Ontario Geological Survey

Northern Ontario
Engineering Geology Terrain Study 68

SAND POINT LAKE AREA

(NTS 52C/SE)

District of Rainy River

by

M.A. Roed

1980

Ontario

Ministry of
Natural
Resources

Hon. James A.C. Auld
Minister

Dr. J.K. Reynolds
Deputy Minister

Ministry of
Northern
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The purpose of this study is to provide an inventory of engineering geology terrain conditions that will serve as a basic data framework for engineering and resource planning activities, at a level of detail consistent with a scale of 1:100 000. The terrain information is contained on the Data Base Map (OGS Map 5071, accompanying this report).

Interpretation of 1976 black and white aerial photographs, at a scale of approximately 1:50 000, formed the basis of the terrain mapping

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An engineering terrain legend was developed to facilitate the mapping and to provide a common information base for the entire map series. This legend is shown on the accompanying Data Base Map. Further discussion on the mapping techniques, legend format, and possible uses of this engineering geology information is available in the Ontario Engineering, Geology Terrain Study Users' Manual (Gartner, Mollard, and Roed 1980), a companion publication to this series of maps and reports.

2.0 GEOLOGIC SETTING

The Sand Point Lake area is underlain by crystalline bedrock of Precambrian age, which is covered in places by a patchy mantle of Quaternary surficial deposits. The terrain is dominated by bedrock landforms, but ground moraine is well represented. Organic terrain is widespread and minor amounts of glaciolacustrine and glaciofluvial deposits have been mapped, but alluvial deposits are poorly represented.

2.1 BEDROCK GEOLOGY

The Sand Point Lake area lies within the Wabigoon Belt in the Superior Province of the Canadian Shield. The area is underlain by two distinct types of bedrock, both of Early Precambrian age. The predominant group, a sequence of steeply dipping metasediments, occupies almost the entire northern part of the area. The second group, consisting of undifferentiated felsic igneous and metamorphic rocks, intrudes the metasediments in the area south of Wilkins Bay and in several other localities throughout the southern and northwestern parts of the map-area (Davies and Pryslak 1967).

The area is considered to be low in mineral potential, but has not been studied in any detail (Springer 1978).

2.2 QUATERNARY GEOLOGY

Northwestern Ontario was affected by several stages of continental glaciation during the Pleistocene. However, only deposits of the last glaciation, the Laurentide of Wisconsinan age, are preserved in the Sand Point Lake area. The ice began to advance approximately 100 000 years ago and travelled as far south as central Wisconsin before receding. The ice disappeared from the Sand Point Lake area approximately 15 000 years ago (Prest 1970). Zoltai (1961) gives a more complete account of the glacial history of the region.

Widespread stagnation of the ice mass resulted in the deposition of a variety of surficial materials. Till was deposited directly by the ice in the form of ground moraine. Meltwater from the glacier formed the glaciofluvial outwash deposit north of Namakan Lake and the spillway channels north of Bearpelt Creek. Ponded meltwater accumulated in lowlands to form glacial lakes. These grew in size and eventually coalesced to form an enormous body of water, located to the northwest of the area and called Glacial Lake Agassiz. Only scattered clay and silt deposits of this glacial lake occur in the lowlands of the Sand Point Lake. In the rocky uplands, the glacier over-deepened valleys, rounded off bedrock outcrops, formed box canyons, and left scattered patches of moraine and boulders. Glacial lake water did not inundate large parts of these uplands.

The complete disappearance of glacial ice and the gradual draining or drying up of glacial lakes marked the end of the Pleistocene Stage of the Quaternary Period in the area. Since that time, approximately 9 000 years ago (Prest 1970), modern streams have developed alluvial flood plains and organic deposits have accumulated in wet depressions. These deposits are nonglacial in origin and, together with the various glacial materials, comprise the variety of Quaternary unconsolidated deposits that forms a discontinuous mantle over the bedrock in the Sand Point Lake area.

