# GRANULAR AGGREGATE RESOURCES THE BATHURST MAP-AREA (N.T.S. 21P/12)

BY

P.F. FINAMORE

MINERAL RESOURCES BRANCH

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## ABSTRACT

This report provides an inventory of granular aggregate resources for the Bathurst (21 P/12) map area. The inventory included mapping granular aggregate deposits, collecting samples and estimating material depth to determine the general quality and quantity of individual deposits.

The total amount of granular aggregate material in the Bathurst map-area is approximately 106 million $m^3$. Approximately 28 million $m^3$ of this total is of good to excellent quality. These figures suggest that presently, there is an adequate supply of granular aggregate material in the Bathurst area.



## RESUME

Le présent rapport présente un inventaire des agrégats pour la région cartographiée (21P/12) de Bathurst. L'inventaire comprend la cartographie des dépots d'agrégats granuleux, les échantillonnages et l'évaluation de la profondeur du dépot, dans le but de déterminer d'une manière générale la qualié et la quantité des matériaux à chacun des emplacements.

La somme totale d'agrégats granuleux dans la région cartographiée de Bathurst est d'environ 106 millions de $m^3$. De ce total, environ 28 millions de $m^3$ sont d'une qualité de bonne à excellente. Ces chiffres indiquent qu'on peut compter présentement sur un approvisionnement suffisant d'agrégats granuleux dans la région de Bathurst.

# INTRODUCTION

## Location:

The area investigated is the Bathurst (N.T.S. 21P/12) map-area and is confined by 47°30' and 47°45' north latitude and 65°30' and 66°00' west longitude. The area lies in northern New Brunswick and includes the City of Bathurst and surrounding communities (Figure 1). Nepisiguit Bay borders the northeastern corner of the map-area.

## Previous Work:

Geologic bedrock maps of the Bathurst map-area have been numerous, owing to the occurrence of abundant mineral wealth and potential.

Young (1911) initiated the first detailed mapping in this area. Alcock (1941) compiled a more regional study of the Jacquet River and Tetagouche River map-areas (G.S.C. Memoir 227) at a scale of 1 inch = 2 miles. The Bathurst map-sheet is included in his study.

A more complete study of the bedrock geology of Tetagouche Lakes, Bathurst, and Nepisiguit Falls map-areas was undertaken by Skinner (1974). More recent detailed mapping by the New Brunswick Department of Natural Resources includes portions of the Bathurst map-sheet at a scale of 1 inch = 1/4 mile (Fyffe, 1974, 1975 and Williams, 1976).

Early work on the surficial geology of this area was reported by Chalmers (1885, 1888). Until recently, little further attention had been given to this area.

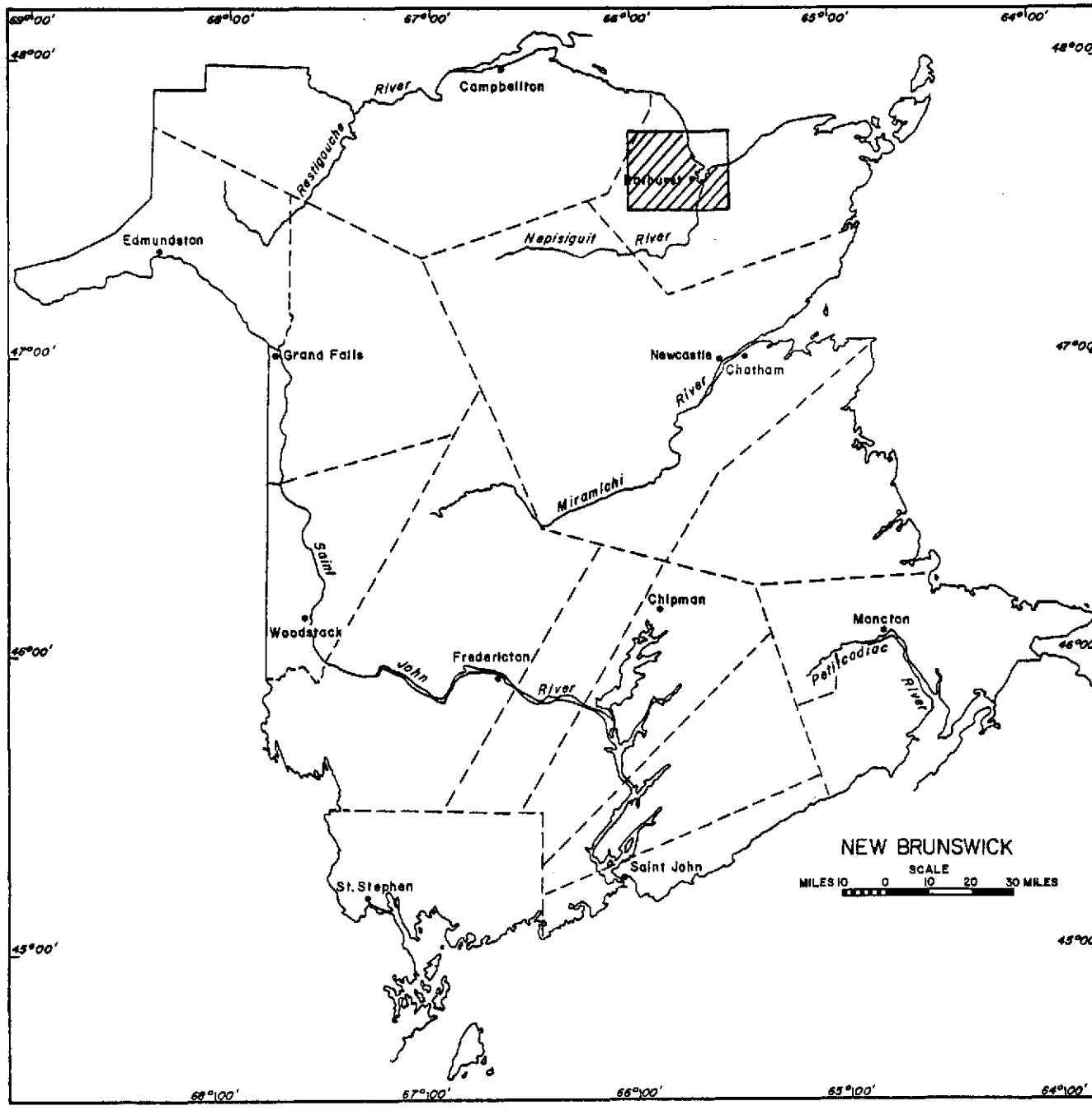


Figure 1: Map Showing Location of Study Area

In 1975, an inventory of sand and gravel in New Brunswick was compiled to "provide a basis for the establishment of an overall granular resource management plan for the Province" (Hamilton and Carroll, 1975). A map of the generalized surficial geology of New Brunswick accompanied that report.

In 1976, the Geological Survey of Canada initiated a mapping program to study the Quaternary geology of north-eastern New Brunswick. The area studied by the Geological Survey includes the Bathurst map-area and is designated by the National Topographic Series 21P map-sheet at a scale of 1:250,000 (Gauthier and Cormier, 1977 and Gauthier, 1978).

In the fall of 1976, a granular aggregate resource study was undertaken by the New Brunswick Department of Natural Resources at the request of the Belledune Planning Commission to provide basic information on granular aggregate resources within the Belledune Planning District (Barnett et al., 1977). A portion of this report includes part of the Bathurst map-area and has been incorporated into the present study.

Present Study:

This report summarizes field work undertaken during the fall of 1976 and the summer of 1977. It forms part of an inventory of granular aggregate resources for the Bathurst-centred region. The inventory included mapping granular aggregate deposits, collecting samples and estimating material depth to determine the general quality and quantity of individual deposits.

Field work involved the examination of man-made and

natural exposures. Airphoto interpretation supplemented field work where access was difficult. In some instances, this necessitated the interpretation of the extent of some deposits.

Seismic studies were carried out near Blue Mountain and Little River (see Figures 2, 3 & 4) by J. Chandra (Geophysicist, Department of Natural Resources). This information has supplemented field data so that reserve estimates could be made. Consequently, the reliability of reserve estimates is greater in those areas where geophysics has been employed.

## DRAINAGE AND TOPOGRAPHY

All of the major rivers and streams in the Bathurst map-area empty into Nepisiguit Bay and most of them exhibit youthful characteristics that reflect, in part, the glaciation of the area.

The Nepisiguit River occupies a rather broad mature valley, exhibiting youthful characteristics such as the rapids near Rough Waters and the small waterfall and gorge at Pabineau Falls. It appears evident that this river is rejuvenating and that glaciation has influenced this process. Owing to its mature nature, the Nepisiguit River was probably preglacial in origin and it appears as though glaciation has altered its previous drainage basin.

The Tetagouche River, in contrast to the Nepisiguit River, is deeply incised into metamorphosed Ordovician sediments. Youthful characteristics again suggest rejuvenation due to glaciation. Gauthier (1977) discusses the fluvial evolution of this river in greater detail.

Other major drainage channels such as the Nigadoo, Little, Middle, and Millstream Rivers all exhibit youthful characteristics.

Numerous spits and barrier beaches have formed at the mouths of many rivers that empty into Nepisiguit Bay, as a result of postglacial sediment redistribution.

The two largest lakes in the map-area (Nigadoo and Pabineau) are both surrounded by ice-contact (morainic) ridges. The formation of these lakes is attributed to "drift-damming" by glacial processes.

The Bathurst map-area can be subdivided into two physiographic divisions: the Maritime Plain and the New Brunswick Highlands. Both divisions are part of the Appalachian Region of eastern Canada (Bostock, 1970).

The Maritime Plain, which lies east of the Nepisiguit River, is characterized by a low and gently rolling plain with elevations varying from sea level to 152 m (500 ft.) above sea level. Numerous bogs and poor drainage systems attest to the subdued nature of the topography.

The New Brunswick Highlands, which rise from sea level westwards, are characterized by deeply incised valleys and variable relief reaching a maximum elevation of 290 m (950 ft.) in the western part of the map-area.

The topography generally reflects the type of underlying bedrock. In comparison, the bedrock of the New Brunswick Highlands consists of volcanic and sedimentary fold belts and numerous intrusive rocks, whereas the Maritime Plain comprises flat-lying Pennsylvanian sediments.

## BEDROCK GEOLOGY

The bedrock in the Bathurst map-area can be subdivided into three regional geological units: the Ordovician folded belt, the Silurian-Devonian folded belt, and the red Pennsylvanian conglomerates and sandstones (Boyle and Davies, 1964).

Both folded belts comprise deformed volcanic and sedimentary rocks that have been intruded by Devonian gabbro and diorite sills and dykes, and other related intrusions; most notably, the Nicholas Denys granodiorite stock and the Bathurst granite batholith (Skinner, 1974).

Major modifications to Skinner's interpretation of the area are that rocks south of the Rocky Brook-Millstream fault that were classified as Middle Devonian or older have been reclassified as Ordovician and the Silurian rocks in the northern part of the map-area have been subdivided in greater detail (Fyffe, 1974, 1975 and Williams, 1976).

## SURFICIAL GEOLOGY

### Introduction:

Two major movements of ice have been recorded in the Bathurst map-area. Both movements are believed to have occurred during late Wisconsin time.

The primary movement of ice was in an east-northeast direction as suggested by glacial striae. A subsequent lobe of ice (herein referred to as the 'Nepisiguit lobe') that originated in the Nepisiguit Valley, south of the map-area,

flowed in a northward direction (Gauthier and Cormier, 1977). This movement has been documented by glacial striae and by a strongly fluted and drumlinized till sheet that primarily occurs in the Nepisiguit Falls map-sheet (Thibault, 1978).

Striations that exhibit a variety of directions (indicating 'floating ice') were observed within the limits of marine submergence. Gauthier and Cormier (1977) suggest that these striations formed after ice retreat.

Ice retreat appears to have been fairly complex. As well, marine transgression appears to have created an unstable regime of deglaciation, particularily in the lower Nepisiguit Valley.

During the initial stages of deglaciation, ablation and recession of the main ice mass appears to have been rapid (Schafer, 1977). Furthermore, Prest and Grant (1969) suggest that due to a unique climatic regime of the Maritime Provinces, there were areas of active ice during the process of deglaciation and that as the seas transgressed, the "deeper-water parts of the submerged coast served as 'leads' into the ice fronts (of active ice) with consequent development of calving bays and ice drawdown". Thus, the Nepisiguit lobe would appear to be late active ice and that, as suggested by this model, the encroaching seas were contemporaneous during the final stages of "active ice" drawdown.

Primary Deglaciation:

Primary deglaciation appears to have been perpendicular to the coast of Nepisiguit Bay as indicated by the pattern

of glacial deposits. Topography seems to have influenced this process as well.

No significant continuous features (with the possible exception of the Nigadoo Lake deposit) are present in the map-area. Therefore, it is difficult to relate events or sequences of events to each other.

During the initial phase of deglaciation, major deposits of glaciofluvial sediments accumulated along the Tetagouche River (near Bathurst) and the Nigadoo River (near Tremblay Settlement). Both of these deposits are found below the maximum limit of marine submergence (Gauthier and Cormier, 1977) and depending on the timing of submergence, they may have been deposited directly into marine waters. However, their internal structure indicates deposition by glaciofluvial processes rather than by marine shoreline processes, and the differentiation of outwash from marine shallow water deposits is made on this basis rather than on physical position.

Downwasting of the primary ice mass continued in the major valleys of the map-area. Ice-contact deposits near Sainte-Rosette, Sormany and Nigadoo Lake suggest that an ablationary trend of sustained duration continued. The ice-contact (ablation till) hummocks and ridges surrounding Nigadoo Lake, which are the most pronounced topographic features in the map-area, indicate a temporary halt of ice retreat.

Further westward, along the Tetagouche River, glaciofluvial sediments accumulated near South Tetagouche where glacial drainage was apparently diverted along Cherry Brook towards the Middle River.

A group of deposits near the Little River, west of Blue Mountain, is the most complex in the map-area. It appears as though ablation material had blocked the Little River, diverting glacial drainage north and south of its present course. Whether these deposits reflect ablation of the main ice mass or of the subsequent Nepisiguit lobe is speculative.

The Nepisiguit Lobe:

Numerous glacial deposits can be related to the retreat of the Nepisiguit lobe. The large terminal moraine system at Blue Mountain and Pabineau Lake comprises numerous complex morainic ridges and associated glaciofluvial sediments. The orientation of these ridges reflects the unstable regime of deglaciation.

