Public Works Canada
Travaux Publics Canada

Western Region Région de l'Ouest

D003542

Granular Materials Inventory
Liard Highway
N.W.T.

Oct. 1980

CANADA

Department of Public Works ADVICE OF TRANSMITTAL

Ministère des Travaux publics AVIS DE TRANSMISSION

DATE 19 Nov 80
Your File/V/réf.
Our File/N/réf.

NOV 20 1980
T8

RE:
OBJET: LIARD HWY

1- THE FOLLOWING ITEMS/LES ARTICLES SUIVANTS

1. 4 COPIES - GRANULAR MATERIAL INVENTORY OCT 1980
2. 4 COPIES - ADDENDUM to ABOVE AT PETITOT RIVER CROSSING KM 257 LIARD HWY

2- ☐ ARE ENCLOSED / CI-INCLUS ☒ ATTACHED / CI-JOINTS ☐ UNDER SEPARATE COVER / SOUS PLI SÉPARÉ

3- FORWARDED BY/MODES DE TRANSMISSION

☐ AIR MAIL / POSTE AÉRIENNE ☐ AIR EXPRESS / MESSAGERIES AÉRIENNES ☐ REGISTERED / RECOMMANDÉS
☐ REGULAR MAIL / COURRIER ORDINAIRE ☐ RAIL EXPRESS / MESSAGERIES (RAIL) ☐ SPECIAL DELIVERY / PAR EXPRÈS
☐ PARCEL POST / COLIS POSTAUX ☒ MESSENGER / MESSAGER ☐

4- FOR/POUR

☐ INFORMATION / VOTRE GOUVERNE ☐ ACTION / DONNER SUITE ☐ AND RETURN / ET À RETOURNER
☐ COMMENTS / VOS OBSERVATIONS ☐ TEST REPORT / VOTRE RAPPORT D'ESSAI ☐
☐ APPROVAL / VOTRE APPROBATION ☒ DISTRIBUTION / DIFFUSION

5- REMARKS/REMARQUES

PLEASE SIGN & RETURN 1 COPY

SIGNATURE	FOR/POUR	RETURN ADDRESS/ADRESSE DE L'ENVOYEUR
R.M. McCullough	G.D. REID TRANSPORTATION DIRECTOR	

DPW 76 (REV. 6/69)
7530-21-023-8754

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PUBLIC WORKS CANADA

Western Region

Report on
GRANULAR MATERIALS INVENTORY
LIARD HIGHWAY
N.W.T.

R.D. Cook, P. Eng.
October 1980

I INTRODUCTION

This report documents all available information and data on granular material sources in close proximity to the Liard Highway within the N.W.T. The highway and the locations of known granular deposits are shown on the 1:250,000 map in Appendix A. A total of 13 deposits have been identified along the 254 km route. Most deposits will provide long-term sources of granular material, however some areas (#6, #7, #9 and possibly #11) will be depleted at completion of highway construction.

A brief description of each source including access, quality of material, quantity available, etc. is in Appendix B. Plans and/or airphotos on which each deposit is delineated are also included in Appendix B along with all available borehole or test pit data.

There is a shortage of accessible quality granular deposits along the route. From the MacKenzie Highway to Ft. Liard the highway closely parallels the Liard River. Granular deposits in the form of channel bars, floodplain deposits, abandoned terraces and ridges are common-place within the Liard channel, however access to these features is difficult due to high channel banks and/or expanses of poorly drained floodplains, abandoned channels, etc. Granular glacial features are non-existent near the route with the exception of Source No. 9, a buried outwash deposit. There are alluvial granular deposits along several tributary streams to the Liard River, in the form of outwash, terraces, floodplain and channel deposits - ie. Poplar, Birch, Blackstone and Muskeg Rivers, and these types of deposit are the major sources of granular near the route.

From Ft. Liard to the N.W.T. border the highway approximately parallels the Pettitot River. Topographically the area is a relatively flat till plain with a conspicuous absence of granular glacial deposits. Sources of granular here are limited to high abandoned terraces near the confluence of the Pettitot and Liard Rivers, and lower terraces and floodplain deposits at the route crossing of the Pettitot in British Columbia - a gap of some 40 kilometers. Channel bars along the

Pettitot may contain some granular material within this gap, however the Pettitot is incised some 150 m below the till upland in a narrow valley and access is impossible.

Source No. 1

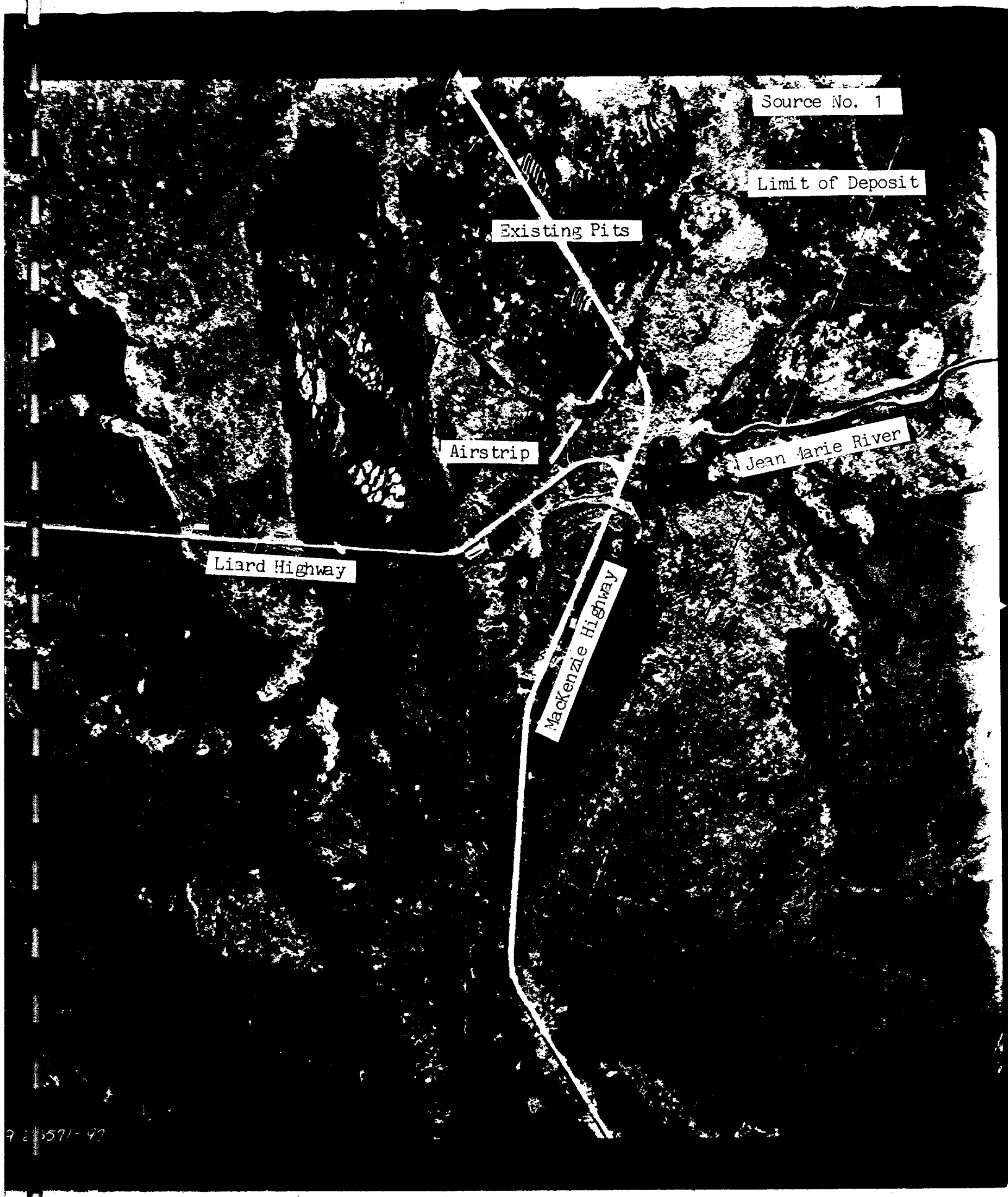
Location: Approx. km 414 MacKenzie Highway - 2.4 km north of junction of Liard Hwy.

Description: Large outwash area, relatively flat.

Material: Sandy gravel, gravelly sand, sand.

Estimated Volume: Not established due to lack of test hole data on depth of deposit. Probably 1,000,000 + m^3.

Comment: Deposit has been used extensively for surfacing on both Liard and MacKenzie Highways. Territorial Government may have test hole or test-pit data on this area. There is currently an active pit on the NE side of the MacKenzie Highway at approximately km 414.


Source No. 1
Limit of Deposit
Existing Pits
Airstrip
Jean Marie River
Liard Highway
Mackenzie Highway

Source No. 2

Location: km 34.5 Liard Highway on the east side of the Poplar River.

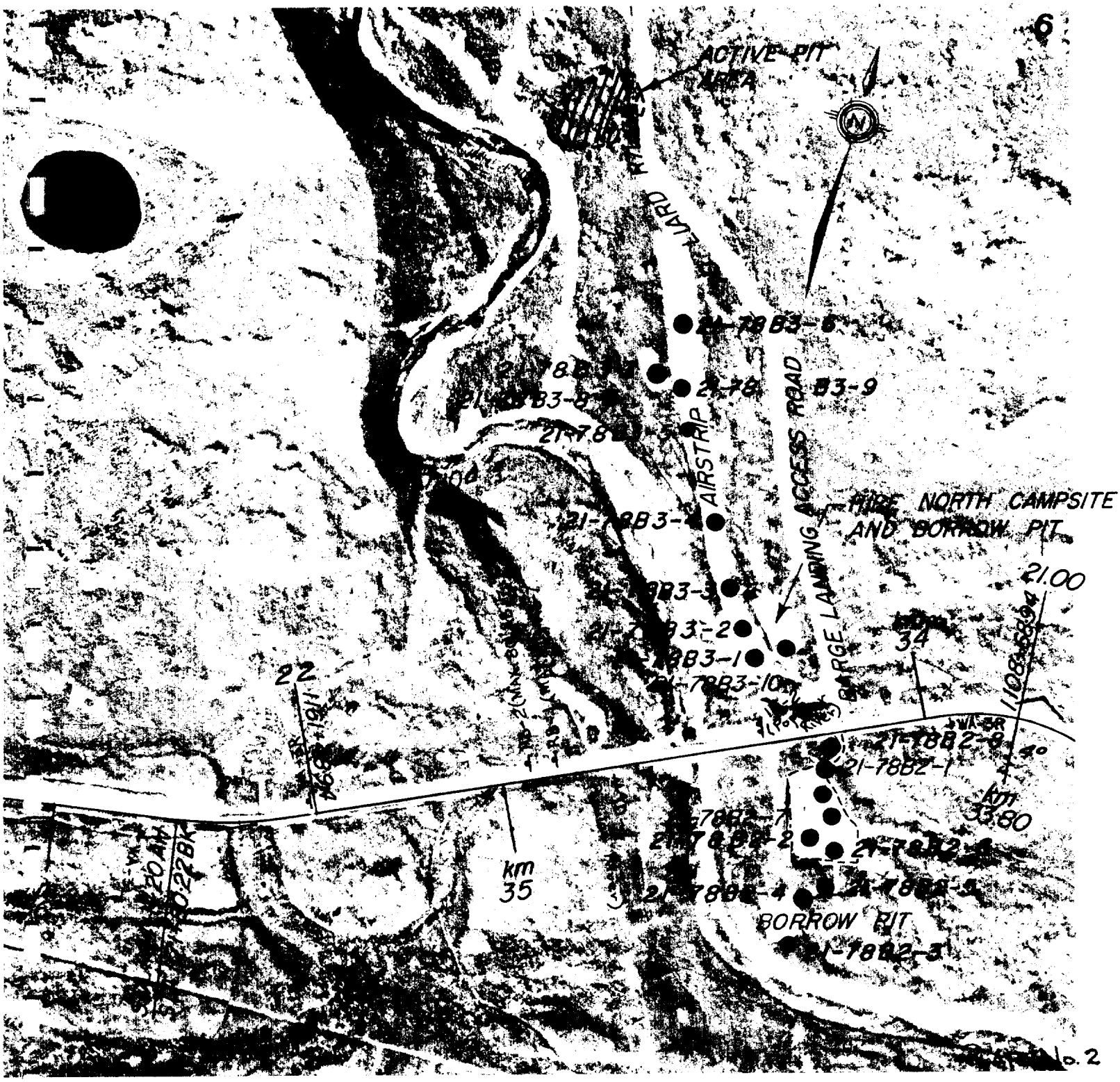
Description: Narrow alluvial terrace along the Poplar River.

Material: Sandy gravel, extensive cobbles and boulders in part.

Estimated Volume: Not established due to limited test hole data - probably in excess of 500,000 m^3 of material suitable for crushing.

Comment: With reference to plate No. 2, areas test-drilled contain granular materials but have excess boulder content and are not a prime source for aggregates. Area of present active pit by Territorial Government is approximately 1.5 km north of Liard Highway along Barge Access Road.

Liard River
Barge Access Road
Source No. 2
Airstrip
Liard Highway
Poplar River


ACTIVE PIT AREA
N
AIRSTRIP
BARGE LANDING ACCESS ROAD
PIPE NORTH CAMPSITE AND BORROW PIT
21.00
34
22
km 35
km 33.80
BORROW PIT

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN	FIELD ENG.	DATE DRILLED 78/6/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH RONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		2

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2						BORROW PIT #2			2								
4						HOLE 1-2-3-4-			4								
6						6 & 7			6								
8						GRAVEL FROM TOP SURFACE			8								
10						UNABLE TO PENETRATE			10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

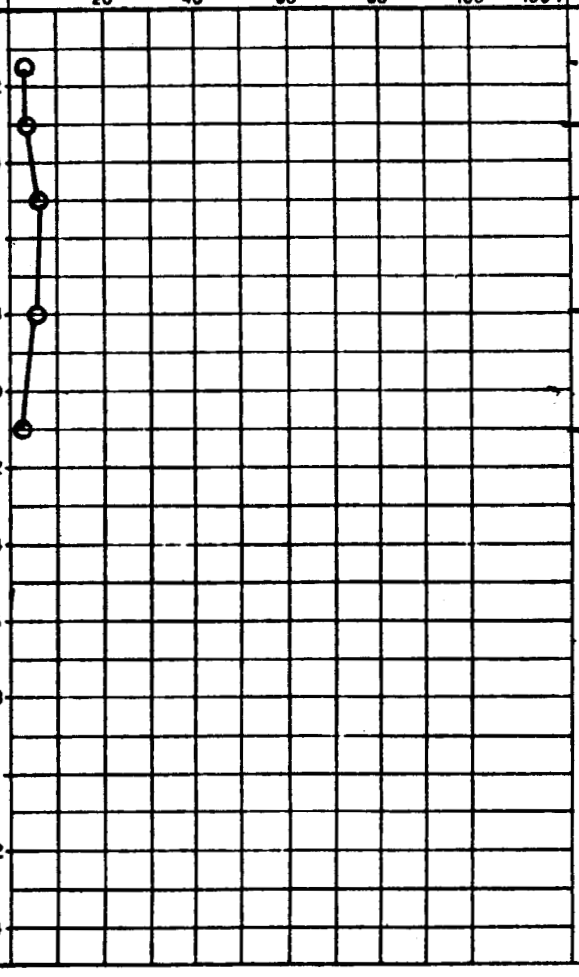
DWN:	FIELD ENG:	DATE DRILLED: 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P		2

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT



DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					GW	GRAVEL - SANDY			3	11	86		DAMP		
					GM	SAND - GRAVEL MIX SILTY			11	45	44		MOIST		
									26	41	33		MOIST		
					GW	GRAVEL - SANDY			15	27	58		MOIST		
					GM				8	17	75		MOIST		
						13'									
						BOTTOM OF HOLE - 13'									

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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

~~MACKENZIE HIGHWAY~~

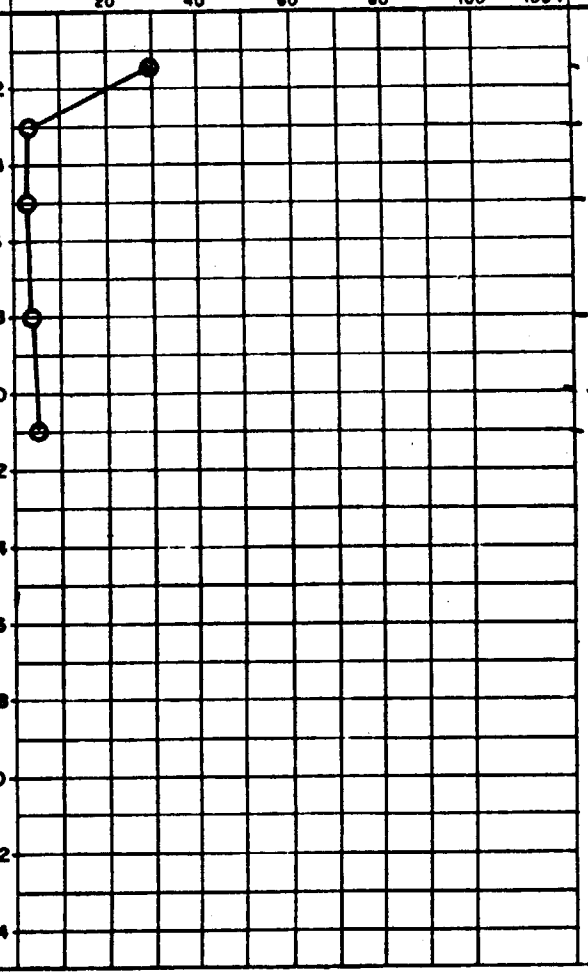
LIARD HWY

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH Prokych	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY		FROZEN	90	9	1				
2						2'									
					GM	GRAVEL - SILTY - SANDY			15	11	74				
4									4	44	52				
6						SAND - GRAVELLY									
8					SP				8	65	27				
10									7	53	40				
12						12'									
						BOTTOM OF HOLE - 12'									
14															
16															
18															
20															
22															
24															



LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

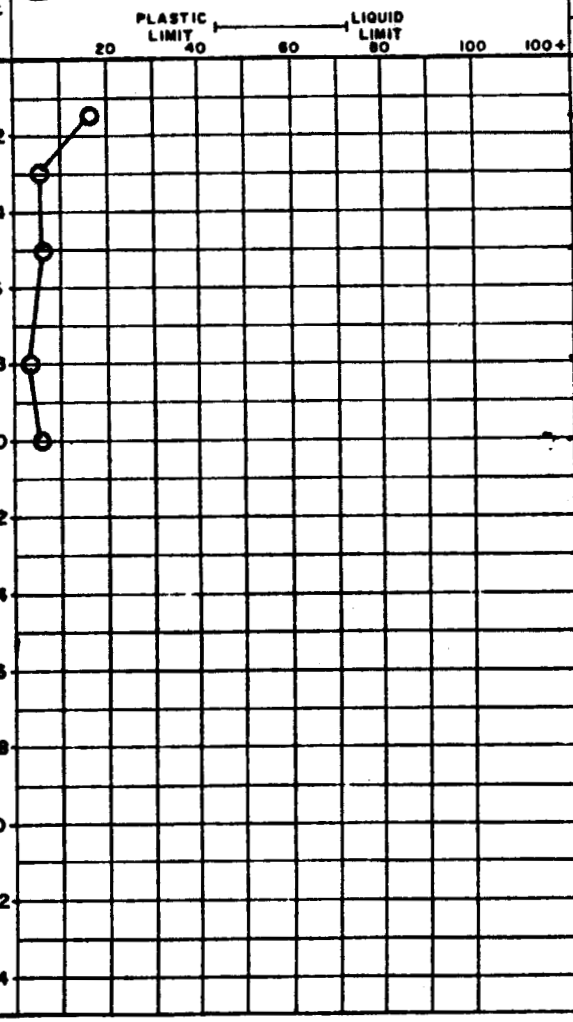
DWN	FIELD ENG.	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 2

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					CL	CLAY - SILTY 1'		FROZEN							
2					ML	SILT - CLAYEY 2'			9	4	6	0	MOIST		
					GC	GRAVEL - CLAYEY - SILTY - SANDY			25	31	44		DAMP		
4									17	49	34		MOIST		
6					GW	- SANDY									
8					GM	SILTY SANDY			9	24	67		MOIST		
10						10'			11	27	62		WET		
						BOTTOM OF HOLE - 10' REFUSAL									
12															
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONNICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY 1'			9	62	29		DAMP		
2					SP	SAND - GRAVELLY			5	52	43		DAMP		
						GRAVEL - SANDY									
4									4	36	60		DAMP		
6					GW										
8									2	22	76		DAMP		
10									1	22	77		DAMP		
12						COBBLE & BOULDERS 13'			6	44	50		WET		
14						BOTTOM OF HOLE - 13'									
16						FREE WATER ON AUGER									
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT

20 40 60 80 100 100+

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LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

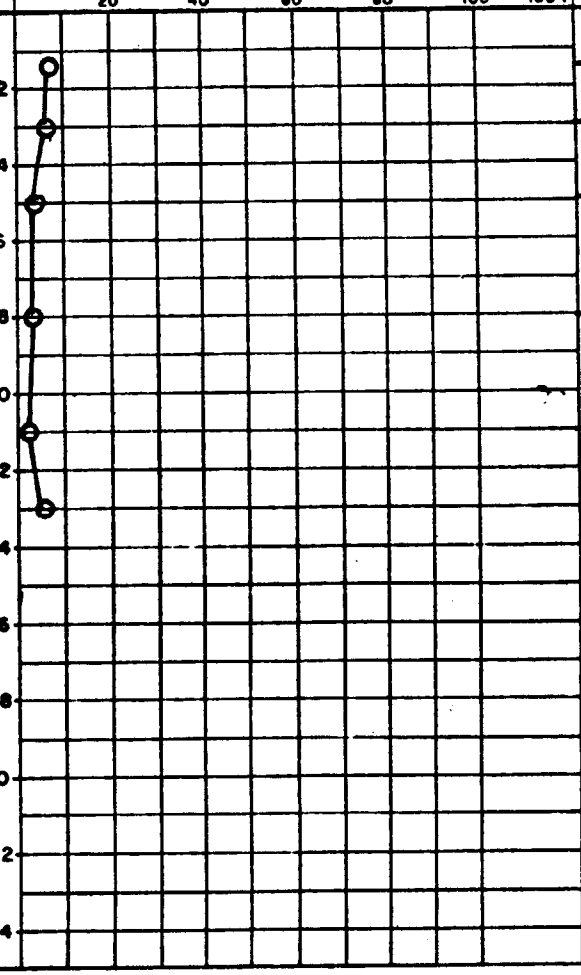
DWN:	FIELD ENG:	DATE DRILLED: 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-CLAYEY 1'			31	54	15		MOIST		
2					SM	SAND-GRAVELLY SILTY TO 5'			20	39	41		MOIST		
4					SP				10	60	30		MOIST		
6															
8									4	85	11		MOIST		
10															
12						13'			6	81	13		MOIST		
						BOTTOM OF HOLE - 13'			14	63	23		WET		
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL											
2						REFUSAL AT 1'			2								
4									4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

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LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED Aug 19	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH Pronych	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					GP	GRAVEL - SAND MIX								MOIST		
2									2					MOIST		
						GRAVEL - SANDY										
4					GW				4					MOIST		
6									6							
8									8					MOIST		
10									10					MOIST		
12									12							
14									14					MOIST		
16									16							
18									18							
20						20'			20					MOIST		
						BOTTOM OF HOLE - 20'										
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONNICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY 1'			9	62	29		DAMP		
2					SP	SAND - GRAVELLY			5	52	43		DAMP		
						GRAVEL - SANDY									
4									4	36	60		DAMP		
6					GW										
8									2	22	76		DAMP		
10									1	22	77		DAMP		
12						COBBLE & BOULDERS 13'			6	44	50		WET		
14						BOTTOM OF HOLE - 13'									
16						FREE WATER ON AUGER									
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT

20 40 60 80 100 100+

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

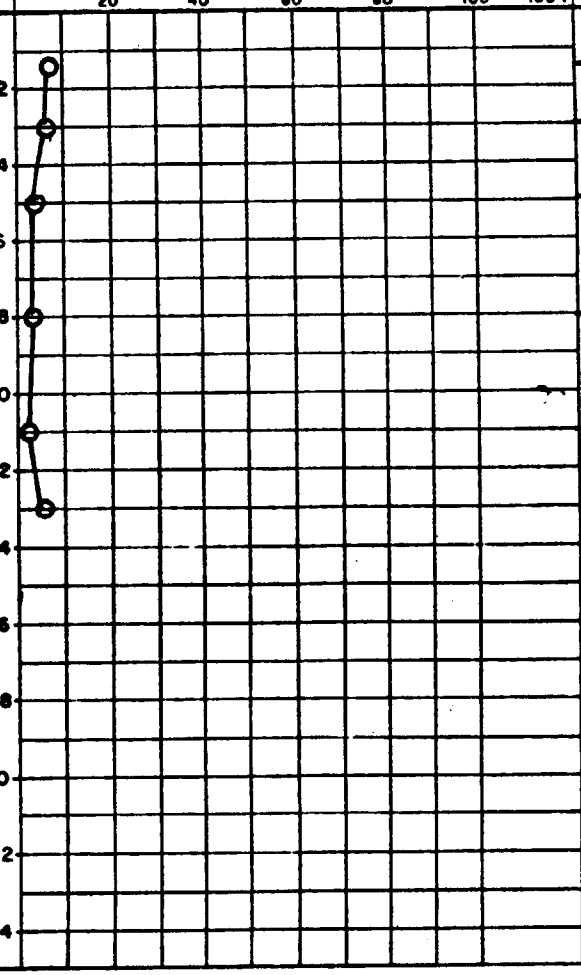
DWN:	FIELD ENG:	DATE DRILLED: 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-CLAYEY 1'			31	54	15		MOIST		
2					SM	SAND-GRAVELLY SILTY TO 5'			20	39	41		MOIST		
4					SP				10	60	30		MOIST		
6															
8									4	85	11		MOIST		
10															
12						13'			6	81	13		MOIST		
						BOTTOM OF HOLE - 13'			14	63	23		WET		
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL											
2						REFUSAL AT 1'			2								
4									4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY

DWN	FIELD ENG	DATE DRILLED 8/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PROMICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 6

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						BOULDERS ON SURFACE											
2						GRAVEL			2								
4						REFUSAL @ 1'			4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN	FIELD ENG.	DATE DRILLED 78/6/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH RONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		2

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2						BORROW PIT #2			2								
4						HOLE 1-2-3-4-			4								
6						6 & 7			6								
8						GRAVEL FROM TOP SURFACE			8								
10						UNABLE TO PENETRATE			10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

~~MACKENZIE HIGHWAY~~

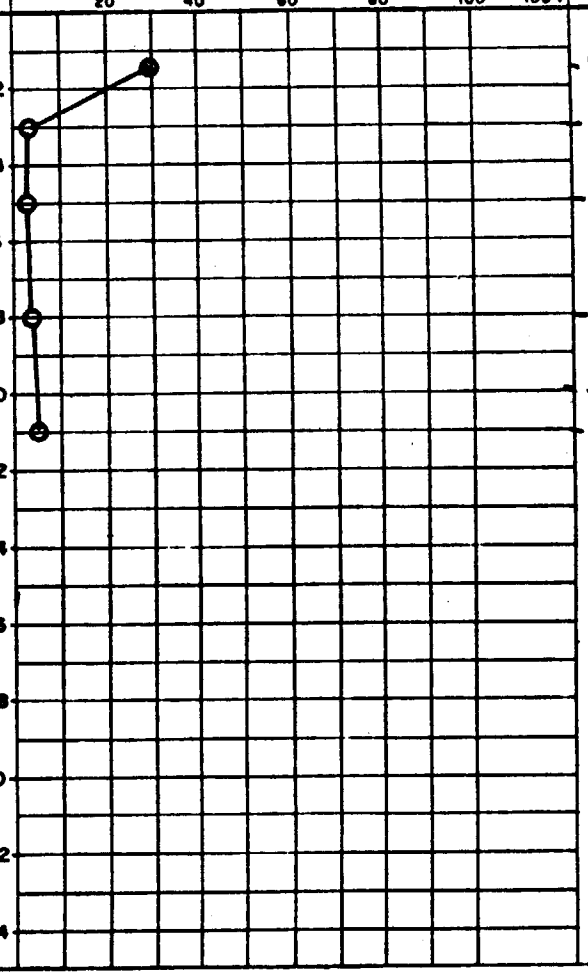
LIARD HWY

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH Prokych	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY		FROZEN	90	9	1				
2						2'									
					GM	GRAVEL - SILTY - SANDY			15	11	74				
4									4	44	52				
6						SAND - GRAVELLY									
8					SP				8	65	27				
10									7	53	40				
12						12'									
						BOTTOM OF HOLE - 12'									
14															
16															
18															
20															
22															
24															



DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONNICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY 1'			9	62	29		DAMP		
2					SP	SAND - GRAVELLY			5	52	43		DAMP		
						GRAVEL - SANDY									
4									4	36	60		DAMP		
6					GW										
8									2	22	76		DAMP		
10									1	22	77		DAMP		
12						COBBLE & BOULDERS 13'			6	44	50		WET		
14						BOTTOM OF HOLE - 13'									
16						FREE WATER ON AUGER									
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT

20 40 60 80 100 100+

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

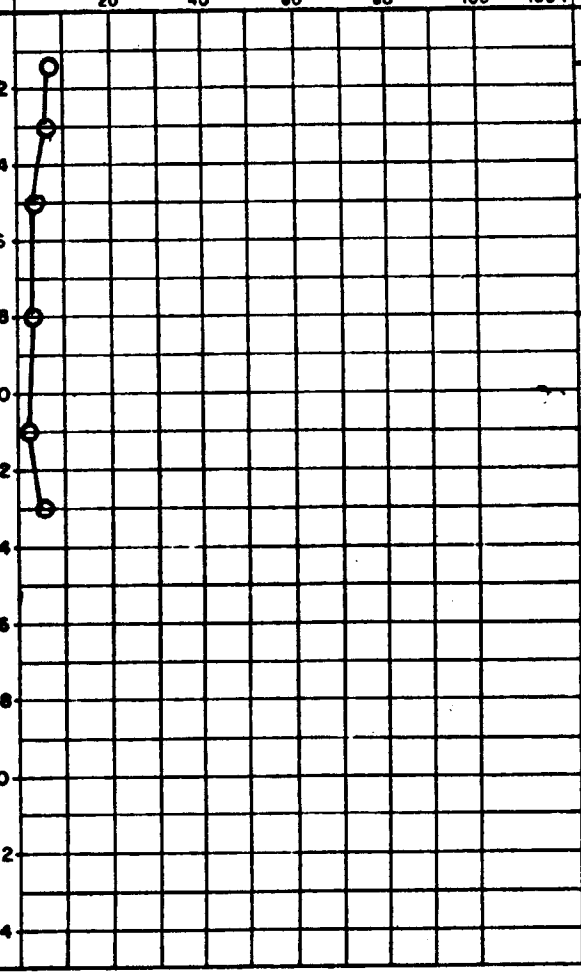
DWN:	FIELD ENG:	DATE DRILLED: 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-CLAYEY 1'			31	54	15		MOIST		
2					SM	SAND-GRAVELLY SILTY TO 5'			20	39	41		MOIST		
4					SP				10	60	30		MOIST		
6															
8									4	85	11		MOIST		
10															
12						13'			6	81	13		MOIST		
						BOTTOM OF HOLE - 13'			14	63	23		WET		
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL											
2						REFUSAL AT 1'			2								
4									4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED Aug 19	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH Pronych	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					GP	GRAVEL - SAND MIX								MOIST		
2									2					MOIST		
						GRAVEL - SANDY										
4					GW				4					MOIST		
6									6							
8									8					MOIST		
10									10					MOIST		
12									12							
14									14					MOIST		
16									16							
18									18							
20						20'			20					MOIST		
						BOTTOM OF HOLE - 20'										
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONNICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - CLAYEY 1'			9	62	29		DAMP		
2					SP	SAND - GRAVELLY			5	52	43		DAMP		
						GRAVEL - SANDY									
4									4	36	60		DAMP		
6					GW										
8									2	22	76		DAMP		
10									1	22	77		DAMP		
12						COBBLE & BOULDERS 13'			6	44	50		WET		
14						BOTTOM OF HOLE - 13'									
16						FREE WATER ON AUGER									
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT

20 40 60 80 100 100+

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

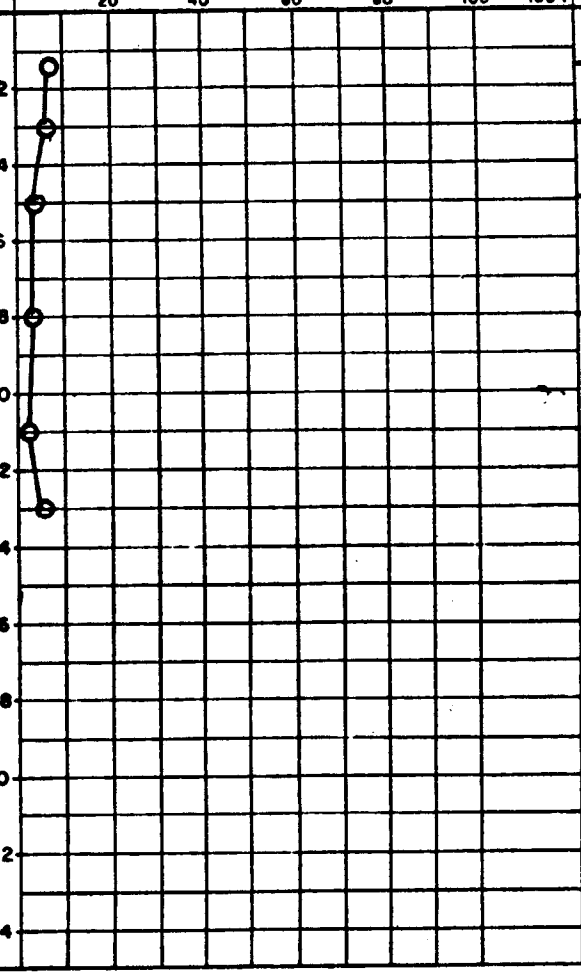
DWN:	FIELD ENG:	DATE DRILLED: 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-CLAYEY 1'			31	54	15		MOIST		
2					SM	SAND-GRAVELLY SILTY TO 5'			20	39	41		MOIST		
4					SP				10	60	30		MOIST		
6															
8									4	85	11		MOIST		
10															
12						13'			6	81	13		MOIST		
						BOTTOM OF HOLE - 13'			14	63	23		WET		
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 8/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL											
2						REFUSAL AT 1'			2								
4									4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED Aug 19	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH Pronych	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					GP	GRAVEL - SAND MIX								MOIST		
2									2					MOIST		
						GRAVEL - SANDY										
4					GW				4					MOIST		
6									6							
8									8					MOIST		
10									10					MOIST		
12									12							
14									14					MOIST		
16									16							
18									18							
20						20'			20					MOIST		
						BOTTOM OF HOLE - 20'										
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED Aug 19	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH Pronych	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					GP	GRAVEL - SAND MIX								MOIST		
2									2					MOIST		
						GRAVEL - SANDY										
4					GW				4					MOIST		
6									6							
8									8					MOIST		
10									10					MOIST		
12									12							
14									14					MOIST		
16									16							
18									18							
20						20'			20					MOIST		
						BOTTOM OF HOLE - 20'										
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

R073

LIARD Hwy.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG.	DATE DRILLED 78/01/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PROWYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 8

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) (PLASTIC LIMIT — LIQUID LIMIT; 20 40 60 80 100 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					Pt	PEAT 2"											
						CLAY SILTY 1'											
2						GRAVEL - SANDY			2								
4						REFUSAL @ 1½'			4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

1073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 9

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL											
2						REFUSAL @ 1'			2								
4									4								
6									6								
8									8								
10									10								
12									12								
14									14								
16									16								
18									18								
20									20								
22									22								
24									24								

RDP2

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

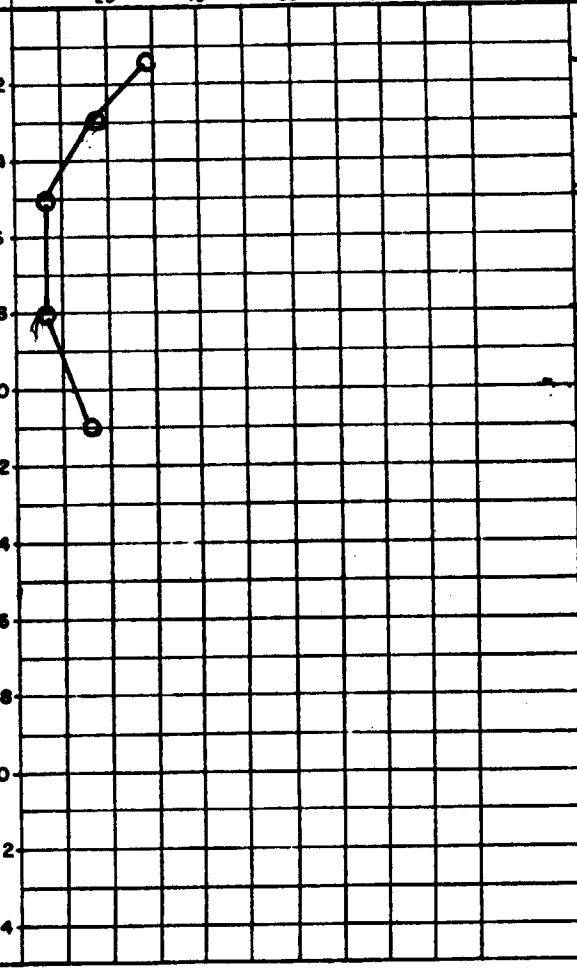
LIARD Hwy

DWN:	FIELD ENG:	DATE DRILLED: 7/9/19	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 10

MILE	B,C,S	NUMBER
B.P.		3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
2					ML	SILT - CLAYEY		
4						4'		
6					SM	SAND - SILTY GRAVELLY		
8								
10						PEBBLES		
12								
14						14'		
16						BOTTOM OF HOLE - 14'		
18						FREE WATER ON AUGERS		
20								
22								
24								



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
94	6	0		WET		
96	4	0		MOIST		
30	50	20		MOIST		
22	50	28		MOIST		
17	76	7		WET		

R073

Source No. 3

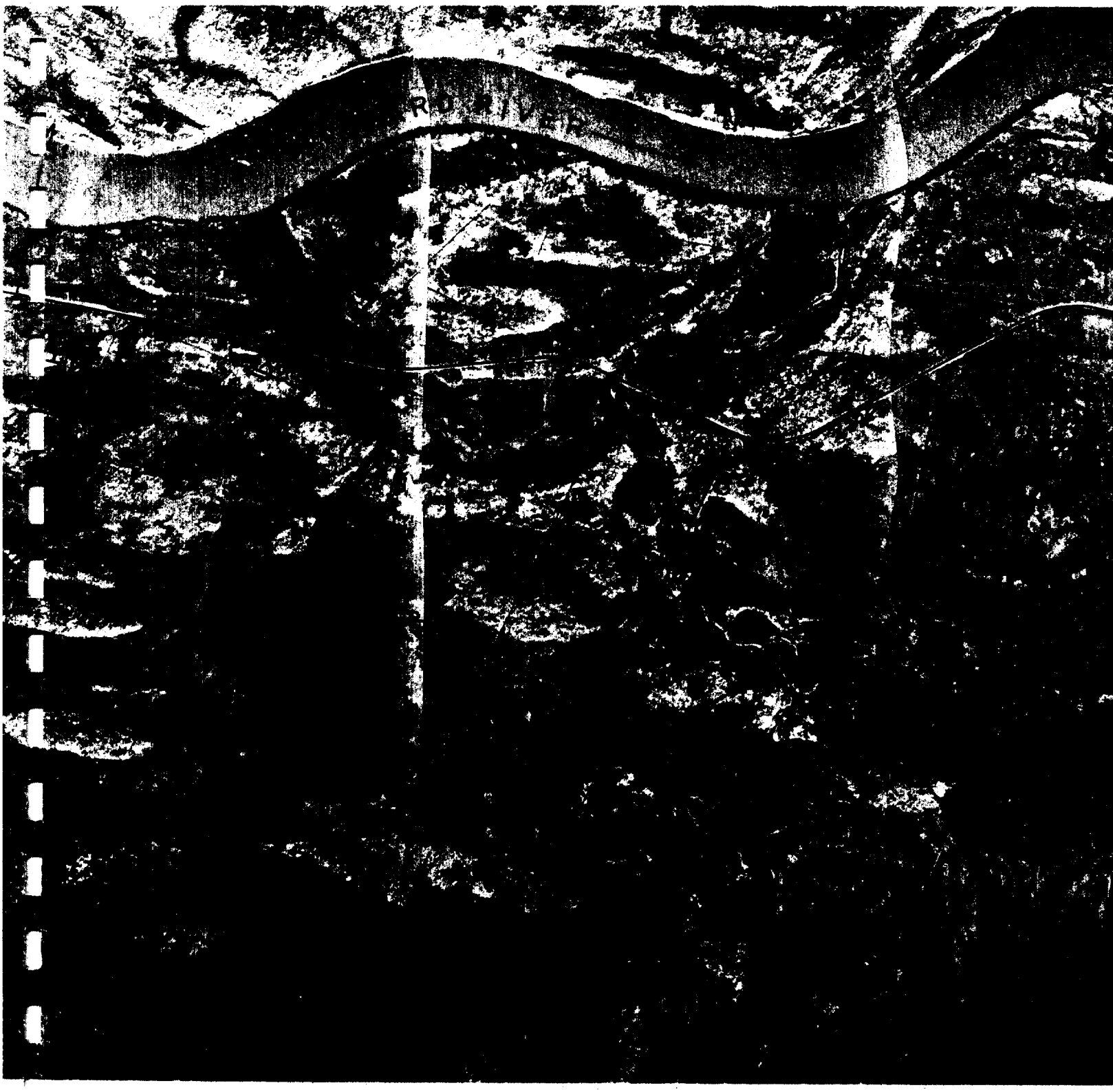
Location: Approximately 2 km south at km 52 of the Liard Highway.

Description: Alluvial deposits and terraces along the west side of the Birch River.

Material: Sandy gravel and gravelly sand.

Estimated Volume: In the order of 1,000,000 m^3 of granular material, however quality unproven.

Comment: Borehole locations and existing pit development shown on plates #1 and #2. Additional drilling required to determine area for expansion and potential volume.



100-1-17

PLATE No. 1

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

LIARD HWY

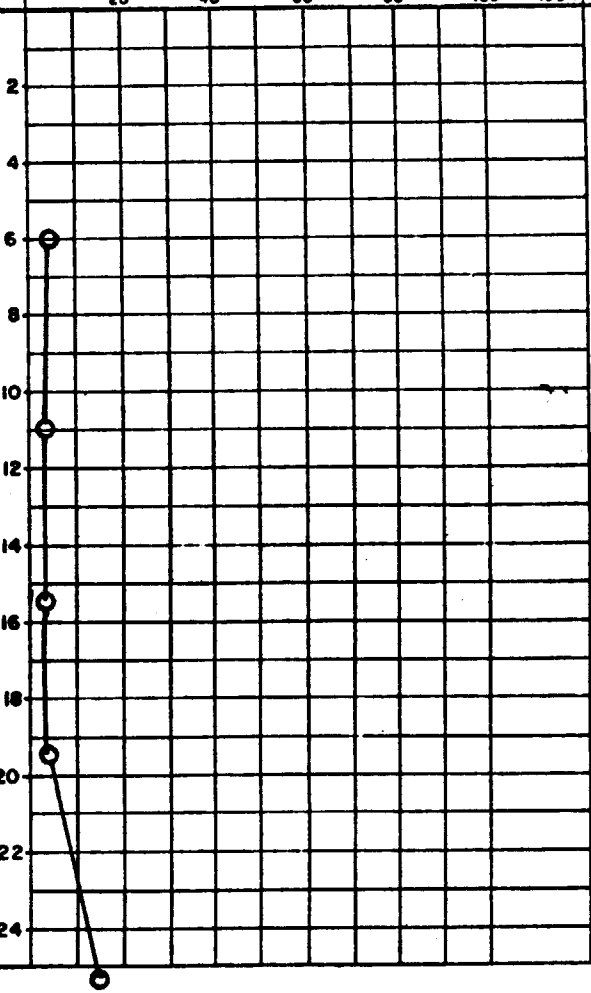
DWN	FIELD ENG	DATE DRILLED [illegible]/20	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL - SANDY									
2															
4															
6													MOIST		
8					GW										
10													MOIST		
12															
14															
16													MOIST		
18															
20													WET		
22								FROZEN							
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



SAT.

HL SAND-SILTY PEBBLES 26'

BOTTOM OF HOLE. 26'

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY

DWN	FIELD ENG	DATE DRILLED 78/01/20	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 2

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) (PLASTIC LIMIT 20–40, LIQUID LIMIT 60–80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - SANDY CLAYEY											
2									2								
4									4								
6						6'			6	NO SAMPLE'S TAKEN							
					SM	SAND - SILTY FEW PEBBLES											
8									8								
10									10								
12									12								
14								FROZEN	14								
16									16								
18									18								
20						20			20								
						BOTTOM OF HOLE 20'											
22									22								
24									24								

RD73

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 78/9/20	AIRPHOTO NO:	CHAINAGE:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:

OFFSET:
ELEV:

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2					GW	GRAVEL - SANDY									
4													DAMP		
6															
8													DAMP		
10															
12					GM	SILTY									
14													DAMP		
16															
18									7	1	98		DRY		
20															
22															
24					GW	SANDY							MOIST		

DEPTH (FEET) 2 4 6 8 10 12 14 16 18 20 22 24

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT
20 40 60 80 100 100+

BOTTOM OF HOLE 32' REFUSAL

RO73

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN:	FIELD ENG:	DATE DRILLED: 8/9/20	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH: PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		5

REMARKS

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
					GW	GRAVEL - SANDY								
2														
4														
6													DAMP	
8														
10													MOIST	
12					SP	SAND-GRAVELLY								
14														
16								FROZEN					WET	
18													WET	
20					GP	GRAVEL-SAND MIX 21'								
22						BOTTOM OF HOLE - 21'								
24														

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT
20 40 60 80 100 100+

R079

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY

DWN	FIELD ENG	DATE DRILLED 8/01/70	AIRPHOTO NO:	CHAINAGE:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:

OFFSET:
ELEV:

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					Pt	PEAT 2"		
					ML	SILT - CLAYEY 11"		
2						GRAVEL - SANDY		
4								
6								
8					GW			
10								
12								
14								
16								
18								
20								
22								
24								
						25'		

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
11	25	64		DAMP		
5	19	76		DAMP		
4	10	86		DAMP		
3	13	84		DAMP		
5	39	56		DAMP		

BOTTOM OF HOLE - 25'
BY LOG BOOK
SAMPLES TAKEN @ 30'-31'

- 4-33-63 MOIST

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD Hwy

DWN	FIELD ENG	DATE DRILLED 8/01/20	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 6

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					Pt	Peat 14"									
					ML	Silt 1'									
2						GRAVEL - SANDY									
4									8	11	81		DAMP		
6					GW										
8									3	29	68		DAMP		
10															
12															
14									4	24	72		DAMP		
16															
18									4	30	66		DAMP		
20															
22															
24									3	27	70		DAMP		

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT
20 40 60 80 100 100+

BOTTOM OF HOLE - 25'

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY

DWN	FIELD ENG	DATE DRILLED 19/10/70	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH PRONYLH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		5

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						14									
2					Gp	SAND - GRAVEL MIX SILTY									
4									11	-	41	48	MOIST		
6															
8					Sp	SAND - GRAVELLY			6	-	64	30	DAMP		
10															
12															
14									9	-	61	30	DAMP		
16															
18					Sm	SILTY			11	-	64	25	DAMP		
20						20'									
22						BOTTOM OF HOLE .20'									
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

R073

Source No. 4

Location: On channel bars of Liard River near km 96 of Liard Highway.

Description: Alluvial deposits on channel bars of Liard River.

Material: Sandy gravel and gravelly sand - variable silt content.

Estimated Volume: Volume dependent upon water levels. Estimate 15,000 to 30,000 m^3 depending upon area of excavation and depth.

Comment: Area has been test pitted only to max. 1.5 m. With reference to plate #1, only area #4A has been tested. Surface gravel also evident in area #4B. Haul distance from highway to area 4A approximately 3.3 km (1 km on all-weather Barge Access Road). Area 4B approximately 4 km to highway. Winter haul only.

Liard River
Source No. 4B
Source No. 4A
Liard Highway
Barge Access Road
23-71 66 LINE 2-NE (66-83)
AS 13-28
LIARD HIGHWAY, FROM MILE 0 TO MILE 134 NWT
AG 1048 153-272 mm 8900 ASL 14-9-72

TL / JF 2

FILE NO. _____

SOURCE No. 4A

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

LAB. SAMPLE NO.	1117
BAG NO.	1
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HOLE 1	1'-4'
HIGHWAY	
PIT NAME & NO.	Km 96 - SOURCE #4A
DATE SAMPLED	80/09/29
CONTRACTOR	
ENGINEER	
DATE SAMPLED	80/09/29
DATE RECEIVED	80/09/29
DATE REPORTED	80/10/09

TO: C. YURCHAK

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	85.4	76.6	
1"	76.7	62.7	
3/4"	71.9	550	
5/8"			
1/2"	61.3	38.1	
3/8"	54.9	27.8	
#4	37.5	0	100
#8	28.9		77.0
#16	22.1		59.0
#30	11.1		29.7
#50	4.8		12.7
#100	3.4		9.1
#200	2.6		7.0

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	3.13
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

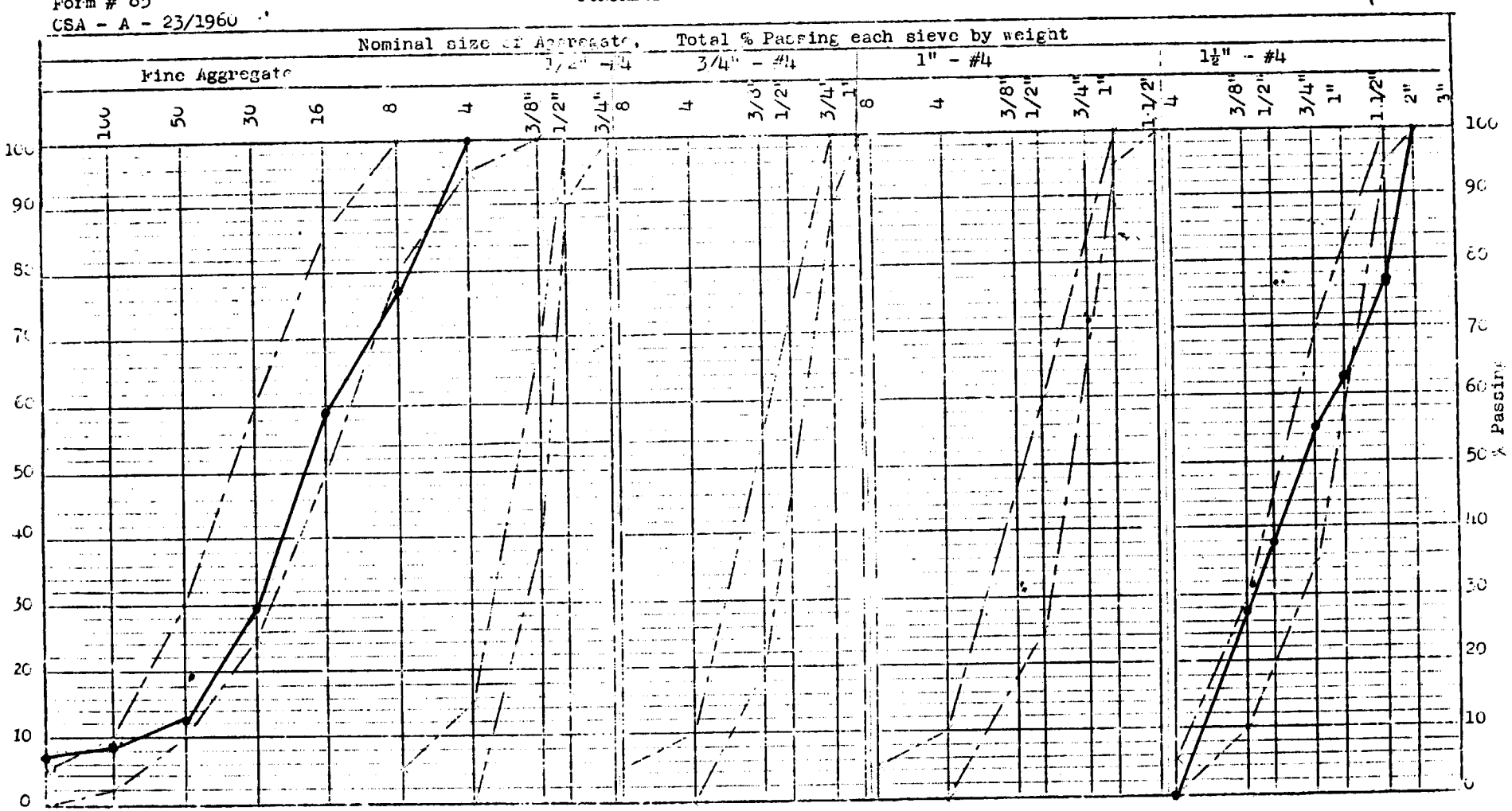
Remarks: _____

Signed: DEPT. OF PUBLIC WORKS OF CANADA QUALITY CONTROL CENTRE EDMONTON
MATERIALS TESTING ENGINEER

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 1117



Source No. 5

Location: East side of Blackstone River at km 107 of Liard Highway.

Description: Alluvial floodplain deposit of Blackstone River.

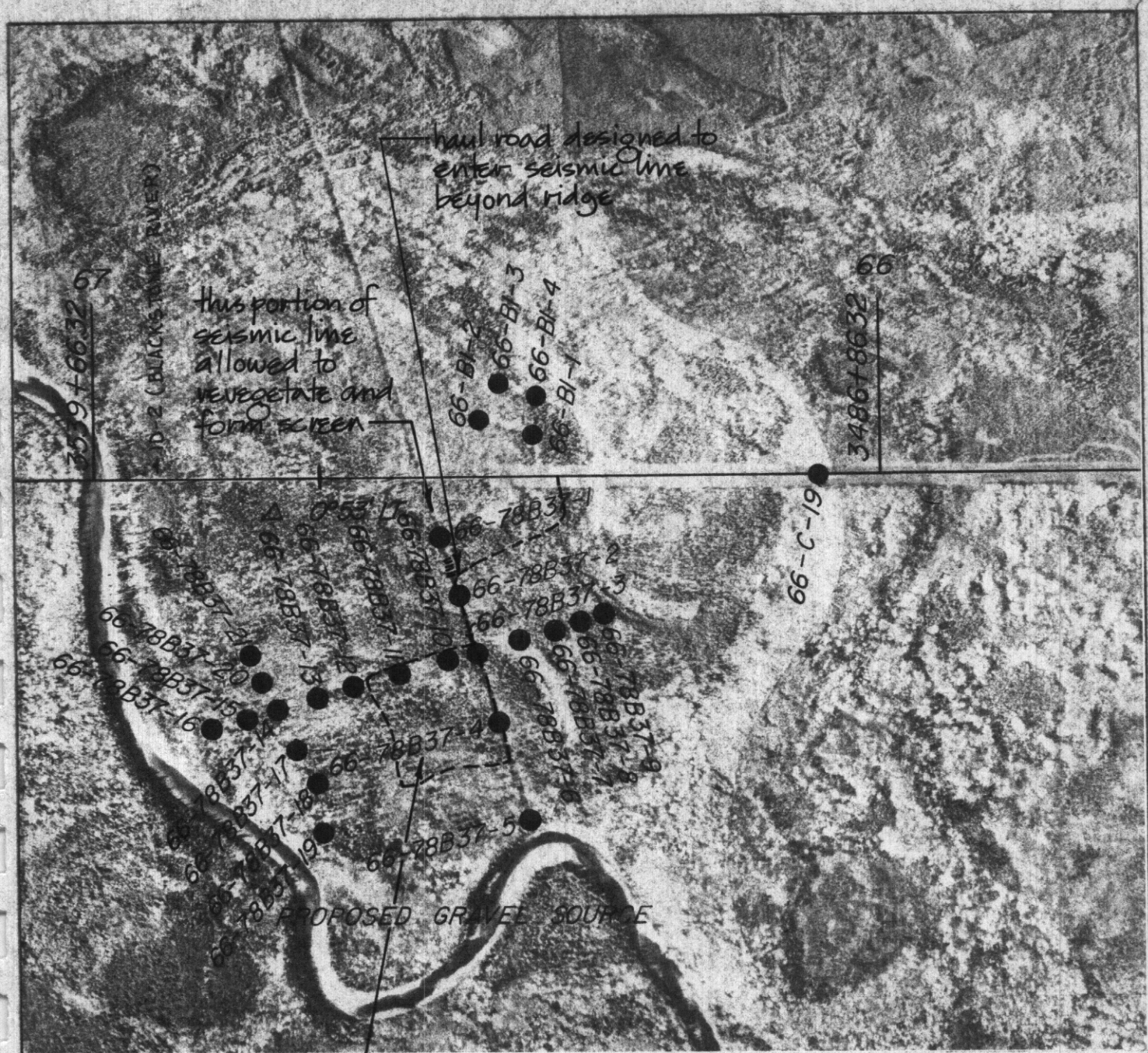
Material: Sandy gravel, gravelly sand, variable silt content.

Estimated Volume: In the order of 250,000 m^3 on south side of highway some of which high in sand content. Additional volume available to north of highway but area reserved for campsite area.

Comment: Average stripping in the order of 1 m. Approximate outline of present pit shown on plate #2. Preferred expansion should be westerly toward Blackstone River.

Plate No. 1

2·24



BORROW REQUIRED
20,000 cy.
(stripping)

current area required for gravel
- does not indicate eventual shape
- stripping to be used in haul road + embankment const.

