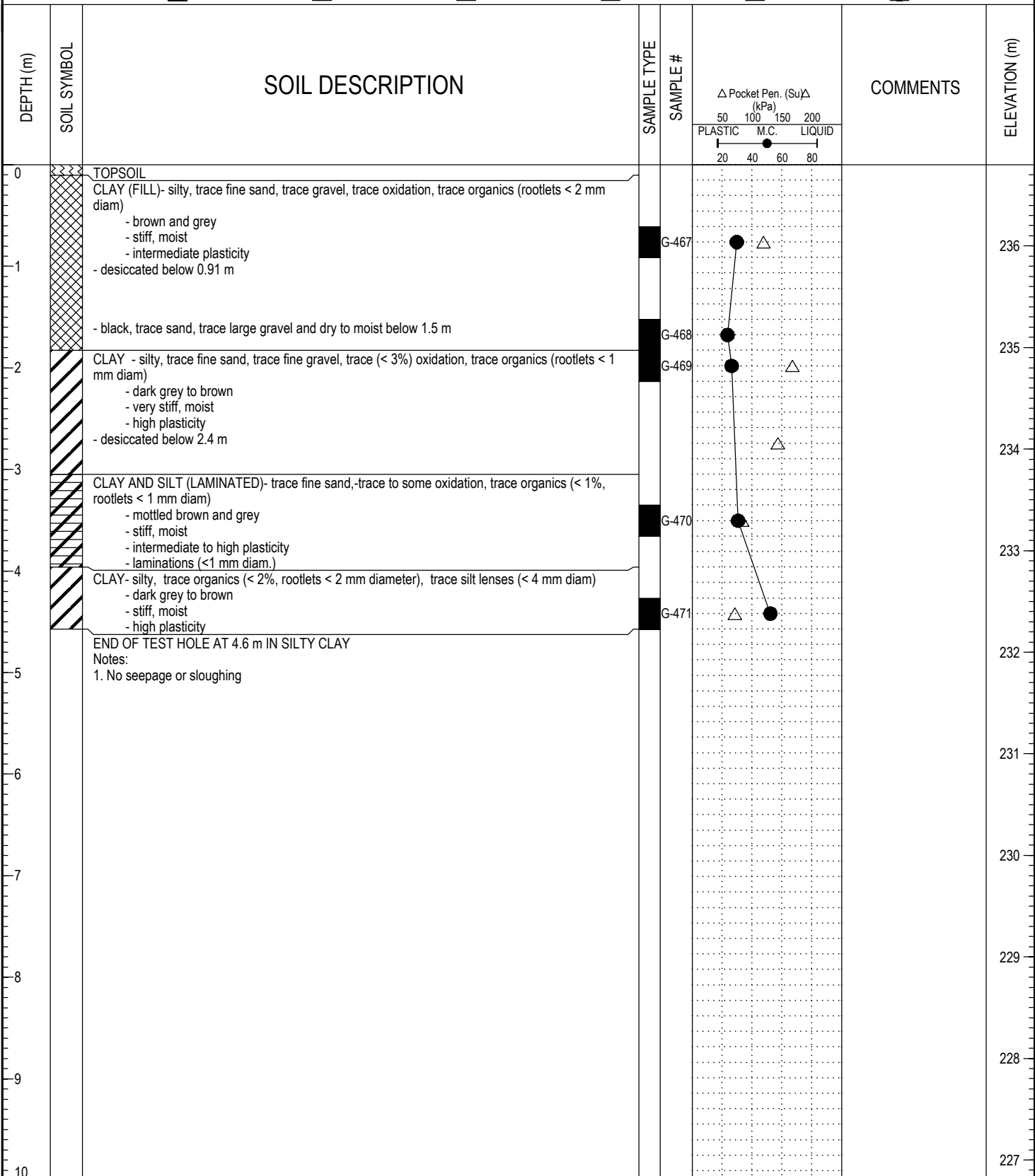


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-44
LOCATION: Access Roads - N 5523935.322 E 647896.922		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.799
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-45
LOCATION: Access Roads - 5523955.117 E 647815.851		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.772
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 #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0	TOPSOIL	CLAY (FILL) - silty, trace gravel, trace fine sand, - trace oxidation, trace organics (rootlets < 2 mm diam) - brown and grey - stiff, moist - intermediate to high plasticity	GRAB	G-463	●		236
1							
2		CLAY- silty, trace fine sand, trace fine gravel, trace (< 3%) oxidation, trace organics (rootlets < 1 mm diam) - dark grey to brown - very stiff, moist - high plasticity - desiccated - stiff below 2.0 m	GRAB	G-464	●	△	235
3		CLAY AND SILT (LAMINATED)- trace fine sand, trace to some oxidation, trace organics (< 1%, rootlets < 1 mm diam.) - mottled brown and grey - stiff, moist - intermediate to high plasticity - laminations (< 1mm thick)	GRAB	G-465	●	△	234
4		CLAY -silty, trace organics (< 2%, rootlets < 2 mm diam), trace silt lenses (< 4 mm diam) - dark grey to brown - stiff, moist - high plasticity	GRAB	G-466	●	△	233
5		END OF TEST HOLE AT 4.6 m IN CLAY Notes: 1. No seepage or sloughing					232
6							231
7							230
8							229
9							228
10							227

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-46
LOCATION: Access Roads - N 5524112.335 647648.893		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.479
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 #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0	TOPSOIL						
0		ORGANIC CLAY -silty, trace fine sand, trace to some oxidation, trace organics (rootlets < 5 mm diam.) - dark grey to black - stiff, moist - high plasticity - dessicated		G-458			236
1		CLAY - silty, trace organics (<4%, rootlets, < 2 mm diam.) - grey - stiff, moist - high plasticity		G-459			235
2		CLAY AND SILT (LAMINATED)- trace fine sand, trace to some oxidation, trace organics (rootlets < 1 mm diam.) - mottled brown and grey - stiff, moist - high plasticity - laminations (< 1 mm thick)		G-460			234
3		CLAY - silty, trace organics (< 2%, rootlets, < 2 mm diam.), silt lenses (< 4 mm diam.) - dark grey to brown - stiff, moist - high plasticity		G-461			233
4		CLAY - silty, trace organics (< 2%, rootlets, < 2 mm diam.), silt lenses (< 4 mm diam.) - dark grey to brown - stiff, moist - high plasticity		G-462			232
5		END OF TEST HOLE AT 4.6 m IN SILTY CLAY Notes: 1. No seepage or sloughing					232
6							231
7							230
8							229
9							228
10							227

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-47
LOCATION: Access Roads - N 5524177.032 E 647667.626		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB	ELEVATION (m): 236.976

