KGS GROUP

SUMMARY LOG

HOLE NO. **SP05-01**

CLIENT	CITY OF WINNIPEG
PROJECT	ST. JOHN'S PARK
SITE	St. John's Park
LOCATION	Upper Bank
DRILLING METHOD	200 mm ø Hollow Stem Auger, Continuous Sampling

JOB NO.	05-107-19
GROUND ELEV.	228.56 m
WATER ELEV.	223.34 m (26-Nov-05)
DATE DRILLED	17-Nov-05
UTM	N 5531248
	E 634517

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	DESCRIPTION AND CLASSIFICATION
228.4	0	0	**TOPSOIL** - Black, organic odour, trace rootlets.
			CLAY FILL (CI) - Black, stiff to very stiff, intermediate plasticity, crumbly, trace coarse grained sand, trace oxidation, trace rootlets.
227.0	1.5	5	
226.8	1.7		**SILT (ML)** - Light brown, moist, soft, low plasticity, trace oxidation.
			CLAY (LACUSTRINE) (CH) - Mottled brown and grey, moist, firm, high plasticity, trace gravel, trace silt nodules, trace oxidation, trace rootlets.
226	2.5		- Firm to stiff below 2.54 m.
	3.0	10	- Trace coarse grained gravel below 3.05 m.
225			- Silt content increasing, material becoming softer below 3.56 m. Grain Size Distribution: Gravel (4.7%), Sand (0.0%), Silt (21.8%) and Clay (73.5%) from 3.56 to 4.57 m.
224	4.5	15	
			▼
223			
	6.0	20	- Becoming grey at 5.97 m. - Grey below 6.10 m.
222			- Firm, trace till inclusions below 6.60 m.
	7.5	25	
221			- Granite stone (0.05 m dia.) at 7.62 m.
	8.0		
220			
219.4	9.1	30	**NO RECOVERY**
219	9.3		**CLAY (CH)** - Grey, moist, soft, high plasticity, trace coarse grained gravel, trace sand, trace silt nodules.

PIEZ. LOG

SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲ (40 80 120)	Cu TORVANE (kPa) ◆ (20 40 60 80)
	1	50		
	2	20		
	3	15		
	4	100		
	5	100		
	6	100		
	7	100		
	8	100		
	9	100		
	10	100		
	11	100		
	12	100		
	13	100		
	14	100		
	15	100		
	16	100		
	17	100		
	18	100		
	19	70		

PL MC LL (%) 20 40 60 80

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED _____ DATE 8/12/05

SPT & TORVANE P:\PROJECTS\2005\05-0107-19\GEOLOGS\05-107-19 LOGS.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO.
SP05-01

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆
216	11	35		Grain Size Distribution: Gravel (0.4%), Sand (1.3%), Silt (25.6%) and Clay (72.7%) from 10.67 to 11.18 m.				20	30		
215	12	40				11.6		21	45		
214								22	10		
215.4	13							23	30		
213		45		**SILT TILL** - Light grey, firm, trace coarse grained sand, trace coarse grained gravel, trace clay. - Limestone cobble (0.06 m dia.) at 13.34 m.		13.1		24	15		
214.4	14					13.9		25	25		
212	15	50		**REFUSAL AT 14.17 m**		14.2		26	15		
211	16			Notes: 1. Water infiltration observed at 14.25 m. 2. Till piezometer with Casagrande tip installed to 14.17 m with above ground casing. Stick up height is 0.83 m. 3. Water elevations: Nov 17 = 214.85 m Nov 26 = 223.34 m Dec 6 = 223.45 m				27	90		
210	17	55									
209	18	60									
208	19										
207	20	65									
206	21										
205		70									

SPT (N) blows/0.30 m ▲: 40 80 120

Cu TORVANE (kPa) ◆: 20 40 60 80

PL MC LL

%: 20 40 60 80

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO.
PN-01 & PN-02

CLIENT CITY OF WINNIPEG
PROJECT ST. JOHN'S PARK
SITE St. John's Park
LOCATION Upper Bank
DRILLING METHOD 200 mm ø Hollow Stem Auger, Continuous Sampling

JOB NO. 05-107-19
GROUND ELEV. 228.56 m
WATER ELEV.
DATE DRILLED 17-Nov-05
UTM N 5531248
E 634517

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION
228.4	0	0		**TOPSOIL** - Black, organic odour, trace rootlets.
228	1	5		**CLAY FILL (CI)** - Black, stiff to very stiff, intermediate plasticity, crumbly, trace coarse grained sand, trace oxidation, trace rootlets.
227.0				
226.8				**SILT (ML)** - Light brown, moist, soft, low plasticity, trace oxidation.
226	2			**CLAY (LACUSTRINE) (CH)** - Mottled brown and grey, moist, firm, high plasticity, trace gravel, trace sand, trace silt nodules, trace oxidation, trace rootlets.
				- Firm to stiff below 2.54 m.
	3	10		- Trace coarse grained gravel below 3.05 m.
225				- Silt content increasing, material becoming softer below 3.56 m.
	4			
224		15		
	5			
223				
	6	20		- Becoming grey at 5.97 m. - Grey below 6.10 m.
222				- Firm, trace till inclusions below 6.60 m.
	7			
221		25		- Granite stone (0.05 m dia.) at 7.62 m.
	8			
220				
219.4	9	30		**END OF HOLE AT 9.14 m**
219				Notes: 1. Moved 3 m south of TH05-01 and installed pneumatics PN-01

PIEZ. LOG: 4.6, 4.9, 5.2, 8.4, 8.8, 9.1

SAMPLE TYPE NUMBER RECOVERY %

SPT (N) blows/0.30 m ▲
40 80 120

Cu TORVANE (kPa) ◆
20 40 60 80

PL MC LL
%
20 40 60 80

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR D. ANDERSON
APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO.
PN-01 & PN-02

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆
				(030272) to 4.88 m and PN-02 (030270) to 9.14 m with above ground casings. 2. Soil stratigraphy obtained from TH05-01. 3. Water elevations: Nov 26, 2005: PN-01 = 223.97 m PN-02 = Not monitored Dec 6, 2005: PN-01 = 223.97 m PN-02 = 219.78 m					

SPT (N) blows/0.30 m ▲: 40 80 120

Cu TORVANE (kPa) ◆: 20 40 60 80

PL MC LL

%: 20 40 60 80

SAMPLE TYPE

CONTRACTOR: Paddock Drilling Ltd.