Approximately 1 km east of Bass River, a discontinuous ridge of till approximately 5 km long is believed to be a lateral moraine of the Nepisiguit lobe. This ridge extends southward into the Nepisiguit Falls map-area (see Thibault, 1978) and it is believed to represent the eastern extension of the Nepisiguit lobe.

Gauthier (personal communication) suggests the possible presence of a lateral moraine, oriented in a northeast-southwest direction (see station P12-52), that apparently represents the westward extension of the Nepisiguit lobe. This information would suggest that the Nepisiguit lobe was, for the most part, confined to the Nepisiguit Valley.

Subsequent downwasting of ice accompanied deposition of glaciofluvial sediments with major accumulations along the Nepisiguit River. It is difficult to ascertain the exact origin of these sediments since they may have been deposited into an estuarine environment or they may be proglacial sediments.

The deposition of marine deposits as they relate to marine shoreline processes appears to represent a transitional phase from glacial to postglacial sedimentation. In west Bathurst, a sequence of marine sediments attains a thickness of up to 100 m (Gauthier and Cormier, 1977).

Radiocarbon Dating:

Two samples of marine fossil shells were collected near Belloni Point, in the Bathurst map-area. These shells yielded radiocarbon dates of 12 110 ± 200 yr (BGS 514)* and 12 760 ± 170 yr (BGS 515)*. Both dates provide minimum ages for the deglaciation of the area.

Radiocarbon dates of marine fossil shells near Shippegan (12 600 ± 400 yr; GSC-1383), Jacquet River (12 500 ± 170 yr; GSC-1557) and New Richmond, Quebec (12 000 ± 180 yr; GSC-1018) tend to corroborate previous ideas on the date of Pleistocene deglaciation in this area.

Species that were identified are similar to those described by Thomas et al., 1973. The three species, Mya arenaria (Linné), Mya truncata (Linné) and Hiatella artica (Linné) were found to be the most common.

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## GRANULAR AGGREGATE RESOURCES

Quality Limitations:

Although excessive amounts of silt and/or clay (commonly referred to as fine particles) are not a serious limitation in most of the local sand and gravel sources, they have limited the use of some deposits which would otherwise be useful as a high-quality aggregate.

Ablation till and some ice-contact deposits commonly contain excessive amounts of fine particles. Depending upon the quantity and location of such a deposit, benefication of the material by washing could upgrade it to become economically suitable.

The primary problem with the quality of granular deposits in the study area is a high percentage of soft and weathered clasts. These percentages are notably higher for most deposits that lie within the maximum limit of marine submergence. The oxidized nature of these clasts suggests a shallow water environment of significant duration. Therefore, most deposits within the maximum limit are relatively unsound.

The relative soundness of pebbles is determined on the basis of lithology and, to some extent, durability. Rock types commonly unsuitable for concrete aggregate are grouped as "unsound lithotypes". Friable clasts that have been exposed to intense weathering are also classified as such. Since this procedure does not conform to any standard tests that aggregate producers use, the author suggests that if the material from any site exceeds a 10 per cent 'unsound' rating,

it should be tested using conventional and acceptable methods for soundness and abrasion if that material is desirable and otherwise suitable for concrete. It should be noted that the given results apply only to gravel in its pit-run form.

Description of Map Units and Major Aggregate Sources:

The four major types of granular deposits in the Bathurst map-area are ablation till, ice-contact stratified drift, glaciofluvial outwash, and shallow water marine deposits. Since quality characteristics are usually common to the type of granular deposit, a description of each type of deposit, as well as a discussion of some of the more important deposits, is given. Information on smaller and less significant deposits can be found in Appendix A.

Ablation Till

Major accumulations of ablation till have been mapped in two localities of the study area; the first being in the vicinity of Nigadoo Lake and the second lying east of Bass River, in the southwest corner of the map-area.

Ablation till is material that has been transported either within or upon a glacier and, as the ice melts, is deposited on the ground. In some instances where tensional stresses have developed abnormal concentrations of crevasses along the terminal area of a receding glacier, the ablation till can accumulate in these crevasses. As a result, ablation till can take on a variety of landforms. The most common topographic characteristics of these deposits include hummocks and complexes of short and irregular ridges.

Texturally, ablation till is largely unsorted material that contains percentages of the entire range of clast sizes. It is usually moderately to loosely compact and may include pockets of material that exhibit some degree of sorting.

Ablation till is considered to be a poor-quality aggregate due to excessive amounts of fine particles. It is probably suitable for borrow or subgrade material in its pit-run state.

The large volume of ablation till surrounding Nigadoo Lake (P12-2) is one of the most pronounced topographic features in the map-area. Although some of the boundary and depth information is interpretative, an average thickness of 5.5 m was assumed. Thicknesses exceeding 14 m would not be uncommon. Recoverable reserves were estimated to be over 25 million $m^3$. Quality limitations of the material suggest an uneconomic resource at this time.

Reserves for the long and discontinuous ridge of ablation till near Bass River (P12-58) were estimated to be over 2 million $m^3$. As are most deposits of ablation till, the quality is very poor.

Ice-Contact Stratified Drift

Ice-contact deposits comprise well- to poorly-sorted sand and gravel with variable amounts of silt and/or clay. These deposits are ice-disintegration features that are deposited in contact with and usually totally confined by the glacier itself.

Stratification of ice-contact deposits is commonly contorted and faulted. This can often be attributed to slump structures that are formed by melting of the supporting walls of ice and subsequent collapse of the unsupported granular materials. Abrupt changes in grain sizes are characteristic of such deposits as well.

This class of deposits commonly includes kames, eskers, kame terraces, and morainic ridges. It should be noted that some ice-contact deposits (such as eskers) are glaciofluvial in origin. Such deposits often exhibit characteristics similar to glaciofluvial outwash.

A major ice-contact deposit near Sormany (P12-1, P12-21) has an estimated 4.4 million $m^3$ of sand and gravel. Although grain sizes are uniform, soundness appears poor.

The ice-contact (esker) deposit near Sainte-Rosette (P12-3, -27), which comprises sand and gravel to gravelly sand, appears to be of excellent quality. Reserves were estimated to be 0.4 million $m^3$. The deposit appears to contain an excessive amount of fines, particularily towards the eastern portion of the deposit.

The morainic ridges at Blue Mountain and Pabineau Lake are quite irregular and complex. For the most part, the material contains excessive amounts of fine particles and often exhibits characteristics similar to that of ablation till. For this reason, the material has been classified as a poor-quality aggregate. Reserve estimates for the Blue Mountain and Pabineau Lake areas are 12.5 and 0.6 million $m^3$, respectively.

Significant quantities of ice-contact sand and gravel are present along the Little River (near P12-62). A minimum of at least 0.8 million $m^3$ of recoverable reserves is present. Access and distance appear to be limiting factors for development at this time.

Glaciofluvial Outwash

Glaciofluvial outwash deposits originate as the bed load of meltwater streams within or upon the glacier and consist mainly of sand and pebble- to cobble-size gravel. Depending on the proximity and gradient of the glacier, these deposits can take on a variety of morphological forms. The most common are plains, deltas, and channel deposits.

Texturally, the material, which comprises sand and gravel, is commonly well sorted and tends to decrease in grain size downstream. Pebbles typically show more rounding with increasing distances of transportation. In general, glaciofluvial outwash deposits can be considered a good source of clean and workable aggregate.

The large deposit at Tremblay Settlement (P12-29, P12-5) contains an estimated 2.9 million $m^3$ of sand and gravel. This deposit is one of the most utilized in the Bathurst area. Facilities are present to crush, wash and sort the various grades of aggregate.

The Rosehill deposit (P12-6, P12-9, P12-20, P12-25) on the north and south sides of the Tetagouche River has an estimated 3 million $m^3$ of sand and gravel. The northern portion contains high percentages of unsound lithotypes

whereas the southern portion appears to be of higher quality.

The large reserves of sand and gravel on the south side of the Tetagouche River near the Bathurst airport (P12-10, P12-11, P12-12) exhibit uniform grain size characteristics. Since soundness is questionable, the deposit would appear to be an unsuitable source for high-specification aggregate. An estimated 7.1 million $m^3$ of workable sand and gravel on the north side of the Tetagouche River (P12-7, P12-8, P12-23, P12-28, P12-32) exhibit similar characteristics. Thicknesses are more variable and grain sizes tend to be finer on the north side.

Glaciofluvial deposits along the Nepisiguit River, whose surface areas are quite large, comprise sand and gravel of excellent quality. Reserves are estimated to be 10.8 million $m^3$. Although this quantity appears significant, material depths seldom exceed 2.5 m. Problems have also been encountered with a high water table.

A significant deposit near the Little River (P12-71, -54), which also appears to be of excellent quality, is relatively undeveloped. Seismic data suggest that there is at least 3.4 million $m^3$ of recoverable reserves (Figure 2).

The large deposit of glaciofluvial sediments at Blue Mountain is the present source for most of the major aggregate producers in the Bathurst area. Reserves are estimated to be 8.5 million $m^3$. Seismic data were used to calculate tonnages for this deposit (Figures 3 and 4).

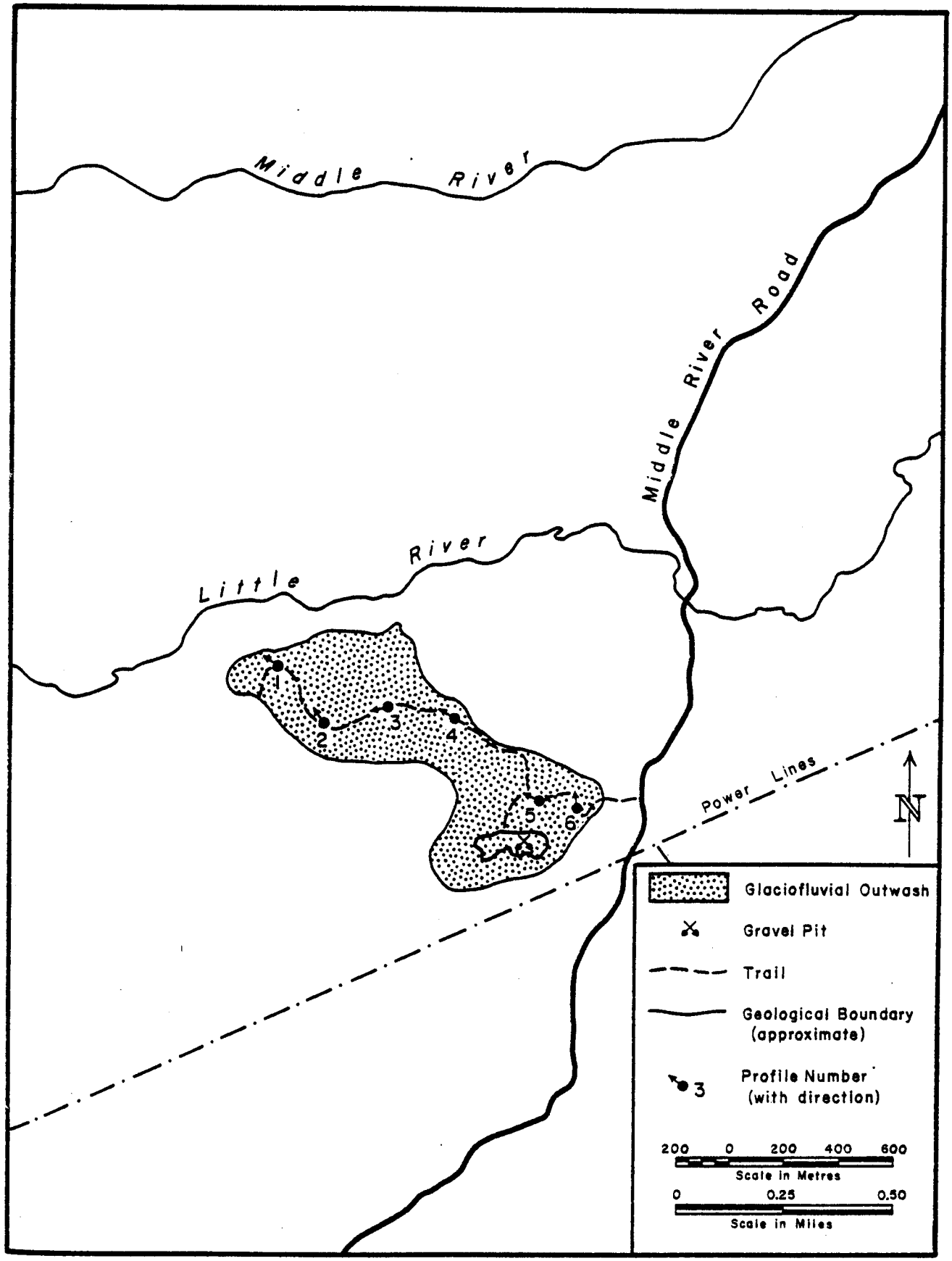


Figure 2 Location of seismic profiles, Little River

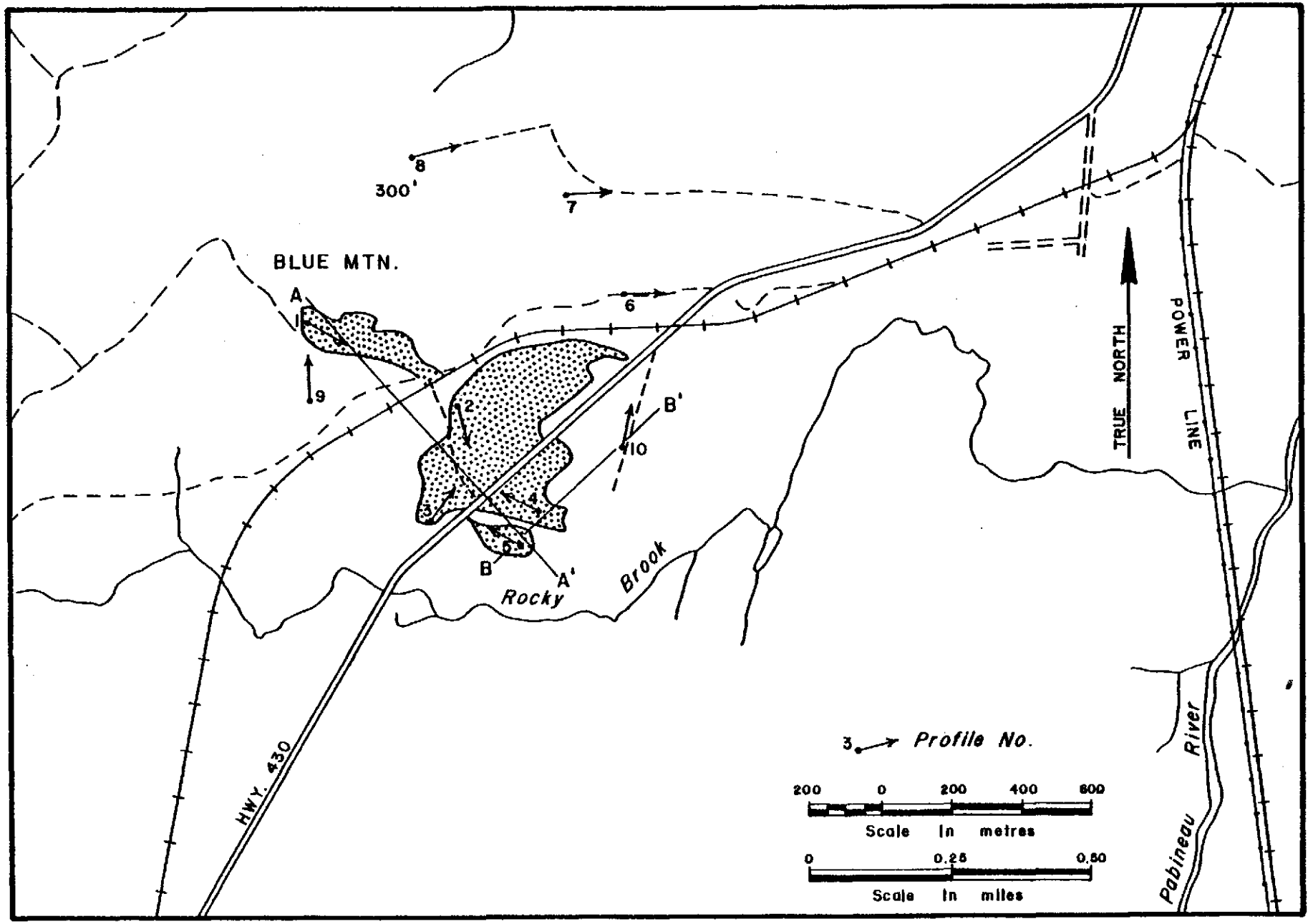


Figure 3 Location of seismic profiles at Rocky Brook. (from Chandra 1976)

