GRANULAR RESOURCE INVENTORY
- MACKENZIE -
CAPE DALHOUSIE NTS 107E E½ & W½
(1:125,000)
Produced for Indian and Northern Affairs
by Dept. of Energy, Mines and Resources

GRANULAR RESOURCE INVENTORY-MACKENZIE

CAPE DALHOUSIE NTS 107E - $E\frac{1}{2}$ and $W\frac{1}{2}$

(1:125,000)

D.E. Lawrence

F.G. Shnay

D.F. VanDine

for:- Department of Indian and Northern Affairs

TABLE OF CONTENTS

SUMMARY

The Cape Dalhousie map area has a number of good sources of granular material. These are found along the eastern coastline at Liverpool Bay and are glaciofluvial and marine in origin. The western portion of the map area also has some granular material but these deposits consist primarily of sand - specifically glaciofluvial sand overlain by eolian sand. Thermokarst lakes and muskeg make access to much of the area very difficult. The water table is high in most of the sands, hence ground ice and permafrost are a problem. The bedrock consists of Late Cretaceous shale, which is ice-free and rippable and therefore could be used for construction purposes.

INTRODUCTION

This report attempts to assess the quantity of granular material available for construction. Only unconsolidated sources have been considered because bedrock is not exposed within the Cape Dalhousie map area. Glaciofluvial and fluvial materials are usually considered first rate sources of sand and gravel. Lacustrine and marine deposits are of variable quality whereas eolian material is of limited use because of its fine texture. Generally, moraines have only been considered where they are known to be hummocky and to contain some coarse granular material. Terminal moraines are usually considered to be sources of granular material whereas ground moraines are not.

The information which appears in this report and on the accompanying map has been compiled largely from published and unpublished manuscripts and personal communication with officers of the Geological Survey of Canada. Supplementary data, mainly on depths, thicknesses and, in some cases, on texture of deposits have been obtained from confidential reports of other government departments and industry. (See appendix for details on information sources).

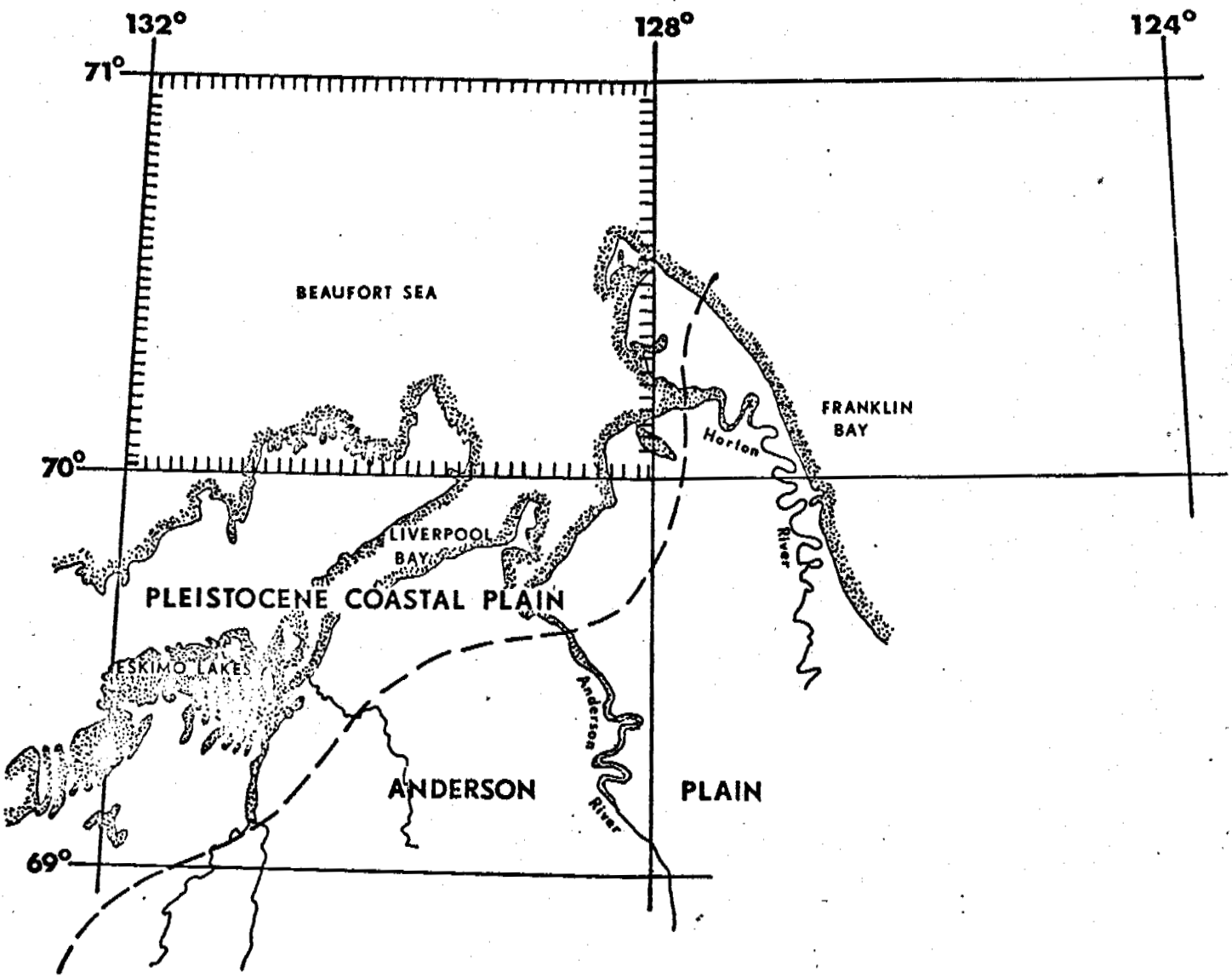
The basic document used in this compilation is a surficial geology map at a scale of 1:125,000 (Rampton, 1972). It is indexed as GSC Open File number 96 and may be viewed at Geological Survey of Canada offices in Ottawa, Calgary and Vancouver; ozalid copies may be obtained at nominal cost. All areal data are derived from this source; all major and most minor unconsolidated deposits of granular material are represented at this scale.