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK NO RECOVERY CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0	TOPSOIL	CLAY - silty, trace fine sand, trace gravel, trace organics (<4%, rootlets < 2 mm diameter), trace oxidation - brown and grey - firm, moist - high plasticity - dessicated		G-453			236
1		CLAY AND SILT (LAMINATED) - trace sand, trace oxidation - mottled brown and grey - stiff, moist - intermediate to high plasticity - laminations (< 1 mm thick)		G-454			235
2		CLAY - silty - grey and brown - stiff, moist - high plasticity - dessicated		G-455			234
3		CLAY AND SILT (LAMINATED) - silty, trace sand, trace oxidation - mottled brown and grey - stiff, moist - intermediate to high plasticity - laminations (< 1 mm thick)		G-456			233
4		END OF TEST HOLE AT 4.6 m IN SILTY CLAY		G-457			232
5		Notes: 1. No seepage or sloughing					231
6							230
7							229
8							228
9							228
10							228

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-48
LOCATION: Access Roads - N 5524184.233 E 647726.958		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Subterranean	METHOD: SoilMech D-312HB, 600mm Auger	ELEVATION (m): 236.211
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

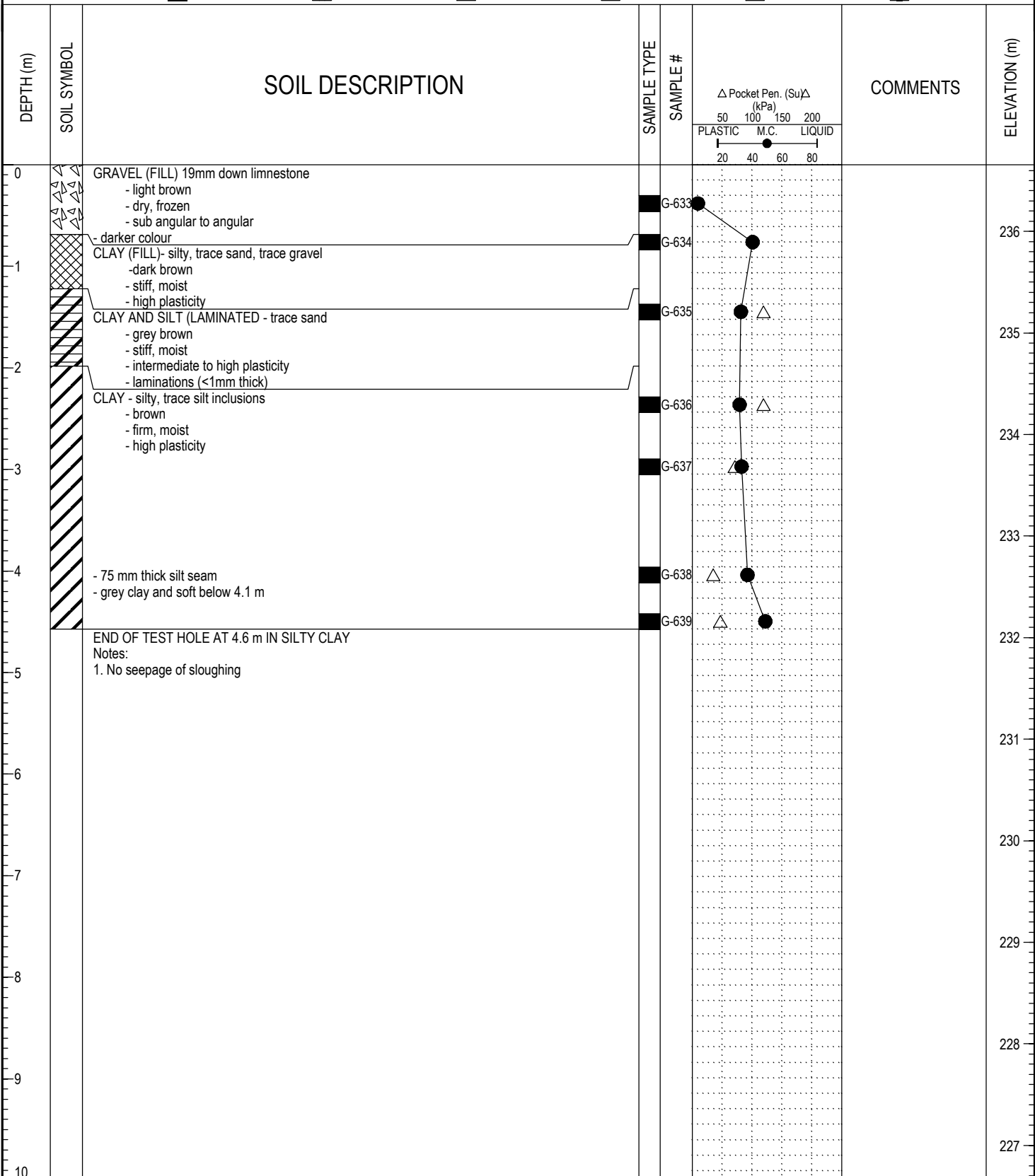
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	Δ Pocket Pen. (Su)Δ (kPa) 50 100 150 200 PLASTIC M.C. LIQUID 20 40 60 80	COMMENTS	ELEVATION (m)
0	TOPSOIL	CLAY - silty, trace fine sand, trace gravel, trace oxidation, trace organics (<4%, rootlets < 2 mm diam.) - brown - firm, moist - high plasticity		G-447			236
1				G-448			235
2				G-449			234
3		CLAY AND SILT (LAMINATED)- trace sand, trace oxidation - mottled brown and grey - stiff, moist - intermediate to high plasticity - laminations (< 1mm thick)		G-450			233
4		CLAY- silty, trace oxidation, trace silt lenses (< 4 mm diam) - grey and brown - stiff, moist - high plasticity		G-451			232
5		END OF TEST HOLE AT 4.6 m IN SILTY CLAY Notes: 1. No seepage or sloughing		G-452			231
6							230
7							229
8							228
9							227
10							

LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Nelson Ferreira	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 15/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-49
LOCATION: Access Roads - N 5523907.744 E 648028.131		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 236.656
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