INSPECTOR: D. ANDERSON

APPROVED

DATE: 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO. **SP05-02**

CLIENT CITY OF WINNIPEG
PROJECT ST. JOHN'S PARK
SITE St. John's Park
LOCATION Lower Bank
DRILLING METHOD 200 mm ø Hollow Stem Auger, Continuous Sampling

JOB NO. 05-107-19
GROUND ELEV. 225.34 m
WATER ELEV. 221.67 m (26-Nov-05)
DATE DRILLED 18-Nov-05
UTM N 5531239
E 634531

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆ / PL MC LL / %
225				**CLAY (ALLUVIAL) (CI-CH)** - Brown, moist, firm, intermediate to high plasticity, some organic matter, trace gravel, trace sand, trace silt, trace rootlets. Grain Size Distribution: Gravel (0.4%), Sand (6.1%), Silt (55.8%) and Clay (37.7%) from 0 to 0.51 m. - Stiff, trace coarse grained sand, trace leaves and organic matter below 0.51 m. - Alluvial, trace to some silt below 1.02 m.				1	55		
224	1	5		- Firm, trace oxidation below 1.52 m.				2	20		
	2			- Mottled brown and grey, trace coarse grained sand below 2.03 m.				3	20		
223.0 223				**ORGANIC CLAY (OI-OH)** - Black, moist, firm, intermediate to high plasticity, some to with organic matter, with organic odour, trace rootlets.				4	15		
222.7	3	10		**CLAY (LACUSTRINE) (CH)** - Mottled brown and grey, moist, firm to stiff, high plasticity, some sand, trace gravel, trace silt nodules.				5	85		
222								6	100		
								7	100		
221.3	4							8	100		
221.0 221				**SILT (ML)** - Light brown, moist, soft, low plasticity, trace oxidation.				9A	100		
		15		**CLAY (LACUSTRINE) (CH)** - Grey, moist, firm to stiff, trace organic matter, trace silt nodules. - Trace till inclusions below 4.57 m.				9B	100		
	5			- Soft, trace coarse grained gravel below 5.08 m.				10	100		
220								11	100		
	6	20		- Soft to firm below 6.10 m.				12	100		
219				- Soft below 7.11 m.				13	100		
	7							14	70		
218		25						15	100		
	8							16	100		
217								17	100		
				Grain Size Distribution: Gravel (2.9%), Sand (12.1%), Silt (30.6%) and Clay (54.4%) from 8.64 to 9.14 m.				18	100		
	9	30									
215.9				**SILT TILL** - Light grey, moist, soft, low to intermediate plasticity, trace coarse grained gravel, trace coarse grained sand, trace clay.				19	100		
								20	55		

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR D. ANDERSON
APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO.
SP05-02

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆
										40 80 120	20 40 60 80
213						10.1					PL MC LL
214.5	11	35		**REFUSAL AT 10.82 m**		10.5		21	80		% 20 40 60 80
						10.8					
212	12	40		Notes: 1. Till piezometer with Casagrande tip installed to 10.82 m with above ground casing. 2. Water elevations: Nov 26 = 221.67 m Dec 6 = 223.27 m							
211	13										
210		45									
	14										
209											
	15	50									
208											
	16										
207		55									
	17										
206											
	18	60									
205											
	19										
204		65									
	20										
203											
	21	70									
202											

SAMPLE TYPE ◧ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO.
PN-03 & PN-04

SHEET 1 of 1

CLIENT CITY OF WINNIPEG
PROJECT ST. JOHN'S PARK
SITE St. John's Park
LOCATION Lower Bank
DRILLING METHOD 200 mm ø Hollow Stem Auger, Continuous Sampling

JOB NO. 05-107-19
GROUND ELEV. 225.34 m
WATER ELEV.
DATE DRILLED 18-Nov-05
UTM N 5531239
E 634531

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE / NUMBER / RECOVERY %	SPT (N) blows/0.30 m ▲ (40 80 120)	Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
225	0			**CLAY (ALLUVIAL) (CI-CH)** - Brown, moist, firm, intermediate to high plasticity, some organic matter, trace gravel, trace sand, trace silt, trace rootlets.					
	1			- Stiff, trace coarse grained sand, trace leaves and organic matter below 0.51 m.					
224		5		- Alluvial, trace to some silt below 1.02 m.					
	2			- Firm, trace oxidation below 1.52 m.					
223.0 223				- Mottled brown and grey, trace coarse grained sand below 2.03 m.					
222.7				**ORGANIC CLAY (OI-OH)** - Black, moist, firm, intermediate to high plasticity, some to with organic matter, with organic odour, trace rootlets.		2.4			
	3	10		**CLAY (LACUSTRINE) (CH)** - Mottled brown and grey, moist, firm to stiff, high plasticity, some sand, trace gravel, trace silt nodules.		2.7			
222						3.0			
221.3	4			**SILT (ML)** - Light brown, moist, soft, low plasticity, trace oxidation.					
221.0 221		15		**CLAY (LACUSTRINE) (CH)** - Grey, moist, firm to stiff, trace organic matter, trace silt nodules.					
	5			- Trace till inclusions below 4.57 m.					
220				- Soft, trace coarse grained gravel below 5.08 m.		5.2			
						5.8			
219.2	6	20				6.1			
219				**END OF HOLE AT 6.10 m**					
	7			Notes: 1. Moved 3 m north of TH05-02 and installed pneumatics PN-03 (030273) to 3.05 m and PN-04 (030271) to 6.10 m with above ground casings. 2. Soil stratigraphy obtained from TH05-02. 3. Water elevations: Nov 26, 2005: PN-03 = 223.31 m PN-04 = 223.56 m Dec 6, 2005: PN-03 = 223.23 m PN-04 = 223.77 m					
218		25							
	8								
217									
	9	30							
216									