2.3 PHYSIOGRAPHY

The area is dominated by rugged knobby topography. Elevations range from 338 m at Namakan Lake in the western part of the area to 549 m near Lilac Lake in the southern extremity of the area. There are numerous bedrock scarps which are commonly located adjacent to water courses. Waterfalls and rapids are characteristic features of the waterways. Local relief is most extreme in the southern part of the area, where differences in elevation of up to 60 m occur. Northward, local relief becomes moderate (15 to 60 m) and the topography more undulating.

Lowlands include alluvial plains along rivers, organic terrain, and a ground moraine unit which flanks Threemile Lake in the north-central part of the map-area.

3.0 ENGINEERING TERRAIN UNITS

Engineering terrain units are composed of a combination of various materials (unconsolidated and/or bedrock) which form recognizable landforms with certain engineering characteristics. Major terrain unit groups, and the engineering significance of each, are discussed in detail. These include bedrock terrain (RN), ground moraine (MG), and organic terrain (OT). Less significant terrain units include glaciolacustrine plains (LP), glaciofluvial outwash (GO), and alluvial plains (AP). A diagrammatic sketch of a typical terrain setting is given in Figure 1. Table 1 summarizes the characteristics and engineering significance of the major terrain units in the Sand Point Lake area.

3.1 BEDROCK

Examples: $\frac{\text{RN(tsMG) (pOT)}}{\text{Mnj-D(M)}}$ $\qquad$ $\frac{\text{RN(tsMG)(pOT)}}{\text{Hnj-D(M)}}$

Knobby bedrock terrain (RN) is dominant in this map-area. Relief of the unit is high (H) (greater than 60 m) in the southern part of the area and moderate (M) in the north, near Thompson Lake and north of Lac La Croix. The terrain is rugged (j) in the southern part where scarps and steep slopes dominate the landscape. Drainage in this unit is generally good (D). A thin, discontinuous layer of ground moraine till (tsMG) is present throughout the lower lying portions of the terrain unit. This till is thickest in bedrock depressions, particularly on the south side of bedrock knobs. Poorly drained depressions contain peat (pOT).