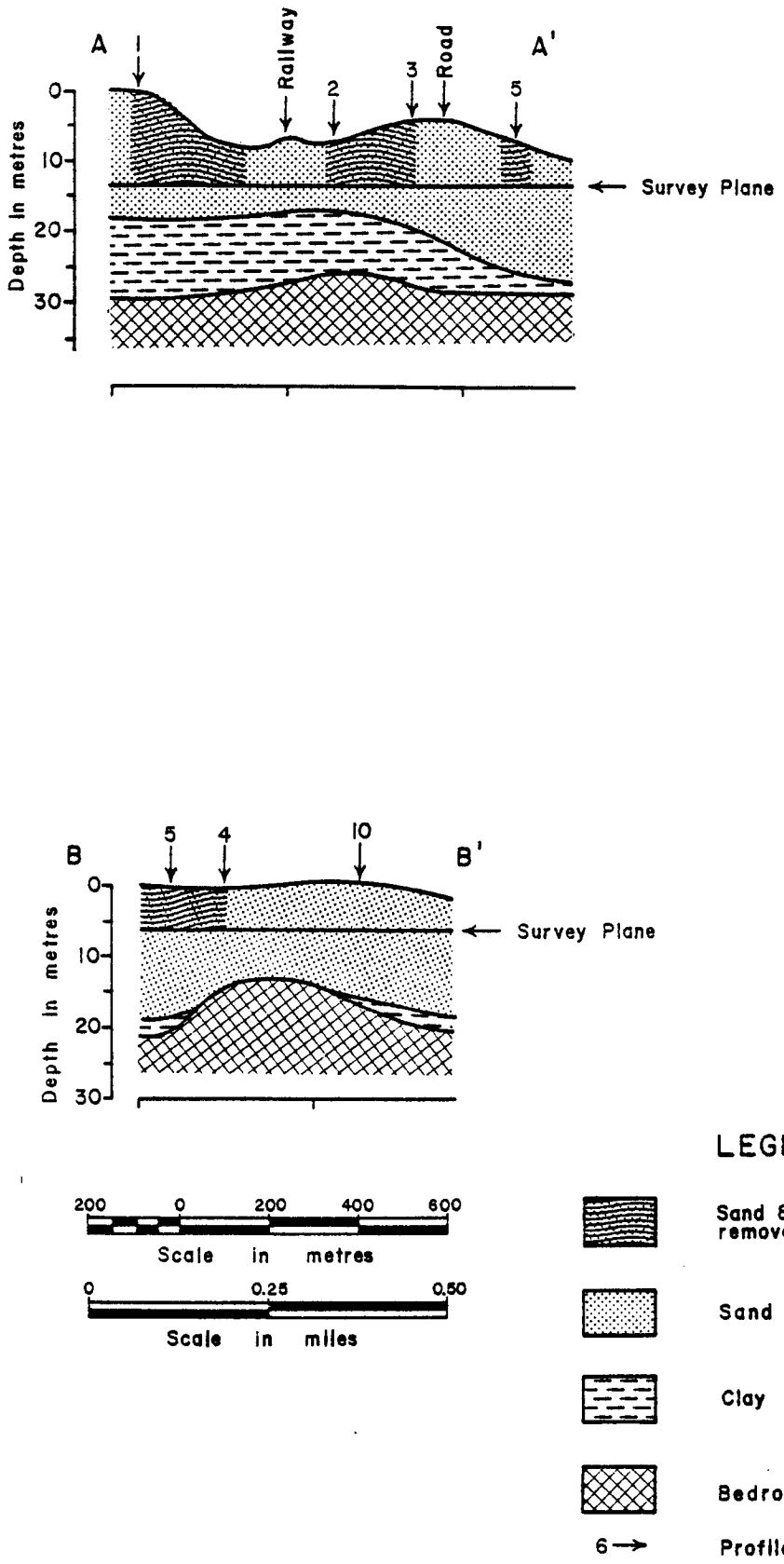


Figure 4, Seismic sections AA' and BB' Rocky Brook (from Chandra 1976)

Marine Shallow Water Deposits

Marine shallow water deposits consist mainly of well-sorted sand and gravel to gravelly sand. Deposits of this nature have been derived from reworking of glacial deposits by wave action to form beaches and bars. They are usually found in flat areas near the present coastline and are generally shallow.

Along the coastal areas and within the maximum limit of marine submergence, large areas of marine shallow water sediments have been mapped. The quality of the material is generally poor, and material depths are shallow. High percentages of unsound lithotypes are common to most deposits of marine origin.

Within the city limits of Bathurst, an estimated 15.2 million $m^3$ of material grading from gravelly sand to sand are present. These deposits are generally shallow, rarely exceeding a material depth of 2.0 m. Below this depth, the amount of fine particles is excessive.

Recoverable reserves near Nigadoo and east of Robertville were estimated to be 3.7 and 2.1 million $m^3$, respectively. Texturally, the material varies from sand and gravel to gravelly sand. The overall quality appears good.

## CONCLUSIONS

The total amount of granular aggregate material in the Bathurst map-area is approximately 106 million $m^3$ (139 million $yds^3$). This total has been subdivided as follows:

| Quantity | Quality |
|---|---|
| 27.8 million $m^3$ | Good to Excellent |
| 36.1 million $m^3$ | Average |
| 42.1 million $m^3$ | Poor |

The above figures suggest that at present, there is no shortage of granular aggregate material in the Bathurst area. If proper management of these resources is implemented, there will be an adequate supply for the future needs of the area.

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# APPENDIX A

Apart from mapping granular aggregate deposits, samples were collected and analysed to determine the general quality of each deposit.

Mechanical and lithological analyses as well as reserve estimates have been tabulated in Appendix A. Material depths used for volume calculations were usually arrived at by projecting depths observed in pit excavations to areas beyond the pit boundaries with the aid of geologic and topographic observations. Seismic data supplemented field observations in areas where exposures were lacking or where maximum depths were unknown. Two such areas are at Blue Mountain and near the Little River.

Since average thicknesses vary in some deposits (see 'Estimation of Reserves' table on data sheets), the workable area has been subdivided to accommodate the appropriate thickness.

Reserves were calculated in the foot-pound-second (fps) system of units (given in brackets) and subsequently converted to metric (SI) units. Therefore, some degree of round-off error can be expected.

| | | | |
|---|---|---|---|
| Location # | P12-1 | County: | Gloucester |
| Type of Deposit: | Ice contact (esker) | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 842 834 |

Section Description & Comments:

6.1 m Sand and Gravel: Medium to coarse sand and pebble-to cobble-size gravel; contains numerous silt-coated clasts; silt content variable due to high percentages of deleterious particles; exhibits ice-contact structures that are typical of eskers (pebble imbrication, contorted stratification, etc.).

High percentages of unsound lithotypes would suggest that this deposit is an unsuitable source for high specification aggregate.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 71.0 | 61.0 | 49.8 | 41.5 | 29.9 | 18.2 | 2.5 | 0.5 | 0.3 | 0.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| schist, slate, etc. 22.6; friable siltstone 5.7; weathered pebbles 12.3; chert 0.9; conglomerate 1.9 | acid intrusive 1.9; intermediate to basic intrusive 4.7; intermediate to basic volcanic 3.8; tuff 0.9; siltstone and sandstone 25.5; quartz and quartzite 16.0; limestone 3.8 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 117 ha | 95 ha | 4.6 m | 4.4 million $m^3$ |
| (290 acres) | (235 acres) | (15.0 feet) | (5.7 million $yds^3$) |

Location # P12-2 County: Gloucester

Type of Deposit: Ablation till? Parish: Beresford

Exposure Type: Pit NTS: 21 P/12

Status: Inactive UTM: 820 863

Section Description & Comments:

13.7 m Sand and Gravel: Poorly sorted sand and gravel; pebble- to boulder-size gravel; varying amounts of silt; appears till-like in places; contains some pockets of stratified material; some striated clasts were noticed.

The sample taken is not very representative since grain sizes vary within the pit.

Although this deposit is more extensive as a Quaternary mappable unit, only salient topographic features were mapped.

Due to a lack of exposures, an average thickness of 5.5 m was assumed. Thicknesses exceeding 14 m would not be uncommon. Seismic data would be required to substantiate greater thicknesses.

This deposit is generally poor in quality. It provides a relatively inexhaustable supply of fill and should be used to alleviate the demand on higher-quality aggregates.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 78.2 | 68.5 | 51.7 | 40.0 | 29.5 | 23.2 | 14.6 | 7.0 | 2.9 | 1.4 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| slate, schist, etc. 14.7; conglomerate 1.4; chert 1.4; weathered pebbles 3.5; friable siltstone and sandstone 4.9 | acid intrusive 2.1; intermediate to basic intrusive 6.3; acid volcanic 8.4; intermediate to basic volcanic 2.8; limestone 22.4; siltstone 19.6; quartz and quartzite 7.0; metasediments 5.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 551 ha (1362 acres) | 463 ha (1145 acres) | 5.5 m + (18.0 feet) | 25.42 million $m^3$ (33.25 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-3 | County: | Gloucester |
| Type of Deposit: | Ice contact (esker?) | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 895 886 |

Section Description & Comments:

1.8 m Gravelly Sand: Predominantly medium to coarse sand and pebble-size gravel; appears horizontally stratified; contains some deleterious particles in the sand fraction; clasts are predominantly subrounded in shape.

Thicknesses vary from 1.5 to 3.0 m within the pit. The deposit is believed to be glaciofluvial in origin and was probably deposited near ice as suggested by the irregular topography of the deposit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | 97.2 | 89.1 | 64.8 | 36.2 | 10.2 | 2.0 | 0.9 | 0.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| friable siltstone 5.2; chert 1.3; weathered pebbles 7.8; sandstone 2.6; tuff 2.6; slate, phyllite, etc. 7.8 | acid to intermediate intrusive 15.6; basic intrusive 5.2; acid to intermediate volcanic 16.9; basic volcanic 9.1; siltstone 15.6; quartz and quartzite 10.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 30 ha (75 acres) | 1.5 ha (4.0 acres) | 9.1 m (30.0 feet) | 150,000 $m^3$ (190,000 $yds^3$) |
| | 14 ha (34 acres) | 2.1 m (7.0 feet) | 290,000 $m^3$ (380,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-4 | County: | Gloucester |
| Type of Deposit: | Glacial outwash/Ice contact | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 899 904 |

Section Description & Comments:

5.5 m Sand and Gravel: Poorly sorted sand and gravel; upper 2 m appear massive and is quite cobbly; displays near-horizontal stratification with minor cross-bedding; contains numerous flat pebbles.

1.8 m Till: Red, gritty, silt till with pebbles, cobbles and some boulders; clasts are striated; this unit is quite compact (lodgement till).

Till is exposed in the northeastern portion of the pit only. The southeastern flank of the pit has material that is almost massive in places (ice contact in origin). This material is quite silty and cobbly. Although two recognizable sand and gravel units were identified within the pit, they were not observed as distinct in the stratigraphic section.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 88.9 | 82.4 | 63.0 | 44.4 | 28.4 | 20.5 | 11.1 | 4.0 | 1.9 | 1.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 7.5; schist, shale, etc. 23.4; friable siltstone 5.6; chert 0.9; tuff 4.7 | acid intrusive 5.6; intermediate to basic intrusive 5.6; acid to intermediate volcanic 7.5; basic volcanic 5.6; siltstone 26.2; quartz, quartzite 4.7; metavolcanic 3.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 40 ha (98 acres) | 14 ha (35 acres) | 1.8 m (6.0 feet) | 260,000 $m^3$ (340,000 $yds^3$) |
| | 10 ha (25 acres) | 3.7 m (12.0 feet) | 370,000 $m^3$ (480,000 $yds^3$) |

Location # P12-5a
Type of Deposit: Glacial outwash
Exposure Type: Pit
Status: Active

County: Gloucester
Parish: Beresford
NTS: 21 P/12
UTM: 932 907

Section Description & Comments:

2.4 m Sand and Gravel: Horizontally stratified sand and gravel; pebble-to cobble-size gravel; displays some cross-bedding; clasts are predominantly subrounded; the water table is near the base of the pit (± 0.6 m).