A derived map for granular material has been produced from the basic surficial geology map in close association with the field geologist. His field observations provide additional data on thickness, texture, ice content, drainage, and the variability of the map units.

To supplement thickness and textural data, additional information was gathered from seismic shot hole records and samples, and from other drill hole logs.

Areal extent of deposits were estimated by planimetric means. Average thickness for each deposit was estimated from the data mentioned above and adjusted according to several other variables such as drainage, height above water table, and amount of ground ice. From this, a volume of granular material was estimated. All estimated volumes of material appear in a tabular summary at the end of the paper.

For purposes of description, areas of granular material are outlined on the surficial geology map and are numbered to correspond to a tabular summary of materials. Areas which appear to have little material with respect to anticipated demand or areas which require more detailed work are discussed in the report.



CAPE DALHOUSIE

PHYSIOGRAPHIC REGIONS

0 Km 80
0 Mi 50

after RAMPTON 1971

GENERAL GEOLOGY AND PHYSIOGRAPHY

The Cape Dalhousie map area is situated entirely within the Pleistocene Coastal Plain physiographic region (Fyles and Rampton, 1971) (Fig. 1). Unconsolidated material covers all of the map area except for the southeast corner where bedrock is near the surface. It is believed that the map region was not covered by ice during either of the two periods of glaciation.

Thick deposits of deltaic marine sands underlie all other surficial deposits. These are overlain by the glaciofluvial outwash of fine and medium sand. Since glaciation, these sand deposits have been modified by wind and water. Recent sandy marine deposits are continually being formed and reworked by current and wave action. Thermokarst activity has also been modifying the surficial material since deposition.

Unconsolidated Deposits

Glaciofluvial Deposits, sand and gravel s,g F_t^G

Glaciofluvial deposits occur in two forms in this map area: glaciofluvial sand and gravel terraces (s,g F_t^G) in the eastern portion of the map (which continue into and make up much of the Malloch Hill Map area, 97F) and a sandy glaciofluvial outwash plain covered by a thin, fine sand, eolian veneer which covers the southern portion of the map. The latter generally has a slightly ridged topography dotted with numerous thermokarst lakes.

Gravel is abundant in the glaciofluvial terrace deposit which is about 40 feet thick, approximately 80% is available as a granular construction material. The sandy glaciofluvial plain is covered by very fine eolian sand. The average thickness of both layers is 20 feet but only 30% is available as a construction material because of ground ice and accessibility.

