DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER-RESOURCES INVESTIGATIONS REPORT 88-4195
SHEET 1. LOCATION OF WELLS AND TEST HOLES

INTRODUCTION

Upstate New York (excluding Long Island) derives 36 percent of its water supply from ground water (New York State Department of Health, 1981). Most of the aquifers that supply this water are unconsolidated glacial and alluvial deposits that partly fill major bedrock valleys and their tributaries. Ground water in these aquifers is under either water-table (unconfined) or artesian (confined) conditions.

The land overlying such aquifers provides a relatively level surface for the development of cities, towns, industries, and agricultural operations. Such development over highly permeable aquifer material, coupled with the generally shallow position of the water table, makes these aquifers susceptible to contamination from point sources such as landfills, road-salt stockpiles, fuel-storage facilities, septic tanks, and industrial facilities with a potential for contaminant leakage. In addition, contamination from urban and agricultural runoff and other nonpoint sources can adversely affect ground-water quality over large areas.

Management decisions by State and local water agencies concerned with present or potential contamination of ground water require detailed knowledge of the hydrogeology of these stratified-drift aquifers. In 1980, the U.S. Geological Survey, in cooperation with the New York State Department of Health, began a study to define the hydrogeology of selected extensively used stratified-drift aquifers in upstate New York. Of these aquifers, 15 have been studied and the results published in individual reports at 1:24,000 scale; 11 of these also are summarized in Waller and Finch (1982) at a reduced scale, and 4 in Cosner (1984) at 1:24,000 scale. As a continuation of this effort, the Geological Survey, in cooperation with the New York State Department of Environmental Conservation, began a study in 1983 to investigate the hydrogeology of several other extensively used aquifers. Each report in this series consists of a set of 1:24,000-scale maps that describe the hydrogeology of the aquifer, including well locations, surficial geology, geologic sections, water-table altitude, bedrock topography, total saturated thickness of the valley-fill sediments, soil permeability, and land use.

This report summarizes the hydrogeology of the aquifer systems in the eastern part of the Utica area. It consists of eight sheets compiled from published and unpublished hydrogeologic data and includes location of wells and test holes (sheet 1), surficial geology (sheet 2), geologic sections (sheet 3), water-table altitude (sheet 4), generalized bedrock topography (sheet 5), saturated thickness of unconsolidated deposits (sheet 6), generalized soil permeability (sheet 7), and land use (sheet 8). A companion set presents similar information for the western part of the Utica area at the same scale (Casey and Reynolds, 1989). The aquifer system depicted here is in southeastern Oneida County and southwestern Herkimer County in east-central New York. The stratified-drift aquifer system underlies valleys of the Mohawk River and parts of Fulmer and Knapp Creeks.

LOCATION OF WELLS AND TEST HOLES

This sheet shows the locations of wells and test holes from which hydrogeologic data were obtained. These data are on file at the U.S. Geological Survey office in Albany, N.Y., either as published reports (mainly Halberg and others, 1962), as unpublished well data; or stored in the U.S. Geological Survey computerized Groundwater Site Inventory data base.

REFERENCES CITED

New York State Department of Health, 1981, Report on ground-water dependence in New York State: New York State Department of Health Report, 49 p.

Waller, R. M. and Finch, A. J., 1982, Atlas of eleven selected aquifers in New York: U.S. Geological Survey Water Resources Investigations 82-553, 255 p.

Halberg, H. N., Hunt, O. P., and Pauszek, F. H., 1962, Water resources of Utica-Rome area, New York: U.S. Geological Survey Water Supply Paper 1499-c, 46 p.

Cosner, O. J., 1984, Atlas of selected aquifers in New York: U.S. Environmental Protection Agency, Water Management Division Report, Contract 68-01-6389, 101 p.

Casey, G. D., and Reynolds, R. J., 1989, Hydrogeology of stratified-drift aquifers in the Utica Area, Oneida County, New York--part 1 (west): U.S. Geological Survey Water Resources Investigations Report 88-4194, 8 sheets, 1:24,000 scale.

