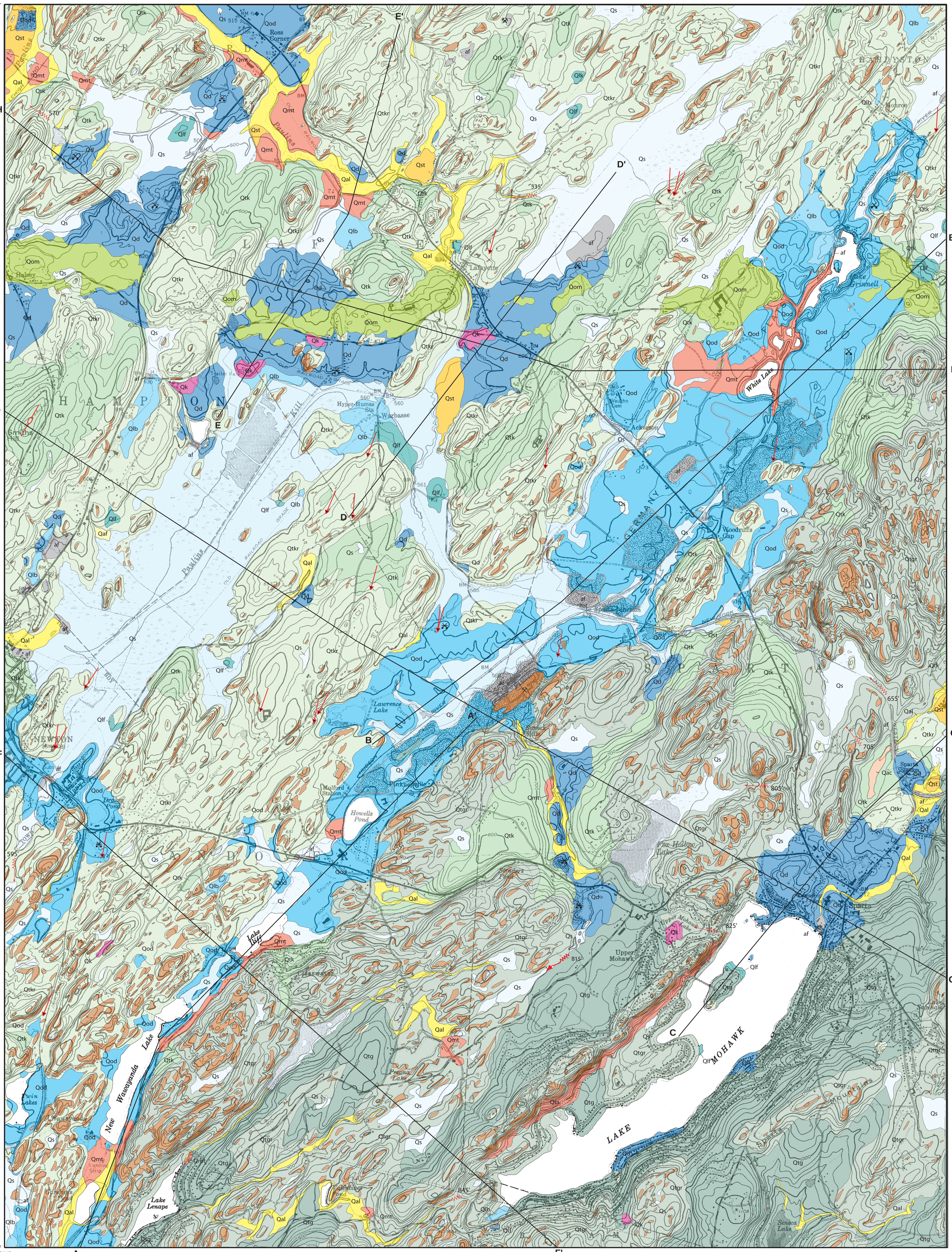
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NEW JERSEY GEOLOGICAL SURVEY



Base from U.S. Geological Survey
Newton East, 1971

SCALE 1:24000

1 1/2 0 1 mile

1000 0 1000 2000 3000 4000 5000 6000 7000 feet

1 1/2 0 1 kilometer

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Geology mapped 1985 - 1991

QUATERNARY GEOLOGY AND GEOLOGIC MATERIAL RESOURCES OF NEWTON EAST QUADRANGLE, SUSSEX COUNTY, NEW JERSEY

BY

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The data presented here are provisional pending external peer review. Changes may be made prior to publication as a New Jersey Geological Survey Geologic Report.

INTRODUCTION

Industrial, commercial, and residential expansion in New Jersey has promoted the increased use of surficial geologic data for 1) land-use planning, 2) identification, management and protection of ground-water resources, 3) locating and developing sources of geologic aggregate, and 4) delineation of geologic hazards. Surficial deposits in Newton East quadrangle are lithologically diverse, cover much of the bedrock surface, and are found in many types of landscape settings. They include glacial drift of late Wisconsinan age, and alluvium, swamp and bog deposits, hillslope deposits, and wind-blown sediment laid down in postglacial time. Collectively, these deposits may be as much as 250 feet (87 m) thick and they form the parent material on which soils form. They are defined by their lithic characteristics, stratigraphic position, and location on the landscape, and further delineated by genetic and morphologic criteria. Geologic history, detailed observations on surficial materials, and list of references are found in the accompanying booklet.

DESCRIPTION OF MAP UNITS

Map units denote unconsolidated deposits more than 5 feet (1.5 m) thick. Color designations are based on Munsell Soil Color Charts (1975), and were determined from naturally moist samples.

Postglacial Deposits

af

Artificial fill (Holocene) -- Rock waste, solid waste, soil, gravel, sand, silt, and manufactured materials put in place by man. As much as 25 feet (8m) thick. Not shown beneath roads, and railroads where it is less than 10 feet (3m) thick. Primarily used to raise the land surface, construct earthen dams and sanitary landfills, and form a solid base for roads and railways.

Qal

Alluvium (Holocene) -- Stratified, moderately- to poorly-sorted sand, gravel, silt, and minor clay and organic material deposited by Wallkill, Paulins Kill, and Pequest Rivers and their tributaries. As much as 25 feet (8m) thick. Includes planar- to cross-bedded gravel and sand, and cross-bedded and rippled sand in channel deposits, and massive and parallel-laminated fine sand, and silt in flood-plain deposits.

Qaf

Alluvial-fan deposits (Holocene and late Wisconsinan) -- Stratified, moderately to poorly sorted sand, gravel, and silt in fan-shaped deposits. As much as 35 feet (11 m) thick. Includes massive to planar-bedded sand and gravel and minor cross-bedded channel-fill sand. Beds dip as much as 30° toward the trunk valley. Stratified sediment is locally interlayered with poorly sorted, sandy-silty to sandy gravel. Most fans dissected by modern streams.

Qst

Stream-terrace deposits (Holocene and late Wisconsinan) -- Stratified, well- to moderately-sorted, massive to laminated, and minor cross-bedded fine sand, and silt in terraces flanking present and late postglacial stream courses. As much as 20 feet (6 m) thick.

Qs

Swamp and Bog deposits (Holocene and late Wisconsinan) -- Dark brown to black, partially decomposed remains of mosses, sedges, trees and other plants, and muck underlain by laminated organic-rich silt and clay, and in places marl. Accumulated in kettles, shallow postglacial lakes, poorly-drained areas in uplands, hollows in ground and end moraine, and in abandoned channels on flood plains. As much as 25 feet (8m) thick. Locally interbedded with alluvium and thin colluvium.

Qac

Colluvium and alluvium undifferentiated (Holocene and late Wisconsinan) -- Stratified, thinnly bedded, moderately to poorly sorted sand, silt, and minor gravel in thin sheets laid down on the floors of small upland tributaries and the lower parts of adjacent slopes. Interlayered with and overlying silty to silty-sandy diamicton (interpreted as a mass-flow deposit). Locally shaly. As much as 15 feet (5 m) thick.

