Nova Scotia Department of Natural Resources
Mineral Resources Branch

Open File Map ME 2007-4

(Figure 6 of Economic Geology Series ME 2007-1)

Digital Elevation Model Map of Western Halifax Regional Municipality Aggregate Study Area, Halifax County, Nova Scotia

(Part of NTS Sheets 11D/12, 11D/13, 21A/09 and 21A/16)

G. Prime and F. J. Bonner

Scale 1:35 000

1 0 1 2 3 km

Halifax, Nova Scotia
2007

NOVA SCOTIA
Natural Resources

Discussion

This shaded relief map has been constructed to show the relationship between the bedrock aggregate potential identified in this report and the topographic features which may influence quarry development in the area. The geological boundaries (compiled from Corey, 1987, 1990; Ham and Horne, 1987; MacDonald and Horne, 1987; MacDonald, 1994) have been superimposed. For a discussion of the digital elevation modelling (DEM) technology used to produce this map, refer to Fisher *et al.* (2006). The user should note that this DEM map was derived from gridded elevation data from separate map sheets, and this resulted in artificial north-south and east-west trends on the map. In order to minimize impacts on community and environment an understanding of land forms and water drainage is critical in the identification of aggregate extraction sites. For example, ideally a quarry should be sited so that it cannot be seen from Route 103 or residential developments to the west of Stillwater Lake. Hills and ridges of bedrock not only have geotechnical advantages for quarrying, but can make effective visual barriers when extraction operations are properly sited. Proximity to water courses is another consideration, because Pit and Quarry Guidelines (Nova Scotia Department of Environment and Labour, 1999) have minimum setbacks from waterways.

An examination of the geomorphology in the area indicates that the features showing the greatest vertical relief are generally bedrock ridges with varying thicknesses of till cover. The primary trend for many of these land forms, lakes and stream courses is northwest-southeast. The surficial features, on the other hand, are generally more subtle in appearance on the map and exhibit more variability in their orientation. Ablation mounds and moraine ridges are regionally oriented in a northwest-southeast to north-south direction, although some of the ridges trend east-west. An example of the till mounds on the map can be found on the eastern branch of the northward trending woods access road at the 10 km mark from Exit 5. Approximately 1 km north of Route 103, where the access road crosses the Ingram River, are three northwestward trending ablation till ridges on the northern side of the River and parallel to it. Till mounds should be avoided when looking for a quarry site because of the high stripping costs associated with reaching the surface of the bedrock. They are usually quite easy to identify in the field because of the hummocky nature of the landscape. A variety of surficial maps produced by the Provincial Government can be useful in locating thick till deposits in the area (Finck and Graves, 1987a, 1987b; Finck *et al.*, 1989; Graves and Finck, 1990).

Proximity to market is another key consideration when identifying a quarry site. Most mining costs associated with quarrying (e.g. blasting, crushing, screening and washing) are constant regardless of location. However, delivery costs, the most expensive component in the price of the landed stone, are highly variable. The greater the distance that the materials have to be hauled, the more they will cost the consumer. Thus locating quarries near the markets is imperative for the producer to be competitive. One can have the best source of aggregate possible, but if it is beyond the distance where the stone can be delivered at a price acceptable to the consumer, the site is worthless. In order to give the reader a sense of proximity to market for the areas identified in this report, distance markers along Route 103 to Exit 5 are indicated. This Exit has been selected as a reference point because it is the closest access to the Upper Tantallon/Hammonds Plains stone market. Using the distance scale provided on the map, the reader can determine approximate distances of potential quarry sites to Route 103. These data can then be used to determine those areas west of Halifax where a new quarry would be competitive with existing producers.

Outcrop locations are indicated on the map to show areas where the bedrock can be evaluated and sampled at the surface. But it should be noted that not all exposures present in the area are shown on the maps. Although the original geological mapping was remarkably thorough, time constraints prevented the documentation of all outcrop. Grid line traverses across a candidate quarry area should produce more bedrock exposures than are indicated here.

References

Corey, M.C. 1987: Geological map of Mount Uniacke, NTS sheet 11D/13 (west half); Nova Scotia Department of Mines and Energy, Map 1987-8, scale 1:50 000.

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Nova Scotia Departments of Health Promotion and Protection, Service Nova Scotia and Municipal Relations, Economic Development, and Tourism, Culture and Heritage 2001: Trails Nova Scotia, available at http://www.trails.gov.ns.ca/SharedUse/hx041.html

Prime, G. 2001: Overview of bedrock aggregate potential in the Halifax-Dartmouth metropolitan area, Nova Scotia; Nova Scotia Department of Natural Resources, Minerals and Energy Branch, Economic Geology Series ME 2001-1, 74 p.

Map Notes

Universal Transverse Mercator Projection (UTM), Zone 20, Central Meridian 63°00' West.

North American Datum (NAD) 1983.

