RECORD OF BOREHOLE BH88-2A3

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,148,392.4N X 670,998.9E

BORING DATE 28 JUNE 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		187.90							
		SAND AND GRAVEL, fine to coarse subangular sand, fine to coarse subangular gravel, light grey brown PERMAFROST @ 0.30m 0.30 to 0.95m - Nf 0.95 to 1.35m - Vs, 1-2mm thick, hard, clear, grey		0.00	1	AS	-				
				186.95	2	AS	-				
1		SAND TILL - fine to coarse subangular Sand, some fine to coarse subangular Gravel, some Silt, trace Clay, light reddish brown, permafrost ice below 1.35m badly disturbed to refusal at 1.83m PERMAFROST 1.35 to 1.83m - badly disturbed by augers in cobbles and boulders		0.95		CRREL					
					3	AS	-				
		Boulders @ 1.35m		186.07							
		End of Borehole Auger refusal in cobbles and boulders		1.83							
2											
3											
4											
5											

0
10 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-2A4

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,149,311.5N X 570,882.4E

BORING DATE 26 JUNE 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

BORING METHOD: MOBILE B-40, MOBILE AUGERS

DEPTH SCALE METRES	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ⊕ rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Ground Surface		193.20							
	SILTY SAND TILL - fine to coarse subrounded sand, some fine subrounded gravel PERMAFROST @ 0.10m 0.10 to 0.20m - Vs, 3-8mm thick, hard, grey 0.20 to 0.45m - Nbe and Nbn 0.45 to 1.10m - few inclusions 1.10 to 1.20m - Vs, 1-2mm thick, clear, grey, hard		0.00	1	AS	-				
1				2	AS	- CRREL				
			192.00							
	PERMAFROST 1.20 to 2.45m - ice, solid ice clear to grey, hard, with some till inclusions		1.20	3	AS	- CRREL				
2				4	AS	-				
				5	AS	- CRREL				
			190.75							
	SILTY SAND TILL - fine sand with fine to coarse subrounded gravel, medium brown PERMAFROST - ice inclusions		2.45							
			190.45							
	PERMAFROST 2.75 to 3.40m - ice, solid ice hard, clear with a few till inclusions @ 3.20 to 3.40m some coarse gravel in ice		2.75	6	AS	-				
3										
			189.80							
	No sample recovery 3.40 to 3.95m		3.40							
			189.25							
4	End of Borehole Auger refusal in cobbles or boulders		3.95							
5										

0 15 ⊕ 6 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-2A5

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,148,033.4N X 571,158.2E BORING DATE 28 JUNE 1988 DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		186.70							
	MOBILE B-40 MOBILE AUGERS	SAND TILL - fine to coarse subrounded Sand, some fine and coarse subrounded Gravel, some Silt, trace Clay, low plastic, light reddish brown (SM)		0.00	1	AS	-				
		0.46 to 0.92m occassional cobble encountered									
					2	AS	-		o	M, H	
		PERMAFROST @ 0.30m 0.30 to 1.82m - Nf 1.82 to 2.75m - Vr, 1-3mm thick, clear, hard 2.75 to 4.26m - ice, 50-75mm thick, clear, hard, many inclusions of till and gravel 4.26 to 4.88m - Nbn									
1											
		SAND TILL - fine to coarse subrounded sand with some coarse gravel, medium reddish brown			3	AS	-		o		
2											
		SAND TILL - as above but with fine to coarse subrounded gravel and occasional cobbles			4	AS	-		o		
3											
					5	AS	-				
		4.26 to 4.88m SILTY SAND TILL fine to medium sand, trace fine to coarse subrounded gravel, lower water content									
4											
				181.82							
5		End of Borehole Auger refusal in boulders or cobbles		4.88							

0 / 15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED BWM

RECORD OF BOREHOLE BH88-2A6

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,148,872.7N X 570,828.4E

BORING DATE 29 JUNE 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + O.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		190.30							
		SANDY GRAVEL - fine to coarse subangular sand fine to coarse gravel		0.00							
		PERMAFROST @ 0.25m 0.25 to 0.62m - Nbn									
				189.88							
		SILTY SAND TILL - fine to coarse subangular Sand, some fine to coarse subangular Gravel, light reddish brown		0.62							
1					1	AS	-				
		PERMAFROST 0.62 to 1.22m - Nbn 1.22 to 2.13m - Vc to Vx, 1-2mm thick, no distinct orientation 2.13 to 3.60m - permafrost melted by auger drilling									
					2	AS	-				
					3	AS	-				
2		2.13 to 3.60m cobbles and boulders encountered in till									
3											
				186.70							
		End of Borehole Auger refusal in boulders and cobbles		3.60							
4											
5											

0 / 15 ⊕ 6 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-2A7

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,149,202.3N X 570,920.7E

BORING DATE 17 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-8140

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		192.40							Frost Depth Indicator
		TOPSOIL - dark brown, organic Silty Sand		0.00 192.25							
		SILTY SAND TILL - fine to coarse Sand, some Cobbles light brown		0.15	1	AS	-				THAWED
1		PERMAFROST @ 0.60m Nbn 0.90 to 1.20m - Vs			2	AS	-				Thaw Depth 31 AUG 1988 1.14m 09 AUG 1988 1.21m
		1.20 to 1.83m increasing Silt content in Till			3	AS	-				
2					4	AS	-				FROZEN
		Cobbles @ 2.45m									
		2.75 to 3.20m increasing Silt content									
3		Cobbles @ 3.00m			5	AS	-				3.03m
		End of Borehole Auger refusal in cobbles or boulders		189.20 3.20							
4											
5											

0 / 10 – ⊕ – 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED Blum

RECORD OF BOREHOLE BH88-2A8

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,148,623.9N X 670,911.2E

BORING DATE 17 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1314D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		189.60			
		TOPSOIL - organic, fine to medium Sand, some Cobbles, dark brown		0.00	1	AS	-
				189.20			
		SILTY SAND TILL - fine to medium Sand		0.40			
		Thaw Depth			2	AS CREL	-
1		PERMAFROST @ 1.00m (Est'd) 1.00 to 1.45m - Vs, 1-2mm thick, clear, hard 1.5 to 1.80m - Vf to Vc 2.10 to 2.40m - Vr,Vc and Vs 2.40 to 2.50m - Vs, 1-2mm thick 2.50 to 2.70m - Nbn 0.50 to 1.20m - some coarse sand in till			3	AS	-
		@ 1.50m Cobbles			4	AS CREL	=
2					6	AS	-
		2.40 to 2.60m occasional cobbles					
3				186.60			
		End of Borehole Auger refusal in cobbles and boulders		3.00			
4							
5							

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m

SHEAR STRENGTH Cu, kPa nat.V.- + Q.- ● rem.V.- ⊕ U.- O

HYDRAULIC CONDUCTIVITY, k, CM/SEC

WATER CONTENT, PERCENT Wp W Wl 20 40 60 80

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

Frost Depth Indicator

THAWED

31 AUG 1988 0.76m

09 AUG 1988 1.00m

FROZEN

2.74m

0 15 ⊕ 6 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.B.

CHECKED

RECORD OF BOREHOLE BH88-2A9

SHEET 1 OF 1

LOCATION DRUMLIN AIRSTRIP 7,148,181.3N X 570,849.1E

BORING DATE 17 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		182.70							
		TOPSOIL - dark brown organic Silt		182.60							
		SILTY SAND TILL - fine sand, damp, medium brown		0.10	1	AS	-				
		PERMAFROST @ 0.60m 0.60 to 1.00m - Nbn 1.14 to 1.38m - Nbn 1.38 to 1.50m - Vs, 2mm thick 1.50 to 4.25m - Nbe (Est'd)			2	AS	-				
1		Cobbles @ 1.00m			3	AS	-	(1.00 to 1.50m) CRREL			
					6	AS	-	(1.00 to 1.50m)			
					5	AS	-	(1.23 to 1.40m)			
		some gravel and cobbles @ 1.50 to 2.80m									
2	MOBILE B-40				4	AS	-				
3	MOBILE AUGERS				7	AS	-				
4					8	AS	-				
				178.46							
		End of Borehole Auger refusal on cobbles and boulders		4.25							
5											

0 / 10 ◇ 16 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED Blum

RECORD OF BOREHOLE BH88-3A3

SHEET 1 OF 1

LOCATION JAEGER LAKE AIRSTRIP
7,145,825N X 569,025E
SAMPLER HAMMER, 63.5kg, DROP, 760mm

BORING DATE 22 JULY 1988
ESTIMATED UTM CO-ORDINATES AND ELEVATIONS

DATUM GEODETIC
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M
0		Ground Surface		164.00			
		TOPSOIL - highly organic, dark brown		0.00 153.85			
	MOBILE B-40 MOBILE AUGERS	SAND - fine to medium, trace coarse, trace fine subrounded to subangular gravel, light brown		0.15	1	AS	-
		@ 0.50m medium to coarse sand, trace coarse subangular gravel wet, medium brown			2	AS	-
1		PERMAFROST @ 0.84m 0.84 to 0.95m - Nbn 0.95 to 1.34m - Nf 1.34 to 1.54m - Nbn 1.54 to 1.65m - Vs, 3-6mm thick			3	AS	-
2		1.44 to 1.65m Fine to medium Sand, some Silt					
				151.75			
		End of Borehole Auger refusal on cobbles or boulders		2.25			
3							
4							
5							

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m

SHEAR STRENGTH Cu, kPa
nat.V.- + Q.- ⊕
rem.V.- ⊕ U.- O

HYDRAULIC CONDUCTIVITY, k, CM/SEC

WATER CONTENT, PERCENT
Wp W Wl
20 40 60 80

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

0
10 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-1B1

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW (UPPER TERRACE) 7,152,423.5N X 571,599.1E

BORING DATE 26 JUNE 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		180.00							
	MOBILE B-40 MOBILE AUGERS	SAND AND GRAVEL-fine to coarse subrounded sand and gravel, with occasional cobbles to 100mm dia. wet @ 0.35m cobble and boulder concentration increasing with depth		0.00							
		PERMAFROST @ 0.35m (Est'd) 0.35 to 0.80m - Nbe (Est'd)			1	AS	-				
1											
				178.50							
		End of Borehole Auger refusal in boulders or cobbles		1.50							
2		PERMAFROST thawed by auger drilling action									
3											
4											
5											

0 / 15 ◆ 6 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED Bum

RECORD OF BOREHOLE BH88-1B2

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW (LOWER TERRACE) 7,152,242.6N X 571,808.8E

BORING DATE 27 JUNE 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		174.90							
	MOBILE B-40 MOBILE AUGERS	SAND AND GRAVEL - medium and coarse subrounded Sand, trace fine Sand, fine and coarse subrounded Gravel, trace Silt, <10% Cobbles to 110mm dia., non-plastic, medium brown, damp (SW)		0.00							
		PERMAFROST @ 0.60m 0.60 to 1.78m - Nbe (Est'd) 1.78 to 1.98m - Nbe (Est'd)									
1		@ 0.90 to 1.78m Cobbles and boulders encountered			1	AS	-		o Non-Plastic	M	PETROGRAPHIC ANALYSIS
				173.12							
		SAND TILL - reddish brown fine to coarse sand and gravel subrounded		1.78 172.92	2	AS	-				
2		End of Borehole Auger refusal in cobbles and boulders		1.98							
		PERMAFROST descriptions estimated - thawed by auger drilling									
3											
4											
5								0 15 10 5 PERCENT AXIAL STRAIN AT FAILURE			

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-1B3

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW 7,152,317.1N X 571,728.7E (LOWER TERRACE)
BORING DATE 18 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		175.30							
		TOPSOIL- highly organic, black		175.20							
		SAND AND GRAVEL - fine to coarse subrounded sand, fine to coarse subrounded gravel, some rounded to sub-rounded cobbles, dry		0.10	1	AS	-				
1				174.00							
	MOBILE B-40 MOBILE AUGERS	GRAVELLY SAND TILL - coarse subangular to subrounded sand fine subangular to subrounded gravel, some silt, wet, medium reddish brown PERMAFROST @ 1.30m (Est'd) 1.30 to 2.90m - Nbn (Est'd) 2.90 to 4.60m - Nbn (Est'd)		1.30	2	AS	-				
2		Cobbles @ 2.70 to 2.90m		172.40							
		SANDY SILT TILL - fine to coarse, sand, wet, medium brown		2.90	3	AS	-				
3											
					4	AS	-				
4				170.70							
		End of Borehole Auger refusal in cobbles and boulders PERMAFROST description estimated - thawed by augers		4.60							
5											

0 / 15 ◆ 5 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-1B4

SHEET 1 of 2

LOCATION SKINNY LAKE BORROW (LOWER TERRACE) 7,152,226.3N X 571,897.9E

BORING DATE 18,19 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		174.70							Frost Depth Indicator
		COBBLES- angular to subangular dry		0.00							
				174.40							
		GRAVEL - coarse rounded to subrounded gravel, some rounded to subrounded cobble, dry		0.30	1	AS	-				THAWED
				173.80							
1		GRAVELLY SAND - fine to coarse sand, fine and coarse subrounded Gravel, some Silt and Clay non-plastic, medium brown, dry (SP-SM)		0.90							Thaw Depth
		@ 1.50m medium to coarse sand, fine trace coarse subrounded gravel, trace silt, wet									31 AUG 1988 1.90m
2					2	AS	-		O Non-Plastic	M	09 AUG 1988 1.92m
		cobbles @ 1.90 to 2.20m									
	MOBILE B-40 MOBILE AUGERS	PERMAFROST @ 2.00m (Est'd) 2.00 to 5.60m - Nbn and Nbe (Est'd)									FROZEN
3											
		Increase in silt content below 3.25m									
					3	AS	-				3.81m
4											
5		continued on next page		169.70							
				5.00							