The following results were obtained from the New Brunswick Department of Transportation:

| Year Tested | % Abrasion Loss | Soundness Stone % | Soundness Sand % | Absorption Stone % | Absorption Sand % | Sand Equivalent | Flakiness Index | Elongated Particles | Organic Content |
|---|---|---|---|---|---|---|---|---|---|
| 1976 | 19 | 2.4 | 3.3 | | | 62 | | | |
| 1976 | 21 | 3.3 | 2.8 | 3.4 | 3.1 | 70 | | | |
| 1966 | 20 | | | | | | 27 | 42 | 3 |
| 1966 | 22 | | | | | | 24 | 28 | 3 |
| 1966 | 21 | | | | | | 30 | 34 | 2 |

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 88.2 | 79.2 | 62.0 | 51.4 | 44.6 | 37.8 | 19.8 | 3.6 | 1.0 | 0.6 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 12.8; schist, slate, etc. 16.5; friable siltstone and sandstone 7.5; chert 2.3 | acid to intermediate intrusive 9.8; basic intrusive 4.5; acid volcanic 15.0; basic volcanic 1.5; siltstone and sandstone 24.8; tuff 1.5; quartz and quartzite 3.8 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-29 | | | |

Location # P12-5b | County: Gloucester

Type of Deposit: Glacial outwash | Parish: Beresford

Exposure Type: Pit | NTS: 21 P/12

Status: Active | UTM: 925 903

Section Description & Comments:

1.8 m Sandy Gravel: Similar structures as P12-5a but contains more cobble-size gravel; clasts are subangular to subrounded in shape with numerous unsound lithotypes (particularily sediments with well-developed cleavage).

Although the percentage of unsound lithotypes (in pit-run form) appears quite high, the gravel may be sound if it is crushed to a certain size.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | 59.0 | 47.9 | 34.1 | 25.2 | 19.7 | 16.4 | 10.7 | 2.9 | 1.0 | 0.5 |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 17.6; schist, slate, etc. 25.7; friable siltstone 2.9; tuff 3.7; chert 2.2; sandstone 1.5 | acid to intermediate intrusive 7.4; basic intrusive 6.6; acid to intermediate volcanic 8.8; basic volcanic 6.6; siltstone 5.9; quartz, quartzite 5.9; metavolcanic 5.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-29 | | | |

Location # P12-6 County: Gloucester

Type of Deposit: Glacial outwash Parish: Bathurst

Exposure Type: Pit NTS: 21 P/5

Status: Active on demand UTM: 876 762

Section Description & Comments:

3.0 m Sand and Gravel: Poorly sorted sand and gravel; contains some cobble-size gravel; quite silty in places; exhibits near-horizontal stratification and cut-and-fill structures; clasts are predominantly subrounded in shape.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 87.6 | 80.3 | 65.1 | 54.4 | 45.3 | 38.5 | 26.3 | 11.8 | 4.0 | 2.3 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| friable siltstone 5.5; schist, slate, etc. 11.8; weathered pebbles 24.6; chert 0.9 | acid intrusive 2.7; intermediate to basic intrusive 4.6; acid volcanic 7.3; intermediate to basic volcanic 5.4; tuff 2.7; siltstone and sandstone 20.9; quartz and quartzite 13.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-20 | | | |

Location # P12-7 County: Gloucester

Type of Deposit: Glacial outwash Parish: Bathurst

Exposure Type: Pit NTS: 21 P/12

Status: Active on demand UTM: 957 804

Section Description & Comments:

1.8 m Sand and Gravel: Predominantly medium sand and pebble-to cobble-size gravel; displays near-horizontal stratification; numerous poor lithotypes are present; quite silty in places; the upper two feet is oxidized and weathered; maximum thickness of 3 m was observed.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 95.1 | 92.6 | 74.1 | 55.2 | 34.7 | 24.8 | 12.6 | 5.3 | 3.1 | 2.2 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| friable siltstone 3.8; schist, slate, etc. 12.5; weathered pebbles 30.0 | acid intrusive 2.5; intermediate to basic intrusive 6.3; acid volcanic 6.3; intermediate to basic volcanic 7.5; tuff 1.3; siltstone and sandstone 20.0; quartz and quartzite 10.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| west of Hwy. #11 | 178 ha (440 acres) (maximum) | 2.4 m (8.0 feet) | 4.34 million $m^3$ (5.68 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-8 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 972 813 |

Section Description & Comments:

2.1 m Sand and Gravel: Predominantly medium sand and pebble-size gravel; contains some cobbles; stratified and poorly sorted; clasts are generally subrounded; contains some deleterious (shaly) particles.

The maximum workable thickness appears to be about 2.7 m. The water table is encountered at this depth.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 90.7 | 83.8 | 66.7 | 51.5 | 38.8 | 29.3 | 14.3 | 4.2 | 1.7 | 1.1 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| schist, slate, etc. 8; weathered pebbles 19; friable siltstone 7; tuff 1; shale 3; chert 3 | acid intrusive 4; intermediate to basic intrusive 9; acid volcanic 11; intermediate to basic volcanic 2; siltstone 17; quartz and quartzite 16 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| east of Hwy. #11 | 54 ha (133 acres) | 2.7 m (9.0 feet) | 1.5 million $m^3$ (1.9 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-9 | County: | Gloucester |
| Type of Deposit: | Glacial outwash? | Parish: | Bathurst |
| Exposure Type: | Road cut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 860 766 |

Section Description & Comments:

7.3 m Sand and Gravel: Steeply dipping strata (40°) of poorly sorted sand and gravel; pebble-to cobble-size gravel; contains individual layers of well-sorted material; appears fairly clean (less than 2% silt).

Till is exposed near the base of this terrace. Thus, the thickness of sand and gravel can vary.

An average thickness of 3.7 m was assumed.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 87.7 | 84.7 | 72.6 | 62.5 | 51.8 | 40.5 | 17.2 | 3.7 | 1.2 | 0.7 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| slate, schist, etc. 7.5; chert 9.0; weathered pebbles 7.5; sandstone 3.0; friable siltstone 4.5 | limestone 25.4; acid intrusive 4.5; basic intrusive 6.0; acid volcanic 10.4; basic volcanic 1.5; siltstone 10.4; quartz and quartzite 10.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 48 ha (118 acres) | 32 ha? (80 acres) | 3.7 m (12.0 feet) | 1.19 million $m^3$ (1.55 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-10 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 937 788 |

Section Description & Comments:

4.6 m Sand and Gravel: Predominantly medium sand and pebble-size gravel with some cobbles; displays some cross-bedding; predominantly horizontally stratified; lower 2 m is "cemented" together with $CaCO_3$; numerous deleterious particles were noticed in the sand fraction; clasts are subrounded to rounded in shape and many are flat.

The reserves were calculated for the area surrounding the airport.

In places, the deposit is much thicker than indicated. Average thicknesses of 1.8 and 2.7 m were used due to the high water table.

The material of this deposit is believed to have been deposited into shallow water suggesting that marine transgression and deposition may have been contemporaneous.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 75.1 | 69.1 | 54.4 | 43.8 | 31.0 | 21.1 | 9.1 | 3.2 | 1.6 | 1.0 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| slate, schist, etc. 21.5; claystone 5.6; weathered pebbles 25.2; friable siltstone 3.7; chert 0.9; tuff 1.9; conglomerate 0.9 | acid to intermediate intrusive 8.4; basic intrusive 2.8; acid to intermediate volcanic 7.5; basic volcanic 3.7; siltstone 10.3; quartz and quartzite 7.5 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 219 ha (540 acres) | 1.8 m (6.0 feet) | 4.0 million $m^3$ (5.2 million $yds^3$) |
| | 144 ha (355 acres) | 2.7 m (9.0 feet) | 4.0 million $m^3$ (5.2 million $yds^3$) maximum |

| | | | |
|---|---|---|---|
| Location # | P12-11 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 936 774 |

Section Description & Comments:

1.8 m Sand and Gravel: Stratified and poorly sorted sand and pebble-size gravel with some cobbles; displays cross-bedding; contains numerous deleterious (shaly) particles; clasts are predominantly subrounded in shape.

The face height doesn't exceed 2.0 m within the pit. The water table is encountered at the base of the pit.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 84.4 | 77.4 | 63.1 | 54.0 | 43.8 | 35.2 | 14.8 | 2.5 | 1.4 | 1.0 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 28.7; friable siltstone and sandstone 6.5; schist, slate, etc. 8.3; chert 0.9; metavolcanic 1.9 | acid to intermediate intrusive 2.8; basic intrusive 1.9; acid volcanic 15.7; basic volcanic 2.8; tuff 0.9; sandstone and siltstone 17.6; quartz and quartzite 12.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-10 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-12 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 933 776 |

Section Description & Comments:

1.7 m Sandy Gravel: Poorly sorted sand and pebble-to cobble-size gravel; contains numerous weathered clasts; no structures were observed due to poor exposures within the pit.

0.8 m Slump Covered: Assumed sand and gravel.

During periods of high run-off (spring), this pit is partially or completely covered with water. Therefore, a maximum workable depth of 1.8 m was assumed.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 69.9 | 61.0 | 44.7 | 35.3 | 28.4 | 22.7 | 10.1 | 2.9 | 1.8 | 1.2 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 25.4; schist, slate 4.5; friable siltstone and sandstone 10.4 | acid to intermediate intrusive 6.0; basic intrusive 9.0; acid volcanic 14.9; intermediate to basic volcanic 9.0; siltstone and sandstone 14.9; quartz 6.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-10 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-13 | County: | Gloucester |
| Type of Deposit: | Glacial outwash? | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 916 727 |

Section Description & Comments:

1.1 m Sand and Gravel: Quite compact and poorly sorted sand and gravel; pebble- to boulder-size gravel; approximately 50% (by volume) cobbles and boulders; clasts are imbricated.

0.5 m Gravelly Sand: Predominantly medium sand with some pebbles and small cobbles; appears weakly stratified; sample P12-13 was taken from this unit.

0.6 m Slump Covered: Assumed sand and gravel.

Mechanical Analysis:

| sieve | | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 80.9 | 76.3 | 66.5 | 59.9 | 54.8 | 48.3 | 18.6 | 2.0 | 0.2 | 0.1 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| friable siltstone 3.0; shale 1.5; chert 1.5; schist 3.0; weathered pebbles 3.0 | acid intrusive 11.9; intermediate to basic intrusive 6.0; acid to intermediate volcanic 13.4; basic volc. 3.0; siltstone 11.9; quartz, quartzite 25.4; metavolcanic 16.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 14.5 ha (36.0 acres) | 6.0 ha (15.0 acres) | 1.8 m (6.0 feet) | 110,000 $m^3$ (150,000 $yds^3$) |
| South of P12-13 | | | |
| 11.0 ha (27.0 acres) | 8.5 ha (21.0 acres) | 1.8 m? (6.0 feet) | 160,000 $m^3$ (200,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-14 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 966 768 |

Section Description & Comments:

2.1 m Sand and Gravel: Horizontally stratified sand and fine-pebble gravel; upper 0.3 m is silty due to oxidation and weathering; clasts are rounded in shape.

An exposure to the southeast of this pit displays at least 12 m of sandy silt below the unit described above. Thus, a maximum workable thickness of 1.8 m was assumed.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 99.1 | 94.9 | 80.1 | 64.8 | 49.0 | 37.3 | 20.4 | 6.1 | 1.9 | 1.3 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 25.9; schist, slate, etc. 11.1; claystone 3.7; friable siltstone 6.2; sandstone 1.2 | acid to intermediate intrusive 9.9; basic intrusive 3.7; acid to intermediate volcanic 7.4; basic volcanic 4.9; siltstone 12.3; quartz and quartzite 13.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-34 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-15 | County: | Gloucester |
| Type of Deposit: | Marine/Glacial outwash? | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 940 918 |

Section Description & Comments:

1.4 m Sand and Gravel: Horizontally stratified sand and pebble-size gravel; no cobbles (or coarser) were noticed; upper 0.8 m is quite silty due to oxidation and weathering; clasts are mostly subangular in shape.

0.6 m Sand: Predominantly fine sand with a few pebbles; horizontally stratified.

0.2 m Sandy Gravel: Very compact sandy gravel; difficult to penetrate.

The middle unit is thicker in other parts of the pit. The upper 2.0 m of this section is believed to be marine in origin.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 25 ha (62 acres) | 18 ha (45 acres) | 1.8 m (6.0 feet) | 330,000 $m^3$ (440,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-16 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand? | UTM: | 944 902 |

Section Description & Comments:

1.8 m Sand and Gravel: Horizontally stratified sand and pebble-size gravel; no cobbles (or coarser) were noticed; clasts are subangular to subrounded in shape; very clean deposit.

This deposit is probably underlain by marine silts as suggested by exposures along the Number 11 Highway near Nigadoo River.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 95.4 | 91.5 | 74.1 | 59.6 | 48.4 | 38.7 | 20.4 | 4.5 | 0.9 | 0.4 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 9.0; schist, slate, etc. 20.2; friable siltstone 2.2; tuff 4.5; chert 2.2 | acid to intermediate intrusive 11.2; basic intrusive 4.5; acid to intermediate volcanic 10.4; basic volcanic 6.7; siltstone 16.9; quartz and quartzite 12.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 150 ha (370 acres) | 97 ha (240 acres) | 2.1 m (7.0 feet) | 2.1 million $m^3$ (2.7 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-17 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 939 879 |

Section Description & Comments:

1.8 m Gravelly Sand: Fine to medium sand with fine-pebble gravel; horizontally stratified with numerous cross-beds; the water table is present at the base of the pit.

Mechanical Analysis:

| sieve | | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 99.4 | 98.7 | 91.3 | 82.3 | 72.7 | 61.7 | 34.5 | 6.3 | 0.8 | 0.4 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 53 ha (130 acres) | 42 ha (104 acres) | 1.8 m (6.0 feet) | 0.8 million $m^3$ (1.0 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-18 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 935 864 |

Section Description & Comments:

1.8 m Gravelly Sand: Fine to coarse sand with fine-pebble gravel; displays near-horizontal stratification and some cross-bedding; the upper 0.3 m is quite silty due to oxidation and weathering.

The thickness of this deposit varies from 1.2 m to 2.7 m. An average thickness of 1.8 m was assumed.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 99.7 | 93.5 | 77.8 | 58.4 | 37.2 | 12.1 | 3.0 | 0.7 | 0.3 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 98 ha (242 acres) | 60 ha (149 acres) | 1.8 m (6.0 feet) | 1.10 million $m^3$ (1.44 million $yds^3$) |

Location # P12-19 | County: Gloucester

Type of Deposit: Ice contact | Parish: Beresford

Exposure Type: Pit | NTS: 21 P/12

Status: Inactive | UTM: 885 829

Section Description & Comments:

2.4 m Sand and Gravel: Medium sand and pebble- to cobble-size gravel; exhibits contorted stratification; appears massive in places; variable silt content; contains numerous deleterious (shaly) particles; clasts are subangular in shape.