EXPLANATION

Wells and test holes are identified by a sequential county well number (local identifier) assigned by the U.S. Geological Survey. These numbers consist of a prefix that identifies the county in which the well is located, in this case "Oe" for Oneida County or "He" for Herkimer County, followed by the sequential well number. For brevity, the prefix is omitted.

○ 478 00465600	PUBLIC-SUPPLY WELL--Large-capacity wells serving municipal water-supply systems. Upper number is a county well number assigned by the U.S. Geological Survey. Public-supply wells are further identified with an 8-digit community water-supply number assigned by the New York State Department of Health.
◉ 51	INDUSTRIAL-SUPPLY WELL--Large-capacity well that supplies an individual industry or manufacturing plant. Number is county well nubmer.
○ 58	DOMESTIC WELL--Well terminating in unconsolidated material that supplies an individual residence. Number is county well number.
● 282	DOMESTIC WELL-- Well that terminates in bedrock and supplies an individual residence. Number is county well number.
⊕ 254	DOMESTIC WELL THAT TAPS UNSPECIFIED SOURCE--No data·to confirm whether well taps unconsolidated material or bedrock. Number is a county well number
⦶ 54	TEST HOLE--Test hole or boring that was drilled to determine subsurface characteristics for engineering properties or development of water supply-wells. Number is county well number.
———— — —	AQUIFER BOUNDARY--Approximate boundary of stratified-drift aquifer, defined as the contact between valley-fill sediments and bedrock valley wall or upland till deposits. Dashed where inferred.
A├──┤A'	TRACE OF GEOLOGIC SECTION--Geologic sections are shown on sheet 3.

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

HYDROGEOLOGY OF THE STRATIFIED-DRIFT AQUIFERS IN THE UTICA AREA, ONEIDA AND HERKIMER COUNTIES, NEW YORK--PART 2 (EAST)

By
George D. Casey and Richard J. Reynolds
1988

Sheet 1. Location of Wells and Test Holes

SURFICIAL GEOLOGY

The Mohawk River valley contains glacial deposits of Wisconsin age that consist of outwash sand and gravel; lacustrine clay, silt, and sand; ice-contact deposits of kame sand, silt, gravel; and recent alluvium of silt, sand, and gravel (Wright, 1972; Ridge, 1985).

Deglaciation Chronology

The study area was covered by the Ontario lobe until the end of the late Wisconsin glaciation. As the ice receded, two glacial sublobes--the Oneida and the Mohawk--formed in the Mohawk valley. The Oneida sublobe retreated to the west, while the Mohawk sublobe retreated to the east. A proglacial lake formed between the retreating ice lobes and the northern margin of the Appalachian Plateau to the south and resulted in the deposition of fine glacial lacustrine sediments. As the Oneida sublobe retreated westward, the Mohawk sublobe readvanced westward in what is referred to as the West Canada readvance (Ridge, 1985) and deposited a layer of till. The maximum extent of this readvance is to the west of Rome, where the advancing Mohawk sublobe came in contact with the receding Oneida sublobe (Ridge, 1985). The subsequent recession of the Mohawk sublobe resulted in the formation of another proglacial lake in the Mohawk valley that drained to the south through a col near Cedarville. The deposits associated with glacial retreat consist of lacustrine sand, silt, and clay interbedded with till. Localized submerged fan deposits of boulder and cobble gravel, muddy gravel, and fine to medium sand also formed in some places (Ridge, 1985).

The Mohawk sublobe deposited a till during its westward (Salisbury) readvance (Muller, Franzi, and Ridge, 1984); the maximum westward limit of this advance is between Frankfort and Utica. As the Mohawk sublobe retreated thereafter, the Oneida sublobe moved eastward. This readvance, known as the Indian Castle readvance (Wright, 1972), was investigated and redefined by Ridge (1985), who identified two separate readvances--the Hinkley readvance, followed by the Barneveld readvance. Both of these readvances left sheets of till in the mapped area.