0 / 15 ◆ 6 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED Burn

RECORD OF BOREHOLE BH88-1B4

SHEET 2 OF 2

LOCATION SKINNY LAKE BORROW

BORING DATE 18,19 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ●, rem.V.- ⊕ U.- ○)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20, 40, 60, 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5		continued from page 1		169.70							
	MOBILE B-40 MOBILE AUGERS			5.00							
				169.10							
		SANDY GRAVEL TILL - fine to medium gravel, coarse sand, some silt, medium brown,		5.60							
6		PERMAFROST 5.60 to 6.60 - Nbe and Nbn (Est'd)			4	AS	-				
				168.10							
		End of Borehole Auger refusal on cobbles and boulders		6.60							
7		PERMAFROST description estimated - thawed by augers									
8											
9											
10											

0 15 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED

RECORD OF BOREHOLE BH88-1B5

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW 7,152,504.3N X 571,519.2E (UPPER TERRACE)
BORING DATE 18 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		179.60							
	MOBILE B-40 MOBILE AUGERS	TOPSOIL - highly organic, dark brown		0.00 179.35							
		GRAVELLY SAND TILL - medium to coarse subrounded sand, fine and coarse subrounded gravel, some silt, dark brown		0.15	1	AS	-				
					2	AS	-				
		@ 0.4 to 0.6m SILTY SAND TILL medium to coarse sub-rounded sand, some cobbles, moist, medium reddish brown			3	AS	-				
1		@ 0.6 to 0.75m SILTY SAND TILL medium subrounded sand, moist, medium reddish brown									
		Cobbles @ 0.75m									
		PERMAFROST @ 1.20m (Est'd) 1.20 to 4.70m - Nbn (Est'd)									
2											
		@ 2.60m, sand fraction becomes coarser, cobbles encountered			4	AS	- CORE				
3											
					5	AS	-				
4											
				174.80							
		End of Borehole Auger refusal on cobbles and boulders		4.70							
5		PERMAFROST description estimated - melted by augering									

0
16 ● 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Burns

RECORD OF BOREHOLE BH88-1B6

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW 7,152,466.3N X 571,676.7E (LOWER TERRACE)
BORING DATE 18 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surace		174.00							
		TOPSOIL - organics, dark brown		0.00 173.85							
		SAND AND GRAVEL-fine and coarse subrounded gravel, medium to coarse subrounded sand, some cobbles, dry		0.15	1	AS	-				
		Cobble layer from 0.75 to 1.00m									
1				172.80							
		SAND TILL - medium to coarse subrounded sand, fine subrounded gravel, some silt, very wet, medium reddish brown		1.20							
		PERMAFROST @ 1.20m (Est'd) 1.20 to 4.70m - Nbe (Est'd)			2	AS	-				
2		PERMAFROST description estimated - melted by augers									
3					3	AS	-				
4											
				169.30							
		End of Borehole Auger refusal on cobbles and boulders		4.70							
5											

0
15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-1B7

SHEET 1 OF 2

LOCATION SKINNY LAKE BORROW 7,152,248.6N X 572,083.7E (LOWER TERRACE)
BORING DATE 18 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		173.50							
		TOPSOIL- highly organic, black		0.05							
		GRAVEL AND COBBLES - coarse subrounded gravel, subrounded cobbles, red to brown		173.30 0.20	1	AS	-				
1		SANDY GRAVEL - fine to medium sand, medium subrounded gravel moist, light brown		171.70							
	MOBILE B-40 MOBILE AUGERS	SILTY SAND TILL - medium to coarse sand, some fine subangular gravel, saturated, medium reddish brown PERMAFROST @ 1.80m (Est'd) 1.80 to 3.45m - Nbe (Est'd) 3.45 to 7.20m - Nbe (Est'd) PERMAFROST description estimated - melted by augers		1.80	2	AS	-				
2											
3				170.05							
		SILTY SAND TILL - medium to coarse sand, trace coarse subrounded gravel, saturated, medium reddish brown		3.45	3	AS	-				
4				168.70							
		See next page for description continued on next page		4.80 168.50	4	AS	-				
5				5.00				0 15 10 6 PERCENT AXIAL STRAIN AT FAILURE			

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Bkm

RECORD OF BOREHOLE BH88-1B7

SHEET 2 OF 2

LOCATION SKINNY LAKE BORROW

BORING DATE 19 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + O.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5		continued from page 1		168.50							
	MOBILE B-40 / MOBILE AUGERS	SILTY SAND TILL - 4.80 to 7.20m, medium to coarse sub-angular sand, trace fine subrounded gravel, medium reddish brown		5.00	4	AS	-				
6											
7				168.30							
		End of Borehole Not at auger refusal		7.20							
8											
9											
10								0 / 15 / 10 6 PERCENT AXIAL STRAIN AT FAILURE			

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED Bum

RECORD OF BOREHOLE BH88-1B8

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW (EAST TERRACE) 7,152,594.6N X 572,329.7E

BORING DATE 19 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		173.20							
		TOPSOIL- highly organic, black to brown		173.10							
				0.10							
		COBBLES AND BOULDERS - sub-rounded to rounded cobble, small subrounded boulders			1	AS	-				
1											
		SILTY SAND TILL - medium to coarse angular sand, non-plastic silt, moist, reddish brown		172.10							
				1.10							
		SANDY GRAVEL TILL - fine to medium subrounded gravel, coarse subrounded sand, moist Cobbles @ 1.50m		171.90							
				1.30							
		SILTY SAND TILL - medium to to coarse angular sand, some fine angular gravel, saturated		171.60							
				1.60							
2		PERMAFROST @ 1.60m (Est'd) 1.60 to 3.70m - Nbe (Est'd)			2	AS	-				
		Cobbles from 2.60 to 2.70m									
3					3	AS	-				
				169.50							
		End of Borehole Auger refusal on cobbles and boulders		3.70							
4		PERMAFROST description estimated - melted by augers									
5											

0 16 10 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.B.

CHECKED Bum

RECORD OF BOREHOLE BH88-1B9

SHEET 1 OF 2

LOCATION SKINNY LAKE BORROW (EAST TERRACE) 7,152,448.2N X 572,349.3E
BORING DATE 19 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ●, rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		173.60							
	MOBILE B-40 MOBILE AUGERS	SANDY GRAVEL - fine to coarse Sand, fine and coarse subrounded Gravel, trace Silt and Clay, non-plastic, some Cobbles (GP)		0.00	1	AS	-		O Non-Plastic	M	
		SAND - medium to coarse subrounded to subangular sand, moist		173.00 0.80 172.80							
1		GRAVEL - medium to coarse subangular gravel, moist		0.80							
					2	AS	-		O		
2		PERMAFROST @ 2.10m (Est'd) 2.10 to 8.25m - Nbe (Est'd)		171.40							
		SILTY SAND TILL - medium to coarse angular sand, fine subangular gravel some, saturated, medium reddish brown		2.20							
3		@ 2.50m fine to coarse angular sand, some subrounded to subangular fine to coarse gravel, few subrounded to subangular cobbles, saturated			3	AS	-				
4		@ 4.30m fine to coarse angular sand, trace subangular to subrounded gravel, few medium subangular to subrounded cobbles, saturated			4	AS	-				
5		continued on next page		168.60 5.00							

0
16 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-1B9

SHEET 2 OF 2

LOCATION SKINNY LAKE BORROW

BORING DATE 19 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5	MOBILE B-40 MOBILE AUGERS	continued from page 1		168.60							
				5.00							
6											
				167.35							
		End of Borehole Auger refusal on cobbles and boulders PERMAFROST description estimated - melted by augers		6.25							
7											
8											
9											
10											

0
15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

CHECKED Burn

RECORD OF BOREHOLE BH88-1B10

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW 7,152,007.5N X 572,149.4E (LOWER TERRACE)
BORING DATE 19 JULY 1988
DATUM GEODETIC
SAMPLER HAMMER, 63.5kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ●, rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC; WATER CONTENT, PERCENT (Wp, W, Wl; 20, 40, 60, 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		174.70							
	MOBILE B-40 MOBILE AUGERS	GRAVEL AND COBBLES - fine to medium subrounded to subangular gravel, subrounded to subangular cobbles, clean, dry		0.00	1	AS	-				
		SAND- medium to coarse subangular to subrounded sand, trace fine subrounded gravel, medium reddish brown		174.10 0.60 173.90							
1		SANDY GRAVEL - fine to coarse subrounded to rounded gravel, medium to coarse subangular to subrounded sand, clean, moist		0.80 173.20							
		GRAVELLY SAND TILL - medium to coarse subangular to angular sand, some fine subrounded to subangular gravel, wet, light brown PERMAFROST @ 1.50m (Est'd) 1.50 to 2.75m - Nbn (Est'd)		1.50	2	AS	-				
2		@ 2.30m increasing Silt content			3	AS	-				
				171.95							
		End of Borehole Auger refusal on cobbles and boulders PERMAFROST description estimated - melted by augers		2.75							
3											
4											
5								0 / 10 / 6 PERCENT AXIAL STRAIN AT FAILURE			

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Burn

RECORD OF BOREHOLE BH88-1B11

SHEET 1 OF 1

LOCATION SKINNY LAKE BORROW 7,152,085.1N X 572,031.3E (LOWER TERRACE)
SAMPLER HAMMER, 63.5kg, DROP, 760mm

BORING DATE 20 JULY 1988

DATUM GEODETIC

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		175.70							
		GRAVEL AND COBBLES - coarse subrounded to subangular gravel, subrounded cobbles, trace fine to coarse subrounded to subangular sand, trace silt, dry light brown		0.00	1	AS	-				
1				174.50							
		End of Borehole Auger refusal on cobbles No permafrost observed		1.20							
2											
3											
4											
5											

0
15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Bum

RECORD OF TEST PIT TP88-1B1

LOCATION Skinny Lake Borrow (UPPER TERRACE) 7,152,415N x 571,655E

DATE 09 August 1988

METHOD OF EXCAVATION Hand Shovel

DATUM Geodetic Estimated Co-ordinates & Elevation

ELEV. / DEPTH (m)	DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	WATER CONTENT, PERCENT W_P W W_L (20 40 60 80)	GROUNDWATER CONDITIONS / ADDITIONAL LAB TESTING
177.00	Ground Surface				
0.00	damp, light brown, silt, sandy TOPSOIL, rootlets, organics				No Water Table or Seepage
0.06	SAND and GRAVEL, fine to coarse subrounded Sand, fine and coarse subrounded Gravel, trace silt, <5% cobbles to 150mm dia., non plastic, medium brown, damp (GP/SP)	1	CS	0.0% Non-Plastic M	Combined Sample CS1 and CS2
176.40		2	CS		
0.60	damp, light brown, SAND, fine to medium grained, subrounded				
176.20					
0.80	Bottom of Test Pit Test Pit in short gully in S.E. corner of Upper Terrace NO PERMAFROST				

Project No. 881-1814 Drawn CG Reviewed Date Oct88

VERTICAL SCALE 1:10

Golder Associates

TEST PIT No. TP88-1B1

SHEET 1 OF 1

RECORD OF TEST PIT TP88-1B2

LOCATION Skinny Lake Borrow (LOWER TERRACE) 7,152,315N x 571,795E

DATE 09 August 1988

METHOD OF EXCAVATION Hand Shovel

DATUM Geodetic Estimated Co-ordinates & Elevation

ELEV. / DEPTH (m)	DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	WATER CONTENT, PERCENT W_P W W_L (20 40 60 80)	GROUNDWATER CONDITIONS / ADDITIONAL LAB TESTING
172.00	Ground Surface				
0.00 171.90	dark brown, silty sandy TOPSOIL, rootlets, organics				No Water Table or Seepage
0.10	SANDY GRAVEL, fine and coarse subrounded Gravel, fine to coarse subrounded Sand, trace silt, non plastic, <5% cobbles to 100mm dia., dark brown, damp, (GP)	1	CS	1.6%	
171.40				Non-Plastic M	Combined Sample CS1 and CS2
0.60	damp, dark brown, clean, loose GRAVEL and SAND, sand medium to coarse, subangular to subrounded, gravel, fine trace medium subangular to subrounded	2	CS	0.0%	
170.90					NOTE: CS1 and CS2 from TP88-1B2 Combined with CS1 and CS2 from TP88-1B3 for additional testing: - organic color plate test - specific gravity and absorption - potential reactivity - magnesium sulphate soundness test
1.10	Bottom of Test Pit Dry Caving Test Pit in short gully on East edge of Lower Terrace, about 50m South of Pumphouse Site No. 1 NO PERMAFROST				