Public Works Canada / Travaux publics Canada	drawing title / titre du dessin: GRAVEL AREA M 66 LIARD HWY.	designed by / conçu par — date
		drawn by / dessiné par: G.G. ALLAN — date
		reviewed by / examiné par: [illegible] — date
	scale / échelle	approved by / approuvé par — date
region: WESTERN	revisions — date	project number: 085915
	revisions	no. de entreprise
		drawing no: FIVE — no du dessin

D.P.W. 700 A

PLATE No 2

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

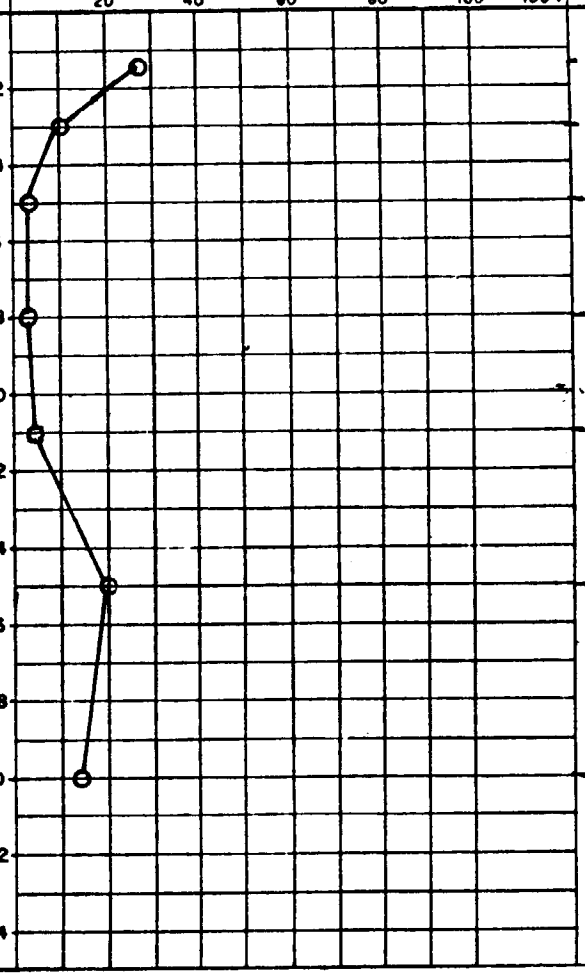
DWN	FIELD ENG	DATE DRILLED 78 01 27	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH WEBBER	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 1

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					CL	CLAY - SILTY			97	3	0		WET		
2					ML	SILT CLAYEY			53	21	26		MOIST		
						3'									
4						SAND - GRAVEL									
					SP	MIX			6	49	45		DAMP		
6															
					GP				4	57	39		MOIST		
8															
10									5	47	48		MOIST		
12															
						14'									
14						CLAY - SILTY									
						SANDY			58	33	9		MOIST		
16					CI	PEBBLES									
						MED. PLASTIC									
18					WL	AT & ABOVE PL									
						TILL			59	34	7		MOIST		
20						20'									
						BOTTOM OF HOLE - 20									
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



GRAIN-SIZE ANALYSIS

R073

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

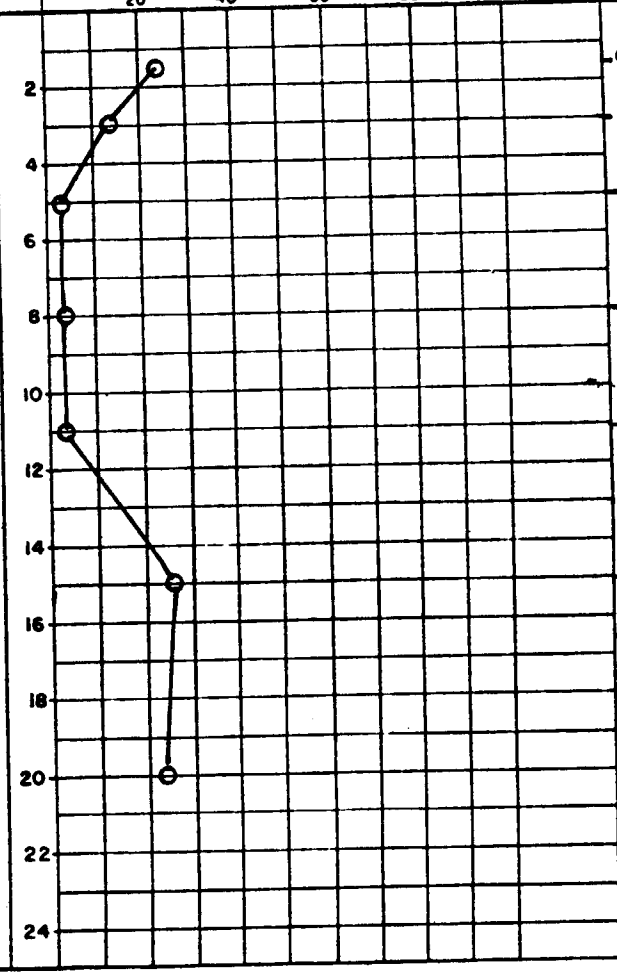
LIARD HIWY

DWN	FIELD ENG	DATE DRILLED 18 a 27	AIRPHOTO NO:	CHAINAGE	OFFSET
CKD	TECH WEBBER	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 2

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2					ML	SILT - CLAYEY SANDY			94	6	0		WET		
4						4'			69	31	0		MOIST		
6					SP	SAND - FINE - COARSE GRAVELLY			7	92	1		DAMP		
8									5	79	15		DAMP		
10									6	62	32		DAMP		
12															
14						14'									
16					CL	CLAY - SILTY SANDY PEBBLES LOW - MED. PLASTIC			87	13	0		MOIST		
18						11% ABOVE P.									
20						20'			87	10	3		MOIST - WET		
22						BOTTOM OF HOLE - 20'									
24															



R073

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 8/01/72	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH WEBBER	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 3

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					SP	SAND - GRAVELLY - GRAVEL - SAND MIX			6	63	31		MOIST		
2									9	48	43		MOIST		
4									3	54	43		MOIST		
6					GP										
8									3	48	49		MOIST		
10					GP	GRAVEL SANDY			6	29	65		DAMP		
12						13'									
14					CL	CLAY - SILTY SANDY GRAVELLY LOW-MED PLASTIC			31	50	19		MOIST		
16															
18					CI	10% @ P_L									
20						20'			61	35	4		MOIST		
22						BOTTOM OF HOLE - 20'									
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟵⟶ LIQUID LIMIT

20 40 60 80 100 100+

R073

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

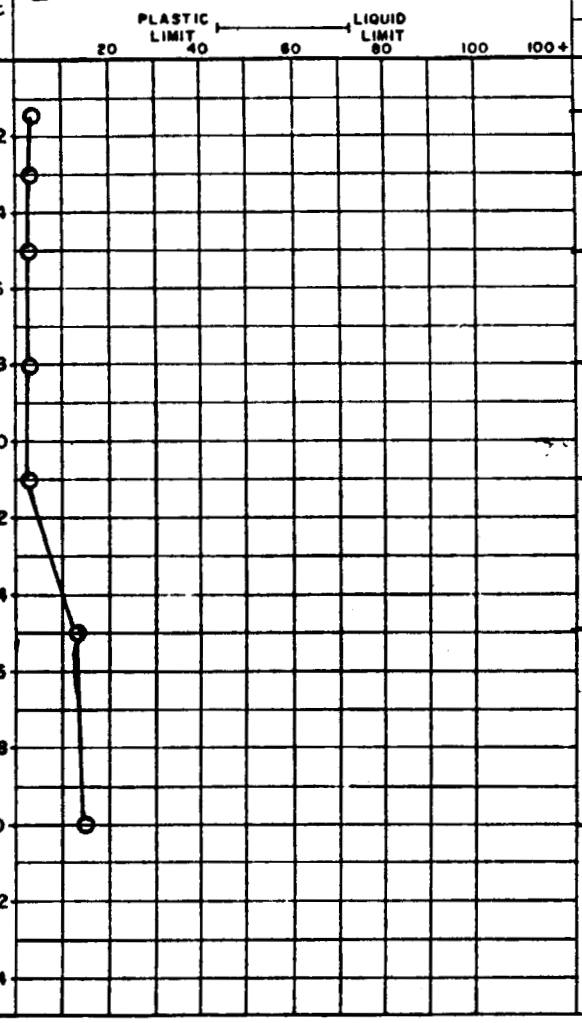
DWN	FIELD ENG	DATE DRILLED 18/6/27	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH WEBBER	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 4

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					SP	SAND-GRAVELLY			7	67	26		MOIST		
2					SP	SAND-GRAVEL MIX			7	50	43		MOIST		
4					GP				4	50	46		MOIST		
6															
8									7	47	46		MOIST		
10									4	55	41		MOIST		
12						13'									
14					CL	CLAY-SILTY SANDY PEBBLES			45	41	14		MOIST		
16						LOW PLASTIC									
18						W% @ PL									
20						GRAVELLY 20'			39	38	23		MOIST		
22						BOTTOM OF HOLE - 20'									
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



R073

LIARD HWY

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

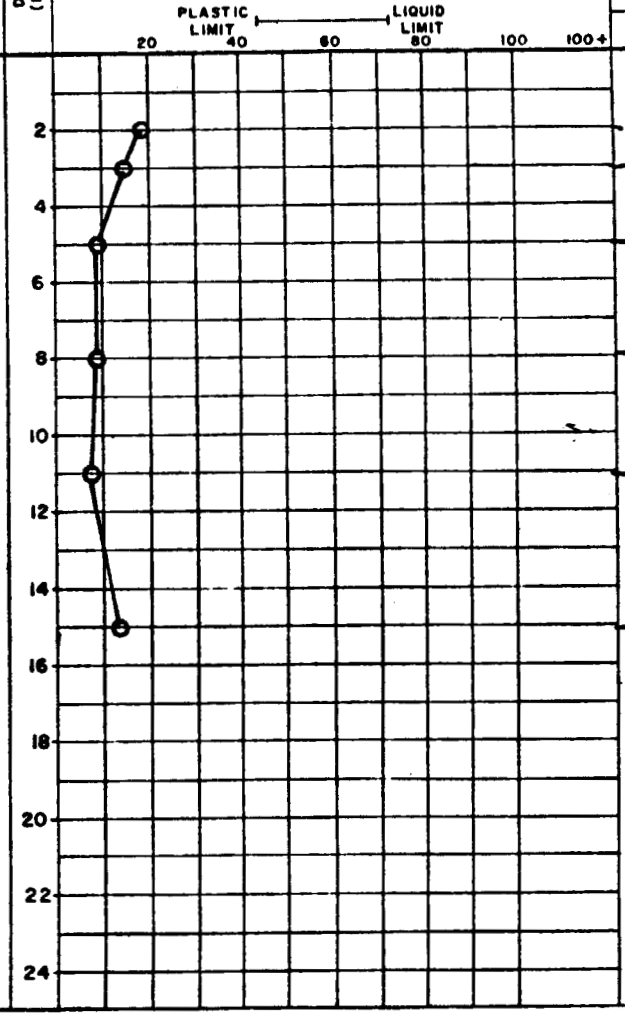
DWN	FIELD ENG	DATE DRILLED 78/01/27	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH WEBBER	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 5

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
2					ML	SILT- CLAYEY SANDY		
4						4'		
6					SM	SAND- SILTY FINE		
8								
10								
12						13'		
14					CL	CLAY-SILTY SANDY -PEBBLES TILL		
16						15'		
18						BOTTOM OF HOLE- 15		
20								
22								
24								

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2	94	6	0		MOIST		
4	72	28	0		MOIST		
6	40	60	0		MOIST		
8	30	70	0		MOIST		
10	22	78	0		MOIST		
14	53	42	5		MOIST-WET		

R073

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

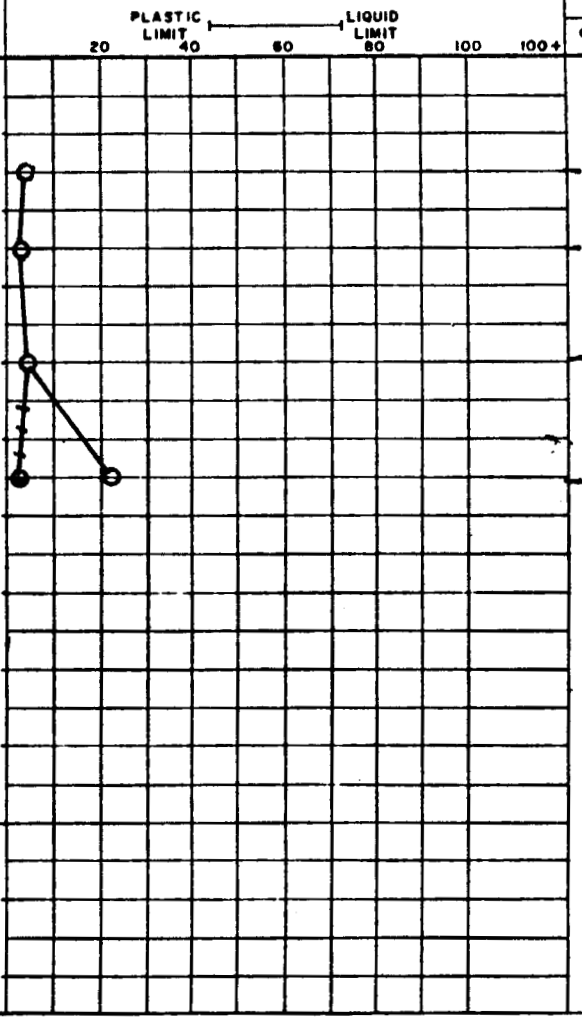
DWN	FIELD ENG	DATE DRILLED 18/9/29	AIRPHOTO NO:	CHAINAGE	OFFSET
CKD	TECH PROWNICH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 6

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						GRAVEL - SANDY									
2									7		40	53	MOIST		
4					GP				4		23	73	MOIST		
6					GW										
8						WET @ 8' 9'			4		27	69	MOIST		
10					CL	CLAY-SILTY SANDY PEBBLES TILL LOW PLASTIC 11'			46		37	17	WET		
12						BOTTOM OF HOLE - 11'									
14															
16															
18															
20															
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



R073

LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 78/04/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

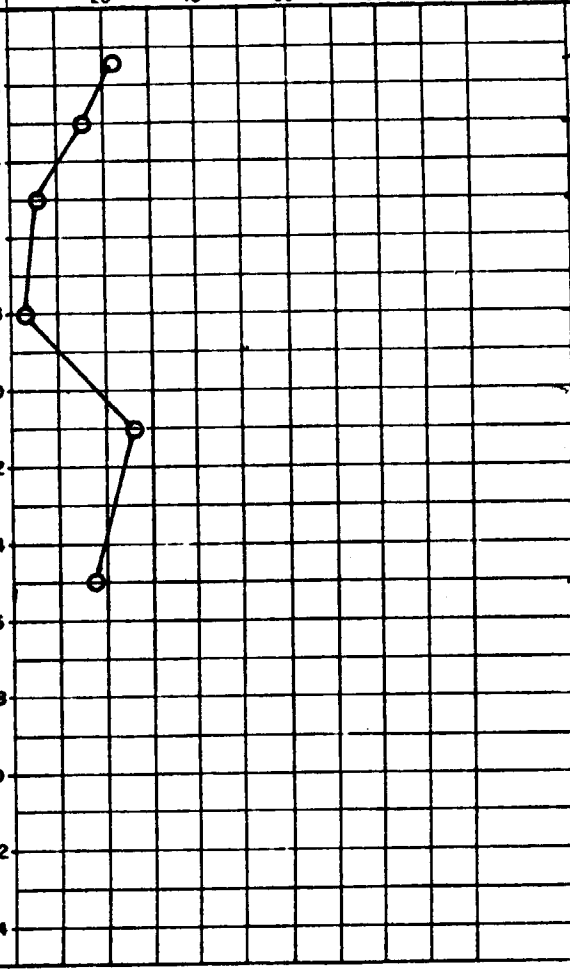
TEST HOLE 7

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
						SILT - CLAYEY										
2					ML	SANDY			2	98	2	0		MOIST		
4						5'			4	85	15	0		MOIST		
6					ML	SILT-GRAVELLY SANDY 7'			6	47	24	29		MOIST		
8					GP	GRAVEL - SANDY			8	4	41	55		MOIST		
10					SM	SAND-GRAVELLY SILTY			10	11	51	38		MOIST		
12						13'			12							
14					CL	CLAY-SILTY SANDY GRAVELLY LOW PLASTIC TILL 15'			14	60	32	8		MOIST-WET		
16						BOTTOM OF HOLE - 15'			16							
18									18							
20									20							
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+



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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY

DWN	FIELD ENG	DATE DRILLED 18/9/79	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 8

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) (PLASTIC LIMIT — LIQUID LIMIT; 20 40 60 80 100 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - SANDY											
2						3.0			2								
4						SAND - SILTY			4								
						FINE PEBBLES											
6									6	NO SAMPLES							
					SM	DAMP											
8									8	TAKEN							
10									10								
12						13'			12								
						CLAY - SILTY SANDY											
14					CL	15'			14								
16						BOTTOM OF HOLE - 15'			16								
18									18								
20									20								
22									22								
24									24								

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Liard Hwy.	DRILL HOLE REPORT	DEPARTMENT OF PUBLIC WORKS, CANADA ~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 78/01/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:	TEST HOLE 9
CKD	TECH Pronych	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV	

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	Silt - Sandy 3'											
2									2								
4					Sm	Sand - Silty Few Pebbles Damp			4								
6									6	No Samples Taken							
8									8								
10									10								
12									12								
14					CL	Clay - Silty Sandy Pebbles 13' 15'			14								
16						Bottom of Hole - 15'			16								
18									18								
20									20								
22									22								
24									24								

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LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 78/01/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 10

MILE	B,C,S	NUMBER
BP		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
2					ML	SILT - SANDY		
4					SM	SAND . SILTY PEBBLES		
6								
8					CL	CLAY - TILL		
10						MOIST 11'		
12						BOTTOM OF HOLE . 11'		
14								
16								
18								
20								
22								
24								

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT

20 40 60 80 100 100+

NO SAMPLES TAKEN

GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS

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LIARD Hwy.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 18/9/79	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PROWICH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 11

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20 40 60 80 100 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-SANDY PAND 1'											
2									2								
4						SAND - SILTY PEBBLES			4								
6									6	NO SAMPLES TAKEN							
8					SM	GRAVELLY 8 - 12'			8								
10									10								
12						12'			12								
14					CL	CLAY - TILL 15'			14								
16						BOTTOM OF HOLE - 15'			16								
18									18								
20									20								
22									22								
24									24								

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LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 18/9/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 12

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					ML	SILT - SANDY 1'		
2					SM	SAND - SILTY PEBBLES		
4								
6					GP	GRAVEL - SANDY 3' - 8'		
8								
10					SP	SAND - GRAVELLY 8' - 13		
12						13'		
14					CL	CLAY - TILL 15'		
16						BOTTOM OF HOLE - 15'		
18								
20								
22								
24								

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT
20 40 60 80 100 100+

NO SAMPLES TAKEN

DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2							
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							

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LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 78/01/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 13

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) (PLASTIC LIMIT 20 40 60 LIQUID LIMIT 80 100 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT SANDY 1'											
2						GRAVEL - SANDY			2								
4									4								
6					GP				6	○	3	28	69		MOIST		
					GW												
8									8	○	2	35	63		MOIST		
10									10								
12									12								
14						15'			14								
16						CLAY - SILT SANDY PEBBLES			16								
18					CL				18								
						TILL 20'											
20						BOTTOM OF HOLE - 20'			20								
22									22								
24									24								

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LIARD Hwy.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG.	DATE DRILLED 18/9/79	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE 14

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT-SANDY 11'									
2						GRAVEL - SANDY									
4					GP				9	21	70		MOIST		
6															
8									5	33	62		MOIST		
10					GW										
12						SILTY SANDY CLAYEY									
14									16	32	52		MOIST		
16															
18						SANDY 19'			3	35	62		MOIST		
20					CL	TILL 20'									
22						BOTTOM OF HOLE - 20'									
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

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LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 8/9/29	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH PRONYCH	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 15

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT - SANDY 2.0'									
2						GRAVEL-SANDY									
4									6	32	62		MOIST		
6					GP GW										
8									3	32	65		MOIST		
10															
12						FREE WATER AFTER 13'			4	29	67		MOIST		
14						14'									
16						TILL ?									
18					CL										
20						20'									
22						BOTTOM OF HOLE . 20'									
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⊢——⊣ LIQUID LIMIT
20 40 60 80 100 100+

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LIARD HWY.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 18/01/78	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH PRONYCH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 16

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT (20, 40, 60, 80, 100, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2						SILT-SANDY CLAYEY			2								
4					ML				4								
6									6	NO SAMPLES TAKEN							
8						9'			8								
10						CLAY-SILTY SANDY PEBBLES WET			10								
12					CL				12								
14						15'			14								
16						BOTTOM OF HOLE - 15			16								
18									18								
20									20								
22									22								
24									24								

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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

LIARD HWY.

DWN	FIELD ENG	DATE DRILLED 18/01/79	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD	TECH WEBBER	RIG: B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

TEST HOLE 17

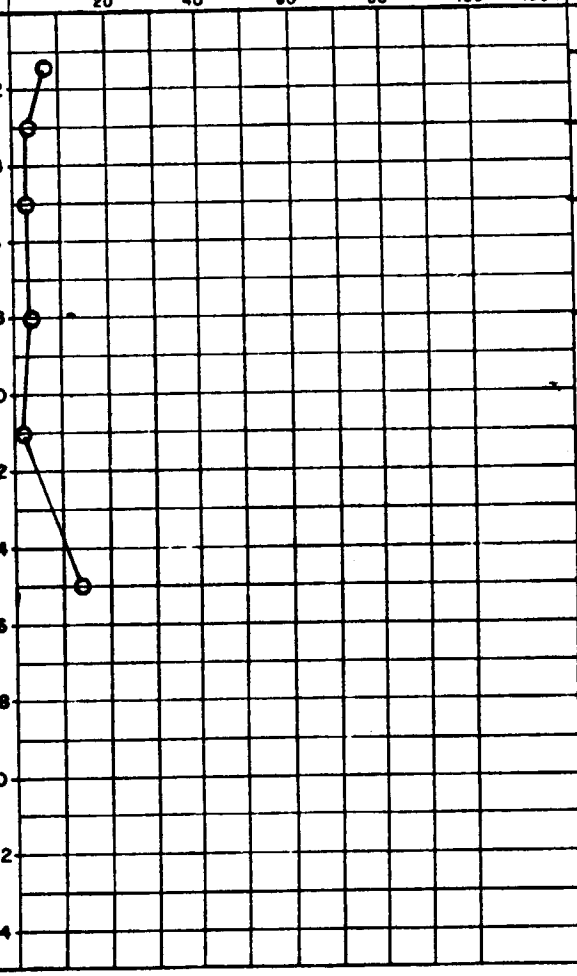
MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	DEPTH (FEET)	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					SM	SAND - SILTY PEBBLES 2'				38	57	5		MOIST		
2					GM	GRAVEL - SANDY SILTY			2	11	38	51		MOIST		
4						SANDY			4	3	42	55		MOIST		
6					GP				6							
8					GW				8	7	26	67		MOIST		
10						12'			10	4	33	63		MOIST		
12						CLAY - SILTY SANDY PEBBLES			12							
14						15'			14	57	34	9		MOIST-WET		
16						BOTTOM OF HOLE - 15'			16							
18									18							
20									20							
22									22							
24									24							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT

20 40 60 80 100 100+



GRAIN-SIZE ANALYSIS

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DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

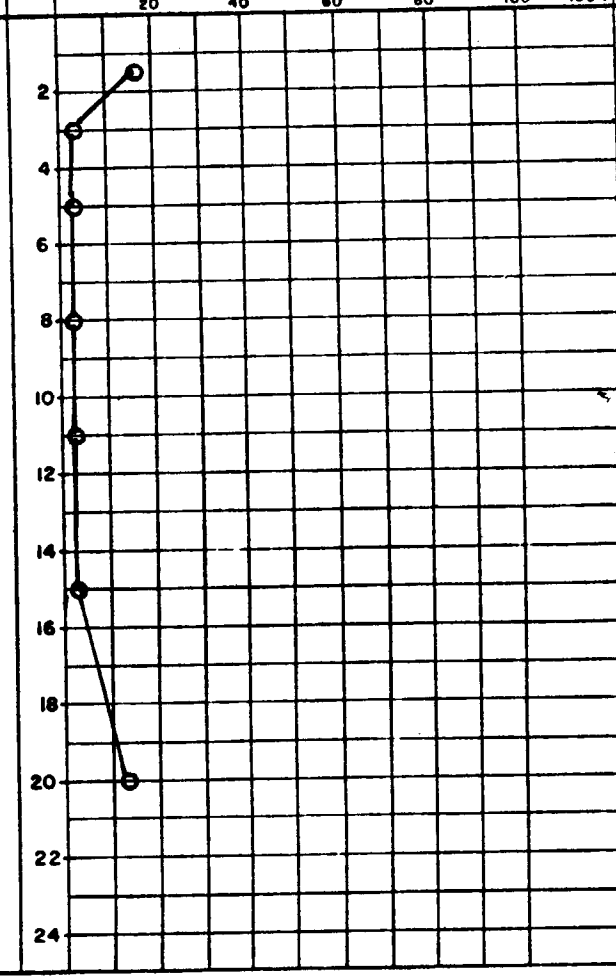
LIARD HWY.

DWN	FIELD ENG	DATE DRILLED 18/01/79	AIRPHOTO NO:	CHAINAGE	OFFSET
CKD	TECH W.F. BAER	RIG B-50	SURFACE DRAINAGE:	VEGETATION	ELEV

TEST HOLE 18

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					ML	SILT - CLAYEY SANDY		
2'						GRAVEL - SANDY		
					GP			
					GW			
16'								
					CL	CLAY - SILTY SANDY PEBBLES TILL		
20'					CI	LOW - MED PLASTIC		
						BOTTOM OF HOLE - 20'		



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
58	42	0		WET		
11	38	51		MOIST		
6	45	48		MOIST		
8	40	52		MOIST		
6	33	61		MOIST		
4	30	66		MOIST		
63	33	4		MOIST		

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LIARD Hwy.

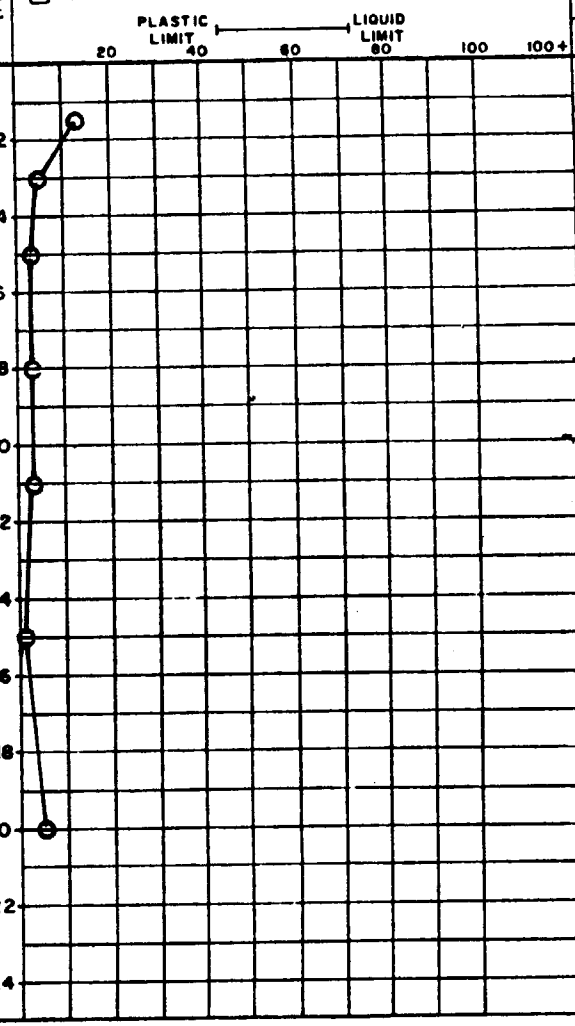
DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED Jan/29	AIRPHOTO NO:	CHAINAGE:	OFFSET:	TEST HOLE 19
CKD	TECH	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV:	MILE BP / B,C,S / NUMBER 37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					ML	SILTY-SANDY CLAYEY 2'		
2					SM	SAND-SILTY GRAVELLY		
4					SP			
6								
8								
10								
12								
14								
16								
18					GP	GRAVEL-SANDY 20'		
20						BOTTOM OF HOLE - 20'		
22								
24								

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
30	70	0		MOIST-WET		
14	56	30		MOIST		
6	63	31		MOIST		
9	56	35		MOIST		
8	50	42		MOIST		
6	37	57		MOIST		
7	41	52		WET		

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LIARD Hwy.

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DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

DWN	FIELD ENG	DATE DRILLED 18/01/79	AIRPHOTO NO:	CHAINAGE	OFFSET
CKD	TECH WERDER	RIG B-50	SURFACE DRAINAGE:	VEGETATION:	ELEV

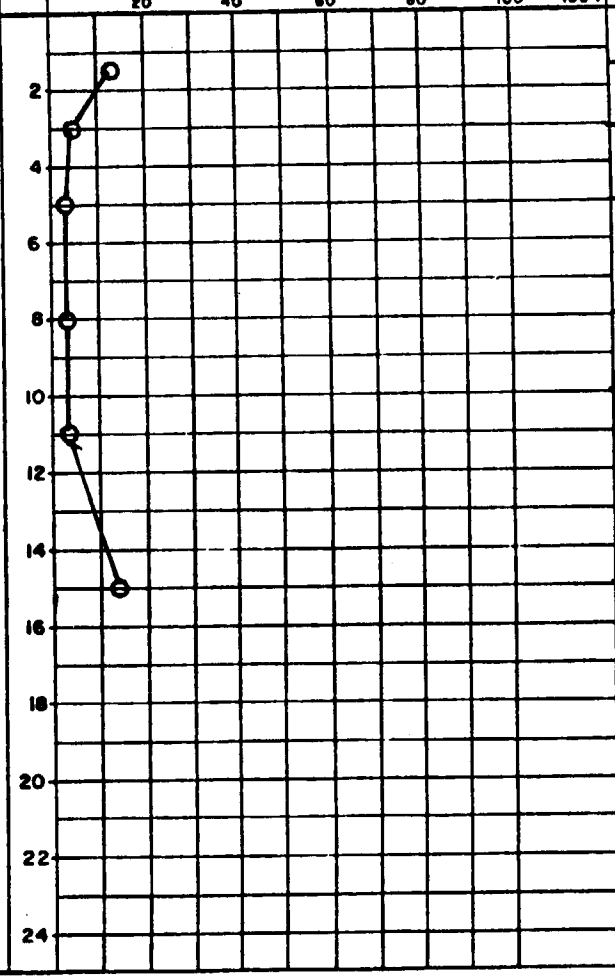
TEST HOLE 20

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					ML	SILT SANDY CLAYEY			39	61		0	MOIST		
2					SM	SAND - SILTY GRAVELLY			19	51		30	MOIST		
4					SP	SAND - GRAVELLY			3	69		28	DAMP		
6															
8									7	57		36	MOIST		
10					GP	GRAVEL - SANDY									
					GW				5	40		55	MOIST		
12						FREE WATER ABOVE TILL									
14						15'			58	33		9	MOIST		
16					CL	CLAY - SILTY SANDY PEBBLES TILL WS O PL									
18															
20						20'									
						BOTTOM OF HOLE - 20'									
22															
24															

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+



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LIARD Hwy.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
~~MACKENZIE HIGHWAY~~

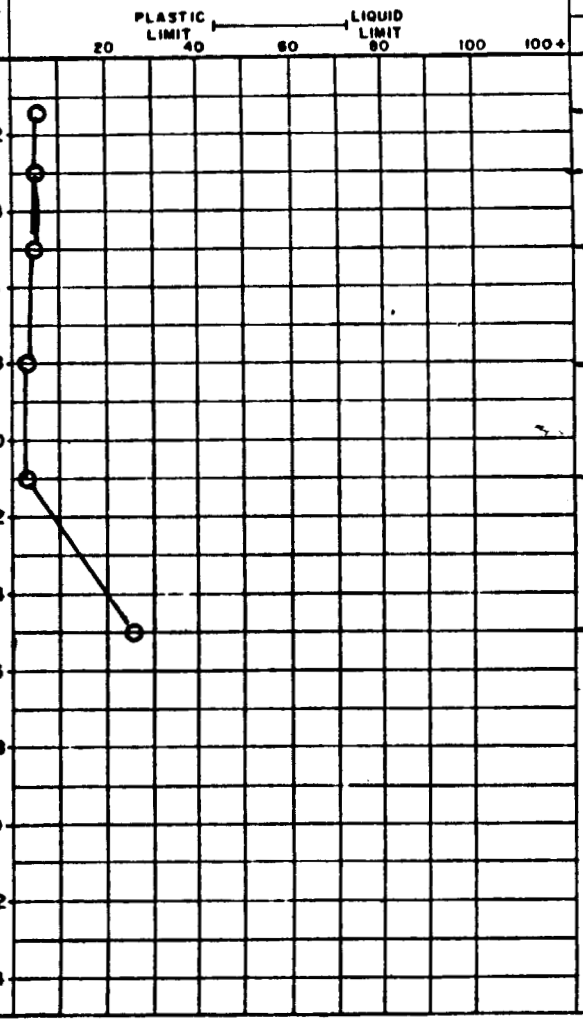
DWN	FIELD ENG	DATE DRILLED 18/01/79	AIRPHOTO NO:	CHAINAGE	OFFSET
CKD	TECH WEBBER	RIG: B-50	SURFACE DRAINAGE:	VEGETATION	ELEV

TEST HOLE 21

MILE	B,C,S	NUMBER
B.P.		37

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					ML	SILT - SANDY FEW PEBBLES — 2'		
					SM	SAND - SILTY GRAVELLY		
					GP	GRAVEL - SAND MIX		
					GP	GRAVEL - SANDY — 12'		
					CL	CLAY - SILTY SANDY FEW PEBBLES TILL — 15'		
						BOTTOM OF HOLE - 15'		

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
32	68	0		MOIST		
12	50	38		MOIST		
14	55	31		MOIST		
8	43	49		MOIST		
5	39	56		MOIST		
82	16	2		MOIST		

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BORROW PIT #1

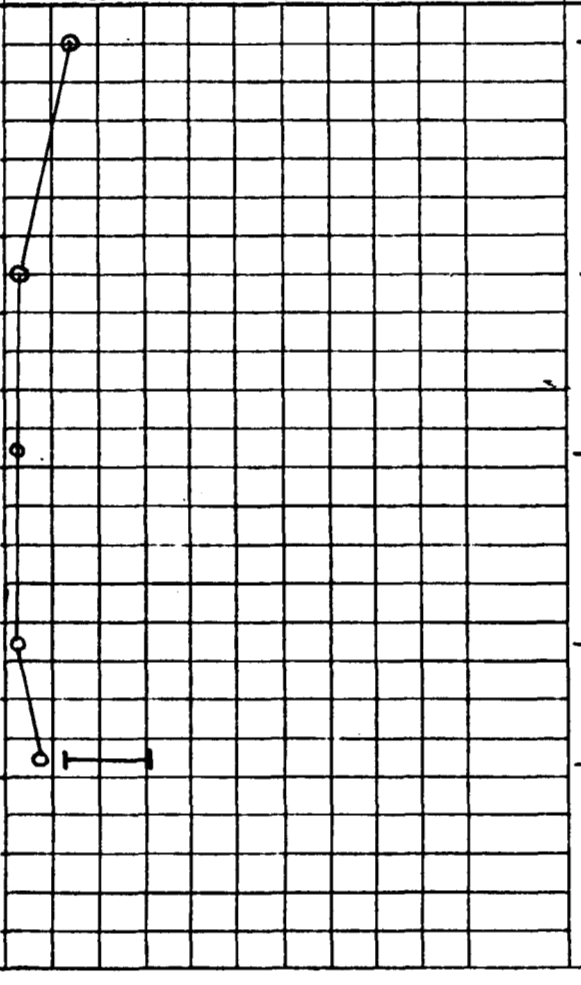
DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

DWN:	FIELD ENG:	DATE DRILLED 8/5/72	AIRPHOTO NO:	CHAINAGE: 3508 TO 3517	OFFSET 500' Rt &
CKD	TECH BRIUCK.	RIG: AUGER	SURFACE DRAINAGE:	VEGETATION POPLAR SPRUCE PINE	ELEV

TEST HOLE		
MILE	B,C,S	NUMBER
66	B	1

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
2	1				SM	3" ORGANIC MTL OVER BROWN SILTY SAND - NON-PLASTIC		NO PERMAFROST	17		81	2			GOOD BORROW SOURCE
						3'									
4					SP	GRAVELLY SAND - NON-PLASTIC - DRY									- BOTH SANDS & GRAVELS TO 20' AND GLACIAL TILL CAN BE USED AS BORROW.
6	2								3		84	13			
8						8'									
10					GW SW	SAND AND GRAVEL MIX - DRY - NON-PLASTIC - MAX. SIZE - 1½"									- VERY LARGE VOLUME AVAILABLE HERE.
12	3								1		44	55			
14															- THIS AREA MAY BE SOURCE OF SURFACING MTL ALTHOUGH DRILLING INDICATES MTL. TO BE TOO SANDY.
16	4								1		56	43			
18						19'									
20	5				GC CI	GLACIAL TILL - SANDY SILTY CLAY WITH PEBBLES - MEDIUM PLASTIC			19		34	47			- SUGGEST TEST PITTING.
22															
24						BOTTOM OF HOLE - 26'									



Borrow Pit #1

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

DWN:	FIELD ENG:	DATE DRILLED:	AIRPHOTO NO:	CHAINAGE:	OFFSET
CKD	TECH:	RIG:	SURFACE DRAINAGE:	VEGETATION: Poplar & Small Spruce	ELEV

TEST HOLE		
MILE	B,C,S	NUMBER
68	B	2

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)	REMARKS
					SM	3" ORGANIC MTL OVER BROWN SANDY SILT AND SILTY SAND -DRY — 4'		No PERMAFROST							Good Borrow Source.
						SAND-GRAVEL MIX -NON-PLASTIC									
8	1				GW	-MAX. SIZE 1½"			-5-		36	59			
					SW	-BECOMING GRAVELLY SAND BELOW 13' -DRY.									
14	2								-2-		71	27			
						— 19.5'									
					CI	GLACIAL TILL -SANDY SILTY CLAY — 21'									
						BOTTOM OF HOLE - 21'									

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT ⟷ LIQUID LIMIT

20 40 60 80 100 100+

Borrow Pit #1

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

[redacted]

DWN:	FIELD ENG:	DATE DRILLED:	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH:	RIG:	SURFACE DRAINAGE:	VEGETATION: Poplar & small spruce	ELEV:

TEST HOLE

MILE	B,C,S	NUMBER
66	B	3

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION	CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
					SM	4" ORGANIC MTL OVER		No Permafrost						
2					ML	BROWN SANDY SILT — 2'								
4						SAND AND GRAVEL MIX - DRY - NON-PLASTIC								
6														
8	1				GW	- MAX. SIZE - 1"			-1-		47	52		
10														
12														
14														
16	2								-2-		34	64		
18						TILL — 18'								
20					CI	- SANDY SILTY CLAY WITH PEBBLES — 20'								
22						BOTTOM OF HOLE - 21'								
24														

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

GRAIN-SIZE ANALYSIS

REMARKS

Good Borrow.

- May be source of surfacing mtl.
- Suggest test pitting.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA

[redacted]

Borrow Pit #1

DWN:	FIELD ENG:	DATE DRILLED:	AIRPHOTO NO:	CHAINAGE:	OFFSET:
CKD:	TECH:	RIG:	SURFACE DRAINAGE:	VEGETATION:	ELEV:

TEST HOLE		
MILE	B,C,S	NUMBER
66	B	4

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY	PENETRATION RESISTANCE	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	LIMITS OF FROZEN GROUND	ICE DESCRIPTION
					SM	4" ORGANIC MTL OVER SANDY SILT. — 1.5'		No Permafrost
2						SAND AND GRAVEL MIX.		
4						- MAX. SIZE - 2"		
6	1				GW	- NON-PLASTIC		
						- DRY		
8								
10					SW			
12								
14								
16						— 16'		
	2				GC CL	AS ABOVE BUT WITH SOME CLAY. — 18'		
18						TILL.		
					CI	- SANDY SILTY CLAY WITH PEBBLES. — 20'		
20						BOTTOM OF HOLE.		
22								
24								

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

PLASTIC LIMIT — LIQUID LIMIT

20 40 60 80 100 100+

DEPTH (FEET)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	WET DENSITY (P.C.F.)	DRY DENSITY (P.C.F.)
4	1		26	73		
16	18		32	50		

REMARKS

GOOD BORROW MAY BE SOURCE OF SURFACING MTL. SUGGEST TEST PITTING.

Source No. 6

Location: km 132.5 Liard Highway

Description: Narrow alluvial terrace on the west side of an unnamed creek at km 132.5.

Material: Primarily gravelly sand with some sandy gravel - variable silt content.

Estimated Volume: Possibly 10,000 m^3 - however tends to be sandy and lacking in plus #4 sizes.

Comment: Area straddles the right-of-way and there is insufficient room to develop a pit. Granular material is at least 2-3m below surface. Wide deep cut would gain access to granular -use probably limited to culvert backfill for the most part - a portion may be suitable for surfacing. This deposit will have to be developed and extracted during highway construction.

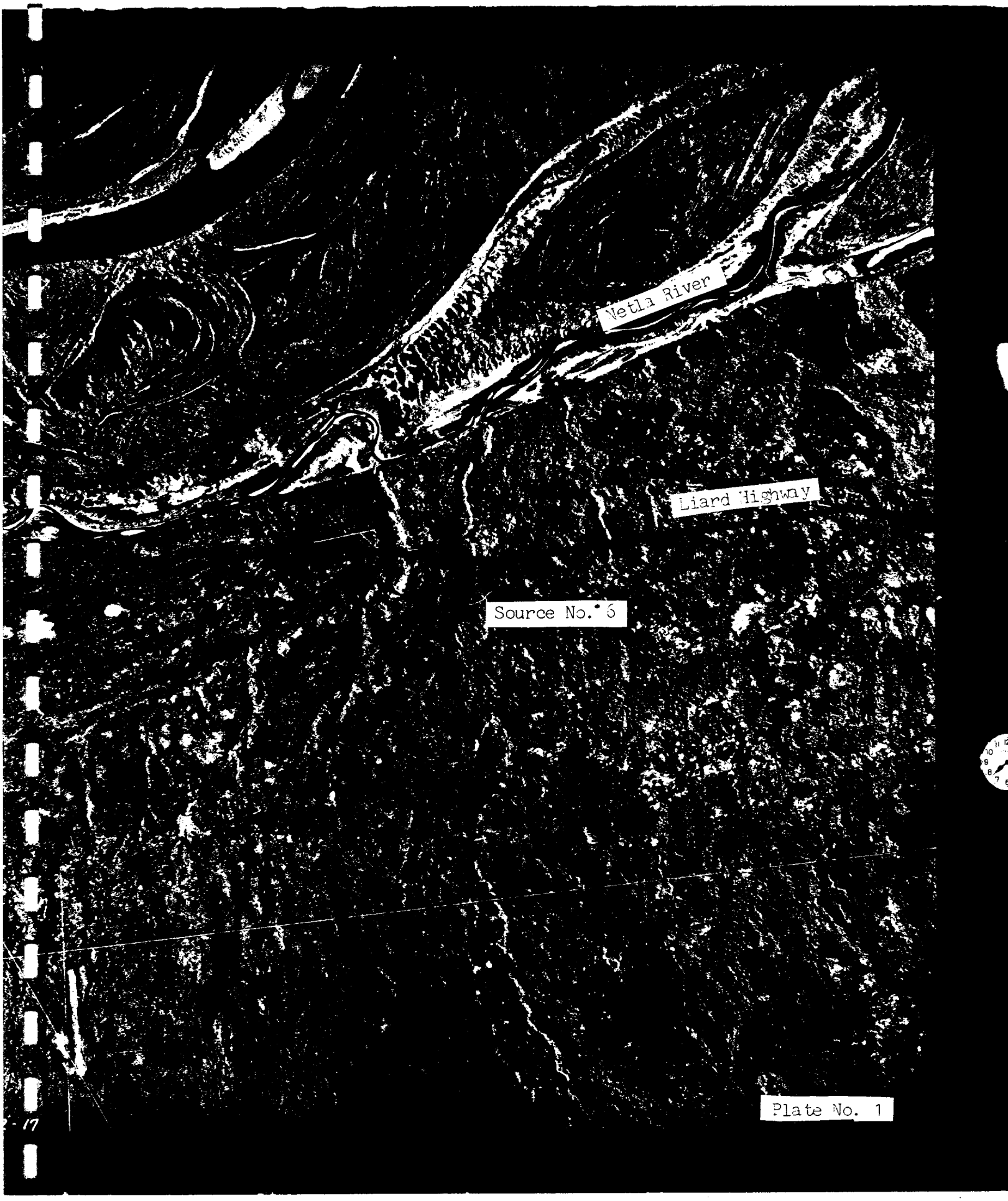


Plate No. 1

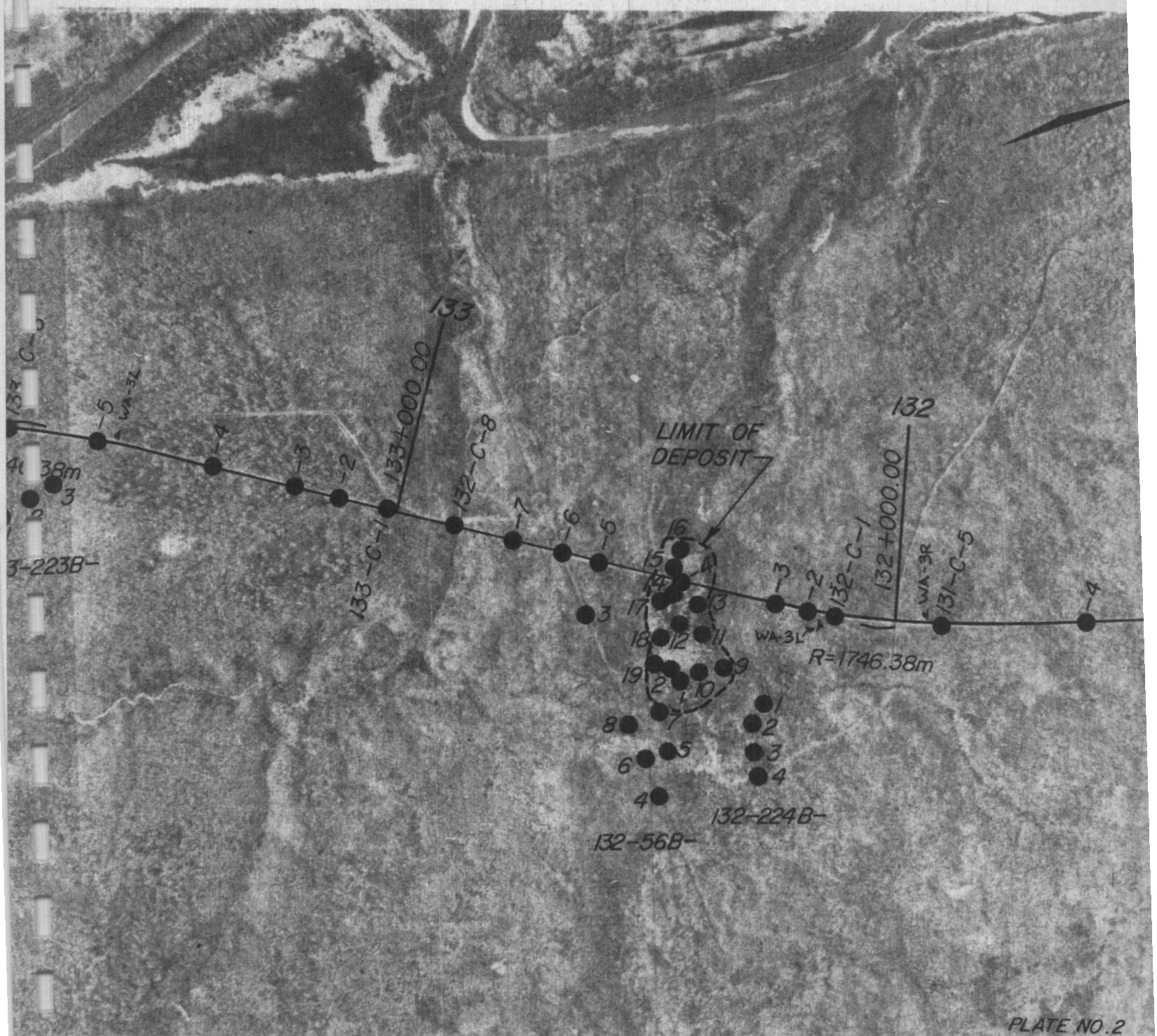
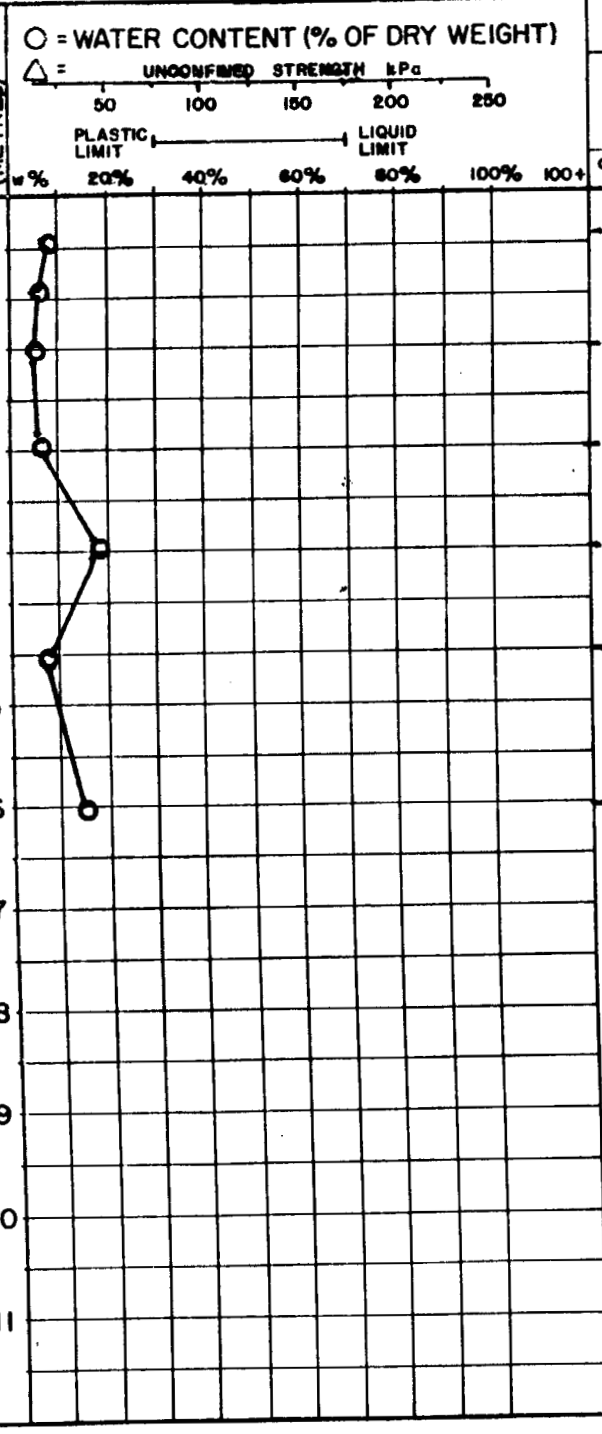

133
133+000.00
132
132+000.00
LIMIT OF DEPOSIT
WA-3L
WA-3R
133-C-1
132-C-8
132-C-1
131-C-5
R=1746.38m
132-224B-
132-56B-
3-223B-

PLATE NO. 2

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/04	km 132	B.P. No. 56	HOLE No. 1

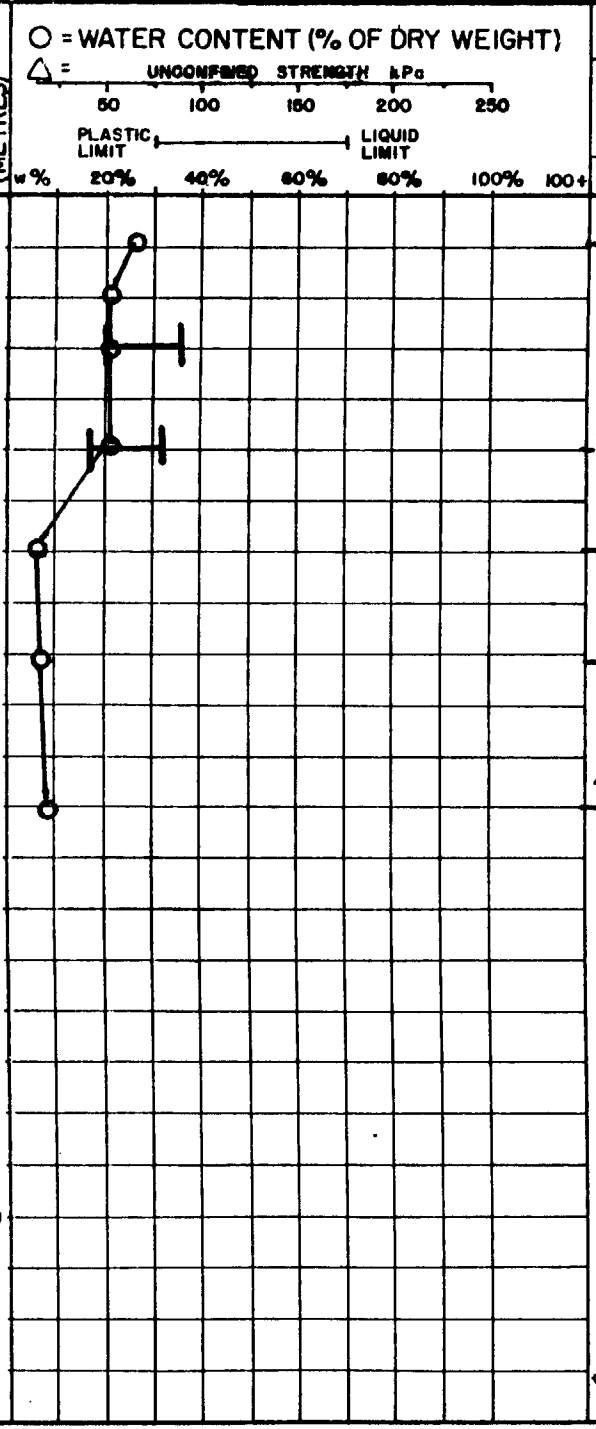
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	SM	SAND - SILTY - PEBBLES			1	24	67		9	DAMP			
										DAMP MOIST			
4						9	86		5	D-M			
6		- GRAVELLY			2	12	57		31	MOIST			
8													
10	ML SM	SAND - SILT MIXTURE PEBBLES			3	56	42		2	MOIST			
12													
14	GM	GRAVEL - SANDY SILTY			4	21	30		49	MOIST			
16													
18		5.5			5								
20	CL	CLAY - SILTY SANDY GRAVELLY - TILL 6.1m			6	51	31		18	MOIST			
22		BOTTOM OF HOLE - 6.1m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36													
38					11								



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/04	km 132'	B.P. No. 56	HOLE No. 2

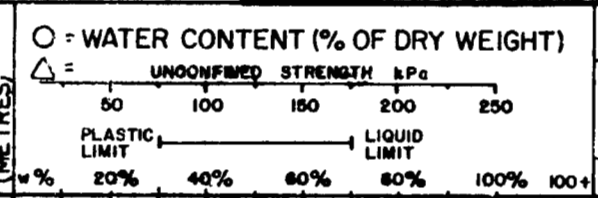
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		CLAY - SILTY											
4	CL	LOW - MED. PLASTIC @ OR + PL			1	99	1		0	WET			
6	CL									MOIST			
8					2					MOIST			
10		3.1 m				94	6		0	MOIST			
12		SAND - SILTY PEBBLES			3								
14	SM	- GRAVELLY			4	14	82		4	DAMP			
16					5	24	44		32	MOIST			
18													
20	CL	CLAY - GRAVEL SAND MIX 6.1 m			6	31	41		28	MOIST - WET			
22		BOTTOM OF HOLE - 6.1 m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36													
38					11								



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. Pronych	RIG B-50	DATE 78/02/04	km 132	B.P. No. 56	HOLE No. 3

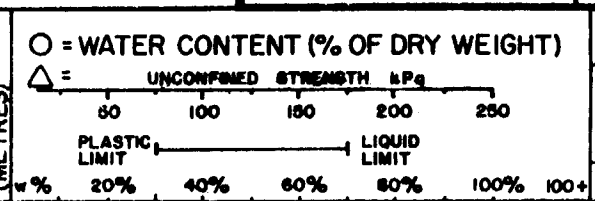
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4	ML	SILT - CLAYEY			1	100	0	0		WET, DAMP			
		1.5m											
6, 8, 10, 12	CL, CI	CLAY - SILTY - LOW - MED. PLASTIC +PL			2, 3	100	0	0		MOIST, MOIST, MOIST			
14		4.6 m			4	99	1	0		WET			
16		BOTTOM OF HOLE. 4.6m			5								
18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38					6, 7, 8, 9, 10, 11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. D. PROWYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 4

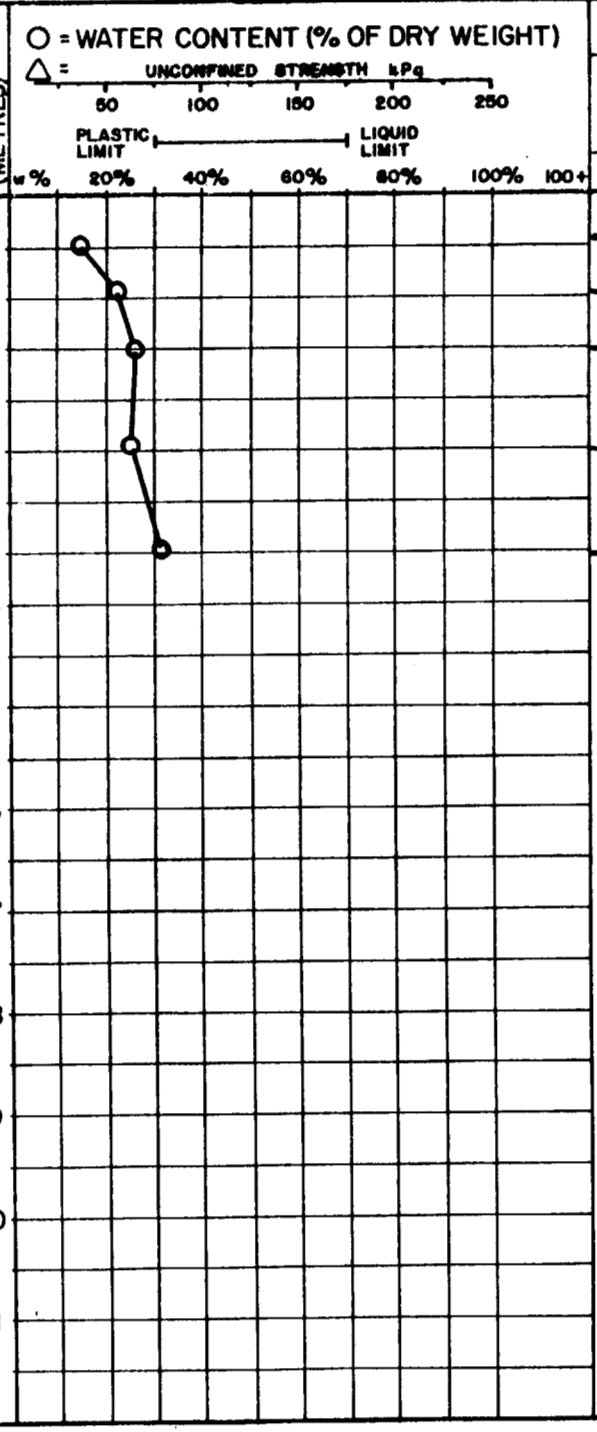
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4	ML	SILT - CLAYEY		FROZEN	1	99	1	0		DAMP			
					1	100	0	0		DAMP			
6		1.8m			1	100	0	0		DAMP			
8		CLAY - SILTY - LOW PLASTIC			2	100	0	0		MOIST			
10, 12	CL				3, 4	100	0	0		MOIST			
14		4.6m			4	100	0	0		WET			
16		BOTTOM OF HOLE. 4.6m			5								
18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38					6, 7, 8, 9, 10, 11								



PUBLIC WORKS CANADA | DRILL HOLE RECORD | Liard Hwy

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 5

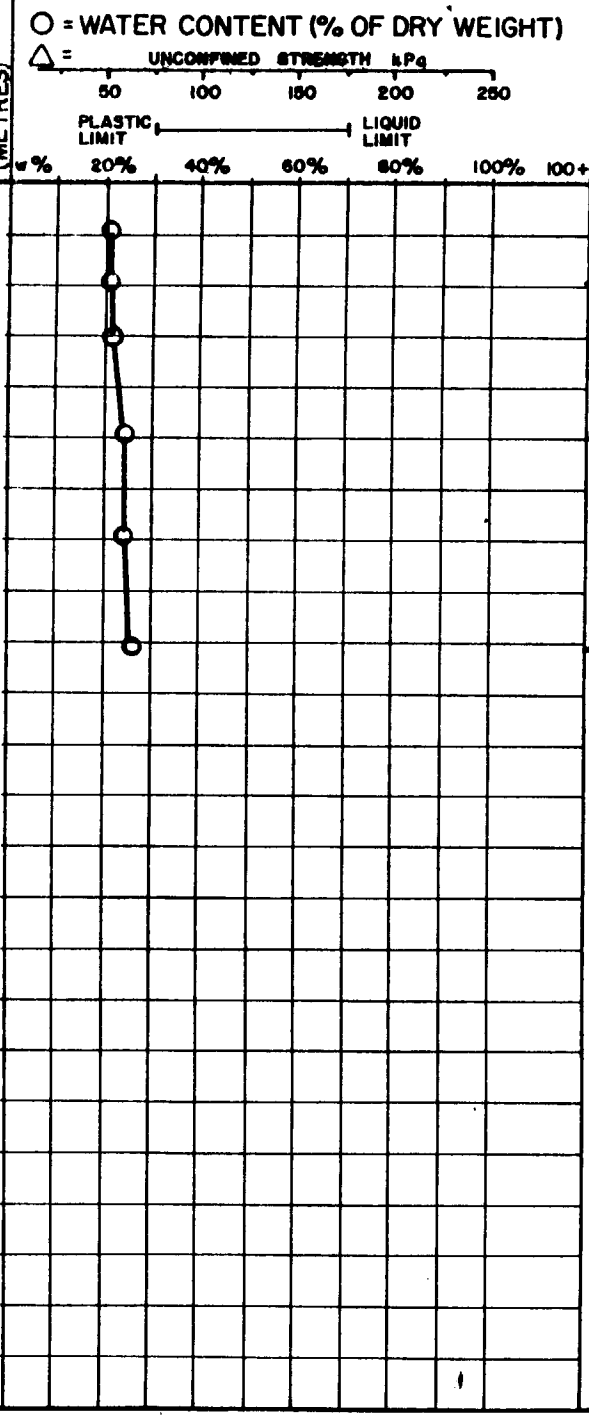
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	Silt-Clayey .6m		Frozen Icelenses	1	98	2	0		Damp			
4		Clay-Silty				99	1	0		Damp			
6		-Low Plastic +Pl		Ice Pockets	2	99	1	0		Moist			
8	CL					100	0	0		Moist			
10		3.4m			3	100	0	0		Wet-Sat.			
12		Bottom of Hole - 3.4m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 6

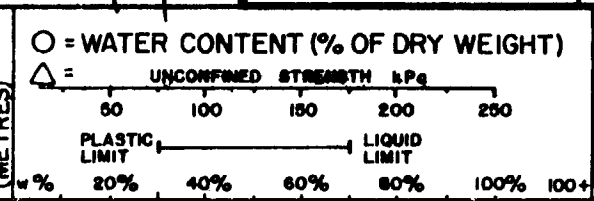
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY		FROZEN		99	1	0		DAMP			
4					1	99	1	0		DAMP			
6		2.1m				99	1	0		DAMP			
8	CL	CLAY - SILTY LOW PLASTIC			2	100	0	0		MOIST			
10					3	100	0	0		MOIST			
12													
14		4.6m			4	100	0	0		WET-SAT.			
16		BOTTOM OF HOLE - 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE RECORD | Liard Hwy

TECH. D. PRONYCH | RIG B-50 | DATE 79 03 20 | km | B.P. No. 56 | HOLE No. 7

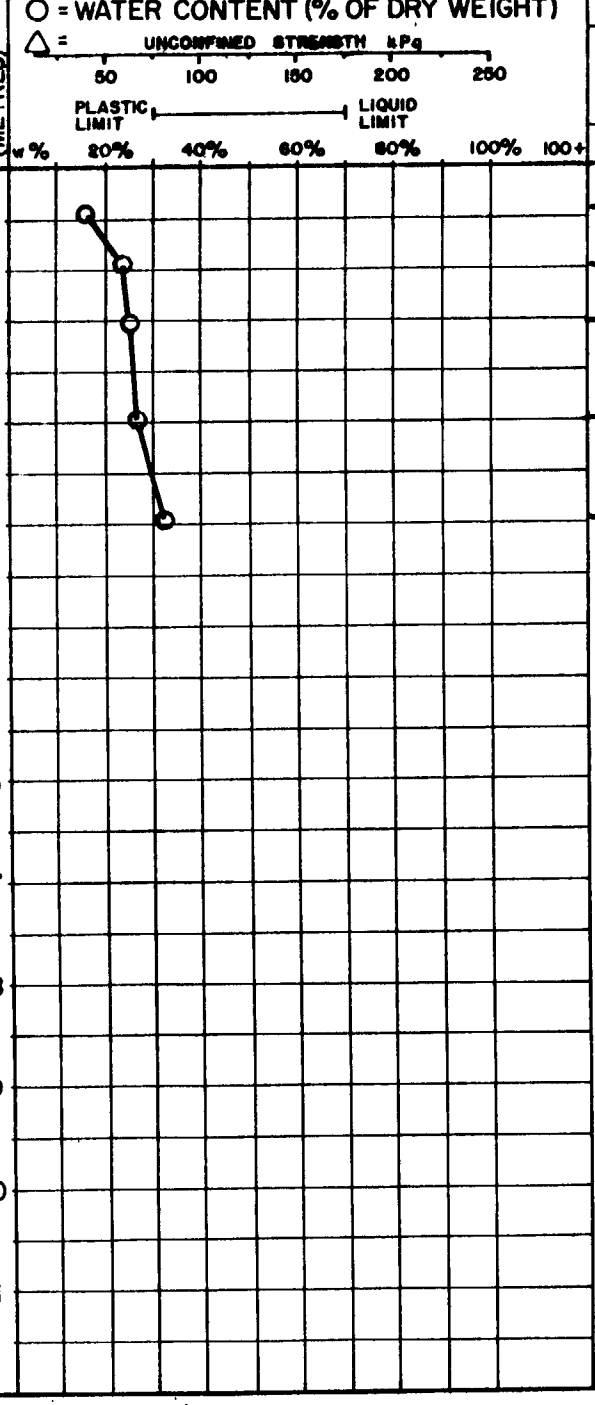
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	Silt - Clayey .6m				-99-	1	0		Damp			
4		Clay - Silty Low Plastic		Frozen Ice Pockets & Lenses	1	-99-	1	0		Moist			
6	CL					-100-	0	0		Moist			
8					2	-100-	0	0		Wet			
10		3.4m			3	-100	0	0		Sat.			
12					4								
14		Bottom of Hole - 3.4m			5								
16					6								
18					7								
20					8								
22					9								
24					10								
26					11								
28													
30													
32													
34													
36													
38													



PUBLIC WORKS CANADA | DRILL HOLE RECORD | LABRADOR

TECH. D. PRONYCH | RIG B-50 | DATE 79/03/20 | km | B.P. No. 56 | HOLE No. 8

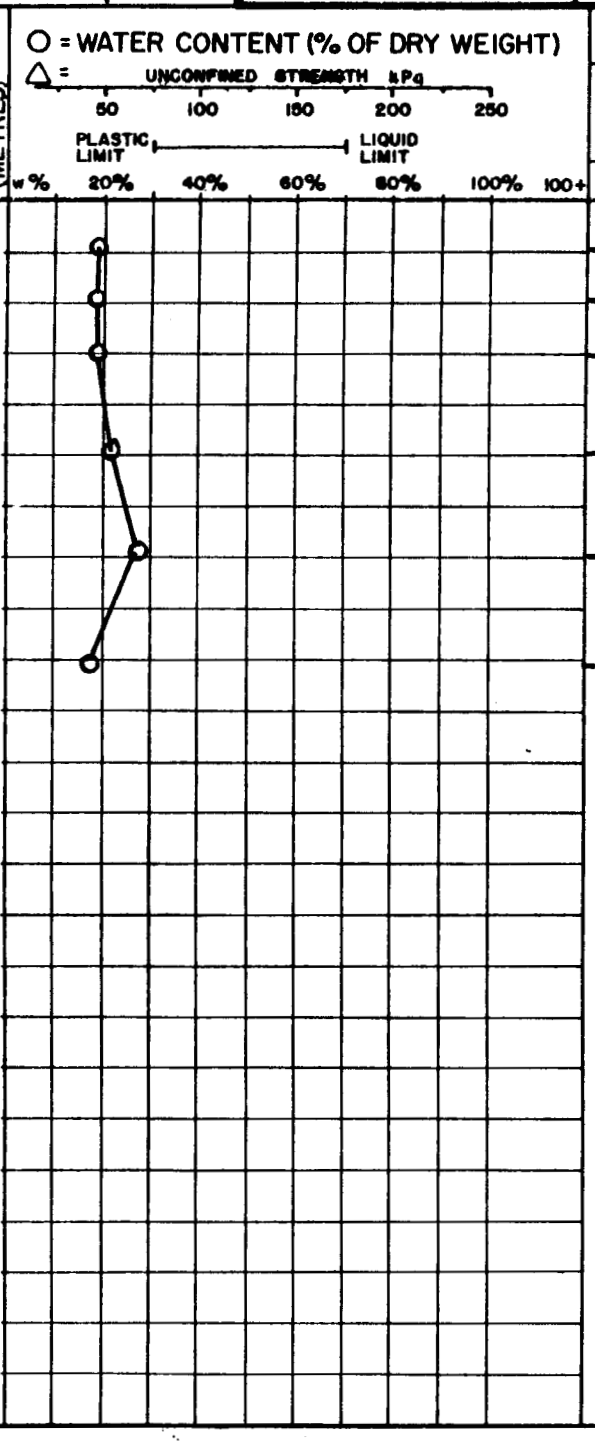
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT-CLAYEY		FROZEN	1	99	1	0		DAMP			
4						99	1	0		WET			
6					2	99	1	0		SAT.			
8		2.4m				100	0	0		MOIST			
10	CL	CLAY-SILTY LOW PLASTIC			3	100	0	0		SAT.			
		3.4m											
12		BOTTOM OF HOLE 3.4m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | Lord Hwy

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 9

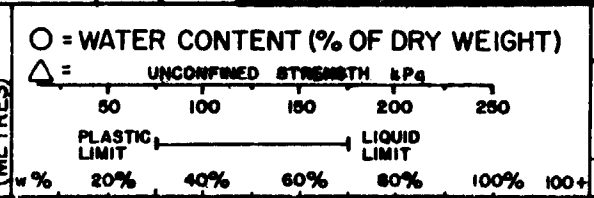
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	Silt - Sandy Clayey			1	89	11		0	Moist			
4						85	15		0	Moist			
6				Frozen		79	21		0	Moist			
8					2	79	21		0	Wet			
10	CL	Clay Silty 3.4m			3	78	22		0	Sat.			
12		Bottom of Hole. 3.4m			4	59	41		0	Wet			? Silt-Sandy
14													Log Book shows
16					5								Drilled to 11'
18													or 3.4 m
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE REPORT | DAR AW

TECH. D. PRONYCH | RIG B-50 | DATE 79 03 20 | km | B.P. No. 56 | HOLE No. 10A

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - CLAYEY SANDY				73	27	0		DAMP			
4	ML				1	77	23	0		DAMP			
6		1.8m				84	16	0		DAMP			
8		CLAY - SILTY		FROZEN	2	94	6	0		WET			
10		LOW PLASTIC		ICE CRYSTALS	3								
12	CL					93	7	0		WET-SAT.			
14		- SANDY PEBBLES			4								
		4.6m				65	24	11		WET-SAT.			
16		BOTTOM OF HOLE - 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								



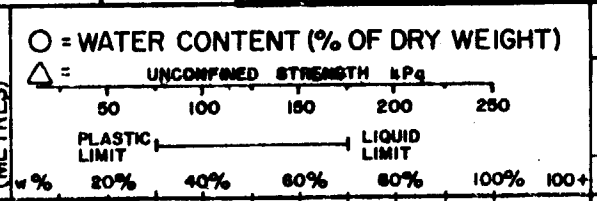
PUBLIC WORKS CANADA | DRILL HOLE RECORD | LAND Ivy.

