

SUBSURFACE TESTING REPORT  
LOWER BLACKSTONE RIVER  
DEMPSTER HIGHWAY MILE 72.8  
YUKON TERRITORY

GR-05-048



PUBLIC WORKS  
CANADA

**PACIFIC REGION**

**WHITEHORSE, YUKON TERRITORY**



SUBSURFACE TESTING REPORT  
LOWER BLACKSTONE RIVER  
DEMPSTER HIGHWAY MILE 72.8  
YUKON TERRITORY

GEOTECHNICAL & MATERIAL SERVICES  
WHITEHORSE, YUKON



DRILL LOG SUMMARIES

JULY 1969 INVESTIGATION

**PUBLIC WORKS, CANADA**

PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON

Diamond Drill NX Rod

**DRILLING RECORD**

Dempster Hwy. Mile 72.8

PROJECT Lower Blackstone River

HOLE NO. 69-4-1 DATE July 21-30 /69

LOCATION See Plan

ELEVATION \_\_\_\_\_ DEPTH 50'

| DRILLING NOTES |     |   | SAMPLE RECORD |  |     |      |          |         |
|----------------|-----|---|---------------|--|-----|------|----------|---------|
| DEPTH FROM TO  |     | SOIL DESCRIPTION  | DEPTH FROM TO |  | NO. | TYPE | % RECOV. | N VALUE |
| 0              | 1½' | Organic material  |               |  |     |      |          |         |
| 1½'            | 50' | Silty sand, grey<br>Gravel & cobbles, some boulders<br>up to 2' |               |  |     |      |          |         |

**PUBLIC WORKS, CANADA**

**PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON**

Diamond Drill NX Rod

**DRILLING RECORD**

Dempster Hwy. Mile 72.8  
 PROJECT Lower Blackstone River  
 HOLE NO. 69-4-2 DATE July 21-30 /69  
 LOCATION See Plan  
 ELEVATION \_\_\_\_\_ DEPTH 50'

| DRILLING NOTES |      |   | SAMPLE RECORD |    |     |      |          |         |
|----------------|------|---|---------------|----|-----|------|----------|---------|
| DEPTH FROM     | TO   | SOIL DESCRIPTION  | DEPTH FROM    | TO | NO. | TYPE | % RECOV. | N VALUE |
| 0              | 1/2' | Organic material  |               |    |     |      |          |         |
| 1/2'           | 50'  | Silty sand (grey) Gravel & cobbles<br>Cobbles 3-8"<br>Some boulders up to 1 1/2'<br>Medium to coarse gravel |               |    |     |      |          |         |

**PUBLIC WORKS, CANADA**

**PACIFIC REGION  
DESIGN / CONSTRUCTION  
CIVIL ENGINEERING - YUKON**

Diamond Drill NX Rod

**DRILLING RECORD**

PROJECT Dempster Hwy. Mile 72.8  
Lower Blackstone River  
HOLE NO. 69-4-3 DATE July 21-30/69  
LOCATION See Plan  
ELEVATION \_\_\_\_\_ DEPTH 25'

| DRILLING NOTES |     |   | SAMPLE RECORD |    |     |      |          |              |
|----------------|-----|---|---------------|----|-----|------|----------|--------------|
| DEPTH FROM     | TO  | SOIL DESCRIPTION  | DEPTH FROM    | TO | NO. | TYPE | % RECOV. | N VALUE      |
| 0'             | 1'  | Organic material & sand (silty)   |               |    |     |      |          |              |
| 1'             | 7'  | Fine to coarse sand, brown<br>(Frozen)  | 5'            | 6' | -   | SPT  | -        | 81<br>for 6" |
| 7'             | 25' | Fine to coarse sand & gravel<br>Sand-brown<br>Cobbles 3-8"<br>Some boulders up to 1½' |               |    |     |      |          |              |

**PUBLIC WORKS, CANADA**

**PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON**

**DRILLING RECORD**

PROJECT Dempster Hwy. Mile 72.8  
Lower Blackstone River  
 HOLE NO. 69-4-4 DATE July 21-30/69  
 LOCATION See Plan  
 ELEVATION \_\_\_\_\_ DEPTH 25'

Diamond Drill NX Rod

| DRILLING NOTES |     |  | SAMPLE RECORD |    |     |      |          |         |
|----------------|-----|--|---------------|----|-----|------|----------|---------|
| DEPTH FROM     | TO  | SOIL DESCRIPTION   | DEPTH FROM    | TO | NO. | TYPE | % RECOV. | N VALUE |
| 0              | ½'  | Organic material   |               |    |     |      |          |         |
| ½'             | 5'  | Sand (brown)   |               |    |     |      |          |         |
| 5'             | 25' | Fine to coarse sand (brown)<br>Some fine to medium gravel<br>Cobbles 3-8"<br>Some boulders up to 1½' |               |    |     |      |          |         |

**PUBLIC WORKS, CANADA**

**PACIFIC REGION  
DESIGN / CONSTRUCTION  
CIVIL ENGINEERING - YUKON**

Diamond Drill NX Rod

**DRILLING RECORD**

DEMPSTER HWY. Mile 72.8

PROJECT Lower Blackstone River

HOLE NO. 69-4-5 DATE July 21-30 /69

LOCATION See Plan

ELEVATION \_\_\_\_\_ DEPTH 50'

| DRILLING NOTES |     |  | SAMPLE RECORD |    |     |      |          |         |
|----------------|-----|--|---------------|----|-----|------|----------|---------|
| DEPTH FROM     | TO  | SOIL DESCRIPTION   | DEPTH FROM    | TO | NO. | TYPE | % RECOV. | N VALUE |
| 0              | ½'  | Organic material (Reddish brown)   |               |    |     |      |          |         |
| ½'             | 2'  | Sand & gravel. Cobbles 3-5"<br>Frozen  |               |    |     |      |          |         |
| 2'             | 4'  | Sand & clay mixture. Clay-grey to light brown, frozen                                |               |    |     |      |          |         |
| 4'             | 17' | Gravel & silty sand.<br>Cobbles 3-6"   |               |    |     |      |          |         |
| 17'            | 50' | Silty, sandy gravel<br>Cobbles 3-6"<br>Some boulders up to 2½'<br>Very hard drilling |               |    |     |      |          |         |

**PUBLIC WORKS, CANADA**

**PACIFIC REGION  
DESIGN / CONSTRUCTION  
CIVIL ENGINEERING - YUKON**

Diamond Drill NX Rod

**DRILLING RECORD**

Dempster Hwy. Mile 72.8

PROJECT Lower Blackstone River

HOLE NO. 69-4-6 DATE July 21-30 /69

LOCATION See Plan

ELEVATION \_\_\_\_\_ DEPTH 50'

DRILLING NOTES

SAMPLE RECORD

| DEPTH FROM TO |     | SOIL DESCRIPTION  | DEPTH FROM TO |    | NO. | TYPE | % RECOV. | N VALUE |
|---------------|-----|---|---------------|----|-----|------|----------|---------|
| FROM          | TO  |   | FROM          | TO |     |      |          |         |
| 0             | 4'  | Silty, sandy clay with some organic material mixed in.<br>Frozen  |               |    |     |      |          |         |
| 4'            | 25' | Sand & gravel. Cobbles 3-5"<br>Water loss at 12'  |               |    |     |      |          |         |
| 25'           | 35' | Gravel, some sand. Cobbles 3-5"<br>Some boulders up to 2½'<br>Hard layer from 28'-29'<br>Water loss stops at 29½' |               |    |     |      |          |         |
| 35'           | 50' | Sand & gravel. Cobbles 3-8"<br>Some boulders up to 2½'<br>Very hard drilling                                      |               |    |     |      |          |         |

DRILL LOG SUMMARIES

AUG. 1974 INVESTIGATION

PUBLIC WORKS, CANADA

PACIFIC REGION  
DESIGN / CONSTRUCTION  
CIVIL ENGINEERING - YUKON

RECORD OF SUBSURFACE EXPLORATION PROGRAM  
DRILLING AND LABORATORY TESTING  
WHITEHORSE QUALITY CONTROL CENTER, WHITEHORSE, Y.T.

PROJECT Dempster Hwy. Reloc. Mi. 0-78  
HOLE NO 1 DATE Aug. 1-20/74  
LOCATION Blackstone River Mile 72.8  
ELEVATION \_\_\_\_\_ SHEET 1 OF 1

| DRILLING NOTES         |   | LABORATORY TESTING         |                       |             |                   |                            |                        |            |          |                                 |                  |  |   |                    |                 |                    |                        |                     |           |       |      |  |
|------------------------|---|----------------------------|-----------------------|-------------|-------------------|----------------------------|------------------------|------------|----------|---------------------------------|------------------|--|---|--------------------|-----------------|--------------------|------------------------|---------------------|-----------|-------|------|--|
| HOLE DEPTH <u>105'</u> |   | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | DEGREE OF SATURATION % | VOID RATIO | POROSITY | DRY DENSITY <u>LBS. CU. FT.</u> | SPECIFIC GRAVITY | STANDARD PENETRATION RESISTANCE <u>BLOWS FT.</u> | UNCONFINED COMPRESSIVE STRENGTH <u>LBS. SQ. FT.</u> | CONSISTENCY LIMITS |                 |                    | UNIFIED CLASSIFICATION | MECHANICAL ANALYSIS |           |       |      |  |
| TYPE OF DRILL          | WATER LEVEL   | SAMPLE DEPTH (FT)          | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            |                        |            |          |                                 |                  |  |   | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % |                        | MAXIMUM SIZE        | % PASSING |       |      |  |
| DEPTH (FT)             | SOIL DESCRIPTION  | FROM                       | TO                    |             |                   |                            |                        |            |          |                                 |                  |  |   |                    |                 |                    | NO. 200                | NO. 40              | NO. 10    | NO. 4 |      |  |
| 3 1/2'                 | ORGANIC<br>- sandy silt, trace clay                     |                            |                       |             |                   |                            |                        |            |          |                                 |                  |  |   |                    |                 |                    |                        |                     |           |       |      |  |
|                        | GRAVEL<br>- silty sandy gravel<br>- boulders & cobbles  | 9                          | 10 1/2                | 1           | SPT               | 8171                       |                        |            |          |                                 | 100/3"           |  |   | N.P.               | SW              | 1 1/2"             | -                      | 2.7                 | 17.0      | 52.8  | 71.2 |  |
|                        | NOTE: Permafrost from 3 3/4'                            | 14                         | 15 1/2                | 2           | SPT               | 8172                       |                        |            |          |                                 | 50/3"            |  |   | N.P.               | GP-GM           | 1 1/2"             | -                      | 10.6                | 20.3      | 30.9  | 36.2 |  |
|                        |   | 19                         | 20 1/2                | 3           | SPT               | 8173                       |                        |            |          |                                 | 50/3"            |  |   | N.P.               | SW-SM           | 1"                 | -                      | 7.2                 | 22.0      | 60.7  | 78.2 |  |
|                        |   | 30                         | 31 1/2                | 4           | SPT               | 8174                       |                        |            |          |                                 | 50/4"            |  |   | N.P.               | GW              | 1"                 | -                      | 2.6                 | 9.7       | 24.7  | 37.2 |  |
|                        |   | 40                         | 41 1/2                | 5           | SPT               | 8175                       |                        |            |          |                                 | 150/3"           |  |   | N.P.               | SW-SM           | 1 1/2"             | -                      | 6.2                 | 16.7      | 44.8  | 61.2 |  |
|                        |   | 50                         | 51 1/2                | 6           | SPT               | 8176                       |                        |            |          |                                 | 50/2 3/4"        |  |   | N.P.               | GW              | 1 1/2"             | -                      | 3.3                 | 12.4      | 34.6  | 52.4 |  |
|                        |   | 67                         | 68 1/2                | 7           | SPT               | 8177                       |                        |            |          |                                 | 100/3 1/2"       |  |   | N.P.               | GW              | 1 1/2"             | -                      | 4.4                 | 14.1      | 32.8  | 50.3 |  |
| 81'                    | SILTY SAND<br>- odd cobble<br>- sand, med to fine grain |                            |                       |             |                   |                            |                        |            |          |                                 |                  |  |   |                    |                 |                    |                        |                     |           |       |      |  |
| 105'                   | BOTTOM OF HOLE  |                            |                       |             |                   |                            |                        |            |          |                                 |                  |  |   |                    |                 |                    |                        |                     |           |       |      |  |

DRILLED FIELD LOGGED FIELD TESTED LABORATORY RECORDED LABORATORY PLOTTED LABORATORY DRAFTING LABORATORY PROJECT NO. 1.3  
 BY P.A. DATE Aug. 74 BY P.A. DATE Aug. 74 BY Souza DATE Dec. 74 BY B.F. DATE JAN. 75 DRWG. NO. \_\_\_\_\_ BY \_\_\_\_\_ DATE \_\_\_\_\_

LABORATORY TESTING REPORTS

AUG. 1974 INVESTIGATION

GRAIN SIZE ANALYSIS

| IEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|-----------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1/2"      | 100.0             | #40        | 17.0              |            |                   |            |                   |
| 1"        | 94.7              | 100        | 5.0               |            |                   |            |                   |
| 3/4"      | 90.3              | 200        | 2.7               |            |                   |            |                   |
| 1/2"      | 85.3              |            |                   |            |                   |            |                   |
| 3/8"      | 83.9              |            |                   |            |                   |            |                   |
| 1/4"      | 71.2              |            |                   |            |                   |            |                   |
| 10        | 52.8              |            |                   |            |                   |            |                   |
| 20        | 30.3              |            |                   |            |                   |            |                   |

| MPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|----------|----------------|------|------|------|---------|------|
|          | SW             |      |      |      | N.P.    |      |
|          | GRAVELLY SAND  |      |      |      |         |      |

CRUSH COUNT %

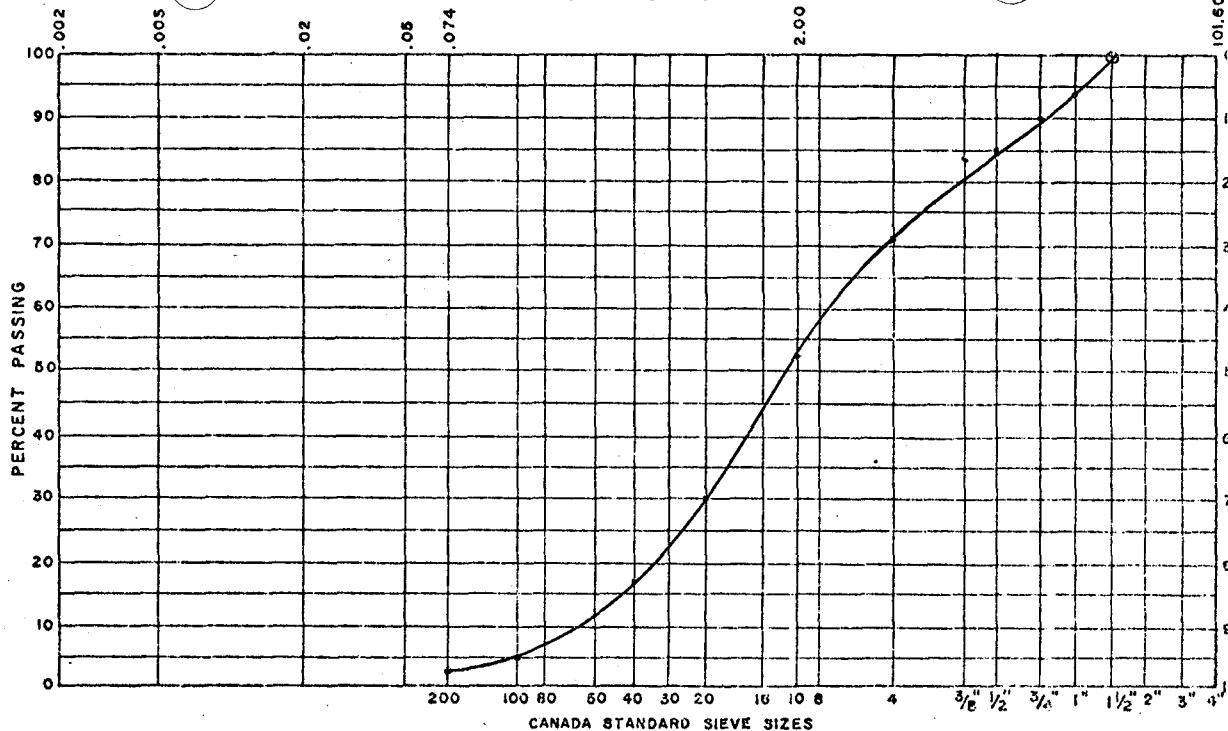
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMASTER HWY.  
 HOLE NO. 1  
 DEPTH 9'-10 1/2' FIELD NO. 1  
 SAMPLE TYPE SPT

LAB. NO.  
**8171**

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | 1-8-74                          |
|                      | DATE RECEIVED 26-8-74           |
|                      | DATE RECORDED 14-1-75           |
|                      | TESTED BY <u>RIK JEJH KT SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2"       | 100.0             | #40        | 20.3              |
| 1          | 68.7              | 100        | 13.0              |
| 3/4        | 68.7              | 200        | 10.6              |
| 1/2        | 48.4              |            |                   |
| 3/8        | 42.8              |            |                   |
| #4         | 36.2              |            |                   |
| #10        | 30.4              |            |                   |
| #20        | 25.2              |            |                   |

| SAMPLE NO. | CLASSIFICATION     | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|--------------------|------|------|------|---------|------|
|            | SP-GM              |      |      | N.P. |         |      |
|            | SILTY-SANDY GRAVEL |      |      |      |         |      |

CRUSH COUNT %

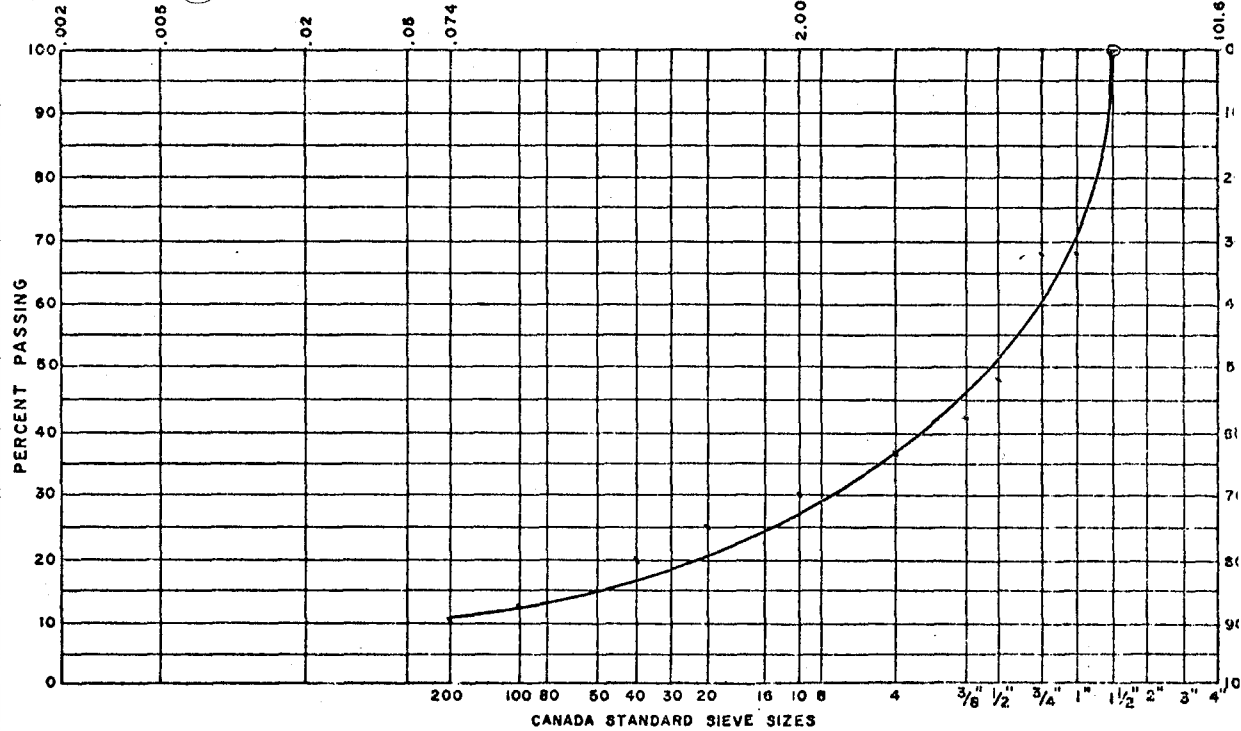
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| JB-ROUND   |  |
| VGULAR     |  |
| JB-ANGULAR |  |
| ATS        |  |
| EDLES      |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMPSTER HWY.  
 HOLE NO. 1  
 DEPTH 14'-15 1/2' FIELD NO. 2  
 SAMPLE TYPE SPT.

LAB. NO.  
**8172**

LABORATORY'S REMARKS

DATE SAMPLED 1-8-74  
 DATE RECEIVED 26-8-74  
 DATE RECORDED 14-1-75  
 TESTED BY RK JE JA BS SE

GRAIN SIZE ANALYSIS

| EVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT |
|-------------|-------------------------|---------------|-------------------------|---------------|-------------------------|---------------|-------------------------|
| 11          | 100.0                   | #100          | 11.2                    |               |                         |               |                         |
| 7/4         | 91.5                    | 200           | 7.2                     |               |                         |               |                         |
| 1/2         | 91.5                    |               |                         |               |                         |               |                         |
| 1/8         | 88.5                    |               |                         |               |                         |               |                         |
| 4           | 78.2                    |               |                         |               |                         |               |                         |
| 0           | 60.7                    |               |                         |               |                         |               |                         |
| 0           | 34.9                    |               |                         |               |                         |               |                         |
| 0           | 22.0                    |               |                         |               |                         |               |                         |

| MPLE<br>NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT.<br>%W | S.G. |
|-------------|----------------|------|------|------|------------|------|
|             | SW-SM          |      |      | 12.1 |            |      |
|             | GRAVELLY SAND  |      |      |      |            |      |

CRUSH COUNT %

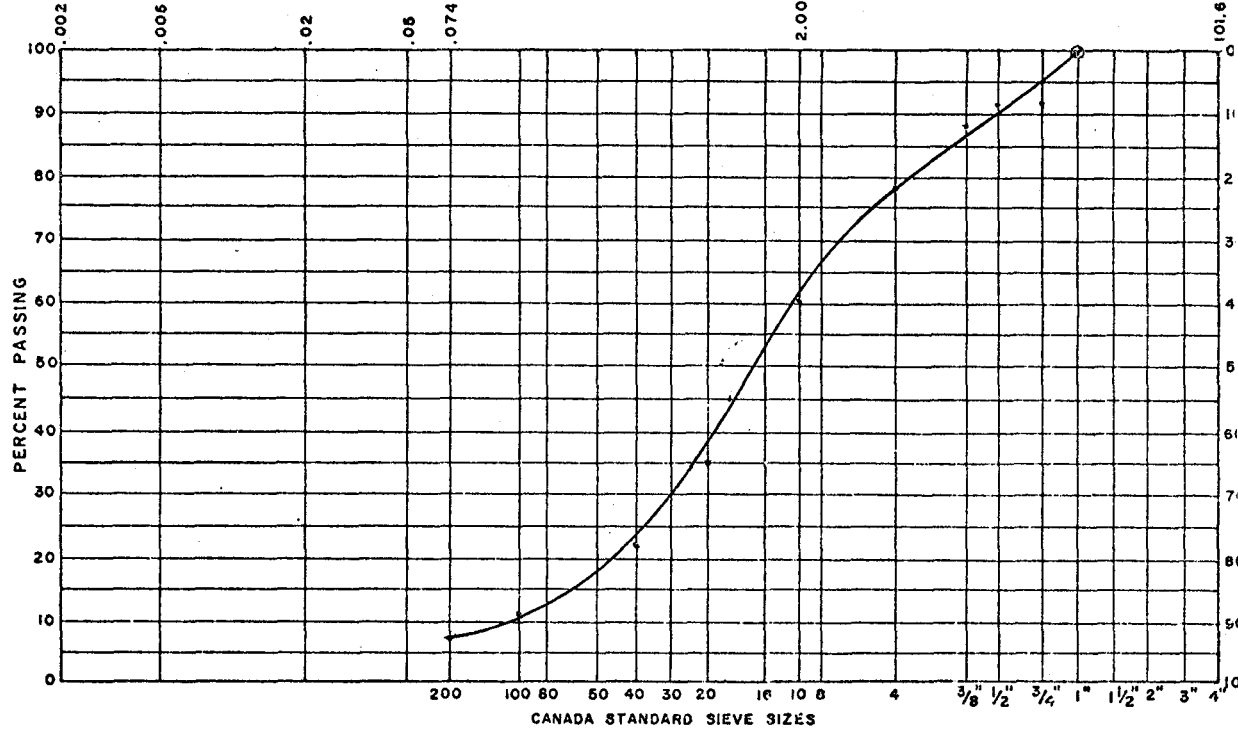
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| THERS         |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| JB-ROUND   |  |
| NGULAR     |  |
| JB-ANGULAR |  |
| LATS       |  |
| EDLES      |  |

GRAIN SIZE IN MILLIMETERS



CLAY SILT SAND GRAVEL

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMETER HWY.  
 HOLE NO. 1  
 DEPTH 19'-20 1/2' FIELD NO. 3  
 SAMPLE TYPE SPT.

LAB. NO.  
8173

LABORATORY'S REMARKS

DATE SAMPLED 1-8-74  
 DATE RECEIVED 26-8-74  
 DATE RECORDED 14-1-75  
 TESTED BY RK JE JH JS SE

GRAIN SIZE ANALYSIS

| EVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT |
|-------------|-------------------------|---------------|-------------------------|---------------|-------------------------|---------------|-------------------------|
| 11          | 100.0                   | #100          | 4.5                     |               |                         |               |                         |
| 3/4         | 84.2                    | 200           | 2.6                     |               |                         |               |                         |
| 1/2         | 65.0                    |               |                         |               |                         |               |                         |
| 3/8         | 53.6                    |               |                         |               |                         |               |                         |
| 1/4         | 37.2                    |               |                         |               |                         |               |                         |
| 10          | 24.7                    |               |                         |               |                         |               |                         |
| 20          | 14.6                    |               |                         |               |                         |               |                         |
| 40          | 9.7                     |               |                         |               |                         |               |                         |

| MPLE<br>NO. | CLASSIFICATION     | L.L. | P.L. | P.I. | NAT.<br>%W | S.G. |
|-------------|--------------------|------|------|------|------------|------|
|             | GW                 |      |      |      | N.P.       |      |
|             | WELL GRADED GRAVEL |      |      |      |            |      |

CRUSH COUNT %

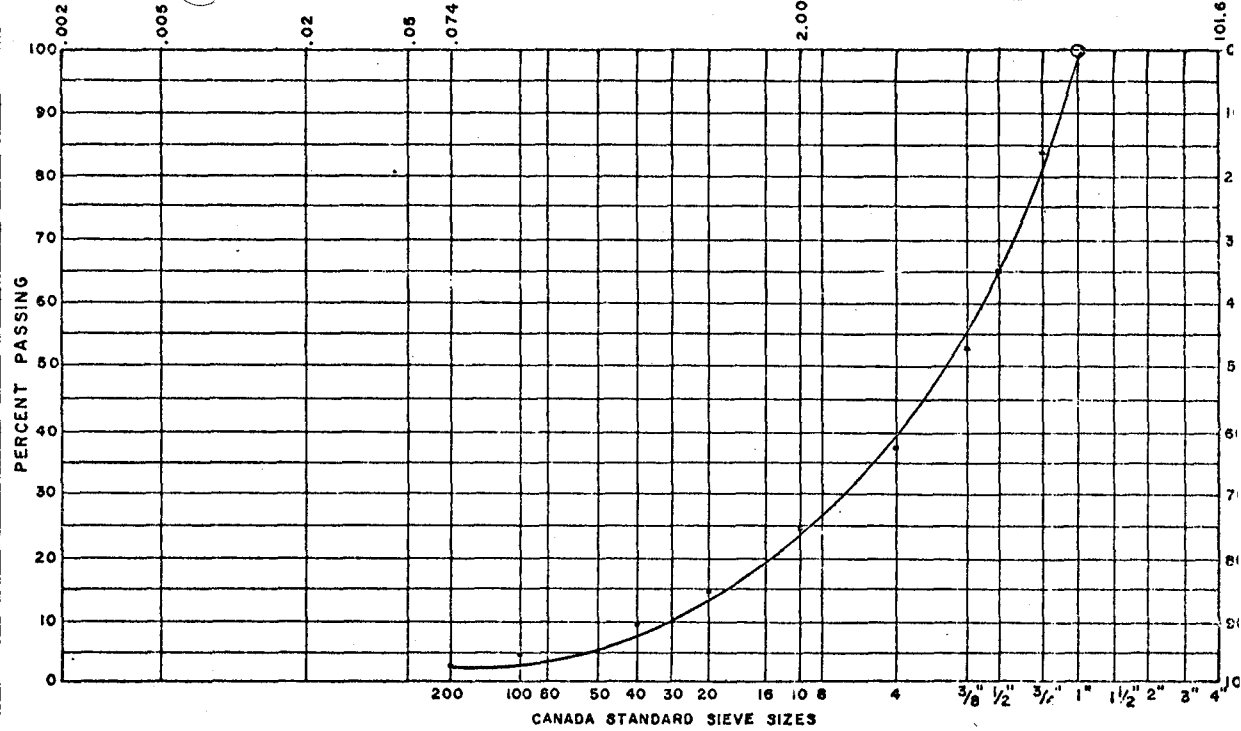
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| JB-ROUND   |  |
| NGULAR     |  |
| JB-ANGULAR |  |
| ATS        |  |
| EDLES      |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMPSTER HWY.  
 HOLE NO. 1  
 DEPTH 30'-31' FIELD NO. 4  
 SAMPLE TYPE SPT.

LAB. NO.  
**8174**

| LABORATORY'S REMARKS | DATE SAMPLED                   |
|----------------------|--------------------------------|
|                      | 1-8-74                         |
|                      | DATE RECEIVED 26-8-74          |
|                      | DATE RECORDED 14-1-75          |
|                      | TESTED BY <u>RK JEDH BT SE</u> |

GRAIN SIZE ANALYSIS

| EVE<br>SIZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT |
|-------------|-------------------------|---------------|-------------------------|
| 1/2"        | 100.0                   | #40           | 16.7                    |
| 1           | 94.6                    | 100           | 8.5                     |
| 3/4         | 88.7                    | 200           | 6.2                     |
| 1/2         | 84.6                    |               |                         |
| 1/8         | 78.2                    |               |                         |
| #4          | 61.9                    |               |                         |
| 10          | 44.8                    |               |                         |
| 20          | 27.0                    |               |                         |

| MPLE<br>NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT.<br>%W | S.G. |
|-------------|----------------|------|------|------|------------|------|
|             | SW-SM          |      |      |      | N.P.       |      |
|             | GRAVELLY SAND  |      |      |      |            |      |

CRUSH COUNT %

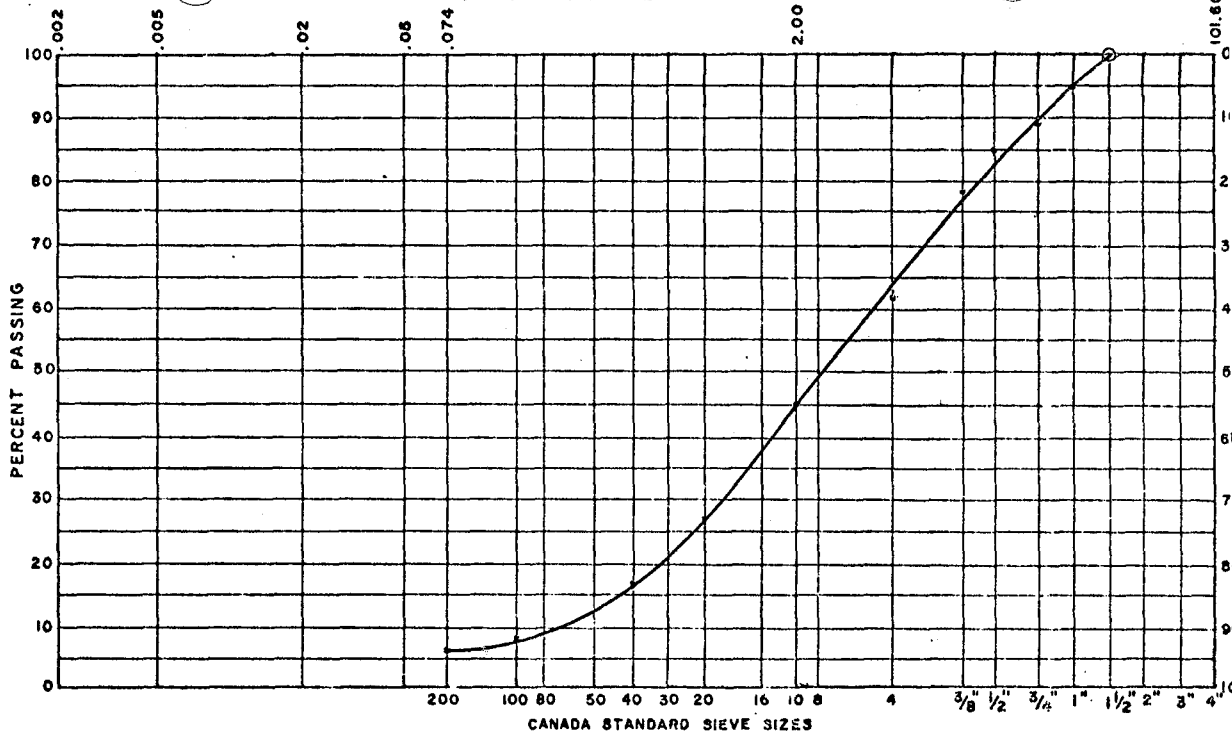
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| THERS         |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| JB-ROUND   |  |
| NGULAR     |  |
| JB-ANGULAR |  |
| -ATS       |  |
| EDLES      |  |

GRAIN SIZE IN MILLIMETERS



CANADA STANDARD SIEVE SIZES

|      |      |      |        |
|------|------|------|--------|
| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 JEMPSTER HWY.  
 HOLE NO. 1  
 DEPTH 40'-4 1/2' FIELD NO. 5  
 SAMPLE TYPE S.P.T.

LAB. NO.  
8175

| LABORATORY'S REMARKS | DATE SAMPLED                  |
|----------------------|-------------------------------|
|                      | <u>1-8-74</u>                 |
|                      | <u>26-8-74</u>                |
|                      | <u>14-1-75</u>                |
|                      | TESTED BY <u>RKJE DJ BJSE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2"       | 10.0              | #40        | 12.4              |
| 1"         | 92.5              | 100        | 5.3               |
| 3/4"       | 77.3              | 200        | 3.3               |
| 1/2"       | 70.3              |            |                   |
| 3/8"       | 64.8              |            |                   |
| #4         | 52.4              |            |                   |
| 10         | 34.6              |            |                   |
| 20         | 20.4              |            |                   |

| IMPLE NO.           | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|---------------------|----------------|------|------|------|---------|------|
|                     | GW             |      |      | N.P. |         |      |
| GRAVEL-SAND MIXTURE |                |      |      |      |         |      |

CRUSH COUNT %

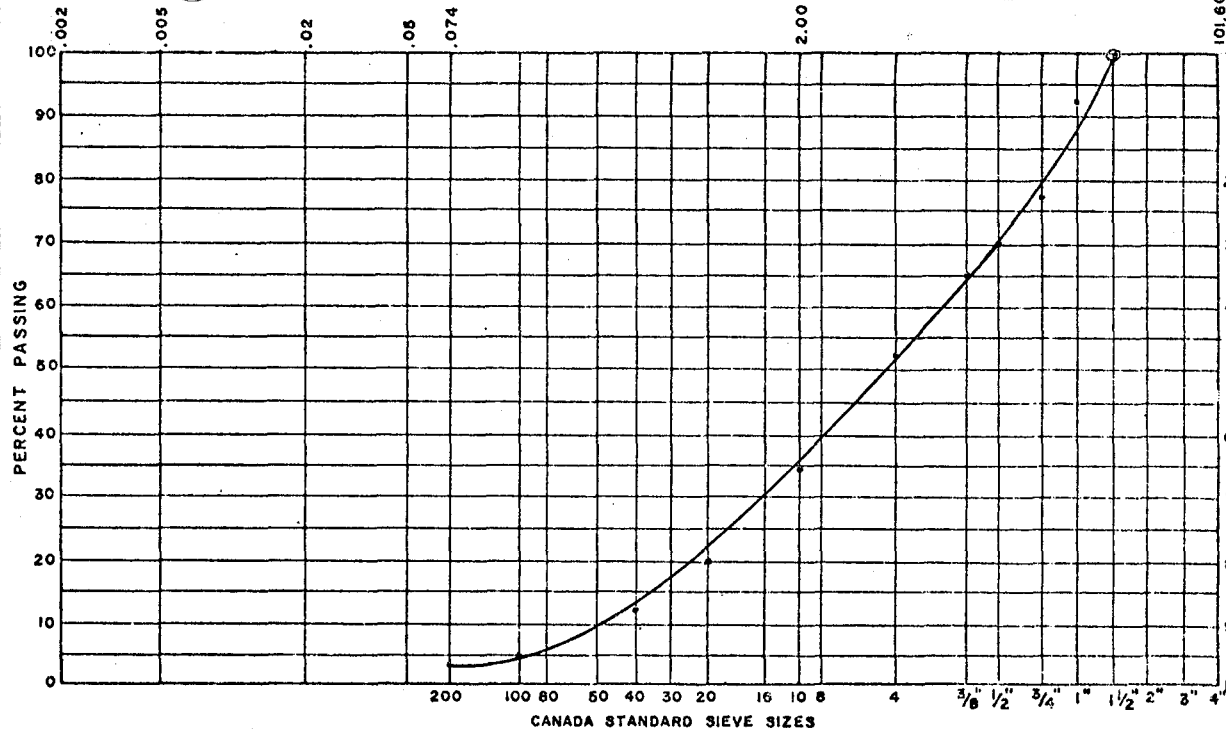
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY      SILT      SAND      GRAVEL

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMPSTER HWY.  
 HOLE NO. 1  
 DEPTH 50'-51 1/2' FIELD NO. 6  
 SAMPLE TYPE SPT.

LAB. NO.  
**8176**

LABORATORY'S REMARKS

DATE SAMPLED 1-8-74  
 DATE RECEIVED 26-8-74  
 DATE RECORDED 14-1-75  
 TESTED BY RK JE JH BJ SE

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2"       | 100.0             | #40        | 14.1              |
| 1"         | 91.8              | 100        | 7.0               |
| 3/4"       | 82.0              | 200        | 4.4               |
| 1/2"       | 72.2              |            |                   |
| 3/8"       | 65.6              |            |                   |
| 3/4"       | 50.3              |            |                   |
| 1"         | 32.8              |            |                   |
| 2"         | 20.3              |            |                   |

| SAMPLE NO. | CLASSIFICATION     | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|--------------------|------|------|------|---------|------|
|            | SW                 |      |      |      | N.P.    |      |
|            | WELL GRADED GRAVEL |      |      |      |         |      |

CRUSH COUNT

%

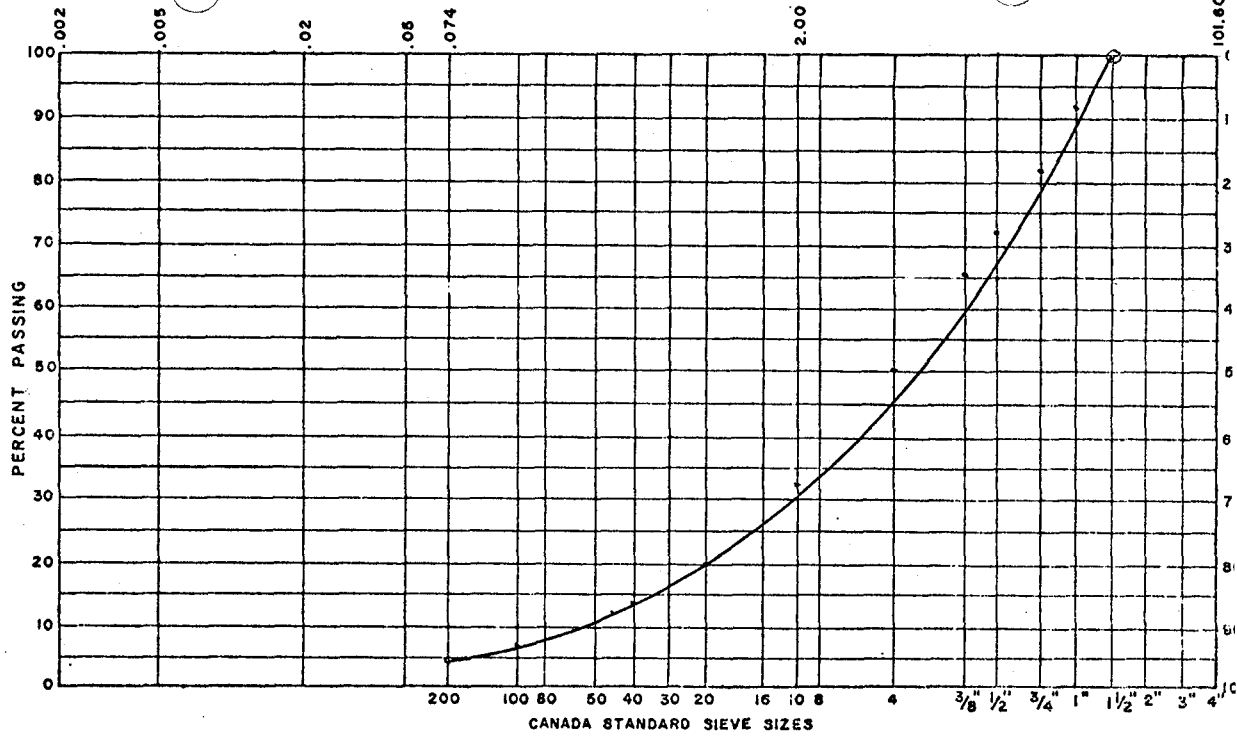
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| THERS         |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| JB-ROUND   |  |
| NGULAR     |  |
| JB-ANGULAR |  |
| .ATS       |  |
| EDLES      |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT BLACKSTONE RIVER BRIDGE  
 LOCATION MILE 72.8 DEMPSTER HWY.  
 HOLE NO. 1  
 DEPTH 67'-68 1/2' FIELD NO. 7  
 SAMPLE TYPE SPT.

LAB. NO.  
**8177**

LABORATORY'S REMARKS

|  |
|--|
|  |
|  |
|  |
|  |
|  |
|  |

DATE SAMPLED 1-8-74  
 DATE RECEIVED 26-8-74  
 DATE RECORDED 14-1-75  
 TESTED BY RK JE DA BJ SE

DRILL LOG SUMMARIES

1974 CENTERLINE RELOCATION INVESTIGATION

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

FIELD ENG. CONSULTANT

DATE DRILLED. 13-2-74

AIRPHOTO NO.

CHAINAGE. STA. 631+35

OFFSET. E

TECH. P. ANDRETTI

RIG. T-40L

SURFACE DRAINAGE.

VEGETATION. THICK SMALL BRUSH

ELEV. 1 1/2' Below Road

TEST HOLE

105

MILE

72

REMARKS

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT |  |
|--------------|---------------|-------------|------------|------------------------|---------------------|--|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|--|
|              |               |             |            |                        |                     |  |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |  |
|              |               |             |            |                        |                     |  |                         |                 |              | %                   | %    | %    | %      |                                  |  |
| 2            |               |             |            |                        |                     | GRAVEL<br>- from 0'-5' - road fill moist |                         |                 | 2            |                     |      |      |        |                                  |  |
| 4            |               |             |            |                        |                     | - below 6', saturated, few fines         |                         |                 | 4            |                     |      |      |        |                                  |  |
| 6            |               |             |            |                        |                     |  |                         |                 | 6            |                     |      |      |        |                                  |  |
| 8            |               |             |            |                        |                     |  |                         |                 | 8            |                     |      |      |        |                                  |  |
| 10           |               |             |            |                        |                     |  |                         |                 | 10           |                     |      |      |        |                                  |  |
| 12           |               |             |            |                        |                     |  |                         |                 | 12           |                     |      |      |        |                                  |  |
| 14           |               |             |            |                        |                     |  |                         |                 | 14           |                     |      |      |        |                                  |  |
| 16           |               |             |            |                        |                     |  |                         |                 | 16           |                     |      |      |        |                                  |  |
| 18           |               |             |            |                        |                     |  |                         |                 | 18           |                     |      |      |        |                                  |  |
| 20           |               |             |            |                        |                     |  |                         |                 | 20           |                     |      |      |        |                                  |  |
| 22           |               |             |            |                        |                     |  |                         |                 | 22           |                     |      |      |        |                                  |  |
| 24           |               |             |            |                        |                     |  |                         |                 | 24           |                     |      |      |        |                                  |  |
| 26           |               |             |            |                        |                     |  |                         |                 | 26           |                     |      |      |        |                                  |  |
| 28           |               |             |            |                        |                     |  |                         |                 | 28           |                     |      |      |        |                                  |  |

18 1/2'  
BOTTOM OF HOLE.

6' WATER TABLE

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

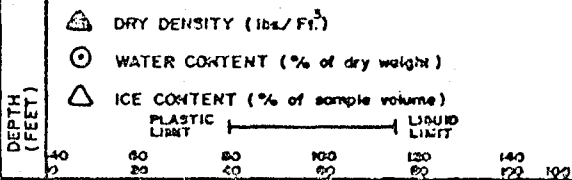
DRILL HOLE REPORT

SITE: *RELOCATION* Mile 078

|                              |                              |                   |                              |                         |
|------------------------------|------------------------------|-------------------|------------------------------|-------------------------|
| FIELD ENG. <i>CONDUCTANT</i> | DATE DRILLED. <i>13-2-74</i> | AIRPHOTO NO.      | CHAINAGE. <i>STA. 626+50</i> | OFFSET. <i>10' LEFT</i> |
| TECH. <i>F. [unclear]</i>    | RIG. <i>[unclear]</i>        | SURFACE DRAINAGE. | VEGETATION.                  | ELEV.                   |

TEST HOLE  
**106**

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS               |
|--------------|---------------|-------------|------------|------------------------|---------------------|---------------------------------------|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|-----------------------|
|              |               |             |            |                        |                     |                                       |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |                       |
|              |               |             |            |                        |                     |                                       |                         |                 |              | %                   | %    | %    | %      |                                  |                       |
|              |               |             |            |                        |                     | FEAT                                  |                         |                 |              |                     |      |      |        |                                  |                       |
| 2            | 76            | <i>Gr</i>   |            |                        | ML                  | CLAYEY SANDY SILT<br>- moist to wet   |                         |                 | 2            |                     | 15   | 71   | 14     | -                                | Moist<br>P.I. - TRACE |
| 4            |               |             |            |                        |                     |                                       |                         |                 | 4            |                     |      |      |        |                                  |                       |
| 6            | 77            | <i>Gr</i>   |            |                        | GM                  | GRAVELLY SILTY SAND<br>- moist to wet |                         |                 | 6            |                     |      | 47   | 20     |                                  | Moist<br>P.I. - TRACE |
| 8            |               |             |            |                        |                     | GRAVEL - wet                          |                         |                 | 8            |                     |      |      |        |                                  | high % sand + silt    |
| 10           |               |             |            |                        |                     | REFUSAL                               |                         |                 | 10           |                     |      |      |        |                                  |                       |
| 12           |               |             |            |                        |                     |                                       |                         |                 | 12           |                     |      |      |        |                                  |                       |
| 14           |               |             |            |                        |                     |                                       |                         |                 | 14           |                     |      |      |        |                                  |                       |
| 16           |               |             |            |                        |                     |                                       |                         |                 | 16           |                     |      |      |        |                                  |                       |
| 18           |               |             |            |                        |                     |                                       |                         |                 | 18           |                     |      |      |        |                                  |                       |
| 20           |               |             |            |                        |                     |                                       |                         |                 | 20           |                     |      |      |        |                                  |                       |
| 22           |               |             |            |                        |                     |                                       |                         |                 | 22           |                     |      |      |        |                                  |                       |
| 24           |               |             |            |                        |                     |                                       |                         |                 | 24           |                     |      |      |        |                                  |                       |
| 26           |               |             |            |                        |                     |                                       |                         |                 | 26           |                     |      |      |        |                                  |                       |
| 28           |               |             |            |                        |                     |                                       |                         |                 | 28           |                     |      |      |        |                                  |                       |



DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

FIELD ENG. CONSULTANT: DATE DRILLED: V3-D-74 AIRPHOTO NO.: CHAINAGE: Sta. 638+50 OFFSET: E

TECH. P. ANDRIETAH RIG. T340L SURFACE DRAINAGE: VEGETATION: SPARSE BUSH ELEV. SAME AS ROAD TEST HOLE: 107

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS |
|--------------|---------------|-------------|------------|------------------------|---------------------|-----------------------------------|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|---------|
|              |               |             |            |                        |                     |                                   |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |         |
|              |               |             |            |                        |                     |                                   |                         |                 |              | %                   | %    | %    | %      |                                  |         |
| 2            |               |             |            |                        |                     | GRAVEL - road fill                |                         |                 | 2            |                     |      |      |        |                                  |         |
| 4            |               |             |            |                        |                     |                                   |                         |                 | 4            |                     |      |      |        |                                  |         |
| 6            |               |             |            |                        |                     | 6' PLAT - subgrade                |                         |                 | 6            |                     |      |      |        |                                  |         |
| 7            |               |             |            |                        |                     | 7' SANDY SILT                     |                         |                 | 7            |                     |      |      |        |                                  |         |
| 8            | 78            | ESG         |            |                        | ML                  | 8 1/2' GRAVELLY CLAYEY SANDY SILT |                         |                 | 8            | I                   |      | 19   | 46     | 18                               | 17      |
| 10           |               |             |            |                        |                     | 10' GRAVEL - fine                 | F                       | Vr-Vs           | 10           |                     |      |      |        |                                  |         |
| 11           |               |             |            |                        |                     | 11' REFUSAL                       |                         |                 | 11           |                     |      |      |        |                                  |         |
| 12           |               |             |            |                        |                     |                                   |                         |                 | 12           |                     |      |      |        |                                  |         |
| 14           |               |             |            |                        |                     |                                   |                         |                 | 14           |                     |      |      |        |                                  |         |
| 16           |               |             |            |                        |                     |                                   |                         |                 | 16           |                     |      |      |        |                                  |         |
| 18           |               |             |            |                        |                     |                                   |                         |                 | 18           |                     |      |      |        |                                  |         |
| 20           |               |             |            |                        |                     |                                   |                         |                 | 20           |                     |      |      |        |                                  |         |
| 22           |               |             |            |                        |                     |                                   |                         |                 | 22           |                     |      |      |        |                                  |         |
| 24           |               |             |            |                        |                     |                                   |                         |                 | 24           |                     |      |      |        |                                  |         |
| 26           |               |             |            |                        |                     |                                   |                         |                 | 26           |                     |      |      |        |                                  |         |
| 28           |               |             |            |                        |                     |                                   |                         |                 | 28           |                     |      |      |        |                                  |         |

5 1/2 WATER TABLE

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

FIELD ENG. CONSULTANT: DATE DRILLED: 13-9-71 AIRPHOTO NO.: CHAINAGE: STA. 643+95 OFFSET: E

TECH. P. ANDERSON: RIG. B40L SURFACE DRAINAGE: VEGETATION: ELEV. SURF. AS ROAD

|              |               |             |            |                        |                     |                  |                         |                 |              |                                      |                                 |                                  |                     |      |      |        |                                  |           |         |
|--------------|---------------|-------------|------------|------------------------|---------------------|------------------|-------------------------|-----------------|--------------|--------------------------------------|---------------------------------|----------------------------------|---------------------|------|------|--------|----------------------------------|-----------|---------|
| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | DEPTH (FEET) | DRY DENSITY (lbs./ft. <sup>3</sup> ) | WATER CONTENT (% of dry weight) | ICE CONTENT (% of sample volume) | GRAIN-SIZE ANALYSIS |      |      |        | RELATIVE THAWED MOISTURE CONTENT | TEST HOLE | REMARKS |
|              |               |             |            |                        |                     |                  |                         |                 |              |                                      |                                 |                                  | CLAY                | SILT | SAND | GRAVEL |                                  | MILE      |         |
|              |               |             |            |                        |                     |                  |                         |                 |              |                                      |                                 |                                  | %                   | %    | %    | %      |                                  |           |         |

|    |    |     |  |  |    |                                     |   |       |    |  |  |  |  |    |    |   |    |      |
|----|----|-----|--|--|----|-------------------------------------|---|-------|----|--|--|--|--|----|----|---|----|------|
| 2  |    |     |  |  |    | GRAVEL - road fill                  |   |       | 2  |  |  |  |  |    |    |   |    |      |
| 4  |    |     |  |  |    | PEAT ± ORG. SILT                    |   |       | 4  |  |  |  |  |    |    |   |    |      |
| 6  | 79 | BAG |  |  | ML | CLAYEY SILT WITH GRAVEL + SOME SAND | F | Vr-Vs | 6  |  |  |  |  | 13 | 71 | 4 | 12 | FREE |
| 8  | 80 | BAG |  |  | ML | SILTY CLAY                          |   | Vc-Vr | 8  |  |  |  |  | 17 | 54 | 7 | 22 | FREE |
| 10 |    |     |  |  |    | BOTTOM OF HOLE                      |   | Vs    | 10 |  |  |  |  |    |    |   |    |      |
| 12 |    |     |  |  |    |                                     |   | Vc-Vr | 12 |  |  |  |  |    |    |   |    |      |
| 14 |    |     |  |  |    |                                     |   |       | 14 |  |  |  |  |    |    |   |    |      |
| 16 |    |     |  |  |    |                                     |   |       | 16 |  |  |  |  |    |    |   |    |      |
| 18 |    |     |  |  |    |                                     |   |       | 18 |  |  |  |  |    |    |   |    |      |
| 20 |    |     |  |  |    |                                     |   |       | 20 |  |  |  |  |    |    |   |    |      |
| 22 |    |     |  |  |    |                                     |   |       | 22 |  |  |  |  |    |    |   |    |      |
| 24 |    |     |  |  |    |                                     |   |       | 24 |  |  |  |  |    |    |   |    |      |
| 26 |    |     |  |  |    |                                     |   |       | 26 |  |  |  |  |    |    |   |    |      |
| 28 |    |     |  |  |    |                                     |   |       | 28 |  |  |  |  |    |    |   |    |      |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

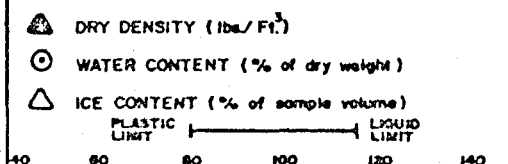
SITE: RELOCATION MILE 0-78

FIELD ENG. CONSULTANT: DATE DRILLED: 18-9-74 AIRPHOTO NO.: CHAINAGE: STA. 647+50 OFFSET: E  
TECH. P. ANDRIEZE RIG. E40L SURFACE DRAINAGE: VEGETATION: SPARSE GRASS ELEV.:

TEST HOLE: 109

MILE:

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS      |  |
|--------------|---------------|-------------|------------|------------------------|---------------------|---------------------------------------|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|--------------|--|
|              |               |             |            |                        |                     |                                       |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |              |  |
|              |               |             |            |                        |                     |                                       |                         |                 |              | %                   | %    | %    | %      |                                  |              |  |
|              |               |             |            |                        |                     | PEAT + ORGANIC                        |                         |                 |              |                     |      |      |        |                                  |              |  |
| 2            | 31            | BAG         |            |                        | ML                  | CLAYEY SANDY SILT<br>- organic layers |                         | Vr-Vs           | 2            |                     |      |      |        |                                  |              |  |
| 4            |               |             |            |                        |                     | ICE                                   | F                       | ICE             | 4            |                     |      |      |        |                                  |              |  |
| 8            | 32            | BAG         |            |                        | SM                  | SILTY GRAVELLY SAND                   |                         | Vr-Vs           | 8            |                     |      | 39   | 34     | FREE                             | P.I. - TRACE |  |
| 10           |               |             |            |                        |                     |                                       |                         |                 | 10           |                     |      |      |        |                                  |              |  |
| 12           |               |             |            |                        |                     |                                       |                         |                 | 12           |                     |      |      |        |                                  |              |  |
| 14           |               |             |            |                        |                     |                                       |                         |                 | 14           |                     |      |      |        |                                  |              |  |
| 16           |               |             |            |                        |                     |                                       |                         |                 | 16           |                     |      |      |        |                                  |              |  |
| 18           |               |             |            |                        |                     |                                       |                         |                 | 18           |                     |      |      |        |                                  |              |  |
| 20           |               |             |            |                        |                     |                                       |                         |                 | 20           |                     |      |      |        |                                  |              |  |
| 22           |               |             |            |                        |                     |                                       |                         |                 | 22           |                     |      |      |        |                                  |              |  |
| 24           |               |             |            |                        |                     |                                       |                         |                 | 24           |                     |      |      |        |                                  |              |  |
| 26           |               |             |            |                        |                     |                                       |                         |                 | 26           |                     |      |      |        |                                  |              |  |
| 28           |               |             |            |                        |                     |                                       |                         |                 | 28           |                     |      |      |        |                                  |              |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
| 13   | 69   | 17   | 1      |
|      |      | 39   | 34     |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

FIELD ENG. CONSULTANT: \_\_\_\_\_ DATE DRILLED: 13-2-74 AIRPHOTO NO. \_\_\_\_\_ CHAINAGE: CS1+85 OFFSET: E  
 TECH. P. ANNUNZIETTI RIG. FAOL SURFACE DRAINAGE. \_\_\_\_\_ VEGETATION. \_\_\_\_\_ ELEV. \_\_\_\_\_

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS |             |
|--------------|---------------|-------------|------------|------------------------|---------------------|--|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|---------|-------------|
|              |               |             |            |                        |                     |  |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |         |             |
| 2            | 83            | CM          |            |                        | PT                  | PEAT<br>ICE = PEAT 1 1/2'              |                         | Vs              | 2            |                     |      |      |        | FREE                             | ORGANIC |             |
| 4            | 84            | CM          |            |                        | PT                  | PEAT<br>3'                             |                         | Vs              | 4            |                     |      |      |        | FREE                             | ORGANIC |             |
| 6            | 85            | ML          |            |                        | ML                  | CLAYEY SANDY SILT<br>5 3/4'            | F                       |                 | 6            |                     | 14   | 74   | 12     | -                                | FREE    | PI. - N.P.  |
| 8            | 86            | ML          |            |                        | ML                  | GRAVEL<br>9 1/2'<br>REFUSAL<br>10 1/2' |                         | Vx-Vc           | 8            |                     | 15   | 55   | 30     | -                                | FREE    | PI. - TRACE |
| 10           |               |             |            |                        |                     |  |                         |                 | 10           |                     |      |      |        |                                  |         |             |
| 12           |               |             |            |                        |                     |  |                         |                 | 12           |                     |      |      |        |                                  |         |             |
| 14           |               |             |            |                        |                     |  |                         |                 | 14           |                     |      |      |        |                                  |         |             |
| 16           |               |             |            |                        |                     |  |                         |                 | 16           |                     |      |      |        |                                  |         |             |
| 18           |               |             |            |                        |                     |  |                         |                 | 18           |                     |      |      |        |                                  |         |             |
| 20           |               |             |            |                        |                     |  |                         |                 | 20           |                     |      |      |        |                                  |         |             |
| 22           |               |             |            |                        |                     |  |                         |                 | 22           |                     |      |      |        |                                  |         |             |
| 24           |               |             |            |                        |                     |  |                         |                 | 24           |                     |      |      |        |                                  |         |             |
| 26           |               |             |            |                        |                     |  |                         |                 | 26           |                     |      |      |        |                                  |         |             |
| 28           |               |             |            |                        |                     |  |                         |                 | 28           |                     |      |      |        |                                  |         |             |



DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

|                       |                         |                   |                       |           |
|-----------------------|-------------------------|-------------------|-----------------------|-----------|
| FIELD ENG. CONDUCTANT | DATE DRILLED. 1952-2-14 | AIRPHOTO NO.      | CHAINAGE. STA. 655+05 | OFFSET. E |
| TECH. P. ...          | RIG. L40L               | SURFACE DRAINAGE. | VEGETATION.           | ELEV.     |

|           |     |
|-----------|-----|
| TEST HOLE | 112 |
| MILE      |     |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION                | DEPTH (FEET) | △ DRY DENSITY (lb./ft. <sup>3</sup> )<br>○ WATER CONTENT (% of dry weight)<br>△ ICE CONTENT (% of sample volume) | GRAIN-SIZE ANALYSIS |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS |      |  |  |  |  |  |  |
|--------------|---------------|-------------|------------|------------------------|---------------------|------------------|-------------------------|--------------------------------|--------------|--|---------------------|------|------|--------|----------------------------------|---------|------|--|--|--|--|--|--|
|              |               |             |            |                        |                     |                  |                         |                                |              |  | CLAY                | SILT | SAND | GRAVEL |                                  |         |      |  |  |  |  |  |  |
|              |               |             |            |                        |                     |                  |                         |                                |              | PLASTIC LIMIT  | LIQUID LIMIT        |      |      |        |                                  |         |      |  |  |  |  |  |  |
|              |               |             |            |                        |                     |                  |                         |                                |              | 40   | 80                  | 100  | 120  | 140    | 160                              | 180     | 200+ |  |  |  |  |  |  |
|              |               |             |            |                        |                     |                  |                         |                                |              | 0  | 20                  | 40   | 60   | 80     | 100                              | 120     | 140  |  |  |  |  |  |  |
| 2            |               |             |            |                        |                     | SILTY SAND       |                         |                                | 2            |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 4            |               |             |            |                        |                     |                  |                         | V <sub>r</sub> -V <sub>s</sub> | 4            |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 6            |               |             |            |                        |                     | SANDY GRAVEL     |                         |                                | 6            |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 8            |               |             |            |                        |                     | REFUSAL          |                         |                                | 8            |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 10           |               |             |            |                        |                     |                  |                         |                                | 10           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 12           |               |             |            |                        |                     |                  |                         |                                | 12           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 14           |               |             |            |                        |                     |                  |                         |                                | 14           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 16           |               |             |            |                        |                     |                  |                         |                                | 16           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 18           |               |             |            |                        |                     |                  |                         |                                | 18           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 20           |               |             |            |                        |                     |                  |                         |                                | 20           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 22           |               |             |            |                        |                     |                  |                         |                                | 22           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 24           |               |             |            |                        |                     |                  |                         |                                | 24           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 26           |               |             |            |                        |                     |                  |                         |                                | 26           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |
| 28           |               |             |            |                        |                     |                  |                         |                                | 28           |  |                     |      |      |        |                                  |         |      |  |  |  |  |  |  |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

FIELD ENG. CONSULTANT

DATE DRILLED: 12-2-74

AIRPHOTO NO.

CHAINAGE: STA. 657+05

OFFSET: E

TECH. P. ANDERSON

RIG. B40L

SURFACE DRAINAGE.

VEGETATION.

ELEV.