Project No. 881-1814 Drawn CG Reviewed Date Oct 88

VERTICAL SCALE 1:10

Golder Associates

TEST PIT No. TP88-1B2

SHEET 1 OF 1

RECORD OF TEST PIT TP88-1B3

LOCATION Skinny Lake Borrow (LOWER TERRACE) 7,152,240N x 572,000E

DATE 09 August 1988

METHOD OF EXCAVATION Hand Shovel

DATUM Geodetic
Estimated Co-ordinates and Elevation

ELEV. / DEPTH (m)	DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	WATER CONTENT, PERCENT W_P W W_L (20 40 60 80)	GROUNDWATER CONDITIONS / ADDITIONAL LAB TESTING
171.00	Ground Surface				
0.00 170.90	damp, light brown, silty, sandy TOPSOIL, rootlets				No Water Table or Seepage
0.10	SAND and GRAVEL, medium and coarse subrounded Sand, trace fine sand, fine and coarse subrounded Gravel, trace silt, < 5% cobbles to 100mm dia., light brown, damp, (SP)	1	CS	0.2%	
170.40				Non-Plastic	M Combined Sample CS1 and CS2
0.60	damp, light brown, clean, gravelly SAND, sand is medium to coarse, subangular, gravel is fine, subrounded	2	CS	0.4%	
169.80					NOTE: CS1 and CS2 from TP88-1B3 combined with CS1 and CS2 from TP88-1B2 for additional testing: - organic color plate test - specific gravity and absorption - potential reactivity - magnesium sulphate soundness
1.20	Bottom of Test Pit Dry Caving Test Pit on South edge of Lower Terrace, near N.W. end of small lake, about 65m South of Skinny Lake NO PERMAFROST				

Project No. 881-1814 Drawn CG Reviewed Date Oct 88

VERTICAL SCALE 1:10

Golder Associates

TEST PIT No. TP88-1B3
SHEET 1 OF 1

RECORD OF BOREHOLE BH88-8B1

SHEET 1 OF 1

LOCATION SQUIGGLY LAKE (EAST) BORROW 7,155,340N X 564,480E
BORING DATE 20 JULY 1988
UTM CO-ORDINTAES AND ELEVATION ESTIMATED
DATUM GEODETIC
SAMPLER HAMMER, 63.6kg, DROP, 760mm
PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ●, rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC; WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		216.00							
	MOBILE B-40 MOBILE AUGERS	GRAVEL AND COBBLES - coarse subrounded gravel, sub-rounded cobbles, clean, dry		0.00							
				215.70							
		SAND AND GRAVEL - medium and coarse subrounded Sand, trace fine Sand, fine and coarse subrounded Gravel, trace Silt, non-plastic (GP)		0.30	1	AS	-		O Non-Plastic	M	
1		moist @ 1.10m									
		PERMAFROST @ 1.50m (Est'd) 1.50 to 4.70m - Nbe (Est'd) PERMAFROST description estimated - melted by augers			2	AS	-		O Non-Plastic	M	
2		1.20 to 2.40m - SAND, medium and coarse Sand, trace fine Sand, fine Gravel, trace coarse Gravel, trace Silt, non-plastic, very wet (SW)									
3		3.00 to 4.20m - SAND, fine to coarse Sand, some Silt and Clay, non-plastic, trace fine Gravel (SM)			3	AS	-		O Non-Plastic	M	
4				211.80							
		SAND - fine to medium sand, some coarse sand trace fine angular to sub-angular gravel		4.20	4	AS	-		O		
				211.30							
		End of Borehole		4.70							
5		No auger refusal									

0 15 10 5 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-8B2

SHEET 1 OF 1

LOCATION SQUIGGLY LAKE (EAST) BORROW PROSTPECT No. 8 BORING DATE 20 JULY 1988 DATUM GEODETIC
7,164,790N X 564,700E UTM CO-ORDINATES AND ELEVATION
SAMPLER HAMMER, 63.5kg, DROP, 760mm ESTIMATED PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (WP, W, WL; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		214.00							
	MOBILE B-40 MOBILE AUGERS	GRAVEL AND COBBLES - coarse some fine subrounded Gravel, subrounded Cobbles, some fine to coarse subrounded Sand, clean, dry		0.00	1	AS	-				
1											
				212.50							
		GRAVELLY SAND - fine to coarse subrounded sand, fine subrounded gravel, trace coarse Gravel, some Silt and Clay, non-plastic, moist (SW-SM)		1.50	2	AS	-		o	M	
2											
		Cobbles @ 2.90m									
3		@ 3.00m - GRAVELLY SAND, fine to coarse subangular Sand, fine subrounded Gravel, trace coarse Gravel, some Silt and Clay, non-plastic, light brown, saturated (SM)			3	AS	-		o	M	
				210.20							
		End of Borehole Auger refusal on cobbles		3.80							
4		PERMAFROST not recorded Frost cracks on surface of deposit									
5											

0 / 15 ◆ 5 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Bum

RECORD OF BOREHOLE BH88-9B1

SHEET 1 OF 1

LOCATION SQUIGGLY LAKE (EAST) BORROW PROSPECT No. 9 — BORING DATE 20 JULY 1988 — DATUM GEODETIC
7,153,870N X 564,925E — UTM CO-ORDINATES AND ELEVATION ESTIMATED
SAMPLER HAMMER, 63.5kg, DROP, 760mm — PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		212.00							
	MOBILE B-40 MOBILE AUGERS	GRAVEL AND COBBLES - coarse subangular Gravel, some fine Gravel, some fine to coarse Sand, trace Silt, non-plastic, dry (GP)		0.00							
				211.60							
		SAND AND GRAVEL - medium to coarse subrounded sand, medium and coarse subrounded gravel, clean, dry		0.40	1	AS	-		o Non-Plastic	M	
1		Cobbles @ 1.15m		210.80							
		SAND AND GRAVEL - fine to coarse Sand, fine and coarse subrounded Gravel, trace Silt, non-plastic, dry (SP-SM)		1.20	2	AS	-		o Non-Plastic	M	
2		Cobbles @ 2.00m becoming wet @ 2.00m			3	AS	-		o		
				209.55							
		SILTY SAND - fine to medium sand, wet, medium reddish brown		2.45							
				209.20							
		End of Borehole Auger refusal		2.80							
3		PERMAFROST not recorded Frost cracks on surface of deposit									
4											
5											

0 / 16 ⊕ 6 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-2B1

SHEET 1 OF 1

LOCATION RHYOLITE LAKE BORROW PROSPECT No. 2
7,145,675N X 561,740E
SAMPLER HAMMER, 63.5kg, DROP, 760mm

BORING DATE 21 JULY 1988
UTM CO-ORDINATES AND ELEVATION
ESTIMATED

DATUM GEODETIC

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER, TYPE, BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m | SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊗ U.- O) | HYDRAULIC CONDUCTIVITY, k, CM/SEC | WATER CONTENT, PERCENT (Wp, W, WL; 20, 40, 60, 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION

DEPTH (m)	DESCRIPTION	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3M
0	Ground Surface	176.00			
	GRAVEL AND COBBLES - coarse subrounded gravel, subrounded cobbles, cobbles are frequently split	0.00			
		175.50			
	SAND - medium Sand, trace coarse Sand, trace fine, some coarse subrounded Gravel, medium brown	0.50	1	AS	-
1	@ 1.20 to 2.10m medium Sand, some fine subrounded gravel, moist, light brown		2	AS	-
2	PERMAFROST @ 2.20m (Est'd) 2.20 to 3.80m - Nbn (Est'd) 2.10 to 3.80m - medium to coarse Sand, fine to coarse subrounded to subangular Gravel		3	AS	-
3		172.20			
	End of Borehole Auger refusal on cobbles or boulders	3.80			
4	PERMAFROST description estimated - melted by augers Frost cracks on surface of deposit				
5					

MOBILE B-40
MOBILE AUGERS

0
15 ⊕ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 26

Golder Associates

LOGGED R.B.
CHECKED

RECORD OF BOREHOLE BH88-4B1

SHEET 1 OF 1

LOCATION SLEEK LAKE BORROW PROSPECT No. 4
7,146,985N X 558,775E
SAMPLER HAMMER, 63.5kg, DROP, 760mm

BORING DATE 21 JULY 1988
UTM CO-ORDINATES AND ELEVATION ESTIMATED

DATUM GEODETIC

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		199.00							
		COBBLES - subrounded		198.90							
		SAND - medium to coarse angular to subangular sand, some fine, trace coarse, gravel, dry		0.10	1	AS	-				
1		@ 1.20m medium subrounded sand some fine subrounded gravel, moist Cobbles @ 1.50m some silt from 1.50 to 2.10m wet PERMAFROST @ 2.00m (Est'd) 2.00 to 4.30m - Nbn (Est'd)			2	AS	-				
2				198.80	3	AS	-				
		SILTY SAND - fine to coarse subangular to subrounded sand, trace fine subrounded gravel, wet, light brown		2.10	4	AS	-				
3											
		@ 3.70 to 4.30m silty fine sand, light brown			5	AS	-				
4				194.70							
		End of Borehole Auger refusal on cobbles or boulders PERMAFROST description estimated - melted by augers Frost cracks on surface of deposit		4.30							
5											

0 / 16 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Bum

RECORD OF BOREHOLE BH88-5B1

SHEET 1 OF 1

LOCATION SLEEK LAKE BORROW PROSPECT No. 5
7,144,630N X 557,740E
SAMPLER HAMMER, 63.5kg, DROP, 760mm

BORING DATE 21 JULY 1988
UTM CO-ORDINATES AND ELEVATION ESTIMATED

DATUM GEODETIC

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814D

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		180.00							
		SAND AND GRAVEL - medium sand and coarse subangular gravel, clean		0.00 179.80							
		SAND - medium to coarse subangular to angular Sand, some coarse subangular Gravel, few cobbles, moist		0.20	1	AS	-				
1		@ 1.20 to 2.10m medium to coarse angular to subangular sand, trace fine subangular to subrounded gravel, trace silt, moist, light brown			2	AS	-				
	MOBILE B-40 MOBILE AUGERS	PERMAFROST @ 2.00m 2.00 to 2.10m - Nbe		177.90							
2		SILTY SAND- medium sand, light brown		2.10							
		PERMAFROST 2.10 to 3.30m - Nbe 3.30 to 3.80m - ice 3.80 to 4.10m - ice and sand			3	AS	-				
3				176.70							
		ICE - clear hard, colourless		3.30 176.20							
		ICE AND SAND- medium to coarse sand		3.80	4	AS	-				
4				175.90							
		End of Borehole No refusal Frost cracks on surface of deposit		4.10							
5											

0
10 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
CHECKED Bum

RECORD OF BOREHOLE BH88-MZ1

SHEET 1 OF 1

LOCATION MAIN ZONE 7,146,675.8N X 565,371.7E

BORING DATE 13 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		176.10							Frost Depth Indicator
	MOBILE B-40 / MOBILE AUGERS	TOPSOIL - dark brown organic Sandy Silt, wet		176.00							
		SAND- fine to medium subrounded sand, trace silt, medium brown, loose, moist		0.10	1	AS	-				THAWED
		PERMAFROST @ 0.70m 0.70 to 0.80m - Nbe			2	AS	-				
				175.30							
1		SAND TILL - fine to coarse Sand, some fine Gravel, subrounded, some Silt, trace Clay, non-plastic (SM)		0.80	3	AS CAREL	-		o	M,H	09 AUG 1988 0.87m 31 AUG 1988 1.01m
		PERMAFROST 0.80 to 1.25m - Vs, 1-3mm thick, clear, hard 1.45 to 1.70m - Vs to Vr, 2-3mm thick, hard, light brown									b = 1920kg/cm d = 1552kg/cm
		from 1.45 to 1.70m SANDY GRAVEL TILL - fine to coarse subrounded Gravel, fine to coarse Sand, some Silt, trace Clay, non-plastic (GM)			4	AS CAREL	-		o	M,H	FROZEN b = 1640kg/cm d = 1084kg/cm
2		1.70 to 2.30m Cobbles and Boulders			5	AS CAREL	-		o	M,H	
				173.80							
		End of Borehole Auger refusal in boulders and cobbles		2.30							2.30m
3											
4											
5											

16 (0 / 10) 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

881 PF

RECORD OF BOREHOLE BH88-MZ2

SHEET 1 OF 1

LOCATION MAIN ZONE 7,146,729.3N X 565,152.8E

BORING DATE 13/07/88

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		178.40							
		TOPSOIL - dark brown organic Silt		178.30							
		SANDY SILT TILL - some fine to coarse subrounded Sand, fine and coarse Gravel, some Clay, non-plastic (ML)		0.10	1	AS	-				
1		No PERMAFROST			2	AS	-		O	M, H	
				177.00							
		End of Borehole Auger refusal in boulders or cobbles		1.40							
2											
3											
4											
5											

PR 881

16 (0 / 10) 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-CZ1

SHEET 1 OF 1

LOCATION CENTRE ZONE 7,146,959.7N X 565,843.8 BORING DATE 12 JULY 1988 DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Ws; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		180.90							
		TOPSOIL - black, organics		180.80							
		SILTY SAND TILL - fine to coarse subrounded Sand, some fine and coarse subrounded Gravel, some Clay, non-plastic (SM)		0.10	1	AS	-				
		PERMAFROST @ 0.90m 0.90 to 1.12m - Vs, 2-4mm thick, clear, hard			2	AS	-		O	M,H	
1		@ 1.13 to 1.80m abundant cobbles and boulders			3	AS CREL	-		O	M,H	b = 2109kg/cm d = 1717kg/cm
					4	AS	-		O	M,H	
				179.05							
2		End of Borehole Auger refusal in cobbles or boulders		1.85							
3											
4											
5											