TECH. D. PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 11

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	SM	SAND - SILT			1	21	79	0		DAMP
4						35	65	0		DAMP
6					2	46	54	0		DAMP
8		SILTY PEBBLES				27	67	6		DAMP
10		GRAVELLY			3	16	59	25		DAMP
12										
14					4	6	61	33		DAMP
16					5					
18										
20		6.3m			6	11	56	33		DAMP
22	CL	CLAY - SILTY SANDY GRAVELLY			7					
24		7.6 m				52	35	13		SAT.
26		BOTTOM OF HOLE. 7.6 m			8					
28										
30					9					
32										
34					10					
36					11					
38										



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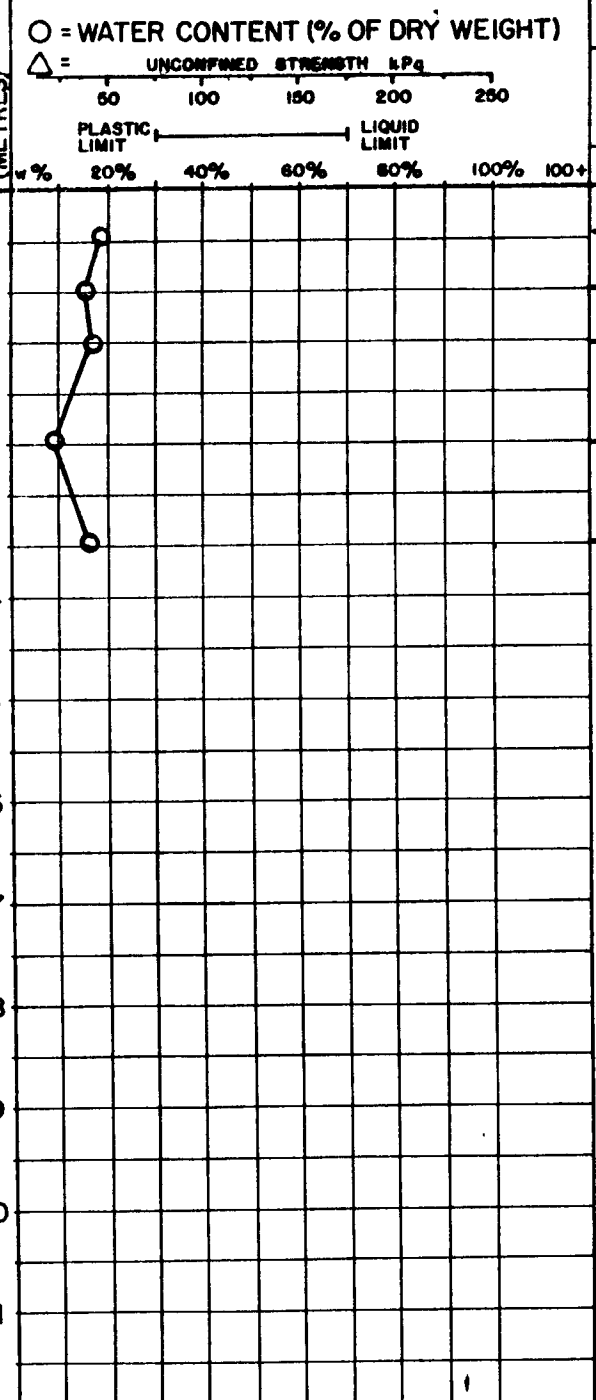
TECH. D. PRONYCH	RIG B-50	DATE 79/02/20	km	B.P. No. 56	HOLE No. 12

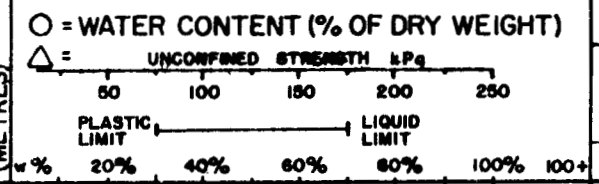
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY SANDY			1	74	26	0		MOIST			
4						63	37	0		MOIST			
		1.7m		Frozen		62	37	1		MOIST			
6		SAND - SILTY GRAVELLY			2								
8						24	61	15		SAT.			
10	SM	- SILTY			3								
		3.4m				23	77	0		WET			
12		BOTTOM OF HOLE - 3.4m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE REPORT | Liard Hwy.

TECH. D. PRONYCH | RIG B-50 | DATE 79 08 20 | km | B.P. No. 56 | HOLE No. 13

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY · PEBBLES .9m				58	39	3		DAMP			
4		SAND - SILTY GRAVELLY			1	13	76	11		DAMP			
6	SM					26	55	19		DAMP			
8		2.4m			2	28	35	37		DAMP			
10		GRAVEL - SANDY			3	10	39	51		DAMP			
12	GP				4								
14						6	46	48		SAT.			
16					5								
18													
20	CL	CLAY - SILTY SANDY GRAVELLY 6.1m			6	30	40	30		SAT.			
22		BOTTOM OF HOLE - 6.1m											
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



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TECH. D. PRONYCH	RIG B-50	DATE 79 03 20	km	B.P. No. 56	HOLE No. 14

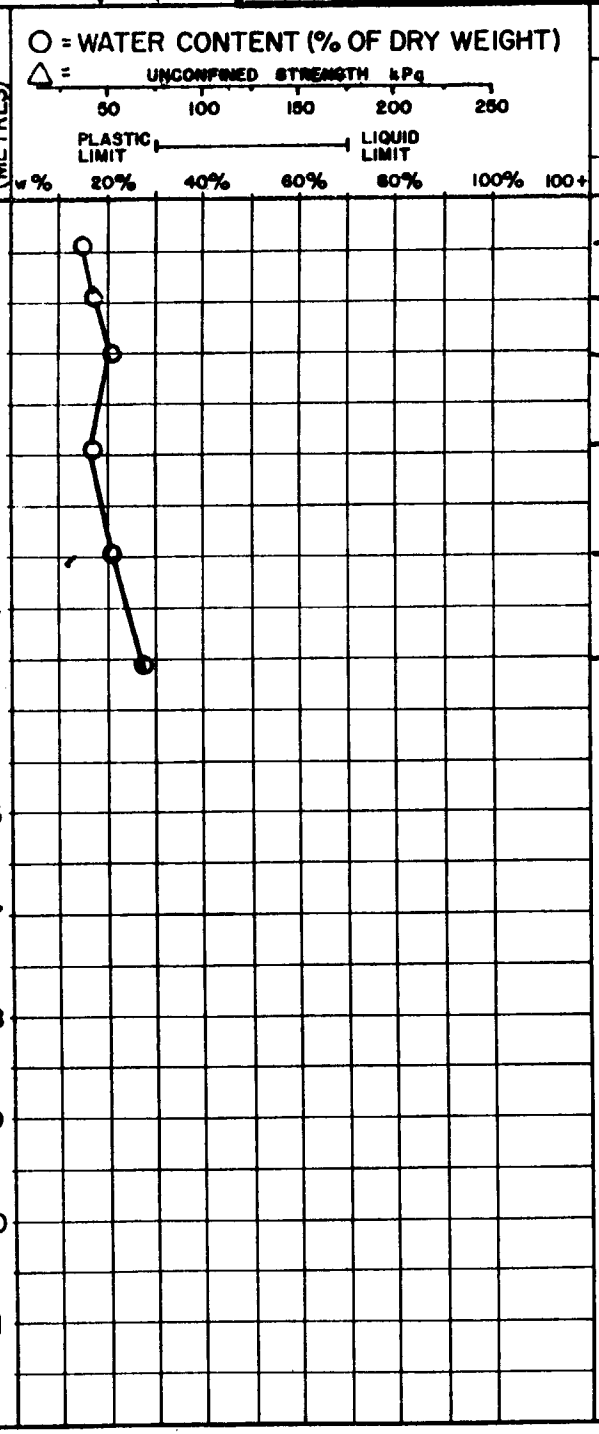
○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w % 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY .6m				81		19	0	DAMP			
4	SM	SAND - SILTY			1	43		57	0	DAMP			
6						30		70	0	DAMP			
8		SILTY GRAVELLY			2	18		62	20	DAMP			
10		3.1m			3								
12	GC	SAND-GRAVEL MIX SILTY				19		53	28	DAMP			
14					4								
16		GRAVEL SANDY				12		46	42	DAMP			
18					5								
20		6.4m			6	7		30	63	DAMP			
22		SAND - GRAVELLY SILTY											
24	SM	WET 7.6m			7	10		80	10	WET			
26					8								
28		BOTTOM OF HOLE - 7.6m											
30					9								
32													
34					10								
36					11								
38													

PUBLIC WORKS CANADA | DRILL HOLE RECORD | LAND DIVY

TECH. D. PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 15

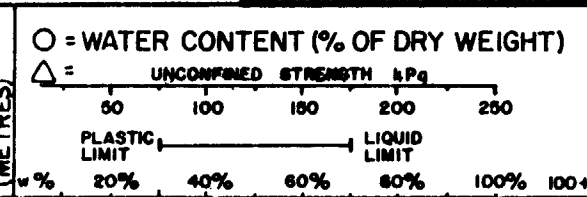
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - CLAYEY			1	89	11	0		DAMP			
4						88	12	0		DAMP			
6	ML	SANDY			2	97	3	0		DAMP			
8						85	15	0		DAMP			
10		3.4 m			3	92	8	0		MOIST			
12	CL	CLAY - SILTY LOW PLASTIC			4								
14		4.6 m				97	3	0		WET			
16					5								
18		BOTTOM OF HOLE 4.6m											
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. D. Paonych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 16

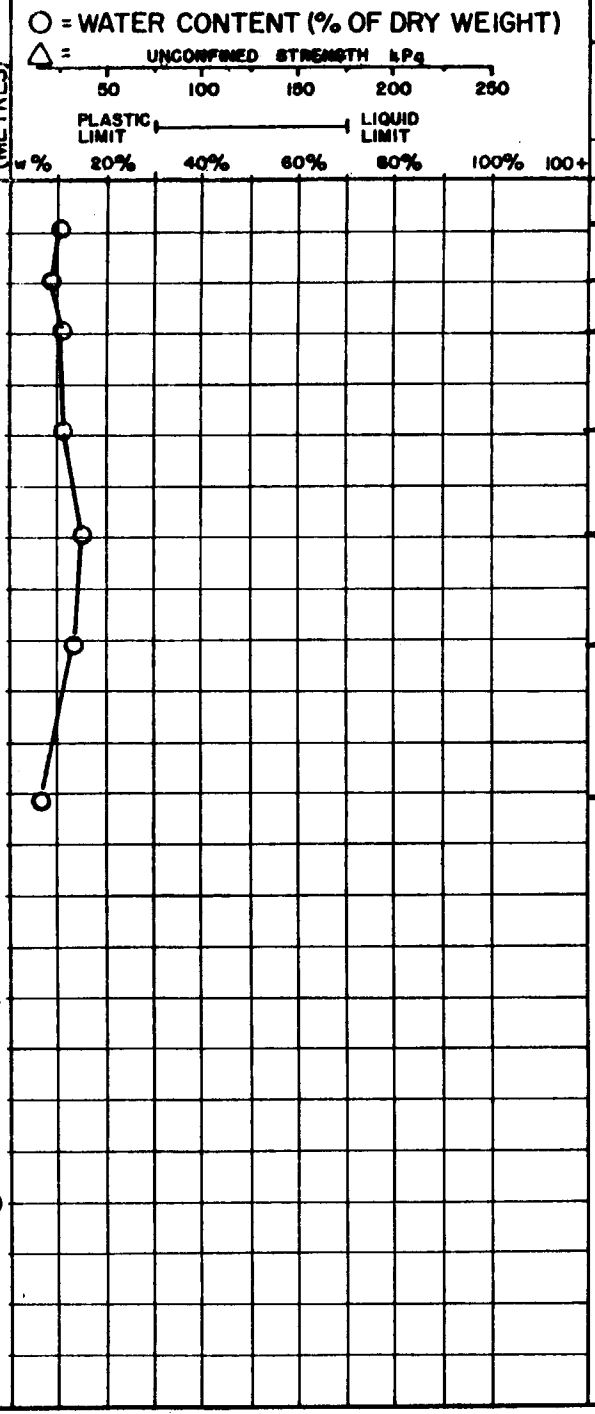
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	SM	SAND - SILTY - PEBBLES			0.5	26	68	6		DAMP			
4					1	10	78	12		DAMP			
6		GRAVELLY			1.5	20	76	4		MOIST			
8					2	16	72	12		DAMP			
10					2.5	11	71	18		DAMP			
12					3								
14					3.5	6	64	30		DAMP			
16					4								
18					4.5								
20	GM	GRAVEL SANDY SILTY			5	14	49	37		MOIST			
22					5.5								
24	SM	SAND - SILTY GRAVELLY 7.6m			6	22	59	19		SAT.			
26					6.5								
28		BOTTOM OF HOLE - 7.6m			7								
30					7.5								
32					8								
34					8.5								
36					9								
38					9.5								
					10								
					10.5								
					11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD Hwy.

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 17

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT -			1	98	2	0		DAMP			
4		- SANDY				71	29	0		DAMP			
6					2	74	26	0		DAMP			
8						65	35	0		DAMP			
10					3								
12		3.7m				83	17	0		DAMP			
		SAND - SILTY			4								
14	SM					43	57	0		MOIST			
16		5.4m			5								
18		GRAVEL - SILTY											
	GM	SANDY											
20		6.1m			6	20	21	59		MOIST			
22		BOTTOM OF HOLE - 6.1m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36													
38					11								



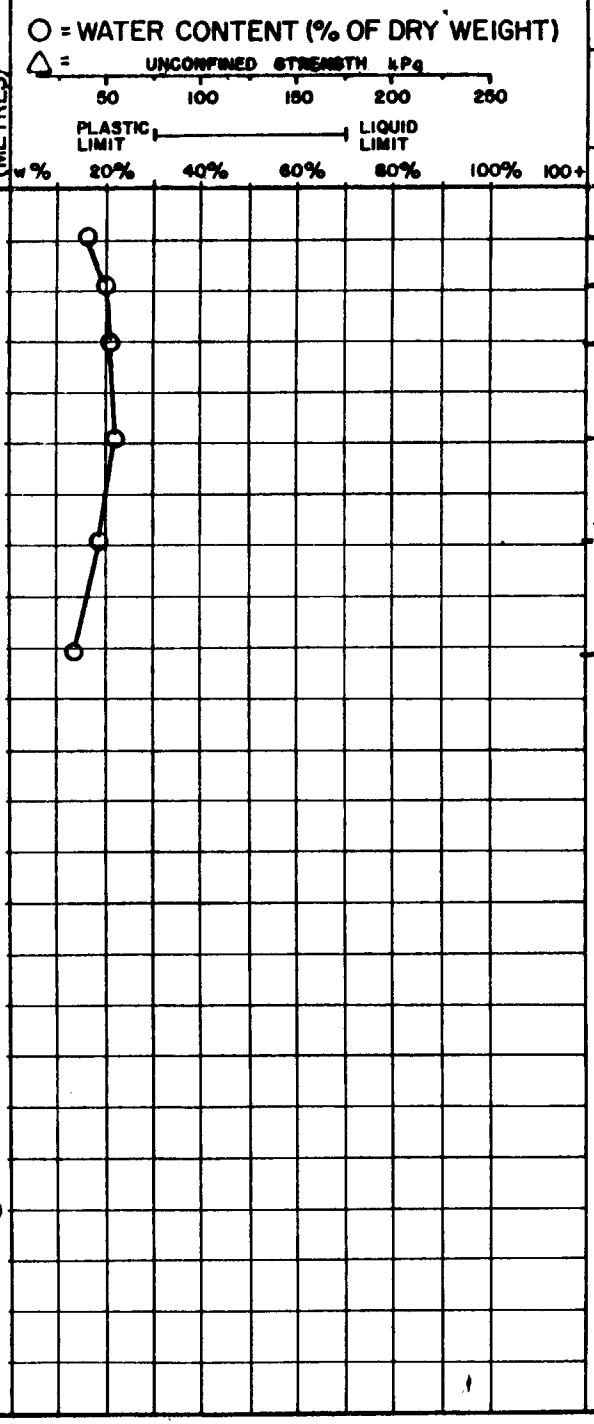
PUBLIC WORKS CANADA | DRILL HOLE RECORD | LAND Hwy.

TECH. D.PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 18

CHAINAGE	OFFSET

REMARKS

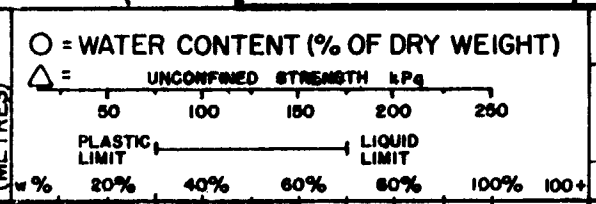
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		SILT -				92	8	0		DAMP
4		- CLAYEY			1	96	4	0		DAMP
6		1.8m				96	4	0		DAMP
8		CLAY - SILTY			2	99	1	0		MOIST
10	CL	LOW-MED. PLASTIC								
12	- CI	- SILTY SANDY			3	79	21	0		MOIST
14		GRAVELLY 4.6m			4	56	22	22		MOIST
16		BOTTOM OF HOLE - 4.6m			5					
18										
20					6					
22										
24					7					
26										
28					8					
30										
32					9					
34										
36					10					
38					11					



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LABRADOR HWY.

TECH. D. PRONYCH	RIG B-50	DATE 79/03/21	km	B.P. No. 56	HOLE No. 19

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4, 6, 8	ML	SILT - CLAYEY - SANDY		Frozen	1, 2	92	8	0		Moist			
						90	10	0		Moist			
						90	10	0		Moist			
		2.7m				90	10	0		Moist			
10, 12, 14	CL	CLAY - SILTY - SANDY Low Plastic			3	74	26	0		Moist			
		4.6m			4								
16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 4.6m			5, 6, 7, 8, 9, 10, 11								



Source No. 7

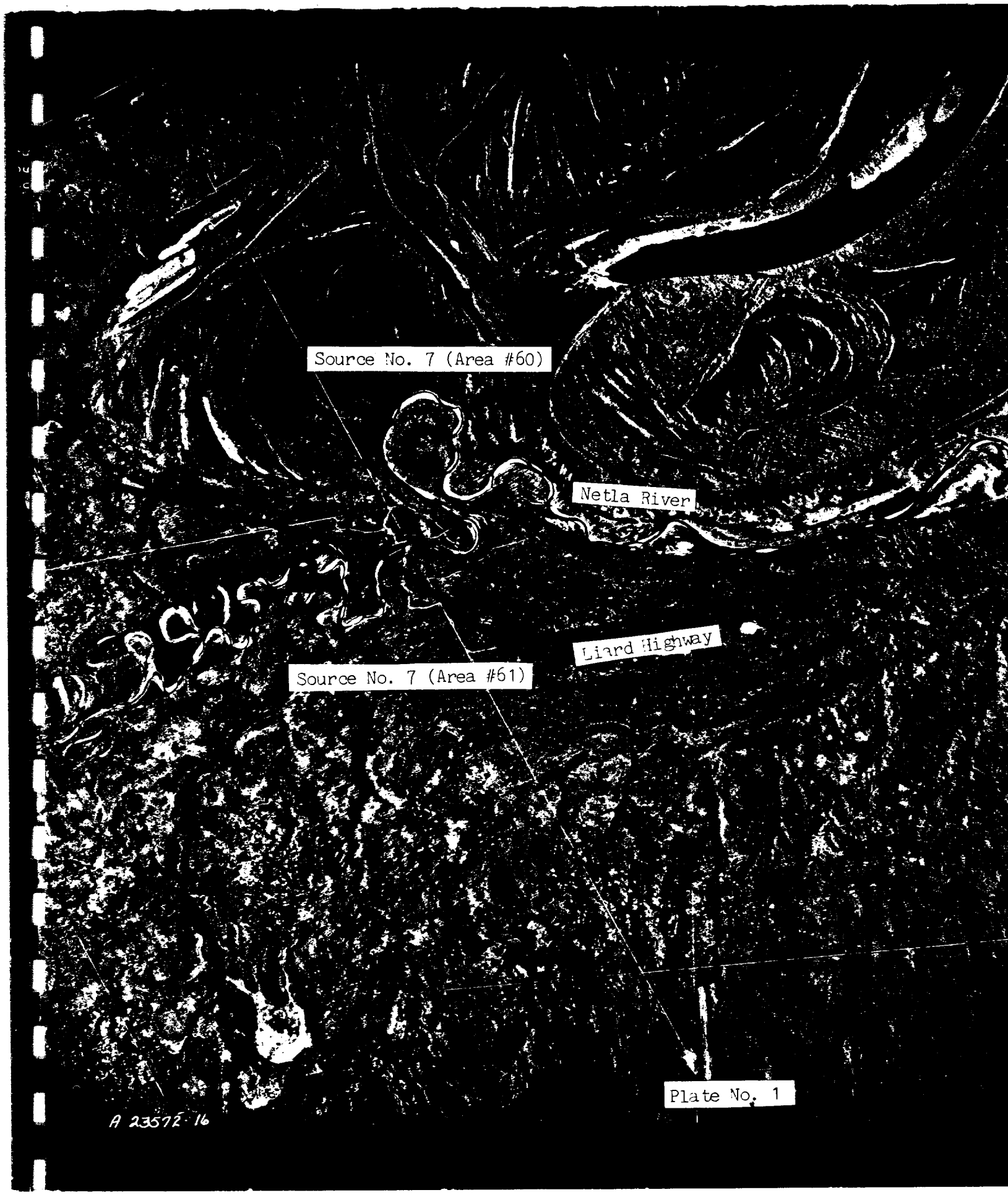
Location: Netla River at km 138.2 Liard Highway.

Description: Alluvial floodplain and channel deposits of Netla River.

Material: Gravelly sand and sandy gravel with variable silt content.

Estimated Volume: With reference to plate No. 2, area #60 depleted during highway construction; area #61 contains possibly 10,000 m^3 but water level creates extraction problem.

Comment: In area #61, boreholes #3, 4, 5 & 9 reveal sandy gravel to approximately 4.5m with approximately 1 m stripping and water at approximately 3.7 m. Best access can be gained in the winter along the Netla River channel. Additional quantities of gravel can probably be obtained at other points and bars along the Netla, primarily upstream.


Source No. 7 (Area #60)
Netla River
Liard Highway
Source No. 7 (Area #61)
Plate No. 1
A 23572-16

PROPOSED GRAVEL AND
BORROW AREA 138-60B-

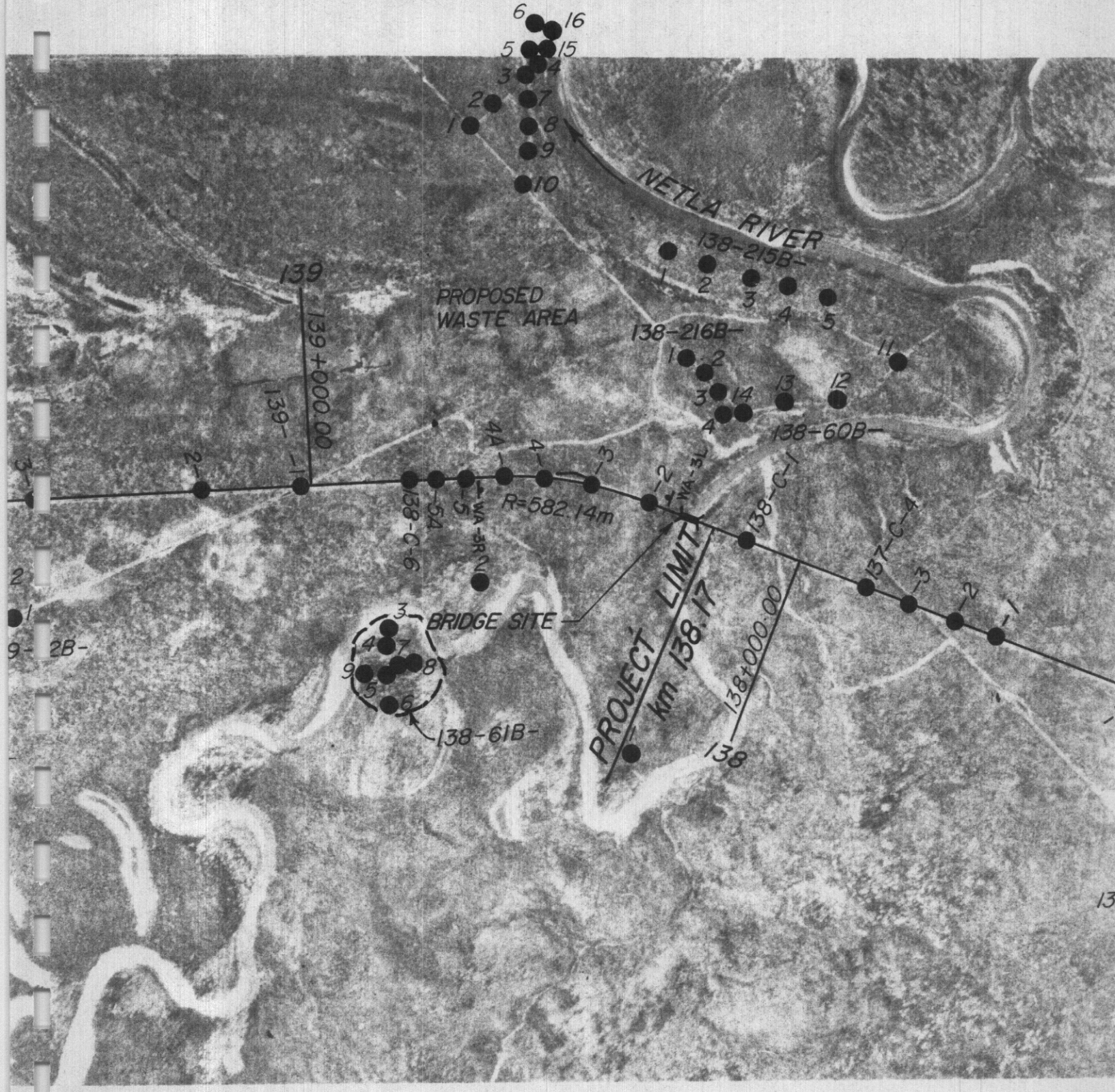


PLATE NO. 2

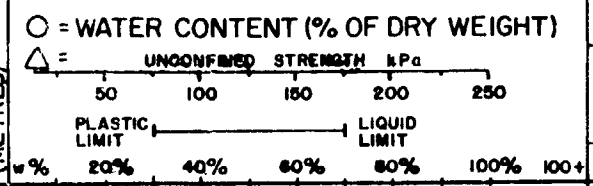
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/04	km 132	B.P. No. 56	HOLE No. 1

CHAINAGE	OFFSET

REMARKS

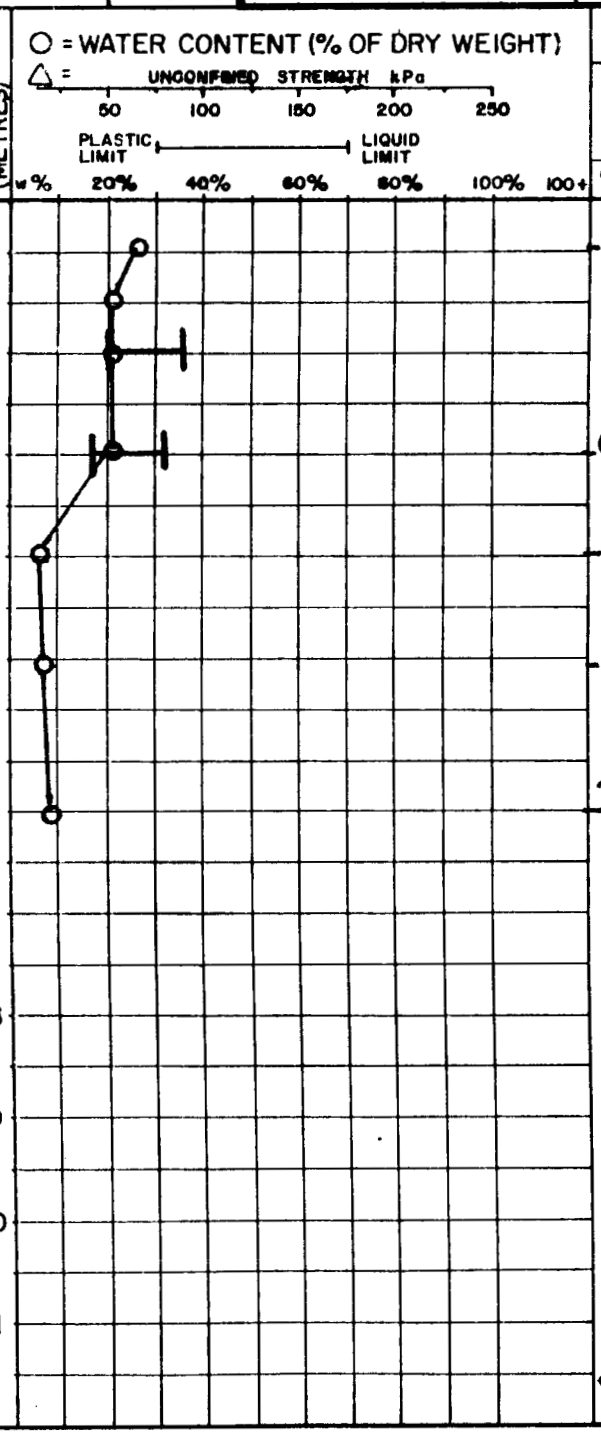
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	SM	SAND - SILTY - PEBBLES			1	24	67	9		DAMP
4										DAMP MOIST
6					2	9	86	5		D-M
8		- GRAVELLY				12	57	31		MOIST
10	ML SM	SAND - SILT MIXTURE PEBBLES			3	56	42	2		MOIST
12										
14	GM	GRAVEL - SANDY SILTY			4	21	30	49		MOIST
16					5					
18		5.5								
20	CL	CLAY - SILTY SANDY GRAVELLY - TILL 6.1m			6	51	31	18		MOIST
22		BOTTOM OF HOLE - 6.1m			7					
24										
26					8					
28										
30					9					
32										
34					10					
36					11					
38										



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/04	km 132'	B.P. No. 56	HOLE No. 2

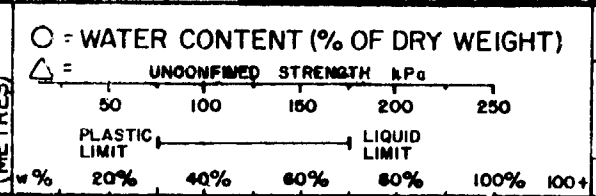
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		CLAY - SILTY											
		LOW-MED. PLASTIC											
4	CL	@ OR + PL			1	99	-	1	0	WET			
										MOIST			
6	CL									MOIST			
8					2	94	-	6	0	MOIST			
10		3.1 m											
		SAND - SILTY PEBBLES			3	14	-	82	4	DAMP			
12													
14	SM	- GRAVELLY			4	24	-	44	32	MOIST			
16													
18					5								
20	CL	CLAY - GRAVEL SAND MIX 6.1 m			6	31	-	41	28	MOIST-WET			
22		BOTTOM OF HOLE - 6.1 m											
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. Pronych	RIG B-50	DATE 78/02/04	km 132	B.P. No. 56	HOLE No. 3

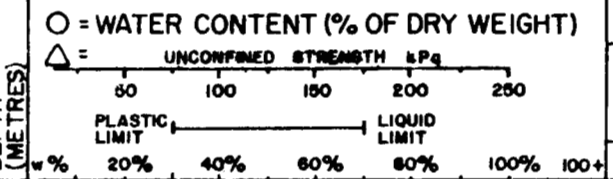
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4	ML	SILT - CLAYEY			1	100	0	0		WET, DAMP			
		1.5m											
6, 8, 10, 12	CL, CI	CLAY - SILTY - LOW - MED. PLASTIC +PL			2, 3	100	0	0		MOIST, MOIST, MOIST			
14		4.6 m			4	99	1	0		WET			
16		BOTTOM OF HOLE. 4.6m			5								
18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38					6, 7, 8, 9, 10, 11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. D. PRONYCH | RIG B-50 | DATE 79/03/20 | km | B.P. No. 56 | HOLE No. 4

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4	ML	SILT - CLAYEY		FROZEN	1	99	1	0		DAMP			
						100	0	0		DAMP			
						100	0	0		DAMP			
6		1.8m			2	100	0	0		MOIST			
8, 10	CL	CLAY - SILTY - LOW PLASTIC			3	100	0	0		MOIST			
12					4	100	0	0		WET			
14		4.6m											
16		BOTTOM OF HOLE. 4.6m			5								
18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38					6, 7, 8, 9, 10, 11								



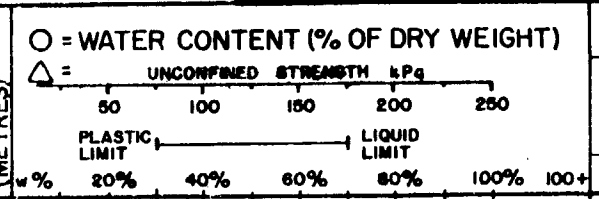
PUBLIC WORKS CANADA | DRILL HOLE RECORD | Liard Hwy

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 5

CHAINAGE	OFFSET

REMARKS

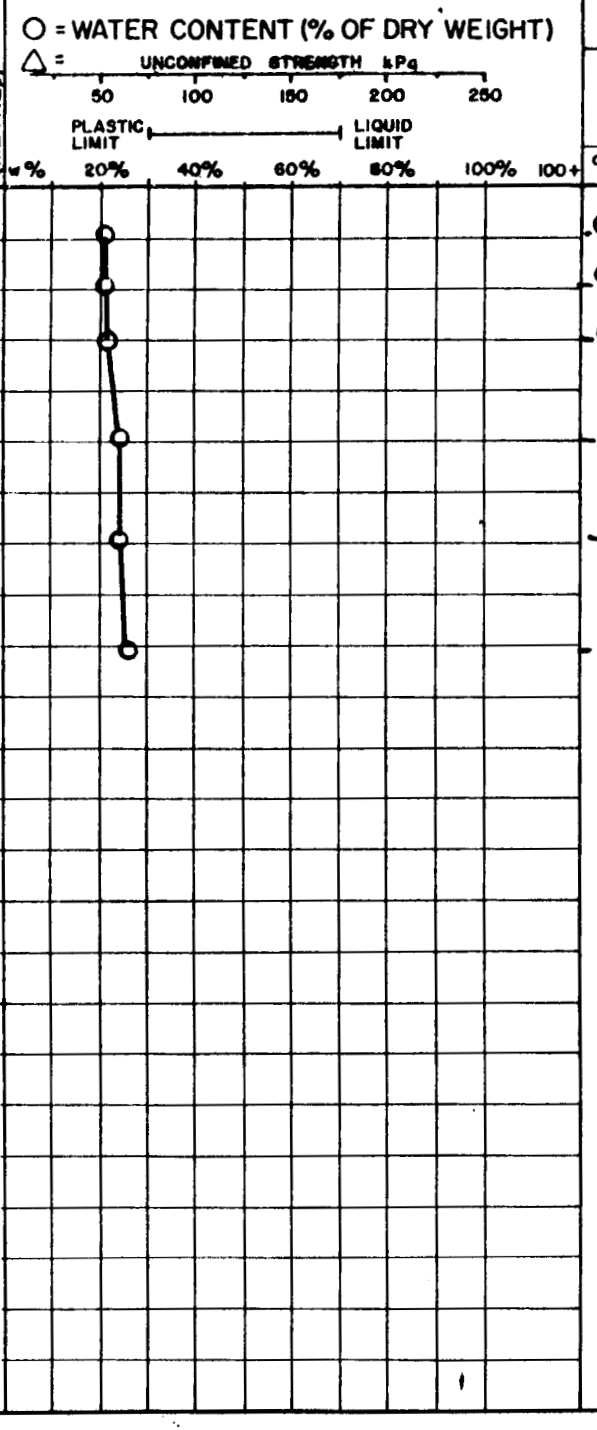
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	Silt-Clayey .6m		Frozen Icelenses	1	98	2	0		Damp
4		Clay-Silty				99	1	0		Damp
6				Ice	2	99	1	0		Moist
8	CL	-Low Plastic +P.		Pockets		100	0	0		Moist
10		3.4m			3	100	0	0		Wet-Sat.
12		Bottom of Hole . 3.4m			4					
14					5					
16					6					
18					7					
20					8					
22					9					
24					10					
26					11					
28										
30										
32										
34										
36										
38										



PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY.

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 6

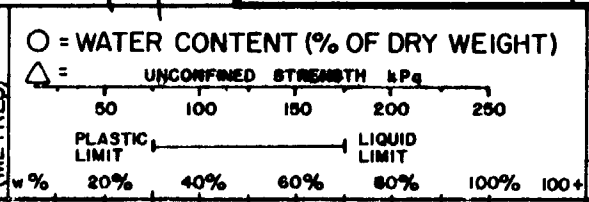
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4, 6	ML	SILT - CLAYEY		FROZEN	1, 2	99	1	0		DAMP			
		2.1m				99	1	0		DAMP			
						99	1	0		DAMP			
8, 10, 12, 14	CL	CLAY - SILTY LOW PLASTIC			3, 4	100	0	0		MOIST			
						100	0	0		MOIST			
		4.6m				100	0	0		WET-SAT.			
16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 4.6m			5, 6, 7, 8, 9, 10, 11								



PUBLIC WORKS CANADA | DRILL HOLE RECORD | Liard Hwy

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 7

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
2	ML	Silt - Clayey .6m				99	1	0		Damp	
4		Clay - Silty			1	99	1	0		Moist	
6	CL	Low Plastic		Frozen ice Pockets & Lenses	2	100	0	0		Moist	
8						100	0	0		Wet	
10		3.4m			3	100	0	0		Sat.	
12					4						
14		Bottom of Hole - 3.4m									
16					5						
18											
20					6						
22											
24					7						
26											
28					8						
30					9						
32											
34					10						
36					11						
38											

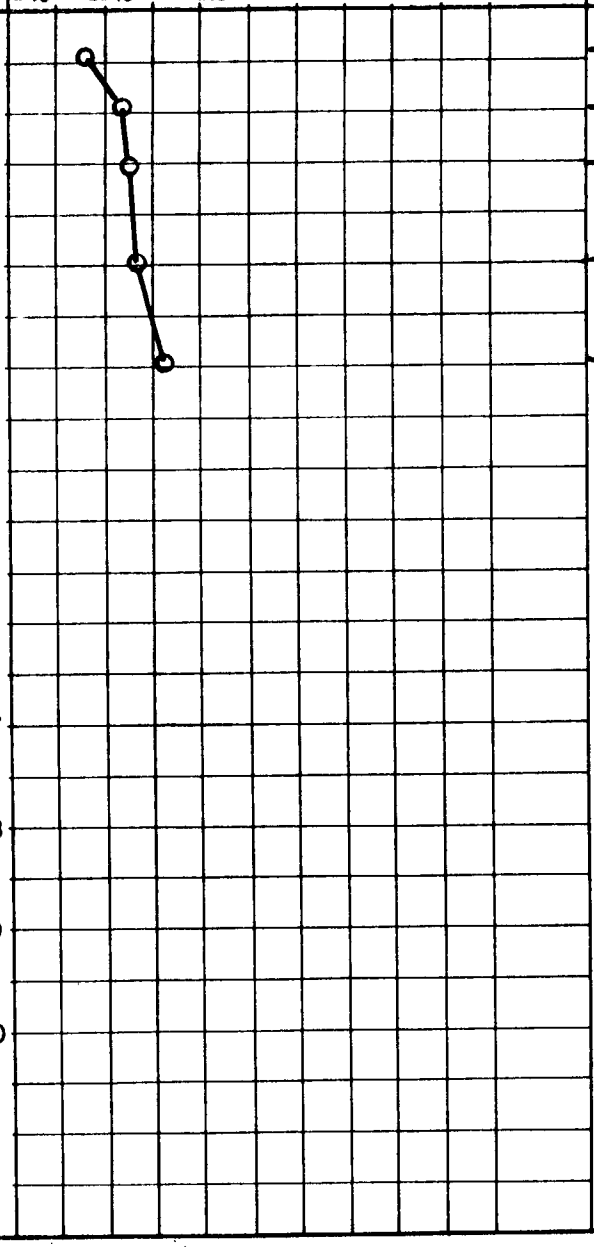


CHAINAGE	OFFSET

PUBLIC WORKS CANADA | DRILL HOLE RECORD | LABRADOR

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 8

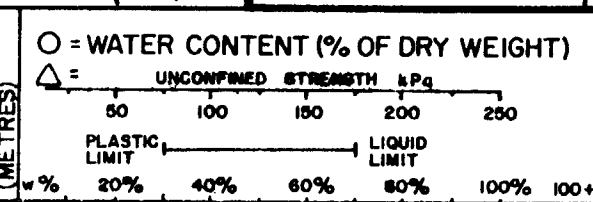
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY		FROZEN	1	99	1	0		DAMP			
4						99	1	0		WET			
6						99	1	0		SAT.			
8		2.4 m			2	100	0	0		MOIST			
10	CL	CLAY - SILTY LOW PLASTIC			3	100	0	0		SAT.			
		3.4 m											
12		BOTTOM OF HOLE 3.4 m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE REPORT | Lloyd Hwy

TECH. D. PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 9

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT- SANDY CLAYEY				89	11	0		MOIST			
4					1	85	15	0		MOIST			
6				FROZEN		79	21	0		MOIST			
8					2	79	21	0		WET			
10	CL	CLAY SILTY 3.4m			3	78	22	0		SAT.			
12		BOTTOM OF HOLE. 3.4m			4								
14						59	41	0		WET			? SILT-SANDY
16					5								LOG BOOK SHOWS
18													DRILLED TO 11'
20					6								OR 3.4 m
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



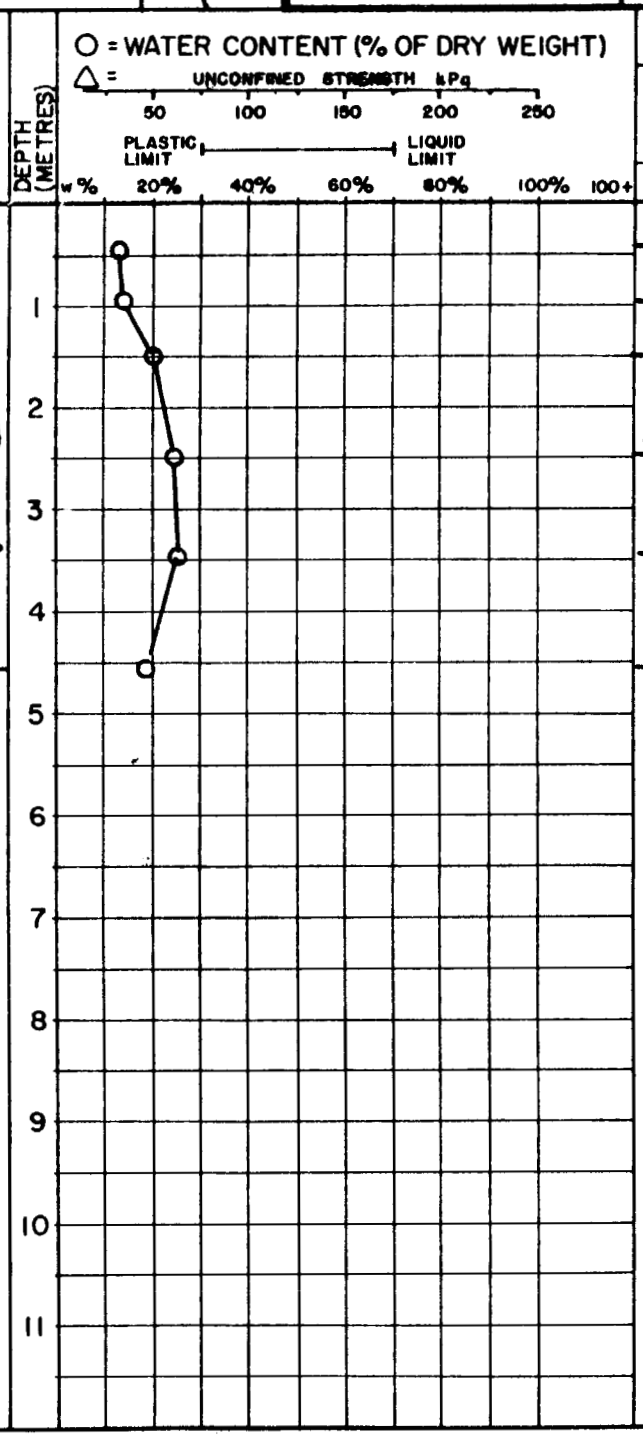
PUBLIC WORKS CANADA | DRILL HOLE REPORT | Dase Hwy

TECH. D. PRONYCH	RIG B-50	DATE 79 03 20	km	B.P. No. 56	HOLE No. 10A

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2, 4	ML	SILT - CLAYEY SANDY		
1.8m				
6, 8, 10, 12, 14	CL	CLAY - SILTY LOW PLASTIC - SANDY PEBBLES		FROZEN ICE CRYSTALS
4.6m				
16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 4.6m		



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
73	27	0		DAMP
77	23	0		DAMP
84	16	0		DAMP
94	6	0		WET
93	7	0		WET-SAT.
65	24	11		WET-SAT.

PUBLIC WORKS CANADA | DRILL HOLE RECORD | LAND Ivy

TECH. D. PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 11

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)
2	SM	SAND - SILT			1
4					
6					2
8		SILTY PEBBLES			
10		GRAVELLY			3
12					
14					4
16					
18					5
20		6.3m			6
22	CL	CLAY - SILTY SANDY GRAVELLY			7
24		7.6 m			
26		BOTTOM OF HOLE. 7.6 m			8
28					
30					9
32					
34					10
36					11
38					

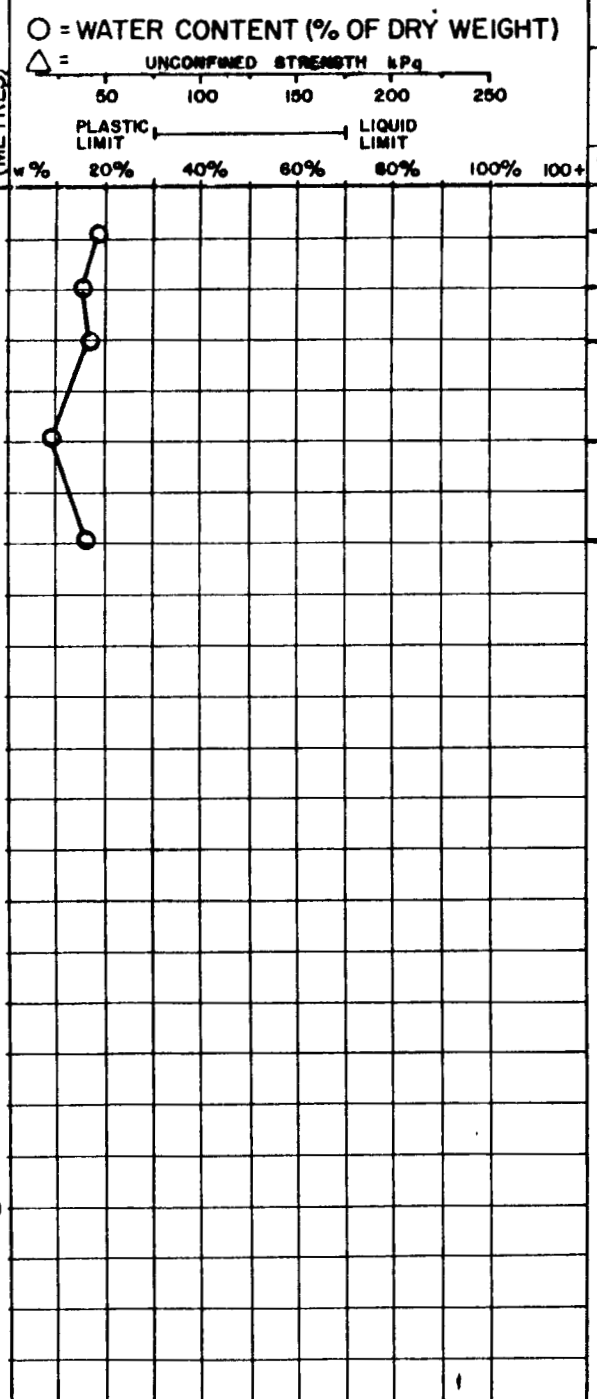
○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa
50 100 150 200 250
PLASTIC LIMIT — LIQUID LIMIT
w % 20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
21	79	0		DAMP			
35	65	0		DAMP			
46	54	0		DAMP			
27	67	6		DAMP			
16	59	25		DAMP			
6	61	33		DAMP			
11	56	33		DAMP			
52	35	13		SAT.			

PUBLIC WORKS CANADA | DRILL HOLE REPORT | [illegible] HWY

TECH. D. PRONYCH	RIG B-50	DATE 79/02/20	km	B.P. No. 56	HOLE No. 12

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY SANDY				74	26		0	MOIST			
4					1	63	37		0	MOIST			
		1.7m		Frozen		62	37		1	MOIST			
6		SAND - SILTY GRAVELLY			2	24	61		15	SAT.			
8													
10	SM	- SILTY			3	23	77		0	WET			
		3.4m											
12		BOTTOM OF HOLE - 3.4m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | Liard Hwy.

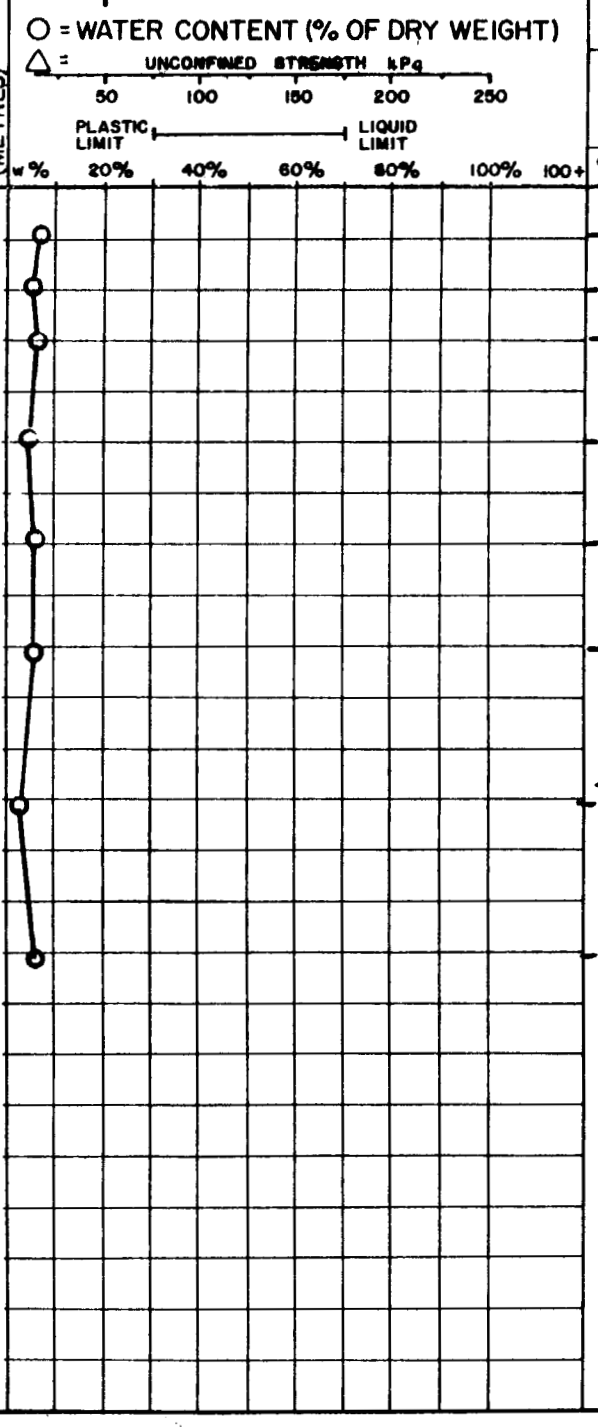
TECH. D. PRONYCH | RIG B-50 | DATE 79 08 20 | km | B.P. No. 56 | HOLE No. 13

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY · PEBBLES				58	39	3		DAMP			
		.9 m			1	13	76	11		DAMP			
4		SAND - SILTY GRAVELLY				26	55	19		DAMP			
6	SM				2								
8		2.4 m				28	35	37		DAMP			
10		GRAVEL - SANDY			3								
12	GP					10	39	51		DAMP			
14					4								
16						6	46	48		SAT.			
18					5								
20	CL	CLAY - SILTY SANDY GRAVELLY 6.1 m			6	30	40	30		SAT.			
22		BOTTOM OF HOLE - 6.1 m											
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								

PUBLIC WORKS CANADA | DRILL HOLE RECORD | LOGGED by.