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR D. ANDERSON
APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO. **TH05-03**

CLIENT CITY OF WINNIPEG
PROJECT ST. JOHN'S PARK
SITE St. John's Park
LOCATION
DRILLING METHOD 125 mm ø Solid Stem Auger

JOB NO. 05-107-19
GROUND ELEV. 224.34 m
WATER ELEV.
DATE DRILLED 18-Nov-05
UTM N 5531257
E 634558

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m	Cu TORVANE (kPa) / PL MC LL %
224				**CLAY (ALLUVIAL) (CI-CH)** - Mottled brown and black, moist, soft, intermediate to high plasticity, trace organic matter, organic odour, trace rootlets.		11		40 80 120	20 40 60 80
223.7				**RIPRAP**					
223.1	1			**CLAY (ALLUVIAL) (CI-CH)** - Mottled grey and black, moist, firm, intermediate to high plasticity, trace organic matter, organic odour, trace silt.		1			
223		5							
222.2	2			**CLAY (LACUSTRINE) (CH)** - Mottled brown and dark brown, moist, high plasticity, trace gravel, trace silt.		2			
222									
	3	10		- Grey below 2.74 m.		3			
221									
	4								
220		15				4			
	5								
219				- Till inclusions between 5.49 and 5.79 m.					
	6	20				5			
218									
	7			- Trace to no silt nodules from 7.01 to 8.69 m.					
217						6			
		25							
	8								
216									
215.7						8			
	9	30		**SILT TILL** - Light grey, moist, soft to firm, low to intermediate plasticity, trace gravel, trace coarse grained sand, trace clay.		7			
215									

SAMPLE TYPE Auger Grab

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR D. ANDERSON
APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO. **TH05-03**

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.30 m ▲	Cu TORVANE (kPa) ◆
212	11	35		- Dense at 10.97 m.		9		40 80 120	20 40 60 80
213.1						10			PL MC LL
211				**END OF HOLE AT 11.28 m**					% 20 40 60 80
210	12	40		Notes: 1. No squeezing or sloughing of sidewalls. 2. No water infiltration upon completion of drilling test hole.					
209	13	45							
208	14								
207	15	50							
206	16	55							
205	17								
204	18	60							
203	19	65							
202	20								
201	21	70							

SAMPLE TYPE Auger Grab

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED _____ DATE 8/12/05

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KGS GROUP

SUMMARY LOG

HOLE NO.
SI-09 (St. Johns)

CLIENT	CITY OF WINNIPEG	JOB NO.	04-107-12.400
PROJECT	FLOOD PUMPING STATIONS - CONDITION ASSESSMENT STUDY	GROUND ELEV.	230.83 m
SITE	St. John's Flood Pumping Station	TOP OF PVC ELEV.	
LOCATION	10 m East from Station	WATER ELEV.	
DRILLING METHOD	200 mm ø Hollow Stem Auger, ACKER SS Drill Rig	DATE DRILLED	12-Oct-04

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	DESCRIPTION AND CLASSIFICATION
230.8			**TOPSOIL**
230.2			**CLAY FILL** - Black, moist, stiff, high plasticity, crumbly, trace gravel, trace rootlets, trace organics, trace oxidation.
230	1		**CONCRETE**
229.4			
229.3		5	**CLAY FILL** - Black, moist, stiff, high plasticity, crumbly, trace gravel, trace organics, trace oxidation.
229			**NO RECOVERY**
228.8	2		**SILTY CLAY** - Brown, moist, firm, intermediate plasticity, trace to some silt, trace fine grained sand.
228.3			**NO RECOVERY**
228			
227.8	3	10	**LACUSTRINE SILTY CLAY (CH)** - Brown, mottled brown to dark brown, moist, stiff, high plasticity, trace oxidation.
			- Silt layer (light brown, moist, soft, crumbly) from 3.38 to 3.43 m.
227			- Silt layer (light brown, moist, soft, crumbly) from 3.63 to 3.71 m.
	4		- Trace silt lenses (<1 mm thick) at 4.06 m.
		15	Grain Size Distribution: Gravel (0.0%), Sand (0.0%), Silt (20.3%) and Clay (79.7%) at 4.06 m.
226			
	5		
			- Grey at 5.51 m.
225			- Firm, trace silt nodules, lacustrine origin below 5.59 m.
	6	20	
			- Brown, mottled brown to dark brown, stiff, trace silt lenses (<1 mm thick) at 6.10 m.
224			- Brown, mottled brown-grey at 6.60 m.
	7		
			- Grey at 7.37 m.
		25	- Firm, trace gravel below 7.62 m.
223			
	8		
222			
	9	30	
221			

INSTALLATION LOG

SAMPLE TYPE	NUMBER	RECOVERY %
	1	85
	2	20
	3	15
	4	
	5	2.5
	6	
	7	100
	8	100
	9	100
	10	100
	11	
	12	100
	13	100
	14	100
	15	100
	16	100
	17	100
	18	100
	19	100
	20	100