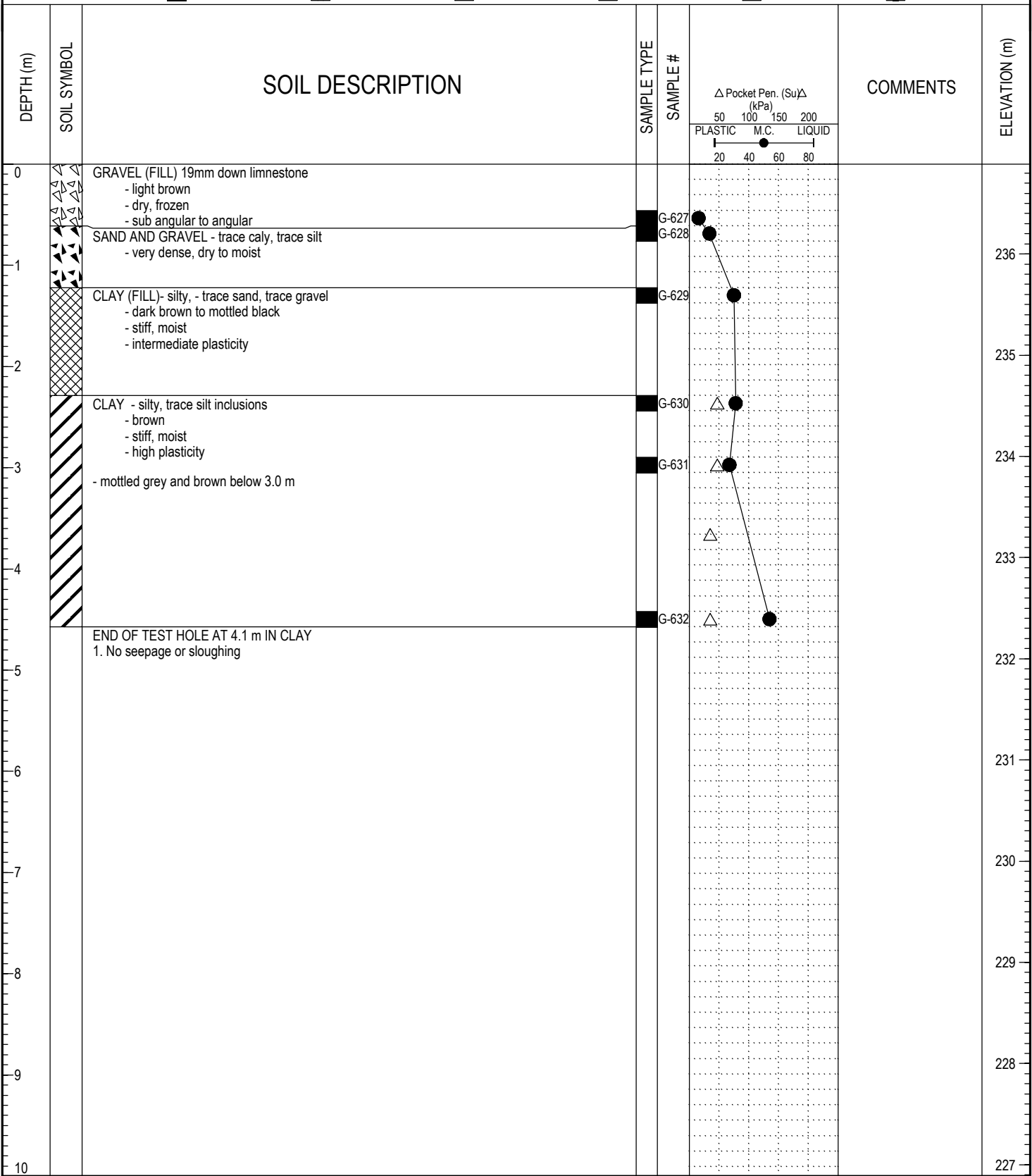


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: Winnipeg Water Treatment Plant	CLIENT: City of Winnipeg (Earth Tech Canada Ltd.)	TESTHOLE NO: 04-50
LOCATION: Access Roads - N 5523911.437 E 648218.067		PROJECT NO.: 3398-055-00-01-00
CONTRACTOR: Maple Leaf Drilling	METHOD: DR 150 - 125 mm Solid Stem Auger	ELEVATION (m): 236.888
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

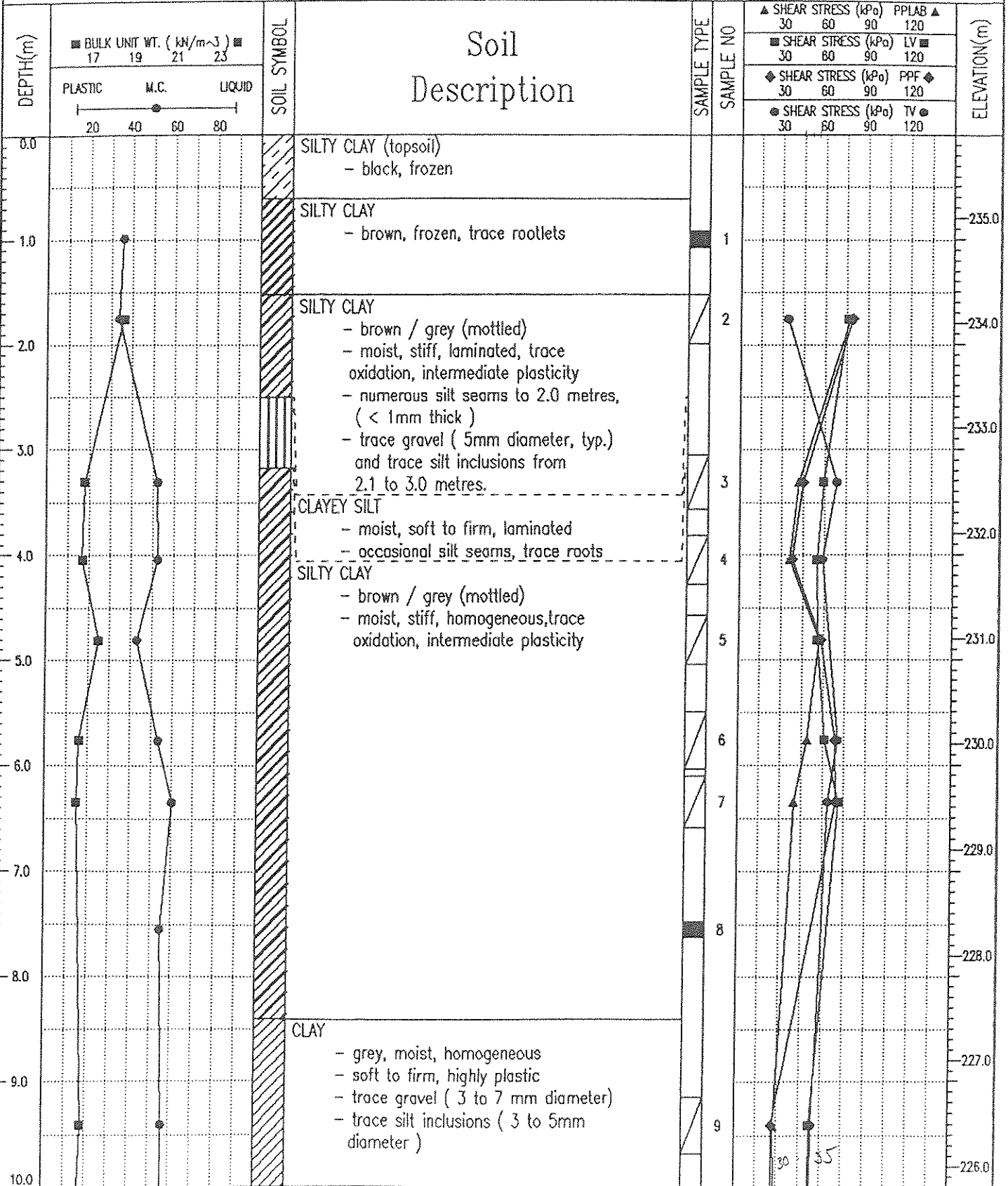


LOG OF TESTHOLE WINNIPEG WATER TREATMENT PLANT.GPJ UMA.GDT 17/2/05



LOGGED BY: Kate Franklin	COMPLETION DEPTH: 4.57 m
REVIEWED BY:	COMPLETION DATE: 17/12/04
PROJECT ENGINEER: Ken Skaffeld	Page 1 of 1