TECH. D. Pronych	RIG B-50	DATE 79 03 20	km	B.P. No. 56	HOLE No. 14

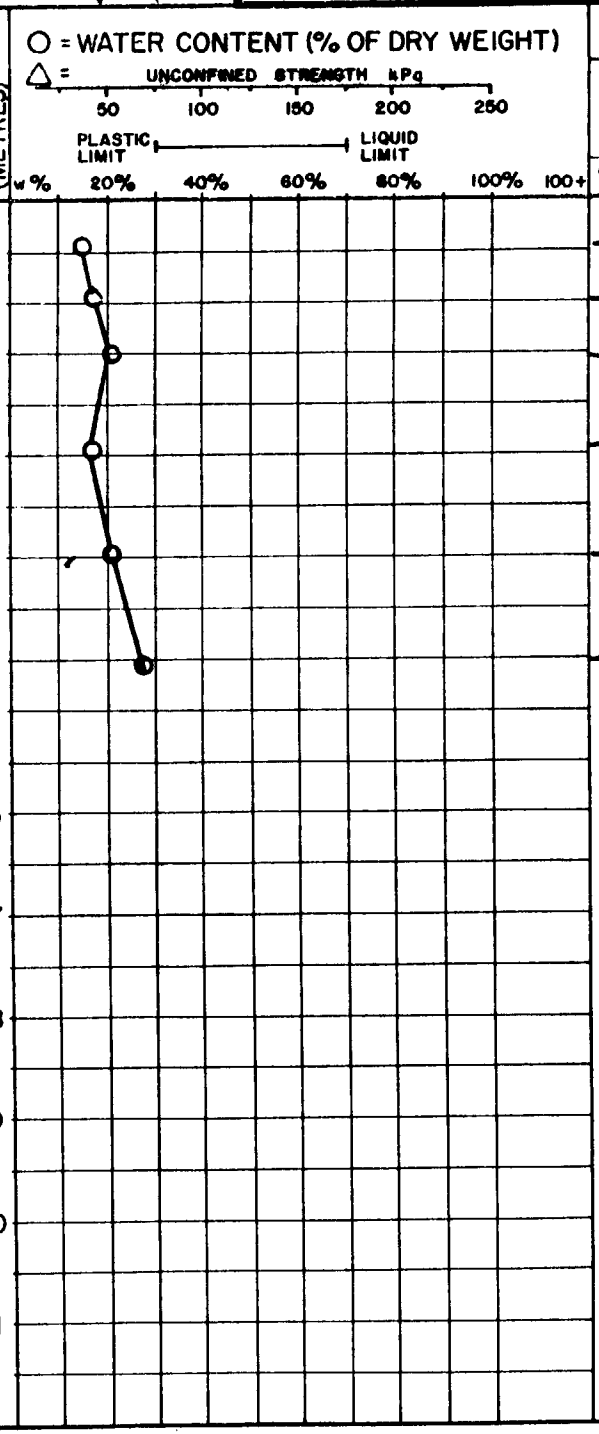
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
	ML	SILT - SANDY				81	-	19	0	DAMP			
2		.6m											
	SM	SAND - SILTY			1	43	-	57	0	DAMP			
4													
6						30	-	70	0	DAMP			
					2								
8		SILTY GRAVELLY				18	-	62	20	DAMP			
10		3.1 m			3								
12	GC	SAND-GRAVEL MIX SILTY				19	-	53	28	DAMP			
					4								
14						12	-	46	42	DAMP			
16		GRAVEL SANDY			5								
18													
20		6.4 m			6	7	-	30	63	DAMP			
22		SAND - GRAVELLY SILTY											
24	SM	WET 7.6m			7	10	-	80	10	WET			
26					8								
28		BOTTOM OF HOLE - 7.6m											
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE RECORD | LORD IVY

TECH. D. PRONYCH | RIG B-50 | DATE 79/03/20 | km | B.P. No. 56 | HOLE No. 15

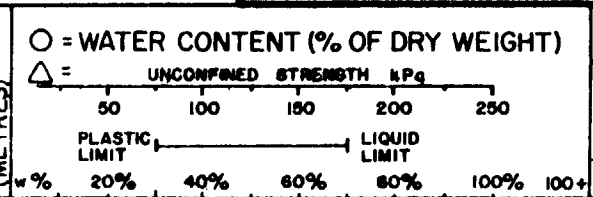
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY SANDY			1	89	11	0		DAMP			
4						88	12	0		DAMP			
6						97	3	0		DAMP			
8					2	85	15	0		DAMP			
10		3.4 m			3	92	8	0		MOIST			
12	CL	CLAY - SILTY LOW PLASTIC			4	97	3	0		WET			
14		4.6 m											
16		BOTTOM OF HOLE 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. D. Paonych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 16

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	SM	SAND - SILTY - PEBBLES			1	26	68	6		DAMP			
4						10	78	12		DAMP			
6		GRAVELLY			2	20	76	4		MOIST			
8						16	72	12		DAMP			
10					3	11	71	18		DAMP			
12					4								
14						6	64	30		DAMP			
16					5								
18													
20	GM	GRAVEL SANDY SILTY			6	14	49	37		MOIST			
22													
24	SM	SAND - SILTY GRAVELLY 7.6m			7	22	59	19		SAT.			
26					8								
28		BOTTOM OF HOLE - 7.6m											
30					9								
32													
34					10								
36													
38					11								



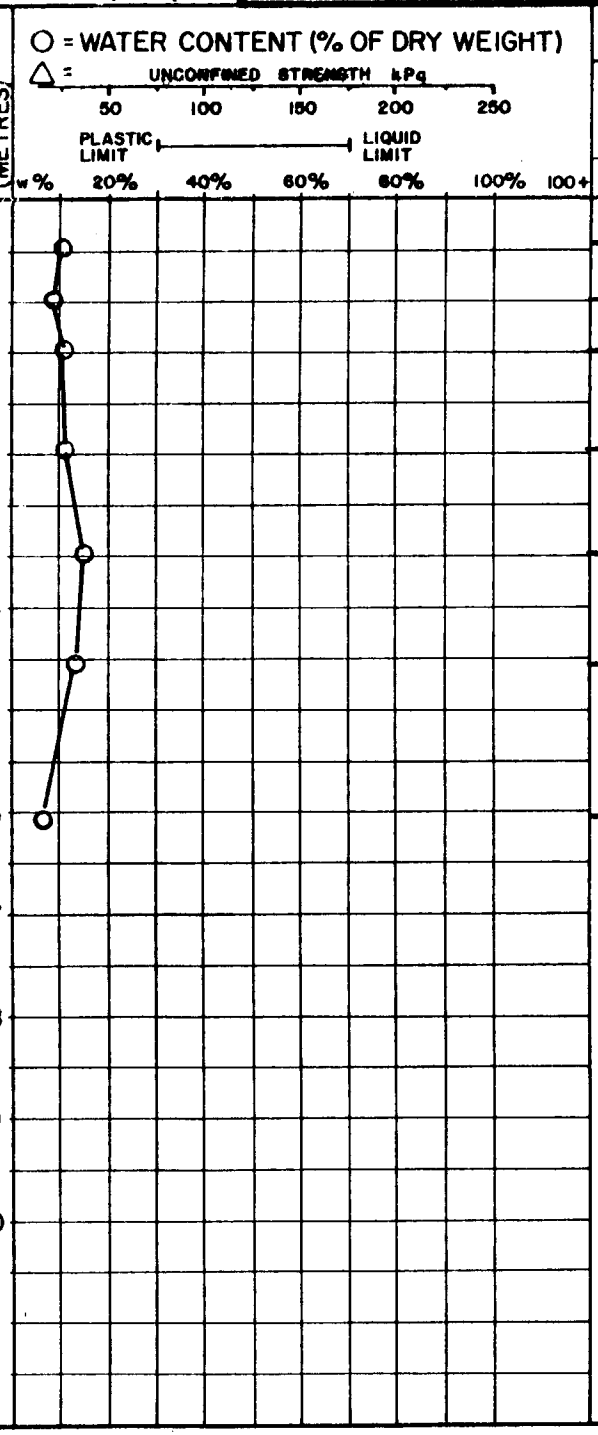
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. D. Pronych	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 17

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
2–12	ML	SILT - SANDY			98	2	0		DAMP		
					71	29	0		DAMP		
					74	26	0		DAMP		
					65	35	0		DAMP		
					83	17	0		DAMP		
12–17	SM	SAND - SILTY			43	57	0		MOIST		
17–20	GM	GRAVEL - SILTY SANDY			20	21	59		MOIST		
20–38		BOTTOM OF HOLE - 6.1m									

Depth marks: 3.7m, 5.4m, 6.1m

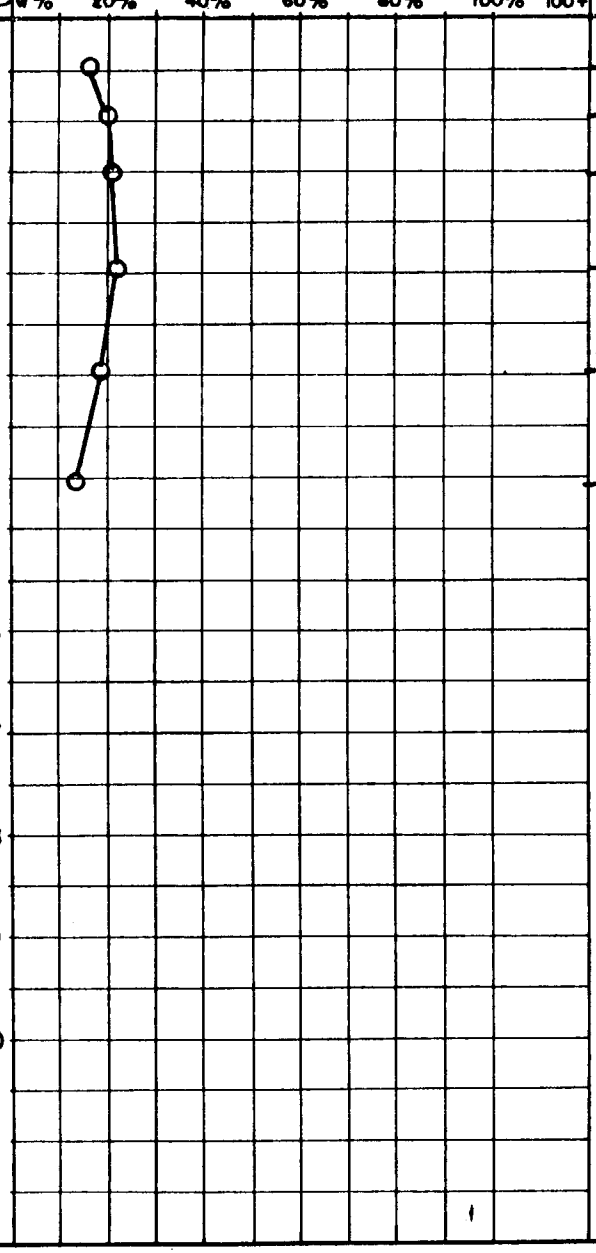
REMARKS



PUBLIC WORKS CANADA | DRILL HOLE RECORD | LAND HWY.

TECH. D.PRONYCH	RIG B-50	DATE 79/03/20	km	B.P. No. 56	HOLE No. 18

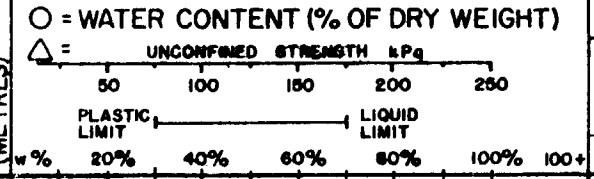
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT -			1	92	8	0		DAMP			
4		- CLAYEY				96	4	0		DAMP			
6		1.8m			2	96	4	0		DAMP			
8		CLAY - SILTY				99	1	0		MOIST			
10	CL	LOW-MED. PLASTIC			3								
12	CI	- SILTY SANDY				79	21	0		MOIST			
14		GRAVELLY 4.6m			4	56	22	22		MOIST			
16		BOTTOM OF HOLE - 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								



PUBLIC WORKS CANADA | DRILL HOLE REPORT | Liard Hwy.

TECH. D. Pronych | RIG B-50 | DATE 79/03/21 | km | B.P. No. 56 | HOLE No. 19

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - CLAYEY		Frozen		92	-	8	0	Moist			
4		- SANDY			1	90	-	10	0	Moist			
6	ML					90	-	10	0	Moist			
8		2.7m			2	90	-	10	0	Moist			
10		CLAY - SILTY			3	74	-	26	0	Moist			
12	CL	- SANDY											
14		LOW PLASTIC			4								
		4.6m											
16		BOTTOM OF HOLE - 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



Source No. 7

Location: Netla River at km 138.2 Liard Highway.

Description: Alluvial floodplain and channel deposits of Netla River.

Material: Gravelly sand and sandy gravel with variable silt content.

Estimated Volume: With reference to plate No. 2, area #60 depleted during highway construction; area #61 contains possibly 10,000 m^3 but water level creates extraction problem.

Comment: In area #61, boreholes #3, 4, 5 & 9 reveal sandy gravel to approximately 4.5m with approximately 1 m stripping and water at approximately 3.7 m. Best access can be gained in the winter along the Netla River channel. Additional quantities of gravel can probably be obtained at other points and bars along the Netla, primarily upstream.

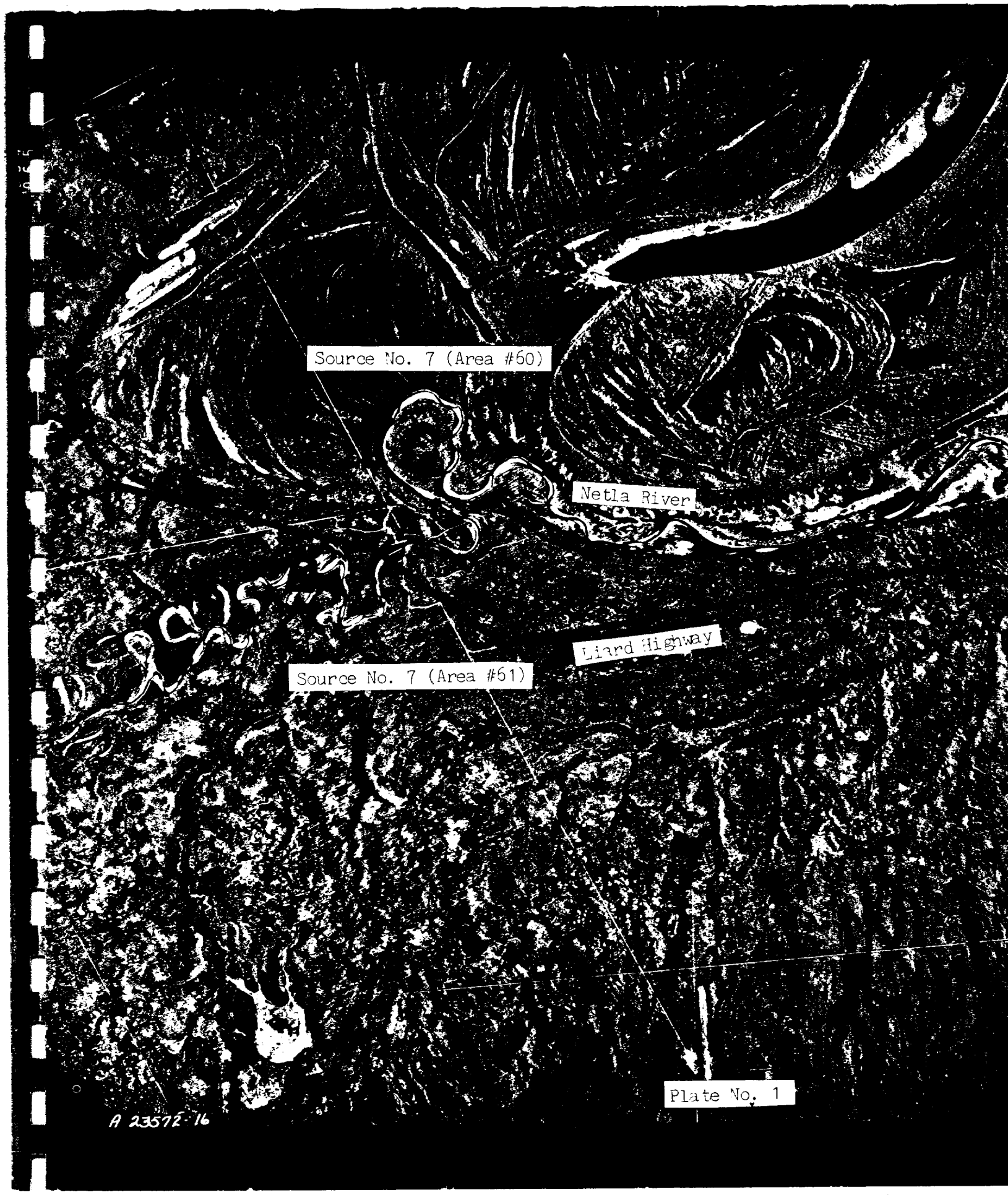

Source No. 7 (Area #60)
Netla River
Liard Highway
Source No. 7 (Area #61)
A 23572-16

Plate No. 1

PROPOSED GRAVEL AND
BORROW AREA 138-60B-

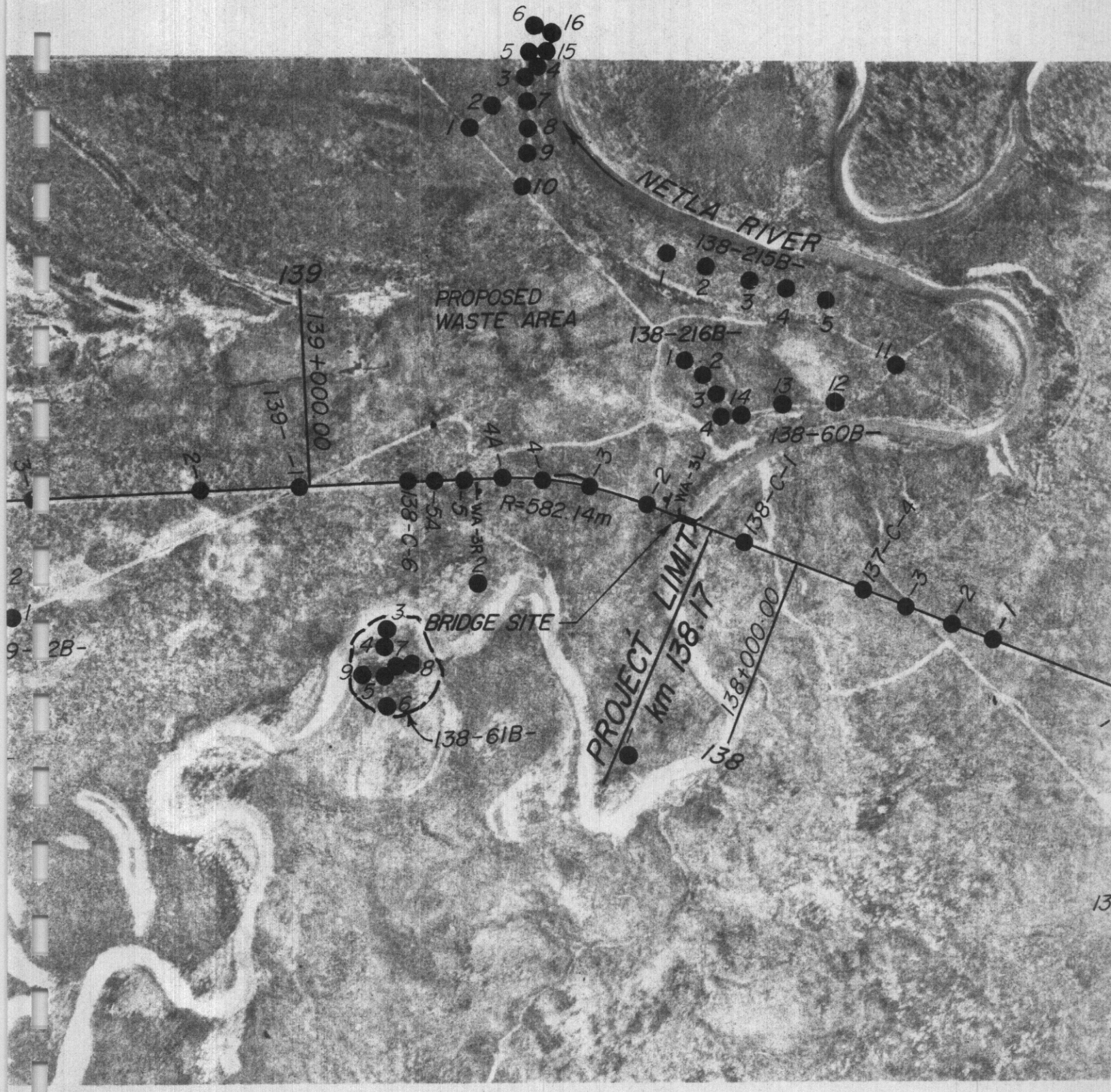


PLATE NO. 2

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD Hwy.

TECH. Pronych	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 1

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	Silt - Sandy			1	No Samples								
4														
6		2.1m			2									
8	SM	Sand - Silty												
10		3.4m			3									
12		Bottom of Hole. 3.4m			4									
14														
16					5									
18														
20					6									
22														
24					7									
26														
28					8									
30														
32					9									
34														
36					10									
38					11									

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. Pronych	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 2

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILT- SANDY										
4	ML				1							
6		2.1m			2	No SAMPLES						
8		SAND - SILTY			3							
10												
12	SM				4							
14		4.6m										
16					5							
18		BOTTOM OF HOLE- 4.6 m										
20					6							
22												
24					7							
26					8							
28												
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
	Pt	PEAT .5m									
2	ML	SILT-SANDY 1.2m									
4		SAND-GRAVEL MIXTURE			1						
6	SM				2	9	42	49		WET	
8	GH	FREE WATER @ 1.8 m									
10		SAND-GRAVELLY SILTY			3	35	40	25		WET	
12	SM				4						
14		4.6m									
16					5						
18		BOTTOM OF HOLE. 4.6 m									
20					6						
22											
24					7						
26											
28					8						
30											
32					9						
34											
36					10						
38					11						

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS

CHAINAGE	OFFSET

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 4

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2–4	ML	SILT - SANDY			1								
		1.5 m											
6–8	SM	SAND - SILTY GRAVELLY			2								
		3.1 m											
10–12		GRAVEL - SANDY			3	6	41	53		MOIST			
12–14		PERC WATER @ 4.0 m			4								
14–16	GP				5	4	33	63		WET			
		5.5 m											
18–20	SP	SAND - GRAVELLY			6								
		6.4 m											
22–38		BOTTOM OF HOLE - 6.4 m			7, 8, 9, 10, 11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

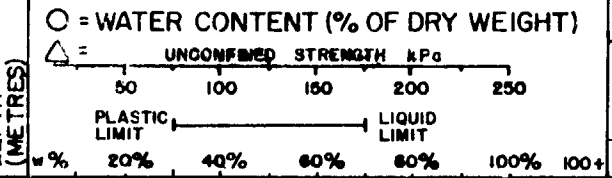
PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 5

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY .9m											
4		GRAVEL - SANDY			1	5	33	62		MOIST			
6	GW	FREE WATER AFTER 2.1m			2	4	36	60		WET			
8													
10					3								
12		4.0											
14	SP	SAND - GRAVELLY 4.6m			4	1	87	12		WET			
16					5								
18		BOTTOM OF HOLE - 4.6m											
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 6

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	C = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
	Pt	PEAT .3 m												
2		SILT - SANDY												
4	ML				1									
6		1.8 m												
8	SM	SAND - GRAVELLY SILTY FREE WATER			2		18	52	30		WET			
10					3		3	82	15		WET			
12	SP	SAND - GRAVELLY												
14		4.6 m			4									
16		BOTTOM OF HOLE - 4.6 m			5									
18														
20					6									
22														
24					7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA

DRILL HOLE REPORT

LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 7

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)
	Pt	PEAT — .3m			
2, 4, 6	ML	SILT-SANDY CLAYEY			1, 2
8		2.4m			
10, 12	GP	SAND-GRAVELLY FREE WATER			3, 4
14		4.6m			
16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 4.6m			5, 6, 7, 8, 9, 10, 11

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

NO SAMPLES

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 8

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)
	Pt	PEAT .5m			
2	ML	SILT - SANDY			1
4		1.5 m			
6	SM	SAND - SILTY GRAVELLY FREE WATER PEBBLES			2
8					
10					3
12					
14		4.6m			4
16		BOTTOM OF HOLE - 4.6m			5
18					
20					6
22					
24					7
26					8
28					
30					9
32					
34					10
36					11
38					

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

No SAMPLE

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 10

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT - SANDY		
		.9m		
4		SAND - SILTY		
6	SM			
8		2.7m		
10	ML	SILT - SANDY		
		3.7m		
12		SAND. SILTY LVLT		
14	SM	GRAVELLY		
		4.6m		
16		BOTTOM OF HOLE - 4.6m		
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

SAMPLES NOT TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 11

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT - SANDY .75 m		
4		SAND - SILTY		
6	SM			
8				
10				
12		3.7 m		
14	CL	CLAY SILTY SANDY WET		
16		4.9 m		
18		BOTTOM OF HOLE - 4.9 m		
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT ——— LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

No SAMPLES

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. Pronych | RIG B-50 | DATE 78/02/06 | km 138 | B.P. No. 60 | HOLE No. 12

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2	ML	Silt-Sandy .75m			1							
4		Sand - Silty										
6	SM				2	No Samples						
8		-Clayey										
10	SC	- Wet			3							
12												
14					4							
16		4.9 m			5							
18		Bottom of Hole - 4.9m										
20					6							
22												
24					7							
26												
28					8							
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. PROWYCH	RIG B-50	DATE 18/02/06	km 138'	B.P. No. 60	HOLE No. 13

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w %, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILTY SAND												
4	ML				1									
6		1.8m												
		SAND - SILTY			2	No Samples								
8														
10	SM				3									
12														
		4.3 m			4									
14	CL	CLAY-SILTY SANDY 4.6 m												
16		BOTTOM OF HOLE - 4.6m			5									
18														
20					6									
22														
24					7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

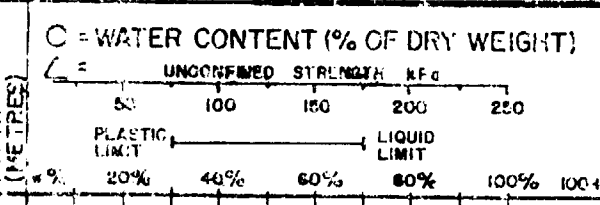
TECH. PRONYCH	RIG B-50	DATE 78/02/06	km 138	B.P. No. 60	HOLE No. 14

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w%, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2	ML	SILT. SANDY			1							
		.75m										
4		SAND-SILTY DRY										
6					2	NO SAMPLES						
8												
10		- CLAYEY - WET			3							
12												
14					4							
		4.6m										
16		BOTTOM OF HOLE - 4.6 m			5							
18												
20					6							
22												
24					7							
26												
28					8							
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY - REVISION

TECH. D. PRONYCH	RIG B-50	DATE 79/08/19	km 138	B.P. No. 60	HOLE No. 15

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT											
4		1.2m			1	6	29	65		DAMP			
6		GRAVEL - SANDY			2								
8	GW				3	4	48	48		DAMP			
10													
12		3.8m			4								
14	SW	SAND - PEBBLES				4	86	10		WET			
		4.6m											
16					5								
18		BOTTOM OF HOLE - 4.6m											
20					6								
22		FREE WATER @ 4.0m											
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								



PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy

TECH. D. Pronych	RIG B-50	DATE 79/08/19	km 138	B.P. No. 60	HOLE No. 16

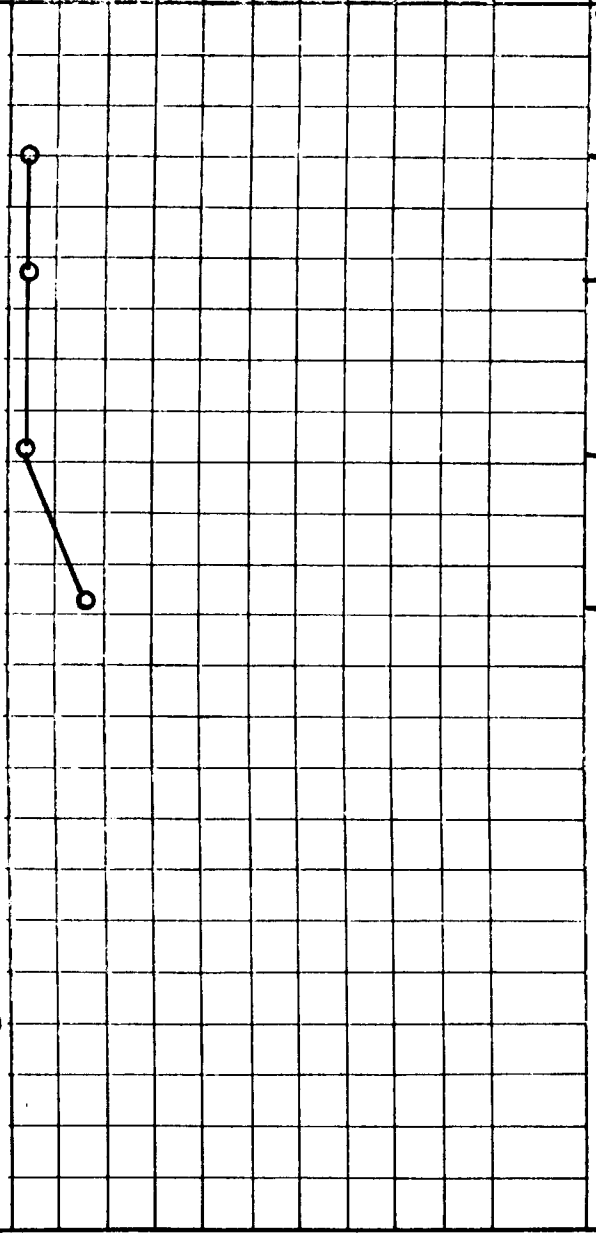
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT		Frozen
		.9 m		
4		GRAVEL - SANDY		
6				
8	GW			
10				
12				
14				
16		5.2 m		
18	SW	SAND - PEBBLES		
20		6.1 m		
22		Bottom of Hole. 6.1 m		
24				
26				
28				
30				
32				
34				
36				
38				

C = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
10	41	49		Moist
4	52	44		Wet
3	43	54		Sat.
2	88	10		Sat.

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 1

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT - SANDY WET		
4		1.2 m		FROZEN
6		SAND - FINE - COARSE SATURATED		
8	SW			
10		3.4 m		
12		BOTTOM OF HOLE - 3.4 m		
14				
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

NO SAMPLES

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 2

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)
2	ML	SILT - SANDY			1
4		WET			
6		1.8m			2
8	SM	SAND - SILTY FEW PEBBLES FREE WATER			3
10					
12					4
14		4.6m			
16		BOTTOM OF HOLE - 4.6m			5
18					
20					6
22					
24					7
26					8
28					
30					9
32					
34					10
36					11
38					

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

NO SAMPLES

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

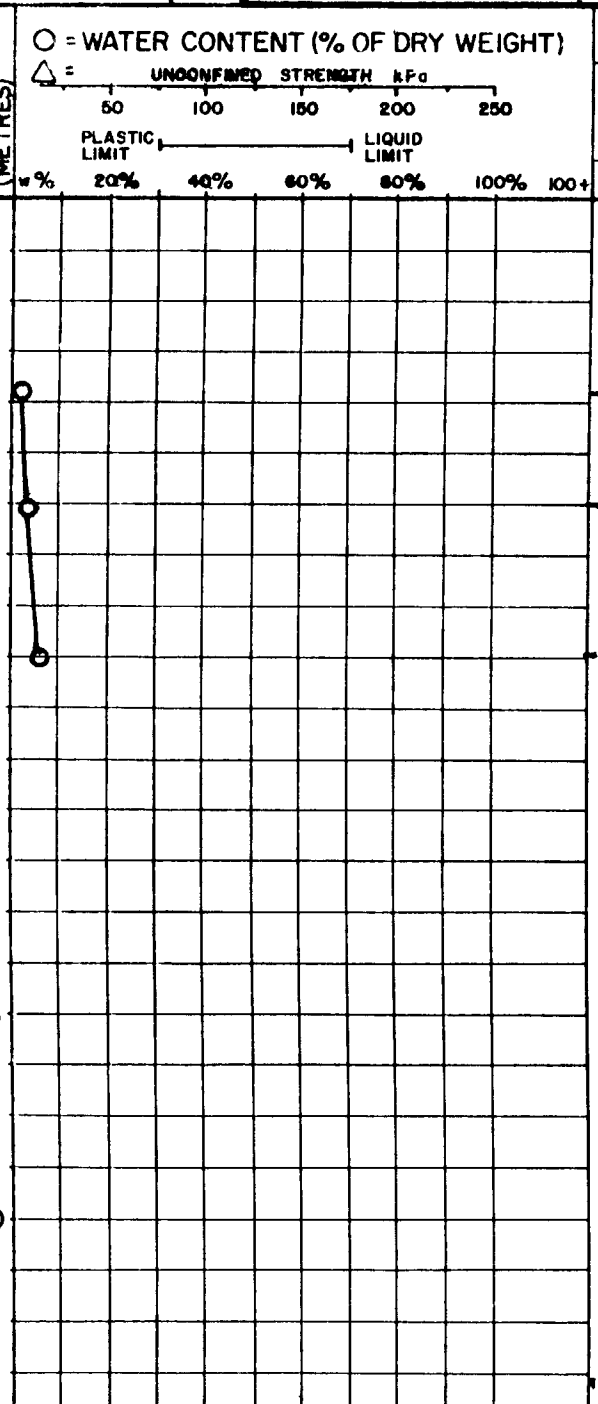
CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT - SANDY		
		.9m		
4		SAND - GRAVEL MIX		
6	SP			
8	GP			
10		PERCH WATER AFTER 3.7m		
12				
14				
16		4.9m		
18		BOTTOM OF HOLE - 4.9m		
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				



GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	
2	58	40		MOIST
2	50	48		MOIST
4	49	47		WET

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. PROWYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 4

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
2	ML	SILT - SANDY .6m										
4		GRAVEL - SANDY			1	3	36	61		DAMP		
6	GW											
8		FREE WATER FROM			2	4	42	54		MOIST		
10		3.7m - 4.6m			3							
12												
14		4.6m			4	2	42	56		WET		
16		CLAY - SILTY SANDY										
18	CL	- PEBBLES WET 5.5m			5							
20		BOTTOM OF HOLE - 5.5m			6							
22												
24					7							
26												
28					8							
30												
32					9							
34												
36					10							
38					11							

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa
50 100 150 200 250
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 5

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY											
4		1.2 m			1	6	70	24		DAMP			
		SAND - GRAVELLY											
6					2								
8	SP	FREE WATER AFTER 3.7m				7	69	24		MOIST			
10					3								
12		4.0 m											
14	CL	CLAY - SILTY SANDY PEBBLES - WET 4.6m			4	5	62	33		WET			
16		BOTTOM OF HOLE - 4.6m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa
50 100 150 200 250
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. PROWYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 6

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY												
4	ML				1									
6		WET AFTER 1.8m			2	No SAMPLES								
8														
10		3.4m			3									
12														
14		BOTTOM OF HOLE. 3.4m			4									
16					5									
18														
20					6									
22														
24					7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. Pronych	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 7

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY											
4		1.2m			1								
6		SAND - SILTY WET			2								
8	SM	SAT. AFTER 2.7m			3								
10		3.4m											
12		BOTTOM OF HOLE 3.4m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

No SAMPLES

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 8

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	○ = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w %, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2	ML	SILT - SANDY			1	No SAMPLES						
		.75m										
4		SAND - SILTY										
6					2							
8	SM	SATURATED AFTER 2.7m										
10		3.4m			3							
12		BOTTOM OF HOLE - 3.4m										
14					4							
16					5							
18												
20					6							
22												
24					7							
26					8							
28												
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY

TECH. PRONYCH	RIG B-50	DATE 78/02/05	km 138	B.P. No. 61	HOLE No. 9

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
2	ML	SILT - SANDY										
4		1.2m			1	6	47	47		DAMP		
6		GRAVEL - SANDY										
8		FREE WATER AFTER 3.7m ?			2	3	27	70		DAMP		
10	GW				3							
12												
14					4	4	42	54		DAMP		
16		5.0m										
18	CL	CLAY - SILTY SANDY PEBBLES WET			5							
20		6.1m			6							
22		BOTTOM OF HOLE - 6.1m										
24					7							
26												
28					8							
30												
32					9							
34												
36					10							
38					11							

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

REMARKS

Source No. 8

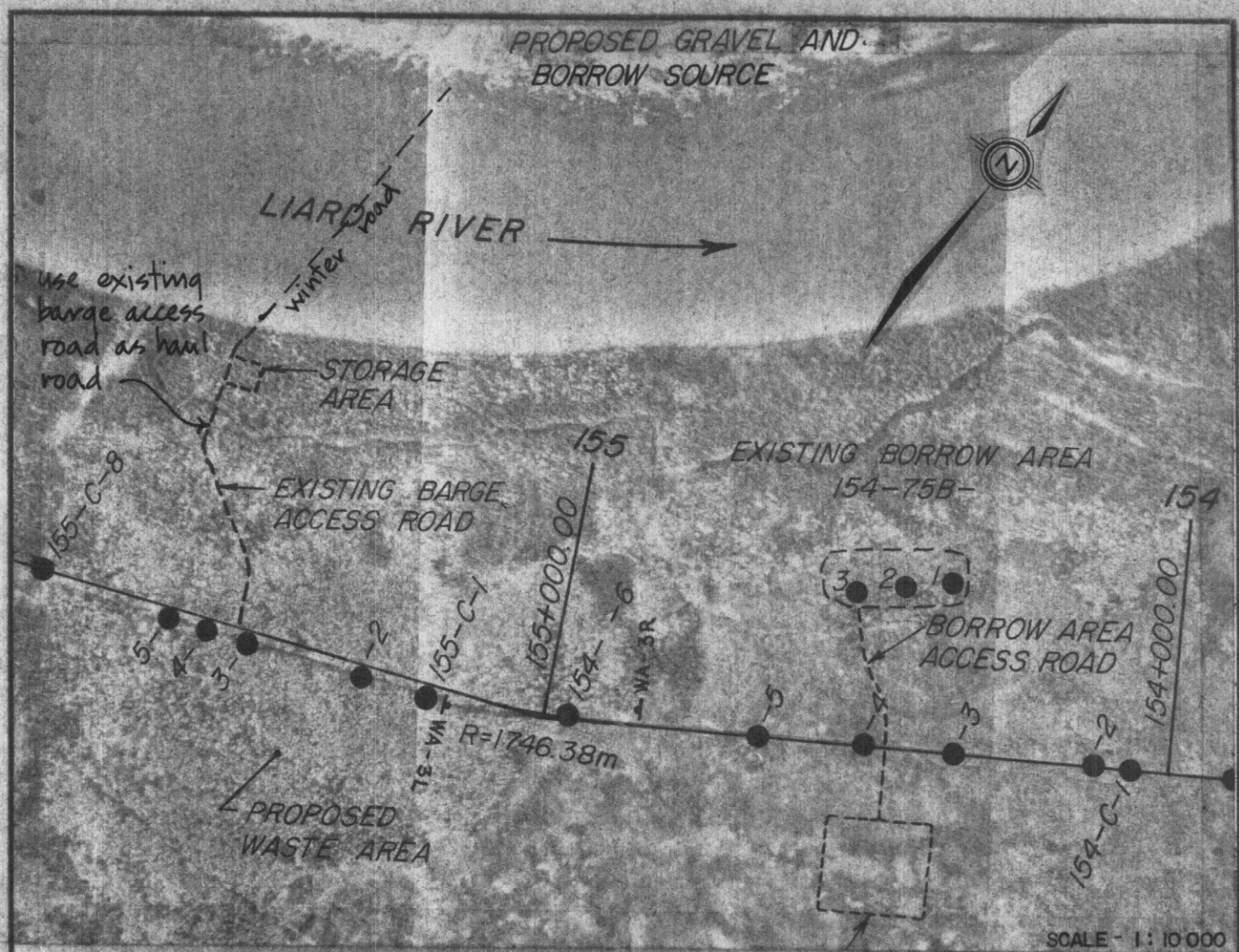
Location: North of km 155 Liard Highway on Liard River.

Description: Alluvial channel deposits of Liard River on north side of channel.

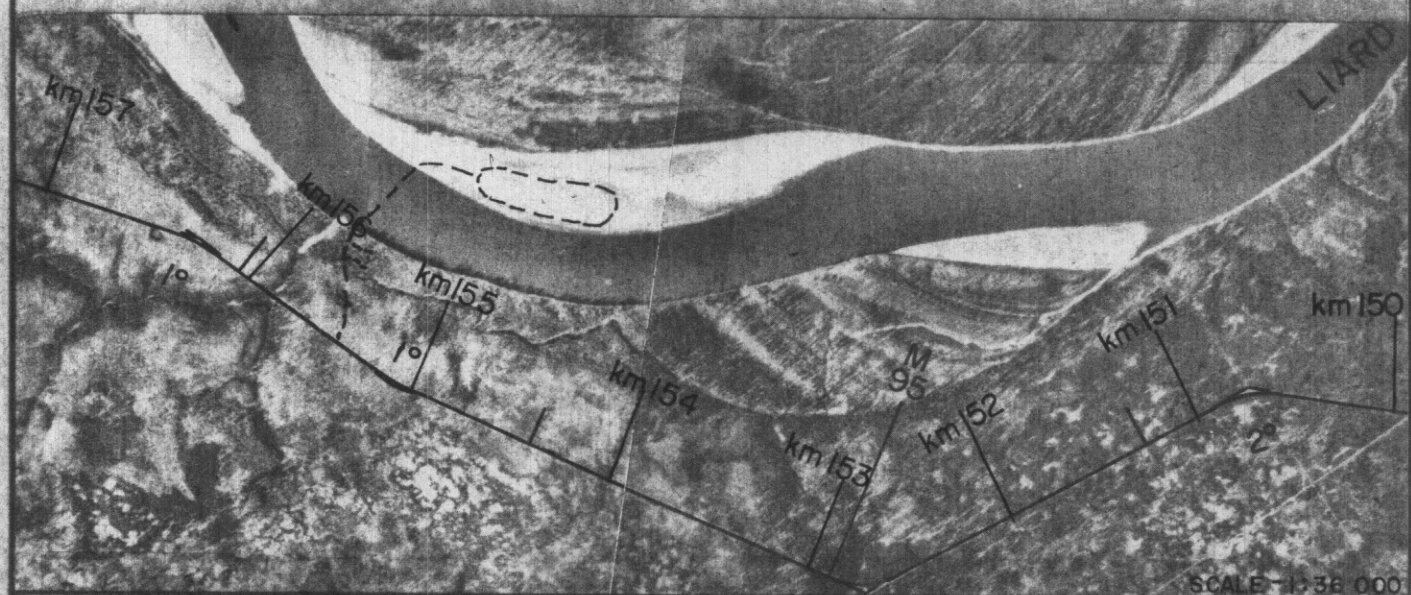
Material: Sandy gravel, or gravelly sand with variable silt content.

Estimated Volume: Volume not established due to lack of drill hole or test-pit data. Approximately 30,000 m^3 removed to-date. Conservative estimates place remaining volume in excess of 100,000 m^3.

Comment: Winter access only across Liard River. All weather Barge Access Road from highway to river.



QUANTITY 20 000m³ BORROW & 17 000m³ PIT RUN GRAVEL



NOTE:- GRAVEL TO BE REMOVED TO WITHIN ONE FOOT OF SUMMER WATER LEVEL OF LIARD RIVER. WHEN COMPLETED THE BAR IS TO BE GRADED AND SLOPED TOWARDS THE WATER SO NO DEPRESSIONS ARE LEFT.

Public Works Canada / Travaux publics Canada

Drawing title: Titre du dessin: GRAVEL BAR BORROW SOURCE

scale: échelle: km 155.0

date: revisions:

designed by: conçu par: date:

drawn by: dessiné par:

reviewed by: examiné par:

approved by: approuvé par:

project no.: no. du projet: 085816

dwg. no. dessin no. 11 of 15

DPW 700A

PLATE No. 1

TL / JF 2

FILE NO. _____

Source No. 8

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

TO: C. Yurchak

LAB. SAMPLE NO.	1119
BAG NO.	3
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	LIARD HWY.
PIT NAME & NO.	KM 156
DATE SAMPLED	STOCKPILE
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/09/29
DATE RECORDED	80/10/10

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	98.8	98.0	
1"	89.3	82.2	
3/4"	79.5	65.9	
5/8"			
1/2"	65.1	42.0	
3/8"	55.9	26.7	
#4	39.8	0	100
#8	33.8		85.0
#16	30.9		77.6
#30	27.0		67.9
#50	10.1		25.5
#100	5.5		13.8
#200	3.2		8.0

Remarks: _____

Signed: _____
MATERIALS TESTING ENGINEER

DEPT. OF PUBLIC WORKS OF CANADA
CONTROL CENTRE
EDMONTON

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

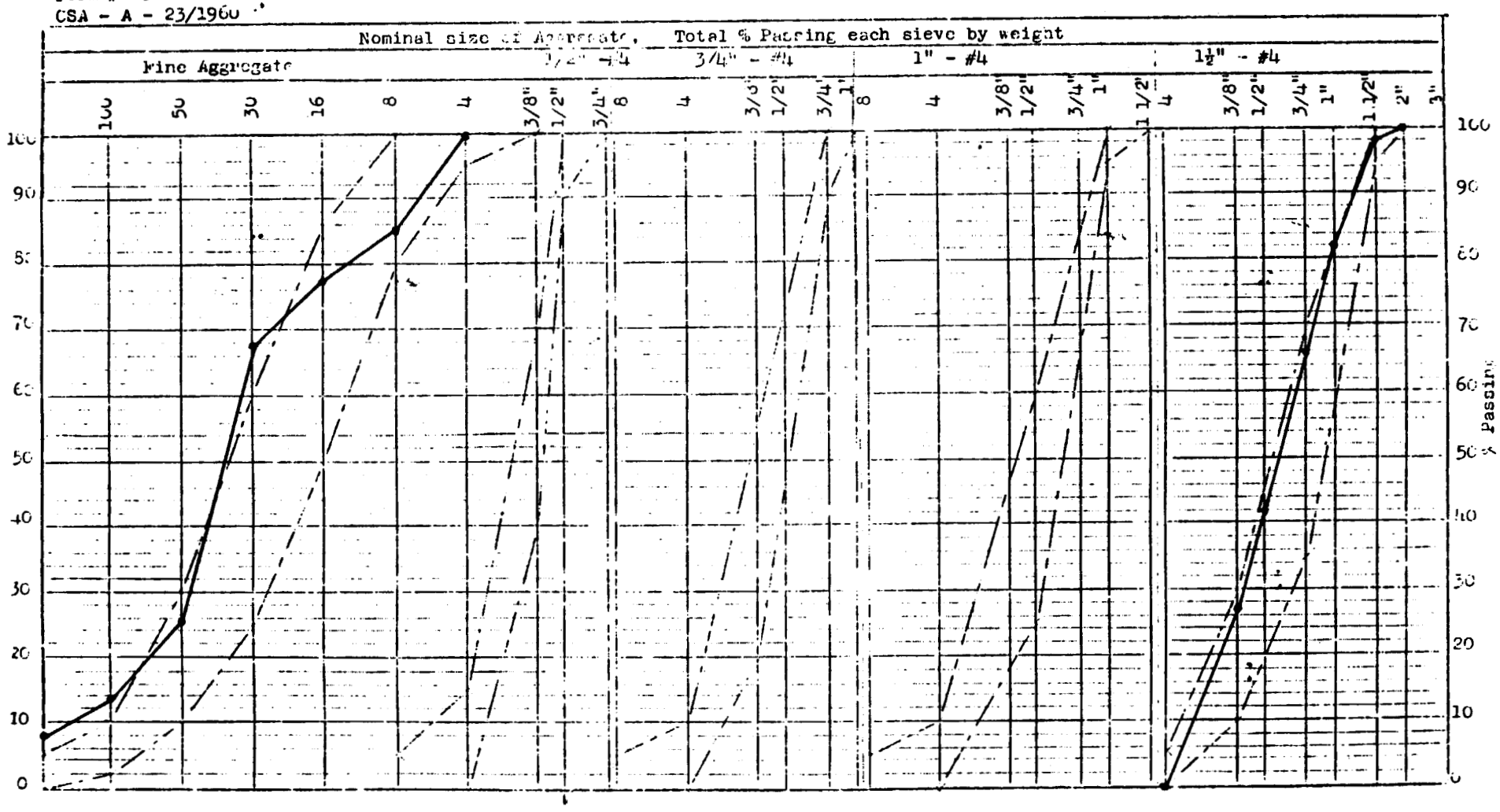
Miscellaneous Test Information

Colour test		
% Coal		
Silt Bond		
Fineness modulus		
Coarse		
Fine	2.30	
Unit weight		
Coarse		lbs./cu.ft.
Fine		lbs./cu.ft.
Specific gravity (Bulk)		
Coarse		
Fine		
Los Angeles Test		
Abrasion loss		%
Mix design		
Strength		p.s.i.

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 1119



TL / JF 2

FILE NO. _____

Source No. 8

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

LAB. SAMPLE NO.	1120
BAG NO.	4
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	KM 156
PIT NAME & NO.	Stock Pile
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/09/29
DATE RECORDED	80/10/10

TO: C. Yurchuk

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	99.3	98.8	
1"	91.8	86.4	
3/4"	81.6	69.5	
5/8"			
1/2"	67.1	45.5	
3/8"	57.3	29.3	
#4	39.6	0	100
#8	32.6		82.4
#16	30.1		76.0
#30	25.7		64.9
#50	7.2		18.1
#100	3.2		8.1
#200	1.7		4.4

Remarks: _____

Signed: _____ DEPT. OF PUBLIC WORKS OF CANADA QUALITY CONTROL CENTRE MATERIALS TESTING ENGINEER

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

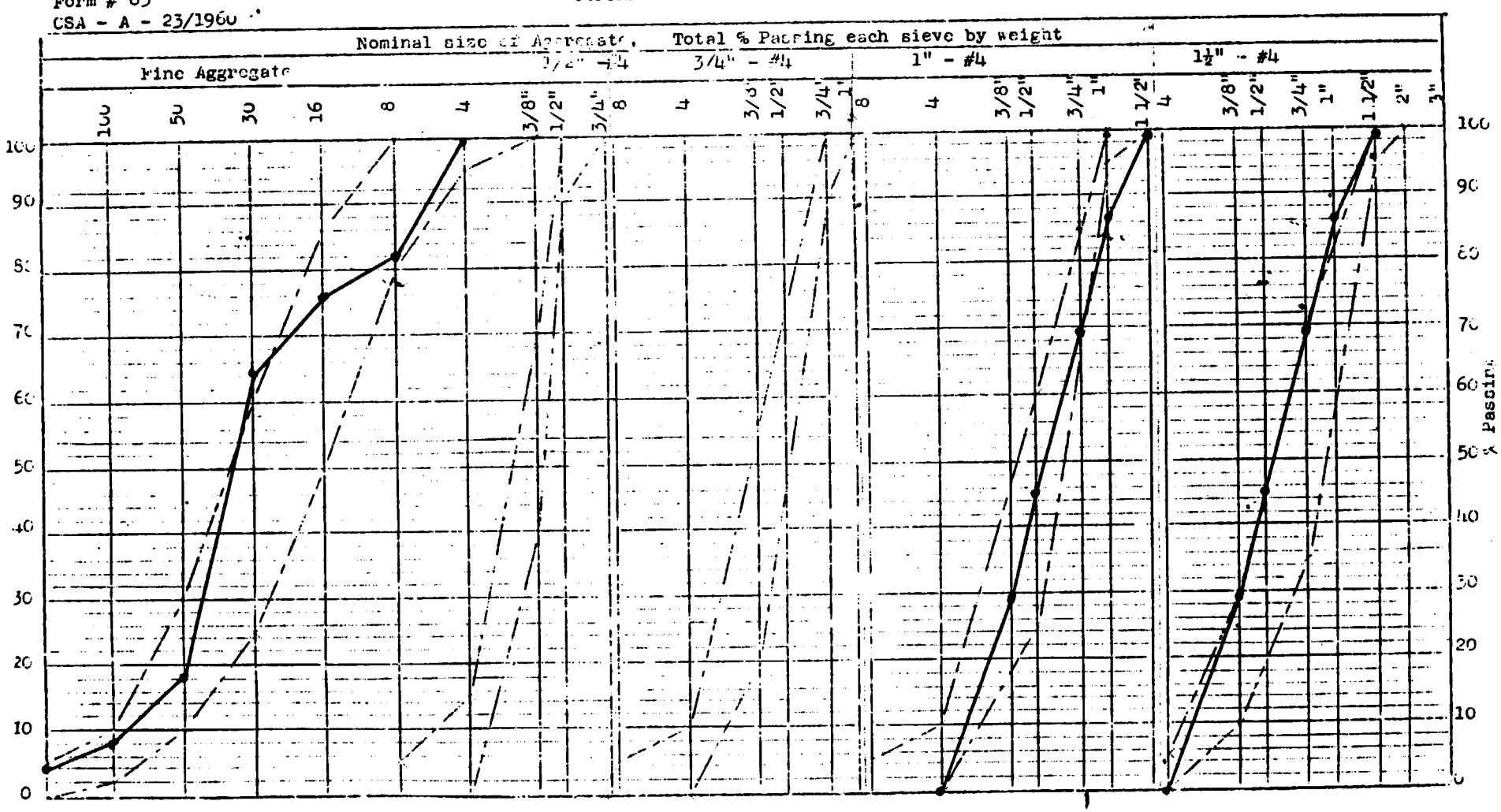
Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	2.51
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 1120



TL / JF 2

FILE NO. _____

Source No. 8

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

LAB. SAMPLE NO.	1121
BAG NO.	5
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	Km 156 Laird Hwy
PIT NAME & NO.	Km 156
DATE SAMPLED	Stock Pile
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/09/29
DATE RECORDED	80/10/10

TO: C. Yurchak

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	95.3	92.0	
1"	87.8	79.2	
3/4"	78.6	63.5	
5/8"	6		
1/2"	65.9	41.8	
3/8"	57.5	27.5	
#4	41.4	0	100
#8	34.0		82.1
#16	30.8		74.5
#30	26.8		64.7
#50	10.0		24.1
#100	5.7		13.7
#200	3.6		8.6

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	2.41
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

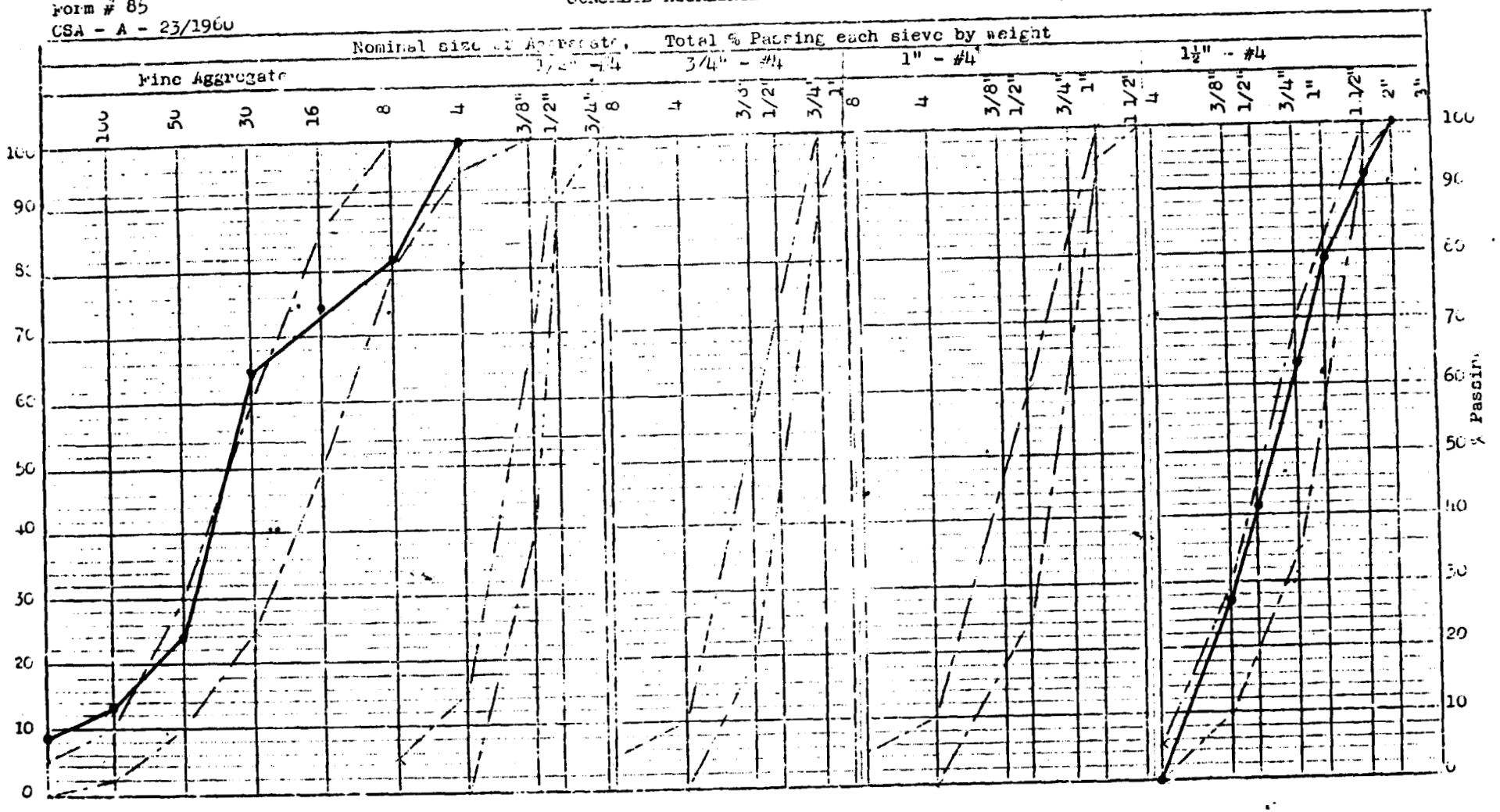
Remarks: _____

Signed: DEPT. OF PUBLIC WORKS DE CANADA
QUALITY CONTROL TESTING ENGINEER
EDMONTON

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # _____



TL / JF 2

FILE NO. _____

Source No. 8

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

TO: C. Yuschak

LAB. SAMPLE NO.	1122
BAG NO.	6
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	KM 156
PIT NAME & NO.	Stock Pile
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/09/29
DATE RECORDED	80/10/10

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	99.2	98.6	
1"	91.5	85.6	
3/4"	82.2	69.8	
5/8"			
1/2"	73.5	55.0	
3/8"	58.7	29.9	
#4	41.1	0	100
#8	34.3		83.5
#16	30.9		75.3
#30	26.7		64.9
#50	8.3		20.1
#100	4.1		9.9
#200	2.3		5.5

Remarks: _____

Signed: DEPT. OF PUBLIC WORKS OF CANADA CONTROL CENTRE EDMONTON

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

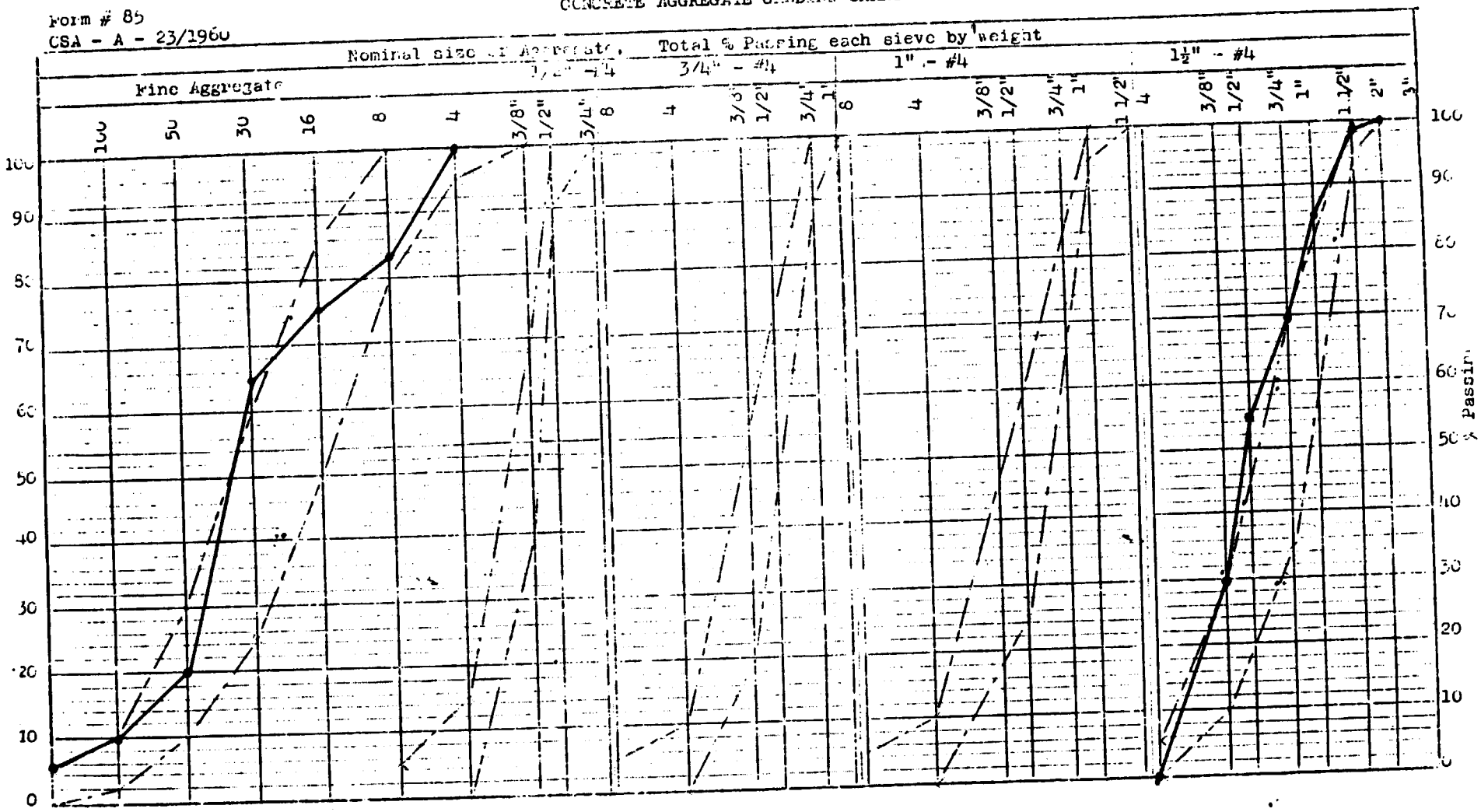
Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	2.46
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 12



TL / JF 2

FILE NO. _____

Source No. 8

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

TO: C. Yuechak

LAB. SAMPLE NO.	Average of 4 Samples
BAG NO.	From Stockpile KM 156
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	
PIT NAME & NO.	
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	
DATE RECORDED	

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	98.2	96.9	
1"	90.1	83.4	
3/4"	80.5	67.2	
5/8"			
1/2"	67.9	46.1	
3/8"	57.4	28.4	
#4	40.5	0	100
#8	33.7		83.2
#16	30.7		75.8
#30	26.6		65.7
#50	8.9		22.0
#100	4.6		11.4
#200	2.7		6.7

Remarks: _____

Signed DEPT. OF PUBLIC WORKS CANADA
MATERIALS TESTING ENGINEER
QUALITY CONTROL CENTRE
EDMONTON

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

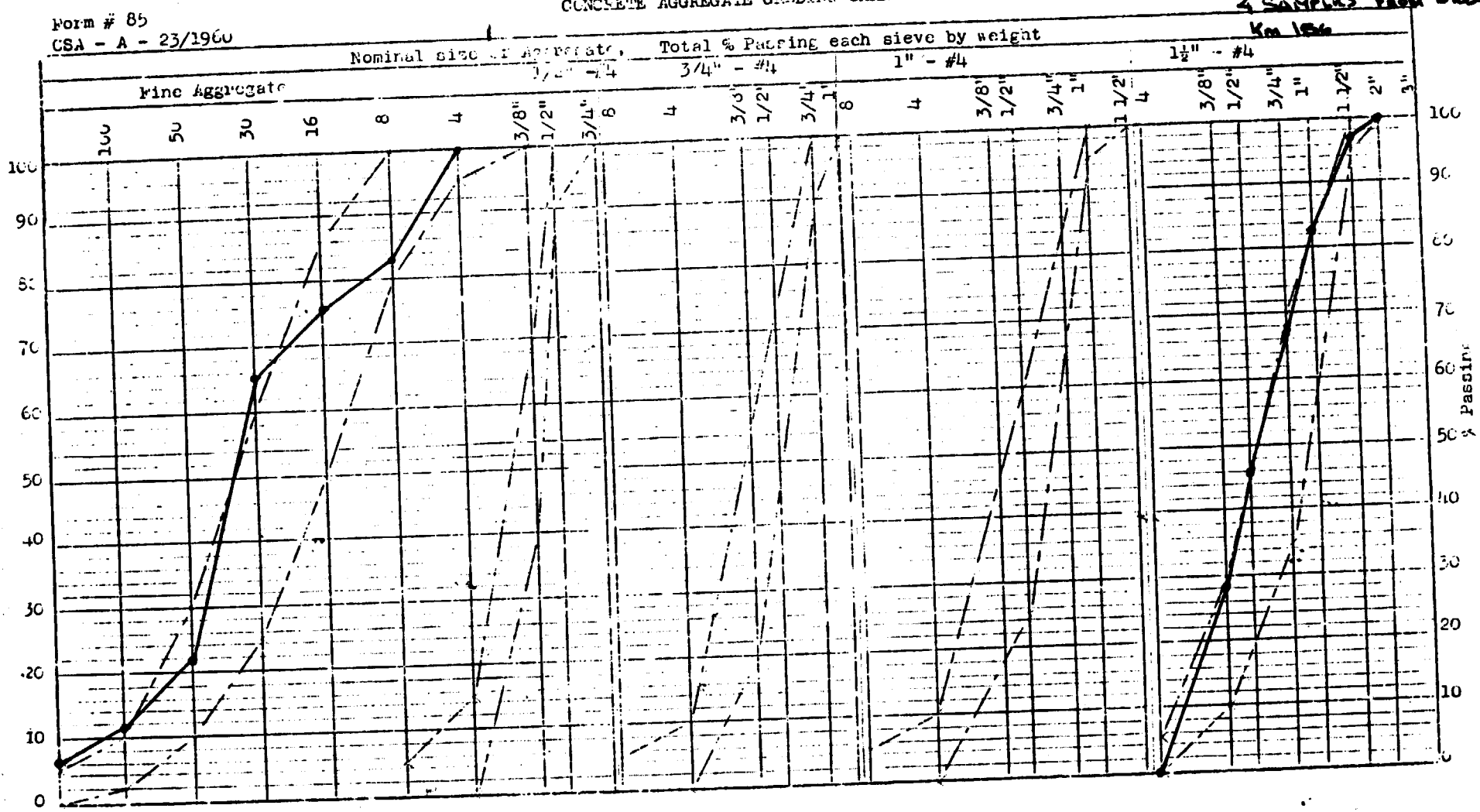
Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	2.66
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # Average of 4 Samples from Stock Pile
Km 186



Source No. 9

Location: km 163 Liard Highway

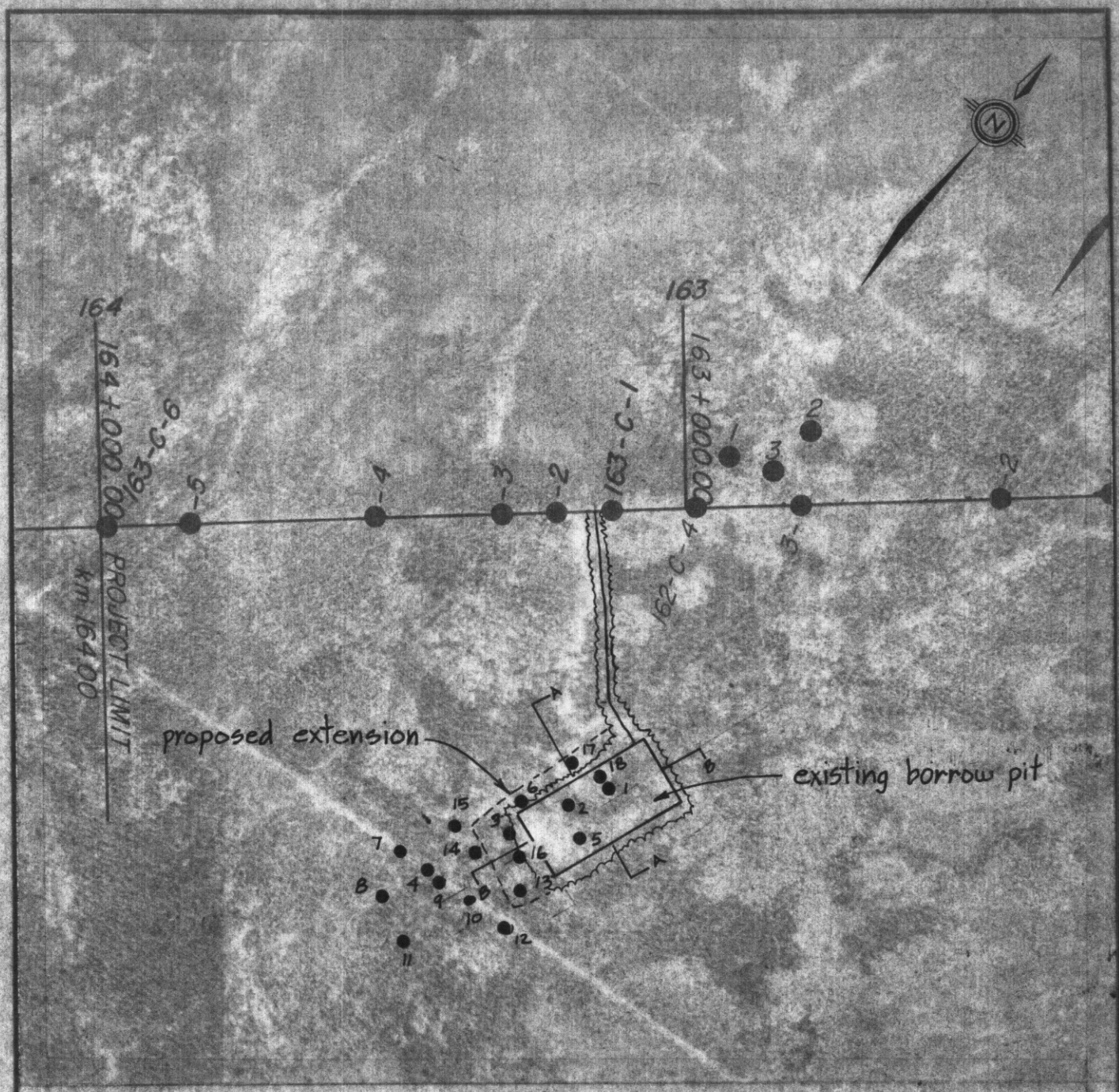
Description: Buried outwash deposit - 2-3 m of overburden.