SPT blows/0.15 m ▲
CONE blows/0.15 m △
20 40 60

Cu from Uncon. Comp. Test (kPa) ◇
Cu TORVANE (kPa) ◆
20 40 60 80

PL MC LL
%
20 40 60 80

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED

DATE 20-09-05

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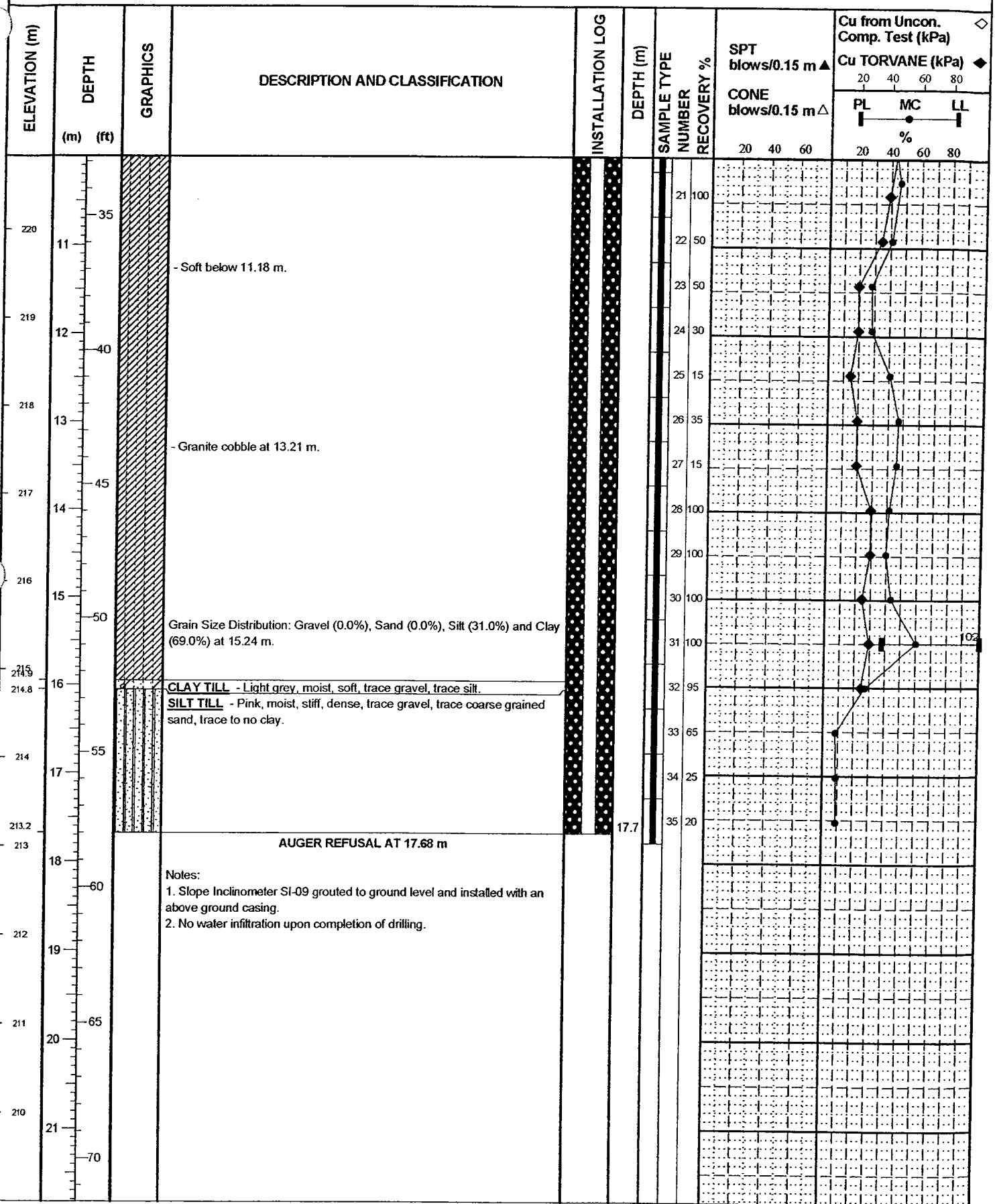
KGS GROUP

SUMMARY LOG

HOLE NO.
SI-09 (St. Johns)



SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED

DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
SI-10 (St. Johns)

CLIENT	CITY OF WINNIPEG	JOB NO.	04-107-12.400
PROJECT	FLOOD PUMPING STATIONS - CONDITION ASSESSMENT STUDY	GROUND ELEV.	227.63 m
SITE	St. John's Flood Pumping Station	TOP OF PVC ELEV.	
LOCATION	Lower Bank, 3 m West of Path	WATER ELEV.	
DRILLING METHOD	200 mm ø Hollow Stem Auger, ACKER SS Drill Rig	DATE DRILLED	13-Oct-04

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION
227.6	0	0		TOPSOIL
				CLAY FILL - Brown, moist, stiff, intermediate plasticity, trace fine grained sand, trace silt, trace organics, trace rootlets, trace oxidation.
227	1			
226.1		5		- Light brown silt layer (2.5 cm thick) at 1.52 m.
226.0				SILT - Light brown, moist, soft, crumbly.
	2			CLAY FILL - Brown, moist, stiff, intermediate plasticity, trace silt, trace rootlets, trace oxidation.
				- Mottled brown to dark brown, stiff, high plasticity, trace gypsum precipitate at 2.03 m.
225				
	3	10		
224				
223.6	4			LACUSTRINE SILTY CLAY (CH) - Grey, mottled brown-grey, moist, stiff, high plasticity, trace silt nodules, lacustrine origin.
223		15		
	5			
222				
	6	20		
221				
	7			- Firm below 7.11 m.
220		25		- Till inclusion at 7.72 m.
	8			
219				
	9	30		
218				

