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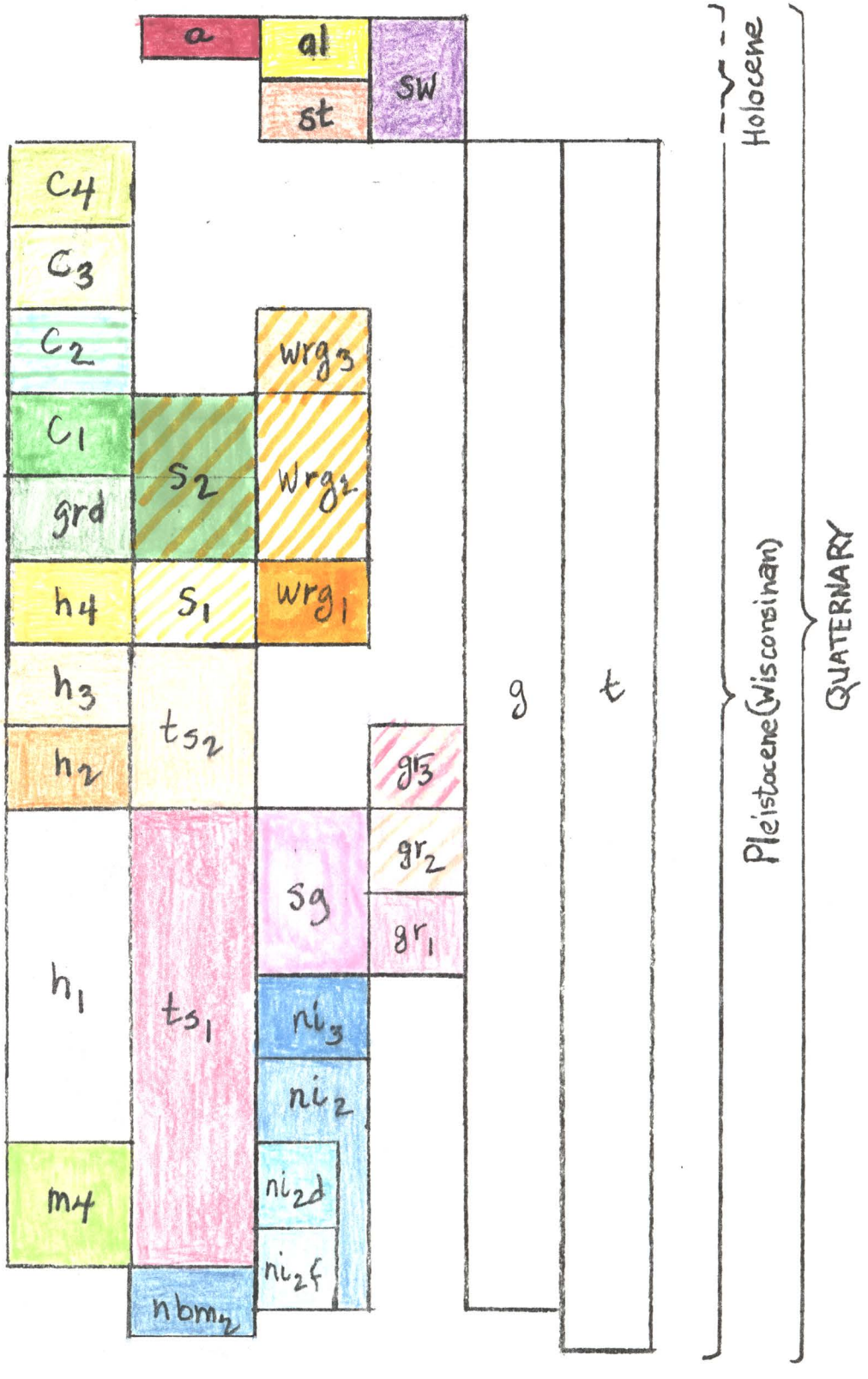
SURFICIAL GEOLOGY OF THE PETERBOROUGH SOUTH QUADRANGLE, HILLSBOROUGH AND CHESHIRE COUNTIES, NEW HAMPSHIRE

CORRELATION OF MAP UNITS



SURFICIAL GEOLOGY OF THE PETERBOROUGH SOUTH QUADRANGLE, HILLSBOROUGH AND CHESHIRE COUNTIES, NEW HAMPSHIRE

DESCRIPTION OF MAP UNITS
(NOTE ALL UNITS ARE QUATERNARY IN AGE AND SYMBOLS NORMALLY WOULD BE PRECEDED BY A "Q")

A layer of windblown sand and silt, generally mixed with underlying glacial deposits, is present over much of the map area but is not shown.