881 PF

0 16 10 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

RECORD OF BOREHOLE BH88-1WD1

SHEET 1 OF 1

LOCATION WASTE DUMP 7,146,381.2N X 665,538.7E

BORING DATE 12 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		174.10							
		TOPSOIL - black organic Silt, damp		174.00							
		SILTY SAND TILL - fine to coarse subrounded Sand, some fine subrounded Gravel, some Clay, non-plastic (SM)		0.10	1	AS	-				
		PERMAFROST @ 0.50m 0.60m to 1.25m - Nbn (Est'd)			2	AS	-		O	M,H	
1				172.85							
		End of Borehole Auger refusal in boulders or cobbles		1.25							
2											
3											
4											
5											

0
16 ⊕ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.W.M.
CHECKED

PR. 881-

RECORD OF BOREHOLE BH88-1WD2

SHEET 1 OF 1

LOCATION WASTE DUMP 7,146,358.3N X 565,891.8E BORING DATE 12 JULY 1988 DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl, 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Ground Surface		173.70							
		TOPSOIL - black organcs, Silt		173.60							
		sand and gravel, medium to coarse subrounded sand and gravel, trace silt, medium brown		0.10	1	AS	-				
1		0.95 to 1.25m SAND AND GRAVEL PERMAFROST @ 1.00m 1.00 to 1.70m - Nbe		172.40	2	AS	-				
		GRAVELLY SAND TILL - fine to coarse subrounded Sand, fine and coarse subrounded Gravel, trace Silt, trace Clay, non-plastic (SP) @ 1.50m cobbles encountered		1.30 172.00	3	AS	-		o	M, H	
		End of Borehole Auger refusal in boulders and cobbles		1.70							
2											
3											
4											
5											

0
15 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.W.M.
CHECKED

RECORD OF BOREHOLE BH88-2WD1

SHEET 1 OF 1

LOCATION WASTE DUMP 7,147,586.1N X 585,791.0E

BORING DATE 12 JULY 1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		196.20							
	MOBILE B-40 MOBILE AUGERS	TOPSOIL - black organics, Silt		196.10							
		gravelly till, fine to coarse subrounded sand and gravel, silty damp with abundant cobbles throughout		0.10	1	AS	-				
1					2	AS	-				
		PERMAFROST @ 1.00m (Est'd)		195.00							
		End of Borehole Auger refusal in boulders and cobbles		1.20							
2											
3											
4											
5											

16 (0 / 10) 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE 1 : 25

Golder Associates

LOGGED R.W.M.

CHECKED

DEPTH (feet)	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY	Main Zone 8+00 E / 5m south 60°/090° 200m
30					Casing set to 32.0' (9.75)						Assume 100% rec.
					32.0'-35.8' Slight to mod. weathered, massive, white-pale-pinkish, coarse, v. strong (R4) biotite Felspar Porphory						Rec 92% RQD 48%
40					35.8'-88.0' Fresh, foliated, dark grey-green, fine to med. grained, strong (R4) chloritised, mafic META ARKOSE Foliation 65°-70° TCA. locally silicified (almost schistose)						RQD 55%
50											RQD 75%
60					60.0'-88.0' Silicified, foliated, meta arkose (R5) Foliation approx. 60° TCA						RQD 75% Sa.#1 21.8-22.2 71.5'-72.8' Silicified Quartzite
70											RQD 75°
80											RQD 90°

PERMEABILITY

LOGGED BY: _____

DATE: 7.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-331

SHEET 1 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Silicified meta arkose - as above						RQD 90%	
90					88.0'-93.1' Fresh, massive, dk grey, med. grained, extremely strong Lamprophyre	L L L L L L		R5			Core broken RQD 48%	
					93.1'-122.2' Fresh, foliated, grey-green, fine to med. grained, silicified, very strong META-ARKOSE Foliations at 55-60° TCA							
100					102.0' local undulation in foliations						RQD 36%	
					106.0'-107.0' Quartz vein along foliation at 60° TCA. Chloritisation each side of vein							
110											RQD 60%	
120					121.0'-124.0' Fresh, massive, pink, med. grained, biotite Felspar-Extremely strong, Porphory						RQD 71%	
					37.8'-49.4' Silicified meta-arkose see Sheet 3.							
130												

LOGGED BY: _____

DATE: 7.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-331

SHEET 2 OF 13

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
140					Fresh, foliated at 60°TCA, light green-grey, fine to med. grained v. strong (R4), silicified META ARKOSE. Unit is uniformly foliated at 60-65° TCA.						RQD 75%	
											RQD 61%	
150					149.5'-150.0' Quartz veining with pyrite						RQD 79%	
160											RQD 88%	
					162.0'-213.0' Fresh, foliated at 55-60° TCA, dark grey, fine to med. grained, extremely strong, biotite - chlorite garnotiferous META-ARKOSE			R5			Sa.#2 166.0'-167.1'	
170											RQD 80%	
180												

LOGGED BY: _____

DATE: 7.7.88

PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 3 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					As above Local concentrations of biotite, chlorite, felspar. Foliation constant at 55-60° TCA			R5			RQD 92%	
190					Extremely strong			R5			RQD 93%	
200								R5			RQD 85%	
210								R5			RQD 96%	
220					213.0'-223.0' Fresh, massive, dark grey, medium grained, v. strong, biotite alteration to chlorite LAMPROPHYRE. At 220.6' slickensides on broken core at 55° TCA - chlorite Shear Zone ?	L L L L L L L L L L L L L L					Sa.#3 218.5'-219.4 Lamprophyre RQD 93%	
230					223.0'-243.4 See sheet 5						Attempted orientation - no mark	

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DATE: 7.7.88

PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 4 OF 13

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
240					Fresh, massive, pink, med. grained extremely strong biotite rich FELSPAR PORPHORY			R5			RQD 91%	
								R5			RQD 99%	← T_1
250					243.4'-261.6' Fresh foliated at 50-60°TCA, fine to med. grained, v. strong META-ARKOSE. Upper contract (1) chlorite rich: variable specified with pyrite and molybdenum Lower contact (2) possible healed shear zone - chlorite rich 257.0'-259.0' Chlorite rich zone -smooth, planar foliations						RQD 90%	
260					261.6-266.0' Fresh, massive, fine grained ext. strong fel. Porphory has assimilated meta-arkose.			R5			RQD 89%	
					266.0'-272.0' Fresh, foliated, silicified, fine grained, v. strong Meta-Arkose						Joints & foliations have molybdenum and chlorite. Planer rough	
270					272.0'-292.3' Fresh foliated at 45° TCA, fine grained, green, chloritised, strong (R3) Meta-Arkose HEALED SHEAR ZONE Pyrite mineralization						Sa. #4 274.5'-276.5' RQD 48%	
280												

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 5 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
290					As above						RQD 72%	
					292.0'-352.0' Fresh, foliated at 50-60° variably silicified, fine to med. grained, v.strong R4, light dark grey META-ARKOSE						RQD 91%	
300					293.6'-295.5' Chlorite/biotite rich 303.0'-305.0' Quartz rich 299.0'-301.0' Biotite-chlorite rich + Pyrite						RQD 82%	
310					314.0'-317.0' Core broken by rig on foliation at 60° TCA						RQD 68%	
320					Foliation 50-60° (constant)						RQD 93% Sa.#5 326.5'-327.0'	← Tz
330												

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 6 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
340					As above Foliations at 52° in chloritised meta arkose with pyrite veining						RQD 93% RQD 84%	
350											RQD 74% Core broken on contact.	
360					352.0'-402.0' Fresh, massive, grey-pink, fine to med. grained ext. strong FELSPAR PORPHORY Two joint sets Set 1 at approx. 35° TCA close space, 2nd set at approx. 20° spaced 1 to 1.5m Chlorite & moly on both set surfaces			R5			RQD 98% Sa.#6 360.3'-362.0'	
370								R5			RQD 75% Core broken on intersecting joints	
380											RQD 90%	

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PROJECT No. 882-1481

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Hole No. 88-331

SHEET 7 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Felspar Porphory - as above			R5				
390					389.0' Fresh, foliated, green-grey, fine to medium grained, very strong mafic META ARKOSE Two joint sets Set one at 30-40°TCA. Close to med. spacing. Set two at approx. 20°TCA - wide space Foliation 50-60° TCA						RQD 75%	
400											RQD 80%	T_3
410					Foliation at 63° TCA						Sa.#7 412.0'-412.8' RQD 95%	
420					423.4'-424.1' Broken zone with chlorite & haematite						RQD 65%	
430												

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 8 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG: BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					As above					RQD 88%	
440					439.6'-440.3' Broken zone with chlorite, pyrite mineralisation and faint slickensiding					RQD 55% Core broken by rig	
450					Foliation 50° TCA					RQD 91%	
					Foliation 52° TCA						
460										RQD 94%	
470					Foliation 58 TCA					RQD 85%	
480											

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 9 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
490					Meta-Arkose - as above 489.0'-518.0' (approx.) silicified with thin chloritic horizons 496.6 Molybdenite on planar rough joint at 50° TCA - photo.						RQD 79% RQD 90% 493.7'-494.8' Sa* 8	T_4
500					Foliation 50° TCA						RQD 92%	
510					517.0' Foliation at 35 locally						RQD 81%	
520					519.0'-543.0' Hematite mineralisation						522.0'-523.0' Sa.* 9 RQD 80%	
530					528.8'-531.0' Core broken by rig action on chloritic horizons 533.0'-534.5'							

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PROJECT No. 882-1481

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Hole No. 88-331

SHEET 10 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Hematised meta-arkose -as above						RQD 79%	
540					543.0' Silicified meta-arkose with quartz stringers						RQD 81%	
550											RQD 72%	
560					Foliation 30°TCA over 1' from 160.0'-161.0' on chloritic horizon						RQD 77%	
570											RQD 84%	← T_5
580					Foliation 53°							

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Hole No. 88-331

SHEET 11 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					As above						RQD 90%	
590					Foliation 35° TCA						RQD 92%	
600					615.0' - Foliation at 35°						RQD 87% 604.8'-605.7' Sa.#10	
610											RQD 93%	
620					625.0' - Foliation at 45°						RQD 99%	
630											RQD 81%	

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 12 OF 13

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
640					635.0' Foliation at 45° 635.71-637.0' Quartz Vein						RQD 81%	
					645.8-646.6' Broken Core						RQD 85%	
650					652.0' Foliation at 50° 652.8'-653.4' Core broken on foliation at 50° TCA						RQD 72%	T_6
					End of Hole 657.0'							