INSTALLATION LOG

DEPTH (m)

SAMPLE TYPE NUMBER	RECOVERY %
1	40
2	20
3	20
4	55
5	100
6	100
7	100
8	100
9	100
10	100
11	100
12	100
13	100
14	100
15	100
16	100
17	100
18	100
19	100
20	

SPT blows/0.15 m ▲
CONE blows/0.15 m △
20 40 60

Cu from Uncon. Comp. Test (kPa) ◇
Cu TORVANE (kPa) ◆
20 40 60 80
PL MC LL
%
20 40 60 80

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR D. ANDERSON
APPROVED
DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
SI-10 (St. Johns)

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	INSTALLATION LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT blows/0.15 m ▲ / CONE blows/0.15 m △	Cu from Uncon. Comp. Test (kPa) ◇ / Cu TORVANE (kPa) ◆ / PL MC LL %
217		35						21	100		
216.6	11			Large cobble in the end of the split barrel at 11.68 m.		11.0		22	15		
				AUGER REFUSAL AT 11.05 m (on cobbles, rock or till)				23	40		
216		40		Notes: 1. Slope Inclinometer SI-10 grouted to ground level and installed with an above ground casing.							
215	12										
214	13	45									
213	14										
212	15	50									
211	16										
210	17	55									
209	18										
208	19	60									
207	20										
206	21	65									
		70									

SAMPLE TYPE ▮ Split Barrel

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED

DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
PN-09 & PN-10 (St. Johns)

CLIENT	CITY OF WINNIPEG	JOB NO.	04-107-12.400
PROJECT	FLOOD PUMPING STATIONS - CONDITION ASSESSMENT STUDY	GROUND ELEV.	227.43 m
SITE	St. John's Flood Pumping Station	TOP OF PVC ELEV.	
LOCATION	Lower Bank, 4.5 m West of Path	WATER ELEV.	
DRILLING METHOD	200 mm ø Hollow Stem Auger, ACKER SS Drill Rig	DATE DRILLED	13-Oct-04

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	INSTALLATION LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT blows/0.15 m ▲ / CONE blows/0.15 m △ (20 40 60)	Cu from Uncon. Comp. Test (kPa) ◇ / Cu TORVANE (kPa) ◆ (20 40 60 80)	PL MC LL % (20 40 60 80)
227.4	0	0		**TOPSOIL**								
227				**CLAY FILL** - Brown, moist, stiff, intermediate plasticity, trace fine grained sand, trace silt, trace organics, trace rootlets, trace oxidation.								
	1											
226												
225.9		5		- Light brown silt layer (2.5 cm thick) at 1.52 m.		1.5						
225.8				**SILT** - Light brown, moist, soft, crumbly.								
	2			**CLAY FILL** - Brown, moist, stiff, intermediate plasticity, trace silt, trace rootlets, trace oxidation.								
225				- Mottled brown to dark brown, stiff, high plasticity, trace gypsum precipitate at 2.03 m.								
	3	10										
224												
223.4	4					3.8						
				LACUSTRINE SILTY CLAY (CH) - Grey, mottled brown-grey, moist, stiff, high plasticity, trace silt nodules, lacustrine origin.								
223		15										
	5					5.3						
222												
	6	20				6.1						
221												
	7			- Firm below 7.11 m.								
220		25										
				- Till inclusion at 7.72 m.								
	8											
219												
	9	30										
218												

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd. INSPECTOR D. ANDERSON APPROVED DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
PN-09 & PN-10 (St. Johns)

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	INSTALLATION LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT blows/0.15 m ▲ / CONE blows/0.15 m △ (20 40 60)	Cu from Uncon. Comp. Test (kPa) ◇ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
217						10.1					
216.7		35				10.7					
	11			END OF HOLE AT 10.7 m							
216				Notes: 1. Stratigraphy based on SI-10 located approximately 1.5 m east. 2. Installed Standpipe Pneumatics PN-09 at 10.67 m, (Serial No. 29635) and PN-10 at 6.10 m (Serial No. 29641) with above ground casings.							
	12	40									
215											
	13										
214		45									
	14										
213											
	15	50									
212											
	16										
211		55									
	17										
210											
	18	60									
209											
	19										
208		65									
	20										
207											
	21	70									
206											

SAMPLE TYPE

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
D. ANDERSON

APPROVED

DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
SP-05 (St. Johns)

CLIENT	CITY OF WINNIPEG	JOB NO.	04-107-12.400
PROJECT	FLOOD PUMPING STATIONS - CONDITION ASSESSMENT STUDY	GROUND ELEV.	227.54 m
SITE	St. John's Flood Pumping Station	TOP OF PVC ELEV.	228.39 m
LOCATION	Lower Bank, 5 m West of Path	WATER ELEV.	
DRILLING METHOD	200 mm ø Hollow Stem Auger, ACKER SS Drill Rig	DATE DRILLED	13-Oct-04

