GRANULAR AGGREGATE RESOURCES, ANDOVER (N.T.S. 21J/12) AND FLORENCEVILLE (N.T.S. 21J/5)

BY

A.J. COOPER

GARTNER LEE ASSOCIATES LIMITED

FOR

MINERAL DEVELOPMENT BRANCH

OPEN FILE REPORT 81-2

MARCH, 1981

NATURAL RESOURCES
NEW BRUNSWICK
RESSOURCES NATURELLES
NOUVEAU-BRUNSWICK

Government of Canada Regional Economic Expansion

Gouvernement du Canada Expansion Économique Régionale

GRANULAR AGGREGATE RESOURCES, ANDOVER (N.T.S. 21J/12) AND FLORENCEVILLE (N.T.S. 21J/5)

By

A. J. Cooper

GARTNER LEE ASSOCIATES LIMITED

This is a Federal-Provincial development project, funded under the Minerals and Fuels Subsidiary Agreement of the Canada-New Brunswick General Development Agreement by the Government of New Brunswick and the Department of Regional Economic Expansion of Canada.

MARCH, 1981.

MINERAL DEVELOPMENT BRANCH
OPEN FILE REPORT 81-2

TABLE OF CONTENTS

LIST OF PHOTOS

ABSTRACT

The granular aggregate resources of the Florenceville (21J/5) and Andover (21J/12) N.T.S. map areas were examined. All pits in the area were field checked and selected testing was performed. Existing data was researched and has been included in data summaries.

The physiography of the area is that of rounded bedrock hills with deeply incised stream valleys. Surficial materials are generally thin. A veneer of till is common throughout the entire map area. Numerous and occasionally thick terraced outwash deposits occur along the Saint John River valley and some of its tributary streams. Ice-contact stratified drift is found in several forms: as a long esker on the western side of the map area, as scattered kame-like features, and as masses of sediment within the Saint John River valley. Local small deposits of ablation materials and alluvium were also noted.

Approximately 34 million m^3 of aggregates were identified. Most is located in the Saint John River valley outwash terraces. The Listerville - Waterville esker is also an important source. Other smaller deposits are of local importance.

High contents of fine material and large proportions of unsound lithotypes render many of the deposits in the area unsuitable for producing high quality aggregate products.

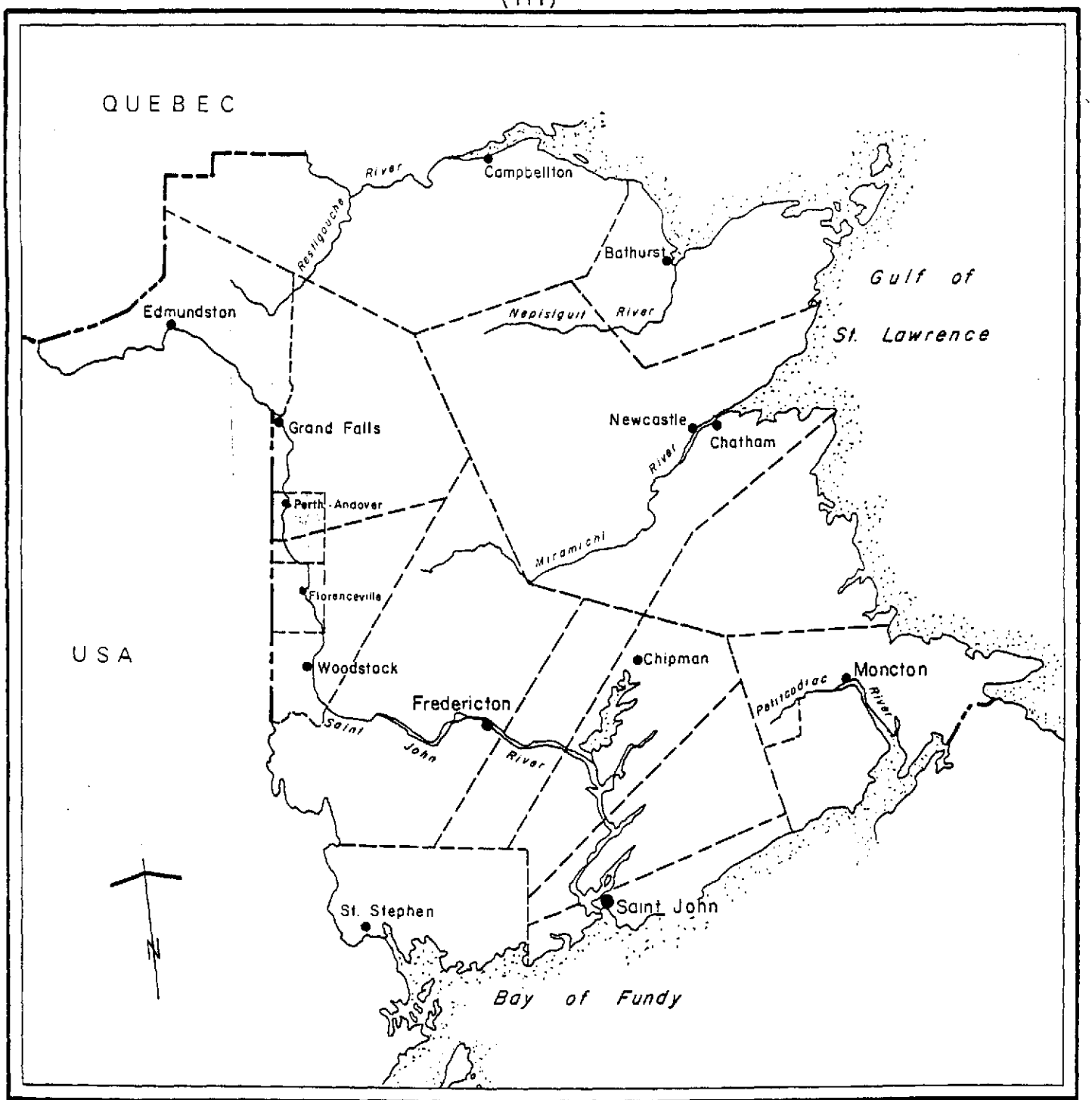
RESUME

Il a été procédé a l'étude des dépôts d'agrégats granulaires dans les régions délimitées par les cartes N.T.S. de Florenceville (21J/5) et d'Andover (21J/12). Toutes les carrières de la région ont été inspectées sur place et certaines expériences ont été effectuées. Les informations dont on pouvait disposer au préalable ont été incluses dans l'ensemble des données.

La géomorphologie de la région se distingue par des collines en roches de fond arrondies et des vallées fluviales profondément encaissées. Les matériaux de surface sont en couches généralement minces. On retrouve fréquemment dans toute la région un revêtement en til. Des dépots d'épandage importants, parfois en terrasses épaisses, sont accumulés en bordure de la rivière Saint-Jean et de quelques-uns de ses affluents. Les contacts glaciaires existent sous diverses formes: en long esker à l'ouest de la région étudiée, en amas dispersés du type kames, et en masses de sédiments dans la vallée de la rivière Saint-Jean. Des dépôts localisés peu importants de matériaux d'ablation et d'alluvion ont également été observés.

Environ 34 millions de mètres cubes d'agrégats ont été identifiés dans la région, la majeure partie se situant sur les terrasses d'épandage de la rivière Saint-Jean. L'esker de Listerville-Waterville en renferme également une quantité importante. D'autres dépôts plus petits sont concentrés par endroits.

La haute teneur des matériaux purs et la large proportion de roches de fond de mauvaise qualité, que l'on a remarquées dans une grande partie des dépôts de la région, ne permettent pas de les utiliser à la production d'agrégats de haute qualité.



Map Showing Location Of Study Area

Scale 1 cm = 22 km (approx.)

0 22 44 66 88
kilometres

1.0 INTRODUCTION:

1.1 LOCATION OF THE STUDY AREA:

The study area consists of the Canadian portions of the Andover (21J/12) and Florenceville (21J/5) 1:50,000 National Topographic Sheets located in west-central New Brunswick along the international boundary. The area covers approximately 1,200 km^2, most of which is accessible by a network of Provincial highways and county and parish roads.

Mixed farming and lumbering are the main economic activities in the area. A substantial proportion of the farmland in the area is used to grow potatoes to supply the McCain Foods Limited factory at Florenceville.

1.2 PREVIOUS WORK:

Early references to the surficial geology of the area were made by Chalmers (1884, 1899). In his 1884 work Chalmers noted many of the major outwash terraces along the Saint John River valley and discussed their formation and the general history of the area. Kiewiet de Jonge (1951) covered much the same area as Chalmers. He added more detailed observations and outlined a more complex deglaciation history. Lee (1962) conducted the first detailed areal mapping of the map area. Hamilton (1973) compiled a map showing the granular aggregate resources in New Brunswick and later (Hamilton and Carroll 1975) described the major aggregate producers in the Province. Rampton (in preparation) is presently preparing a revised Quaternary geology map for the area.

The bedrock geology of the area has been assessed by Caley (1936) and Pavlides (1963). Lee (1962) also included a bedrock geology map. Carroll (1974) has compiled new bedrock geology maps for the map area. Potter et al. (1979) have compiled a provincial bedrock geology map.

1.3 PRESENT STUDY:

Gartner Lee Associates Limited was commissioned by the Mineral Resources Branch of the Department of Natural Resources to carry out a Granular Aggregate Resources Inventory

of the Florenceville and Andover map areas as part of a province - wide survey program.

The aim of the survey is to provide basic information on the distribution, extent, thickness and quality of granular aggregate resources in the map area. Previously published data were consulted and unpublished data were obtained from the New Brunswick Electric Power Commission, the Mineral Resources Branch and the New Brunswick Departments of Transport and Environment. Field work involved the examination of natural and man-made exposures, supplemented by the interpretation of stereoscopic aerial photographs. Reserve estimates are based on field observations. A more detailed explanation of the map and pit descriptions occurs later in this report.

1.4 Physiography and Drainage:

The map area forms part of a broad area of eroded gently to moderately rolling bedrock peneplain with incised stream channels. With the exception of the Saint John River valley and its tributaries (discussed below), the area may be separated into two broad physiographic regions.

The region north of the Victoria-Carleton County boundary and along the eastern edge of the map area has rugged topography. Relief is up to 300 m and the hills are rolling and steep sided with narrow intervening gullies. Because of these rugged conditions the land is seldom cleared for farming and extensive forest cover stands out on the topographic map.

The remainder of the study area, south of the county boundary is topographically more subdued. The land is gently to moderately rolling with few large hills. Relief ranges from 30 to 150 m and a much larger proportion of this area has been cleared for use as farmland.

A major bedrock valley - the Saint John River valley - runs from north to south through the centre of the map area. The valley ranges from 45 to 90 m in depth and carries the drainage for the entire area, as well as much of the area to the north. Numerous tributary streams such as the Muniac Stream, Monquart Stream, Shikatehawk Stream, River de Chute and Presque Isle Streams conduct surface drainage laterally into the Saint John River. Each of these tributary streams occupies a small bedrock valley.

Physiographic features not associated with general bedrock control are small and relatively minor - glaciofluvial terrace features are common along the banks of the Saint John River valley and a small but well defined esker can be traced intermittently from Listerville to Waterville on the western side of the map area.

1.5 Acknowledgements:

The author wishes to thank several individuals who assisted during the study. Mr. Don Barnett and M. Jacques Thibault of the Mineral Resources Branch provided valuable discussions and advice on certain geological aspects of the study. Mr. Ron Brinsmead, formerly of the Mineral Resources Branch, conducted some preliminary investigations in the area and discussed several aspects of the project with the author. Ms. Janet Haynes assisted in the research and petrographic analysis phases of the study. John F. Gartner reviewed the technical work and edited the report.

2.0 GEOLOGY:

2.1 BEDROCK:

The bedrock of the area has been mapped by Caley (1936) and Carroll (1974). These authors indicate that all the bedrock in the map area is sedimentary in origin and ranges from Ordovician to Devonian in age. The rocks have been folded and subjected to mild metamorphism. Potter et al. (1979) indicate the presence of two small granitic bodies east of Kilburn and two small areas of extrusive and related rocks southeast of Florenceville.

Detailed mapping has not been carried out in the map area but descriptions by Caley (1936) and observations during the present survey indicate that light to dark grey calcareous slate, sandstone and siltstone is very common in areas of higher relief in Victoria County and along the eastern boundary of the map area. Quartz and calcite stringers are occasionally abundant in these rocks. The areas of lower relief commonly exhibit a lower outcrop frequency with a greater proportion of relatively soft brown shales. Grey slate to phyllite with some limestone, sandstone and siltstone is abundant in some areas, particularly along the Saint John River and along the southern edge of the map area. The presence of non-sedimentary rocks noted by Potter et al.(1979) is supported by the high relief of Moose, Porcupine, Carrs and Oakland Mountains.

2.2 SURFICIAL:

The surficial geology of the Florenceville - Andover area is relatively uncomplicated and has therefore not attracted a great deal of attention in the literature.

Till is the most common surficial material found in the area. "Till occurs everywhere within the region, always underlying the other surface deposits and sometimes forming hills or short ridges on the elevated grounds, as well as along the upper part of the slopes of the river valleys where it has escaped denudation." (Chalmers 1884, p.11). The present survey established that the till does not underlie all surface deposits but it was found beneath some outwash deposits within the Saint John River valley. (International Saint John River Engineering Board, 1953). Distinct basal and ablation till units were observed and

both tend to be thin but rather general in distribution. Ablation till was observed overlying basal till but no multiple till sections were observed.

Ice-contact features such as kames and eskers are common in the area but are usually small in extent. In several places till was noted as a major constituent of the landform and in one pit (Location 79) a till cap was observed overlying esker sediments. The occurrence of ice-contact materials and proximal facies outwash along the Saint John River valley indicates that the valley acted as a major proglacial drainage channel and probably drained meltwaters directly from the ice front.

The most striking surficial sediment type in the area is the outwash system associated with the Saint John River valley. The multiple terraces ranging from over 100 m above the river to just above river level indicate a long and complex pro- and post-glacial drainage history. Kiewiet de Jonge (1951) has addressed this system of terraces as part of a study covering the entire Saint John River valley. He has recorded a terrace level at "357 feet" a.s.l. (109 m) at Upper Kent which he feels represents the "Upper Marine Limit" in this portion of the valley. Rare occurrences of the "valley clays and eskers" he has noted were observed in the present work.

Most of the glacial chronology for the area must be inferred from other areas. Lee (1962) has made the most recent summary of data. Glaciation took place after a prolonged period of weathering. There are no data to confirm more than one glacial event (assumed to be Wisconsin in age) in the region. Lee (1962) notes multiple till sections along the river in the region but none were found in the present study area. The ice advanced in a south - south-easterly direction according to data from striae and till fabrics recorded by Lee. The absence of morainal features and the generally meagre amounts of till would suggest that glacial retreat was rapid and uninterrupted.