TEST HOLE  
113

DEPTH (FEET)  
SAMPLE NUMBER  
SAMPLE TYPE  
% RECOVERY  
PENETRATION RESISTANCE  
UNIFIED SOIL SYMBOL

SOIL DESCRIPTION

LIMITS OF FROZEN GROUND  
ICE DESCRIPTION

DEPTH (FEET)  
 ▲ DRY DENSITY (lbs/Ft<sup>3</sup>)  
 ○ WATER CONTENT (% of dry weight)  
 △ ICE CONTENT (% of sample volume)  
 PLASTIC LIMIT — LIQUID LIMIT

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

RELATIVE THAWED MOISTURE CONTENT

MILE

REMARKS

| DEPTH (FEET) | SOIL DESCRIPTION          | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | DEPTH (FEET) | DRY DENSITY (lbs/Ft <sup>3</sup> ) | WATER CONTENT (% of dry weight) | ICE CONTENT (% of sample volume) | CLAY (%) | SILT (%) | SAND (%) | GRAVEL (%) | RELATIVE THAWED MOISTURE CONTENT | REMARKS |
|--------------|---------------------------|-------------------------|-----------------|--------------|------------------------------------|---------------------------------|----------------------------------|----------|----------|----------|------------|----------------------------------|---------|
| 0            | SAND                      |                         |                 | 0            |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 2            | - clean, dry, med. grain  |                         |                 | 2            |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 4            | ----- 4 1/2'              |                         |                 | 4            |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 6            | GRAVELLY SAND             |                         |                 | 6            |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 8            | - dry, some coarse gravel |                         |                 | 8            |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 10           | ----- 10'                 |                         |                 | 10           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 12           | GRAVEL                    |                         |                 | 12           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 14           | - coarse                  |                         |                 | 14           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 16           | - moist to dry,           |                         |                 | 16           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 18           | ----- 13'                 |                         |                 | 18           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 20           |                           |                         |                 | 20           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 22           |                           |                         |                 | 22           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 24           |                           |                         |                 | 24           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 26           |                           |                         |                 | 26           |                                    |                                 |                                  |          |          |          |            |                                  |         |
| 28           |                           |                         |                 | 28           |                                    |                                 |                                  |          |          |          |            |                                  |         |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

FIELD ENG. CONSULTANT: \_\_\_\_\_ DATE DRILLED: 12-2-74 AIRPHOTO NO. \_\_\_\_\_ CHAINAGE STA. 659+80 OFFSET: 0  
TECH. P. AMMERTZ RIG. PAOL SURFACE DRAINAGE. \_\_\_\_\_ VEGETATION. 5' HIGH WILLOW ELEV. \_\_\_\_\_

TEST HOLE 114

MILE \_\_\_\_\_

REMARKS

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT |      |
|--------------|---------------|-------------|------------|------------------------|---------------------|--|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|------|
|              |               |             |            |                        |                     |  |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |      |
|              |               |             |            |                        |                     |  |                         |                 |              | %                   | %    | %    | %      |                                  |      |
| 2            |               |             |            |                        |                     | FLAT & ORG. SILT                       |                         |                 | 2            |                     |      |      |        |                                  |      |
| 4            | B3            | BAG         |            |                        | ML                  | CLAYEY SANDY SILT<br>- organic layers  |                         | Vc              | 4            |                     |      |      |        |                                  |      |
| 6            | B0            | BAG         |            |                        | PT                  | ORGANIC                                |                         | Vr - Vs         | 6            |                     |      |      |        |                                  | FREE |
| 6            |               |             |            |                        |                     | CLAYEY SANDY SILT                      |                         | ICE + SILT      | 6            |                     |      |      |        |                                  | FREE |
| 8            | B1            | BAG         |            |                        | ML                  | CLAYEY SAND-SILT MIX<br>- some organic |                         | Vc              | 8            |                     |      |      |        |                                  |      |
| 8            |               |             |            |                        |                     | ORGANIC                                |                         | Vr - Vs         | 8            |                     |      |      |        |                                  |      |
| 10           |               |             |            |                        |                     | GRAVELLY SILTY SAND                    |                         | Vc - Vr         | 10           |                     |      |      |        |                                  |      |
| 10           |               |             |            |                        |                     | REFUSAL                                |                         |                 | 10           |                     |      |      |        |                                  |      |
| 12           |               |             |            |                        |                     |  |                         |                 | 12           |                     |      |      |        |                                  |      |
| 14           |               |             |            |                        |                     |  |                         |                 | 14           |                     |      |      |        |                                  |      |
| 16           |               |             |            |                        |                     |  |                         |                 | 16           |                     |      |      |        |                                  |      |
| 18           |               |             |            |                        |                     |  |                         |                 | 18           |                     |      |      |        |                                  |      |
| 20           |               |             |            |                        |                     |  |                         |                 | 20           |                     |      |      |        |                                  |      |
| 22           |               |             |            |                        |                     |  |                         |                 | 22           |                     |      |      |        |                                  |      |
| 24           |               |             |            |                        |                     |  |                         |                 | 24           |                     |      |      |        |                                  |      |
| 26           |               |             |            |                        |                     |  |                         |                 | 26           |                     |      |      |        |                                  |      |
| 28           |               |             |            |                        |                     |  |                         |                 | 28           |                     |      |      |        |                                  |      |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

FIELD ENG. CONSULTANT: \_\_\_\_\_ DATE DRILLED: 13-9-74 AIRPHOTO NO. \_\_\_\_\_ CHAINAGE: STA. 653+60 OFFSET: 60' LEFT  
 TECH. F. ANDRETE RIG. B40L SURFACE DRAINAGE: Poor (Summary) VEGETATION: \_\_\_\_\_ ELEV. \_\_\_\_\_ TEST HOLE: 115

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION    | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | DEPTH (FEET) | GRAM-SIZE ANALYSIS |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS |         |
|--------------|---------------|-------------|------------|------------------------|---------------------|---------------------|-------------------------|-----------------|--------------|--------------------|------|------|--------|----------------------------------|---------|---------|
|              |               |             |            |                        |                     |                     |                         |                 |              | CLAY               | SILT | SAND | GRAVEL |                                  |         |         |
|              |               |             |            |                        |                     | PEAT & ORGANIC.     |                         |                 |              |                    |      |      |        |                                  |         |         |
| 2            | 32            | EAG         |            |                        | PT                  |                     |                         | Vr-Vc           | 2            |                    |      |      |        |                                  |         | ORGANIC |
| 4            |               |             |            |                        |                     |                     |                         |                 | 4            |                    |      |      |        |                                  |         |         |
| 6            |               |             |            |                        |                     | GRAVELLY SILTY SAND | 5 1/2'                  | Vc-Vr           | 6            |                    |      |      |        |                                  |         |         |
| 8            |               |             |            |                        |                     | REFUSAL             | 6'                      |                 | 8            |                    |      |      |        |                                  |         |         |
| 10           |               |             |            |                        |                     |                     |                         |                 | 10           |                    |      |      |        |                                  |         |         |
| 12           |               |             |            |                        |                     |                     |                         |                 | 12           |                    |      |      |        |                                  |         |         |
| 14           |               |             |            |                        |                     |                     |                         |                 | 14           |                    |      |      |        |                                  |         |         |
| 16           |               |             |            |                        |                     |                     |                         |                 | 16           |                    |      |      |        |                                  |         |         |
| 18           |               |             |            |                        |                     |                     |                         |                 | 18           |                    |      |      |        |                                  |         |         |
| 20           |               |             |            |                        |                     |                     |                         |                 | 20           |                    |      |      |        |                                  |         |         |
| 22           |               |             |            |                        |                     |                     |                         |                 | 22           |                    |      |      |        |                                  |         |         |
| 24           |               |             |            |                        |                     |                     |                         |                 | 24           |                    |      |      |        |                                  |         |         |
| 26           |               |             |            |                        |                     |                     |                         |                 | 26           |                    |      |      |        |                                  |         |         |
| 28           |               |             |            |                        |                     |                     |                         |                 | 28           |                    |      |      |        |                                  |         |         |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

FIELD ENG. CONSULTANT: DATE DRILLED: 12-2-74 AIRPHOTO NO. CHAINAGE: STA. 661+35 OFFSET: E

TECH. V. ANDREWS RIG. EAOL SURFACE DRAINAGE. VEGETATION. GRASS ELEV. TEST HOLE 116

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS      |
|--------------|---------------|-------------|------------|------------------------|---------------------|---|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|--------------|
|              |               |             |            |                        |                     |   |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |              |
|              |               |             |            |                        |                     | Mix. 3 FEET                             |                         |                 |              |                     |      |      |        |                                  |              |
| 2            | 33            | EG          |            |                        | FT                  | ORGANIC<br>- few coarse sand grains     |                         | Vr-Vs           |              |                     |      |      |        | FREE                             | ORGANIC      |
| 4            |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 6            | 34            | EG          |            |                        | OL                  | SILT & ORGANIC<br>ORGANIC<br>SANDY SILT | F                       | Vs              |              |                     |      |      |        | FREE                             | P.I. - TRACE |
| 8            |               |             |            |                        |                     | PEAT                                    |                         |                 |              |                     |      |      |        |                                  |              |
| 10           | 35            | EG          |            |                        | OL                  | SILT & ORGANIC<br>ORGANIC SANDY SILT    |                         | Nbr             |              |                     |      |      |        | FREE                             | P.I. - N.P.  |
| 12           |               |             |            |                        |                     | ORGANIC SILT                            |                         | Vr-Vs           |              |                     |      |      |        |                                  |              |
| 14           |               |             |            |                        |                     | REFUSAL IN GRAVEL                       |                         |                 |              |                     |      |      |        |                                  |              |
| 16           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 18           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 20           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 22           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 24           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 26           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |
| 28           |               |             |            |                        |                     |   |                         |                 |              |                     |      |      |        |                                  |              |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

|                       |                       |                   |                       |                     |
|-----------------------|-----------------------|-------------------|-----------------------|---------------------|
| FIELD ENG. CONSULTANT | DATE DRILLED. 13.3.74 | AIRPHOTO NO.      | CHAINAGE. STN. 666700 | OFFSET. E           |
| TECH. P. ANNUNZIETTI  | RIG. PAOL             | SURFACE DRAINAGE. | VEGETATION.           | ELEV. 5.000 TO ROAD |

|           |     |
|-----------|-----|
| TEST HOLE | 117 |
| MILE      |     |

| 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   |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS |
|--------------|---------------|-------------|------------|------------------------|---------------------|------------------|-------------------------|-----------------|--------------|---|------|------|--------|----------------------------------|---------|
|              |               |             |            |                        |                     |                  |                         |                 |              | CLAY  | SILT | SAND | GRAVEL |                                  |         |
|              |               |             |            |                        |                     |                  |                         |                 |              | △ DRY DENSITY (lbs./ft. <sup>3</sup> )<br>○ WATER CONTENT (% of dry weight)<br>△ ICE CONTENT (% of sample volume)<br>PLASTIC LIMIT ————— LIQUID LIMIT | %    | %    | %      | %                                |         |
| 2            |               |             |            |                        |                     | GRAVEL           |                         |                 | 2            |   |      |      |        |                                  |         |
| 4            |               |             |            |                        |                     | - dry to moist   |                         |                 | 4            |   |      |      |        |                                  |         |
| 6            |               |             |            |                        |                     | - some coarse    |                         |                 | 6            |   |      |      |        |                                  |         |
| 8            |               |             |            |                        |                     |                  |                         |                 | 8            |   |      |      |        |                                  |         |
| 10           |               |             |            |                        |                     |                  |                         |                 | 10           |   |      |      |        |                                  |         |
| 12           |               |             |            |                        |                     |                  |                         |                 | 12           |   |      |      |        |                                  |         |
| 14           |               |             |            |                        |                     |                  |                         |                 | 14           |   |      |      |        |                                  |         |
| 16           |               |             |            |                        |                     |                  |                         |                 | 16           |   |      |      |        |                                  |         |
| 18           |               |             |            |                        |                     |                  |                         |                 | 18           |   |      |      |        |                                  |         |
| 20           |               |             |            |                        |                     |                  |                         |                 | 20           |   |      |      |        |                                  |         |
| 22           |               |             |            |                        |                     |                  |                         |                 | 22           |   |      |      |        |                                  |         |
| 24           |               |             |            |                        |                     |                  |                         |                 | 24           |   |      |      |        |                                  |         |
| 26           |               |             |            |                        |                     |                  |                         |                 | 26           |   |      |      |        |                                  |         |
| 28           |               |             |            |                        |                     |                  |                         |                 | 28           |   |      |      |        |                                  |         |

10'  
BOTTOM OF HOLE

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-18

| FIELD ENG. COMMENTS |             | DATE DRILLED: 10-2-76 |                        | AIRPHOTO NO.        |                                      | SURFACE DRAINAGE.       |                                | CHAINAGE: S.N. 663+12 |                                    | VEGETATION.                     |                                  | OFFSET: E           |                                  | TEST HOLE |   |  |
|---------------------|-------------|-----------------------|------------------------|---------------------|--------------------------------------|-------------------------|--------------------------------|-----------------------|------------------------------------|---------------------------------|----------------------------------|---------------------|----------------------------------|-----------|---|--|
| TECH. NAME          |             | RIG: 200L             |                        | SOIL DESCRIPTION    |                                      | LIMITS OF FROZEN GROUND |                                | ICE DESCRIPTION       |                                    | DEPTH (FEET)                    |                                  | GRAIN-SIZE ANALYSIS |                                  | ELEV.     |   |  |
| SAMPLE NUMBER       | SAMPLE TYPE | % RECOVERY            | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION                     | LIMITS OF FROZEN GROUND | ICE DESCRIPTION                | DEPTH (FEET)          | DRY DENSITY (lb./ft <sup>3</sup> ) | WATER CONTENT (% of dry weight) | ICE CONTENT (% of sample volume) | GRAIN-SIZE ANALYSIS | RELATIVE THAWED MOISTURE CONTENT | REMARKS   |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                |                       | PLASTIC LIQUID                     | PLASTIC LIQUID                  |                                  | CLAY                | SAND                             | GRAVEL    |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                |                       |                                    |                                 |                                  | %                   | %                                | %         |   |  |
| 2                   |             |                       |                        |                     | Moss & Feet                          |                         |                                | 2                     |                                    |                                 |                                  |                     |                                  |           |   |  |
| 36                  | Eng         |                       |                        | ML                  | CLAYEY SANDY SILT<br>± ORGANIC       |                         | V <sub>c</sub> -V <sub>r</sub> | 4                     |                                    |                                 |                                  | 12                  | 74                               | 14        | - |  |
| 37                  | Eng         |                       |                        | ML                  | GRAVELLY SANDY SILT<br>- 10% Organic |                         | V <sub>r</sub> -V <sub>s</sub> | 6                     |                                    |                                 |                                  | 18                  | 46                               | 35        | 1 |  |
| 38                  | Eng         |                       |                        | ML                  | CLEAN SILTY SAND<br>± SANDY SILT     |                         | V <sub>c</sub> -V <sub>r</sub> | 8                     |                                    |                                 |                                  | 17                  | 37                               | 46        | - |  |
|                     |             |                       |                        |                     | GRAVELLY SILTY SAND                  | F                       | V <sub>r</sub> -V <sub>s</sub> | 10                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     | ICE                                  |                         | ICE                            | 12                    |                                    |                                 |                                  |                     |                                  |           |   |  |
| 93                  | Bag         |                       |                        | SM                  | CLAYEY SAND-SILT MIX                 |                         | V <sub>c</sub> -V <sub>r</sub> | 14                    |                                    |                                 |                                  | 15                  | 31                               | 53        | 1 |  |
|                     |             |                       |                        |                     | ICE + SILTY SAND                     |                         | ICE + SAND                     | 15                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     | Bottom of Hole                       |                         |                                | 16                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 18                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 20                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 22                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 24                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 26                    |                                    |                                 |                                  |                     |                                  |           |   |  |
|                     |             |                       |                        |                     |                                      |                         |                                | 28                    |                                    |                                 |                                  |                     |                                  |           |   |  |

DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION MILE 0-78

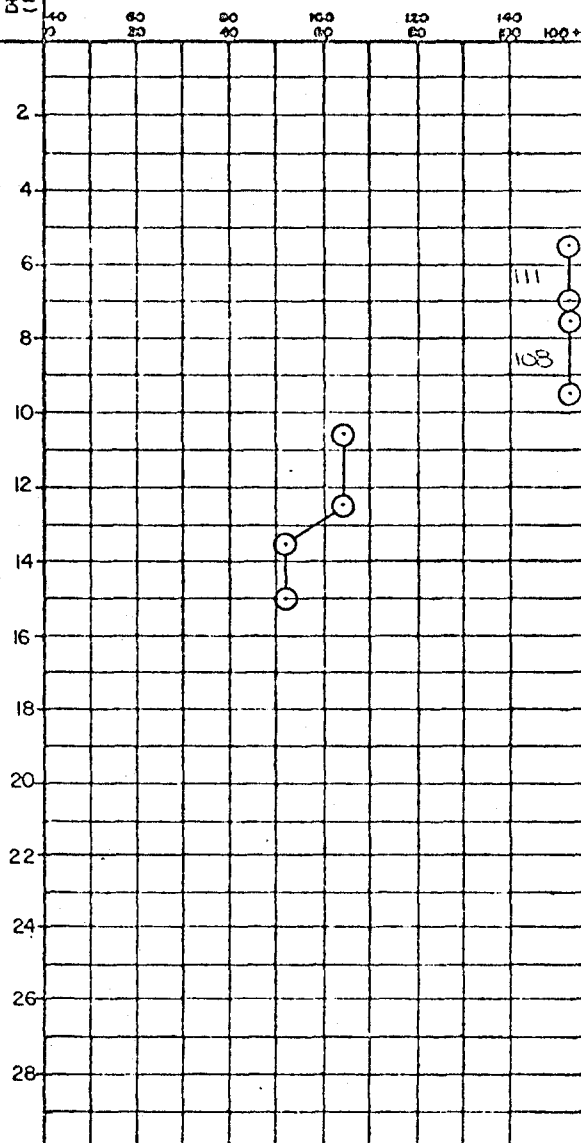
FIELD ENG. CONSULTANT: \_\_\_\_\_ DATE DRILLED: 12-3-74 AIRPHOTO NO. \_\_\_\_\_ CHAINAGE: STA 682+40 OFFSET: E

TECH. P. ANSCILITE RIG. F340L SURFACE DRAINAGE: \_\_\_\_\_ VEGETATION: \_\_\_\_\_ ELEV. ON ROAD: \_\_\_\_\_

TEST HOLE: 119

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS     |             |
|--------------|---------------|-------------|------------|------------------------|---------------------|--|-------------------------|------------------|--------------|---------------------|------|------|--------|----------------------------------|-------------|-------------|
|              |               |             |            |                        |                     |  |                         |                  |              | CLAY                | SILT | SAND | GRAVEL |                                  |             |             |
|              |               |             |            |                        |                     |  |                         |                  |              | %                   | %    | %    | %      |                                  |             |             |
| 2            |               |             |            |                        |                     | GRAVEL<br>- round fill                                 |                         |                  | 2            |                     |      |      |        |                                  |             |             |
| 4            |               |             |            |                        |                     | PEAT & ORGANIC SILT<br>- moist to wet<br>- layered     |                         |                  | 4            |                     |      |      |        |                                  |             |             |
| 6            | 100           | BAG         |            |                        | OL                  | CLAYEY SILT<br>- from 5'-7½',<br>organic, some gravel. |                         | Vc-Vr            | 6            |                     |      | 7    | 15     | FREE                             | PI. - TRACE |             |
| 8            | 101           | BAG         |            |                        | ML                  | - from 10½'-13',<br>almost all ice                     |                         | Vr-Vs<br>NBD     | 8            |                     | 14   | 79   | 3      | 4                                | FREE        | PI. - TRACE |
| 10           |               |             |            |                        |                     | - gravel content decreases<br>with depth               |                         | Ice<br>+<br>SILT | 10           |                     |      |      |        |                                  |             |             |
| 12           | 102           | BAG         |            |                        | ML                  |  |                         |                  | 12           |                     | 14   | 84   | 2      | -                                | FREE        | PI. - TRACE |
| 14           | 103           | BAG         |            |                        | ML                  |  |                         | Nbn-Vx           | 14           |                     | 14   | 83   | 3      | -                                | FREE        | PI. - TRACE |
| 16           |               |             |            |                        |                     | BOTTOM OF HOLE   |                         |                  | 16           |                     |      |      |        |                                  |             |             |
| 18           |               |             |            |                        |                     |  |                         |                  | 18           |                     |      |      |        |                                  |             |             |
| 20           |               |             |            |                        |                     |  |                         |                  | 20           |                     |      |      |        |                                  |             |             |
| 22           |               |             |            |                        |                     |  |                         |                  | 22           |                     |      |      |        |                                  |             |             |
| 24           |               |             |            |                        |                     |  |                         |                  | 24           |                     |      |      |        |                                  |             |             |
| 26           |               |             |            |                        |                     |  |                         |                  | 26           |                     |      |      |        |                                  |             |             |
| 28           |               |             |            |                        |                     |  |                         |                  | 28           |                     |      |      |        |                                  |             |             |

▲ DRY DENSITY (lbs./ft.<sup>3</sup>)  
 ○ WATER CONTENT (% of dry weight)  
 △ ICE CONTENT (% of sample volume)



DEPARTMENT OF PUBLIC WORKS, CANADA  
DEMPSTER HIGHWAY

DRILL HOLE REPORT

SITE: RELOCATION Mile 0-78

FIELD ENG. CONSULTANT: TECH. P. ANDRIEUX DATE DRILLED: 26-3-74 AIRPHOTO NO. CHAINAGE STA. 635+05 OFFSET: E  
RIG. T340L SURFACE DRAINAGE. VEGETATION. ELEV. SAME AS ROAD

TEST HOLE 169

| 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 |      |      |        | RELATIVE THAWED MOISTURE CONTENT | REMARKS    |
|--------------|---------------|-------------|------------|------------------------|---------------------|-------------------------------------|-------------------------|-----------------|--------------|---------------------|------|------|--------|----------------------------------|------------|
|              |               |             |            |                        |                     |                                     |                         |                 |              | CLAY                | SILT | SAND | GRAVEL |                                  |            |
|              |               |             |            |                        |                     |                                     |                         |                 |              | %                   | %    | %    | %      |                                  |            |
| 2            | 123           | EM          |            |                        | SM                  | GRAVEL<br>GRAVELLY SAND-SILT 1 1/2' |                         |                 | 2            |                     |      |      |        |                                  |            |
| 4            | 101           | EM          |            |                        | SM                  | SAND-SILT MIX 3'                    |                         |                 | 4            | 10                  | 32   | 31   | 27     | Moist                            |            |
| 6            | 105           | EM          |            |                        | SM                  | SILTY SANDY GRAVEL 5'               |                         |                 | 6            | 10                  | 47   | 33   | 10     | Moist                            | PI. - N.P. |
| 8            | 126           | EM          |            |                        | EM                  | - moist 8'                          |                         |                 | 8            | 6                   | 18   | 33   | 43     | WET                              | PI. - N.P. |
| 10           |               |             |            |                        |                     | REFUSAL 9'                          |                         |                 | 10           |                     |      |      |        |                                  |            |
| 12           |               |             |            |                        |                     |                                     |                         |                 | 12           |                     |      |      |        |                                  |            |
| 14           |               |             |            |                        |                     |                                     |                         |                 | 14           |                     |      |      |        |                                  |            |
| 16           |               |             |            |                        |                     |                                     |                         |                 | 16           |                     |      |      |        |                                  |            |
| 18           |               |             |            |                        |                     |                                     |                         |                 | 18           |                     |      |      |        |                                  |            |
| 20           |               |             |            |                        |                     |                                     |                         |                 | 20           |                     |      |      |        |                                  |            |
| 22           |               |             |            |                        |                     |                                     |                         |                 | 22           |                     |      |      |        |                                  |            |
| 24           |               |             |            |                        |                     |                                     |                         |                 | 24           |                     |      |      |        |                                  |            |
| 26           |               |             |            |                        |                     |                                     |                         |                 | 26           |                     |      |      |        |                                  |            |
| 28           |               |             |            |                        |                     |                                     |                         |                 | 28           |                     |      |      |        |                                  |            |

LABORATORY TESTING REPORTS

1974 CENTERLINE RELOCATION INVESTIGATION

GRAIN SIZE ANALYSIS

| NO  | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D <sub>mm</sub> SIEVE SIZE | % FINER BY WEIGHT | D <sub>mm</sub> SIEVE SIZE | % FINER BY WEIGHT |
|-----|-------------------|------------|-------------------|----------------------------|-------------------|----------------------------|-------------------|
| 4   | 100.0             |            |                   | 0.075                      | 73.2              | 0.075                      | 12.9              |
| 10  | 99.7              |            |                   | 0.15                       | 64.3              |                            |                   |
| 20  | 97.3              |            |                   | 0.3                        | 53.3              |                            |                   |
| 40  | 88.3              |            |                   | 0.6                        | 41.0              |                            |                   |
| 60  | 92.3              |            |                   | 1.18                       | 37.5              |                            |                   |
| 100 | 85.6              |            |                   | 2.0                        | 26.2              |                            |                   |
|     |                   |            |                   | 4.75                       | 19.9              |                            |                   |
|     |                   |            |                   | 7.5                        | 16.4              |                            |                   |

| NO. | CLASSIFICATION       | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|-----|----------------------|------|------|-------|---------|------|
|     | CLAYEY SANDY SILT ML |      |      | TRACE | 30      | 2.71 |

CRUSH COUNT %

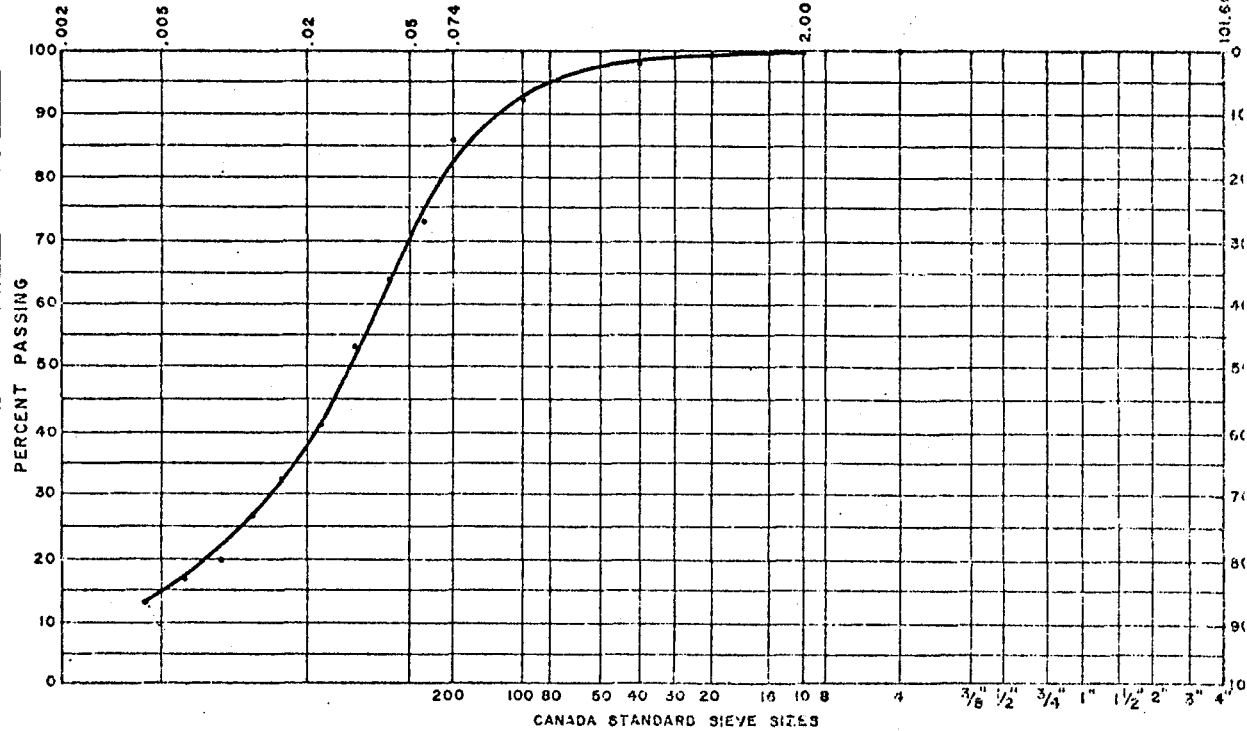
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| SALT          |                   |
| WHEATSTONE    |                   |
| ANITIC        |                   |
| WADSTONE      |                   |
| WHALE         |                   |
| HIST          |                   |
| WARTZITE      |                   |
| WHERS         |                   |

PARTICLE SHAPE ANALYSIS

|           |  |
|-----------|--|
| UND       |  |
| B-ROUND   |  |
| GULAR     |  |
| B-ANGULAR |  |
| ATS       |  |
| EDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMASTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 636+50 E  
 HOLE NO. 106  
 DEPTH 2'-4' FIELD NO. 76  
 SAMPLE TYPE SAS

LAB. NO.  
8257

| LABORATORY'S REMARKS | DATE SAMPLED              |
|----------------------|---------------------------|
|                      | 18-9-74                   |
|                      | DATE RECEIVED 23-9-74     |
|                      | DATE RECORDED 17-12-74    |
|                      | TESTED BY RJK JE DA SS SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1"         | 100.0             | #100       | 37.9              |
| 3/4        | 97.5              | 200        | 33.2              |
| 1/2        | 91.5              |            |                   |
| 3/8        | 89.2              |            |                   |
| #4         | 80.2              |            |                   |
| 10         | 69.6              |            |                   |
| 20         | 62.2              |            |                   |
| 40         | 56.7              |            |                   |

| SAMPLE NO. | CLASSIFICATION           | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|--------------------------|------|------|-------|---------|------|
|            | GRAVELLY SILTY SAND - SM |      |      | TRACE | 14      |      |

CRUSH COUNT %

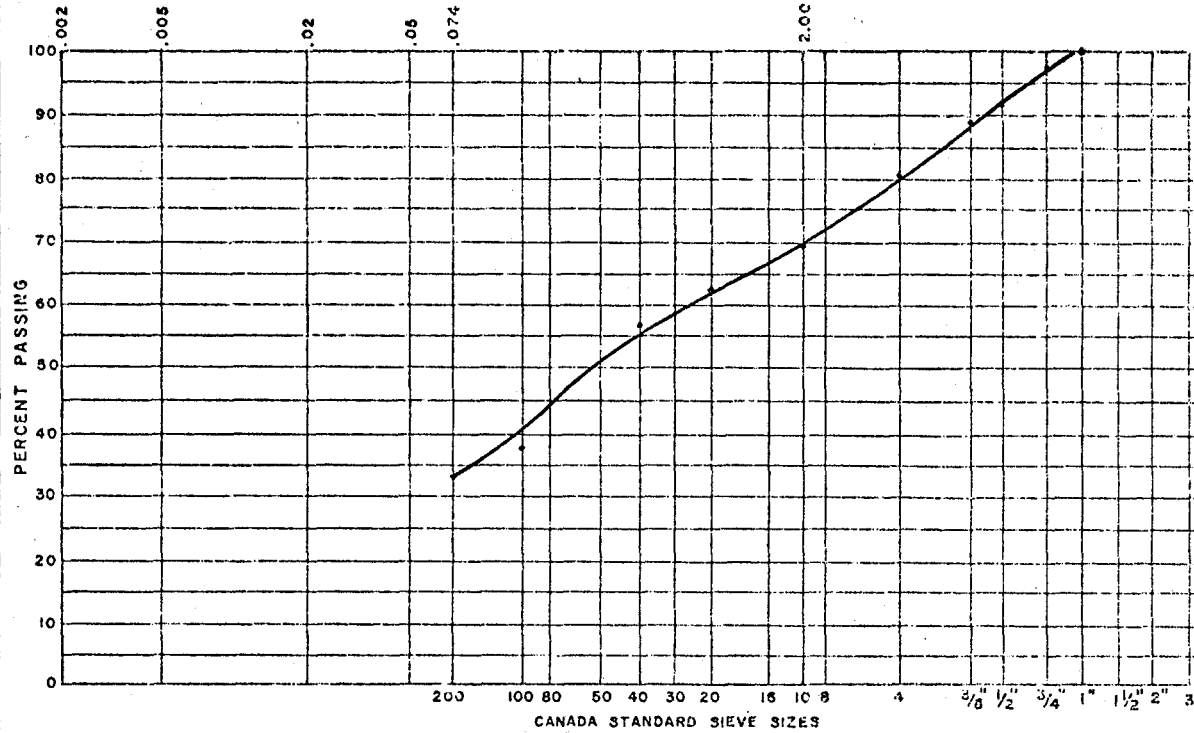
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HWY. RELOCATION - MILE 0.78  
 LOCATION STA. 636+50 E  
 HOLE NO. 106  
 DEPTH 5 1/2' - 7 1/2' FIELD NO. 77  
 SAMPLE TYPE BAS

LAB. NO.  
**8258**

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | <u>18-9-74</u>                  |
|                      | DATE RECEIVED <u>23-9-74</u>    |
|                      | DATE RECORDED <u>12-12-74</u>   |
|                      | TESTED BY <u>RK JE DA BT SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 1/2"       | 100.0             | #40        | 76.1              | .0576           | 58.5              | .0044           | 17.9              |
| 1          | 83.1              | 100        | 70.4              | .0419           | 52.3              |                 |                   |
| 3/4        | 83.1              | 200        | 64.9              | .0304           | 46.4              |                 |                   |
| 1/2        | 83.1              |            |                   | .0223           | 38.5              |                 |                   |
| 3/8        | 83.1              |            |                   | .0161           | 33.1              |                 |                   |
| #4         | 82.9              |            |                   | .0120           | 28.5              |                 |                   |
| 10         | 81.0              |            |                   | .0086           | 24.4              |                 |                   |
| 20         | 79.2              |            |                   | .0061           | 21.0              |                 |                   |

| SAMPLE NO. | CLASSIFICATION                | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|-------------------------------|------|------|------|---------|------|
|            | GRAVELLY CLAYEY SANDY SILT ML | 28.4 | 23.3 | 5.1  | 70.     | 2.70 |

CRUSH COUNT %

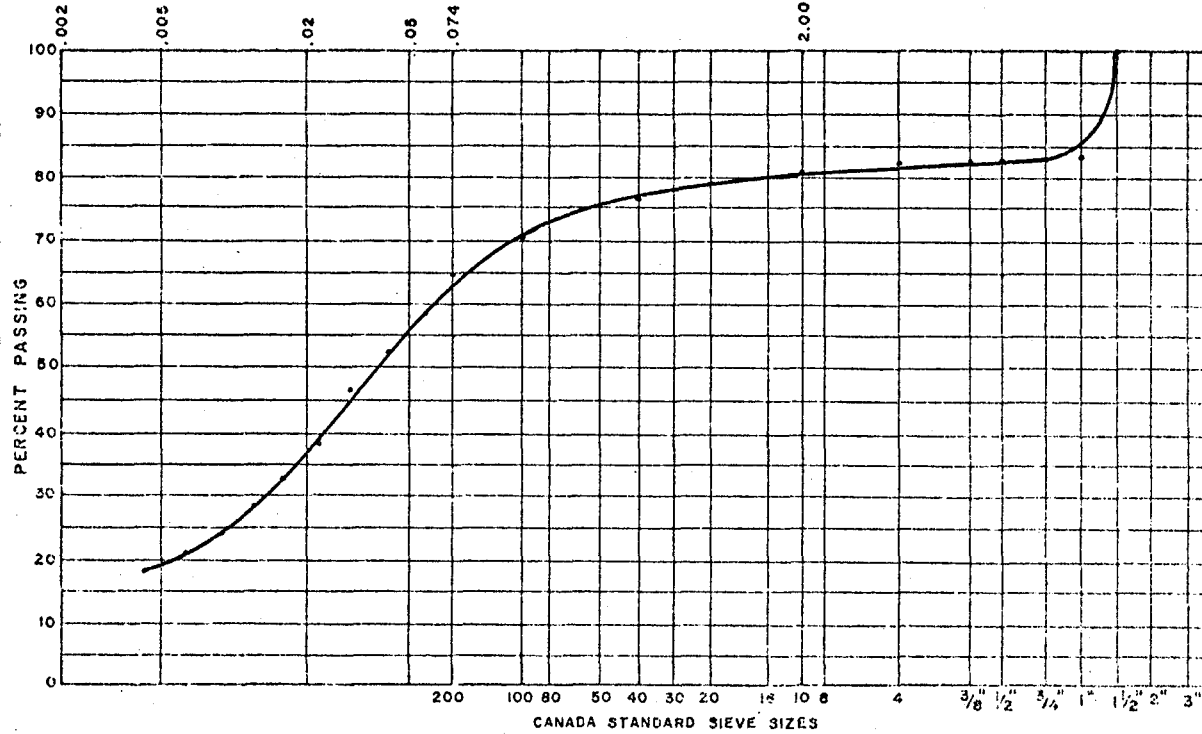
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 638+50 E  
 HOLE NO. 107  
 DEPTH 7 1/2' - 9 1/2' FIELD NO. 78  
 SAMPLE TYPE BAS.

LAB. NO.  
8259

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 18-9-74                  |
|                      | DATE RECEIVED 23-9-74    |
|                      | DATE RECORDED 17-12-74   |
|                      | TESTED BY RK JE SA BJ SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 1/11       | 100.0             | #100       | 85.4              | 0.552           | 71.7              | 0.045           | 11.9              |
| 3/4        | 89.0              | 200        | 84.2              | 0.406           | 63.1              |                 |                   |
| 1/2        | 89.0              |            |                   | 0.302           | 51.0              |                 |                   |
| 3/8        | 89.0              |            |                   | 0.225           | 38.2              |                 |                   |
| #4         | 88.4              |            |                   | 0.164           | 30.2              |                 |                   |
| 10         | 87.8              |            |                   | 0.122           | 23.5              |                 |                   |
| 20         | 87.2              |            |                   | 0.088           | 18.8              |                 |                   |
| 40         | 86.7              |            |                   | 0.063           | 16.1              |                 |                   |

| SAMPLE NO. | CLASSIFICATION          | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|-------------------------|------|------|------|---------|------|
|            | GRAVELLY CLAYEY SILT ML | 33.3 | 30.8 | 2.5  | 96.     | 2.71 |

CRUSH COUNT %

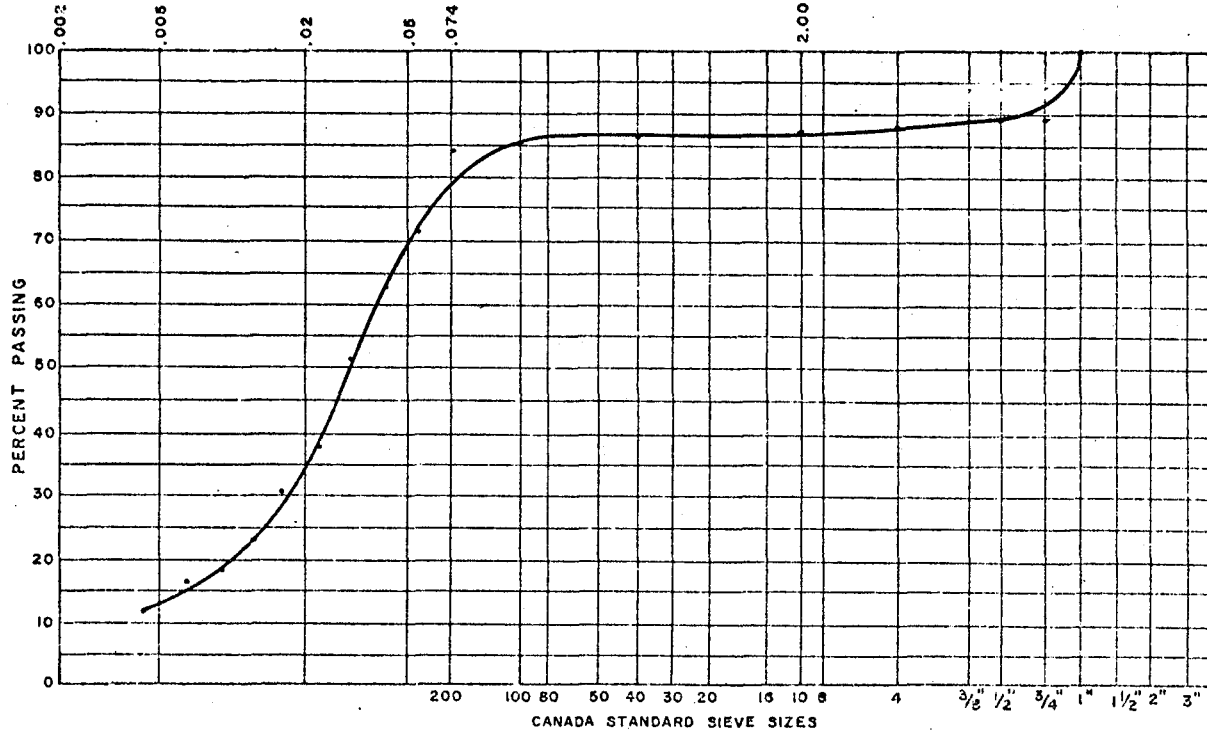
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 643+95 E  
 HOLE NO. 108  
 DEPTH 5'-6 1/2' FIELD NO. 79  
 SAMPLE TYPE BAG.

LAB. NO.  
8260

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 18-9-74                  |
|                      | DATE RECEIVED 23-9-74    |
|                      | DATE RECORDED 17-12-74   |
|                      | TESTED BY RK JE JA BT SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D. MM. SIEVE SIZE | % FINER BY WEIGHT | D. MM. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 1 1/2"     | 100.0             | #40        | 75.3              | .0569             | 57.7              | .0044             | 15.3              |
| 1          | 78.7              | 100        | 72.6              | .0409             | 55.5              |                   |                   |
| 3/4        | 78.7              | 200        | 70.5              | .0298             | 48.0              |                   |                   |
| 1/2        | 78.7              |            |                   | .0217             | 42.3              |                   |                   |
| 3/8        | 77.7              |            |                   | .0158             | 35.2              |                   |                   |
| #4         | 77.7              |            |                   | .0118             | 30.6              |                   |                   |
| 10         | 76.6              |            |                   | .0085             | 23.9              |                   |                   |
| 20         | 76.1              |            |                   | .0062             | 18.8              |                   |                   |

| SAMPLE NO. | CLASSIFICATION                             | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|--|------|------|------|---------|------|
|            | CLAYEY SILT WITH FINE SAND ± MED GRAVEL ML | 49.2 | 43.4 | 5.8  | 80      | 2.72 |

CRUSH COUNT %

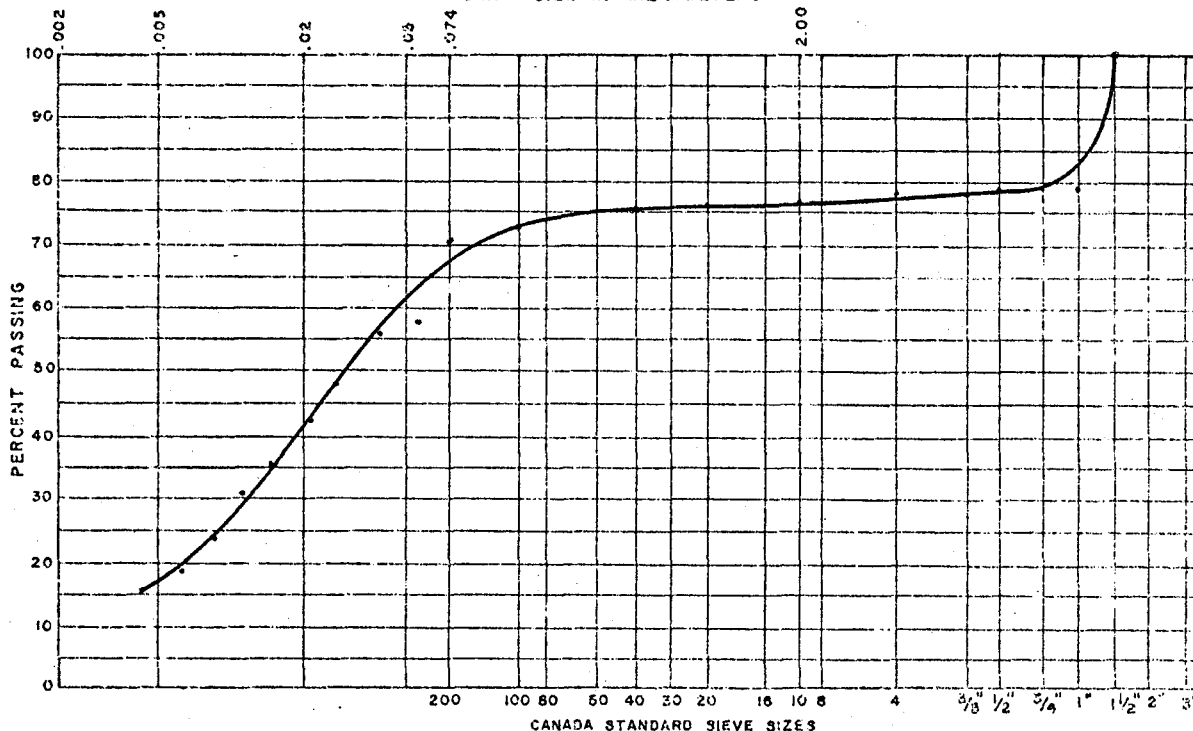
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMASTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 643+95 E  
 HOLE NO. 108  
 DEPTH 7 1/2' - 9 1/2' FIELD NO. 80  
 SAMPLE TYPE BAS.

LAB. NO.  
8261

| LABORATORY'S REMARKS | DATE SAMPLED            |
|----------------------|-------------------------|
|                      | 18-9-74                 |
|                      | DATE RECEIVED 23-9-74   |
|                      | DATE RECORDED 13-12-74  |
|                      | TESTED BY RK JE & BT SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D.M.M. SIEVE SIZE | % FINER BY WEIGHT | D.M.M. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 3/8"       | 100.0             |            |                   | .0075             | 55.4              | .0045             | 12.0              |
| #4         | 98.7              |            |                   | .075              | 52.3              |                   |                   |
| 10         | 95.6              |            |                   | .036              | 44.3              |                   |                   |
| 20         | 94.0              |            |                   | .0230             | 36.6              |                   |                   |
| 40         | 92.8              |            |                   | .0165             | 29.8              |                   |                   |
| 100        | 87.3              |            |                   | .0123             | 24.0              |                   |                   |
| 200        | 82.0              |            |                   | .0088             | 20.0              |                   |                   |
|            |                   |            |                   | .0063             | 14.8              |                   |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------------|------|------|------|---------|------|
|            | CLAYEY SANDY SILT ML | 49.2 | 42.5 | 6.7  | 106.1   | 2.71 |

| CRUSH COUNT | % |
|-------------|---|
|             |   |

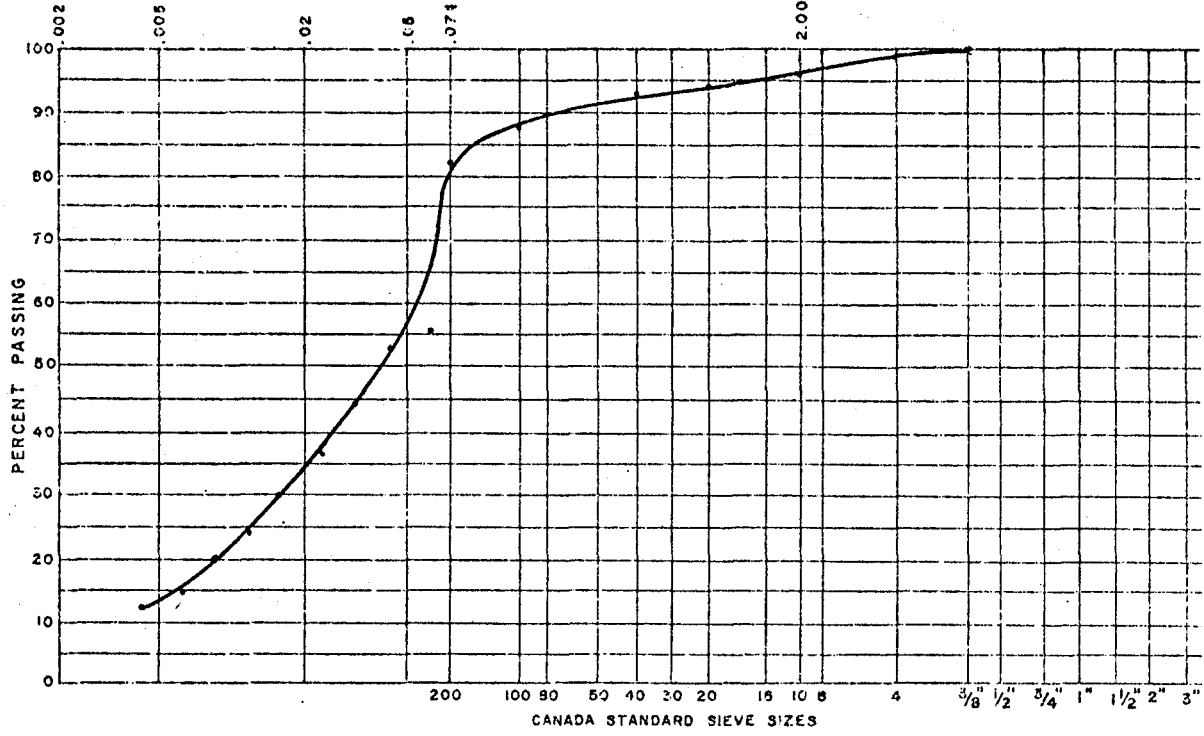
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT - DENVER HWY. (RELOCATION) MILE 0-78  
 LOCATION STA. 647+50 E  
 HOLE NO. 109  
 DEPTH 2'-4' FIELD NO. 81  
 SAMPLE TYPE BAG

LAB. NO.  
8262

LABORATORY'S REMARKS  
ORGANIC TRACES

DATE SAMPLED 18-9-74  
 DATE RECEIVED 23-9-74  
 DATE RECORDED 13-12-74  
 TESTED BY RK JE DA BS SE

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1"         | 100.0             | #100       | 30.6              |            |                   |            |                   |
| 3/4        | 90.2              | 200        | 27.3              |            |                   |            |                   |
| 1/2        | 85.3              |            |                   |            |                   |            |                   |
| 3/8        | 77.3              |            |                   |            |                   |            |                   |
| #4         | 65.9              |            |                   |            |                   |            |                   |
| 10         | 54.9              |            |                   |            |                   |            |                   |
| 20         | 46.0              |            |                   |            |                   |            |                   |
| 40         | 39.5              |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION           | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|--------------------------|------|------|-------|---------|------|
|            | SILTY GRAVELLY SAND - SM |      |      | TRACE | 108.    |      |

| CRUSH COUNT | % |
|-------------|---|
|             |   |

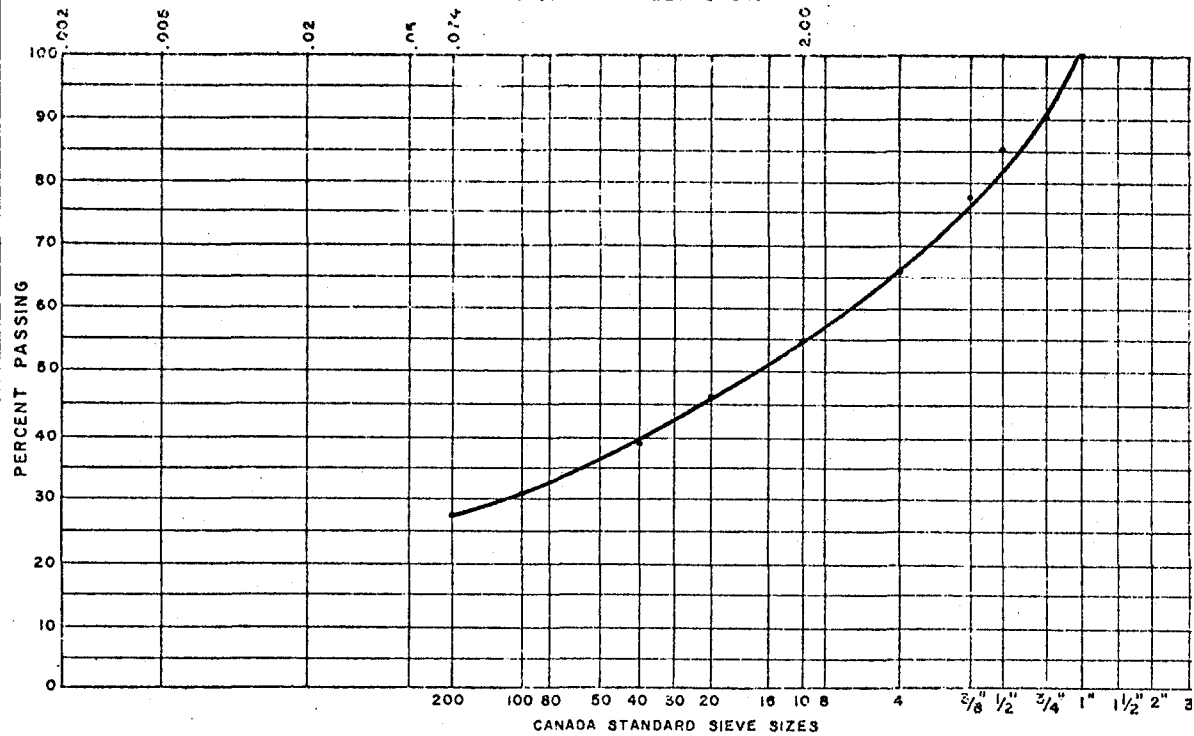
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 647+50 E  
 HOLE NO. 109  
 DEPTH 8'-9' FIELD NO. 87  
 SAMPLE TYPE SAG

LAB. NO.  
**8263**

| LABORATORY'S REMARKS | DATE SAMPLED                   |
|----------------------|--------------------------------|
|                      | 18-9-74                        |
|                      | DATE RECEIVED 23-9-74          |
|                      | DATE RECORDED 11-12-74         |
|                      | TESTED BY <u>RK JE DA BS S</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE         | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|--------------------|-------------------|------------|-------------------|
| * ORGANIC MATERIAL |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |
|                    |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------|------|------|------|---------|------|
|            | PT             |      |      |      | 933.    |      |

CRUSH COUNT %

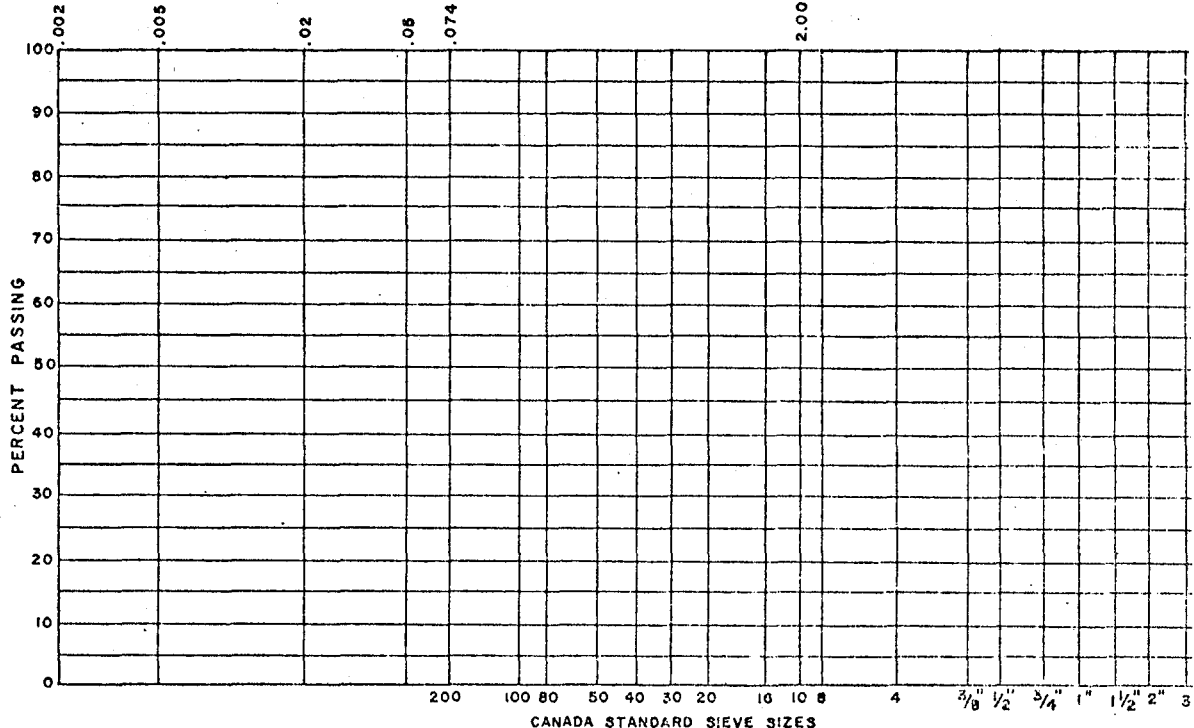
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 651+85 E.  
 HOLE NO. 110  
 DEPTH 1 1/2' - 3' FIELD NO. 83  
 SAMPLE TYPE BAG

LAB. NO.  
8264

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
| * ORGANIC MATERIAL   | 18-9-74                         |
|                      | DATE RECEIVED 23-9-74           |
|                      | DATE RECORDED 11-12-74          |
|                      | TESTED BY <u>RK JE JA BJ SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE          | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|---------------------|-------------------|------------|-------------------|
| * ORGANIC MATERIALS |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |
|                     |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------|------|------|------|---------|------|
|            | PT             |      |      |      | 356     |      |

CRUSH COUNT %

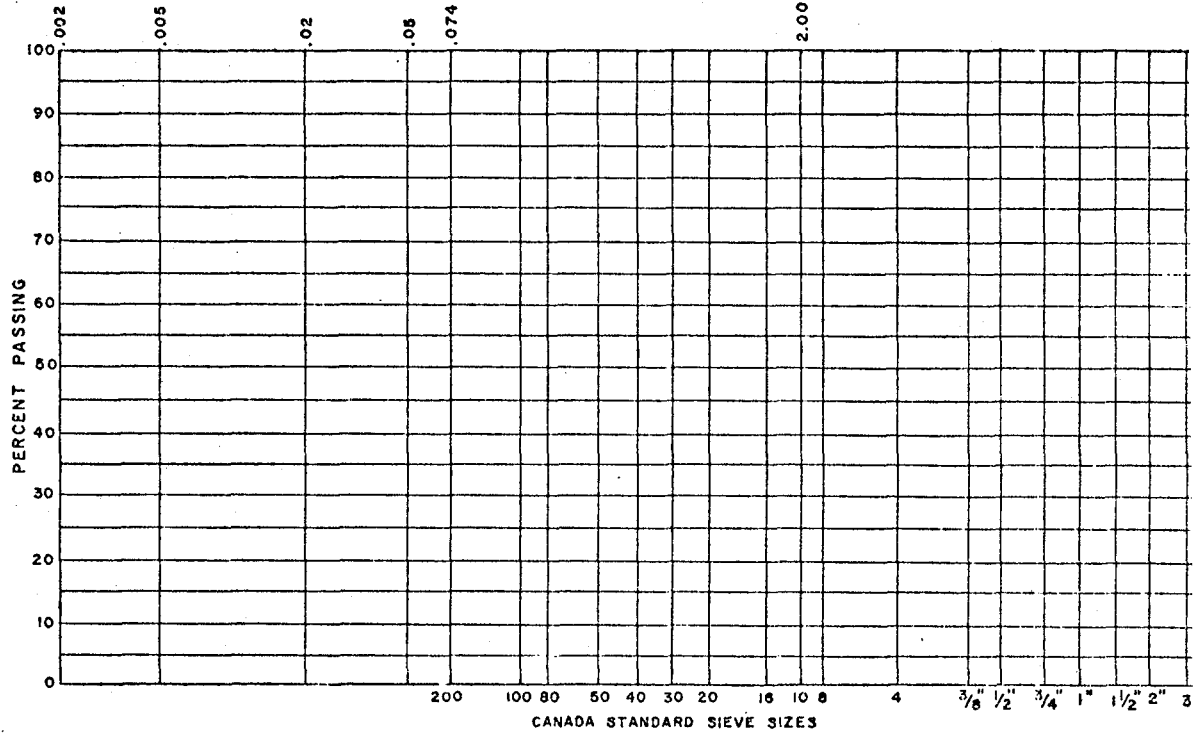
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 651+85 E  
 HOLE NO. 110  
 DEPTH 3 1/2' - 4 1/2' FIELD NO. 84  
 SAMPLE TYPE BAG.

LAB. NO.  
8265

LABORATORY'S REMARKS

\* ORGANIC MATERIAL

DATE SAMPLED 18-9-74  
 DATE RECEIVED 23-9-74  
 DATE RECORDED 11-12-74  
 TESTED BY RIK JE DA BJS

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. MM SIEVE SIZE | % FINER BY WEIGHT | D. MM SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|--------------------|-------------------|------------------|-------------------|
| #4         | 100.0             |            |                   | .075               | 73.2              | .045             | 12.6              |
| 10         | 99.4              |            |                   | .0475              | 66.3              |                  |                   |
| 20         | 98.4              |            |                   | .0300              | 53.4              |                  |                   |
| 40         | 97.8              |            |                   | .0225              | 42.1              |                  |                   |
| 100        | 94.7              |            |                   | .0150              | 33.3              |                  |                   |
| 200        | 88.1              |            |                   | .0106              | 27.6              |                  |                   |
|            |                   |            |                   | .0085              | 21.0              |                  |                   |
|            |                   |            |                   | .0060              | 16.0              |                  |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------------|------|------|------|---------|------|
|            | CLAYEY SANDY SILT ML |      |      | N.P. | 115.    | 2.71 |

CRUSH COUNT %

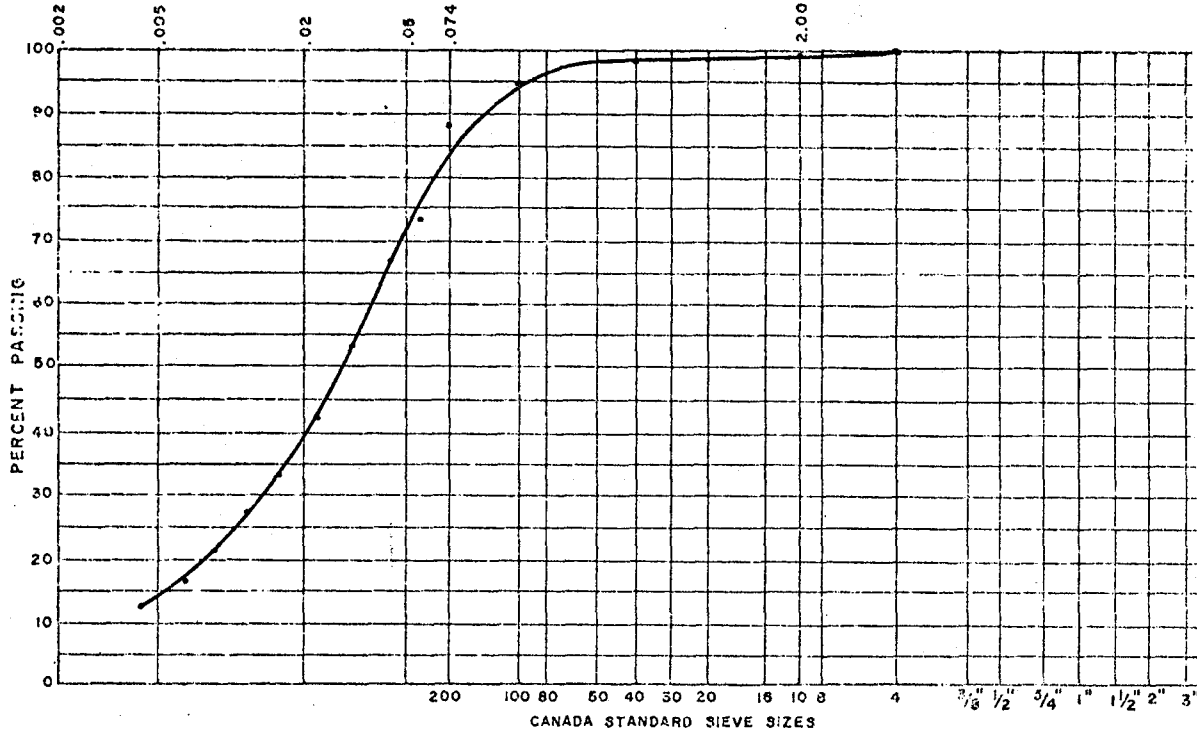
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY                      SILT                      SAND                      GRAVEL

PROJECT DEMASTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 651+85  
 HOLE NO. 110  
 DEPTH 6'-7" FIELD NO. 85  
 SAMPLE TYPE BAG

LAB. NO.  
8766

| LABORATORY'S REMARKS | DATE SAMPLED                   |
|----------------------|--------------------------------|
|                      | <u>18-9-74</u>                 |
|                      | <u>23-9-74</u>                 |
|                      | <u>12-12-74</u>                |
|                      | TESTED BY <u>RK JE, H, STS</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D. mm SIEVE SIZE | % FINER BY WEIGHT | D. mm SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------------|-------------------|------------------|-------------------|
| #4         | 100.0             |            |                   | .0601            | 59.4              | .0045            | 14.5              |
| 10         | 97.6              |            |                   | .075             | 50.3              |                  |                   |
| 20         | 98.5              |            |                   | .0319            | 42.1              |                  |                   |
| 40         | 96.0              |            |                   | .0232            | 33.9              |                  |                   |
| 100        | 82.7              |            |                   | .0166            | 29.6              |                  |                   |
| 200        | 70.0              |            |                   | .0122            | 25.2              |                  |                   |
|            |                   |            |                   | .0088            | 20.8              |                  |                   |
|            |                   |            |                   | .0063            | 17.3              |                  |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|----------------------|------|------|-------|---------|------|
|            | CLAYEY SANDY SILT ML |      |      | TRACE | 48.     | 2.71 |

CRUSH COUNT %

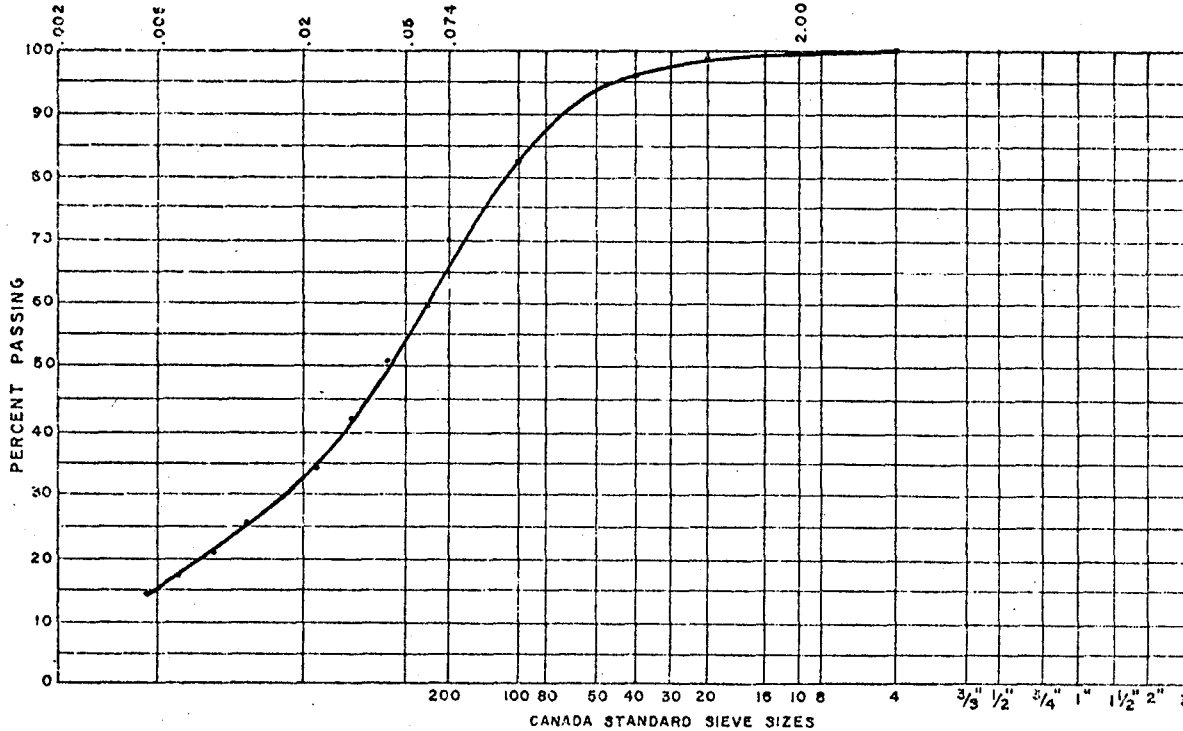
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMASTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 651+85 E  
 HOLE NO. 110  
 DEPTH 81-91 FIELD NO. 86  
 SAMPLE TYPE BAS.

LAB. NO.  
8267

| LABORATORY'S REMARKS | DATE SAMPLED              |
|----------------------|---------------------------|
|                      | 18-9-74                   |
|                      | DATE RECEIVED 23-9-74     |
|                      | DATE RECORDED 12-12-74    |
|                      | TESTED BY RIK JE JA BS SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | d.m.m. SIEVE SIZE | % FINER BY WEIGHT | d.m.m. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 3/8"       | 100.0             |            |                   | 0.0578            | 69.2              | 0.0045            | 15.4              |
| #4         | 99.9              |            |                   | 0.0425            | 59.2              |                   |                   |
| 10         | 99.6              |            |                   | 0.0312            | 48.5              |                   |                   |
| 20         | 99.2              |            |                   | 0.0228            | 38.4              |                   |                   |
| 40         | 98.9              |            |                   | 0.0165            | 31.8              |                   |                   |
| 100        | 94.2              |            |                   | 0.0122            | 28.6              |                   |                   |
| 200        | 83.0              |            |                   | 0.0087            | 23.6              |                   |                   |
|            |                   |            |                   | 0.0062            | 19.2              |                   |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|----------------------|------|------|-------|---------|------|
|            | CLAYEY SANDY SILT ML |      |      | TRACE | 85.     | 2.71 |

CRUSH COUNT %

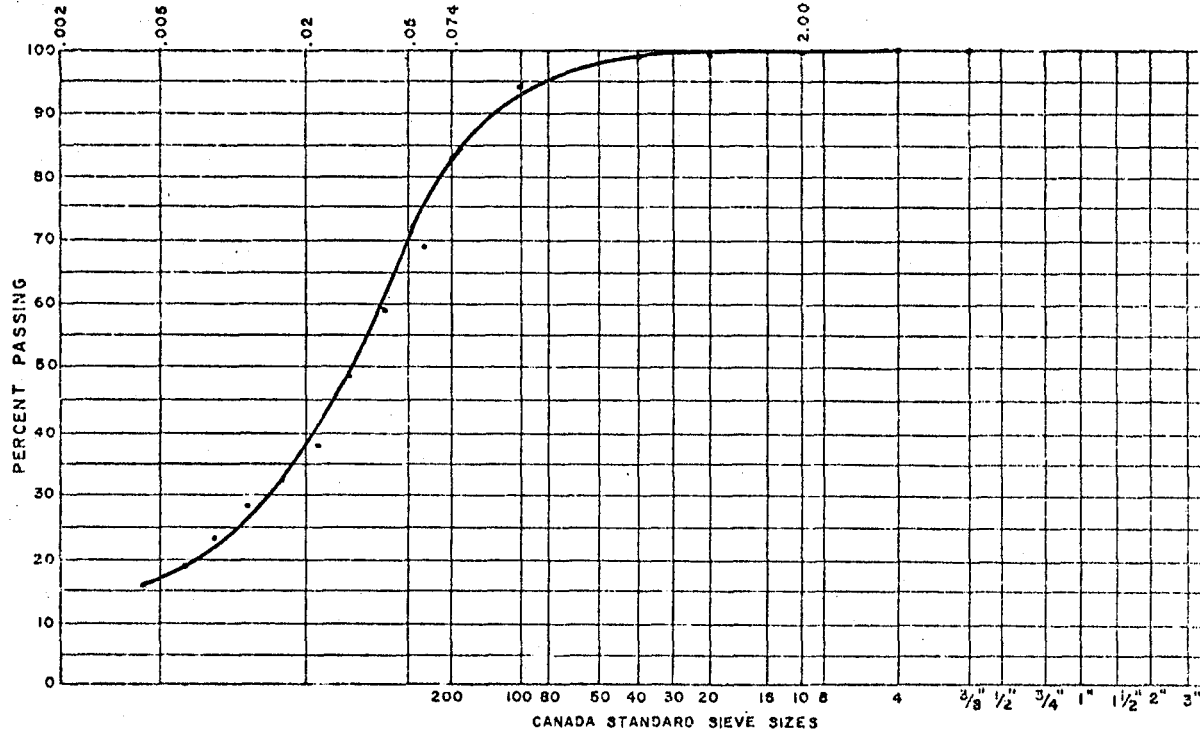
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HWY. RELOCATION MILE 0-78.  
 LOCATION STA. 653+85 E  
 HOLE NO. 111  
 DEPTH 1 1/2' - 3 1/2' FIELD NO. 87  
 SAMPLE TYPE BAG.