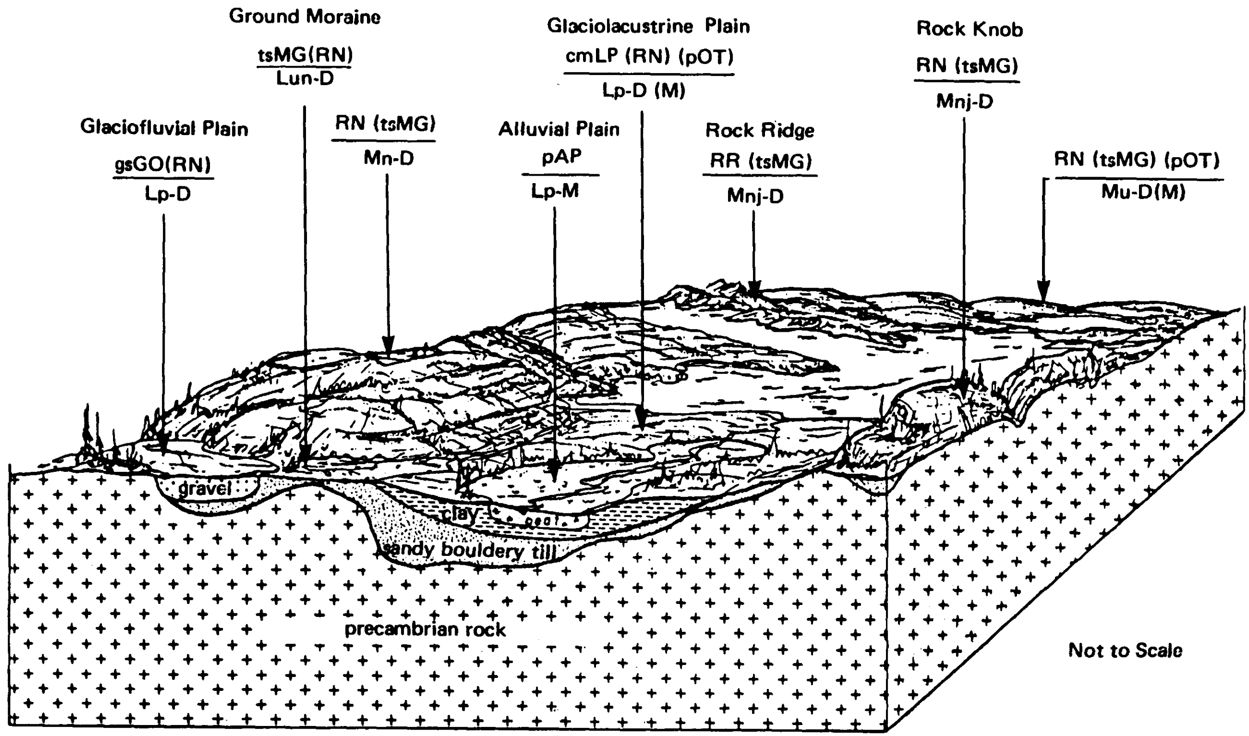

FIGURE 1 – DIAGRAMMATIC SKETCH SHOWING TYPICAL TERRAIN TYPES AND THEIR REPRESENTATIVE LETTER SYMBOLS.

TABLE 1 SUMMARY OF TERRAIN UNIT CHARACTERISTICS AND ENGINEERING SIGNIFICANCES, SAND POINT LAKE AREA.

CLASSIFICATION		ENGINEERING USE				
Terrain Unit and Location	**Material; Relief; Topography; Drainage**	**General Construction**	**Transportation Routes**	**Waste Disposal**	**Groundwater Supply**	**Major Constraints**
BEDROCK TERRAIN (RN), throughout the area	rock; relief varies from 15 to 30 m; rugged; drainage is good	excavations and fill necessary for most construction	blasting and fill necessary; aggregate in small pockets	pollution potential is high	domestic supply from deep wells	rugged terrain; lack of aggrega blasting requir
GROUND MORAINE (MG), close to the Namakan River and as a veneer over parts of the bedrock terrain	sandy till (ts); relief varies from 0 to 30 m; knobby to undulating; is good	excavations and fill are necessary for some types of construction	excavation and fill easier than in bedrock terrain; aggregate in spillways west of Wolseley Lake	fair to good	poor to fair	deposits are th aggregate ofte must be impor possibility of near-surface bedrock
ORGANIC TERRAIN (OT), scattered through the area	peat (p); relief is low; planar; drainage is poor	low-bearing capacity; high compressibility; frost susceptible	unsuitable subgrade except for minor light vehicle roads	pollution potential is high	quantity and quality of water is poor	low strength; h frost susceptibility; poor drainage

Comments: Glaciofluvial outwash sand and gravel (sgGO) occurs locally in small pockets and would provide sufficient material for forest access ro but not major roads. Glaciolacustrine silt and clay (cmLP) occur beneath some organic deposits, but are not extensive. Alluvial plains of silt and peat (mpAP) occur along most streams, but are too small to map at this scale.

The principal engineering significance of bedrock terrain is that it is difficult and expensive to excavate. Due to the rugged topographic character, extreme alignment techniques and extensive cut-and-fill operations are necessary for adequate road construction. Since, in many places, this unit has a limited supply of unconsolidated material and a shortage of aggregate, importation of suitable materials would be necessary and would involve considerable expense. It was noted, however, that thick blankets of ground moraine till do occur in association with some bedrock landforms. Careful exploration for this soil type could substantially decrease engineering difficulties in bedrock terrain. Although local deposits of glaciofluvial sand and gravel can be expected, aggregate is generally scarce.

Groundwater can occur in fractures and along fault zones in the rock, but this terrain unit is considered to have only poor to fair potential for groundwater supply. Rock terrain is unsuitable for surface waste disposal of any kind, except where there is a thick layer (at least 1.5 m) of attenuating soil material.