"Deglaciation probably took place between 12,000 and 13,000 years ago as indicated by radiocarbon dates and pollen chronology at Saint John ..." (Lee 1962). Relatively minor alluvial sedimentation has taken place since deglaciation.

3.0 GRANULAR AGGREGATE RESOURCES:

3.1 SOURCES OF AGGREGATE:

Four types of geological materials are potential sources of aggregate within the map area. Most of the aggregate in the area is in glaciofluvial outwash deposits. A smaller amount of material is present in ice-contact sediments. Very minor amounts of ablation materials and alluvium are available for extraction.

3.1.1 GLACIOFLUVIAL OUTWASH:

Glaciofluvial outwash is common in the Saint John River valley and its tributaries. There are numerous outwash terraces - ranging from a few metres to 100 m above the present river level.

The highest levels of outwash are often very thin deposits that have been badly dissected and eroded so that little remains. These materials rarely exceed two metres in thickness. Where they do, the materials tend to be sandy and heavily weathered. The boundaries shown on the accompanying maps include only those outwash deposits that appear to have potential as granular aggregate resources (e.g. Locations 11, 43). The original extent of outwash materials was probably broader. Recent geological mapping in the area (Rampton, in preparation) confirms substantial areas of thin outwash and bedrock along the edge of the Saint John River valley and along several drainage channels in the area.

Medium level terraces, ranging from 20 to 60 m above present river level are common - many have been excavated for aggregate (Photo 1). The materials in these terraces are often moderately sandy gravel and bedding was observed to dip to the south in several pits. All the medium level terraces encountered in the present study are considered to have potential for usage as aggregate. In many cases substantial thicknesses are present (Location 15 - 12 m, Location 51 - 16 m) and in several areas large acreages are available for extraction (Location 27 - 15 ha, Location 49 - 70 ha). The deposits are occasionally variable (Location 64) and some contain quantities of ice-contact materials and ablation till (Location 16, Photo 2), but the majority of pits examined contained moderate to good quality aggregate. The presence of bedrock in this type of pit is particularly problematic - the bedrock surface is highly irregular and very difficult to predict. Accurate quantity estimates are

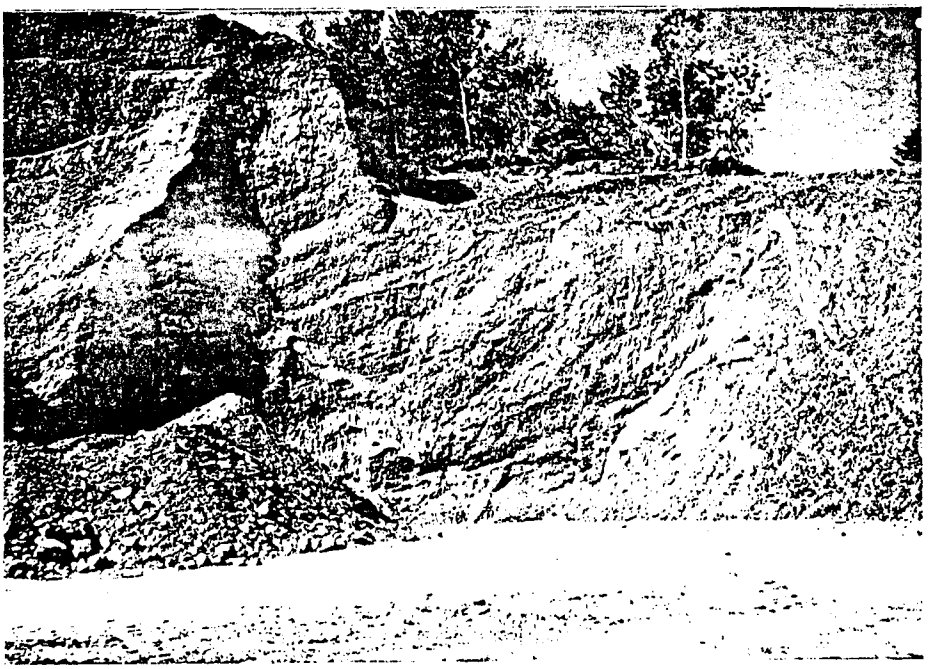


PHOTO 1

A thick sequence of deltaic outwash gravel at Location 51. The pit face is 16 m in height.

PHOTO 2

Two metres of outwash gravel overlying poorly sorted ice-contact stratified drift at Location 44.

not possible without extensive testing data.

Lower level terraces tend to be much broader in extent but the materials present are thinner. In some places up to two metres of silty fine sand is present as a surface (overburden) deposit. One particularly thick deposit of this surface material was tested (Location 12). It is recognized that these deposits may be post-glacial in age but the designation as outwash has been retained in this report because 1) the materials are identical to local outwash materials and 2) uniformity has been maintained with adjoining map sheets to the north (Thibault 1979) and to the south (Finamore 1979a, b). Some of these lower terraces associated with deltas have been used as sources of aggregate and have yielded some high-quality products (Locations 5 and 23, Photo 3). Unfortunately many of these lower terraces are favourable sites for buildings and route alignments and large quantities of these materials are no longer available.

Smaller outwash deposits are present along several of the smaller stream valleys in the area. The Big Presque Isle Stream has several terraced outwash deposits along its valley that have been used as aggregate sources. A substantial area of outwash exists north of the valley at Tracey Mills (Locations 54 and 55). Two levels of outwash are present here in an abandoned outwash channel which apparently drained into the Big Presque Isle Stream. Another similar but much less well developed channel deposit flanks the present Meduxnekeag River in the southwest corner of the map area (Location 85). A new pit has been opened in an outwash deposit along Monquart Stream (Location 22, Photo 4).

Outwash deltas have formed where several of the larger tributaries join the Saint John River. Field observations at Locations 27 and 23 indicate good potential for aggregate of high quality. Similar observations were made at several other confluences and these areas must rate highly as potential exploration targets.

In general, outwash deposits are good sources of aggregate in the Florenceville - Andover area. The materials tend to be moderately to well sorted, horizontally bedded and texturally consistent. Landforms are flat, well drained and present few extraction problems. The proportion of fines often limits the use of materials to borrow, subbase and base course unless beneficiation is contemplated. Quantity estimates must account for the erratic occurrence of bedrock.

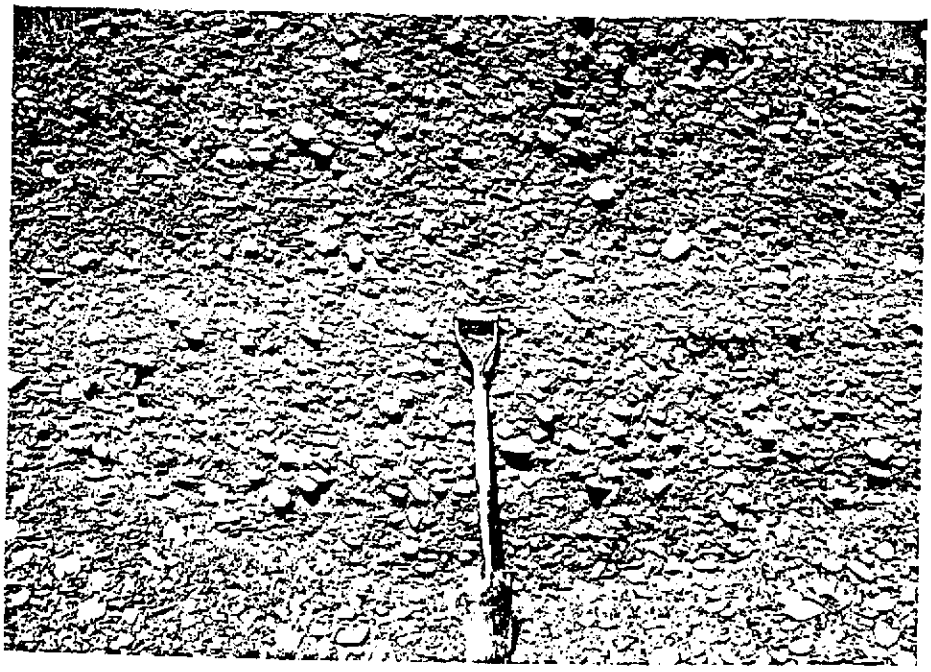


PHOTO 3

Close up of gravel face in the lower outwash terrace at Location 5.

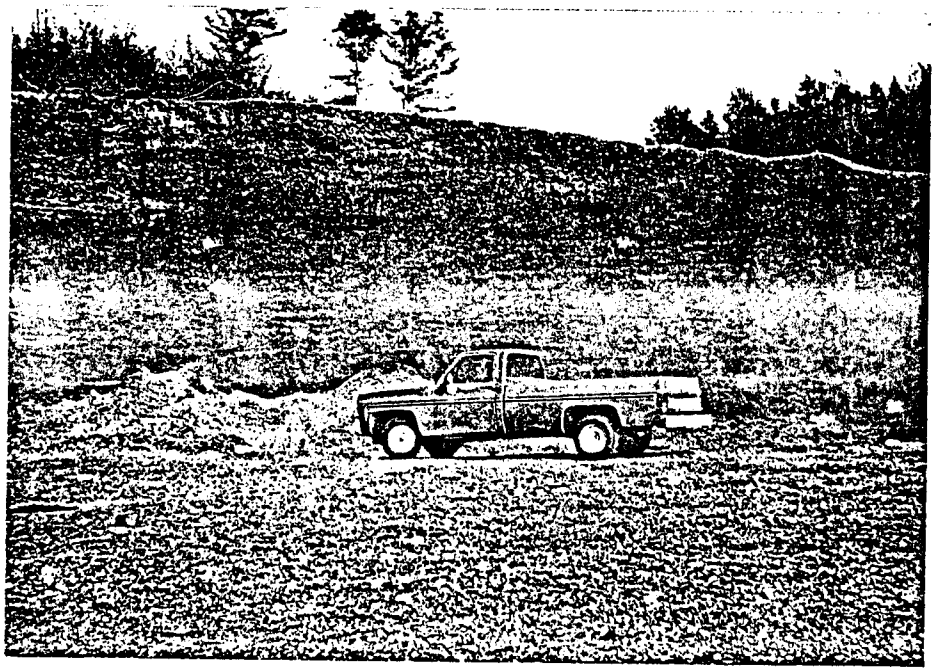


PHOTO 4

Well laminated sandy gravel outwash deposit at Location 22. The pit face is 8 m in height.

3.1.2 ICE-CONTACT STRATIFIED DRIFT:

Although ice-contact stratified drift deposits in the Andover-Florenceville area suffer from quality problems, they may be important locally when they are located at some distance from better quality materials. They are often used for local construction projects. Three general categories of ice-contact stratified drift were recognized in the map area:

1. the esker system stretching from Listerville to Waterville on the west side of the map area;

2. the kame-like landforms scattered throughout the area but concentrated near Holmesville, and

3. the ice-contact materials occurring with outwash in the Saint John River valley.

The esker system present on the west side of the map area consists of a discontinuous series of straight to sinuous ridges composed of medium to coarse sandy gravel, sand, and till (Photo 5). The segments are seldom wider than 100 m or longer than 2 km in length. The system has a general north-south trend - parallel to the Saint John River. Sediments observed in the esker are variable but all facies observed have been used as aggregate sources. Very coarse, very poorly sorted gravel and/or ablation till is dominant at Locations 30 and 75. Sand is present at Locations 80 and 81. Large quantities of sandy gravel are present at Locations 32 and 35. Bedrock was noted in the floors of many of the pits and reserves are restricted to the central ridge of the esker - the flanks are limited in extent, thin and markedly sandy in composition.

Numerous kames and kame-like deposits were noted in the present survey. These deposits often lack a distinct geomorphic form and are therefore difficult to distinguish from bedrock landforms - especially when forested. It is possible that detailed local explorations may reveal more of these features, particularly in wooded areas. Field observations indicate that the larger these features are, the more likely they are to contain good quality aggregate. The larger features (Locations 1 and 2, 13, 17, and 46) have all produced sizeable amounts of aggregate. Several smaller deposits (Locations 18, 19, 20, 21, 45 and others, Photo 6) have produced some material but exposures indicate

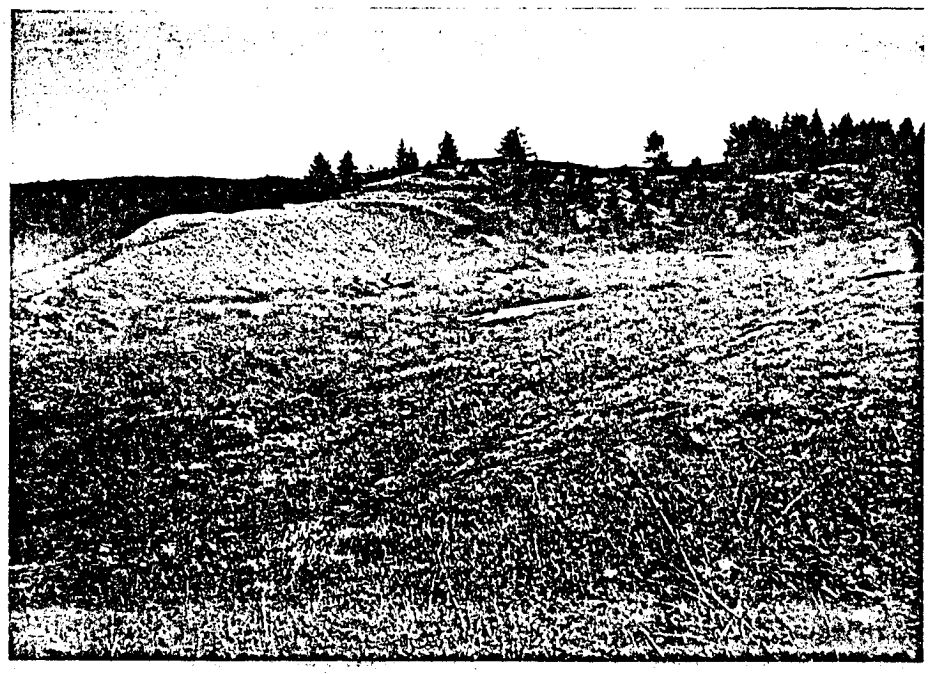


PHOTO 5

The Listerville - Waterville esker at Location 32. The esker ridge has 7 to 10 m relief.

