

SURFICIAL GEOLOGY, GAINSBOROUGH CREEK, MANITOBA - SASKATCHEWAN (62F/SW)

SURFICIAL MATERIALS

CENOZOIC
Quaternary
Holocene

COLLUVIAL DEPOSITS: silty to clayey diamicton occurring as slope and slump deposits derived largely from till but in places from lacustrine deposits and shale.

SFD Slope Failure Deposits: Silty to clayey diamicton and shale slabs and blocks; occur as irregular hummocks, ridges and steps on slopes, and as ridges and hummocks within valleys; formed by slumping and slope failure; <10 m thick.

CC Colluvial Complex: Silty to clayey diamicton; veneers, blankets, aprons, and fans of colluvial debris occurring on and at the base of steep slopes; complex of colluvial materials which can include areas of till, washed till and locally may contain small inclusions of alluvial plains and terraces; <5 m thick.

ALD ALLUVIAL DEPOSITS: clayey to sandy materials containing some gravel and organic-rich sediments; formed as stream deposits and now underlie modern floodplains, low terraces or broad plains.

AD Modern Floodplain Sediments: silt, clay, and sand with minor gravel and organic muck and organic-rich silt and clay; poorly sorted and stratified; occurs as gently undulating plains containing swales and abandoned stream channels; locally swampy; <5 m thick in most areas; gAp - dominantly gravel.

AT Alluvial Terrace Sediments: sand, silt, and clay with minor gravel; generally well sorted and stratified; occurs as low benches up to 5 m above present stream level; <5 m thick. Late Wisconsinan.

LACUSTRINE AND GLACIAL LACUSTRINE DEPOSITS: silt, sand, and clay; generally underlying flat to gently undulating plains with variable densities of small closed depressions (potholes); relief generally <2 m but locally up to 20 m; the surface metre of sandy lacustrine deposits has, in many places, been reworked by wind and locally is overlain by isolated dunes <20 m high; includes deposits of glacial Lake Hind and other temporary and residual lakes.

LI Lacustrine Plain Sediments, Flat: silt, sand, and clay with organic-rich muck at the surface in poorly drained areas; well to moderately well sorted, massive to laminated; nearly flat (level) surface, with some low rises and shallow hollows (relief <2 m); <50 m thick; eLI - sand dominant; oLI - organic-rich clay (swamp and slough sediments).

GLACIOFLUVIAL DEPOSITS: sand and gravel in ridges and hummocks, underlying benches well above present stream level, and underlying broad flat to undulating plains; coarse clast composition variable and in many places dominated by shale; deposited as glaciofluvial materials in contact with melting ice, as glacial outwash plains and deltas, as catastrophic flood deposits, and as terraces and flats in glacial outlet channels.

GTS Glaciofluvial Terrace Sediments: sand, gravel, and bouldery gravel; well washed and sorted; occurs as benches 5-40 m above modern valley floors; remnants of glaciofluvial outwash plains, and terraces in glacial outlet channels; <5 m thick; GTC - dominantly gravel.

GP Glaciofluvial Plain Sediments, Flat: sand, gravel, and bouldery gravel; well washed and sorted; nearly flat (level) to gently undulating with relief <2 m; coarse clast composition variable and generally high in shale; largely formed as detritic deposits at the margin of glacial lakes; <10 m thick.

GCU Glaciofluvial Plains Sediments, Gently Undulating: sand, gravel, and bouldery gravel; well washed and sorted; gently undulating plain marked by low ridges and abandoned scour channels with relief 2-5 m; coarse clast composition variable and generally high in shale; trains of outwash occupying meltwater channel bottoms and detritic deposits formed at the margin of glacial lakes <10 m thick; gGP - dominantly gravel.

GR Glaciofluvial Hummocky and Ridged Gravels: gravel, and gravely diamicton with minor sand and silt; poorly sorted; in most places the coarse clasts are dominantly shale; occurs as mounds, hummocks, and ridges with 2-20 m relief and deep potholes and lakes; formed as ice contact glaciofluvial deposits; <15 m thick.

GVR Glaciofluvial Sediments, Veneer: sand and bouldery gravel; thin to discontinuous layer of glaciofluvial materials overlying rock; glaciofluvial component thickness <1.5 m; GvT - glaciofluvial veneer overlying till.