During the period between these readvances, silt, clay, sand, and gravel were deposited in the proglacial lake that formed between the ice front and the Appalachian Escarpment. These deposits were formed in and along the edge of the Mohawk River valley where glacial meltwater streams drained into the lake. As the Mohawk lobe continued its eastward retreat, lake levels dropped, and free drainage eventually developed to the east and caused the lake to drain completely. Southeast of Utica is an area of elongated semirounded ridges and knobs made up of till, kame, and outwash deposits known as the "Frankfort Hill Moraine." This marks one of the earliest recessional stillstands of the glacier in the area (Wright, 1972).

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Lykens, C. A., 1983, The maximum extent of Oneida Lobe Ice within the western Mohawk Valley, within the Port Bruce Stadial--a reevaluation: Syracuse University, Master's dissertation, 84 p.

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Reynolds, R. J., 1989, Availability of ground water from unconsolidated deposits in the Mohawk River basin, New York: U.S. Geological Survey Water Resources Investigations Report 88-4091, 9 sheets, scale 1:125,000 (in press).

Whipple, J. M., 1969, Surficial geologic maps of the Clinton, Utica West, Oriskany, and Rome quadrangles: Unpublished data on file in Albany, N.Y. Office of the U.S. Geological Survey, 34 sheets, scale 1:24,000.

Wright F. W. III, 1972, The Pleistocene and Recent geology of the Onieda-Rome District, New York: Syracuse University, Ph.D dissertation, 192 p.

EXPLANATION

al	ALLUVIUM--Postglacial alluvial deposits of silt, fine sand, and some gravel in the flood plain. In larger valleys that are subject to frequent flooding, may be overlain by silt of variable thickness; here the alluvium is generally permeable. Thickness variable but generally less than 30 feet.
alf	ALLUVIAL FAN--Fan-shaped alluvial deposits of poorly stratified silt, sand, and gravel at the foot of steep slopes. Generally permeable.
lb	LACUSTRINE BEACH--Stratified sand and gravel deposited at the shoreline of a proglacial lake that has since drained. Generally well sorted, well drained, and permeable. May have wave-winnowed lag deposits of gravel. Variable thickness.
ld	LACUSTRINE DELTA DEPOSITS--Fluvially deposited, stratified, coarse to fine gravel and sand deposits. Generally well-sorted and deposited by meltwater streams flowing into a proglacial lake. Variable thickness.
ls	LACUSTRINE SAND--Sand, well-sorted, stratified, fluvially deposited into a proglacial or postglacial lake in a nearshore, shallow-water environment. Variable thickness, permeable.
og	OUTWASH SAND AND GRAVEL--Stratified sand and gravel deposited by meltwater streams as valley train or as outwash plains and terraces. Highly permeable, well-sorted coarse to fine gravel with sand. Generally finer-grained with increasing distance from ice border. Variable thickness.
k	KAME DEPOSITS--Include kames, eskers, kame terraces, and kame deltas. Ice-contact sand and gravel deposits consisting of fluvially sorted coarse to fine sand and gravel. Extreme variability in sorting, grain size, and thickness of individual beds. May be locally cemented with calcium carbonate. Variable thickness and permeability; permeability generally high in coarser, more well-sorted beds.
km	KAME-MORAINE DEPOSITS--Poorly sorted ice-contact deposits, primarily of sand and gravel, but also containing larger amounts of silt, clay and boulders. Generally composed of the slumped remnants of a formerly continuous outwash plain built on the foot of a rapidly wasting or stagnant ice front. Indicates a temporary stillstand of the ice front during deglaciation. Thickness and content are variable. Locally cemented by calcium carbonate. Permeability variable but generally high in coarser, more well-sorted material.
t	TILL--Ice contact deposits unstratified, unsorted mixture of clay, silt, sand, gravel, and boulders. Relatively impermeable with moderate to high clay content. Thickness variable (up to 150 feet) but generally less than 20 feet in the upland areas.
ta	ABLATION TILL--A moraine or sheet of till that was deposited from a rapidly retreating ice margin. Ablation till consists of rock debris that was formerly embedded in or on top of the ice sheet and deposited as the ice melted. Ablation till typically is loose and therefore more permeable than till moraine or ground moraine; it also tends to be coarser because more of the silt and clay fraction was removed by meltwater.
r	BEDROCK--Exposed section of the Utica shale or area where the shale is covered by a veneer of unconsolidated material.
——— — —	CONTACT BETWEEN SURFICAL GEOLOGIC UNITS--Approximately located, dashed where inferred.
A——A′	TRACE OF GEOLOGIC SECTION--Geologic sections are shown on sheet 3.