3.2 MORAINE

Examples: $\frac{\text{tsMG(RN)}}{\text{Ln-D}}$ $\frac{\text{tsMG/RN(RN) (pOT)}}{\text{Mu-D(W)}}$

Ground moraine composed of sandy till (tsMG) occurs around Wright Lake. The surface is knobby (n) or undulating (u) and low in relief (L). The terrain is well drained (D), but is bisected by a major organic unit (pOT). Thin till over an undulating bedrock surface (tsMG/RN) occurs northwest of Wolseley Lake. This unit is of moderate relief (M) and is well drained. All ground moraine includes bedrock knobs (RN) and poorly drained pockets of organic terrain (pOT).

Ground moraine provides the only substantial local source of aggregate, but the quality of the material is poor. This well-drained terrain is suitable for construction and for waste disposal where the till is sufficiently thick. Septic tile field development is generally feasible, but groundwater potential is poor.

3.3 GLACIOFLUVIAL

Example: $\frac{\text{sGO}}{\text{Lp-M}}$

The outwash deposit (GO) located north of Namakan Lake is limited in size, but due to its uniqueness in the Sand Point Lake area, it has been mapped. The unit is planar (p) and low in relief (L), has mixed drainage conditions (M), and is inferred to consist of sand(s). Other small deposits likely occur in the map-area, and gravel may be present along the melt-water channels north of Bearpelt Creek. The unit is important as a source of aggregate, but the deposits appear to be local in extent.

3.4 GLACIOLACUSTRINE

Examples: $\frac{\text{pOT(cmLP) (RN)}}{\text{Lpn-M}}$ $\frac{\text{pOT/cmLP}}{\text{Lp-M}}$

All glaciolacustrine (LP) terrain appears to be overlain by organic material (pOT). Deposits are restricted to poorly drained (M or W) lowland areas. The unit is inferred to consist of silty clay in most places, and bedrock knobs (RN) may be present.

The engineering significance of glaciolacustrine terrain is the same as that of organic terrain in this map-area, since organic deposits overlie it. Thus, the unit is poorly drained, has low strength, and is compressible and frost-susceptible. The unit is not suitable as a groundwater source or for waste disposal.

3.5 ALLUVIAL

Examples: $\frac{\text{pAP}}{\text{Lp-W}}$ $\frac{\text{spAP}}{\text{Lp-W}}$

Alluvial terrain (AP) is present along most drainage courses and is composed of peat (pAP) or peaty sand (spAP). Relief is low (L) and the unit is poorly drained (W).

Alluvial terrain may be subject to flooding. Also, due to the predominance of fine-grained and organic material, it is a very poor foundation material. Some steep slopes along Sand Point Lake and Gullwing Creek may be susceptible to erosion and slumping. Groundwater potential is poor and the unit is unsuitable for waste disposal.

3.6 ORGANIC

Examples: $\frac{\text{pOT}}{\text{Lp-W}}$ $\frac{\text{pOT/cmLP}}{\text{Lp-M}}$

Organic terrain composed of peat (pOT) is found in poorly drained (M or W) depressions. Deposits in the northeastern part of the map-area are inferred to be underlain by glaciolacustrine silty clay (cmLP).

Engineering use of organic terrain is restricted, due to the poor drainage conditions and the low strength, high compressibility, and extremely high frost susceptibility of the soil materials. The unit is a very poor source of groundwater and is unsuitable for waste disposal.

4.0 REFERENCES

Davies, J.C. and Pryslak, A.P.
1967: Kenora-Fort Frances Sheet, Kenora and Rainy River Districts; Ontario Department of Mines, Map 2115, Geological Compilation Series. scale 1:253 440 or 1 inch to 4 miles. Geological compilation 1963-1965.

Gartner, John F., Mollard, J.D., and Roed, M.A.
1980: Ontario Engineering Geology Terrain Study Users Manual; Ontario Geological Survey, Open File Report 5288, 99p.