MORAINAL DEPOSITS: till (diamicton), in many areas overlain by a surface layer (<1 m) of massive, sparsely pebbly, clayey silt; in places includes variable amounts of sorted glacial deposits, and minor veneers of postglacial alluvial and eolian silt and sand, and organic-rich silt and clay; till generally is a sandy, clayey, silt diamicton having a minor content of pebbles and variable content of boulders; morainal deposits are the direct deposits of glacial ice; till layers of different ages commonly underlie the surface but stratigraphy and thickness can be assessed only by drilling; a discontinuous layer of large (<1.5 m diameter) faceted boulders lies at the base of the surface till layer in many places; thickness varies from as little as 1 m where a single till sheet overlies bedrock, to 120 m in buried valleys and where multiple till units are present.

Tm Till Plain, Eroded: till, gravel, boulders, sandy silt, sand, and muck; consists of till, in many places with an overlying discontinuous lag of gravel, sand, and boulders; includes muck and silty sediments in poorly drained valley floor locations; occurs as flat plains, on benches, in valley bottoms, and on slopes at the margins of meltwater channels; patchy gravel and sand occurring as part of this unit is in places <2 m thick.

Tf Till Plain, Flat: till and minor sorted sediments, in many places overlain by massive clayey silt <1.5 m thick; nearly flat (level) to very gently undulating with relief <2 m in the form of low rises and shallow depressions; locally includes low mounds which generally consist of massive, pebbly, silty sand or sandy gravel.

Tc Tc - flat till plain including rim ridges (arcuate ridges in part outlining shallow depressions).

Tu Till Plain, Gently Undulating: till and minor sorted sediments; gently undulating areas of low rises and shallow depression (relief 2-5 m), locally includes low mounds which generally consist of massive, pebbly, silty sand or sandy gravel.

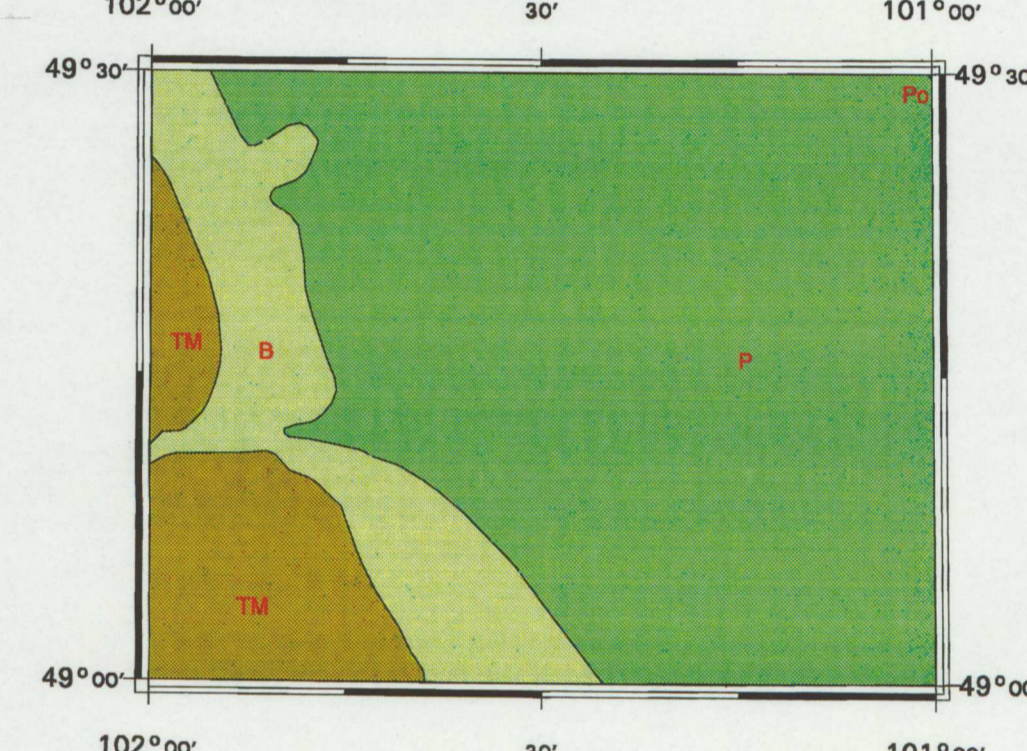
Tp* Tp* - gently undulating till plain including rim ridges (arcuate ridges in part outlining shallow depressions);

Tp+r Tp+r - gently undulating till plain including scattered low ridges 100 to 1000 m in length; generally consisting of massive, pebbly, silty sand or sandy gravel.