The pit floor appears to be near bedrock. The deposit is of poor quality, suitable only for borrow.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 74.2 | 66.5 | 54.0 | 43.8 | 33.7 | 23.6 | 8.5 | 3.4 | 1.9 | 1.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| phyllite, schist, etc. 21.9; weathered pebbles 26.0; friable siltstone 12.5 | intermediate to basic intrusive 4.2; acid to intermediate volcanic 6.3; quartz and quartzite 5.2; siltstone 24.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 9 ha (22 acres) | 7 ha (18 acres) | 2.7 m (9.0 feet) | 190,000 $m^3$ (250,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-20 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 871 762 |

Section Description & Comments:

4.6 m Sand and Gravel: Predominantly fine to medium sand and fine- to coarse-pebble gravel with some cobbles; displays gently dipping strata with some cross-bedding; contains some silty beds; clasts are predominantly sub-rounded in shape.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 86.5 | 82.8 | 70.5 | 58.1 | 46.0 | 37.8 | 23.9 | 8.4 | 3.0 | 1.9 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 20.9; friable siltstone and sandstone 5.5; schist, slate, etc. 9.9 | acid intrusive 8.8; intermediate to basic intrusive 2.2; acid volcanic 13.2; intermediate to basic volcanic 13.2; quartz and quartzite 13.2; siltstone and sandstone 13.2 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 79 ha (195 acres) | 2.5 ha (6.0 acres) | 2.7 m (9.0 feet) | 70,000 $m^3$ (90,000 $yds^3$) |
| | 23.5 ha (58.0 acres) | 3.7 m (12.0 feet) | 0.86 million $m^3$ (1.12 million $yds^3$) |
| | 29.0 ha (72.0 acres) | 3.0 m (10.0 feet) | 0.89 million $m^3$ (1.16 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-21 | County: | Gloucester |
| Type of Deposit: | Ice contact | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 848 840 |

Section Description & Comments:

1.5 m Sandy Gravel: Stratified and poorly sorted sand and pebble-to cobble-size gravel; the upper 0.5 m is quite silty due to oxidation and weathering; clasts are predominantly angular in shape.

0.2 m Sand: Coarse sand; appears massive.

1.5 m Slump-Covered: Assumed similar material.

Reserves are estimated to be 4.4 million $m^3$ (5.7 million $yds^3$). High percentages of unsound lithotypes would suggest that this deposit is an unsuitable source for high specification aggregate.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 58.2 | 49.4 | 32.7 | 23.9 | 16.8 | 11.0 | 3.8 | 1.6 | 1.0 | 0.7 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 37.9; schist, slate, etc. 22.4; friable siltstone 9.7; tuff 2.9 | acid intrusive 2.9; basic intrusive 1.0; acid to intermediate volcanic 2.9; basic volcanic 1.9; siltstone 2.9; quartz and quartzite 8.7; metavolcanic 6.8 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-1 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-22 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 983 789 |

Section Description & Comments:

0.3 m Sand: Massive silty fine sand with a few small pebbles.

0.9 m Sand: Horizontally stratified fine and medium sand with some silty layers; no pebbles were noticed.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

The large deposit of predominantly fine to medium sand (gravelly in places) east of Tetagouche Hill may contain as much as 7.3 million $m^3$ (9.5 million $yds^3$) of material if an average depth of 1.8 m is assumed.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | 99.8 | 99.0 | 80.0 | 22.0 | 4.0 | 2.0 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 86 ha (213 acres) | 1.5 m (5.0 feet) | 1.3 million $m^3$ (1.7 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-23 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 968 800 |

Section Description & Comments:

2.3 m Sand and Gravel: Horizontally stratified sand and gravel; pebble-to cobble-size gravel; contains well sorted horizons of gravel; clasts are predominantly subrounded in shape.

0.6 m Slump Covered: Assumed sand and gravel.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 69.5 | 59.6 | 45.3 | 35.6 | 24.8 | 18.7 | 10.7 | 3.4 | 1.9 | 1.3 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 29.5; schist, slate, etc. 13.9; friable siltstone 2.3; tuff 2.3; claystone 2.3; chert 0.8 | acid intrusive 2.3; basic intrusive 3.0; acid to intermediate volcanic 7.0; basic volcanic 4.7; siltstone 7.0; quartz and quartzite 15.5; metavolcanic 8.5 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-7 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-24 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand? | UTM: | 981 770 |

Section Description & Comments:

2.7 m Sand and Gravel: Fine to medium sand and fine-pebble gravel; displays horizontal stratification; clasts are rounded and subrounded in shape.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 97.8 | 94.1 | 79.6 | 65.5 | 54.0 | 44.0 | 26.8 | 7.3 | 2.6 | 1.8 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 27.5; schist, slate, etc. 7.5; friable siltstone 10.0; tuff 3.8; claystone 1.2 | acid to intermediate intrusive 6.3; basic intrusive 2.5; acid to intermediate volcanic 7.5; basic volcanic 7.5; siltstone 11.2; quartz, quartzite 11.2; metavolcanic 3.8 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 125 ha (310 acres) | 1.8 m (6.0 feet) | 2.3 million $m^3$ (3.0 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-25 | County: | Gloucester |
| Type of Deposit: | Glacial outwash? | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 859 767 |

Section Description & Comments:

2.7 m Sand and Gravel: Sand and pebble-to cobble-size gravel with some silt (5% ±); large clasts are subrounded and rounded in shape and appear to be unsound; contains incorporated till-like balls; clasts are imbricated; one sandy silt layer 0.2 m thick was noticed 1.5 m down the section.

A sample of the gravel was taken for lithologic analysis. Results show that this portion of the deposit is poor in quality. The overall quality of the deposit seems to be good in the southern portion and progressively poor to the north. It would appear that the till unit noticed at the base of the terrace (P12-9), is rising to the north as well.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 27.5; schist, slate, etc. 17.5; friable siltstone 6.2; claystone and shale 5.0; tuff 1.3; conglomerate 1.3 | basic intrusive 1.3; acid volcanic 3.7; basic volcanic 7.5; siltstone 8.7; quartz and quartzite 10.0; metavolcanic 10.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-9 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-26 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 957 907 |

Section Description & Comments:

2.1 m Sand and Gravel: Subhorizontally stratified sand and gravel; gentle easterly dip; contains numerous friable clasts; displays cut-and-fill structures; clasts are flat and imbricated.

A few ice-rafted (?) boulders were noticed within the pit. The maximum thickness of the pit is 2.7 m. At this depth, the water table is encountered.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 88.9 | 81.8 | 67.7 | 54.5 | 42.4 | 31.2 | 15.5 | 3.0 | 0.7 | 0.4 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 5.3; schist, slate, etc. 31.8; friable siltstone 3.0; tuff 2.3; claystone 3.0 | acid to intermediate intrusive 11.4; basic intrusive 6.1; acid to intermediate volcanic 8.3; basic volcanic 4.5; siltstone 9.8; quartz and quartzite 5.3; metavolcanic 9.1 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 92 ha (228 acres) | 75 ha (185 acres) | 2.1 m (7.0 feet) | 1.6 million $m^3$ (2.1 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-27 | County: | Gloucester |
| Type of Deposit: | Ice contact (esker?) | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 899 884 |

Section Description & Comments:

0.6 m Gravelly Sand: Oxidized and weathered (silty) gravelly sand.

4.0 m Sand and Gravel: Horizontally stratified sand and gravel; the gravel becomes progressively coarser with depth but is predominantly fine-pebble gravel; contains some silty layers.

This deposit is a typical glaciofluvial deposit with sediments becoming progressively coarser with depth.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 3.6; schist, slate, etc. 4.8; friable siltstone and sandstone 8.3; chert 1.2; conglomerate 2.4; tuff 2.4 | intrusive 14.2; acid to intermediate volcanic 11.9; basic volcanic 3.6; siltstone 29.8; quartz and quartzite 8.3; limestone 3.6; metavolcanic 6.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-3 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-28 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 940 795 |

Section Description & Comments:

2.4 m Sand and Gravel: Poorly sorted sand and pebble-to cobble-size gravel; appears horizontally stratified; the sample doesn't represent the coarser fraction of the material; grain sizes are extremely variable within the pit; much finer grain sizes are exposed in the northern end of the pit.

0.6 m Slump Covered: Assumed sand and gravel.

The water table is present at the base of the pit. Rock is exposed on the pit floor in two locations.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 82.9 | 74.3 | 54.2 | 39.9 | 29.8 | 22.2 | 11.5 | 6.3 | 4.0 | 2.7 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 15.4; schist, slate, etc. 22.2; friable siltstone 2.6; tuff 3.4; claystone 0.9; chert 0.9 | acid to intermediate intrusive 6.0; basic intrusive 2.6; acid to intermediate volcanic 13.7; basic volcanic 6.0; siltstone 13.7; quartz and quartzite 7.7; metavolcanic 5.1 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 75 ha (185 acres) | 62 ha (153 acres) | 2.1 m (7.0 feet) | 1.3 million $m^3$ (1.7 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-29 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 932 908 |

Section Description & Comments:

3.7 m Sand and Gravel: Horizontally stratified sand and gravel; pebble- to cobble-size gravel; appears cross-bedded in places; clasts are subangular to subrounded in shape.

This deposit is one of the most active in the Bathurst area. Facilities to crush, wash and sort the various grades of aggregate are present. See P12-5a for more information on this deposit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 75.2 | 68.6 | 49.9 | 37.3 | 28.4 | 22.1 | 9.8 | 2.8 | 1.4 | 0.9 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| friable siltstone 11.0; shale, schist, etc. 15.4; weathered pebbles 12.1; chert 1.1; conglomerate 1.1 | siltstone 27.5; acid to intermediate extrusive 7.7; basic extrusive 3.3; acid to intermediate intrusive 6.6; basic intrusive 7.7; quartz and quartzite 4.4; tuff 2.2 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 166 ha (411 acres) | 106 ha (262 acres) | 2.7 m (9.0 feet) | 2.9 million $m^3$ (3.8 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-30 | County: | Gloucester |
| Type of Deposit: | Ice contact (esker) | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 870 876 |

Section Description & Comments:

1.8 m Sand and Gravel: Subhorizontally stratified sand and gravel; mostly pebble-size gravel with some cobbles; clasts are predominantly subangular in shape; glaciofluvial in origin.

Since this deposit is very small, no samples were taken. From visual inspection, the material appears to be of good quality.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 1.2 ha (3.0 acres) | 0.8 ha (2.0 acres) | 2.7 m (9.0 feet) | 20,000 $m^3$ (30,000 $yds^3$) maximum |

| | | | |
|---|---|---|---|
| Location # | P12-31 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Beresford |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 875 912 |

Section Description & Comments:

3.7 m Sand and Gravel: Poorly stratified sand and gravel; predominantly pebble-size gravel; cobbly in places; clasts are predominantly subrounded in shape.

Bedrock is exposed at the base of the pit. Thus, recoverable reserves are small.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 76.5 | 70.3 | 53.4 | 42.0 | 33.1 | 26.7 | 14.4 | 2.8 | 1.0 | 0.5 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| schist, slate, etc. 41.9; friable siltstone and sandstone 2.3; weathered pebbles 3.1; chert 1.5 | acid intrusive 3.1; intermediate to basic intrusive 10.9; acid volcanic 4.7; basic volcanic 4.6; tuff 2.3; quartz and quartzite 7.0; siltstone and sandstone 18.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 4 ha (10 acres) | 3.5 ha (9.0 acres) | 2.7 m (9.0 feet) | 100,000 $m^3$ (130,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-32 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 980 820 |

Section Description & Comments:

0.6 m Gravelly Sand: Oxidized and weathered gravelly sand (silty).

3.4 m Gravelly Sand: Interstratified layers of gravelly sand, sand, and silt (4 to 8%); one layer of predominantly silt displaying internal contorted stratification (0.3 m thick) was noticed.

0.9 m Sand: Horizontally stratified fine and medium sand.

1.2 m Slump Covered: Assumed sand and/or gravel.

This portion of the deposit is quite silty and doesn't appear useful for high specification aggregate.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 94.6 | 92.2 | 86.8 | 79.5 | 75.0 | 70.9 | 57.6 | 28.2 | 11.9 | 5.6 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 13.3; chert 3.3 | acid to intermediate volcanic 13.3; basic volcanic 6.7; intermediate intrusive 16.7; siltstone 13.3; tuff 3.3; quartz and quartzite 23.3; metavolcanic 6.7 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-8 | | | |

Location # P12-33 County: Gloucester

Type of Deposit: Glacial outwash Parish: Bathurst

Exposure Type: Pit NTS: 21 P/12

Status: Active on demand UTM: 882 663

Section Description & Comments:

0.5 m Sand and Gravel: Oxidized and weathered sand and gravel.

1.2 m Sand and Gravel: Poorly sorted sand and gravel; horizontally stratified; contains mostly pebble-size gravel with some cobbles; clasts are predominantly subrounded in shape.

The sand fraction from both samples satisfies the grading requirements for concrete fine aggregate. The overall quality of the deposit appears excellent.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 92.2 | 88.1 | 76.9 | 64.0 | 53.6 | 45.0 | 28.6 | 14.1 | 4.7 | 1.2 |
| | b | 89.6 | 83.8 | 69.0 | 56.8 | 47.4 | 39.6 | 23.5 | 9.7 | 2.4 | 0.6 |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 11.1; schist, slate, friable clasts 7.4 | acid intrusive 5.6; sediments 14.8; quartz and quartzite 5.6; metavolcanic and metasediments 48.1; tuff 1.9; argillite 5.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-71 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-34 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 979 760 |

Section Description & Comments:

1.2 m Sand and Silt: Interstratified sand and silt becoming progressively silty with depth.

No samples were taken from this pit due to excessive amounts of silt (and finer).

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 87 ha (214 acres) | 1.5 m (5.0 feet) | 1.32 million $m^3$ (1.73 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-41 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 956 667 |

Section Description & Comments:

SECTION I

1.6 m Sandy Silt: Interstratified layers of sand and silt; exhibits near-horizontal stratification.

7.6 m Gravelly Sand: Pebbly sand; contains some silty layers; deltaic-like bedding observed. Sample P12-41a was taken from a more gravelly layer of this unit.

SECTION II

4.9 m Sand: Predominantly fine to medium sand with some pebbles; silty in places; exhibits cut-and-fill structures and cross-bedding. Sample P12-41b was taken from this unit.

Within the entire pit, an estimated 10 to 20% gravel and 3 to 5% silt is present.