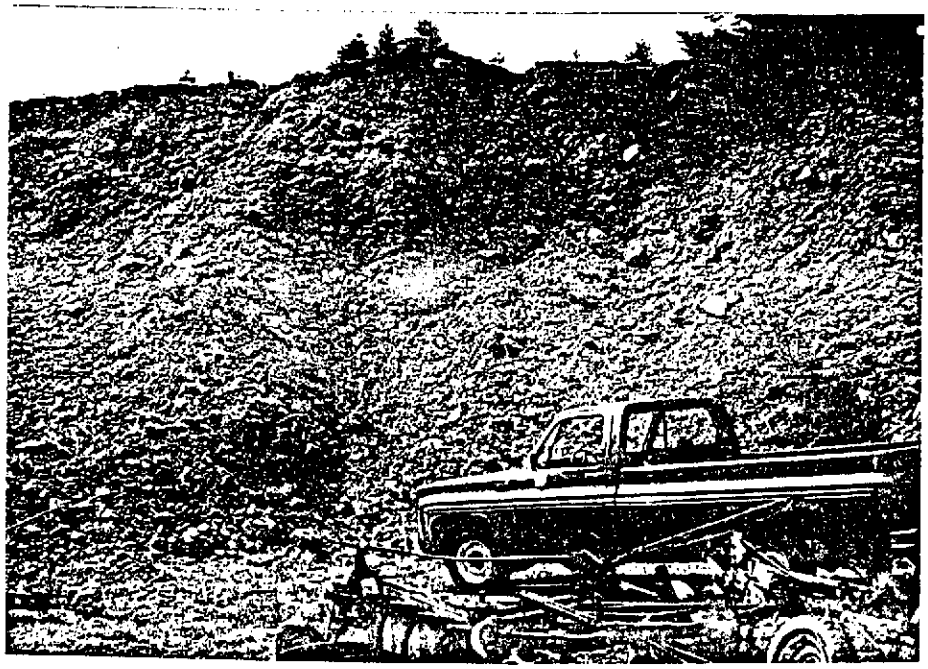


PHOTO 6

Coarse esker sediments at Location 20.
Pit face is 12 m in height.

that large proportions of fines, oversized boulders and extreme variability pose major problems.

Ice-contact stratified drift was encountered at several locations along the Saint John River valley. These deposits exhibited a combination of the following features:

- abrupt grain size variations
- extreme grain size combinations
- frozen sediment deposition
- till layers or lenses
- kame-like geomorphology
- deformation structures

At several sites a veneer of outwash was encountered on top of the ice-contact sediments (e.g. Locations 3, 16). At several other sites discrete kame features were observed protruding through an apron of outwash materials (Locations 3 and 4, 7, 8, and 23). All the ice-contact sediments observed in the Saint John River valley occurred in the northern portion of the map area, in Victoria County.

3.1.3 ABLATION MATERIALS:

Ablation materials are found throughout the map area and range in composition from a loose stony sandy till to laminated sandy fine gravel. These materials are typically very sporadic and unpredictable in occurrence, thickness and composition.

Ablation materials are commonly found as a veneer (0 - 3 m) over weathered bedrock or over compacted basal till. Only locally do thicknesses exceed one metre over extensive areas. These areas are difficult to detect, especially when they are forested. The upper surface of the ablation till has often been sorted by water and small pockets of poorly sorted material have been used as granular sources. One recently used source was noted in the present survey. (Location 45, Photo 7). This site exposes several metres of sorted material over cobbly sandy silty gravel. This lower material has many of the physical characteristics of till.

Ablation materials can be used as sources of borrow or even subbase. They tend to have a high content of fine material,

PHOTO 7

Ablation Materials in a small pit at Location 45.
Total thickness of materials is 4 m.

and boulders can make excavation and crushing difficult. Crushing and washing of ablation materials can yield an acceptable aggregate product but the extra cost of such processing is often prohibitive.

3.1.4 ALLUVIUM:

Alluvium is found in small amounts along the Saint John River and several of the smaller creeks in the map area. The Muniac, Monquart, and Shikatehawk Streams on the east side of the Saint John River have small but continuous alluvial flood plain areas.

Alluvium is typically a variable and heterogeneous mixture of materials transported by the modern river flow. The materials range from large boulders to gravel, sand, silt, and clay. Organic materials such as logs and plant detritus are common. The alluvial materials often reflect the materials eroded from portions of the river banks. The alluvium in the Saint John River reflects the gravel eroded from the river banks. The alluvium noted in the Muniac Stream is typical of the smaller streams in the area - much of the material is a dirty bouldery coarse sand to fine gravel with a surface veneer of fine sand, silt and clay.

The alluvial materials observed in the study area have not been used as a source of aggregate and there is little likelihood that they will be used in the foreseeable future. They are very restricted in occurrence and are commonly found in areas where better quality aggregate is available.

3.2 QUALITY PARAMETERS:

The potential of an aggregate deposit is dependent upon two basic physical parameters: the grain size of the material and the composition of the fragments in the aggregate.

3.2.1 GRAIN SIZE:

There are four problems which can be associated with the grain size of a deposit: proportion of fine material, presence of oversized material, the distribution of the various grain size fractions (grading) and variability of a deposit.

An excess of silt and clay sized material (finer than 200

mesh) renders an aggregate material unsuitable for many high specification uses. The New Brunswick Department of Transportation (D.O.T.) sets specific limits on the amount of fines permitted in materials used in such things as asphalt pavement and structural concrete. This limit is determined by using the wet sieving process (A.S.T.M. C-117-76). Washing can reduce the fines content of an aggregate material but this process increases costs substantially. Most of the subbase and base course specifications require less than 10% fines by weight. Most of the aggregates tested in the area ranged between 1 and 15% fine material. Casual observation indicates that outwash materials, particularly those in deltaic situations, tend to have the least amount of fine materials.

The grading, or proportions of the various sizes of material in the aggregate, is also specified by the D.O.T. These limits ensure that there is a generally even proportion of each size range in the aggregate. The exact specifications are often specific to each individual contract. Most of the deposits observed during the present survey would meet these grading specifications. In the few cases observed where grading may be a problem the D.O.T. has indicated that crushing would improve the materials enough to meet their specifications.

An excess of coarse material can pose operational problems but will not necessarily affect the quality of the deposit. Any boulders or cobbles larger than 10 cm in diameter may be too large for portable crushing equipment. The removal of boulders usually requires a loader and therefore increases the cost of operation. The percentages of "oversized" material (i.e. greater than 10 cm) have been estimated for most of the pits surveyed. The proportion of oversized material will be an operational factor in some of the pits observed, particularly those developed in the coarser ice-contact and ablation materials.

The variability of a deposit can be a very important consideration for an aggregate extraction operation. Many of the pits in the area suffer from variability problems - some seriously. The variability of a deposit has a direct bearing on two factors: the ability of an operation to maintain a consistent quality of product (i.e. meet D.O.T. specifications), and the costs of working a variable deposit in order to maintain product quality. Many of the ice-contact and ablation deposits in the area show marked variability. The outwash materials encountered in the survey tended to exhibit more consistent properties. Variability has been noted wherever it occurred. Where

extreme variability was encountered a grading diagram is not presented on the accompanying maps - a single set of data is not adequate to describe these pits and the reader is encouraged to consult the complete description.

3.2.2 LITHOLOGIES:

The composition of the individual pebbles in the aggregate has a profound effect on the performance of an aggregate. Ideally all clasts should be hard, strong, uncoated and resistant to both chemical and physical weathering. In practice, there are always some clasts that are considered "unsound" - they are likely to provide unsatisfactory performance and so weaken any structure or road surface they are used in (Photo 8).

There are several ways of assessing the soundness of an aggregate. Detailed petrographic analysis, the magnesium sulphate soundness test and the Los Angeles abrasion are the most common tests for the overall quality of an aggregate. Numerous other tests may be used to test for specific properties: organic impurities test, freeze-thaw test, absorption and porosity tests, reactivity tests, washing tests, specific gravity test, stripping tests and mortar strength tests. Precise methods for these tests are specified by the American Society for Testing and Materials.

A petrographic analysis of approximately 100 pebbles of the 2.5 to 5.0 cm size range was conducted for selected deposits in the area to give a general assessment of aggregate quality. Pebbles were separated according to rock type and soundness. The results of these analyses will enable the reader to make a preliminary assessment of the quality of stone that may be expected from a deposit. Where they are available, Los Angeles abrasion test results from D.O.T. records have also been recorded in the pit report. These data will yield a good general impression of a deposit's quality, but more detailed and exhaustive testing should precede any major extraction operation if high quality aggregate is required.

The sound lithotypes encountered include: limestone (and dolostone), siltstone, sandstone and various igneous and metamorphic rocks. These pebbles were usually sub-angular to sub-rounded. The major unsound lithologies were phyllites and limestones. "Phyllite" includes a range of fissile metamorphosed fine grained rocks, including some slates and schists. Unsound limestones usually exhibit shale partings. Both phyllites and shaley limestones are

PHOTO 8

Weathering of deleterious shale and phyllite particles in an aggregate deposit.

susceptible to abrasion and will break down when exposed to repeated freeze-thaw cycles (Photo 8). They also exhibit a preference to platy or rod shaped particle shapes. Chert, which is often found with limestone, commonly breaks down when exposed to moisture. Badly weathered pieces of any rock lithology are also classified as being unsound.

Data obtained from the petrographic analyses indicate a wide range in quality. Values of 15 to 20% unsound lithotypes are common but values range from 5% to over 40%. A consistent spatial or geological pattern was not apparent.

3.3 The Maps:

The accompanying maps of the Aggregate Resources of the Perth-Andover (21J/12) and Florenceville (21J/5) areas show those deposits that have potential for use as sources of aggregate materials. The deposits indicated on the maps are generally more restricted than those shown on the surficial geology maps of the area (Lee 1962, Rampton in preparation). Many of the shallow outwash and ice-contact deposits identified on those maps are not considered to have potential as aggregate resources.

Data sources such as Lee (1962), borehole records and D.O.T. pit records were consulted during the initial phases of the survey. In the field all roads were traversed and road cuts and natural exposures were examined. All known pits were visited. Selected pits were described and sampled. The map units were established using airphoto interpretation and the data obtained from the field survey. The map units were checked against a manuscript map (Rampton in preparation) being prepared to up-date the surficial geology of the area.

The "grading diagrams" shown on the maps are summaries of the data obtained in the present survey. They are intended to give a capsule description of the pit - the reader is referred to the pit description for a more detailed assessment. At some locations extreme variation was encountered - these pits are considered too variable to be characterized by a single sample and no "grading diagram" is presented.

3.4 Pit Reports:

The following passage is a brief explanation of the terms

used in and data presented on the pit forms found following:

Location: - the number refers to the site located on the accompanying maps

Type of Deposit: - outwash, ice-contact, ablation etc. as outlined in text

Status:
- active - in use during visit
- inactive - evidence of sizeable workings within the last few years, still workable
- on demand - recent working and active on occasion, casual extraction
- abandoned - no evidence of recent working, overgrown and/or depleted

Section Description and Comments:
- Paragraph 1 - geological setting and location
- Paragraph 2 - description of the pit face and estimate of size ranges
- Paragraph 3 - summary of D.O.T. data for the pit (if available)
- Paragraph 4 - additional comments (as necessary)

Mechanical Analysis:
- Grain size analysis results per A.S.T.M. sieve procedures
- Single value for 200 mesh is separate A.S.T.M. washed sieve determination for fines content
- D.O.T. data is generally averaged

Estimate of Reserves:
- areas calculated from national topographic map and airphotographs
- area workable is the area not covered by existing cultural features

4.0 CONCLUSIONS:

The present survey of granular reserves has identified approximately 34 million m^3 of material available for extraction in the Florenceville - Andover map area. Numerous small deposits scattered throughout the area are not included in this estimate - they may be useful for local purposes. The major aggregate sources are the terraced outwash deposits located along the Saint John River and several of its major tributaries, and the long esker on the west side of the map area.

Results of selected testing on deposits indicate that there is a shortage of high quality aggregate in the area. Most deposits are suitable for borrow or subbase uses, a few can produce base course and several meet asphaltic concrete specifications.

REFERENCES

A.S.T.M. American Society for Testing and Materials Annual Book of A.S.T.M. Standards, Part 10 (up-dated annually).

Caley, J.F. 1936. Geology of Woodstock Area, Carleton and York Counties, New Brunswick; Geological Survey of Canada, Memoir 198, 21 p.

Carroll, B.M.W. 1974. Bedrock Compilation Maps for the Andover East, Andover West, Florenceville East and Florenceville West Sheets; Mineral Resources Branch, New Brunswick Department of Natural Resources.

Chalmers, R. 1884. Report on the Surface Geology of Western New Brunswick with Special Reference to York and Carleton Counties; Geological and Natural History Survey of Canada, Annual Report 1884-1885, Volume 1, Part GG, 47 p.

..... 1899. Report on the Surface Geology of the Fredericton and Andover Quarter - Sheet Maps, New Brunswick; Geological Survey of Canada, Annual Report (New Series) Volume XII, Part M, 41p. published 1902.

Finamore, P. 1979a. Granular aggregate resources of Millville East (21J/3E). New Brunswick Department of Natural Resources, Mineral Resources Branch, Plate. 81-36.

..... 1979b. Granular aggregate resources of Millville West (21J/3W). New Brunswick Department of Natural Resources, Mineral Resources Branch, Plate. 81-37.

Hamilton, J.B. 1973. Generalized Surficial Geology Illustrating the Distribution of Granular Resources in New Brunswick; New Brunswick Department of Natural Resources, Mineral Resources Branch, Plate 73-14.

Hamilton, J.B. and Carroll, D.J.J. 1975. Sand and Gravel in New Brunswick; Department of Natural Resources, Mineral Resources Branch, Report of Investigation No. 16, 107p.

International Saint John River Engineering Board, 1953: Water Resources of the Saint John River Basin, Quebec, Maine, New Brunswick; Appendix C, Geology, Beechwood Dam Site p. C-54-57. (geology largely quoted from unpublished report by V.K. Prest).

Kiewiet de Jonge, E.J.C. 1951. Glacial Water Levels in the Saint John River Valley; Unpublished Ph.D. thesis, Clark University, Worcester, Massachusetts, 116p.

Lee, H.A. 1962. Surficial Geology of the Canterbury, Woodstock Florenceville and Andover Map - Areas; York, Carleton and Victoria Counties, New Brunswick; Geological Survey of Canada, Paper 62-12, 8p.

Pavlides, L. 1963. Reconnaissance Map of the Bedrock Geology of a part of Northwestern New Brunswick, Canada, United States Geological Survey, Open Map File.

Potter, et al 1979. Geological Map of New Brunswick, Map Number NR-1. New Brunswick Department of Natural Resources, Mineral Resources Branch.