NOTE: Correlation between isolated deposits and between map units is tentative

a ARTIFICIAL CUT AND FILL--Manmade. Material of fill varies from natural sand and gravel to quarry wastes to sanitary landfill. Depth of cuts and thickness of fill variable.

al ALLUVIUM (HOLOCENE)--Sand, silt, gravel and minor muck in flood plains along present rivers and streams. As much as 10 feet thick. Extent of alluvium indicates most areas flooded in the past which may be subject to future flooding. In places, indistinguishable from swamp deposits, sw.

sw SWAMP DEPOSITS (HOLOCENE)--Muck, peat, silt, and sand. Generally 1 to 10 feet thick. In places, indistinguishable from alluvium, al.

st STREAM-TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE)--Sand and gravel, generally on terraces cut into former glacial-lake or glacial-stream deposits. Formed in part during late-glacial time. From 1/2 to 25 feet thick.

GLACIAL-LAKE AND GLACIAL-STREAM DEPOSITS OF GLACIAL LAKE CONTOOCOOK (PLEISTOCENE)--Sand., gravel, silt, and clay deposited in contact with or beyond adjacent ice, representing different stages of a glacial lake within the Contoocook River valley. Unit c_4 is graded partly to a gap in the hills about 3.5 miles north of the northeast corner of the quadrangle at 860-880 feet elevation, whence the glacial meltwaters flowed eastward into the Greenfield area (then south through a 840-860 foot elevation bedrock-floored divide near Russell), and partly to an 820-840 foot elevation outlet channel through glacial deposits in downtown Greenfield about 5.2 miles north of the northeast corner of this quadrangle, whence meltwaters flowed eastward toward the Piscataquog River Valley. Unit c_3 deposits are graded to a 940-960 foot elevation un-named bedrock gorge (contains a plunge pool) in the Greenfield quadrangle, about 3 miles north of the northeast corner of this quadrangle, whence the glacial meltwater flowed eastward into Russell thence southward down Stony Brook. Units c_{1+2} are graded to a 1020-1040 foot elevation divide in hills southwest of modern Contoocook Lake in the Monadnock quadrangle.

c_4 Ice-channel filling, kame-terrace, kame-delta and lake-bottom deposits ; as much as 80 feet thick.

c_3 Ice-channel filling, kame-terrace, kame-delta and lake-bottom deposits; as much as 60 feet thick.

c_2 Ice-channel filling, kame-terrace, kame-delta and lake-bottom deposits; as much as 80 feet thick.

c_1 Ice-channel filling, kame-terrace, kame-delta and lake-bottom deposits; as much as 95 feet thick.

GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS ALONG THE WEST EDGE OF THE WATATIC RANGE (PLEISTOCENE)--Sand, gravel, and minor silt deposited in contact with or beyond adjacent ice. Unit wrg_3 was graded over ice to 1060-1080 foot elevation. Unit wrg_2 was graded to 1200-1240 feet elevations over ice or through gaps in the adjacent hills. Unit wrg_1 is graded to the 1480-1500 foot elevation gap in the Watatic Range between Temple and Pack Monadnock Mountains, whence glacial meltwater flowed eastward.

wrg_3 Kame-terrace deposit; as much as 30 feet thick.

wrg_2 Kame-terrace, kame-delta, lake-bottom and outwash deposits; as much as 25 feet thick.

wrg_1 Ice-channel, kame-terrace, kame-delta and lake-bottom deposits; as much as 40 feet thick.

GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS IN THE SHARON AREA (PLEISTOCNE)--Sand, gravel, silt and minor clay deposited in contact with or beyond adjacent stagnant ice in vallies in the Town of Sharon. Unit s_2 is graded southward to a gap at 1200-1220 feet elevation and unit s_1 is graded southward to two gaps at 1120-1140 and 1100-1120 feet elevation, respectively. Partly contemporaneous with units c_1, grd, and wgr_2.

s_2 Esker and/or ice-channel filling and kame-terrace deposits; as much as 60 feet thick.

s_1 Kame-terrace and lake deposits; as much as 25 feet thick.

grd GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS IN THE GRIDLEY RIVER BASIN (PLEISTOCENE)--Sand, gravel and silt deposited by meltwaters adjacent to and beyond stagnant ice. Graded southward, initially through a gap at the head of h_4 deposits at 1140-1160 feet elevation; later to a 1120-1140 foot elevation gap in till hills. Consists of eskers, ice-channel fillings, kame-terrace, kame-delta and lake-bottom deposits; as much as 100 feet thick.

GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS OF HUBBARD POND AREA (PLEISTOCENE)--Sand, gravel, and minor silt deposited by glacial meltwaters in contact with and beyond adjacent stagnant ice. Unit h_4 graded partly to gap in till hills to the south (which is also the head of outwash of unit m_4) at 1120-1140 feet elevation and partly over ice to the west edge of the quadrangle; when the ice front moved slightly north of where it lay when h_4 was being deposited, meltwaters in the Hubbard Pond area carved a new temporary outlet to the west as 1100-1120 feet elevation channels in h_4. Units h_{3-1} are graded south to the till gap-m_4 head of outwash at 1120-1140 feet elevation.

h_4 Esker, kame-terrace, kame-delta, lake-bottom and outwash deposits; as much as 80 feet thick. Inferred to be contemporaneous with units s_1 and wrg_1.

h_3 Esker and/or ice-channel filling, kame-delta and lake-bottom deposits; as much as 60 feet thick. Inferred to be correlated in time with part of unit ts_2.

h_2 Kame-terrace, kame-delta and esker and/or ice-channel filling deposits; as much as 50 feet thick. Correlated in time with unit gr_3 and with part of unit ts_2.

h_1 Kame terrace and kame-delta deposits as much as 40 feet thick. Inferred to be contemporaneous with units sg, ni_3 and gr_{1+2}, and with part of units ts_1 and ni_2.

m_4 GLACIAL-STREAM DEPOSITS OF THE LAKE MONOMONAC VALLEY (PLEISTOCENE)--Gravel and sand deposited in contact with or beyond adjacent stagnant ice at the head of a larger deposit of outwash materials graded southward to 1150-1160 feet elevation in Massachusetts near the present lake outlet. See Ashburnham Surficial geologic map (Hildreth, 1990) for further explanation. The m_4 deposits in this quadrangle have been partly eroded by glacial meltwaters draining the Hubbard Pond area (Units h_{1-4}); in fact, bedrock in one pit in this unit (as indicated on map) is strongly water worn as a result.

GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS NEAR TOPHET SWAMP (PEISTOCENE)--Sand, gravel and minor silt deposited in contact with or beyond adjacent stagnant ice. Unit ts_2 is graded southwestward to a till-hill gap at 1200-1220 feet elevation, whence meltwaters flowed west incising a meandering deep channel in till and joined meltwaters of unit h_2; later, as the ice melted further north, a lower gap in the hills was uncovered at 1180-1200 feet elevation and ts_2 meltwaters flowed out there to join those depositing unit h_3. Unit ts_1 deposits are graded initially southward through a till gap at 1280-1300 feet elevation and subsequently westward over a bedrock-floored notch at 1280-1300 feet elevation; and, later, even lower spillways opened allowing these meltwaters to join those depositing unit h_1. Unit ts_1 is also inferred to be partly contemporaneous with units m_4, sg, gr_{1+2}, and $ni_{3,2,2d \text{ and } 2f}$.

ts_2 Esker, ice-channel fillings, and kame-terrace deposits; as much as 50 feet thick.

ts_1 Esker, ice-hannel fillings, kame-terrace, lake and outwash deposits; as much as 60 feet thick.

sg GLACIAL-LAKE AND GLACIAL-STREAM DEPOSITS IN SPOFFARD GAP (PEISTOCENE)--Sand, gravel and minor silt graded to the 1380-1400 foot elevation within the Gap. Consists of kame-delta, kame-terrace and lake-bottom deposits as much as 40 feet thick.