Prest, V.K.
1970: Quaternary Geology of Canada; p. 675-764 *in* Geology and Economic Minerals of Canada, edited by R.J.W. Douglas, Geological Survey of Canada, Economic Geology Report No. 1, 5th edition, 838 p.

Springer, Janet
1978: Ontario Mineral Potential, International Falls-Roseau Sheet, District of Rainy River; Ontario Geological Survey, Preliminary Map P. 1523, Mineral Deposits Series, scale 1:250 000. Compilation 1977, 1978.

Zoltai, S.C.
1961: Glacial History of Part of Northwestern Ontario; Proceedings of the Geological Association of Canada, Vol. 13, p. 61-83.
1965: Surficial Geology, Kenora-Rainy River; Ontario Department of Lands and Forests, Map S165, scale 1:506 880 or 1 inch to 8 miles. Surficial geology 1958-1960.

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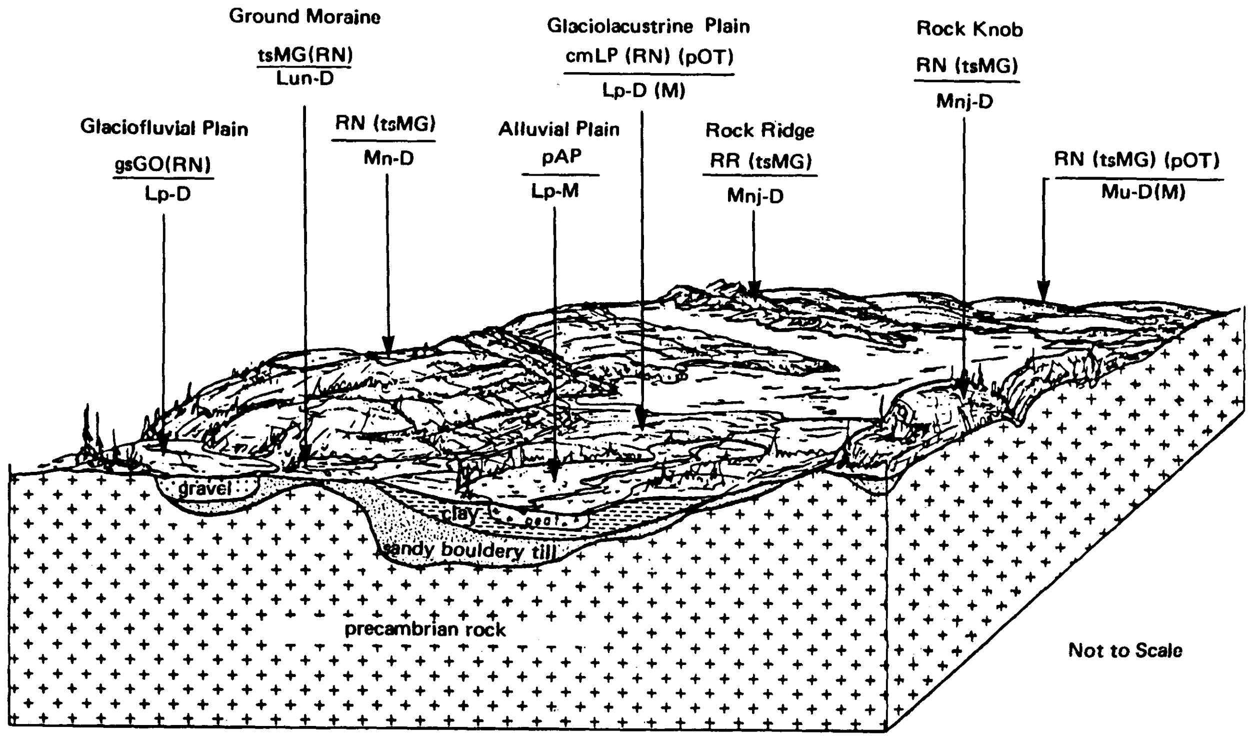

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ORGANIC TERRAIN (OT), scattered through the area	peat (p); relief is low; planar; drainage is poor	low-bearing capacity; high compressibility; frost susceptible	unsuitable subgrade except for minor light vehicle roads	pollution potential is high	quantity and quality of water is poor	low strength; h frost susceptibility; poor drainage

Comments: Glaciofluvial outwash sand and gravel (sgGO) occurs locally in small pockets and would provide sufficient material for forest access roa but not major roads. Glaciolacustrine silt and clay (cmLP) occur beneath some organic deposits, but are not extensive. Alluvial plains of silt and peat (mpAP) occur along most streams, but are too small to map at this scale.