PROJECT: DEACON DRAINAGE STRUCTURE	DRILLED BY: PADDOCK DRILLING LIMITED	BOREHOLE NO: TH-1
CLIENT: CH2M G&S / CITY OF WINNIPEG	DRILL TYPE: ACKER MP5, 125 mm SS AUGERS	PROJECT NO: 4895-006-07-01
PROJECT ENGINEER: DY	LOCATION: STN 20693.3, 14m S OF BR-1 C/L	ELEVATION: 235.794 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB SAMPLE <input checked="" type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> WIRE LINE-TYPE	

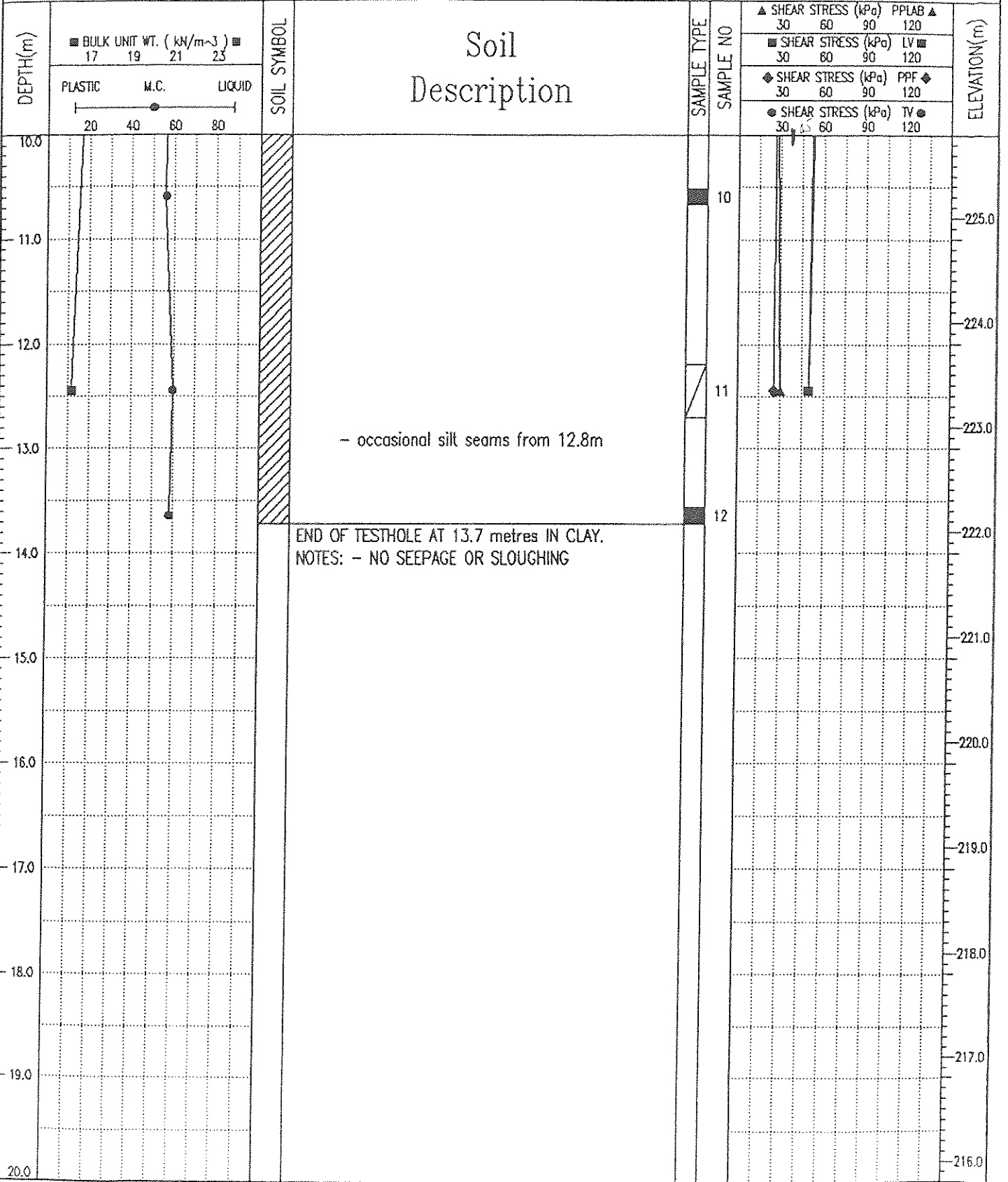


UMA Environmental
Winnipeg, Manitoba

LOGGED BY: CR
REVIEWED BY: KS
Fig. No:

COMPLETION DEPTH: 13.7 m
COMPLETE: 16/02/96

PROJECT: DEACON DRAINAGE STRUCTURE	DRILLED BY: PADDOCK DRILLING LIMITED	BOREHOLE NO: TH-1
CLIENT: CH2M G&S / CITY OF WINNIPEG	DRILL TYPE: ACKER MP5, 125 mm SS AUGERS	PROJECT NO: 4895-006-07-01
PROJECT ENGINEER: DY	LOCATION: STN 20693.3, 14m S OF BR-1 C/L	ELEVATION: 235.794 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB SAMPLE <input checked="" type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> WIRE LINE-TYPE	