Marine Deposits, sand and gravel s,g∇^A

Marine deposits occur in two forms: along the coast they form spits, bay-mouth bars and off-shore islands; inland from Nuvorak Point and Cape

Dalhousie they form a thin beach veneer over lacustrine deposits. Both types of deposits average 8 feet in thickness and are continually being modified by wave and current action. Approximately 70% of the marine gravel deposit, which is found in the eastern portion of the map area is available as a granular resource while only 20% of the sandy deposits are available.

Eolian Deposits sEv

The eolian veneer deposits consist of sand which has been reworked by wind action. This fine grained sand occurs in ridged deposits to 20' thick, approximately 30% of this is available as a granular construction material.

Lacustrine Deposits, sand sL

Surrounding most of the thermokarst lakes in the sandy glaciofluvial deposits is a sandy lacustrine deposit. In practically all cases, the water table is within inches of the surface. These deposits are therefore not being considered as potential construction material.

BEDROCK

The only bedrock is exposed in the southeastern corner of the map area. Late Cretaceous flat-lying shale is overlain by a thin veneer of clayey colluvium. The shale is mostly non-coherent and could be easily ripped.

MATERIALS

There are large areas of glaciofluvial material in the map area but only the terrace deposits in the east have potential as construction material. These deposits are 20 to 40 feet thick and although they appear small on this map they continue into the Malloch Hill map area, 97F, where they are exposed extensively.

The recent marine deposits are composed of sand and gravel with medium and fine sand being the most abundant. Poor accessibility because of geographical position and low elevation (in most places maximum 8 feet above sea level) limit the resource potential of these deposits.

Bedrock, consisting of flat lying Cretaceous shale, is ice-free and rippable. It may, therefore, be a good material for construction.

TABULAR SUMMARY

Description and Material	Area (sq. mi.)	Estimated Average Thickness (ft.)	Estimated Volume of Granular Material ($yds^3 \times 10^6$) total	available
Area I BAILLIE ISLANDS				
a) $\underline{gs^{MA}r}$ marine actively forming ridges and beaches; gravel and sand.	.20	5	1.01	.50
Area II NED LAKE NORTH				
a) $\underline{sEv}$ eolian veneer; sand.	.71	20	18.65	5.57
Area III NED LAKE SOUTH				
a) $\underline{sF^{G}t}$ glaciofluvial terrace; sand.	7.69	20	160.04	48.01
Area IV MAITLAND POINT				
a) $\underline{g^{MA}r}$ marine actively forming ridges and beaches; gravel.	.35	5	1.83	1.28
b) $\underline{gF^{G}t}$ glaciofluvial terrace; gravel.	.39	40	16.26	13.00
c) $\underline{sF^{G}p}$ glaciofluvial plain; sand.	1.37	20	28.44	8.53
Area V CAPE DALHOUSIE				
a) $\underline{s^{MA}r}$ marine actively forming ridges and beaches; sand.	.36	5	2.86	.62

SOURCES OF INFORMATION

Mackay, J.R.
1963: The Mackenzie Delta Area, N.W.T.; Can. Dept. Mines Tech. Survey Geog. Br., Mem. 8.

Rampton, V.N.
1971a: Manuscript Surficial Geology Map of Cape Dalhousie, Geol. Surv. Can., Open File 96.

1971b: Surficial deposits of portion of Mackenzie Delta, Stanton, Cape Dalhousie and Malloch Hill map sheets, Geol. Surv. Can. (in preparation).

1971c: An outline of the Quaternary Geology of the Lower Mackenzie Region: Pleistocene geology and geomorphology, Mackenzie and Keewatin districts, N.W.T., Edited by J.G. Fyles et al., 24th Inter. Geol. Cong., Guidebook A30.

Prest, V.K., Grant, D.R., and Rampton, V.N.
1967: Glacial Map of Canada; Geol. Surv. Can., map 1253A.

APPENDIX I, Part I

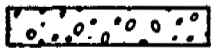
Unconsolidated Granular Materials

Each map sheet has a surficial geology legend (see appendix I, part 4). This legend, differentiated by means of patterns only indicates granular material, classified by genetic characteristics. In some cases only part of a map unit has been patterned, indicating that only that portion is considered a suitable source for granular material.