Glacial Deposits

Deposits of Glacial Meltwater Streams

Qd | Qod

Glacial-lake delta deposits (late Wisconsinan) -- Stratified, sand, gravel, and silt deposited by meltwater streams in proglacial lakes at and beyond the stagnant glacier margin. Includes massive to horizontally-bedded and imbricated coarse gravel and sand, and planar to tabular and trough cross-bedded fine gravel and sand in bars, and channel-lag deposits with minor cross-bedded sand in channel-fill deposits glaciofluvial topset beds that are as much as 25 feet (8m) thick. Overlies and grades into foreset beds that dip 20° to 35° basinward and consist of well- to moderately-sorted, rhythmically-bedded cobble-pebble and pebble gravel and sand. These beds grade downward and outward into ripple cross-laminated and parallel-laminated, sand, silt and pebble gravel that dip less than 20°. Lower foreset beds grade into gently inclined prodelta bottomset beds of rhythmically-bedded, ripple cross-laminated to graded fine sand and silt with minor clay drapes. Qod similar to Qd except deposit laid down in a very narrow lake basin. Fluvial topset beds may have been extensively aggraded and deposit may have once filled the valley from wall to wall. Thickness may be as much as 100 feet (30m). In places deposits are extensively collapsed indicating their deposition over and against stagnant ice. Numbered units in the Lake Sparta basin define successively younger ice-contact deltas that delineate local ice-retreatal positions (see text for a detailed description of the lake's history).

Qlf

Lacustrine-fan deposits (late Wisconsinan) -- Stratified, sand, gravel, and silt deposited by meltwater streams in proglacial lakes at and beyond the stagnant glacier margin. Consists of foreset beds that dip 20° to 35° basinward and consist of well- to moderately-sorted, rhythmically-bedded cobble-pebble and pebble gravel and sand. These beds grade downward and outward into ripple cross-laminated and parallel-laminated, sand, silt and pebble gravel that dip less than 20°. Lower foreset beds grade into gently inclined prodelta bottomset beds of rhythmically-bedded, ripple cross-laminated to graded fine sand and silt with minor clay drapes. Thickness may be as much as 100 feet (30m). Interpreted to have been deposited by meltwater at the mouth of a glacial meltwater tunnel. In places deposits are extensively collapsed indicating their deposition over and against stagnant ice. Differentiated from deltas by their lack of topset beds.

Qlb

Glacial lake-bottom deposits (late Wisconsinan) -- Parallel-laminated, rhythmically-bedded, alternating layers of thin clay and very fine silt, and silt and very fine sand deposited from suspension; and minor cross-laminated silt, and fine sand deposited on the floor of glacial lakes chiefly by subaqueous flows. As much as 100 feet (30m) thick. Thick deposits underie Qs deposits in Newton Meadows.

Qmt

Meltwater-terrace deposits (late Wisconsinan) -- Stratified, well- to moderately-sorted sand, cobble-pebble to pebble gravel, and minor silt deposited by meltwater streams as terraces incised in valley-train, glacial lake delta deposits, and other meltwater-terrace deposits. As much as 20 feet (6m) thick. Sediment and bedforms similar to the downstream, distal part of valley-train deposits. Includes bouldery strath terraces cut in till along meltwater stream courses in uplands.

Qk

Kame (late Wisconsinan) -- Stratified, well- to poorly-sorted sand, boulder- to pebble-gravel, silt, and interbedded flowtill in small collapsed hills and ridges overlying till. Presumed to be ice-hole and crevasse fillings. As much as 50 feet (15m) thick. Attitude of bedding is highly variable.

Nonstratified Materials

Till (late Wisconsinan) -- Scattered patches of noncompact to slightly compact, bouldery "upper till" overlying a blanket-like compact "lower till" deposited chiefly on bedrock and locally some older pre-Wisconsinan surficial deposits. Includes two varieties:

Qtk | Qtkr

1) Compact, unstratified, poorly sorted yellowish-brown (10YR 5/4), light yellowish-brown (2.5Y 6/4), light olive-brown (2.5Y 5/4) to grayish-brown (2.5Y 5/2), gray (5Y 5/1) to olive-gray (5Y 5/2) noncalcareous to calcareous silt and sandy silt that typically contains 5 to 15 percent gravel. As much as 100 feet (30 m) thick. Locally overlain by thin, discontinuous, noncompact to slightly compact, poorly sorted, indistinctly layered yellow-brown (10YR 5/6-8), light yellowish-brown (10YR 6/4) sandy silt that contains as much as 30 percent gravel, and minor thin beds of well- to moderately sorted sand, gravel, and silt. Clasts chiefly consist of unweathered slate, siltstone and sandstone, dolomite, limestone, chert, minor quartzite, and quartz-pebble conglomerate. Matrix is a varied mixture of unweathered quartz, rock fragments, and silt; minor constituents include feldspar and clay. Till derived chiefly from slate, graywacke, dolomite, and minor limestone bedrock in Kittatinny Valley. Qtk denotes areas where till is greater than 10 feet thick (3 m) and Qtkr denotes areas where till is generally less than 10 feet thick (3 m) with some bedrock outcrops.

Qtg | Qtgr

2) Slightly compact to compact, unstratified, poorly sorted yellowish-brown (10YR 5/4), pale brown (10YR 6/3) to brown (10YR 5/3) noncalcareous silty sand that typically conatins 5 to 15 percent gravel. As much as 65 feet (20 m) thick. Locally overlain by thin, discontinuous, non-compact, poorly sorted and layered, sand and minor silty sand, similar in color to lower till, that contains as much as 35 percent gravel, and minor thin beds of well- to moderately-sorted sand and pebbly sand. Clasts chiefly consist of unweathered to lightly weathered gneiss, granite and mnior amphibolite, sandstone, and dolomite. Till derived chiefly from metasedimentary and intrusive rocks that underlie New Jersey Highlands. Qtg denotes areas where till is greater than 10 feet thick (3 m) and Qtgr denotes areas where till is generally less than 10 feet thick (3 m) with some bedrock outcrops.

Qom

Ogdensburg-Culvers Gap moraine (late Wisconsinan) -- Unstratified to poorly stratified sand, gravel, and silt deposited at the active margin of the Kittatinny Valley ice lobe. As much as 80 feet (24 m) thick. Consists of poorly compacted stony till, silty-sandy compact till, and minor lenses and layers of water-laid sand, gravel, and silt in discontinuous, bouldery, chiefly cross-valley segemented ridges that mark the former glacier margin. Overlies till (Qtk and Qtg) in uplands and locally, outwash in valleys.

Bedrock

Bedrock -- Extensive outcrops, minor regolith, and scattered erratics.

Explanation of Map Symbols

Contact, dashed where inferred.

Striation, measurement at tip of arrow. The letter "y" denotes a younger striation based on crosscutting relationships.

Drumlin, line denotes long axis.

Large excavation wall in sand and gravel pit. Tics point downslope.

925'

Glacial-lake spillway with estimated elevation of its floor.

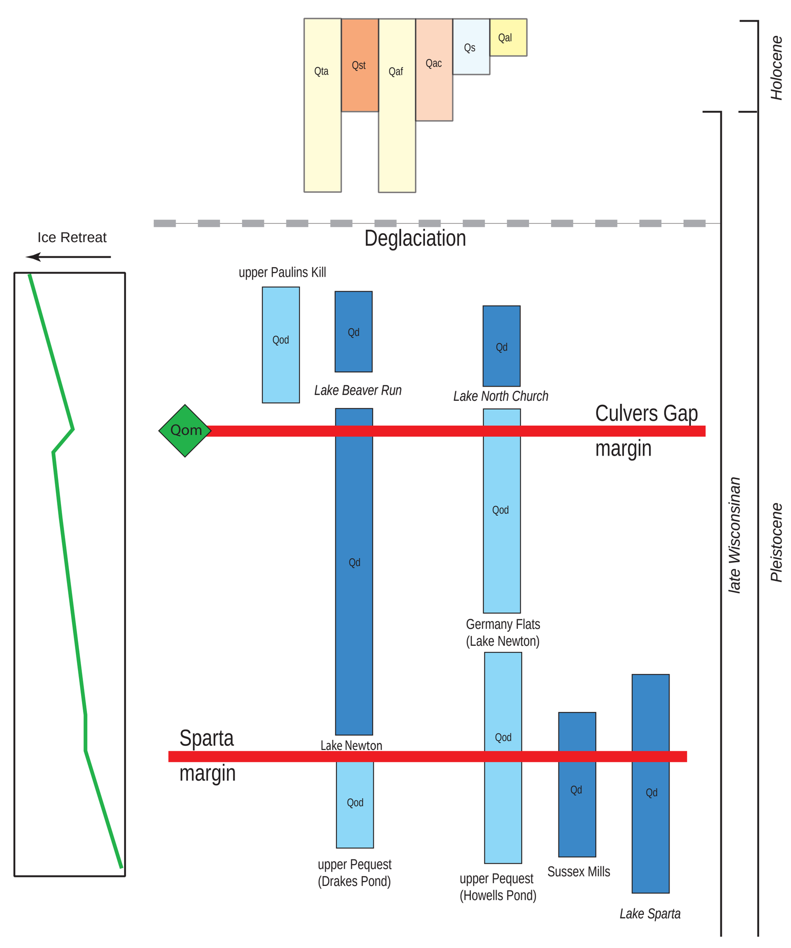
Active sand and gravel pit.