Material: Sandy gravel and gravelly sand with variable high silt content.

Estimated Volume: Not established - deposit partially depleted for borrow during construction of highway to km 164 - will be totally depleted during construction south from km 164.

Comment: Material of marginal quality - primarily used for embankment construction and culvert backfill.

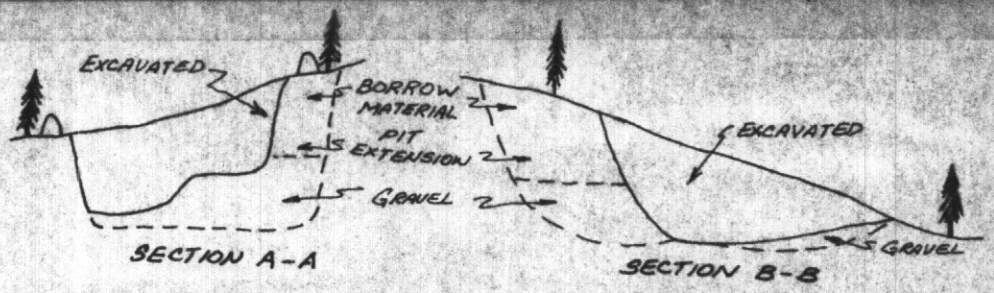
Liard River
Liard Highway
Source No. 9
Plate No. 1



PIT EXTENDED AS SHOWN ABOVE

BORROW 40 000 m³

GRAVEL 12 000 m³



AIR PHOTO NO.: A24871 - 14, 15

NOTES:

- ALL CLEARING TO BE DEPOSED OF BY BURNING.
- WASTE PILE ALONG WEST SIDE OF PIT TO BE PLACED IN DEPLETED PORTION OF PIT.

Public Works Canada / Travaux publics Canada

Drawing title: Titre du dessin: 163 - 81B

BORROW SOURCE

scale: échelle: 1:10 000

date: revisions:

designed by: conçu par: date:

drawn by: dessiné par:

reviewed by: examiné par:

approved by: approuvé par:

project no.: no. du projet: 085861

dwg. no. dessin no. 1 of 1

DPW 700A

PLATE No. 2

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY.

TECH. Prowych	RIG B-50	DATE 78/02/19	km 104	B.P. No. 81	HOLE No. 1

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		CLAY - SILTY LOW PLASTIC								MOIST			
4	CL				1	98	2		0	MOIST			
6										MOIST			
		2.1 m			2								
8		SAND - SILTY PEBBLES				22	69		9	DAMP			
10	SM				3								
12										DAMP			
		4.0 m			4								
14	CL	CLAY - SANDY PEBBLES				44	48		8	SAT.			
		4.6 m											
16		BOTTOM OF HOLE 4.6 m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38					11								

C = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

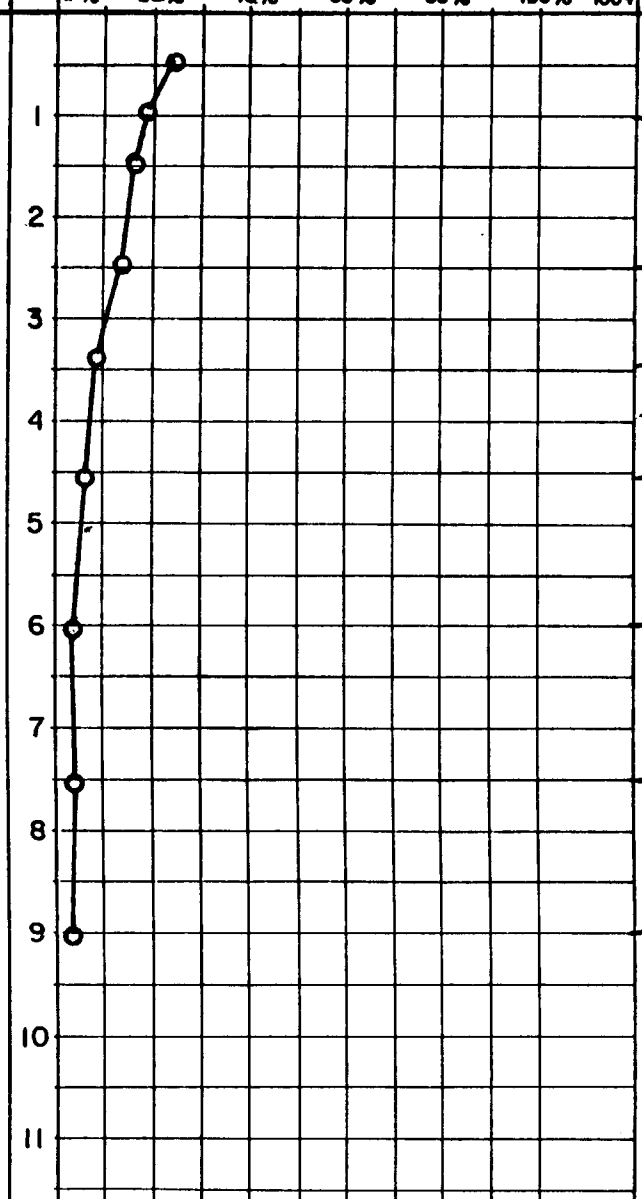
PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. PRONUCH | RIG B-50 | DATE 78/02/19 | km 164 | B.P. No. 81 | HOLE No. [redacted] 1A

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY							MOIST			
		.6m										
4	CL	CLAY - SILTY - PEBBLES			91	-	7	2	DAMP			
6		SILTY SANDY - PEBBLES							MOIST			
8					69	-	27	4	DAMP			
10		3.1m										
12		SAND. SILTY PEBBLES			30	-	68	2	DAMP			
14		- GRAVELLY										
16	SM				16	-	58	26	DAMP			
18												
20					9	-	61	30	DAMP			
22												
24		7.6m										
26		GRAVEL - SANDY			3	-	36	61	DAMP			
28												
30	GP				5	-	30	65	DAMP			
32												
34		10.7m										
36		BOTTOM OF HOLE - 10.7m										
38												



PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. Pronych	RIG B-50	DATE 78/02/19	km 164	B.P. No. 81	HOLE No. 18

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)
2	ML	SILT - CLAYEY SANDY			1
4		1.5m			
6					2
8		BOTTOM OF HOLE - 1.5m			
10		REFUSAL			3
12		COBBLES - GRAVEL			4
14					
16					5
18					
20					6
22					
24					7
26					8
28					
30					9
32					
34					10
36					11
38					

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

NO SAMPLES TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
CLAY %	SILT %	SAND %	GRAVEL %		REMARKS	

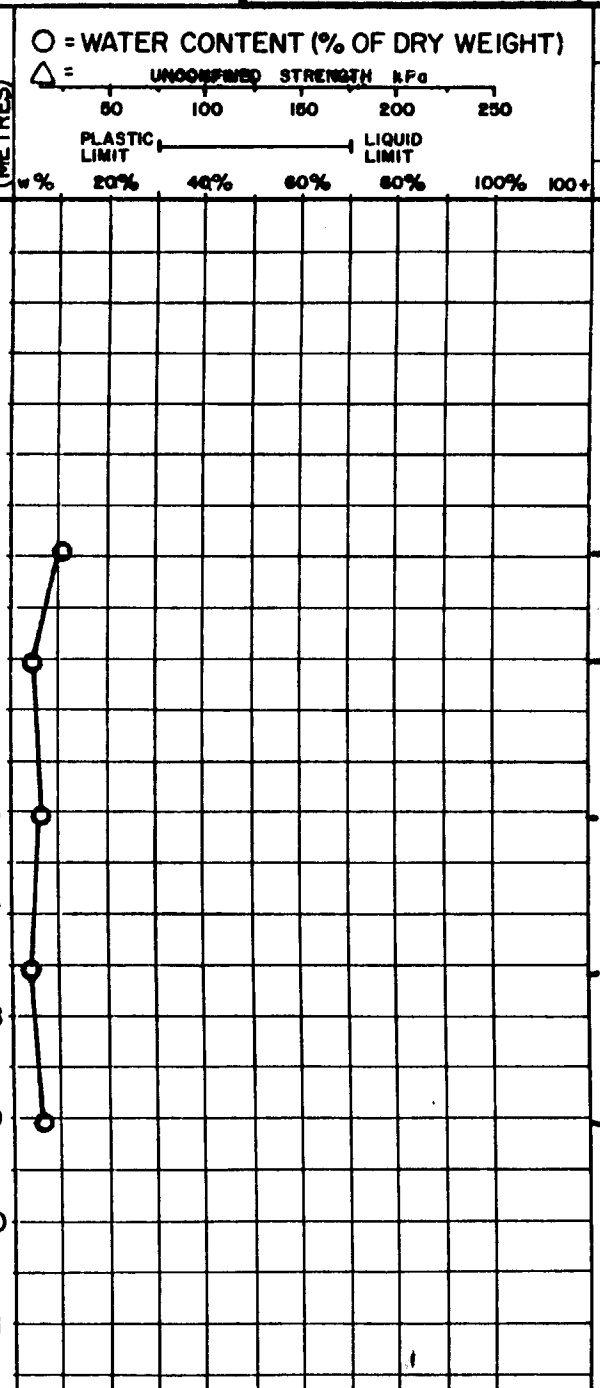
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. Pronych	RIG B-50	DATE 78/02/22	km 164	B.P. No. 81	HOLE No. 2

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	SILT - CLAYEY SANDY			1					
4		1.4m								
6	CL	CLAY - SILTY - SANDY - PEBBLES			2					
8										
10					3					
12		- GRAVELLY				30	48	22		DAMP
		4.0m			4					
14	SM	SAND - SILTY				11	89	0		DAMP
16					5					
18		- SILTY GRAVELLY								
20					6	18	47	35		DAMP
22	GW	GRAVEL - SANDY			7					
24						5	44	51		DAMP
26					8					
28	GM	SAND - GRAVEL MIX SILTY				19	43	38		DAMP
30		9.1m			9					
32		BOTTOM OF HOLE - 9.1m			10					
34										
36					11					
38										



PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | WIARD HWY

TECH. Pronych	RIG B-50	DATE 78/02/22	km 164	B.P. No. 81	HOLE No. 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4, 6	ML	SILT-CLAYEY SANDY			1								
2.3m													
8, 10		GRAVEL-CLAY-SAND MIXTURE			2	25	38	37		DAMP			
12	GC				3	23	28	49		DAMP			
3.7m													
14, 16	SP	SAND-GRAVELLY			4	6	79	15		MOIST			
18, 20					5								
6.1m					6	7	73	20		SAT.			
22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 6.1m			7, 8, 9, 10, 11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

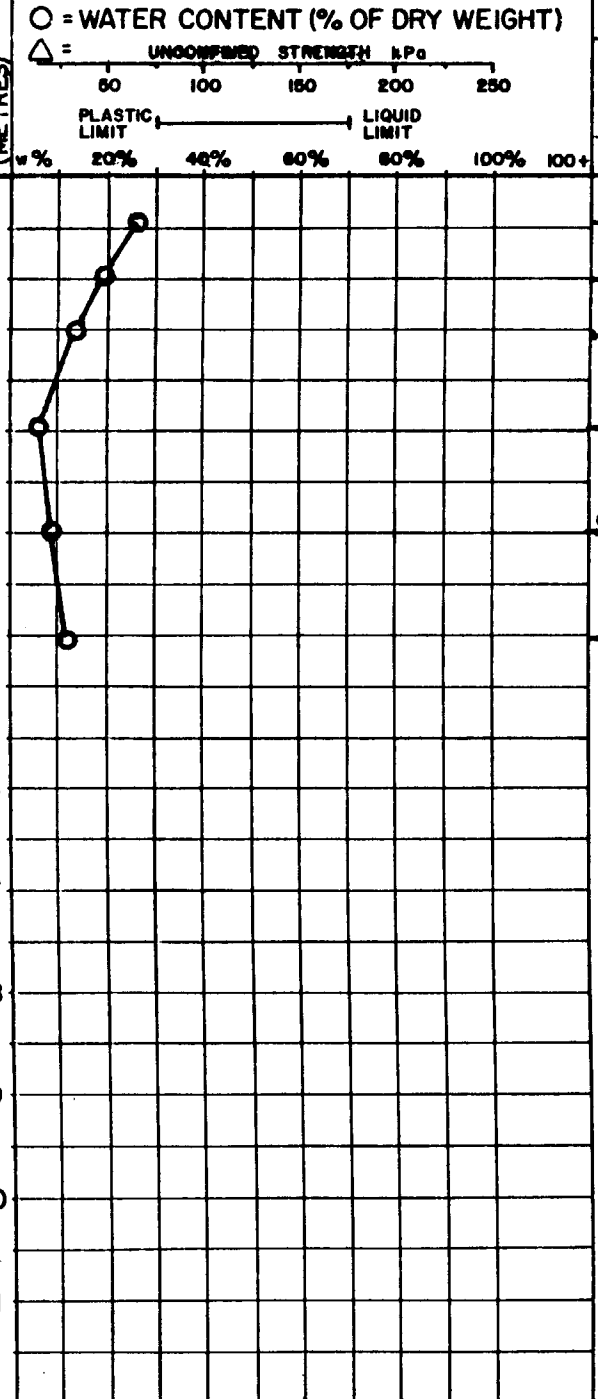
PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. Pronych	RIG B-50	DATE 78/02/22	km 164	B.P. No. 81	HOLE No. 4

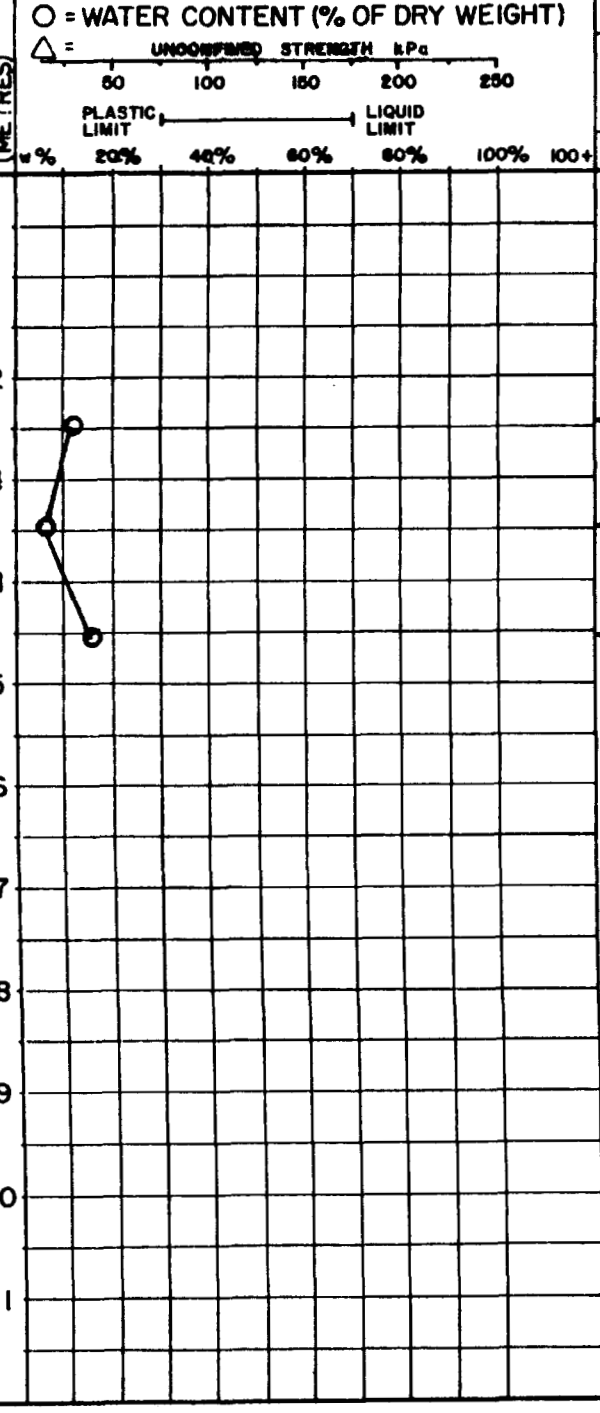
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT. - CLAYEY SANDY			1	99	1		0	SAT.			
4	CL	CLAY - SILTY SANDY 1.2 m				84	16		0	MOIST			
6	CI	PEBBLES 2.0 m			2	61	36		3	MOIST			
8	SP	SAND -				9	91		0	DAMP			
10	SM	- SILTY GRAVELLY			3	22	58		20	MOIST			
12					4								
14	ML	SILT - PEBBLES SANDY 4.9 m				59	37		4	DAMP			
16					5								
18		BOTTOM OF HOLE - 4.9 m											
20		REFUSAL			6								
22													
24					7								
26													
28					8								
30													
32					9								
34													
36					10								
38													
					11								



PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. PRONYCH	RIG B-50	DATE 78/02/22	km 164	B.P. No. 81	HOLE No. 5

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
2	ML	SILT - CLAYEY - SANDY									
		.9m									
4		CLAY - SILTY SANDY - PEBBLES			1						
6	CL	BOULDERS @ 2.1m			2						
8		2.4.m				14	72	14		WET	
10		SAND - SILTY PEBBLES TO GRAVELLY			3	39	61	5		DAMP	
12					4						
14	SM	PERCH WATER AFTER 4.6m				12	78	10		SAT.	
16					5						
18											
20		6.1m			6						
22		BOTTOM OF HOLE - 6.1m									
24					7						
26											
28					8						
30					9						
32											
34					10						
36					11						
38											



CHAINAGE	OFFSET

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy.

TECH. PRONIYCH	RIG B150	DATE 78/02/22	km 164	B.P. No. 81	HOLE No. 6

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
2, 4, 6	ML	SILT-CLAYEY SANDY			1, 2						
		2.1m									
8, 10, 12	CL-CI	CLAY-SILTY SANDY - PEBBLES LOW-MED. PLASTIC			3	34	62	4		MOIST	
		3.8m									
14, 16	GM	GRAVEL-SAND MIX SILTY			4, 5	13	44	43		MOIST	
18, 20, 22, 24	SM	SAND-GRAVELLY SILTY			6, 7	16	58	26		DAMP	
		7.6m									
26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE - 7.6m			8, 9, 10, 11						

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

CHAINAGE	OFFSET

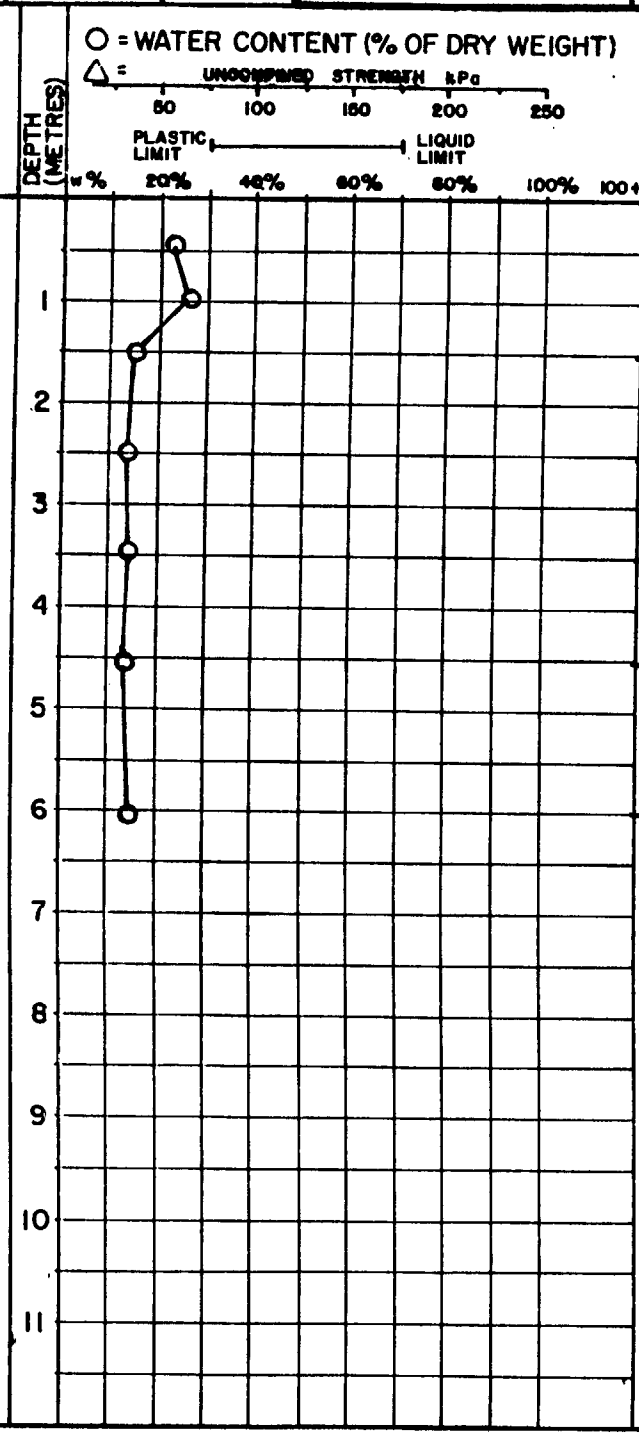
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. D. PRONYCH	RIG B-50	DATE 79 03 14	km 163	B.P. No. 81	HOLE No. 7

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT		
4		1.2m		
	ML	SILT - CLAYEY - SANDY PEBBLES		
6		1.8m		
8		CLAY - SILTY		
10		- SANDY		
12		- PEBBLES		
14	CI	TILL		
16		MED. PLASTIC		
		GREY		
18				
20		6.1m		
22		BOTTOM OF HOLE		
24				
26				
28				
30				
32				
34				
36				
38				

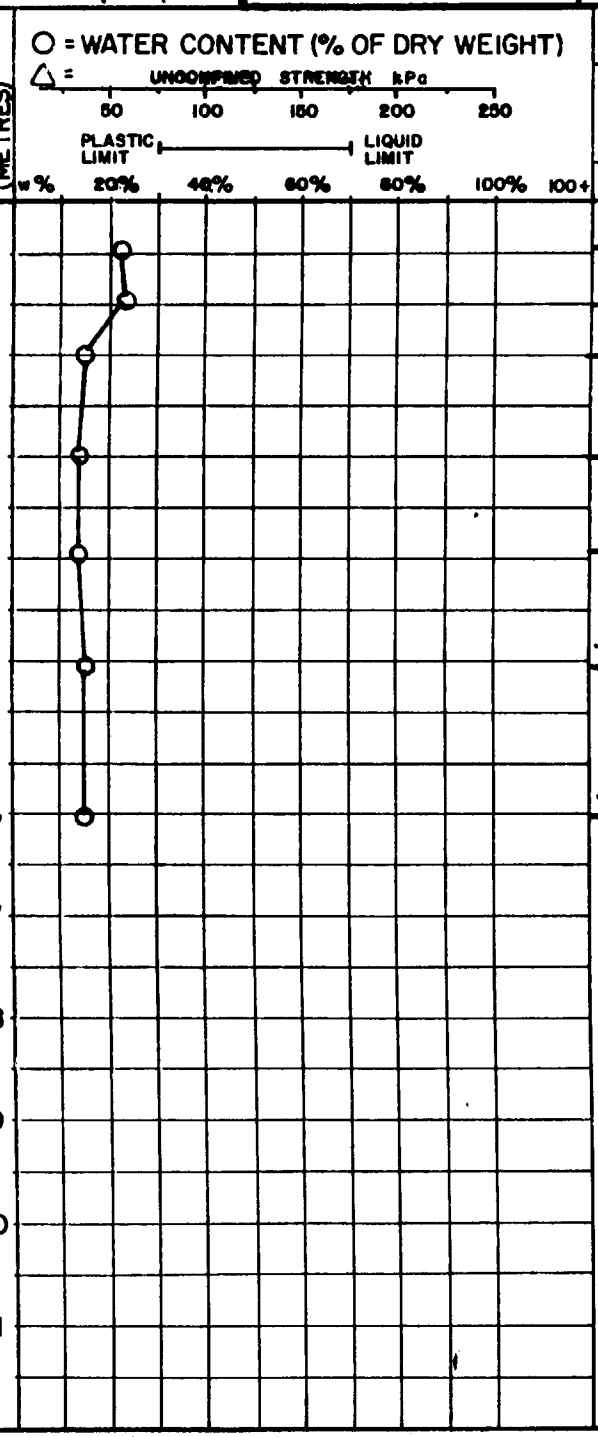


GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
97	3		0	MOIST
97	3		0	MOIST-WET
73	19		8	WET
72	26		2	MOIST
70	25		5	MOIST
62	25		13	MOIST
74	25		1	MOIST

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. D. PROWYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 8

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT				98	-	2	0	MOIST			
4		1.1 m			1	96	-	4	0	MOIST			
6		CLAY - SILTY				73	-	25	2	MOIST			
8		- SANDY			2								
10		- PEBBLES				72	-	23	5	MOIST			
12	CL	TILL LOW PLASTIC			3	67	-	22	11	MOIST			
14					4								
16		GREY MED. PLASTIC				73	-	26	1	MOIST			
18	CI				5								
20		6.1 m			6	73	-	26	1	MOIST			
22		BOTTOM OF HOLE - 6.1 m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36													
38					11								

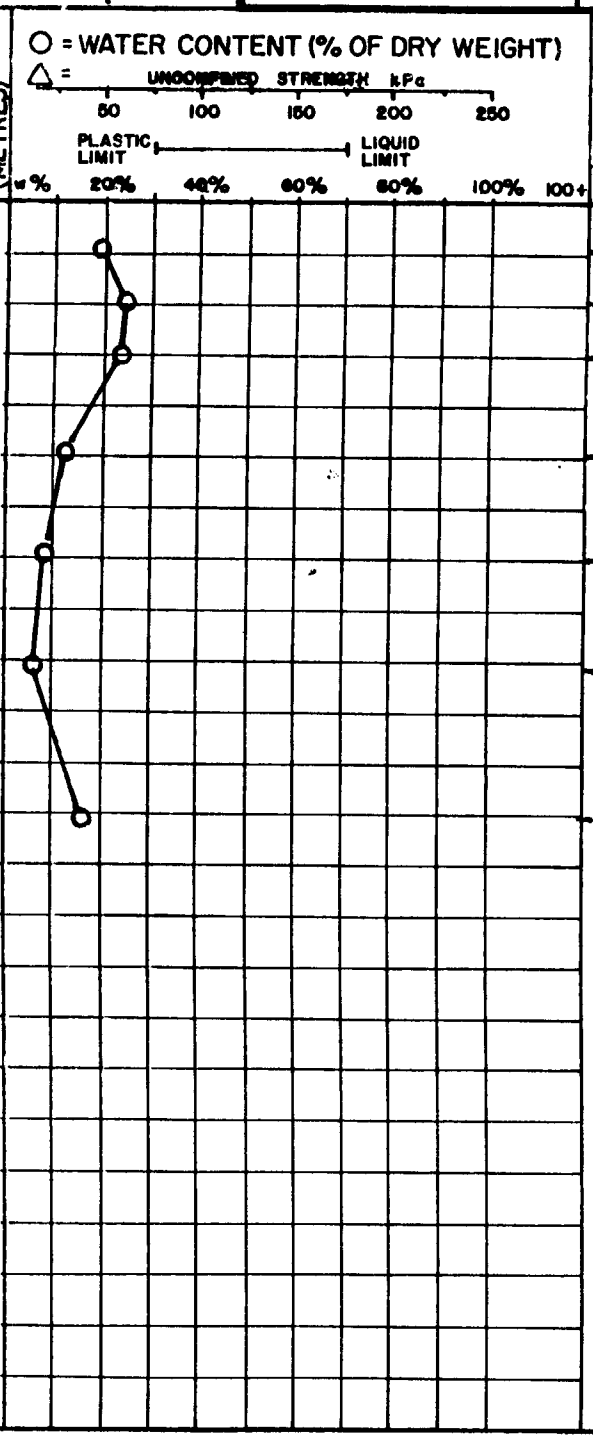


PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy.

TECH. D. Pronych	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 9

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4	ML	SILT - SANDY			1	97	3		0	MOIST			
		1.5m				97	3		0	MOIST-WET			
6	CL	CLAY - SILTY SANDY PEBBLES			2	80	18		2	MOIST			
8	CL-SC					54	45		1	MOIST			
10	SC	CLAY - SAND MIX			3								
		3.4m				30	63		7	MOIST			
12, 14	SC	SAND - CLAYEY GRAVELLY FREE WATER AFTER 4m			4								
16					5	14	63		23	WET			
		5.2m											
18, 20	CL	CLAY - SILTY SANDY PEBBLES WET			6	51	47		2	WET			
		6.1m											
22		BOTTOM OF HOLE - 6.1m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36					11								
38													

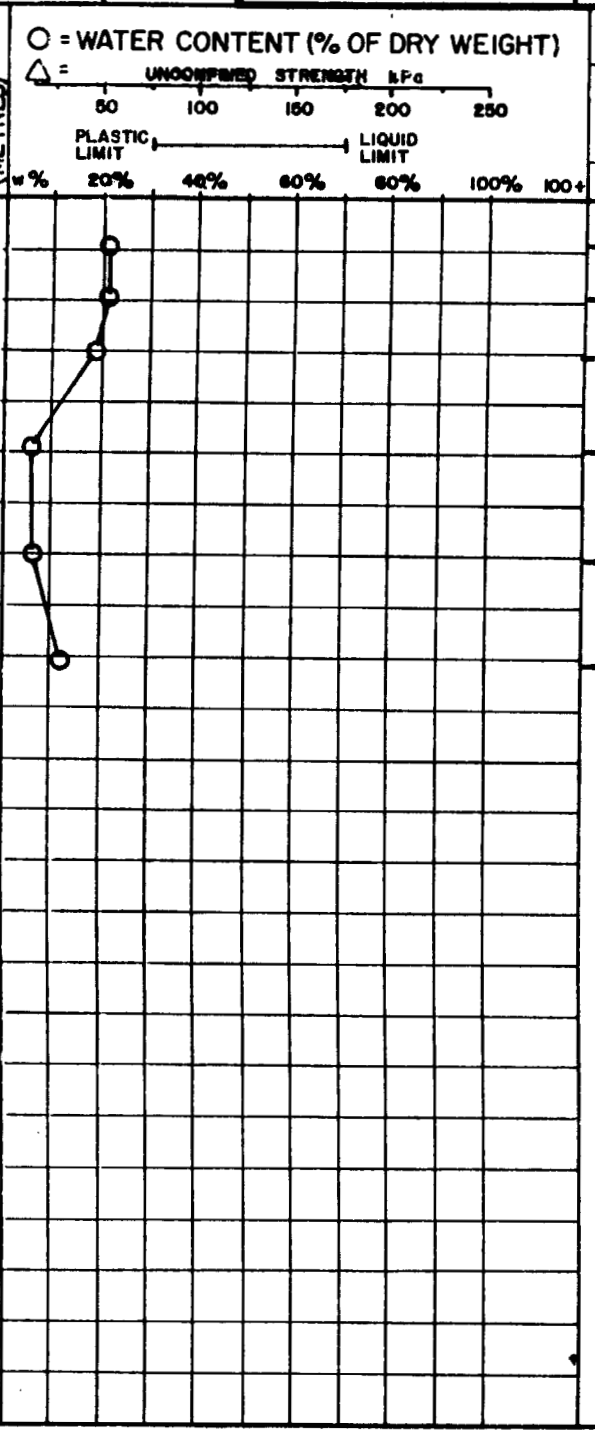


PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY.

TECH. D. PRONYCH	RIG B-50	DATE 79 03/14	km 163	B.P. No. 81	HOLE No. 10

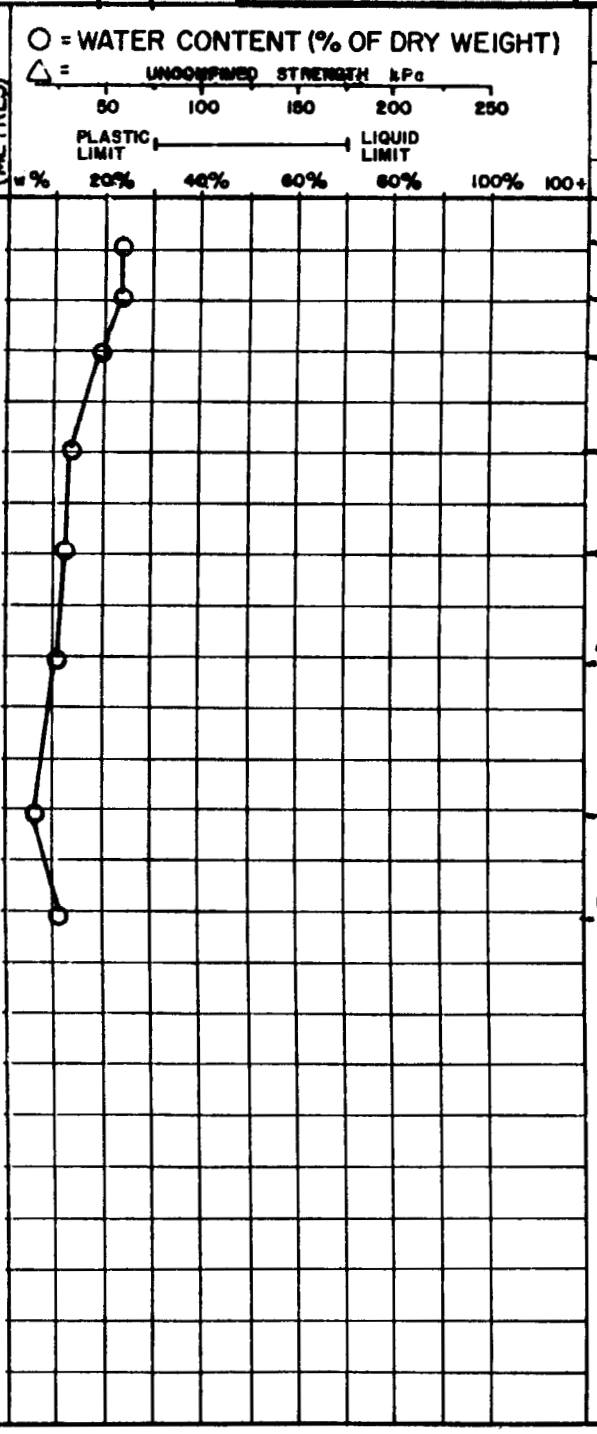
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT			1	96	4		0	MOIST			
4		1.2m				96	4		0	MOIST			
6	CL	CLAY - SILTY SANDY PEBBLES 1.7m			2	80	15		5	MOIST			
8		GRAVEL - SILTY SANDY 2.6m				16	30		54	MOIST			
10	SM	SAND - GRAVELLY SILTY			3								
12		FREE WATER AFTER 3.7m				14	66		20	DAMP. MOIST			
14	SP				4								
16		4.6m				9	78		13	SAT.			
18		BOTTOM OF HOLE - 4.6m			5								
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								



PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. D. PRONYCH	RIG B-50	DATE 79 03 14	km 163	B.P. No. 81	HOLE No. 11

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT				96	4		0	MOIST			
4		1.2m			1	98	2		0	MOIST			
6	CL	CLAY - SILTY SANDY PEBBLES LOW PLASTIC			2	81	15		4	MOIST			
8		2.m				66	24		10	MOIST			
10	SM	SAND - SILTY			3	27	72		1	MOIST			
12		GRAVELLY			4								
14	SC					22	60		18	WET			
16		PEBBLES			5								
18	SM	SAND - SILTY PEBBLES 5.5m											
20	CL	CLAY - GRAVELLY SAND 6.1m			6	21	71		8	MOIST			
22		BOTTOM OF HOLE - 6.1m											
24		BY LOG BOOK			7	25	46		29	MOIST			
26		SAMPLES TO 25' OR											
28		7.6m			8								
30					9								
32													
34					10								
36					11								
38													



PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy.

TECH. D. PRONYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 12

CHAINAGE	OFFSET

REMARKS

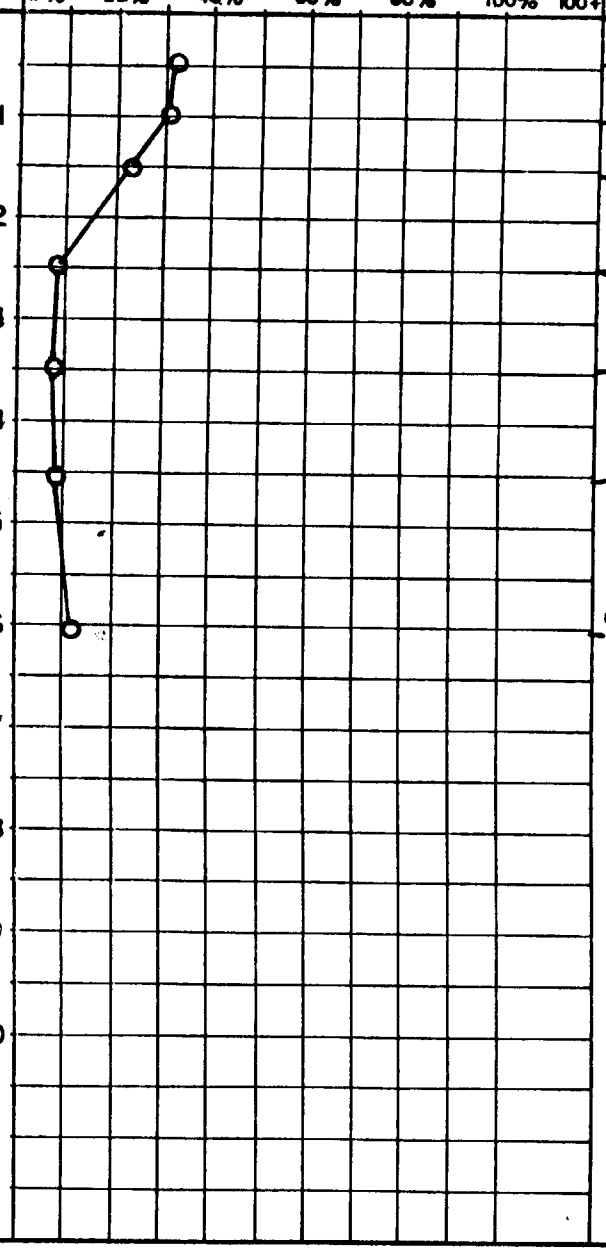
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2–6	ML	SILT		
6		2.1m		
8–12	SC	SAND-SILTY CLAYEY PEBBLES		
12–16	SM	SILTY GRAVELLY		
16–18	SC			
20		6.1m		
22		BOTTOM OF HOLE - 6.1m		

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

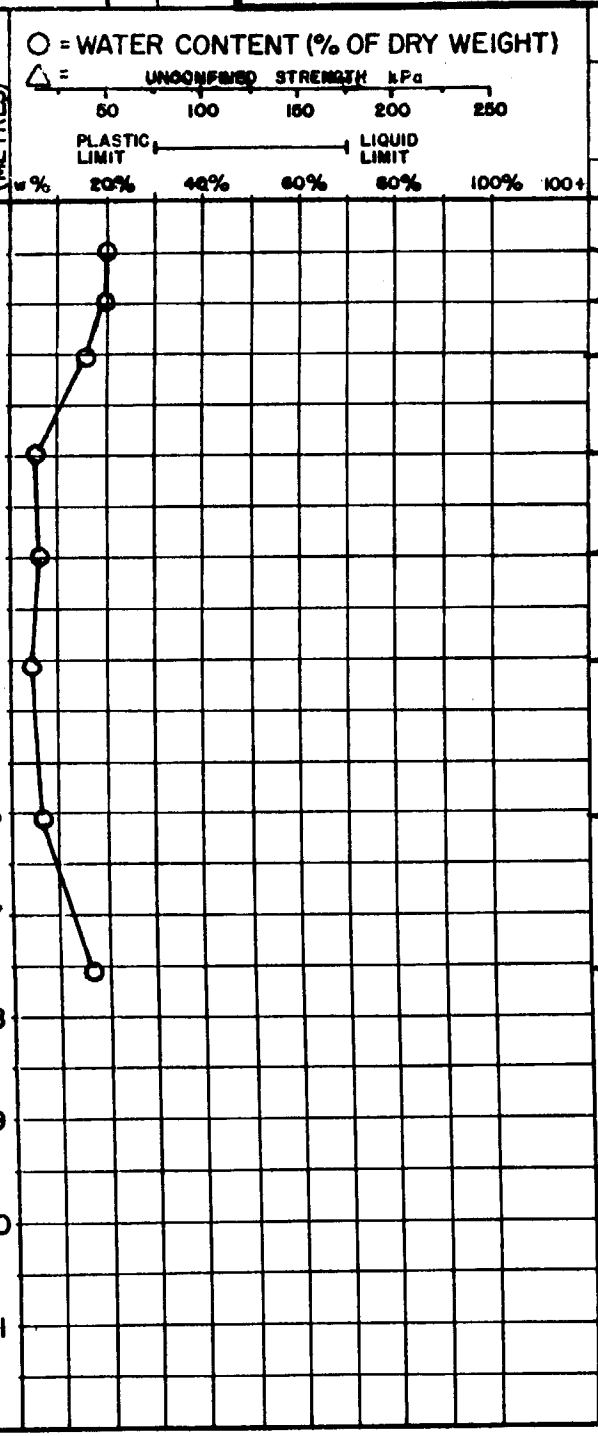


GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
96	4	0		SAT.
97	3	0		SAT.
98	2	0		MOIST
39	59	2		MOIST
29	70	1		MOIST
21	64	15		MOIST
24	58	18		WET

PUBLIC WORKS CANADA | DRILL HOLE REPORT

TECH. D. PRONYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 13

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT			1	95	5		0	MOIST			
4		1.2m				98	2		0	MOIST			
6	CL	CLAY - SILTY SANDY PEBBLES LOW PLASTIC 2.1m			2	75	22		3	MOIST			
8		SAND - SILTY CLAY LUMPS			3	16	83		1	MOIST			
10					4	19	73		8	MOIST			
12	SC	CLAYEY											
14		GRAVELLY			5	8	69		23	DAMP			MOIST
16													
18	SP				6	7	74		19	DAMP			MOIST
20													
22	SM	PEBBLES 6.7m			7								
24		FREEWATER AFTER 7.6m				14	79		7	SAT.			
26		BOTTOM OF HOLE - 7.6m			8								
28													
30					9								
32													
34					10								
36													
38					11								



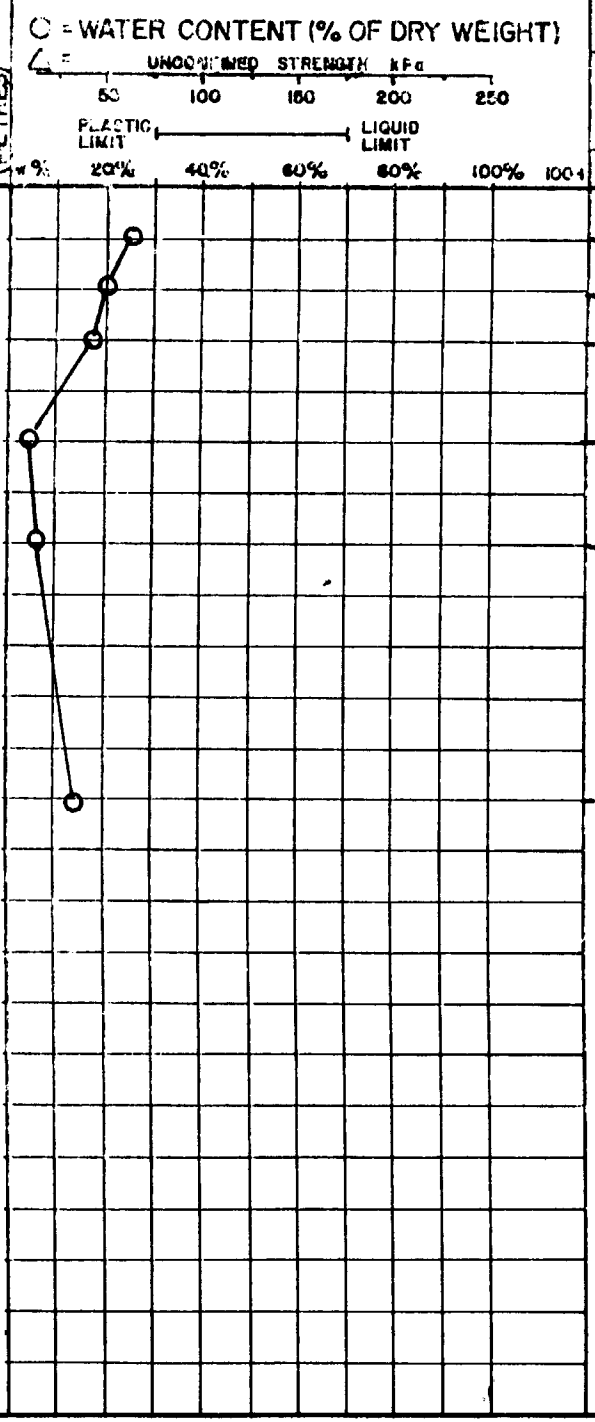
PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY

TECH. D. PRONYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 14

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	SILT - CLAYEY - CLAYEY SANDY			1	99	1		0	WET
4						91	9		0	MOIST
6		2.1 m			2	79	20		1	MOIST
8	SM	SAND - SILTY FINE - MED.			3	12	88		0	DAMP
10										MOIST
12					4	16	84		0	
14										
16		FREE WATER AFTER 4.9 m			5					
18	SC	- CLAYEY SILTY PEBBLES								
20		6.1 m			6	23	67	10		SAT.
22		BOTTOM OF HOLE - 6.1 m			7					
24										
26					8					
28										
30					9					
32										
34					10					
36										
38					11					



PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. D. PRONYCH | RIG B-50 | DATE 79/03/14 | km 163 | B.P. No. 81 | HOLE No. 15

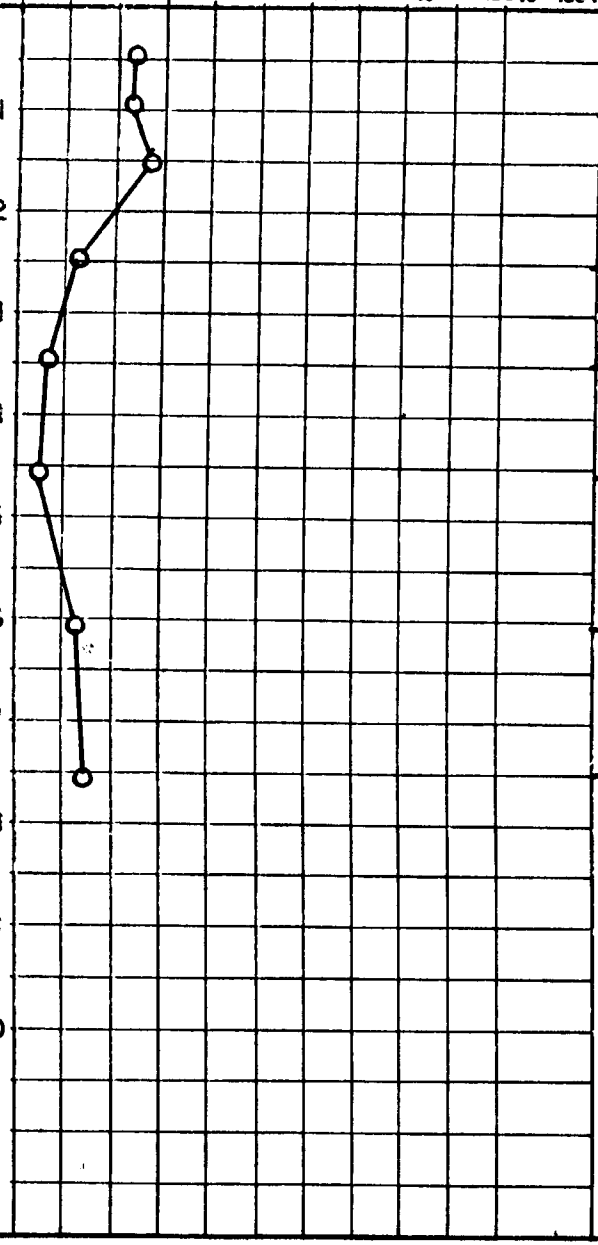
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
2	ML	SILT.										
4		WET FROM 1.2 - 1.7 m - CLAYEY			1	97	3	0		DAMP		
6		1.7m				99	1	0		MOIST		
8	ML	SILT - SAND MIX CLAY			2	99	1	0		SAT.		
10	SM	2.9m				55	44	1		DAMP		
12	SM	SAND - SILTY FINE - MEDIUM			3	16	74	10		DAMP		
14	GP	3.7m			4							
16		GRAVEL - SILTY SANDY				13	39	48		DAMP		
18		4.8m			5							
20		CLAY - SILTY - SANDY GRAVELLY			6	53	29	18		DAMP		
22		ORGY PEBBLES AFTER 5.5m										
24	CI	MED. PLASTIC			7	73	22	5		DAMP		
26		7.6m										
28		BOTTOM OF HOLE. 7.6m			8							
30					9							
32												
34					10							
36												
38					11							

C = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

x % 20% 40% 60% 80% 100% 100+

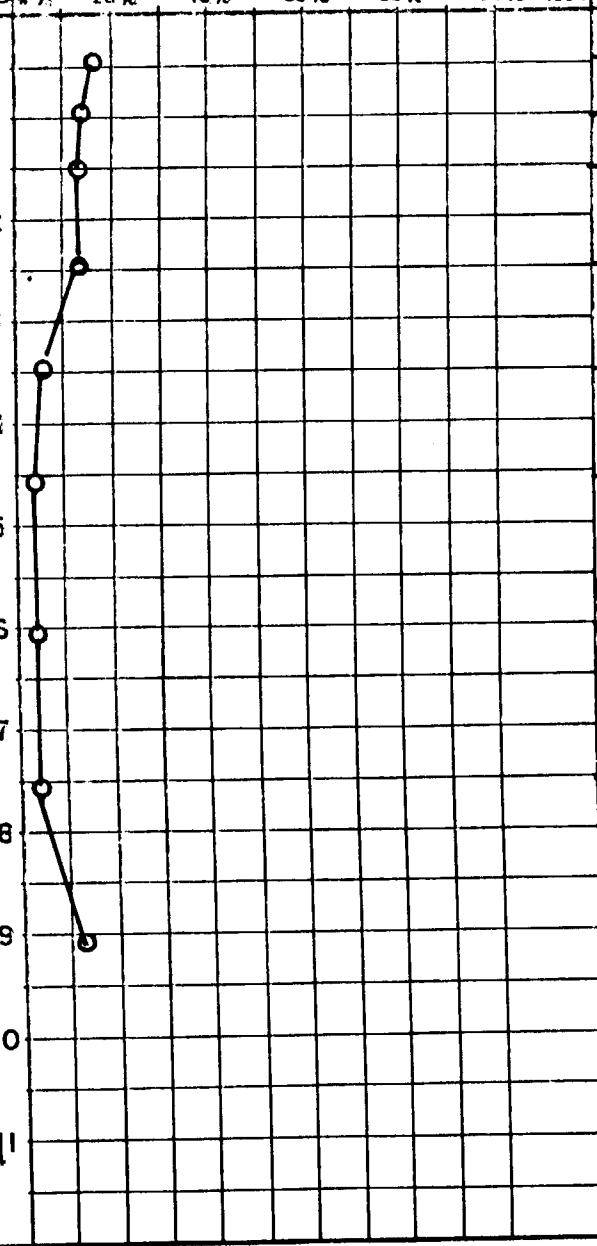


REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD HWY.

TECH. D. PRONYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 16

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2	ML	SILT - SANDY PEBBLES CLAYEY .6m				82	16	2		DAMP	
4	CL - CI	CLAY - SILTY SANDY PEBBLES @ P_L LOW - MOD. PLASTIC			1	74	24	2		DAMP	
6						72	26	2		DAMP	
8		SILTY SAND LENSE FROM 2.1 - 2.3m 2.7m			2	61	37	2		DAMP	
10	SM	SAND - SILTY - GRAVELLY			3	23	49	28		DAMP	
12					4						
14		- GRAVELLY MED. COARSE				6	76	18		DAMP	
16					5						
18											
20	SP				6	6	81	13		DAMP	
22					7						
24		SATURATED - FREE WATER AFTER 7.6m				6	61	33		DAMP	
26					8						
28	SM	PEBBLES - SILTY 9.1m				10	85	5		WET - SAT.	
30					9						
32		BOTTOM OF HOLE - 9.1m									
34		CLAY TILL ON BIT OF AUGER @ 9.1m			10						
36											
38					11						

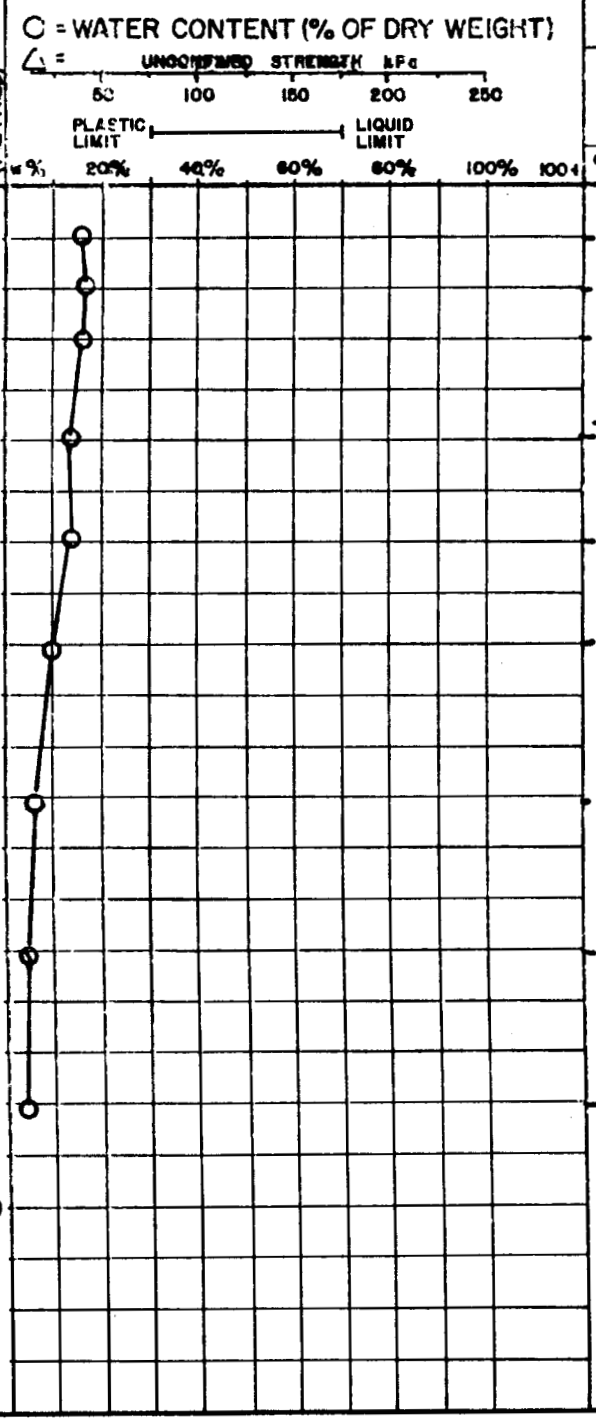


PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY.

