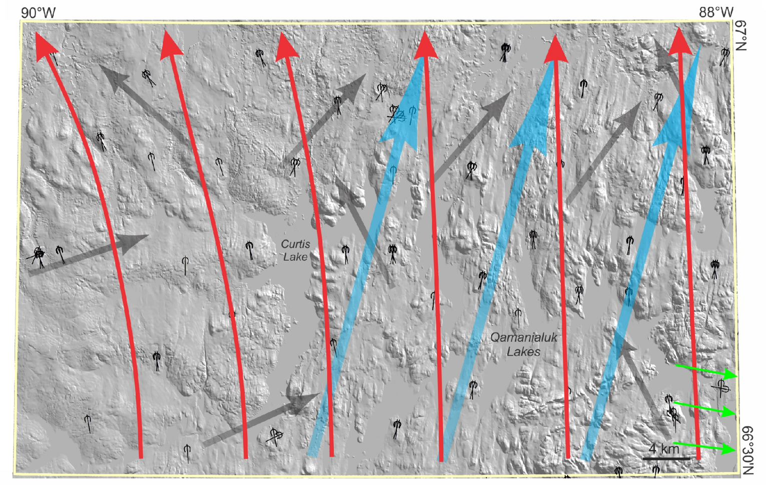


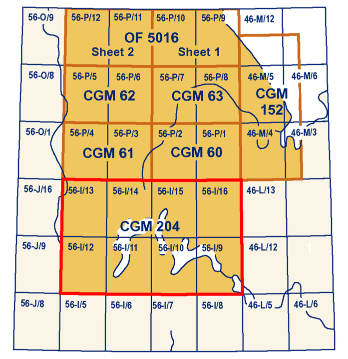
Figure 1. Generalized glacial flow directions derived from small ice-flow indicators (e.g. striations) and from trends of streamlined landforms. The digital elevation model is derived from CDED 1:50 000 scale topography.

Abstract

Much of the Curtis Lake North map area is covered by streamlined till interspersed in the east by dissected bedrock ridges and plateaus, and in the west by boulder-strewn bedrock uplands. Multiple ice-flow indicators reveal a complex ice flow history during the last glaciation and following deglaciation (Figure 1). East of Curtis Lake, the largest streamlined landforms and early striations converge north-northeastward into Committee Bay, associated with ice streaming during the last glaciation. Pervasive north to north-northwestward streamlined landforms associated with late striations formed during deglaciation as the ice retreated southward. Large meltwater corridors carried meltwater northward, infilling north-trending valleys near the head of the Committee Bay drainage basin. Lateral meltwater channels developed in the southern uplands at the margin of cold-based ice remnants. In the southeast, evidence for a late deglacial eastward ice flow reversal is found in the form of weakly fluted till, fine striations, and glaciofluvial sediments.

Résumé

Une grande partie de la région cartographique du lac Curtis Nord est recouverte par du till profilé, intercalé dans l'est par des crêtes et plateaux rocheux disséqués et dans l'ouest par des hautes terres du substratum rocheux jonché de blocs. Plusieurs indicateurs de l'écoulement glaciaire révèlent une histoire glaciaire complexe au cours de la dernière glaciation et de la déglaciation subséquente (Figure 1). À l'est du lac Curtis, d'imposantes formes profilées et des stries précoces convergent vers le nord-nord-est dans Committee Bay, liées à la formation d'un courant de glace amorcé au cours de la dernière glaciation. Des formes glaciaires profilées vers le nord à nord-nord-ouest et des stries tardives associées se sont formées durant la déglaciation alors que la glace s'est retirée vers le sud. De grands couloirs d'eaux de fonte ont dirigé les eaux glaciaires vers le nord, remplissant les vallées près du commencement du bassin versant de Committee Bay. Des chenaux d'eaux de fonte latéraux se sont développés dans les hautes terres du sud de la carte, à la marge des vestiges du glacier à base froide. Dans le sud-est, l'évidence pour un renversement tardif de l'écoulement glaciaire vers l'est lors de la déglaciation est présente sous forme de till légèrement profilé, de stries fines, et de sédiments fluvio-glaciaires.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Cover illustration
Thick deposits of ice-contact sediments occur in a large valley north of Curtis Lake within a north-trending subglacial meltwater corridor. Prominent esker ridges, apron pads and crevasse-fill ridges are found in association with subaqueous outwash fan deposits and glaciolacustrine sediments deposited in a proglacial lake trapped by the topographic drainage divide. Photograph by I. McMartin. 2014-168