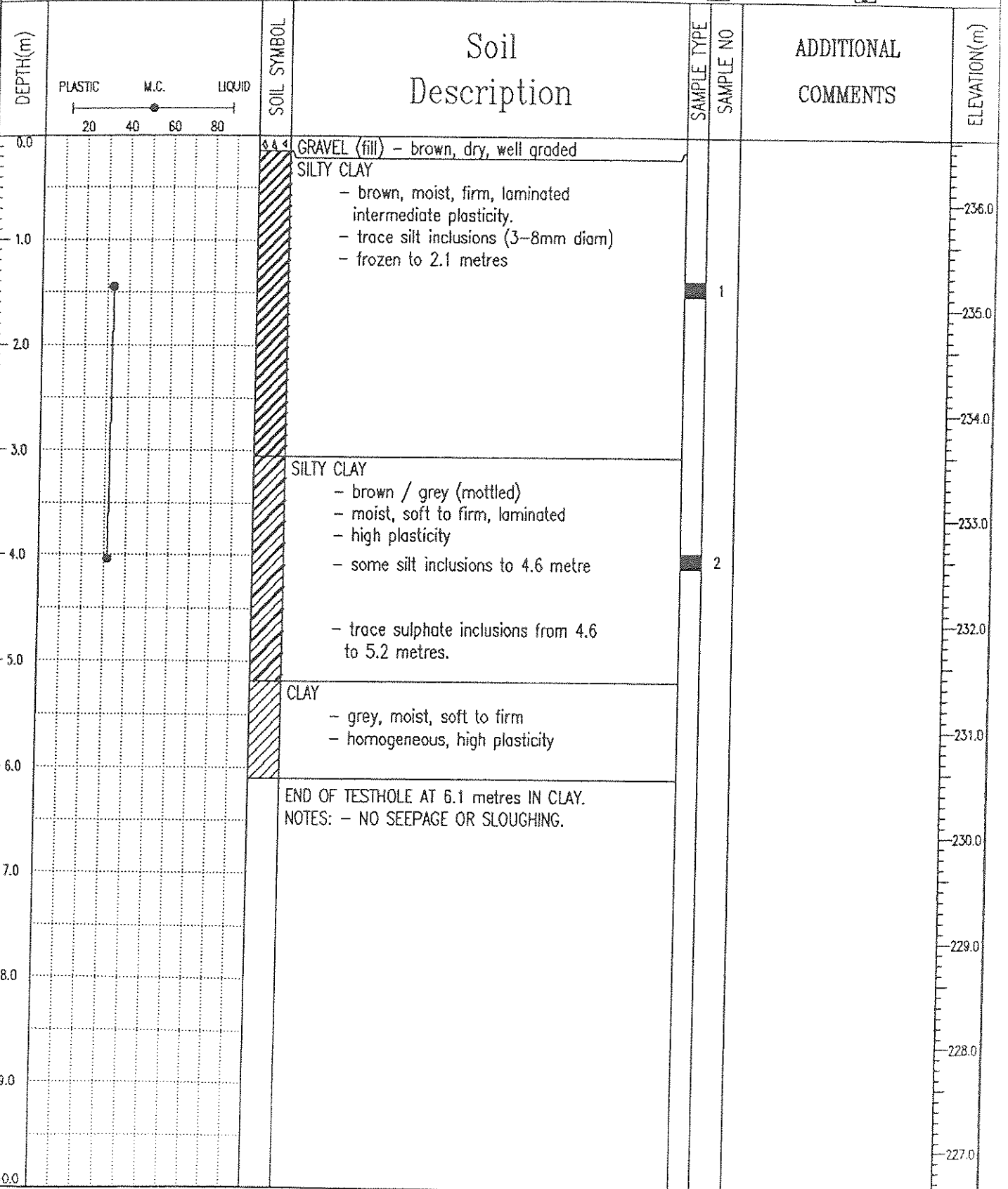


UMA Environmental
Winnipeg, Manitoba

LOGGED BY: GR
 REVIEWED BY: KS
 Fig. No:

COMPLETION DEPTH: 13.7 m
 COMPLETE: 16/02/96

PROJECT: DEACON DRAINAGE STRUCTURE	DRILLED BY: PADDOCK DRILLING LIMITED	BOREHOLE NO: TH-2
CLIENT: CH2M G&S / CITY OF WINNIPEG	DRILL TYPE: ACKER MP5, 125 mm SS AUGERS	PROJECT NO: 4895-006-07-01
PROJECT ENGINEER: DY	LOCATION: STN 20629m, 10m S OF BR-1 C/L	ELEVATION: 236.633 (m)
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB SAMPLE	<input checked="" type="checkbox"/> SHELBY TUBE
	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY
	<input type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> WIRE LINE-TYPE



END OF TESTHOLE AT 6.1 metres IN CLAY.
 NOTES: - NO SEEPAGE OR SLOUGHING.

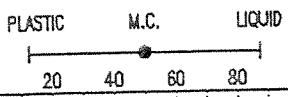
UMA Environmental
 Winnipeg, Manitoba

LOGGED BY: GR	COMPLETION DEPTH: 6.1 m
REVIEWED BY: KS	COMPLETE: 16/02/96
Fig. No:	Page 1 of 1

PROJECT: DEACON DRAINAGE STRUCTURE	DRILLED BY: PADDOCK DRILLING LIMITED	BOREHOLE NO: TH-3
CLIENT: CH2M G&S / CITY OF WINNIPEG	DRILL TYPE: ACKER MP5, 125 mm SS AUGERS	PROJECT NO: 4895-006-07-01
PROJECT ENGINEER: DY	LOCATION: STN 20556m, 8m S OF BR-1 C/L	ELEVATION: 236.222 (m)

SAMPLE TYPE: GRAB SAMPLE SHELBY TUBE DISTURBED NO RECOVERY SPLIT SPOON WIRE LINE-TYPE

DEPTH(m)	SOIL SYMBOL	Soil Description	SAMPLE TYPE	SAMPLE NO	ADDITIONAL COMMENTS	ELEVATION(m)
0.0		SILTY CLAY (fill) - brown, frozen - trace gravel				236.0
1.0		SILTY CLAY (topsoil) - black, frozen				235.0
2.0		SILTY CLAY - brown, moist, firm, laminated - high plasticity - trace gravel (3mm diameter typ.)				234.0
3.0						233.0
4.0		CLAY - grey, moist, firm, homogeneous - high plasticity - some silt inclusions - trace gravel (4mm diameter typ.) - soft to firm from 4.8 to 5.2metres				232.0
5.0						231.0
6.0		CLAY - grey, moist, firm, homogeneous - high plasticity, trace silt inclusions				230.0
7.0		END OF TESTHOLE AT 6.1 metres IN CLAY. NOTES: - NO SEEPAGE OR SLOUGHING.				229.0
8.0						228.0
9.0						227.0
10.0						



UMA Environmental
Winnipeg, Manitoba

LOGGED BY: GR	COMPLETION DEPTH: 6.1 m
REVIEWED BY: KS	COMPLETE: 16/02/96
Fig. No:	Page 1 of 1



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT

DEACON RESERVOIR

CK'D

DATE OF INVESTIGATION

JOB NO W-0420

HOLE 3

Wt CONTENT

SOIL PROFILE

SOIL SAMPLES

SOIL DESCRIPTION

DEPTH DATUM
FEET

SOIL
SYMBOL

UNIFIED
CLASSIF

CONDITION

TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TESTS

WATER CONTENT - %

w_p - □

w - ○

w_L - △

10 20 30 40 50 60 70

SURFACE ELEVATION

36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70

CLAY, SILTY,
STIFF

$q_u = 2060$ psf
 $e_f = 4.4\%$
 $\gamma = 105.2$ pcf
 $\gamma_d = 71.8$ pcf

$q_u = 2067$ psf
 $e_f = 6.6\%$
 $\gamma = 112.0$ pcf
 $\gamma_d = 73.3$ pcf

TILL, LIGHT
BROWN, SILT
WITH SOME
SAND, CLAY,
GRAVEL UP TO
3" SIZE

VERY DENSE, 65'

SEEPAGE ON ROCK
SURFACE AT 70'
END OF HOLE (REMARKS)

PLATE 9



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT
DEACON RESERVOIR

BY A.L.B.