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Groundwater can occur in fractures and along fault zones in the rock, but this terrain unit is considered to have only poor to fair potential for groundwater supply. Rock terrain is unsuitable for surface waste disposal of any kind, except where there is a thick layer (at least 1.5 m) of attenuating soil material.

3.2 MORAINE

Examples: $\frac{\text{tsMG(RN)}}{\text{Ln-D}}$ $\frac{\text{tsMG/RN(RN) (pOT)}}{\text{Mu-D(W)}}$

Ground moraine composed of sandy till (tsMG) occurs around Wright Lake. The surface is knobby (n) or undulating (u) and low in relief (L). The terrain is well drained (D), but is bisected by a major organic unit (pOT). Thin till over an undulating bedrock surface (tsMG/RN) occurs northwest of Wolseley Lake. This unit is of moderate relief (M) and is well drained. All ground moraine includes bedrock knobs (RN) and poorly drained pockets of organic terrain (pOT).

Ground moraine provides the only substantial local source of aggregate, but the quality of the material is poor. This well-drained terrain is suitable for construction and for waste disposal where the till is sufficiently thick. Septic tile field development is generally feasible, but groundwater potential is poor.

3.3 GLACIOFLUVIAL

Example: $\frac{\text{sGO}}{\text{Lp-M}}$

The outwash deposit (GO) located north of Namakan Lake is limited in size, but due to its uniqueness in the Sand Point Lake area, it has been mapped. The unit is planar (p) and low in relief (L), has mixed drainage conditions (M), and is inferred to consist of sand(s). Other small deposits likely occur in the map-area, and gravel may be present along the melt-water channels north of Bearpelt Creek. The unit is important as a source of aggregate, but the deposits appear to be local in extent.

3.4 GLACIOLACUSTRINE

Examples: $\frac{\text{pOT(cmLP) (RN)}}{\text{Lpn-M}}$ $\frac{\text{pOT/cmLP}}{\text{Lp-M}}$

All glaciolacustrine (LP) terrain appears to be overlain by organic material (pOT). Deposits are restricted to poorly drained (M or W) lowland areas. The unit is inferred to consist of silty clay in most places, and bedrock knobs (RN) may be present.

The engineering significance of glaciolacustrine terrain is the same as that of organic terrain in this map-area, since organic deposits overlie it. Thus, the unit is poorly drained, has low strength, and is compressible and frost-susceptible. The unit is not suitable as a groundwater source or for waste disposal.

3.5 ALLUVIAL

Examples: $\frac{\text{pAP}}{\text{Lp-W}}$ $\frac{\text{spAP}}{\text{Lp-W}}$

Alluvial terrain (AP) is present along most drainage courses and is composed of peat (pAP) or peaty sand (spAP). Relief is low (L) and the unit is poorly drained (W).

Alluvial terrain may be subject to flooding. Also, due to the predominance of fine-grained and organic material, it is a very poor foundation material. Some steep slopes along Sand Point Lake and Gullwing Creek may be susceptible to erosion and slumping. Groundwater potential is poor and the unit is unsuitable for waste disposal.

3.6 ORGANIC

Examples: $\frac{\text{pOT}}{\text{Lp-W}}$ $\frac{\text{pOT/cmLP}}{\text{Lp-M}}$

Organic terrain composed of peat (pOT) is found in poorly drained (M or W) depressions. Deposits in the northeastern part of the map-area are inferred to be underlain by glaciolacustrine silty clay (cmLP).