Reserves were calculated for the shallow portions of this deposit; particularily the northeastern fringes. The material may be excessively silty.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 89.0 | 85.3 | 76.2 | 65.5 | 53.6 | 42.9 | 26.9 | 15.5 | 6.5 | 3.0 |
| | b | 100.0 | 96.7 | 91.4 | 82.8 | 68.6 | 58.9 | 42.3 | 21.1 | 5.7 | 1.3 |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 9.4; schist, shale, friable clasts 9.4; siltstone and sandstone 2.4 | intrusives (mostly granite) 27.1; acid volcanic 7.1; basic volcanic 3.5; sediments 3.5; quartz and quartzite 12.9; metavolcanic and metasediments 22.4; gneiss 2.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 32.5 ha (80.5 acres) | 2.7 m (9.0 feet) | 0.89 million $m^3$ (1.17 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-42 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 952 664 |

Section Description & Comments:

2.7 m Sand: Mostly sand with some silty layers; exhibits near-horizontal stratification; appears unconformable with the lower unit.

1.8 m Sand and Gravel: Medium to coarse sand and fine- to coarse-pebble gravel with a few cobbles; generally horizontally stratified with minor cross-bedding. Sample P12-42 was taken from this unit.

2.6 m Slump Covered: Assumed similar material as above.

The upper unit may represent marine reworking.

The overall gravel content varies from 15 to 25 percent. Certain portions of the pit are fairly silty.

Reserves were calculated for that portion of the deposit lying between the highway and the railway (see map).

Seismic information was used to estimate the average thickness of this portion of the deposit.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 87.3 | 84.8 | 75.4 | 62.6 | 41.6 | 28.1 | 12.7 | 3.5 | 0.6 | 0.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 6.7; schist, friable clasts 4.4 | intrusives (mostly granite) 48.9; acid volcanic 6.7; basic volcanic 2.2; sediments 6.7; quartz and quartzite 13.3; metasediments and metavolcanic 8.9; gneiss 2.2 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 4.0 ha<br>(9.5 acres)<br>2.5 ha<br>(6.5 acres) | 6.4 m<br>(21.0 feet)<br>10.7 m<br>(35.0 feet) | 250,000 $m^3$<br>(320,000 $yds^3$)<br>280,000 $m^3$<br>(370,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-43 | County: | Gloucester |
| Type of Deposit: | Ice contact (morainic ridge) | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 937 664 |

Section Description & Comments:

6.1 m Sand and Gravel: Poorly sorted sand and gravel; pebble- to cobble-size gravel with a few small boulders; moderately compact and till-like in places; contains some silty sand layers; clasts are angular in shape and are silt-coated.

This deposit exhibits poor stratification and, in places, it is massive. Some pockets of clean gravel were noticed in the northeastern part of the pit.

In general, approximately 40% of the material is gravel and the silt content varies from 5 to 15%.

Reserves were estimated for the ice-contact ridge segments west of P12-43 (see table below).

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 12.5; schist, shale, friable clasts 12.5 | acid intrusive 8.7; basic intrusive 1.3; acid volcanic 7.5; sediments 10.0; quartz and quartzite 11.2; metavolcanic and metasediments 32.5; tuff 2.5; gneiss 1.3 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 39.0 ha (97.0 acres) | 34.5 ha (85.0 acres) | 3.7 m (12.0 feet) | 1.26 million $m^3$ (1.65 million $yds^3$) |
| 8.5 ha (21.0 acres) | 7.5 ha (18.0 acres) | 2.7 m (9.0 feet) | 200,000 $m^3$ (260,000 $yds^3$) |
| 10.0 ha (25.0 acres) | 9.5 ha (24.0 acres) | 2.7 m (9.0 feet) | 270,000 $m^3$ (350,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-44 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 006 731 |

Section Description & Comments:

2.4 m Sand and Gravel: Predominantly medium sand and fine- to coarse-pebble gravel with some cobbles; exhibits near horizontal stratification with minor cross-bedding.

Red silt is exposed below the sand and gravel. The material becomes quite silty towards the river (eastward). The material appears excellent in quality.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 69.2 | 58.5 | 45.1 | 37.6 | 31.6 | 25.5 | 10.5 | 1.1 | 0.2 | 0.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| See P12-45 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 31.5 ha (78.0 acres) | 14.5 ha (36.0 acres) | 2.1 m (7.0 feet) | 310,000 $m^3$ (410,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-45 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive? | UTM: | 996 719 |

Section Description & Comments:

1.8 m Sand and Gravel: Poorly sorted sand and gravel; pebble-to cobble-size gravel with a few boulders; exhibits some stratification (poor exposure); clasts are generally subrounded in shape and are somewhat platy and elongate.

The overall quality of this deposit appears excellent. Reserves are rapidly diminishing.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 57.3 | 49.5 | 32.8 | 23.9 | 16.9 | 11.8 | 4.5 | 0.9 | 0.4 | 0.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 3.8; schist, shale, friable clasts 1.5; siltstone and sandstone 4.6; chert 0.8; conglomerate 0.8 | acid intrusive 5.3; basic intrusive 7.6; acid volcanic 9.2; basic volcanic 13.0; sediments 7.6; quartz and quartzite 16.8; metavolcanic and metasediments 26.0; tuff 0.8; gneiss 2.3 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 20.5 ha (51.0 acres) | 13.5 ha (33.0 acres) | 1.7 m (5.5 feet) | 220,000 $m^3$ (290,000 $yds^3$) |
| South of P12-45 (24 acres) | 7.3 ha (18.0 acres) | 1.5 m (5.0 feet) | 110,000 $m^3$ (150,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-46 | County: | Gloucester |
| Type of Deposit: | Glacial outwash (terrace) | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 002 711 |

Section Description & Comments:

0.3 m Gravelly Silt: Orange-brown pebbly silt; oxidized and weathered.

0.9 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with a few cobbles; exhibits horizontal stratification; individual layers are well sorted.

1.8 m Sand and Gravel: Poorly sorted sand and gravel; pebble-to cobble-size gravel with a few boulders; similar to the above unit but is more gravelly.

Clasts are subangular to subrounded in shape. Products from this deposit include sorted sand and crushed stone. The water table is present near the base of the pit. One soundness test completed by the N.B. Department of Transportation from this deposit yielded the following results: Stone, 1.5% and Sand, 3.0%.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 76.5 | 68.1 | 48.4 | 37.6 | 28.8 | 22.8 | 12.7 | 3.8 | 1.1 | 0.4 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| See P12-45 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 180 ha (445 acres) | 85.5 ha (211.0 acres) | 1.7 m (5.5 feet) | 1.43 million $m^3$ (1.87 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-47 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 997 698 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

1.5 m Sandy Gravel: Pebble-to cobble-size gravel with predominantly medium sand; stratified and poorly sorted; clasts are subrounded in shape.

Excavations are restricted to shallow depths since this area has a high water table. The overall quality of this deposit appears excellent.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 70.4 | 60.7 | 45.9 | 34.3 | 25.4 | 20.7 | 11.5 | 1.7 | 0.2 | 0.1 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| siltstone and sandstone 3.7 | acid intrusive 12.3; basic intrusive 6.2; acid volcanic 16.0; basic volcanic 7.4; sediments 11.1; quartz and quartzite 16.0; metavolcanic and metasediments 24.7; gneiss 2.5 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-46 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-48 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Roadcut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 030 771 |

Section Description & Comments:

0.2 m Sand and Gravel: Oxidized and weathered sand and gravel.

0.6 m Sand and Gravel: Fine to medium sand and fine-pebble gravel; horizontally stratified.

1.1 m Sand: Fine sand; some silt; displays near-horizontal stratification. Sample P12-48 was taken from this unit.

0.2 m Silty Sand: Silty fine sand; becomes progressively silty with depth.

1.5 m Slump Covered: Assumed similar material as above.

Numerous small pits can be found near this site. Reserves appear extensive but the quality is generally poor due to excessive amounts of silt (and finer). Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | 100.0 | 99.2 | 98.9 | 98.4 | 96.5 | 49.3 | 11.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 142 ha (351 acres) | 47 ha (116 acres) | 1.5 m (5.0 feet) | 720,000 $m^3$ (940,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-49 | County: | Gloucester |
| Type of Deposit: | Ice contact? | Parish: | Bathurst |
| Exposure Type: | Roadcut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 992 671 |

Section Description & Comments:

1.0 m Sand and Gravel: Oxidized and weathered sand and gravel; quite silty.

6.4 m Sand and Gravel: Poorly sorted sand and gravel; pebble-to cobble-size gravel with some boulders; silty in places; some stratification noticed; clasts are predominantly subangular in shape.

5.0 m Slump Covered: Assumed similar material as above.

The average thickness of this exposure is approximately 12 m. An overall average thickness of 4.6 m was assumed.

The glacial outwash deposit directly east of P12-49 is almost depleted. Reserves are estimated to be 70,000 $m^3$ (90,000 $yds^3$) or less.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 66.9 | 61.6 | 45.2 | 33.7 | 28.4 | 25.1 | 8.3 | 3.5 | 1.9 | 1.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 11.1; schist 1.2; siltstone and sandstone 2.5 | acid intrusive 16.0; acid volcanic 6.2; sediments 12.3; quartz and quartzite 17.3; metavolcanic and metasediments 32.1; tuff 1.2 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 40 ha (99 acres) | 34 ha (84 acres) | 4.6 m (15.0 feet) | 1.55 million $m^3$ (2.03 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-50 | County: | Gloucester |
| Type of Deposit: | Glacial outwash terrace | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 983 666 |

Section Description & Comments:

0.3 m Sand: Oxidized and weathered medium sand.

1.2 m Sand Gravel: Predominantly sand and fine-to coarse-pebble gravel with a few cobbles; appears fairly clean; material is stratified.

The stone content in this portion of the deposit is about 40%. The overall quality appears good.

Reserves in the three outwash segments that are south of P12-50 and adjacent to the Nepisiguit River are estimated to be 370,000 $m^3$ (480,000 $yds^3$). An average depth of between 1.5 and 1.8 m was assumed.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 4 ha (10 acres) | 3.0 ha (7.5 acres) | 1.8 m (6.0 feet) | 54,000 $m^3$ (70,000 $yds^3$) |
| 19 ha (47 acres) | 16 ha (40 acres) | 2.7 m+ (9.0 feet) | 440,000 $m^3$ (580,000 $yds^3$) |
| 17 ha (42 acres) | 16 ha (40 acres) | ? | ? |

| | | | |
|---|---|---|---|
| Location # | P12-51 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 955 671 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

6.1 m Gravelly Sand: Predominantly medium sand with fine-pebble gravel; contains some silty layers; exhibits subhorizontal stratification (north-easterly dip direction) and cross-bedding.

Boulders appear to be at the surface of the deposit. They were probably derived either from reworking (lag) or from ice-rafting.

Reserves were calculated for the material designated as glacial outwash to the northwest of this pit.

Seismic information was used to estimate the average thickness of this portion of the deposit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 98.0 | 96.1 | 86.7 | 77.2 | 64.8 | 54.9 | 36.2 | 15.3 | 6.6 | 2.9 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 22.5 ha (55.5 acres) | 14.6 m (48.0 feet) | 3.29 million $m^3$ (4.30 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-52 | County: | Gloucester |
| Type of Deposit: | Ablation(?) till | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 897 673 |

Section Description & Comments:

0.6 m Silty Sandy Gravel: Poorly sorted silt, sand, and gravel; pebble- to bounder-size gravel; moderately to well compact; appears massive; clasts are angular in shape and are silt-coated.

Location P12-52 is situated on a ridge-like feature (possibly a morainic ridge; Gauthier, personal communication) oriented in a northeast-southwest direction. The material, however, has textural characteristics similar to lodgement till.

The estimated thickness of this "ridge" is 9 m. Bedrock was noticed at the base of the ridge near the river.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | | | | | | | |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| Location # | P12-53 | County: | Gloucester |
| Type of Deposit: | Glacial outwash/Ice contact | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 948 666 |

Section Description & Comments:

3.7 m Sand and Gravel: Medium to coarse sand and fine- to coarse-pebble gravel; exhibits subhorizontal stratification; appears nonconformable with the lower unit. Sample P12-53a was taken from this unit.

6.1 m Sand and Gravel: Stratified and poorly sorted sand and gravel; pebble- to cobble-size gravel with a few small boulders.

6.1 m Silty Sandy Gravel: Poorly sorted silt, sand, and gravel; pebble- to cobble-size gravel; gravel and silt content are extremely variable; moderately to well compact; appears weakly stratified; this unit appears gradational with the above unit. Sample P12-53b was taken from this unit.

6.1 m Slump Covered: Assumed similar material as above.

Slump features and faulting were noticed at the western extremity of the pit. This portion of the deposit is believed to be an ice-contact face.

One current direction measured in the upper unit of this pit suggests northeast (065°Az) flow.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 100.0 | 87.8 | 80.7 | 71.0 | 48.7 | 22.1 | 4.9 | 1.5 | 0.5 | 0.2 |
| | b | 77.1 | 66.0 | 39.5 | 28.8 | 19.6 | 12.0 | 6.8 | 6.0 | 5.7 | 5.3 |
| | c | | | | | | | | | | |

Lithologic Analysis: P12-53b

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 12.7; schist, shale, friable clasts 13.9; siltstone 1.3; chert 2.5 | acid intrusive 16.5; basic intrusive 3.8; acid volcanic 2.5; basic volcanic 6.3; sediments 3.8; quartz and quartzite 17.7; metavolcanic and metasediments 16.5; gneiss 2.5 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-74 and P12-75 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-54 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 883 677 |

Section Description & Comments:

0.2 m Overburden: Mostly roots and decayed vegetation.

0.3 m Sand and Gravel: Poorly sorted sand and gravel; slightly silty due to oxidation and weathering.

1.4 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel; one horizon of angular cobble-size gravel noticed; appears horizontally stratified; clasts are subangular to subrounded in shape (generally). Sample P12-54 was taken from this unit.

0.8 m Sand: (hand-auger) Coarse sand becoming progressively finer with depth; gravelly at base.

The lower terrace east of this deposit may be alluvial in origin. Quality appears to be excellent.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 75.6 | 67.7 | 52.4 | 43.3 | 38.2 | 33.5 | 15.6 | 2.3 | 0.6 | 0.3 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| See P12-73 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 44 ha (109 acres) includes lower terrace | 32 ha (79 acres) | 1.8 m (6.0 feet) | 580,000 $m^3$ (760,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-55 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 982 674 |

Section Description & Comments:

1.2 m Sand: Medium to coarse sand; contains some fine-pebble gravel; appears stratified; contains numerous red sandstone clasts; silty in places; red in colour.

0.9 m Slump Covered: Assumed similar material as above.