CXD

DATE OF INVESTIGATION MARCH 23, 1977

JOB NO W-0420

HOLE 3

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

SOIL DESCRIPTION

WATER CONTENT - %
10 20 30 40 50 60 70
w_p - □ w - ○ w_L - △

DEPTH
FEET

DAYUM

SOIL
SYMBOL
UNITED
CLAMPS

CONDITION

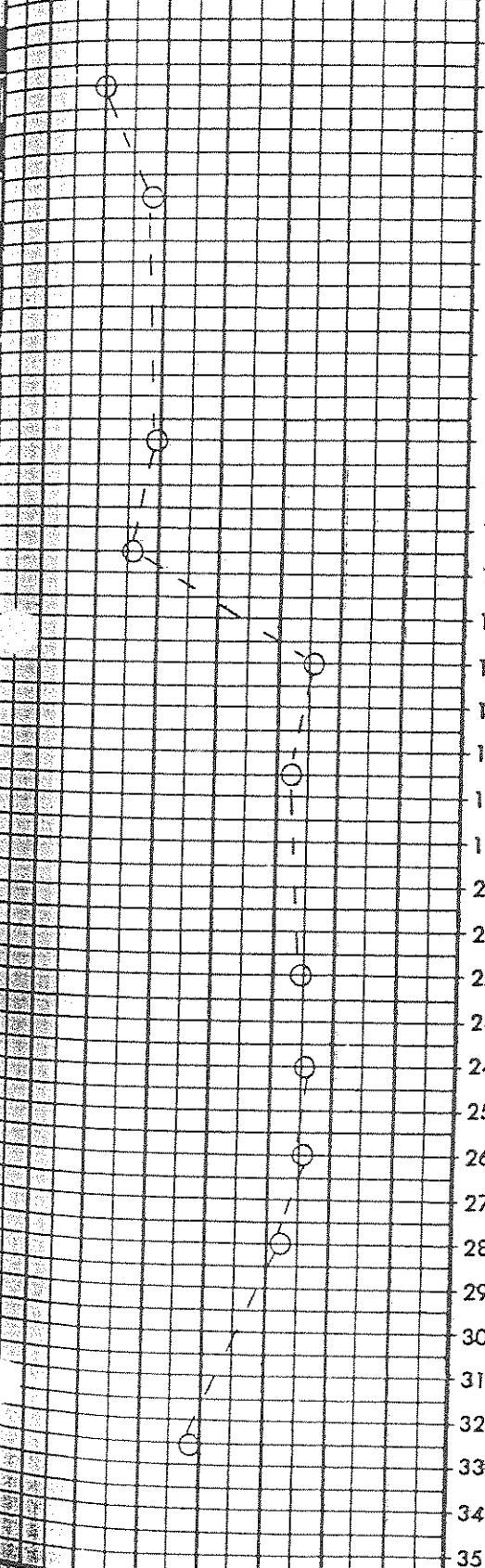
TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TESTS

SURFACE ELEVATION



1 TOPSOIL, SILT

4 CLAYEY SILT
TO
6 SILTY CLAY,
FIRM

13 CLAY, GREY,
SILTY, STIFF

CH

$q_u = 1903 \text{ psf}$
 $e_f = 7.5\%$
 $\gamma = 117.7 \text{ pcf}$
 $\gamma_d = 87.7 \text{ pcf}$

$q_u = 2778 \text{ psf}$
 $e_f = 3.0\%$
 $\gamma = 109.7 \text{ pcf}$
 $\gamma_d = 71.4 \text{ pcf}$

$q_u = 2930 \text{ psf}$
 $e_f = 3.2\%$
 $\gamma = 119.1 \text{ pcf}$
 $\gamma_d = 78.8 \text{ pcf}$

PLATE 8

PROJECT

DEACON RESERVOIR

L.B.

C'D

DATE OF INVESTIGATION MAR 24 1977

LOG NO W-0420

HOLE 4

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

DEPTH FEET	DATUM	SOIL DESCRIPTION	SOIL SYMBOL	UNIFIED CLASSIF	CONDITION	TYPE	PENETRATION RESISTANCE	RECOVERY %	OTHER TESTS
36		CLAY, STIFF							
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56		GLACIAL SILT TILL							
57		- GRAVELLY							
58		- FREQUENT							
59		COBBLES, BOULDERS							
60		- FIRM							
61									
62									
63		- DENSE							
64									
65									
66		END OF HOLE							
67		(ROCK ENCOUNTERED)							
68		GROUNDWATER LEVEL AT 66'							
69									
70									

$q_u = 2348 \text{ psf}$
 $e_f = 2.3\%$
 $\gamma = 105.1 \text{ pcf}$
 $\gamma_d = 67.4 \text{ pcf}$

$q_u = 2353 \text{ psf}$
 $e_f = 3.3\%$
 $\gamma = 107.0 \text{ pcf}$
 $\gamma_d = 69.4 \text{ pcf}$



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT
DEACON RESERVOIR

DATE OF INVESTIGATION **MARCH 24, 1977** | JOB NO **W-0420** | HOLE **4**

L.B.
C.K.D.

SOIL PROFILE				SOIL SAMPLES			
DEPTH FEET	DATUM	SOIL DESCRIPTION	SOIL SYMBOL	UNIFIED CLASSIF.	CORRECTION	TYPE	OTHER TESTS
1		CLAY, BROWN,		CI			$q_u = 1783 \text{ psf}$ $e_f = 2.6\%$ $\gamma = 103.5 \text{ pcf}$ $\gamma_d = 66.0 \text{ pcf}$
2		SILTY					
3		(CONTAINS SILT					
4		LAYERS 4'-12')		CI-M			
5							
6							
7							
8							
9							
10							
11							
12							
13		CLAY, GREY		CH			$q_u = 3521 \text{ psf}$ $e_f = 2.0\%$ $\gamma = 107.0 \text{ pcf}$ $\gamma_d = 70.3 \text{ pcf}$
14		AND BROWN,					
15		VARVED,					
16		FIRM TO					
17		STIFF					
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT
DEACON RESERVOIR

BY A. L. B.

CKD

DATE OF INVESTIGATION MARCH 24, 1977

LOG NO W-0420

HOLE 5

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

WATER CONTENT - %
10 20 30 40 50 60 70

w_p - □

w - ○

w_L - △

DEPTH DATUM
FEET

SOIL DESCRIPTION

SOIL
SYMBOL

UNIFIED
CLASSIF.