Legend

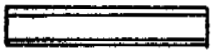
GLACIOFLUVIAL


coarse grained granular material, cobbles, pebbles, gravel, may be mixed with some coarse sand.

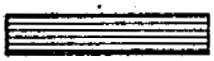

mixed or interbedded sand and gravel


predominantly sand or sand with undesireable fines

GLACIOLACUSTRINE


gravel lacustrine

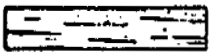

sand and gravel


sand

FLUVIAL


fluvial (only sand and gravel deposits are coloured)

MORAINAL


morainal deposit

MARINE


coarse grained granular material, cobbles, pebbles, gravel, may be mixed with coarse sand


mixed or interbedded sand and gravel


predominantly sand or sand with undesireable fines

EOLIAN

usually fine and medium sandy material only

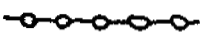
COLLUVIUM

only the pattenned area is coarse grained

Symbols

>>>>>>>>> eskers

* * * * gravel mounds

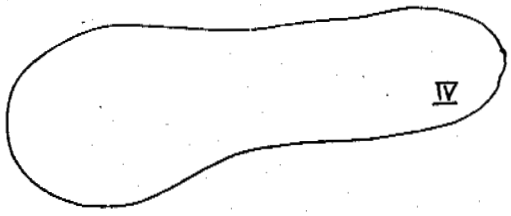


morainal ridge found within moraine

APPENDIX I, Part II

Granular Resource Units

I Granular Resource areas (black)



granular resource area

(see text corresponding description)

APPENDIX I, Part IV

SURFICIAL GEOLOGY AND LANDFORMS

Malloch Hill (97F), Mackenzie Delta (107C), Stanton (107D), and Cape Dalhousie (107E) map-areas

V.N. Rampton

Landform unit notation

Genetic category (ies) → F^{G} ← Genetic modifier

Textural modifier(s) → ^{s}pK ← Morphologic modifier(s)

$\frac{M}{F}$ Stratigraphic relationship (M overlies F): used when upper unit is thin and irregular and underlying unit is known.

Genetic Categories

C - colluvial
E - eolian
F - fluvial
L - lacustrine
M - morainal
  - marine
O - organic (see symbol for organic)
R - bedrock
U - undifferentiated or unknown, commonly M or L

Genetic Modifiers[1]

G - glacial
A - responsible genetic process still actively affecting area

Textural Modifiers

c - clay, clayey
ǂ - silt or interbedded clay
  - silt and fine sand
s - sand, sandy
g - gravel, gravelly
sh - shale

Morphologic Modifiers

e - eroded, gullied
f - fan
h - hummocky
m - rolling
p - plain
r - ridged, beach
t - terrace
v - veneer[2]
G - glaciated[3]
K - thermokarst[5]

---

[1] Mainly used to separate glaciofluvial deposits (F^{G}) from nonglacial fluvial deposits (F); to separate late Pleistocene glaciolacustrine deposits (L^{G}) from lacustrine deposits of thermokarst origin (L); to indicate areas where the responsible genetic process is still active (A).

[2] Veneer indicates known thickness of category is less than 15 feet, commonly only 3 feet or less. Surface is flat or gently rolling.

[3]Glaciated indicates that map-unit has been topographically modified by glaciation even though till is not always easily identified on surface of map-unit.

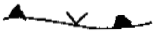
Thermokarst indicates that a hummocky topography has developed as a result of subsidence and erosion where frozen sediments or ground ice have melted.

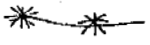
Symbols

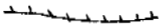

- beach ridge or spit (sand or gravel)

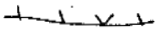

- former beach ridge or spit (sand or gravel; gravel)


- sea cliff or escarpment, >25 ft., constantly or periodically undercut (indicates escarpment partly cut in bedrock)


- former sea cliff (partly cut in bedrock)


- abandoned glaciolacustrine shoreline, marked by cliff beaches, etc.


- stream-cut escarpment, constantly or periodically undercut (indicates escarpment partly cut in bedrock)


- former stream-cut escarpment (indicates escarpment partly cut in bedrock)


- standing water covering >30 percent of area


- organic deposit, 5 to 15 ft. thick


- active, or recently active, blow-out


- ground observation point


- area of aerial observation

- boundaries (defined, approximate, assumed)