GLACIAL-STREAM DEPOSITS GRADED EASTWARD TO THE GREENVILLE QUADRANGLE (PLEISTOCENE)--Sand, gravel and minor silt deposited by glacial meltwater in contact with or beyond adjacent stagnant ice. Each unit is graded to a spillway over ice. Correlation between isolated deposits and between units is tentative.

gr_3 Kame-terrace deposit; as much as 50 feet thick.

gr_2 Kame-terrace deposits; as much as 25 feet thick.

gr_1 Kame-terrace deposits ; as much as 15 feet thick.

GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS IN THE NEW IPSWICH AREA (PLEISTOCENE)--Sand, gravel, silt and minor clay deposited in contact with or beyond adjacent stagnant ice in susidiary vallies of the Souhegan River. Unit ni_3 is graded southeastward to 1060-1080 feet elevation andni_2 is graded to a notch at 1200-1220 feet elevation; both units are given the same name on the surficial geology map of the Greenville Quadrangle (Hildreth, mapped in 1988). Unit ni_{2d} here was mapped as ni_1 on the Greenville Quad.; ni_{2d} is graded to a notch at 1260-1280 feet elevation, just north of Wheeler Pond. Unit ni_{2f} consists of deposits graded directly to a glacial lake impounded between the ice front and the Souhegan drainage divide to the south in Ashby, Mass., at elevation 1040-1050 feet. All the glacial meltwaters responsible for all these New Ipswich deposits flowed southward into that glacial lake. These units are named to correlate also with those mapped in the Ashby (Hildreth, 1989-90) and Ashburnham (Hildreth, mapped in 1990).

nbm_2 GLACIAL-STREAM DEPOSITS ALONG THE NORTH BRANCH OF THE MILLERS RIVER (PLEISTOCENE)--Sand and gravel deposited in contact with or beyond adjacent stagnant ice. Graded southwestward to 1160-1170 notches in till hills in East Rindge along the current course of the river. Partly eroded after intitial deposition by ts_1 meltwaters draining through divide to north. See description in Ashburnham surficial geologic map for further explanation (Hildreth, mapped in 1990). Consists of kame-terrace and outwash deposits as much as 25 feet thick.

g UNCORRELATED GLACIAL-STREAM AND GLACIAL-LAKE DEPOSITS (PLEISTOCENE)--Mixed sand, gravel, and minor silt and clay in isolated deposits not correlated with other sorted materials; as much as 15 feet thick.

t TILL (PLEISTOCENE)--Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; contains some gravel. Thickness varies but generally is less than 20 feet. May be more than 50 feet under the crests of drumlins.

BEDROCK EXPOSURES--Individual outcrops not shown completely. Ruled pattern indicates areas of abundant exposures and areas where surficial deposits are less than 10 feet thick. Extent of ruled pattern mapped in part from aerial photos and in part from Soils Survey (Handler, 1982; Rosenberg, 1985; and Simmons, 1953).

Texture of stratified deposits - Indicated to a depth of at least 3 feet.

Pebble to boulder gravel

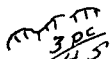
Mixed sand and gravel

Sand and minor silt

Silt, sand, and minor clay

Borrow pit (small)

Borrow pit (small) - abandoned



Borrow pit (large) or cut bank

Direction of current flow within outwash deposits

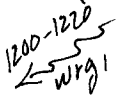
Direction of dip of delta foresets

Melt-water channel - cut chiefly in till

Glacial striations. Point of observation is at southern end of line.

Glacial groove. Point of observation is at south end of line.

Drumlin form (indicates general direction of glacial ice movement)



Threshold to which designated glacial deposits are graded. Number gives approximate elevation in feet.

Approximate stagnant ice frontal position.

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