Inactive sand and gravel pit.

Quarry.

Inactive quarry.

Correlation of Glacial Meltwater Deposits, Glacial Lakes, and Postglacial deposits



Environmental Characteristics of Geologic Materials

Surficial Deposits

Qal, Qac - *Alluvium, Colluvium-Alluvium undifferentiated* - Permeable but too thin to store large quantities of water; drainage is generally poor because of high water table, and accumulation of fines and organic material on flood plains. Easy to excavate. Unsuitable for foundations and septic systems. Very limited use for fill because of high water table. Areas susceptible to frequent flooding.

Qst - *Stream-terrace deposits* - Permeable but generally too thin to store large quantities of water; drainage is good. Easy to excavate. Suitable for foundations; generally unsuitable for septic systems. Maintain shallow- to moderately-cut slopes. Limited use for aggregate and fill. Areas susceptible to infrequent flooding.

Qaf - *Alluvial-fan deposits* - Permeable but too thin to store large quantities of water; drainage may be poor because of seasonally high or perched water table. Easy to excavate. Generally unsuitable for foundations and septic systems. Maintain shallow- to moderately-cut slopes. Limited use for coarse aggregate and fill. May be susceptible to infrequent flooding.

Qs - *Swamp deposits* - Low permeability and very poor drainage; generally underlain by lake-bottom deposits. Easy to excavate, but generally requires artificial drainage at and near the land surface. Not suitable for foundations or septic systems. Peat is mined for use as humus.

Qmt - *Meltwater-terrace deposits* - Highly permeable but too thin to store large quantities of water. Drainage is good and material is easy to excavate except for bouldery lags. Suitable for foundations but generally not for septic systems. Maintain shallow- to moderately-cut slopes. Limited use as aggregate and fill.

Qd, Qod - *Ice-marginal deltas and fluviodeltas* - Highly permeable, may store large volumes of water. Drainage is good and material is easy to excavate. Suitable for foundations but generally not for septic systems. Maintain shallow- to moderately-cut slopes. Mined extensively for aggregate, road base and road covering.

Qlf - *Lacustrine-fan deposits* - Permeable, may store large volumes of water; typically lie beneath lake-bottom deposits. Drainage is fair to good and material is easy to excavate. Suitable for foundations but generally not for septic systems. Maintain shallow- to moderately-cut slopes. Mined for aggregate, road base, and road covering.

Qlb - *Lake-bottom deposits* - Very low permeability; typically lie beneath swamp deposits. Drainage is very poor and material is easy to excavate. Not suitable for foundations or septic systems. Maintains moderately- to deeply-cut slopes, although susceptible to slope failure due to liquifaction. Used to make impermeable liners and covers in landfills, and has been used to make bricks.

Qtk, Qtg - *Till* - Generally low permeability. Drainage is poor to fair and material is moderately to highly difficult to excavate. Suitable for foundations; suitability for septic systems is highly variable. Maintains moderate- to deeply-cut slopes. Used for fill, and fines may be screened for use as impermeable cover or liner material.

Qom - *Ogdensburg-Culvers Gap moraine* - Low to moderate permeability. Drainage is poor to fair and material is easy to excavate except where bouldery. Suitable for foundations; suitability for septic systems is highly variable. Maintains shallow- to moderately-cut slopes. Minor use for fill.

Qk - *Kame deposits* - Highly permeable, generally too small to store large volumes of water. Drainage is good and material is easy to excavate, although it may contain unsorted, compact to bouldery till. Suitable for foundations, but generally not suited for septic systems. Maintain shallow- to moderately-cut slopes. Minor use as aggregate and fill.

Bedrock
(distribution shown on Plate 2)

Sandstone, shale, slate - Low to moderate permeability related to joints, fractures, and faults. Aquifer potential is poor to fair for domestic groundwater needs with supplies very limited for commercial and industrial use. Generally, underlies areas of intermediate elevation. Minor use for road base and fill. In places, slate has been previously quarried for roofing material.

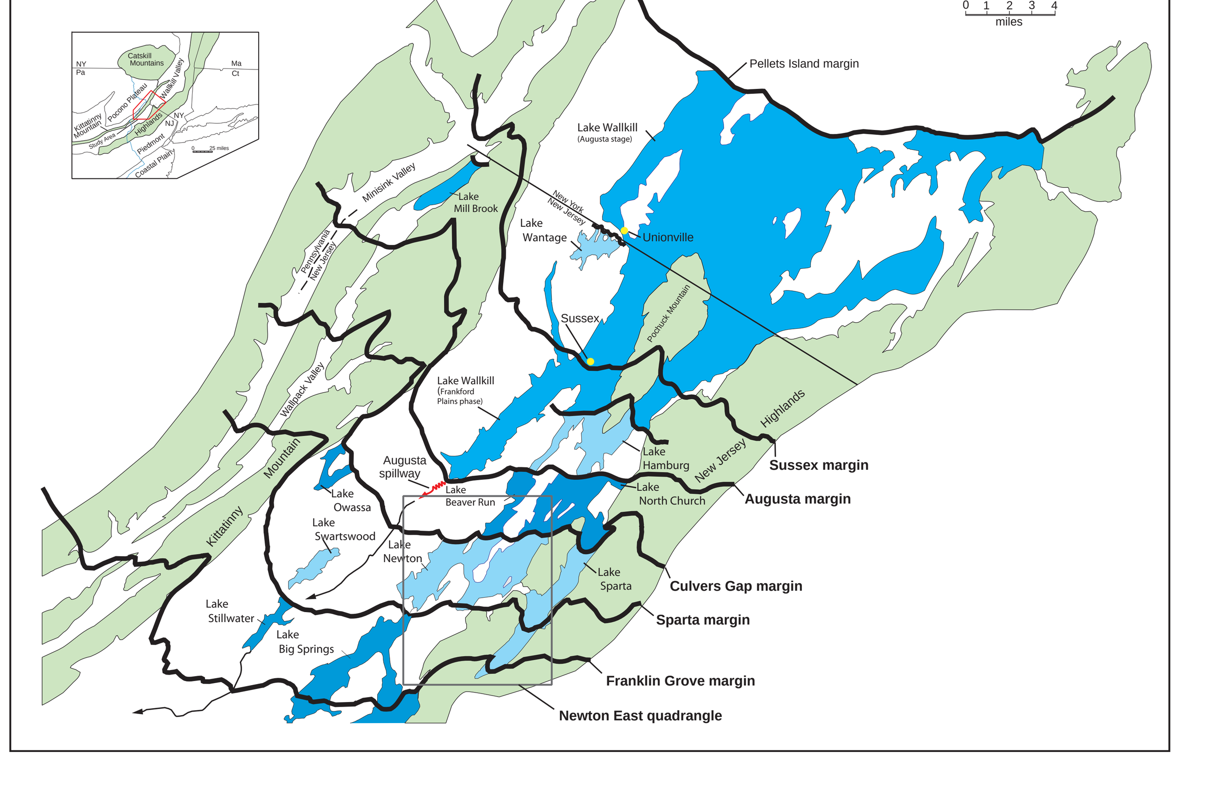
Dolomite - Moderate to high permeability related to dissolution along joints and fractures and differential weathering of the different types of dolomite beds. Aquifer potential is good to excellent for domestic supplies, and locally good to excellent for commercial, municipal and industrial needs. Unit is susceptible to sinkhole formation. Under lies valleys, low ridges and hills. Minor use for agricultural lime.