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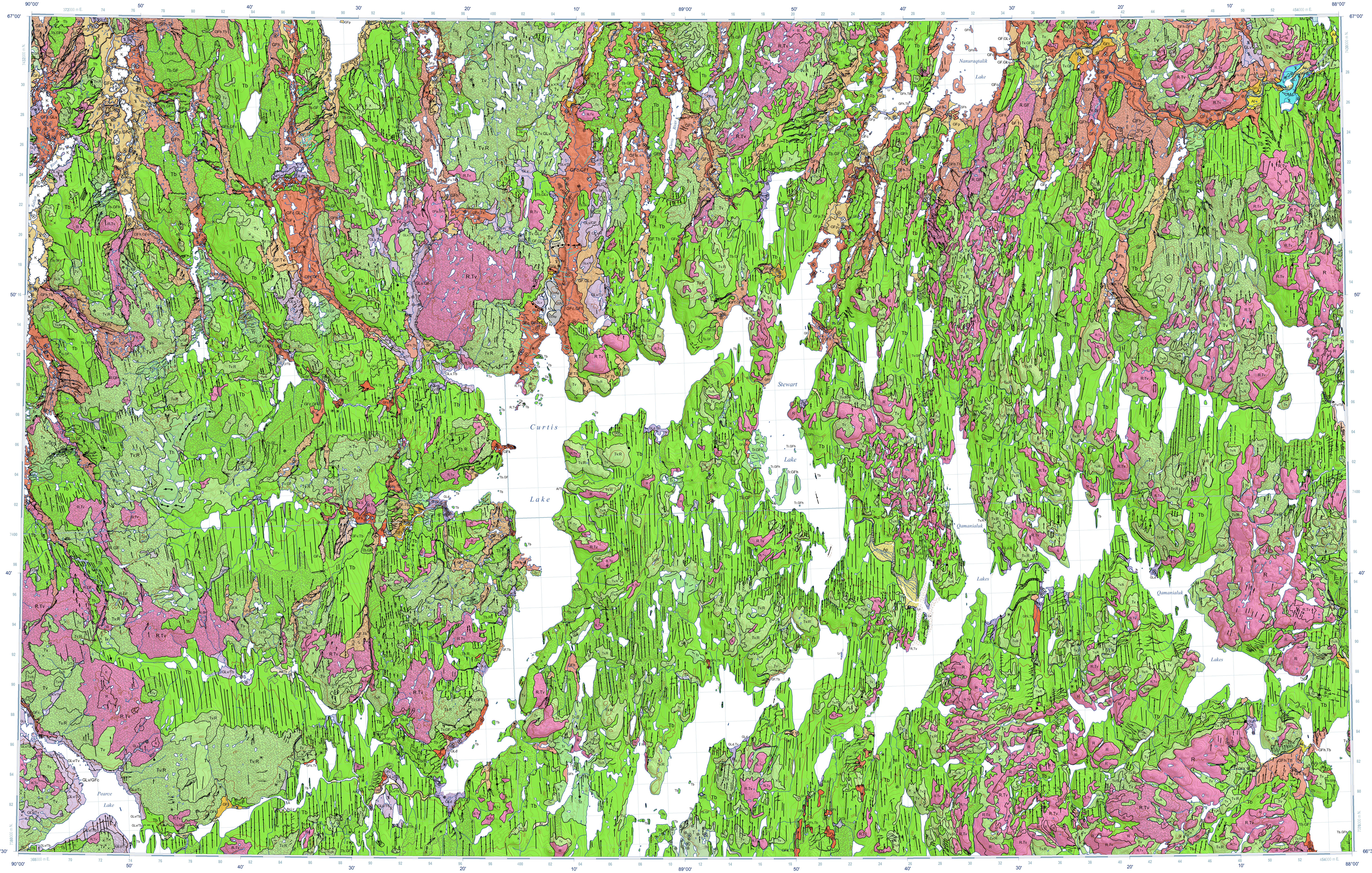
CANADIAN GEOSCIENCE MAP 204
SURFICIAL GEOLOGY
CURTIS LAKE NORTH
Nunavut
NTS 56-I north
1:100 000



SURFICIAL DEPOSITS
QUATERNARY
HOLOCENE

O — **ORGANIC DEPOSITS:** undifferentiated peat and muck; commonly less than 30 cm thick; generally occur as flat, grassy terrain over poorly drained fine-grained alluvial deposits, or in low depressions between streamlined glacial landforms.

EOLIAN DEPOSITS: well sorted sand and minor silt; derived from and overlying glaciofluvial or alluvial sands and silts; occur exclusively in a large valley north of Curtis Lake.