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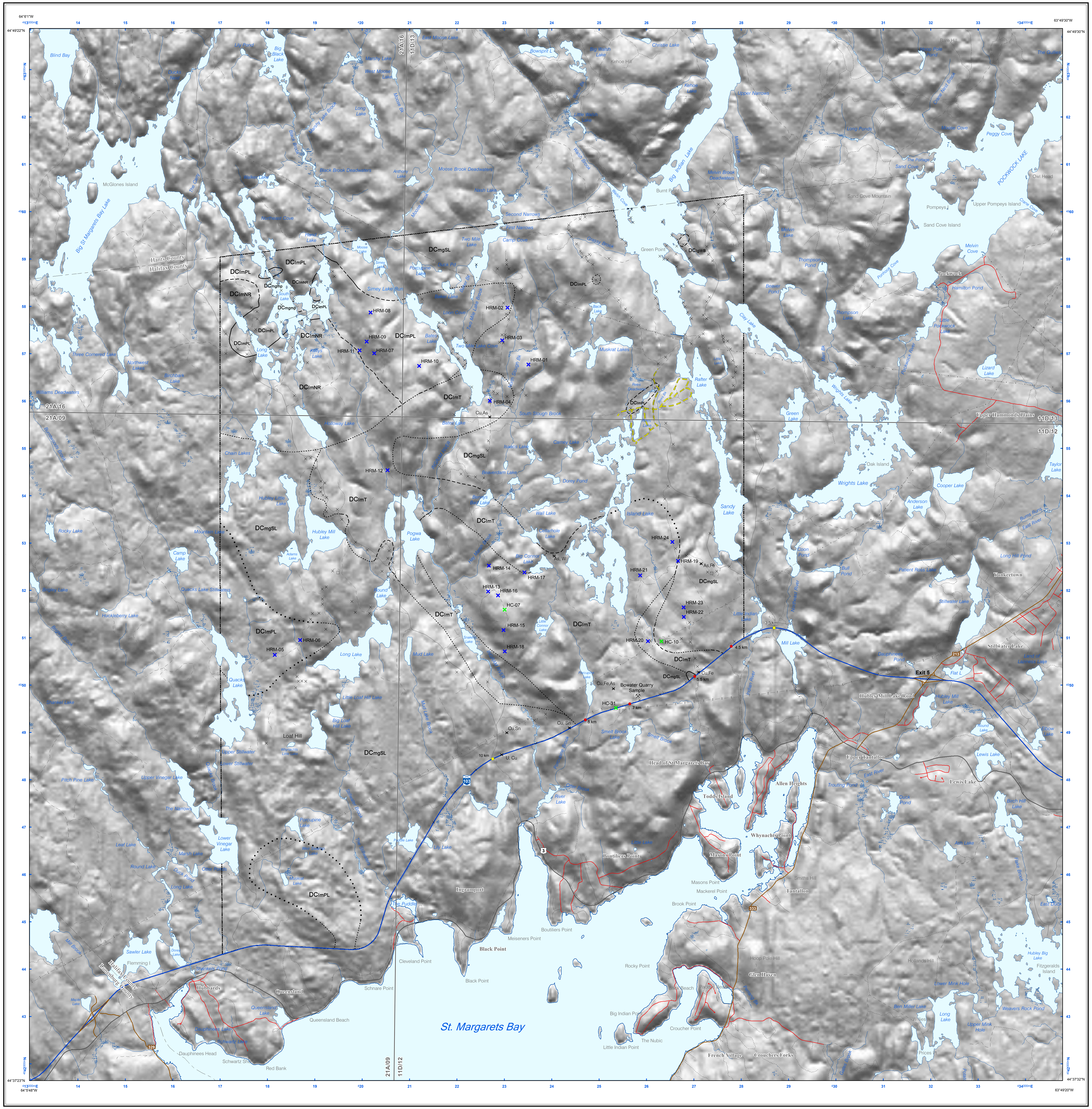
The information on this map may have come from a variety of government and nongovernment sources. The Nova Scotia Department of Natural Resources does not assume any liability for errors that may occur.

The user should note that this DEM map was derived from gridded elevation data from separate map sheets, and this resulted in artificial north-south and east-west trends on the map.

Recommended Citation

Prime, G. and Bonner, F. J. 2007: Digital Elevation Model map of western Halifax Regional Municipality aggregate study area, Halifax County, Nova Scotia (part of NTS sheets 11D/12, 11D/13, 21A/09 and 21A/16); Nova Scotia Department of Natural Resources, Mineral Resources Branch, Open File Map ME 2007-4, scale 1:35 000.



Legend

DEVONO-CARBONIFEROUS

- DCIgWB — WALSH BROOK LEUCOGRANITE
- DCImPL, DCImT — PANUKE LAKE LEUCOMONZOGRANITE; TANTALLON LEUCOMONZOGRANITE
- DCImNR — NEW ROSS LEUCOMONZOGRANITE
- DCmgSL — SANDY LAKE MONZOGRANITE
- DCmgmp — MAFIC PORPHYRY

Note: Geology only given within limits of study area

Symbols

- Bowater Mersey Paper Company Limited's primary road intersections with Route 103 (approximate distance to Exit 5) — 10 km
- Approximate distance along Route 103 to Exit 5 — 4.5 km
- Sample locations from Prime (2001) — HC-07
- Sample locations from current study — HRM-16
- Bowater Quarry sample location
- Mineral occurrences (from Nova Scotia Department of Natural Resources, Mineral Occurrences Data Base; MacDonald and Horne, 1987) — As
- Outcrop locations
- Xenoliths
- Limit of study area
- Old Annapolis Road Hiking Trail (digitized from Nova Scotia Departments of Health Promotion and Protection *et al.*, 2001)
- Geological boundary (defined, approximate, assumed, defined by till clasts)
- 100 Series Highway — 102
- Trunk Highway — 4
- Collector Highway — 333
- Hard surface road
- Loose surface road
- Resource access road
- Vehicle track
- Railway inactive
- Coastline
- Rivers, streams
- County boundary
- Transmission lines (multi, single lines)
- Swamps
- Lakes

Regional Key Map