CONDITION

TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TESTS

SURFACE ELEVATION

36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70

CLAY

CH

$f_u = 1700$
 $\gamma = 104$

$f_u = 1600$
 $\gamma = 107$

TILL (MOIST),
LIGHT BROWN
SILT WITH SOME
SAND, GRAVEL
AND CLAY,
MEDIUM DENSE,
FREQUENT
COBBLES AND
OCCASIONAL
BOULDERS

END OF HOLE

WATER LEVEL
AT 66'



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT: DEACON RESERVOIR

BY: A.L.B.

CKD

DATE OF INVESTIGATION: MARCH 24, 1957

JOB NO: W-0420

NO.: 5

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

WATER CONTENT - %
10 20 30 40 50 60 70
w_p - □ w - ○ w_L - △

DEPTH FEET

DATUM

SURFACE ELEVATION

TOP SOIL

SOIL SYMBOL

UNIFIED CLASSIF.

CONDITION

TYPE

PENETRATION RESISTANCE

RECOVERY %

OTHER TESTS

1
2 CLAY, FIRM TO
3 STIFF
4 (CONTAINS
5 NUMEROUS SILT
6 LAYERS TO 11')
7 SOME COARSE
8 SAND 0.3' - 1.5'

CI-ML

$q_u = 1039 \text{ psf}$
 $e_f = 2.3\%$
 $\gamma = 104.6 \text{ pcf}$
 $\gamma_d = 67.7 \text{ pcf}$

$q_u = 2034 \text{ psf}$
 $e_f = 2.5\%$
 $\gamma = 108.7 \text{ pcf}$
 $\gamma_d = 72.2 \text{ pcf}$

$q_u = 2200$
 $\gamma = 106$



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TESTS

PROJECT
DEACON RESERVOIR

BY A.L.B.

CEO

DATE OF INVESTIGATION MARCH 24, 1957

JOB NO W-0420

HOLE 6

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

WATER CONTENT - %
10 20 30 40 50 60 70

DEPTH
FEET

DATUM

SOIL DESCRIPTION

SOIL
SYMBOL

UNIFIED
CLASSIF

CONDITION

TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TESTS

SURFACE ELEVATION

CLAY, GREY
FIRM TO
STIFF

$q_u = 1662 \text{ psf}$
 $e_f = 7.1\%$
 $\gamma = 106.0 \text{ pcf}$
 $\gamma_d = 63.5 \text{ pcf}$

SILT TILL
- GRAVELLY
- MOIST
- FIRM

- VERY DENSE

$q_u = 2200 \text{ psf}$
 $e_f = 6.5\%$
 $\gamma = 109.5 \text{ pcf}$
 $\gamma_d = 75.5 \text{ pcf}$

WATER LEVEL AT 69'

END OF HOLE
(REFUSAL)



BY A. L. B.

CEO

DATE OF INVESTIGATION MARCH 24, 1977

JOB NO M-0420

HOLE 6

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

SOIL DESCRIPTION

DEPTH DATUM
FEET

SOIL
SYMBOL
UNIFIED
CLASSIF.

CONDITION

TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TESTS

WATER CONTENT - %
10 20 30 40 50 60 70
w_p - □ w - ○ w_L - △

SURFACE ELEVATION

SILTY SAND

1 TOPSOIL, TREE
2 ROOTS

4 CLAY, BROWN,
5 SILTY, FIRM
6 (CONTAINS SILT
7 LAYERS 3-11',
8 TRACE OF SAND)

12 CLAY, GREY,
13 STIFF
14 OCC. SILT POCKETS

CI-ML

CH

$q_u = 1470$
 $e_f = 2.2$
 $\gamma = 107.1 \text{ pcf}$
 $\gamma_d = 70.9 \text{ pcf}$

$q_u = 2002 \text{ psf}$
 $e_f = 2.4\%$
 $\gamma = 105.2 \text{ pcf}$
 $\gamma_d = 66.8 \text{ pcf}$

$q_u = 2264 \text{ psf}$
 $e_f = 3.7\%$
 $\gamma = 106.0 \text{ pcf}$
 $\gamma_d = 67.9 \text{ pcf}$



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

SUMMARY OF SAMPLING & LABORATORY TEST

PROJECT

DEACON RESERVOIR

DWN. A.L.B.

CK'D.

DATE APRIL 21/77 HOLE R-5

JOB NO. W-0420

PLATE

WATER CONTENT

SOIL PROFILE

SOIL SAMPLES

SOIL DESCRIPTION

DEPTH-DATUM
FEET

SOIL
SYMBOL

UNIFIED
CLASSIF.

CONDITION

TYPE

PENETRATION
RESISTANCE

RECOVERY %

OTHER TEST:

WATER CONTENT - %
10 20 30 40 50 60 70
w_p - □ w - ○ w_L - △

SURFACE ELEVATION

CLAY AND GRAVEL

0

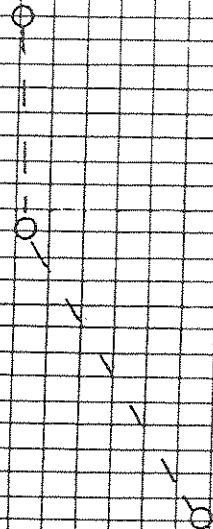
SAND AND GRAVEL

0.0

CLAY, BROWN
(SILTY 4'-11')

END OF HOLE

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
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DYREGROV CONSULTANTS

BOREHOLE LOG

PROJECT

Proposed Venturi Chambers
Deacon Reservoir

LOGGED/OWN.	SDG	CKD.	AOD.	DATE OF INVEST.	JOB NO.	HOLE NO.			
				21/05/93	931176	1			
WATER CONTENT			DEPTH (M)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION	236.04 M		
			0	⊗	Fill -clay -some gravel				
			1	⊗					
			2	⊗					
			3	⊗	Clay -mottled brown -highly plastic -silt seams and lenses to 5.2 m				
			4	⊗					
			5	⊗		U		qu=204.6kpa γ _w =18.6kn/m ³ pp=222.6kpa Tv=95.8kpa	
			6	⊗	---grey				
			7	⊗					
			8	⊗		U		qu=130.4kpa γ _w =17.0kn/m ³ pp=138.9kpa Tv=69.2kpa	
			9	⊗					
			10	⊗					
			11	⊗		U		qu=157.7kpa γ _w =16.5kn/m ³ pp=107.7kpa Tv=57.5kpa	
			12	⊗					
			13	⊗					
			14	⊗		U		qu=156.1kpa γ _w =15.9kn/m ³ pp=110.1kpa Tv=54.6kpa	
			15	⊗					
			16	⊗					
			17	⊗					
			18	⊗					
			19	⊗					
					Note: Hole terminated at 19.0 m on glacial till.				