Ev — **Eolian veneer:** medium- to fine-grained sand and minor silt forming a thin cover generally less than 1 m thick.

ALLUVIAL DEPOSITS: sand, silt, and clay with minor gravel and organic detritus; deposited by modern rivers and streams.

Ap — **Floodplain sediments:** sand, silt, clay, minor gravel, and organic detritus; moderately to well sorted; massive to stratified; greater than 2 m thick; form active floodplains close to modern river and stream levels; include abandoned channels and bars. Form large deposits that are frequently flooded along the Kellett and Quusluk rivers, in a large valley north of Curtis Lake and along the outlet stream of Stewart Lake that connects to Qamanialuk Lakes.

Af — **Fan sediments:** gravel, sand, and gravelly diamicton; poorly to moderately sorted; stratified; 1 to 10 m thick; form a few fan-shaped subaerial deposits where streams enter large lakes.

At — **Terraced sediments:** sand and gravel; moderately to well sorted; massive to stratified; greater than 2 m thick; occur as a series of large inactive fluvial terraces a few metres above modern floodplain; formed by incision into alluvial sediments due to postglacial uplift.

Av — **Alluvial veneer:** undifferentiated sand, silt, and clay; less than 1 m thick forming a thin discontinuous cover over existing sediments within valleys.

A — **Undifferentiated alluvial sediments:** comprised of alluvial sediments (sand, gravel, and mud) that cannot be differentiated or delineated by deposit type.

LACUSTRINE DEPOSITS: sand, silt, gravel, and/or clay with minor organics; variable thickness; deposited in and adjacent to modern lakes.

Lr — **Littoral sediments:** sands, silts, and gravels; moderately to well sorted; stratified; 1 to 3 m thick; form beach ridges and terraces near modern lake shores.

Lv — **Lacustrine veneer:** sand, silt, and/or clay; laminated to massive; less than 1 m thick forming a thin cover over existing sediments bordering modern lake shores.

MARINE DEPOSITS: sediments deposited in postglacial proto-Committee Bay; occur in the northeast extremity of the map area near marine limit that lies at approximately 160 m a.s.l.

Md — **Deltaic sediments:** sand, gravel, and silt; well sorted; planar to cross-stratified; up to 10 m thick; form planar surfaces. The single marine deltaic deposit in the map formed at approximately 160 m a.s.l. where a large glaciofluvial system emptied eastward into the high postglacial sea; thermokarst ponds and ice-wedge polygons are common.

Mv — **Marine veneer:** sand, silt, and clay; massive to laminated; less than 2 m thick; mimics surface of underlying thick till deposit.

HOLOCENE - LATE PLEISTOCENE

GLACIOLACUSTRINE DEPOSITS: sand, gravel, and silt deposited in short-lived glacial lakes ponded against the retreating ice margins, or trapped by topographic divides within or adjacent to meltwater corridors. In places, evidence for lake basins is limited to faint shorelines or wave-cut notches cut into till surfaces.

GLd — **Deltaic sediments:** sand and rounded gravels; moderately to well sorted; planar to cross-stratified; up to 5 m thick; deposited by glacial meltwater sediment-laden streams entering pro-glacial lake basins which are now largely occupied by modern lakes. Deposits generally form fan-shaped plains with braided channels; may have a depositional scarp along the delta front a few metres above modern lake levels.

GLv — **Glaciolacustrine veneer:** sand and minor silt; moderately to well sorted; massive to laminated; 1 to 2 m thick; commonly associated with glaciofluvial sediments deposited in valley settings, particularly along Kellett River, around Pearce Lake and north of Curtis Lake; sediments drape underlying topography.

GLACIOFLUVIAL DEPOSITS: sand, gravel with minor silt, and diamicton; well to poorly sorted; massive to stratified; deposited by glacial meltwater streams from or in contact with glacial ice in a subglacial, subaqueous or proglacial sub-aerial environment. Deposits largely occur at the head of the Committee Bay drainage basin in the northern half of the map area.

GFp — **Outwash sediments:** sand and rounded gravel, minor silt; moderately to well sorted; planar and cross-stratified; 2 to 15 m thick; form low-relief plains commonly with kettle lakes, channel scars, ice-wedge polygons, and minor thermokarst lakes; represent the distal facies of ice-contact stratified drift deposited in a proglacial, sub-aerial environment within meltwater corridors. Deposits essentially occur in the most northern part of the map area.

GFt — **Terraced outwash sediments:** sand and rounded gravel, minor silt; moderately to well sorted; planar and cross-stratified; 2 to 15 m thick; form incised outwash plain with numerous erosional terraces and scarps due to down-cutting related to base level adjustment in response to glacio-isostatic uplift.