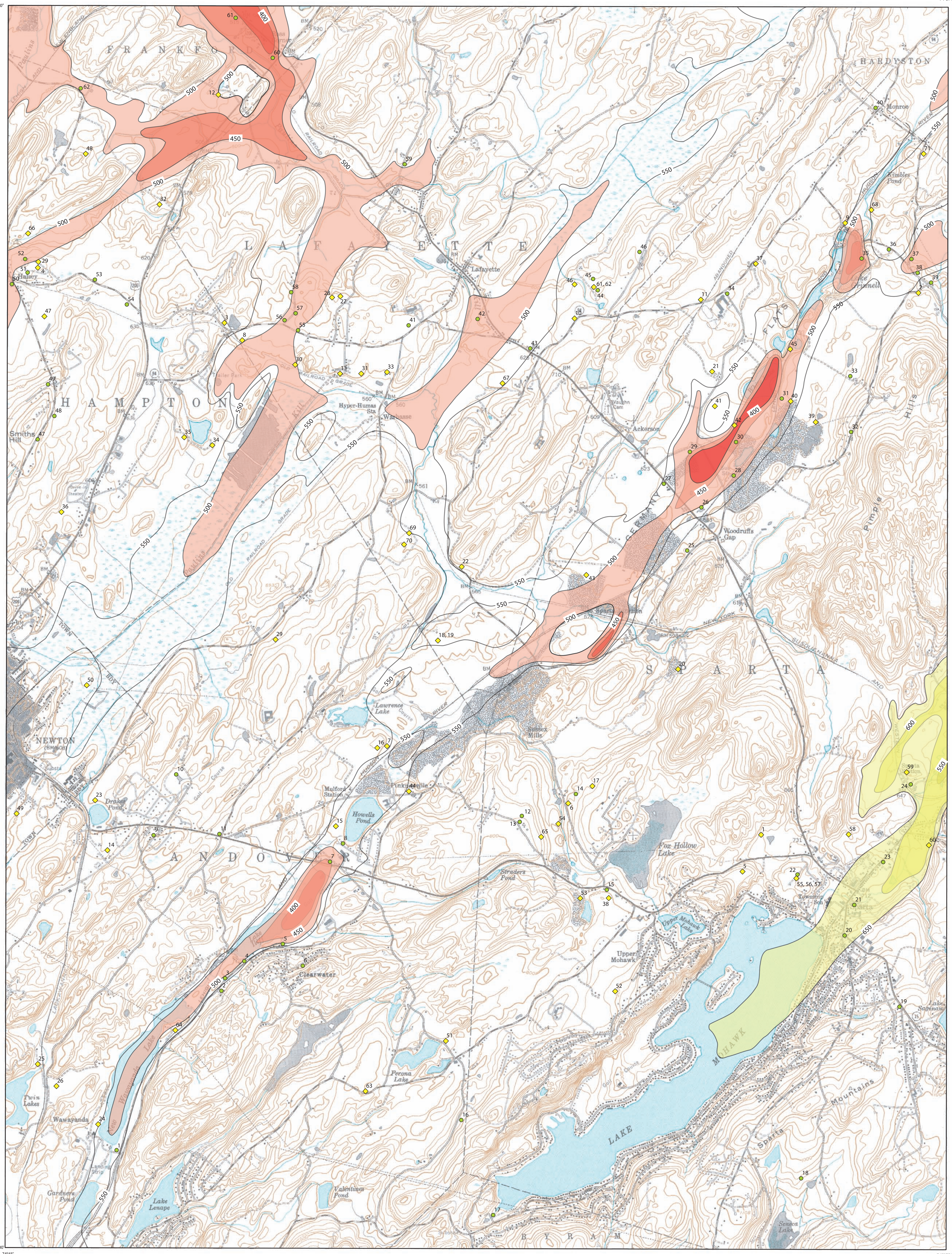
Limestone - Moderate to high permeability related to dissolution along joints and fractures. Aquifer potential is good to excellent for domestic, commercial, municipal, and industrial water supply needs. Unit is susceptible to sinkhole formation. Under lies valleys, low ridges and hills. Minor use for agricultural lime.

Marble - Low to moderate permeability related to secondary fractures and dissolution. Aquifer potential is fair to good for domestic needs and locally sufficient for commercial, municipal and industrial use. Forms topographic highs equal to the hills of the dolomite. Material used for road base, ornamental stone, and reagent grade chemicals.

Gneiss, granite - Low to moderate permeability related to joints, fractures, and faults. Aquifer potential is fair to good for domestic needs, but typically poor for commercial, municipal and industrial use. Typically forms the highest hills and ridges. Minor use for fill and road base.

Figure 1. Late Wisconsinan ice-recession margins and glacial lakes in the upper parts of Kittatinny and Wallkill Valleys, New Jersey and New York. Different shades of blue denote different lake basins. Data modified from Witte (1997), Connally and others (1989), Stanford and Harper (1985), and Ridge (1983).





Base from U.S. Geological Survey
Newton East, 1971

SCALE 1:24000

1 1/2 0 1 mile
1000 0 1000 2000 3000 4000 5000 6000 7000 feet
1 .5 0 1 kilometer

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Pebble samples collected and analyzed 1985 - 1987.

Table 1. Records of selected wells in the Newton East quadrangle, Sussex County, New Jersey. The listed wells were drilled for private and public water supply, and exploration. Well information on file with Bureau of Water Allocation, Division of Water Resources, New Jersey Department of Environmental Protection. Well locations are based on tax maps and information provided by well drillers. Discharge listed as gallons per minute. The letters "s" and "f"indicate well location is generally within 200 feet or 500 feet respectively of actual location.