PROJECT

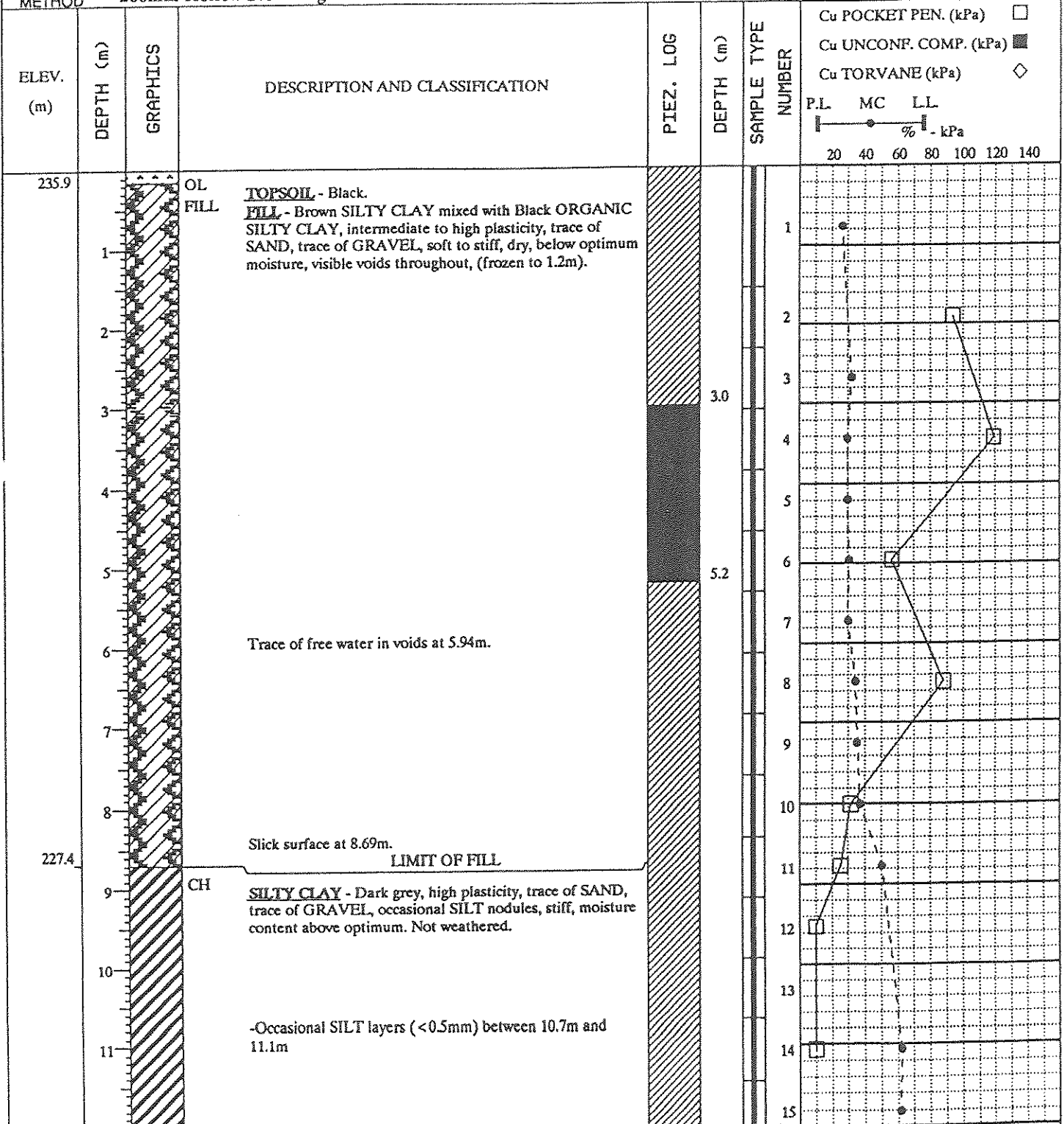
Proposed Venturi Chambers
Deacon Reservoir

GED/DWN SDG CKD AOD DATE OF INVEST. 21/05/93 JOB NO. 931176 HOLE NO. 2

WATER CONTENT						DEPTH (M)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE 400 mm Auger
W _D - □	W - ○	W _L - △	PERCENT %						DATUM	CONDITION	TYPE	
10	20	30	40	50	60							
						0	X	Fill -clay, trace gravel				
						1		Clay -mottled brown				
						2		-highly plastic				
						3		-silt seams and lenses to 3.8 m				qu=60.5kpa γ _w =17.6kn/m ³
						4		-stiff to firm		U		pp=117.3kpa Tv=81.4kpa
						5						
						6		grey				qu=93.8kpa γ _w =16.6kn/m ³
						7				U		pp=151.3 Tv=64.6kpa
						8						
						9						qu=142.1kpa γ _w =16.4kn/m ³
						10				U		pp=112.5kpa Tv=58.4kpa
						11						
						12						qu=120.1kpa γ _w =15.8kn/m ³
						13				U		pp=95.8kpa Tv=52.7kpa
						14						
						15						
						16						
						17		Glacial Till				
						18		-silty, sandy, gravelly				
						19		-tan, clay seams				
								-cobble and bouldery				
								-wet				
								-compact to medium dense below 18.2 m				
<p>Note: Hole terminated at 18.9 m in glacial till.</p>												

CLIENT **CITY OF WINNIPEG, WATERWORKS, WASTE AND DISPOSAL**
 PROJECT **DEACON RESERVOIR - PROPOSED EXPANSION**
 SITE **BOOSTER STATION**
 LOCATION **(LOCAL) N 5,171 E 4,367**
 DRILLING METHOD **200mm Hollow Stem Auger**

JOB NO. **90-107-04**
 GROUND ELEV. **236.0**
 WATER ELEV.
 DATE DRILLED **91/1/22**



ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	Cu POCKET PEN. (kPa) <input type="checkbox"/> Cu UNCONF. COMP. (kPa) <input checked="" type="checkbox"/> Cu TORVANE (kPa) <input type="checkbox"/> P.L. MC LL (%)
220.8	12		CH SILTY CLAY - Dark grey, high plasticity, trace of SAND, trace of GRAVEL, occasional SILT nodules, stiff, moisture content above optimum. Not weathered. -Occasional STONES (angular, diam. <25mm) below 13.7m		13.7		16	P.L. ≈ 65, MC ≈ 75, LL ≈ 85
	13						17	
	14						18	
	15				15.2		19	
	16		END OF HOLE NOTE: The unweathered SILTY CLAY below 8.7m is stiffer in hole A13 than it is in the other holes.					
	17							
	18							
	19							
	20							
	21							
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SAMPLE TYPE SPLIT SPOON SHELBY SPLIT BARREL SAMPLER AUGER GRAB

CONTRACTOR **Paddock Drilling Ltd** INSPECTOR **H.B. Dahl** APPROVED Rke DATE **91/04/03**