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PROJECT No. 882-1481

Golder Associates

Hole No. 88-331

SHEET 13 OF 13

STRUCTURAL MAPPING CODING FORM

BHN^{O} 88-331
1

LOCATION	SURFACE TYPE	ORIENTATION DIP	ORIENTATION DIRECTION	INFILLINGS 1	2	3	THICK	FORM	ROUGH	
39.5	J	30		Fe	K			P	V	
43.5	J	21		Fe	K			P	V	
44.1	J	16		Q				P	R	
53.7	J	29		Fe	Q	K		P	V	
61.8	J	33		K				P	R	
71.5	J	16		K				P	R	
74.5	J	13		K	P			P	V	
86.8	J	12		K				P	V	
95.0	J	25		K	Q			P	V	
99.7	J	10		a				P	R	
101.0	J	14		K				P	R	
107.0	J	25		K	Q			P	V	
112.0	J	30		K	Q			P	R	
120.5	J	43		K				P	R	
121.2	J	25		K				P	R	
123.0	J	3		K				INTACT		
126.2	J	39		K				P	S	
135.4	J	6		K			1	INTACT		
143.5	J	30		K	Q			P	R	
146.1	J	22		K	P			P	R	
148.7	J	35		K	Q			P	R	
153.1	J	26		K				P	R	
154.3	J	30		K				P	V	
159.4	J	25		K			4	P	R	
166.0	J	35		K				P	V	
174.2	J	33		Molybdenum			2	P	R	
179.8	J	11		K	P			P	R	
181.9	J	30		Mica		K		P	R	
188.5	J	42		Fe	P			P	R	
191.6	Fo	55		K				P	R	
205.6	J	30		K				P	R	
214.0	J	19		K	P			P	R	
219.4	J	50		K				P	R	
225.7	J	32		P				P	V	
225.7	J	55		P				P	R}	INTERSECT
235.4	J	19	170	K				P	R}	
236.3	J	64	150	K				P	V	
238.4	J	60	150	K				P	R	
239.6	J	47	135	K	M			P	R	
240.8	J	25	020	K				P	R	
241.3	J	29	045	K	P			P	R	
242.0	J	36	225	K				P	R}	INTERSECT
242.6	J	30	050	K	P			P	V}	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION DIP	DIRECTION	INFILLINGS 1	2	3	THICK	FORM	ROUGH	
243.5	J	27	300	K				P	R	
243.7	V	25	330	Q				INTACT}		
244.7	J	58	355	K				}		
245.2	J	53	300	K	P			P	R	Faint slickensides in K. Joint is normal to Foliation
245.7	Fo	52	150							
245.9	Fo	58	135							
246.0	V	35	325	Q				INTACT		Normal
246.3	J	74	310	K	M			P	S	- slickensided
246.7	J	52	320	K	M			P	R	- slickensided
249.3	J	22	225	K				P	R	
250.9	Fo	55	190					INTACT		
259.6	J	33		K				P	V	- normal to Foliation
274.4	J	26		K	M			P	V	
276.3	J	30		K			2	P	R	
280.5	J	14		K				P	R	
284.5	J	55		K				P	R	
286.0	Fe	65		K				P	K	
289.4	J	50		K				P	R	
293.4	J	24		K				P	V	
299.5	J	27		K				P	V	
303.1	J	42		K				P	S	- normal to Foliation
307.0	J	50		K				P	R	
307.5	J	60		K	P			P	K	
312.1	J	27		K			3	P	R	
320.7	V	34		K			2	P	R	
324.3	V	38		K	Q		3	P	R	
325.5	J	28		P				P	R	
331.7	J	28		P	K			P	R	
335.8	J	33		Q	M	P		P	R	
339.1	J	37		K				P	R	
340.5	J	34		Q				P	R	
343.0	Fo	56	315	K				P	R	
343.2	J	16	030	Q				P	V	
344.4	Fo	58	195					P	K	
345.7	J	47	220	K				P	R	
346.0	J	46	360					P	R	
347.4	J	13	090	K				P	R	
349.0	J	08	235	K				C		R
349.7	J	27	330	K				P	R	
350.7	J	58	170	K				P	R	- normal to faint foliation
352.4	J	40		K				P	R	
352.7	J	20		K				P	R	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION		INFILLINGS			THICK	FORM	ROUGH	
		DIP	DIREC-TION	1	2	3				
353.0	J	32		K				P	R	
355.0	J	11		K				P	V	
358.0	J	47		K				P	R	
359.8	J	22		K	P			P	R	
362.0	J	31		K				P	R	
368.5	J	30		K				P	R	
383.6	J	15		K	M			P	R	
398.0	J	30		K				P	R	
398.0	J	18		K				P	R	
403.0	J	20		K				P	R	
405.5	J	24		K				P	R	
410.0	J	37		K	P			P	R	
413.3	J	15		K				P	K	
415.5	J	22		M				P	K	
420.0	J	15		K	Fe			P	R	
422.4	J	29		K	Fe	Q		P	R	
433.5	J	57		K	M			P	S	
428.0	J	21		K	P			P	K	
439.6	J	20		K				P	R	
440.3	J	30		K				P	R	
443.0	Fo	59		K	M	Fe		P	K	- faint slickenslides
450.5	J	42		K	Fe			P	R	
454.5	1J	73		K	P			P	S	
460.0	J	46		K	P			P	R	
462.0	J	20		Q	K	Fe		P	R	
463.6	J	28		K				P	R	
466.0	J	38		K	M			P	S	
467.2	J	58		K				P	R	
467.3	J	38		K				P	S	
467.6	J	48		K				P	R	
473.2	J	30		-				P	R	
477.4	J	40		K	M			P	S	
481.2	J	44		K				P	V	
483.5	J	30		Fe				P	R	
495.4	J	25		K	P			P	V	- faint slickenslides
496.6	J	50		M				P	R	
497.7	J	20		K				P	S	
498.6	J	22		K				P	R	
508.0	J	32		K				P	V	
513.4	J	44		K				P	R	
515.5	J	25		K				P	R	
519.2	J	40		K			2	P	V	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION DIP	ORIENTATION DIRECTION	INFILLINGS 1	INFILLINGS 2	INFILLINGS 3	THICK	FORM	ROUGH	
520.8	J	28		K				P	S	
523.0	J	38		K				P	R	
536.8	J	15		K				P	V	
541.8	J	45		K	Fe			P	R	
542.0	J	40		Q				P	V	
551.2	J	42		Q	K			P	R	
565.6	J	27		K				P	V	
571.0	J	48		K	M			P	R	
576.5	J	37		K				P	R}	Intersecting
576.7	J	45		K				P	R}	
582.5	J	38		P				P	R	
589.0	J	66		K				P	S	
588.0	J	39		K				P	R	
592.0	J	47		K				P	5	
593.0	J	6		K				P	R	
598.0	J	56		K				P	R	
599.0	J	40		K				P	V	
602.0	J	48		K				P	R}	Intersecting
602.3	J	31		K				P	V}	
608.2	J	40		-				P	R	
612.0	J	25		K	M			P	R	
617.5	J	55		K				P	V}	Intersecting
617.5	J	33		K				P	R}	
623.6	J	38		-				P	V	
639.5	J	20		K				P	R	(spacing 0.3 m)
642.0	J	21		K				P	V	

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG: BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
70					72.0'-73.0' Crumbly zone lighter green weak chloritic gouge with angular rock fragments. Zone at approx. 25° TCA					RQD 23%	
80					75.0'-84.0' Broken core zone - several small shear zones. Chloritic gouge washed out, Foliation at 58°					RQD 4%	
90					84.0'-94.5' Fresh, foliated, green-grey, fine grained, chloritic, strong (R3) meta-arkose Foliation 45 -50° TCA					RQD 70%	
					Mafic meta-arkose, v. strong below 94.5'						
100					Foliation 48° TCA					RQD 65%	
					Broken Core (drill action) 106.0'-107.0'						
110					Foliation 55°					RQD 96%	
					Quartz stringer →						
120											

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DATE: 11.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 2 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Matic meta-arkose -asabove						RQD 86% 124.7'-125.4' Sa.#2	
					Foliation at 60° TCA							
130					133.0' Meta arkose becomes silicified						RQD 91%	
140											RQD 97%	
150											RQD 84%	
160											RQD 89%	
170											RQD 83%	

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DATE: 11.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 3 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Silicified Meta-arkose							
					175.2'-175.6 Felspar Porphory							
180					182.0'-183.6' Broken core zone - rig action. Run also broken on joints						RQD 66%	
190											RQD 99%	
200					200.1'-203.5' Fresh, massive, grey, med. grained, extremely strong LAMPROPHYRE			R5			RQD 97%	
					203.5' Fresh, foliated at 50-60°TCA, whitish, grey, fine grained, v. strong silicified META-ARKOSE							
210					213.3'-216.0' Core broken. Hematite stained, vuggy possibly brecciated zone						RQD 66%	
					Foliation 51°TCA							
220											RQD 79%	

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DATE: 11.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 4 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Silicified Meta-arkose-as above						RQD 79%	
230					Foliation 51° TCA						RQD 78%	
240											RQD 80%	
250											RQD 79%	
260											RQD 91%	
					Foliation 55-60° TCA							
270											RQD 82%	

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DATE: 11.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 5 OF 11

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
280					Meta-arkose - As above Quartz stringers						RQD 82%	
					Foliation 60° TCA 283.0'-284.1' Quartz vein 287.0'-312.0' Mafic well foliated arkose has 1-2mm biotite-chlorite bands parallel to foliation. Rock is R3 but breaks on foliation only.						RQD 63%	
290											RQD 80%	
300											299.5'-300.4' Sa.#3 biotite meta arkose RQD 84%	
310					Foliation 50-55° TCA 312.0'- Silicified meta-arkose						RQD 89%	T_3
320											319.2'-320.2' Sa.#4	

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DATE: 11.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 6 OF 11

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Foliation 60° TCA Meta-arkose – as above						RQD 92%	
					325.6-327.0' Quartz vein with hematite							
330					332.7'-334.7' Core broken on coring joint at 5° TCA						RQD 70% Core broken on sub-vertical joint	
					Foliation – 45° TCA							
					337.0'-344.0' Quartz veining							
340					339.0'-341.0' Pink quartz vein at 5° TCA - 2cms wide						RQD 84%	
					Foliation at 58° TCA							
					344.8' - Soft weak, chlorite/calcite filled joint; 1.5cm wide; normal to foliation (photo)						Note: Gouge-filled if close to pit wall?	
350											RQD 83%	
					354.0'-354.1' Quartz vein							
					Foliation 60° TCA							
360					Foliation 60° TCA						RQD 98%	
					Foliation 50° TCA							
370											RQD 68%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 7 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Silicified Meta-arkose - as above							
					Foliation 60° TCA						RQD 68%	
380												
											RQD 91%	
					Foliation 55° TCA							
390												T4
											RQD 78%	
											386.1'-387.0' Sa. #5	
400												
											RQD 93%	
					Foliation 55° TCA							
410					411.6'-412.0' Chlorite rich arkose 412.0'-413.8' Quartz vein or quartz rrch						RQD 76%	
					Foliation 52° TCA							
420											RQD 80%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 8 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Silicified Meta-arkose						RQD 80%	
					Foliation 50°TCA							
430											RQD 87%	
					Foliation 52°TCA							
440											RQD 72%	
					Foliation 54°TCA							
450					452.0'-467.0' Variable hematite staining. Core broken on close spaced joints & foliations						RQD 47%	
					Foliation 50°TCA							
460												
					Foliation 62°TCA						RQD 67%	
											467.0'-467.8' Sa.#6	
470					467.0'(approx.)-Mafic Meta-arkose						RQD 90%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 9 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
480					Mafic Meta-arkose Foliation 50° TCA 427'-428.0' Core broken on 20° TCA clean joint 481.5'-482.5' Core broken by rig on joint						RQD 90% RQD 63%	← T_5
490					Fresh, massive, fine grained, pink, extremely strong felspar porphory (R5)			R5				
					Fresh, foliated, green-grey, very strong mafic meta-arkose. Foliation 45° TCA 494.4'-497.0' Pink, extremely strong, fine grained, massive felspar porphyry vein at 40°TCA 499.0'-500.0' Core broken on joint. 506.0'-507.0' Quartz veining Foliation 59° TCA						RQD 88% RQD 65%	
500												
510					Core broken on close spaced W, K joints						RQD 56%	
520					Foliation 56° TCA							

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PROJECT No. 882-1421

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Hole No. 88-332

SHEET 10 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Meta-arkose (as above) chloritic with variable feldspar content Foliation 45° TCA						RQD 77%	
530											RQD 73%	
					546.5' Possible chlorite / rock fragment filled joint at 70° TCA (likely rig action)						548.1'-548.9 Sa. #7	
540											RQD 63%	
					Foliation 52° TCA							
550											RQD 89%	
					Foliation 55° TCA							← T_6
560					End of Hole 558.0'							

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-332

SHEET 11 OF 11

STRUCTURAL MAPPING CODING FORM

BHN^{O} 88-332
1

LOCATION	SURFACE TYPE	ORIENTATION DIP	ORIENTATION DIRECTION	INFILLINGS 1	2	3	THICK	FORM	ROUGH	
23.7	J	30		K				P	R	
24.6	J	33		K	Fe	A	1	P	S	
25.0	J	17		Fe				P	R	
25.7	J	39		K	F			P	R	
26.2	F	45		-				INTACT		
26.6	J	60		K				P	K	
26.8	J	41		F	P			P	R	
27.2	J	66		K	F			P	V	
28.7	J	42		K				P	V	
32.4	J	5		K	F			P	V	
33.6	J	30		K				P	R	
34.4	Fo	55		K				P	R	
35.4	J	36		K				P	R	
36.8	J	9		K				P	V-	Faint Slickensides
41.8	J	37		K				P	R	
44.5	J	38		K	Q			P	V	
48.3	Fo	60		K				P	R	
49.3	J	39		K				P	R	
50.2	J	38		K				P	R	
55.4	J	43		K				P	R	
58.8	J	29		K	Q			P	R	
60.6	J	38		C				P	R	
62.5	J	5		K				P	R	
74.6	J	15		K	F			P	R	
87.6	J	5		F				C		R
89.0	J	5		K				P	R	
97.8	J	14		K	Q			P	R	
106.0	J	28		K				P	R	
122.0	J	23		K				P	V	
125.4	J	22		C				P	R	
132.0	J	53	135	K	F			P	R	
132.2	J	33	125	C				P	R	
132.7	J	51	095	K				P	V	
133.2	Fo	51	230	K	P			P	R	FAIR CONFIDENCE LEVEL
133.6	J	52	105	K				P	V	
134.4	J	34	100	K				P	V	
136.1	J	48	195	K	F			P	R	
138.0	J	65	160	K				P	V	
139.0	J	44	080	K	F			P	R	
139.5	J	50	080	C				P	V	
140.3	J	55	090	K				P	R	
141.0	J	50	210	C				P	R	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION DIP	ORIENTATION DIRECTION	INFILLINGS 1	2	3	THICK	FORM	ROUGH	
238.8	J	45	080	Q				P	V	
240.2	Fo	34	080	K	W			P	R	
240.9	J	34	060	P				P	R	
241.6	J	59	070	P				P	R	
242.3	J	34	070	C				P	V	
244.0	Fo	54	190	C				P	R	
244.3	J	56	195	Q				P	V	
245.8	J	45	040	C				P	R	
246.5	Fo	60	180	C				P	R	
246.6	Fo	60	190	C				P	V	
247.0	J	65	200	C				P	R	
247.5	J	25	095	F				P	R	
232.2	Fo	52	195	C				P	R	
233.6	J	12	105	C				P	R	
233.9	J	48	005	C				P	R	
235.4	J	33	060	W	F			P	R	
236.0	Fo	59	200	P				P	R	
237.0	Fo	57	185	C				P	R	
252.0	J	30		F				P	R	
257.8	Fo	55		K				P	S	
262.1	J	35		Q	P			P	R	
263.5	J	5		K	P			P	V	
265.1	Fo	58		K				C		S
266.1	J	31		F				P	R	
272.2	J	32		C				P	R	
275.9	J	36		K	F			P	R	
279.8	J	60		K	F			P	V	
283.8	J	20		K				P	V	
285.5	J	45		K	W			P	R	
294.9	J	12		Q	F			P	V	
304.5	J	40		K				P	K	
307.4	J	5		Q	F			INTACT		
317.5	J	42		C				P	R	
319.2	J	50		C				P	R	
333.7	J	5		C				C		R
335.1	J	70		W	K			P	R	
344.8	J	40		W	K		15	P	R	
349.5	J	14		K	Q			P	R	
358.7	J	77		K	H	Q		P	R	
369.4	J	63		K				P	R	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION DIP	ORIENTATION DIRECTION	INFILLINGS 1	INFILLINGS 2	INFILLINGS 3	THICK	FORM	ROUGH	
379.5	J	30		K				P	V	
381.1	J	73		W				P	R	
385.2	J	64		W				P	R	
386.1	Fo	50		K				P	R	
388.9	J	15		P	F			P	R	
391.6	Fo	60		W	P			P	R	
396.8	J	58		K	P			P	R	
398.5	Fo	45		F	P			P	R	
405.3	J	16		K				INTACT		
412.6	J	42		K				P	R	
415.5	J	58		K	W			P	V	
435.8	J	57		W				P	R	
439.7	J	27		K	W			P	S	
448.1	J	40		K	W			P	K	
452.6	Fo	54		K				P	K	
453.0	J	20		C				P	V	
454.1	J	38		W				P	R	
456.2	J	53		W				P	R	
456.8	J	30		W				P	R	
458.5	J	5		K	W			P	R	
462.1	J	16		C				P	V	
462.2	J	30		C				P	R	
477.0	J	20		C				P	R	
480.1	J	8		C				P	V	
498.5	J	26		K				P	V	
510.2	J	77		K	W			P	R	
510.9	Fo	50		K	W			P	K	
511.2	J	74		K	W			P	R	
511.5	J	60		K	W			P	K	
511.8	J	62		K	Q			P	R	
512.4	J	32		K				P	K	
513.6	J	75		W				P	R	
517.0	J	17		K				P	R	
519.3	J	20		K	H	W		P	R	
519.5	Fo	47		K				P	S	
521.0	J	29		W				P	R}	Intersect
521.3	J	27		W	H			P	R}	
523.1	Fo	62		K				P	R	
529.0	J	10		W	P			W	R	
533.2	J	25		W				P	R	
534.5	J	47		W	K			P	V	
536.6	J	40		W				P	R	
538.7	J	20		K				P	R	