TECH. D. PRONYCH	RIG B-50	DATE 79 03 14	km 163	B.P. No. 81	HOLE No. 17

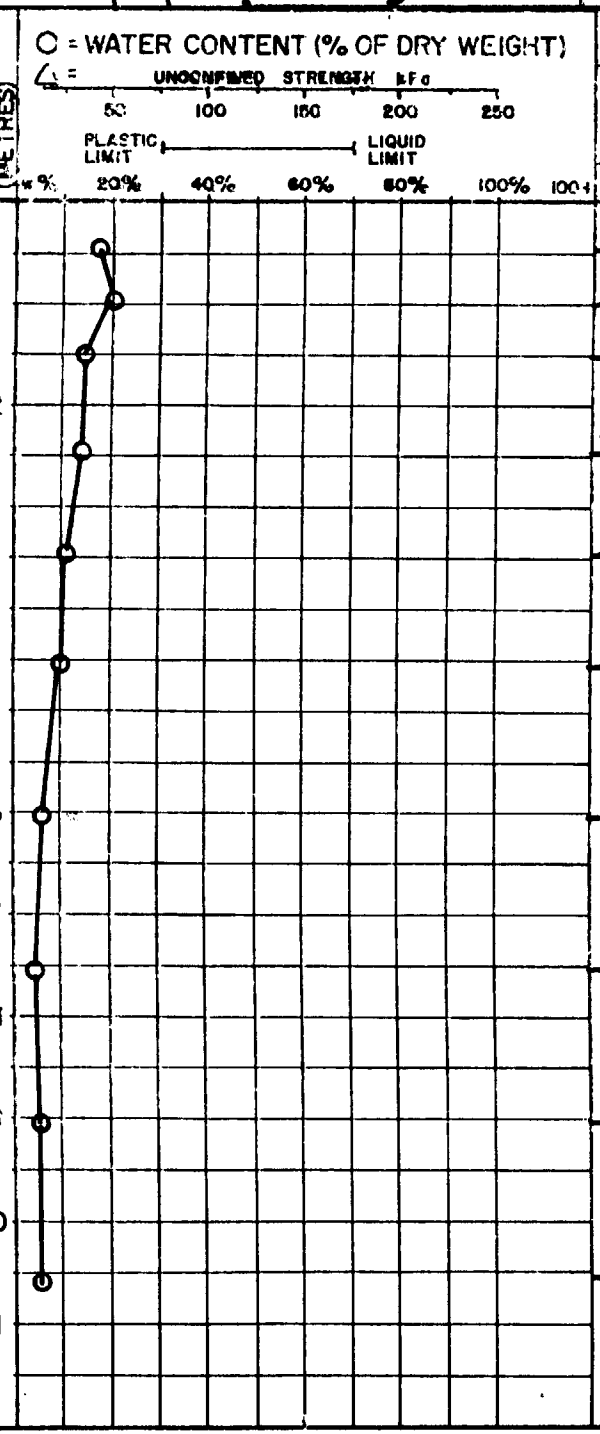
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT.			1	98.	2	0		DAMP			
4						99.	1	0		DAMP			
6		1.8m				98.	2	0		DAMP			
8		CLAY - SILTY SANDY PEBBLES			2	72.	25	3		DAMP			
10		GRAVELLY			3								
12	CI	MED. PLASTIC				50.	15	35		DAMP			
14		PEBBLES			4								
16		4.9m				52.	40	8		DAMP			
18	GM	GRAVEL - SILTY SANDY			5								
20					6	20.	31	49		DAMP			
22	GM												
24					7								
26	GW	SANDY				10.	21	69		DAMP			
28					8								
30		9.1m			9	6.	47	47		DAMP			
32		BOTTOM OF HOLE - 9.1m			10								
34													
36					11								
38													



PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. D. PRONYCH	RIG B-50	DATE 79/03/14	km 163	B.P. No. 81	HOLE No. 18

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY - PEBBLES				82	15	3		DAMP			
4		1.2 m			1	89	9	2		DAMP			
6		CLAY - SILTY SANDY - PEBBLES				73	18	9		DAMP			
8	CL	LOW - MED. PLASTIC			2	71	25	4		DAMP			
10	CI	@ PL			3	62	33	5		DAMP			
12					4								
14		4.3 m				31	42	27		DAMP			
16	SM	SAND - SILTY GRAVELLY			5								
18													
20	SP				6	21	44	35		DAMP			
22	-												
24	SW				7	12	59	29		DAMP			
26					8								
28													
30	SM				9	21	51	28		DAMP			
32													
34		10.7 m			10	18	45	37		DAMP			
36		BOTTOM OF HOLE - 10.7 m			11								
38													



Source No. 10

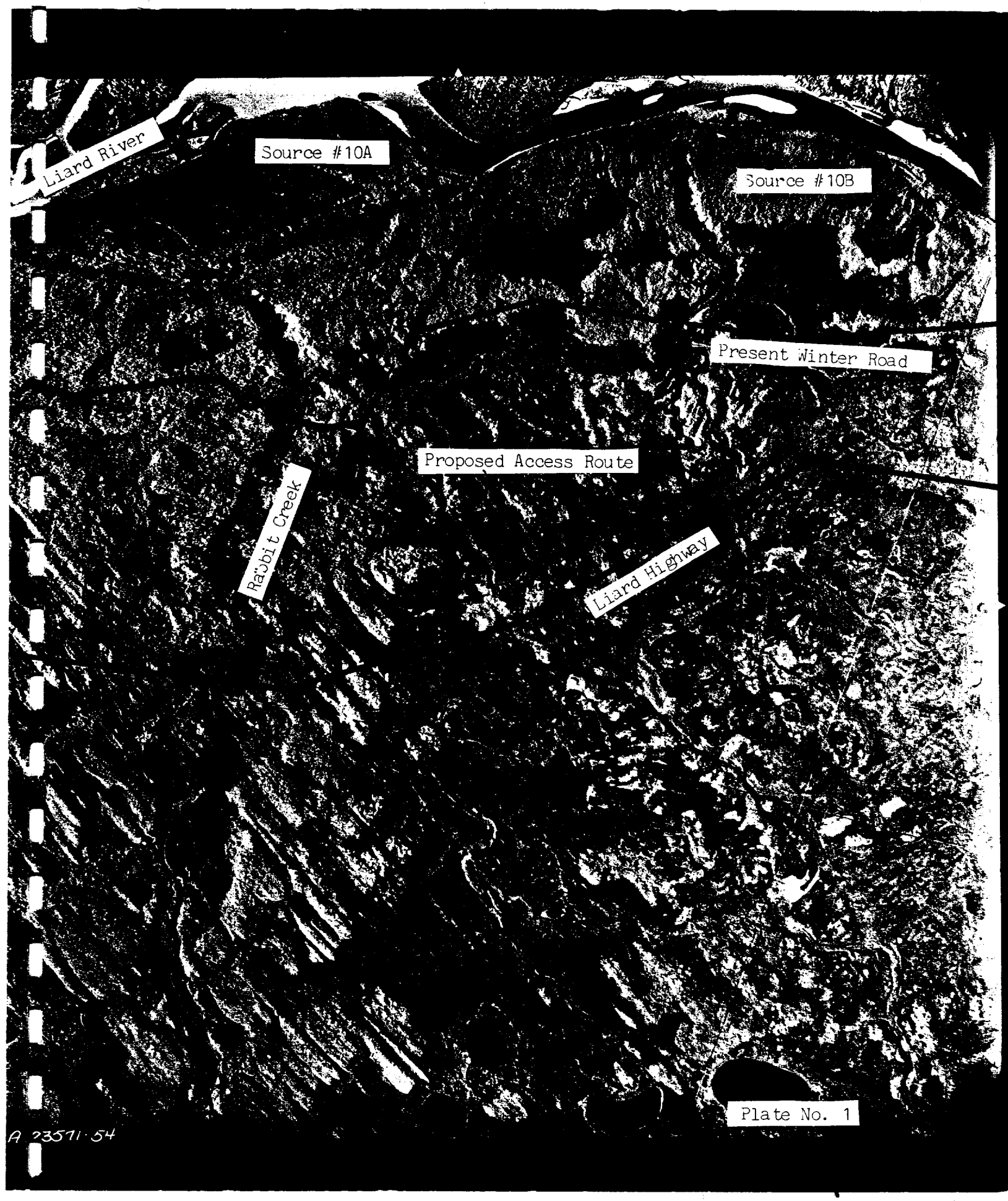
Location: West of km 188 Liard Highway on Liard River.

Description: Channel bars and deposits of the Liard River.

Material: Sandy gravel and gravelly sand - variable silt content.

Estimated Volume: With reference to Plate No. 1
-area #10A - approx. 30,000 m^3
-area #10B - approx. 70,000 m^3

Comment: Winter access only - approximate haul distance from Liard Highway via proposed "straight line" route and existing seismic line - to #10A approx. 5.5 km
- to #10B approx. 8.0 km


Liard River
Source #10A
Source #10B
Present Winter Road
Proposed Access Route
Rabbit Creek
Liard Highway
Plate No. 1
A 23571-54

T. / JF 2

FILE NO. _____

Source No. 10A

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

TO: C. Yurchak

LAB. SAMPLE NO.	1118
BAG NO.	2
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	Liard Hwy. – Liard River
PIT NAME & NO.	Km 190 – Source #10A
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/09/29
DATE RECORDED	80/10/10

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	90.8	87.1	
1"	77.8	68.8	
3/4"	65.6	51.7	
5/8"			
1/2"	52.0	32.6	
3/8"	43.7	20.9	
#4	28.8	0	100
#8	21.4		74.4
#16	17.1		59.5
#30	13.7		47.7
#50	8.7		30.1
#100	5.3		18.5
#200	3.2		11.0

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	2.70
Unit weight	
Coarse	lbs./cu. ft.
Fine	lbs./cu. ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i

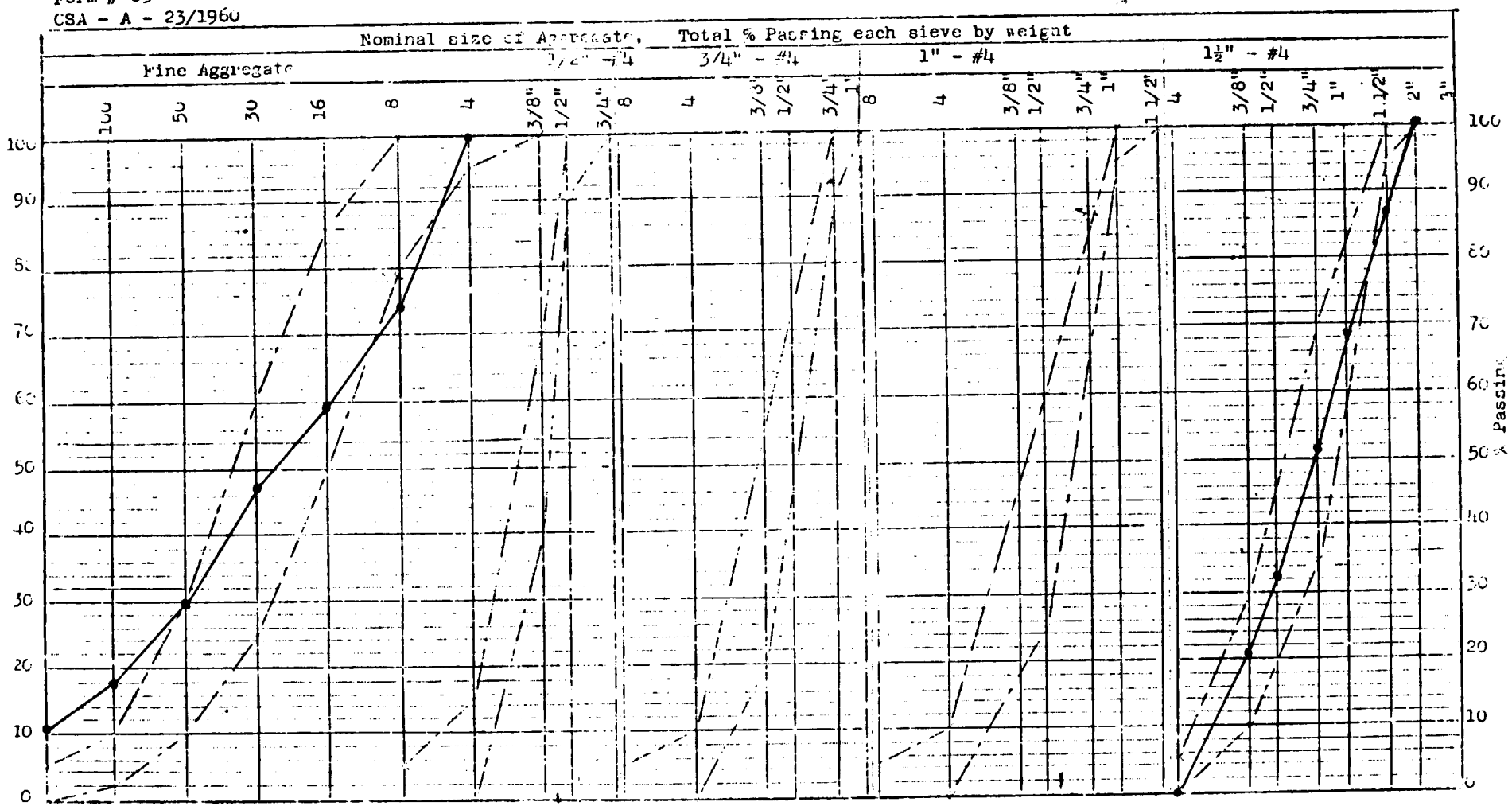
Remarks: _____

Signed: DEPT. OF PUBLIC WORKS OF CANADA QUALITY CONTROL CENTRE MATERIALS TESTING ENGINEER EDMONTON

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 1118



TL / JF 2

FILE NO. _____

Source * No. 10 B

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

TO: C. Kuchak

LAB. SAMPLE NO.	1125
BAG NO.	7
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	Liard Hwy
PIT NAME & NO.	Liard River Km 185
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	
DATE RECEIVED	80/10/15
DATE RECORDED	80/10/21

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	98.5	97.7	
1"	88.2	82.0	
3/4"	78.4	67.0	
5/8"			
1/2"	62.0	42.0	
3/8"	52.6	27.6	
#4	34.5	0	100
#8	24.2		70.0
#16	15.9		46.1
#30	8.0		23.3
#50	3.1		9.0
#100	1.7		4.9
#200	.9		2.5

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	3.47
Unit weight	
Coarse	lbs./cu.ft.
Fine	lbs./cu.ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

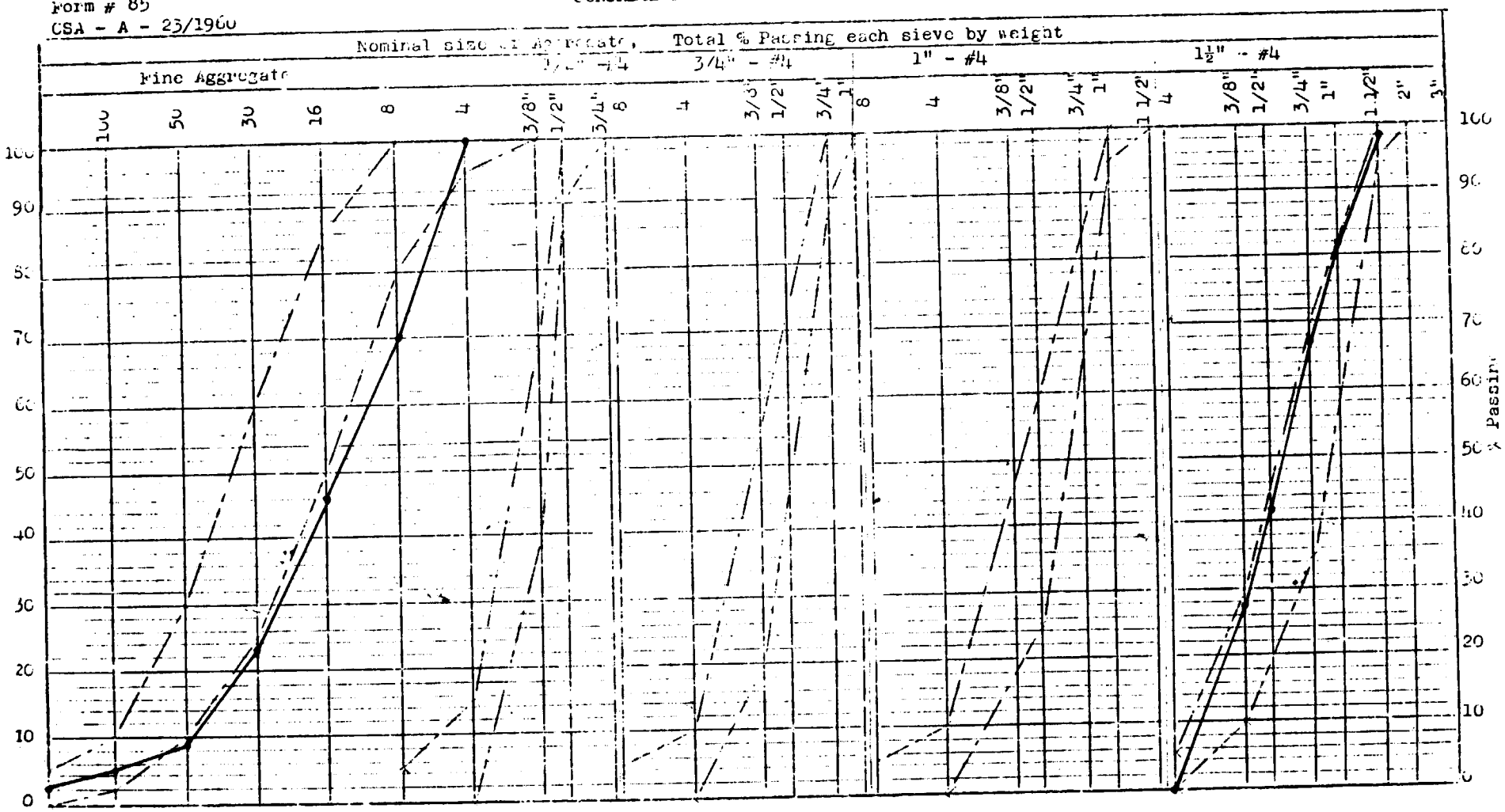
Remarks: _____

Signed: [illegible] PUBLIC WORKS OF CANADA
MATERIALS TESTING ENGINEER
for EDMONTON

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 112



Source No. 11

Location: Km 208 Liard Highway - Muskeg River.

Description: Alluvial floodplain deposits of Muskeg River.

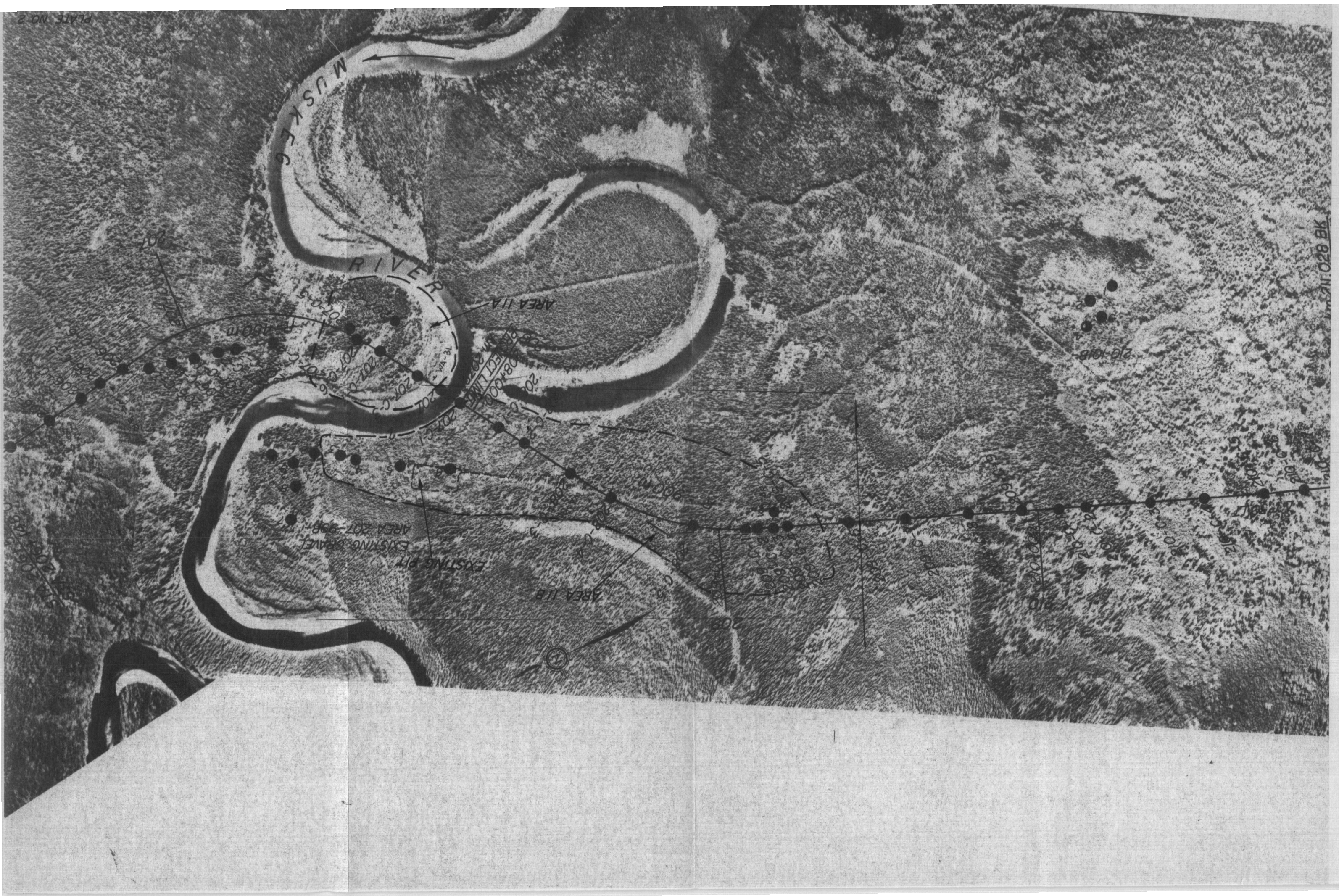
Material: Sandy gravel and gravelly sand - variable low silt content.

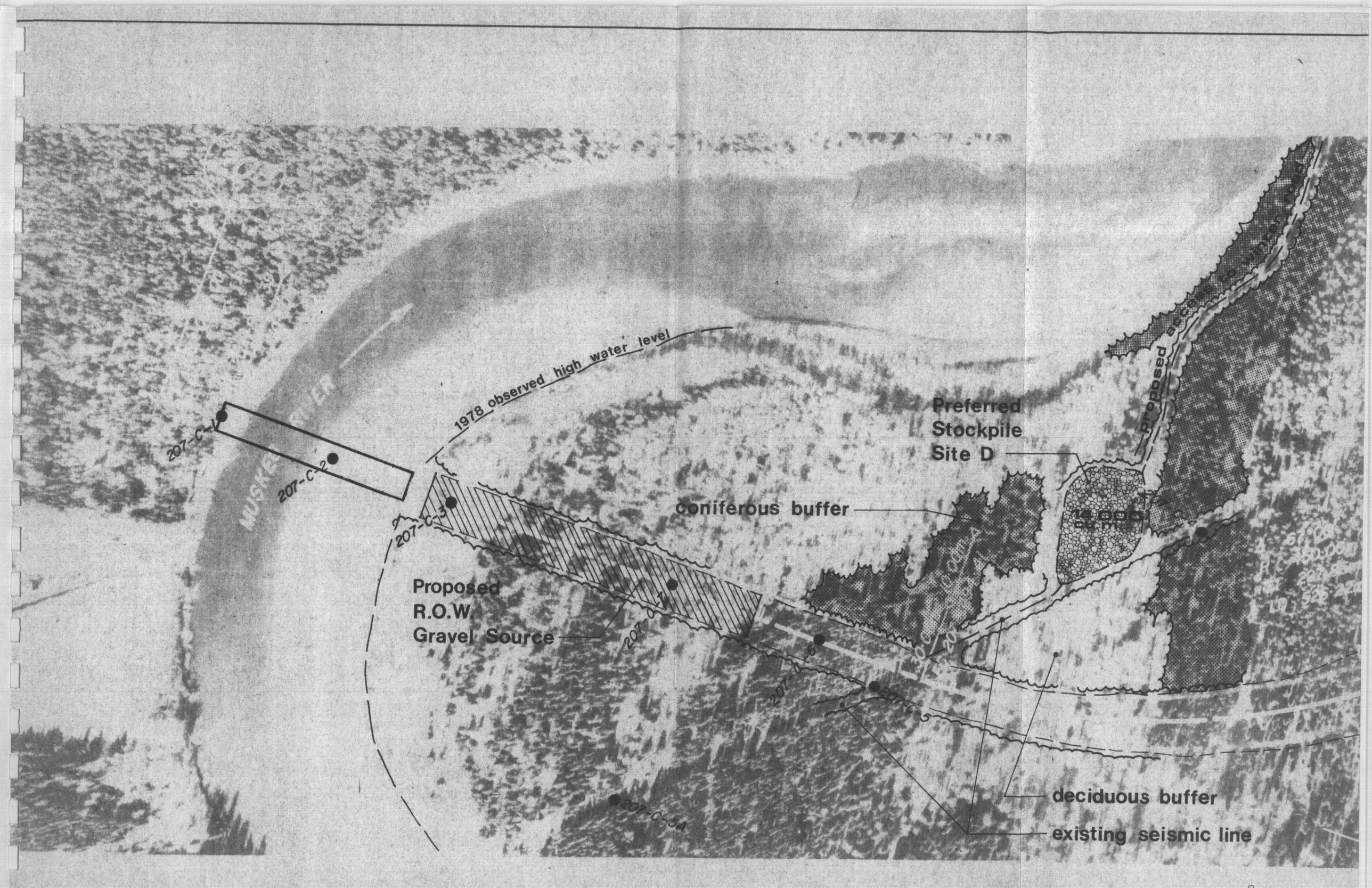
Estimated Volume: Area #11A - in the order of 250,000 m^3 of variable quality granular - most with 1-2 m of overburden. R.O.W. passes directly through deposit limiting available area. Propose some extraction under highway - see plate 3.

Area #11B - volume not established - a large floodplain area with variable thickness of granular, variable quality and variable overburden. In additon R.O.W. passes through area. A small pit has been developed - see plate 4. Probably in excess of 150,000 m^3 in vicinity of present pit.

Comment: Construction requirements will be satisfied from sub-excavation in area #11A and pit in 11B. Area #11B best suited for long term usage. Additional quantities of granular available on most channel bars, bends and floodplains upstream along the Muskeg River.

Source #11B
Liard River
Muskeg River
Source #11A
Liard Highway
Plate No. 1
A 23571-48


MUSKEG
RIVER
AREA IIA
AREA IIB
EXISTING PIT
EXISTING GRAVEL
AREA 207-398m
207
216-1018
PLATE NO. 2


1978 observed high water level
Preferred
Stockpile
Site D
proposed access
coniferous buffer
Proposed
R.O.W.
Gravel Source
deciduous buffer
existing seismic line
207-C-1
207-C-2
207-C-3
207-C-4
207-C-5
207-C-6
207-C-7
207-C-8
207-C-9A
MUSKEG RIVER

TL / JF 2

FILE NO. _____

Source No. 11

CANADA

DEPARTMENT OF PUBLIC WORKS
DEVELOPMENT ENGINEERING BRANCH
TESTING LABORATORIES DIVISION

LAB. SAMPLE NO.	1026
BAG NO.	1-2-3-4-5
STRUCTURE	
STRUCTURE LOC.	
TYPE OF MEMBER – PROPOSED USE	
HIGHWAY	Liard Hwy.
PIT NAME & NO.	208.1 Km
DATE SAMPLED	
CONTRACTOR	
ENGINEER	
DATE SAMPLED	80/10/
DATE RECEIVED	80/10/16
DATE RECORDED	80/10/21

TO: C. Yurchak

REPORT OF CONCRETE AGGREGATE TESTS

Sieve Analysis

Sieve U.S. Std.	Percent Passing by Wt. Combined Agg.	Coarse	Fine
4"			
3-1/2"			
2-1/2"			
2"	100	100	
1-1/2"	92.4	86.0	
1"	83.6	69.9	
3/4"	76.3	56.4	
5/8"			
1/2"	66.4	38.2	
3/8"	59.9	26.3	
#4	45.6	0	100
#8	38.4		84.3
#16	32.0		70.1
#30	21.4		47.0
#50	7.1		15.5
#100	3.6		7.8
#200	2.5		5.4

Petrographic Analysis

Material Type	% of Total Sample
Limestone	
Quartz	
Sandstone	
Chert	
Marble	
Ochreous	
Shale	
Schist	
Quartzite	
Others	
TOTAL	

Particle Shape Analysis

Round	
Sub-Round	
Angular	
Sub-Angular	
Flats	
Needles	
TOTAL	

Miscellaneous Test Information

Colour test	
% Coal	
Silt Bond	
Fineness modulus	
Coarse	
Fine	
Unit weight	
Coarse	lbs./cu.ft.
Fine	lbs./cu.ft.
Specific gravity (Bulk)	
Coarse	
Fine	
Los Angeles Test	
Abrasion loss	%
Mix design	
Strength	p.s.i.

Remarks: _____

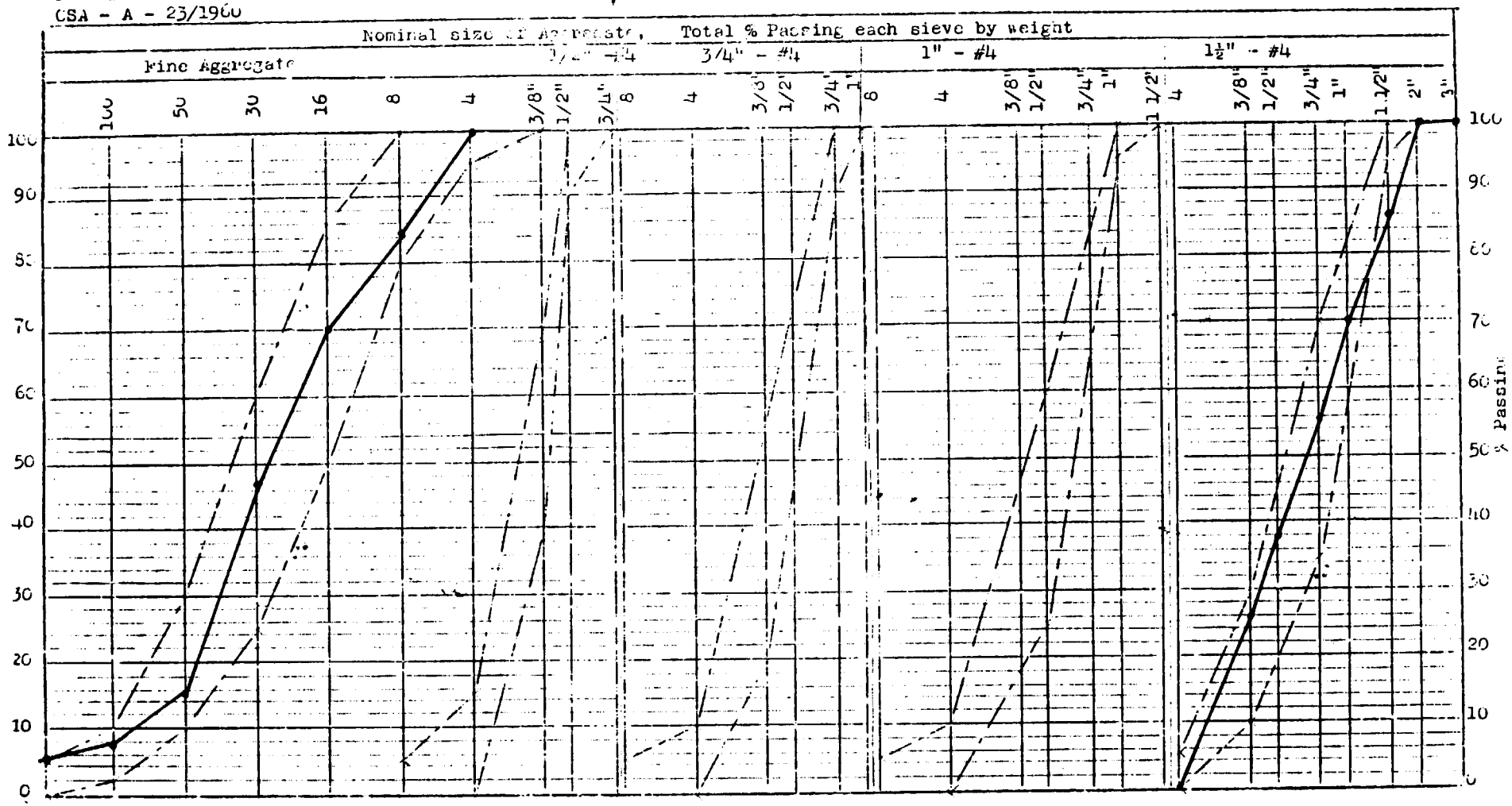
DEPT. OF PUBLIC WORKS OF CANADA
QUALITY CONTROL CENTRE

Signed: [illegible]
MATERIALS TESTING ENGINEER

Form # 85
CSA - A - 23/1960

CONCRETE AGGREGATE GRADING CHART

Sample # 1126



PUBLIC WORKS CANADA — DRILL HOLE REPORT — MUSKEG GRAVEL

TECH. D. PRONYCH	RIG B-61	DATE 79/02/12	km	B.P. No.	HOLE No. MG - 1

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY CLAYEY ~~[illegible]~~			1	63	37	0		MOIST			
4		1.4 m				76	24	0		WET			
6		SAND - GRAVELLY			2	5	76	19		MOIST			
8	SP					8	59	33		MOIST			
10		3.4 m			3								
12		GRAVEL - SANDY				3	22	75		MOIST			
14	GW				4	2	10	88		MOIST			
16		4.9 m											
		OUT OF GRAVEL - SOIL NORTHERNS			5								
18		5.5 m											
20					6								
22		BOTTOM OF HOLE 5.5 m			7								
24													
26					8								
28													
30					9								
32													
34					10								
36					11								
38													

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA — DRILL HOLE REPORT — Muskeg Gravel

TECH. D. Pazoniych	RIG B-61	DATE	km	B.P. No.	HOLE No. MG 2

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
	Pt	Peat .1m											
2	ML	Silt - Sandy Damp .9m											
4	SM	Sand. Silty Damp 1.5m											
6													
8		Gravel Sandy			2	6	23	71		Moist			
10					3	7	23	70		Moist			
12	GW												
14					4	4	10	86		Moist			
16					5								
18		5.8m											
20		Out of Gravel Soft - Free Water No Returns			6								
22		7.0m											
24		Bottom of Hole - 7.0m			7								
26					8								
28													
30					9								
32													
34					10								
36					11								
38													

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

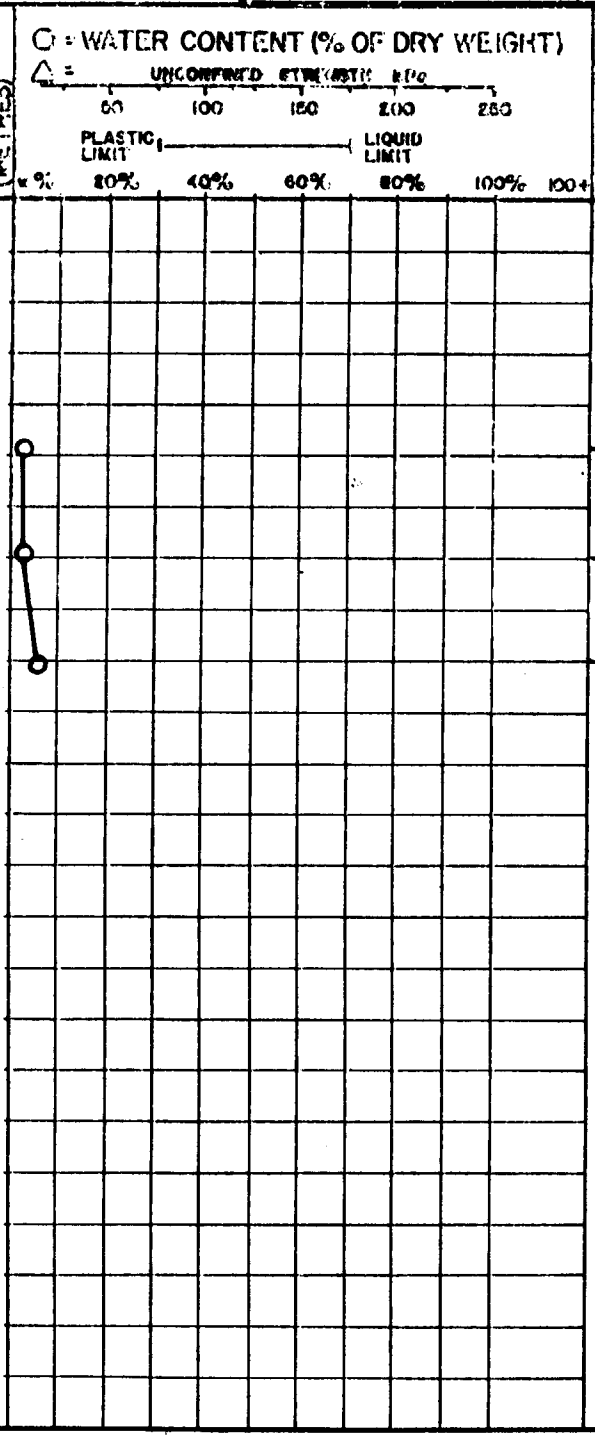
PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | MUSKEG - GRAVEL WINTER Rd.

TECH. D. PRONYCH	RIG B-61	DATE	Km	B.P. No.	HOLE No. MG 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
	Pt	PEAT .1m		
2	SM	SAND - SILTY MOIST		
4		SAND - GRAVELLY DAMP		
6	SP			
8		2.4m		
10		GRAVEL - SANDY		
12				
14		4.7m		
16		SILT - CLAYEY SANDY		
18				
20	ML	SATURATED		
22		7.0 m		
24		BOTTOM OF HOLE 7.0 m		
26				
28				
30				
32				
34				
36				
38				



GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET
CLAY %	SILT %	SAND %	GRAVEL %			
2 -	26	72		MOIST		
4 -	43	53		MOIST		
7 -	44	39		MOIST - WET		

REMARKS

PUBLIC WORKS CANADA — DRILL HOLE REPORT — MUSKEG GRAVEL

TECH. D. Pronych	RIG B-50	DATE 79/02/12	km	B.P. No.	HOLE No. MG-4

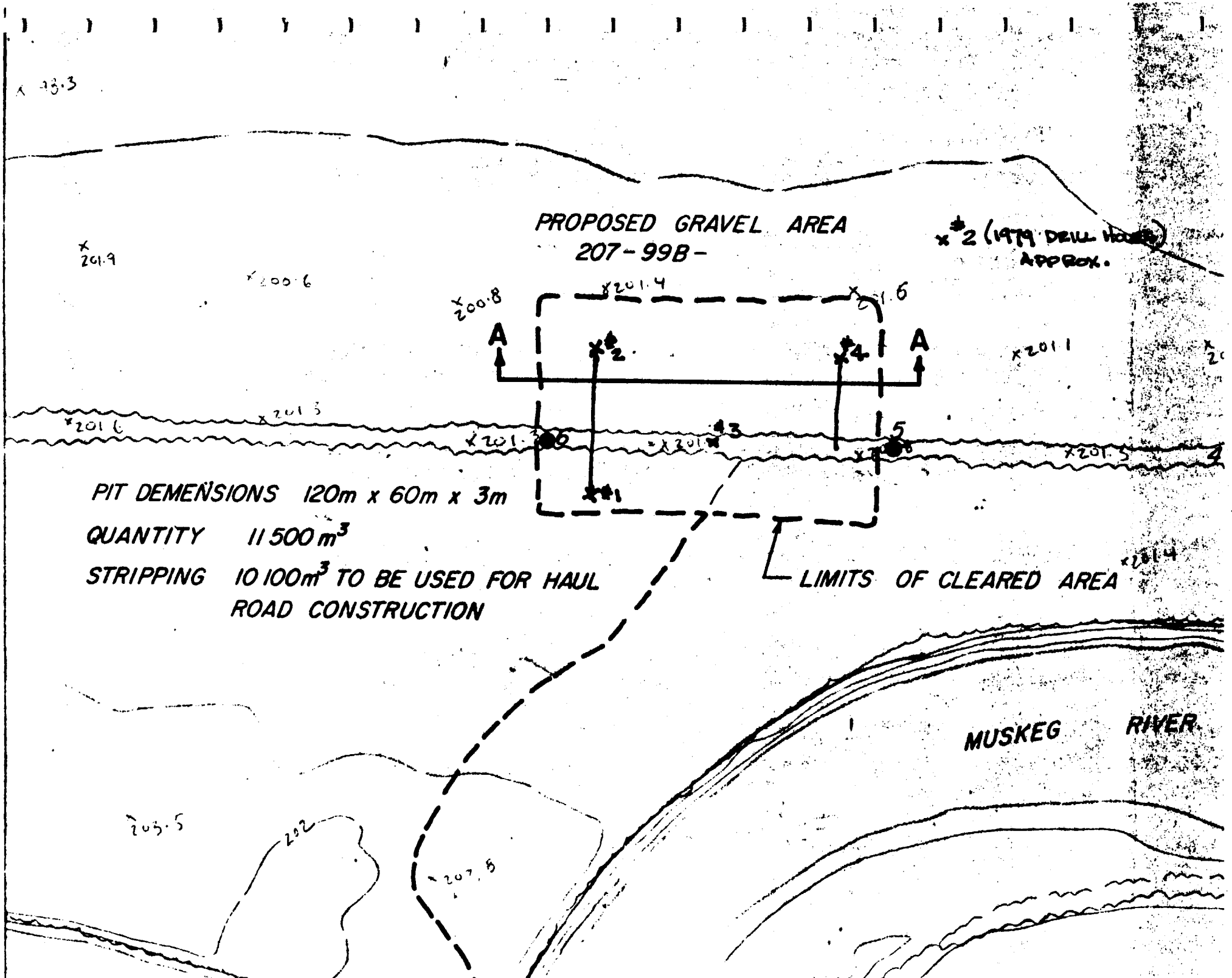
DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4, 6	SM	SAND - SILTY SAND - GRAVELLY - DAMP			1								
		2.1m											
8		GRAVEL SANDY			2	9	26	65		MOIST			
10	GW				3	4	22	74		MOIST			H.I.B.
12		4.0m											
14		CLAY - SILTY SANDY WET			4								
16	CL - CI				5								
18		5.5m											
20		BOTTOM OF HOLE - 5.5m			6								
22, 24, 26, 28, 30, 32, 34, 36, 38					7, 8, 9, 10, 11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+


PROPOSED GRAVEL AREA
207-99B-
#2 (1979 DRILL HOLE) APPROX.
A
A
#1
#2
#3
#4
5
6
PIT DEMENSIONS 120m x 60m x 3m
QUANTITY 11 500 m³
STRIPPING 10 100m³ TO BE USED FOR HAUL ROAD CONSTRUCTION
LIMITS OF CLEARED AREA
MUSKEG RIVER
201.9
200.6
200.8
201.4
201.6
201.1
201.6
201.3
201.5
201.4
203.5
202
207.8

PUBLIC WORKS CANADA | DRILL HOLE RECORD | LANGLEY

TECH. PRONYCH	RIG B-61	DATE 78/03/06	km	B.P. No. 99	HOLE No. 1

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		GRAVEL -			1					
4										
6					2	-	3 -	4	93	MOIST
8	GP									
10		SANDY			3	-	3 -	40	57	MOIST
12										
		FREE WATER LAST 1.2-1.5 m			4					
14										
16					5	-	2 -	34	64	MOIST
18		5.5 m								
20		BOTTOM OF HOLE - 5.5 m			6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										

PUBLIC WORKS CANADA | DRILL HOLE REPORT | [illegible] Hwy.

TECH. Pronych	RIG B61	DATE 18/03/06	km	B.P. No. 99	HOLE No. 2

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	Q = WATER CONTENT (% OF DRY WEIGHT) / Δ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILT - CLAYEY SANDY		FROZEN	1							
4	ML											
6					2	NO SAMPLES TAKEN						
8		2.4m										
10		SAND - FEW PEBBLES SILTY			3							
12	SM											
14		FREE WATER @ 4.6 m			4							
16					5							
18		5.5m										
20		BOTTOM OF HOLE - 5.5 m			6							
22												
24					7							
26												
28					8							
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. PRONYCH	RIG B-61	DATE 78/03/06	km C	B.P. No. 99	HOLE No. 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - CLAYEY .6m			1								
4	SM	SAND - SILTY FINE 1.4m											
6	GP	GRAVEL - SANDY			2	4	10	86		MOIST			
8		2.6m											
10		REFUSAL @ 2.6m			3								
12													
14					4								
16													
18					5								
20													
22					6								
24													
26					7								
28													
30					8								
32													
34					9								
36													
38					10								
					11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS

PUBLIC WORKS CANADA | DRILL HOLE RECORD | Island Hwy

TECH. Pronych	RIG B-61	DATE 78/03/06	Km	B.P. No. 99	HOLE No. 4

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	Silt - Clayey Sandy .9'			1								
4	SM	Sand - Silty from 1.5 m											
6		Gravel - Sandy			2	4	46	50		Moist			
8													
10					3								
12	GW					1	9	90		Moist			
14					4								
16					5	2	28	70		Moist			
18		Clay Silty Sandy 5.5m											
20		Bottom of Hole. 5.5m			6								
22													
24					7								
26					8								
28													
30					9								
32													
34					10								
36					11								
38													

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

20% 40% 60% 80% 100%

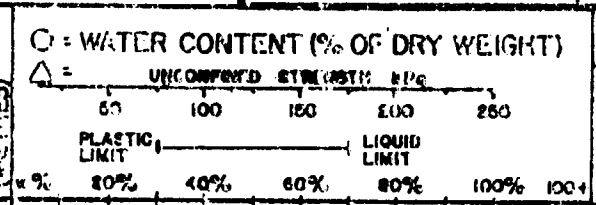
PUBLIC WORKS CANADA | DRILL HOLE RECORD | [illegible] Hwy.

TECH. Paonych	RIG B-61	DATE 78/03/06	km	B.P. No. 99	HOLE No. 5

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	SILT - CLAYEY SANDY 1.5m								
4	SM	SAND - SILTY FINE 1.5m			1					
6		GRAVEL - SANDY			2					
8										
10					3	3	41	56		MOIST
12	GW									
14					4	3	36	61		MOIST
16		5.2m								
18	CL	CLAY - SILTY SANDY 5.5m			5					WET
20		BOTTOM OF HOLE - 5.5m			6					
22										
24					7					
26										
28					8					
30										
32					9					
34										
36					10					
38					11					



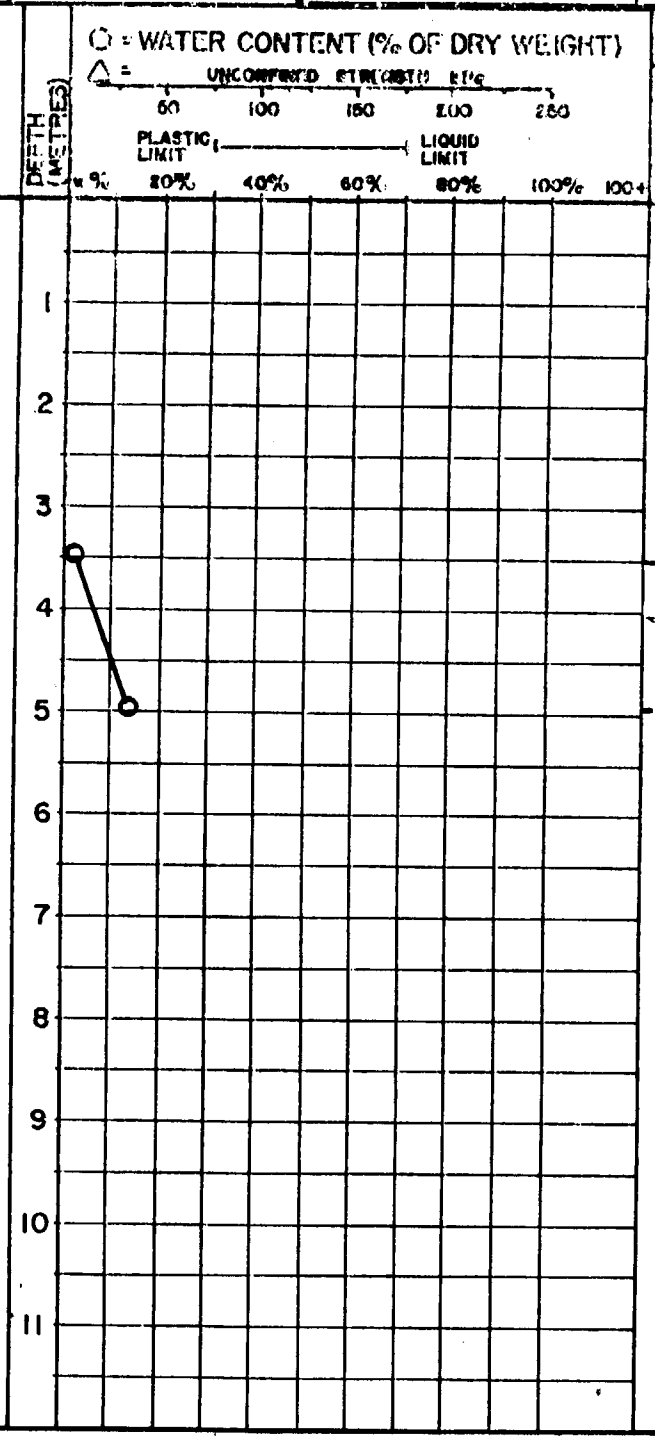
PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. PRONYCH	RIG B-61	DATE 78/03/06	km	B.P. No. 99	HOLE No. 6

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2	ML	SILT - SANDY CLAYEY .75 m		
4	SM	SAND . SILTY FINE 1.5 m		
6		GRAVEL . SANDY		
8				
10	GW			
12				
14				
16		5.2 m		
18	CL	CLAY SILTY SANDY 5.5 m		
20		Bottom of Hole . 5.5m		
22				
24				
26				
28				
30				
32				
34				
36				
38				



GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	
3	39	58		MOIST
44	22	34		MOIST

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. PRONYCH	RIG BI-61	DATE 78/03/06	km	B.P. No. 99	HOLE No. 7

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2, 4, 6, 8	ML	SILT - CLAYEY SANDY		
		2.4m		
10, 12	SP	SAND - FEW PEBBLES WET		
		4.0m		
14, 16	GW	GRAVEL - SANDY FREE WATER		
		5.5m		
18		BOTTOM OF HOLE - 5.5m		
20, 22, 24, 26, 28, 30, 32, 34, 36, 38				

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

20% 40% 60% 80% 100% 100+

NO SAMPLES TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | DRILL HOLE RECORD | Alaska Hwy.

TECH. Pronych	RIG B-61	DATE 78/03/06	km	B.P. No. 99	HOLE No. 8

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2, 4	ML	SILT - CLAYEY SANDY DAMP		
		1.5m		
6, 8, 10, 12, 14	SP	SAND - FEW PEBBLES DAMP WET AFTER 4.0m FREE WATER		
		4.9m		
16, 18	CL	CLAY - SILTY SANDY WET		
		5.5m		
20, 22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE. 5.5m		

O = WATER CONTENT (% OF DRY WEIGHT)

Δ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

10% 20% 40% 60% 80% 100% 100+

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

No SAMPLES TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | LOCAL ROAD REPORT | Hwy.

TECH. Pronych	RIG B-61	DATE 78/03/06	Km	B.P. No. 99	HOLE No. 9

CHAINAGE	OFFSET

REMARKS

C = WATER CONTENT (% OF DRY WEIGHT)
Δ = UNCONFINED STRENGTH (KPa)
PLASTIC LIMIT — LIQUID LIMIT

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
		Pavement .1m								
2		SAND - GRAVEL MIXTURE			1					
4	Sw									
6	-				2	- 3 -	60	37		Moist
8	Gw									
10					3	- 4 -	55	41		Moist
12					4					
14										
16					5	- 2 -	51	47		Moist
18		5.5m								
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										

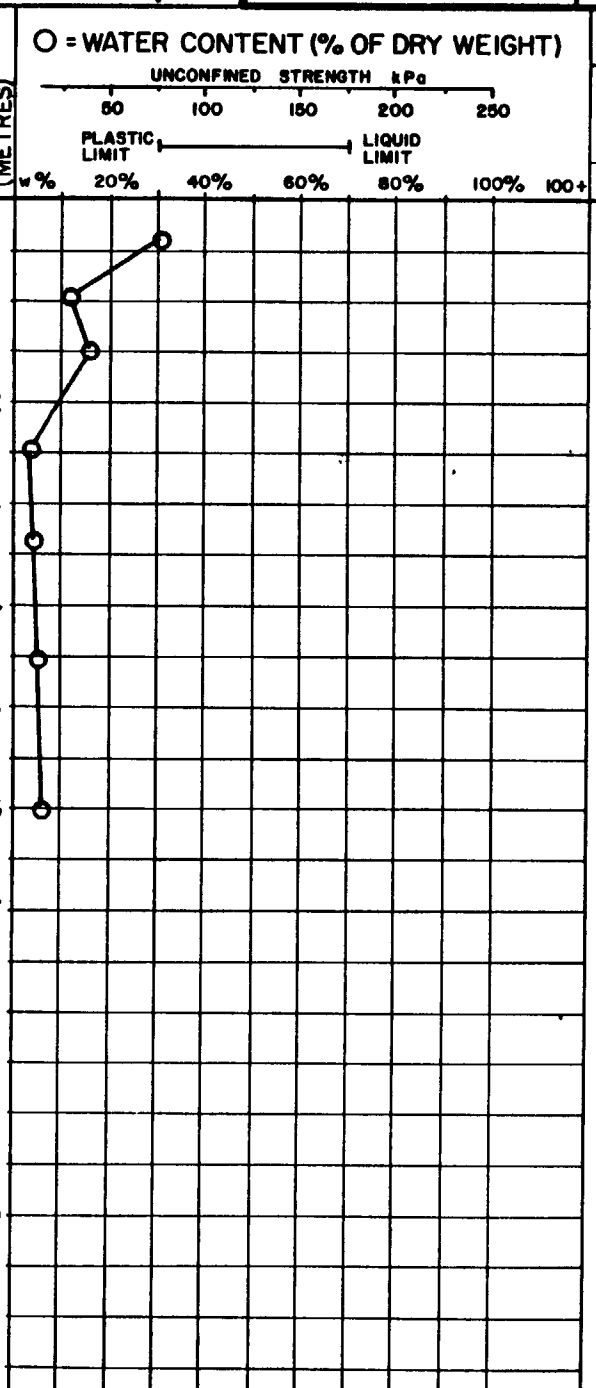
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. WEBBER	RIG B-50	DATE 78/03/05	km 207	B.P. No.	HOLE No. 5

CHAINAGE	OFFSET
207+500	℄

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	SILT - CLAYEY - ORGANIC								MOIST
4		- SANDY 1.2 m			1					MOIST
6	SC	SAND - SILTY CLAYEY								MOIST
8					2					
10	SM	GRAVELLY SILTY			3					MOIST
12										MOIST
14		4.3 m			4					
16		GRAVEL - SANDY								WET
18	GW				5					
20		6.1 m			6					WET
22		BOTTOM OF HOLE - 6.1 m								
24					7					
26										
28					8					
30					9					
32										
34					10					
36										
38					11					



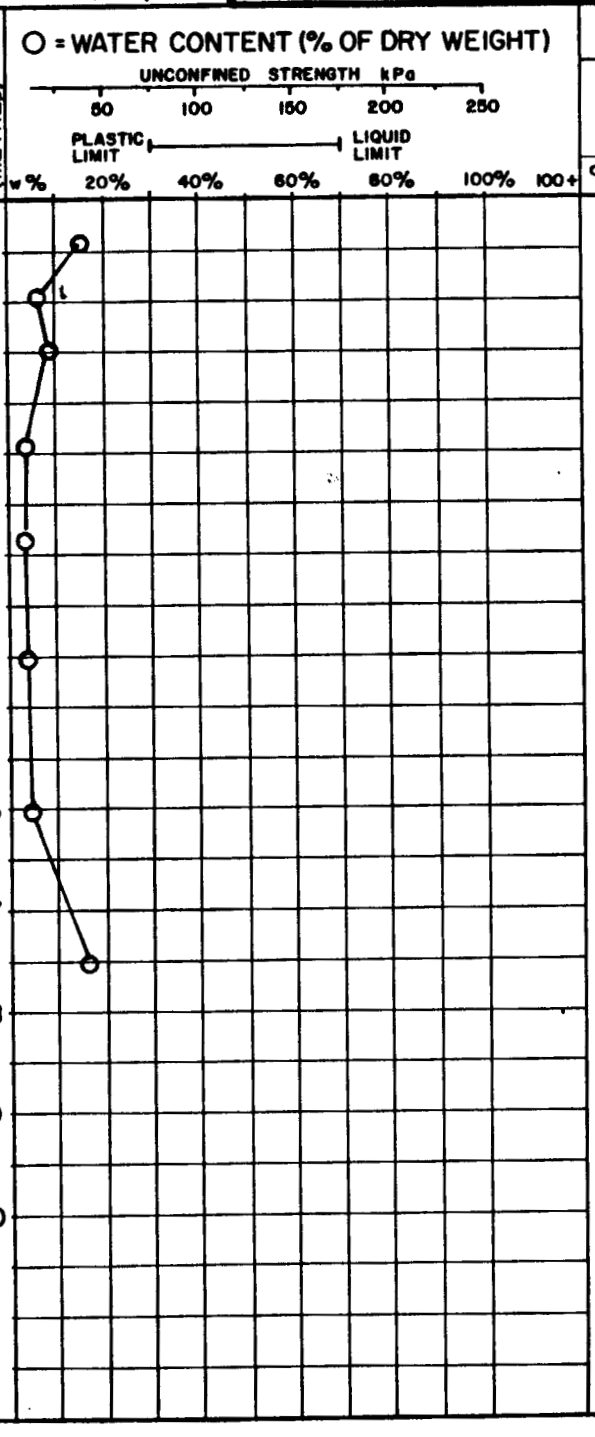
PUBLIC WORKS CANADA — DRILL HOLE REPORT

TECH.	RIG	DATE	km	B.P. No.	HOLE No.
WEBBER	B-50	78/08/06	207		5A

CHAINAGE	OFFSET
207+625	4

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	RELATIVE MOISTURE CONTENT
2	ML	SILT			MOIST
		.9 m			
4	SM	SAND - SILTY			MOIST
		CLAY LUMPS			MOIST
6					
8	SC	SILTY CLAYEY			DAMP
10		3.4 m			DAMP
12	SM GW	SAND - GRAVEL MIX			
14					DAMP
16	GW	GRAVEL - SANDY			
18					
20					DAMP
22		7.0 m			
24	CL	CLAY - SILTY SANDY TILL PEBBLES			WET
		7.6 m			
26		BOTTOM OF HOLE - 7.6 m			
28					
30					
32					
34					
36					
38					



GRAIN-SIZE ANALYSIS			
CLAY %	SILT %	SAND %	GRAVEL %

207-C-6

PUBLIC WORKS CANADA — DRILL HOLE REPORT

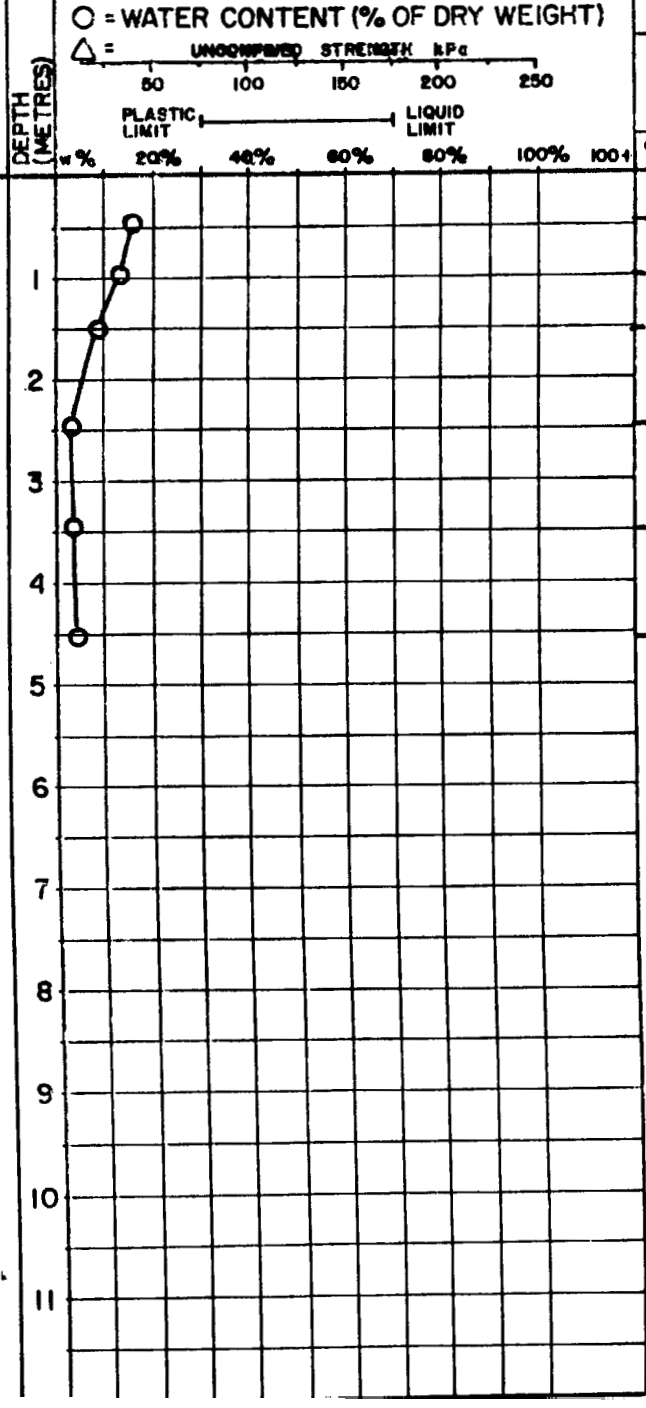
MUSKEG - LIARD HWY. REVISION

TECH. D. PRONYCH	RIG B-50	DATE	km 207+560	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
	ML	SILT - SANDY			61	39		0	MOIST-DAMP
2		.6m							
	SM	SAND - SILTY			45	55		0	M-D
4					22	78		0	M-D
6									
	SW - GW	SAND - GRAVEL MIX			5	51		44	MOIST
8									
10									
					7	48		45	MOIST
12									
14		4.6m			5	55		40	MOIST
16		BOTTOM OF HOLE - 4.6m							
18									
20									
22									
24									
26									
28									
30									
32									
34									
36									
38									



PUBLIC WORKS CANADA	DRILL HOLE REPORT	MUSKEG - LIARD HWY REVISION

TECH. D. PRONYCH	RIG B150	DATE 79/02/25	km 207+660	B.P. No.	HOLE No. [redacted]

O = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY				79	21		0	DAMP			
		1m			1	52	48		0	DAMP			
4	SM	SAND - SILTY				42	58		0	DAMP			
6	SM	GRAVELLY			2	5	59		36	DAMP-MOIST			
10					3	6	67		27	D-M			
12					4								
14		4.6m				5	53		42	D-M			
16		BOTTOM OF HOLE - 4.6 m			5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								

208-C-1

PUBLIC WORKS CANADA — DRILL HOLE REPORT

MUSKEG - LIARD HWY. REVISION

TECH. D. Pronych	RIG B-50	DATE 79/02/25	km 208+100	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET
+100	

REMARKS

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	SM	SAND - SILTY				26	74	0		DAMP
4					1	3	97	0		DAMP
6						3	97	0		DAMP
8		- PEBBLES			2	3	96	1		DAMP
10		3.4m			3	5	84	11		DAMP
12										
14		BOTTOM OF HOLE - 3.4m			4					
16					5					
18										
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36										
38					11					

208-C-2

PUBLIC WORKS CANADA — DRILL HOLE REPORT

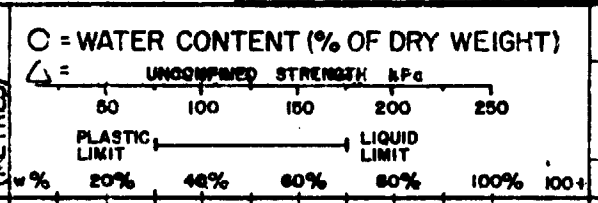
Muskeg - Liard Hwy. Revision

TECH.	RIG	DATE	km	B.P. No.	HOLE No.
D. Pronych	B-50	79/02/25	208 + 215		[redacted]

CHAINAGE	OFFSET
+ 215	

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	SM	SAND - Silty N.P.			1	42	58	0		DAMP
4						31	69	0		DAMP
6		SAND GRAVEL MIX — 1.8m Silty			2	34	36	0		DAMP
8	SM-GM					11	46	43		DAMP
10		3.4m			3	10	54	36		DAMP
12										
14		Bottom of Hole - 3.4m			4					
16					5					
18										
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										



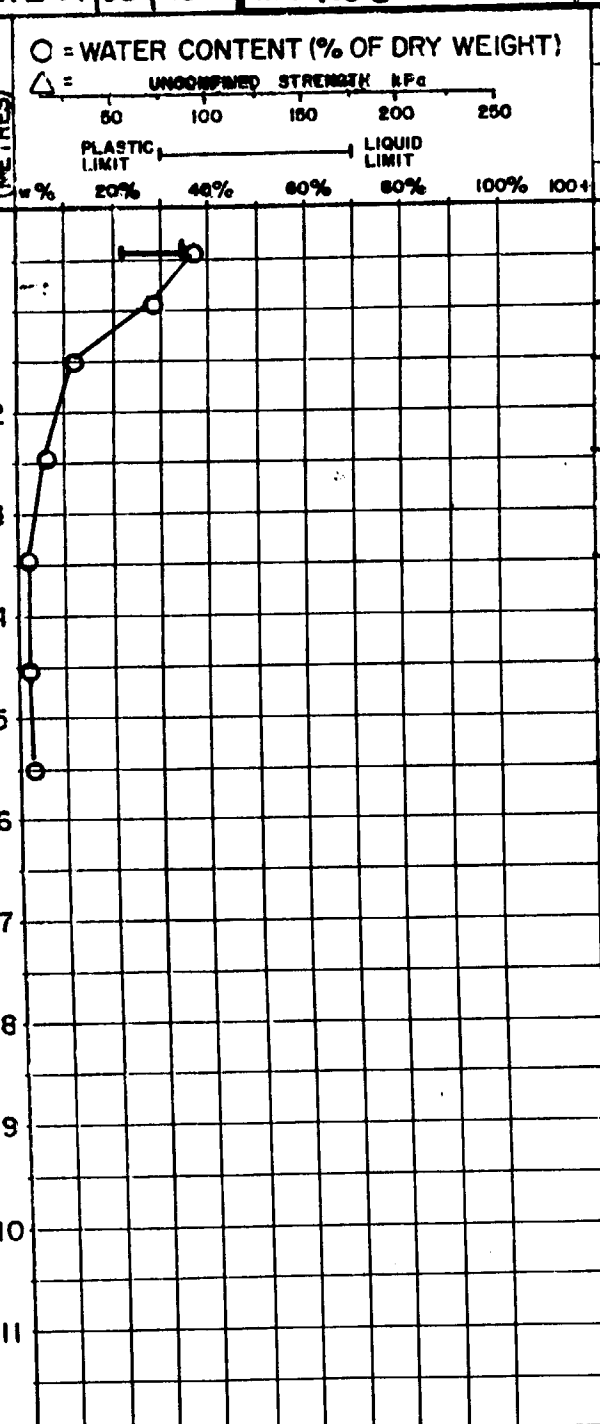
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | MUSKEG RIVER REVISION 208-C-3

TECH. D. PRONYCH	RIG B-50	DATE 79 02 12	km 208+380	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
	Pt	PEAT .05 m									
2	CL	CLAY - SILTY				95	5	0		WET-SAT.	
4		1.2 m			1	92	8	0		WET	
	SM	SAND - SILT MIX.				51	49	0		WET	
6	GM	GRAVEL - SILTY SANDY			2	26	25	49		WET - MOIST	
8											
10	GW	GRAVEL - SANDY			3	3	34	63		WET - MOIST	
12											
14					4	3	51	46		WET - MOIST	
16											
18		5.5 m			5	3	48	49		WET - MOIST	
20		BOTTOM OF HOLE - 5.5 m									
22					6						
24											
26					7						
28											
30					8						
32											
34					9						
36					10						
38					11						



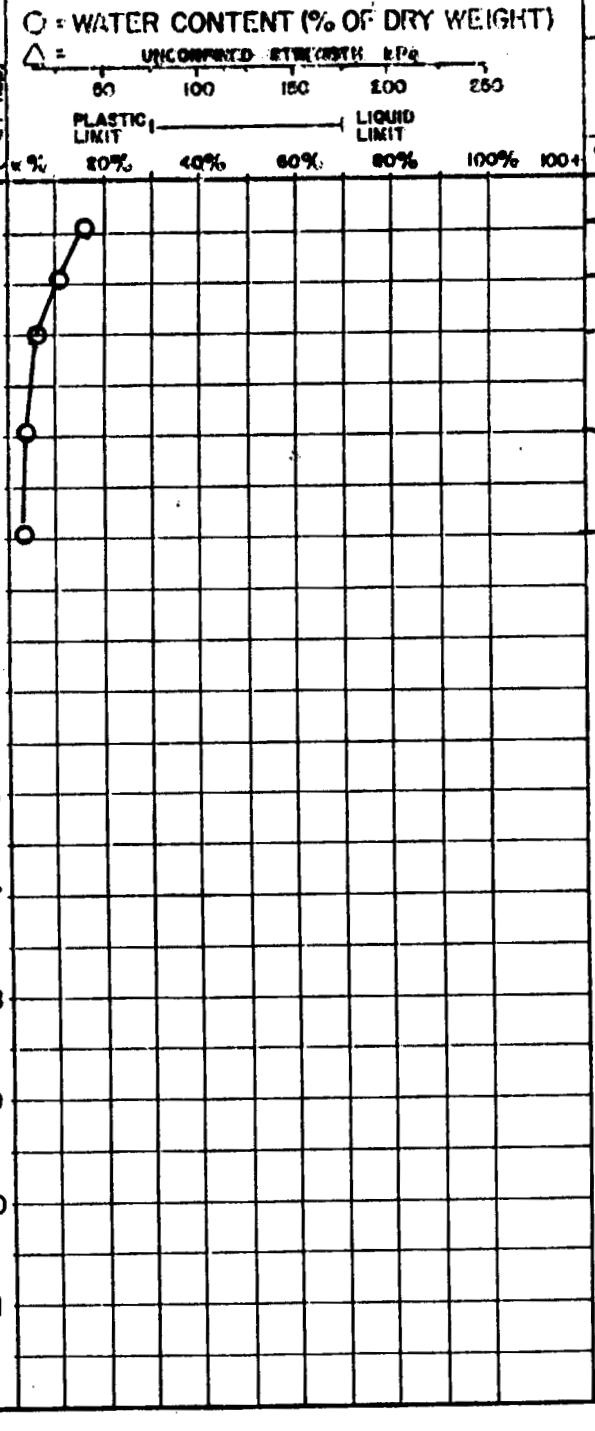
PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | MUSKEG RIVER REVISION 208-C-4

TECH. D. PRONYCH	RIG B-50	DATE 79/02/12	km 208+520	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
	Pt	PEAT · 1m								
2	ML	SILT - CLAYEY SANDY				85	15	0		MOIST
4		1.2 m			1	67	33	0		MOIST
		SAND. SILTY - PEBBLES - GRAVELLY				24	74	2		MOIST
6					2					
8	SM					8	73	19		MOIST
10		3.4m			3	5	69	24		MOIST
12		BOTTOM of HOLE · 3.4m			4					
14										
16					5					
18										
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										



PUBLIC WORKS CANADA — DRILL HOLE REPORT — MUSKEG RIVER REVISION — 208-C-5

TECH. D. PRONYCH	RIG B-50	DATE 79/02/12	km 208+920	B.P. No.	HOLE No. [redacted]

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT ⟨——⟩ LIQUID LIMIT
0% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
		~~Peat~~ .1m											
2	CI	CLAY - SILTY MEDIUM PLASTIC 1.2 m			1	99	1		0	MOIST			
4	ML	SILT - SANDY N.P.				95	5		0	MOIST			
6					2	67	33		0	MOIST - WET			
8		SILT - SAND MIX 2.4m				52	48		0	MOIST			
10		BOTTOM OF HOLE - 2.4 m			3								
12					4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY. REVISION 209-C-1

TECH. D. PRONIJCH | RIG B1-50 | DATE 79 | 02 | 20 | km | B.P. No. | HOLE No. [redacted]

CHAINAGE	OFFSET
209+080	℄

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
2, 4, 6, 8, 10		CLAY - SILTY SANDY			1, 2, 3						
10		3.4m									
12, 14	GM	GRAVEL - SANDY DIRTY to 4.3m FINALLY CLEAN AFTER. FREE WATER AFTER 5.2m			4	- 3 -		35	62	DAMP	
16, 18, 20		6.1m			5, 6						
22, 24, 26, 28, 30, 32, 34, 36, 38		BOTTOM OF HOLE 6.1m			7, 8, 9, 10, 11						

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

0% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy. - MUSKEG REVISION

TECH. D. PRONYCH	RIG B-50	DATE 79/02/20	km	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET
209+120	

REMARKS

C = WATER CONTENT (% OF DRY WEIGHT)

Cu = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w % (20%, 40%, 60%, 80%, 100%, 100+)

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2, 4	CL	CLAY - SILTY SANDY			1					
6		1.7 m			2	9	31	60		DAMP
8, 10, 12, 14	GW	GRAVEL - SANDY			3, 4	7	33	60		DAMP
16		5.2 m			5					
18, 20	CL	CLAY - SILTY SANDY SAT. PEBBLES			6					
		6.1 m								
22		BOTTOM OF HOLE - 6.1 m			7					
24, 26, 28, 30, 32, 34, 36, 38					8, 9, 10, 11					

209-C-3

PUBLIC WORKS CANADA — DRILL HOLE REPORT — MUSKEG RIVER REVISION

TECH. D. PRONYCH	RIG B-50	DATE 79/02/12	km 209 + 171	B.P. No.	HOLE No. [redacted]

CHAINAGE	OFFSET

REMARKS

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
		Peat								
2	CI	CLAY - SILTY MEDIUM PLASTIC GRAVELLY 1m			1	98	2	0		MOIST
4		GRAVEL - SANDY				68	4	28		MOIST
6	GW				2	7	19	74		MOIST
8		2.4 m				5	24	71		MOIST
10		BOTTOM OF HOLE - 2.4 m			3					
12					4					
14										
16					5					
18										
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										

209-C-4

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LISBO HWY - MUSKEG REVISION

TECH.	RIG	DATE	km	B.P. No.	HOLE No.
D. PRONYCH	B-50	79/02/20			[redacted]

CHAINAGE	OFFSET
209+200	

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	CL / CI	CLAY - SILTY SANDY			1	8	20	72		DAMP
4		1m GRAVEL - SANDY			2					
6										
8										
10					3	5	37	58		DAMP
12										
14					4	2	50	48		DAMP
16		4.9 m MOIST			5					
18	SP	SAND-GRAVELLY 5.5 m WET								
20	SP	SAND-GRAVELLY 6.1m			6	4	57	39		WET
22		Bottom of Hole - 6.1m			7					
24										
26					8					
28										
30					9					
32										
34					10					
36					11					
38										

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

0% 20% 40% 60% 80% 100% 100+

OPP. [redacted] ON WINTER RD. 209-C-

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY. - MUSKEG DIVISION

TECH. D. PRONYCH	RIG B-50	DATE 79/02/20	km	B.P. No.	HOLE No. [redacted]

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
	Pt	PEAT .2m		
2		CLAY - SILTY		
4		SANDY		
		PEBBLES		
6		MOIST		
8		WET AFTER 2.4m		
10				
12				
14		4.3m		
		GRAVEL SANDY		
16		WET		
18		FREE WATER AFTER 5.5m		
20		6.1m		
22		BOTTOM OF HOLE - 6.1m		
24				
26				
28				
30				
32				
34				
36				
38				

C = WATER CONTENT (% OF DRY WEIGHT)

Δ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

20% 40% 60% 80% 100%

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

NO SAMPLES TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

Source No. 12

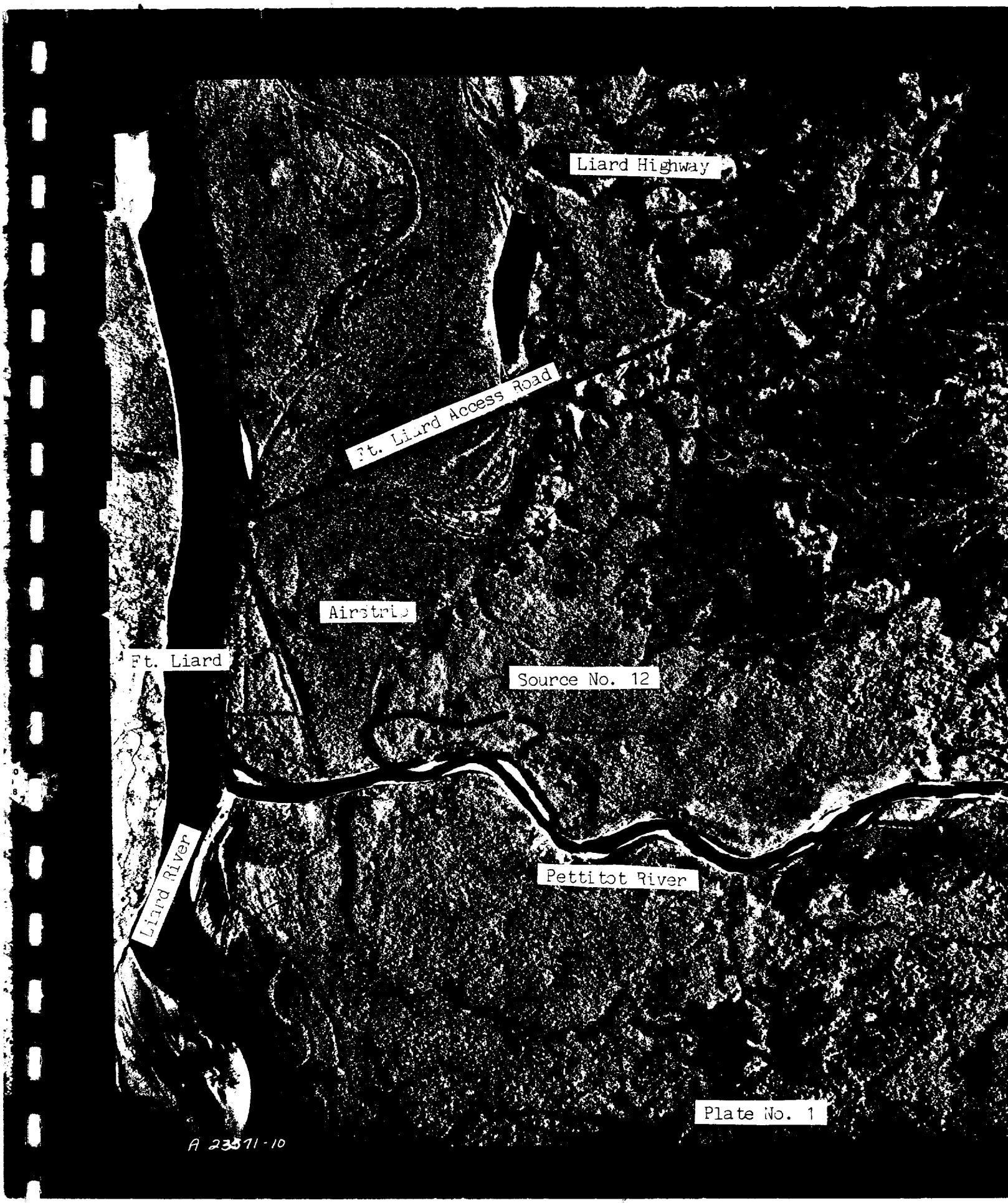
Location: Ft. Liard N.W.T. - km 217 Liard Highway
-junction of the Pettitot and Liard Rivers

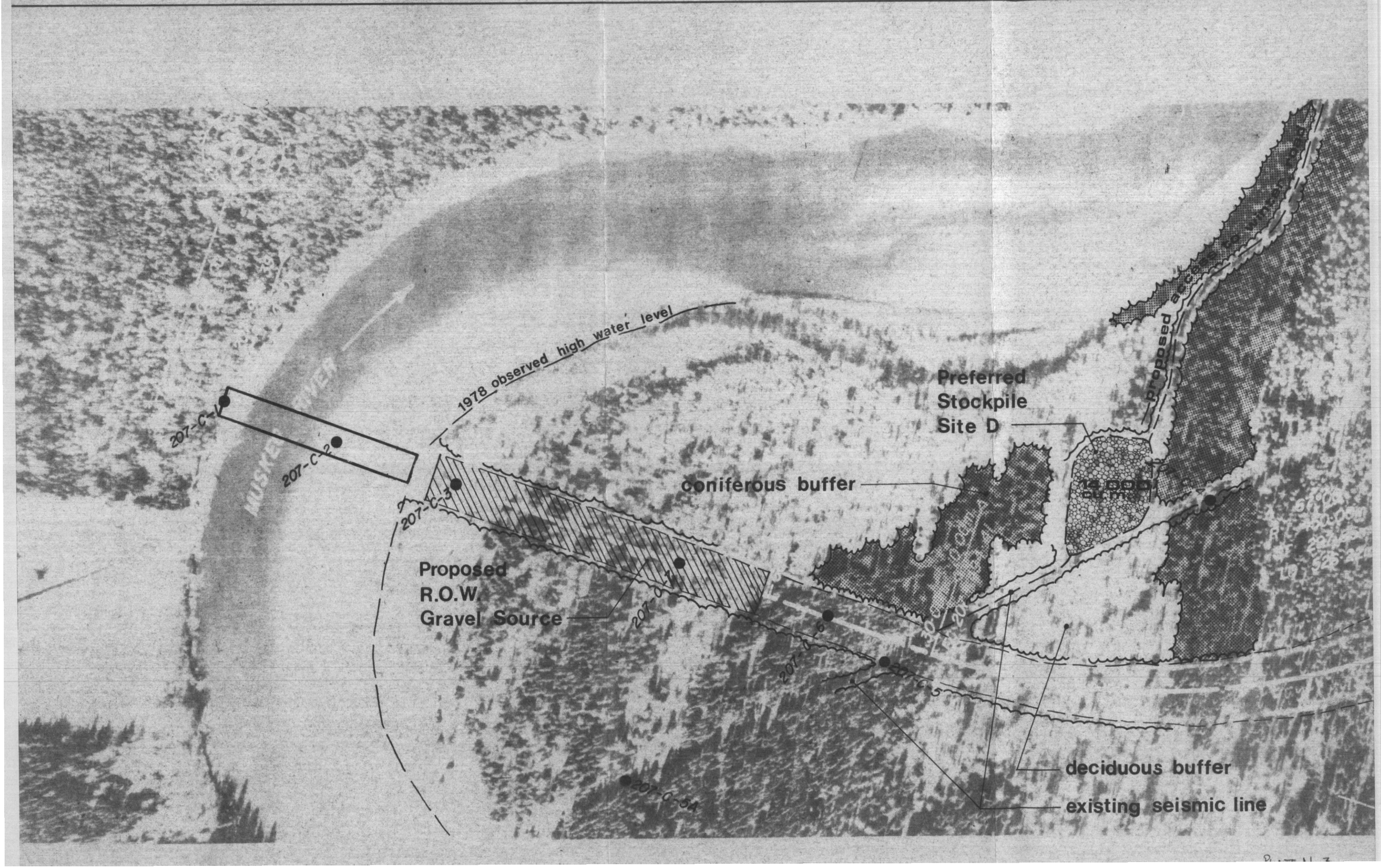
Description: Alluvial terrace of the Pettitot and/or Liard Rivers.

Material: Sandy gravel or gravelly sand.

Estimated Volume: Approximately 500,000 m^3 with minimum overburden.

Comment: Two faces opened as show approximately on plate no. 2. Use of deposit may be limited to the Ft. Liard community. Territorial Government has retained consultant to further evaluate granular materials in vicinity of source - report not yet available.


Liard Highway
Ft. Liard Access Road
Airstrip
Ft. Liard
Source No. 12
Liard River
Pettitot River
Plate No. 1
A 23871-10


1978 observed high water level
Preferred
Stockpile
Site D
Proposed
coniferous buffer
Proposed
R.O.W.
Gravel Source
deciduous buffer
existing seismic line
207-C-1
207-C-2
207-C-3
207-C-4
207-C-5
207-C-6
207-C-7
207-C-54

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 1

CHAINAGE	OFFSET

O = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w % 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2, 4, 6	ML	SILT - SANDY			1, 2					
6		2.1 m								
8, 10		BOULDERS			3					
10		3.4 m								
12, 14, 16, 18	GM	GRAVEL - SANDY SILTY			4, 5	31	23	46		MOIST
20		6.1 m			6					
22, 24, 26, 28, 30, 32	SM	SAND - GRAVELLY SILTY			7, 8, 9, 10	10	71	19		DAMP
						12	53	35		DAMP
34		10.7 m				9	66	25		DAMP
36, 38		BOTTOM OF HOLE - 10.7 m			11					

REMARKS

MUCH OF AREA DRILLED CONSISTS OF SILTY AND GRAVELLY SAND.
- PREFERRED GRAVEL IN VICINITY OF HOLES #11, #13, #14 & #15
- MORE DRILLING REQ'D TO EXPAND AREA.

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD Hwy.

TECH. WEBBAR	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 2

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2, 4, 6, 8	ML	SILT - SANDY			1, 2					
		2.4m								
8, 10, 12		BOULDERS			3					
		4.0m								
14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34	GM	SAND-GRAVELLY SILTY			4, 5, 6, 7, 8, 9, 10	29	41	30		MOIST
		GRAVEL-SANDY SILTY				15	35	50		MOIST
		PEA-GRAVEL				0	29	62		MOIST
						10	36	54		MOIST
						0	39	52		MOIST
		10.7m								
36, 38		BOTTOM OF HOLE - 10.7m			11					

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 3

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY											
4					1								
6	ML												
8					2								
10		3.1 m			3								
12		SAND - GRAVELLY SILTY											
14		GRAVEL - SANDY SILTY			4								
16					5	24	54	22		MOIST			
18	GM												
20	GW				6	13	33	54		MOIST			
22					7								
24						12	36	52		MOIST			
26					8								
28													
30					9	11	32	57		MOIST			
32					10								
34		10.7 m				8	29	63		MOIST			
36		BOTTOM OF HOLE - 10.7 m			11								
38													

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD Hwy

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 4

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILT - SANDY										
4					1							
6	ML				2	NO SAMPLES TAKEN						
8												
10					3							
12												
14		BOULDERS			4							
16		4.9m			5							
18		BOTTOM OF HOLE - 4.9m										
20					6							
22												
24					7							
26												
28					8							
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD Hwy.

TECH. WEBBER | RIG B-50 | DATE 78/03/10 | km 219 | B.P. No. 113 | HOLE No. 5

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
		SILT - SANDY								
2, 4, 6, 8, 10, 12, 14	ML				1, 2, 3, 4					
16		4.9m				24	49	27		MOIST
		SAND - SILTY GRAVELLY			5, 6, 7					
18, 20, 22, 24	SM					16	43	41		MOIST
26, 28, 30, 32					8, 9	19	47	34		MOIST
34	GM	GRAVEL - SANDY SILTY 10.7m			10	14	36	50		MOIST
36, 38		BOTTOM OF HOLE - 10.7m			11					

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT ——— LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 13	HOLE No. 6

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY											
4	ML				1								
6		2.1m			2								
8		SAND - SILTY GRAVELLY											
10					3	25	44	31		DAMP			
12	SM												
14					4								
16					5	24	59	17		DAMP			
18													
20					6	11	71	18		DAMP			
22					7								
24						13	50	37		DAMP			
26					8								
28		GRAVEL - SANDY											
30	GW				9	7	37	56		DAMP			
32					10								
34		10.7m				5	40	55		DAMP			
36		Bottom of Hole - 10.7m			11								
38													

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 7

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		SILT-SANDY								
4					1					
6										
8	ML				2					
10					3					
12										
14					4					
16										
18		5.5 m			5					
20		SAND - SILTY GRAVELLY			6	15	74	11		Moist
22	SM									
24		7.6m			7	13	69	18		Moist
26		BOTTOM OF HOLE - 7.6m			8					
28										
30					9					
32										
34					10					
36					11					
38										

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD HWY.

TECH. WEBBER | RIG B-50 | DATE 78/03/10 | km 219 | B.P. No. 113 | HOLE No. 8

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / REMARKS	OFFSET
2		SILT. SANDY			1								
4													
6		SAND. SILTY			2	NO SAMPLES TAKEN							
8	ML												
10					3								
12	SM												
14					4								
16													
18					5								
20		6.1m			6								
22		BOTTOM OF HOLE - 6.1m											
24					7								
26													
28					8								
30					9								
32													
34					10								
36					11								
38													

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 9

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) PLASTIC LIMIT — LIQUID LIMIT (w %, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSE	REMARKS
2		SILT - SANDY			1									
4														
6		SAND - SILTY			2	NO SAMPLES TAKEN								
8														
10	ML				3									
12	SM													
14					4									
16														
18					5									
20		6.1m			6									
22		BOTTOM OF HOLE - 6.1m												
24					7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 10

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	○ = WATER CONTENT (% OF DRY WEIGHT) △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) PLASTIC LIMIT — LIQUID LIMIT (0%, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY												
4		SAND - SILTY			1									
6					2	No SAMPLES TAKEN								
8	ML													
10	SM				3									
12														
14					4									
16														
18					5									
20		6.1 m			6									
22		BOTTOM OF HOLE - 6.1 m												
24					7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 11

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		SILT - SANDY								
4	ML				1					
6										
8		2.4m			2					
		SAND - GRAVELLY SILTY								
10					3					
12	GM	GRAVELLY - SANDY SILTY								
14					4					
16	GW	SANDY ONLY			5	12	25	63		MOIST
18										
20					6	10	23	67		MOIST
22					7					
24						5	12	83		MOIST
26					8					
28										
30					9	8	19	73		MOIST
32					10					
34		10.7m				10	22	68		MOIST
36		BOTTOM OF HOLE - 10.7m			11					
38										

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | DRILL HOLE REPORT | LIARD Hwy.

TECH. WEBBER | RIG B-50 | DATE 78/03/10 | km 219 | B.P. No. 113 | HOLE No. 12

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILT - SANDY			1							
4	ML											
6					2	NO SAMPLES TAKEN						
8	SM	SAND - SILTY										
10					3							
12					4							
14												
16					5							
18												
20		6.4 m			6							
22		REFUSAL @ 6.4 m			7							
24												
26					8							
28												
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 13

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML	SILT - SANDY			1					
4										
6					2					
8										
10		3.4m			3					
12	SM	SAND GRAVELLY SILTY			4					
14										
16	GM	GRAVEL - SANDY SILTY			5	26	44	30		MOIST
18										
20		GRAVEL COARSE			6	18	30	52		MOIST
22										
24	GP				7	9	7	84		MOIST
26					8					
28										
30					9	5	3	92		MOIST
32		SILTY SANDY			10					
34		10.7m				14	10	76		MOIST
36		BOTTOM OF HOLE - 10.7m			11					
38										

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa

50 100 150 200 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA — DRILL HOLE REPORT — LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 14

CHAINAGE	OFFSET

REMARKS

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w % 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2	ML SM	SILTY SAND - SANDY SILT			1					
4										
6					2					
8		2.4 m								
10	SP	SAND - GRAVELLY			3	9	56	35		MOIST
12		SILTY GRAVELLY			4					
14	SM					14	52	34		MOIST
16					5					
18										
20					6	10	48	42		MOIST
22		7.0 m								
24	GM	GRAVEL - SANDY SILTY			7	12	39	49		MOIST
26		SANDY			8					
28	GW									
30					9	9	28	63		MOIST
32										
34		10.7 m			10	6	11	83		MOIST
36		BOTTOM OF HOLE. 10.7m			11					
38										

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 15

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT SANDY			1								
4	ML												
6		2.1m			2								
8	SM	SAND - SILTY - GRAVEL											
	GM	MIX.											
10					3	15	40	45		MOIST			
12		GRAVEL - SANDY											
14					4								
16	GM					12	33	55		MOIST			
18					5								
20					6	8	17	75		MOIST			
22					7								
24													
26					8								
28													
30		9.1m			9								
32		BOTTOM OF HOLE - 9.1m											
34					10								
36					11								
38													

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 16

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		SILT - SANDY			1					
4										
6	ML				2					
8										
10					3					
12										
14					4					
16		4.9m			5					
18	SM	SAND - GRAVELLY SILTY								
20					6	16	63	21		MOIST
22	GM	GRAVEL - SANDY SILTY			7					
24		7.6m				10	40	50		MOIST
26		BOTTOM OF HOLE - 7.6m			8					
28										
30					9					
32										
34					10					
36					11					
38										

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD Hwy.

TECH. WEBBER	RIG B-50	DATE 78/03/10	km 219	B.P. No. 113	HOLE No. 17

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (0%, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT-SANDY			1									
4														
6					2									
8														
10		SAND, SILTY CLAYEY			3									
12														
14					4	NO SAMPLES TAKEN								
16														
18		PEBBLES COBBLES			5									
20														
22					6									
24		7.3m			7									
26		REFUSAL @ 7.3 m			8									
28														
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY.

TECH. D. PRONYCH	RIG B-50 AUGER	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 18

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILTY SAND.												
4					1									
6														
8					2									
		2.7m												
10		GRAVELLY SAND.			3									
12		3.7m												
		SANDY GRAVEL.			4									
14														
16					5									
18														
20					6									
22														
24					7									
		7.6m												
26		BOTTOM OF HOLE - 7.6m.			8									
28														
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA — DRILL HOLE REPORT

Liard Hwy.

TECH. D. Pronych	RIG B-50 Auger	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 19

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2, 4, 6, 8		Silty Sand.		
		2.7m		
10, 12, 14		Gravelly Sand -Silty		
		4.6m		
16		Bottom of Hole - 4.6m		
18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38				

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY.

TECH. D. PRONYCH	RIG B-50 AUGER	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 20

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILTY SAND.										
4					1							
6					2							
8												
10					3							
12												
		4m			4							
14		GRAVELLY SAND										
16					5							
18												
20		- INCREASE IN GRAVEL CONTENT BELOW 5m.			6							
22												
24					7							
		7.6m										
26		BOTTOM OF HOLE - 7.6m.			8							
28												
30					9							
32												
34					10							
36					11							
38												

PUBLIC WORKS CANADA	DRILL HOLE REPORT	Liard Hwy.

TECH. D. Pronych.	RIG B-50 Auger	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 21

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w%, 20%, 40%, 60%, 80%, 100%, 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE / OFFSET / REMARKS
2		SILTY SAND.			1							
4		- fine-medium grained.										
6					2							
8												
10					3							
12		- pebbles after 3.5m										
14		4.5m			4							
16		Bottom of Hole - 4.5m			5							
18												
20					6							
22												
24					7							
26												
28					8							
30												
32					9							
34												
36					10							
38					11							

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY.

TECH. D. PROWYCH.	RIG B-50 AUGER	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 22

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILTY SAND.												
4					1									
		FINE TO MEDIUM												
6		GRAINED			2									
8														
10					3									
12														
14		-PEBBLES AFTER 4m.			4									
16														
18					5									
20														
22		6.7m			6									
24		Bottom of Hole - 6.7m.			7									
26														
28					8									
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA	DRILL HOLE REPORT	CIARD HWY.

TECH. PRONYCH	RIG B-50 AUGER	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 23

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	O = WATER CONTENT (% OF DRY WEIGHT) / △ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250) / PLASTIC LIMIT — LIQUID LIMIT (w% 20% 40% 60% 80% 100% 100+)	GRAIN-SIZE ANALYSIS: CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILTY SAND.												
4		-DAMP			1									
6		-MEDIUM-FINE GRAINED												No SAMPLES.
8					2									
		2.7m												
10		GRAVELLY SAND			3									
12		-SILTY												
14		-THIN GRAVEL LAYERS			4									
16														
		5.2m			5									
18		SANDY GRAVEL.												
20		-POOR RETURNS			6									
22														
24					7									
		7.6m												
26		BOTTOM OF HOLE - 7.6m.			8									
28														
30					9									
32														
34					10									
36					11									
38														

PUBLIC WORKS CANADA	DRILL HOLE REPORT	LIARD HWY.

TECH. D. PRONYCH	RIG B-50 AUGER	DATE 79-02-23	km 219	B.P. No. 113	HOLE No. 24

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2		SANDY SILT.		
		1m		
4		SILTY SAND.		
6		-FINE TO MEDIUM GRAINED		
8		-PEBBLES AFTER 2m		
10		-GRAVELLY AFTER 3.5m		
12				
14				
16				
		5.2m		
18		SANDY GRAVEL.		
20				
22				
		7m		
24		Bottom of Hole - 7m.		
26				
28				
30				
32				
34				
36				
38				

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

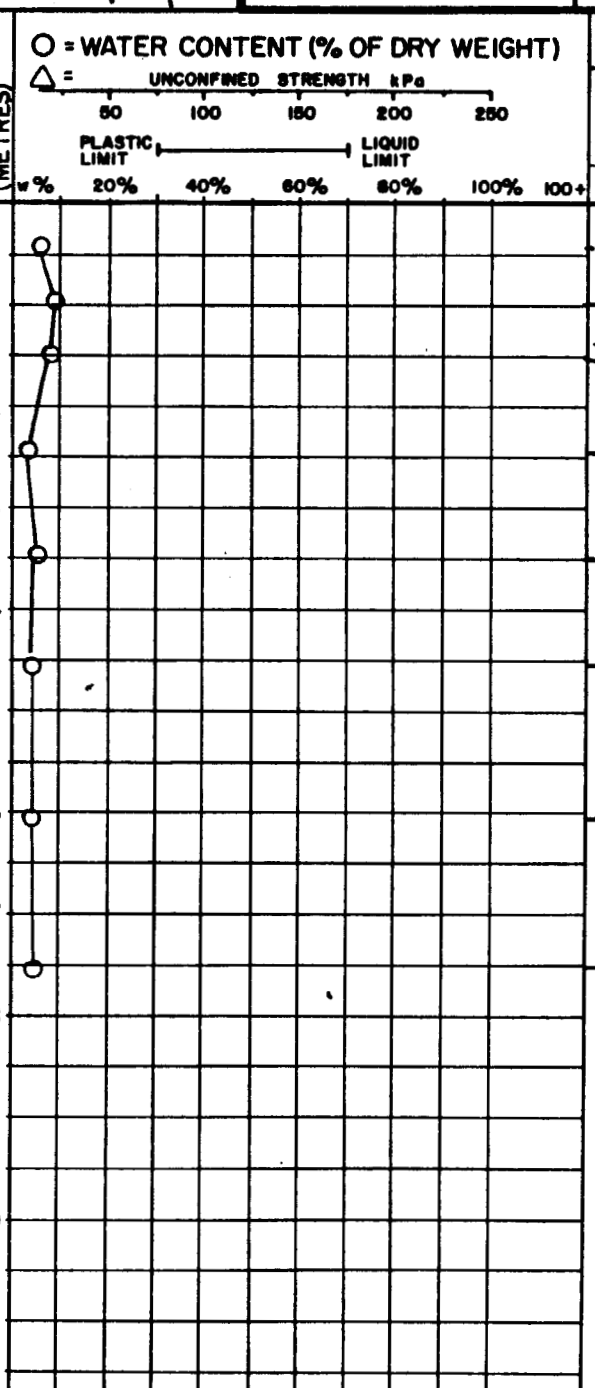
REMARKS

No SAMPLES

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. D. PRONYCHE | RIG B-50 | DATE 80/02/16 | km | B.P. No. | HOLE No. 113-30

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2	ML	SILT - SANDY		FROZEN		94	6		0	DAMP			
4		1.5m			1	91	9		0	DAMP			
6		SAND - SILTY				74	26		0	DAMP			
8					2	21	79		0	DAMP			
10		PEBBLES			3	20	70		10	DAMP			
12					4								
14	SM	SILTY ONLY				12	88		0	DAMP			
16					5								
18													
20					6	12	88		0	DAMP			
22													
24		7.6m			7	19	81		0	DAMP			
26		BOTTOM OF HOLE - 7.6m											
28													
30					8								
32					9								
34													
36					10								
38					11								

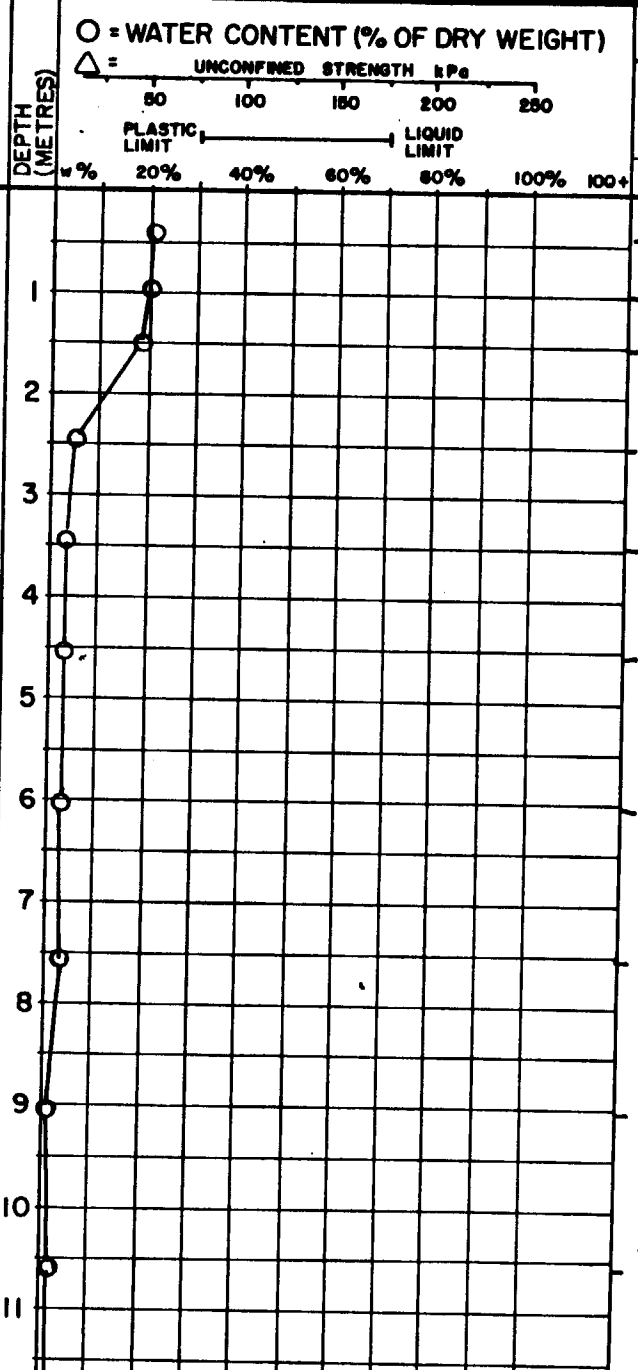


PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY

TECH. D. PRONYCH | RIG B-50 | DATE 80/02/15 | km | B.P. No. | HOLE No. 113-31

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2, 4, 6, 8, 10	ML	SILT - CLAYEY TRACE SANDY		
10		3.1 m		
12, 14, 16, 18, 20, 22	GM, GP	GRAVEL - SILTY SANDY - SANDY		
24, 26, 28, 30, 32, 34, 36, 38				



GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	REMARKS
97	3		0	DAMP	
94	6		0	DAMP	
76	24		0	DAMP-MOIST	
23	59		18	DAMP	
13	32		55	DAMP	
6	22		72	DAMP	
9	31		60	DAMP	
5	12		83	DAMP	
5	10		85	DAMP	
3	7		90	DAMP	

CHAINAGE | OFFSET

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY

TECH.	RIG	DATE	km	B.P. No.	HOLE No. 113-3

O = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
		GRAVEL -			1.7	- 5 -		15	80	DAMP			
2	GR	- SANDY			1.3								
4		13.7m				- 2 -		16	82	DAMP			
6		Bottom of Hole - 13.7m			2								
8													
10					3								
12													
14					4								
16													
18					5								
20													
22					6								
24													
26					7								
28													
30					8								
32													
34					9								
36					10								
38					11								

PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD HWY.

TECH. D. PRONYCH	RIG B-50	DATE 80/02/16	km	B.P. No.	HOLE No. 113-32

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		SILT - SANDY		FROZEN									
4					1	81	-	19	0	MOIST			
6	ML												
8					2								
10					3	58	-	42	0	MOIST-WET			
12		3.7 m											
14		GRAVEL - SANDY SILTY			4								
16	GM					12	-	35	53	DAMP			
18					5								
20					6	16	-	35	49	DAMP			
22					7								
24													
26	GP	- SANDY			8	13	-	29	58	DAMP			
28													
30					9	8	-	29	63	DAMP			
32													
34					10								
36						7	-	22	71	DAMP			
38					11								

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

1 of 1

PUBLIC WORKS CANADA — DRILL HOLE REPORT

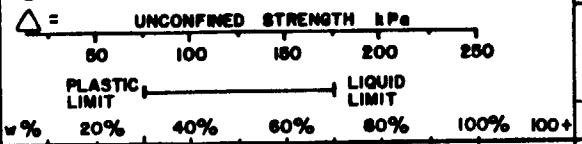
LIARD HWY.

TECH. D. PRONYCH	RIG B-50	DATE 80/02/16	km	B.P. No.	HOLE No. B-32

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2		GRAVEL - SANDY			12	-	-	22	71	HUMID			
4	GP				13	-	6 -	18	76	DAMP			
6					14								
8													
50		15.2 m			15	-	5 -	16	79	DAMP			
12		BOTTOM OF HOLE - 15.2 m			4								
14													
16					5								
18													
20					6								
22													
24					7								
26													
28					8								
30					9								
32													
34					10								
36													
38					11								

O = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa



PUBLIC WORKS CANADA — DRILL HOLE REPORT

LIARD Hwy.

TECH. D. Pronych	RIG B-50	DATE 80/02/16	km	B.P. No.	HOLE No. 113-33

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2, 4, 6, 8	ML	SILT - SANDY			1, 2	81	19	0		MOIST			
		2.5m											
10	SM	SAND - SILTY GRAVELLY			3	24	47	29		MOIST-WET			
		3.7m											
12, 14, 16	GM	GRAVEL - SILTY TO 7.5m SANDY			4, 5	12	33	55		DAMP			
18, 20	GP				6	11	34	55		DAMP			
22, 24, 26					7, 8	11	24	65		DAMP			
28, 30					9	7	14	79		DAMP			
32, 34	GP				10	5	18	77		DAMP			
36, 38					11								

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA — DRILL HOLE REPORT

TECH.	RIG	DATE	km	B.P. No.	HOLE No.

CHAINAGE	OFFSET

REMARKS

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT
2		GRAVEL - SANDY			13	- S	21	74		DAMP
4	GP									
6					14	- S -	21	74		HUMID
8										
10		15.2m			15	- S -	20	75		HUMID
12		BOTTOM OF HOLE - 15.2m			4					
14										
16					5					
18										
20					6					
22										
24					7					
26										
28					8					
30					9					
32										
34					10					
36					11					
38										

○ = WATER CONTENT (% OF DRY WEIGHT)

△ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w % 20% 40% 60% 80% 100% 100+

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY.

TECH. D. PRONYCH | RIG B-50 | DATE 80/02/16 | km | B.P. No. | HOLE No. 113-34

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION
2		SILT - SANDY		FROZEN
4		DUMP		
6		2.1m		
8		SAND - SILTY FINE GRAIN		
10				
12				
14		GRAVELLY		
16		5.2m		
18		SAND		
20		MEDIUM - FINE GRAINED		
22		FEW PEBBLES		
24		MOIST 7.6m		
26		BOTTOM OF HOLE - 7.6m		
28				
30				
32				
34				
36				
38				

DEPTH (METRES): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

O = WATER CONTENT (% OF DRY WEIGHT)

Δ = UNCONFINED STRENGTH kPa: 50, 100, 150, 200, 250

PLASTIC LIMIT — LIQUID LIMIT

w% 20% 40% 60% 80% 100% 100+

NO SAMPLES TAKEN

GRAIN-SIZE ANALYSIS				RELATIVE MOISTURE CONTENT
CLAY %	SILT %	SAND %	GRAVEL %	

CHAINAGE	OFFSET

REMARKS

PUBLIC WORKS CANADA | **DRILL HOLE REPORT** | LIARD HWY

TECH. D. PRONYCH	RIG B-50	DATE 80/02/16	km	B.P. No.	HOLE No. 113-35

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = UNCONFINED STRENGTH kPa (50, 100, 150, 200, 250)
PLASTIC LIMIT — LIQUID LIMIT
w% 20% 40% 60% 80% 100% 100+

DEPTH (FEET)	UNIFIED SOIL SYMBOL	SOIL DESCRIPTION	PENETRATION RESISTANCE	ICE DESCRIPTION	DEPTH (METRES)	GRAIN-SIZE ANALYSIS CLAY %	SILT %	SAND %	GRAVEL %	RELATIVE MOISTURE CONTENT	CHAINAGE	OFFSET	REMARKS
2–6	ML	SILT-SANDY		FROZEN	1	75	25		0	DAMP			
6		2.1m			2								
8–12		GRAVEL - SANDY			3	14	31		55	DAMP			
14–16	GP				4–5	6	44		50	DAMP			
18–20					6	5	34		61	DAMP			
22–24					7	5	34		61	DAMP			
24		7.6m											
26–38		BOTTOM OF HOLE - 7.6m			8–11								

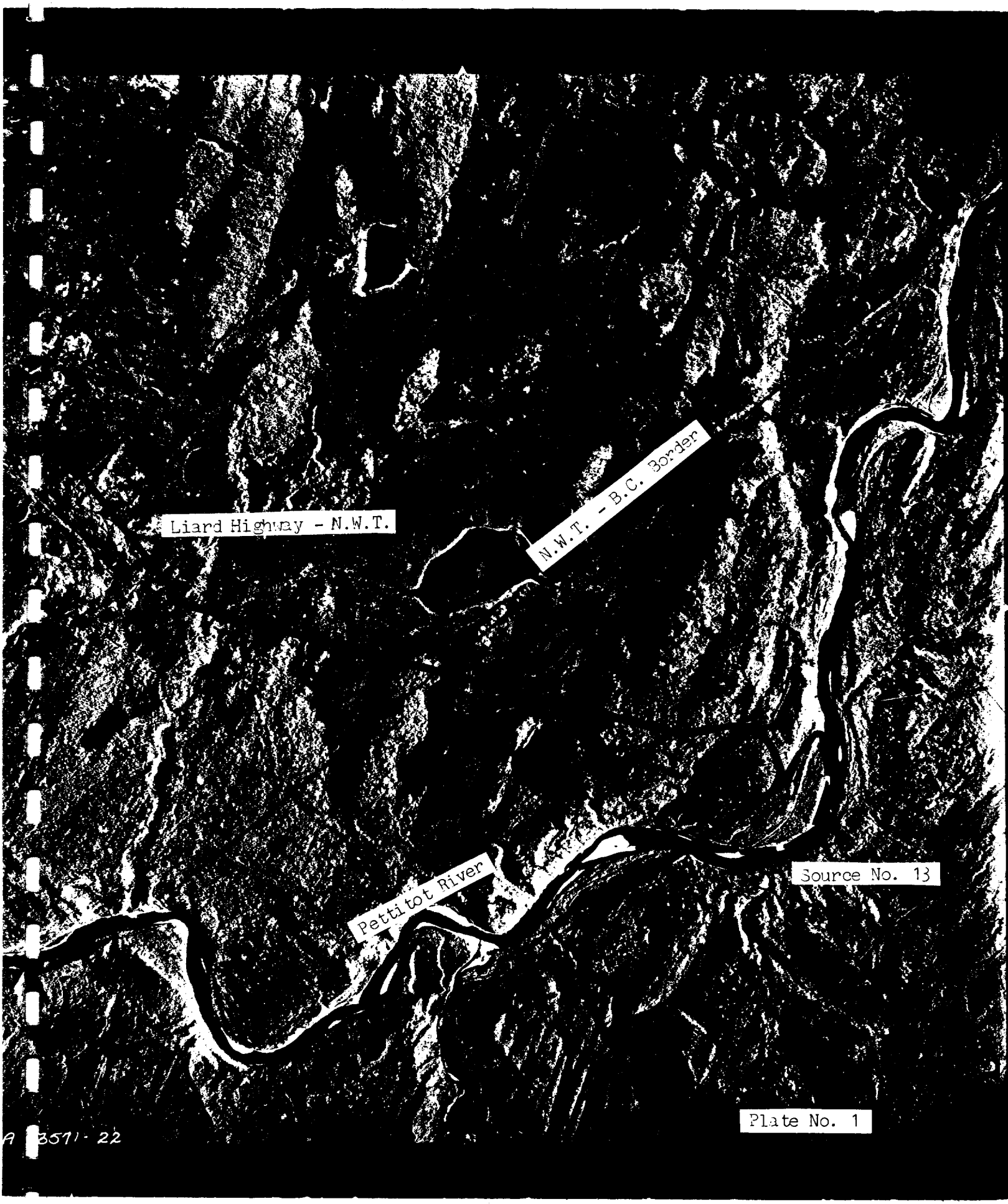

Liard Highway - N.W.T.
N.W.T. - B.C. Border
Pettitot River
Source No. 13
A 3571-22

Plate No. 1

Source No. 13

Location: Approximately km 257 Liard Highway at the crossing of the Pettitot River.

Description: Alluvial terraces within the Pettitot River Valley.

Material: Sandy gravel.

Volume: Not established - probably in excess of 500,000 m^3.

Comments: Deposit within British Columbia, approximately 2 km from N.W.T. border. Right-of-way cut will pass through terrace and province has indicated surplus cut material will be available for immediate PWC requirements. Long term availability of material for usage within N.W.T. not established.

Source No. 13

Location: Approximately km 257 Liard Highway at the crossing of the Pettitot River.

Description: Alluvial terraces within the Pettitot River Valley.

Material: Sandy gravel and gravelly sand.

Volume: Not established - probably in excess of 200,000 m^3. in Total

Comments: Deposit within British Columbia, approximately 3 km from N.W.T. border. Right-of-way cut will pass through terrace and province has indicated surplus cut material will be available for immediate PWC requirements. Long term availability of material for usage within N.W.T. not established. Test pit locations by B.C. Highways are shown on plate #2. Logs and sieve analysis data follow.

area & the best gravel
possibly 80,000 m3

BC5555 № 031

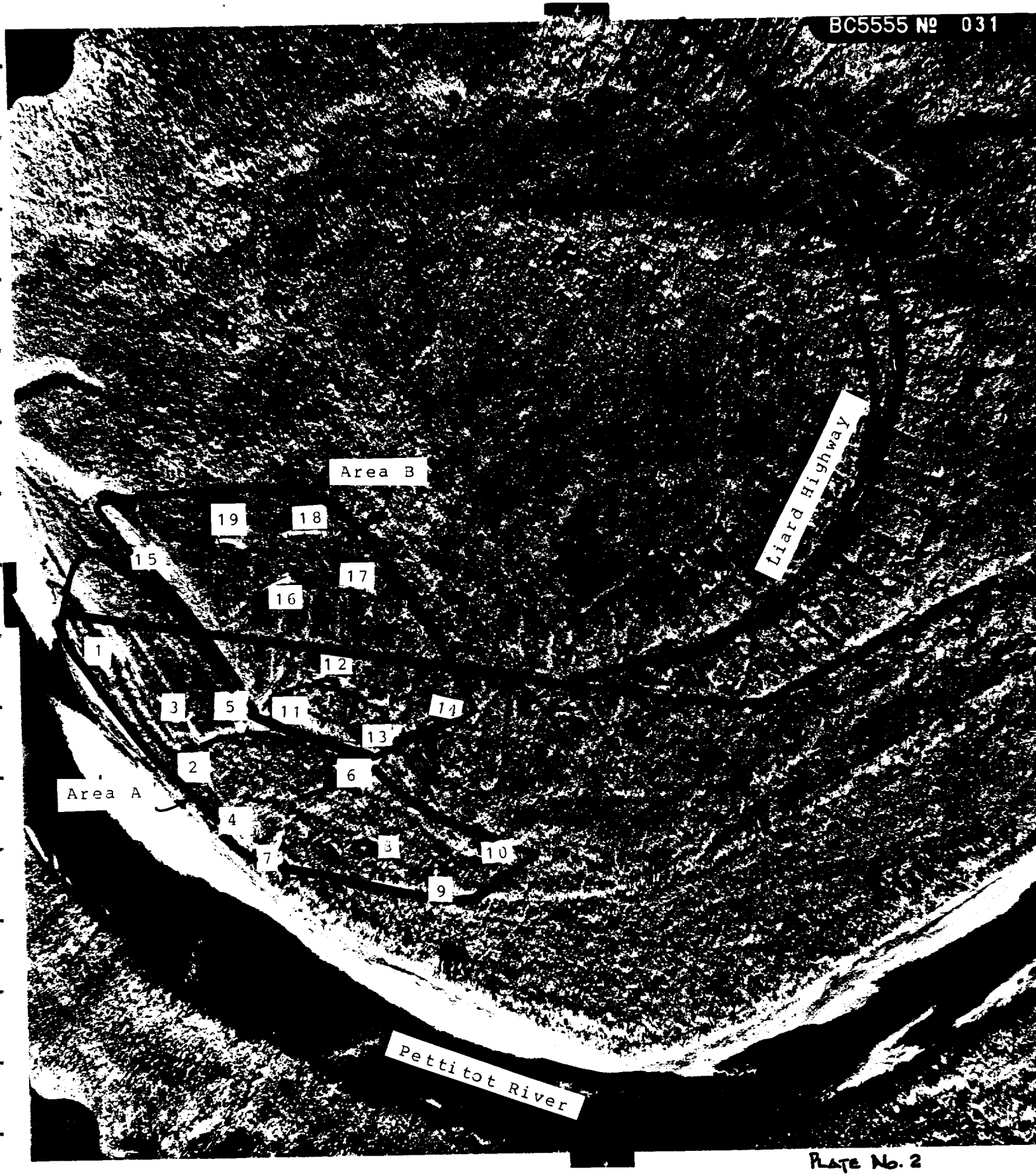


PLATE No. 2

District Highway Manager
Department of Highways
Ft. St. John, B.C.

Regional Materials Engineer
202 - 2nd Avenue
Prince George, B.C.

April 26, 1974

REGIONAL CONSTRUCTION SUPERINTENDENT
PRINCE GEORGE, B.C.

Petitot River Pit

(Ft. Nelson - Petitot River)

PROJECT:

The above pit was investigated as a possible gravel source to be used for the construction of the road from Ft. Nelson to the Petitot River. This was requested by the Design and Survey Branch of the Department of Highways. A rented Komatsu Cat was used to carry out the investigation.

LOCATION:

Area "A" is located approximately 200' right of station 4560+00 and area "B" is located approximately 170' left and 180' right of station 4565+00. As can be seen on the attached plan area "A" is located on the lower river bench.

GRADATION:

The average gradation of area "A" and "B" are as follows:

Area "A" - coarse 44%, sand 54%, and fines 2%.

Area "B" - coarse 33%, sand 64% and fines 3%.

The overall gradation of area "A" and "B" is the same as the average gradation.

SOUNDNESS INDICATORS AREA "A"

Sand equivalent test run on 1 sample from area "A" resulted in a reading of 77. The degradation test on the material from area "A" produced a reading of 87.

The specific gravity of the coarse aggregate is 2.63 with an absorption value of 0.95%. The fine aggregate has a specific gravity of 2.58 with an absorption value of 0.17%.

The material in area "A" as indicated by the degradation and sand equivalent tests is sound and has an absence of plastic fines.

...../2

SOUNDNESS INDICATORS AREA "B"

The sand equivalent result of the material in area "B" is 91 with a degradation value of 46.

The specific gravity of the coarse aggregate is 2.64 with an absorption value of 0.65%. The fine aggregate has a specific gravity of 2.57 with an absorption value of 1.027%.

The material in area "B" indicates the coarse aggregate is relatively unsound with the fine aggregate having an absence of plastic fines.

SUITABILITY:

The material in the designated areas "A" and "B" on the attached plan would be suitable for:

1. Select granular sub-base.
2. Borrow.
3. Possible drainage blanket.

However with the shortage of material in this area, it may have to be used for crush material. If this is to be done it is recommended that the material in area "A" be crushed due to its overall higher percentage of gravel.

QUANTITY:

In the areas outlined "A" and "B" the estimated potential of all material is approximately 107,000 cu. yards. 81,855 m³
Area "A" has an average depth of 5.9 ft. 1.8 m of good gravel and sand, with an estimated potential of approximately 36,000 cubic yards. 27,540 m³
In area "B" there is an average depth of 6.8 feet 2.1 m of gravel and sand, with an estimated potential of 71,000 cubic yards. 54,315 m³

...../3

PIT CHARACTERISTICS:

1. The pit topography consists of relatively flat river benches.

2. The pit areas outlined, area "A" is covered with small poplar and birch trees with an average diameter of 6". Area "B" is covered with poplar, birch and jackpine trees with an average diameter of 6-8 inches.

3. Overburden over the areas consists of silts and roots. Area "A" has an average of 3.8 feet of overburden with the exception of T.P. #7, 9 and 10 which have a depth of 5 ft., 9 ft. and 6 ft. respectively. Area "B" has an average of 2.8' of overburden with the exception of T.P. #14 which has 5 feet.

4. In T.H. #1 as seen on the attached plan it is left out of area "A" because of the 6' of SM. encountered. The area west of T.P. #1 could be a possible source of gravel if a further investigation is carried out.

5. There is sufficient space for stockpiles and set-ups as shown on the attached plan. A possible crusher set-up could be placed west of T.P. #5, for area "A".

6. Overburden could be pushed in the areas as indicated on the attached plan. This material would then be readily available for landscaping depleted pit areas.