LAB. NO.  
8268

| LABORATORY'S REMARKS   | DATE SAMPLED                    |
|------------------------|---------------------------------|
| <u>ORGANIC TRACES.</u> | <u>18-9-74.</u>                 |
|                        | <u>23-9-74.</u>                 |
|                        | <u>13-12-74.</u>                |
|                        | <u>TESTED BY RK JE SA BS SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | Ø, mm SIEVE SIZE | % FINER BY WEIGHT | Ø, mm SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------------|-------------------|------------------|-------------------|
| #4         | 100.0             |            |                   | .0600            | 59.6              | .0045            | 14.5              |
| 10         | 99.8              |            |                   | .0138            | 50.4              |                  |                   |
| 20         | 99.8              |            |                   | .0318            | 42.2              |                  |                   |
| 40         | 99.4              |            |                   | .0731            | 34.0              |                  |                   |
| 100        | 82.0              |            |                   | .166             | 29.6              |                  |                   |
| 200        | 68.0              |            |                   | .0122            | 25.2              |                  |                   |
|            |                   |            |                   | .0088            | 20.8              |                  |                   |
|            |                   |            |                   | .0063            | 17.4              |                  |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|----------------------|------|------|-------|---------|------|
|            | CLAYEY SANDY SILT ML |      |      | TRACE | 46.     | 2.71 |

CRUSH COUNT %

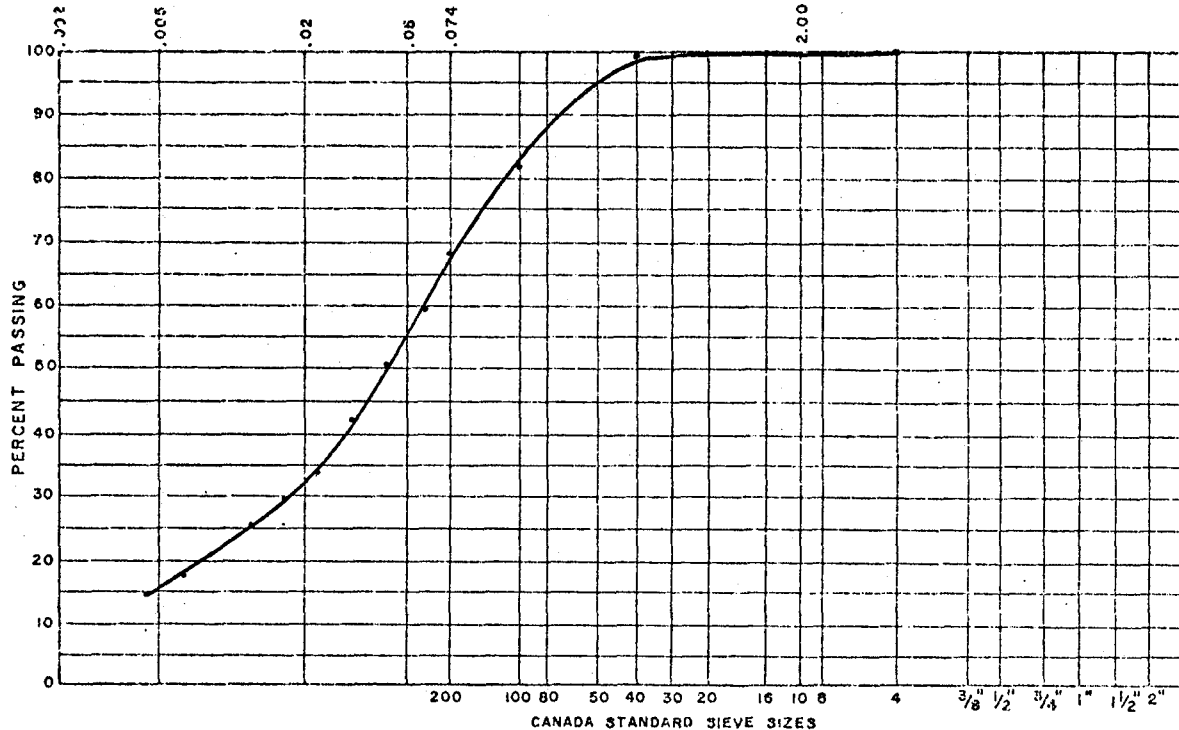
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 653+85 E  
 HOLE NO. III  
 DEPTH 4'-6" FIELD NO. 88  
 SAMPLE TYPE BAG

LAB. NO.  
8269

| LABORATORY'S REMARKS | DATE SAMPLED              |
|----------------------|---------------------------|
|                      | 18-9-74                   |
|                      | DATE RECEIVED 23-9-74     |
|                      | DATE RECORDED 12-12-74    |
|                      | TESTED BY R.K. JEHA BS SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | mm SIEVE SIZE | % FINER BY WEIGHT | mm SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|---------------|-------------------|---------------|-------------------|
| 3/8"       | 100.0             |            |                   | .0602         | 57.4              | .0045         | 10.1              |
| #4         | 99.5              |            |                   | .075          | 51.9              |               |                   |
| 10         | 96.9              |            |                   | .0316         | 44.2              |               |                   |
| 20         | 94.2              |            |                   | .0231         | 34.4              |               |                   |
| 40         | 91.2              |            |                   | .0166         | 28.2              |               |                   |
| 100        | 82.3              |            |                   | .0123         | 22.4              |               |                   |
| 200        | 77.1              |            |                   | .0088         | 18.7              |               |                   |
|            |                   |            |                   | .0063         | 13.8              |               |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------------|------|------|------|---------|------|
|            | CLAYEY SANDY SILT ML | 44.1 | 41.2 | 2.9  | 149.    | 2.71 |

CRUSH COUNT %

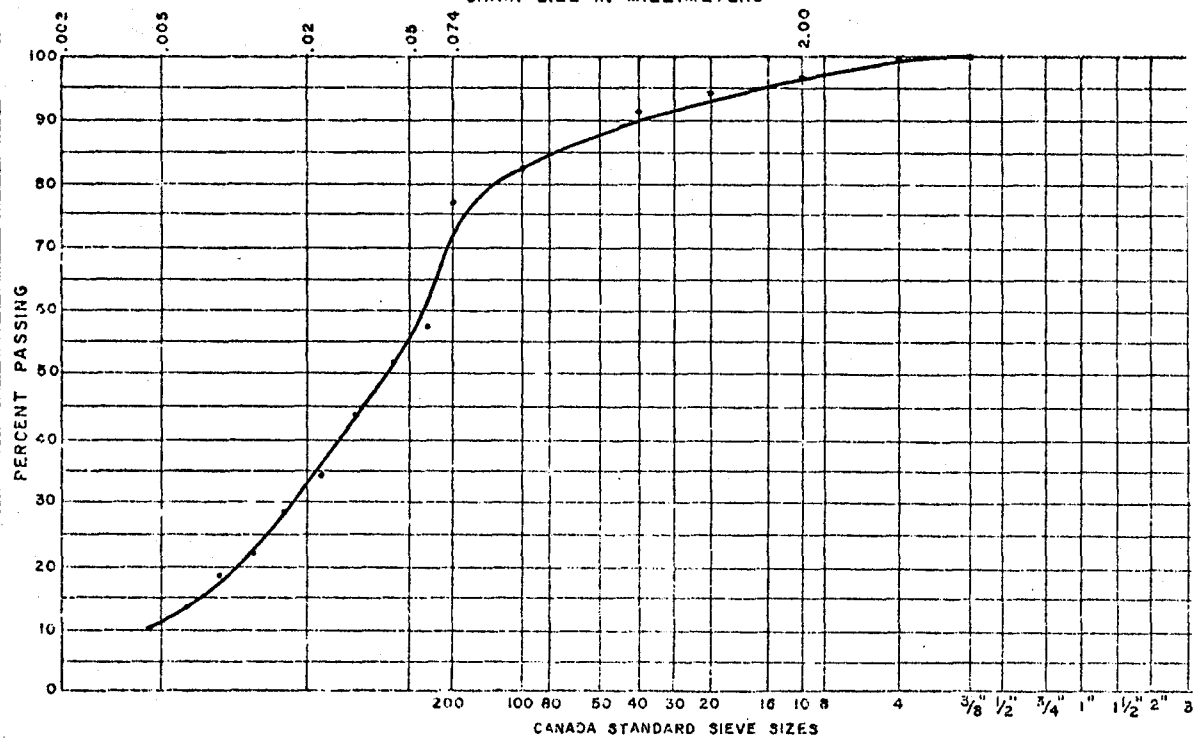
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY SILT SAND GRAVEL

PROJECT DEMISTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 659+80 E  
 HOLE NO. 114  
 DEPTH 2 1/2' - 4 1/2' FIELD NO. 89  
 SAMPLE TYPE SAG

LAB. NO.  
**8270**

LABORATORY'S REMARKS

DATE SAMPLED 18-9-74  
 DATE RECEIVED 23-9-74  
 DATE RECORDED 12-12-74  
 TESTED BY JK JE DA ST SE

GRAIN SIZE ANALYSIS

| SIEVE SIZE        | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|-------------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| *ORGANIC MATERIAL |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------|------|------|------|---------|------|
|            | PT             |      |      | N.P. | 166.    |      |
|            |                |      |      |      |         |      |
|            |                |      |      |      |         |      |

CRUSH COUNT %

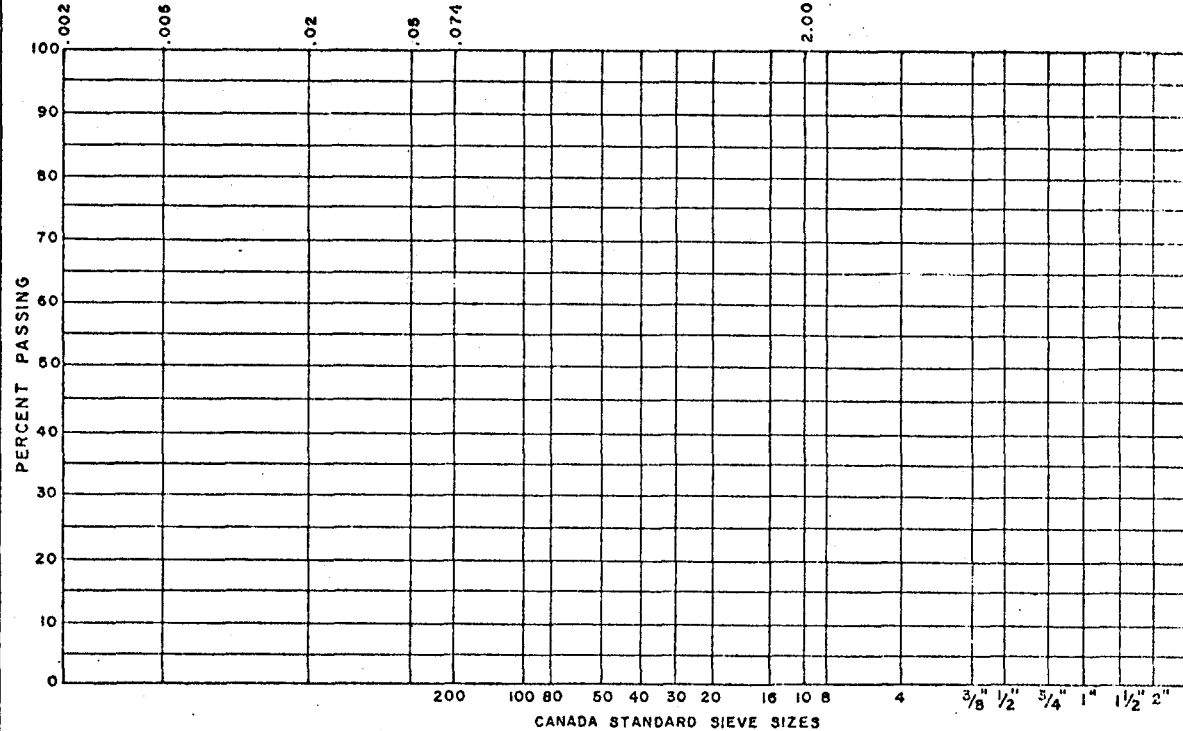
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 659+80 E  
 HOLE NO. 114  
 DEPTH 5'-6' FIELD NO. 90  
 SAMPLE TYPE BAG

LAB. NO.  
**8271**

| LABORATORY'S REMARKS | DATE SAMPLED                 |
|----------------------|------------------------------|
| *ORGANIC MATERIAL    | 18-9-74                      |
|                      | DATE RECEIVED 23-9-74        |
|                      | DATE RECORDED 11-12-74       |
|                      | TESTED BY <u>RK SE DA BS</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D. mm. SIEVE SIZE | % FINER BY WEIGHT | D. mm. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 3/8"       | 100.0             |            |                   | .0610             | 53.8              | .0045             | 16.2              |
| #4         | 98.4              |            |                   | .0441             | 47.5              |                   |                   |
| 10         | 94.5              |            |                   | .0318             | 42.3              |                   |                   |
| 20         | 89.0              |            |                   | .0229             | 36.3              |                   |                   |
| 40         | 84.0              |            |                   | .0165             | 31.5              |                   |                   |
| 100        | 70.5              |            |                   | .0127             | 27.3              |                   |                   |
| 200        | 61.1              |            |                   | .0087             | 22.8              |                   |                   |
|            |                   |            |                   | .0062             | 19.5              |                   |                   |

| SAMPLE NO. | CLASSIFICATION          | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|-------------------------|------|------|------|---------|------|
|            | CLAYEY SAND-SILT MIX ML | 25.8 | 24.9 | 0.9  | 86.     | 2.70 |

CRUSH COUNT %

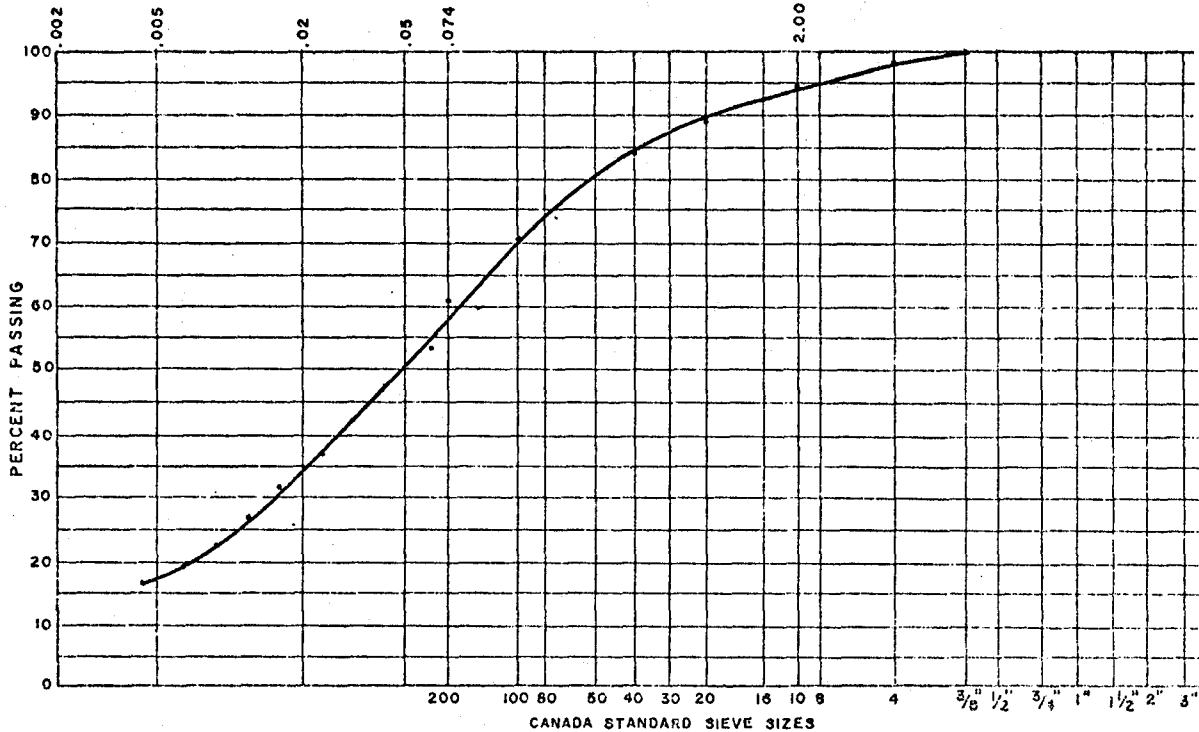
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 659+80 E  
 HOLE NO. 114  
 DEPTH 6 1/2' - 7 1/2' FIELD NO. 91  
 SAMPLE TYPE BAG

LAB. NO.  
8272

| LABORATORY'S REMARKS | DATE SAMPLED           |
|----------------------|------------------------|
| * ORGANIC TRACES     | 18-9-74                |
|                      | DATE RECEIVED 23-9-74  |
|                      | DATE RECORDED 17-12-74 |
|                      | TESTED BY RK JE & JS S |

GRAIN SIZE ANALYSIS

| SIEVE SIZE        | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|-------------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| *ORGANIC MATERIAL |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |
|                   |                   |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------|------|------|------|---------|------|
|            | PT             |      |      |      | 696.    |      |

CRUSH COUNT %

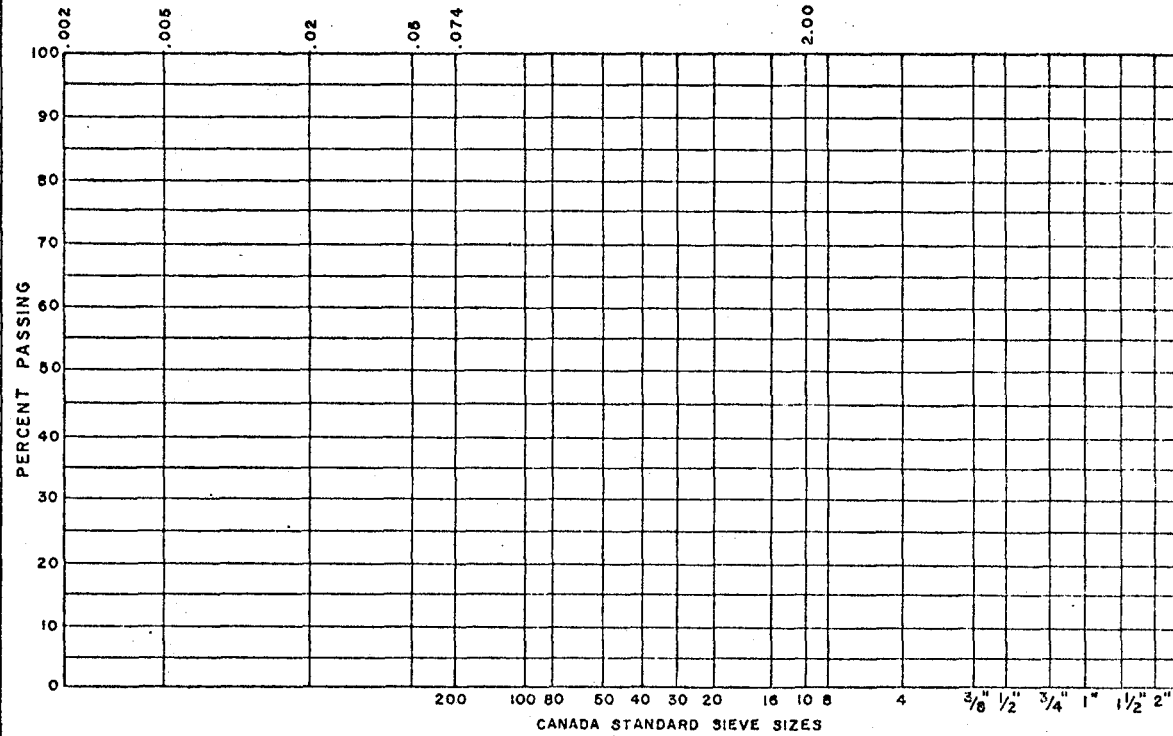
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 659+60 60' L. &  
 HOLE NO. 115  
 DEPTH 21-3 1/2' FIELD NO. 92  
 SAMPLE TYPE SAS

LAB. NO.  
**8273**

| LABORATORY'S REMARKS | DATE SAMPLED                  |
|----------------------|-------------------------------|
| *ORGANIC MATERIAL    | 19-9-74                       |
|                      | DATE RECEIVED 23-9-74         |
|                      | DATE RECORDED 11-12-74        |
|                      | TESTED BY <u>RK JE DH BJS</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE         | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|--------------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| * ORGANIC MATERIAL |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |
|                    |                   |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------|------|------|------|---------|------|
|            | PT             |      |      |      | 688.    |      |
|            |                |      |      |      |         |      |
|            |                |      |      |      |         |      |

CRUSH COUNT %

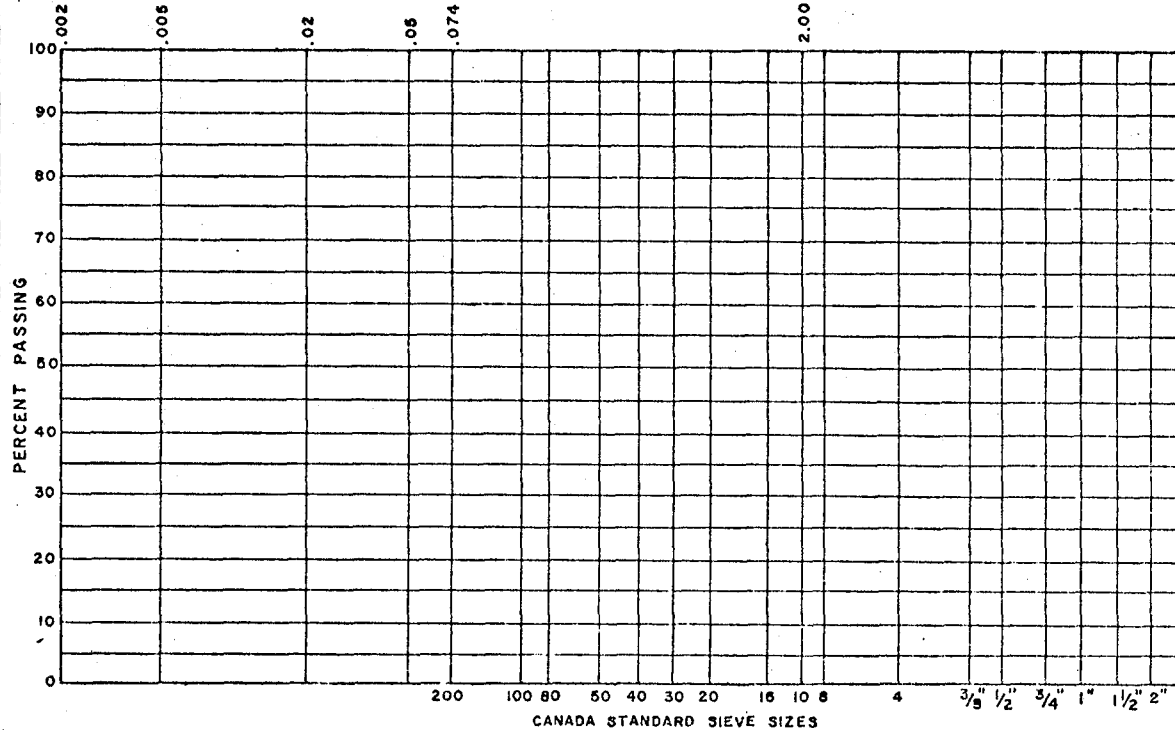
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEARSTEP HUXY RELOCATION MILE 0-78  
 LOCATION STA. 661+35 E  
 HOLE NO. 116  
 DEPTH 1 1/2' - 3 1/2' FIELD NO. 93  
 SAMPLE TYPE BAG

LAB. NO.  
8274

| LABORATORY'S REMARKS | DATE SAMPLED                 |
|----------------------|------------------------------|
| * ORGANIC MATERIAL   | 19-9-74                      |
|                      | DATE RECEIVED 23-9-74        |
|                      | DATE RECORDED 11-12-74       |
|                      | TESTED BY <u>RK JE DA BS</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/8"       | 100.0             |            |                   |            |                   |            |                   |
| #4         | 96.9              |            |                   |            |                   |            |                   |
| 10         | 87.8              |            |                   |            |                   |            |                   |
| 20         | 82.9              |            |                   |            |                   |            |                   |
| 40         | 78.3              |            |                   |            |                   |            |                   |
| 100        | 67.2              |            |                   |            |                   |            |                   |
| 200        | 61.5              |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION        | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|-----------------------|------|------|-------|---------|------|
|            | ORGANIC SANDY SILT OL |      |      | TRACE | 135     |      |

CRUSH COUNT %

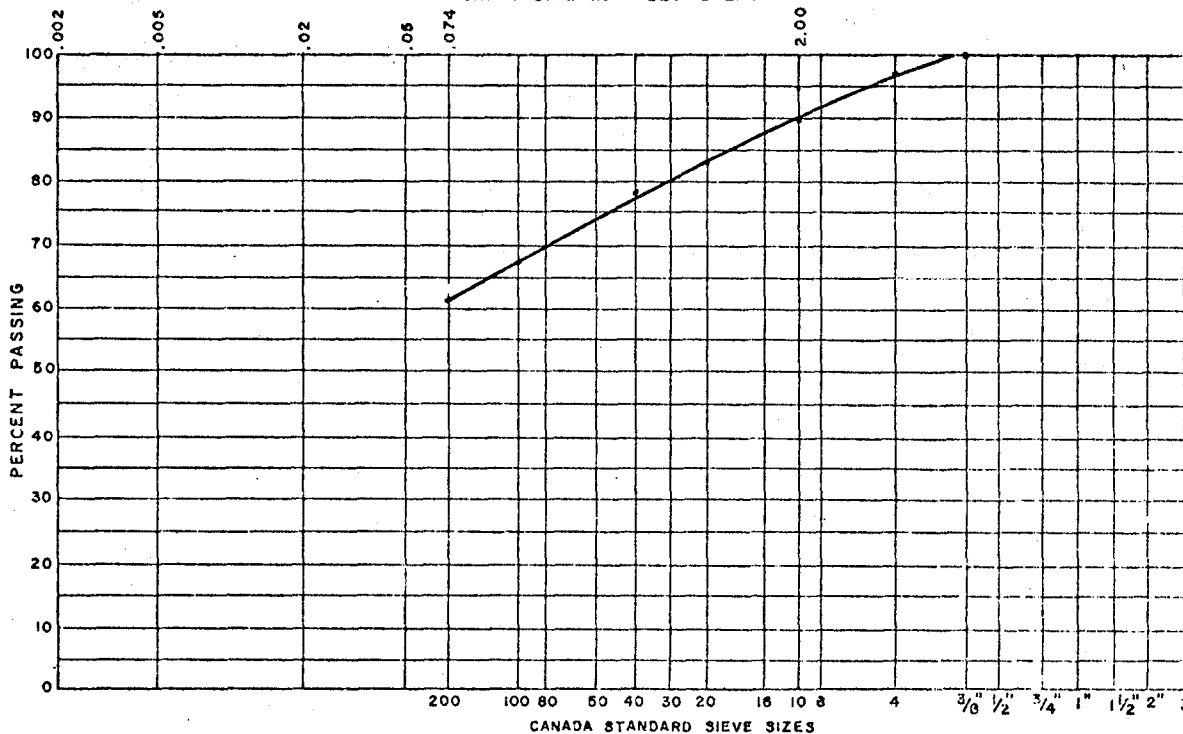
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 661+35 E  
 HOLE NO. 116  
 DEPTH 5 1/2' - 6 1/2' FIELD NO. 94  
 SAMPLE TYPE BAG

LAB. NO.  
**8275**

| LABORATORY'S REMARKS | DATE SAMPLED                |
|----------------------|-----------------------------|
| *CRS WIC MATERIAL    | 19-9-74                     |
|                      | DATE RECEIVED 23-9-74       |
|                      | DATE RECORDED 11-12-74      |
|                      | TESTED BY <u>RK JE HARS</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 3/8"       | 100.0             |            |                   |
| #4         | 97.2              |            |                   |
| 10         | 89.3              |            |                   |
| 20         | 82.6              |            |                   |
| 40         | 78.1              |            |                   |
| 100        | 62.2              |            |                   |
| 200        | 62.2              |            |                   |

| SAMPLE NO. | CLASSIFICATION        | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|-----------------------|------|------|------|---------|------|
|            | ORGANIC SANDY SILT OL |      |      | N.P. | 231.    |      |

CRUSH COUNT %

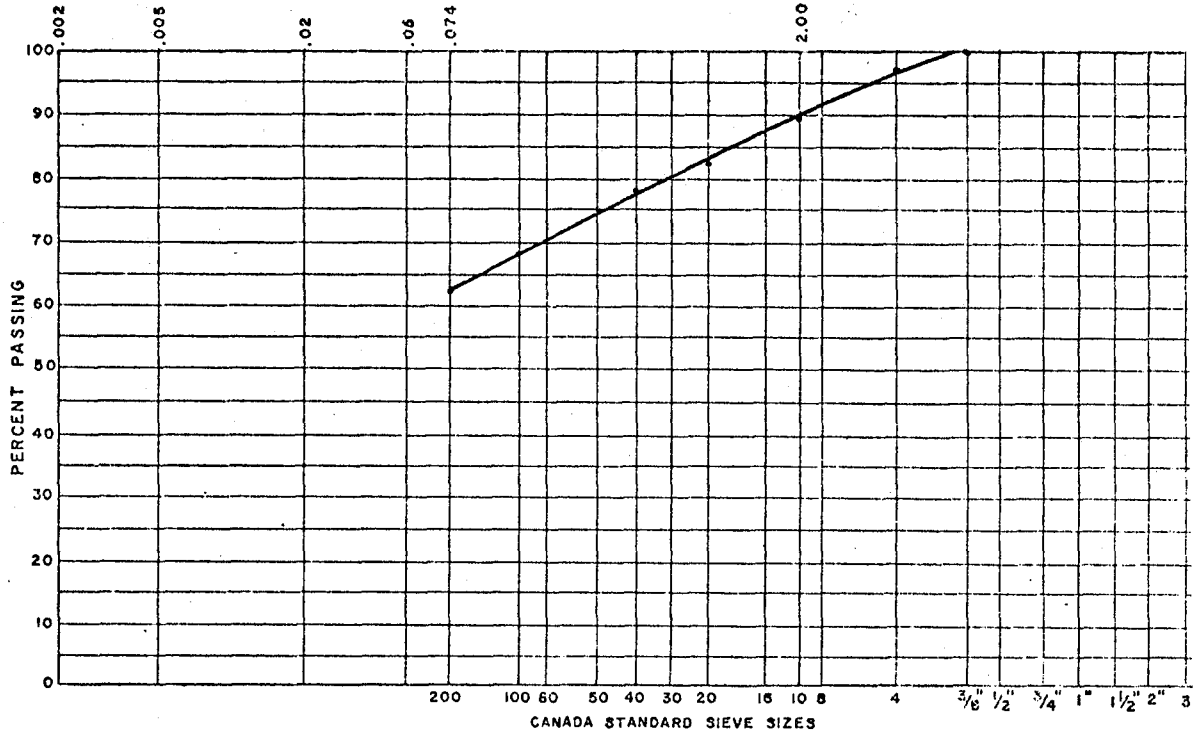
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 661+35 E  
 HOLE NO. 116  
 DEPTH 9 1/2' - 11 1/2' FIELD NO. 95  
 SAMPLE TYPE BAS.

LAB. NO.  
**8276**

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
| *ORGANIC MATERIAL    | 11-9-74                         |
|                      | DATE RECEIVED 23-9-74           |
|                      | DATE RECORDED 11-12-74          |
|                      | TESTED BY <u>RK JE DH BT SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. mm SIEVE SIZE | % FINER BY WEIGHT | U.S. mm SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| 3/8"       | 100.0             |            |                   | 0.584              | 68.5              | 0.046              | 9.8               |
| #4         | 99.5              |            |                   | 0.425              | 60.6              |                    |                   |
| 10         | 98.8              |            |                   | 0.315              | 47.9              |                    |                   |
| 20         | 97.9              |            |                   | 0.230              | 38.1              |                    |                   |
| 40         | 96.9              |            |                   | 0.167              | 29.2              |                    |                   |
| 100        | 90.6              |            |                   | 0.124              | 22.8              |                    |                   |
| 200        | 86.2              |            |                   | 0.087              | 17.4              |                    |                   |
|            |                   |            |                   | 0.063              | 14.0              |                    |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------------|------|------|------|---------|------|
|            | CLAYEY SANDY SILT ML | 43.7 | 39.1 | 4.6  | 95      | 2.70 |

CRUSH COUNT %

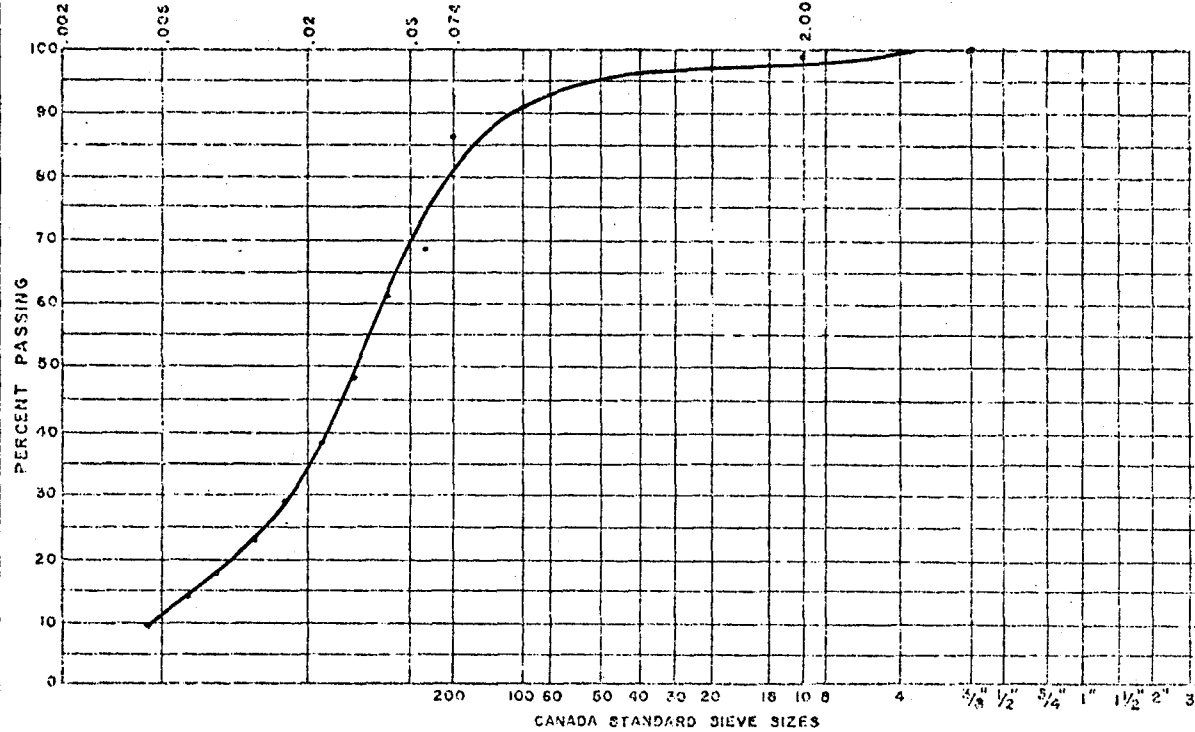
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMAREST HWY. RELOCATION MILE 0-78  
 LOCATION STA. 669+12 E  
 HOLE NO. 118  
 DEPTH 2'-4' FIELD NO. 96  
 SAMPLE TYPE BAS.

LAB. NO.  
**8277**

| LABORATORY'S REMARKS  | DATE SAMPLED                   |
|-----------------------|--------------------------------|
| <u>ORGANIC TRACES</u> | <u>19-9-74.</u>                |
|                       | <u>DATE RECEIVED 23-9-74.</u>  |
|                       | <u>DATE RECORDED 12-12-74.</u> |
|                       | <u>TESTED BY RK JEDH GS SE</u> |

GRAIN SIZE ANALYSIS

| NO | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|----|-------------------|------------|-------------------|------------|-------------------|
| 3" | 100.0             |            |                   | 0600       | 57.4              |
| 4  | 99.3              |            |                   | 0443       | 50.2              |
|    | 98.0              |            |                   | 0321       | 43.5              |
|    | 96.1              |            |                   | 0231       | 37.8              |
|    | 92.8              |            |                   | 0166       | 31.7              |
|    | 71.9              |            |                   | 0123       | 26.6              |
|    | 64.3              |            |                   | 0088       | 23.0              |
|    |                   |            |                   | 0063       | 19.8              |

| CLASSIFICATION       | L.L. | P.L. | P.I.  | NAT. %W. | S.G. |
|----------------------|------|------|-------|----------|------|
| CLAYEY SANDY SILT ML |      |      | TRACE | 80.      | 2.70 |

CRUSH COUNT %

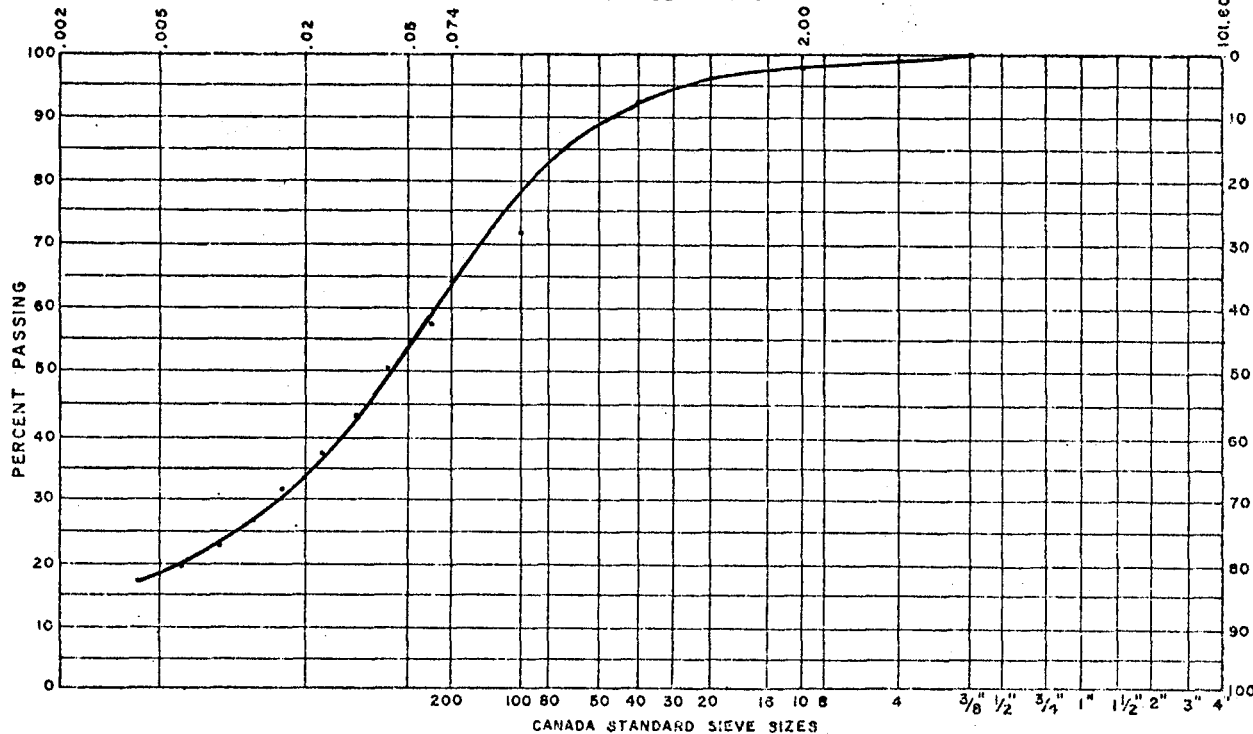
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ALT           |                   |
| ESTONE        |                   |
| NITIC         |                   |
| DSTONE        |                   |
| ILE           |                   |
| IST           |                   |
| RTZITE        |                   |
| ERS           |                   |

PARTICLE SHAPE ANALYSIS

|           |  |
|-----------|--|
| ND        |  |
| - ROUND   |  |
| ULAR      |  |
| - ANGULAR |  |
| TS        |  |
| DLES      |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 669+12 L  
 HOLE NO. 118  
 DEPTH 5 1/2' - 6 1/2' FIELD NO. 97  
 SAMPLE TYPE BAG

LAB. NO.  
**8278**

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | 19-9-74                         |
|                      | DATE RECEIVED 23-9-74           |
|                      | DATE RECORDED 16-12-74          |
|                      | TESTED BY <u>RK JE JA BT SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D.M.M. SIEVE SIZE | % FINER BY WEIGHT | D.M.M. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| #4         | 100.0             |            |                   | 0.630             | 47.7              | 0.045             | 15.8              |
| 10         | 98.9              |            |                   | 0.456             | 42.0              |                   |                   |
| 20         | 96.7              |            |                   | 0.329             | 35.9              |                   |                   |
| 40         | 92.9              |            |                   | 0.235             | 32.3              |                   |                   |
| 100        | 68.5              |            |                   | 0.168             | 28.8              |                   |                   |
| 200        | 54.3              |            |                   | 0.124             | 24.2              |                   |                   |
|            |                   |            |                   | 0.089             | 20.7              |                   |                   |
|            |                   |            |                   | 0.063             | 19.1              |                   |                   |

| SAMPLE NO. | CLASSIFICATION       | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|----------------------|------|------|------|---------|------|
|            | CLAYEY SILTY SAND ML | 17.8 | 17.5 | 0.3  | 70.     | 2.70 |

CRUSH COUNT %

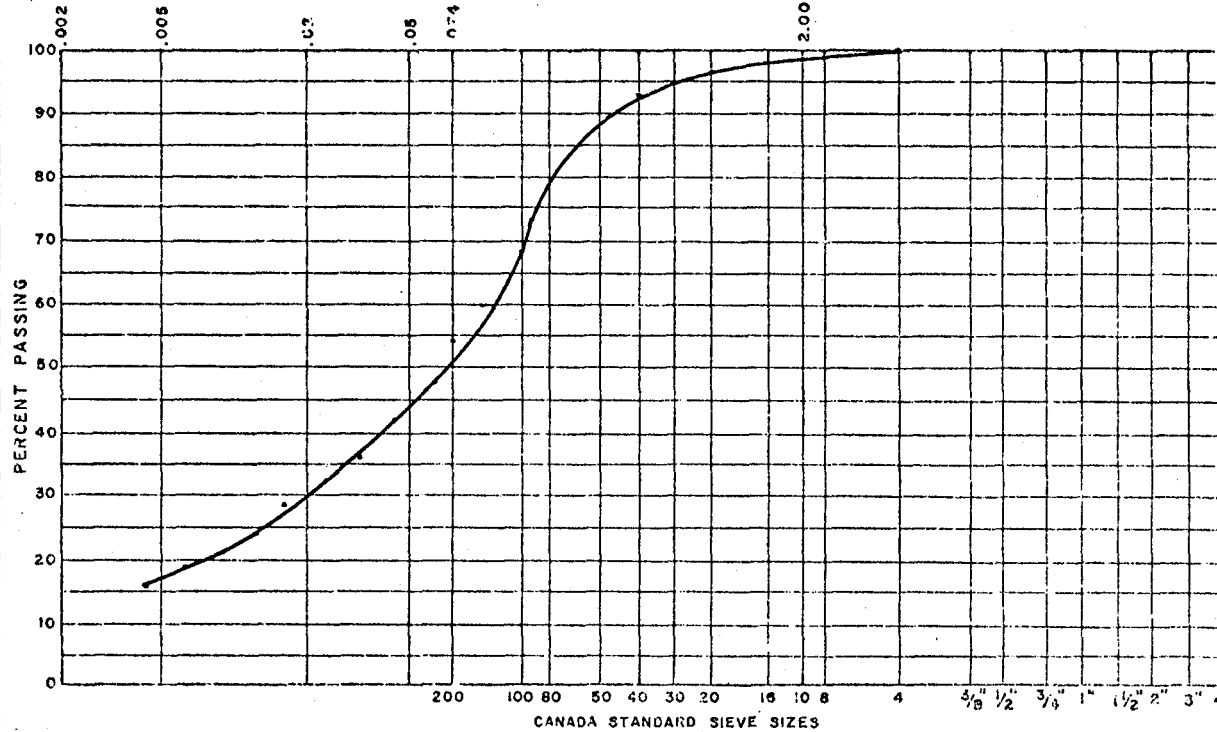
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 669+12E  
 HOLE NO. 118  
 DEPTH 6 3/4' - 7 1/2' FIELD NO. 98  
 SAMPLE TYPE SAS

LAB. NO.  
8279

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 19-9-74                  |
|                      | DATE RECEIVED 23-9-74    |
|                      | DATE RECORDED 17-12-74   |
|                      | TESTED BY RK JE JH BT SE |

GRAIN SIZE ANALYSIS

| VE<br>ZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | Ø.M.M.<br>SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | Ø.M.M.<br>SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT |
|----------|-------------------------|---------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8"       | 100.0                   |               |                         | 0.647                   | 39.8                    | 0.045                   | 13.4                    |
| 4        | 99.1                    |               |                         | 0.467                   | 34.7                    |                         |                         |
| 0        | 96.6                    |               |                         | 0.334                   | 30.2                    |                         |                         |
| 0        | 94.3                    |               |                         | 0.239                   | 26.1                    |                         |                         |
| 0        | 91.7                    |               |                         | 0.171                   | 22.9                    |                         |                         |
| 0        | 57.1                    |               |                         | 0.126                   | 20.7                    |                         |                         |
| 0        | 45.6                    |               |                         | 0.089                   | 17.9                    |                         |                         |
|          |                         |               |                         | 0.063                   | 15.9                    |                         |                         |

| PLE<br>O. | CLASSIFICATION                 | L.L. | P.L. | P.I. | NAT.<br>%W | S.G. |
|-----------|--------------------------------|------|------|------|------------|------|
|           | CLAYEY SAND-<br>SILT MIX<br>SM |      |      |      | 10.9       | 2.69 |

CRUSH COUNT %

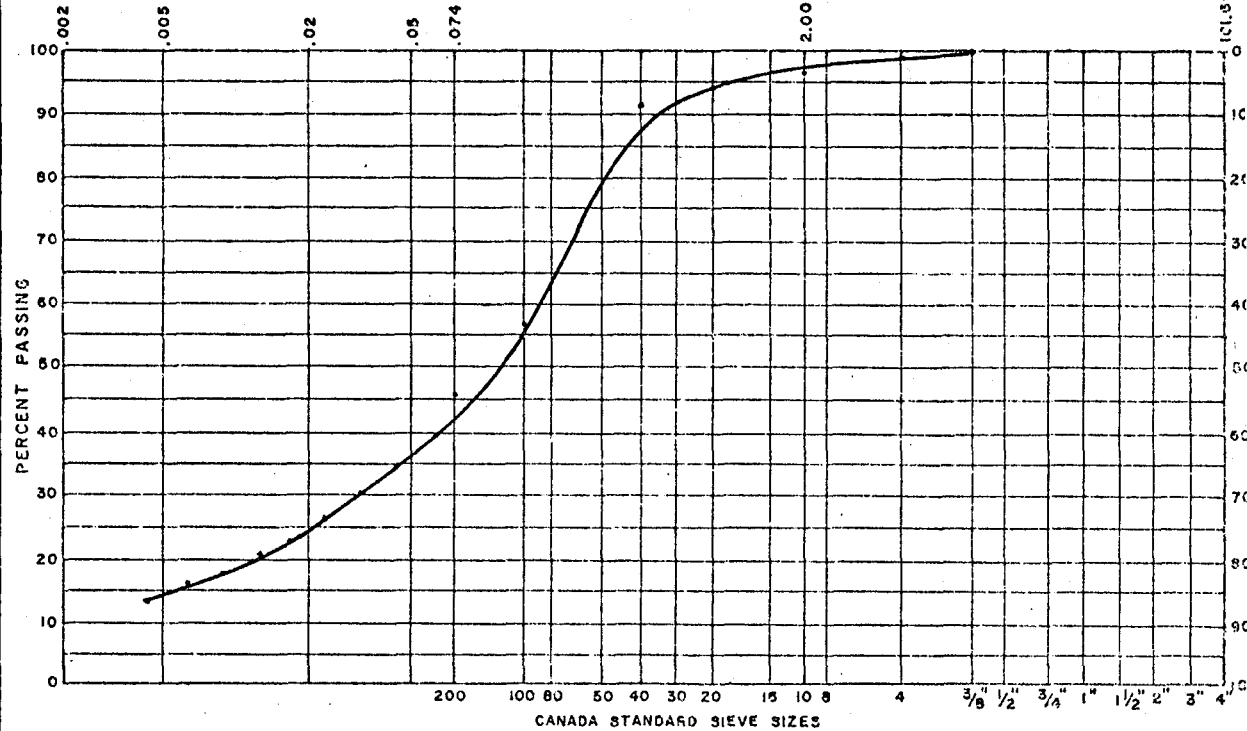
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| SALT          |                   |
| PELTONITE     |                   |
| ANITIC        |                   |
| NDSTONE       |                   |
| ALE           |                   |
| HIST          |                   |
| ARTZITE       |                   |
| HERS          |                   |

PARTICLE SHAPE ANALYSIS

|           |  |
|-----------|--|
| UND       |  |
| B-ROUND   |  |
| GULAR     |  |
| B-ANGULAR |  |
| ATS       |  |
| EDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 669+12 E  
 HOLE NO. 118  
 DEPTH 12 1/2' - 14' FIELD NO. 99  
 SAMPLE TYPE SAS

LAB. NO.  
8280

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | <u>19-9-74</u>                  |
|                      | <u>23-9-74</u>                  |
|                      | <u>16-12-74</u>                 |
|                      | TESTED BY <u>RK JE JH ST SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| #11        | 100.0             | #100       | 79.3              |
| #4         | 86.2              | #200       | 77.7              |
| #12        | 86.2              |            |                   |
| #8         | 86.2              |            |                   |
| #4         | 85.3              |            |                   |
| #10        | 83.9              |            |                   |
| #20        | 82.8              |            |                   |
| #40        | 81.8              |            |                   |

| SAMPLE NO. | CLASSIFICATION                   | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|------------|----------------------------------|------|------|-------|---------|------|
|            | ORGANIC SILT WITH FINE GRAVEL OL |      |      | TRACE | 111.    |      |

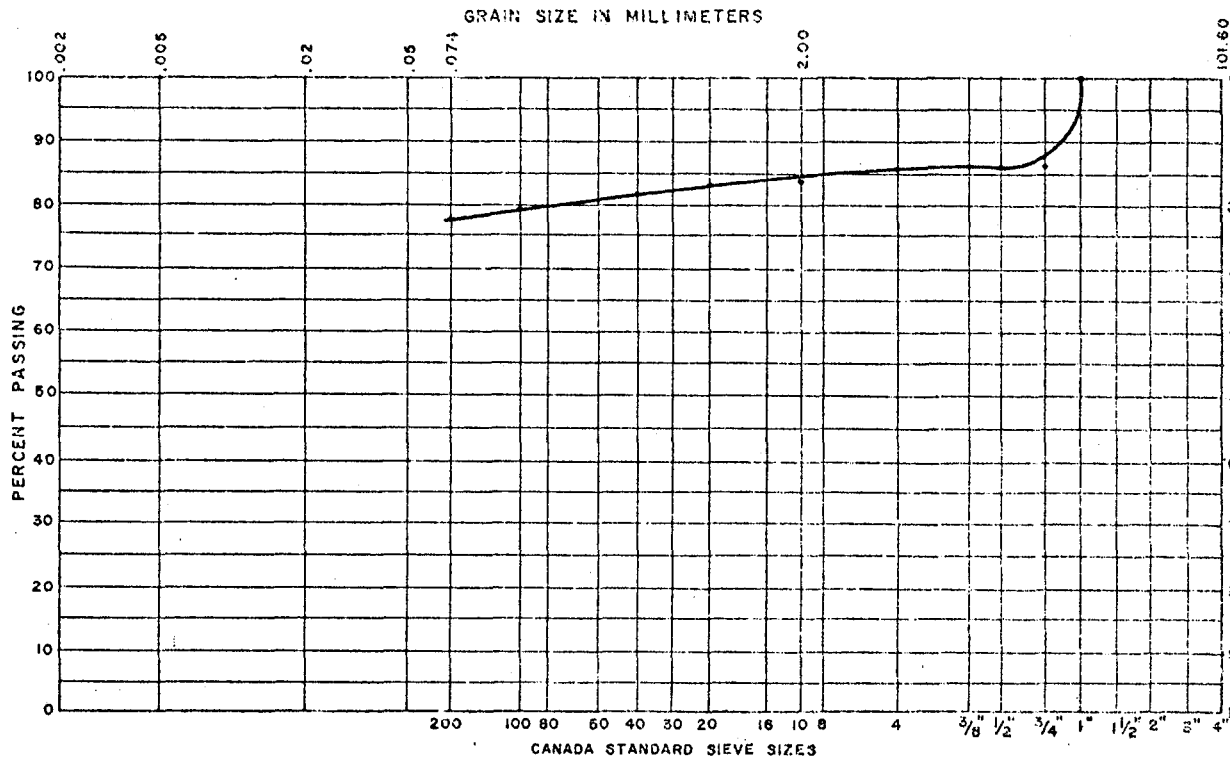
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| ESTONE        |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| OB-ROUND   |  |
| NGULAR     |  |
| OB-ANGULAR |  |
| ATS        |  |
| EDLES      |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMISTON HWY. (RELOCATION) MILE 0-78  
 LOCATION STA. 682+40 E  
 HOLE NO. 119  
 DEPTH 5 1/2' - 7' FIELD NO. 100  
 SAMPLE TYPE SAG

LAB. NO.  
**8281**

LABORATORY'S REMARKS  
 \* ORGANIC MATERIAL

DATE SAMPLED 19-9-74  
 DATE RECEIVED 23-9-74  
 DATE RECORDED 11-12-74  
 TESTED BY RK JF SA RT SF

GRAIN SIZE ANALYSIS

| VE<br>ZE | % FINER<br>BY<br>WEIGHT | SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | D.M.M.<br>SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT | D.M.M.<br>SIEVE<br>SIZE | % FINER<br>BY<br>WEIGHT |
|----------|-------------------------|---------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 11       | 100.0                   | #100          | 93.8                    | 0.538                   | 83.9                    | 0.045                   | 12.1                    |
| 4        | 95.8                    | 200           | 92.9                    | 0.075                   | 71.2                    |                         |                         |
| 2        | 95.8                    |               |                         | 0.296                   | 61.9                    |                         |                         |
| 1/8      | 95.8                    |               |                         | 0.220                   | 48.8                    |                         |                         |
| 1/4      | 95.8                    |               |                         | 0.162                   | 37.6                    |                         |                         |
| 0        | 95.5                    |               |                         | 0.122                   | 27.4                    |                         |                         |
| 0        | 95.2                    |               |                         | 0.088                   | 21.1                    |                         |                         |
| 0        | 94.7                    |               |                         | 0.063                   | 16.5                    |                         |                         |

| PLE<br>D. | CLASSIFICATION                        | L.L. | P.L. | P.I.  | NAT.<br>%W | S.G. |
|-----------|---------------------------------------|------|------|-------|------------|------|
|           | CLAYEY SILT<br>WITH MED. GRAVEL<br>ML |      |      | TRACE | 108.       | 2.72 |

CRUSH COUNT %

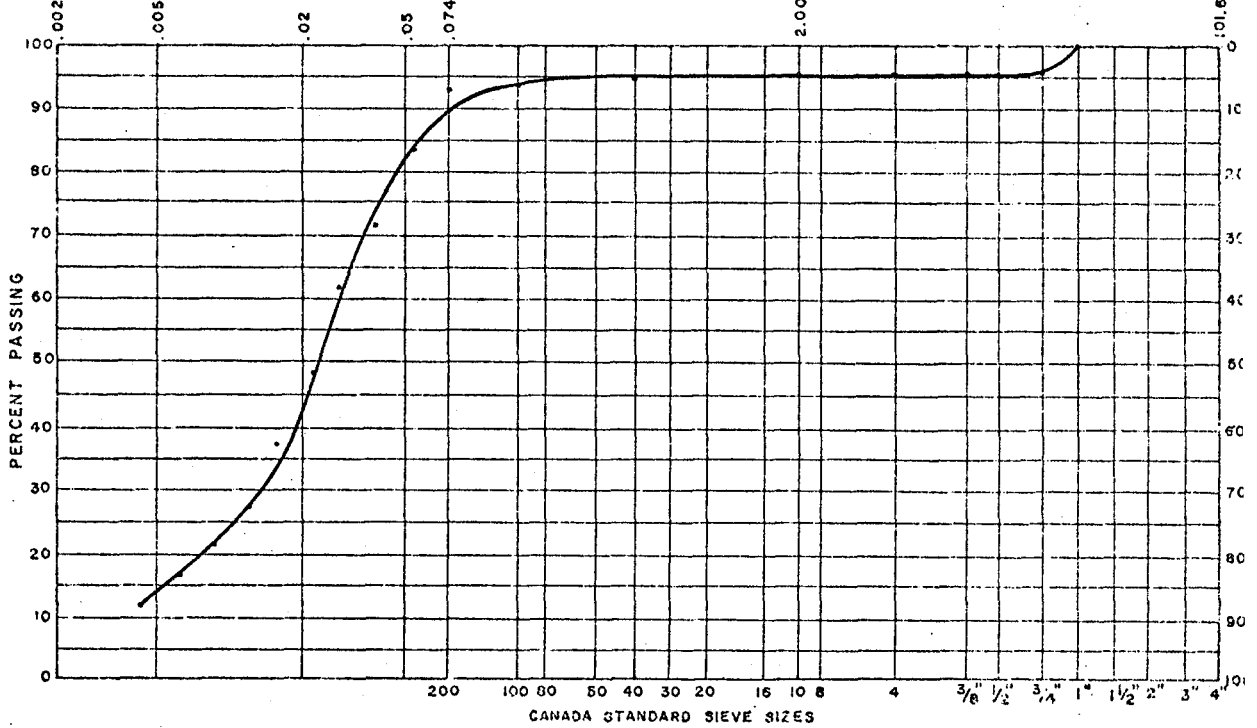
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| SALT          |                   |
| TESTONE       |                   |
| ANITIC        |                   |
| VDSTONE       |                   |
| ALE           |                   |
| 11ST          |                   |
| ARTZITE       |                   |
| HERS          |                   |

PARTICLE SHAPE ANALYSIS

| IND       |  |
|-----------|--|
| 3-ROUND   |  |
| 3-ULAR    |  |
| 3-ANGULAR |  |
| ITS       |  |
| 0LES      |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT: DEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION: STA. 682+40 E  
 HOLE NO. 119  
 DEPTH 7 1/2' - 9 1/2' FIELD NO. 101  
 SAMPLE TYPE: BAS.

LAB. NO.  
8282

LABORATORY'S REMARKS

|  |                          |
|--|--------------------------|
|  | DATE SAMPLED 19-9-74     |
|  | DATE RECEIVED 23-9-74    |
|  | DATE RECORDED 16-12-74   |
|  | TESTED BY RK JE DA BS SE |

GRAIN SIZE ANALYSIS

| SEIVE SIZE | % FINER BY WEIGHT | SEIVE SIZE | % FINER BY WEIGHT | D. (mm) SIEVE SIZE | % FINER BY WEIGHT | D. (mm) SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| #4         | 100.0             |            |                   | .0536              | 87.5              | .0045              | 12.6              |
| 10         | 99.6              |            |                   | .0400              | 74.3              |                    |                   |
| 20         | 99.5              |            |                   | .0295              | 64.5              |                    |                   |
| 40         | 99.3              |            |                   | .0219              | 50.9              |                    |                   |
| 100        | 98.5              |            |                   | .0161              | 39.2              |                    |                   |
| 200        | 97.8              |            |                   | .0121              | 28.6              |                    |                   |
|            |                   |            |                   | .0088              | 22.0              |                    |                   |
|            |                   |            |                   | .0063              | 17.2              |                    |                   |

| MPL NO. | CLASSIFICATION    | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|---------|-------------------|------|------|-------|---------|------|
|         | CLAYEY SILT<br>ML |      |      | TRACE | 64      | 2.72 |

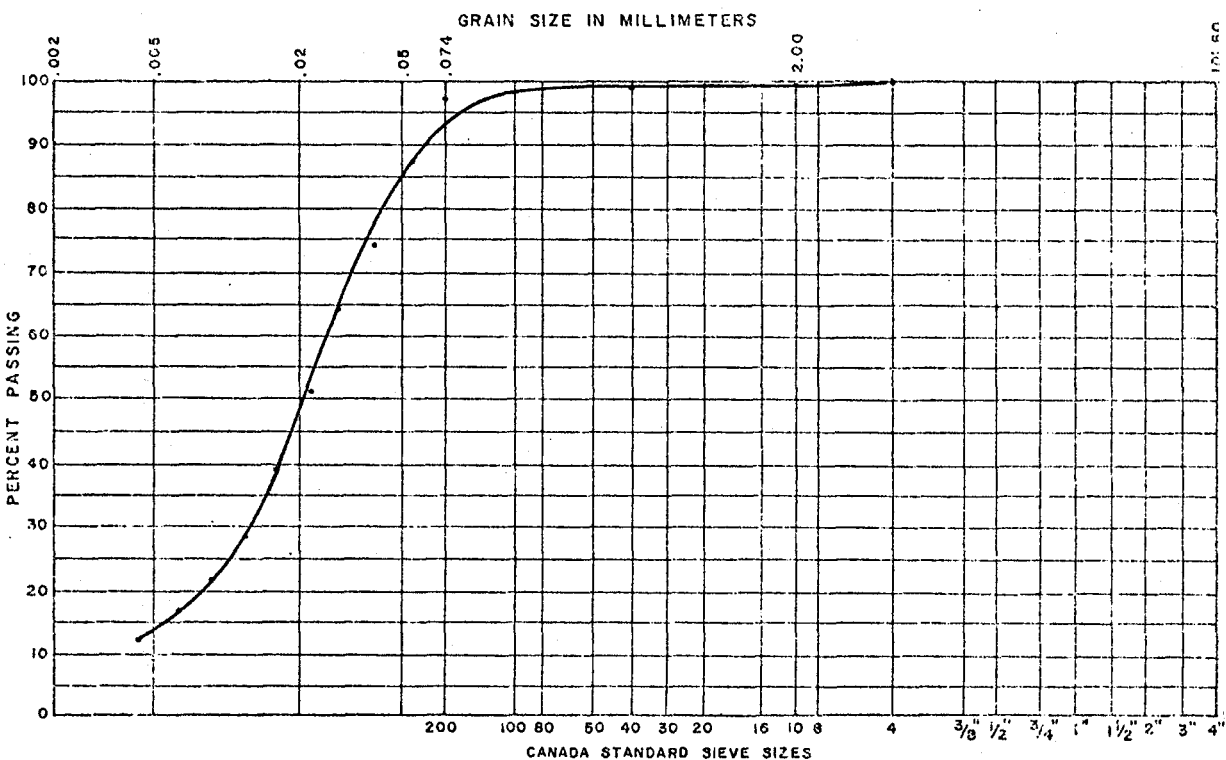
| CRUSH COUNT | % |
|-------------|---|
|             |   |

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| THEERS        |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| UB-ROUND   |  |
| NGULAR     |  |
| UB-ANGULAR |  |
| LATS       |  |
| EEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 682 + 40 E  
 HOLE NO. 119  
 DEPTH 10 1/2' - 12 1/2' FIELD NO. 102  
 SAMPLE TYPE BAS.

LAB. NO.  
**8283**

| LABORATORY'S REMARKS |
|----------------------|
|                      |
|                      |
|                      |
|                      |
|                      |

|                                 |
|---------------------------------|
| DATE SAMPLED <u>19-9-74</u>     |
| DATE RECEIVED <u>23-9-74</u>    |
| DATE RECORDED <u>16-12-74</u>   |
| TESTED BY <u>TK T. M. RT SF</u> |

GRAIN SIZE ANALYSIS

| EVE IZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D. mm SIEVE SIZE | % FINER BY WEIGHT | D. mm SIEVE SIZE | % FINER BY WEIGHT |
|---------|-------------------|------------|-------------------|------------------|-------------------|------------------|-------------------|
| 100     | 100.0             |            |                   | 0.0532           | 87.9              | 0.045            | 12.7              |
| 200     | 96.7              |            |                   | 0.402            | 74.6              |                  |                   |
|         |                   |            |                   | 0.296            | 64.8              |                  |                   |
|         |                   |            |                   | 0.270            | 51.1              |                  |                   |
|         |                   |            |                   | 0.162            | 39.4              |                  |                   |
|         |                   |            |                   | 0.122            | 28.7              |                  |                   |
|         |                   |            |                   | 0.088            | 22.1              |                  |                   |
|         |                   |            |                   | 0.063            | 17.3              |                  |                   |

| MPLE NO. | CLASSIFICATION    | L.L. | P.L. | P.I.  | NAT. %W | S.G. |
|----------|-------------------|------|------|-------|---------|------|
|          | CLAYEY SILT<br>ML |      |      | TRACE | 52      | 2.72 |

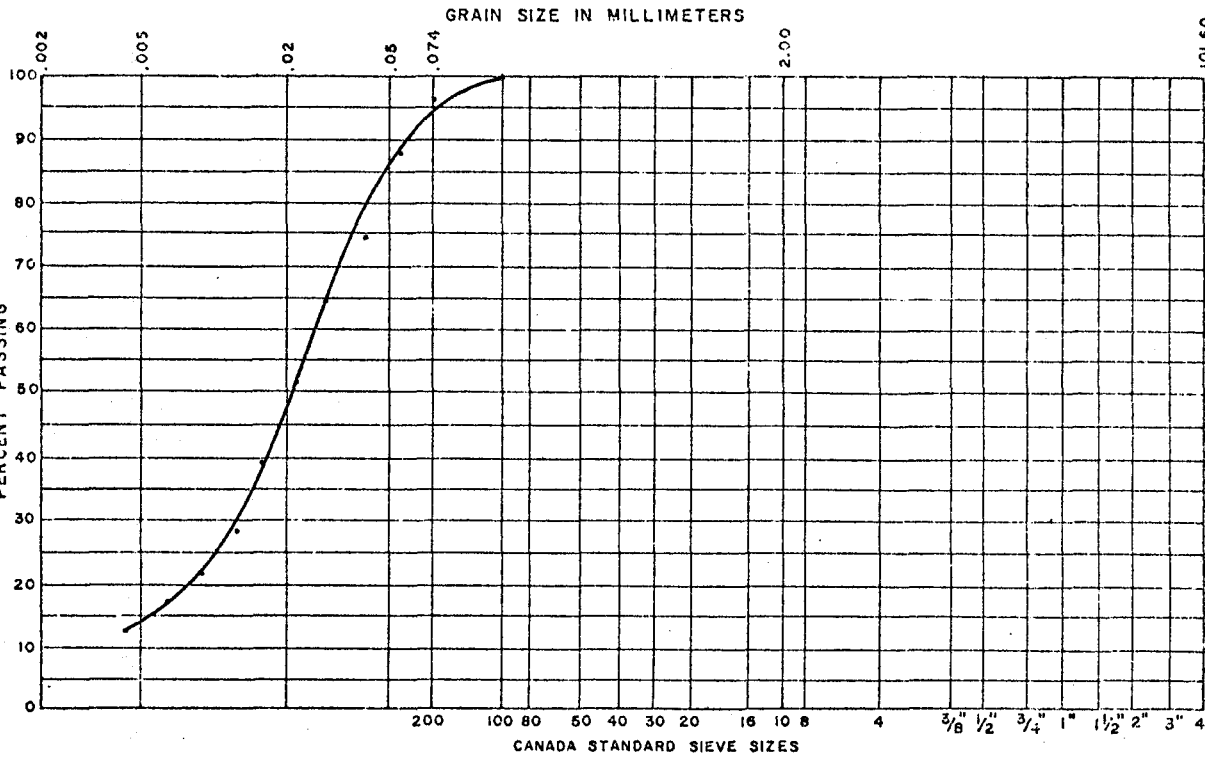
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| IMESTONE      |                   |
| RANITIC       |                   |
| ANDSTONE      |                   |
| HALE          |                   |
| CHIST         |                   |
| UARTZITE      |                   |
| THERS         |                   |

PARTICLE SHAPE ANALYSIS

|            |  |
|------------|--|
| OUND       |  |
| UB-ROUND   |  |
| NGULAR     |  |
| UB-ANGULAR |  |
| LATS       |  |
| FFDI FS    |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEM/STER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 682+40 E  
 HOLE NO. 119  
 DEPTH 13 1/2' - 15' FIELD NO. 103  
 SAMPLE TYPE BAG

LAB. NO.  
**8284**

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | 19-9-74                         |
|                      | DATE RECEIVED 23-9-74           |
|                      | DATE RECORDED 16-12-74          |
|                      | TESTED BY <u>RK JE JA BT SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | Sieve Size | % Finer by Weight | Sieve Size | % Finer by Weight |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1/2"       | 100.0             | #40        | 56.5              | 0.075      | 37.6              | 0.075      | 9.4               |
|            | 83.6              | 100        | 46.7              | 0.15       | 33.4              |            |                   |
| 1/4"       | 83.6              | 200        | 41.8              | 0.3        | 29.7              |            |                   |
| 2"         | 83.6              |            |                   | 0.6        | 23.8              |            |                   |
| 3/8"       | 79.6              |            |                   | 1.18       | 19.6              |            |                   |
| 4"         | 73.0              |            |                   | 2.0        | 16.9              |            |                   |
| 0"         | 65.5              |            |                   | 3.75       | 14.0              |            |                   |
| 0"         | 60.9              |            |                   | 7.5        | 11.5              |            |                   |

| U.C.                       | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|----------------------------|----------------|------|------|------|---------|------|
|                            | SM             | -    | -    | -    | 19      | 2.68 |
| GRAVELLY SAND-SILT MIXTURE |                |      |      |      |         |      |
| CRUSH COUNT                |                |      |      |      |         | %    |

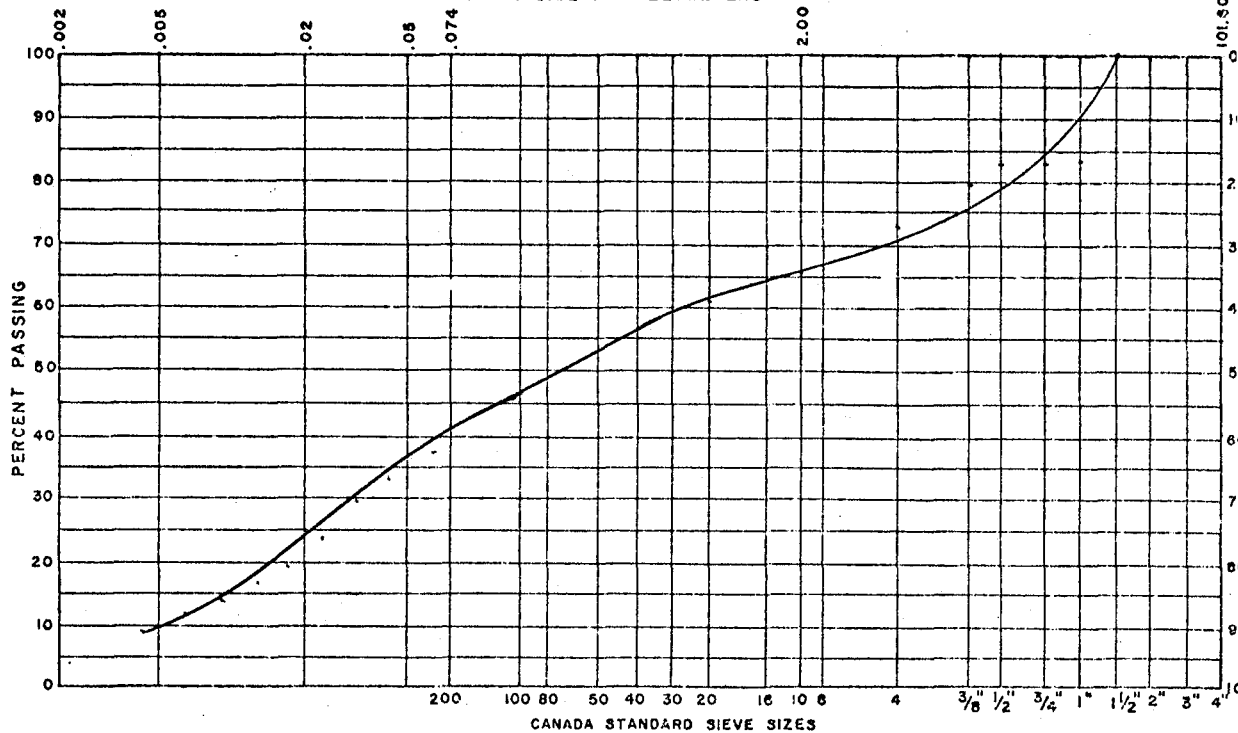
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| SALT          |                   |
| WHEATSTONE    |                   |
| QUARTZ        |                   |
| WHEATSTONE    |                   |
| GRAVEL        |                   |
| SILT          |                   |
| CLAY          |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLAT        |  |
| EDGES       |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HWY. RELOCATION MILE 0-7.8  
 LOCATION STA. 636+05 E  
 HOLE NO. 169  
 DEPTH 1 1/2' - 2 1/2' FIELD NO. 193  
 SAMPLE TYPE BAG

LAB. NO.  
8662

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 26-9-74                  |
|                      | DATE RECEIVED - 10-74    |
|                      | DATE RECORDED 03-1-75    |
|                      | TESTED BY RK JE DH BS SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | D. (mm) SIEVE SIZE | % FINER BY WEIGHT | D. (mm) SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| 3/4"       | 100.0             | #200       | 46.9              | .0653              | 39.4              | #16                | 10.1              |
| 1/2        | 94.5              |            |                   | .0475              | 32.9              |                    |                   |
| 3/8        | 94.2              |            |                   | .0341              | 27.7              |                    |                   |
| 1/4        | 81.8              |            |                   | .0245              | 23.1              |                    |                   |
| 10         | 85.1              |            |                   | .0175              | 19.0              |                    |                   |
| 20         | 82.0              |            |                   | .0125              | 16.3              |                    |                   |
| 40         | 78.5              |            |                   | .0092              | 14.1              |                    |                   |
| 100        | 56.9              |            |                   | .0065              | 12.2              |                    |                   |

| AMPLE NO.         | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|-------------------|----------------|------|------|------|---------|------|
|                   | SM             |      |      | W.P. | 19      | 2.68 |
| SAND-SILT MIXTURE |                |      |      |      |         |      |

CRUSH COUNT %

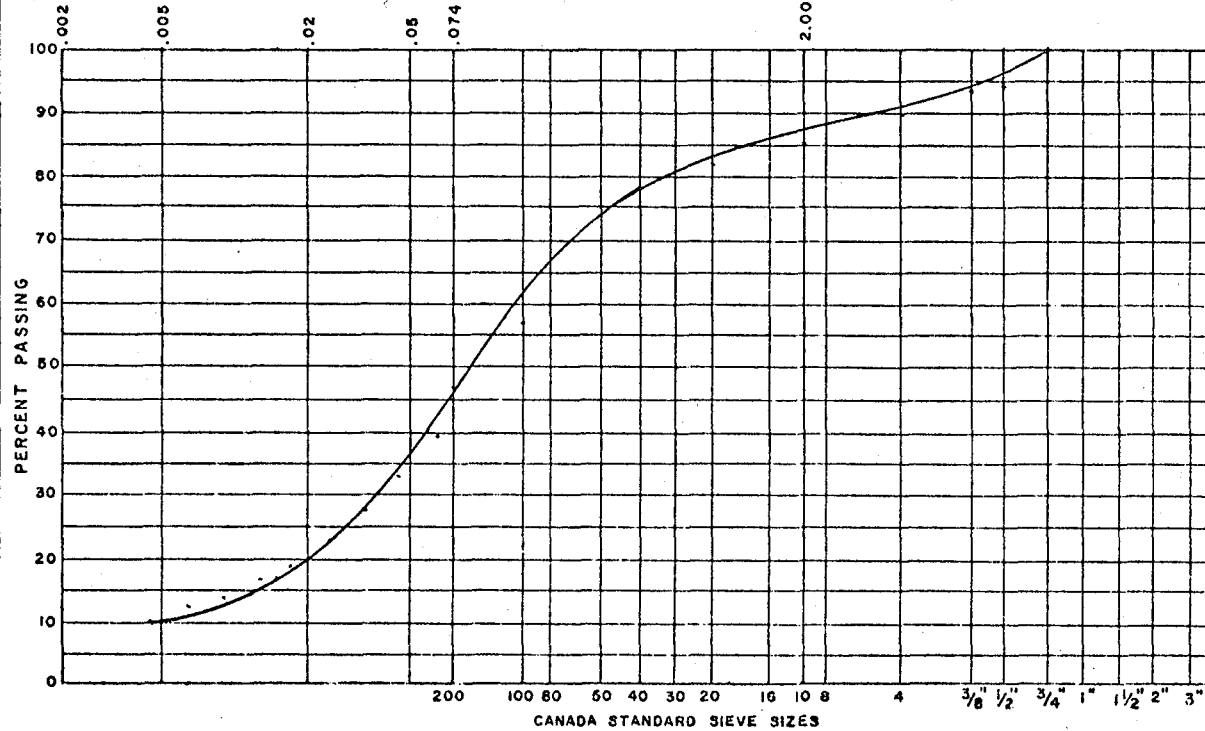
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMETER HWY. RELOCATION MILE 0-78  
 LOCATION STA. 636+05 ±  
 HOLE NO. 169  
 DEPTH 3 1/2' - 4 1/2' FIELD NO. 194  
 SAMPLE TYPE SAG

LAB. NO.  
8663

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | 26-9-74                         |
|                      | - 10-74                         |
|                      | 03-1-75                         |
|                      | TESTED BY <u>RK JE JA KS SE</u> |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 1/2"       | 100.0             | #40        | 46.0              | 100             | 21.4              | #46             | 5.4               |
| 1          | 68.4              | 100        | 32.2              | 148             | 17.8              |                 |                   |
| 3/4        | 61.5              | 200        | 24.1              | 135             | 15.1              |                 |                   |
| 1 1/2      | 61.5              |            |                   | 125             | 12.6              |                 |                   |
| 3/8        | 60.8              |            |                   | 118             | 10.8              |                 |                   |
| #4         | 57.0              |            |                   | 130             | 9.6               |                 |                   |
| 10         | 52.8              |            |                   | 192             | 7.7               |                 |                   |
| 20         | 49.3              |            |                   | 266             | 6.2               |                 |                   |

| SAMPLE NO.               | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|--------------------------|----------------|------|------|------|---------|------|
|                          | SM             |      |      | N.P. | 14      | 2.67 |
| SILT-SAND-GRAVEL MIXTURE |                |      |      |      |         |      |

CRUSH COUNT %

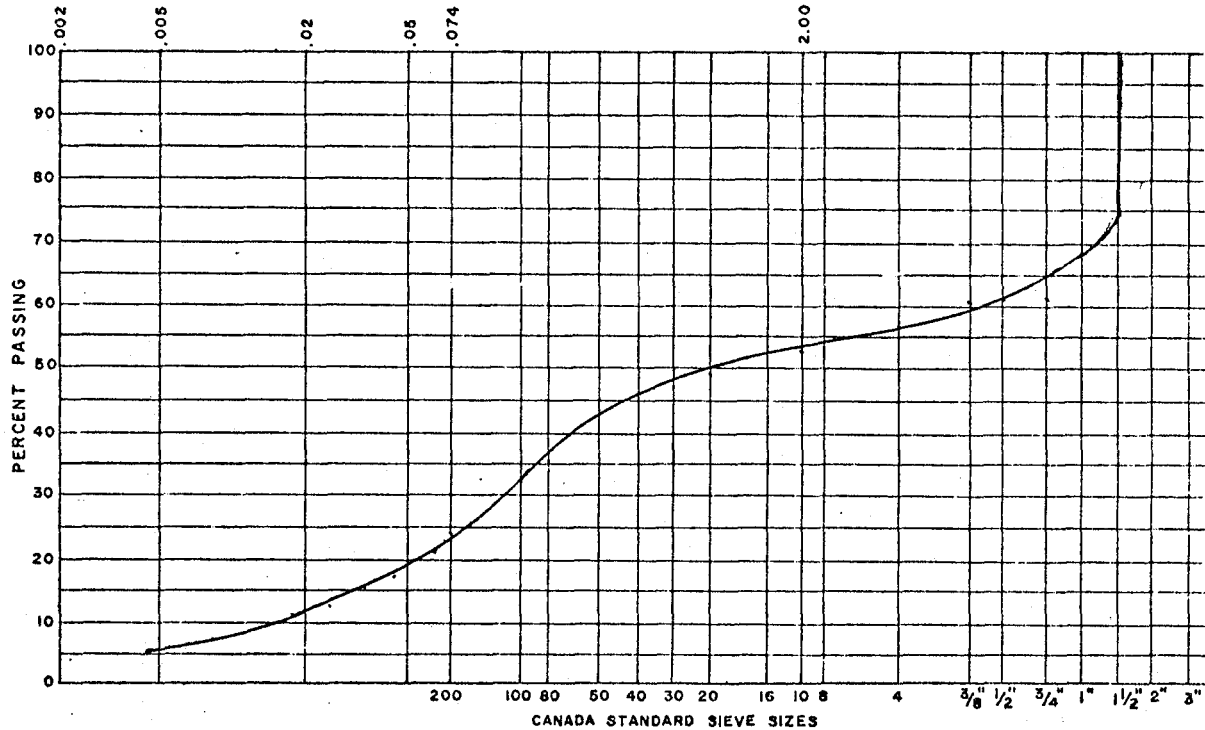
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY SILT SAND GRAVEL

PROJECT DEMISTON HWY. RELOCATION MILE 0-78  
 LOCATION STA. 636+05 E  
 HOLE NO. 169  
 DEPTH 5 1/2' - 7' FIELD NO. 195  
 SAMPLE TYPE BAG

LAB. NO.  
8664

| LABORATORY'S REMARKS | DATE SAMPLED              |
|----------------------|---------------------------|
|                      | 26-9-74                   |
|                      | DATE RECEIVED - 10-74     |
|                      | DATE RECORDED 03-1-75     |
|                      | TESTED BY RIK JE DA RT SE |

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2"       | 100.0             | #40        | 25.9              |
| 1          | 73.9              | 100        | 17.9              |
| 3/4        | 68.6              | 200        | 13.9              |
| 1/2        | 64.3              |            |                   |
| 3/8        | 57.6              |            |                   |
| #4         | 46.0              |            |                   |
| 10         | 36.7              |            |                   |
| 20         | 30.5              |            |                   |

| AMPLE NO.          | CLASSIFICATION | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|--------------------|----------------|------|------|------|---------|------|
|                    | GM             |      |      | N.P. | 6       |      |
| SILTY SANDY GRAVEL |                |      |      |      |         |      |

CRUSH COUNT %

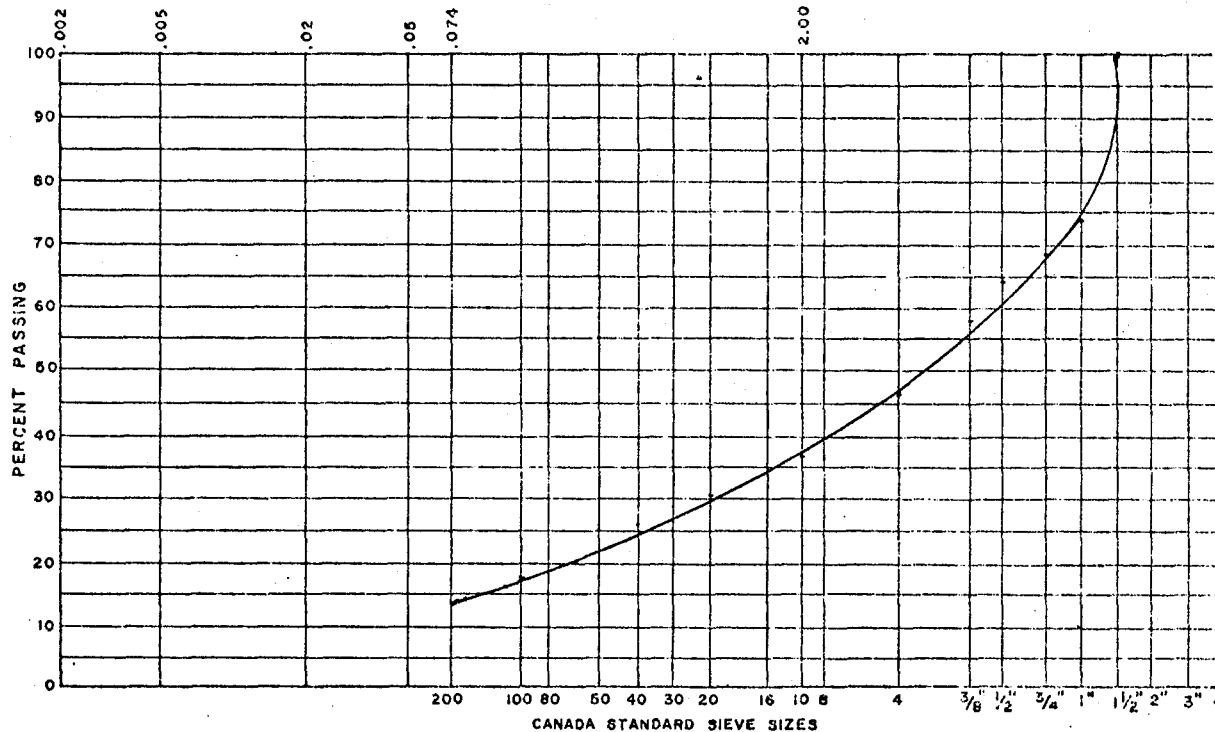
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT JEMSTER HWY. RELOCATION-MILE 0-78  
 LOCATION STA. 636+05 &  
 HOLE NO. 169  
 DEPTH 7 1/2' - 8 1/2' FIELD NO. 196  
 SAMPLE TYPE BAS

LAB. NO.  
8665

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 26-9-74                  |
|                      | DATE RECEIVED - 10-74    |
|                      | DATE RECORDED 02-1-75    |
|                      | TESTED BY RK JE JA ST SE |

DRILL LOG SUMMARIES

AUG. 1975 INVESTIGATION

**PUBLIC WORKS, CANADA**

PACIFIC REGION  
DESIGN / CONSTRUCTION  
CIVIL ENGINEERING - YUKON

**RECORD OF SUBSURFACE EXPLORATION PROGRAM**  
**DRILLING AND LABORATORY TESTING**  
WHITEHORSE QUALITY CONTROL CENTER, WHITEHORSE, Y.T.