STRUCTURAL MAPPING CODING FORM

LOCATION	SURFACE TYPE	ORIENTATION		INFILLINGS			THICK	FORM	ROUGH
		DIP	DIREC-TION	1	2	3			
538.9	J	35		K				P	R
539.7	J	30		C				P	R
543.4	J	25		K	W	P		P	V
547.1	J	35		W	P			P	V
548.9	J	45		W	K			P	R
552.0	J	42		K				P	V
555.6	J	50		C				P	P
556.0	J	72		W				P	S

DEPTH (feet)	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY	Hole 50°/090° Longitudinal Section 35N Centre Zone	PERMEABILITY
30					Start Coring 32.0'							
					Hydrothermally altered (chloritised, illitised & sericitised) foliated (at 50-60°TCA) pale green -grey, mod. strong (R2) META - ARKOSE. limonite staining on joints & foliation. Pitchblende associated with limonite. Bands of weak, white sericite schist (ssch) R1 throughout	ssch					RQD 0%	
40											RQD 22%	
		Fo		60° TCA								
					Qt_2 vein 47.0 – 49.5							
50					Foliation fractures typically >10 ans with sericite, alteration products and/or drill wash.	ssch					RQD 3%	
		Fo		70° TCA								
60					flaky ssch S1 →						RQD 5%	
					flaky ssch S1 →							
					67.0'-68.0' broken core							
70												
		Fo		60° TCA	Limonite staining on contract (3")						RQD 27%	
					Hydro-altered, massive grey, mod. strong LAMPROPHYRE	L L L L						
80					78.9 1cm sericitic, limonitic, v. weak gouge on joint at 70°						RQD 7%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 1 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
90		Fo		58°	Altered, foliated, fine grained, chloritic, illitic & sericitised, mod. strong mafic META ARKOSE. Variably limonite stained. Sericitic gouge on joints and foliations (see structural log) - very weak material. Occurs on many v. close spaced foliations. 87.0'-97.0' Foliation fractures spaced.						RQD 4%	
		Fo		64°	2-15 cm throughout run.	ssch					RQD 7%	
100		Fo		65°	96.0'-115.5' Altered, foliated, fine grained, strong (R3) mottled light grey meta arkose with limonite staining on foliation. Fol. fractures spaced 2-8 cm. 106.6'-2" ssch	Arkose Meta Mottled					RQD 5%	
110											RQD 7%	
					115.5'-117.0' Broken core on cericitic -chloritic zone	ssch						
120					117.0'-124.0' Mottled, foliated, fine gravel, green-grey, mod. strong (R2) altered mafic meta arkose. Unit splits easily on fol.-sericitic on foliation. 124.0'-133.0' Altered, grey-green, fine grain, chloritic strong R3 mafic meta-arkose.						RQD 16%	
130											RQD 14%	

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DATE: 12.7.88

PROJECT No. 882-1421

Hole No. 88-333

SHEET 2 OF 11

Golder Associates

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					As above	ssch					RQD 14%	
140					133.0'-187.3 Slightly altered, faintly foliated, fine-med. grained, strong R4 white-grey, ORTHOQUARTZITE. Sericite on fol. and joints where broken.						RQD 21%	T_1
150					143.0'-157.0' Foliation at 45-55° TCA spaced 6" with 1mm sericite. This spacing present throughout unit.						RQD 61%	
160											RQD 21%	
170					167.0'-177.0' Entire run recovered as broken fragments. At 168.0' (approx.) 3" clay seam with quartz fragments - dark grey high plastic. Possible shear zone.						RQD 3%	
180											RQD 8%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 3 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					ORTHOQUARTZITE - as above						RQD 8%	
190					187.3' - 209.6' Altered, massive, fine to med. grained, dark grey-green, very weak (S1) LAMPROPHYRE. limonitic staining and sericite 200.0' - 205.0' Pitchblende	lamprophyre					RQD 87%	
200											RQD 62%	
		Fo		53°	207.0' - 3" dark grey, high plastic gouge with rock fragments	MA						
210					207.0' - 209.6' Highly altered meta arkose, dark grey, very weak (R1) foliated at 53° TCA, may have been silicified - high quartz content. Shear Zone 212.6' - 213.2' sand.	Orthoquartzite					RQD 35%	
220					209.6' - 231.5, slightly altered, massive to faintly foliated, fine grained, light grey, strong R4 ORTHOQUARTZITE.						RQD 40%	
					223.5' - 225.8' altered matic meta-arkose band. As 207.0' - 209.6' (R1)	MA						T_2
230					226.0' - 229.5' - Broken core zone.						RQD 3%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 4 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
240					230.0'-230.6' Angular rounded slightly altered quartz in ground mass of granular quartz RZ BRECCIA 231.5'-237.0' Broken Core Zone 231.5'-234.3' Highly altered (possibly sheared & then altered) ORTHO-QUARTZITE - dark grey, v. weak 234.3'-242.0' Highly altered dark grey, massive, v. weak (R1) LAMPROPHYRE. 242.0'-278.2' Highly altered, faintly foliated, fine grained, v. weak (S5) illitised meta arkose with sericite schist & sandy interbeds. Unit is red & brown iron stained easily broken by fingers - see lithological log for details	QQ QQ L L L L L L ssch sand clay					RQD 3% RQD 21% RQD 23%		
250												
260					Highly altered, illitised (clay) yellow v. weak (S5) sericite schist. Unit altered to sericitic clay.	ssch					RQD 31%	
270											RQD 45%	
280		Fo		57°	See Sheet 6 278.6 2" Sericitic clay seam						RQD 64%	

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PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 5 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
290		Fo		50°	278.2'-310.5' Highly altered, faintly foliated, fine grained, dark red-green-black, variably sericitic, very weak (R1) mafic meta-arkose	Altered mafic meta arkose					RQD 64%	
		Fo		55°								
		Fo		50°							RQD 47%	
300											RQD 21%	
310					310.5'-324.0' Mod. altered variable Fe stained, faintly foliated, white-green-rust, fine grey, mod. strong (R2) mafic meta-arkose with sericitic, highly altered, weak (R1) zones	25CM					RQD 37%	T_3
		Fo		48°	317.3 Red stiff plastic clay seam 2"							
320											RQD 41%	
					324.0'-382.0' Altered, bleached, strong (R3) pale green, meta-arkose. Foliated.							
330											RQD 52%	

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DATE: 12.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 6 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Bleached meta-arkose - as above						RQD 52%	
		Fo		52°								
340					340.1' - 2" Weak sericitic zone						RQD 58%	
					345.1' - 4" Fe stained sericitic arkose			R3				
		Fo		63°	346.0'-347.0' - Broken core							
350											RQD 30%	
		Fo		59°								
360											RQD 59%	
		Fo		59°	363.0'-369.3' Rock splits readily Foliation - spared 2-4"							
370											RQD 50%	
		Fo		55	380.0'-381.0' Broken core.						RQD 18%	
380												

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PROJECT No. 882-1421

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Hole No. 88-333

SHEET 7 OF 11

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
390		Fo		56°	Bleached meta-arkose-as above 382.0' - Mod. altered, foliated, variably iron stained, red-grey/green, mod. strong R3 meta-arkose						RQD 18% RQD 43% 394.5'-395.4' - Sa.#2 haematised m.a.	T_4
400		Fo		57°				R3			RQD 54% 409.7-410.5 Sa.#3	
410		Fo		58°	Pit Wall at 410.0' (approx.) 407.1' - 2" red plastic clay zone. 407.1'-410.8 haematised m.a. 410.8'-437.0' - Core is highly fractured, v. close spaced foliations (5-2") and joint set at 30°TCA (spaced 6") Foliation from 50-60° TCA.						RQD 26%	
420											RQD 0	
430		Fo		51°							RQD 11%	

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PROJECT No. 882-1421

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Hole No. 88-333

SHEET 8 OF 11

DEPTH	PERCENT CORE LOSS (25 50 75)	FRACTURES: TYPE	FRACTURES: INFILLING	FRACTURES: INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS (4 3 2)	ROCK QUALITY DESIGNATION (75 50 25)	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					Mod. altered meta-arkose - as above			R3			RQD 11%	
		Fo		49°	437.0'-448.0' Slightly to mod. altered foliated, grey-green, fine-grained, strong R3 meta arkose							
440											443.4'-444.1' Sa.#4	
											RQD 34%	
		Fo		59°	448.0'-457.0' Altered, haematised meta-arkose - amount of haematisation increases with depth			R3				
450											RQD 0	
					447.0'-457.0' Core broken on foliations and joints							
		Fo		61°	457.0'-467.0' Highly altered red-beige-green structureless, very weak (S5) felspar porphory			S5			460.5'-461.5' Sa.*5	
460											464.5'-465.7' Sa.#	
											RQD 40%	
		Fo		59°							467.0'-469.2' Core broken on v. close spaced foliations	
					467.0'-502.0' Mod. to slightly altered & haematised, foliated, dk brown to light grey strong (R3) meta arkose. Degree of haematisation decreases with depth.			R3				← T5
470											RQD 32%	
		Fo		61°								
480											RQD 25%	

LOGGED BY: _____

DATE: 12.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 9 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
490		Fo		50°	Slightly altered meta arkose - as above 488.0'-510.0' Core broken on foliation & joints haematised from 491.0'-502.0'			R3			RQD 25% 487.9-488.6 Sa.#6 RQD 28%	
500		Fo		47°							RQD 4%	
510		Fo		54°	508.0'-510.5' Sericitic meta arkose 502.0'-558.0' Fresh, unaltered faintly foliated fine to med. grained grey-green, very strong (R4) meta arkose.			R4			RQD 58%	
520											525.8-526.8 Sa.#8 RQD 97%	
530		Fo		57°	528.9'-532.4' Quartz veining						RQD 67%	

LOGGED BY: _____

DATE: 12.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 10 OF 11

DEPTH	PERCENT CORE LOSS 25 50 75	FRACTURES TYPE	FRACTURES INFILLING	FRACTURES INCLINATION	DESCRIPTION AND REMARKS	GRAPHIC LOG	BRECCIA/GOUGE ■ BROKEN CORE ▨	HARDNESS 4 3 2	ROCK QUALITY DESIGNATION 75 50 25	NATURAL FRACTURE FREQUENCY		PERMEABILITY
					530.5' Quartz vein 532.4'						RQD 67%	
		F_o		52°								
540					Fresh, faintly foliated, grey-green strong (R4) mafic meta arkose - as above.						RQD 77%	
		F_o		60°								
550											RQD 69%	← T_6
		F_o		56°								
560					End of Hole 558.0 ft.							