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	INSTALLATION LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT blows/0.15 m ▲ / CONE blows/0.15 m △ (20 40 60)	Cu from Uncon. Comp. Test (kPa) ◇ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
227.5				**TOPSOIL**							
227	1			**CLAY FILL** - Brown, moist, stiff, intermediate plasticity, trace fine grained sand, trace silt, trace organics, trace rootlets, trace oxidation.							
226.0				- Light brown silt layer (2.5 cm thick) at 1.52 m.		1.5					
226		5									
225.9				**SILT** - Light brown, moist, soft, crumbly.							
	2			**CLAY FILL** - Brown, moist, stiff, intermediate plasticity, trace silt, trace rootlets, trace oxidation.							
225				- Mottled brown to dark brown, stiff, high plasticity, trace gypsum precipitate at 2.03 m.							
	3	10									
224											
223.5	4			**LACUSTRINE SILTY CLAY (CH)** - Grey, mottled brown-grey, moist, stiff, high plasticity, trace silt nodules, lacustrine origin.							
223		15									
	5										
222											
	6	20									
221											
	7			- Firm below 7.11 m.							
220		25									
	8			- Till inclusion at 7.72 m.							
219											
	9	30									
218											

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED

DATE 20-09-05

KGS GROUP

SUMMARY LOG

HOLE NO.
SP-05 (St. Johns)

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	INSTALLATION LOG	DEPTH (m)	SAMPLE TYPE / NUMBER / RECOVERY %	SPT blows/0.15 m ▲ / CONE blows/0.15 m △ (20 40 60)	Cu from Uncon. Comp. Test (kPa) ◇ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
217	35				10.1			
216.5	11		- Suspect till, no samples recovered below 11.05 m.					
216			- Large cobble in the end of the split barrel at 11.68 m.					
	12 — 40							
215					12.5			
	13							
214.1			AUGER REFUSAL AT 13.40 m (on cobbles, rock or till)		13.4			
214	45							
	14		Notes: 1. Stratigraphy based on SI-10 located approximately 2 m east. 2. Installed Casagrande Standpipe SP-05 at 13.41 m. Stick up height is 0.85 m. Water level 13.245 m on October 12, 2004.					
213								
	15 — 50							
212								
	16							
211								
	17 — 55							
210								
	18 — 60							
209								
	19							
208								
	20 — 65							
207								
	21							
206	70							

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd.

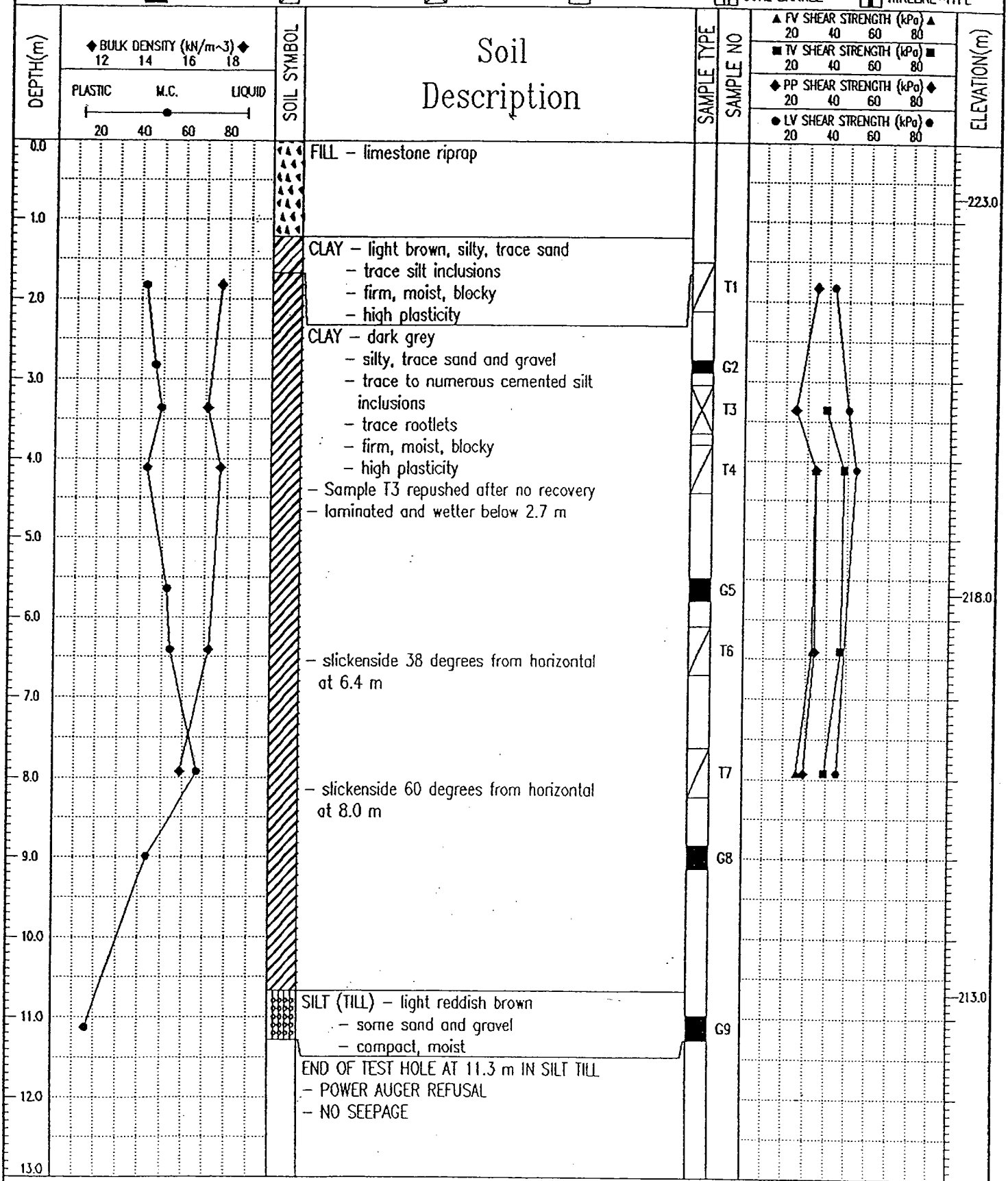
INSPECTOR D. ANDERSON

APPROVED

DATE 20-09-05

PROJECT: ST. JOHN'S AVENUE OUTFALL	DRILLED BY: PADDOCK DRILLING LTD.	TEST HOLE NO: 1
CLIENT: CITY OF WINNIPEG	DRILL TYPE: RM30 TRACK-MOUNTED,	PROJECT NO: 3483-041-01-00
PROJECT ENGINEER: KMS	EQUIPPED WITH 125 mm SOLID-STEM AUGERS	ELEVATION: 223.70 (m)

