

LEGEND

Sedimentary Facies Map of Quaternary Deposits of the Two Harbors and Whyte Quadrangles.

PLATES I and II

Q_{sw}

Swamp deposits

Dark brown to black accumulations of partially decayed plant debris, mainly peat, peaty silt and muck; local clay, silt, fine sand. Formed in post-glacial times in low-lying, poorly drained areas.

WRENSHALL FORMATION

Reddish-brown clayey to silty, deep-water proglacial lake sediments, below elevations of 360 meters (1180 feet); and gravel and sand deposits (nearshore and shoreline sediment) found along a northeast-southwest trending zone at about 350 to 366 meters (1150 to 1200 feet) in elevation. Deposition is associated with Glacial Lake Duluth and its immediate predecessors.

Q_{wns}

Nearshore and shoreline sediment facies:

Moderately to well-sorted stratified sand and gravel deposits in the form of abandoned beaches and strandlines, and large deltaic complexes, associated with higher levels of Glacial Lake Duluth. Deltaic complexes are locally cross-bedded and commonly exhibit pinch and swell features and lag deposits of pebbles within the finer sand beds. Gravel ranges from pebble to boulder in size. This unit is locally interbedded with, and overlain by, sediment flow deposits. Maximum exposed thickness of 9 meters.

Q_{wdc}

Deep-water (clay) sediment facies:

Reddish-brown, massive, jointed, and locally laminated silt or sand and clay, of the lowlying lake plain. Includes pebbles, cobbles and boulders of basalt, rhyolite, gabbro-diorite, red sandstone, and granite, and white to gray calcareous concretions. Locally expressed as topographic benches. Maximum exposed thickness of 10 meters.

CROMWELL FORMATION

Reddish-brown, sandy to clayey, unsorted, subglacially and supraglacially (includes sediment flow deposits) derived debris; and glaciofluvial deposits, in the form of braided stream deposits, deltaic deposits, eskers, and abandoned meltwater channels.

Q_{csg}

Glaciofluvial and deltaic sediment facies:

- a. Poorly sorted, stratified sand and gravel deposits in the form of eskers and esker-like ridges.
- b. Moderately to well-sorted sand, cobbles, or boulders, partially buried by glacial sediment along abandoned river and meltwater channels.
- c. Moderately to well-sorted, stratified, locally cross-bedded silt, sand and gravel deltaic deposits. Locally interbedded with sediment and mudflow debris, ranging from several centimeters to a meter in thickness. Locally expressed as topographic highs, surrounded by a fluted terrain. Maximum observed thickness of 30 meters.

Q_{cth}

Supraglacial sediment facies

Sandy, unsorted, collapsed glacial sediment of hummocky kettle and kame surfaces, draped over and partially obliterating the glacial topography existing before the last glacial advance. Includes sediment flow deposits. Maximum calculated thickness of 22 meters.

Q_{ctnf}

Subglacial non-fluted (loam) sediment facies:

Reddish-brown, silty to clayey, unsorted till, expressed as a non-fluted topography; as thick as 4 meters.

Q_{ctf}

Subglacial fluted (sandy loam) sediment facies:

Reddish-brown, silty to sandy, unsorted till, characterized by flutes; as thick as 8 meters.

SULLIVAN LAKE FORMATION

Gray to brown, sandy to stony, unsorted glacial sediment; and glaciofluvial deposits associated with eskers, abandoned tunnel valleys, and meltwater channels. Clasts and surface boulders are predominantly granophyre, granite, greenstone, basalt, and gabbro-d diabase, from the underlying Duluth Complex and other Precambrian igneous and metamorphic sources cropping out to the north and northeast.

Q_{slsg}

Glaciofluvial sediment facies:

- a. Poorly sorted, stratified sand and gravel deposits in the form of eskers and esker-like ridges.
- b. Moderately to well-sorted sand, cobbles, or boulders lying along present stream courses or abandoned tunnel valleys and meltwater channels.

Q_{sld}

Subglacial sediment facies

Gray to brown, sandy to stony, unsorted till, characterized by drumlins and interdrumlin depressions. Maximum observed thickness of 5 meters.

P_c

BEDROCK

Mainly lava flows of the North Shore Volcanic Group ranging in composition from olivine basalt to rhyolite; and anorthositic, gabbroic, and granitic intrusions of the Duluth Complex.