LOGGED BY: _____

DATE: 12.7.88

PROJECT No. 882-1421

Golder Associates

Hole No. 88-333

SHEET 11 OF 11

Geotechnical Log

PROJECT : Kiggavik	**NORTHING : 7147747**	**EASTING : 566014**	**HOLE ID: RMI-09-01**
SITE : Mill Site	**ELEVATION :210m**	**DIP : -90**	**AZIMUTH : N000**
DRILLING CONTRACTOR: Boart Longyear		**LOGGED BY: BS/RQ**	
DRILLING TYPE: Diamond		**CHECKED BY:**	

Hole Diameter:	HQ	Core Diameter:	HQ3
Drilling Date:	14/08/2009 - 15/08/2009		
Logging Date:	14/08/2009 - 15/08/2009		

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Description	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
1	0.0		40cm of ORGANICS below the surface followed by fine to coarse, sub-agular to angular												
	1.5														
2	2.6		GRAVEL with trace silt/sand and sporadic cobbles												
	3.0			100	100	-	R3	W2				20	2	3	1
3	4.5		Yellowish-light green, medium strong, slightly weathered granite	100	100	5	R3	W2				20	6	3	2
4	6.0			93	91	6	R3	W2				20	6	3	1
5	7.5			100	90	8	R3	W2				19	9	3	1
6	9.0			69	69	2	R3	W2	LC:7.70-8.00/8.15-8.32m			23	4	2	1
7	10.5		Rusty red, slightly weathered, medium strong metasediment	100	93	14	R3	W2				19	6	2	1
8	12.0			93	95	9	R3	W2				21	6	2	1
9	13.5			100	100	6	R3	W2				20	4	2	1
10	15.0			100	100	3	R3	W2				17	3	1	1
11	16.5			100	100	3	R3	W2				20	6	1	1
12	18.0			93	93	3	R3	W1/W2				28	2	3	2
13	19.5			100	96	4	R3	W2				20	6	2	2
14	21.0			100	100	5	R3	W2	Dessiminated qz veins			20	6	3	1
15	22.5			100	100	5	R3	W2	from 21.00-21.70m ~15cm qz vein @ 21.25-21.41m with			20	6	2	1
16	24.0			93	93	1	R3	W2	chlorite content LC: 10cm			20	1	2	1
17	25.5		Pinkish-light red, slightly weathered, strong competent granite	100	100	3	R4	W2				20	2	3	1
18	27.0			100	100	3	R4	W2				22	4	2	1
19	28.5			100	97	6	R4	W2				20	4	2	1
20	30.0		End of Hole	100	91	0	R4/R5	W2				21	5	2	1

Overburden
Granitic gneiss
Quartzite
Intrusive
Metasediment

JN = Joint
FLT = Fault
SH = Shear
VN = Vein
FR = Fracture

PL = Planar
CU = Curved
UN = Undulating (wavy)
ST = Stepped
IR = Irregular

SL = Slickensided, PO = Polished
SM = Smooth, RO = Rough
VRO = Very Rough
Lost Core (LC)
Broken Core (BC)

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Geotechnical Log

PROJECT : Kiggavik	**NORTHING : 7147905**	**EASTING : 564975**	**HOLE ID: RMI-09-02**

SITE : Mill Site	**ELEVATION :211m**	**DIP : -90**	**AZIMUTH : N000**	Hole Diameter: HQ Core Diameter: HQ3
DRILLING CONTRACTOR: Boart Longyear		**LOGGED BY: BS/RQ**		Drilling Date: 16/08/2009 - 17/08/2009
DRILLING TYPE: Diamond		**CHECKED BY:**		Logging Date: 16/08/2009 - 17/08/2009

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Description	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
	0.00		Approximately 12cm of dark brown organics followed by Silty Gravel up to 1.5m. Fine to medium, sub-angular to angular Gravel at 1.5-3.0m overlies Silty Gravel.												
	1.50														
	3.00														
	4.10														
1	4.50		Pink black to pink, fine to coarse crystalline, strong to extremly strong, farily fresh to moderately weathered granite.	100	29	19	R4	W3	BC/Crushed: 4.10-4.51m			20	20	3	1
	5.50														
2	7.00			100	77	9	R4	W3				16	12	3	3
3	8.04			100	86	10	R4	W3	BC: 7.34-7.46m			12	12	3	4
4	8.50			100	78	9	R5	W2				20	12	3	2
5	10.00			97	85	9	R5	W2				17	12	3	2
6	11.50		Becomes medium to coarse crystalline	100	84	6	R5	W2				18	12	3	2
7	13.00			100	83	12	R5	W2				17	12	3	3
8	14.50			100	44	10	R5	W2				20	15	3	1
9	16.00			96	73	7	R5	W2	BC: 15.42-15.47m			20	12	3	1
10	17.50		Black and pink with some white, slighly weathered, massive, coarse to very coarse	100	88	4	R5	W2	BC: 17.05-17.12m			16	6	3	3
11	19.00		crystalline, non-porous, very strong granite	100	97	4	R5	W2				19	6	3	2
12	20.50			100	100	3	R5	W2				19	6	3	2
13	22.00			96	91	9	R5	W2	BC: 20.67-20.75m			16	6	3	3
14	23.50			100	91	9	R4/45	W2				17	5	3	2
15	25.00			100	91	8	R4/R5	W2	BC: 24.06-24.20m			21	4	3	1
16	26.50			100	87	3	R4	W2	BC: 26.30-26.50m			20	4	3	1
17	28.00			93	93	5	R5/R6	W1	BC: 27.60-27.70m			20	1	2	1
18	29.50		End of Hole	97	97		R4/R5	W2	LC: 28.50-28.55m			21	4	3	2

Overburden
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Geotechnical Log

PROJECT : Kiggavik	**NORTHING : 7148084**	**EASTING : 564983**	**HOLE ID: RMI-10-01**

SITE : Mill Site	**ELEVATION :212m**	**DIP : -90**	**AZIMUTH : N000**	Hole Diameter: NQ Core Diameter: NQ
DRILLING CONTRACTOR: Boart Longyear		**LOGGED BY: KR**		Drilling Date: 20/08/2010 - 21/08/2010
DRILLING TYPE: Diamond		**CHECKED BY:**		Logging Date: 20/08/2010 - 21/08/2010

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Comments	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
	0.0		10cm of boulder rubble was retrieved												
1	2.7 3.0														
			Fine to medium, weakly to strongly foliated subhorizontal to the core	92	65	20	R3		competent core				15	6	1
2	6.0		axis, strongly silicified, granitic gneiss with common quartz flooding and vening												
			Granitic veins were generally closed and subvertical to the	102	86	12	R3		competent core				12	7	1
3	9.0		core axis.												
			Hematite and chlorite were common coatings in fracture surfaces. Fracturing increased	92	82	11	R3		3% weak rock (R2)				12	7	1
4	12.0		between 12.5m and 25m.						Minor alteration overall competent core						
			Minor strong chlorite gouge	100	74	15	R3		5% weak rock (R2)				15	6	1
5	15.0								competent core						
				98	97	9	R3		competent core with				6	8	1
6	18.0								granitic veining						
				97	87	9	R3		competent core with				6	7	1
7	21.0								minor defects						
				100	68	24	R3		<1% very weak rock (R1)				12	7	1
8	24.0								clay gouge along the joint at 23.55m						
			Core was competent at 25m	101	101	3	R3		competent core				2	8	1
9	27.0		and below.												
				99	98	4	R3		competent core with				3	7	1
10	30.0								minor granitic veining						

Overburden
Granitic gneiss
Quartzite
Intrusive
Metasediment

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Broken Core (BC)

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(All are average value per run)

Geotechnical Log

PROJECT : Kiggavik	NORTHING : 7148084	EASTING : 564983	HOLE ID:	RMI-10-01

SITE : Mill Site	ELEVATION :212m		DIP : -90	AZIMUTH : N000	Hole Diameter:	NQ	Core Diameter:	NQ
DRILLING CONTRACTOR:	Boart Longyear		LOGGED BY:	KR	Drilling Date:	20/08/2010 - 21/08/2010		
DRILLING TYPE:	Diamond		CHECKED BY:		Logging Date:	20/08/2010 - 21/08/2010		

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Comments	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
	30.0		(continued) Fine to medium, weakly to strongly folidated	99	81	16	R3		Minor rubble zone from				12	7	1
11	33.0		subhorizontal to the core axis, strongly silicified, granitic gneiss with common						32.4 to 32.5m						
			quartz flooding and vening	98	88	13	R3		competent core				6	7	1
12	36.0														
				99	94	7	R3		competent core				6	8	1
13	39.0														
				99	86	9	R3		competent core				12	7	1
14	42.0														
				100	100	5	R3		competent core				2	8	1
15	45.0		End of Hole												

Overburden	JN = Joint	PL = Planar	SL = Slickensided, PO = Polished		Jcon = Joint Condition
Granitic gneiss	FLT = Fault	CU = Curved	SM = Smooth, RO = Rough		Jn = Joint Set Number
Quartzite	SH = Shear	UN = Undulating (wavy)	VRO = Very Rough		Jr = Joint Roughness Number
Intrusive	VN = Vein	ST = Stepped	Lost Core (LC)		Ja = Joint Alteration Number
Metasediment	FR = Fracture	IR = Irregular	Broken Core (BC)		(All are average value per run)

Geotechnical Log

PROJECT : Kiggavik	**NORTHING : 7147500**	**EASTING : 565000**	**HOLE ID: RMI-10-02**
SITE : Mill Site	**ELEVATION :202m**	**DIP : -90**	**AZIMUTH : N000**
DRILLING CONTRACTOR:	**Boart Longyear**	**LOGGED BY:**	**KR**
DRILLING TYPE:	**Diamond**	**CHECKED BY:**	

Hole Diameter:	NQ	Core Diameter:	NQ
Drilling Date:	22/08/2010 - 23/08/2010		
Logging Date:	22/08/2010 - 23/08/2010		

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Comments	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
	0.0		Approximately 1m of rubble including rounded fragments of boulders												
1	3.0														
2	6.0														
	6.5														
			Pink to oragne, fine to medium grained, medium strong,												
3	9.0		generally unaltered and fresh granite with abundant fractures and quartz			7	R3	W1	competent core with 60cm vertical vein				6	6	1
			veins sub-vertical to the core axis	101	82	17	R3	W1	competent core with				6	7	1
4	12.0								subvertical fractures and vein						
				100	92	7	R3	W1	quartz veining and weak				12	7	1
5	15.0								rock (R2) at 14.8-15m						
				99	97	5	R3	W1	subvertical joints				3	7	1
6	18.0														
				99	91	10	R3	W1	competent core with				12	8	1
7	21.0								quartz veining						
				101	98	8	R3	W1	>50cm subvertical quartz				12	7	1
8	24.0								vein						
				101	99	5	R3	W1	subvertical joints/fractures				6	7	1
9	27.0								and quartz veins						
				97	89	4	R3	W1	subvertical joints/fractures				3	7	1
10	30.0								and quartz veins						

Overburden
Granite
Quartzite
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Metasediment

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Lost Core (LC)
Broken Core (BC)

Jcon = Joint Condition
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Ja = Joint Alteration Number
(All are average value per run)

Geotechnical Log

PROJECT : Kiggavik	**NORTHING : 7147500**	**EASTING : 565000**
SITE : Mill Site	**ELEVATION :202m**	**DIP : -90** / **AZIMUTH : N000**
DRILLING CONTRACTOR:	**Boart Longyear**	**LOGGED BY: KR**
DRILLING TYPE:	**Diamond**	**CHECKED BY:**

HOLE ID:	**RMI-10-02**
Hole Diameter:	NQ — Core Diameter: NQ
Drilling Date:	22/08/2010 - 23/08/2010
Logging Date:	22/08/2010 - 23/08/2010

RUN	Depth (m)	Graphic Log	LITHOLOGY	TCR (%)	RQD (%)	FF/Run	IRS	WI	Comments	BC	LC	Discontinuity Data Jcon	Jn	Jr	Ja
	30.0		(continued) Pink to oragne, fine to medium grained, medium strong,	101	99	8	R3	W1	4cm thick subvertical				6	7	1
11	33.0		generally unaltered and fresh granite with abundant fractures and quartz						quartz vein at 31.9m						
			veins sub-vertical to the core axis	99	99	6	R3	W1	competent core				6	7	1
12	36.0														
				99	97	5	R3	W1	competent core				3	7	1
13	39.0														
				97	93	8	R3	W1	competent core				6	7	1
14	42.0														
				97	97	4	R3	W1	vertical joint with graphite				1	7	1
15	45.0								at 43.5-44.7m						
				98	79	13	R3	W1	competent core with				12	7	1
16	48.0								chlorite-quartz veining						
				99	88	14	R3	W1	competent core				15	7	1
17	51.0														
				102	100	1	R3	W1	competent core with				1	8	1
18	54.0								>1m subvertical joint						
				100	96	5	R3	W1	competent core with				4	8	1
19	57.0		End of Hole						minor rubble at 56.m						

Overburden
Granite
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(All are average value per run)

RECORD OF BOREHOLE BH88-D100

SHEET 1 OF 3

LOCATION 9704N 9886E LOCAL CO-ORDINATES

BORING DATE 21/06/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	NO CORING MOBILE AUGERS B-40	Top of Ice		1.20 0.00							
1											
		Bottom of Ice		-0.70							
2		WATER - Baker Lake		1.90							
3											
4											
5		continued on next page		-3.80 5.00							

0
15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE
10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RWM

CHECKED RWM

RECORD OF BOREHOLE BH88-D100

SHEET 2 OF 3

LOCATION 9704N 9886E LOCAL CO-ORDINATES

BORING DATE 21/06/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC; WATER CONTENT, PERCENT (Wp W Wl, 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5		continued from page 1		-3.80							
		WATER - Baker Lake		5.00							
				-3.95							
		SAND, very fine to fine subangular, medium brown, trace silt, trace fine gravel very loose		5.15	1	DO	2		O		
6					2	DO	3		O	MH	
7	NO CORING MOBILE AUGERS B-40				3	DO	0		O	M	
				-6.72							
8		SAND and GRAVEL, occasional cobble		7.92							
				-7.64							
9		BEDROCK		8.84	4	RC	-				
				-8.19							
		End of Borehole		9.39							
10											

0 / 15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RWM

CHECKED Rwm

RECORD OF DRILLHOLE BH88-D100

SHEET 3 OF 3

LOCATION 9704N 9886E LOCAL CO-ORDINATES
INCLINATION AZIMUTH

DRILLING DATE 21/06/88
DRILL RIG ROTARY/MOBILE B-40
DRILLING CONTRACTOR MOBILE AUGERS & RESEARCH

DATUM GEODETIC (Approx.)