SAMPLE TYPE: GRAB SAMPLE | SHELBY TUBE | DISTURBED | NO RECOVERY | CORE BARREL | WIRELINE-TYPE



UMA Environmental Winnipeg, Manitoba	LOGGED BY: DY	COMPLETION DEPTH: 11.3 m
	REVIEWED BY: KMS	COMPLETE: 95/02/22
	Fig. No:	Page 1 of 1

95/02/28 09:36AM

HART PUMPING STATION	PADDOCK DRILLING LTD.	BOREHOLE No: 1
CITY OF WINNIPEG	NODWELL – 125 mm SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ▨ CUTTINGS ⊠ SPT ▤ CORE ▯ CONT. SAMPLE

▲ UNCONFINED COMP. (kPa) ▲ 100 200 300 400
■ POCKET PEN (kPa) ■ 100 200 300 400
PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOPE INDICATOR	COMMENTS	ELEVATION(m)
0.0									0.0
1.0	N	1-1		FI		FILL – dark brown clay, soft – some gravel and sand			-1.0
	N	1-2							
2.0	N	1-3		CH		CLAY – brown, firm – slightly fissured, medium plasticity			-2.0
	N	1-4		ML		SILT – tan, soft, wet – some clay			
3.0									-3.0
4.0	N	1-5				CLAY – grey–brown, soft to firm – high plasticity – trace sand and gravel below 4.6 m – tan silt inclusions – firm below 6.1 m			-4.0
5.0									-5.0
6.0	N	1-6							-6.0
7.0				CH					-7.0
	N	1-7							
8.0									-8.0
9.0	N	1-8							-9.0
10.0									-10.0
11.0	N	1-9		ML		GLACIAL TILL – tan–brown, silty, some clay – some sand and gravel			-11.0
12.0	N	1-10				GRAVEL – fine, semi–rounded, saturated – well graded, trace sand – medium to coarse below 12.2 m			-12.0
13.0				GW					-13.0
14.0									-14.0
15.0						Auger refusal at 14.3m Slope Indicator installed to 14.3 m from grade, sand packed			-15.0
16.0									-16.0
17.0									-17.0

HBT AGRA Limited
Winnipeg, Manitoba

LOGGED BY: HP	COMPLETION DEPTH: 14.3 m
REVIEWED BY: BR	COMPLETE: 01/04/93
Fig. No: 2	Page 1 of 1

HART PUMPING STATION	PADDOCK DRILLING	BOREHOLE No: 2
CITY OF WINNIPEG	NODWELL – 125 MM SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ☒ CUTTINGS ☒ SPT ▤ CORE ▥ CONT. SAMPLE ▮

▲ UNCONFINED COMP. (kPa) ▲ 100 200 300 400
■ POCKET PEN (kPa) ■ 100 200 300 400
PLASTIC N.C. LIQUID 20 40 60 80

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOPE INDICATOR	COMMENTS	ELEVATION(m)
0.0				FI		FILL – brown clay with some gravel – black clay inclusions			0.0
1.0	N	6-1				CLAY – brown, soft, some silt – sandy, wet at 1.20 m – firm below 2.10 m, stiff below 3.1 m – dark grey alluvial clay, soft silty at 3.80 m – medium plasticity – grey–brown below 4.6 m – heavy seepage at 6.1 m – glacial till inclusions below 9.5 m			-1.0
2.0									-2.0
3.0	N	6-2							-3.0
4.0	N	6-3							-4.0
5.0				CH					-5.0
6.0									-6.0
7.0									-7.0
8.0									-8.0
9.0									-9.0
10.0									-10.0
11.0				ML		GLACIAL TILL – tan, silty, soft – some clay, trace sand and gravel – medium dense at 11.0 m – gravelly, saturated below 11.6 m			-11.0
12.0									-12.0
13.0						End hole at 12.20 m below grade Slope indicator installed to 12.20 m from grade, sand packed			-13.0
14.0									-14.0
15.0									-15.0
16.0									-16.0
17.0									-17.0

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LOGGED BY: HP	COMPLETION DEPTH: 12.2 m
REVIEWED BY: BR	COMPLETE: 02/04/93
Fig. No: 3	Page 1 of 1

...T PUMPING STATION	PADDOCK DRILLING LTD	BOREHOLE No: 3
CITY OF WINNIPEG	NODWELL – 125 MM SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ▨ CUTTINGS ▩ SPT ▤ CORE ▥ CONT. SAMPLE

▲ UNCONFINED COMP. (kPa) ▲ 100 200 300 400
■ POCKET PEN (kPa) ■ 100 200 300 400
PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOTTED PIEZOMETER	COMMENTS	ELEVATION(m)
0.0									0.0
1.0				FI		FILL – very soft brown clay – organic inclusions			-1.0
2.0	N	2-1							-2.0
3.0	N	2-2		CH		CLAY – brown, firm, silt inclusions – stiff below 2.3 m – high plasticity – some silt from 2.75 to 2.90 m – firm below 3.65 m			-3.0
4.0	N	2-3							-4.0
5.0						End hole at 4.6 m below grade 20 mm piezometer installed to 4.6 m 1.5 m solid, 3.1 m slotted			-5.0
6.0									-6.0
7.0									-7.0
8.0									-8.0
9.0									-9.0
10.0									-10.0
11.0									-11.0
12.0									-12.0
13.0									-13.0
14.0									-14.0
15.0									-15.0
16.0									-16.0
17.0									-17.0