Rampton, V.N. in preparation. Quaternary Geological Mapping for parts of New Brunswick; for the New Brunswick Department of Natural Resources.

Thibault, J. 1979. Granular aggregate resources of Aroostook (21J/13). New Brunswick Department of Natural Resources, Mineral Resources Branch, Plate 80-81.

APPENDIX

PIT DESCRIPTIONS

Location: 1 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 134 783

Section Description & Comments:

An extensive pit in an ice-contact deposit on the northern edge of the map area. Adjoins location 2.

Pit Face:

10.0 m Sandy medium gravel, moderately well bedded and sorted. Estimated 70% gravel, 35% >2.5 cm, 4% >10 cm.

D.O.T. data (1978) indicate that the material is suitable for borrow, subbase and base course. Los Angeles abrasion loss is 26%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	99	96	93	85	68	38	10	3.4 3.3
D.O.T. 1978	93.4		74.2	60.6	50.0	40.6		16.6			4.1

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	4	8	320,000

Same deposit as Location 2.

Location: 2 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 136 783

Section Description & Comments:

A fairly extensive pit in an ice-contact deposit on the northern edge of the map area. Adjoins location 1. Stock piles of crushed and screened material on site.

Pit Face:

0.6 m Pebbly medium sand (overburden)
6.0 m Sandy medium to coarse gravel with occasional sand seams, poorly bedded but apparently few fines.
Estimated 80% gravel, 60% >2.5 cm, 5% >10 cm.

D.O.T. data (1974, 1979) indicate the material can produce borrow subbase, base course, and road chips. Los Angeles abrasion losses range from 26 to 29%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	88	53	33	17	8	5	4	3.5
											3.5
D.O.T. 1974	87.0		60.5	44.0	28.8	18.8		7.3			3.4
D.O.T. 1979	93.8		78.0	60.8	43.5	29.0		9.0			3.5

Lithologic Analysis:

Unsound Lithotypes % 13		Sound Lithotypes % 87	
Phyllite	8	Sandstone	28
Siltstone	5	Limestone	23
		Siltstone	20
		Igneous	16

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m³) probable
7	4	8	320,000

Same deposit as location 1.

Location: 3 **County:** Victoria

Type Of Deposit: Outwash/Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 985 746

Section Description & Comments:

This pit appears to contain two geological units - a lower unit of ice-contact materials similar to those exposed in location 4 and an upper unit more typical of the valley outwash sediments of the Saint John River valley.

Pit Face:

5.0 m Dirty medium to coarse gravel, crudely bedded with occasional sand stringers to 0.2 m thick.

2.0 m Gravelly medium to coarse sand, crudely bedded, maximum 20% gravel, highly variable.

D.O.T. data (1979) indicate a Los Angeles abrasion loss at 31% and excessive fines content.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1979	93.6		75.4	59.6	45.6	34.0		17.8			7.0
D.O.T. 1979	100		98.0	96.5	95.0	93.5		90.0			28.0

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
23	10	5	500,000

Location: 4 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 986 745

Section Description & Comments:

The pit is developed in a hillside on the side of the Saint John River valley where Larlee Creek enters the valley. The lower flanks of the deposit (location 3) are more characteristic of outwash materials but the sediments in the core (location 4) are probably ice-contact.

South Face:

5 m+ Coarse very dirty crudely bedded sandy silty gravel, very variable. Estimated 60% gravel, 40% >2.5 cm, 2% >10 cm.

North Face:

3 m Stratified gravelly sand, chaotic bedding, 0-20% gravel.

D.O.T. data (1976) indicate a Los Angeles abrasion loss of 30% and a high fines content. Material only suitable for borrow unless processed.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1976	96.7		76.6	60.5	48.0	38.4		18.7			9.2

Lithologic Analysis:

Unsound Lithotypes % 7		Sound Lithotypes % 93	
Shale	4	Limestone	38
Phyllite	2	Sandstone	24
Siltstone	1	Igneous	14
		Siltstone	12
		Metamorphic	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m3) probable
4	2	4	80,000

Location: 5 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand (small plant) **UTM:** 980 739

Section Description & Comments:

A pit located on a low level outwash terrace south of Perth-Andover. Bedrock is exposed in the base of the pit and most of the deposit is built over. A layer of silty fine sand is general over the deposit.

Pit Face:

0.5 - 2.0 m Silty fine sand (overburden).
3.3 m Medium to coarse gravel with occasional pockets of medium to coarse sand.
Estimated 70-80% gravel, 60-70% >2.5 cm, 1% >10 cm.

Lower Bench:

3.5 m Gravelly medium to coarse sand.

D.O.T. data (1963, 1965) indicate the material is well graded and was capable of producing borrow, subbase and base course materials. Los Angeles abrasion losses ranged from 16% to 21%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1963	79.5		59.0		28.9			10.6			1.0
D.O.T. 1965	90.2		63.8		29.8			10.1			1.2

Lithologic Analysis:

Unsound Lithotypes % 3		Sound Lithotypes % 97	
Gneiss	2	Sandstone	38
Shale	1	Limestone	36
		Siltstone	12
		Igneous	11

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
180	5 extensively built over.	3	150,000

Location: 6 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 970 734

Section Description & Comments:

Small deposit in bank of small creek tributary to the Saint John River. Origin is questionable but the variability of material suggests ice-contact or proximal facies outwash.

Pit Face:

0.3 m Medium sand (overburden).

6.0 m Gravelly sand with some dirty coarse gravel lenses remaining, appears generally dirty, gravel commonly coated with silt and clay. Estimated 15% >2.5 cm, 2% >10 cm.

D.O.T. data (1964) indicate the material has excess fines and is suitable for borrow and selected subbase. Los Angeles abrasion value was 21.3%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	98	93	86	76	58	40	25	15	10.9
											10.7
D.O.T. 1964	93.2		66.9		33.6		10.4				5.6

Lithologic Analysis:

Unsound Lithotypes % 12		Sound Lithotypes % 88	
Shale	8	Limestone	23
Sandstone	2	Sandstone	20
Siltstone	2	Igneous	20
		Siltstone	15
		Quartzite	10

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Very limited

Location: 7 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 968 726

Section Description & Comments:

Small pit cut into a high level outwash deposit bordering the Saint John River valley. The excavation extends back from a creek bank exposure. The farmer indicates that excavations have encountered "clay" in the lower slope. Field evidence indicates that a thinning of the deposit, southward from the pit face, is possible.

Pit Face:

0.5 - 1.3 m Silty pebbly fine to medium sand (overburden).
10.0 m Sandy medium to coarse gravel, subhorizontal bedding. Estimated 70% gravel, 50% >2.5 cm, 5% >10 cm.

Lower Bench Face:

2.0 m Sandy coarse gravel.

D.O.T. data (1973) indicate the material grades B, 1A and A. Los Angel abrasion 21% to 23.8%. Useable as borrow or subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	86	67	48	24	8	3	2	1.5
D.O.T. 1973	100		76.0	58.0	40.7	27.3		11.0			1.5 5.4

Lithologic Analysis:

Unsound Lithotypes % 10		Sound Lithotypes % 90	
Limestone	5	Limestone	38
Shale	3	Quartzite	16
Slate	2	Siltstone	13
		Igneous	10
		Metamorphic	7
		Sandstone	6

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
20	16	3	480,000

Location: 8 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 969 722

Section Description & Comments:

Small pit cut into the side of an ice-contact knoll which protrudes through an apron of outwash (location 7). Excavations appear to have encountered silt and fine sand beneath the exposed face. The deposit exhibits considerable variation.

Pit Face:

0.5 - 1.5 m	Variable fine to coarse sand with occasional pebbles and minor gravel lenses.
5.0 m	Sandy coarse gravel, slumped and poorly exposed. Estimated 60% >2.5 cm, 5% >10 cm, maximum boulder 0.7 m.

D.O.T. data (1965) indicate the deposit grades 2A, 1A and C with an excess of fines. Los Angeles abrasion values range from 22 to 29% and the material is considered suitable for borrow and is marginal for subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1965	71.6		44.3		26.7			12.2			6.9
D.O.T. 1965	93.8		72.2		45.9			18.2			7.3

Lithologic Analysis:

Unsound Lithotypes % 6		Sound Lithotypes % 94	
Shale	3	Limestone	41
Limestone	3	Sandstone	25
		Siltstone	13
		Igneous	12
		Metamorphic	3

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
12	6	3	180,000

Location: 9 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 980 719

Section Description & Comments:

The pit is excavated into the Saint John River valley side. The presence of variable materials, clay balls and till suggests ice-contact sediments rather than outwash materials.

Pit Face:

10.0 m Very variable medium to coarse gravel, crudely laminated with occasional sand stringer to 0.3 m thickness, occasional clay balls and occasional till lens.
Estimated 65% gravel, 40% >2.5 cm, 5% >10 cm, maximum 0.4 m.

D.O.T. data (1971) indicate a Los Angeles abrasion loss of 28% and that the material is suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	76	59	41	28	18	10	7.0
											6.8
D.O.T. 1971	85.8		62.5	47.5	36.5	30.0		13.8			3.2

Lithologic Analysis:

Unsound Lithotypes % 12		Sound Lithotypes % 88	
Siltstone	6	Siltstone	36
Slate	4	Sandstone	26
Shale	2	Igneous	16
		Limestone	7
		Metamorphic	3

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Unknown but probably limited

Location: 10 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 973 706

Section Description & Comments:

A small pit in a high level outwash terrace above the Saint John River.

Pit Face:

0.6 m Silty fine sand (overburden).
4.0 m Sandy coarse gravel, several small silt layers.
1.0 m Pebbly coarse sand.

D.O.T. data (1980) indicate an average of <4% fines and a Los Angeles abrasion value of 23%. It is recommended for use as borrow or subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1980	93.7		69.0	51.3	39.3	31.3		13.7			4.6

Lithologic Analysis:

Unsound Lithotypes %	5	Sound Lithotypes %	95
Shale	2	Quartzite	25
Sandstone	2	Limestone	20
Siltstone	1	Calcareous sandstone	19
		Igneous	18
		Sandstone	13

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 11 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: Abandoned **UTM:** 982 703

Section Description & Comments:

A small shallow pit in a very limited outwash deposit on the edge of the Saint John River valley.

Pit Face:

0.5 - 1.0 m Fine sand with occasional pebble.
1.0 - 2.0 m Sandy fine to medium gravel, appears dirty with abundant siltstone visible.
Estimated 50% gravel, 5% >2.5 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	74	56	43	33	20	12	6.7 6.4

Lithologic Analysis:

Unsound Lithotypes % 33		Sound Lithotypes % 67	
Phyllite	14	Siltstone	28
Siltstone	13	Sandstone	22
Sandstone	3	Metamorphic	12
Shale	3	Argillite	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Very limited

Location: 12 **County:** Victoria

Type Of Deposit: Outwash? **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 981 700

Section Description & Comments:

A sand pit on a medium level terrace on the east side of the Saint John River. This pit is representative of several small pits excavated in the middle and low level terraces in this portion of the Saint John River valley.

Pit Face:

4.0 m Well laminated silty very fine sand, no pebbles occasional small organic fragments.

Mechanical Analysis:

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)					100	99	97	92	87	71.5 71.0

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 13 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 92 7 698

Section Description & Comments:

The pit is situated in an ice-contact knoll on the international border. There is an extensive active extraction operation in the same deposit in the United States. The entire face is 7 m in height but only the upper 3.5 m is slump free.

Pit Face:

3.5 m Variable pebbly sand to sandy gravel in discrete but thin (maximum 1 m) beds, rapid changes in grainsize, some till-like areas, appears to be an excess of fines. Estimated 10% >2.5 cm, 1% >10 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	95	86	77	67	52	36	23	12	7.2
											7.0

Lithologic Analysis:

Unsound Lithotypes % 5		Sound Lithotypes % 95	
Limestone	5	Limestone	56
		Sandstone	15
		Igneous	15
		Siltstone	6
		Metamorphic	3

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
9	9	5	450,000

Location: 14 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 977 672

Section Description & Comments:

Small pit adjacent to Trans-Canada Highway. The sediments are extremely erratic and appear to indicate deposition in a changeable near-ice position.

Pit Face:

3.0 m Variable dirty coarse gravelly sand to silty fine sand and some finely laminated silt, approximately one third of the face is sand.

D.O.T. data (1964) indicate a very erratic deposit with pockets suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve (% passing)	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
D.O.T. 1964	93.0		69.5		40.4			12.3			4.4
D.O.T. 1964	100		96.1		70.0			28.6			10.0

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
16	3	3	90,000

Location: 15 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 979 669

Section Description & Comments:

High level outwash terrace above the Saint John River at Brown Brook. Gravel is noticeably dusty.

Pit Face:

12.0 m Dirty medium gravel with occasional sand stringers, bedding is somewhat erratic but overall the deposit appears consistent.

Estimated 60% gravel, 15% > 2.5 cm

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	79	60	37	16	6	4	3.2 3.1

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
31	10	10	1,000,000

Location: 16 **County:** Victoria

Type Of Deposit: Outwash/Ice-Contact **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 989 645

Section Description & Comments:

Two pits in high level terraces in the Saint John River valley. Exposures indicate a veneer (2 m) of outwash gravel over ice-contact sediments (ablation till and gravel).

Pit Face:

1.0 m	Silt and silty fine sand (overburden).
1.0 - 2.0 m	Moderately sorted and horizontally bedded sandy gravel.
2.5	Silty gravelly sand till, some evidence of stratification and minor bedding, ablation till. Estimated (over entire face) 60% gravel, 30% >2.5 cm, 2% >10 cm.

D.O.T. data (1964) indicate bedrock in test hole at the bottom of the pit. Material grades 1A and is suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	81	65	50	36	20	14	11.9
											11.8
D.O.T. 1964	91.9		70.5		37.1			9.1			3.4

Lithologic Analysis:

Unsound Lithotypes % 44		Sound Lithotypes % 56	
Shale	18	Sandstone	28
Siltstone	12	Igneous	18
Limestone	8	Siltstone	6
Phyllite	6	Limestone	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
60	60	3	1,800,000

Location: 17 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 020649

Section Description & Comments:

A small pit cut into an ice-contact hill behind a farm house. The deposit lacks any distinctive geomorphic form.

Pit Face:

0.5 m	Pebbly to gravelly sand (overburden).
4.0 m	Sandy coarse gravel with occasional fine gravel seams, bedding is moderately well developed and dirty areas are visible, a 0.6 m layer of fine to medium sand occurs at the base of the cut. Estimated 65% gravel, 30% >2.5 cm, 5% >10 cm.