PROJECT DEMONSTRER HWY. BLACKSTONE RIVER

HOLE NO. 75-1 DATE \_\_\_\_\_

LOCATION STATION 655+01 E

ELEVATION \_\_\_\_\_ SHEET 1 OF 1

DRILLING NOTES

LABORATORY TESTING

HOLE DEPTH 50'  
TYPE OF DRILL \_\_\_\_\_  
WATER LEVEL \_\_\_\_\_

DEPTH (FT) | SOIL DESCRIPTION

1 1/2' | ORGANIC  
          | -SANDY SILT

3 1/2' | SILTY GRAVEL-SAND MIX - odd COBBLE

50' | BOTTOM OF HOLE

| SAMPLE IDENTIFICATION DATA |                       | LABORATORY TESTING |                   |                              |                          |            |          |                         |                  |  |  | MECHANICAL ANALYSIS |                   |                      |                        |              |          |       |    |    |   |  |  |
|----------------------------|-----------------------|--------------------|-------------------|------------------------------|--------------------------|------------|----------|-------------------------|------------------|--|--|---------------------|-------------------|----------------------|------------------------|--------------|----------|-------|----|----|---|--|--|
| SAMPLE DEPTH (FT)          | SAMPLE NUMBER (FIELD) | SAMPLE TYPE        | LABORATORY NUMBER | NATURAL MOISTURE CONTENT (%) | DEGREE OF SATURATION (%) | V200 RATIO | POROSITY | DRY DENSITY (LBS/CU FT) | SPECIFIC GRAVITY | STANDARD PENETRATION RESISTANCE (Blows/FT) | UNCONFINED COMPRESSIVE STRENGTH (LBS/IN <sup>2</sup> ) | CONSISTENCY LIMITS  |                   |                      | UNIFIED CLASSIFICATION | MAXIMUM SIZE | PASS NO. |       |    |    |   |  |  |
|                            |                       |                    |                   |                              |                          |            |          |                         |                  |  |  | LIQUID LIMIT (%)    | PLASTIC LIMIT (%) | PLASTICITY INDEX (%) |                        |              | 5        | 200   | 40 | 10 | 5 |  |  |
| 1 1/2                      | 3                     | 1                  | BAS               | 1702                         | 38                       |            |          | 2.68                    |                  |  |  | N.P.                | ML                | #4                   | 7.9                    | 98.3         | 99.6     | 100.0 |    |    |   |  |  |
| 10                         | 11 1/2                | 2                  | SPT               | 1703                         | 13                       |            |          | 2.68                    | 140              |  |  | N.P.                | SM                | 1"                   | 33.7                   | 50.7         | 64.3     | 75.1  |    |    |   |  |  |
| 15                         | 16 1/2                | 3                  | SPT               | 1704                         | 11                       |            |          | 2.68                    | 100/4"           |  |  | N.P.                | SM                | 1"                   | 27.3                   | 42.8         | 54.5     | 63.5  |    |    |   |  |  |
| 20                         | 21 1/2                | 4                  | SPT               | 1712                         | -                        |            |          | 2.66                    | 100/2"           |  |  | N.P.                | SM                | 1 1/2"               | 11.7                   | 31.3         | 43.5     | 50.9  |    |    |   |  |  |
| 25                         | 26 1/2                | 5                  | SPT               | 1713                         | -                        |            |          | -                       | 110/3"           |  |  | N.P.                | GW                | 1"                   | 5.1                    | 7.5          | 13.1     | 24.3  |    |    |   |  |  |
| 30                         | 31 1/2                | 6                  | SPT               | 1714                         | -                        |            |          | -                       | 100/5"           |  |  | N.P.                | GW                | 1 1/2"               | 7.8                    | 14.6         | 27.3     | 43.7  |    |    |   |  |  |



PUBLIC WORKS, CANADA  
 PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON

RECORD OF SUBSURFACE EXPLORATION PROGRAM  
 DRILLING AND LABORATORY TESTING  
 WHITEHORSE QUALITY CONTROL CENTER, WHITEHORSE, Y.T.

PROJECT DEMPSTER HWY. BLACKSTONE RIVER  
 HOLE NO. 75-3 DATE AUG 8/75  
 LOCATION STATION 656+24. 9/S 3/4  
 ELEVATION \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_

| DRILLING NOTES        |                                 | LABORATORY TESTING         |                       |                       |                   |                            |                            |                        |            |                               |                               |  |  |   |                |                 |                        |                        |                 |                    |                 |           |      |
|-----------------------|---------------------------------|----------------------------|-----------------------|-----------------------|-------------------|----------------------------|----------------------------|------------------------|------------|-------------------------------|-------------------------------|--|--|---|----------------|-----------------|------------------------|------------------------|-----------------|--------------------|-----------------|-----------|------|
| HOLE DEPTH <u>40'</u> |                                 | SAMPLE IDENTIFICATION DATA |                       |                       |                   | NATURAL MOISTURE CONTENT % | DEGREE OF SATURATION %     | VOID RATIO             | POROSITY   | DRY DENSITY g/cm <sup>3</sup> | SPECIFIC GRAVITY              | STANDARD PENETRATION RESISTANCE (BLows/30 sec) | UNCLINDED COMPRESSIVE STRENGTH (lb/sq ft)      | CONSISTENCY LIMITS                        |                |                 | UNIFIED CLASSIFICATION | MECHANICAL ANALYSIS    |                 |                    |                 |           |      |
| TYPE OF DRILL _____   |                                 | SAMPLE DEPTH (FT)          | SAMPLE NUMBER (FIELD) | SAMPLE TYPE           | LABORATORY NUMBER |                            |                            |                        |            |                               |                               |  |  | LIQUID LIMIT                              |                |                 |                        | PLASTIC LIMIT          |                 | PLASTICITY INDEX % | WATER CONTENT % | % PASSING |      |
| WATER LEVEL _____     |                                 |                            |                       |                       |                   | FROM                       | TO                         | W                      | U          | P                             | L                             | P  | 20   | 40  | 60             | 75              | 100                    |                        |                 |                    |                 |           |      |
| DEPTH (FT)            | SOIL DESCRIPTION                | FROM                       | TO                    | SAMPLE NUMBER (FIELD) | SAMPLE TYPE       | LABORATORY NUMBER          | NATURAL MOISTURE CONTENT % | DEGREE OF SATURATION % | VOID RATIO | POROSITY                      | DRY DENSITY g/cm <sup>3</sup> | SPECIFIC GRAVITY                               | STANDARD PENETRATION RESISTANCE (BLows/30 sec) | UNCLINDED COMPRESSIVE STRENGTH (lb/sq ft) | LIQUID LIMIT % | PLASTIC LIMIT % | PLASTICITY INDEX %     | UNIFIED CLASSIFICATION | WATER CONTENT % | % PASSING          |                 |           |      |
| 5'                    | SILTY GRAVELLY SAND - SATURATED |                            |                       |                       |                   |                            |                            |                        |            |                               |                               |  |  |   |                |                 |                        |                        |                 |                    |                 |           |      |
|                       | SILTY GRAVELLY SAND             | 5                          | 10                    | 1                     | 896               | 1717                       |                            |                        |            |                               | 2.67                          |  |  |   |                |                 |                        | N.P. SM                | 3/4"            | 11.0               | 31.1            | 57.3      | 71.0 |
|                       | NOTE: PERMAFROST FROM 32'       |                            |                       |                       |                   |                            |                            |                        |            |                               |                               |  |  |   |                |                 |                        |                        |                 |                    |                 |           |      |
| 40                    | BOTTOM OF HOLE                  |                            |                       |                       |                   |                            |                            |                        |            |                               |                               |  |  |   |                |                 |                        |                        |                 |                    |                 |           |      |

PUBLIC WORKS, CANADA  
 PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON

RECORD OF SUBSURFACE EXPLORATION PROGRAM  
 DRILLING AND LABORATORY TESTING  
 WHITEHORSE QUALITY CONTROL CENTER, WHITEHORSE, Y.T.

PROJECT DEWATER HULL BROOKSIDE RIVER  
 HOLE NO. 75-4 DATE AUG. 8/75  
 LOCATION STATION 655+75 S/S 48'R.  
 ELEVATION \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_

DRILLING NOTES

HOLE DEPTH 44'  
 TYPE OF DRILL \_\_\_\_\_  
 WATER LEVEL \_\_\_\_\_

LABORATORY TESTING

| DEPTH<br>(FT) | SOIL DESCRIPTION   | SAMPLE IDENTIFICATION DATA |    |                       |             |                   |                            |                        |            |          |             |                  | LABORATORY TESTING              |                                 |                    |                 |               |                        |              |                     |        |        |        |        |  |  |  |
|---------------|--|----------------------------|----|-----------------------|-------------|-------------------|----------------------------|------------------------|------------|----------|-------------|------------------|---------------------------------|---------------------------------|--------------------|-----------------|---------------|------------------------|--------------|---------------------|--------|--------|--------|--------|--|--|--|
|               |  | SAMPLE DEPTH (FT)          |    | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER | NATURAL MOISTURE CONTENT % | DEGREE OF SATURATION % | LIQ. RATIO | POROSITY | GRY DENSITY | SPECIFIC GRAVITY | STANDARD PENETRATION RESISTANCE | UNCONFINED COMPRESSIVE STRENGTH | CONSISTENCY LIMITS |                 |               | UNIFIED CLASSIFICATION | MAXIMUM SIZE | MECHANICAL ANALYSIS |        |        |        |        |  |  |  |
|               |  | FROM                       | TO |                       |             |                   |                            |                        |            |          |             |                  |                                 |                                 | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTIC INDEX |                        |              | NO. 200             | NO. 10 | NO. 40 | NO. 20 | NO. 10 |  |  |  |
| 44            | GRAVELLY SILTY SAND<br><br>NOTE: PERMAFROST FROM 35'<br><br>BOTTOM OF HOLE | 5                          | 10 | 1                     | BAG         | 1719              |                            |                        |            |          | 2.68        |                  |                                 |                                 |                    | N.P.            | SM            | 3/4"                   | 37.2         | 53.0                | 7.2    | 81.5   |        |        |  |  |  |

PUBLIC WORKS, CANADA  
 PACIFIC REGION  
 DESIGN / CONSTRUCTION  
 CIVIL ENGINEERING - YUKON

RECORD OF SUBSURFACE EXPLORATION PROGRAM  
 DRILLING AND LABORATORY TESTING  
 WHITEHORSE QUALITY CONTROL CENTER, WHITEHORSE, Y.T.

PROJECT: WESTER HWY BRACKSTONE RIVER  
 HOLE NO: PS-5 DATE: AUG. 9-12/75  
 LOCATION: STATION 657 ± 10 9/8 4'R.  
 ELEVATION: \_\_\_\_\_ SHEET \_\_\_\_\_ OF \_\_\_\_\_

| DRILLING NOTES  |   | LABORATORY TESTING         |                       |             |                   |                            |                        |           |          |                          |                  |  |  |                    |                 |                  |                         |                     |           |        |        |       |       |      |
|---|---|----------------------------|-----------------------|-------------|-------------------|----------------------------|------------------------|-----------|----------|--------------------------|------------------|--|--|--------------------|-----------------|------------------|-------------------------|---------------------|-----------|--------|--------|-------|-------|------|
| HOLE DEPTH <u>51'</u><br>TYPE OF DRILL _____<br>WATER LEVEL _____ |   | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | DEGREE OF SATURATION % | WOB RATIO | POROSITY | DRY DENSITY<br>LB/ CU FT | SPECIFIC GRAVITY | STANDARD PENETRATION RESISTANCE<br>BLKS FT | UNCONFINED COMPRESSIVE STRENGTH<br>LB/ SQ FT | CONSISTENCY LIMITS |                 |                  | US FIELD CLASSIFICATION | MECHANICAL ANALYSIS |           |        |        |       |       |      |
| DEPTH (FT)  | SOIL DESCRIPTION                        | FROM TO                    | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            |                        |           |          |                          |                  |  |  | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX |                         | MAXIMUM SIZE        | % PASSING | 475 μm | 200 μm | 40 μm | 10 μm | 5 μm |
|   | NOTE: PERMAFROST FROM 9 1/2' SILTY SAND | 10                         | 11 1/2                | 2           | SPT               | 1722                       |                        |           |          |                          | 2.68             | 255  |  |                    | N.P.            | SM               | 1/2"                    | 27.6                | 70.4      | 91.1   | 96.6   |       |       |      |
|   | GRAVEL-SAND MIXTURE                     | 15                         | 16 1/2                | 3           | SPT               | 1721                       |                        |           |          |                          | 100/26           |  |  |                    | N.P.            | GW               | 1"                      | 4.3                 | 9.5       | 28.4   | 44.7   |       |       |      |
|   | SILTY GRAVELLY SAND                     | 49 1/2                     | 51                    | 9           | SPT               | 1726                       |                        |           |          |                          | 350/45           |  |  |                    | N.P.            | SM               | 1/2"                    | 11.6                | 22.2      | 47.3   | 67.1   |       |       |      |
| 51  | BOTTOM OF HOLE                          |                            |                       |             |                   |                            |                        |           |          |                          |                  |  |  |                    |                 |                  |                         |                     |           |        |        |       |       |      |



LABORATORY TESTING REPORTS

AUG. 1975 INVESTIGATION

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 4          | 99.93             |            |                   | 0.075      | 39.2              | 0.075      | 9.9               |
| 10         | 99.56             |            |                   | 0.15       | 38.2              |            |                   |
| 20         | 99.0              |            |                   | 0.3        | 37.4              |            |                   |
| 40         | 98.3              |            |                   | 0.6        | 25.6              |            |                   |
| 100        | 91.0              |            |                   | 1.18       | 21.6              |            |                   |
| 200        | 70.3              |            |                   | 2.5        | 18.2              |            |                   |
|            |                   |            |                   | 5.0        | 14.5              |            |                   |
|            |                   |            |                   | 10.0       | 11.4              |            |                   |

| SAMPLE NO. | CLASSIFICATION    | L.L. | P.L. | P.I. | NAT. %W | 30  |
|------------|-------------------|------|------|------|---------|-----|
|            | M/S<br>SANDY SILT |      |      |      | 38.4    | 268 |

CAUSH COUNT

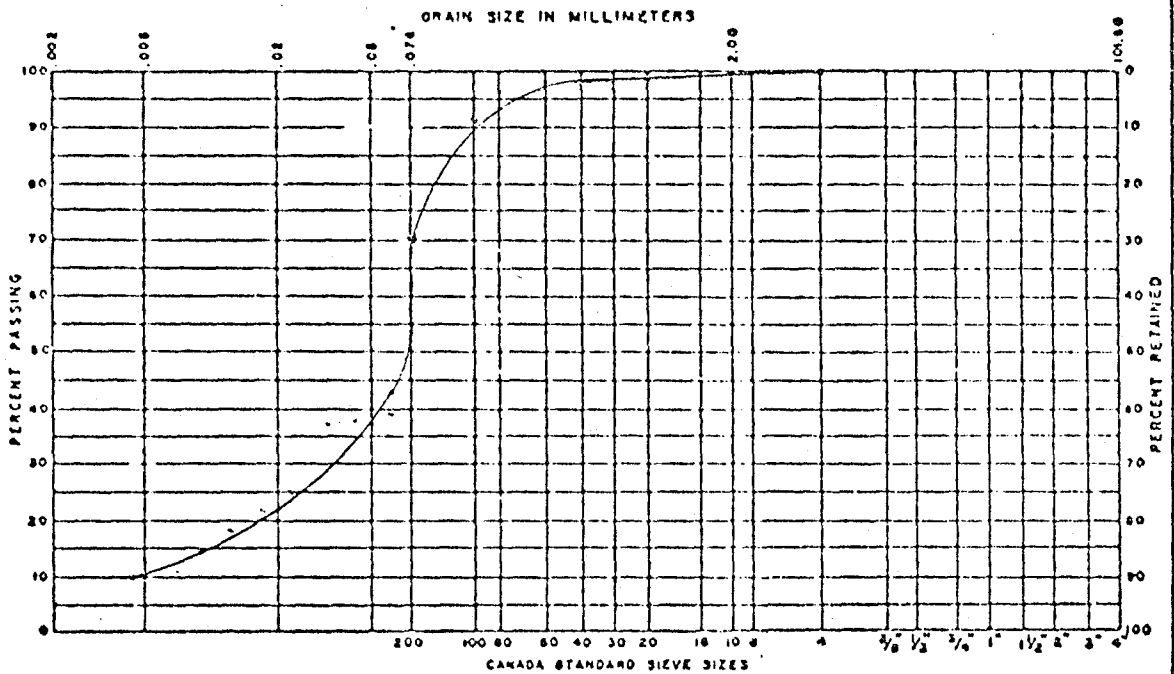
%

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 1  
 DEPTH 1 1/2 - 3 FIELD NO. 1  
 SAMPLE TYPE BAG

LAB. NO.  
**1702**

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 1-8-75                   |
|                      | DATE RECEIVED 17-08-75   |
|                      | DATE RECORDED 03-10-75   |
|                      | TESTED BY WHITEHORSE LAB |
|                      | CHECKED BY SC            |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. #10 SIEVE SIZE | % FINER BY WEIGHT | U.S. #20 SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|---------------------|-------------------|---------------------|-------------------|
| 3/4        | 95.9              | 200        | 33.2              | 0.643               | 29.1              | 0.045               | 10.8              |
| 1/2        | 89.2              |            |                   | 0.425               | 25.3              |                     |                   |
| 3/8        | 85.1              |            |                   | 0.329               | 24.8              |                     |                   |
| 4          | 75.1              |            |                   | 0.235               | 23.0              |                     |                   |
| 10         | 64.3              |            |                   | 0.170               | 17.7              |                     |                   |
| 20         | 56.6              |            |                   | 0.125               | 15.4              |                     |                   |
| 40         | 50.7              |            |                   | 0.089               | 14.1              |                     |                   |
| 100        | 39.2              |            |                   | 0.064               | 12.3              |                     |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | PL. | P.I. | NAT. %W | S.O. |
|------------|---------------------------|------|-----|------|---------|------|
|            | SM<br>GRAVELLY SILTY SAND |      |     |      | 13.1    | 26.8 |

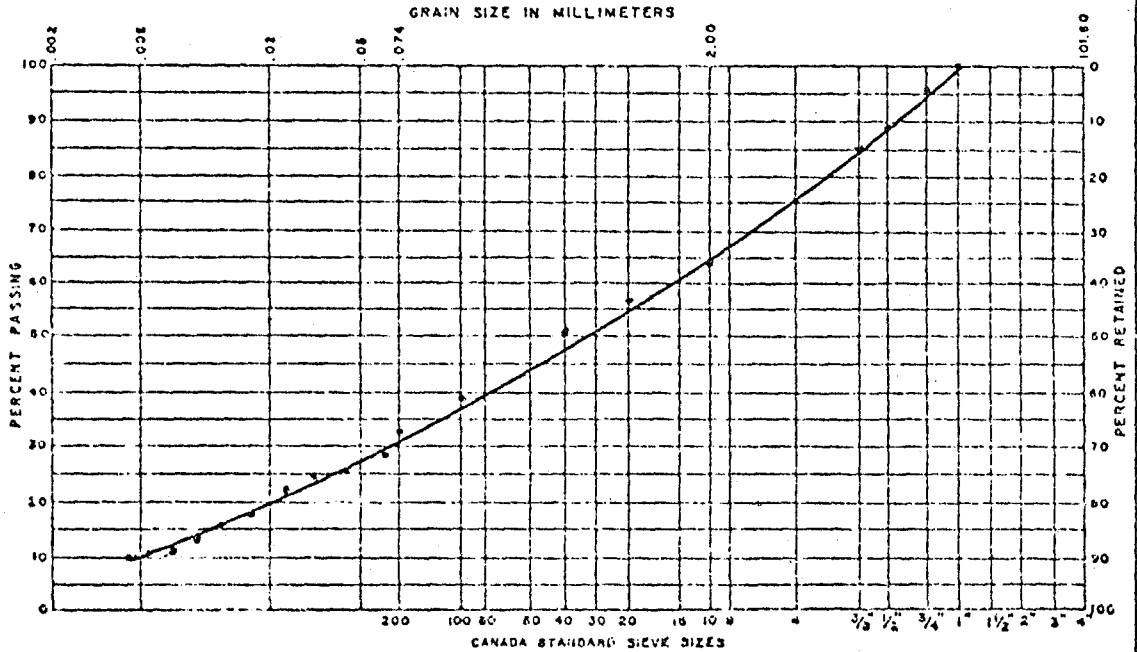
| CRUSH COUNT | % |
|-------------|---|
|             |   |

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIVESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 1  
 DEPTH 10' - 11 1/2' FIELD NO. 2  
 SAMPLE TYPE BAG

LAB. NO.  
**1703**

LABORATORY'S REMARKS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED 01-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 03-10-75  
 TESTED BY WHITEHORSE LAB

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. #/M.M. SIEVE SIZE | % FINER BY WEIGHT | U.S. #/M.M. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------------------|-------------------|------------------------|-------------------|
| 1          | 97.2              | 100        | 34.5              | 75                     | 12.3              | 0.075                  | 12.3              |
| 3/4        | 93.2              | 200        | 29.3              | 0.425                  | 25.3              | 0.075                  | 11.5              |
| 1/2        | 80.3              |            |                   | 0.375                  | 22.3              |                        |                   |
| 3/8        | 74.6              |            |                   | 0.250                  | 21.9              |                        |                   |
| 4          | 63.5              |            |                   | 0.193                  | 19.9              |                        |                   |
| 10         | 54.5              |            |                   | 0.137                  | 17.4              |                        |                   |
| 20         | 47.7              |            |                   | 0.100                  | 16.0              |                        |                   |
| 40         | 42.8              |            |                   | 0.070                  | 14.2              |                        |                   |

| SAMPLE NO | CLASSIFICATION                 | L.L. | P.L. | P.I. | NAT. %W | S.O. |
|-----------|--------------------------------|------|------|------|---------|------|
|           | SM<br>GRAVEL-SILT-SAND MIXTURE |      |      |      | 11.0    | 2.68 |

CRUSH COUNT %

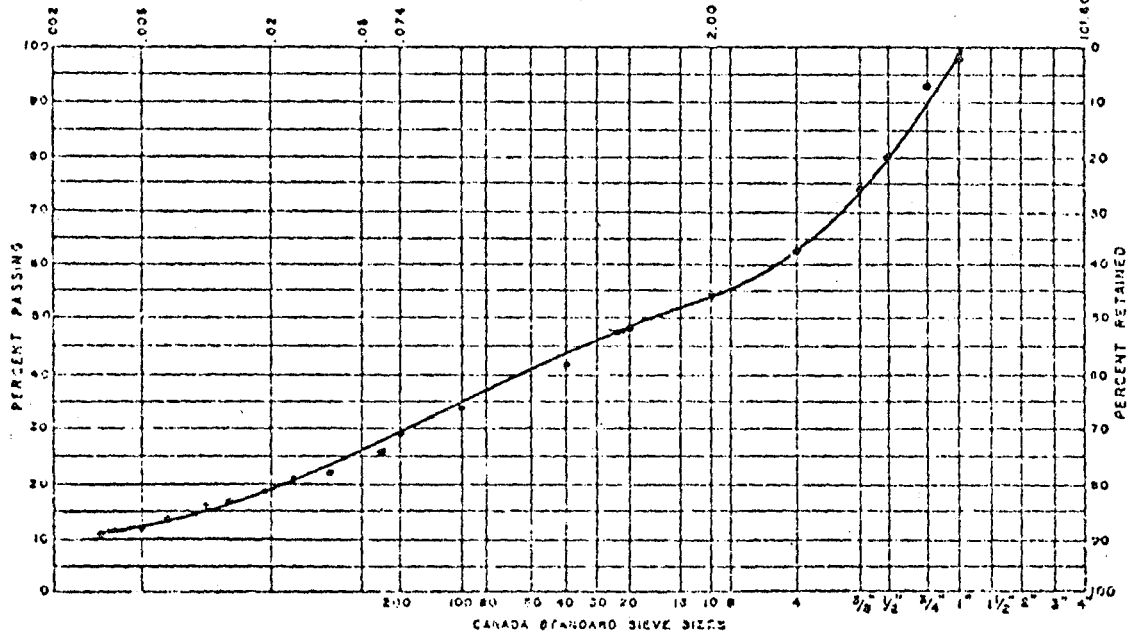
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| ASALT         |                   |
| LIVESTONE     |                   |
| GRANITE       |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT ..... DEMPSTER HIGHWAY .....  
 LOCATION ..... BLACKSTONE RIVER .....  
 HOLE NO. .... 1 .....  
 DEPTH ..... 15'-16 1/2' ..... FIELD NO. .... 3 .....  
 SAMPLE TYPE ..... BAG .....

LAB. NO.  
**1704**

LABORATORY'S REMARKS

|  |
|--|
|  |
|  |
|  |
|  |
|  |
|  |
|  |

DATE SAMPLED 01-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 03-10-  
 TESTED BY Whitehorse LAB  
 CHECKED BY SA

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 3/4        | 96.0              | 200        | 27.6              | 0.65            | 22.3              | 0.46            | 5.3               |
| 1/2        | 80.6              |            |                   | 0.463           | 21.4              |                 |                   |
| 3/8        | 74.2              |            |                   | 0.336           | 16.4              |                 |                   |
| 4          | 64.4              |            |                   | 0.242           | 13.6              |                 |                   |
| 10         | 55.7              |            |                   | 0.173           | 10.6              |                 |                   |
| 20         | 49.4              |            |                   | 0.127           | 8.6               |                 |                   |
| 40         | 44.2              |            |                   | 0.091           | 7.2               |                 |                   |
| 100        | 34.0              |            |                   | 0.065           | 5.4               |                 |                   |

| SAMPLE NO. | CLASSIFICATION               | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|------------------------------|------|------|------|---------|------|
|            | SM                           |      |      |      | 19.1    | 2.67 |
|            | SILTY GRAVEL - SAND MIXTURES |      |      |      |         |      |

CRUSH COUNT %

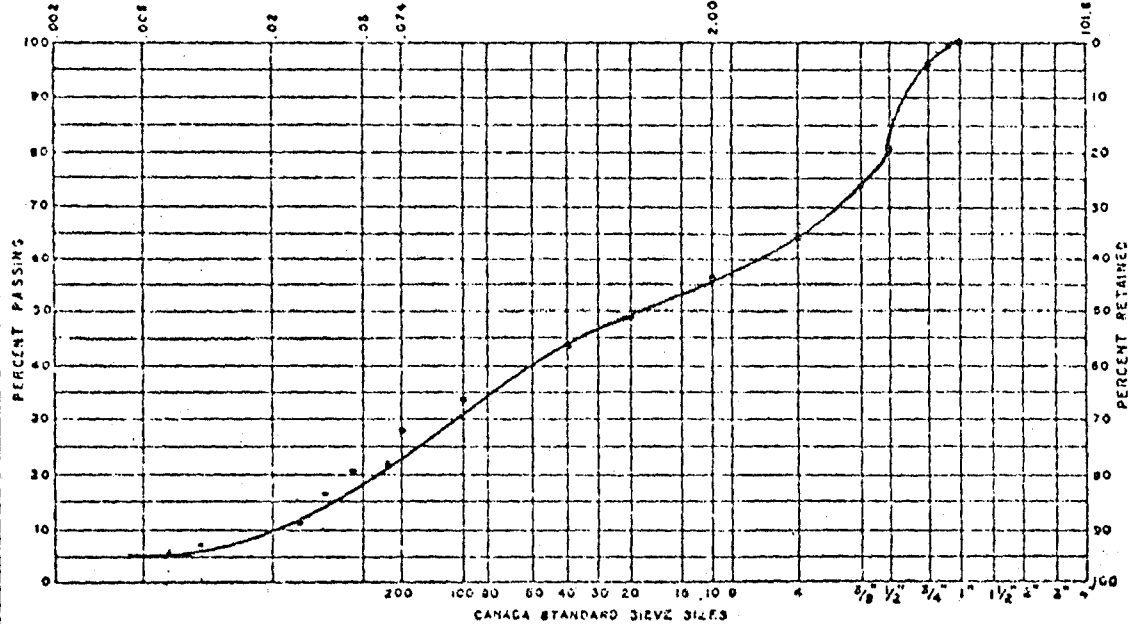
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASEALT       |                   |
| LIVESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY      SILT      SAND      GRAVEL

PROJECT DEMOSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 2  
 DEPTH 4' - 5 1/2'      FIELD NO. 1  
 SAMPLE TYPE B.M.C.

LAB. NO.  
1905

| LABORATORY'S REMARKS | DATE SAMPLED             |
|----------------------|--------------------------|
|                      | 07-08-75                 |
|                      | DATE RECEIVED 17-08-75   |
|                      | DATE RECORDED 03-10-75   |
|                      | TESTED BY WHITEHORSE LAB |
|                      | CHECKED BY SC.           |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 3/4"       | 100.0             | #20        | 72.0              |
| 1/2"       | 92.5              |            |                   |
| 3/8"       | 84.2              |            |                   |
| #4         | 67.5              |            |                   |
| 10         | 52.6              |            |                   |
| 20         | 42.6              |            |                   |
| 40         | 36.0              |            |                   |
| 100        | 27.9              |            |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------------|------|------|------|---------|------|
|            | SM<br>SILTY-GRAVELLY SAND |      |      |      | 8.5     |      |

|             |   |
|-------------|---|
| CRUSH COUNT | % |
|-------------|---|

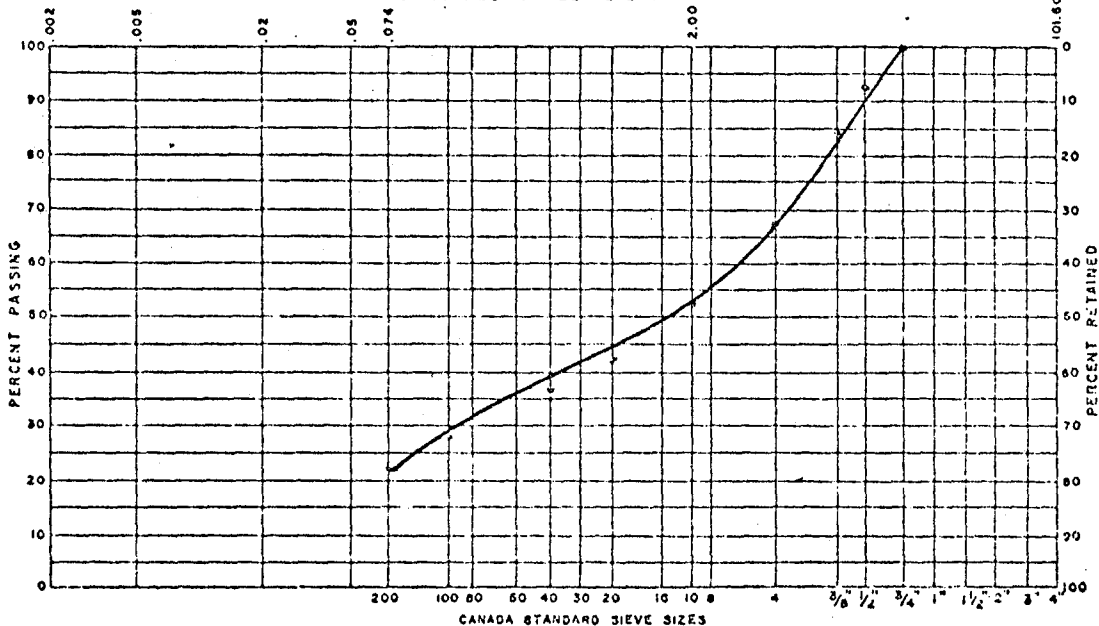
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GFANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



|      |      |      |        |
|------|------|------|--------|
| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|

PROJECT: DEWATER HIGHWAY  
 LOCATION: BLACKSTONE RIVER - STA. 655+18 2/4  
 HOLE NO.: 2  
 DEPTH: 15'-16 1/2' FIELD NO.: 3  
 SAMPLE TYPE: BAG

LAB. NO.  
**1707**

LABORATORY'S REMARKS

DATE SAMPLED: 07-08-75  
 DATE RECEIVED: 17-08-75  
 DATE RECORDED: 23-10-75  
 TESTED BY: WHITEHOUSE LMS.  
 CHECKED BY:

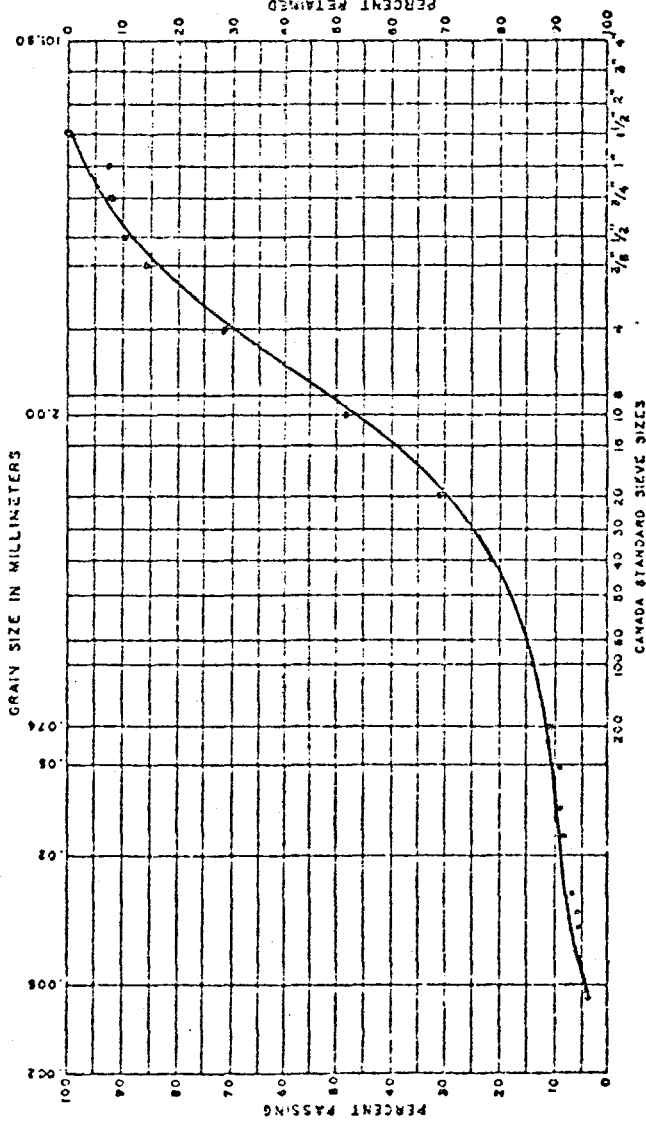
CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | % FINER BY SIEVE SIZE | % FINER BY SIEVE SIZE | % FINER BY WEIGHT | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------------|-----------------------|-------------------|-------------------|
| 1          | 93.9              | 100        | 14.4              | 0.685                 | 11.3                  | 0.045             | 4.7               |
| 3/4        | 93.9              | 200        | 10.8              | 0.490                 | 9.6                   |                   |                   |
| 1/2        | 89.9              |            |                   | 0.348                 | 9.1                   |                   |                   |
| 3/8        | 85.8              |            |                   | 0.247                 | 8.8                   |                   |                   |
| 4          | 71.3              |            |                   | 0.175                 | 7.6                   |                   |                   |
| 10         | 48.1              |            |                   | 0.128                 | 6.7                   |                   |                   |
| 20         | 30.6              |            |                   | 0.091                 | 6.2                   |                   |                   |
| 40         | 21.6              |            |                   | 0.065                 | 5.1                   |                   |                   |

| CLASSIFICATION    | L.L. | P.L. | P.I. | MAT. %W | E.G. |
|-------------------|------|------|------|---------|------|
| Silty clayey sand |      |      |      | 5.7     | 21.8 |

CRUSH COUNT - %



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

LAB. NO.  
1708

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 2  
 DEPTH 20 - 2 1/2' FIELD NO. 4  
 SAMPLE TYPE B.P.G.

| LABORATORY'S REMARKS     |
|--------------------------|
| DATE SAMPLED 07-08-75    |
| DATE RECEIVED 17-08-75   |
| DATE RECORDED 03-10-75   |
| TESTED BY WHITEHORSE LAB |
| CHECKED BY S.C.          |

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIVESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

| PARTICLE SHAPE ANALYSIS | % |
|-------------------------|---|
| ROUND                   |   |
| SUB-ROUND               |   |
| ANGULAR                 |   |
| SUB-ANGULAR             |   |
| FLATS                   |   |
| NEEDLES                 |   |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| #11        | 100.0             | #100       | 19.6              |            |                   |            |                   |
| #3/4       | 91.3              | #200       | 17.2              |            |                   |            |                   |
| #1/2       | 82.0              |            |                   |            |                   |            |                   |
| #3/8       | 77.9              |            |                   |            |                   |            |                   |
| #1/4       | 60.4              |            |                   |            |                   |            |                   |
| #10        | 43.9              |            |                   |            |                   |            |                   |
| #20        | 31.9              |            |                   |            |                   |            |                   |
| #40        | 27.7              |            |                   |            |                   |            |                   |

| SAMPLE NO | CLASSIFICATION              | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|-----------|-----------------------------|------|------|------|---------|------|
|           | SM                          |      |      |      | 5.4     |      |
|           | SILTY GRAVEL - SAND MIXTURE |      |      |      |         |      |

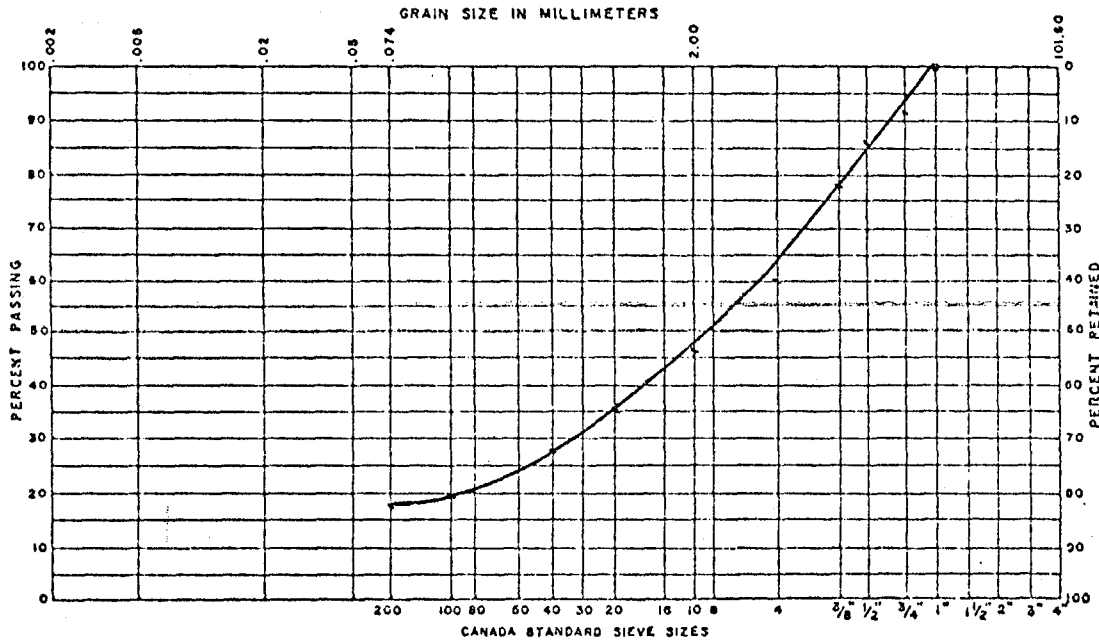
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPESTER HIGHWAY

LOCATION BLACKSTONE RIVER - STA. 655+66.5

HOLE NO. 6 % 38'R.

DEPTH 39 1/2' - 41' FIELD NO. 3

SAMPLE TYPE BAS.

LAB. NO.  
1711

LABORATORY'S REMARKS

DATE SAMPLED 15-08-75

DATE RECEIVED 17-08-75

DATE RECORDED 23-10-75

TESTED BY WHITEHORSE LABS.

CHECKED BY

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 1          | 89.7              | 1.00       | 16.5              | 0.653           | 19.8              | 0.045           | 7.3               |
| 3/4        | 85.1              | 2.00       | 11.7              | 0.469           | 17.4              |                 |                   |
| 1/2        | 79.9              |            |                   | 0.334           | 15.9              |                 |                   |
| 3/8        | 73.0              |            |                   | 0.239           | 14.2              |                 |                   |
| 4          | 60.9              |            |                   | 0.171           | 11.8              |                 |                   |
| 10         | 49.5              |            |                   | 0.126           | 10.6              |                 |                   |
| 20         | 40.5              |            |                   | 0.090           | 9.6               |                 |                   |
| 40         | 34.3              |            |                   | 0.063           | 8.6               |                 |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.O. |
|------------|---------------------------|------|------|------|---------|------|
|            | SM<br>SILTY GRAVELLY SAND |      |      |      |         | 26.8 |

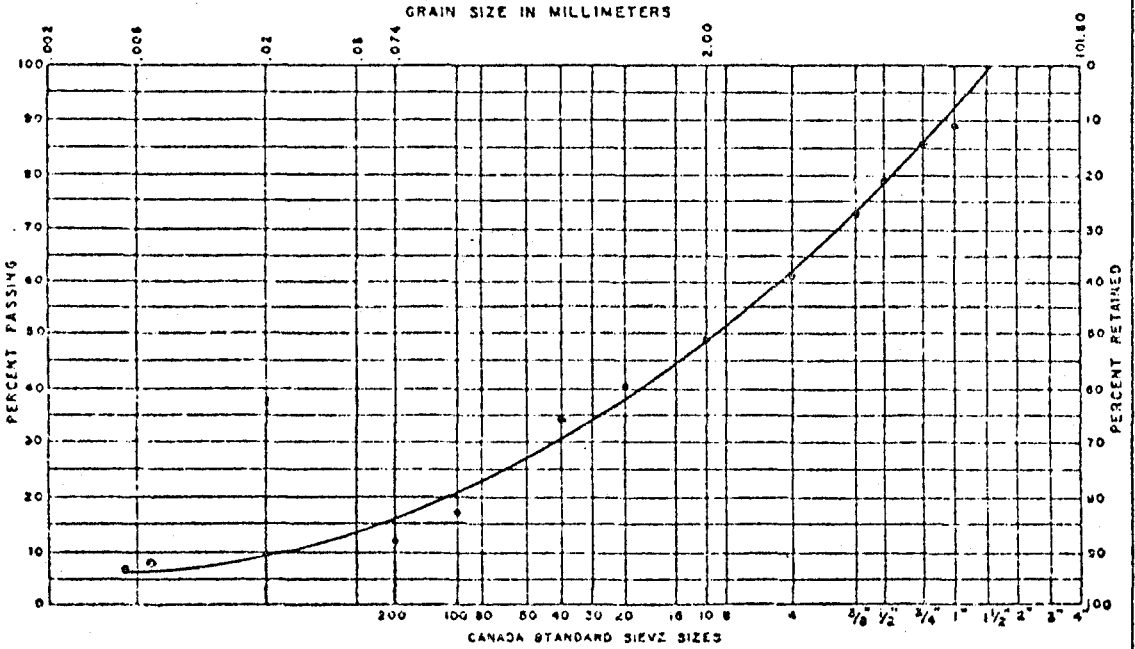
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BAASLT        |                   |
| LIVESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATE       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|------|------|------|--------|

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 1  
 DEPTH 20'-21 1/2' FIELD NO. 4  
 SAMPLE TYPE BAG

LAB. NO.  
1712

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | <u>02-08-75</u>                 |
|                      | DATE RECEIVED <u>17-08-75</u>   |
|                      | DATE RECORDED <u>03-10-75</u>   |
|                      | TESTED BY <u>WHITEHORSE LAB</u> |
|                      | CHECKED BY <u>SG</u>            |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/4        | 100.0             | 10         | 5.1               |
| 3/4        | 94.2              | 20         | 5.1               |
| 1/2        | 66.4              |            |                   |
| 3/8        | 47.9              |            |                   |
| #4         | 24.3              |            |                   |
| 10         | 13.1              |            |                   |
| 20         | 9.3               |            |                   |
| 40         | 7.5               |            |                   |

| SAMPLE NO. | CLASSIFICATION           | L.L. | P.L. | P.I. | NAT. %W | S.C. |
|------------|--------------------------|------|------|------|---------|------|
|            | GW<br>WELL GRADED GRAVEL |      |      |      |         |      |

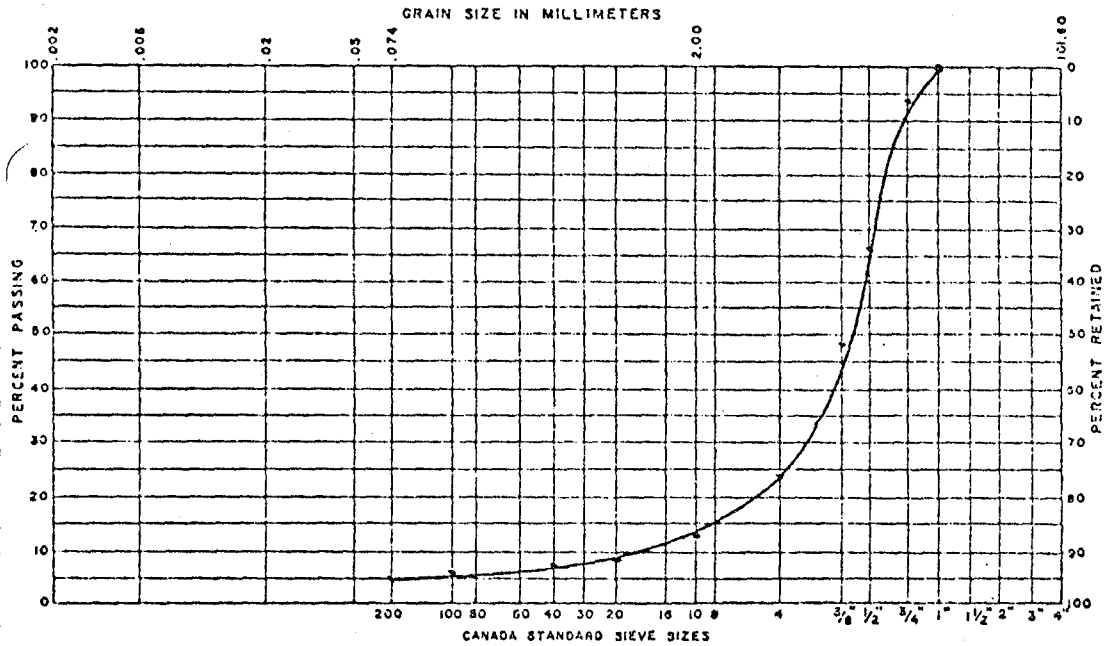
|             |   |
|-------------|---|
| CRUSH COUNT | % |
|-------------|---|

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| FOUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



|      |      |      |        |
|------|------|------|--------|
| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|

PROJECT DEMISTAR HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 655+01.4  
 HOLE NO. 1  
 DEPTH 25'-26 1/2' FIELD NO. 5  
 SAMPLE TYPE BAG

LAB. NO.  
1713

| LABORATORY'S REMARKS | DATE SAMPLED                     |
|----------------------|----------------------------------|
|                      | <u>04-08-75</u>                  |
|                      | <u>17-08-75</u>                  |
|                      | <u>23-10-75</u>                  |
|                      | TESTED BY <u>WHITEHORSE LABS</u> |
|                      | CHECKED BY                       |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2"       | 100.0             | #40        | 14.6              |
| 1"         | 85.7              | 100        | 9.7               |
| 3/4"       | 75.9              | 200        | 7.8               |
| 1/2"       | 66.8              |            |                   |
| 3/8"       | 61.8              |            |                   |
| #4         | 43.3              |            |                   |
| 10         | 27.3              |            |                   |
| 20         | 18.5              |            |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------------|------|------|------|---------|------|
|            | SW<br>GRAVEL-SAND MIXTURE |      |      |      |         |      |

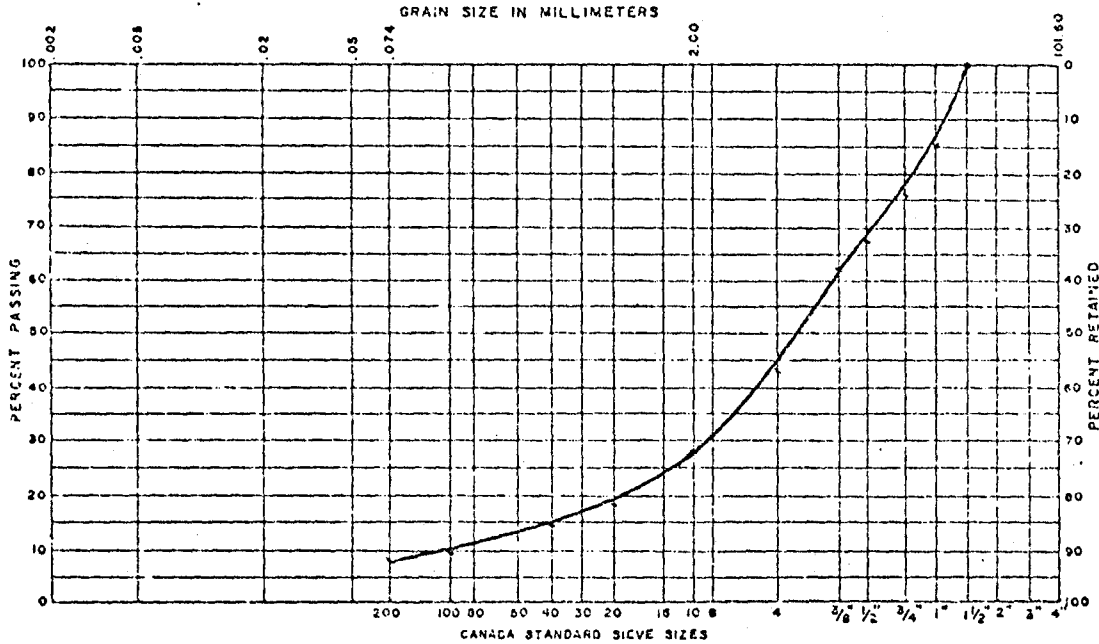
| CRUSH COUNT | % |
|-------------|---|
|             |   |

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| CRANIC        |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMASTER HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 655+01 E  
 HOLE NO. 1  
 DEPTH 30'-31 1/2' FIELD NO. 6  
 SAMPLE TYPE BAG

LAB. NO.  
1714

LABORATORY'S REMARKS

DATE SAMPLED 04-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 23-10-75  
 TESTED BY WHITEHORSE LAB.  
 CHECKED BY

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. (No. 1) SIEVE SIZE | % FINER BY WEIGHT | U.S. (No. 2) SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|
| 3/4        | 96.9              | 200        | 11.0              | 0693                    | 11.6              | 0046                    | 3.7               |
| 1/2        | 89.3              |            |                   | 0493                    | 10.4              |                         |                   |
| 3/8        | 83.7              |            |                   | 0350                    | 9.2               |                         |                   |
| 4          | 71.0              |            |                   | 0249                    | 8.1               |                         |                   |
| 10         | 57.3              |            |                   | 0178                    | 6.3               |                         |                   |
| 20         | 43.9              |            |                   | 0130                    | 5.7               |                         |                   |
| 40         | 31.1              |            |                   | 0092                    | 4.8               |                         |                   |
| 100        | 14.3              |            |                   | 0060                    | 4.1               |                         |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------------|------|------|------|---------|------|
|            | SM<br>SILTY GRAVELLY SAND |      |      |      |         | 2.67 |

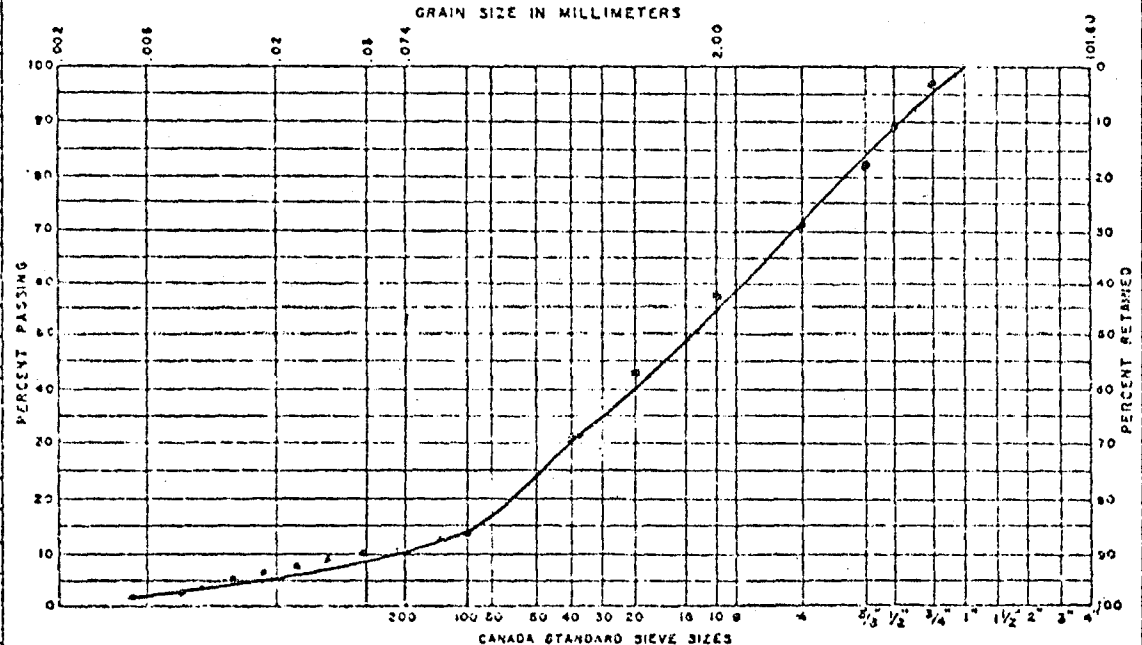
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASEALT       |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



CLAY      SILT      SAND      GRAVEL

PROJECT DEMPESTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 3  
 DEPTH 5'-10' FIELD NO. 1  
 SAMPLE TYPE B.A.S.