Engineering use of organic terrain is restricted, due to the poor drainage conditions and the low strength, high compressibility, and extremely high frost susceptibility of the soil materials. The unit is a very poor source of groundwater and is unsuitable for waste disposal.

4.0 REFERENCES

Davies, J.C. and Pryslak, A.P.
1967: Kenora-Fort Frances Sheet, Kenora and Rainy River Districts; Ontario Department of Mines, Map 2115, Geological Compilation Series. scale 1:253 440 or 1 inch to 4 miles. Geological compilation 1963-1965.

Gartner, John F., Mollard, J.D., and Roed, M.A.
1980: Ontario Engineering Geology Terrain Study Users Manual; Ontario Geological Survey, Open File Report 5288, 99p.

Prest, V.K.
1970: Quaternary Geology of Canada; p. 675-764 *in* Geology and Economic Minerals of Canada, edited by R.J.W. Douglas, Geological Survey of Canada, Economic Geology Report No. 1, 5th edition, 838 p.

Springer, Janet
1978: Ontario Mineral Potential, International Falls-Roseau Sheet, District of Rainy River; Ontario Geological Survey, Preliminary Map P. 1523, Mineral Deposits Series, scale 1:250 000. Compilation 1977, 1978.

Zoltai, S.C.

1961: Glacial History of Part of Northwestern Ontario; Proceedings of the Geological Association of Canada, Vol. 13, p. 61-83.

1965: Surficial Geology, Kenora-Rainy River; Ontario Department of Lands and Forests, Map S165, scale 1:506 880 or 1 inch to 8 miles. Surficial geology 1958-1960.

LEGEND

LANDFORM

MORAINAL
- **ME** *End moraine*
- **MG** *Ground moraine*
- **MH** *Hummocky moraine*

GLACIOFLUVIAL
- **GD** *Ice contact delta, esker delta, kame delta, delta moraine*
- **GE** *Esker, esker complex, crevasse filling*
- **GK** *Kame, kame field, kame terrace, kame moraine*
- **GO** *Outwash plain, valley train*

GLACIOLACUSTRINE
- **LB** *Raised (abandoned) beach form*
- **LD** *Glaciolacustrine delta*
- **LP** *Glaciolacustrine plain*

ALLUVIAL
- **AP** *Alluvial plain*

COLLUVIAL
- **CS** *Slope failure*
- **CT** *Talus pile*
- **CW** *Slopewash and debris creep sheet; minor talus*

EOLIAN
- **ED** *Sand dunes*

ORGANIC
- **OT** *Organic terrain*

BEDROCK
- **RL** *Bedrock plateau*
- **RN** *Bedrock knob*
- **RP** *Bedrock plain*
- **RR** *Bedrock ridge*
- **/R** *Bedrock below a drift veneer*

MATERIAL
- **b** *boulders, bouldery*
- **c** *clay, clayey*
- **g** *gravel, gravelly*
- **p** *peat, muck*
- **r** *rubble*
- **s** *sand, sandy*
- **m** *silt, silty*
- **t** *till*

TOPOGRAPHY

LOCAL RELIEF
- **H** *Mainly high local relief*
- **M** *Mainly moderate local relief*
- **L** *Mainly low local relief*

VARIETY
- **c** *channelled*
- **d** *dissected, gullied*
- **j** *jagged, rugged, cliffed*
- **j*** *cliffed volcanic rock signature*
- **k** *kettled, pitted*
- **n** *knobby, hummocky*
- **p** *plain*
- **r** *ridged*
- **s** *sloping*
- **t** *terraced*
- **u** *undulating to rolling*
- **w** *washed, reworked*

DRAINAGE

SURFACE CONDITION
- **W** *Wet*
- **D** *Dry*
- **M** *Mixed wet and dry*
- **h** *Suspected high water table*

The letter codes describing the terrain units are made up of four components arranged as follows: —

MATERIAL	LANDFORM
TOPOGRAPHY	DRAINAGE

Examples:

1. dominant landform; material; subordinate landform — **tMG(RN)** / **Mu(Hj)-D** — drainage; relief of subordinate landform; local relief; topographic variety of dominant landform

2. **pOT/sGO** / **Lp-W** — slash indicates a veneer of one landform overlying a second landform

SYMBOLS

- *Significant end moraine or linear moraine-like feature*
- *Well expressed drumlins and drumlinoid ridges*
- *All other linear ice-flow features*
- *Esker ridge (continuous, discontinuous; the symbol does not indicate direction of flow)*
- *Abandoned shoreline (continuous, discontinuous)*
- *Local dune area (type and location of individual dunes not indicated)*
- *Abandoned river channel, spillway, or ice marginal channels*
- *Escarpment*
- ●10 *Sample location*
- *Small landslide scar*
- *Sand or gravel pit*
- *Quarry or mine workings evident from airphotos or field observation (crossed picks are shown in the area of open excavation)*
- *Other man-made features (rock dumps, tailings, lagoons, landfills, etc.: type of feature mentioned where identifiable)*
- *Steep-walled valleys, often bedrock-controlled features*
- *Talus (defined, inferred; base of talus triangle indicates downslope side of escarpment)*
- *Line joining the same terrain units*

NOTE 1:

This map is intended to be an inventory of regional engineering terrain conditions, as determined largely by airphoto interpretation. Its purpose is to provide a guide for engineering and resource planning functions. The boundaries of the terrain units shown on the map are approximate only, consistent with a 1:100 000 scale. Site specific investigations are required in order to obtain detailed information for a particular area. The map user should refer to the accompanying report for a fuller description of terrain in the study area.

NOTE 2:

Colour is used to enhance what is considered to be the dominant engineering condition in simple, complex or layered terrain units.

NOTE 3:

Not all letter and graphic symbols shown in the legend necessarily appear on this map sheet.

Reference to this map is recommended as follows:

Roed M. A.
1980: Northern Ontario Engineering Geology Terrain Study, Data Base Map, Sand Point Lake
Ontario Geological Survey, Map 5071. Scale 1:100 000

Published 1980. Base Map derived from 1 inch to 2 miles Provincial Series, Surveys and Mapping Branch, Ministry of Natural Resources.

Engineering Geology Terrain Evaluation by M. A. Roed, GEO-ANALYSIS LIMITED, OTTAWA, ONT. 1978.

Ontario
Ministry of Natural Resources
Hon. James A. C. Auld, Minister
Dr. J. K. Reynolds, Deputy Minister

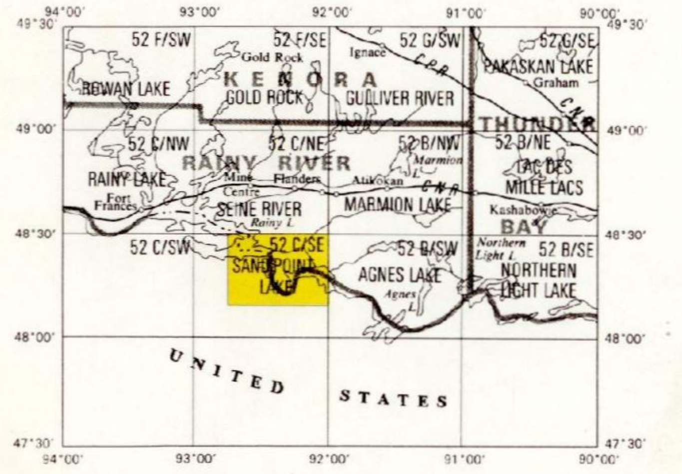
Ontario Geological Survey

Map 5071
SAND POINT LAKE

NTS 52 C/SE

Data Base Map

Northern Ontario Engineering Geology Terrain Study



INDEX TO ADJOINING SHEETS

1:100 000

One centimetre represents one kilometre

THIS PROJECT WAS FUNDED BY THE ONTARIO MINISTRY OF NORTHERN AFFAIRS