D.O.T. data (1974) indicate 2-7% fines with an abrasion loss of 28%. The pit is capable of producing borrow, subbase and crushed base course if dirty areas are avoided.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	93	74	56	36	10	5	4	4.0
											4.0
D.O.T. 1974	87.2		58.6	42.0	31.4	20.6		9.8			5.1

Lithologic Analysis:

Unsound Lithotypes % 25		Sound Lithotypes % 75	
Shale	13	Siltstone	40
Siltstone	6	Sandstone	23
Sandstone	3	Igneous	12
Igneous	2		
Chert	1		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
14	4	3	120,000

Location: 18 **County:** Victoria

Type Of Deposit: Ice-Contact **Parish:** Perth

Exposure Type: Pit Face **NTS:** 21J/12

Status: Abandoned **UTM:** 011 645

Section Description & Comments:

A small thin deposit without definite geomorphic form. The pit is abandoned and largely overgrown.

Pit Face:

3.0 m Sandy medium gravel, poorly exposed.
Estimated 40% gravel, 20% >2.5 cm.

D.O.T. data (1959) indicate 6-12% fines and an abrasion loss of 24-27%. The material grades 1A and A.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	95	84	68	46	29	20	15	11.7
D.O.T. 1959	88.5		63.2		38.2			14.2			11.6 9.2

Lithologic Analysis:

Unsound Lithotypes % 25		Sound Lithotypes % 75	
Sandstone	10	Sandstone	25
Siltstone	10	Igneous	23
Slate	5	Siltstone	20
		Metamorphic	7

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 19 **County:** Carleton

Type Of Deposit: Ice-Contact **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 096 619

Section Description & Comments:

A small pit in one of several hummocky mounds in the area. According to the farmer other test pits in the deposit yielded "too much clay". Road cuts in the area indicate a large proportion of ablation till in similar features.

Pit Face:

0.3 m	Silty pebbly sand (ablation till?) (overburden).
3.0 m	Silty to sandy medium to coarse gravel, pebbly medium to coarse gravel, chaotic bedding, erratic distribution appears to have a lot of fines. Estimated 40% gravel, 20% >2.5 cm.

D.O.T. data (1961) indicate the material has 5 to 23% fines and a Los Angeles abrasion loss of 27%. The material is suitable for borrow.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	78	61	43	27	13	8	6.1
											5.9
D.O.T. 1961	86.5		68.4		43.3			23.0			12.3

Lithologic Analysis:

Unsound Lithotypes %	10	Sound Lithotypes %	90
Phyllite	8	Limestone	26
Chert	2	Sandstone	24
		Igneous	20
		Siltstone	7
		Metamorphic	13

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 20 **County:** Carleton

Type Of Deposit: Esker **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 139 618

Section Description & Comments:

A small esker-like feature of probable ice-contact origin with very coarse sediments.

Pit Face:

0.6 m	Sandy gravel (overburden)
12.0 m	Very coarse gravel, poorly bedded, minor sand and fines. Estimated 80% gravel, 50% >2.5 cm, 20% >10 cm, boulders to 1 m.

D.O.T. data (1962) indicate 4% fines with a Los Angeles abrasion loss of 26%. Grading is erratic. The pit is capable of producing borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1962	84.3		61.6		29.1			7.2			4.3

Lithologic Analysis:

Unsound Lithotypes % 13		Sound Lithotypes % 87	
Slate	7	Sandstone	32
Shale	4	Igneous	28
Siltstone	2	Siltstone	15
		Metamorphic	12

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
9	4	6	240,000

Location: 21 **County:** Carleton

Type Of Deposit: Ice-Contact **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 055 590

Section Description & Comments:

A small poorly defined deposit of ice-contact materials.

Pit Face:

0.3 m	Pebbly sand (overburden)
12.0 m	Very dirty silty sandy medium to coarse gravel, much of the material is ablation till, massive to poorly laminated with some well laminated pockets. Estimated 60% gravel, 30% >2.5 cm, 5% >10 cm, maximum boulder 1 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	95	78	63	46	33	26	22	19.0
											18.8

Lithologic Analysis:

Unsound Lithotypes % 22		Sound Lithotypes % 78	
Shale	8	Sandstone	22
Limestone	6	Limestone	19
Siltstone	6	Igneous	17
Sandstone	1	Siltstone	13
Igneous	1	Metamorphic	7

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 22 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 083 590

Section Description & Comments:

This pit is newly opened and exposures indicate a clean well sorted, uniform deposit. The pit is located in the upper portion of a dissected outwash deposit.

Pit Face:

8.0 m Sandy medium gravel to gravelly medium to coarse sand, material is horizontally bedded, moderately to well sorted, and uniform over the pit face. Estimated 50% gravel, 25% >2.5 cm, maximum 0.3 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	98	91	69	51	37	25	14	8	4.6 4.4

Lithologic Analysis:

Unsound Lithotypes % 8		Sound Lithotypes % 92	
Shale	3	Limestone	25
Phyllite	3	Siltstone	21
Igneous	2	Igneous	21
		Sandstone	21
		Metamorphic	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	5	8	400,000 upper portion of deposit

Location: 23 **County:** Victoria

Type Of Deposit: Outwash **Parish:** Andover

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 977 619

Section Description & Comments:

Small pit beside Trans-Canada Highway at Grahams Brook. Deposit is a well developed outwash terrace at the junction of the Saint John River and Grahams Brook.

Pit Face:

3.7 m Sandy medium to coarse gravel with occasional cobbles, well bedded and moderately to well sorted. Estimated 65% gravel, 25% >2.5 cm, 2% >10 cm.

D.O.T. data (1976) indicate the deposit can produce borrow, subbase, base and asphaltic concrete aggregate. Los Angeles abrasion values are below 22%.

The material described in the pit is considered typical of only a small portion of the deposit shown on the map. Further testing would be required to assess the upper portions of the deposit.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	95	83	73	61	43	24	10	6.6
											6.5
D.O.T. 1976	91.7		73.7	57.3	45.7	37.7		24.7			4.5

Lithologic Analysis:

Unsound Lithotypes % 15		Sound Lithotypes % 85	
Siltstone	5	Limestone	27
Shale	4	Igneous	25
Limestone	3	Sandstone	18
Sandstone	2	Siltstone	10
Phyllite	1	Quartzite	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Unknown but limited by cultural features

Location: 24 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 958 608

Section Description & Comments:

The pit face is developed in a small outwash deposit on the south side of the River de Chute. Presence of bedrock is suspected but not confirmed in the base of the pit.

Pit Face:

10.0 m Sandy medium to coarse gravel, moderate sorting with dirty sections.
Estimated 60% gravel, 35% >2.5 cm. 2% >10 cm, maximum 0.5 m.

D.O.T. data (1959) indicate that the material grades 1A, 2A and D with an excess of fines. Los Angeles abrasion values ranged from 18 to 30%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	86	72	56	37	21	11	7.1
											6.9
D.O.T. 1959	93.0		69.0		37.9			10.6			4.4

Lithologic Analysis:

Unsound Lithotypes % 7		Sound Lithotypes % 93	
Shale	5	Limestone	50
Igneous	1	Siltstone	17
Schist	1	Sandstone	12
		Igneous	14

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
4	3	7	210,000

Location: 25 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 983 608

Section Description & Comments:

The pit is located along a long road cut, cut into a high level river terrace. Approximately 10 m of sandy medium gravel is exposed over a 1 km long cut.

Pit Face:

0.4 m	Gravelly sand (overburden).
7.0 m	Sandy medium gravel, occasional sand strata to 0.3 m especially near the top, moderate bedding and sorting, occasional clay ball observed. Estimated 60% gravel, 30% >2.5 m, 2% >10 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	90	70	52	33	15	8	5	4.5
											4.4

Lithologic Analysis:

Unsound Lithotypes % 18		Sound Lithotypes % 82	
Igneous	4	Limestone	26
Phyllite	3	Sandstone	23
Sandstone	3	Igneous	23
Siltstone	3	Siltstone	10
Limestone	3		
Shale	2		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
16	10	7	700,000

Location: 26 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 974 603

Section Description & Comments:

A large pit exposing somewhat variable materials. The deposit is probably proximal facies outwash. The deposit extends westward from the river an unknown distance - no bedrock was observed but it may limit further excavations.

Pit Face:

0.6 m Pebbly medium sand (overburden)
15.0 m Medium to coarse sandy gravel with lenses and stringers of medium sand, bedding is well developed to chaotic and sorting is moderate to good.

D.O.T. data (1964) indicate that the material is suitable for borrow, subbase and base course. The Los Angeles abrasion loss was 16.9%

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	86	70	45	17	8	6	4.7 4.7
D.O.T. 1964	77.2		55.2		30.1			9.0			2.2

Lithologic Analysis:

Unsound Lithotypes % 5		Sound Lithotypes % 95	
Phyllite	4	Limestone	38
Shale	1	Sandstone	23
		Igneous	20
		Siltstone	14

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
14	3	12	360,000 upper terrace

Location: 27 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 976 587

Section Description & Comments:

This is a new pit developed in a medium level outwash deposit which appears to have sizeable reserves. The deposit is an outwash - delta formed at the confluence of Guisiguit Brook and the Saint John River. The exposed material appears to be of fair to good quality.

Pit Face:

0.5 m Sandy medium gravel (overburden)
6.0 m Sandy medium to coarse gravel, fair sorting and bedding, portions of the material are moderately cemented, few fines; Estimated 80% gravel, 50% > 2.5 cm, 5% > 10 cm, maximum boulder 0.5 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	75	61	46	28	13	7	4.7 4.6

Lithologic Analysis:

Unsound Lithotypes % 8		Sound Lithotypes % 92	
Shale	5	Limestone	39
Igneous	2	Sandstone	24
Chert	1	Igneous	19
		Siltstone	10

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
24	15	6	900,000 upper terrace

Location: 28 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 990 580

Section Description & Comments:

A small area of high level outwash along the Saint John River Valley at Upper Kent.

Pit Face:

0.3 m Gravelly sand (overburden)
4.0 m Sandy coarse gravel, dirty sandy medium gravel, medium gravel, sandy medium to fine gravel, sediment types are separated as layers or pockets of material, occasional cobble. Estimated (entire face) 50% gravel, 20% > 2.5 cm, 2% > 10 cm

D.O.T. data (1975) indicate less than 5% fines and a Los Angeles abrasion loss of 23-27%. The material is capable of producing borrow, subbase, base course and chip cover materials.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	93	76	53	28	13	6	5	4.3 4.2
D.O.T. 1971	84.1		59.6	45.4	35.0	27.7		10.9			4.0
D.O.T. 1975	76.0		58.5	43.5	30.0	22.0		8.5			2.8

Lithologic Analysis:

Unsound Lithotypes % 19		Sound Lithotypes % 81	
Siltstone	12	Sandstone	37
Sandstone	4	Siltstone	17
Igneous	2	Igneous	16
Chert	1	Metamorphic	9
		Limestone	2

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
10	9	4	360,000

Location: 29 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 982 570

Section Description & Comments:

The pit is located in a small area of outwash on the edge of the Saint John River valley. There is evidence of up to 3 m of silty fine to medium sand at the surface over a large part of the deposit.

Pit Face:

5.0 m Variable sandy medium gravel, moderate sorting, moderatley clean. Estimated 70% gravel, 40% > 2.5 cm, 2% > 10 cm, maximum boulder 1 m.

D.O.T. data (1965) indicate the water table is present in test pits and the material is suitable for borrow only because of poor sand grading.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	92	74	62	46	28	16	13	11.4 11.2
D.O.T. 1965					97.7			32.1			2.5

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 30 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 942 585

Section Description & Comments:

A small pit is developed behind a farm house on a small but well defined esker ridge. The bulk of the material is ablation till but the material has been used for road construction according to the farmer.

Pit Face:

2.5 m Massive dirty sandy bouldery gravel, mainly ablation till with some partially sorted material.
Estimated 50% gravel, 30% > 2.5 cm, 5% > 10 cm

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	88	72	52	42	35	32	29.2 29.0

Lithologic Analysis:

Unsound Lithotypes % 20		Sound Lithotypes % 80	
Slate	8	Limestone	33
Siltstone	6	Sandstone	18
Shale	4	Siltstone	17
Limestone	2	Igneous	12

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 31 **County:** Carleton

Type Of Deposit: Ice-contact (esker?) **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 942 575

Section Description & Comments:

A continuation of the esker described in location 30. The material exposed here is much better sorted.

Pit Face:

0.6 m Pebbly sand (overburden)
6.0 m Sandy medium gravel and gravelly medium to coarse sand, moderately well sorted and moderate bedding. Estimated 60% gravel, 25% > 2.5 cm, 2% > 10 cm.

D.O.T. data (1971) indicate an erratic deposit with bedrock at variable depth. The material is suitable as borrow and subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	99	92	77	57	27	8	3	2	1.6 1.4
D.O.T. 1971	98.0		79.0	60.0	42.0	32.0		13.0			2.2

Lithologic Analysis:

Unsound Lithotypes % 19		Sound Lithotypes % 81	
Phyllite	9	Limestone	36
Shale	6	Igneous	24
Siltstone	2	Sandstone	13
Igneous	2	Siltstone	5
		Metamorphic	3

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 32 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 955 546

Section Description & Comments:

Large excavation in a well developed esker ridge. Reserve calculations include the entire segment of the esker.

Pit Face:

7.0 m Moderate to well sorted stratified medium to coarse gravel, occasional sand lenses to 20 cm thick, sand more abundant on flanks of esker.
Estimated 70% gravel, 30% > 2.5 cm, 5% > 10 cm, large boulders for 1 m.

D.O.T. data (1958) indicate very low fines (<2%) with numerous platy and elongate pebbles. The Los Angeles abrasion loss is 24.4% and the deposit can produce base, subbase, asphaltic concrete and aggregate chips with suitable crushing.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	91	61	30	13	6	4	3	2.0 1.8
D.O.T. 1958	91.0		62.6		26.6			5.1			1.5

Lithologic Analysis:

Unsound Lithotypes % 39		Sound Lithotypes % 61	
Limestone	24	Limestone	46
Phyllite	8	Siltstone	10
Shale	7	Sandstone	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
15	5	5	250,000

Location: 33 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 959 521

Section Description & Comments:

A sizeable pit in a well defined esker. The material is variable from sand through coarse gravel.