C.B. Kern, P. Eng.
Acting Regional Geotechnical &
Materials Engineer

DST/nm

cc: Assistant Highway Engineer, Prince George
Regional Design and Survey Engineer, Prince George
Regional Construction Engineer, Prince George
Regional Paving Superintendent, Prince George
Senior Materials Engineer, Victoria

Test Pit No.	Overburden and Waste Material	Depth of soil boundaries	Classification	Gradation of Material: +3"	Gravel	Sand	Fines	Degradation	Sand Equivalent	Specific Gravity: Coarse Aggregate	Fine Aggregate	Absorption: Coarse Aggregate	Fine Aggregate	Material at Bottom of T.H.	Water Table	REMARKS
1	1½'	0'-1½'	OL													OVERBURDEN
		1½'-6'	SM1		5	80	15									MAX SIZE
		6'-7'	GP	-	63	35	2							GP		
2	2'	0'-2'	ML													OVERBURDEN
		3'-5'	SM2		10	70	20									
		5'-6'	SP		20	75	5									
		6'-7'	SPSM		22	72	6							SP-SM		
3	1½'	0'-1½'	ML													OVERBURDEN MAX SIZE
		1½'-4'	SP		41	58	1									MAX SIZE
		4'-6'	GP	-	60	35	5									PETRO (N=18
		6'-7½'	SP	✓	40	55	5							SP		
4	2½'	0'-2½'	ML													OVERBURDEN
		2½'-3½'	SPSM	✓	10	80	10									MAX SIZE
		3½'-9'	GP	✓	59	40	1	87	77					GP		
5	1½'	0'-1½'	ML													OVERBURDEN
		1½'-8'	GP	-	65	33	2							GP		MAXIMUM SIZE
6	3'	0'-3'	ML													OVERBURDEN
		3'-8'	SM4		-	55	45									
		8'-13'	GP	-	63	35	2			2.63	2.58	.95	.17			MAX SIZE
		13'-14'	GP	1½	65	30	5							GP		MAX SIZE

SUMMARY OF TEST HOLES

Test Hole No.	Overburden and Waste Material	Depth of soil boundaries	Classification	Gradation of Material				Degradation	Sand Equivalent	Specific Gravity		Absorption		Material at Bottom of TH.	Water Table	REMARKS
				+3"	Gravel	Sand	Fines			Coarse Aggregate	Fine Aggregate	Coarse Aggregate	Fine Aggregate			
7	5'	0'-5'	ML													OVERBURDEN
		5'-7'	SM			55	45									
		7'-13'	GP		56	43	1							GP		MAX SIZE 2
8	4½'	0'-4½'	ML													OVERBURDEN
		4½'-6'	SP-SM		5	85	10									
		6'-10½'	SP			99	1							SP		
9	9'	0'-9'	ML													OVERBURDEN
		9'-15'	GP		58	41	1							GP		MAX SIZE 3 clam shells
10	6'	0'-6'	ML													OVERBURDEN
		6'-8'	SP-SM		10	80	10									
		8'-9'	GP-GM		65	30	5							GP		MAX SIZE 4
11	2'	0'-2'	ML													OVERBURDEN
		2'-12'	SP		45	53	2							SP		
12	3½'	0'-3½'	ML													OVERBURDEN
		3½'-6'	SP		34	65	1	46	91							
		6'-10'	SP		35	64	1							SP		
13	2½'	0'-2½'	ML													OVERBURDEN
		2½'-11'	SP		34	64	2							SP		

Test Hole No.	Overburden and Waste Material	Depth of soil boundaries	Classification	Gradation of Material				Degradation	Sand Equivalent	Specific Gravity		Absorption		Material at Bottom of T.H.	Water Table	REMARKS
				+3"	Gravel	Sand	Fines			Coarse Aggregate	Fine Aggregate	Coarse Aggregate	Fine Aggregate			
14	5'	0'-5'	ML													OVERBURDEN
		5'-11'	SP	-	46	52	2			2.64	2.57	.65	1.027	SP		MAX SIZE 3"
15	1½'	0'-1½'	ML													OVERBURDEN
		1½'-8'	GP	-	65	30	5									MAX SIZE 3"
		8'-11½'	SP	-	19	79	2									MAX SIZE 3"
		11½'-16'	SP	-	5	90	5							SP		
16	2½'	0'-2½'	ML													OVERBURDEN
		2½'-6½'	SP	-	34	65	1									
		6½'-9'	SP	-	35	60	5							SP		
17	3'	0'-3'	ML													OVERBURDEN
		3'-4'	SP	-	25	70	5									
		4'-7'	SP	-	43	56	1							SP		
18	2½'	0'-2½'	ML													OVER BURDEN
		2½'-5'	SP	-	6	91	3							SP		
19	2½'	0'-2½'	ML													OVERBURDEN
		2½'-3'	GP	-	55	40	5									
		3'-6'	SP	-	10	85	5							SP		

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson – Petitot River Pit

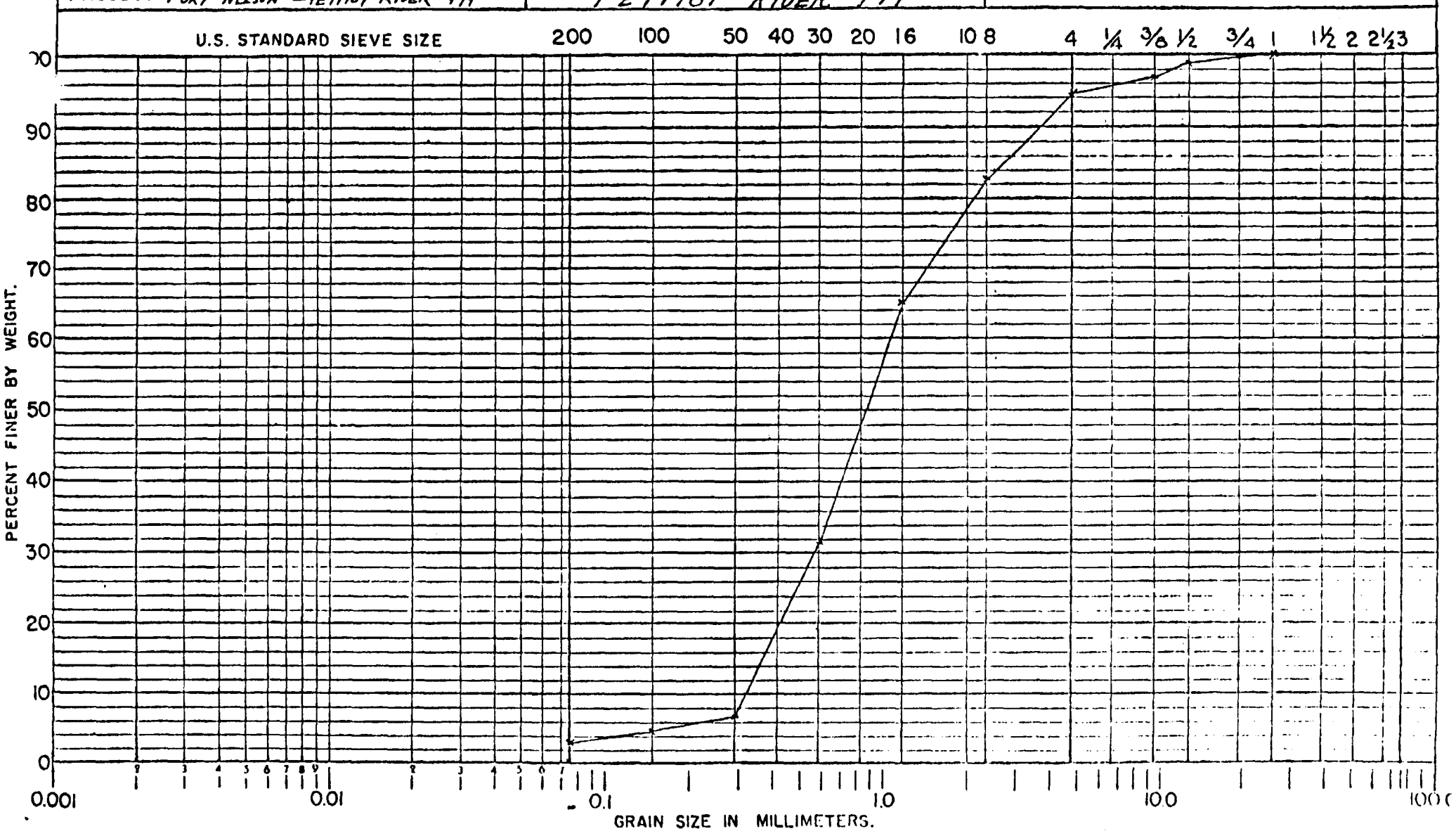
TEST BY Lab Staff — Nov 21 1973

District – Fort St. John

Sampled By – D. St. Thomas

Method – Cat & Backhoe — TH #18 S #1 D 2½'-5' X-2283

PETITOT RIVER PIT



Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson - Petitot River Pit.

TEST BY Lab Staff — Dec 5 1963

District: Ft St. John.

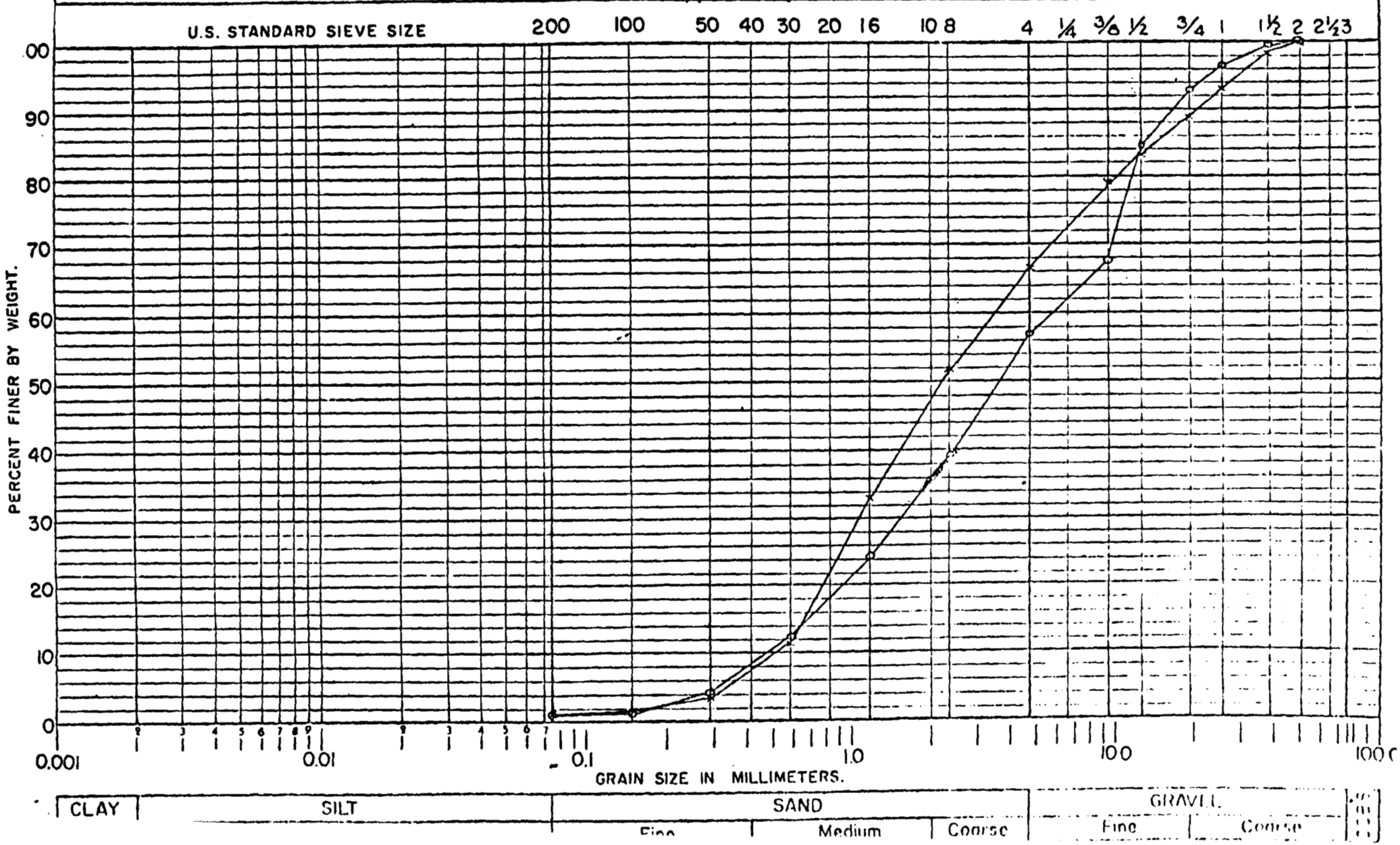
Sampled by: D. St Thomas.

Method: Cat & Backhoe.

PETITOT RIVER PIT

×—× TH#16 S#1 2½'-6½' X2280

o—o TH#17 S#1 4'-7' X2284



Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson – Petitot River Pit

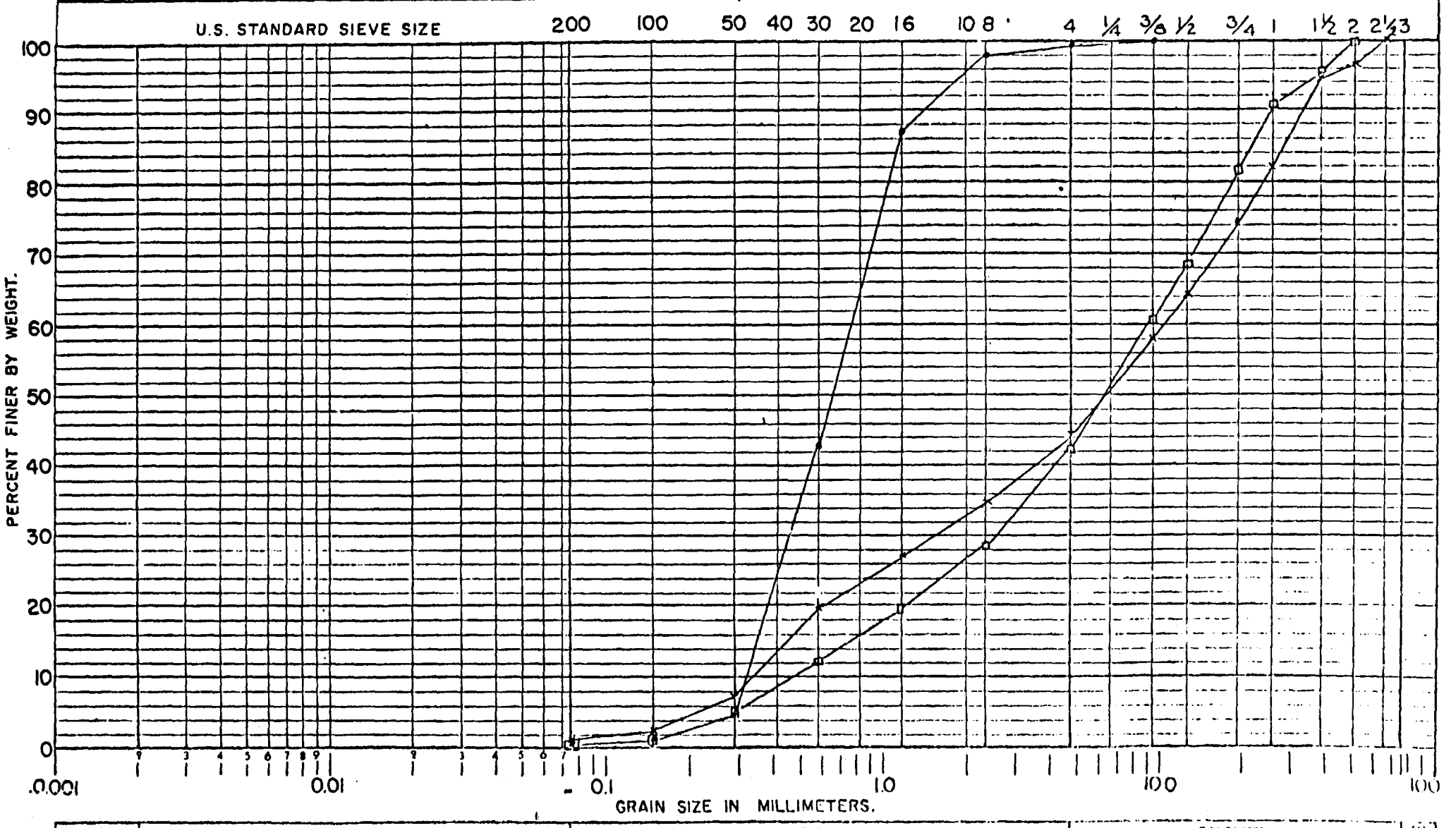
TEST BY LAB STAFF — Nov 21 1973

DISTRICT - Fort St John

SAMPLED BY - D St. Thomas

METHOD – CAT & Backhoe

PETITOT RIVER PIT



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson - Petitot River Pit

TEST BY Lab Staff. Dec 5 1973

District: Fort St John.

Sampled by: D. St. Thomas.

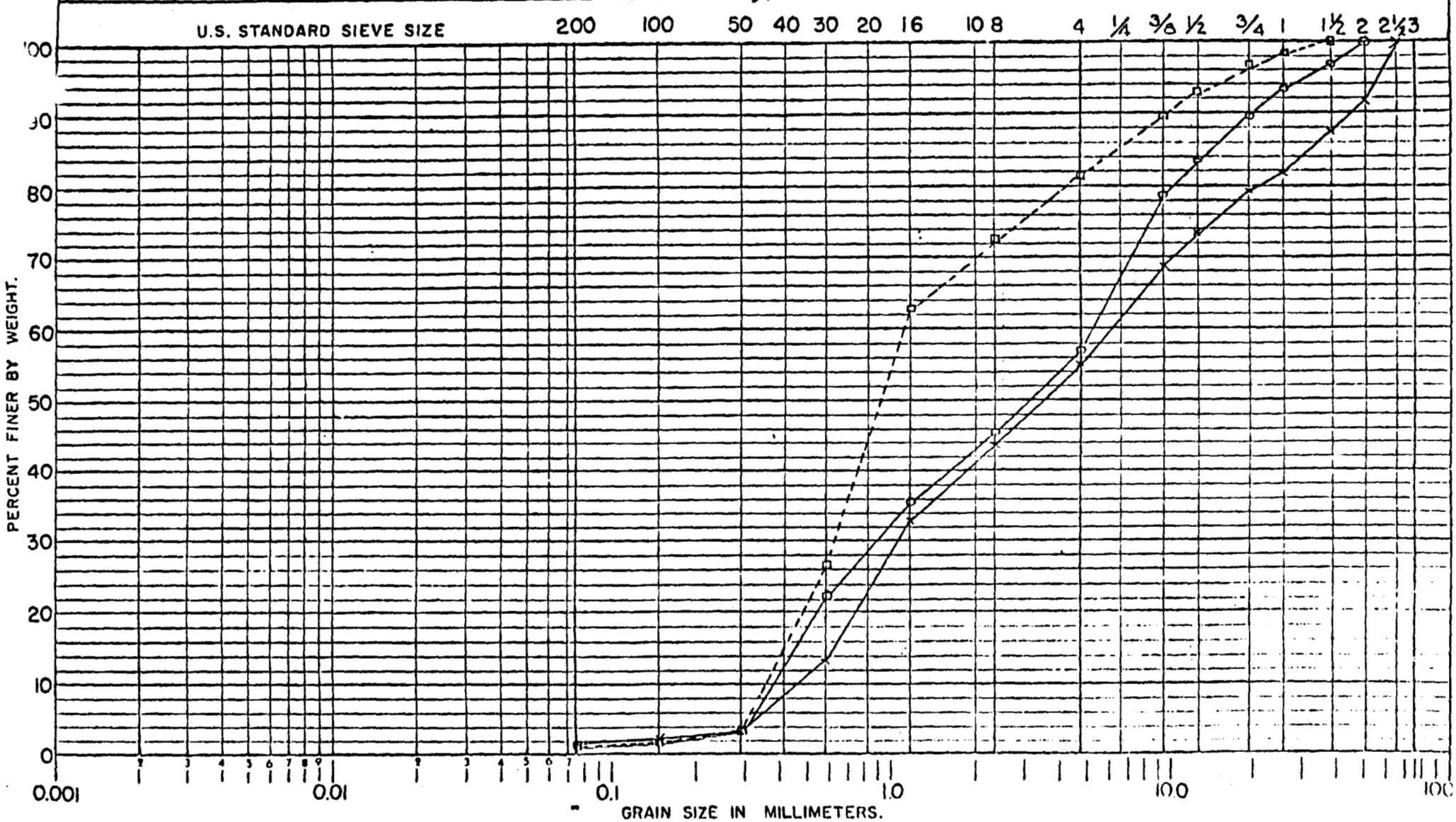
Method: Cat-Backhoe.

PETITOT RIVER PIT

x—x TH# 11 S# 1 D2'-12' x 6102 (2286)

o—o TH# 12 S# 1 D3½'-10' T939 (2285)

□--□ TH# 15 S# 2 D8'-11½' x 2279



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson – Petitot River Pit

TEST BY Lab Staff

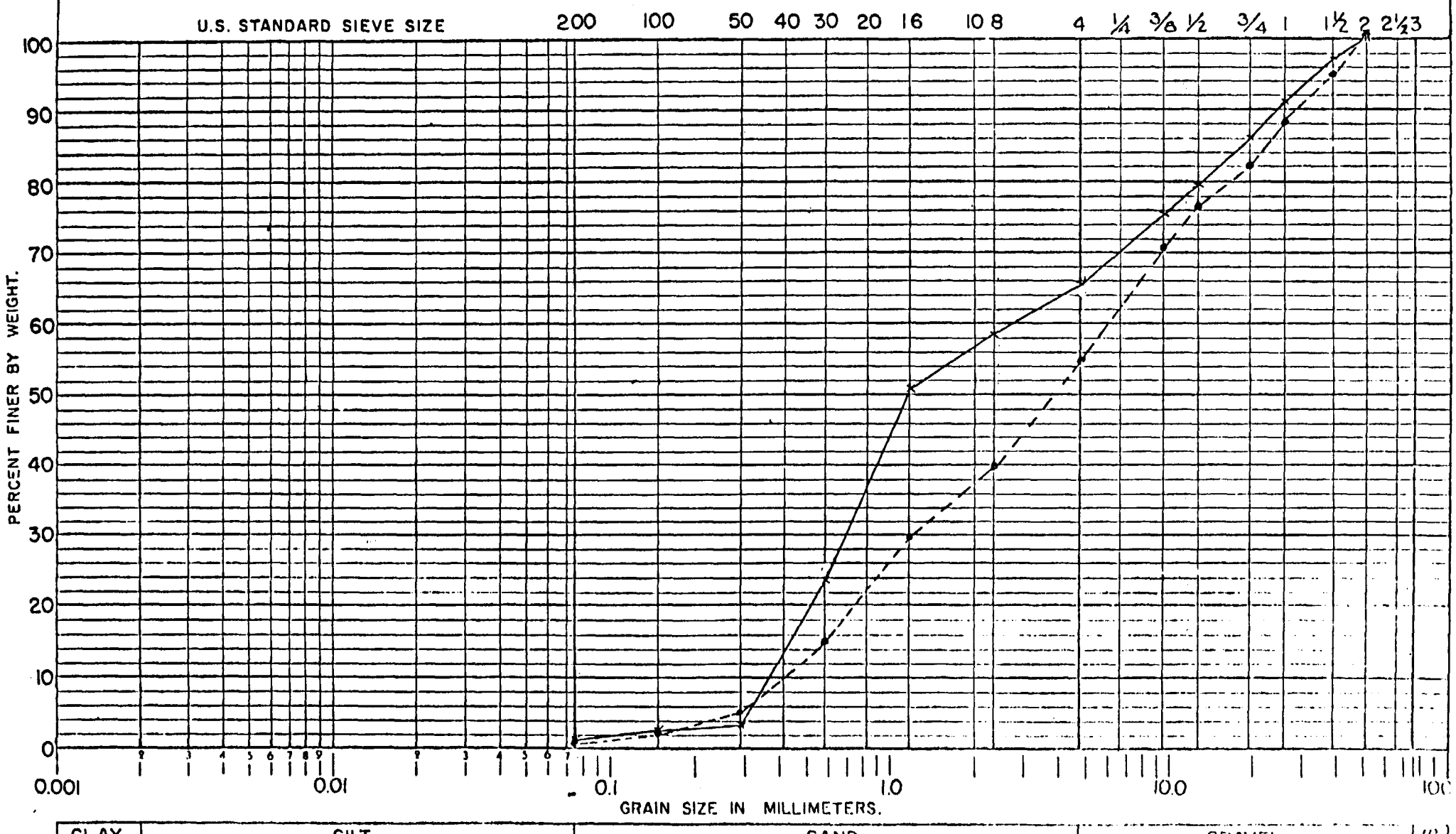
Nov 21 1973

District – Fort St. John

Sampled By – D St. Thomas

Method – Cat & Backhoe

Petitot River Pit



CLAY	SILT	SAND			GRAVEL		
		Fine	Medium	Coarse	Fine	Coarse	

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson - Petitot River Pit.

TEST BY Lab Staff.

District : Fort St John.

Sampled by D. St Thomas

Method : Cat and Backhoe.

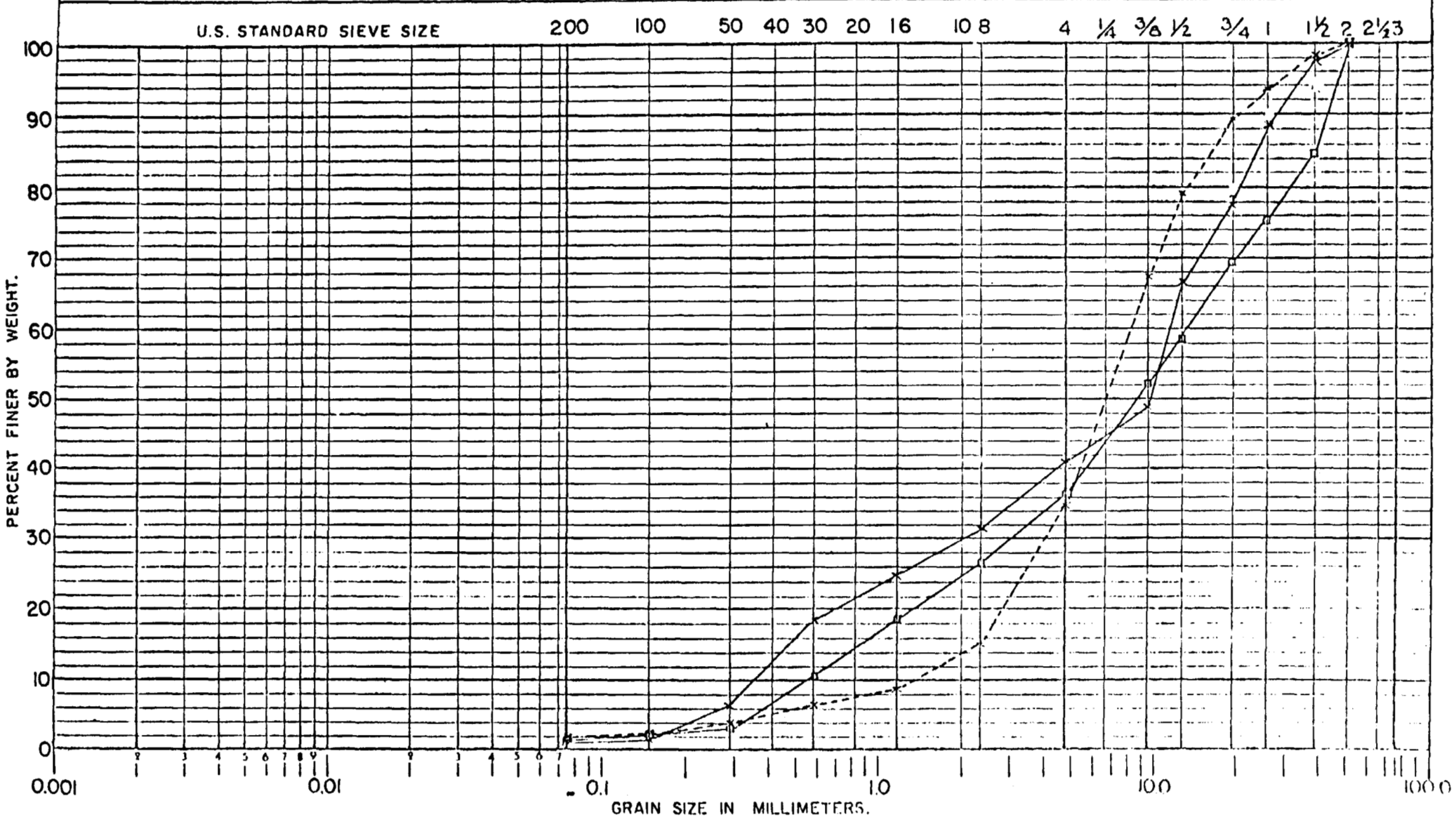
PETITOT RIVER PIT

Dec 5 1973

×—× TH #4 S #1 D 3½'-9' X-2296

×---× TH #5 S #1 D 1½'-8' X-2297

□—□ TH #6 S 1 D 8'-13' X-2270



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT Fort Nelson - Petitot River Pit

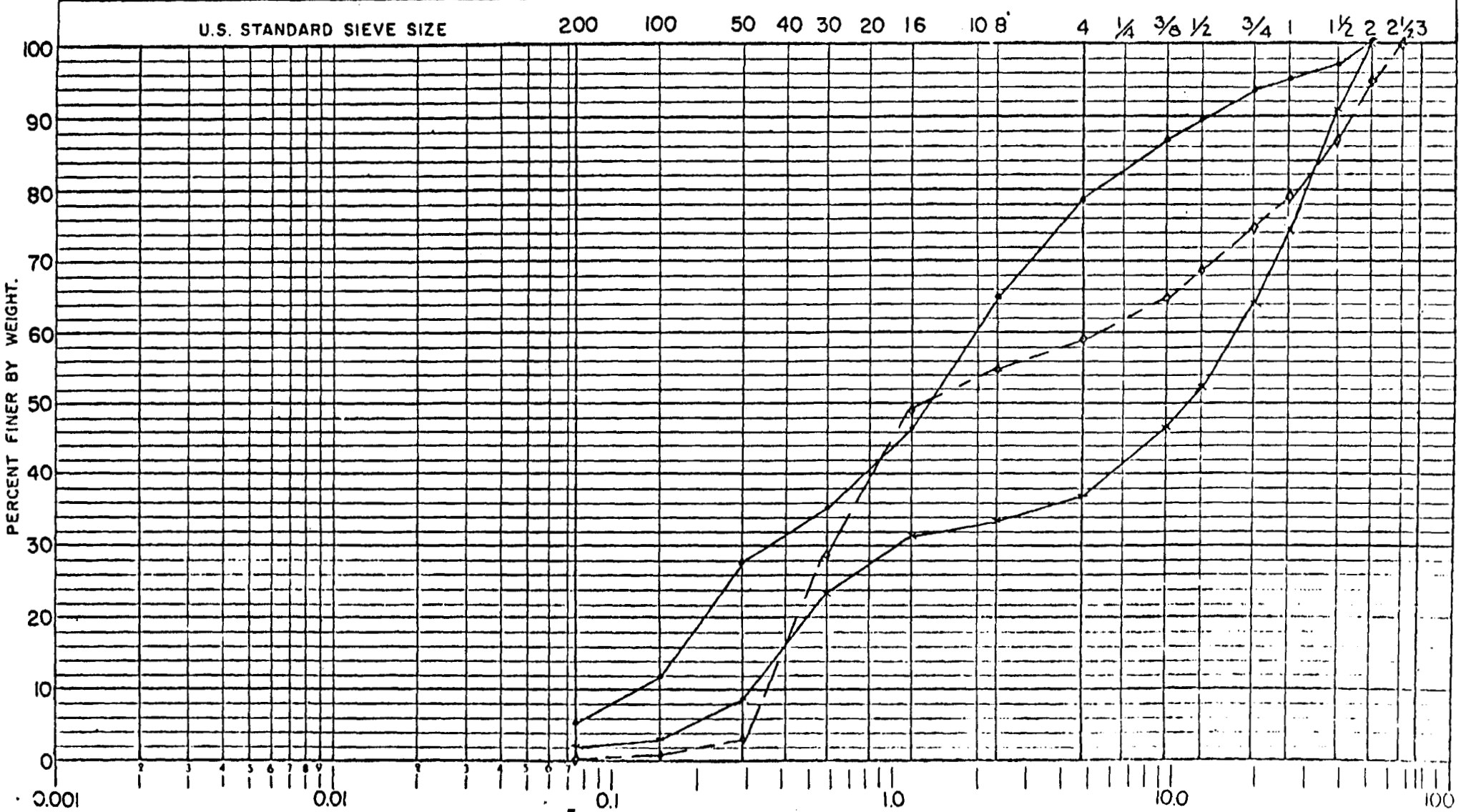
TEST BY LAB STAFF — Nov 21 1963

DISTRICT - Fort St John

SAMPLED BY - D. St. Thomas

METHOD - CAT & BACKHOE

PETITOT RIVER PIT



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT *PETITOT River Pit*

TEST BY Lab Staff.

SAMPLED BY: D. St Thomas.

DISTRICT: Ft St John.

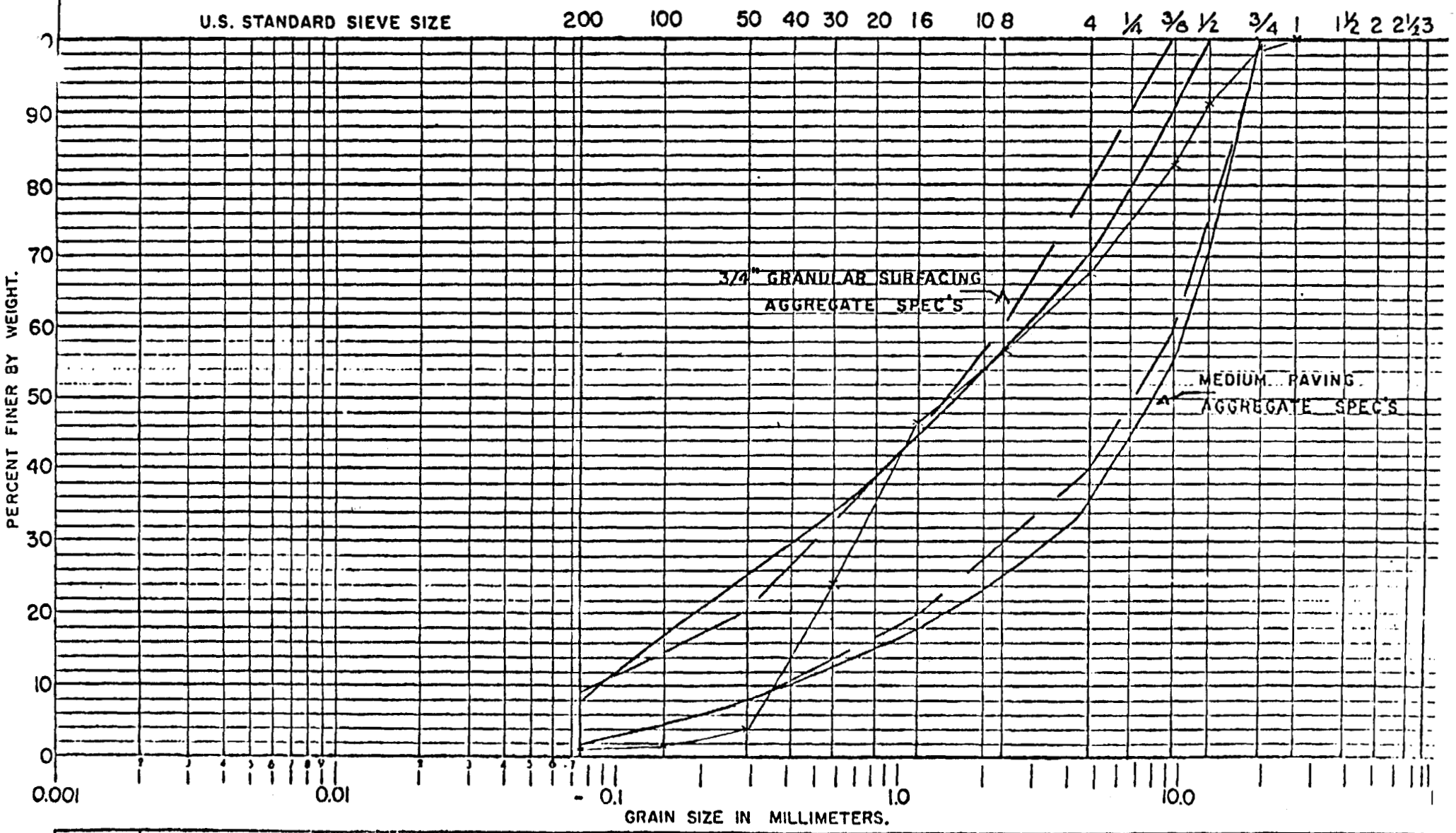
Method Cat & Backhoe.

Fort Nelson.- Petitot Pit.

Dec 13 1973

X→ 111"12 1"1. D:R½-10' K1231

3/4" Lab Crush.



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

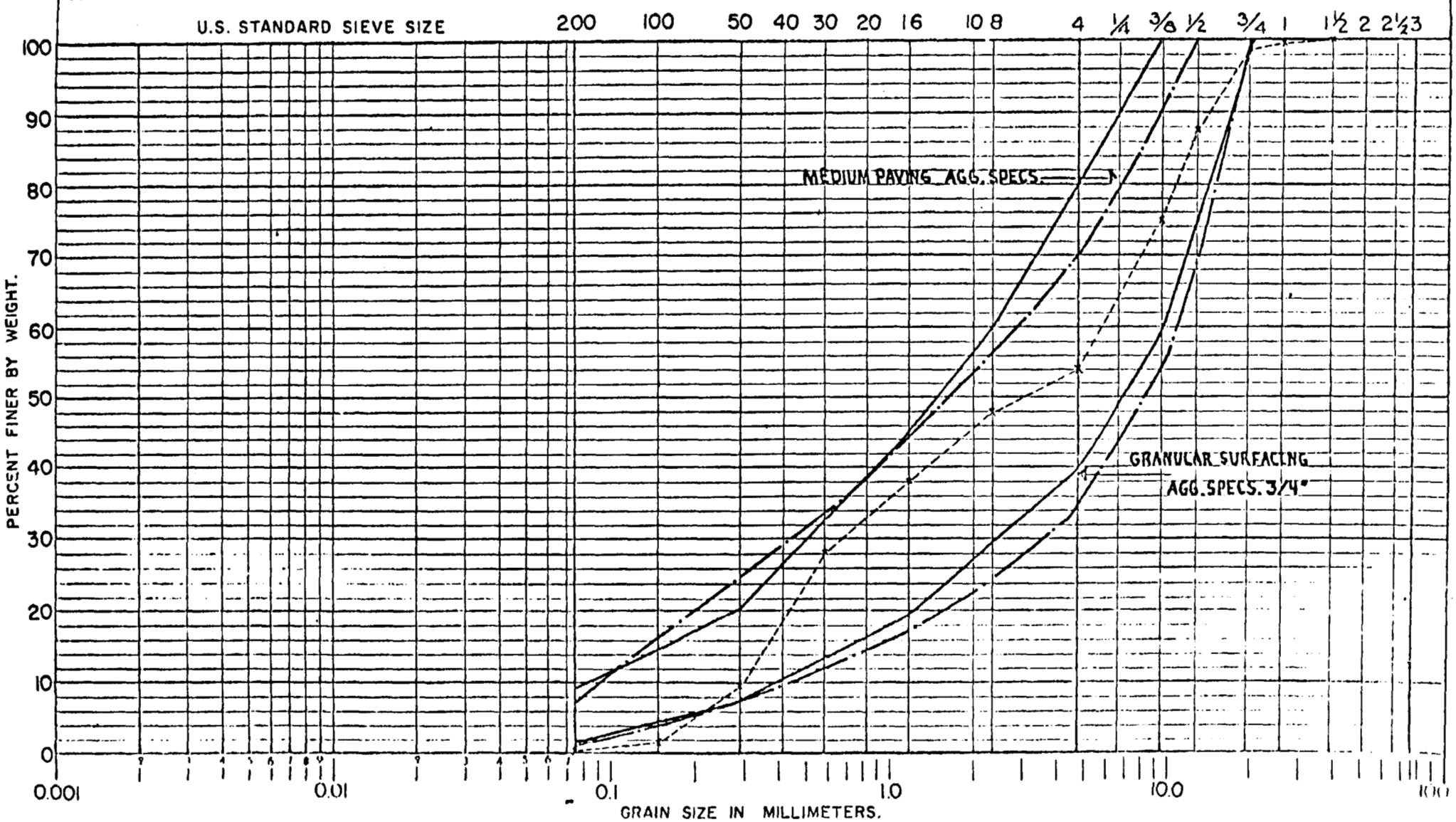
GRADING CURVES

PROJECT: PETITOT RIVER PIT

TEST BY: LAB STAFF
DISTRICT: FT. ST. JOHN
SAMPLED: D. ST. THOMAS
METHOD: CAT.
3/4" LAB CRUSH

DECEMBER /18/73

TH#4 BAG# X2296



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse

Province of British Columbia
DEPARTMENT OF HIGHWAYS
TESTING BRANCH

GRADING CURVES

PROJECT FT. NELSON- PETITOT RIVER

TEST BY P.O. KAN

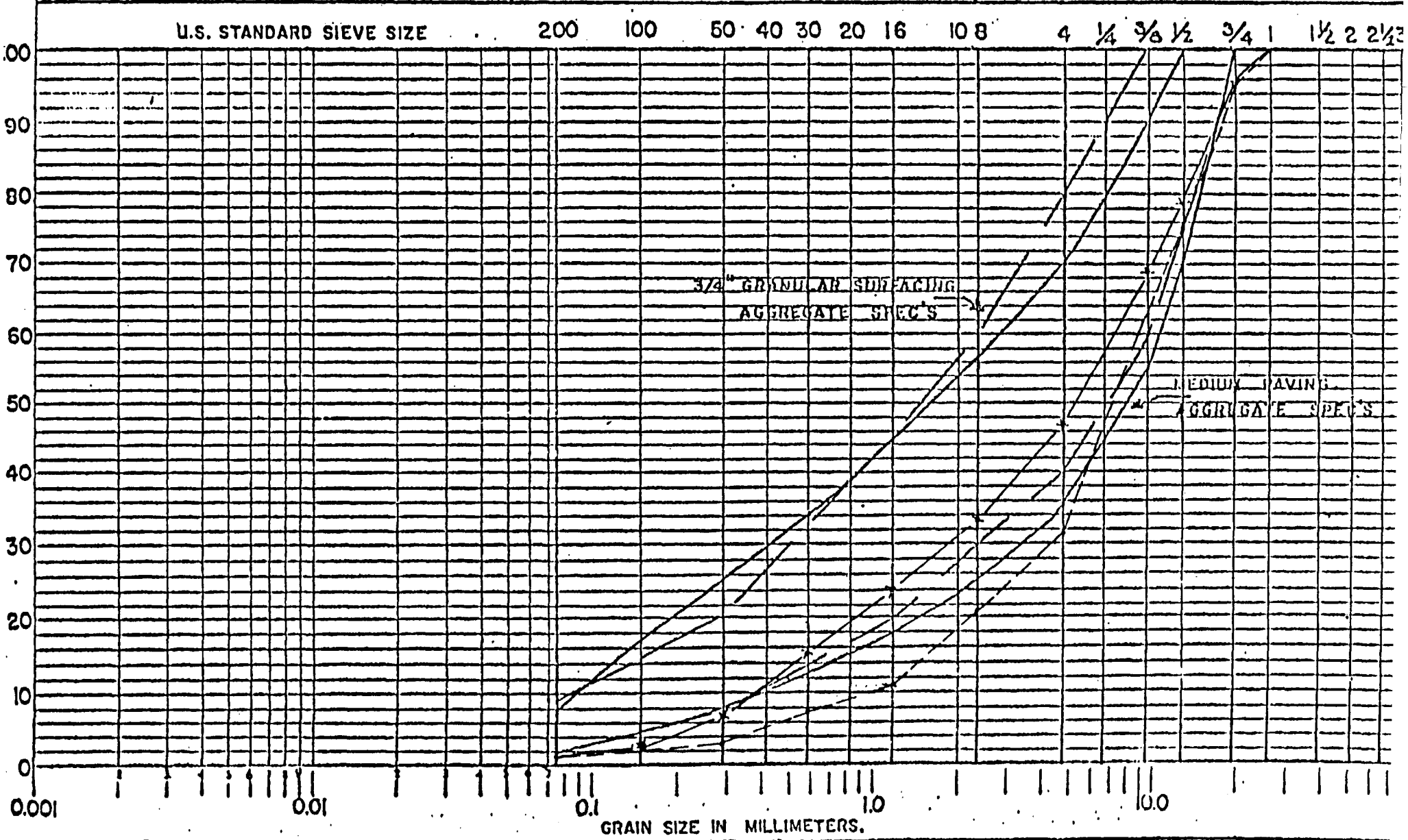
SAMPLED BY: D ST. THOMAS

DISTRICT: FT. ST. JOHN

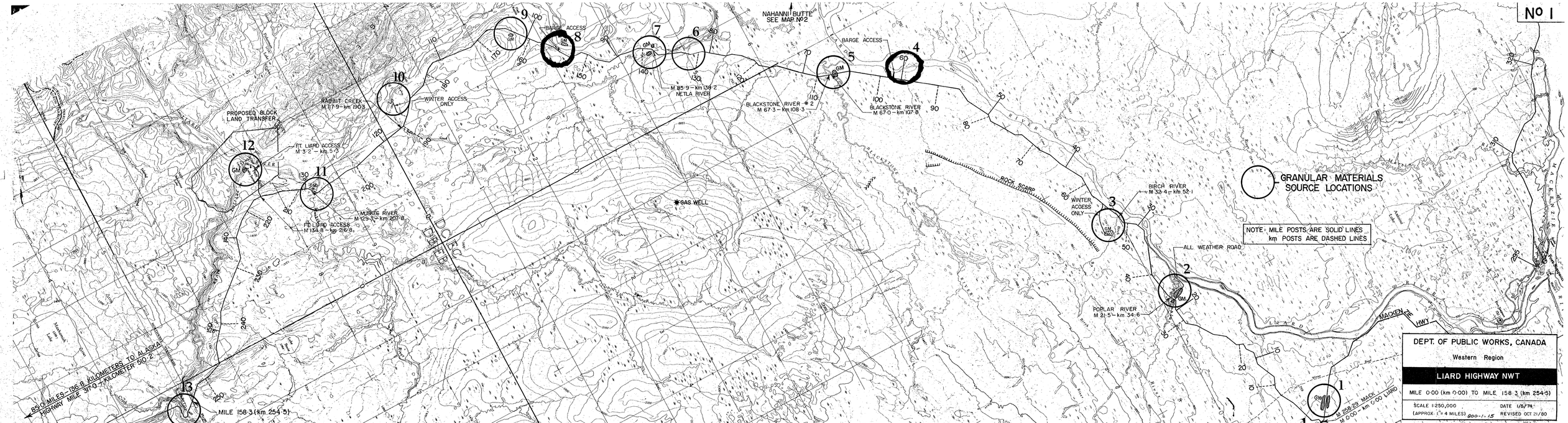
PETITOT RIVER PIT

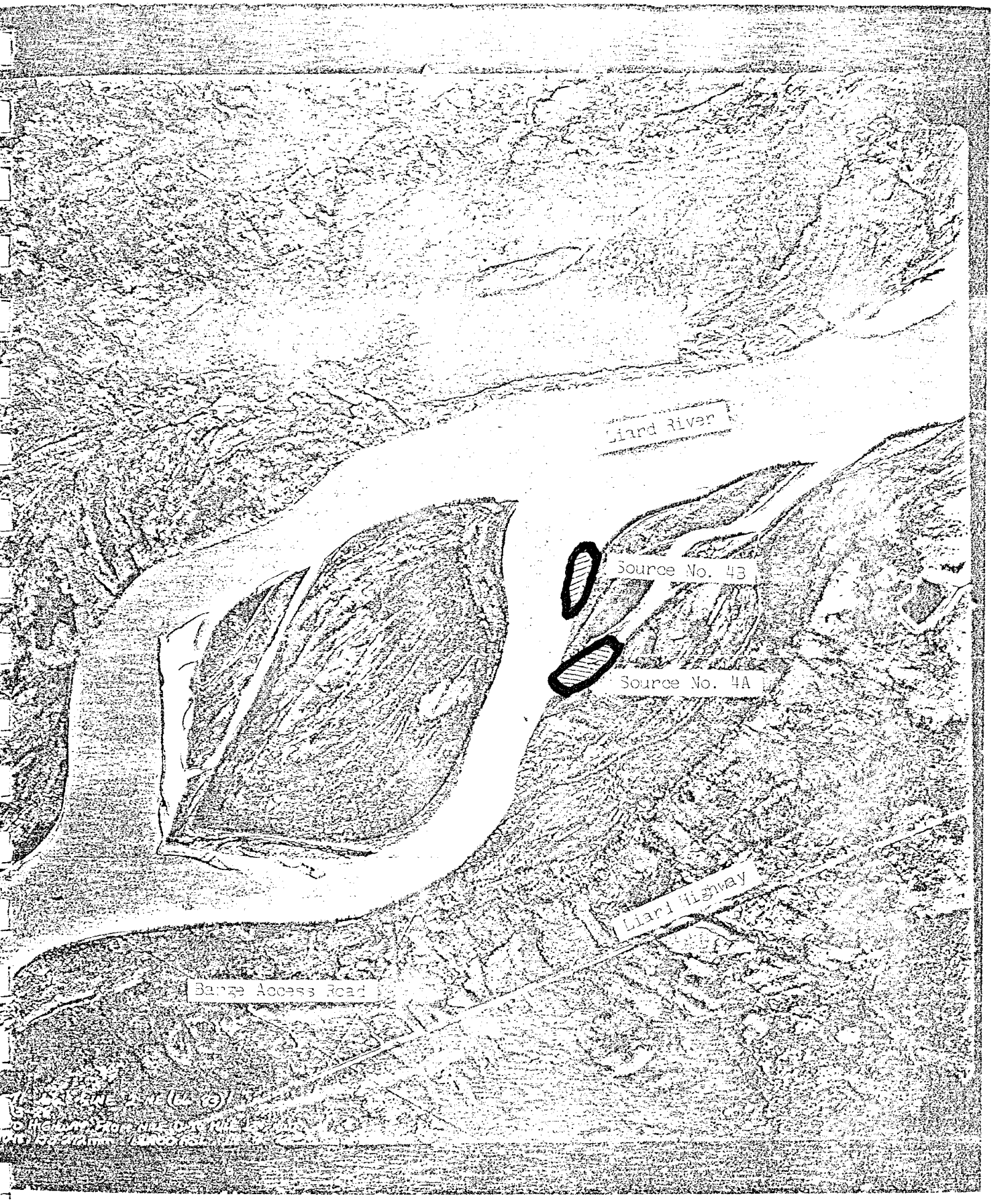
T.P. "S" 1½'-8' ---------

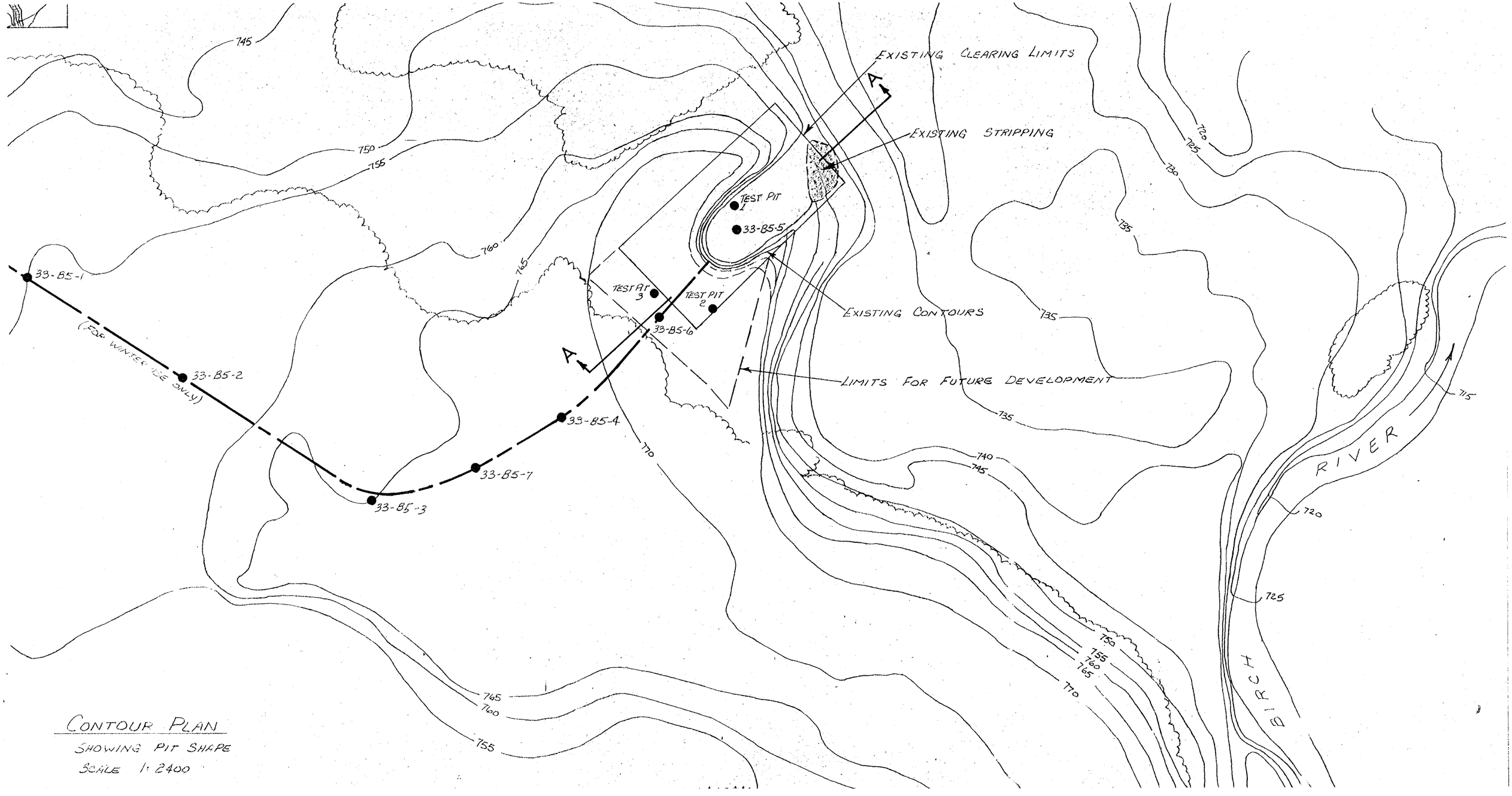
T.P. "Y" 7'-15' ---x---



CLAY	SILT	SAND			GRAVEL	
		Fine	Medium	Coarse	Fine	Coarse


No 1
GRANULAR MATERIALS SOURCE LOCATIONS
NOTE: MILE POSTS ARE SOLID LINES
km POSTS ARE DASHED LINES
DEPT. OF PUBLIC WORKS, CANADA
Western Region
LIARD HIGHWAY NWT
MILE 0·00 (km 0·00) TO MILE 158·3 (km 254·5)
SCALE 1:250,000
(APPROX. 1" = 4 MILES)
DATE 1/5/74
REVISED OCT 21/80
800-1-15
NAHANNI BUTTE SEE MAP No 2
BARGE ACCESS
WINTER ACCESS ONLY
RABBIT CREEK M 117·9 – km 190·3
PROPOSED BLOCK LAND TRANSFER
FT LIARD ACCESS M 3·2 – km 5·3
FT LIARD ACCESS M 134·8 – km 216·8
MUSKEG RIVER M 129·3 – km 207·8
NETLA RIVER M 85·9 – km 138·2
BLACKSTONE RIVER M 67·3 – km 108·3
BLACKSTONE RIVER M 67·0 – km 107·8
GAS WELL
ROCK SCARP
BIRCH RIVER M 32·4 – km 52·1
ALL WEATHER ROAD
POPLAR RIVER M 21·5 – km 34·6
MACKENZIE HWY
M 258·23 MACK
M 0·00 – km 0·00 LIARD
MILE 158·3 (km 254·5)
99·0 MILES 159·3 KILOMETERS TO ALASKA HIGHWAY MILE 377·0 KILOMETER 607·2


Liard River
Source No. 4B
Source No. 4A
Liard Highway
Barge Access Road



CONTOUR PLAN

SHOWING PIT SHAPE

SCALE 1: 2400

AREA 11B
EXISTING PIT
EXISTING GRAVEL
AREA 207-398
AREA 11A
MUSKEG RIVER
PROJECT LINE
210-1018
210-1028 BK
207-C
207-6
207-5
207-8
207-9
207-10
207-11
207-12
207-13
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207-47

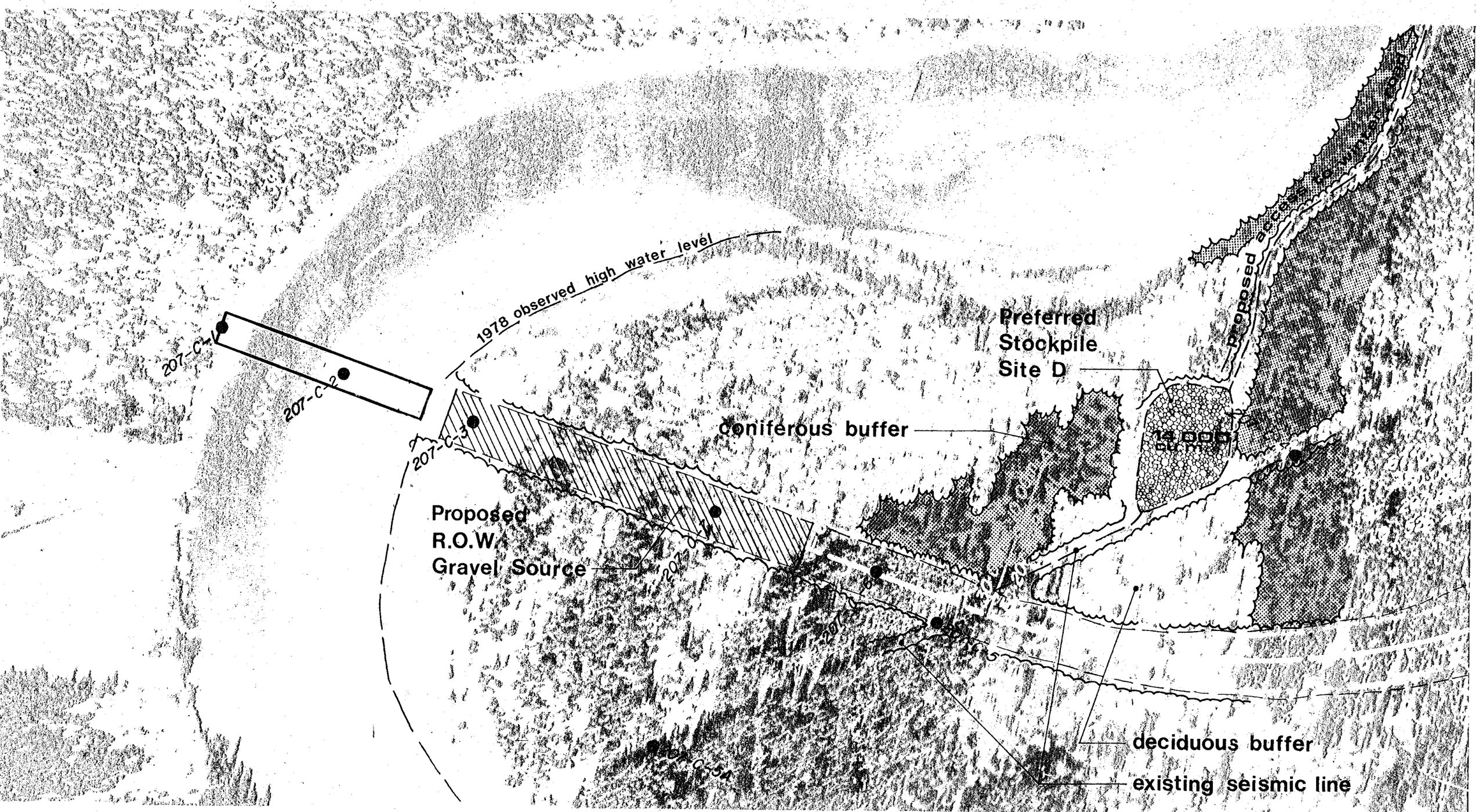
1978 observed high water level
Preferred
Stockpile
Site D
Proposed access to Wineskin Road
207-C-1
207-C-2
207-C-3
coniferous buffer
14 000
cu m
Proposed
R.O.W.
Gravel Source
deciduous buffer
existing seismic line

PLATE No. 3

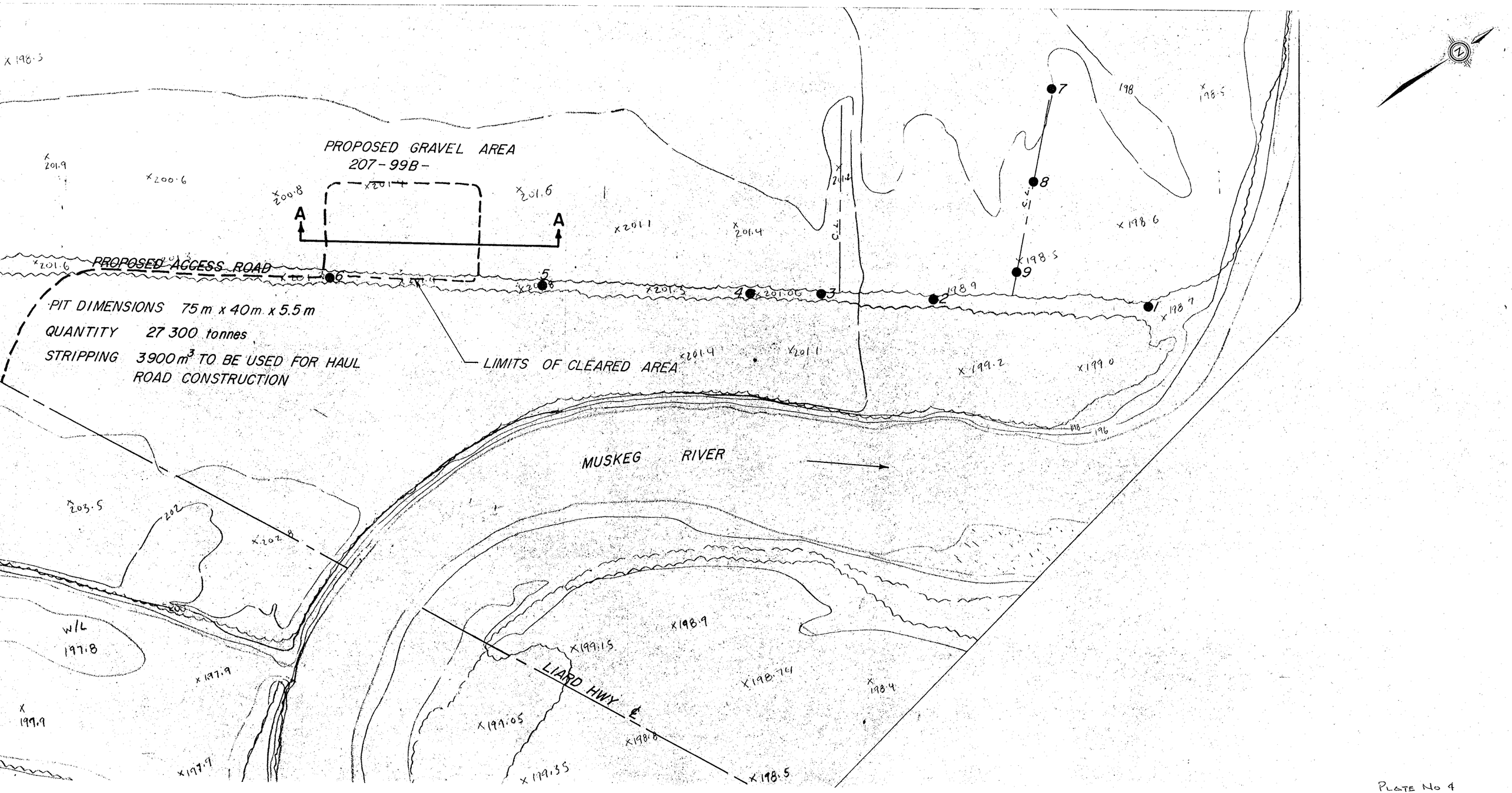
PROPOSED GRAVEL AREA
207-99B-
A
A
PROPOSED ACCESS ROAD
PIT DIMENSIONS 75 m x 40 m x 5.5 m
QUANTITY 27 300 tonnes
STRIPPING 3900 m³ TO BE USED FOR HAUL ROAD CONSTRUCTION
LIMITS OF CLEARED AREA
MUSKEG RIVER
LIARD HWY ℄
W/L 197.8
1
2
3
4
5
6
7
8
9

PLATE No 4