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LOGGED BY: HP	COMPLETION DEPTH: 4.6 m
REVIEWED BY: BR	COMPLETE: 01/04/93
Fig. No: 4	Page 1 of 1

...RT PUMPING STATION	PADDOCK DRILLING LTD	BOREHOLE No: 4
CITY OF WINNIPEG	NODWELL – 125 MM SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ▨ CUTTINGS ▩ SPT ▤ CORE ▥ CONT. SAMPLE

▲ UNCONFINED COMP. (kPa) ▲ 100 200 300 400
■ POCKET PEN (kPa) ■ 100 200 300 400
PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOTTED PIEZOMETER	COMMENTS	ELEVATION(m)
0.0						FILL – brown clay, frozen to 0.80 m			0.0
1.0						– soft below 0.80 m, trace gravel and organics to 3.1 m			-1.0
2.0	N	3-1		FI		– black clay and silt inclusions at 3.35 m			-2.0
3.0	N	3-2							-3.0
	N	3-3							
4.0	N	3-4		CH		CLAY – brown–grey, stiff, slightly fissured			-4.0
5.0						– silt inclusions – high plasticity			-5.0
6.0						End hole at 4.60 m from grade 20 mm piezometer installed to 4.6 m 1.5 m solid, 3.1 m slotted			-6.0
7.0									-7.0
8.0									-8.0
9.0									-9.0
10.0									-10.0
11.0									-11.0
12.0									-12.0
13.0									-13.0
14.0									-14.0
15.0									-15.0
16.0									-16.0
17.0									-17.0

HBT AGRA Limited Winnipeg, Manitoba	LOGGED BY: HP	COMPLETION DEPTH: 4.6 m
	REVIEWED BY: BR	COMPLETE: 01/04/93
	Fig. No: 4	Page 1 of 1

ART PUMPING STATION	PADDOCK DRILLING LTD	BOREHOLE No: 5
CITY OF WINNIPEG	NODWELL – 125 MM SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ☒ CUTTINGS ☒ SPT ▤ CORE ▥ CONT. SAMPLE ▮

DEPTH (m)	▲UNCONFINED COMP. (kPa)▲ 100 200 300 400 / ■POCKET PEN (kPa)■ 100 200 300 400 / PLASTIC M.C. LIQUID 20 40 60 80	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOTTED PIEZOMETER	COMMENTS	ELEVATION(m)
0.0							CLAY – brown, alluvial clay with some silt			0.0
1.0	■	N	4-1				– slightly disturbed, abundance of tree roots to 0.6 m			-1.0
2.0					CH		– firm, silty below 1.5 m – high plasticity			-2.0
3.0	■	N	4-2				– grey, soft at 3.3 m			-3.0
4.0							– wood pieces at 4.3 m			-4.0
5.0	■	N	4-3				End hole at 4.6 m from grade 20 mm piezometer installed to 4.6 m 1.5 m solid, 3.1 m slotted			-5.0
6.0										-6.0
7.0										-7.0
8.0										-8.0
9.0										-9.0
10.0										-10.0
11.0										-11.0
12.0										-12.0
13.0										-13.0
14.0										-14.0
15.0										-15.0
16.0										-16.0
17.0										-17.0

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LOGGED BY: HP	COMPLETION DEPTH: 4.6 m
REVIEWED BY: BR	COMPLETE: 02/04/93
Fig. No: 6	Page 1 of 1

MART PUMPING STATION	PADDOCK DRILLING LTD	BOREHOLE No: 6
CITY OF WINNIPEG	NODWELL – 125 MM SOLID STEM AUGER	Project No: WX03381
SLOPE MONITORING		ELEVATION: 0.000 (m)

SAMPLE TYPE ■ SHELBY TUBE ▨ CUTTINGS ⊠ SPT ▤ CORE ▥ CONT. SAMPLE

DEPTH (m)	▲UNCONFINED COMP. (kPa)▲ 100 200 300 400 / ■POCKET PEN (kPa)■ 100 200 300 400 / PLASTIC M.C. LIQUID 20 40 60 80	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SLOTTED PIEZOMETER	COMMENTS	ELEVATION(m)
0.0					FI		FILL – brown clay to 0.3 m, saturated clayey gravel below 0.3 m			0.0
1.0	■	N	5-1		OH		CLAY – dark brown organic clay, firm			-1.0
					CH		CLAY – dark brown, firm – brown below 1.2 m – high plasticity			
2.0		N	5-2		ML		SILT – tan, clayey, soft to firm			-2.0
3.0					CH		CLAY – brown, firm, some silt – grey–brown below 3.1 m – high plasticity			-3.0
4.0	■	N	5-3							-4.0
5.0							End hole at 4.6 m from grade 20 mm piezometer installed to 4.6 m 1.5 m solid, 3.1 m slotted			-5.0
6.0										-6.0
7.0										-7.0
8.0										-8.0
9.0										-9.0
10.0										-10.0
11.0										-11.0
12.0										-12.0
13.0										-13.0
14.0										-14.0
15.0										-15.0
16.0										-16.0
17.0										-17.0

HBT AGRA Limited
Winnipeg, Manitoba

LOGGED BY: HP	COMPLETION DEPTH: 4.6 m
REVIEWED BY: BR	COMPLETE: 02/04/93
Fig. No: 7	Page 1 of 1