Well no.	NJDEP Permit no.	Location accuracy	Discharge in gpm	Depth in feet	Driller's Log
1	22-20605	s	20	0-30	Sand and gravel
				30-55	Fine sand
				55-62	Sand and gravel
2	22-14659	s	20+	0-6	Overburden
				6-64	Sand and clay
				64-65	Gravel and water
3	22-22142	s	15	0-60	Sand
				60-86	Sand and gravel
4	22-16534	f	20+	0-55	Sand and gravel
5	22-18747	f	20	0-105	Sand and gravel
				105-129	Lime rock
6	22-21430	s	1	0-35	Clay and gravel
				35-450	Granite
7	22-3935	f	30	0-60	Gravel and sand
				60-130	Sand
				130-140	Gravel
8	22-10862	f	10+	0-55	Clay and boulders
				55-73	Clay and gravel
				73-80	Gravel
9	22-22922	f	15	0-60	Clay and gravel
				60-124	Slate
10	22-8466	f	115	0-20	Broken rock
				20-110	Limestone
				110-357	Slate
11	22-21085	f	3	0-23	Boulders, sand and gravel
				30-500	Slate
12	22-23250	s	15	0-90	Clay and gravel
				90-225	Granite
13	22-8695	f	4	0-30	Overburden with boulders
				30-60	Sand and boulders
				60-63	Boulders
				63-85	Fine sand and gravel
14	22-23345	f	25	0-2	Clay
				2-100	Sand and gravel
				100-125	Granite
15	22-22575	s	20	0-68	Overburden
				68-175	Granite
16	22-21158	f	12	0-20	Clay and boulders
				20-40	Sandstone
				40-72	Granite
17	22-21183	f	16	0-32	Sand and gravel
				32-50	Granite
18	22-22829	f	12	0-50	Overburden with layers of clay, gravel, and water
				50-175	Granite
19	22-20086	f	3	0-60	Clay and gravel
				60-100	Clay, sand, and gravel
				100-197	Gray granite
20	22-22645	f	60	0-197	Clay and gravel
				197-225	Rotten rock
21	22-1905	f	135	0-60	Clay
				60-78	Clay and sand
				78-134	Blue granite with streaks of rotten rock
				134-206	Limestone
22	22-21720	s	23	0-66	Sand and gravel
				66-325	Granite
23	22-19870	s	5	0-92	Sand
				92-125	Rock
24	22-20783	f	50	0-17	Brown clay and fine sand
				17-25	Gray brown clay and fine gravel
				25-36	Brown clay and fine sand
				36-41	Light gray fine sand and silt
				41-45	Gray clay and fine gravel
				45-55	Light gray fine sand and silt
				55-65	Gray clay and gravel
				65-69	Gray fine sand
				69-90	Gray dolomite
25	22-22983	f	15	0-51	Clay and gravel
				51-175	Granite
26	22-2739	s	70	0-80	Sand, gravel, and clay
27	22-19046	f	10	0-84	Clay and gravel
				84-225	Blue lime rock
28	22-5348	s	40	0-35	Clay
				35-52	Coarse gravel
				52-58	Gravel
				58-62	Gravel and sand
				62-72	Coarse gravel
29	observation well	s	None reported	0-50	Sand and gravel
				50-85	Fine sand
				85-122	Silt
				122-140	Sand / limestone
30	22-20370	s	200	0-20	Sand and gravel
				20-119	Fine sand and gravel
				119-132	Sand and gravel
31	22-7557	s	307	0-10	Sand and boulders
				10-36	Sand and gravel
				36-108	Fine dirty sand and clay
				108-142	Sand and gravel
32	22-20121	s	3	0-32	Clay and gravel
				32-300	Granite
33	22-22825	s	30	0-3	Overburden
				3-88	Sand and gravel
				88-125	Granite
34	22-20604	s	55	0-12	Sandy gravel
				12-200	Limestone
35	22-20951	s	20	0-150	Sand and gravel
36	22-18192	s	10	0-21	Overburden
				21-172	Granite
37	22-22302	s	20	0-20	Sand and gravel
				20-36	Gravel
				36-125	Sand and gravel with some clay
38	22-22401	s	20	0-41	Sand and gravel
				41-290	Soft yellow limestone and clay
39	22-4001	f	15	0-80	Light yellowish brown overburden of granitic origin
				80-130	Light gray granitic gneiss
40	22-23147	s	10	0-80	Sand, clay, and gravel
				80-150	Lime rock
41	22-13612	s	3	0-4	Dirt
				4-40	Boulders, sand, and gravel
				40-63	Gravel
				63-425	Limestone
42	22-22619	f	75	0-123	Sand and gravel
				123-150	Lime rock
43	22-3942	s	15	0-25	Hardpan and boulders
				25-50	Hardpan, boulders, and gravel
				50-75	Fine sand
				75-86	Quick sand
				86-120	Shale
44	21-21986	s	None reported	0-52	Gray silt, sand, gravel, and shale fragments
45	22-21900	s	None reported	0-50	Gray silt, sand, gravel, and shale fragments
46	22-22025	s	90	0-20	Overburden
				20-85	Sand and gravel
				85-360	Blue shale
47	22-22891	s	12	0-32	Sand and gravel
				32-185	Shale
48	22-22204	s	6	0-42	Clay and boulders
				42-173	Shale
49	22-3826	s	8	0-25	Hardpan and gravel
				25-50	Clay, sand, and gravel
				50-75	Gravel and rock fragments
				75-275	Shale
50	22-13469	s	30	0-128	Sand and clay
				128-150	Slate
51	22-21997	s	4	0-55	Clay, sand, gravel, and boulders
				55-97	Clay
				97-270	Shale
52	22-19147	s	1	0-20	Overburden
				20-80	Fine sand
				80-166	Clay
				166-171	Fine sand and gravel
53	22-22433	s	12	0-117	Clay, silt, sand, and gravel
				117-122	Slate
54	22-20638	s	20	0-40	Sand and gravel
				40-70	Clay
				70-98	Blue shale
55	22-19407	s	3	0-80	Clay
				80-85	Boulder
				85-273	Limestone
56	22-23130	s	20	0-153	Clay, sand, and gravel
57	22-19762	f	20+	0-20	Overburden
				20-65	Sand and clay
				65-98	Fine sand and gravel
				98-102	Sand and gravel
58	22-22679	s	30	0-132	Clay and gravel
				132-222	Shale
59	22-19658	s	1	0-15	Clay overburden
				15-550	Lime rock
60	22-3117	s	10	0-50	Hardpan
				50-100	Blue clay
				100-136	River muck
				136-225	Black shale
				225-245	Soft lime rock
61	22-20300	s	20	0-48	Overburden with clay and gravel
				48-375	Blue shale

Table 2. Pebble composition of glacial sediment in Newton East quadrangle. Data based on 100 to 125 pebbles, one to three inches in diameter, collected at each sample site. List of abbreviations: Pc - gneiss and granite, Fm - marble, Cb - dolomite and limestone, Sh - shale and slate, Qc - quartzite and quartz-pebble conlomerate, Rs - red sandstone, and Ss - gray sandstone.

Sample	Surficial Material	Percent Pebbles						
		Pc	Fm	Cb	Sh	Qc	Rs	Ss
1	Ablation till	94	0	4	1	1	0	0
2	Ablation till	57	0	17	25	1	0	0
3	Till	1	0	0	95	1	0	3
4	Till	0	0	0	95	0	1	4
5	Ablation till	80	0	5	16	0	0	0
6	Fluvial gravel	73	0	8	16	0	0	3
7	Flowtill	26	0	20	48	3	0	3
8	Fluvial gravel	0	0	0	96	1	3	0
9	Lacustrine gravel	8	1	62	24	4	1	1
10	Ablation till	1	0	5	87	6	0	1
11	Fluvial gravel	1	0	15	72	6	1	5
12	Fluvial gravel	1	0	1	85	10	0	4
13	Lacustrine gravel	0	0	3	93	4	0	0
14	Lacustrine gravel	0	0	64	35	0	0	1
15	Lacustrine gravel	29	0	25	42	1	1	1
16	Lacustrine gravel	0	0	45	51	2	0	2
17	Till	29	0	25	42	2	0	1
18	Lacustrine gravel	1	0	41	51	4	0	2
19	Fluvial gravel	30	0	52	15	3	0	0
20	Till	75	0	11	9	1	0	4
21	Lacustrine gravel	11	1	71	15	1	1	0
22	Lacustrine gravel	37	0	8	50	4	0	1
23	Lacustrine gravel	0	0	37	61	2	0	1
24	Lacustrine gravel	29	0	55	10	3	0	2
25	Lacustrine gravel	0	0	5	90	2	0	3
26	Lacustrine gravel	0	0	4	89	4	0	3
27	Flowtill	0	0	0	92	3	0	4
28	Lacustrine gravel	0	0	0	97	2	0	1
29	Till	1	0	4	86	5	1	3
30	Lacustrine gravel	0	0	0	95	3	3	0
31	Fluvial gravel	0	0	0	97	2	1	1
32	Flowtill	0	0	3	79	9	0	8
33	Lacustrine gravel	0	0	22	75	3	0	0
34	Lacustrine gravel	0	0	2	90	7	1	1
35	Fluvial gravel	0	0	2	87	4	0	6
36	Fluvial gravel	0	0	1	97	2	0	0
37	Fluvial gravel	10	0	77	9	1	1	2
38	Lacustrine gravel	43	0	38	12	4	0	3
39	Fluvial gravel	20	0	65	10	0	2	4
40	Fluvial gravel	11	0	70	10	1	5	3
41	Fluvial gravel	16	0	75	4	1	0	3
42	Fluvial gravel	13	0	70	14	3	0	0
43	Fluvial gravel	19	0	61	13	4	1	2
44	Lacustrine gravel	11	0	65	16	3	2	2
45	Fluvial gravel	15	0	70	12	0	0	2
46	Flowtill	0	0	61	31	0	3	5
47	Fluvial gravel	1	0	1	91	1	2	4
48	Lacustrine gravel	0	0	2	79	11	2	7
49	Fluvial gravel	0	0	0	96	1	0	3
50	Lacustrine gravel	0	0	90	10	0	0	0
51	Fluvial gravel	61	0	11	20	2	1	5
52	Till	65	0	17	17	1	0	0
53	Lacustrine gravel	61	1	22	8	6	1	1
54	Lacustrine gravel	79	0	3	14	4	0	0
55	Lacustrine gravel	82	2	11	4	0	0	0
56	Flowtill	93	0	2	4	1	0	0
57	Lacustrine gravel	71	0	16	12	1	0	0
58	Fluvial gravel	85	0	2	14	0	0	1
59	Lacustrine gravel	27	0	56	13	1	0	3
60	Lacustrine gravel	43	3	46	5	3	0	1
61	Till	1	0	35	46	5	2	10
62	Till	0	0	61	34	3	0	2
63	Till	42	0	29	26	1	0	2
64	Fluvial gravel	14	0	61	24	2	0	0
65	Till	47	0	37	14	1	0	1
66	Fluvial gravel	0	0	0	93	4	0	3
67	Fluvial gravel	0	0	71	22	6	0	3
68	Lacustrine gravel	8	0	58	26	4	0	3
69	Fluvial gravel	34	0	20	34	5	2	0
70	Fluvial gravel	0	0	7	85	3	0	4
71	Lacustrine gravel	8	0	58	26	4	0	3