LAB. NO.  
1717

| LABORATORY'S REMARKS | DATE SAMPLED                    |
|----------------------|---------------------------------|
|                      | <u>08-08-75</u>                 |
|                      | DATE RECEIVED <u>17-08-75</u>   |
|                      | DATE RECORDED <u>03-10-75</u>   |
|                      | TESTED BY <u>WHITEHORSE LAB</u> |
|                      | CHECKED BY <u>SC</u>            |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | DATA BY SIEVE SIZE | % FINER BY WEIGHT | DATA BY SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| 3/4        | 98.5              | 200        | 37.2              | .0645              | 28.3              | .0045              | 9.0               |
| 1/2        | 93.9              |            |                   | .0460              | 26.3              |                    |                   |
| 3/8        | 89.7              |            |                   | .0329              | 24.2              |                    |                   |
| 4          | 81.5              |            |                   | .0235              | 22.1              |                    |                   |
| 10         | 72.8              |            |                   | .0168              | 20.1              |                    |                   |
| 20         | 64.7              |            |                   | .0124              | 17.5              |                    |                   |
| 40         | 58.0              |            |                   | .0089              | 14.9              |                    |                   |
| 100        | 43.7              |            |                   | .0063              | 12.7              |                    |                   |

| SAMPLE NO. | CLASSIFICATION          | L.L. | P.L. | P.I. | NAT. %W | S.U. |
|------------|-------------------------|------|------|------|---------|------|
|            | SM<br>EVENLY SILTY SAND |      |      |      |         | 268  |

CRUSH COUNT %

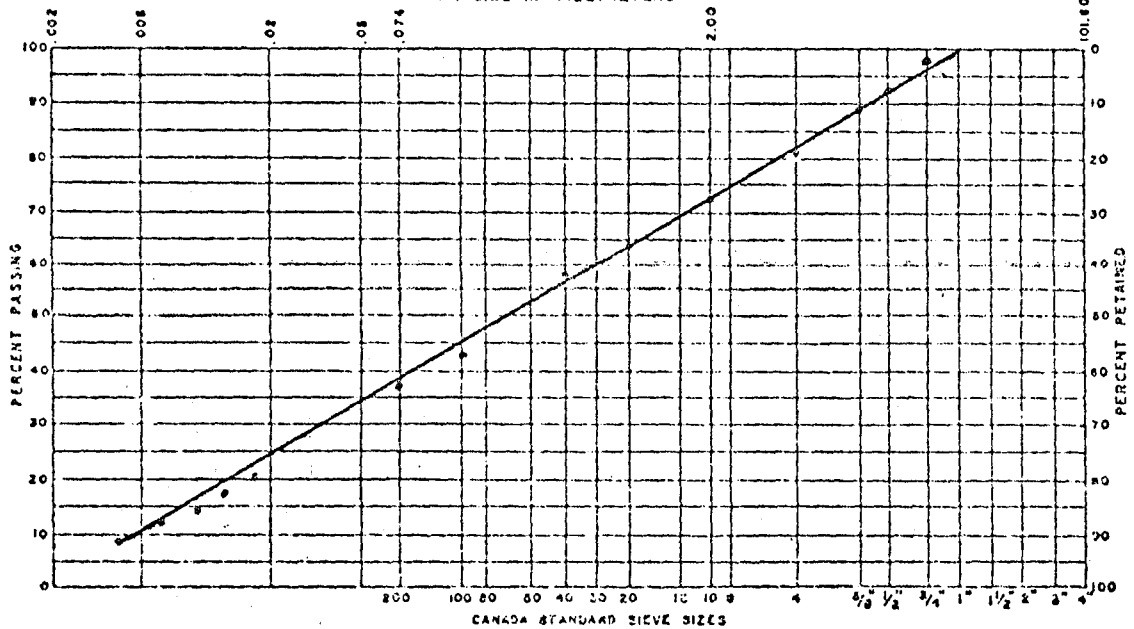
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| CRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY      SILT      SAND      GRAVEL

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 4  
 DEPTH 5-10'      FIELD NO. 1  
 SAMPLE TYPE BAG

LAB. NO.  
**1719**

LABORATORY'S REMARKS

DATE SAMPLED 08-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 03-10-75  
 TESTED BY WHITEHORSE LAB  
 CHECKED BY SC

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2"     | 100.0             | #40        | 9.5               |            |                   |            |                   |
| 1"         | 74.5              | 100        | 5.4               |            |                   |            |                   |
| 3/4"       | 87.1              | 200        | 4.3               |            |                   |            |                   |
| 1/2"       | 68.6              |            |                   |            |                   |            |                   |
| 3/8"       | 62.0              |            |                   |            |                   |            |                   |
| #4         | 44.2              |            |                   |            |                   |            |                   |
| 10         | 28.4              |            |                   |            |                   |            |                   |
| 20         | 17.5              |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION      | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------|------|------|------|---------|------|
|            | GW                  |      |      |      |         |      |
|            | GRAVEL-SAND MIXTURE |      |      |      |         |      |

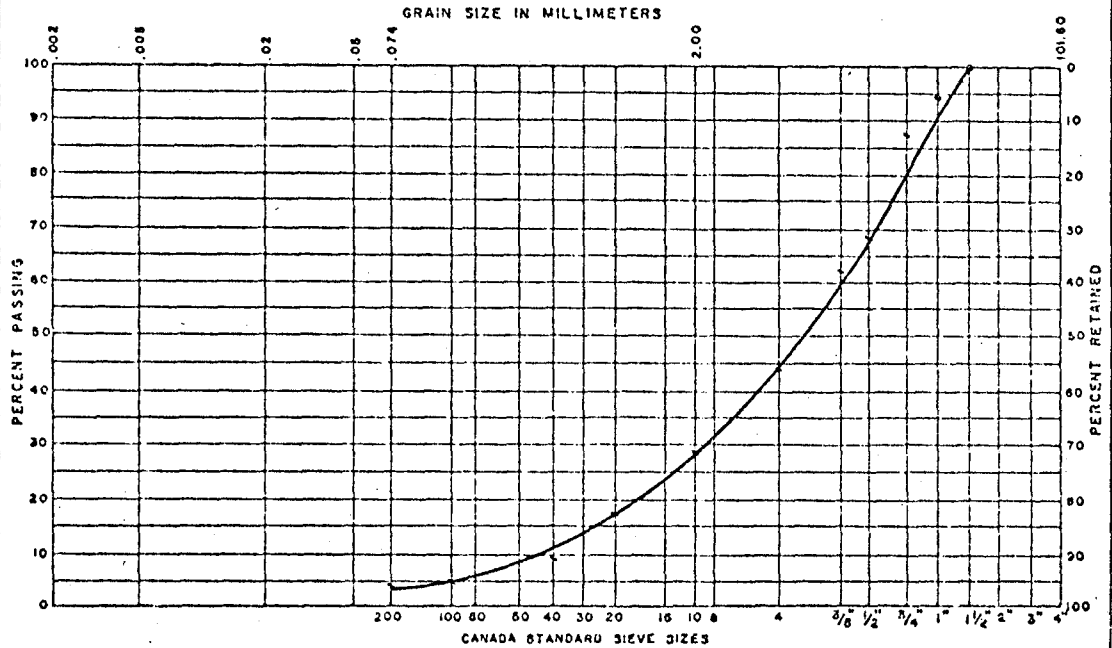
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 657+10  
 HOLE NO. 5 O/S 4'R.  
 DEPTH 15'-16 1/2' FIELD NO. 3  
 SAMPLE TYPE BAG

LAB. NO.  
1721

| LABORATORY'S REMARKS | DATE SAMPLED                     |
|----------------------|----------------------------------|
|                      | <u>11-08-75</u>                  |
|                      | <u>17-08-75</u>                  |
|                      | <u>23-10-75</u>                  |
|                      | TESTED BY <u>WHITEHORSE LAB.</u> |
|                      | CHECKED BY                       |

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT | U.S. SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 3/4        | 100               | 200        | 27.6              | 0.075           | 26.1              | 0.045           | 11.5              |
| 1/2        | 99.8              |            |                   | 0.425           | 24.9              |                 |                   |
| 3/8        | 99.5              |            |                   | 0.354           | 23.8              |                 |                   |
| 4          | 96.6              |            |                   | 0.250           | 21.1              |                 |                   |
| 10         | 91.1              |            |                   | 0.150           | 19.0              |                 |                   |
| 20         | 83.9              |            |                   | 0.125           | 17.0              |                 |                   |
| 40         | 70.4              |            |                   | 0.090           | 14.7              |                 |                   |
| 100        | 33.4              |            |                   | 0.063           | 12.9              |                 |                   |

| SAMPLE NO. | CLASSIFICATION   | L.L. | P.L. | P.I. | NAT. %W | S.O. |
|------------|------------------|------|------|------|---------|------|
|            | SM<br>SILTY SAND |      |      |      |         | 26.8 |

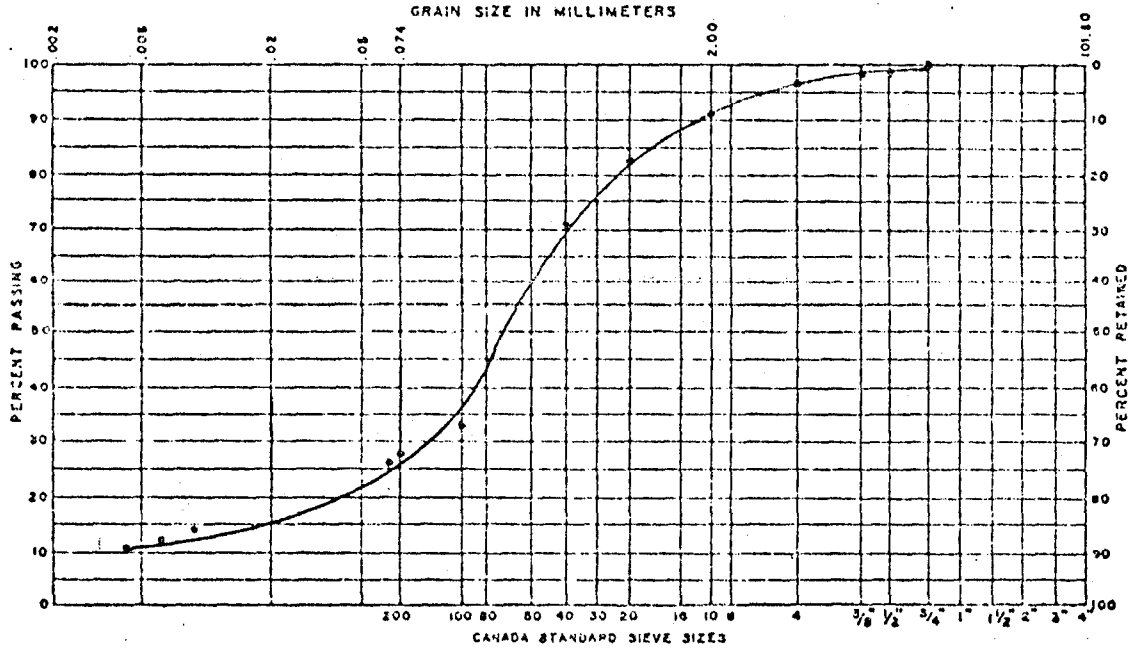
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMETER HIGHWAY  
 LOCATION BLACKSTONE RIVER  
 HOLE NO. 5  
 DEPTH 10'-11 1/2' FIELD NO. 2  
 SAMPLE TYPE BAG

LAB. NO.  
1722

LABORATORY'S REMARKS

DATE SAMPLED 9-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 03-10-75  
 TESTED BY WHITEHORSE LAB  
 CHECKED BY SC

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/4"       | 100.0             | #200       | 11.6              |            |                   |            |                   |
| 1/2"       | 71.2              |            |                   |            |                   |            |                   |
| 3/8"       | 82.0              |            |                   |            |                   |            |                   |
| #4         | 67.1              |            |                   |            |                   |            |                   |
| 10         | 47.3              |            |                   |            |                   |            |                   |
| 20         | 31.0              |            |                   |            |                   |            |                   |
| 40         | 22.2              |            |                   |            |                   |            |                   |
| 100        | 14.9              |            |                   |            |                   |            |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------------|------|------|------|---------|------|
|            | SM<br>SILTY GRAVELLY SAND |      |      |      |         |      |

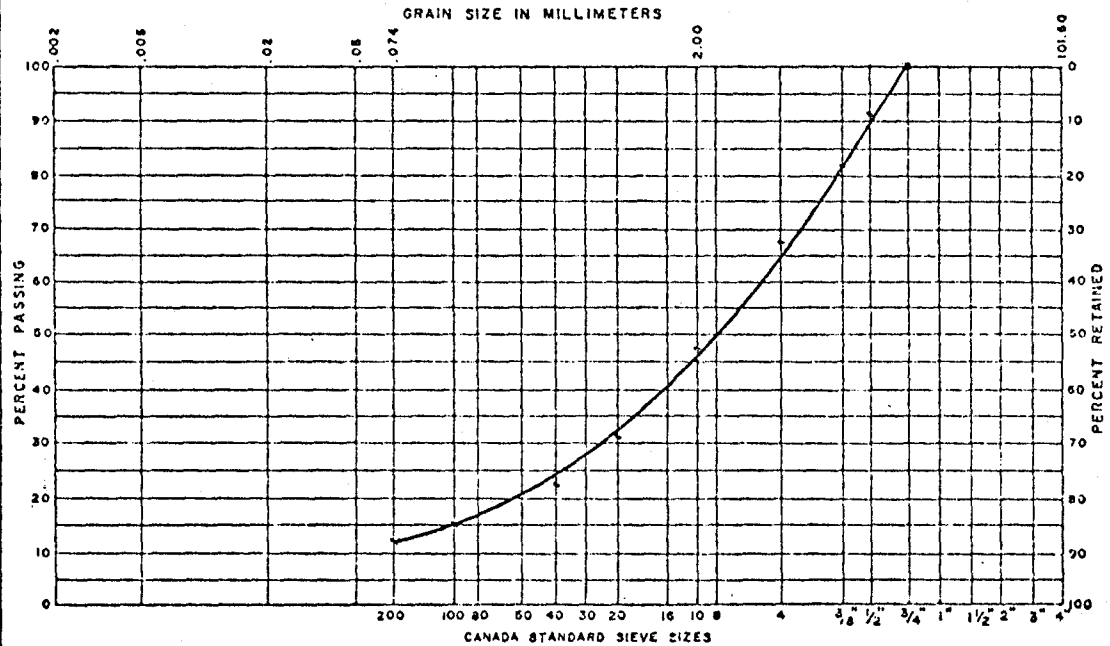
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



| CLAY | SILT | SAND | GRAVEL |
|------|------|------|--------|
|      |      |      |        |

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 657+10  
 HOLE NO. 5 9/5 4' R.  
 DEPTH 4 1/2' - 51' FIELD NO. 9  
 SAMPLE TYPE SAG

LAB. NO.  
**1726**

LABORATORY'S REMARKS

|  |
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|  |
|  |
|  |
|  |
|  |
|  |

DATE SAMPLED 12-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 23-10-75  
 TESTED BY WHITEHORSE LAB.  
 CHECKED BY

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/4"       | 100.0             | #200       | 37.2              |            |                   |            |                   |
| 1/2"       | 97.5              |            |                   |            |                   |            |                   |
| 3/8"       | 94.7              |            |                   |            |                   |            |                   |
| #4         | 84.9              |            |                   |            |                   |            |                   |
| 10         | 73.6              |            |                   |            |                   |            |                   |
| 20         | 62.3              |            |                   |            |                   |            |                   |
| 40         | 54.8              |            |                   |            |                   |            |                   |
| 100        | 43.1              |            |                   |            |                   |            |                   |

| SAMPLE NO | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|-----------|---------------------------|------|------|------|---------|------|
|           | SM<br>GRAVELLY SILTY SAND |      |      |      |         |      |

CRUSH COUNT %

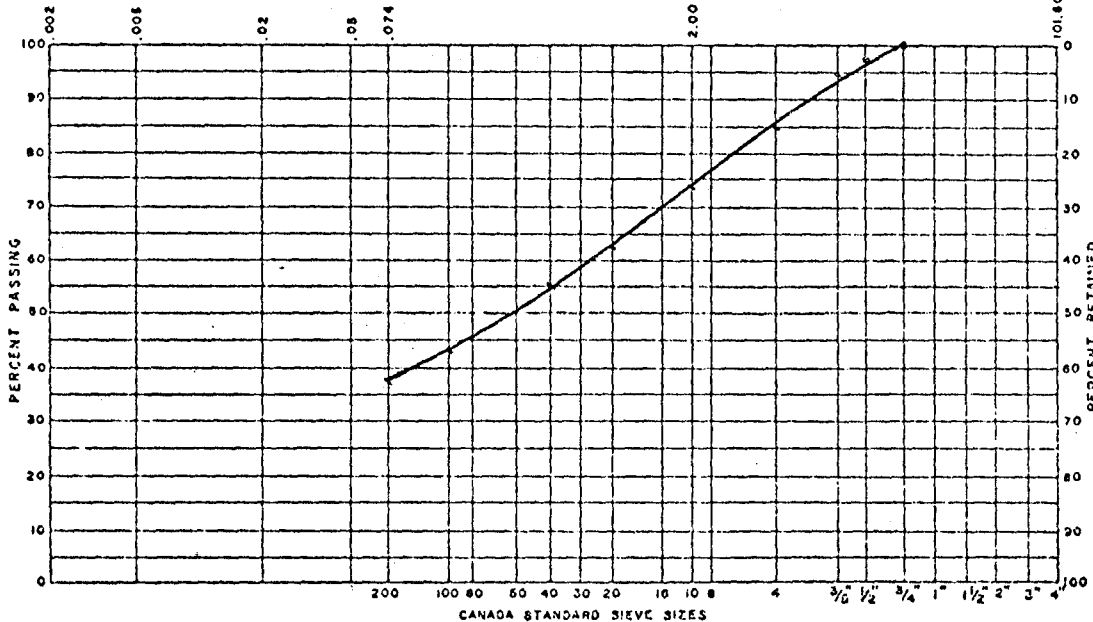
PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

GRAIN SIZE IN MILLIMETERS



CLAY      SILT      SAND      GRAVEL

PROJECT DEMETER HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 655+66.5  
 HOLE NO. 6      9/5 38'R.  
 DEPTH 35'-36 1/2'      FIELD NO. 2  
 SAMPLE TYPE BAG

LAB. NO.  
1727

LABORATORY'S REMARKS

DATE SAMPLED 15-08-75  
 DATE RECEIVED 17-08-75  
 DATE RECORDED 23-10-75  
 TESTED BY WHITEHORSE LAB.  
 CHECKED BY

CANADA DEPARTMENT OF PUBLIC WORKS, WHITEHORSE MATERIALS LABORATORY TESTING REPORT

GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 3/4"       | 100.0             | 1/200      | 16.9              |
| 1/2"       | 77.4              |            |                   |
| 3/8"       | 23.4              |            |                   |
| 7/4"       | 72.4              |            |                   |
| 10         | 57.6              |            |                   |
| 20         | 47.4              |            |                   |
| 40         | 35.7              |            |                   |
| 100        | 20.9              |            |                   |

| SAMPLE NO. | CLASSIFICATION            | L.L. | P.L. | P.I. | NAT. %W | S.G. |
|------------|---------------------------|------|------|------|---------|------|
|            | SM<br>SILTY GRAVELLY SAND |      |      |      |         |      |

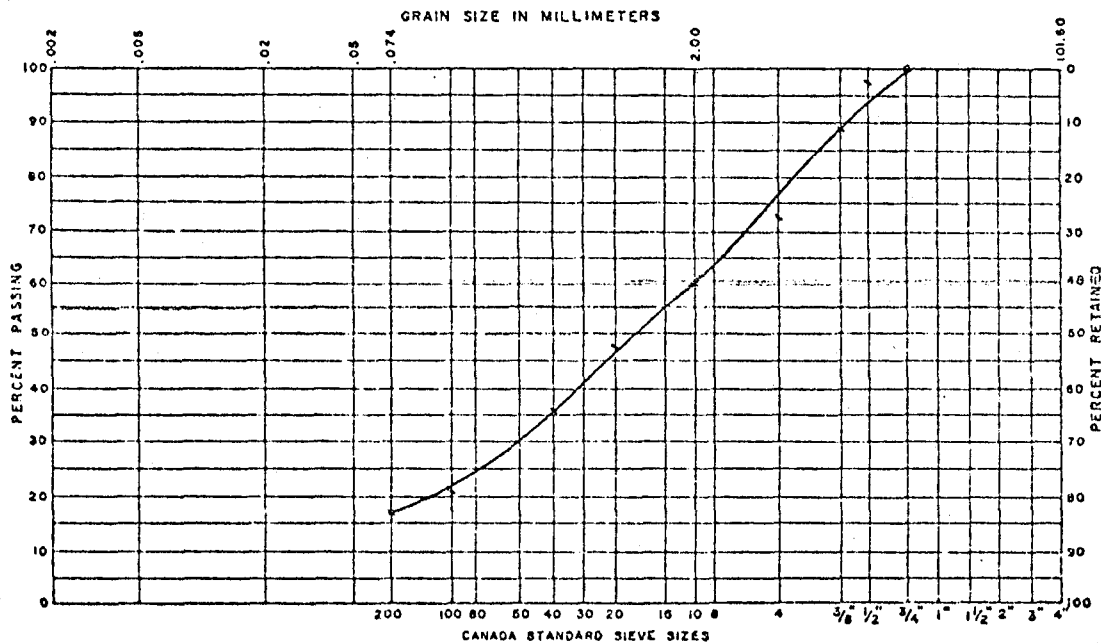
CRUSH COUNT %

PETROGRAPHIC ANALYSIS

| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
| BASALT        |                   |
| LIMESTONE     |                   |
| GRANITIC      |                   |
| SANDSTONE     |                   |
| SHALE         |                   |
| SCHIST        |                   |
| QUARTZITE     |                   |
| OTHERS        |                   |

PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |



CLAY      SILT      SAND      GRAVEL

PROJECT DEMPSTER HIGHWAY  
 LOCATION BLACKSTONE RIVER - STA. 655+66.5  
 HOLE NO. 6      1/5 38'R.  
 DEPTH 41-42 1/2'      FIELD NO. 4  
 SAMPLE TYPE SAS

LAB. NO.  
**1728**

| LABORATORY'S REMARKS | DATE SAMPLED              |
|----------------------|---------------------------|
|                      | 15-08-75                  |
|                      | DATE RECEIVED 17-08-75    |
|                      | DATE RECORDED 23-10-75    |
|                      | TESTED BY WHITEHORSE LAB. |
|                      | CHECKED BY                |

DRILL LOG SUMMARIES

JULY 1977 INVESTIGATION





Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy HOLE LOCATION: STA. 655+71 0/3 7' LT  
 DATE DRILLED: 11-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: SC HOLE ELEVATION: \_\_\_\_\_ HOLE NO.: 1

| DEPTH (FT.) | SOIL DESCRIPTION                    | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | CONSISTENCY LIMITS |                 |                    | MECHANICAL ANALYSIS |        |             |             | STANDARD PENETRATION RESISTANCE BLOWS/FT. | UNIFIED CLASSIFICATION |
|-------------|-------------------------------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|----------------------------|--------------------|-----------------|--------------------|---------------------|--------|-------------|-------------|---|------------------------|
|             |                                     |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % | GRAVEL %            | SAND % | > .005 mm % | < .075 mm % |   |                        |
| 25          | GRAVEL                              |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |             |             |   |                        |
| 30          | ICE                                 | Ice                              | 28'                        | 8                     |             | 400               | 6.3                        |                    | N.P.            |                    | 66                  | 27     | 7           |             |   | Gw.Gm                  |
| 35          | GRAVELL GRAVELLY SAND U. HIGH SILT. | Ice or some of WDW               | 38'                        | 9                     |             | 401               | 5.3                        |                    | N.P.            |                    | 61                  | 33     | 6           |             |   | Gw.Gm                  |
| 45          | SILTY SANDY GRAVELL                 |                                  | 43'                        | 10                    |             | 402               | 8.9                        |                    | N.P.            |                    | 43                  | 43     | 14          |             |   | SM                     |
| 50          |                                     |                                  | 48'                        | 11                    |             | 403               | 6.2                        |                    | N.P.            |                    | 59                  | 31     | 10          |             |   | Gw.Gm                  |





Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 DEMPSTER Hwy

HOLE LOCATION: STA. 655+50 9/5 7' RT

DATE DRILLED: 11-8-77

DRILL TECHNICIAN: P.A.

PLOTTED BY: SC

HOLE ELEVATION:

HOLE NO.: 2

HOLE DEPTH: 70'

TYPE OF DRILL: ROTARY AIR

WATER LEVEL:

DEPTH (FT.) SOIL DESCRIPTION

N.R.C.  
PERMAFROST  
CLASSIFICATION

SAMPLE IDENTIFICATION DATA

| SAMPLE DEPTH (FT.) | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |
|--------------------|-----------------------|-------------|-------------------|
| 2                  | 2                     | AUGER       | 433               |
| 3 1/2              | 3                     | AUGER       | 406               |
| 7'                 | 4                     | BAG         | 408               |
| 12'                | 5                     | BAG         | 434               |
| 17'                | 6                     | BAG         | 435               |
| 22'                | 7                     | BAG         | 409               |

NATURAL  
MOISTURE  
CONTENT  
%

CONSISTENCY LIMITS

| LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX |
|--------------|---------------|------------------|
| 35.8         | 10.P.         |                  |
| 19.4         | 10.P.         |                  |
| 13.3         | 10.P.         |                  |
| 8.1          | 10.P.         |                  |
| 9.6          | 10.P.         |                  |
| 9.3          | 10.P.         |                  |

MECHANICAL ANALYSIS

| GRAVEL | SAND | > 0.075 mm | < 0.075 mm | < 0.005 mm |
|--------|------|------------|------------|------------|
| 1      | 39   | 52         | 8          |            |
| 22     | 42   | 32         | 4          |            |
| 56     | 32   | 12         |            |            |
| 36     | 55   | 9          |            |            |
| 43     | 36   | 12         | 9          |            |
| 59     | 32   | 9          |            |            |

DRY  
DENSITY  
LBS.  
CU. FT.

STANDARD  
PENETRATION  
RESISTANCE  
BLOWS  
FT.

UNIFIED  
CLASSIFICATION

|    |  |        |
|----|--|--------|
| 0  | ORGANIC                                | 6"     |
|    | ORGANIC SAND - SILT                    |        |
|    | SILTY SAND                             | 2'     |
|    | (GRAVEL) PERMAFROST SILTY SANDY GRAVEL | 3 1/2' |
| 5  |  | 4'     |
| 10 |  |        |
| 15 |  |        |
| 20 |  |        |
| 25 | GRAVEL SILTY SANDY GRAVEL              |        |

ICE  
BY  
UC  
AND  
SOME  
DR.

|       |   |       |     |      |       |    |    |    |   |  |  |       |
|-------|---|-------|-----|------|-------|----|----|----|---|--|--|-------|
| 2     | 2 | AUGER | 433 | 35.8 | 10.P. | 1  | 39 | 52 | 8 |  |  | ML    |
| 3 1/2 | 3 | AUGER | 406 | 19.4 | 10.P. | 22 | 42 | 32 | 4 |  |  | SM    |
| 7'    | 4 | BAG   | 408 | 13.3 | 10.P. | 56 | 32 | 12 |   |  |  | GW-GM |
| 12'   | 5 | BAG   | 434 | 8.1  | 10.P. | 36 | 55 | 9  |   |  |  | SP-SM |
| 17'   | 6 | BAG   | 435 | 9.6  | 10.P. | 43 | 36 | 12 | 9 |  |  | SM    |
| 22'   | 7 | BAG   | 409 | 9.3  | 10.P. | 59 | 32 | 9  |   |  |  | GW-GM |



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MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy HOLE LOCATION: STA. 655+50 9/16 7' RT  
 DATE DRILLED: 11-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: SC HOLE ELEVATION: HOLE NO.: 2

| HOLE DEPTH | TYPE OF DRILL                | WATER LEVEL | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | CONSISTENCY LIMITS |                 |                    | MECHANICAL ANALYSIS |        |              |              | STANDARD PENETRATION RESISTANCE BLOWS FT. | UNIFIED CLASSIFICATION |
|------------|------------------------------|-------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|----------------------------|--------------------|-----------------|--------------------|---------------------|--------|--------------|--------------|---|------------------------|
|            |                              |             |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % | GRAVEL %            | SAND % | > 0.075 mm % | < 0.075 mm % |   |                        |
| 25'        | GRAVEL<br>SILTY SAND GRAVEL  |             | ICE<br>UC<br>OX<br>Some<br>URS   |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 27'        |                              |             |                                  | 8                          | BAG                   | 410         | 9.8               |                            | N.P.               |                 |                    | 59                  | 36     | 5            |              |   | GW                     |
| 30'        |                              |             |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 32'        |                              |             |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 35'        |                              |             | UR                               | 9                          | BAG                   | 419         | 5.2               |                            | N.P.               |                 |                    | 77                  | 21     | 2            |              |   | GP                     |
| 37'        |                              |             |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 40'        |                              |             | ICE<br>UC<br>UC<br>ND0           | 10                         | BAG                   | 436         | 10.3              |                            | N.P.               |                 |                    | 56                  | 35     | 9            |              |   | GW-GM                  |
| 42'        |                              |             |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 45'        |                              |             |                                  | 11                         | BAG                   | 420         | 9.1               |                            | N.P.               |                 |                    | 56                  | 33     | 11           |              |   | GW-GM                  |
| 47'        |                              |             |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 50'        | GRAVEL<br>SILTY SANDY GRAVEL |             |                                  | 12                         | BAG                   | 421         | 8.4               |                            | N.P.               |                 |                    | 58                  | 34     | 8            |              |   | GW-GM                  |



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MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy

HOLE LOCATION: STA. 655+50 9/16 7' RT

DATE DRILLED: 11-8-77

DRILL TECHNICIAN: P.A.

PLOTTED BY: SC

HOLE ELEVATION:

HOLE NO.: 2

HOLE DEPTH: 70'

TYPE OF DRILL: ROTARY AIR

WATER LEVEL:

DEPTH (FT.) SOIL DESCRIPTION

M.R.C.  
PERMAFROST  
CLASSIFICATION

SAMPLE IDENTIFICATION DATA

| SAMPLE DEPTH (FT.) | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |
|--------------------|-----------------------|-------------|-------------------|
| 52                 | 13                    | BAG         | 422               |
| 55                 |                       |             |                   |
| 57                 |                       |             |                   |
| 60                 | 14                    | BAG         | 423               |

NATURAL  
MOISTURE  
CONTENT  
%

CONSISTENCY LIMITS

| LIQUID LIMIT (%) | PLASTIC LIMIT (%) | PLASTICITY INDEX (%) |
|------------------|-------------------|----------------------|
|                  | N.P.              |                      |
|                  |                   |                      |
|                  | N.P.              |                      |

MECHANICAL ANALYSIS

| GRAVEL (%) | SAND (%) | > 0.075 mm (%) | < 0.075 mm (%) | < 0.005 mm (%) |
|------------|----------|----------------|----------------|----------------|
| 39         | 53       | 8              |                |                |
|            |          |                |                |                |
| 40         | 52       | 8              |                |                |

DRY  
DENSITY  
LBS.  
CU. FT.

STANDARD  
PENETRATION  
RESISTANCE  
BLOWS  
FT.

UNIFIED  
CLASSIFICATION

50' GRAVEL  
SILTY SANDY GRAVEL

55'

60'

70' EDGE HOLE 70'

ICE  
OK  
DC  
NOB

52

55

57

60

SW-sm

SW-sm



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 728 Dempster Hwy

HOLE LOCATION: STA. 657 + 06 E

DATE DRILLED: 12-8-77

DRILL TECHNICIAN: P.A.

PLOTTED BY: SC

HOLE ELEVATION:

HOLE NO.: 3

HOLE DEPTH: 39'

TYPE OF DRILL: ROTARY AIR

WATER LEVEL:

DEPTH (FT.) SOIL DESCRIPTION

N.R.C.  
PERMAFROST  
CLASSIFICATION

SAMPLE IDENTIFICATION DATA

| SAMPLE DEPTH (FT.) | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER | NATURAL MOISTURE CONTENT (%) |
|--------------------|-----------------------|-------------|-------------------|------------------------------|
| 1'                 | 1                     | BAG         | 411               | 54.8                         |
| 2'                 | 2                     | BAG         | 412               | 90.7                         |
| 3'                 | 3                     | BAG         | 424               | 37.7                         |
| 4'                 | 4                     | BAG         | 425               | 7.3                          |
| 5'                 | 5                     | BAG         | 426               | 7.2                          |
| 6'                 | 6                     | BAG         | 427               | 9.1                          |

CONSISTENCY LIMITS

| LIQUID LIMIT (%) | PLASTIC LIMIT (%) | PLASTICITY INDEX (%) |
|------------------|-------------------|----------------------|
| N.P.             | N.P.              | N.P.                 |
| N.P.             | N.P.              | N.P.                 |
| N.P.             | N.P.              | N.P.                 |
| N.P.             | N.P.              | N.P.                 |
| N.P.             | N.P.              | N.P.                 |

MECHANICAL ANALYSIS

| GRAVEL (%) | SAND (%) | > 0.075 mm (%) | < 0.075 mm (%) | < 0.005 mm (%) |
|------------|----------|----------------|----------------|----------------|
| 15         | 66       | 19             |                |                |
| 16         | 73       | 11             |                |                |
| 1          | 50       | 42             | 7              |                |
| 62         | 33       | 5              |                |                |
| 49         | 43       | 8              |                |                |
| 51         | 32       | 17             |                |                |

| DRY DENSITY (LBS. CU. FT.) | STANDARD PENETRATION RESISTANCE (BLOWS FT.) | UNIFIED CLASSIFICATION |
|----------------------------|---|------------------------|
|                            |   | OL                     |
|                            |   | ML                     |
|                            |   | SM                     |
|                            |   | GW                     |
|                            |   | SW-sm                  |
|                            |   | GM                     |

0' ORGANIC PEAT  
1' SILT SAND ORGANIC  
2 1/2' PERMAFROST  
Silt - SAND mixture  
5'  
8' GRAVEL  
Silty SANDY GRAVEL  
10'  
15'  
20'  
25'

2 1/2' NOW BY 00032  
Ice  
Ice OR SOME DR. NOW



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy

HOLE LOCATION: STA. 657+00 &

DATE DRILLED: 12-8-77

DRILL TECHNICIAN: P.A.

PLOTTED BY: sc

HOLE ELEVATION:

HOLE NO.: 3

HOLE DEPTH: 39'

TYPE OF DRILL: ROTARY Air

WATER LEVEL:

DEPTH (FT.) SOIL DESCRIPTION

| DEPTH (FT.) | SOIL DESCRIPTION             | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | CONSISTENCY LIMITS |                 |                    | MECHANICAL ANALYSIS |        |              |              | DRY DENSITY<br><small>lbs. / cu. ft.</small> | STANDARD PENETRATION RESISTANCE<br><small>BLOWS / FT.</small> | UNIFIED CLASSIFICATION |              |
|-------------|------------------------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|----------------------------|--------------------|-----------------|--------------------|---------------------|--------|--------------|--------------|--|---|------------------------|--------------|
|             |                              |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % | GRAVEL %            | SAND % | > 0.075 mm % | < 0.075 mm % |  |   |                        | < 0.005 mm % |
|             |                              |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |  |   |                        |              |
| 27'         | GRAVEL<br>SILTY SANDY GRAVEL | Ice<br>NO<br>OK<br>OK            |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |  |   |                        |              |
| 30'         |                              |                                  | 7                          | BAG                   | 413         | 8.4               |                            |                    | N.P.            |                    | 51                  | 40     | 9            |              |  |   | GW-GM                  |              |
| 32'         |                              |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |  |   |                        |              |
| 35'         |                              |                                  | 8                          | BAG                   | 414         | 8.6               |                            |                    | N.P.            |                    | 48                  | 42     | 10           |              |  |   | SW-SM                  |              |
| 37'         |                              | Ice                              |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |  |   |                        |              |
| 39'         | END HOLE 39'                 | Ice                              | 9                          | BAG                   | 415         | 16.5              |                            |                    | N.P.            |                    | 33                  | 53     | 14           |              |  |   | SM                     |              |



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy HOLE LOCATION: STA. 657+14 % 4' RT

DATE DRILLED: 13-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: SC HOLE ELEVATION: HOLE NO.: 4

BORE HOLE DEPTH: 36' 1/2'  
TYPE OF DRILL: ROTARY AIR  
WATER LEVEL: \_\_\_\_\_

| DEPTH (FT.) | SOIL DESCRIPTION          | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT (%) | CONSISTENCY LIMITS |                   |                      | MECHANICAL ANALYSIS |          |                | STANDARD PENETRATION RESISTANCE (BLOWS/FT.) | UNIFIED CLASSIFICATION |                |
|-------------|---------------------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|------------------------------|--------------------|-------------------|----------------------|---------------------|----------|----------------|---|------------------------|----------------|
|             |                           |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                              | LIQUID LIMIT (%)   | PLASTIC LIMIT (%) | PLASTICITY INDEX (%) | GRAVEL (%)          | SAND (%) | > 0.075 mm (%) |   |                        | < 0.075 mm (%) |
| 0           | ORGANIC PEAT              |                                  |                            |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 1'          | ORGANIC SILT-SAND MIXTURE |                                  |                            |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 2 1/2'      | PERMASOIL 2 1/2'          | 2 1/2'                           | 2 1/2'                     |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 3'          | SILTY SAND                |                                  | 4'                         | 1                     | BAG         | 416               | 59.7                         |                    | N.P.              |                      |                     | 27       | 62             | 11  | ML                     |                |
| 5'          | SILT SAND MIXTURE         |                                  | 5'                         |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 8'          |                           | NOV FOR UX DC                    | 8'                         | 2                     | BAG         | 438               | 43.2                         |                    | N.P.              |                      |                     | 6        | 42             | 42  | 10                     | ML             |
| 10'         | GRAVEL SILTY SANDY GRAVEL |                                  | 10'                        |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 15'         |                           |                                  | 15'                        | 3                     | BAG         | 439               | 8.1                          |                    | N.P.              |                      |                     | 44       | 44             | 12  |                        | SM             |
| 17'         |                           |                                  | 17'                        |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 20'         |                           |                                  | 20'                        | 4                     | BAG         | 440               | 8.3                          |                    | TRACE             |                      |                     | 47       | 30             | 16  | 7                      | SM             |
| 22'         |                           | ICE                              | 22'                        |                       |             |                   |                              |                    |                   |                      |                     |          |                |   |                        |                |
| 25'         |                           |                                  | 25'                        | 5                     | BAG         | 417               | 8.5                          |                    | N.P.              |                      |                     | 33       | 44             | 14  | 9                      | SM             |



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy

HOLE LOCATION: STA. 657+14 9/3 4' RT

DATE DRILLED: 13-8-77

DRILL TECHNICIAN: P.A.

PLOTTED BY: SC

HOLE ELEVATION:

HOLE NO.: 4

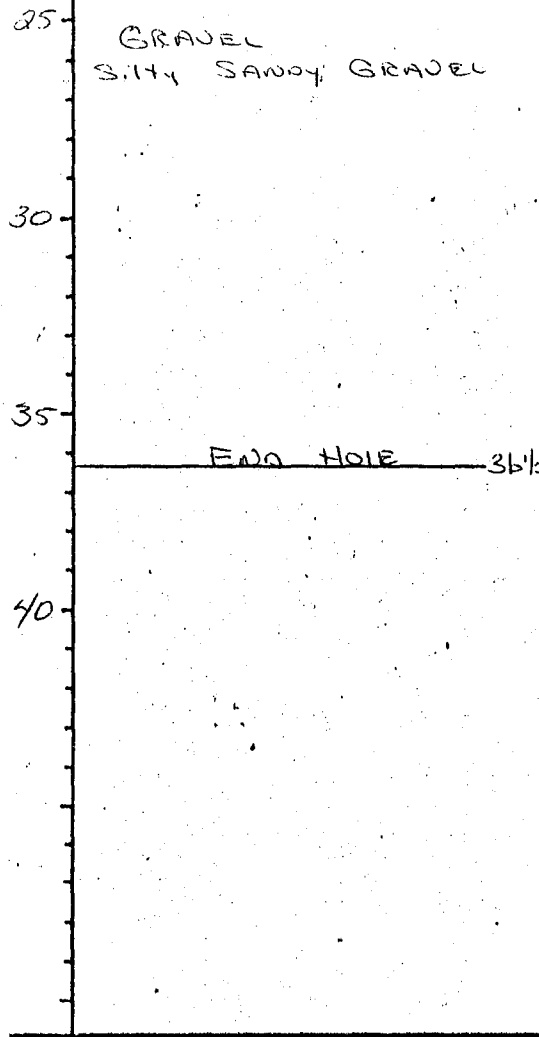
HOLE DEPTH: 36 1/2'

TYPE OF DRILL: ROTARY AIR

WATER LEVEL:

DEPTH (FT.) SOIL DESCRIPTION

| DEPTH (FT.) | SOIL DESCRIPTION              | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | CONSISTENCY LIMITS |                 |                    | MECHANICAL ANALYSIS |        |             |             | DRY DENSITY (LB./CU. FT.) | STANDARD PENETRATION RESISTANCE (BLOWS/FT.) | UNIFIED CLASSIFICATION |
|-------------|-------------------------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|----------------------------|--------------------|-----------------|--------------------|---------------------|--------|-------------|-------------|---------------------------|---|------------------------|
|             |                               |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % | GRAVEL %            | SAND % | >0.075 mm % | <0.075 mm % |                           |   |                        |
| 25          | GRAVEL<br>S.I.Y. SANDY GRAVEL | Ice<br>Uc<br>Ux<br>won           | 27                         | 6                     | BAG         | 441               | 5.4                        | N.P.               |                 | 64                 | 28                  | 8      |             |             |                           |   | GW-GM                  |
| 30          |                               |                                  | 30                         |                       |             |                   |                            |                    |                 |                    |                     |        |             |             |                           |   |                        |
| 35          |                               | Ice                              | 32                         | 7                     | BAG         | 418               | 9.1                        | N.P.               |                 | 42                 | 45                  | 13     |             |             |                           |   | SM                     |
| 35          | END HOLE                      |                                  | 35                         |                       |             |                   |                            |                    |                 |                    |                     |        |             |             |                           |   |                        |





Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy HOLE LOCATION: STA. 658 + 52  
 DATE DRILLED: 13-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: sc HOLE ELEVATION: \_\_\_\_\_ HOLE NO.: 5

| HOLE DEPTH | TYPE OF DRILL | WATER LEVEL | DEPTH (FT.) | SOIL DESCRIPTION                                      | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT % | CONSISTENCY LIMITS |                 |                    | MECHANICAL ANALYSIS |        |              |              | STANDARD PENETRATION RESISTANCE BLOWS/FT. | UNIFIED CLASSIFICATION |
|------------|---------------|-------------|-------------|---|----------------------------------|----------------------------|-----------------------|-------------|-------------------|----------------------------|--------------------|-----------------|--------------------|---------------------|--------|--------------|--------------|---|------------------------|
|            |               |             |             |   |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                            | LIQUID LIMIT %     | PLASTIC LIMIT % | PLASTICITY INDEX % | GRAVEL %            | SAND % | > 0.075 mm % | < 0.075 mm % |   |                        |
| 0          |               |             |             | ORGANIC MIXED IO WITH ORGANIC SILT + SAND SOME GRAVEL |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
| 5          |               |             |             | GRAVEL SILTY SAND                                     |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
|            |               |             | 5 1/2       |   |                                  |                            | 1                     | AUGER       | 442               | 17.5                       |                    | N.P.            |                    | 21                  | 40     | 29           | 10           |   | SM                     |
|            |               |             | 7 1/2       |   |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
|            |               |             | 8 1/2       |   |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
|            |               |             | 8 1/2       |   |                                  |                            | 2                     | AUGER       | 443               | 24.3                       |                    | TRACE           |                    | 8                   | 30     | 50           | 12           |   | OL                     |
|            |               |             | 10          |   |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
|            |               |             | 12 1/2      |   |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |
|            |               |             | 12 1/2      |   |                                  |                            |                       |             |                   |                            |                    |                 |                    |                     |        |              |              |   |                        |

8' 000 ICE

PERMAFROST 8'

END HOLE 12 1/2











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MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 72.9 Dempster Hwy HOLE LOCATION: STA. 657 + 25 9/5 85' LT  
 DATE DRILLED: 15-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: sc HOLE ELEVATION: HOLE NO.: 10

| DEPTH<br>(FT.) | SOIL DESCRIPTION               | N.R.C.<br>PERMAFROST<br>CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                             |                |                      | NATURAL<br>MOISTURE<br>CONTENT<br>% | CONSISTENCY LIMITS   |                       |                          | MECHANICAL ANALYSIS |           |                 |                 | UNIFIED<br>CLASSIFICATION |   |
|----------------|--------------------------------|--|----------------------------|-----------------------------|----------------|----------------------|-------------------------------------|----------------------|-----------------------|--------------------------|---------------------|-----------|-----------------|-----------------|---------------------------|---|
|                |                                |  | SAMPLE<br>DEPTH<br>(FT.)   | SAMPLE<br>NUMBER<br>(FIELD) | SAMPLE<br>TYPE | LABORATORY<br>NUMBER |                                     | LIQUID<br>LIMIT<br>% | PLASTIC<br>LIMIT<br>% | PLASTICITY<br>INDEX<br>% | GRAVEL<br>%         | SAND<br>% | < 0.075 mm      |                 |                           | STANDARD<br>PENETRATION<br>RESISTANCE<br>BLOWS<br>/ FT. |
|                |                                |  |                            |                             |                |                      |                                     |                      |                       |                          |                     |           | > 0.005 mm<br>% | < 0.005 mm<br>% |                           |   |
| 0              | ORGANIC PEAT.                  |  |                            |                             |                |                      |                                     |                      |                       |                          |                     |           |                 |                 |                           |   |
|                | TERMAFROST 2'                  |  |                            |                             |                |                      |                                     |                      |                       |                          |                     |           |                 |                 |                           |   |
| 3 1/2          | ICE                            |  | 3 1/2                      |                             |                |                      |                                     |                      |                       |                          |                     |           |                 |                 |                           |   |
| 5              | Silt, SAND MIXTURE<br>ORGANIC. | SOME<br>ICE<br>NOV<br>OF<br>ICE        | 5                          | 9                           | Auger          | 447                  | 133.5                               |                      | 10.P.                 |                          |                     | 29        | 59              | 12              | OK                        |   |
| 7 1/2          | EDA HOLE<br>GRAVEL             | 7 1/2                                  | 7 1/2                      | 10                          | Auger          | 448                  | 39.5                                |                      | 10.P.                 |                          |                     | 35        | 53              | 12              | OL                        |   |













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MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

SUBSURFACE TESTING REPORT

PROJECT: Blackstone River Mi 729 Dempster Hwy HOLE LOCATION: STA. 655+57 9/5 40' RT  
 DATE DRILLED: 15-8-77 DRILL TECHNICIAN: P.A. PLOTTED BY: SC HOLE ELEVATION: HOLE NO.: 16

| DEPTH (FT.) | SOIL DESCRIPTION  | N.R.C. PERMAFROST CLASSIFICATION | SAMPLE IDENTIFICATION DATA |                       |             |                   | NATURAL MOISTURE CONTENT (%) | CONSISTENCY LIMITS |                   |                      |            | MECHANICAL ANALYSIS |                |                |                | UNIFIED CLASSIFICATION |
|-------------|-------------------|----------------------------------|----------------------------|-----------------------|-------------|-------------------|------------------------------|--------------------|-------------------|----------------------|------------|---------------------|----------------|----------------|----------------|------------------------|
|             |                   |                                  | SAMPLE DEPTH (FT.)         | SAMPLE NUMBER (FIELD) | SAMPLE TYPE | LABORATORY NUMBER |                              | LIQUID LIMIT (%)   | PLASTIC LIMIT (%) | PLASTICITY INDEX (%) | GRAVEL (%) | SAND (%)            | > 0.075 mm (%) | < 0.075 mm (%) | < 0.005 mm (%) |                        |
| 0           | ORGANIC PEAT      |                                  |                            |                       |             |                   |                              |                    |                   |                      |            |                     |                |                |                |                        |
|             | SILTY SAND        |                                  |                            |                       |             |                   |                              |                    |                   |                      |            |                     |                |                |                |                        |
|             | PERMAFROST 2 1/2' | 3 1/2' ICE 1000                  | 2 1/2'                     |                       |             |                   |                              |                    |                   |                      |            |                     |                |                |                |                        |
|             | ORGANIC TRACERS   |                                  | 4 1/2'                     | 16                    | AUGER       | 452               | 52.8                         |                    | N.P.              | 6                    | 44         | 39                  | 11             |                |                | SM                     |
| 5           | GRAVEL            |                                  |                            |                       |             |                   |                              |                    |                   |                      |            |                     |                |                |                |                        |
|             | END HOLE          |                                  |                            |                       |             |                   |                              |                    |                   |                      |            |                     |                |                |                |                        |















LABORATORY TESTING REPORTS

JULY 1977 INVESTIGATION



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

|   |                             |                       |                      |                       |                                  |
|---|-----------------------------|-----------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                       |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>655+71 1/2 LT</b>                            | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>1'-2'</b> | HOLE NO.<br><b>1</b> | FIELD NO.<br><b>1</b> | LAB NO.<br><b>393</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 10         | 100.0             |            |                   | .059       | 69.2              | .005       | 10.2              |
| 20         | 99.4              |            |                   | .045       | 53.3              |            |                   |
| 40         | 98.3              |            |                   | .033       | 43.7              |            |                   |
| 100        | 87.1              |            |                   | .024       | 32.9              |            |                   |
| 200        | 70.8              |            |                   | .017       | 25.2              |            |                   |
|            |                   |            |                   | .013       | 18.2              |            |                   |
|            |                   |            |                   | .009       | 16.3              |            |                   |
|            |                   |            |                   | .007       | 11.8              |            |                   |

#### PETROGRAPHIC ANALYSIS

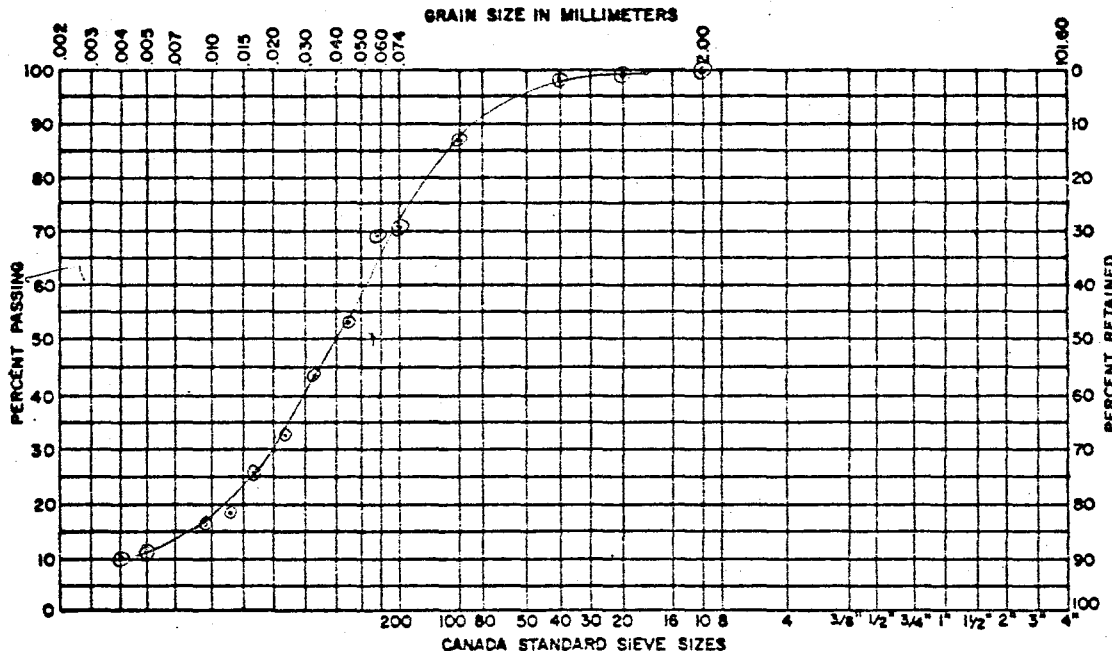
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|-------------|------|----------------------------|-------------|
|            | <b>OL</b>              |    | <b>N.P.</b> |      | <b>52.1</b>                | <b>2.68</b> |
|            |                        |    |             |      |                            |             |
|            |                        |    |             |      |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 6-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

655+71 0/3 TLT

SAMPLE TYPE

AUGER

DEPTH

3 1/2 - 4 1/2

HOLE NO.

1

FIELD NO.

2

LAB NO.

394

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 20         | 100.0             | D62        | 59.7              |
| 40         | 99.5              | D46        | 46.9              |
| 100        | 90.2              | D34        | 34.1              |
| 200        | 65.9              | D24        | 28.4              |
|            |                   | D17        | 23.0              |
|            |                   | D13        | 18.2              |
|            |                   | D09        | 15.6              |
|            |                   | D07        | 11.2              |

#### PETROGRAPHIC ANALYSIS

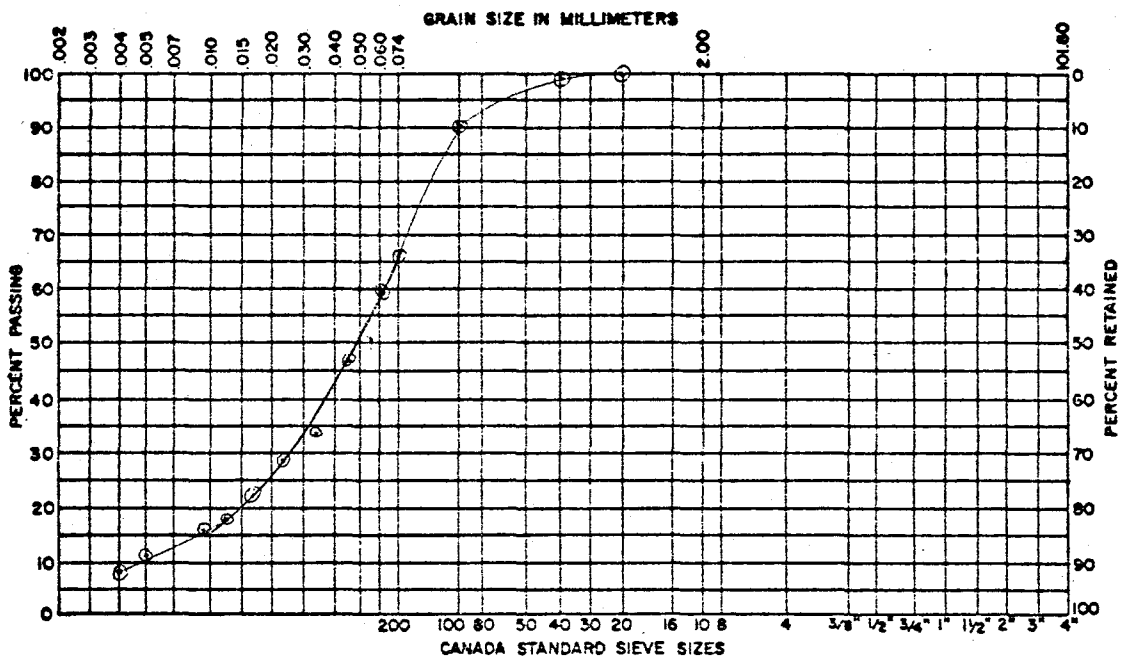
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H2O | S.G. |
|------------|------------------------|----|------|------|---------------|------|
|            | ML                     |    | 10.8 |      | 38.2          | 2.68 |
|            |                        |    |      |      |               |      |
|            |                        |    |      |      |               |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 6-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

14-10-77

STA.

655+71' 9/8 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

6'-9'

HOLE NO.

1

FIELD NO.

3

LAB NO.

395

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 14.4              |            |                   |            |                   |
| 1          | 97.2              | 100        | 9.4               |            |                   |            |                   |
| 3/4        | 92.6              | 200        | 7.3               |            |                   |            |                   |
| 1/2        | 75.2              |            |                   |            |                   |            |                   |
| 3/8        | 66.5              |            |                   |            |                   |            |                   |
| 4          | 48.1              |            |                   |            |                   |            |                   |
| 10         | 29.4              |            |                   |            |                   |            |                   |
| 20         | 18.1              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

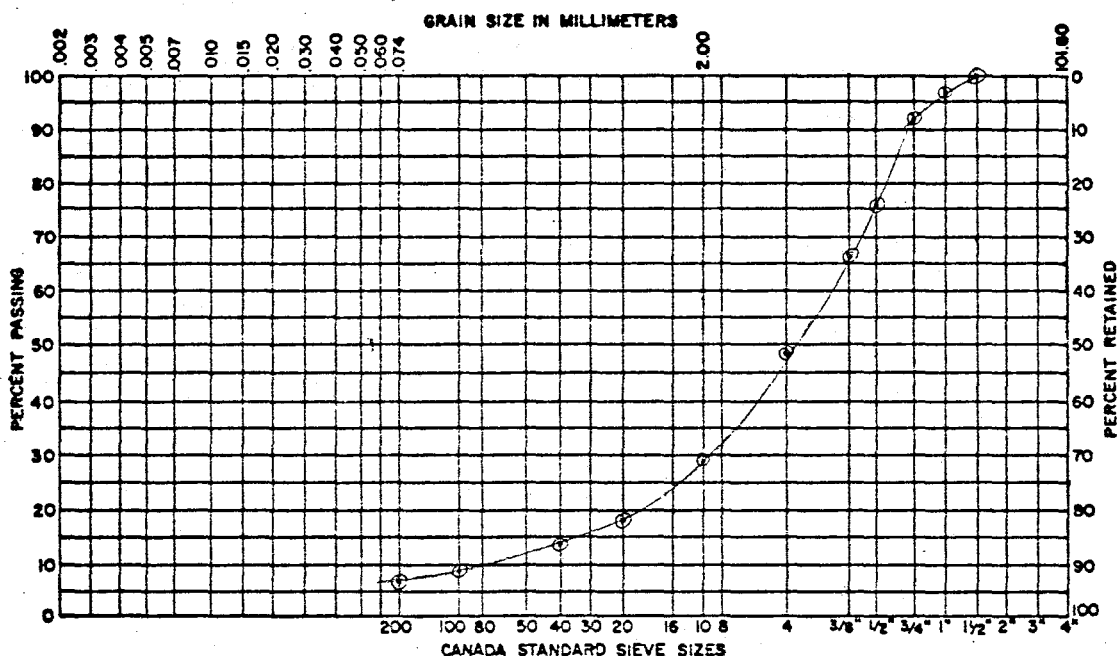
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW - GM                |    | 10.2 |      | 18.0                       |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 6-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y. T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

655+71 0/3 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

10'-12'

HOLE NO.

1

FIELD NO.

4

LAB NO.

396

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 6.4               |
| 1          | 86.0              | 100        | 4.2               |
| 3/4        | 72.5              | 200        | 3.2               |
| 1/2        | 53.1              |            |                   |
| 3/8        | 41.9              |            |                   |
| 4          | 26.1              |            |                   |
| 10         | 15.9              |            |                   |
| 20         | 9.0               |            |                   |

#### PETROGRAPHIC ANALYSIS

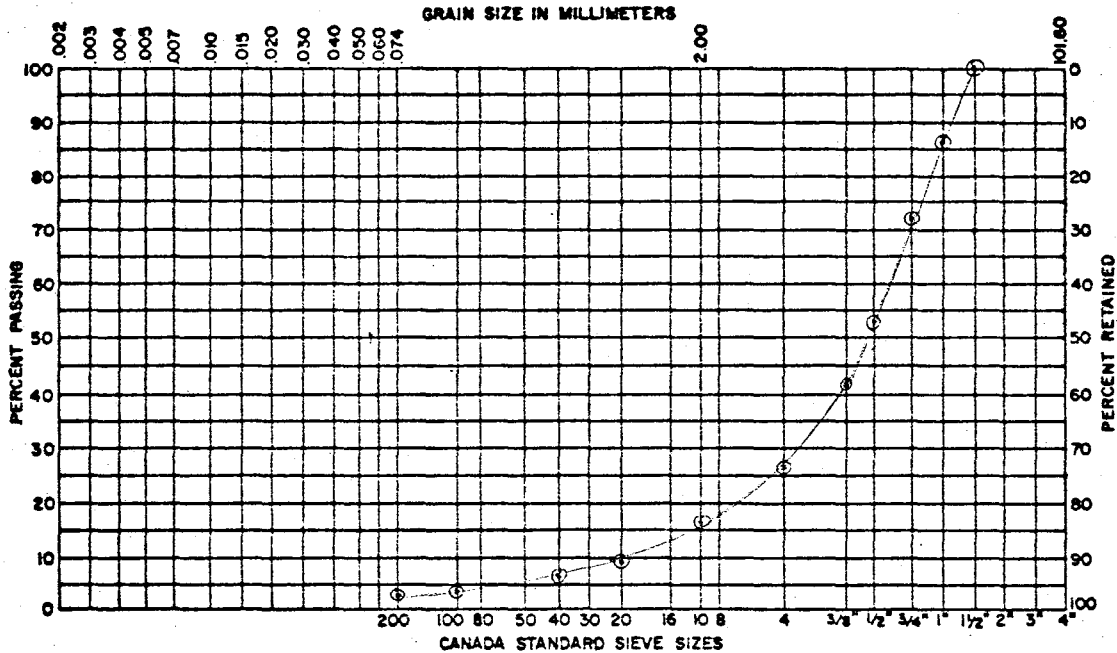
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW                     |    | N.P. |      | 4.1                        |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 6-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

655+71% 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

13'-15'

HOLE NO.

1

FIELD NO.

5

LAB NO.

397

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 14.2              |
| 1          | 95.0              | 100        | 10.0              |
| 3/4        | 88.9              | 200        | 8.2               |
| 1/2        | 76.9              |            |                   |
| 3/8        | 68.9              |            |                   |
| 4          | 49.6              |            |                   |
| 10         | 33.2              |            |                   |
| 20         | 18.9              |            |                   |

#### PETROGRAPHIC ANALYSIS

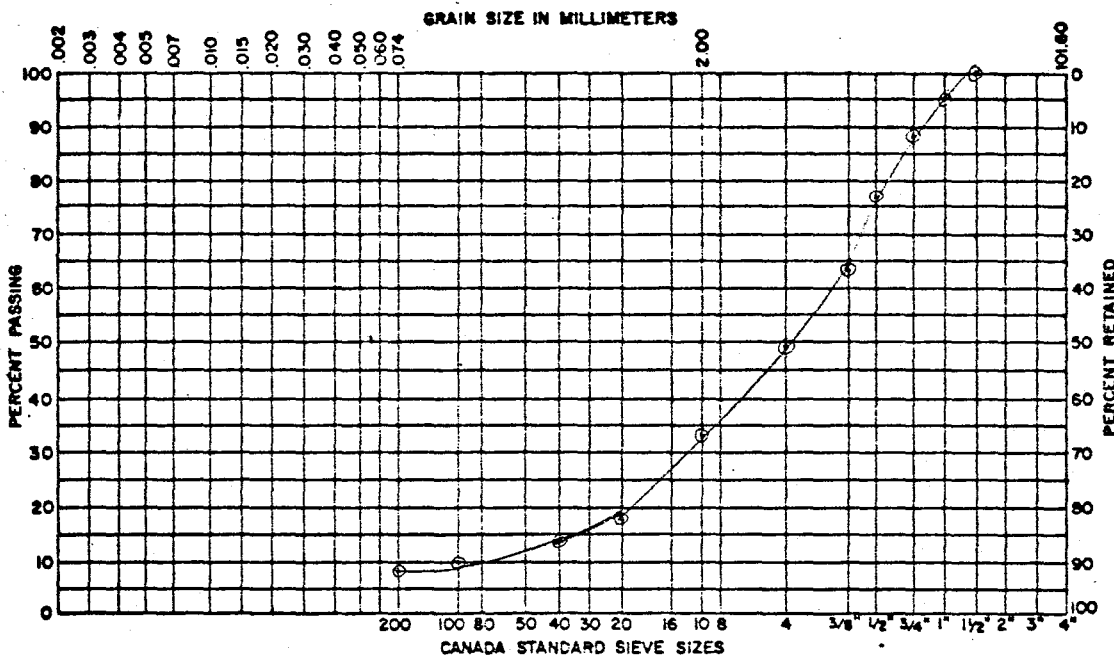
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | NP   |      | 6.5                        |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 6-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                                  |                         |                      |                       |                                  |
|---|----------------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                                  |                         |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>655+71% 7' LT</b>                            | SAMPLE TYPE<br><b>ROTARY-AIR</b> | DEPTH<br><b>18'-20'</b> | HOLE NO.<br><b>1</b> | FIELD NO.<br><b>6</b> | LAB NO.<br><b>398</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | 40         | 19.0              |
| 1          | 97.2              | 100        | 13.9              |
| 3/4        | 76.8              | 200        | 11.6              |
| 1/2        | 52.3              |            |                   |
| 3/8        | 49.2              |            |                   |
| 4          | 35.4              |            |                   |
| 10         | 29.1              |            |                   |
| 20         | 22.6              |            |                   |

#### PETROGRAPHIC ANALYSIS

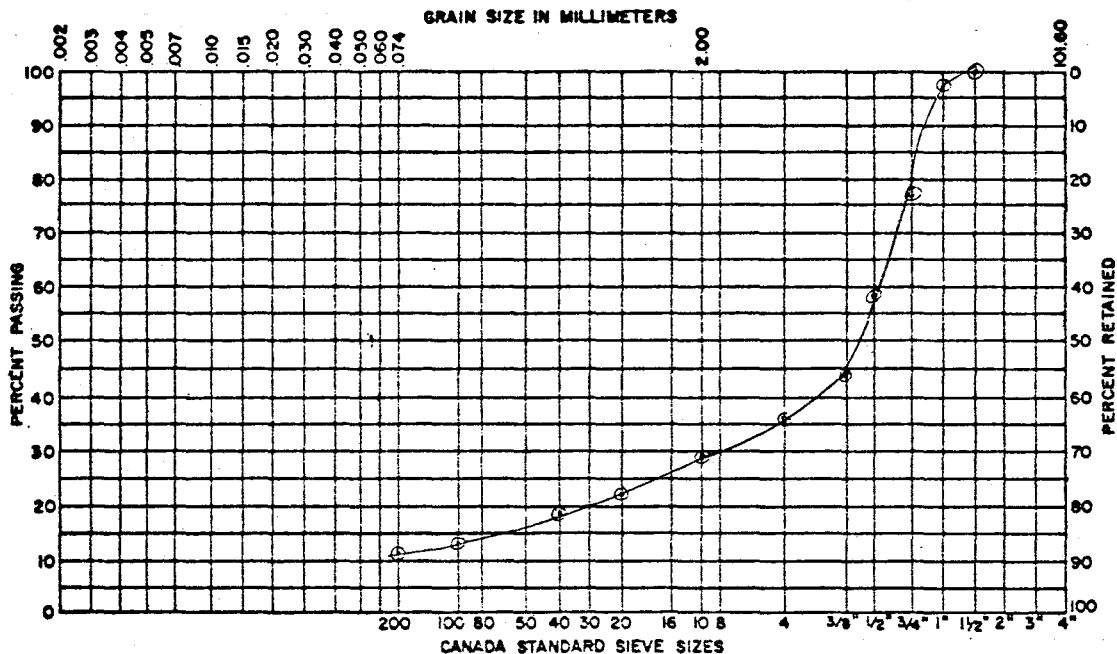
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>N.P.</b> |      | <b>7.4</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 6-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

655+71' 1/2 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

23'-25'

HOLE NO.

1

FIELD NO.

7

LAB NO.

399

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 15.8              |            |                   |            |                   |
| 1          | 93.0              | 100        | 11.3              |            |                   |            |                   |
| 3/4        | 79.8              | 200        | 9.4               |            |                   |            |                   |
| 1/2        | 66.9              |            |                   |            |                   |            |                   |
| 3/8        | 57.0              |            |                   |            |                   |            |                   |
| 7          | 37.6              |            |                   |            |                   |            |                   |
| 10         | 26.0              |            |                   |            |                   |            |                   |
| 20         | 19.7              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

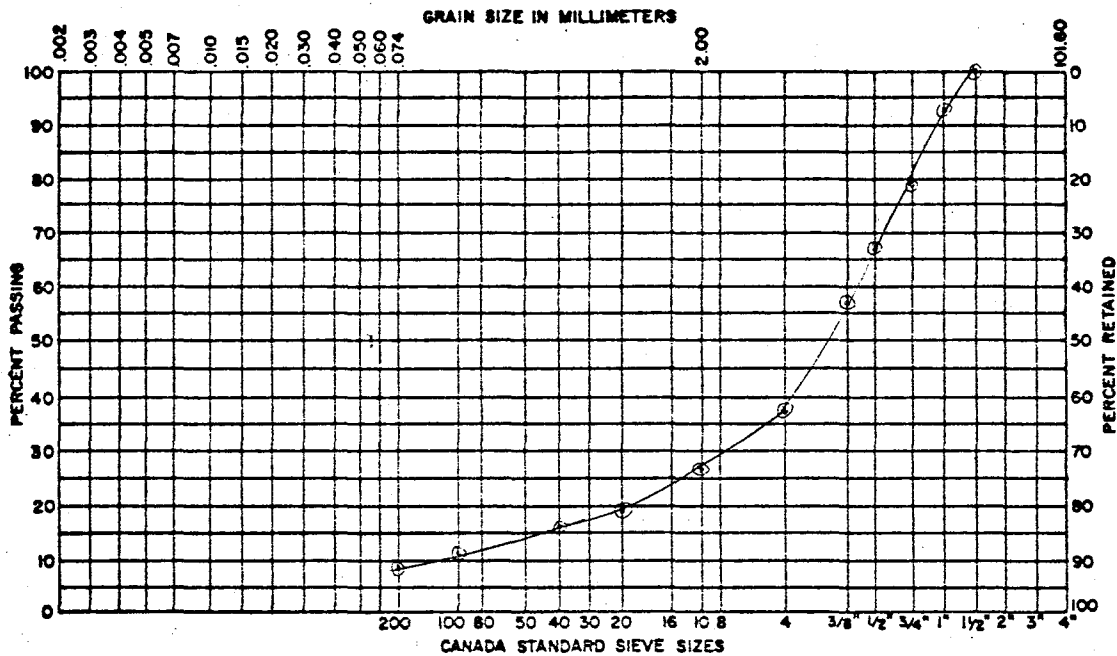
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | N.P. |      | 5.3                        |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 6-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

|   |                                  |                         |                      |                       |                                  |
|---|----------------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                                  |                         |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>655+71 1/3 7' LT</b>                         | SAMPLE TYPE<br><b>ROTARY-AIR</b> | DEPTH<br><b>28'-30'</b> | HOLE NO.<br><b>1</b> | FIELD NO.<br><b>8</b> | LAB NO.<br><b>400</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 71.4              |
| 1          | 91.4              | 100        | 2.6               |
| 3/4        | 82.8              | 200        | 7.3               |
| 1/2        | 64.8              |            |                   |
| 3/8        | 54.7              |            |                   |
| 4          | 34.6              |            |                   |
| 10         | 20.2              |            |                   |
| 20         | 14.2              |            |                   |

#### PETROGRAPHIC ANALYSIS

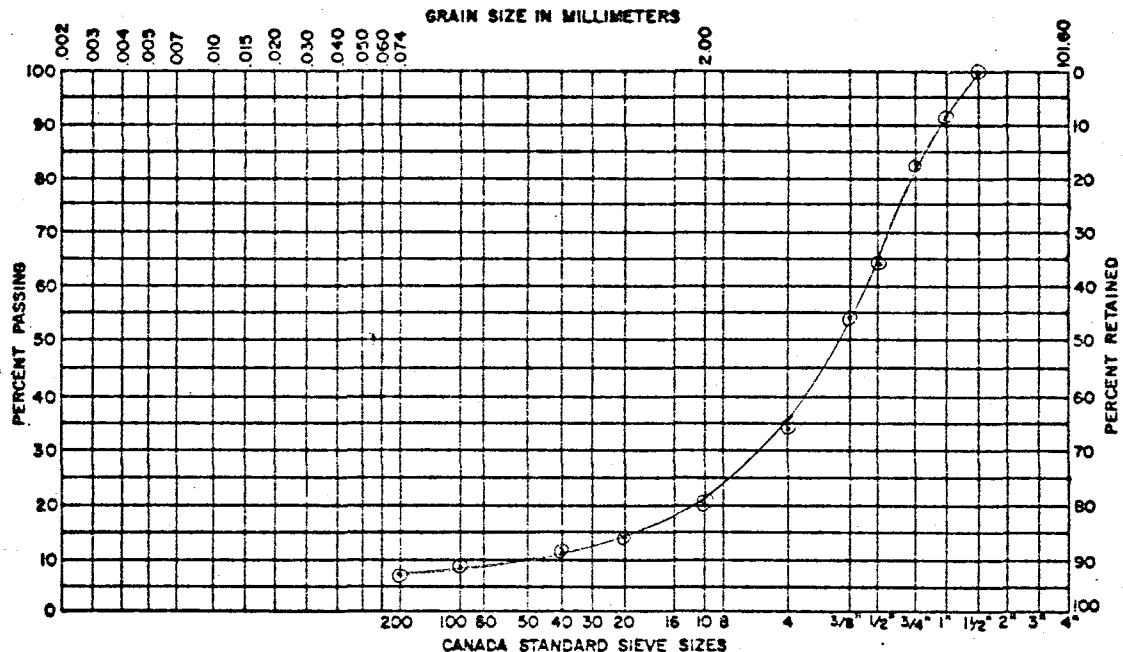
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | PI | NATURAL % H <sub>2</sub> O | SG |
|------------|------------------------|----|-------------|----|----------------------------|----|
|            | <b>GW-GM</b>           |    | <b>N.P.</b> |    | <b>6.3</b>                 |    |
|            |                        |    |             |    |                            |    |
|            |                        |    |             |    |                            |    |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **6-8-77**  
 DATE RECEIVED **9-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY.

DATE RECORDED

14-10-77

STA.

655+71% 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

38'-40'

HOLE NO.

1

FIELD NO.

9

LAB NO.

401

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 8.4               |
| 3/4        | 93.2              | 300        | 6.8               |
| 1/2        | 79.4              |            |                   |
| 3/8        | 65.6              |            |                   |
| 4          | 39.6              |            |                   |
| 10         | 19.5              |            |                   |
| 20         | 12.9              |            |                   |
| 40         | 11.3              |            |                   |

#### PETROGRAPHIC ANALYSIS

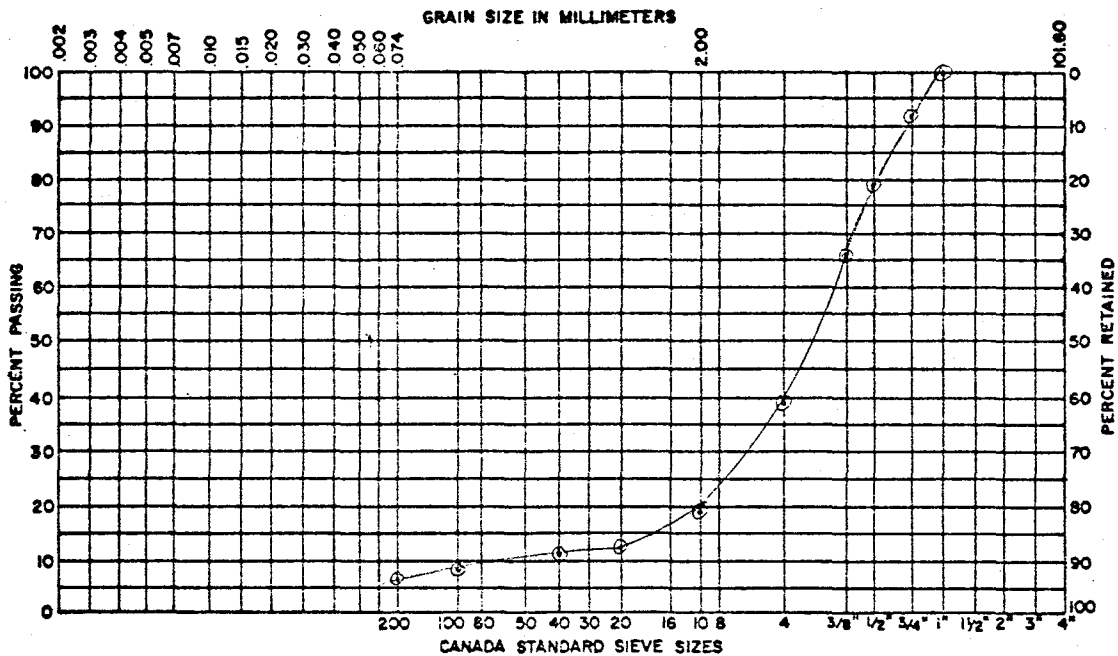
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | D.P. |      | 5.3                        |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 8-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y. T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

14-10-77

STA.

655+71 1/3 T' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

43'-45'

HOLE NO.

1

FIELD NO.

10

LAB NO.