PROJECT 881-1814E

FR-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN
F-FAULT J-JOINT P-POLISHED S-SLICKENSIDED
SM-SMOOTH R -ROUGH ST-STEPPED PL-PLANAR
FL-FLEXURED UE-UNEVEN W -WAVY C -CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (M)	RUN No.	PENETRATION RATE (M/MIN)	FLUSH % RETURN COLOUR	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3M	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
5				-3.80												
				5.00												
6																
7																
8																
9		META SANDSTONE, fresh, foliation @ 45 deg., light pinkish red with dark green on foliation contacts, chloritic, fine grained to coarser with depth, minor hematite staining with trace calcite on joints and foliation breaks, minor feldspar phenocrysts throughout, siliceous cement		-7.64												
				8.84	1	.051	~60%									
					2	.015	~60%					5	FO,R,HEMATITE, CALCITE			
												0	J,R,UE,TR HEMATITE			
				-8.20								0	FO,R,CHLORITE HEMATITE,CALCIT			
		End of Drillhole		9.40								0	FO,R			
10																

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.W.M.
DATE 24/08/88 16 Aug 89
CHECKED BWM

RECORD OF BOREHOLE BH88-D101

SHEET 1 OF 4

LOCATION 9644N 9919E LOCAL CO-ORDINATES

BORING DATE 20/06/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, w, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	MOBILE B-40 MOBILE AUGERS	Top of Ice		1.20							
				0.00							
1											
2		Bottom of Ice		-0.78							
		WATER - Baker Lake		1.98							
3											
4				-3.00							
		SAND, fine to coarse, trace silt, multicolored, sub-angular, loose to very loose		4.20	1	DO	2				
5		continued on next page		-3.80							
				5.00							

0 10 ◇ 6 PERCENT AXIAL STRAIN AT FAILURE 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RWM

CHECKED Rwm

RECORD OF BOREHOLE BH88-D101

SHEET 2 OF 4

LOCATION 9644N 9919E LOCAL CO-ORDINATES

BORING DATE 20/06/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5	MOBILE B-40 MOBILE AUGERS	continued from page 1		-3.80 / 5.00							
		SAND, fine to coarse, trace silt, subangluar, loose to very loose			2	DO	8		O		
6					5a	DO	-				
7					3	DO	5		O	M	
8											
		SAND and GRAVEL, fine subangular gravel, fine to coarse subangular sand, trace very fine sand, loose, multicolored		-7.49 / 8.69	4	DO	4		O	MH	
9											
10		continued on next page		-8.80 / 10.00							

0 / 15 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RWM

CHECKED BWM

RECORD OF BOREHOLE BH88-D101

SHEET 3 OF 4

LOCATION 9644N 9919E LOCAL CO-ORDINATES

BORING DATE 20/06/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, CM/SEC	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	MOBILE B-40 MOBILE AUGERS	continued from page 2		-8.80				SHEAR STRENGTH Cu, kPa nat.V.- + Q.- ● rem.V.- ⊗ U.- O	WATER CONTENT, PERCENT Wp w Wl 20 40 60 80		
				10.00							
		SAND and GRAVEL (as before)			5	WS	-		O	M	
				-9.62							
11		BEDROCK		10.82	6	RC	-				
				-10.38							
		End of Borehole		11.58						Direct Shear and Specific Gravity (2.74) on combined Samples 1 to 4.	
12											
13											
14											
15											

0 / 10 — ⊗ — 8 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RWM

CHECKED Bwm

RECORD OF DRILLHOLE BH88-D101

SHEET 4 OF 4

LOCATION 9644N 9919E LOCAL CO-ORDINATES
INCLINATION AZIMUTH

DRILLING DATE 20/06/88
DRILL RIG ROTARY/MOBILE B-40
DRILLING CONTRACTOR MOBILE AUGERS & RESEARCH

DATUM GEODETIC (Approx.)

PROJECT 881-1814E

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED
CL-CLEAVAGE J-JOINT R -ROUGH UE-UNEVEN
SH-SHEAR P-POLISHED ST-STEPPED W -WAVY
VN-VEIN S-SLICKENSIDED PL-PLANAR C -CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (M)	RUN No.	PENETRATION RATE (M/MIN)	% RETURN FLUSH COLOUR	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3M	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
10				-8.80												
				10.00												
				-9.82												
11		META SANDSTONE, fresh, foliation @40 deg, light pinkish red with chlorite on foliation contacts (joints), very micaceous (biotite), fine to coarse grained with some hematite staining on joints, several large (10-13mm), feldspar phenocrysts oriented along the foliation @40-45 degrees, siliceous cement		10.82	1	.0119	-60%					0	FO,R			
												0	J,R,HEMATITE STAINED,TR CALCITE			
												0	J,HEALED CALCITE FILLED			
												0	FO,R,FRESH			
												0	J,HEALED,CALCITE FILLED			
				-10.38	2	.0021	-60%					0	J,SM-R CHLORITE TR S,TR HEMATIT			
		End of Drillhole		11.58								0	J,S.M.,S CHLORITE			
12																
13																
14																
15																

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.W.M.
DATE 22/08/88 16 Aug 89
CHECKED Brown

RECORD OF BOREHOLE BH88-D102

SHEET 1 OF 4

LOCATION 9827N 9881E LOCAL CO-ORDINATES

BORING DATE 26/07/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC	WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	SOLID STEM AUGER / MOBILE AUGERS B-40	Ground Surface		7.90									
		SAND, medium, subangular to subrounded, moist, trace fine subrounded gravel		0.00	1	AS	-				O	MH	
				7.60									
		SAND, silty, gravelly, trace to some clay, with cobbles and boulders, medium brown (TILL)		0.30									
1		@ 0.92 to 1.22m, increased silt content, some fine sand, trace subangular coarse gravel, trace subrounded cobbles, moist, reddish brown			2	AS	-				O	MH	
		cobbles/boulders from 1.22 to 2.35m											
		@ 1.80 to 2.35m, sand fraction becomes coarser, gravel content increases, wet											
2					3	AS	-				O	MH	
		@ 2.35 to 3.60m, clay and silt content increases to approx 60%, medium subrounded sand, moist, brown to grey											
3					4	AS	-				O	MH	
		Begin NQ Coring at 3.60m											
		@ 3.60m, auger refusal on boulder											
4		assumed clayey silt with cobbles/boulders (TILL) from 3.60 to 4.81m											
		@ 4.81 to 6.81m, clayey silt some fine subrounded to subangular gravel, some fine to medium sand, trace coarse subangular to subrounded gravel, some subrounded cobbles (TILL)											
5					5	RC	-						
6		continued on next page		2.90									
				5.00									

0 10 ⊕ 6 PERCENT AXIAL STRAIN AT FAILURE 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RB

CHECKED Bum

RECORD OF BOREHOLE BH88-D102

SHEET 2 OF 4

LOCATION 9827N 988E LOCAL CO-ORDINATES

BORING DATE 26/07/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ⊕ rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC; WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5	NO CORING MOBILE AUGERS B-40	continued from page 1		2.90							
		@ 4.81 to 8.81m, clayey silt, some fine subrounded to subangular gravel, some fine to medium sand, trace coarse subangular to subrounded gravel, some subrounded cobbles (TILL)		5.00	6	RC	-				
6											
7					7	RC	-				
8					8	RC	-				
				-0.91							
		BEDROCK		8.81	9	RC	-				
9		NOTE: No permfrost encountered									
10		continued on next page		-2.10							
				10.00							

⊕ 0 / 10 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RB

CHECKED Bum

RECORD OF BOREHOLE BH88-D102

SHEET 3 OF 4

LOCATION 9827N 988E LOCAL CO-ORDINATES

BORING DATE 26/07/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊗ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT Wp W Ws	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	NO CORING MOBILE AUGERS B-40	continued from page 2		-2.10							
		BEDROCK see rock log		10.00							
11											
12											
13											
				-5.51							
		End of Borehole		13.41							
14											
15											

0 / 16 ◇ 6 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RB

CHECKED Burn

RECORD OF DRILLHOLE BH88-D102

SHEET 4 OF 4

LOCATION 9827N 9881E LOCAL CO-ORDINATES

INCLINATION AZIMUTH

DRILLING DATE 26/07/88

DRILL RIG ROTARY/MOBILE B-40

DRILLING CONTRACTOR MOBILE AUGERS & RESEARCH

DATUM GEODETIC (Approx.)

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED
CL-CLEAVAGE J-JOINT R -ROUGH UE-UNEVEN
SH-SHEAR P-POLISHED ST-STEPPED W -WAVY
VN-VEIN S-SLICKENSIDED PL-PLANAR C -CURVED

PROJECT 881-1814E

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (M)	RUN No.	PENETRATION RATE (M/MIN)	FLUSH % RETURN COLOUR	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3M	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
9				-1.10												
		0.00 to 9.70m overburden see overburden logs for description		9.00												
				-1.80												
		META ARKOSE, black to red to white alternating bands of biotite quartz and feldspar, heavily hematized micro-cyrstalline foliation @ 25-35 deg., @ 10.0 to 10.50m rock is sheared with abundant microfolds, 9.70 to 12.00m broken core with core loss due to drilling technique		9.70	1	.083							BROKEN AND LOST CORE			
10					2	.073										
					3	.016										
					4	.03										
					6	.034										
11																
					6	.038										
					7	.076										
12					8	.067							LOST CORE			
					9	.073										
13																
				-5.45												
		End of Drillhole		13.35												
14																

DEPTH SCALE

1 : 25

Golder Associates

LOGGED R.B.

DATE ~~24/08/88~~ 16 Aug 89

CHECKED Blum

RECORD OF BOREHOLE BH88-D103

SHEET 1 OF 3

LOCATION 9632N 10,126E LOCAL CO-ORDINATES

BORING DATE 27/07/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

BORING METHOD: SOLID STEM AUGER; MOBILE AUGERS B40

DEPTH SCALE METRES	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC; WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Ground Surface		7.80							
	Gravelly SAND, medium to coarse subrounded sand, some fine subrounded gravel, trace coarse subrounded gravel, wet, medium brown		0.00	1	AS	-		O	MH	
			7.00							
1	SAND, silty, gravelly, occasional cobbles and boulders, wet, light brown, (TILL)		0.60							
	@ 1.35 to 1.70m becoming greyish brown, trace clay			2	AS	-		N.P. O I	MH	
	boulder at 1.70m									
2	Begin NQ Coring at 2.00m									
	@ 2.00m auger refusal on boulder									
			4.67	3	RC	-				
3			2.93							
	no permafrost encountered									
4										
5	continued on next page		2.80							
			5.00							

0 10 ◆ 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RB

CHECKED Bwm

RECORD OF BOREHOLE BH88-D103

SHEET 2 OF 3

LOCATION 9632N 10,126E LOCAL CO-ORDINATES

BORING DATE 27/07/88

DATUM GEODETIC (Approx.)

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-1814E

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3M	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ● U.- O)	HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
5	NO CORING MOBILE AUGERS B-40	continued from page 1		2.60							
		BEDROCK see rock log		5.00							
				2.18							
		End of Borehole		5.42							
6											
7											
8											
9											
10											

0 / 16 ◆ 6 PERCENT AXIAL STRAIN AT FAILURE / 10

DEPTH SCALE

1 : 25

Golder Associates

LOGGED RB

CHECKED Bum

RECORD OF DRILLHOLE BH88-D103

SHEET 3 OF 3

LOCATION 9832N 10,128E LOCAL CO-ORDINATES
INCLINATION AZIMUTH

DRILLING DATE 27/07/88
DRILL RIG ROTARY/MOBILE B-40
DRILLING CONTRACTOR MOBILE AUGERS & RESEARCH

DATUM GEODETIC (Approx.)

PROJECT 881-1814E

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED
CL-CLEAVAGE J-JOINT R -ROUGH UE-UNEVEN
SH-SHEAR P-POLISHED ST-STEPPED W -WAVY
VN-VEIN S-SLICKENSIDED PL-PLANAR C -CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (M)	RUN No.	PENETRATION RATE (M/MIN)	% RETURN / COLOUR FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3m	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
2				5.80												
		0.00 to 2.95m overburden see overburden log for description		2.00												
				4.65												
3		META ARKOSE, black to red to white alternating bands of biotite feldspar and quartz, feldspar heavily hematized, fine grained, 3.90 to 4.35m rock is sheared with abundant microfolds, foliation @ 25 deg throughout core		2.95	2	.02										
					3	.0242										
					4	.0233										
					5	.0422							FO,R,TR P			
4													FO,R,TR P			
					6	.0223										
					7	.0345							FO,R,UE,S FO,SM,TR S FO,SM,P,TR S, HEMATITE			
5													FO,R,HEMATITE, TR CHLORITE			
				2.18									J,P,TR S,UE			
		End of Drillhole		5.42									J,R,IRR,P,TR S			
6																
7																

DEPTH SCALE
1 : 25

Golder Associates

LOGGED R.B.
DATE ~~24/08/88~~ 16/Aug/89
CHECKED Burn