Explanation of Map Symbols

550 — Bedrock surface contour - Shown where rock surface is buried beneath thick glacial sediment. Approximately located, number indicates altitude of rock surface in feet above sea level. Contour interval is 50 feet.

12 — Location of well or boring listed in Table 1 on this plate.

19 — Location of pebble sample listed in Table 2 on this plate.

Color-filled contours showing elevation of the buried bedrock surface

Pequest and Paulins Kill Valleys
- 350 to 400 feet
- 400 to 450 feet
- 450 to 500 feet

Wallkill Valley
- 500 to 550 feet
- 550 to 600 feet
- 600 to 650 feet

Types of bedrock

- Gneiss and granite
- Dolomite
- Slate, shale, and siltstone
- Marble
- Limestone

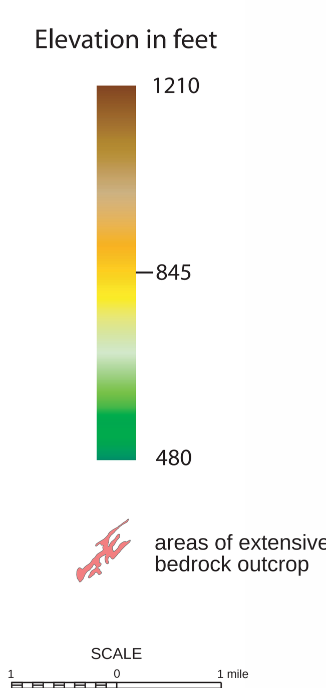
Bedrock geology modified from Drake and others, 1996.

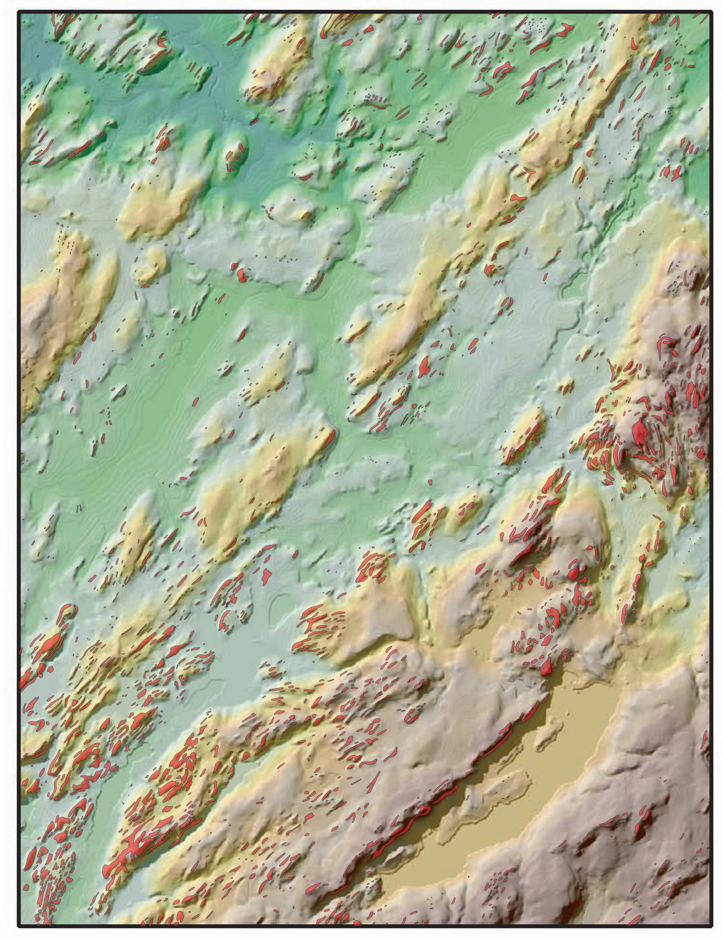
ELEVATION OF THE BURIED-ROCK SURFACE BENEATH THICK GLACIAL SEDIMENT, LOCATION OF SELECTED WELLS AND BORINGS, AND PEBBLE SAMPLES IN NEWTON EAST QUADRANGLE, SUSSEX COUNTY, NEW JERSEY