There are only a few exposures in this large deposit. The depth to bedrock is unknown but it is expected to be shallow in places. The bedrock is probably a red sandstone (Pennsylvanian in age).

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 100.0 | 98.5 | 90.0 | 71.6 | 49.7 | 20.6 | 3.6 | 1.1 | 0.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-56 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-56 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 976 680 |

Section Description & Comments:

0.2 m Overburden: Mostly decayed vegetation.

2.1 m Sand: Predominantly medium sand; contains a few pebbles; exhibits cross-bedding and cut-and-fill structures; horizontal or near-horizontal bedding in places; red-brown in colour.

0.6 m Slump Covered: Assumed similar material as above.

The pit floor appears very silty. No large clasts were noticed in the pit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 100.0 | 99.6 | 98.5 | 96.5 | 92.7 | 85.5 | 49.2 | 18.4 | 3.0 | 0.7 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 46 ha (114 acres) | 40.5 ha (100.0 acres) | 2.7 m (9.0 feet) | 1.11 million $m^3$ (1.45 million $yds^3$) |
| 7 ha (17 acres) | 7 ha (17 acres) | ? | ? |

| | | | |
|---|---|---|---|
| Location # | P12-57 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 999 658 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

0.3 m Sand and Gravel: Oxidized and weathered (silty) sand and gravel.

0.6 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with a few small cobbles; subhorizontally stratified; clasts are subangular to subrounded in shape. Sample P12-57 was taken from this unit.

0.9 m Slump Covered: Assumed similar material as above.

The reserves include the glacial outwash material south of Round Rock Brook on the east side of the Nepisiguit River. The upper terrace is 2.4 m thick and the lower terrace is approximately 1.5 m thick. Within the confines of the Pabineau Indian Reserve (on the east side of the Nepisiguit River), approximately 1.0 million $m^3$ (1.3 million $yds^3$) of sand and gravel are present.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 96.5 | 86.9 | 68.0 | 59.0 | 51.7 | 47.1 | 34.2 | 5.3 | 0.6 | 0.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 1.6; schist, shale, friable clasts 4.7; chert 1.6 | acid intrusive 10.9; basic intrusive 9.4; acid volcanic 18.8; basic volcanic 7.8; quartz and quartzite 23.4; metavolcanic and metasediments 17.2; tuff 3.1; gneiss 1.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 133.5 ha (330.0 acres) | 110.5 ha (273.0 acres) | 2.4 m (8.0 feet) | 2.69 million $m^3$ (3.52 million $yds^3$) |
| 137 ha (339 acres) | 88 ha (218 acres) | 1.5 m (5.0 feet) | 1.34 million $m^3$ (1.76 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-58 | County: | Gloucester |
| Type of Deposit: | Ablation till (lateral moraine?) | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 078 672 |

Section Description & Comments:

0.2 m Overburden: Mostly decayed vegetation.

0.3 m Silty Sand: Moderately compact silty fine sand; weakly stratified.

1.5 m Sand and Gravel: Predominantly medium sand and pebble-to cobble-size gravel; quite silty in places; moderately to loosely compact; no structures noticed; clasts are predominantly rounded in shape and are silt-coated. Sample P12-58 was taken from this interval.

Numerous poor lithotypes (especially sandstone clasts) and excessive amounts of silt are present. The overall quality is poor.

Near the northern segments of this moraine, there are abundant quantities of marine sand and silt.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 82.4 | 78.0 | 69.3 | 60.5 | 53.2 | 47.1 | 24.2 | 15.3 | 11.2 | 9.0 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 16.7; schist, shale, friable clasts 3.3; siltstone and sandstone 50.0 | acid intrusive 3.3; basic intrusive 3.3; volcanic 5.0; sediments 3.3; quartz and quartzite 10.0; metasediments and meta-volcanic 3.3; tuff 1.7 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 57.5 ha (142 acres) | 55.5 ha (136.5 acres) | 4.0 m (13.2 feet) | 2.22 million $m^3$ (2.91 million $yds^3$) |
| 17 ha (42 acres) | ? | ? | ? |

| | | | |
|---|---|---|---|
| Location # | P12-59 | County: | Gloucester |
| Type of Deposit: | Marine/Ablation till (lateral moraine) | Parish: | Bathurst |
| Exposure Type: | Roadcut (erosion) | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 072 678 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

0.6 m Sand and Gravel: Poorly sorted sand and gravel; silty due to oxidation and weathering; appears disturbed (in place?).

3.7 m Silty Sand: Interstratified layers of fine sand and silt; silt content is variable. Sample P12-59 was taken from this unit.

The material described in the above 'section description' is believed to be marine (estuarine) in origin. It probably flanks the morainic ridge. The northern-most segment of this moraine appears to be reworked as it exhibits a sandy surface. A small pit of sand was excavated along the side of this ridge-like feature.

The ridge segments become progressively subdued to the north, suggesting reworking as well.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | 100.0 | 98.0 | 94.5 | 74.9 | 37.0 | 16.6 | 7.4 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-58 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-60 | County: | Gloucester |
| Type of Deposit: | Glaciofluvial | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 839 649 |

Section Description & Comments:

1.2 m Gravelly Sand: Predominantly medium sand with some fine-pebble gravel; contains a few cobbles; appears stratified.

This pit is small and is almost depleted. It appears to be a pocket of glaciofluvial material surrounded by till. The water table was noticed at the base of the pit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 95.9 | 94.0 | 87.5 | 79.5 | 69.7 | 60.4 | 36.7 | 7.8 | 1.3 | 0.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | | | very little |

| | | | |
|---|---|---|---|
| Location # | P12-61 | County: | Gloucester |
| Type of Deposit: | Glaciofluvial? Marine? | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 939 700 |

Section Description & Comments:

1.2 m Sand: Predominantly fine to medium sand; slightly silty; contains a few pebbles; appears stratified.

0.2 m Till: Gravelly sandy silt till; pebble-to cobble-size clasts; brown in colour; moderately compact.

This deposit is small in extent and is almost depleted. It may be a beach remnant indicating the maximum marine limit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | 100.0 | 97.3 | 92.5 | 59.6 | 17.5 | 3.6 | 1.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | | | very little |

| | | | |
|---|---|---|---|
| Location # | P12-62 | County: | Gloucester |
| Type of Deposit: | Ice contact (esker) | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 854 669 |

Section Description & Comments:

0.6 m Silty Gravelly Sand: Very silty gravelly sand; oxidized and weathered horizon; buff brown in colour.

0.2 m Gravelly Sand: Predominantly medium sand and fine-pebble gravel; very little silt; grey in colour; clasts are predominantly subrounded in shape. Sample P12-62 taken from this interval.

Silt flanks the southern part of the ridge near its base. It is believed to be alluvial in origin. The height of the esker ridge at location P12-62 is 6.4 m.

A kame southeast of P12-62 (south side of Middle River) contains an estimated 110,000 $m^3$ (140,000 $yds^3$) of recoverable reserves. Associated ice-contact sediments east of the kame contain an estimated 300,000 $m^3$ (390,000 $yds^3$) of recoverable reserves.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 100.0 | 98.6 | 94.3 | 83.7 | 73.4 | 58.0 | 18.7 | 3.8 | 1.3 | 0.3 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 9.0 ha (22.5 acres) | 9.0 ha (22.5 acres) | 4.6 m (15.0 feet) | 410,000 $m^3$ (540,000 $yds^3$) |
| 5.0 ha (12.0 acres) | unknown | unknown | unknown |

| | | | |
|---|---|---|---|
| Location # | P12-63 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 875 668 |

Section Description & Comments:

0.8 m Sand and Gravel: Oxidized and weathered sand and pebble-size gravel with a few cobbles; upper 0.3 m displays a good soil profile.

0.2 m Sand and Gravel: Predominantly medium sand and fine- to coarse-pebble gravel with a few cobbles; appears somewhat gap-graded; no structures observed; appears good in quality. Sample P12-63 was taken from this unit.

Seismic data were used to estimate reserves (see P12-71).

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 90.7 | 81.6 | 64.1 | 49.6 | 41.2 | 35.5 | 21.6 | 8.0 | 4.3 | 3.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 9.6; schist, shale, friable clasts 12.3; siltstone and sandstone 4.1 | acid intrusive 12.3; acid volcanic 6.8; basic volcanic 1.4; sediments 6.8; quartz and quartzite 8.2; metavolcanic and metasediments 37.0; iron formation 1.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| See P12-71 | | | |

| | | | |
|---|---|---|---|
| Location # | P12-64 | County: | Gloucester |
| Type of Deposit: | Ice contact | Parish: | Bathurst |
| Exposure Type: | Roadcut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 839 646 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

0.2 m Sand and Gravel: Poorly sorted sand and gravel; silty due to oxidation and weathering.

0.5 m Sand and Gravel: Predominantly medium to coarse sand and pebble-size gravel with a few cobbles; clasts are subangular in shape; no structures observed. Sample P12-64 was taken from this interval.

An average thickness of 3.7 m was assumed for this terrace-shaped deposit. Numerous cobbles were noticed on the surface. The sample doesn't represent the coarser fraction of the deposit.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 90.4 | 89.0 | 83.1 | 71.8 | 51.9 | 34.9 | 11.8 | 1.5 | 0.7 | 0.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 4.5 ha (11.5 acres) | 3.0 ha (8.0 acres) | 3.7 m (12.0 feet) | 110,000 $m^3$ (150,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-65 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand? | UTM: | 013 712 |

Section Description & Comments:

0.8 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with a few small cobbles; displays subhorizontal stratification; clasts are subangular to subrounded in shape.

2.3 m Slump Covered: Assumed similar material as above.

Reserves were also calculated for the outwash deposit west of P12-65. This deposit is part of the Nepisiguit River outwash system. Reserves are rapidly decreasing because the deposit is extensively worked.

The overall quality appears excellent.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 93.7 | 89.3 | 70.4 | 53.0 | 41.1 | 34.1 | 23.1 | 6.4 | 2.0 | 0.7 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 8 ha (20 acres) | 7 ha (17 acres) | 2.1 m (7.0 feet) | 150,000 $m^3$ (190,000 $yds^3$) |
| 155.5 ha (384.0 acres) | 68.5 ha (169.0 acres) | 1.8 m (6.0 feet) | 1.25 million $m^3$ (1.64 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-66 | County: | Gloucester |
| Type of Deposit: | Ice contact (morainic ridge) | Parish: | Bathurst |
| Exposure Type: | Roadcut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 920 642 |

Section Description & Comments:

0.6 m Sand and Gravel: Poorly sorted sand and gravel; pebble-to boulder-size gravel; appears stratified in places; silt content is variable and usually excessive (greater than 5%); clasts are predominantly subangular in shape.

The ridge is about 12 m (40 feet) thick here. The exposure was observed adjacent to a road that rapidly descends the ridge (approximately half way down the ridge).

The sample doesn't represent the coarse fraction of the deposit. No reserve estimates were made for the ridge surrounding Pabineau Lake due to its value as a recreational resort.

There is at least 58 ha (144 acres) of concentrated boulders east of Pabineau Lake. Some boulders have been removed by A.C. Landry Ltd. of Caraquet to stabilize the shoreline near Chatham for the construction of a wharf.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 82.8 | 76.2 | 56.8 | 44.2 | 28.3 | 17.3 | 4.7 | 1.9 | 1.4 | 1.3 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 11.4; schist, shale, friable clasts 18.6; siltstone and sandstone 2.9 | intrusives 5.7; volcanic 5.7; sediments 7.1; quartz and quartzite 24.3; metasediments and metavolcanic 21.4; tuff 1.4; iron formation 1.4 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 12.5 ha (31.0 acres) | 12.5 ha (31.0 acres) | 4.6 m (15.0 feet) | Nil; see comments |

| | | | |
|---|---|---|---|
| Location # | P12-67 | County: | Gloucester |
| Type of Deposit: | Ice contact (morainic ridge) | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 932 656 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

0.2 m Sand and Gravel: Poorly sorted sand and gravel; slightly silty due to oxidation and weathering.

1.7 m Sand and Gravel: Medium to coarse sand and pebble-to cobble-size gravel; grey in colour; moderately compact; no structures observed; silt content is variable; clasts are predominantly subangular in shape and are silt-coated. Sample P12-67 was taken from this unit.

The pit thickness varies from 2 to 4 m and increases in thickness to the south. An average thickness of 4.6 m (overall) was assumed.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 71.4 | 67.8 | 57.6 | 47.6 | 37.1 | 26.8 | 11.2 | 5.3 | 3.3 | 2.2 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| See P12-43 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 12.5 ha (31.0 acres) | 12.5 ha (31.0 acres) | 4.6 m (15.0 feet) | 570,000 $m^3$ (750,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-68 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 971 754 |

Section Description & Comments:

1.2 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel; silty in places; clasts are imbricated; no other structures observed; clasts are generally subrounded in shape.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

The deposit west of P12-68 is either glaciofluvial or ice contact in origin. Although no depth control was observed, an average thickness of 1.8 m was assumed.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 86.4 | 75.8 | 58.3 | 44.4 | 33.6 | 27.1 | 13.0 | 4.3 | 1.9 | 1.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 17.8; schist, shale, friable clasts 6.9; siltstone and sandstone 5.5 | acid intrusive 1.4; basic intrusive 12.3; acid volcanic 12.3; basic volcanic 12.3; sediments 9.6; quartz and quartzite 12.3; metasediments and metavolcanic 9.6 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 9.0 ha (22.5 acres) Glacial outwash (?) deposit west of P12-68 | 8.0 ha (20.0 acres) 40.5 ha (100.0 acres) | 1.8 m (max.) (6.0 feet) 1.8 m? (6.0 feet) | 150,000 $m^3$ (190,000 $yds^3$) 740,000 $m^3$ (970,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-69 | County: | Gloucester |
| Type of Deposit: | Ice contact (morainic ridge) | Parish: | Bathurst |
| Exposure Type: | Roadcut | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 938 671 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

0.9 m Sand and Gravel: Poorly sorted sand and gravel; pebble- to cobble-size gravel; silty in places; clasts are subangular to subrounded in shape and are partially silt-coated; no structures observed (poor exposure).

1.8 m Slump Covered: Assumed similar material as above.

The material from this exposure appears consistent with other exposures along the ridge.