402

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 22.1              |
| 1          | 97.2              | 100        | 15.8              |
| 3/4        | 94.0              | 200        | 13.2              |
| 1/2        | 71.4              |            |                   |
| 3/8        | 73.1              |            |                   |
| 4          | 57.6              |            |                   |
| 10         | 43.4              |            |                   |
| 20         | 27.2              |            |                   |

#### PETROGRAPHIC ANALYSIS

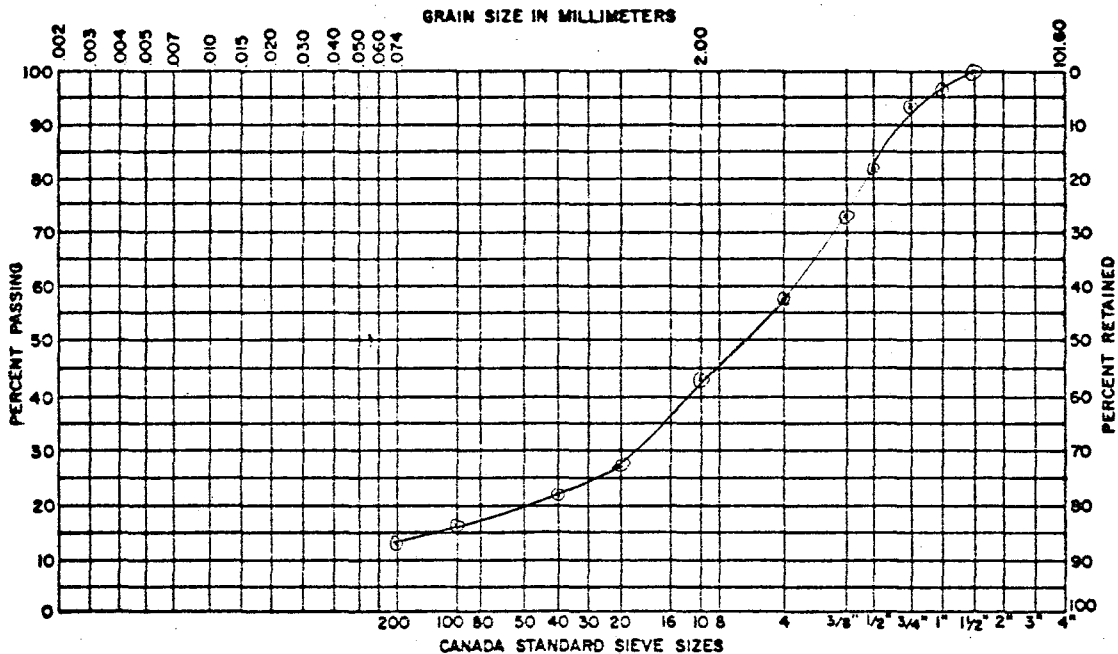
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | SM                     |    | NP   |      | 8.9                        |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 8-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

13-10-77

STA.

655+71 1/2 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

48'-50'

HOLE NO.

1

FIELD NO.

11

LAB NO.

403

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 16.7              |            |                   |            |                   |
| 1          | 97.1              | 100        | 11.6              |            |                   |            |                   |
| 3/4        | 94.5              | 200        | 10.0              |            |                   |            |                   |
| 1/2        | 78.6              |            |                   |            |                   |            |                   |
| 3/8        | 63.5              |            |                   |            |                   |            |                   |
| 4          | 41.2              |            |                   |            |                   |            |                   |
| 10         | 28.0              |            |                   |            |                   |            |                   |
| 20         | 20.5              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

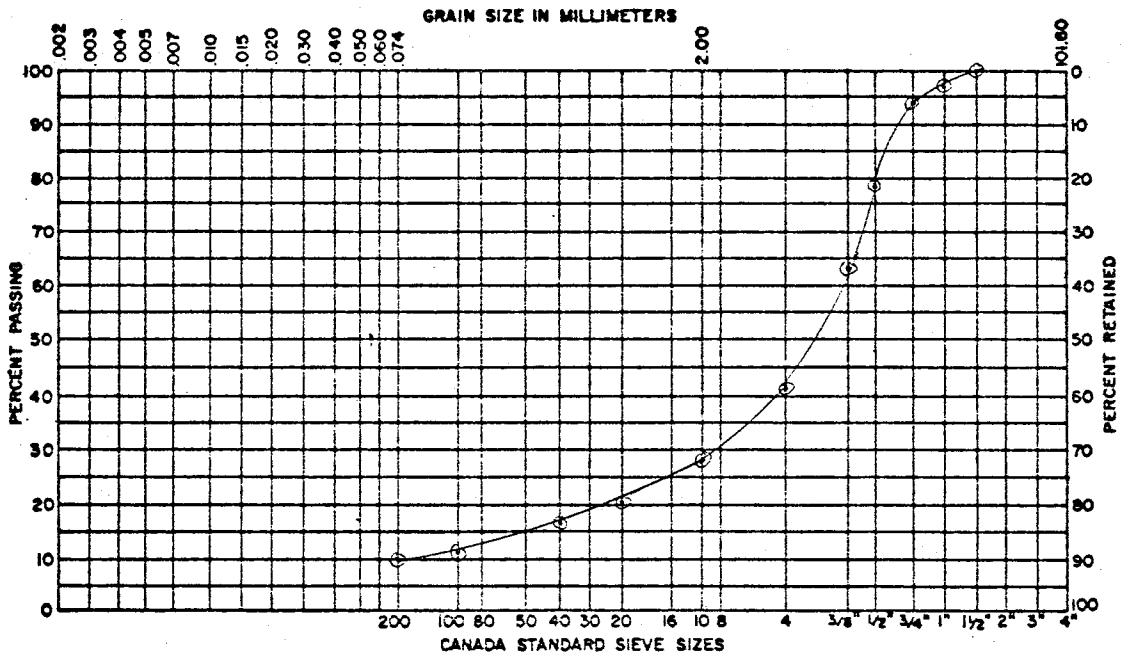
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | 10.0 |      | 6.2                        |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED 8-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

12-10-77

STA.

655+71% 7' LT

SAMPLE TYPE

ROTARY-AIR

DEPTH

53'-55'

HOLE NO.

1

FIELD NO.

12

LAB NO.

404

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 16.8              |
| 3/4        | 97.6              | 200        | 14.0              |
| 1/2        | 92.6              |            |                   |
| 3/8        | 87.7              |            |                   |
| 4          | 72.9              |            |                   |
| 10         | 49.5              |            |                   |
| 20         | 31.1              |            |                   |
| 40         | 23.4              |            |                   |

#### PETROGRAPHIC ANALYSIS

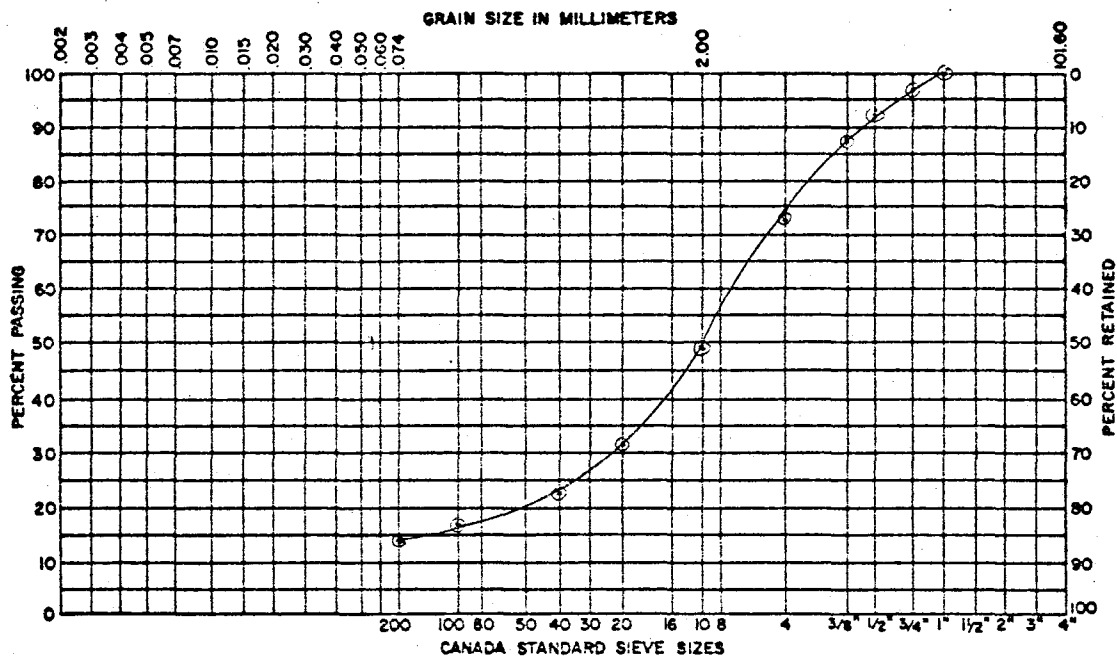
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | SM                     |    | 10.0 |      | 8.3                        |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 8-8-77

DATE RECEIVED 9-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

|   |                                  |                         |                      |                        |                                  |
|---|----------------------------------|-------------------------|----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                                  |                         |                      |                        | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>655+71% 7' LT</b>                            | SAMPLE TYPE<br><b>ROTARY-AIR</b> | DEPTH<br><b>58'-60'</b> | HOLE NO.<br><b>1</b> | FIELD NO.<br><b>13</b> | LAB NO.<br><b>405</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 12.7              |
| 1          | 88.3              | 100        | 9.1               |
| 3/4        | 73.3              | 200        | 7.4               |
| 1/2        | 52.3              |            |                   |
| 3/8        | 49.4              |            |                   |
| 4          | 34.8              |            |                   |
| 10         | 24.0              |            |                   |
| 20         | 16.0              |            |                   |

#### PETROGRAPHIC ANALYSIS

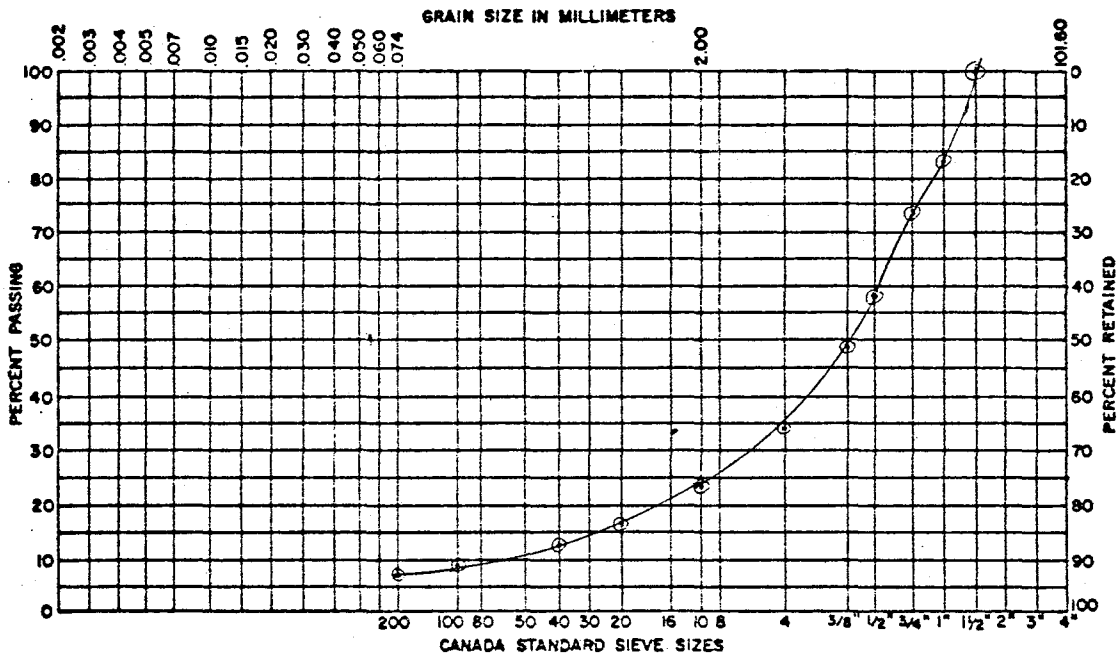
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>U.P.</b> |      | <b>6.3</b>                 |      |
|            |                        |    |             |      |                            |      |
|            |                        |    |             |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 8-8-77  
 DATE RECEIVED 9-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y. T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

12-10-77

STA.

655+50 3/4 RT

SAMPLE TYPE

AUGER

DEPTH

2'-3'

HOLE NO.

2

FIELD NO.

2

LAB NO.

433

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/8        | 100.0             |            |                   | .063       | 53.9              | .005       | 7.6               |
| 4          | 99.8              |            |                   | .048       | 34.2              |            |                   |
| 10         | 99.6              |            |                   | .034       | 27.3              |            |                   |
| 20         | 99.0              |            |                   | .025       | 22.8              |            |                   |
| 40         | 98.4              |            |                   | .018       | 15.8              |            |                   |
| 100        | 83.7              |            |                   | .013       | 12.7              |            |                   |
| 200        | 61.7              |            |                   | .009       | 10.5              |            |                   |
|            |                   |            |                   | .007       | 9.8               |            |                   |

#### PETROGRAPHIC ANALYSIS

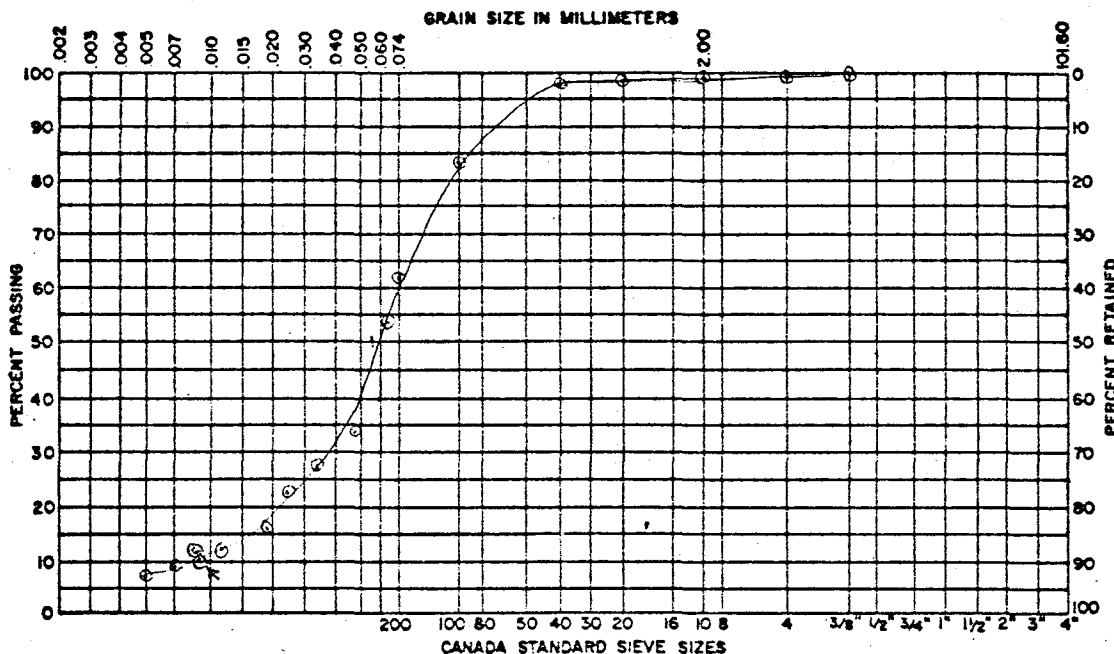
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | ML                     |    | N.P. |      | 35.8                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 11-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

29-9-77

STA.

655+50% T'RT

SAMPLE TYPE

AUGER

DEPTH

3 1/2' - 5'

HOLE NO.

2

FIELD NO.

3

LAB NO.

406

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 61.5              | .065       | 29.2              | .005       | 4.6               |
| 1          | 97.1              | 100        | 51.5              | .047       | 25.0              |            |                   |
| 3/4        | 87.1              | 200        | 35.9              | .034       | 17.1              |            |                   |
| 1/2        | 79.6              |            |                   | .025       | 12.9              |            |                   |
| 3/8        | 74.1              |            |                   | .018       | 10.9              |            |                   |
| 4          | 62.6              |            |                   | .013       | 7.8               |            |                   |
| 10         | 65.4              |            |                   | .009       | 7.5               |            |                   |
| 20         | 63.6              |            |                   | .007       | 5.8               |            |                   |

#### PETROGRAPHIC ANALYSIS

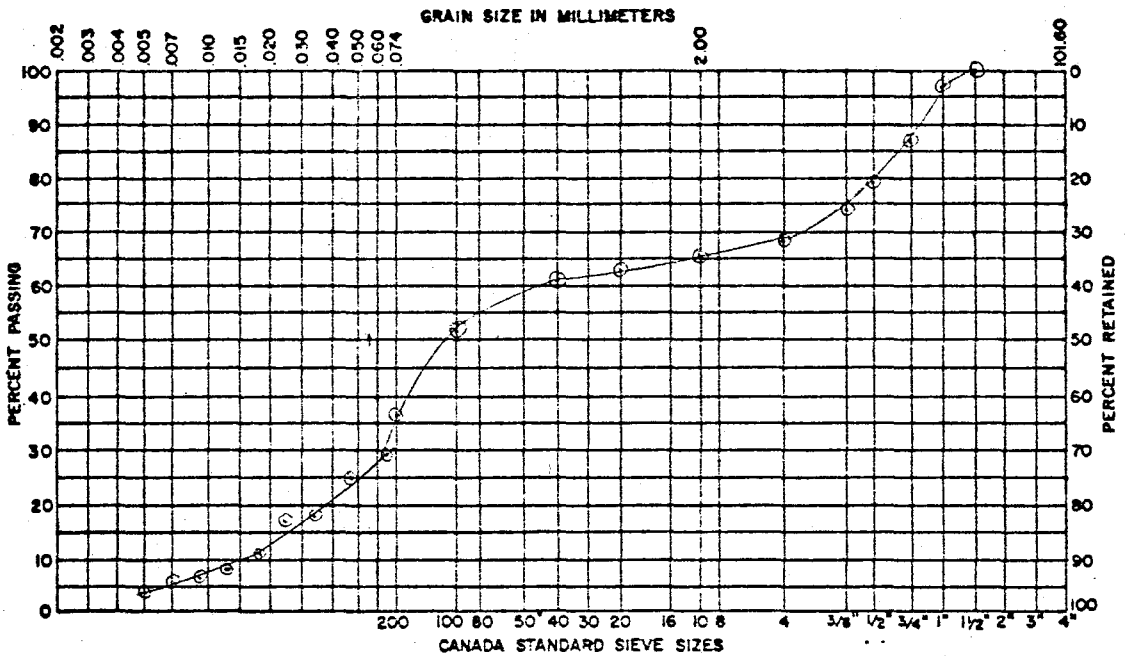
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|----|----------------------------|------|
|            | SM                     |    | 10.0 |    | 19.4                       | 2.63 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 11-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

655+50% 7' RT

SAMPLE TYPE

BAG

DEPTH

7'-10'

HOLE NO.

2

FIELD NO.

4

LAB NO.

408

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 2          | 100.0             | 20         | 27.2              |
| 1 1/2      | 84.2              | 40         | 23.1              |
| 1          | 81.5              | 100        | 16.0              |
| 3/4        | 73.9              | 200        | 11.6              |
| 1/2        | 62.6              |            |                   |
| 3/8        | 55.4              |            |                   |
| 4          | 43.7              |            |                   |
| 10         | 36.0              |            |                   |

#### PETROGRAPHIC ANALYSIS

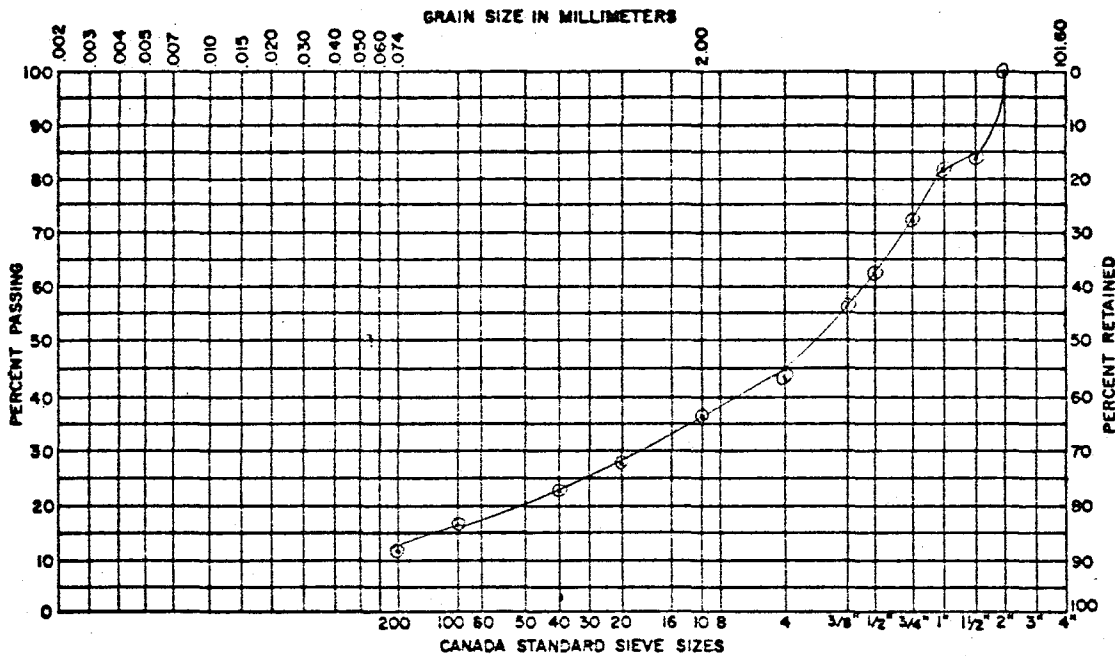
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | N.P. |      | 13.3                       |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 11-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

|   |                           |                         |                      |                       |                                  |
|---|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>12-10-77</b> |
| STA.<br><b>655+50%ST RT</b>                             | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>12'-15'</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>5</b> | LAB NO.<br><b>434</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | 40         | 39.0              |
| 1          | 97.2              | 100        | 13.6              |
| 3/4        | 91.0              | 200        | 8.8               |
| 1/2        | 81.6              |            |                   |
| 3/8        | 74.5              |            |                   |
| 4          | 64.3              |            |                   |
| 10         | 58.1              |            |                   |
| 20         | 52.4              |            |                   |

#### PETROGRAPHIC ANALYSIS

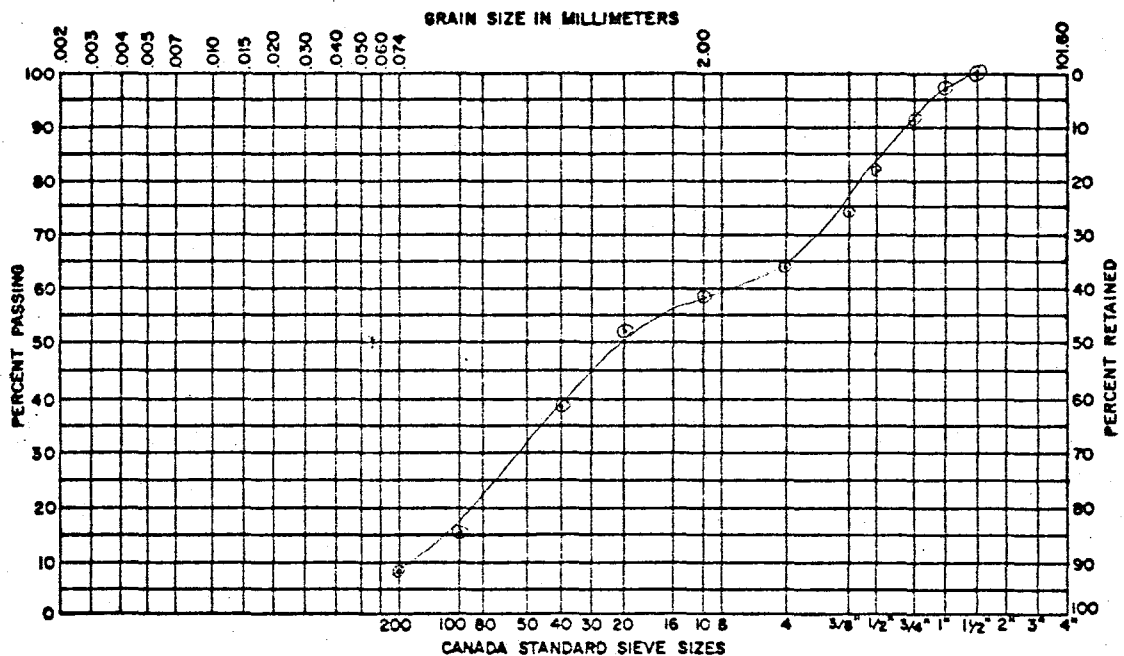
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>SP-SM</b>           |    | <b>N.P.</b> |      | <b>8.1</b>                 |      |
|            |                        |    |             |      |                            |      |
|            |                        |    |             |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 11-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

12-10-77

STA.

655+50 7' RT

SAMPLE TYPE

BAG

DEPTH

17'-20'

HOLE NO.

2

FIELD NO.

6

LAB NO.

435

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 34.7              | .063       | 24.7              | .005       | 2.0               |
| 1          | 97.5              | 100        | 26.7              | .046       | 20.5              |            |                   |
| 3/4        | 90.6              | 200        | 21.5              | .033       | 19.1              |            |                   |
| 1/2        | 81.4              |            |                   | .024       | 15.8              |            |                   |
| 3/8        | 74.0              |            |                   | .017       | 14.3              |            |                   |
| 4          | 52.4              |            |                   | .012       | 13.7              |            |                   |
| 10         | 46.3              |            |                   | .009       | 11.7              |            |                   |
| 20         | 39.2              |            |                   | .006       | 9.6               |            |                   |

#### PETROGRAPHIC ANALYSIS

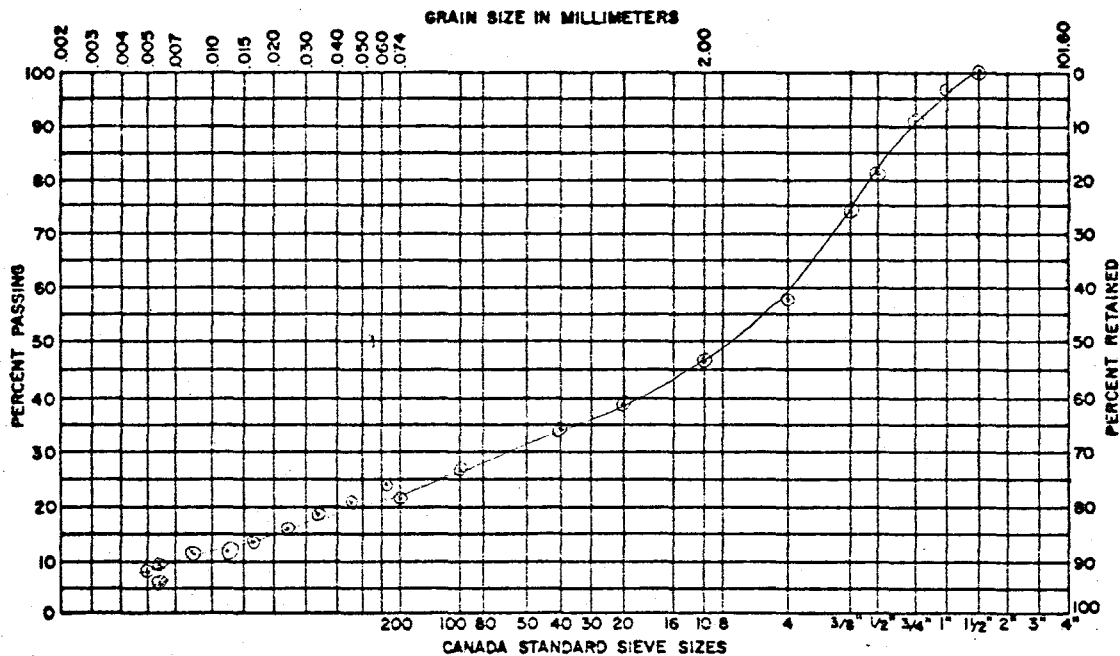
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
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|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | SG   |
|------------|------------------------|----|------|----|----------------------------|------|
|            | SM                     |    | 10.0 |    | 9.6                        | 2.68 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 11-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_



|   |                           |                         |                      |                       |                                 |
|---|---------------------------|-------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>30-9-77</b> |
| STA.<br><b>655+50%TRT</b>                               | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>22'-25'</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>7</b> | LAB NO.<br><b>409</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 16.2              |
| 1          | 98.0              | 100        | 11.8              |
| 3/4        | 94.0              | 200        | 9.4               |
| 1/2        | 80.3              |            |                   |
| 3/8        | 65.4              |            |                   |
| 1/4        | 40.6              |            |                   |
| 10         | 24.6              |            |                   |
| 20         | 19.1              |            |                   |

#### PETROGRAPHIC ANALYSIS

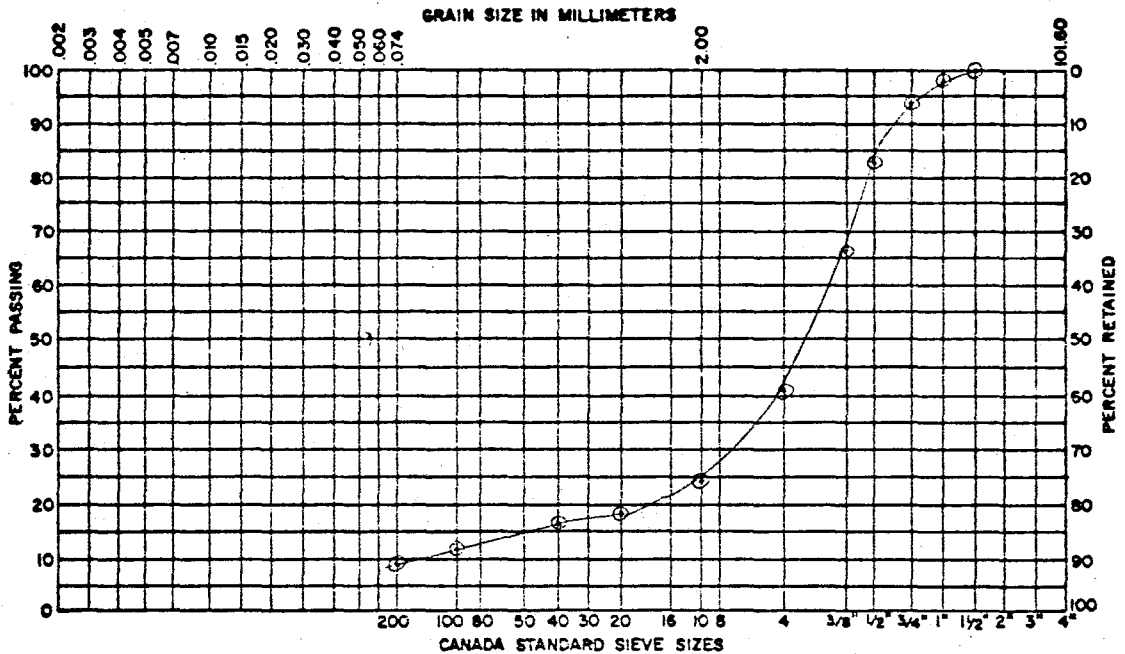
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>10.P</b> |      | <b>9.3</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                        |                      |                       |                                  |
|---|---------------------------|------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                        |                      |                       | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>655+50% 7' RT</b>                            | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>27'-30</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>8</b> | LAB NO.<br><b>410</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 2          | 100.0             | 20         | 14.2              |
| 1 1/2      | 87.4              | 40         | 9.9               |
| 1          | 87.4              | 100        | 6.1               |
| 3/4        | 73.0              | 200        | 4.9               |
| 1/2        | 62.2              |            |                   |
| 3/8        | 57.8              |            |                   |
| 4          | 41.1              |            |                   |
| 10         | 23.9              |            |                   |

#### PETROGRAPHIC ANALYSIS

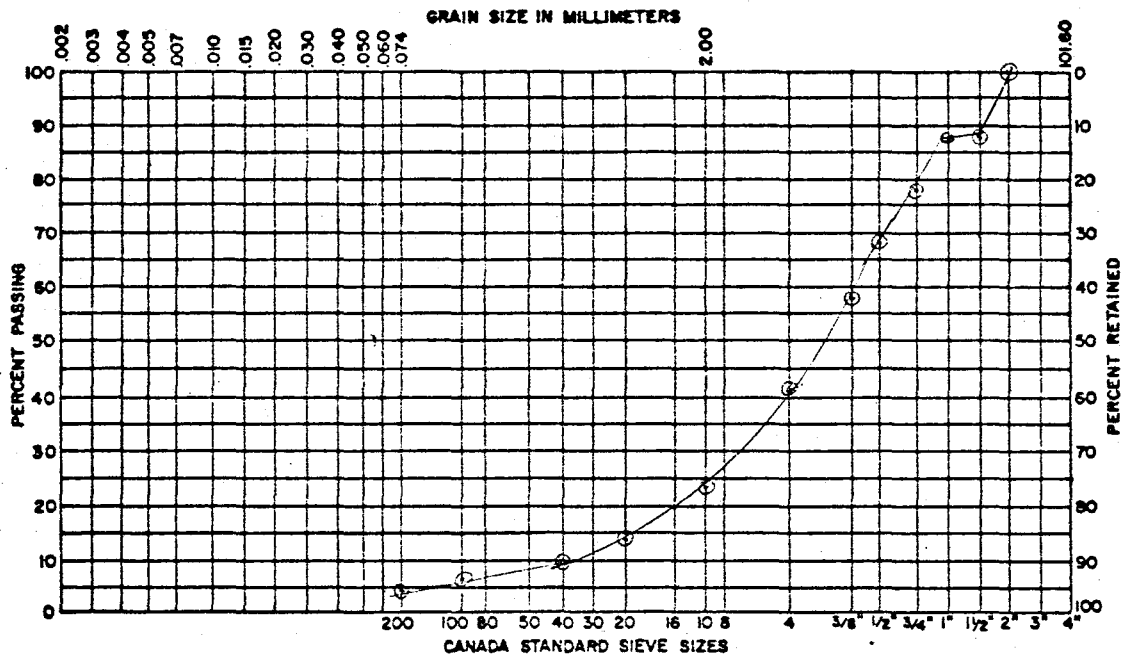
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.S. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW</b>              |    | <b>D.P.</b> |      | <b>9.8</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED **12-8-77**

DATE RECEIVED **22-8-77**

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY.

DATE RECORDED

14-10-77

STA.

655+50%7RT

SAMPLE TYPE

BAG

DEPTH

32-35

HOLE NO.

2

FIELD NO.

9

LAB NO.

419

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 4.7               |
| 1          | 97.7              | 100        | 2.8               |
| 3/4        | 91.6              | 200        | 2.2               |
| 1/2        | 64.4              |            |                   |
| 3/8        | 44.4              |            |                   |
| 4          | 21.9              |            |                   |
| 10         | 12.6              |            |                   |
| 20         | 6.7               |            |                   |

#### PETROGRAPHIC ANALYSIS

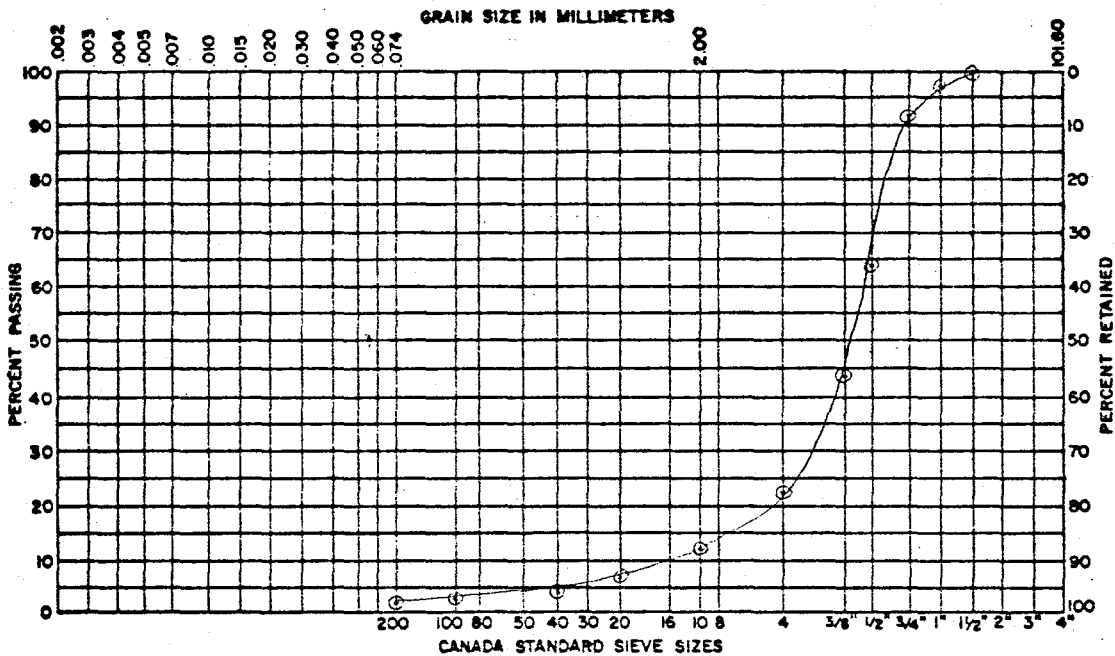
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GP                     |    | N.P. |      | 5.2                        |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 12-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

29-9-77

STA.

655+50%37'RT

SAMPLE TYPE

BAG

DEPTH

37'-40'

HOLE NO.

2

FIELD NO.

10

LAB NO.

436

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 17.0              |            |                   |            |                   |
| 1          | 94.6              | 100        | 12.1              |            |                   |            |                   |
| 3/4        | 88.9              | 200        | 9.2               |            |                   |            |                   |
| 1/2        | 79.8              |            |                   |            |                   |            |                   |
| 3/8        | 69.0              |            |                   |            |                   |            |                   |
| 4          | 43.9              |            |                   |            |                   |            |                   |
| 10         | 28.7              |            |                   |            |                   |            |                   |
| 20         | 21.3              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

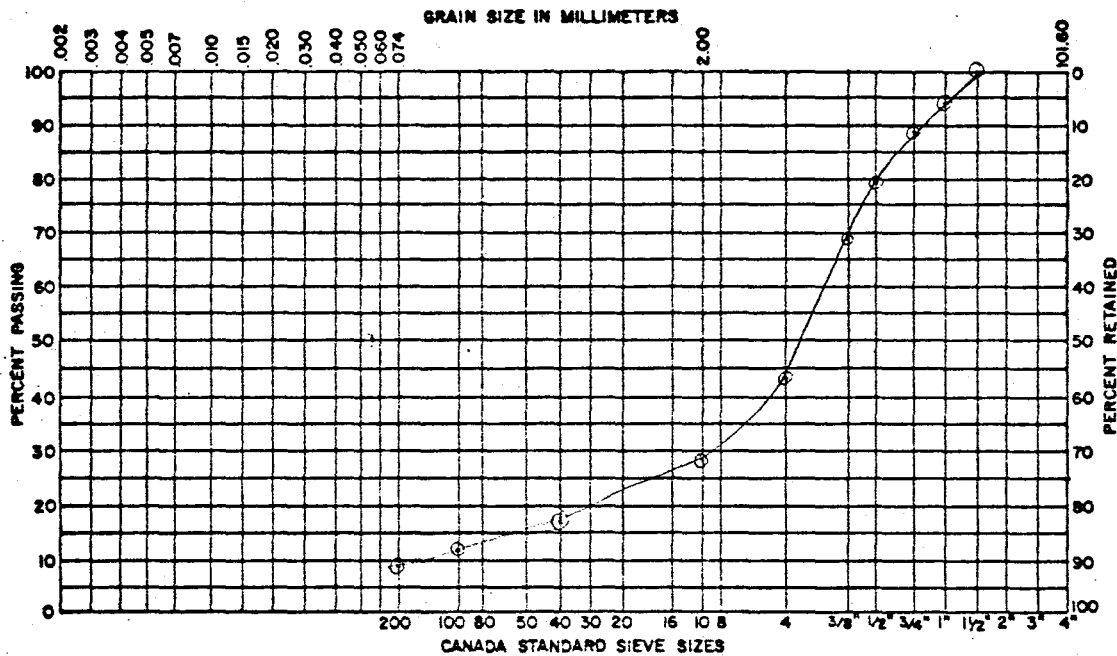
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | GW-GM                  |    | 10.0 |      | 10.3                       |      |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 12-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                        |                      |                        |                                  |
|---|---------------------------|------------------------|----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                        |                      |                        | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>655+50' 1/2 RT</b>                           | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>42'-45</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>11</b> | LAB NO.<br><b>420</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | 40         | 16.5              |            |                   |            |                   |
| 1          | 98.1              | 100        | 12.4              |            |                   |            |                   |
| 3/4        | 96.1              | 200        | 10.6              |            |                   |            |                   |
| 1/2        | 80.0              |            |                   |            |                   |            |                   |
| 3/8        | 66.8              |            |                   |            |                   |            |                   |
| 4          | 46.5              |            |                   |            |                   |            |                   |
| 10         | 31.5              |            |                   |            |                   |            |                   |
| 20         | 20.0              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

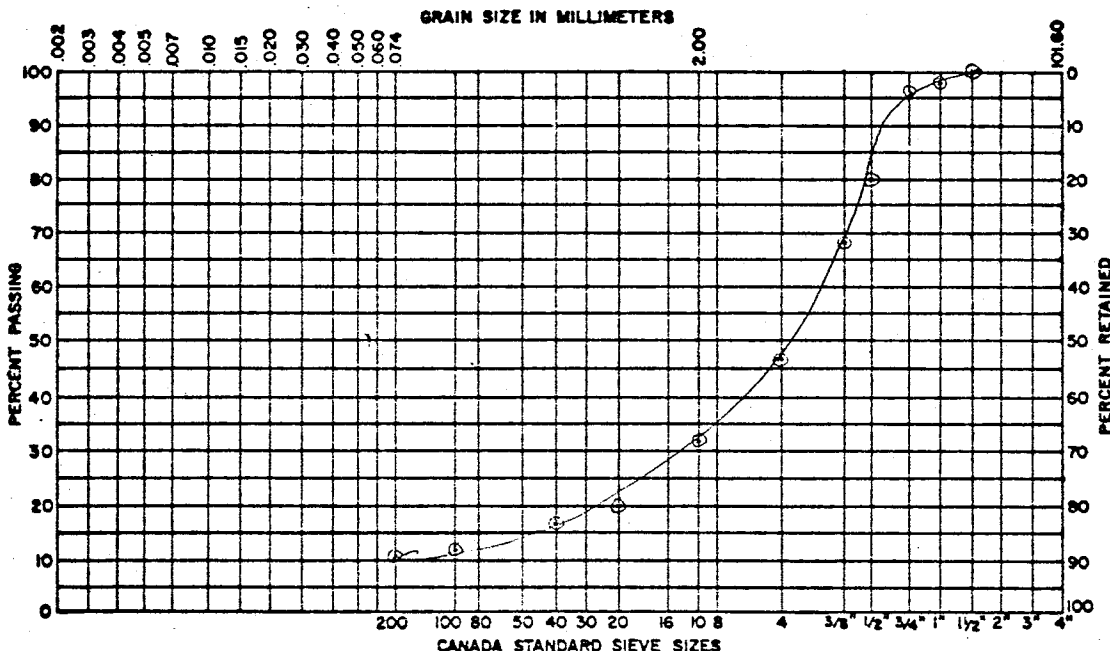
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|----|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>N.P.</b> |    | <b>9.1</b>                 |      |
|            |                        |    |             |    |                            |      |
|            |                        |    |             |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **12-8-77**  
 DATE RECEIVED **22-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                        |                                  |
|---|---------------------------|-------------------------|----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                        | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>655+50%37'RT</b>                             | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>47'-50'</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>12</b> | LAB NO.<br><b>421</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1.         | 100.0             | 100        | 10.3              |
| 3/4        | 98.0              | 200        | 8.9               |
| 1/2        | 79.0              |            |                   |
| 3/8        | 69.8              |            |                   |
| 4          | 42.4              |            |                   |
| 10         | 25.8              |            |                   |
| 20         | 16.8              |            |                   |
| 40         | 13.8              |            |                   |

#### PETROGRAPHIC ANALYSIS

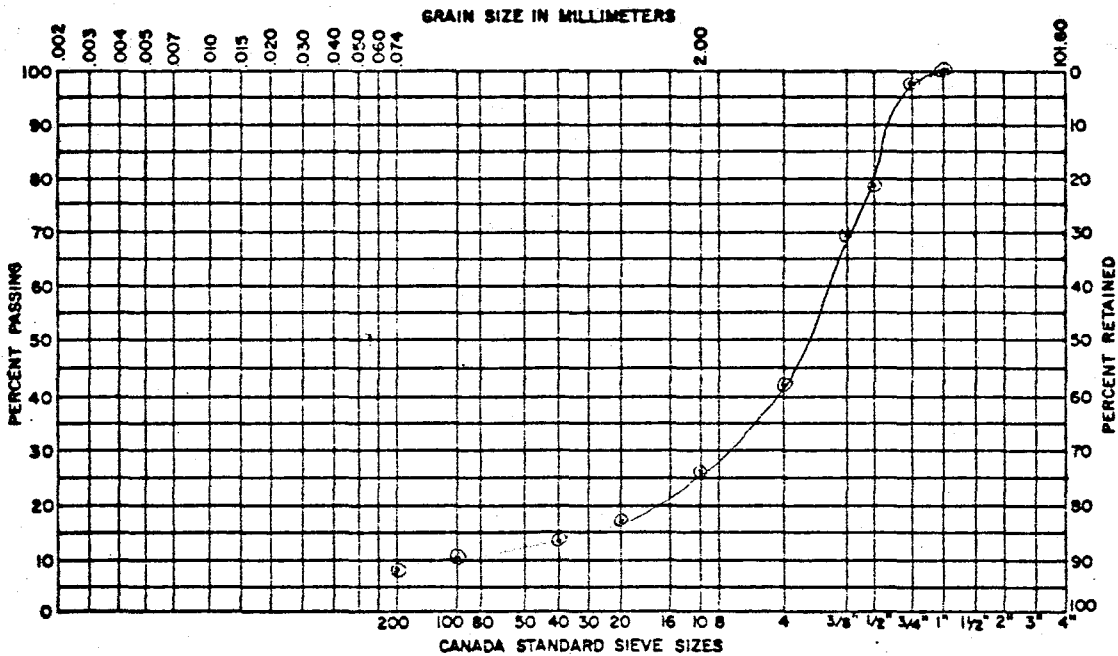
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L         | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>N.P.</b> |      | <b>8.4</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED **12-8-77**

DATE RECEIVED **22-8-77**

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                       |                      |                        |                                  |
|---|---------------------------|-----------------------|----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                       |                      |                        | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>655+50' 1/2 RT</b>                           | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>52-55</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>13</b> | LAB NO.<br><b>422</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 3/4        | 100.0             | 200        | 8.7               |
| 1/2        | 92.9              |            |                   |
| 3/8        | 80.5              |            |                   |
| 4          | 65.5              |            |                   |
| 10         | 34.1              |            |                   |
| 20         | 18.9              |            |                   |
| 40         | 14.2              |            |                   |
| 100        | 10.3              |            |                   |

#### PETROGRAPHIC ANALYSIS

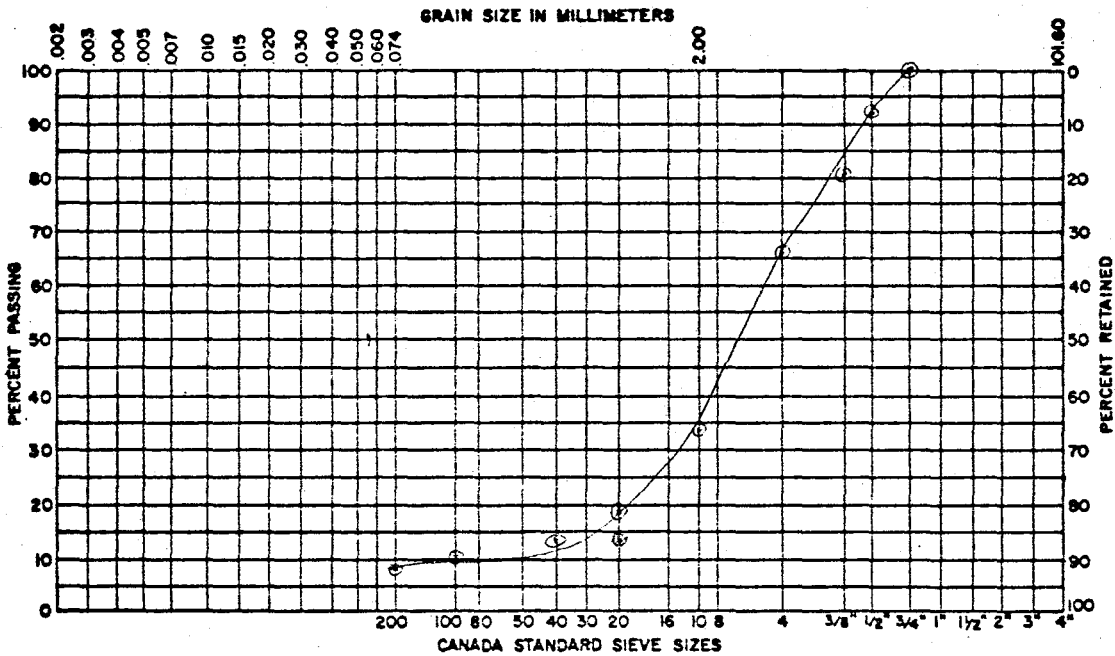
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>SW-SM</b>           |    | <b>N.P.</b> |      | <b>11.2</b>                |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED 12-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                        |                                 |
|---|---------------------------|-------------------------|----------------------|------------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                        | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>655+50%7'RT</b>                              | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>57'-60'</b> | HOLE NO.<br><b>2</b> | FIELD NO.<br><b>14</b> | LAB NO.<br><b>4.23</b>          |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | 40         | 15.0              |
| 1          | 97.8              | 100        | 9.5               |
| 3/4        | 91.9              | 200        | 7.5               |
| 1/2        | 85.1              |            |                   |
| 3/4        | 78.8              |            |                   |
| 4          | 59.9              |            |                   |
| 10         | 39.6              |            |                   |
| 20         | 22.4              |            |                   |

#### PETROGRAPHIC ANALYSIS

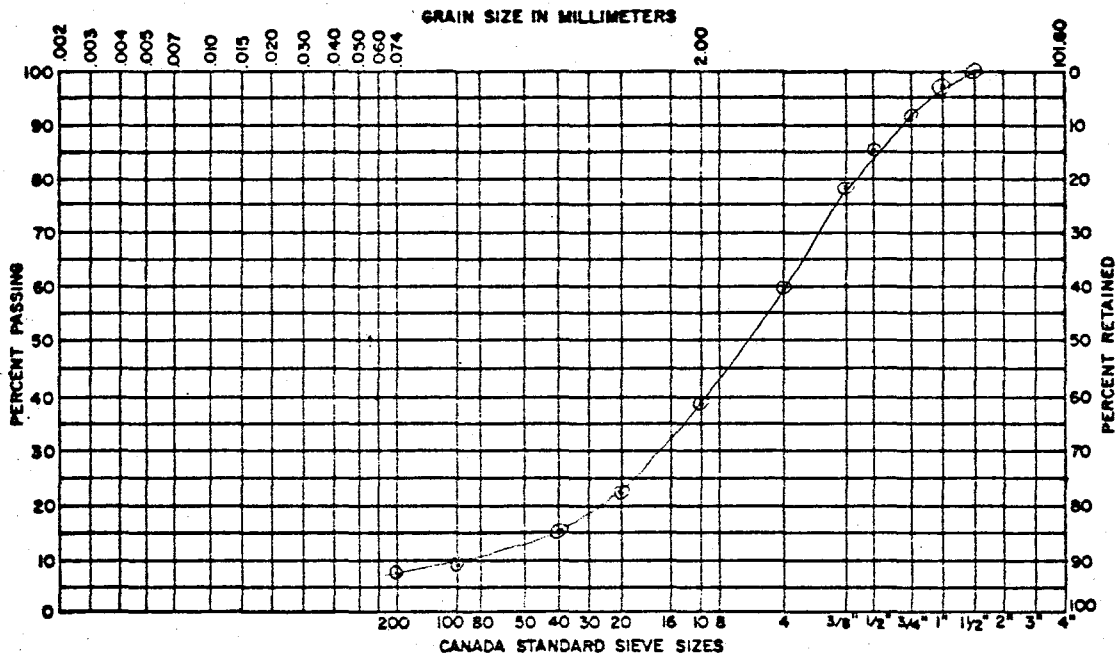
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>SW-SM</b>           |    | <b>10.P</b> |      | <b>8.2</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                       |                      |                       |                                  |
|---|---------------------------|-----------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                       |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>657+06.4</b>                                 | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>1'-2'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>1</b> | LAB NO.<br><b>4/11</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 4          | 100.0             | 0.075      | 81.6              |
| 10         | 99.8              | 0.042      | 72.0              |
| 20         | 99.1              | 0.031      | 59.3              |
| 40         | 97.9              | 0.023      | 47.9              |
| 100        | 93.8              | 0.017      | 38.4              |
| 200        | 85.3              | 0.012      | 32.7              |
|            |                   | 0.009      | 26.3              |
|            |                   | 0.006      | 21.9              |

#### PETROGRAPHIC ANALYSIS

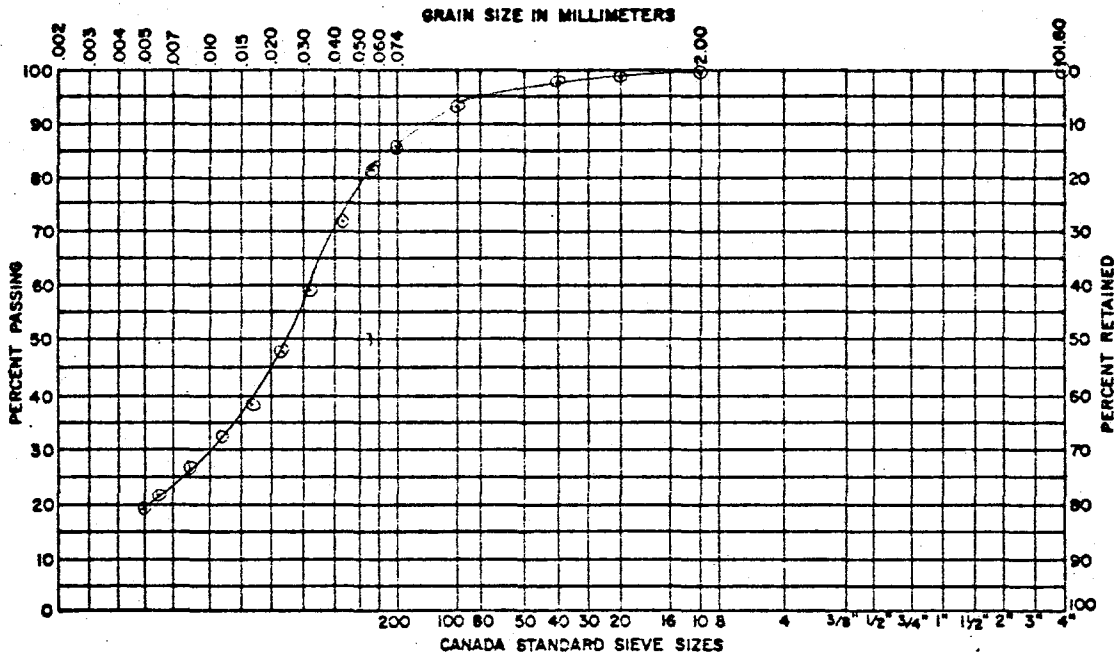
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|-------------|------|----------------------------|-------------|
|            | <b>OL</b>              |    | <b>N.P.</b> |      | <b>54.5</b>                | <b>2.69</b> |
|            |                        |    |             |      |                            |             |
|            |                        |    |             |      |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                       |                      |                       |                                  |
|---|---------------------------|-----------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                       |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>657+06 E</b>                                 | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>3'-5'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>2</b> | LAB NO.<br><b>412</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 4          | 100.0             | .059       | 71.7              |
| 10         | 99.7              | .043       | 62.2              |
| 20         | 99.4              | .032       | 49.5              |
| 40         | 98.9              | .024       | 36.8              |
| 100        | 92.4              | .017       | 28.6              |
| 200        | 78.6              | .013       | 23.5              |
|            |                   | .009       | 18.4              |
|            |                   | .007       | 15.6              |

#### PETROGRAPHIC ANALYSIS

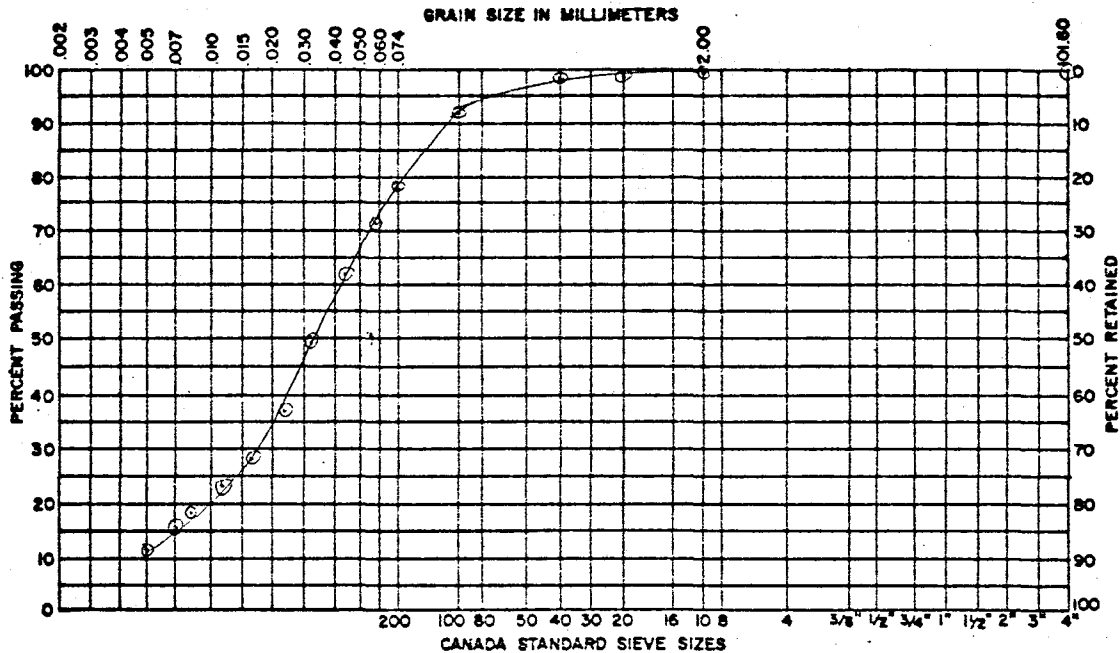
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | PI | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|-------------|----|----------------------------|-------------|
|            | <b>ML</b>              |    | <b>N.P.</b> |    | <b>20.7</b>                | <b>2.68</b> |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                      |                      |                       |                                 |
|---|---------------------------|----------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                      |                      |                       | DATE RECORDED<br><b>30-9-77</b> |
| STA.<br><b>657+06 E</b>                                 | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>5'-8</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>3</b> | LAB NO.<br><b>424</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/8        | 100.0             |            |                   | .065       | 44.9              | .005       | 7.0               |
| 4          | 99.9              |            |                   | .047       | 36.7              |            |                   |
| 10         | 99.3              |            |                   | .034       | 29.1              |            |                   |
| 20         | 98.8              |            |                   | .025       | 24.2              |            |                   |
| 40         | 96.8              |            |                   | .018       | 18.3              |            |                   |
| 100        | 74.4              |            |                   | .013       | 18.3              |            |                   |
| 200        | 49.7              |            |                   | .007       | 10.7              |            |                   |
|            |                   |            |                   | .006       | 9.5               |            |                   |

#### PETROGRAPHIC ANALYSIS

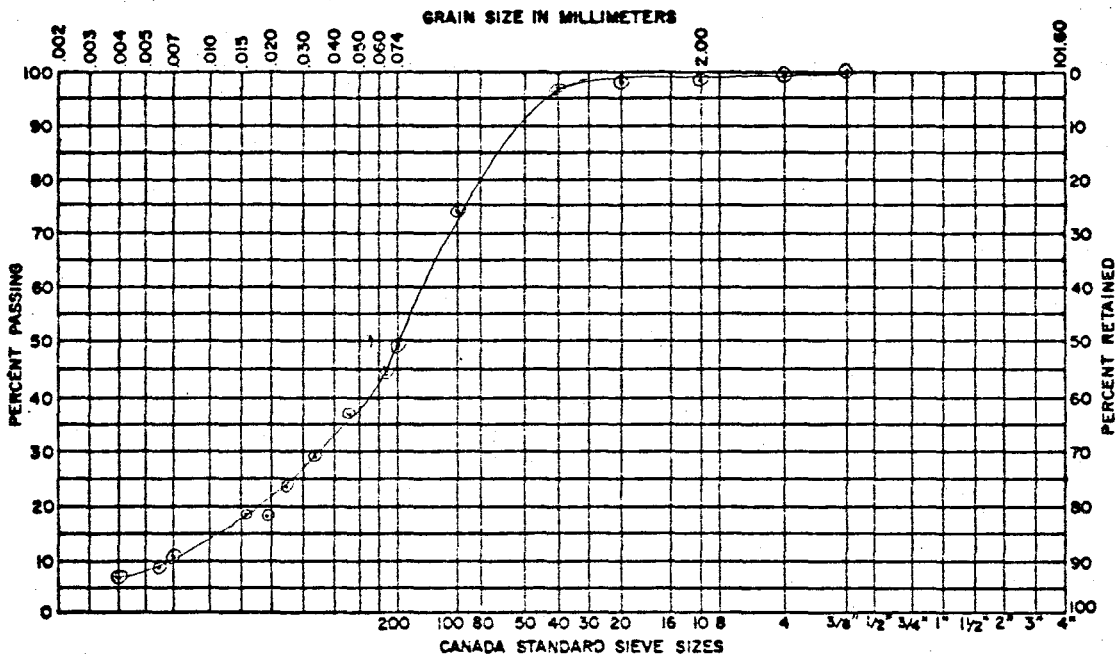
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|----|----------------------------|------|
|            | SM                     |    | R.P. |    | 37.7                       | 2.68 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

14-10-77

STA.

657+06 E

SAMPLE TYPE

BAG

DEPTH

12'-15

HOLE NO.

3

FIELD NO.

4

LAB NO.