BY

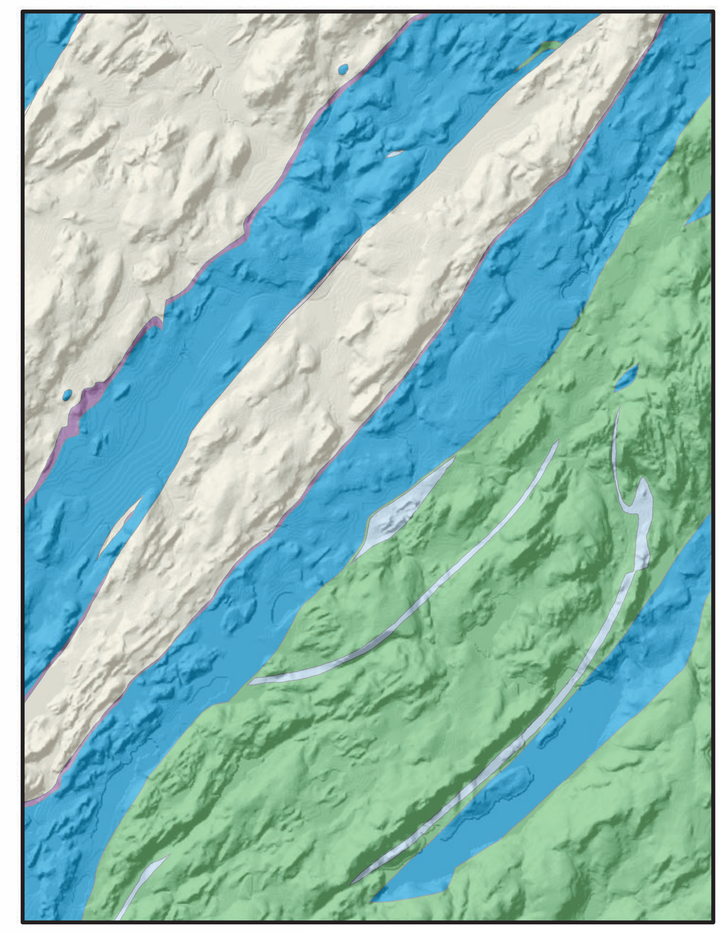
RON W. WITTE and DON H. MONTEVERDE

2006





Colored shaded-relief map of Newton East Quadrangle



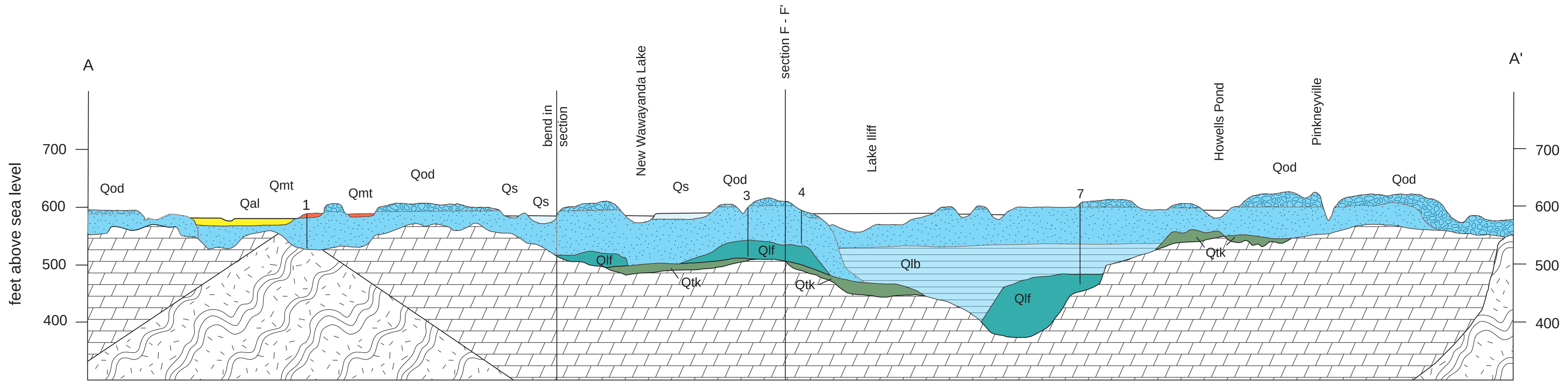
Simplified bedrock map of Newton East Quadrangle

DEPARTMENT OF ENVIRONMENTAL PROTECTION
NEW JERSEY GEOLOGICAL SURVEY

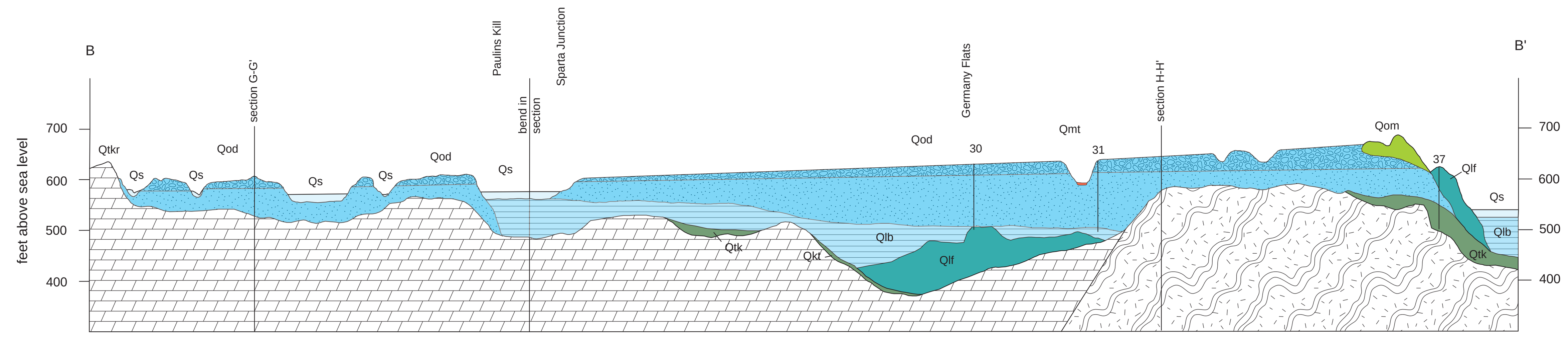
Geologic Sections - Newton East Quadrangle, Sussex County, New Jersey

by
Ron W. Witte and Don H. Monteverde

2006



Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.



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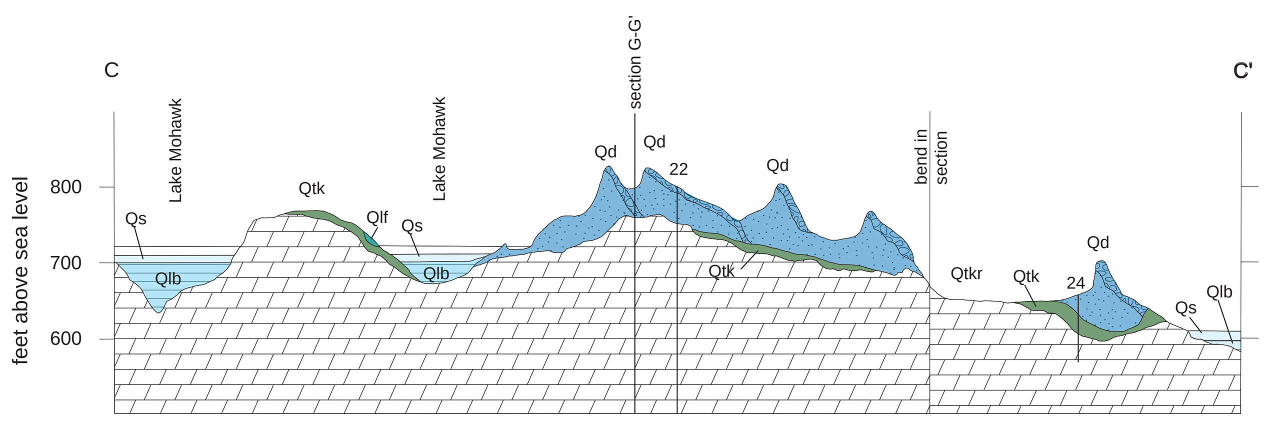
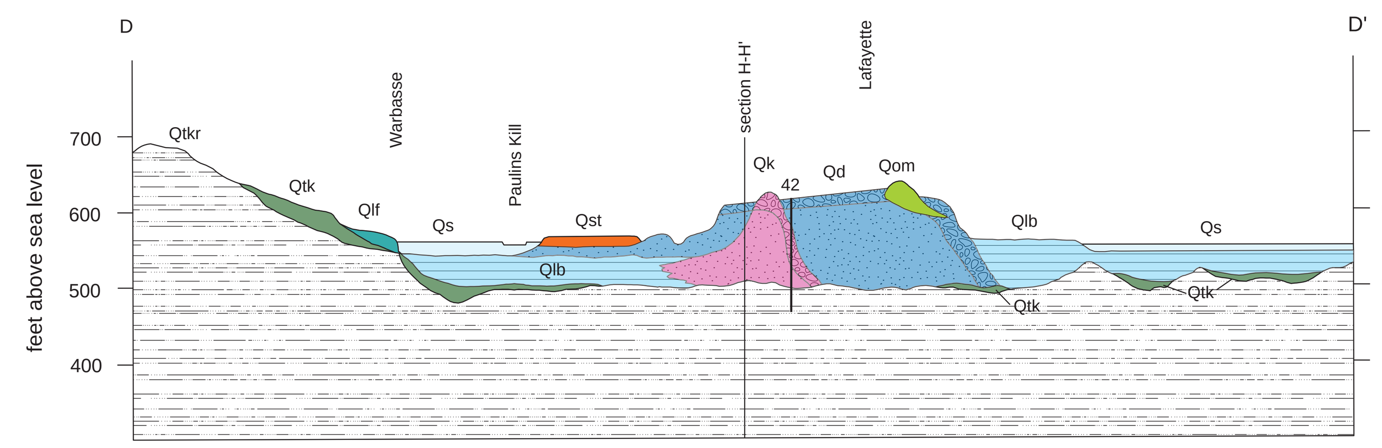
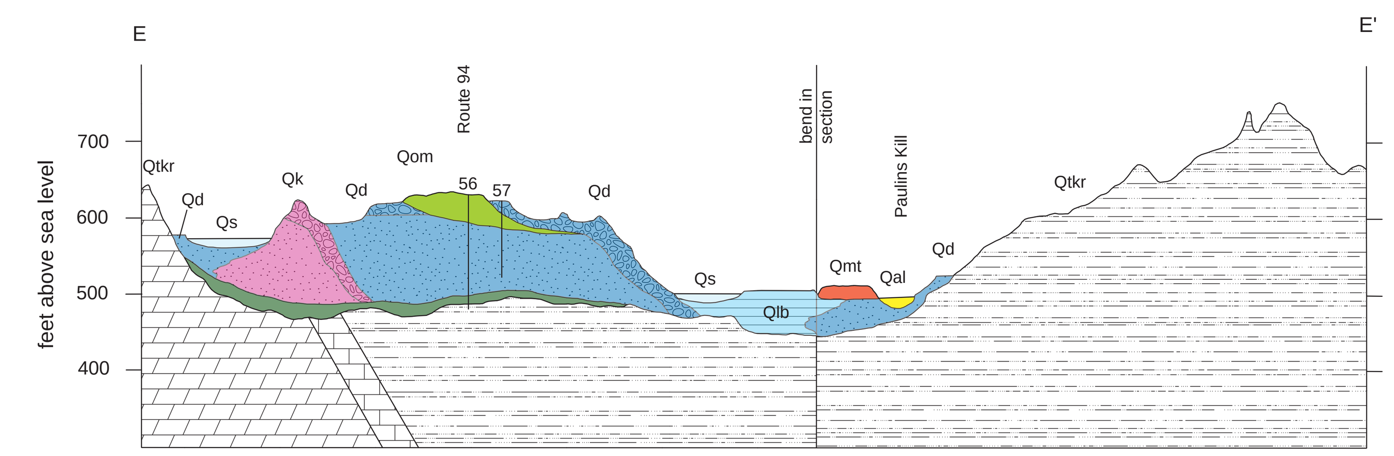


Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.



Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.



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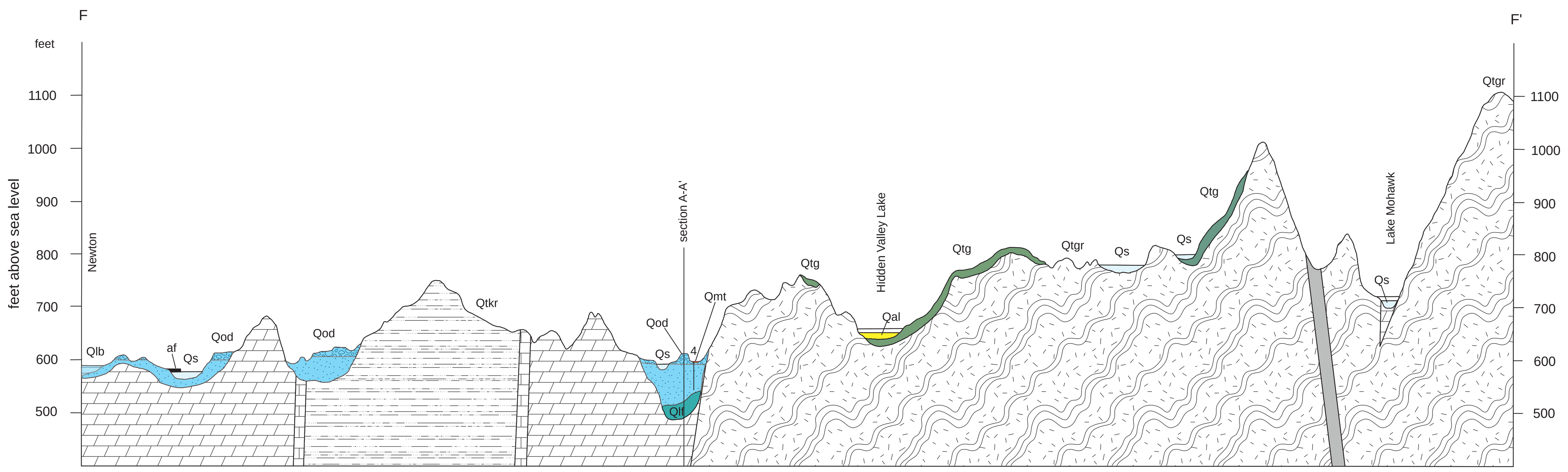
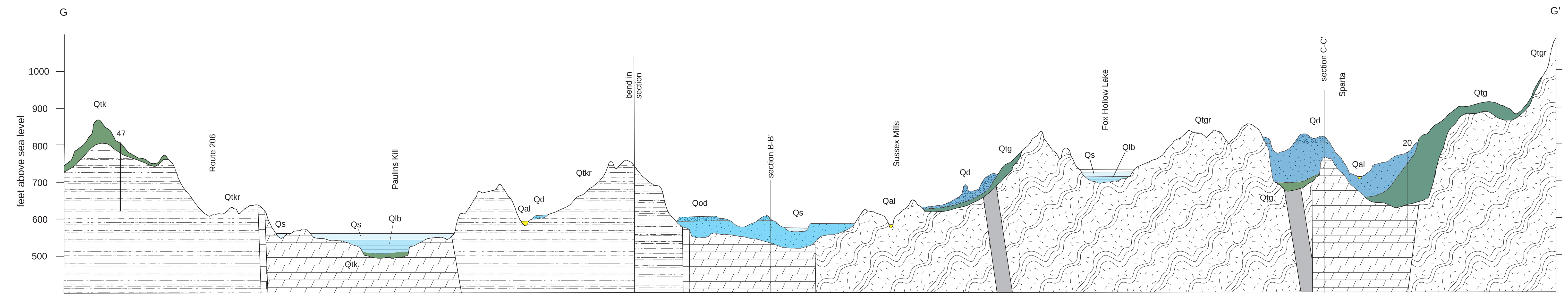
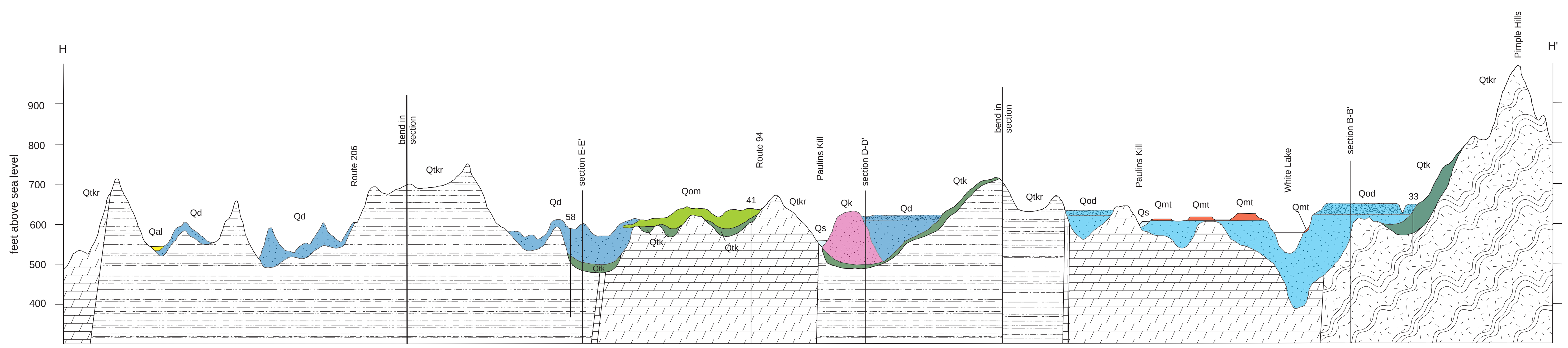


Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.



Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.



Vertical exaggeration x 10. Thin till units are not differentiated from bedrock on section.

EXPLANATION

Bedrock

- Limestone
- Dolomite
- Marble
- Slate and siltstone
- Gneiss and granite

Texture of deltaic outwash and lake-bottom deposits

- Gravel and sand
- Sand
- Silt, and clay

List of surficial units

- Qal - alluvium
- Qst - stream-terrace deposit
- Qs - swamp and bog deposit
- Qd - delta
- Qod - valley-fill delta
- Qlb - lake-bottom deposit
- Qlf - lacustrine-fan deposit
- Qmt - meltwater-terrace deposit
- Qk - kame
- Qom - Ogdensburg-Culvers Gap moraine
- Qtk - Kittatinny Valley till
- Qtg - Highlands till

Qtkr and Qtgr - thin Kittatinny Valley and Highlands till. Too thin to show separately from underlying bedrock.

37 well location, geologic log listed in Table 1 on Plate 2.