- Features and Symbols**
- Geological boundary defined
 - approximate
 - assumed
 - Streamlined features developed by glaciofluvial flow
 - Abandoned meltwater channel large
 - small
 - Escarpment in unconsolidated materials
 - Minor moraine ridges, rim ridges
 - Gravel pit
 - Paleocurrent direction
 - Ground observation
 - Till analysis site
 - Borehole log site locality only
 - analyses available

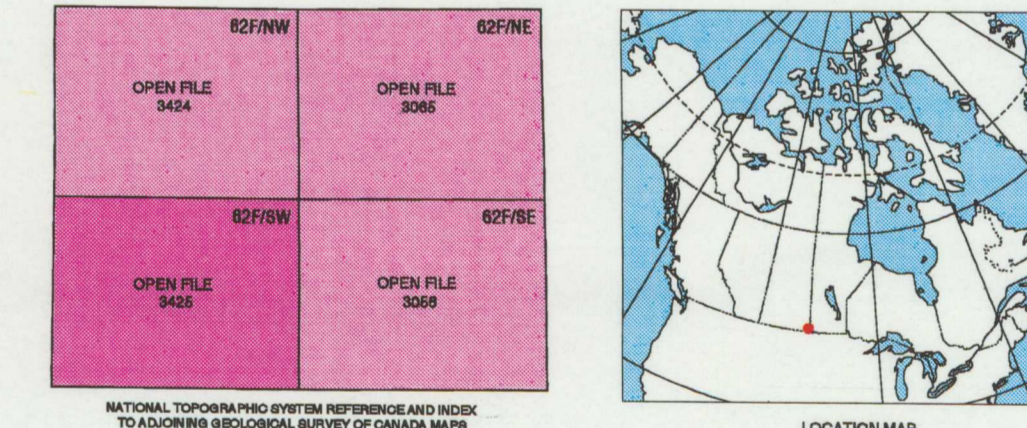
Geology by A. Blais-Stevens, 1994-96, and C. Sun, 1996

Bedrock Geology



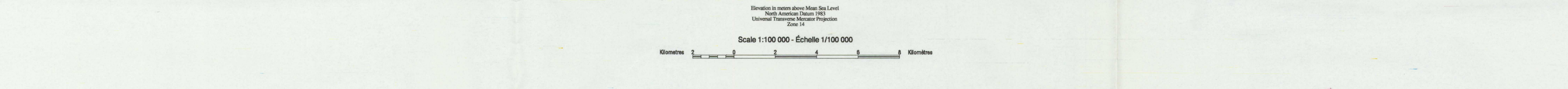
- BEDROCK UNITS**
- CENOZOIC**
Tertiary
Paleocene
- FRENCHMAN AND RAVENSCRAG FORMATIONS:** shale and sandstone, largely unconsolidated, in places containing lignite.
- MESOZOIC**
Cretaceous
- EASTEND, WHITEMUD, AND BATTLE:** sandstone containing minor clay and siltstone, largely poorly consolidated.
 - PIERRE FORMATION (Bearpaw Formation in Saskatchewan):** shale, soft greenish brown bentonitic, hard grey siliceous, and buff silt that have been subdivided into several members (McNeil and Caldwell, 1981).
 - PIERRE FORMATION UNDIFFERENTIATED:** Mainly hard siliceous Odanah member and soft shales and silts of the upper "unnamed member".
 - ODANAH MEMBER:** Shale, siliceous and hard, <150 m thick.

Source of bedrock geology information:
McNeil, D.H. and Caldwell, W.G.E. 1981: Geological rocks and their foraminifera in the Manitoba Escarpment; Geological Association of Canada, St. John's, Newfoundland, Special Paper 21, 439 p.
Whitaker, S.H. 1974: Geology and groundwater resources of the Weyburn area (62E-62F); Saskatchewan Research Council, Map No. 21, (scale 1:250,000).



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Surficial Geology, Gainsborough Creek, Manitoba - Saskatchewan (62F/SW)



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