Pit Face:

10.0 m Variable gravelly to pebbly medium to coarse sand and sandy medium to coarse gravel, the face is generally gravel with numerous sand lenses and stringers to 0.7 m thick. Estimated 60% gravel, 30% > 2.5 cm, 4% > 10 cm

D.O.T. (1979) data indicate <7% fines and a Los Angeles abrasion loss of 25-31%. The material is suitable for borrow, subbase, and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	78	63	46	25	13	9	6.9 6.8
D.O.T. 1979	93.2		75.2	60.3	46.3	32.8		13.5			5.4

Lithologic Analysis:

Unsound Lithotypes % 19		Sound Lithotypes % 81	
Siltstone	6	Limestone	38
Sandstone	5	Sandstone	21
Limestone	5	Siltstone	12
Shale	3	Igneous	10

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
37	15	8	1,200,000

Same deposit as Location 34

Location: 34 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 960 517

Section Description & Comments:

The same esker as location 33. A well defined esker feature composed of sand through coarse gravel.

Pit Face:

8.0 m Sandy medium to coarse gravel with discrete sand laminae and lenses to 0.5 m thick, moderate bedding. Estimated 50% gravel (to 85% in pockets), 25% > 2.5 cm 5% > 10 cm.

D.O.T. data (1974) indicate <5% fines and a Los Angeles abrasion loss of 30%. The material is suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	72	54	39	26	13	2	1.0 1.0
D.O.T. 1974	73.4		48.2	34.4	24.2	16.6		6.4			3.7

Lithologic Analysis:

Unsound Lithotypes % 25		Sound Lithotypes % 75	
Limestone	10	Limestone	32
Shale	9	Sandstone	16
Phyllite	4	Siltstone	15
Chert	1	Igneous	8
Igneous	1	Metamorphic	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
37	15	8	1,200,000
Same deposit as location 33			

Location: 35 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 964 490

Section Description & Comments:

The pit is located in a well developed esker. Bedrock is very common in the area and may occur in the base of the pit.

Pit Face:

7.0 m Sandy medium to coarse gravel with discrete sand strata to 0.3 m thickness, moderate sorting, many stones have a calcite coating. Estimated 70% gravel, 40% > 2.5 cm, 5% > 10 cm, maximum boulder 0.5 m.

D.O.T. data (1959) indicate a Los Angeles abrasion loss of 24 to 33%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	87	64	26	7	4	3	2.9 2.8
D.O.T. 1959	77.1		56.1		24.3			5.2			2.0

Lithologic Analysis:

Unsound Lithotypes % 39		Sound Lithotypes % 61	
Limestone	26	Limestone	44
Shale	12	Igneous	8
Siltstone	1	Sandstone	7
		Quartzite	2

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
30	30	5	1,500,000

Location: 36 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: On Demand **UTM:** 002 562

Section Description & Comments:

A medium level terrace on the east side of the Saint John River north of Beechwood. Stock piles of crushed material are present in the pit and there is good indication of bedrock in the pit floor.

Pit Face:

0.6 m Pebbly sand(overburden)
6.0 m Dirty medium to coarse gravel, moderately well bedded.
Estimated 60% gravel, 40% > 2.5 cm, 3% > 10 cm

D.O.T. data (1971) indicate less than 5% fines and an abrasion loss of 21%. The pit is capable of producing borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	83	71	57	32	14	11	9.8 9.6
D.O.T. 1971	82.2		53.3	39.7	29.5	22.8		12.3			3.7

Lithologic Analysis:

Unsound Lithotypes % 28		Sound Lithotypes % 72	
Metamorphic	6	Sandstone	28
Siltstone	6	Siltstone	21
Sandstone	6	Igneous	15
Shale	5	Limestone	8
Phyllite	3		
Igneous	2		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m3) probable
120	30	5.0	1,500,000

Same deposit as location 37.

Location: 37 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 007 561

Section Description & Comments:

Nearly depleted pit between railroad and highway in the same terrace as location 36.

Pit Face:

0.3 m Pebbly sand (overburden)
8.0 m Sandy medium to coarse gravel, moderately well bedded and sorted, seems dirty.
Estimated 50% gravel, 25% > 2.5 cm

D.O.T. data (1975) indicate 3% fines and an abrasion loss of 24%. The pit is capable of producing borrow, subbase, base course and cover chips.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	93	70	48	28	14	9	7	5.2 5.1
D.O.T. 1975	74.0		63.0		49.0	35.0	24.0	10.0			2.9

Lithologic Analysis:

Unsound Lithotypes % 16		Sound Lithotypes % 84	
Limestone	15	Limestone	48
Chert	1	Igneous	20
		Sandstone	9
		Siltstone	7

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	30	5.0	1,500,000
Same deposit as	location 36		

Location: 38 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 021 545

Section Description & Comments:

Three small pits are developed in a small area of outwash high above the river. The variable nature of the sediments and the bedding which dips to the southeast indicate the materials are probably proximal facies outwash.

Pit Face:

4.0-8.0 m Sandy medium to coarse gravel, variable from well to poorly sorted with occasional sand layers to 0.4 m thick, some horizons are particularly dirty.
Estimated 65% gravel, 30% > 2.5 cm, 3% > 10 cm.

D.O.T. data (1973) indicate fines vary from 2% to 14% and the Los Angeles abrasion loss is 26%. The material is suitable for borrow and is borderline for subbase due to excess fines.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	88	74	54	38	17	10	7.8 7.7
D.O.T. 1973	81.0		46.0	31.3	23.0	18.0		10.5			5.4
D.O.T. 1973	93.0		72.0	56.5	43.3	34.3		17.5			9.1

Lithologic Analysis:

Unsound Lithotypes % 18		Sound Lithotypes % 82	
Shale	7	Limestone	32
Limestone	6	Sandstone	28
Chert	3	Igneous	10
Siltstone	2	Siltstone	7
		Metamorphic	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	2	4	80,000

Location: 39 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 027 545

Section Description & Comments:

A pit located in high level outwash along the Saint John River south of the Beechwood Dam. Extensive slopes of gravel are visible on the river bank in the area. Bedrock is exposed in the river bank beneath the gravel and along the highway to the west.

Pit Face:

0.3 m Pebbly medium sand (overburden)
8.0 m Sandy medium to coarse gravel with fine gravel and sand lenses and layers, well bedded and moderately well sorted, moderate carbonate cementation over much of pit.
Estimated 70% gravel, 40% > 2.5 cm, 5% > 10 cm, maximum 1 m.

D.O.T. data (1965) indicate < 2.5% fines with an abrasion loss of 20%. Bedrock is exposed in the river bank approximately 10 m beneath the pit floor.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	86	80	64	48	28	15	11	8.7
D.O.T. 1965	83.0		57.1		34.8			9.0			8.6 1.5

Lithologic Analysis:

Unsound Lithotypes % 12		Sound Lithotypes % 88	
Siltstone	6	Sandstone	26
Chert	3	Limestone	26
Slate	2	Siltstone	19
Sandstone	1	Igneous	12
		Other sedimentary	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
90	45	5	2,250,000

Location: 40 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 032 538

Section Description & Comments:

Small deposit on valley side above Saint John River. Bedrock is exposed in the pit floor.

Pit Face:

0.3 m Pebbly sand (overburden)
0.3-2.0m Pebbly medium to coarse sand, 5-10% gravel
2.0-3.0m Sandy medium gravel, some very clean and well sorted layers of limited extent. Estimated 60% gravel, 20% > 2.5 cm, occasional cobble.

D.O.T. data (1965) indicate a very variable deposit with isolated pockets that meet all aggregate specifications. Present exposure indicates that it is not possible to extract these small pockets and that the mixed material could produce borrow and subbase products.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	97	90	78	58	33	12	4	3.0 2.9
D.O.T. 1965	78.5		53.3		30.8			8.6			3.3

Lithologic Analysis:

Unsound Lithotypes % 11		Sound Lithotypes % 89	
Sandstone	3	Sandstone	41
Siltstone	3	Limestone	23
Chert	3	Igneous	15
Igneous	2	Siltstone	10

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited by bedrock

Location: 41 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 04 7 527

Section Description & Comments:

Pit in high level outwash materials near the Saint John River. The variability of the materials would suggest proximal facies or ice-contact conditions. Located where Kilpatrick Brook flows into the Saint John River.

Pit Face:

1.0 m Silty sand (overburden)
5.0 m Variable medium to coarse gravel, clean to dirty.
Estimated 60% gravel, 35% > 2.5 cm, 4% > 10 cm.

D.O.T. data (1965) indicate bedrock at 2.7 m below pit floor. Proposed uses were borrow and subbase. Los Angeles abrasion losses range from 21 to 25%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	75	60	48	36	26	20	15.1 14.9
D.O.T. 1965	85.6		66.7		40.8			10.4			3.6

Lithologic Analysis:

Unsound Lithotypes % 12		Sound Lithotypes % 88	
Shale	6	Limestone	39
Siltstone	3	Sandstone	29
Slate	2	Siltstone	15
Sandstone	1	Igneous	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	1	5	50,000

Location: 42 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 060 529

Section Description & Comments:

A rambling pit excavated in a low level terrace of the Saint John River north of Bath.

Pit Face:

1.0 m Sandy silt (overburden)
7.0 m Highly variable and erratic silty very fine sand to dirty medium gravel, clay balls in gravel, some selective extraction possible. Estimated (better material) 35% gravel, 15% > 2.5 cm

D.O.T. data (1975) indicate 7-15% fines and 20-25% abrasion loss. The material is suitable for borrow and is borderline for subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	89	84	76	45	8	4	3.7 3.5
D.O.T. 1975	82.0		60.9		33.5			11.1			2.7

Lithologic Analysis:

Unsound Lithotypes % 21		Sound Lithotypes % 79	
Siltstone	13	Sandstone	28
Shale	6	Siltstone	23
Sandstone	2	Igneous	21
		Quartzite	7

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
47	10	5	500,000 much sand

Location: 43 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 074 526

Section Description & Comments:

One of several pits in an area of high level outwash north of Bath.

Pit Face:

7.0 m Highly variable sandy gravel and fine to medium sand, sand areas are segregated enough to permit selective extraction. Estimated (coarser areas only) 50% gravel, 20% > 2.5 cm, 1% > 10 cm.

D.O.T. data (1958) indicate less than 2% fines and an abrasion loss of 28%.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	81	65	45	21	5	2	1.6
D.O.T. 1958	79.1		56.6		32.3			9.6			1.5 1.0

Lithologic Analysis:

Unsound Lithotypes % 22		Sound Lithotypes % 78	
Limestone	9	Limestone	29
Shale	7	Igneous	15
Igneous	5	Siltstone	14
Phyllite	1	Metamorphics	11
		Sandstone	9

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m3) probable
19	5	5	250,000 includes much sand

Location: 44 **County:** Carleton

Type Of Deposit: Outwash/ice-contact **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 081 516

Section Description & Comments:

The pit is located on the upper terrace level but the excavation has gone through the outwash into ablation gravel and till. It is probable that the outwash will decrease in thickness as the excavation is extended to the east.

Pit Face:

0.5 m Sandy gravel (overburden)
4.5 m Silty sandy medium gravel, well bedded and moderately well sorted, appears to be much shale.
Estimated 50% gravel, 20% > 2.5 cm, 1% > 10 cm.
2.0 m Poorly sorted dirty sandy coarse gravel, rough, angular clasts, probably ablation till.

D.O.T. data (1975) indicate 6% fines and an abrasion loss of 25%. The pit can produce borrow, subbase and base course if dirty sections are avoided. Bedrock was encountered 2 m below pit floor.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	82	65	47	28	13	7	4.4 4.4
D.O.T. 1975	93.5		68.0	51.0	37.3	27.8		12.3			4.9

Lithologic Analysis:

Unsound Lithotypes % 13		Sound Lithotypes % 87	
Shale	11	Sandstone	36
Limestone	2	Limestone	19
		Siltstone	17
		Igneous	15

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
25	4	3	120,000 upper terrace

Location: 45 **County:** Carleton

Type Of Deposit: Ice-contact **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 127 515

Section Description & Comments:

A small excavation in ablation till and ice-contact materials.

Pit Face:

4.0 m Very poorly sorted dirty sandy coarse gravel, crudely stratified with many large boulders, upper 2 m slightly better sorted. Estimated 70% gravel, 40% > 2.5 cm, 5% > 10 cm, maximum boulder 0.7 m

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 46 **County:** Carleton

Type Of Deposit: Ice-contact **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 148 488

Section Description & Comments:

The pit is located in an area of ice-contact stratified drift north of Gordonville. This pit is unusually sandy compared to most deposits in the area.

Pit Face:

10.0 m Sandy medium gravel, gravelly to pebbly medium to coarse sand, occasional coarse gravel lenses, moderately well bedded. Estimated 45% gravel, 25% > 2.5 cm

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	78	60	43	22	8	5	3.0 2.9

Lithologic Analysis:

Unsound Lithotypes % 14		Sound Lithotypes % 86	
Phyllite	9	Igneous	39
Chert	3	Sandstone	28
Igneous	1	Siltstone	15
Sandstone	1	Limestone	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
10	10	7	700,000

Location: 47 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 110 487

Section Description & Comments:

The deposit is poorly exposed and appears to thin rapidly away from the road.

Pit Face:

3.0 m Sandy medium to coarse gravel, till in base of pit.
Estimated 50% gravel, 30% > 2.5 cm, 1% > 10 cm

D.O.T. data (1974) indicate an erratic deposit with limited tonnage. Abrasion losses are approximately 24%. The deposit is capable of producing borrow, subbase, base coarse and cover chips.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T 1974	75.3		54.3	42.0	33.0	25.3		9.0			3.2

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 48 **County:** Carleton

Type Of Deposit: Outwash/till **Parish:** Kent

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 096 475

Section Description & Comments:

The pit is developed in an outwash deposit at the confluence of Shikatehawk Stream and the Saint John River. The pit exposes outwash over probable ablation till. This stratigraphy indicates that either the outwash is very thin or that the material is ice-contact in origin and these two units are facies variants within the deposit. The deposit is very erratic.

Pit Face: (east end)

2.0 m Sandy medium gravel, moderately developed horizontal bedding
2.5 m Silty sandy cobbly till, minor mixed stratified material. Estimated (entire face) 60% gravel, 35% > 2.5 cm, 3% > 10 cm maximum boulder 1 m, highly variable.

D.O.T. data (1977, 1979) indicate an abrasion loss of 25%. The material is acceptable only as borrow because of excess fines.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	76	57	40	22	9	5	3.5 3.4
D.O.T. 1977	98.3		76.3	58.0	45.0	36.0		18.7			7.1
D.O.T. 1979	89.9		68.3	52.3	40.0	31.1		18.3			8.3

Lithologic Analysis:

Unsound Lithotypes % 12		Sound Lithotypes % 88	
Shale	10	Limestone	28
Sandstone	2	Quartzite	28
		Igneous	20
		Siltstone	8
		Metamorphic	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 49 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 088 488

Section Description & Comments:

This is the largest of several pits developed in outwash terraces at an intermediate and high level along the Saint John River at Wicklow. The pit has been active recently and a loader was present at the site.