425

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 6.2               |
| 3/4        | 75.3              | 200        | 4.9               |
| 1/2        | 70.5              |            |                   |
| 3/8        | 57.5              |            |                   |
| 4          | 38.1              |            |                   |
| 10         | 24.5              |            |                   |
| 20         | 14.4              |            |                   |
| 40         | 10.1              |            |                   |

#### PETROGRAPHIC ANALYSIS

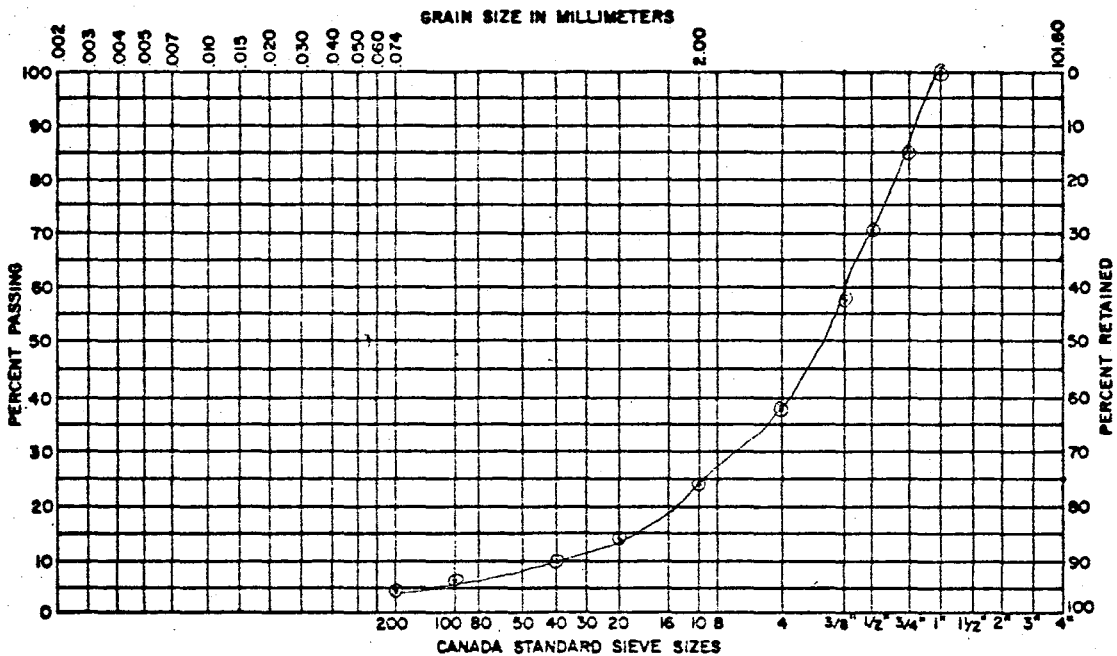
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|----|----------------------------|------|
|            | GW                     |    | 10.P |    | 7.3                        |      |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 12-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                        |                      |                       |                                 |
|---|---------------------------|------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                        |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>657+06 &amp;</b>                             | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>17'-20</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>5</b> | LAB NO.<br><b>426</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 10.7              |
| 3/4        | 84.4              | 200        | 8.1               |
| 1/2        | 68.8              |            |                   |
| 3/8        | 59.7              |            |                   |
| 4          | 51.9              |            |                   |
| 10         | 29.9              |            |                   |
| 20         | 20.4              |            |                   |
| 40         | 15.8              |            |                   |

#### PETROGRAPHIC ANALYSIS

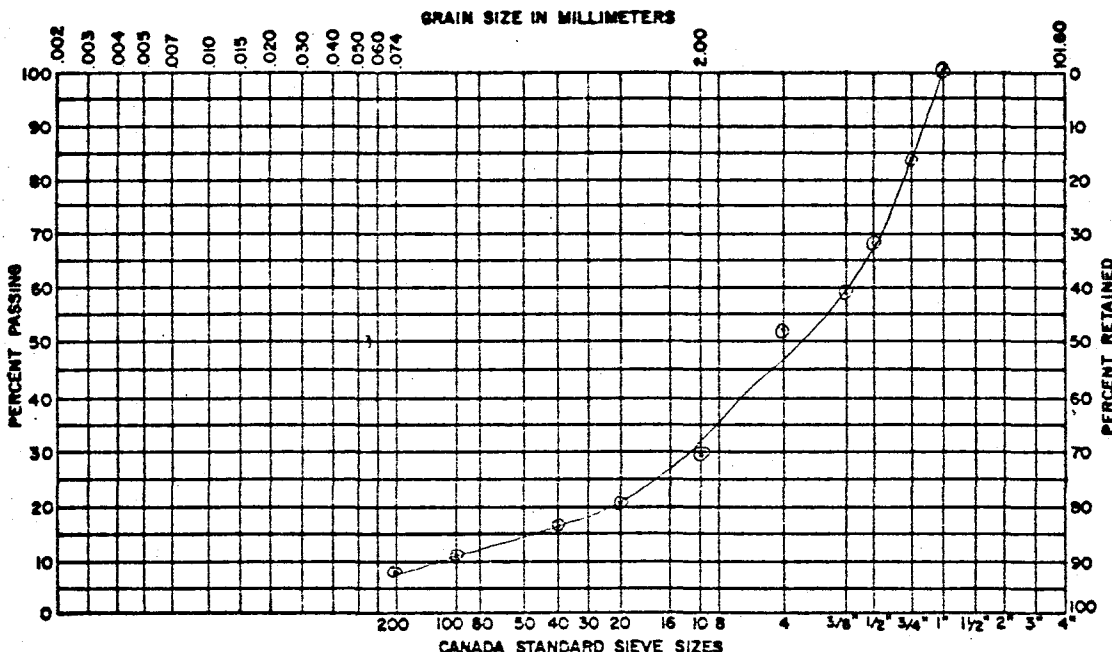
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------|------|----------------------------|------|
|            | SW-SM                  |    | 10.P. |      | 7.2                        |      |
|            |                        |    |       |      |                            |      |
|            |                        |    |       |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED 12-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                  |
|---|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>657+06 E</b>                                 | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>22'-25'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>6</b> | LAB NO.<br><b>427</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 20.9              |
| 3/4        | 91.4              | 200        | 16.4              |
| 1/2        | 74.9              |            |                   |
| 3/8        | 66.0              |            |                   |
| 4          | 49.8              |            |                   |
| 10         | 41.1              |            |                   |
| 20         | 34.5              |            |                   |
| 40         | 29.0              |            |                   |

#### PETROGRAPHIC ANALYSIS

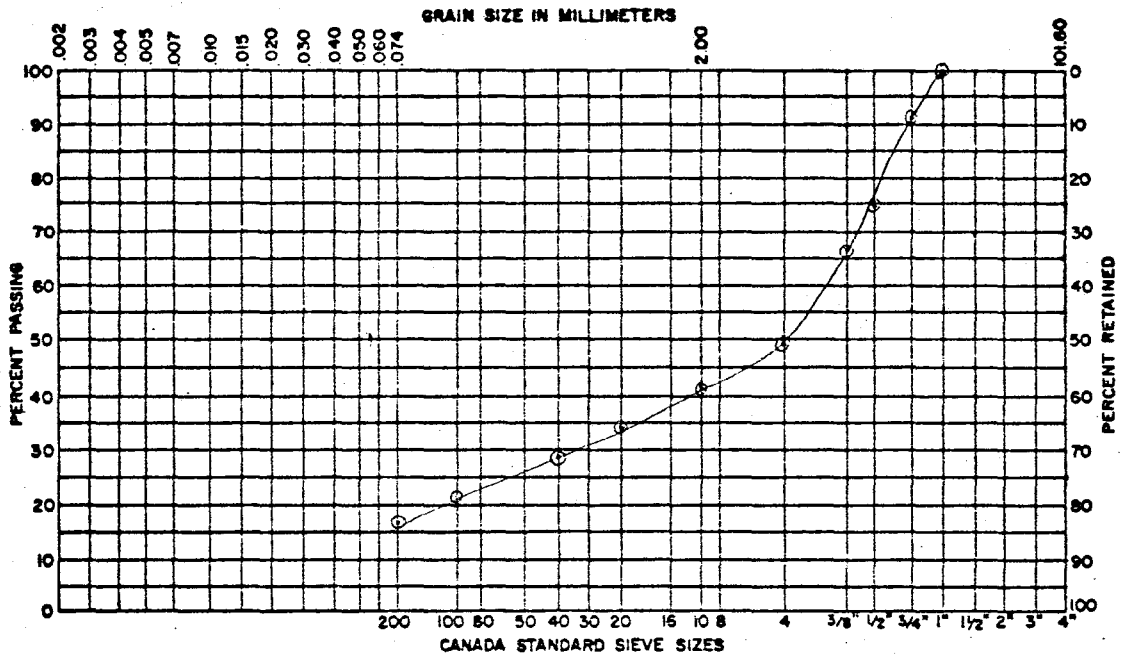
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL        | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-----------|----|----------------------------|------|
|            | <b>GM</b>              |    | <b>MP</b> |    | <b>9.1</b>                 |      |
|            |                        |    |           |    |                            |      |
|            |                        |    |           |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                 |
|---|---------------------------|-------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>30-9-77</b> |
| STA.<br><b>657+06 E</b>                                 | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>27'-30'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>7</b> | LAB NO.<br><b>4/13</b>          |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 75         | 100.0             | 100        | 12.3              |            |                   |            |                   |
| 3/4        | 94.7              | 200        | 9.6               |            |                   |            |                   |
| 1/2        | 81.4              |            |                   |            |                   |            |                   |
| 3/8        | 70.1              |            |                   |            |                   |            |                   |
| 4          | 49.3              |            |                   |            |                   |            |                   |
| 10         | 37.4              |            |                   |            |                   |            |                   |
| 20         | 28.8              |            |                   |            |                   |            |                   |
| 40         | 20.0              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

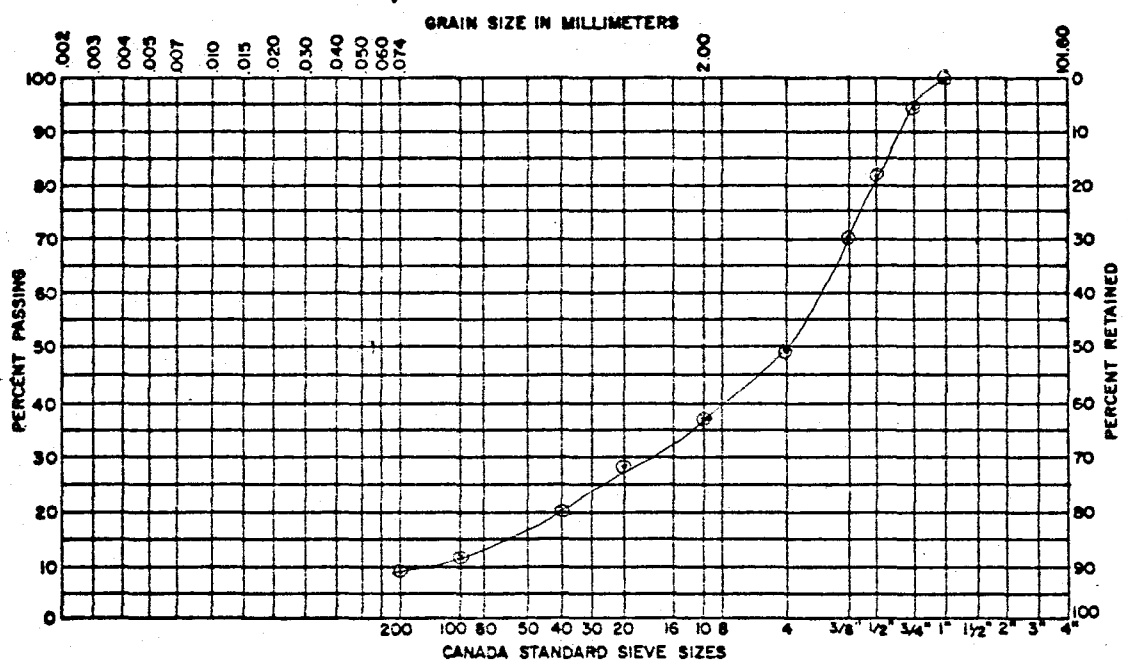
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>10.2</b> |      | <b>8.4</b>                 |      |
|            |                        |    |             |      |                            |      |
|            |                        |    |             |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 12-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|  |                           |                         |                      |                       |                                  |
|--|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY.</b> |                           |                         |                      |                       | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>657+06 ±</b>                                  | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>32'-35'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>8</b> | LAB NO.<br><b>414</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 12.9              |
| 3/4        | 97.8              | 200        | 10.4              |
| 1/2        | 83.7              |            |                   |
| 3/8        | 73.9              |            |                   |
| 4          | 52.1              |            |                   |
| 10         | 38.6              |            |                   |
| 20         | 26.6              |            |                   |
| 40         | 20.4              |            |                   |

#### PETROGRAPHIC ANALYSIS

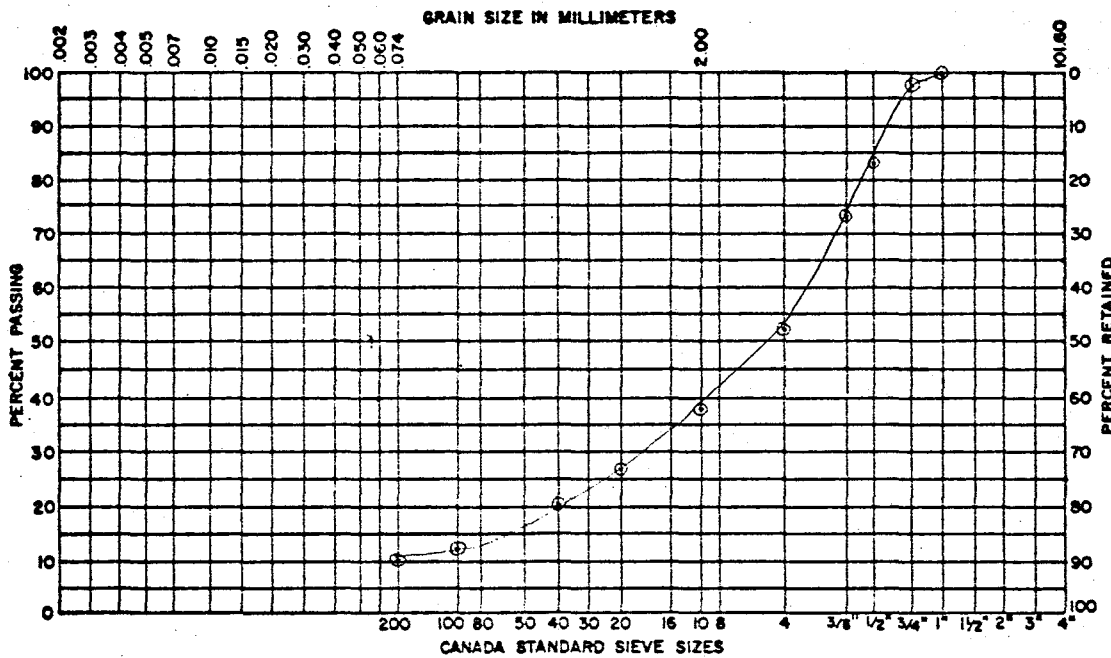
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.         | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|--------------|------|----------------------------|------|
|            | <b>SW-SM</b>           |    | <b>10.P.</b> |      | <b>8.6</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED **12-8-77**

DATE RECEIVED **22-8-77**

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                  |
|---|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>657+06</b>                                   | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>39'-39'</b> | HOLE NO.<br><b>3</b> | FIELD NO.<br><b>9</b> | LAB NO.<br><b>415</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 20.7              |            |                   |            |                   |
| 3/4        | 97.8              | 200        | 14.8              |            |                   |            |                   |
| 1/2        | 90.1              |            |                   |            |                   |            |                   |
| 3/8        | 73.7              |            |                   |            |                   |            |                   |
| 4          | 66.5              |            |                   |            |                   |            |                   |
| 10         | 54.4              |            |                   |            |                   |            |                   |
| 20         | 42.3              |            |                   |            |                   |            |                   |
| 40         | 33.4              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

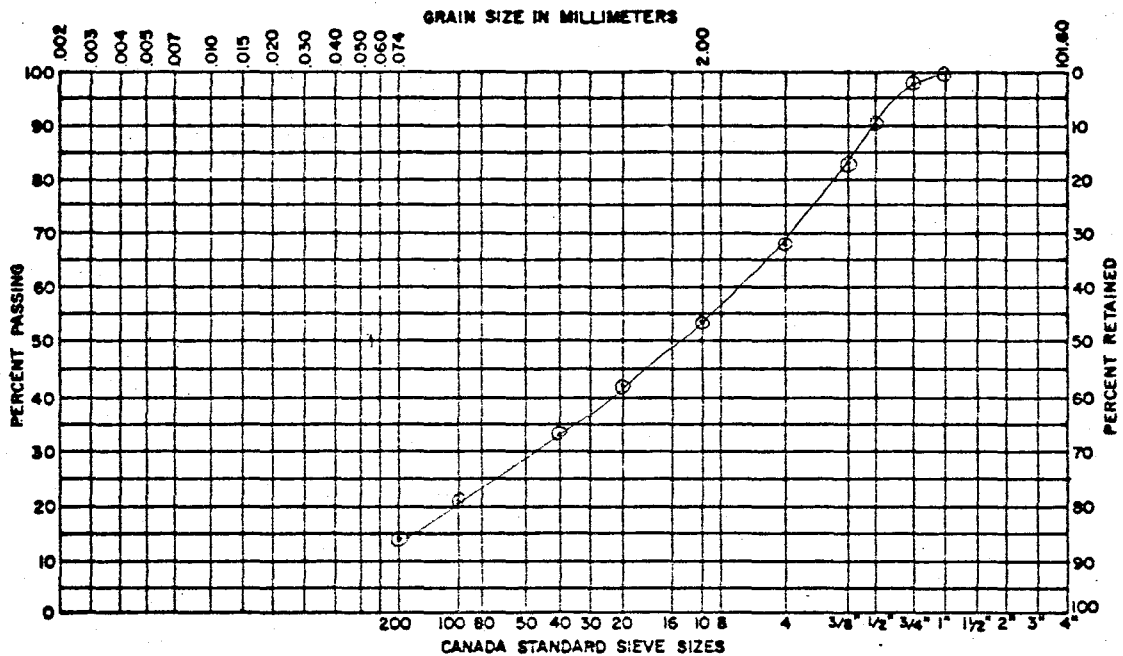
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|----|----------------------------|------|
|            | SM                     |    | 10.7 |    | 16.5                       |      |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **12-8-77**  
 DATE RECEIVED **22-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                           |                      |                       |                                  |
|---|---------------------------|---------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                           |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>657+14 1/2 4' RT</b>                         | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>2 1/2 - 4</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>1</b> | LAB NO.<br><b>416</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 20         | 100.0             |            |                   | 0.60       | 71.6              | 0.075      | 10.5              |
| 40         | 99.7              |            |                   | 0.425      | 58.9              |            |                   |
| 100        | 91.4              |            |                   | 0.30       | 45.5              |            |                   |
| 200        | 72.8              |            |                   | 0.25       | 32.8              |            |                   |
|            |                   |            |                   | 0.175      | 25.1              |            |                   |
|            |                   |            |                   | 0.15       | 20.7              |            |                   |
|            |                   |            |                   | 0.09       | 15.6              |            |                   |
|            |                   |            |                   | 0.075      | 13.7              |            |                   |

#### PETROGRAPHIC ANALYSIS

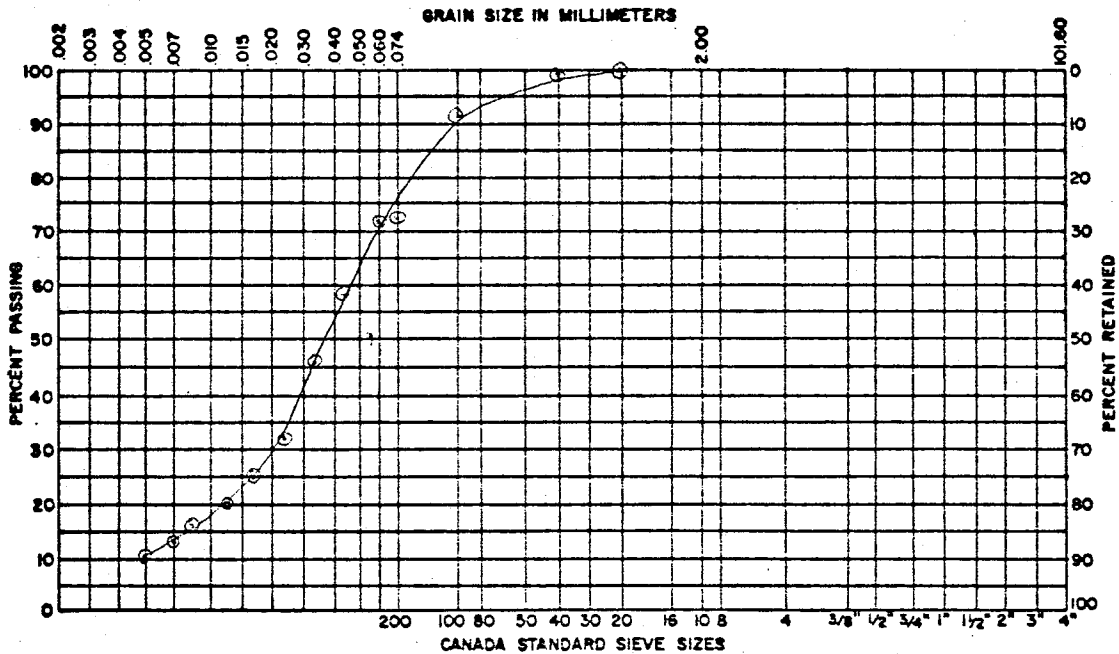
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L  | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | ML                     |    | 10.2 |      | 59.7                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

29-9-77

STA.

657+17 1/2 4' RT

SAMPLE TYPE

BAG

DEPTH

5'-8'

HOLE NO.

4

FIELD NO.

2

LAB NO.

438

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/4        | 100.0             | 200        | 52.7              | .068       | 25.2              | .005       | 5.7               |
| 1/2        | 98.2              |            |                   | .048       | 23.5              |            |                   |
| 3/8        | 97.5              |            |                   | .035       | 17.8              |            |                   |
| 4          | 93.7              |            |                   | .025       | 17.2              |            |                   |
| 10         | 90.0              |            |                   | .018       | 13.8              |            |                   |
| 20         | 87.2              |            |                   | .013       | 11.2              |            |                   |
| 40         | 85.0              |            |                   | .009       | 8.0               |            |                   |
| 100        | 74.7              |            |                   | .007       | 6.9               |            |                   |

#### PETROGRAPHIC ANALYSIS

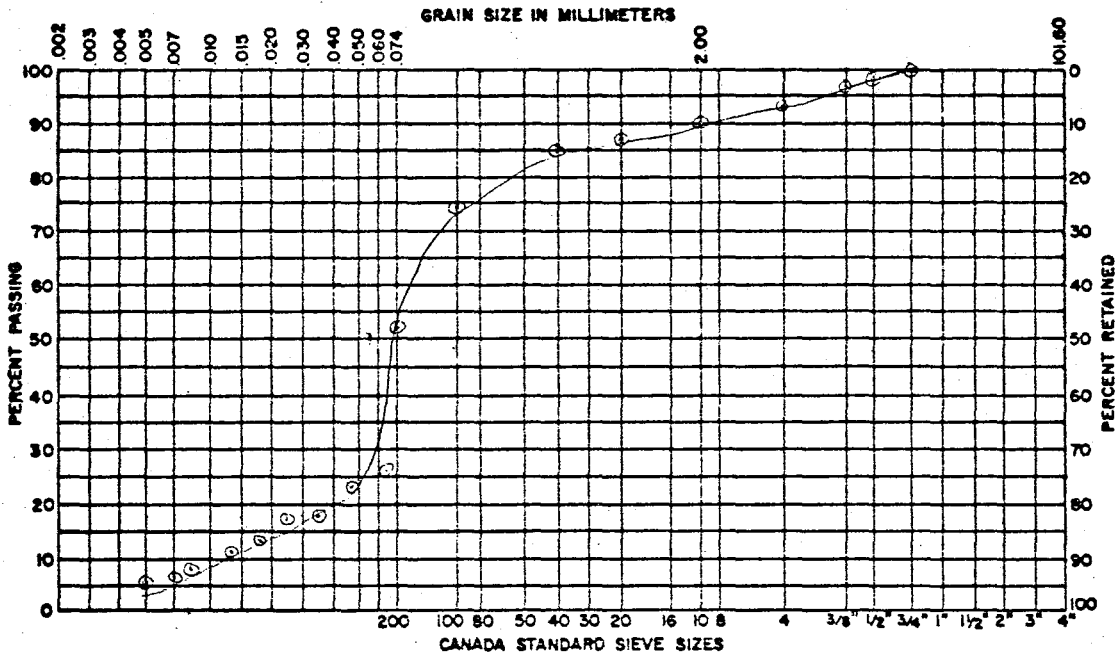
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | SG.  |
|------------|------------------------|----|------|----|----------------------------|------|
|            | ML                     |    | 10.2 |    | 43.2                       | 2.68 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 13-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                 |
|---|---------------------------|-------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>657+17 3/4 RT</b>                            | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>10'-15'</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>3</b> | LAB NO.<br><b>439</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 20.9              |            |                   |            |                   |
| 3/4        | 97.4              | 200        | 17.1              |            |                   |            |                   |
| 1/2        | 86.1              |            |                   |            |                   |            |                   |
| 3/8        | 76.3              |            |                   |            |                   |            |                   |
| 4          | 56.9              |            |                   |            |                   |            |                   |
| 10         | 41.0              |            |                   |            |                   |            |                   |
| 20         | 32.3              |            |                   |            |                   |            |                   |
| 40         | 27.6              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

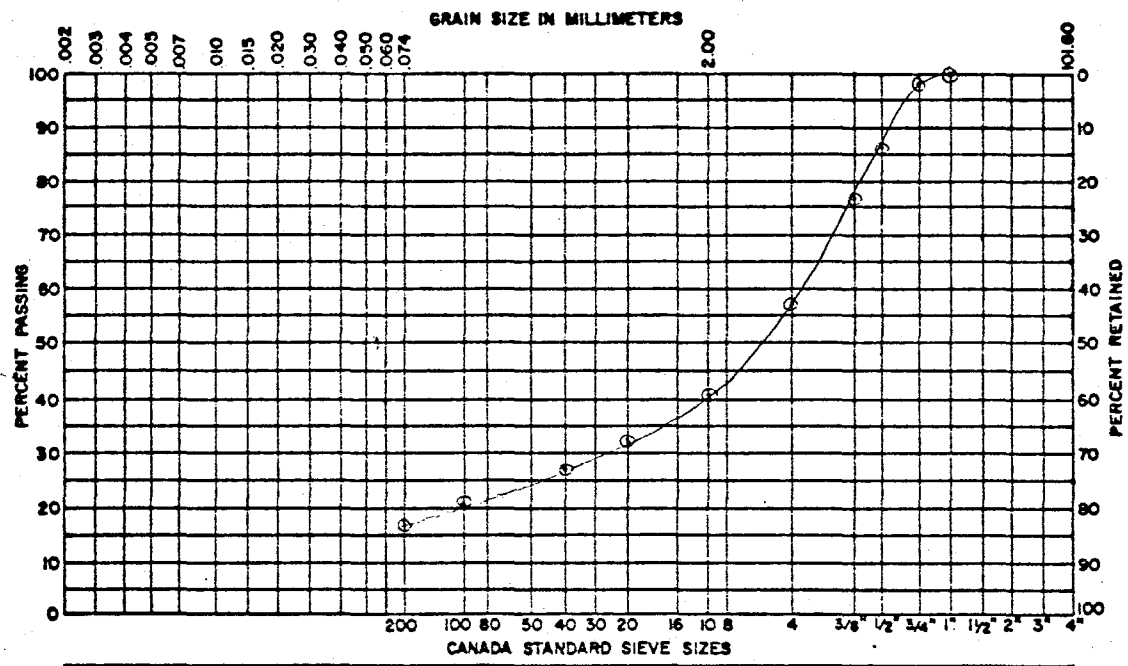
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | PI | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|----|----------------------------|------|
|            | <b>SM</b>              |    | <b>10.9</b> |    | <b>8.1</b>                 |      |
|            |                        |    |             |    |                            |      |
|            |                        |    |             |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                                  |                         |                      |                       |                                 |
|---|----------------------------------|-------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                                  |                         |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>657+17 1/2 4' RT</b>                         | SAMPLE TYPE<br><b>ROTARY-AIR</b> | DEPTH<br><b>17'-20'</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>4</b> | LAB NO.<br><b>440</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 27.3              | .063       | 23.3              | .005       | 6.9               |
| 3/4        | 92.2              | 200        | 23.2              | .046       | 30.0              |            |                   |
| 1/2        | 77.8              |            |                   | .033       | 16.4              |            |                   |
| 3/8        | 64.1              |            |                   | .024       | 14.7              |            |                   |
| 4          | 52.7              |            |                   | .017       | 13.0              |            |                   |
| 10         | 43.5              |            |                   | .013       | 10.5              |            |                   |
| 20         | 37.8              |            |                   | .009       | 9.7               |            |                   |
| 40         | 33.9              |            |                   | .005       | 9.3               |            |                   |

#### PETROGRAPHIC ANALYSIS

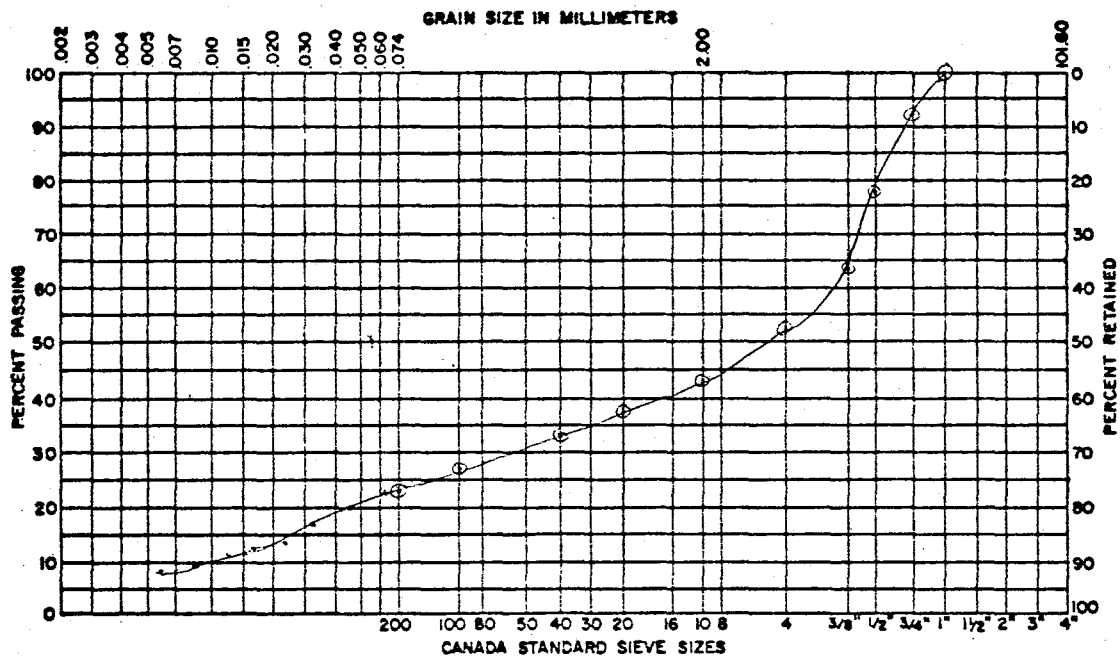
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL    | PI | NATURAL % H <sub>2</sub> O | SG   |
|------------|------------------------|----|-------|----|----------------------------|------|
|            | SM                     |    | TRACE |    | 8.3                        | 2.66 |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                  |
|---|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>14-10-77</b> |
| STA.<br><b>657+14% 4' RT</b>                            | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>22'-25'</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>5</b> | LAB NO.<br><b>417</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 27.8              | .06        | 22.8              | .005       | 9.0               |
| 3/4        | 95.7              | 200        | 23.1              | .0475      | 21.0              |            |                   |
| 1/2        | 89.8              |            |                   | .034       | 18.6              |            |                   |
| 3/8        | 82.5              |            |                   | .024       | 17.3              |            |                   |
| 4          | 66.8              |            |                   | .0175      | 15.3              |            |                   |
| 10         | 52.3              |            |                   | .013       | 13.0              |            |                   |
| 20         | 42.4              |            |                   | .009       | 11.3              |            |                   |
| 40         | 36.3              |            |                   | .0075      | 10.3              |            |                   |

#### PETROGRAPHIC ANALYSIS

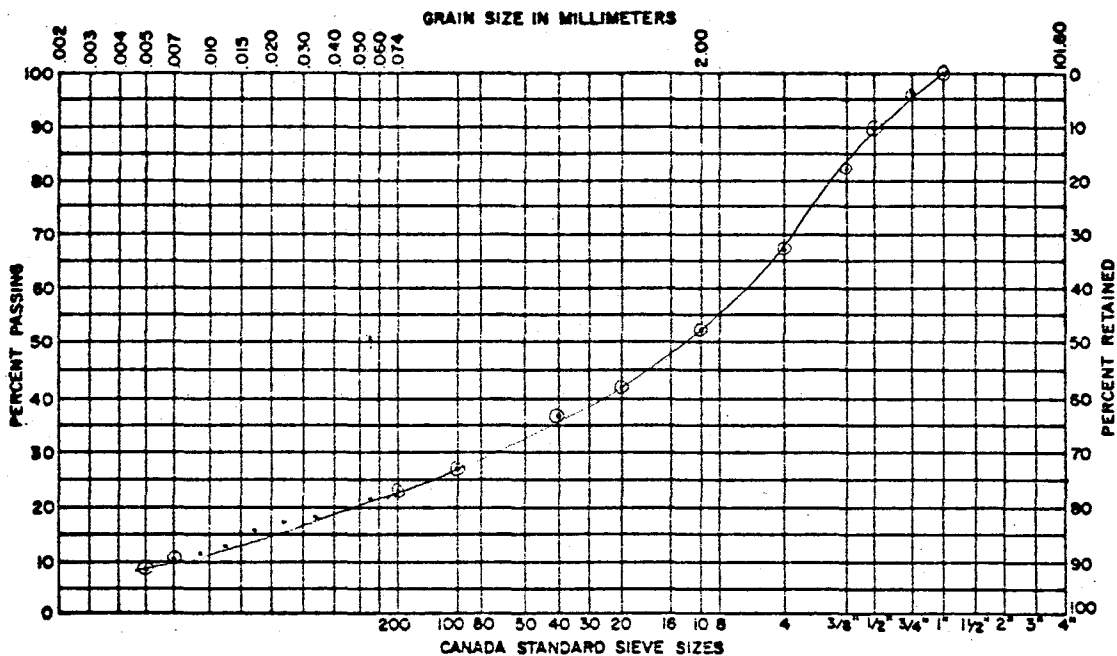
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L | P.I. | NATURAL % H <sub>2</sub> O | SG.  |
|------------|------------------------|----|-----|------|----------------------------|------|
|            | SM                     |    | NP  |      | 8.5                        | 2.68 |
|            |                        |    |     |      |                            |      |
|            |                        |    |     |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED **13-8-77**

DATE RECEIVED **22-8-77**

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                 |
|---|---------------------------|-------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>657+17 3/4 RT</b>                            | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>27'-30'</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>6</b> | LAB NO.<br><b>441</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 10.2              |
| 3/4        | 96.1              | 200        | 8.4               |
| 1/2        | 78.7              |            |                   |
| 3/8        | 62.2              |            |                   |
| 4          | 35.8              |            |                   |
| 10         | 20.8              |            |                   |
| 20         | 15.9              |            |                   |
| 40         | 13.4              |            |                   |

#### PETROGRAPHIC ANALYSIS

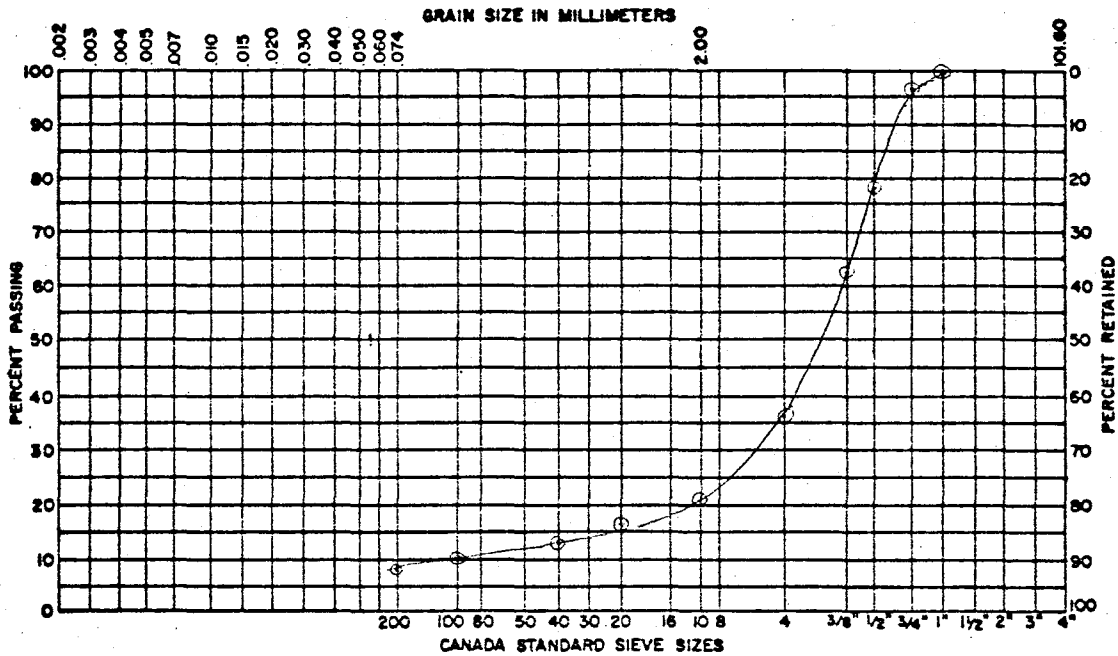
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
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|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>GW-GM</b>           |    | <b>10.P</b> |      | <b>5.4</b>                 |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                         |                      |                       |                                  |  |
|---|---------------------------|-------------------------|----------------------|-----------------------|----------------------------------|--|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                         |                      |                       | DATE RECORDED<br><b>14-10-77</b> |  |
| STA.<br><b>657+14 1/4 RT</b>                            | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>32'-35'</b> | HOLE NO.<br><b>4</b> | FIELD NO.<br><b>7</b> | LAB NO.<br><b>418</b>            |  |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 17.1              |            |                   |            |                   |
| 3/4        | 96.2              | 200        | 13.0              |            |                   |            |                   |
| 1/2        | 88.2              |            |                   |            |                   |            |                   |
| 3/8        | 75.6              |            |                   |            |                   |            |                   |
| 4          | 57.9              |            |                   |            |                   |            |                   |
| 10         | 42.8              |            |                   |            |                   |            |                   |
| 20         | 31.5              |            |                   |            |                   |            |                   |
| 40         | 24.2              |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

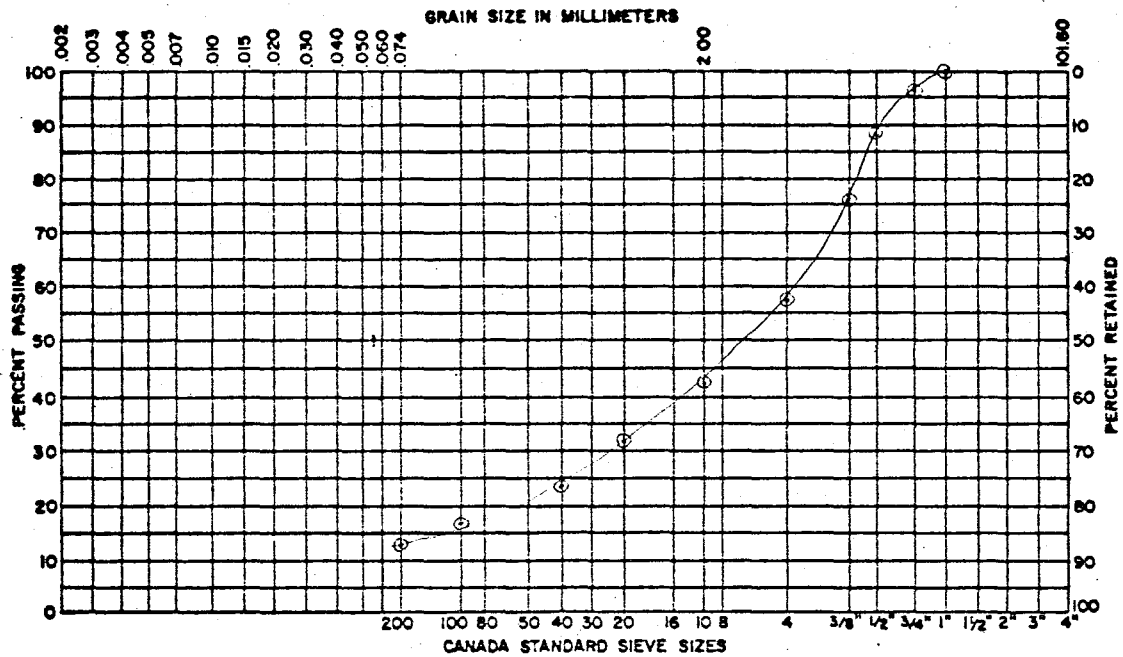
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L         | P.I. | NATURAL % H <sub>2</sub> O | SG. |
|------------|------------------------|----|-------------|------|----------------------------|-----|
|            | <b>SM</b>              |    | <b>10.P</b> |      | <b>9.1</b>                 |     |
|            |                        |    |             |      |                            |     |
|            |                        |    |             |      |                            |     |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **13-8-77**  
 DATE RECEIVED **22-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                        |                      |                       |                                 |
|---|-----------------------------|------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                        |                      |                       | DATE RECORDED<br><b>30-9-77</b> |
| STA.<br><b>658+52 ±</b>                                 | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>5½-7½'</b> | HOLE NO.<br><b>5</b> | FIELD NO.<br><b>1</b> | LAB NO.<br><b>442</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 46.8              | 1061       | 43.5              | 1005       | 10.5              |
| 3/4        | 92.9              | 200        | 39.1              | 1045       | 36.6              |            |                   |
| 1/2        | 88.6              |            |                   | 1033       | 29.3              |            |                   |
| 3/8        | 85.0              |            |                   | 1023       | 27.5              |            |                   |
| 4          | 78.7              |            |                   | 1017       | 24.3              |            |                   |
| 10         | 71.8              |            |                   | 1013       | 18.3              |            |                   |
| 20         | 64.6              |            |                   | 1009       | 15.1              |            |                   |
| 40         | 58.5              |            |                   | 1005       | 12.6              |            |                   |

#### PETROGRAPHIC ANALYSIS

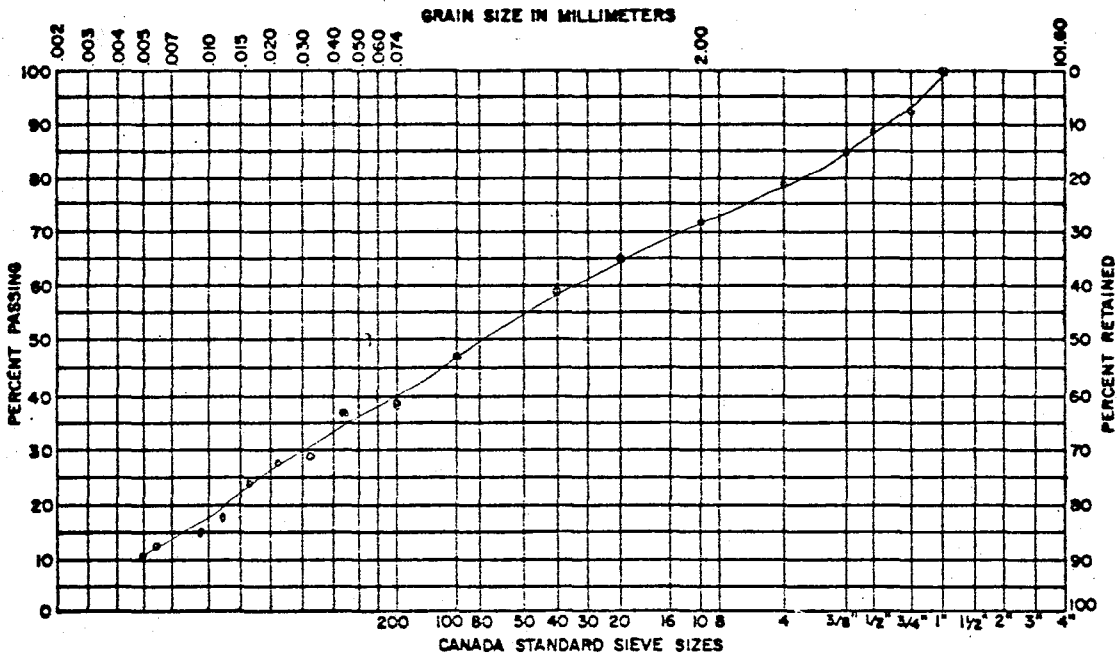
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L          | P.I.     | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|--------------|----------|----------------------------|-------------|
|            | <b>SM</b>              |    | <b>10.P.</b> | <b>4</b> | <b>17.5</b>                | <b>2.68</b> |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                                |                      |                       |                                 |
|---|-----------------------------|--------------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                                |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>658+52 E</b>                                 | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>8 1/2 - 10 1/2</b> | HOLE NO.<br><b>5</b> | FIELD NO.<br><b>2</b> | LAB NO.<br><b>443</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/4        | 100.0             | 200        | 61.5              | .060       | 64.7              | .005       | 17.2              |
| 1/2        | 99.1              |            |                   | .043       | 59.9              |            |                   |
| 3/8        | 97.2              |            |                   | .031       | 53.8              |            |                   |
| 4          | 97.3              |            |                   | .022       | 47.8              |            |                   |
| 10         | 94.8              |            |                   | .016       | 35.1              |            |                   |
| 20         | 90.6              |            |                   | .012       | 30.2              |            |                   |
| 40         | 84.5              |            |                   | .009       | 25.4              |            |                   |
| 100        | 70.9              |            |                   | .006       | 21.2              |            |                   |

#### PETROGRAPHIC ANALYSIS

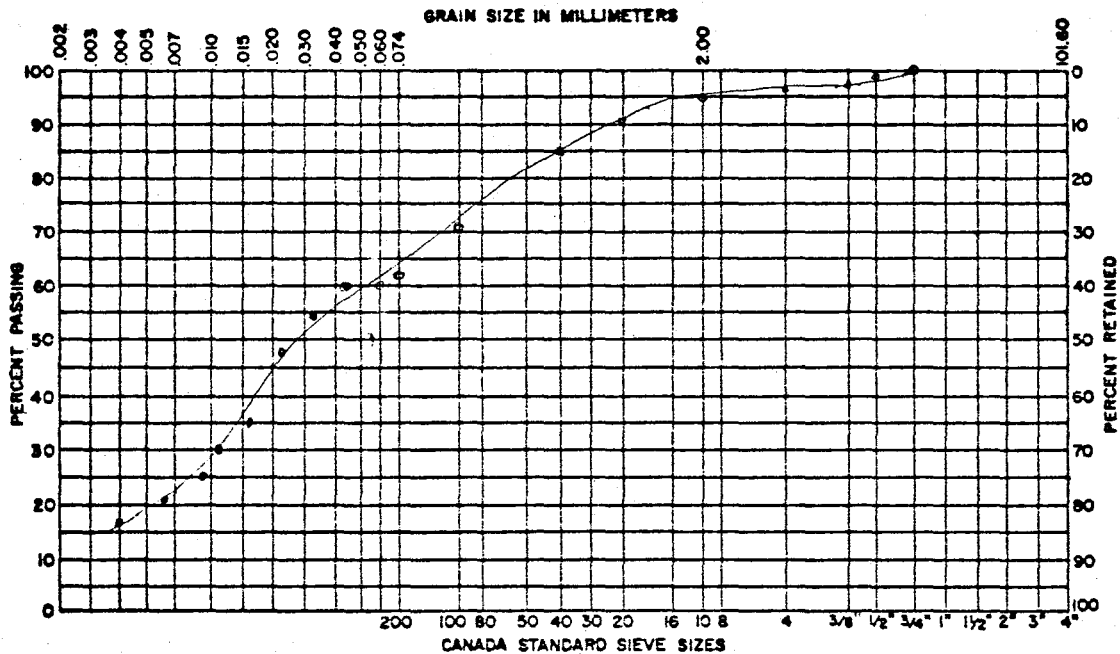
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL           | PI | NATURAL % H <sub>2</sub> O | SG.         |
|------------|------------------------|----|--------------|----|----------------------------|-------------|
|            | <b>CL</b>              |    | <b>TRACE</b> |    | <b>24.3</b>                | <b>2.68</b> |
|            |                        |    |              |    |                            |             |
|            |                        |    |              |    |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **13-8-77**  
 DATE RECEIVED **23-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y.T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

17-10-77

STA.

659+00 ON CURVE

SAMPLE TYPE

BAG

DEPTH,

3 1/2 - 5 1/2'

HOLE NO.

6

FIELD NO.

3

LAB NO.

444

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 36.0              | .065       | 20.7              | .005       | 5.3               |
| 1          | 92.6              | 100        | 27.7              | .047       | 19.4              |            |                   |
| 3/4        | 81.4              | 200        | 22.9              | .033       | 15.8              |            |                   |
| 1/2        | 73.1              |            |                   | .024       | 12.8              |            |                   |
| 3/8        | 68.9              |            |                   | .017       | 10.5              |            |                   |
| 4          | 60.5              |            |                   | .018       | 7.8               |            |                   |
| 10         | 51.6              |            |                   | .009       | 7.6               |            |                   |
| 20         | 42.7              |            |                   | .007       | 6.2               |            |                   |

#### PETROGRAPHIC ANALYSIS

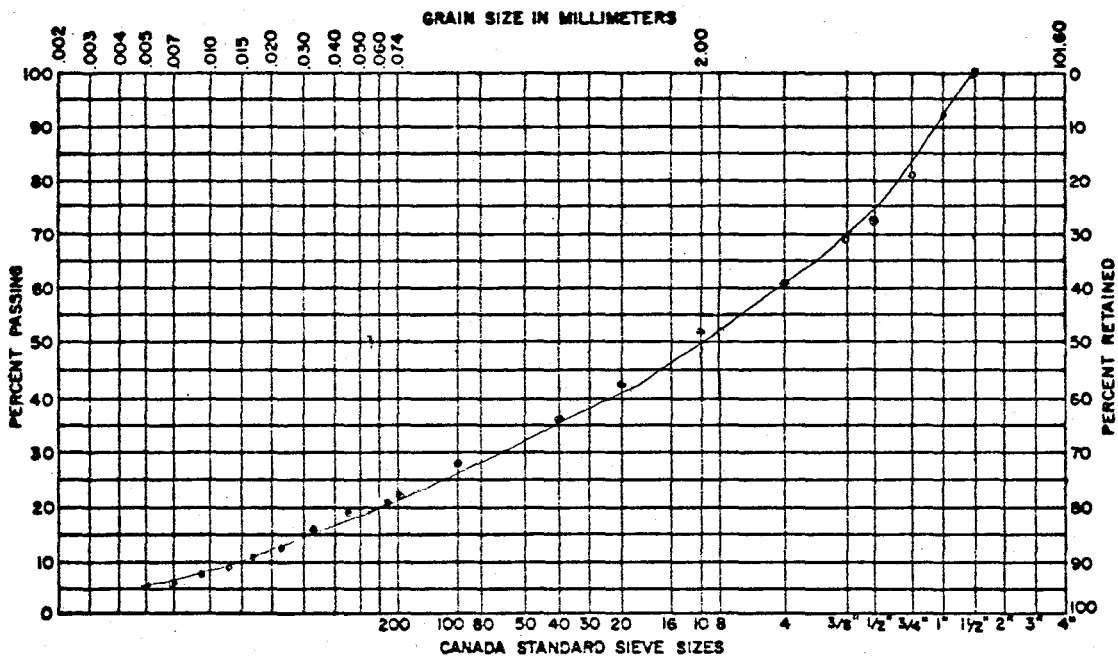
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | SM                     |    | 10.P |      | 33.7                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 13-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

29-9-77

STA.

660+50

SAMPLE TYPE

AUGER

DEPTH

3'-5'

HOLE NO.

7

FIELD NO.

1

LAB NO.

437

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 39.1              | .060       | 24.1              | .005       | 4.3               |
| 3/4        | 91.4              | 200        | 31.8              | .047       | 21.0              |            |                   |
| 1/2        | 83.0              |            |                   | .034       | 17.5              |            |                   |
| 3/8        | 80.6              |            |                   | .024       | 13.6              |            |                   |
| 4          | 70.8              |            |                   | .018       | 9.7               |            |                   |
| 10         | 61.0              |            |                   | .013       | 7.4               |            |                   |
| 20         | 53.8              |            |                   | .009       | 6.6               |            |                   |
| 40         | 48.3              |            |                   | .007       | 5.4               |            |                   |

#### PETROGRAPHIC ANALYSIS

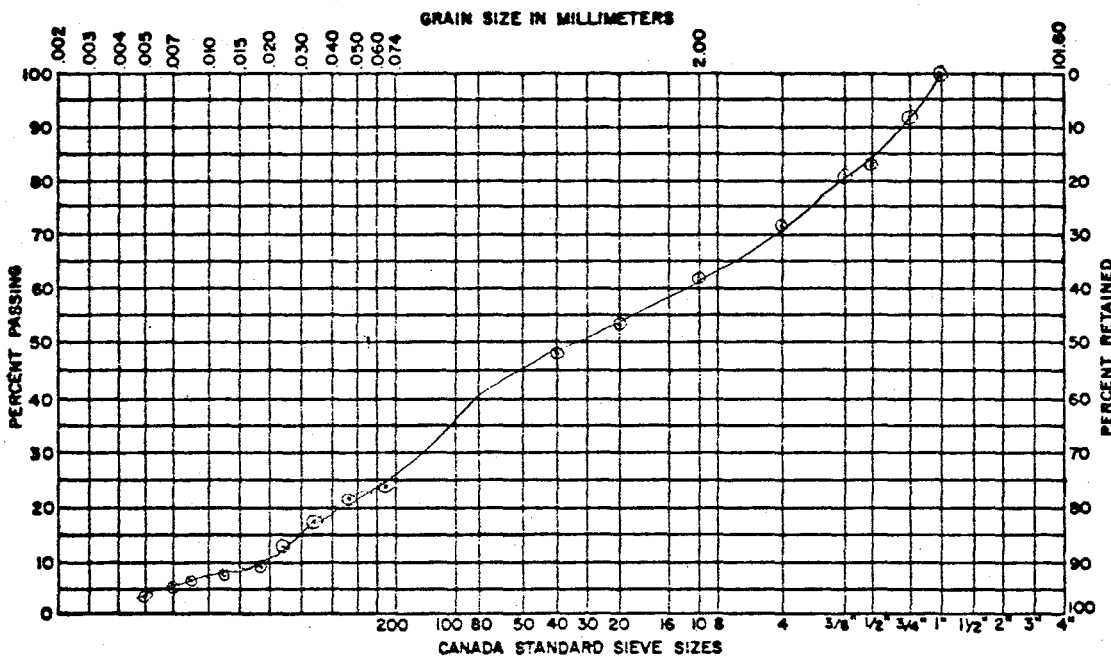
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | SM                     |    | NP.  |      | 32.0                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 13-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                           |                            |                      |                       |                                  |
|---|---------------------------|----------------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                            |                      |                       | DATE RECORDED<br><b>17-10-77</b> |
| STA.<br><b>660+85</b>                                   | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>1 1/2 - 3'</b> | HOLE NO.<br><b>8</b> | FIELD NO.<br><b>5</b> | LAB NO.<br><b>445</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |
|            |                   |            |                   |            |                   |            |                   |

#### PETROGRAPHIC ANALYSIS

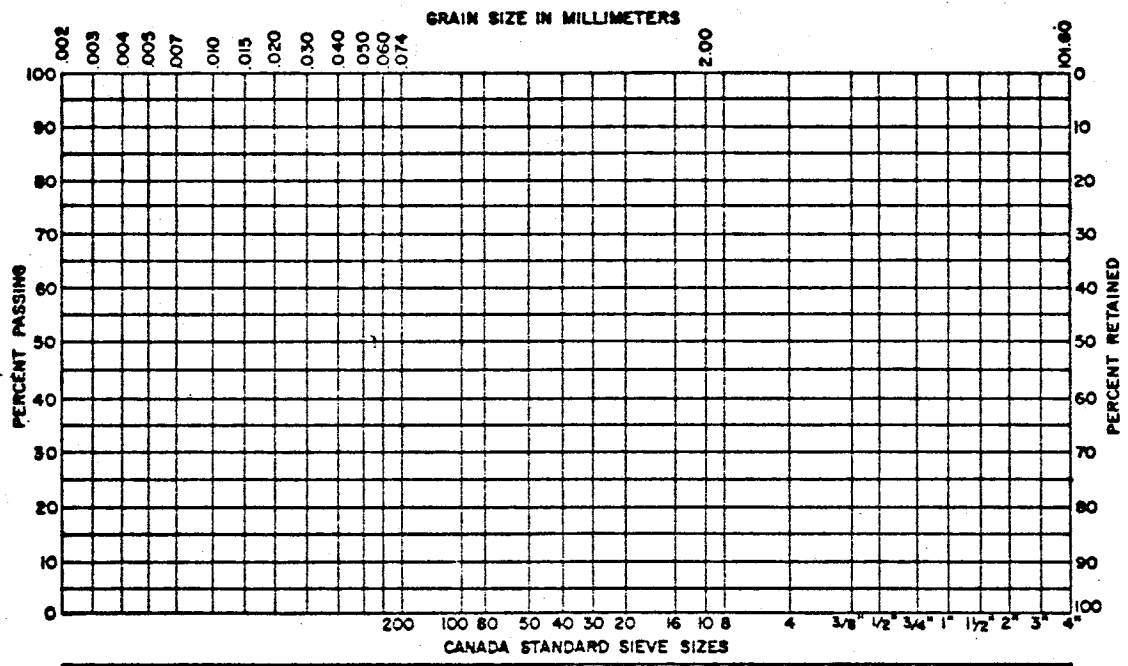
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>PE</b>              |    | <b>N.P.</b> |      | <b>660.1</b>               |      |
|            |                        |    |             |      |                            |      |
|            |                        |    |             |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE SAMPLED **13-8-77**  
DATE RECEIVED **23-8-77**  
TECHNICIAN(S) \_\_\_\_\_  
CHECKED BY \_\_\_\_\_



|   |                           |                       |                      |                       |                                  |
|---|---------------------------|-----------------------|----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                           |                       |                      |                       | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>660+85</b>                                   | SAMPLE TYPE<br><b>BAG</b> | DEPTH<br><b>5'-7'</b> | HOLE NO.<br><b>8</b> | FIELD NO.<br><b>6</b> | LAB NO.<br><b>446</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 90.8              | 100        | 30.0              | .064       | 26.1              | .0075      | 7.1               |
| 3/4        | 82.0              | 200        | 25.2              | .045       | 23.8              |            |                   |
| 1/2        | 76.9              |            |                   | .033       | 19.2              |            |                   |
| 3/8        | 69.4              |            |                   | .024       | 16.3              |            |                   |
| 4          | 58.2              |            |                   | .017       | 14.0              |            |                   |
| 10         | 51.5              |            |                   | .013       | 11.7              |            |                   |
| 20         | 45.8              |            |                   | .009       | 10.3              |            |                   |
| 40         | 39.2              |            |                   | .006       | 8.7               |            |                   |

#### PETROGRAPHIC ANALYSIS

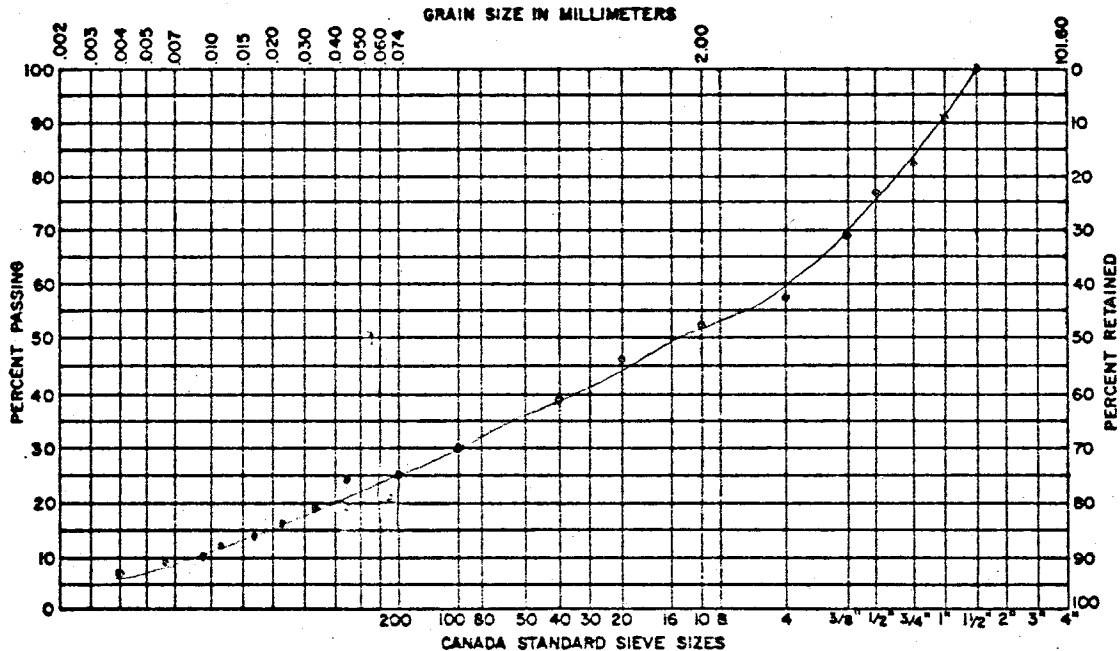
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL           | PI | NATURAL % H <sub>2</sub> O | SG          |
|------------|------------------------|----|--------------|----|----------------------------|-------------|
|            | <b>SM</b>              |    | <b>10.P.</b> |    | <b>24.1</b>                | <b>2.68</b> |
|            |                        |    |              |    |                            |             |
|            |                        |    |              |    |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **13-8-77**  
 DATE RECEIVED **23-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                          |                      |                       |                                 |
|---|-----------------------------|--------------------------|----------------------|-----------------------|---------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                          |                      |                       | DATE RECORDED<br><b>29-9-77</b> |
| STA.<br><b>657+35%43'LT</b>                             | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>2 1/2'-4</b> | HOLE NO.<br><b>9</b> | FIELD NO.<br><b>7</b> | LAB NO.<br><b>428</b>           |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/8        | 100.0             |            |                   | .063       | 50.8              | .005       | 7.6               |
| 4          | 99.4              |            |                   | .045       | 43.7              |            |                   |
| 10         | 99.1              |            |                   | .053       | 32.2              |            |                   |
| 20         | 98.4              |            |                   | .075       | 27.9              |            |                   |
| 40         | 97.8              |            |                   | .107       | 21.4              |            |                   |
| 100        | 86.4              |            |                   | .150       | 15.8              |            |                   |
| 200        | 65.2              |            |                   | .250       | 14.5              |            |                   |
|            |                   |            |                   | .355       | 10.7              |            |                   |

#### PETROGRAPHIC ANALYSIS

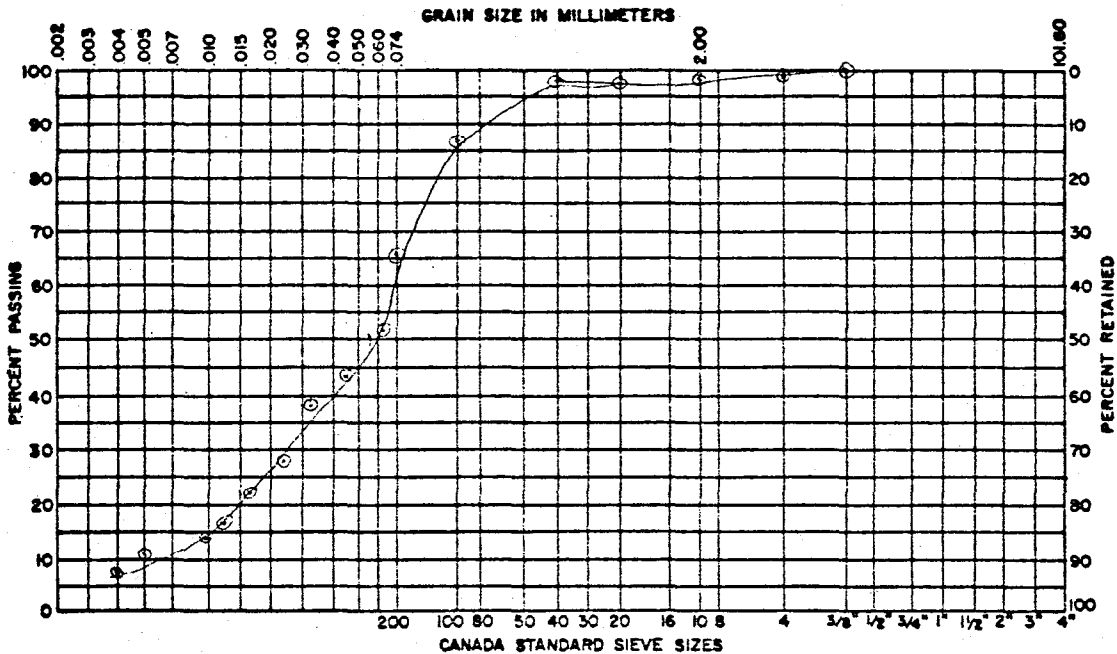
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|-------------|------|----------------------------|------|
|            | <b>ML</b>              |    | <b>10P.</b> |      | <b>120.22.68</b>           |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 15-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                       |                      |                       |                       |                                  |
|---|-----------------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                       |                      |                       |                       | DATE RECORDED<br><b>12-10-77</b> |
| STA.<br><b>657+35%343'LT</b>                            | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>7'-9'</b> | HOLE NO.<br><b>9</b> | FIELD NO.<br><b>8</b> | LAB NO.<br><b>429</b> |                                  |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 3/8        | 100.0             | .066       | 39.5              |
| 4          | 99.8              | .048       | 27.5              |
| 10         | 99.3              | .035       | 21.8              |
| 20         | 98.6              | .025       | 19.9              |
| 40         | 97.1              | .018       | 16.7              |
| 100        | 68.4              | .013       | 13.6              |
| 200        | 43.2              | .009       | 10.4              |
|            |                   | .007       | 10.1              |

#### PETROGRAPHIC ANALYSIS

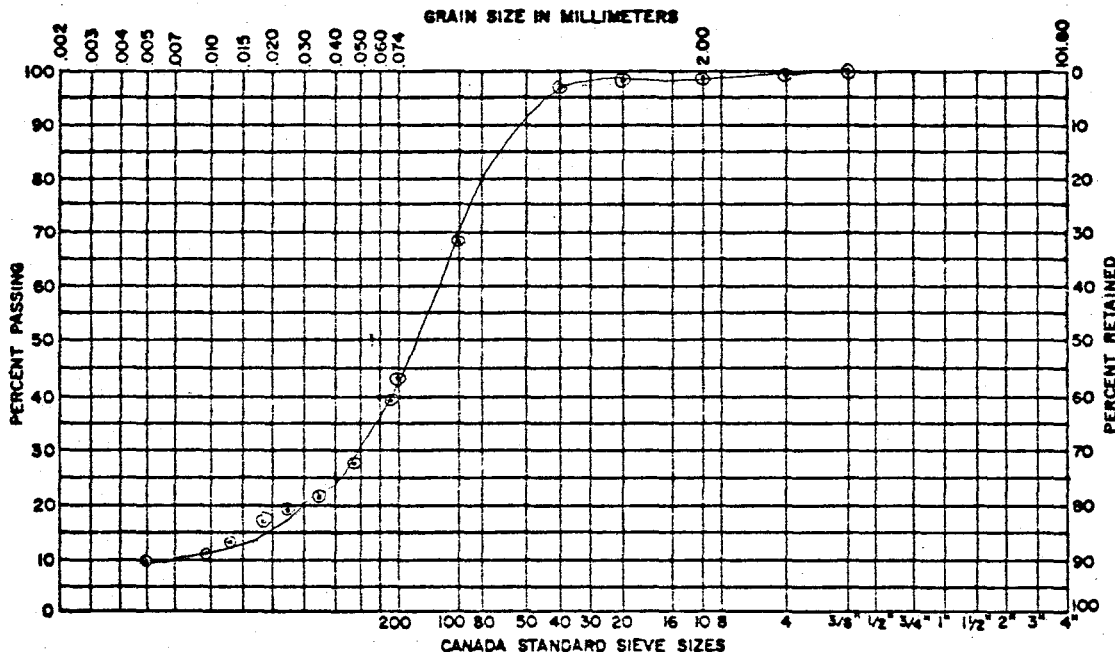
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | SM                     |    | D.P. |      | 32.1                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DATE SAMPLED 15-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                             |                            |                       |                       |                                  |
|---|-----------------------------|----------------------------|-----------------------|-----------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                            |                       |                       | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>657+25 3/85' LT</b>                          | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>3 1/2 - 5'</b> | HOLE NO.<br><b>10</b> | FIELD NO.<br><b>9</b> | LAB NO.<br><b>447</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 10         | 100.0             | .057       | 78.5              |
| 20         | 98.2              | .043       | 63.2              |
| 40         | 96.6              | .032       | 46.6              |
| 100        | 80.5              | .023       | 40.8              |
| 200        | 77.3              | .017       | 32.5              |
|            |                   | .013       | 23.6              |
|            |                   | .009       | 19.1              |
|            |                   | .006       | 13.7              |

#### PETROGRAPHIC ANALYSIS

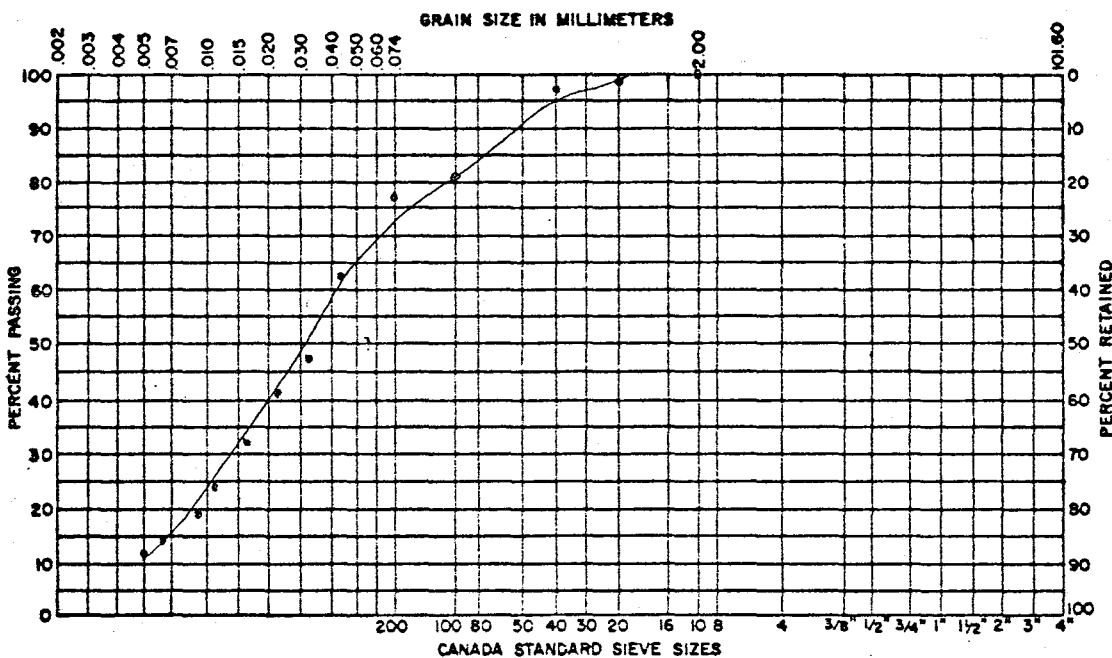
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
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|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|-------------|------|----------------------------|-------------|
|            | <b>OL</b>              |    | <b>N.P.</b> |      | <b>133.5</b>               | <b>2.68</b> |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 15-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                           |                       |                        |                                  |
|---|-----------------------------|---------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                           |                       |                        | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>657+25% 85' LT</b>                           | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>6'-7 1/2'</b> | HOLE NO.<br><b>10</b> | FIELD NO.<br><b>10</b> | LAB NO.<br><b>448</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 20         | 100.0             |            |                   | .075       | 69.1              | .005       | 12.7              |
| 40         | 99.6              |            |                   | .043       | 61.4              |            |                   |
| 100        | 71.7              |            |                   | .032       | 48.7              |            |                   |
| 200        | 67.8              |            |                   | .024       | 36.6              |            |                   |
|            |                   |            |                   | .017       | 28.3              |            |                   |
|            |                   |            |                   | .013       | 24.5              |            |                   |
|            |                   |            |                   | .009       | 20.7              |            |                   |
|            |                   |            |                   | .007       | 16.2              |            |                   |

#### PETROGRAPHIC ANALYSIS

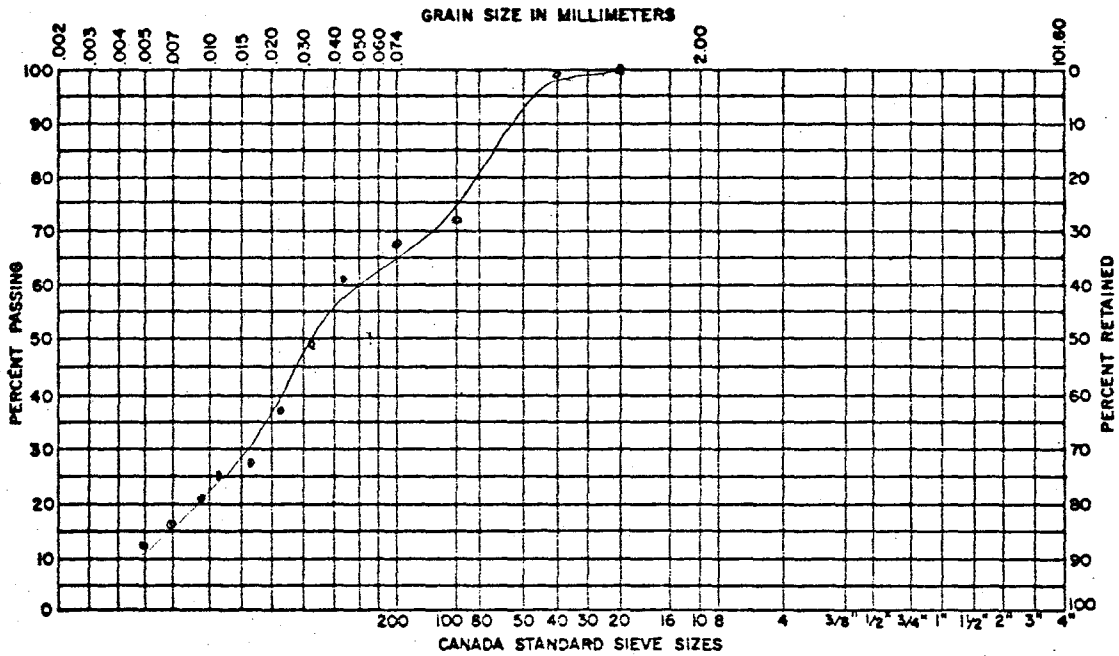
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L. | P.I. | NATURAL % H <sub>2</sub> O | S.G. |
|------------|------------------------|----|------|------|----------------------------|------|
|            | OL                     |    | N.P. |      | 39.5                       | 2.68 |
|            |                        |    |      |      |                            |      |
|            |                        |    |      |      |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



|                                      |      |        |        |        |        |
|--------------------------------------|------|--------|--------|--------|--------|
| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 15-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                             |                       |                        |                                  |
|---|-----------------------------|-----------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                             |                       |                        | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>657+00%30'RT</b>                             | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>3 1/2' - 5'</b> | HOLE NO.<br><b>11</b> | FIELD NO.<br><b>11</b> | LAB NO.<br><b>449</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 10         | 100.0             |            |                   | 0.57       | 79.8              | 0.075      | 12.8              |
| 20         | 99.4              |            |                   | 0.43       | 60.6              |            |                   |
| 40         | 99.0              |            |                   | 0.33       | 43.4              |            |                   |
| 100        | 88.7              |            |                   | 0.23       | 39.6              |            |                   |
| 200        | 80.6              |            |                   | 0.17       | 30.6              |            |                   |
|            |                   |            |                   | 0.13       | 25.5              |            |                   |
|            |                   |            |                   | 0.09       | 19.8              |            |                   |
|            |                   |            |                   | 0.06       | 15.6              |            |                   |

#### PETROGRAPHIC ANALYSIS

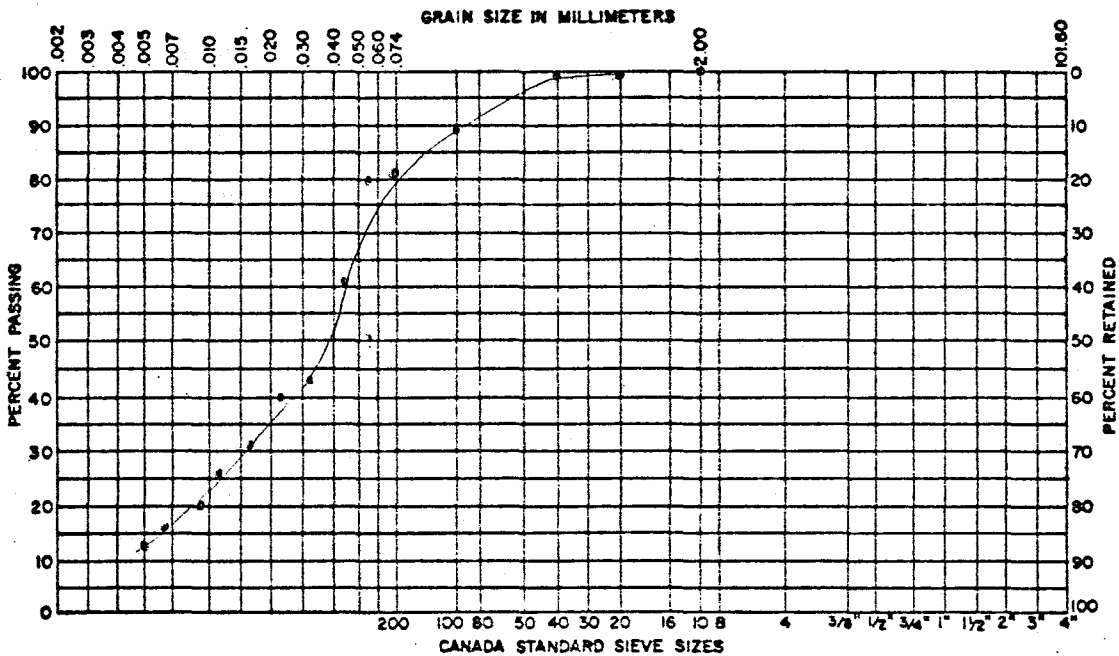
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | P.L.        | P.I. | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|----|-------------|------|----------------------------|-------------|
|            | <b>OL</b>              |    | <b>10.8</b> |      | <b>66.5</b>                | <b>2.68</b> |
|            |                        |    |             |      |                            |             |
|            |                        |    |             |      |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |
|             |  |
|             |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **15-8-77**  
 DATE RECEIVED **23-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                         |                       |                        |                                  |
|---|-----------------------------|-------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                         |                       |                        | DATE RECORDED<br><b>12-10-77</b> |
| STA.<br><b>656+75 3/4 RT</b>                            | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>13'-15'</b> | HOLE NO.<br><b>12</b> | FIELD NO.<br><b>12</b> | LAB NO.<br><b>430</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1 1/2      | 100.0             | 40         | 52.8              | .065       | 27.4              | .005       | 11.6              |
| 1          | 98.1              | 100        | 35.4              | .047       | 24.9              |            |                   |
| 3/4        | 92.6              | 200        | 30.7              | .027       | 22.0              |            |                   |
| 1/2        | 84.3              |            |                   | .018       | 19.8              |            |                   |
| 3/8        | 79.0              |            |                   | .012       | 16.7              |            |                   |
| 4          | 71.4              |            |                   | .009       | 15.6              |            |                   |
| 10         | 66.4              |            |                   | .0075      | 14.4              |            |                   |
| 20         | 59.1              |            |                   | .006       | 13.1              |            |                   |

#### PETROGRAPHIC ANALYSIS

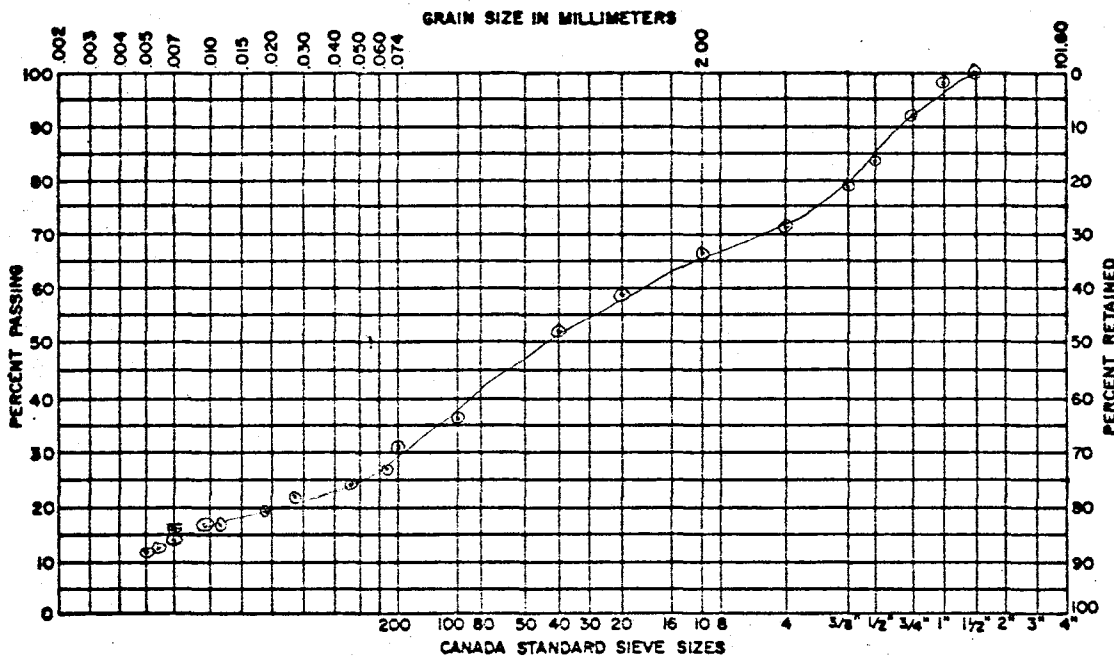
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL    | PI | NATURAL % H <sub>2</sub> O | SG   |
|------------|------------------------|----|-------|----|----------------------------|------|
|            | SM                     |    | TRACE |    | 8.7                        | 2.69 |
|            |                        |    |       |    |                            |      |
|            |                        |    |       |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED **15-8-77**

DATE RECEIVED **22-8-77**

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                             |                           |                       |                        |                                  |
|---|-----------------------------|---------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                           |                       |                        | DATE RECORDED<br><b>13-10-77</b> |
| STA.<br><b>654+50</b>                                   | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>1 1/2'-3'</b> | HOLE NO.<br><b>13</b> | FIELD NO.<br><b>13</b> | LAB NO.<br><b>450</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 40         | 100.0             | 0.075      | 68.6              |
| 100        | 95.3              | 0.425      | 60.3              |
| 200        | 76.0              | 0.250      | 45.6              |
|            |                   | 0.150      | 34.1              |
|            |                   | 0.075      | 27.1              |
|            |                   | 0.0425     | 17.2              |
|            |                   | 0.0250     | 14.4              |
|            |                   | 0.0150     | 10.5              |

#### PETROGRAPHIC ANALYSIS

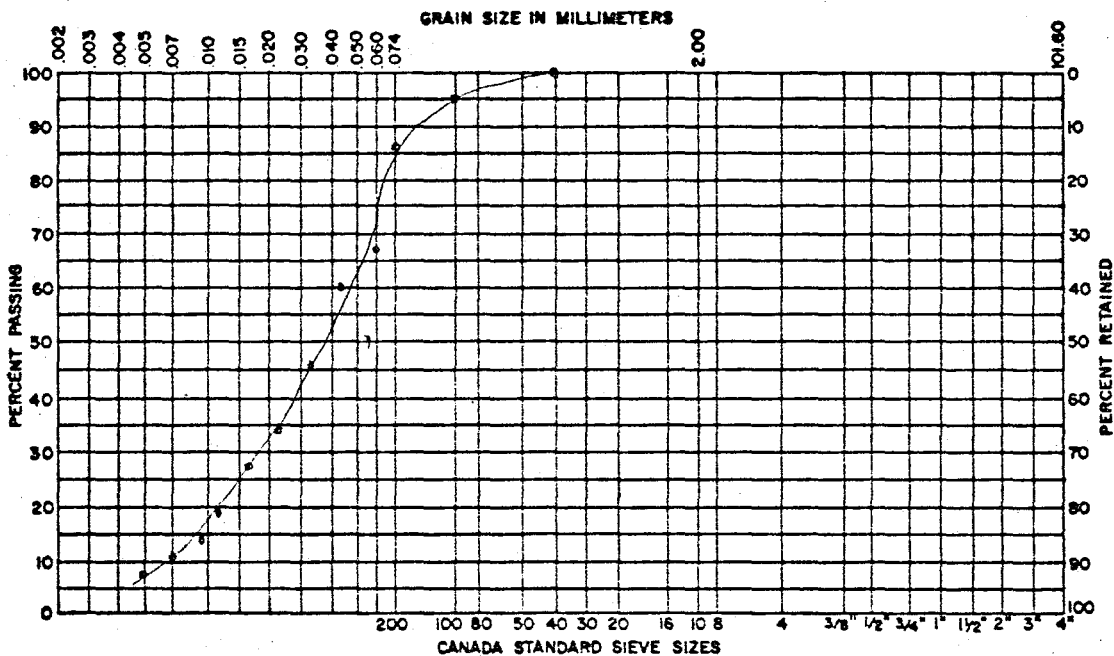
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
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|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL          | PI | NATURAL % H <sub>2</sub> O | SG.         |
|------------|------------------------|----|-------------|----|----------------------------|-------------|
|            | <b>OL</b>              |    | <b>10.P</b> |    | <b>133.6</b>               | <b>2.62</b> |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED **15-8-77**  
 DATE RECEIVED **23-8-77**  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



Public Works  
Canada

MATERIALS QUALITY CONTROL LABORATORY  
WHITEHORSE, Y. T.

PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

13-10-77

STA.

654+50 ±

SAMPLE TYPE

AUGER

DEPTH

5½'-7'

HOLE NO.

13

FIELD NO.

14

LAB NO.

451

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | .061       | 46.5              |
| 3/8        | 92.8              | .047       | 34.6              |
| 4          | 95.8              | .035       | 22.2              |
| 10         | 93.0              | .025       | 18.7              |
| 20         | 89.1              | .015       | 16.9              |
| 40         | 81.8              | .010       | 13.3              |
| 100        | 52.5              | .0075      | 11.0              |
| 200        | 40.9              | .006       | 10.4              |

#### PETROGRAPHIC ANALYSIS

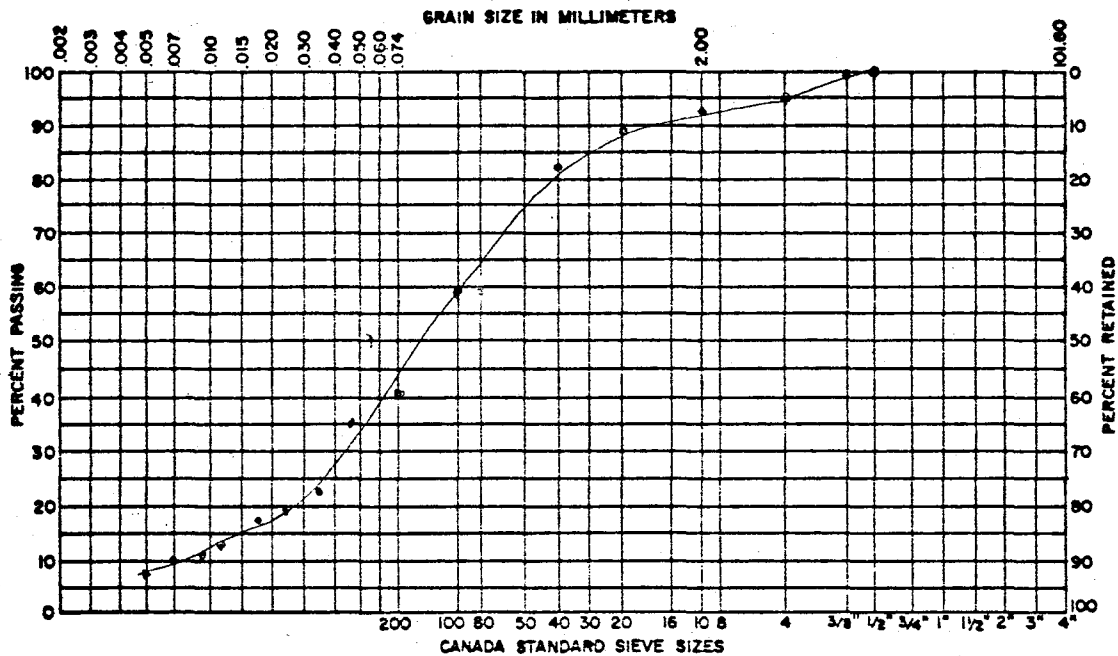
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL    | PI | NATURAL % H <sub>2</sub> O | SG   |
|------------|------------------------|----|-------|----|----------------------------|------|
|            | SM                     |    | 10.P. |    | 50.5                       | 2.68 |
|            |                        |    |       |    |                            |      |
|            |                        |    |       |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 15-8-77

DATE RECEIVED 23-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



PROJECT

BLACKSTONE RIVER MI 72.8 DEMPSTER HWY

DATE RECORDED

12-10-77

STA.

656+78 1/2 40' LT

SAMPLE TYPE

AUGER

DEPTH

2'-3 1/2'

HOLE NO.

15

FIELD NO.

15

LAB NO.

431

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|
| 1/2        | 100.0             | .058       | 74.3              |
| 3/8        | 99.5              | .042       | 65.0              |
| 4          | 98.5              | .031       | 53.2              |
| 10         | 97.3              | .023       | 43.3              |
| 20         | 95.1              | .017       | 37.7              |
| 40         | 93.9              | .012       | 30.9              |
| 100        | 90.3              | .009       | 24.3              |
| 200        | 81.0              | .006       | 13.6              |

#### PETROGRAPHIC ANALYSIS

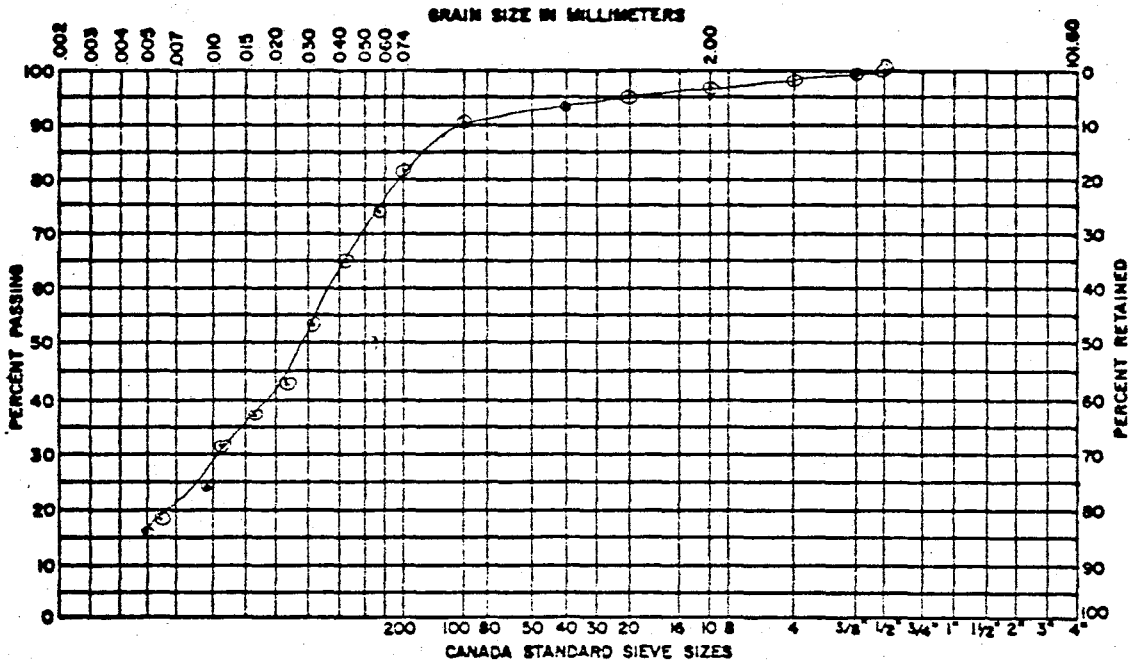
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | SR   |
|------------|------------------------|----|------|----|----------------------------|------|
|            | OL                     |    | N.P. |    | 65.8                       | 2.69 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_

DATE SAMPLED 15-8-77

DATE RECEIVED 22-8-77

TECHNICIAN(S) \_\_\_\_\_

CHECKED BY \_\_\_\_\_



|   |                             |                               |                       |                        |                                  |
|---|-----------------------------|-------------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                               |                       |                        | DATE RECORDED<br><b>12-10-77</b> |
| STA.<br><b>655+51 1/2 40' RT</b>                        | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>2 1/2 - 4 1/2</b> | HOLE NO.<br><b>16</b> | FIELD NO.<br><b>16</b> | LAB NO.<br><b>452</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 79.4              | .075       | 53.2              | .005       | 10.5              |
| 3/4        | 94.2              | 200        | 47.1              | .149       | 39.5              |            |                   |
| 1/2        | 94.2              |            |                   | .250       | 23.9              |            |                   |
| 3/8        | 94.2              |            |                   | .425       | 22.1              |            |                   |
| 4          | 94.2              |            |                   | .600       | 20.9              |            |                   |
| 10         | 93.9              |            |                   | .850       | 17.3              |            |                   |
| 20         | 93.9              |            |                   | 1.18       | 15.0              |            |                   |
| 40         | 93.9              |            |                   | 1.65       | 12.6              |            |                   |

#### PETROGRAPHIC ANALYSIS

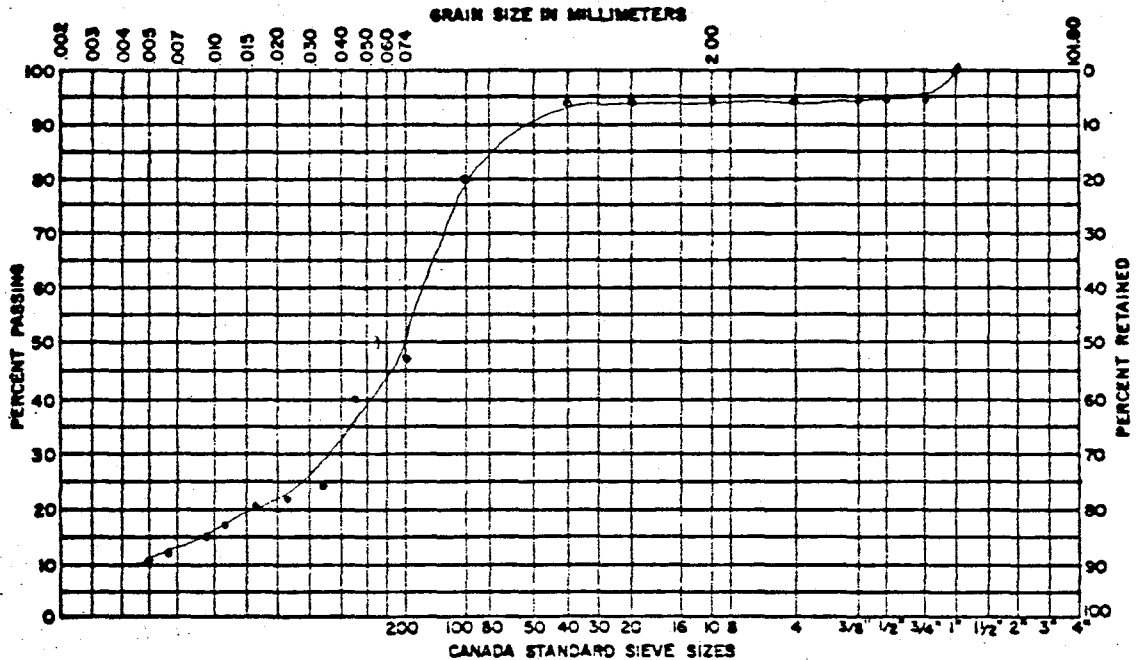
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL | PL   | PI | NATURAL % H <sub>2</sub> O | SL   |
|------------|------------------------|----|------|----|----------------------------|------|
|            | SM                     |    | 10.0 |    | 52.2                       | 2.62 |
|            |                        |    |      |    |                            |      |
|            |                        |    |      |    |                            |      |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %



| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 15-8-77  
 DATE RECEIVED 23-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_



|   |                             |                         |                       |                        |                                  |
|---|-----------------------------|-------------------------|-----------------------|------------------------|----------------------------------|
| PROJECT<br><b>BLACKSTONE RIVER MI 72.8 DEMPSTER HWY</b> |                             |                         |                       |                        | DATE RECORDED<br><b>12-10-77</b> |
| STA.<br><b>656+35 1/2 RT</b>                            | SAMPLE TYPE<br><b>AUGER</b> | DEPTH<br><b>13'-15'</b> | HOLE NO.<br><b>17</b> | FIELD NO.<br><b>17</b> | LAB NO.<br><b>432</b>            |

### LABORATORY TESTING REPORT

#### GRAIN SIZE ANALYSIS

| SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT | SIEVE SIZE | % FINER BY WEIGHT |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|
| 1          | 100.0             | 100        | 39.7              | .065       | 32.9              | .005       | 12.5              |
| 3/4        | 97.8              | 200        | 33.6              | .048       | 29.8              |            |                   |
| 1/2        | 91.5              |            |                   | .034       | 29.4              |            |                   |
| 3/8        | 87.0              |            |                   | .024       | 25.4              |            |                   |
| 4          | 76.5              |            |                   | .017       | 21.8              |            |                   |
| 10         | 69.9              |            |                   | .013       | 20.5              |            |                   |
| 20         | 60.5              |            |                   | .009       | 17.9              |            |                   |
| 40         | 53.9              |            |                   | .006       | 16.7              |            |                   |

#### PETROGRAPHIC ANALYSIS

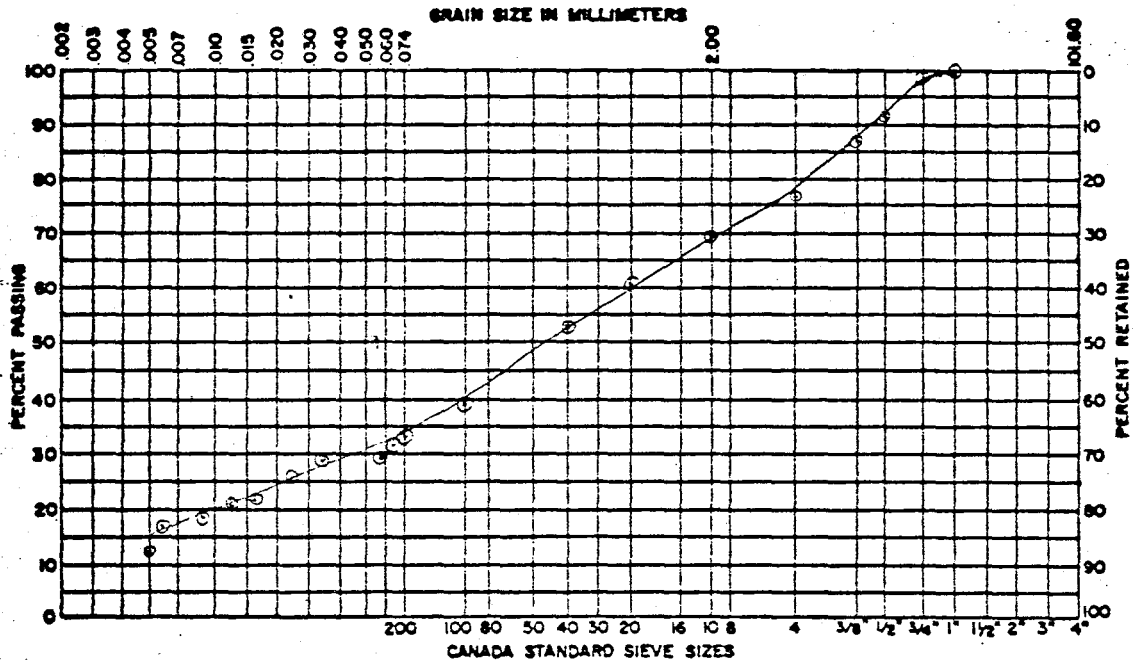
| MATERIAL TYPE | % OF TOTAL SAMPLE |
|---------------|-------------------|
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

| SAMPLE NO. | UNIFIED CLASSIFICATION | LL          | PL          | PI         | NATURAL % H <sub>2</sub> O | S.G.        |
|------------|------------------------|-------------|-------------|------------|----------------------------|-------------|
|            | <b>SM</b>              | <b>15.2</b> | <b>13.7</b> | <b>1.5</b> | <b>10.2</b>                | <b>2.69</b> |
|            |                        |             |             |            |                            |             |
|            |                        |             |             |            |                            |             |

#### PARTICLE SHAPE ANALYSIS

|             |  |
|-------------|--|
| ROUND       |  |
| SUB-ROUND   |  |
| ANGULAR     |  |
| SUB-ANGULAR |  |
| FLATS       |  |
| NEEDLES     |  |

CRUSH COUNT \_\_\_\_\_ %

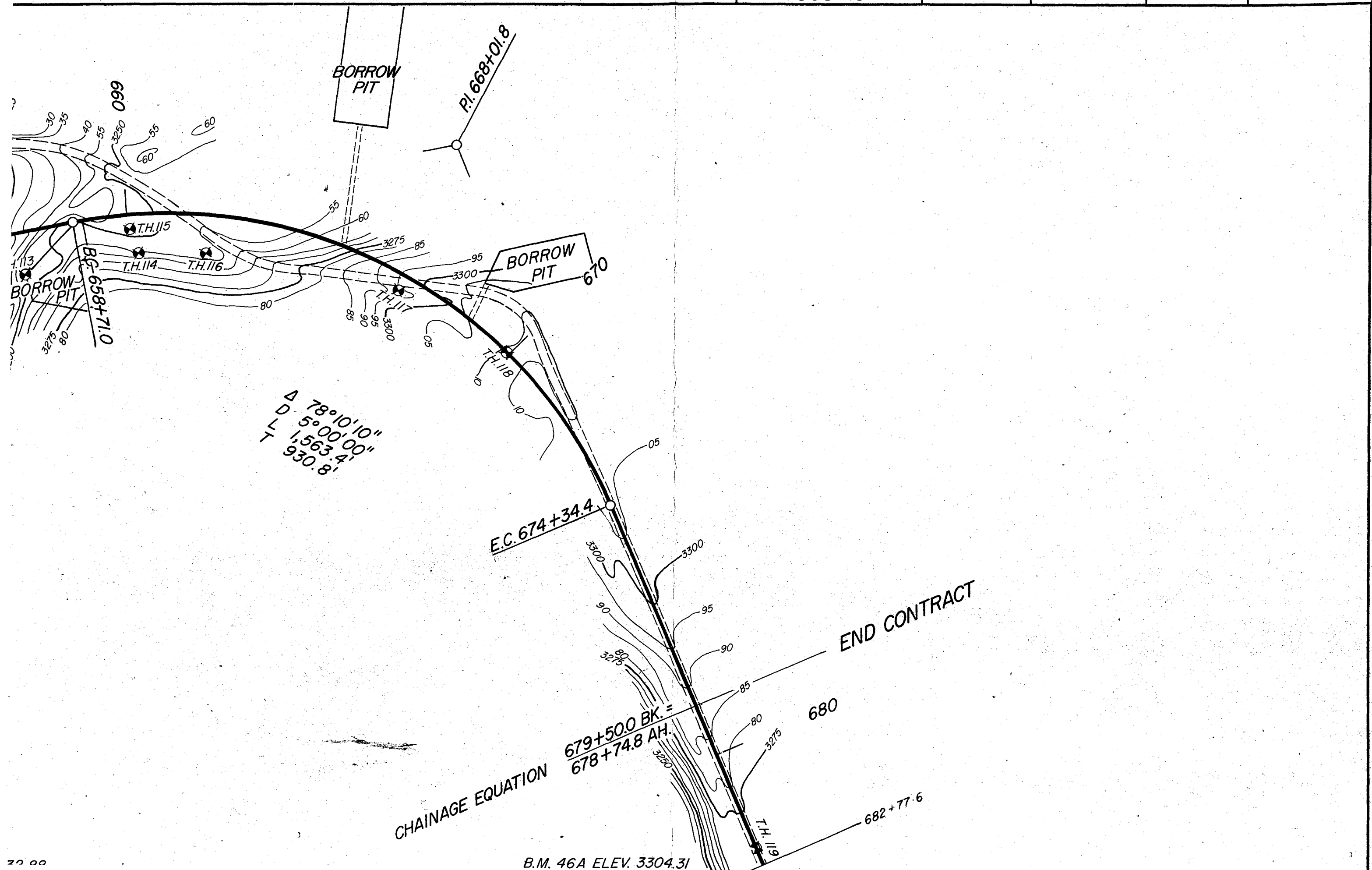


| CLAY (PLASTIC) TO SILT (NON-PLASTIC) | SAND |        |        | GRAVEL |        |
|--------------------------------------|------|--------|--------|--------|--------|
|                                      | FINE | MEDIUM | COARSE | FINE   | COARSE |
|                                      |      |        |        |        |        |

LABORATORY'S REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DATE SAMPLED 15-8-77  
 DATE RECEIVED 22-8-77  
 TECHNICIAN(S) \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25



PROPOSED NEW BRIDGE  
(FOR DETAILS SEE  
BRIDGE DRAWINGS)



NO. OF WAY CHECKED

BEGIN CONTRACT - 631+00.0  
630+72.8

$\Delta$  31°03'55"  
D 7°00'00"  
L 443.8'  
T 227.5'

ADJUST TO  
EXIST. ALIGNMENT

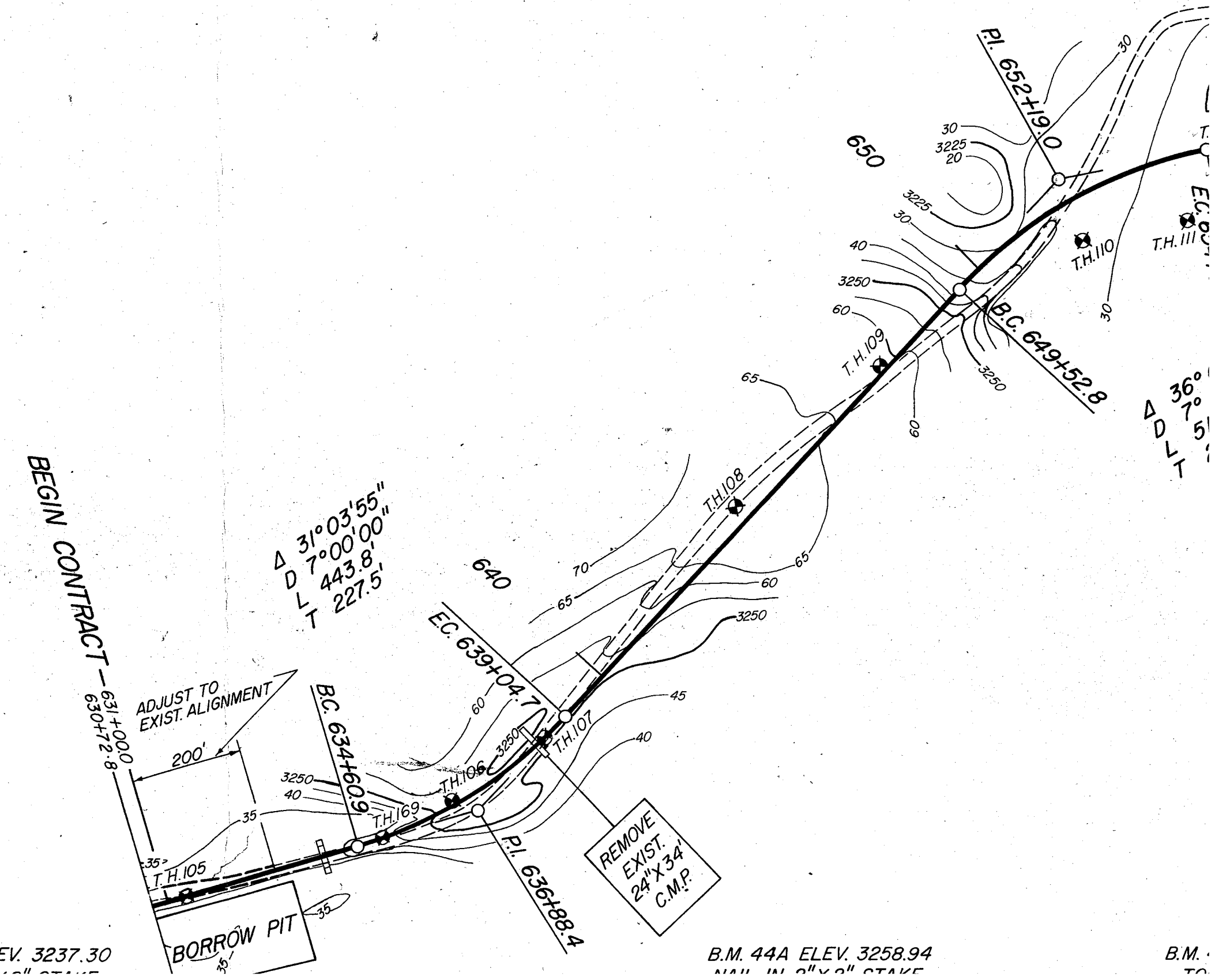
BORROW PIT

REMOVE  
EXIST.  
24" X 34"  
C.M.P.

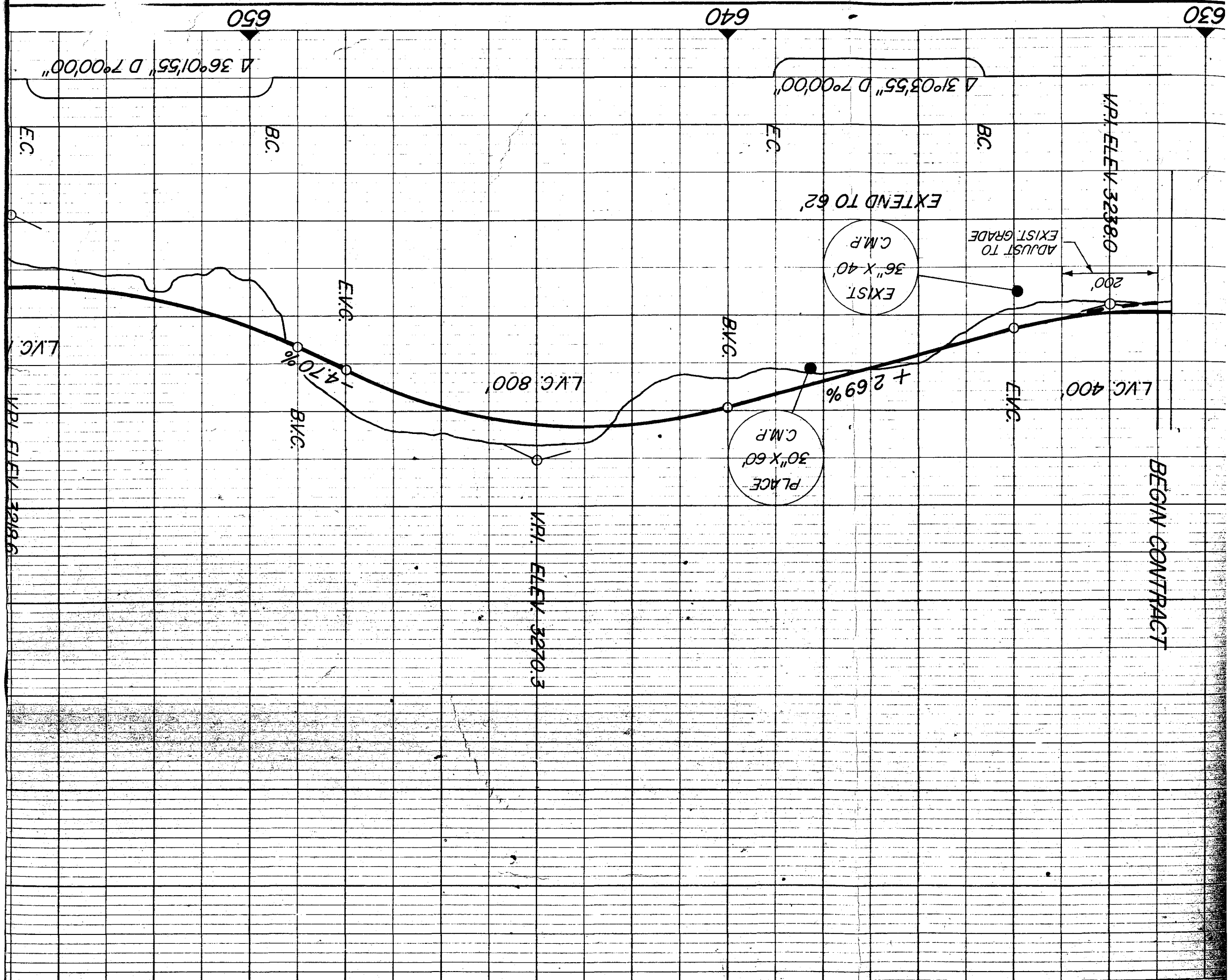
B.M. 43A ELEV. 3237.30  
MAN. IN 0" X 0" STAKE

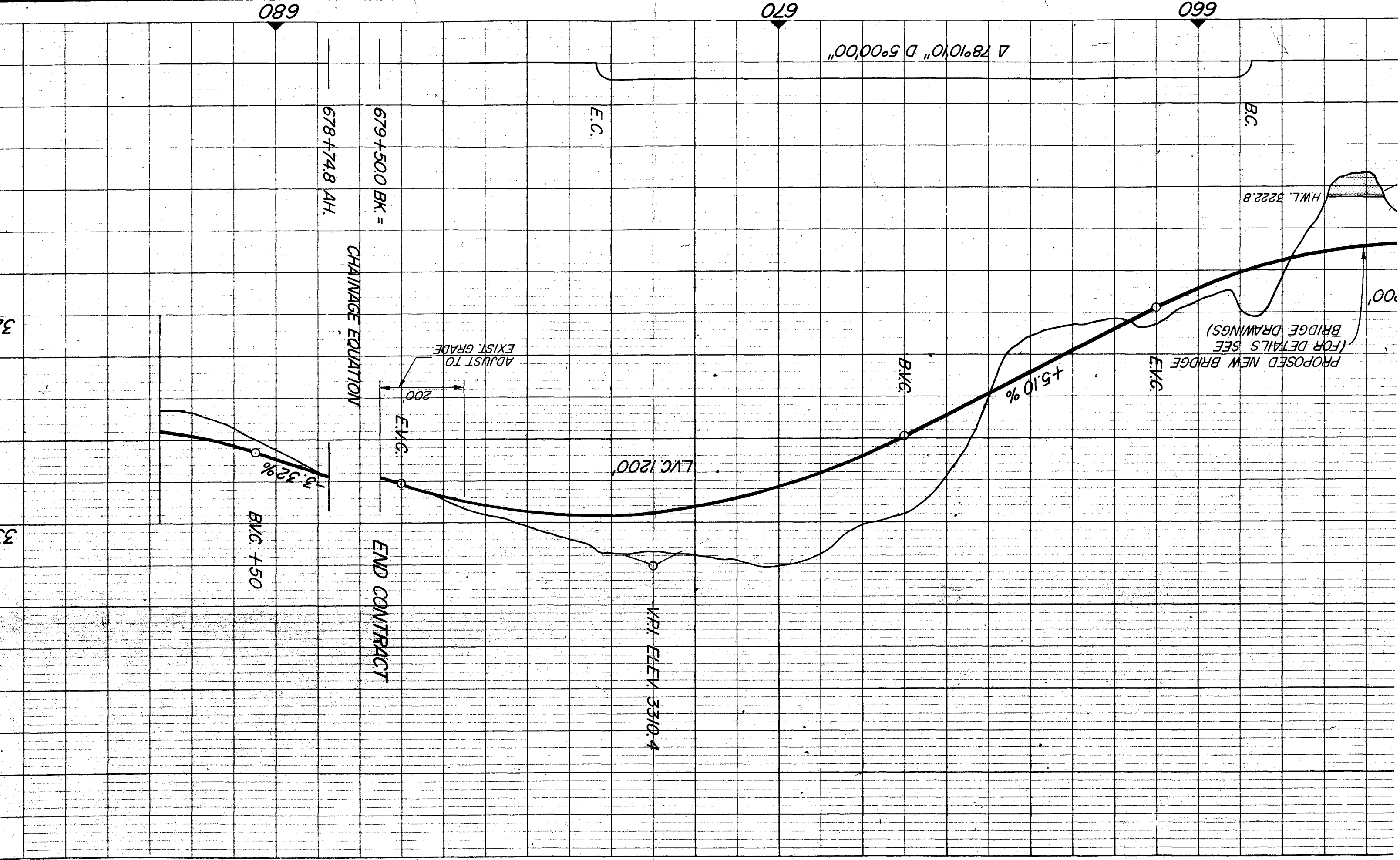
B.M. 44A ELEV. 3258.94  
MAN. IN 0" X 0" STAKE

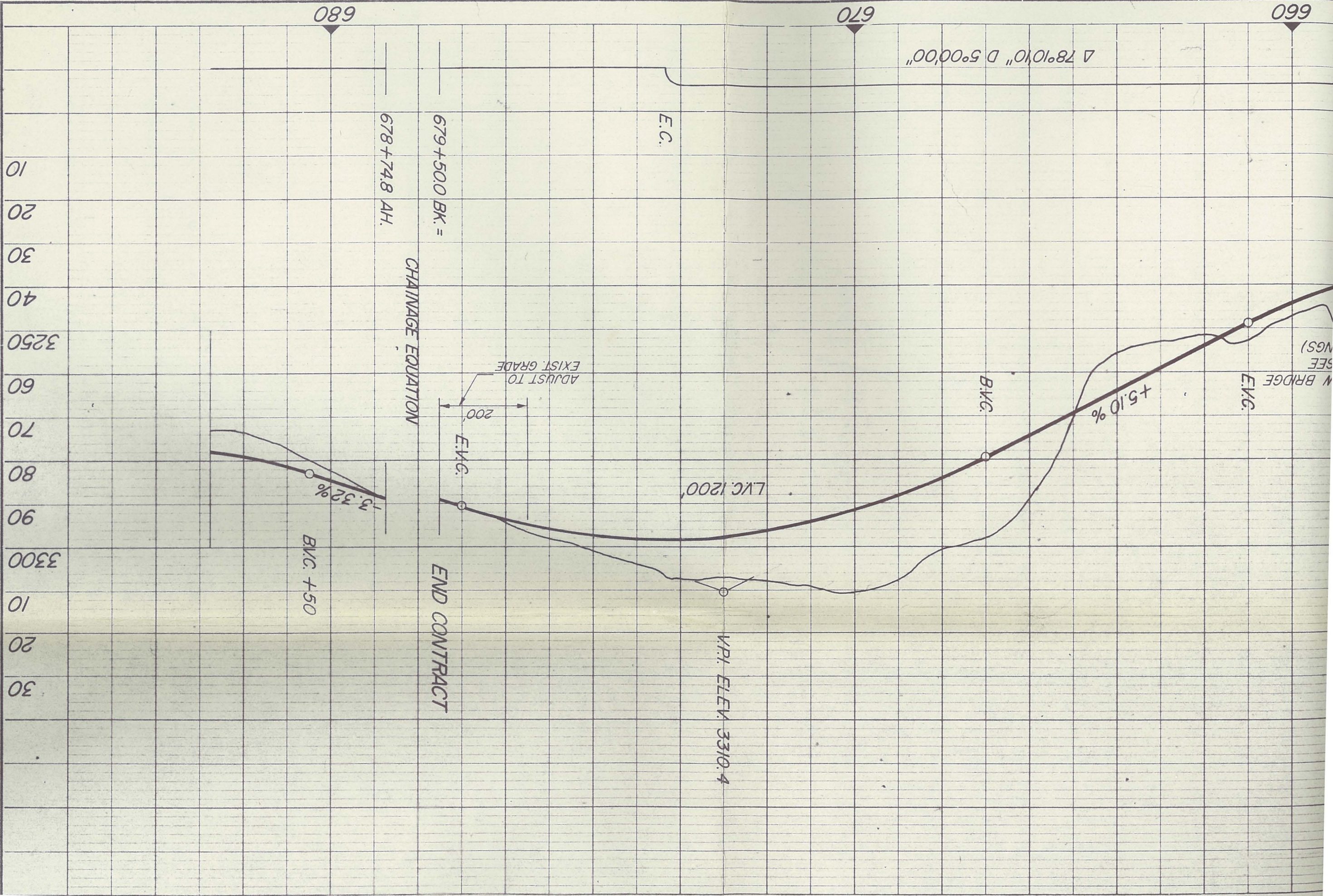
B.M. 45A ELEV. 3271.50  
MAN. IN 0" X 0" STAKE

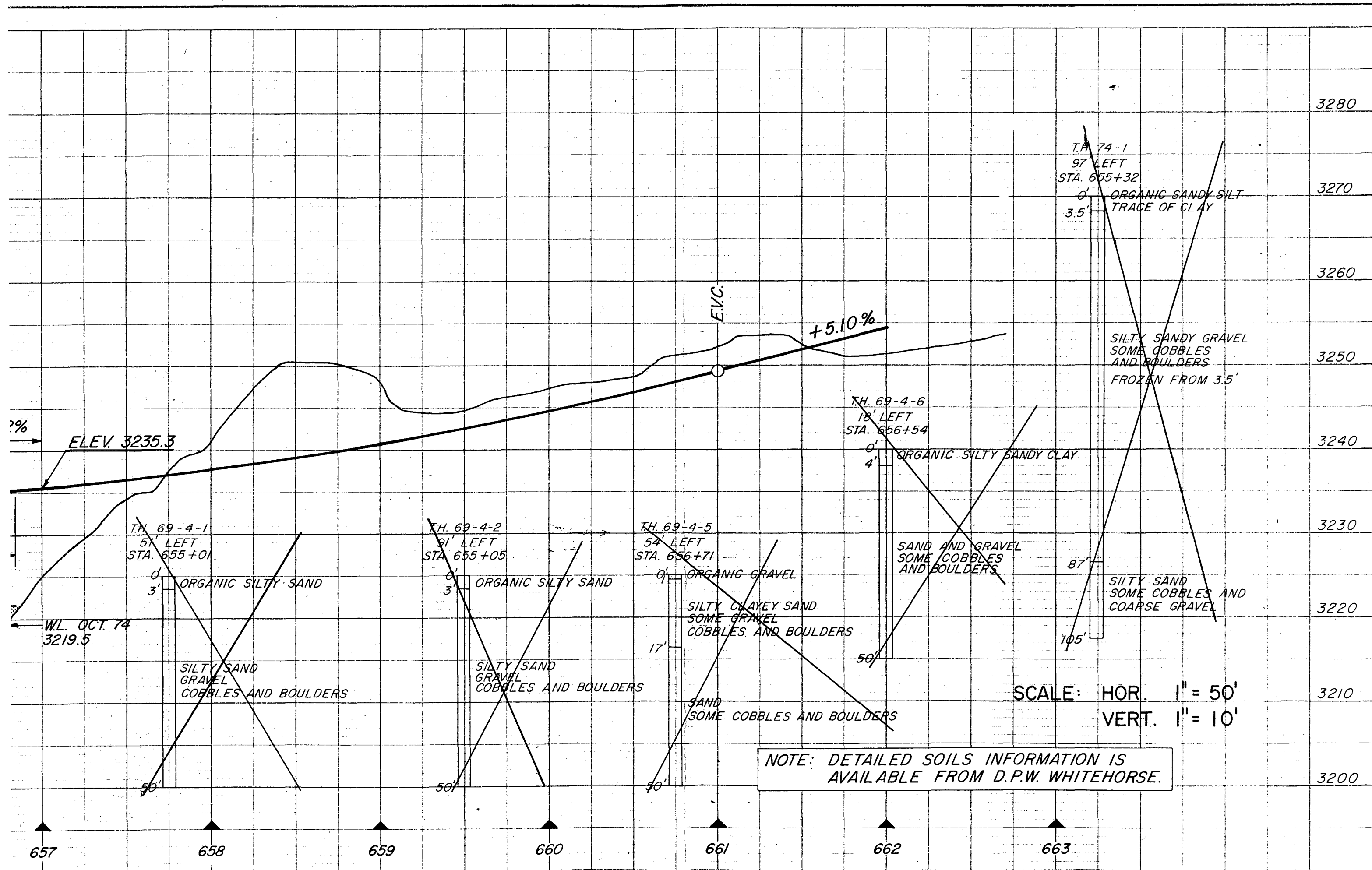


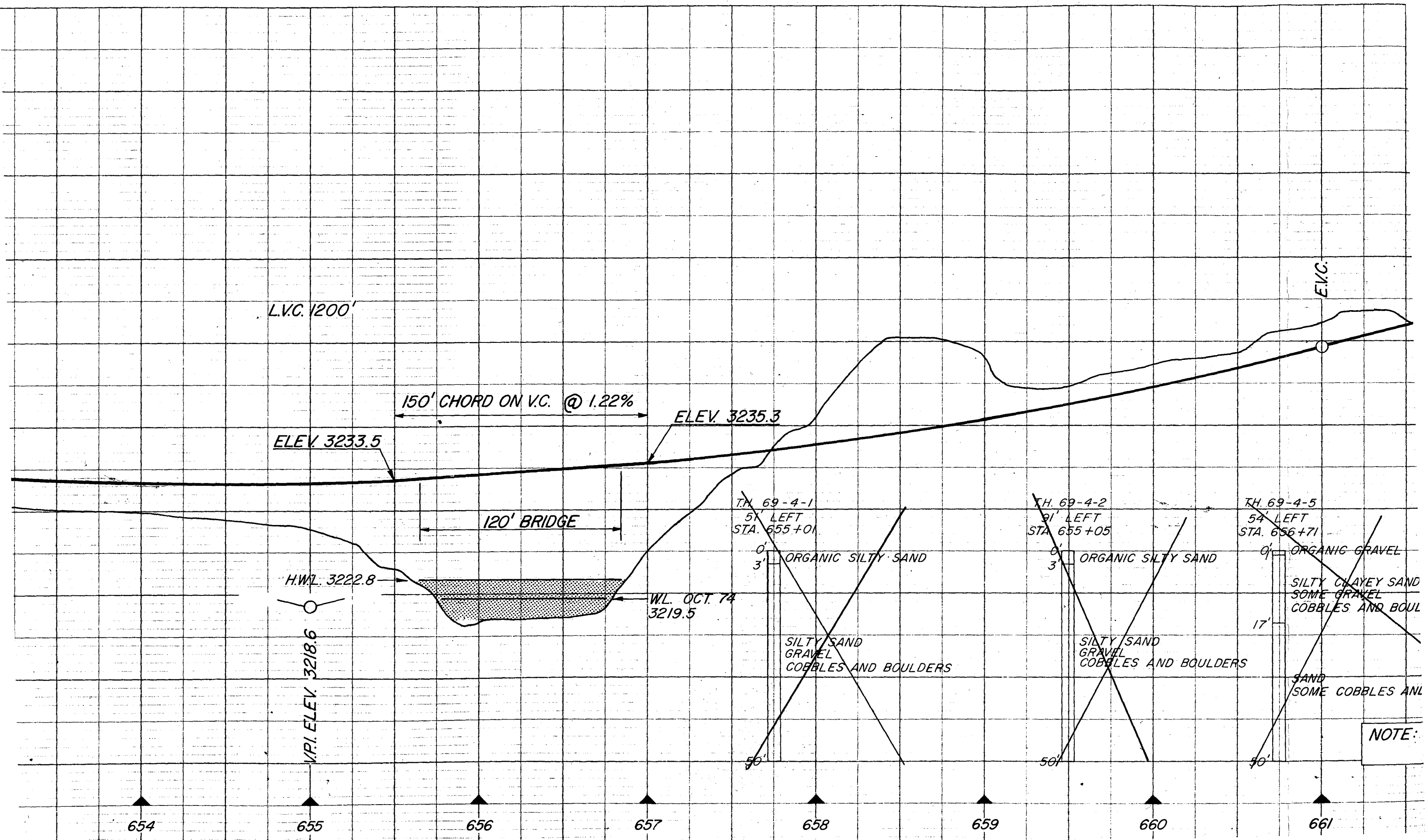












L.V.C. 1200'

150' CHORD ON V.C. @ 1.22%

ELEV. 3233.5

ELEV. 3235.3

120' BRIDGE

H.W.L. 3222.8

WL. OCT. 74  
3219.5

M.P.I. ELEV. 3218.6

TH. 69-4-1  
5' LEFT  
STA. 655+01

ORGANIC SILTY SAND

SILTY SAND  
GRAVEL  
COBBLES AND BOULDERS

TH. 69-4-2  
9' LEFT  
STA. 655+05

ORGANIC SILTY SAND

SILTY SAND  
GRAVEL  
COBBLES AND BOULDERS

TH. 69-4-5  
54' LEFT  
STA. 656+71

ORGANIC GRAVEL

SILTY CLAYEY SAND  
SOME GRAVEL  
COBBLES AND BOUL

SAND  
SOME COBBLES ANL

NOTE:

654

655

656

657

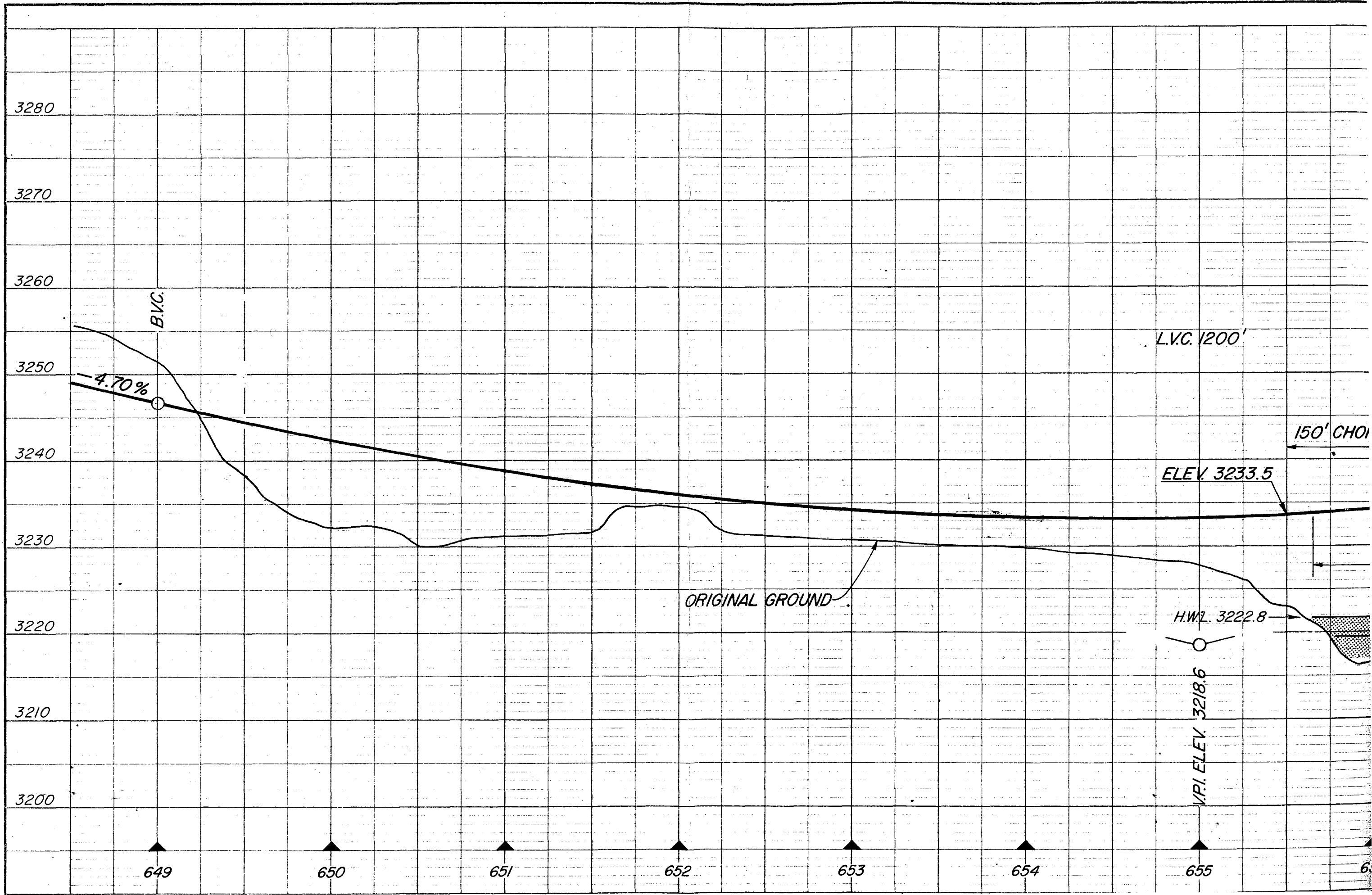
658

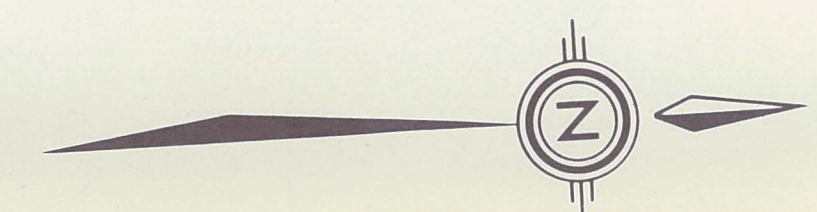
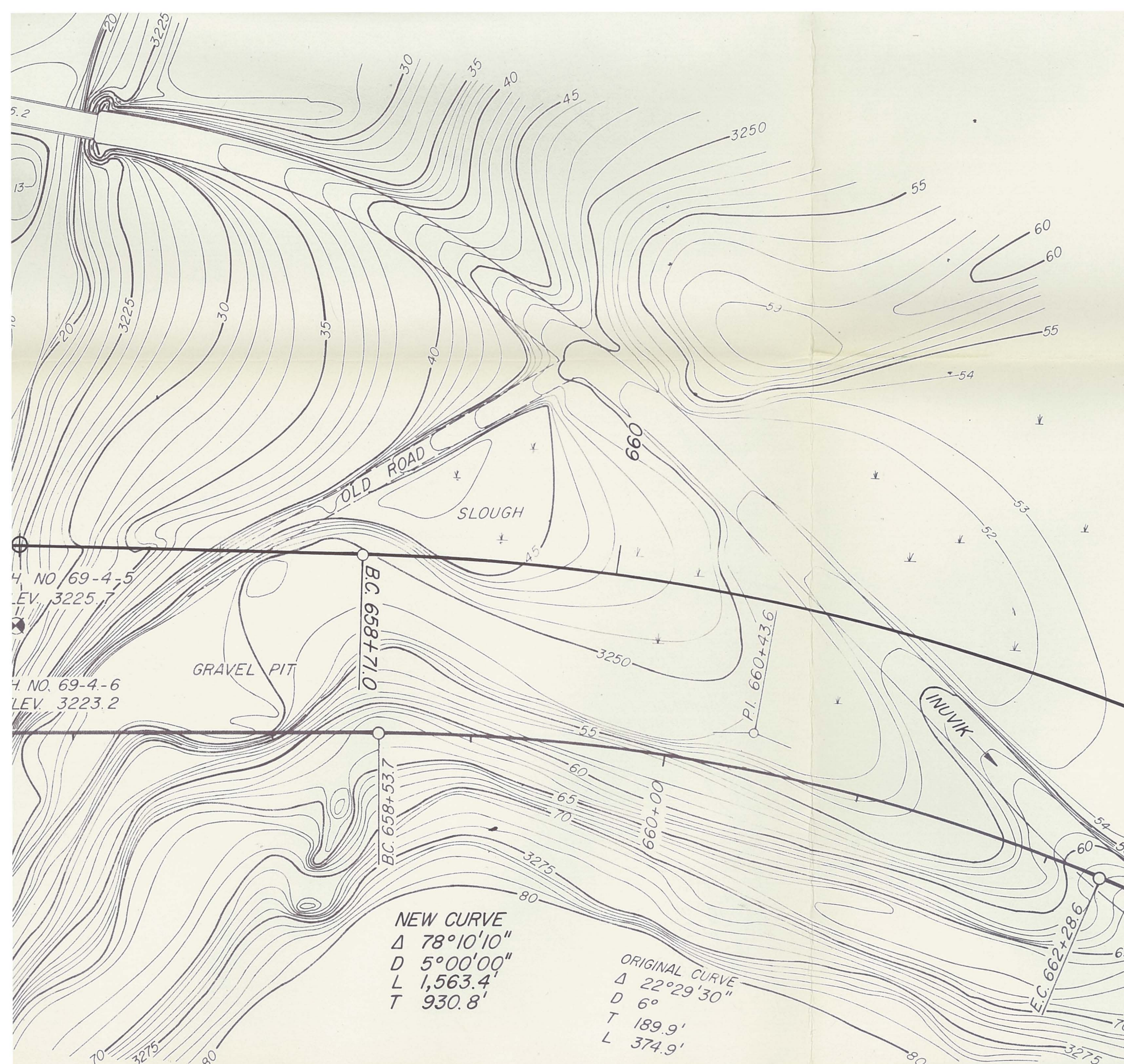
659

660

661

E.I.C.





**LEGEND**

- ⊗ EXISTING TEST HOLES
- ⊕ NEW TEST HOLES BEING DRILLED JULY 1977

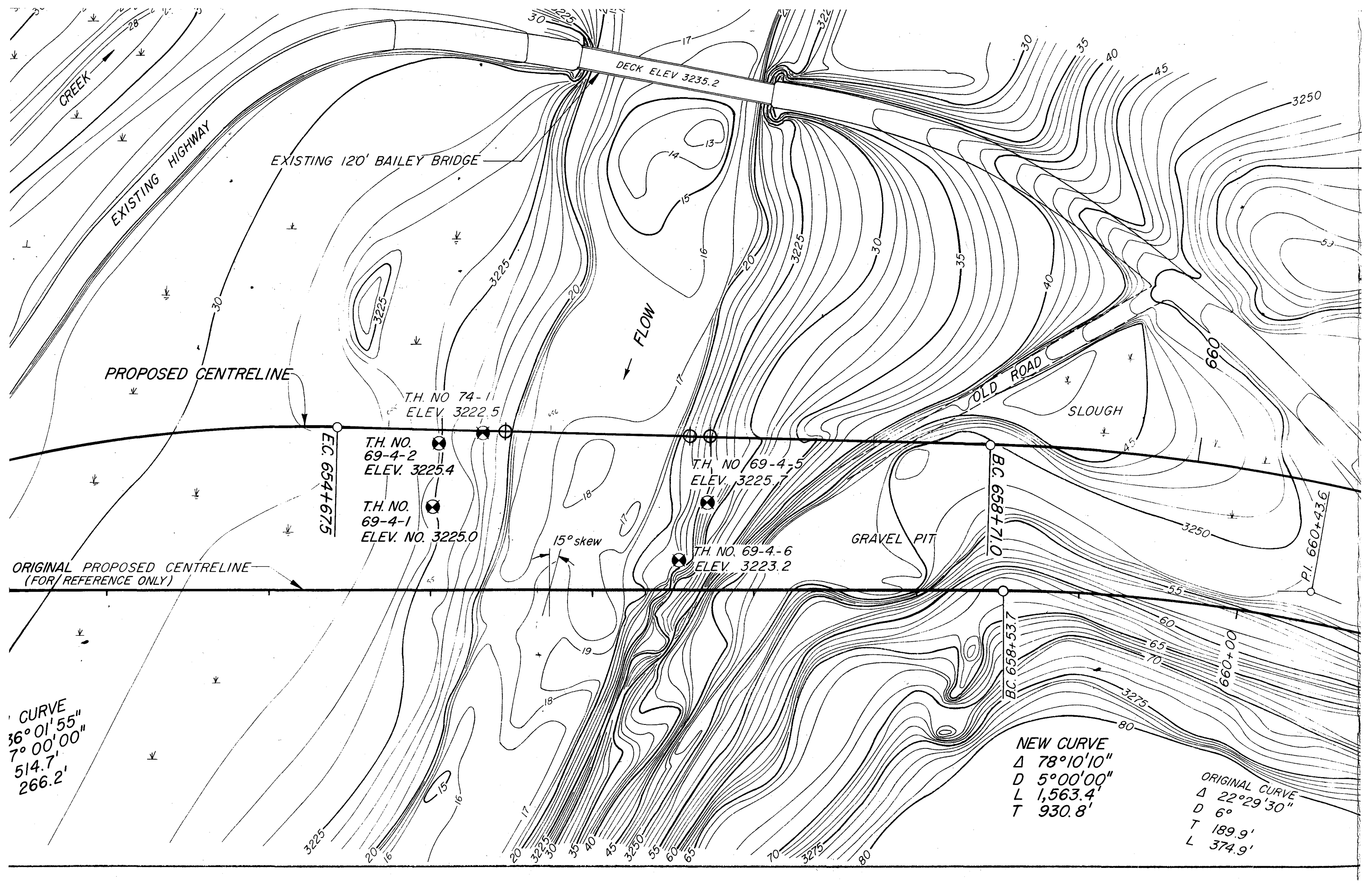
REVISED JULY 1977 : VERTICAL GRADE  
 REVISED OCT. 1976

SCALE : 1" = 50'

|   |         |                                     |           |
|---|---------|-------------------------------------|-----------|
| <b>PUBLIC WORKS, CANADA</b>                                 |         |                                     |           |
| PACIFIC REGION<br>DESIGN / CONSTRUCTION<br>WHITEHORSE, Y.T. |         |                                     |           |
| LOCATION  |         | DEMPSTER HIGHWAY - MILE 72.8        |           |
| DRWG. TITLE   |         | LOWER BLACKSTONE RIVER<br>SITE PLAN |           |
| SCALE: AS SHOWN   |         | APPROVED                            |           |
| DATE: JAN. 75   |         |                                     |           |
| DESIGN: J. FOX  | CHECKED |                                     |           |
| DRAWN: Fr. V.   | CHECKED |                                     |           |
| REDRAWN:  | CHECKED | TS. NO.                             | DRWG. NO. |
| SHEET 2 OF 2  |         |                                     | 7008-7-2b |

**NEW CURVE**  
 $\Delta$  78°10'10"  
 D 5°00'00"  
 L 1,563.4'  
 T 930.8'

**ORIGINAL CURVE**  
 $\Delta$  22°29'30"  
 D 6°  
 T 189.9'  
 L 374.9'



DECK ELEV 3235.2

EXISTING 120' BAILEY BRIDGE

EXISTING HIGHWAY

CREEK

PROPOSED CENTRELINE

FLOW

OLD ROAD

SLOUGH

GRAVEL PIT

T.H. NO 74-1  
ELEV. 3222.5

T.H. NO. 69-4-2  
ELEV. 3225.4

T.H. NO. 69-4-1  
ELEV. NO. 3225.0

T.H. NO. 69-4-5  
ELEV. 3225.7

T.H. NO. 69-4-6  
ELEV. 3223.2

EC. 654+67.5

BC. 658+71.0

P.I. 660+43.6

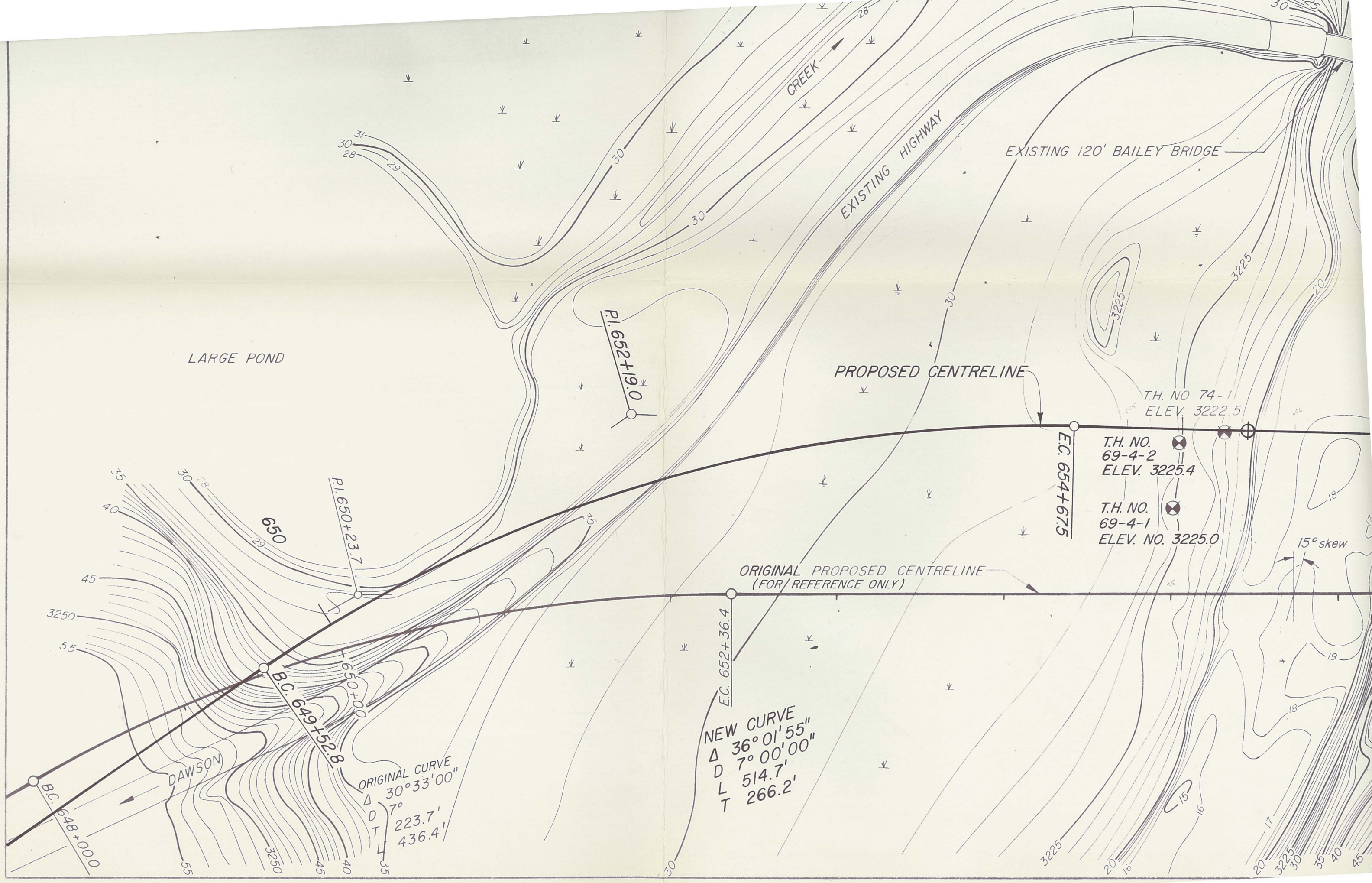
ORIGINAL PROPOSED CENTRELINE  
(FOR REFERENCE ONLY)

15° skew

CURVE  
 $\Delta$  36° 01' 55"  
 $D$  7° 00' 00"  
 $L$  514.7'  
 $T$  266.2'

NEW CURVE  
 $\Delta$  78° 10' 10"  
 $D$  5° 00' 00"  
 $L$  1,563.4'  
 $T$  930.8'

ORIGINAL CURVE  
 $\Delta$  22° 29' 30"  
 $D$  6°  
 $T$  189.9'  
 $L$  374.9'



LARGE POND

CREEK

EXISTING HIGHWAY

EXISTING 120' BAILEY BRIDGE

PROPOSED CENTRELINE

ORIGINAL PROPOSED CENTRELINE  
(FOR REFERENCE ONLY)

T.H. NO 74-1  
ELEV. 3222.5

T.H. NO. 69-4-2  
ELEV. 3225.4

T.H. NO. 69-4-1  
ELEV. NO. 3225.0

15° skew

NEW CURVE  
 $\Delta$  36° 01' 55"  
 D 7° 00' 00"  
 L 514.7'  
 T 266.2'

ORIGINAL CURVE  
 $\Delta$  30° 33' 00"  
 D 7°  
 L 223.7'  
 T 436.4'

P.I. 652+19.0

P.I. 650+23.7

650

B.C. 649+52.8

3250

3250

DAWSON

B.C. 648+00.0

EC. 654+67.5

EC. 652+36.4

31  
30  
28

29

30

30

30

3225

20

35

30

28

29

45

55

650+00

35

35

30

3225

20

16

15

16

20

3225

30

35

40

45

50

55

60

65

70

75

80

85

90

95

100