Tb — **Till blanket:** silty sand diamicton; 2 m to greater than 20 m thick; forms a continuous cover that generally masks underlying bedrock topography; occurs as swaths of streamlined forms such as drumlins, drumlinoid ridges, crag-and-tail ridges, or as variably fluted drift, indicating ice flow towards the NNE to NNW, except for a small field of fluted bedforms in the SE portion of the map area related to a later ice flow into Repulse Bay; frost boils and solifluction stripes are common; ice-wedge polygons may be present in sandier diamictons.

T — **Till, undifferentiated:** bouldery sandy diamicton of unknown age; 1 to 10 m thick; forms hummocky terrain with kettle depressions and an orthogonal, giant, ice-wedge polygon network; till is streamlined in places; the single deposit occurs in the south-central part of the map area.

PRE-QUATERNARY

BEDROCK: Archean to Paleoproterozoic; primarily metamorphosed granitic to intermediate intrusive, igneous, and minor supracrustal rocks. Major dykes trend NW-SE. Supracrustal rocks of the Penrhyn Group and Hudson Suite granites form prominent topographic features in the eastern part of the map area.

R — **Bedrock, undifferentiated:** intact and frost-riven outcrops of various lithologies; variously modified by glacial erosion; surfaces range from rough and weathered to glacially polished and striated, and/or fluted. Felsenmeer commonly ring low-relief outcrops, or occur more extensively in the western part of the map area in upland surfaces. Outcrops are commonly associated with a discontinuous thin till cover, or form prominent crags of crag-and-tail ridges in streamlined terrain.

Stratigraphic relationship: where observed or can be confidently inferred, a map unit stratigraphic sequence is shown with a maximum of two map unit designators separated by a slash ("/") (e.g. GLv/Tb designates a glaciolacustrine veneer overlying till blanket).

Complex units: where the surficial cover forms a complex and the map units are too small to be mapped individually, yet constitute a significant component of the total polygon, a dot (".") separates the dominant map unit designator from the less abundant secondary unit (e.g. R.Tv designates an area of bedrock interspersed with till veneer).

Thermokarst, large

Reworked sediments: reworked and/or eroded till from meltwater action; sediments may be winnowed at surface and interspersed with gravel deposits related to meltwater drainage; surface may exhibit meltwater channels formed in proglacial, subglacial or lateral settings.

Boulder concentration: exposed bedrock and/or till with surface boulders primarily deposited by glacial ice; also includes boulder lags from meltwater

McMartin, I., Campbell, J.E., Dredge, L.A., LeCheminant, A.N., McCurdy, M.W., and Scromeda, N., in press. Quaternary geology and till composition north of Wager Bay: Results from the GEM Wager Bay Surficial Geology Project; Geological Survey of Canada, Open File 7748.

McMartin, I., Campbell, J.E., Dredge, L.A., and McCurdy, M.W., 2013. Till composition and ice-flow indicators West of Repulse Bay: 2010 and 2011 results from the GEM Wager Bay Surficial Geology Activity; Geological Survey of Canada, Open File 7288. doi:10.4095/292565

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Canadian Geoscience Maps

Authors: I. McMartin, J.E. Campbell, and L.A. Dredge

Geology based on aerial photograph interpretation, LANDSAT TM 7 classification and SPOT imagery by I. McMartin and on field work in 2011 and 2012 by I. McMartin and J.E. Campbell.

Geology conforms to Surficial Data Model v. 2.0

Field site information, field photographs, sample description and analytical results are available in GSC Open File Reports 7288 and 7748.

Geomatics by L. Robertson

Cartography by L. Robertson and D. Viner

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Map projection Universal Transverse Mercator, zone 16. North American Datum 1983

CANADIAN GEOSCIENCE MAP 204
SURFICIAL GEOLOGY
CURTIS LAKE NORTH
Nunavut
NTS 56-I north
1:100 000
2 0 2 4 6 8 km

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications.
Elevations in metres above mean sea level

Shaded relief image derived from the digital elevation model supplied by the Geological Survey of Canada. Illumination: azimuth 45°, altitude 45°, vertical factor 1x

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area.
Mean magnetic declination 2015, 16°16'W, decreasing 17.2' annually. Readings vary from 14°26'W in the SW corner to 18°04'W in the NE corner of the map.

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data.

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

This map is not to be used for navigational purposes.

Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 204
SURFICIAL GEOLOGY
CURTIS LAKE NORTH
Nunavut
NTS 56-I north