Pit Face:

0.6 m Pebbly sand (overburden)
8.0 m Well bedded, moderately sorted sandy gravel with medium to coarse sand lenses and interbeds, discrete sand layers to 0.3 m. Estimated 60% gravel, 25% > 2.5 cm, maximum boulder 1 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	97	82	66	50	33	20	13	8.1 7.9

Lithologic Analysis:

Unsound Lithotypes % 5		Sound Lithotypes % 95	
Limestone	3	Limestone	43
Chert	1	Sandstone	32
Slate	1	Igneous	12
		Siltstone	8

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	70	8	5,600,000

Location: 50 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Abandoned **UTM:** 077 466

Section Description & Comments:

The pit is located adjacent to the Saint John River in a low level outwash terrace. The exposures are badly slumped but observations indicate very clean material.

Pit Face:

0.3 m Pebbly dirty sand (overburden).
6.0 m Fine to medium sandy gravel, gravelly medium to coarse sand and medium to coarse sand, well bedded and moderately well sorted.
Estimated 50% gravel, 25% >2.5 cm.

D.O.T. data (1962) indicate that the material can be used for borrow, base course, blending sand and filter sand.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	91	79	72	67	51	18	8	3.2 3.1
D.O.T.	79.9		67.9		54.3			22.2			2.1
D.O.T.	100.0		96.1		91.9			51.4			5.4

Lithologic Analysis:

Unsound Lithotypes % 3		Sound Lithotypes % 97	
Shale	1	Sandstone	35
Sandstone	1	Limestone	33
Chert	1	Siltstone	11
		Igneous	11
		Quartzite	5
		Metamorphic	2

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
Same deposit as location 52			Limited by cultural features

Location: 51 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 066 458

Section Description & Comments:

This pit has been active recently and is supplying the local concrete plant. The pit is located in an unusually thick outwash deposit adjacent to the Saint John River north of Florenceville. The thickness of material, location and bedding indicate that the deposit may be an outwash delta.

Pit Face:

16.0 m Moderately sorted, moderately well bedded sandy medium to coarse gravel, some coarse gravel and medium to coarse sand lenses.
Estimated 70% gravel, 35% >2.5 cm, 3% >10 cm.

Mechanical Analysis:

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	99	89	73	51	32	21	14	7.4
										7.2

Lithologic Analysis:

Unsound Lithotypes %	31	Sound Lithotypes %	69
Limestone	10	Limestone	31
Shale	7	Siltstone	15
Phyllite	7	Igneous	14
Siltstone	3	Sandstone	9
Sandstone	4		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m³) probable
12	7	15	1,050,000

Location: 52 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 069 458

Section Description & Comments:

This site is a series of small pits developed in the same outwash terrace described in location 50. Exposures indicate a veneer of dirty fine sand is common in the area. A concrete plant near the site produces a variety of redi-mix concrete mixes for local construction. The plant was not operating at the time of the field visit but it is described in Hamilton and Carroll (1975).

Pit Face:

Upper Bench:

2.0 m Dirty silty fine sand, presently being extracted for fill.

Lower Bench:

3.5 m Sandy coarse gravel, poorly developed horizontal bedding, occasional sand lens.
Estimated (lower unit) 80% gravel, 60% >2.5 cm, 5% >10 cm.

D.O.T. data (1962) indicate an excess of 1½ - 3 inch sizes, and an abrasion loss of 20%. The material is suitable for borrow, subbase and base course use.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1962	70.4		41.0		27.9			9.6			1.6
D.O.T. 1962					99.5			98.3			16.3

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m³) probable
Same deposit as location 50.			Limited

Location: 53 **County:** Carleton

Type Of Deposit: Outwash-Ablation Till **Parish:** Peel

Exposure Type: Pit Face **NTS:** 21J/5

Status: Active **UTM:** 096 423

Section Description & Comments:

This is a small borrow pit developed for a road improvement project.

Pit Face:

3.0 m Poorly sorted sandy medium to coarse gravel, crudely stratified.

3.0 m Very poorly sorted coarse gravel, sandy and silty, possible ablation till.

D.O.T. data (1974) indicate an excess of fines and an abrasion loss of 27%. The material is useable as borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1974	79.4		61.0	49.4	38.0	29.6		13.0			4.8

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 54 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Active **UTM:** 964 445

Section Description & Comments:

The pit is developed in the higher of two levels of outwash.

Pit Face:

0.6 m Pebbly sand (overburden).
7.0 m Well bedded sandy medium gravel, deltaic type crossbedding dipping to the southeast, moderately to well sorted, bedrock exposed in base of pit.
Estimated 60% gravel, 30% >2.5 cm, 1% >10 cm.

Mechanical Analysis:

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	98	80	52	26	8	4	2	2.0
										2.0

Lithologic Analysis:

Unsound Lithotypes % 29		Sound Lithotypes % 71	
Limestone	15	Limestone	39
Shale	9	Igneous	13
Phyllite	5	Sandstone	9
		Metamorphic	6
		Siltstone	4

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
1	1	6	60,000 upper level terrace

Location: 55 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 963 441

Section Description & Comments:

The pit is located in the lower of two terrace levels in an area of outwash north of Tracey Mills.

Pit Face:

0.5 m Pebbly sand (overburden).
5.5 m Sandy fine to medium gravel, layered, with some coarse gravel, occasional pockets of fine to medium sand, abundant shale noted on surface.

Estimated 60% gravel.

D.O.T. data (1979) indicate less than 5% fines and an abrasion loss of 27%. The pit has been approved for asphalt aggregate.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1979	91.0		74.6	57.8	43.6	28.8		9.2			3.9

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
50	40	6	2,400,000 lower terrace

Location: 56 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Active **UTM:** 967 432

Section Description & Comments:

This pit is the location of the Trafford Redi-Mix concrete plant at Tracey Mills. The deposit is too coarse for use without processing and the owner has found it more economic to import processed aggregate from Houlton, Maine than to process his own material. The material at the site is used as a source of fill. The concrete plant produces a variety of redi-mix concretes for local construction projects.

Pit Face:

1.0 m	Sandy gravel (overburden).
7.0 m	Sandy medium to coarse gravel, moderately well bedded. Estimated (from this unit only) 60% gravel, 25% >2.5 cm, 2% >10 cm.
2.0 m	Pebbly medium to coarse sand.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	71	51	34	20	10	7	5.9 5.8

Lithologic Analysis:

Unsound Lithotypes % 16		Sound Lithotypes % 84	
Shaly limestone	10	Limestone	44
Chert	2	Sandstone	20
Shale	4	Igneous	18
		Metamorphic	2

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited by cultural features

Location: 57 **County:** Carleton

Type Of Deposit: Ice-Contact **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 950 427

Section Description & Comments:

A small pit in an irregular ice-contact deposit.

Pit Face:

0.3 m Pebbly medium sand (overburden).
7.0 m Fine to medium sandy gravel, boulders and cobbles common, dirty, poorly sorted.
Estimated 60% gravel, 25% >2.5cm, 2% >10 cm.

D.O.T. data (1959, 1974) indicate an erratic source with ground water beneath the pit floor. The material is suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1959	79.3		58.7		29.6			4.0			0.8
D.O.T. 1974	88.0		67.0	47.8	30.4	18.0		6.0			2.7

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
			Limited

Location: 58 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wicklow

Exposure Type: Pit Face **NTS:** 21J/5

Status: Abandoned **UTM:** 959 425

Section Description & Comments:

Pit visit not possible - data from D.O.T. data (1961).

Pit Face:

0.6 m Sandy medium gravel, dirty, overburden.
13.0 m Sandy medium gravel, occasional boulders.

Los Angeles abrasion loss 26%. Erratic grading but suitable for borrow, subbase and base course.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1961	64.6		52.7		33.9			9.6			3.4
D.O.T. 1961	73.3		53.3		29.8			3.7			1.9
D.O.T. 1961	79.7		71.7		56.5			16.9			2.2

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
2	1	10	100,000

Location: 59 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Abandoned **UTM:** 022 409

Section Description & Comments:

This pit is one of several developed in outwash associated with the Presque Isle Stream. These deposits are relatively thick but do not extend far back from the stream, bedrock is usually a limiting factor.

Pit Face:

3.0 m	Sandy medium gravel, some dirty areas, silty sand lenses.
3.0 m	Sandy fine to medium gravel, moderate cementation observed.
	Estimated (both units) 50% gravel, 30% >2.5 cm.

D.O.T. data (1959, 1961) gives 22-26% Los Angeles abrasion loss. The material is useable as borrow and subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1959	94.4		70.0		34.3			15.6			2.1
D.O.T. 1961	94.0		77.5		43.6			19.7			3.9

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
7	1	6	60,000

Location: 60 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 032 399

Section Description & Comments:

This pit is developed in one of several small patches of outwash associated with Presque Isle Stream. This particular pit shows a considerable quantity of sand in the centre of the exposure.

Pit Face:

0.6 m Pebbly medium sand (overburden).
3.0 m Dirty fine to medium gravel, occasional sand lens, a large area of dominantly sand occurs in the centre of the pit.
Estimated (gravel area only) 35% gravel, 10% >2.5 cm.

D.O.T. data (1966) indicate a Los Angeles abrasion loss of 18-21%. Records indicate some problems with grading and an excess of fines. Bedrock is recorded in test pits. The material is useable as borrow and subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1966	87.4		62.8		24.2			8.4			3.6
D.O.T. 1966	97.3		78.2		43.8			17.0			4.3

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m³) probable
8	6	4	240,000

Same deposit as location 61.

Location: 61 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Active **UTM:** 935 397

Section Description & Comments:

This pit was recently opened to supply a local road construction project.

Pit Face:

1.0 m	Pebbly medium sand (overburden).
3.0 m	(Thickness variable 2 m to 4.5 m). Very dirty sandy medium gravel, silty clay coating on most pebbles, gravel is generally uniform in size range, bedding is horizontal and the gravel has a generally open framework.
2.5 m	Sandy medium gravel, variable bedding, much cleaner than above unit and greater proportion of sand. Estimated (entire face) 50% gravel, 25% >2.5 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	72	52	40	23	9	6	5.7
											5.7

Lithologic Analysis:

Unsound Lithotypes % 17		Sound Lithotypes % 83	
Limestone	2	Limestone	49
Chert	3	Siltstone	10
Shale	12	Sandstone	18
		Igneous	6

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
8	6	4	240,000

Same deposit as location 60.

Location: 62 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 063 391

Section Description & Comments:

The pit is developed in a high level outwash deposit near the confluence of Presque Isle Stream and the Saint John River. The pit appears to be developed in a thicker portion of the deposit.

Pit Face:

0.3 m	Dirty sandy gravel (overburden).
11.0 m	Sandy medium to coarse gravel, moderately well sorted, well bedded, rare silty sand pocket, appears clean. Estimated 70% gravel, 40% >2.5 cm, 1% >10 cm, maximum boulder 0.3 m.

D.O.T. data (1964) indicate an excess of stone and a Los Angeles abrasion loss of approximately 20%. The deposit is capable of producing borrow, subbase, base course, and chip seal aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	91	77	51	18	8	6	5.6
											5.5
D.O.T. 1964	70.7		47.0		26.2			5.4			1.9
D.O.T. 1964	93.8		76.9		44.9			11.9			2.3

Lithologic Analysis:

Unsound Lithotypes % 18		Sound Lithotypes % 82	
Limestone	6	Limestone	40
Shale	5	Igneous	18
Siltstone	3	Calcareous Sandstone	14
Sandstone	2	Siltstone	4
Igneous	1	Metamorphic	4
Chert	1	Quartzite	2

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
8	4	7	280,000 upper terrace

Location: 63 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Recently Active **UTM:** 074 382

Section Description & Comments:

The pit is developed in an outwash deposit on the crest of the Saint John River valley.

Pit Face:

0.6 m	Fine to medium sand (overburden).
4.0 m	Highly variable sandy medium gravel to pebbly medium sand, fairly well sorted but bedding is erratic, occasional silt and till-like pockets. Estimated (in better areas) approximately 50% gravel, 20% >2.5 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	95	79	69	60	44	16	6	4.7
											4.7

Lithologic Analysis:

Unsound Lithotypes % 17		Sound Lithotypes % 83	
Limestone	15	Limestone	47
Chert	2	Igneous	19
		Sandstone	9
		Siltstone	8

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
25	10	4	400,000

Location: 64 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Peel

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 088 383

Section Description & Comments:

This is a large rambling pit with numerous excavations. A total of 10 m of highly variable material is present and large quantities of material have been removed. There are presently a number of pockets of gravel material exposed. The exposures at the north end of the pit are indicative of outwash sediments, the materials at the south end of the pit are considerably more variable and suggest proximal outwash or ice-contact type sedimentation. Face data is taken from the active face in the centre of the pit.

Pit Face:

2.0 m Sandy medium gravel, well bedded.
Estimated 50% gravel, 30% >2.5 cm, 1% >10 cm.

D.O.T. data (1965) indicate Los Angeles abrasion loss of 22% and that bedrock was encountered in test pits.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	74	56	42	22	11	8	5.6
D.O.T. 1965	86.8		57.5		28.6			11.9			5.5 5.1

Lithologic Analysis:

Unsound Lithotypes % 19		Sound Lithotypes % 81	
Limestone	14	Limestone	40
Chert	2	Igneous	15
Shale	1	Sandstone	13
Igneous	1	Metamorphic	7
Slate	1	Siltstone	6

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	10	5	500,000

Same deposit as location 65.

Location: 65 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Peel

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 100 376

Section Description & Comments:

The material exposed in this pit is variable in nature and is probably proximal facies outwash. No bedrock was observed but it is suspected in the pit floor. The south end of the pit has been excavated most recently and it is described as the pit face. The material at the northern end of the pit is primarily fine to medium sand.

Pit Face:

2.0 m	Dirty sandy medium gravel.
10.0 m	Chaotically bedded sandy gravel, gravelly sand, and sand variable. Estimated (centre of pit, recent excavation) 35% gravel, 15% >2.5 cm, 2% >10 cm, maximum 1 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	87	72	54	33	18	12	6.6
											6.4

Lithologic Analysis:

Unsound Lithotypes % 34		Sound Lithotypes % 66	
Metamorphic	17	Limestone	22
Phyllite	9	Igneous	20
Limestone	5	Sandstone	19
Chert	3	Siltstone	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	10	5	500,000

Same deposit as location 64.

Location: 66 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Abandoned **UTM:** 100 362

Section Description & Comments:

The pit is badly overgrown and the materials are poorly exposed.

Pit Face:

10.0 m Poorly exposed gravelly sand to sandy gravel.
Estimated 40% gravel, 15% >2.5 cm.