Reserves were calculated for the ice-contact sediments north of, and including P12-69.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 81.9 | 74.0 | 52.2 | 30.0 | 14.6 | 10.0 | 6.8 | 4.8 | 2.9 | 1.5 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| See P12-43 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 33 ha (81 acres) | 33 ha (81 acres) | 7.3 m (24.0 feet) | 2.40 million $m^3$ (3.14 million $yds^3$) |
| 8.0 ha (19.5 acres) | 7.5 ha (19.0 acres) | 3.7 m (12.0 feet) | 280,000 $m^3$ (370,000 $yds^3$) |
| 4.5 ha (11.0 acres) | 4.5 ha (11.0 acres) | 2.7 m (9.0 feet) | 120,000 $m^3$ (160,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-70 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 952 662 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

4.6 m Gravelly Sand: Predominantly fine to medium sand and fine- to coarse-pebble gravel; exhibits near-horizontal stratification with some cross-bedding; contains some silty layers.

1.2 m Slump Covered: Assumed similar material as above.

A unit(?) of cobbly gravel was noticed near the top of the pit (not in section). The material appears to be of excellent quality.

The reserves were calculated for the glacial outwash sediments south of Highway #430. Seismic information has supplemented field data to determine average thicknesses (see table below).

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 96.5 | 95.5 | 89.3 | 79.9 | 69.8 | 58.8 | 39.4 | 18.3 | 7.8 | 3.0 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 7.5 ha (19.0 acres) | 11.9 m (39.0 feet) | 0.92 million $m^3$ (1.20 million $yds^3$) |
| | 10.5 ha (26.0 acres) | 4.6 m (15.0 feet) | 480,000 $m^3$ (630,000 $yds^3$) |
| | 6.0 ha (15.0 acres) | 2.7 m (9.0 feet) | 170,000 $m^3$ (220,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-71 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 878 668 |

Section Description & Comments:

0.2 m Overburden: Mainly decayed vegetation.

0.6 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with a few cobbles; slightly silty due to oxidation and weathering; cleaner with depth.

0.2 m Sand and Gravel: Same material as above but contains less silt; cobble-size gravel is more abundant; clasts are subrounded to subangular in shape. Sample P12-71 was taken from this interval.

Reserves were calculated using seismic data.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 89.0 | 81.6 | 64.1 | 53.6 | 46.1 | 37.9 | 21.0 | 10.5 | 5.7 | 4.0 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| see P12-63 | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 51.0 ha (125.5 acres) | 41.0 ha (101.0 acres) | 6.2 m (20.5 feet) | 2.55 million $m^3$ (3.33 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-72 | County: | Gloucester |
| Type of Deposit: | Ablation till (moraine?) | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 882 675 |

Section Description & Comments:

0.5 m Silty Sand and Gravel: Poorly sorted silt, sand, and gravel; pebble-to cobble-size gravel; moderately compact; orange-brown in colour.

0.2 m Silty Sand and Gravel: Similar material as above; buff brown in colour; clasts are angular in shape. Sample P12-72 was taken from this interval.

Reserves appear extensive but the quality of the deposit is poor owing to an excessive amount of fines. Reserves can be in the order of 1.2 million $m^3$ (1.6 million $yds^3$) if an average thickness of 2.7 m (9.0 feet) is assumed.

Mechanical Analysis:

| sieve | | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 89.3 | 85.7 | 78.5 | 71.5 | 66.2 | 62.6 | 56.2 | 47.3 | 37.8 | 27.0 |
| | b | | | | | | | | | | | |
| | c | | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| North side of Little River | 14.0 ha (34.5 acres) | unknown | |
| South side of Little River | 30.5 ha (75.0 acres) | unknown | |

| | | | |
|---|---|---|---|
| Location # | P12-73 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Test pit | NTS: | 21 P/12 |
| Status: | Undeveloped | UTM: | 874 676 |

Section Description & Comments:

0.3 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with a few cobbles; becomes sandy with depth.

An average thickness of 1.8 m was assumed. The deposit is relatively inaccessible and its extent was interpreted from aerial photographs.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 88.9 | 83.0 | 70.1 | 61.5 | 49.0 | 38.7 | 16.5 | 2.6 | 1.2 | 0.9 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 10.3; schist, shale, friable clasts 10.3; siltstone and sandstone 5.2; chert 2.1 | acid intrusive 8.2; basic intrusive 1.0; volcanic 2.0; sediments 17.5; quartz and quartzite 12.4; metavolcanic and metasediments 29.9; argillite 1.0 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 14 ha (34 acres) | 12.5 ha (31.0 acres) | 1.8 m? (6.0 feet) | 230,000 $m^3$ (300,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-74 | County: | Gloucester |
| Type of Deposit: | Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active | UTM: | 954 669 |

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

1.5 m Sand and Gravel: Poorly sorted sand and gravel; pebble-to cobble-size gravel; clasts are predominantly subangular in shape.

0.9 m Gravelly Sand: Predominantly medium sand and fine-pebble gravel; somewhat silty in places; exhibits cross-bedding and cut-and-fill structures.

0.9 m Sand and Gravel: Similar material as in uppermost unit.

1.8 m Slump Covered: Assumed similar material as above.

Current directions that were recorded in the pit suggest an east-northeast flow.

Seismic information was used to estimate the average thickness for this portion of the deposit.

Reserve estimates for the material designated as glacial outwash which occur between P12-53 and P12-74 have been calculated. Ice-contact sediments probably exist stratigraphically below the outwash sediments.

This pit is presently being worked by Kenny's Ready-Mix Ltd.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 88.9 | 84.4 | 67.4 | 54.4 | 43.5 | 33.8 | 14.7 | 3.7 | 1.3 | 0.7 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 6.2; schist, shale, friable clasts 22.5; siltstone 3.8 | acid intrusive 7.5; intermediate to basic intrusive 3.8; acid volcanic 1.3; sediments 8.7; quartz and quartzite 18.7; gneiss 3.8; metasediments and metavolcanic 23.7 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| | 14.0 ha (34.5 acres) | 15.5 m (51.0 feet) | 2.17 million $m^3$ (2.84 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-75 | County: | Gloucester |
| Type of Deposit: | Ice contact (morainic ridge) | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 950 670 |

Section Description & Comments:

7.3 m Sand and Gravel: Very poorly sorted sand and gravel; pebble-to cobble-size gravel and a few small boulders; exhibits contorted stratification and associated slump features; clasts are coated with clayey silt and are predominantly subangular in shape.

4.0 m Slump Covered: Assumed similar material as above.

The average exposed thickness of this portion of the deposit is approximately 9.0 m. Beds are dipping northward.

Seismic information has supplemented field data to determine average thicknesses (see table below).

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 77.7 | 70.3 | 49.6 | 35.9 | 25.7 | 19.4 | 8.0 | 5.2 | 4.7 | 4.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 6.7; schist, shale, friable clasts 11.7; siltstone 1.7 | acid intrusive 18.3; acid volcanic 6.7; sediments 8.3; quartz and quartzite 18.3; metasediments and metavolcanic 26.7; gneiss 1.7 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| P12-75 | 5.0 ha (12.0 acres) | 21.3 m (70.0 feet) | 1.04 million $m^3$ (1.36 million $yds^3$) |
| West of P12-75 | 5.5 ha (13.0 acres) | 9.1 m (30.0 feet) | 480,000 $m^3$ (630,000 $yds^3$) |
| South of P12-75 | 24.5 ha (61.0 acres) | 26.2 m (86.0 feet) | 6.47 million $m^3$ (8.46 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-76 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 043 781 |

Section Description & Comments:

1.5 m Sand: Fine to medium sand with some fine-pebble gravel; exhibits near-horizontal stratification; no large clasts observed.

Grain sizes appear consistent within the pit. The average pit thickness varies from 1.2 to 1.5 m.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | 100.0 | 93.8 | 86.2 | 75.0 | 67.9 | 52.6 | 13.8 | 6.6 | 2.9 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 20.5 ha (51.0 acres) | 15.5 ha (38.0 acres) | 1.5 m (5.0 feet) | 230,000 $m^3$ (300,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-77 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Active on demand | UTM: | 072 808 |

Section Description & Comments:

1.2 m Sand: Predominantly medium sand; contains some layers of fine-pebble gravel; compact in places (possibly ferruginous cementation); exhibits near-horizontal stratification.

The average pit thickness varies from 1.2 to 1.5 m. Water is present at the base of the pit.

Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | 100.0 | 85.1 | 77.6 | 47.6 | 3.7 | 0.5 | 0.4 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 82 ha (203 acres) | 60 ha (148 acres) | 1.5 m (5.0 feet) | 0.9 million $m^3$ (1.2 million $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-78 | County: | Gloucester |
| Type of Deposit: | Marine or Glacial outwash | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 026 765 |

Section Description & Comments:

1.8 m Sand and Gravel: Predominantly medium sand and fine-to coarse-pebble gravel with some small cobbles; contains some sand lenses; exhibits horizontal stratification with minor cross-bedding; clasts are mostly subrounded in shape.

Reserves do not appear to be extensive since most of the area is populated. Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | 1" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | 71.9 | 62.1 | 48.5 | 43.8 | 40.1 | 34.7 | 16.5 | 3.3 | 0.4 | 0.1 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| weathered pebbles 7.1; schist, shale, friable clasts 1.2 | acid intrusive 10.7; basic intrusive 7.1; acid volcanic 14.3; basic volcanic 14.3; sediments 7.1; quartz and quartzite 15.5; metavolcanic and metasediments 21.4; tuff 1.2 |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 168 ha (415 acres) | 19 ha (47 acres) | 1.5 m (5.0 feet) | 290,000 $m^3$ (380,000 $yds^3$) |
| | 1.5 ha (3.5 acres) | 2.7 m (9.0 feet) | 40,000 $m^3$ (50,000 $yds^3$) |

| | | | |
|---|---|---|---|
| Location # | P12-79 | County: | Gloucester |
| Type of Deposit: | Marine | Parish: | Bathurst |
| Exposure Type: | Pit | NTS: | 21 P/12 |
| Status: | Inactive | UTM: | 008 753 |

Section Description & Comments:

1.5 m Sand: Predominantly fine sand; contains some fine-pebble gravel and variable amounts of silt; silt content increases with depth; sub-horizontally stratified.

1.0 m Slump Covered: Assumed similar material as above.

The average pit thickness is 2.7 m. The workable area of this deposit may be smaller than indicated due to increasing habitation. Extraction problems may be encountered since this deposit lies within the city limits of Bathurst.

Mechanical Analysis:

| sieve | | I" | 3/4" | 3/8" | #4 | 8 | 14 | 30 | 50 | 100 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| % passing | a | | | | 100.0 | 99.2 | 98.1 | 90.6 | 64.9 | 27.8 | 7.5 |
| | b | | | | | | | | | | |
| | c | | | | | | | | | | |

Lithologic Analysis:

| Unsound Lithotypes % | Sound Lithotypes % |
|---|---|
| | |

Estimation of Reserves:

| total deposit area (acres) | area workable (acres) | average thickness (feet) | recoverable reserves ($yd^3$) probable |
|---|---|---|---|
| 44 ha (108 acres) | 24 ha (60 acres) | 2.1 m (7.0 feet) | 520,000 $m^3$ (680,000 $yds^3$) |
| West of P12-79 | 6.3 ha (15.5 acres) | 1.8 m (6.0 feet) | 110,000 $m^3$ (150,000 $yds^3$) |
| South of P12-79 | 4 ha (10 acres) | 1.8 m (6.0 feet) | 70,000 $m^3$ (100,000 $yds^3$) |

# APPENDIX B

The information presented on the following page has been extracted from the files of the New Brunswick Department of Transportation.

In the past, some of the deposits in the Bathurst map-area have been tested and approved for various uses. Tests for abrasion loss, grading, and soundness (in two locations) were completed. The results have been presented in tabular form on the following page.

The gravel content reported in this appendix does not necessarily represent the true amount of gravel since sampling may have been selective.

## Previous Uses of Some Deposits, Bathurst Map-area

| Location | Abrasion Loss (%) | Gravel Content (%) | Previous Uses* | Remarks |
|---|---|---|---|---|
| P12-3 | 22 | 60±10 | 1, 2, 3 | — |
| Near P12-4 | 24-25 | 60±10 | 1, 2, 3 | — |
| Near P12-5, P12-29 | 19-22 | 60±10 | 1, 2, 3, 5, 6, 8 | See data sheet P12-5a. |
| Near P12-6, P12-20 | 33-36 | 45±10 | 1, 2, 4 | — |
| P12-7 | 32 | 35±5 | 1, 2, 4 | Water table at a depth of 2.5 m. |
| Near P12-9, P12-25 | 29-33 | 63±10 | 1, 2, 3 | South Tetagouche area. |
| P12-10 | 35 | 60±10 | 1, 2, 3 | — |
| Near P12-11 | 30-32 | 55±10 | 1, 2, 3 | Water table at a depth of 3 m. |
| Near P12-15 | 27 | 63±10 | — | Abundant cobble-size gravel present. |
| P12-16 | 18 | 60±10 | — | High organic content (4).<br>Flakiness index of 37. |
| Near P12-17 | — | 30±5 | 1 | Water table at a depth of 2 m. |
| East of P12-18 | 20 | 22±5 | 1, 4, 7 | Water table at a depth of 2 to 3 m. |
| West of P12-18 | 28 | 35±5 | 1, 2 | — |
| Near P12-24 | 30 | 30±5 | 1, 7 | — |
| P12-28 | 33 | 58±10 | 1, 2, 3 | — |
| Near P12-42 | 26-28 | Variable | 1, 2, 3, 4 | Blue Mountain Deposit. |
| P12-44 | 20 | 65±10 | 1, 2, 3 | Water table at a depth of 2 m. |
| Near P12-46 | 21 | 65±10 | 1, 2, 3, 5, 6, 8, 9 | See data sheet P12-46. |
| Near P12-47 | 21-22 | Variable | 1, 2, 3 | Water table at a depth of between 1.5 and 3.0 m. |
| Near P12-49 | 29 | 40±10 | 1 | 20% passing #200 sieve.<br>This area is probably north of P12-49. |
| Near P12-57 | 19 | 60±10 | 1, 2, 3 | Water table at a depth of 1.5 m.<br>Clay encountered at a depth of 2.5 m. |
| Near P12-79 | — | less than 20 | 1, 4 | Water table at a depth of 3.0 m.<br>1.7 to 43.1% passing #200 sieve. |
| East of Dunlop | 25 | 50±10 | 1, 2 | Water table at a depth of 1.5 m.<br>Bedrock at a depth of 2.0 m. |

*SYMBOL EXPLANATION

GRADING

1 Borrow
2 Subbase
3 Base (1/4" crushed)
4 Filter material

ASPHALTIC CONCRETE

5 Base aggregate
6 Seal aggregate
7 Blending sand

SURFACE TREATMENT

8 3/4" and 1/2" chips
9 3/8" chips