Mechanical Analysis N.A.

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)										

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
70	10	7	700,000

Location: 67 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 108 336

Section Description & Comments:

This pit exposes very dirty material in a high level outwash terrace along the Saint John River north of Hartland.

Pit Face:

0.6 m	Pebbly dirty sand (overburden)
10.0 m	Very dirty, very variable gravelly sand, poorly stratified and poorly sorted. Estimated 30% gravel, 10% >2.5 cm, maximum 1 m.

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
129	5	8	400,000

Same deposit as locations 68, 69 and 70.

Location: 68 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 110 321

Section Description & Comments:

The pit is located on the valley side in a high level outwash terrace. Some crushed material is present in the pit.

Pit Face:

10.0 m Variable silty to gravelly sand, sandy medium gravel and clean medium to coarse sand.
Estimated 50% gravel, 25% >2.5 cm, 1% >10 cm.

Mechanical Analysis:

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)		100	96	76	58	38	17	4	2	1.1
										1.0

Lithologic Analysis:

Unsound Lithotypes % 21		Sound Lithotypes % 79	
Limestone	11	Limestone	31
Shale	7	Igneous	24
Sandstone	2	Sandstone	14
Chert	1	Siltstone	5
		Quartzite	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
129	5	8	400,000

Same deposit as locations 67, 69 and 70.

Location: 69 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 115 303

Section Description & Comments:

Adjoining location 70 in high level outwash overlying ablation till.

Pit Face:

7.5 m	Medium and coarse sandy gravel, interbedded with occasional sand lenses, numerous cobbles, boulders. Estimated 50% gravel, 25% >2.5 cm, 5% >10 cm.
4.0 m	Hard silty cobbly sandy gravel, ablation till.

D.O.T. data (1973) give an abrasion loss of 23%. The pit can produce borrow, subbase, base course, and cover chips.

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
129	.5	8	400,000

Same deposit as locations 67, 68 and 70.

Location: 70 **County:** Carleton

Type Of Deposit: Outwash/ablation till **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 115 301

Section Description & Comments:

This is one of a number of pits in a high level outwash deposit on the Saint John River north of Hartland. Ablation till is exposed in the base of the pit.

Pit Face:

5.0 m Variable and interbedded sandy gravel to pebbly sand. Estimated 50% gravel, 25% > 2.5 cm, 1% > 10 cm.

4.0 m Poorly sorted, cobbly silty sandy gravel, ablation till

D.O.T. data (1966) indicate an excess of fines and bedrock in test pits. The material is useable as borrow and possibly some subbase and filter.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	81	64	48	26	5	1	0.8
											0.7
D.O.T. 1966	95.1		74.7		50.8			16.8			3.5
D.O.T. 1966	81.5		62.0		39.0			18.1			13.5

Lithologic Analysis:

Unsound Lithotypes % 16		Sound Lithotypes % 84	
Limestone	5	Limestone	33
Shale	6	Igneous	16
Slate	2	Siltstone	14
Igneous	2	Metamorphic	11
Sandstone	1	Sandstone	9
		Quartzite	1

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
129	5	8	400, 000

Same deposit as locations 67, 68 and 69

Location: 71 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Simonds

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 122 288

Section Description & Comments:

This pit is located in a high level outwash terrace on the west side of the Saint John River north of Hartland.

Pit Face:

0.3 m Gravelly dirty medium sand (overburden)
6.0 m Laminated and interbedded sandy medium gravel to pebbly sand. Sand and pebbly sand is present in more than ¼ of the pit face. Estimated (entire face) 50% gravel, 20% > 2.5 cm

D.O.T. data (1966) indicate a Los Angeles abrasion loss of 30% and that the material is useable as borrow and subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	98	82	63	42	32	29	18	8.6 8.5
D.O.T. 1966	100.0		84.2		59.1			21.4			4.1

Lithologic Analysis:

Unsound Lithotypes % 17		Sound Lithotypes % 83	
Limestone	9	Limestone	38
Siltstone	3	Igneous	21
Shale	2	Sandstone	14
Sandstone	1	Siltstone	5
Slate	1	Quartzite	5
Igneous	1		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
10	4	6	240,000

Location: 72 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Brighton

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 147 269

Section Description & Comments:

The pit is located beside Highway 105 in a high level outwash deposit.

Pit Face:

0.3 m Pebbly silty fine sand (overburden)
8.0 m Sandy medium gravel to gravelly medium to coarse sand, occasional medium sand pocket, there is a general coarsening of material downward.
Estimated 35% gravel, 15% > 2.5 cm, 1% > 10 cm

D.O.T. data (1964) indicate a Los Angeles abrasion loss of 21% and less than 3% fines. The material is useable as borrow and subbase.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	95	72	48	29	17	11	6	3.3
D.O.T. 1964	89.2		70.8		39.4			9.2			3.2 2.4

Lithologic Analysis:

Unsound Lithotypes % 13		Sound Lithotypes % 87	
Shale	7	Igneous	29
Phyllite	5	Limestone	20
Chert	1	Sandstone	20
		Siltstone	15
		Metamorphic	3

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
100	2	6	120,000

Same deposit as location 73

Location: 73 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Brighton

Exposure Type: Pit Face **NTS:** 21J/5

Status: Recently Active **UTM:** 154 262

Section Description & Comments:

The pit is immediately east of Highway 105 and is situated in a high level terrace of the Saint John River.

Pit Face:

0.6 m Pebbly sand (overburden)
4.0 m Sandy medium to coarse gravel and gravelly coarse sand, moderately well stratified with sand laminae to 0.2 m thick, moderately dirty. Estimated 60% gravel, 20% > 2.5 cm, 1% > 10 cm.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	77	58	38	22	10	5	3.7 3.5

Lithologic Analysis:

Unsound Lithotypes % 34		Sound Lithotypes % 66	
Limestone	13	Igneous	29
Siltstone	6	Sandstone	14
Shale	7	Metamorphic	13
Slate	4	Siltstone	10
Igneous	3		
Chert	1		

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
100	2	6	120,000

Same deposit as location 72.

Location: 74 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Brighton

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 152 239

Section Description & Comments:

The pit is developed between Highway 105 and the railroad on a high terrace of the Saint John River. The material is noteably variable and silty for outwash and the highway and railroad limit the area of extraction.

Pit Face:

0.6 m Silty fine to medium sand (overburden)
10.0 m Silty fine sand, medium to coarse sand, occasional layers and lenses of gravelly medium to coarse sand, occasional boulders throughout to 0.5 m, quite variable overall and boulders throughout to 0.5 m, quite variable overall and silty - especially toward base of pit.

D.O.T. data (1978) indicate a Los Angeles abrasion loss of 20 to 23% and the material is capable of producing mainly borrow material.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1968	91.3		72.3	57.8	45.5	35.5		19.5			8.4

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
30	15	8	1,200,000

Location: 75 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/12

Status: Inactive **UTM:** 972 387

Section Description & Comments:

This is one of several pits in the esker. It is an unusually coarse portion of the feature and the material is noteably coarse and poorly sorted.

Pit Face:

3.6 m Medium to coarse gravel with numerous cobbles and boulders, gravel is very poorly sorted and approaches till in composition, crudely laminated in places.

D.O.T. data (1974) indicate a Los Angeles abrasion loss of 27-33%. It was recommended for borrow, subbase and base course uses.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											
D.O.T. 1974	83.8		60.5	48.0	37.1	27.6		9.1			3.7

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
6	2	3	60,000

Location: 76 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 97 3 383

Section Description & Comments:

This pit is nearly depleted but some material remains between this pit and location 77.

Pit Face:

2.0 m Dirty sandy medium gravel, bedrock probable in pit floor, numerous cobbles.
Estimated 70% gravel, 40% > 2.5 cm, 5% > 10 cm maximum 0.3 m

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	1	4	40,000

Same deposit as location 77

Location: 77 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 975 382

Section Description & Comments:

One of several pits along a small segment of esker.

Pit Face:

0.6 m Pebbly medium sand (overburden)
5.0 m Very dirty medium to coarse gravel, till-like in places although stratification is common, occasional sand pockets, very sandy on flanks of esker, probably bedrock in pit floor.
Estimated 75% gravel, 40% > 2.5 cm, 5% > 10 cm.

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis:

Unsound Lithotypes % 42		Sound Lithotypes % 58	
Phyllite	14	Limestone	42
Shale	13	Siltstone	9
Shaly Limestone	12	Igneous	4
Igneous	2	Sandstone	2
Limestone	1	Quartzite	1

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
5	1	4	40,000

Same deposit as location 76

Location: 78 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Abandoned **UTM:** 013 330

Section Description & Comments:

An abandoned pit in a small esker.

Pit Face:

4.0 m Very dirty bouldery coarse gravel, some lenses of sandy silt till, a lot of shale in the gravel, possible bedrock in pit floor. Estimated 80% gravel, 60% > 2.5 cm, 10% >10 cm maximum 1 m

Mechanical Analysis: N.A.

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)										

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
14	5	2	100,000

Location: 79 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 050 263

Section Description & Comments:

One of several pits (locations 80, 81, 82, 84) in this portion of the esker. Numerous faces show extreme variability.

South Face: (on flank of esker)

2.0 m Stony sandy silt till (ablation till)
4.0 m Variably bedded pebbly to gravelly coarse sand.
Estimated 15% gravel overall, higher in pockets.

East Face: (on spine of esker)

8.0 m Sandy coarse gravel, crude bedding, some cementation.
Estimated 70% gravel, 45% > 2.5 cm, 5% > 10 cm
2.0 m Well laminated pebbly medium to coarse sand

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	40	5	2,000,000
Same deposit as Locations 80, 81, 82, 84			

Location: 80 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 051 261

Section Description & Comments:

One of several pits (location 79, 81, 82, 84) in this portion of the esker. Pit shows considerable variability.

Pit Face: (near esker spine)

10.0 m Sandy medium to coarse gravel
Estimated 70% gravel, 40% > 2.5 cm, 5% > 10 cm

Pit Face: (on flank of esker)

3.0 m Dirty gravelly medium to coarse sand to sandy medium gravel.
Estimated 40% gravel, 20% > 2.5 cm

Mechanical Analysis: N.A.

sieve	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)										

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	40	5	2,000,000
Same deposit as locations 79, 81, 82, 84			

Location: 81 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: On Demand **UTM:** 055 260

Section Description & Comments:

This pit is one of many in this section of the esker (location 79, 80, 82, 84). Bedrock is present in the pit floor and immediately adjacent to the esker in several areas.

Pit Face:

1.5 m Dirty sandy poorly sorted medium gravel

2.0 m Well bedded, moderately sorted interbedded fine to medium sand and gravelly coarse sand.
Estimated 15% gravel (entire face)
D.O.T. data (1975) indicate a Los Angeles abrasion loss of 25%.
The material is suitable for borrow, subbase, base course and asphaltic concrete aggregate.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing) D.O.T. 1975	94.2		75.7	59.5	45.2	33.0		7.7			2.9

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	40	5	2,000,000
Same deposits as	Locations 79, 80, 82, 84		

Location: 82 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 056 258

Section Description & Comments:

One of several pits (locations 79, 80, 81, 84) in the same portion of the esker. There are numerous other small diggings in the area.

Pit Face:

0.5 m Sandy gravel (overburden)
8.0 m Sandy medium to coarse gravel, poorly sorted with sandy to silty areas, most of the gravel has a coating of silt.
Estimated 60% gravel, 40% > 2.5 cm, 5% > 10 cm, maximum 1 m

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	94	70	45	26	19	16	15	13.3 13.1

Lithologic Analysis:

Unsound Lithotypes % 28		Sound Lithotypes % 72	
Shale	15	Limestone	50
Limestone	10	Igneous	10
Siltstone	3	Sandstone	7
		Siltstone	5

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	40	5	2,000,000
Same deposit as locations 79, 80, 81, 84			

Location: 83 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 081 260

Section Description & Comments:

Small pit in a very small area of outwash adjacent to the Little Presque Isle Stream.

Pit Face:

0.5 m Pebbly medium sand (overburden)
3.0 m Sandy medium gravel, well bedded and well sorted, bedrock in pit floor.
Estimated 40% gravel, 15% > 2.5 cm

Mechanical Analysis: N.A.

sieve		1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)											

Lithologic Analysis: N.A.

Unsound Lithotypes %	Sound Lithotypes %

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m³) probable
			Limited

Location: 84 **County:** Carleton

Type Of Deposit: Esker **Parish:** Wakefield

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 997 235

Section Description & Comments:

The pit is located in a broadened section of the esker. Much of the central spine of the feature has been removed but there appears to be some material in the flanks of the esker at this point.

Pit Face:

2.0 m Silty sand, occasional gravel lens
3.5 m Very dirty variable sandy gravel.
Estimated 50% gravel, 10% > 2.5 cm, maximum 0.5 m

D.O.T. data (1959) gives a Los Angeles abrasion loss of 28% with approximately 8% fine material. The pit is capable of producing borrow and subbase.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	96	79	62	49	36	25	15	8.6
											8.4
D.O.T. 1959	95.1		77.2		47.6			16.2			8.4

Lithologic Analysis:

Unsound Lithotypes % 31		Sound Lithotypes % 69	
Limestone	18	Limestone	41
Shale	10	Igneous	14
Phyllite	2	Metamorphic	5
Igneous	1	Sandstone	4
		Siltstone	4
		Quartzite	1

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
120	40	5	2,000,000
Same deposit as locations 79, 80, 81, 82			Limited at Site

Location: 85 **County:** Carleton

Type Of Deposit: Outwash **Parish:** Wilmot

Exposure Type: Pit Face **NTS:** 21J/5

Status: Inactive **UTM:** 939 259

Section Description & Comments:

The pit is located in an outwash channel along the Maine - New Brunswick boundary.

Pit Face:

0.5 m Pebbly silty sand (overburden)
3.0 m Dirty sandy medium gravel, moderate sorting
Estimated 60% gravel, 25% > 2.5 cm

D.O.T. data (1972) indicate an abrasion loss of 24% and an excess of fines. The material is suitable for borrow only.

Mechanical Analysis:

sieve	2"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
(% passing)			100	97	89	82	74	48	5	2	1.3 1.1
D.O.T. 1972	81.0		67.0	56.0	46.0	38.0		23.0			12.3

Lithologic Analysis:

Unsound Lithotypes % 15		Sound Lithotypes % 85	
Siltstone	8	Igneous	33
Slate	6	Sandstone	22
Chert	1	Siltstone	17
		Metamorphic	13

Estimation Of Reserves:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (meters)	Recoverable Reserves (m^3) probable
175	100	2	2,000,000 Over very large area