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

Geology from Whipple, 1969, Antonetti, 1981, and Cadwell, 1985, modified by G.D. Casey, 1987

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

HYDROGEOLOGY OF THE STRATIFIED-DRIFT AQUIFERS IN THE UTICA AREA, ONEIDA AND HERKIMER COUNTIES, NEW YORK--PART 2 (EAST)

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Sheet 2. Surficial Geology

PREPARED IN COOPERATION WITH THE
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GEOLOGIC SECTIONS

Hydrogeologic data obtained from drillers' logs, consultants' reports, published reports of the U.S. Geological Survey, and data on file with the U.S. Geological Survey in Albany were used to construct the geologic sections. The sections show the stratigraphic relationships among the various types of unconsolidated deposits in the Utica area. Because the data were scant, many of the boundaries between various stratigraphic units are inferred. See sheet 2 for locations of sections.

STRATIFIED-DRIFT AQUIFERS

The valley fill in the Mohawk River valley proper generally consists of Holocene alluvium underlain by outwash sand and gravel that is in turn underlain by lacustrine silt and clay. This sequence of deposition resulted from the final glacial retreat, followed by occupation of the area by a large glacial lake and subsequent free drainage to the east. Beneath these sediments is a till layer emplaced by the last advance of the Oneida sublobe. Locally the till is underlain by sand and gravel deposits that may have been reworked (and deposited) by earlier glacial movement. Ridge and others (1984) concluded that two episodes of eastward drainage of the proglacial Great Lakes caused the fluvial aggradation of sand and gravel in the Mohawk River valley. Most of the sediment originally came from meltwater streams discharging from retreating ice lobes. This sediment was probably reworked by the large volume of water that drained eastward from the proglacial Great Lakes, which removed much of the silt and clay and left a clean lag deposit of coarse sand and gravel. The drift in the tributary valleys is generally a result of the last glacial advance and retreat.

REFERENCE CITED

Mueller, E. H., Franzi, D. A., Ridge, J. C., 1984, The late Wisconsinan glaciation of the West Canada Creek valley, in Potter, D. B., (ed.), Guidebook, New York State Geological Association, 56th annual meeting, Hamilton, N.Y.: 352 p.

EXPLANATION

al ALLUVIUM--Postglacial alluvial deposits of silt, fine sand, and some gravel within the flood plains. In larger valleys that are subject to frequent flooding, may be overlain by silt of variable thickness. Alluvium is generally moderate to poorly permeable, but is generally underlain by more permeable outwash deposits. Thickness variable but generally less than 30 feet.

lb LACUSTRINE BEACH DEPOSITS--Fluvially deposited, stratified sand and gravel deposited at the shore of a proglacial lake that has since drained. Generally well-sorted, well-drained, and permeable. May have wave-winnowed lag deposits of gravel. Variable thickness.

lsc LACUSTRINE SILT AND CLAY--Silt and clay deposited as bottom sediment in a proglacial lake. Generally composed of calcareous, thinly bedded, laminated beds of silt and clay but can be massive. Variable thickness, up to 300 feet; very low permeability.

ls LACUSTRINE SAND--Sand, well sorted, stratified, fluvially deposited into a proglacial or postglacial lake in a nearshore, shallow-water environment. Variable thickness, permeable.

og OUTWASH SAND AND GRAVEL--Stratified sand and gravel deposited by meltwater streams as valley train or as outwash plains and terraces. Highly permeable, well-sorted coarse to fine gravel with sand. Generally finer-grained as distance from ice border increases. Variable thickness.

k KAME DEPOSITS--Include kames, eskers, kame terraces, and kame deltas. Ice-contact sand and gravel deposits consisting of fluvially sorted, coarse to fine sand and gravel. Extreme variability in sorting, grain size, and thickness of individual beds. May be locally cemented with calcium carbonate. Variable thickness and permeability, but permeability generally is high in coarser, more well-sorted beds.

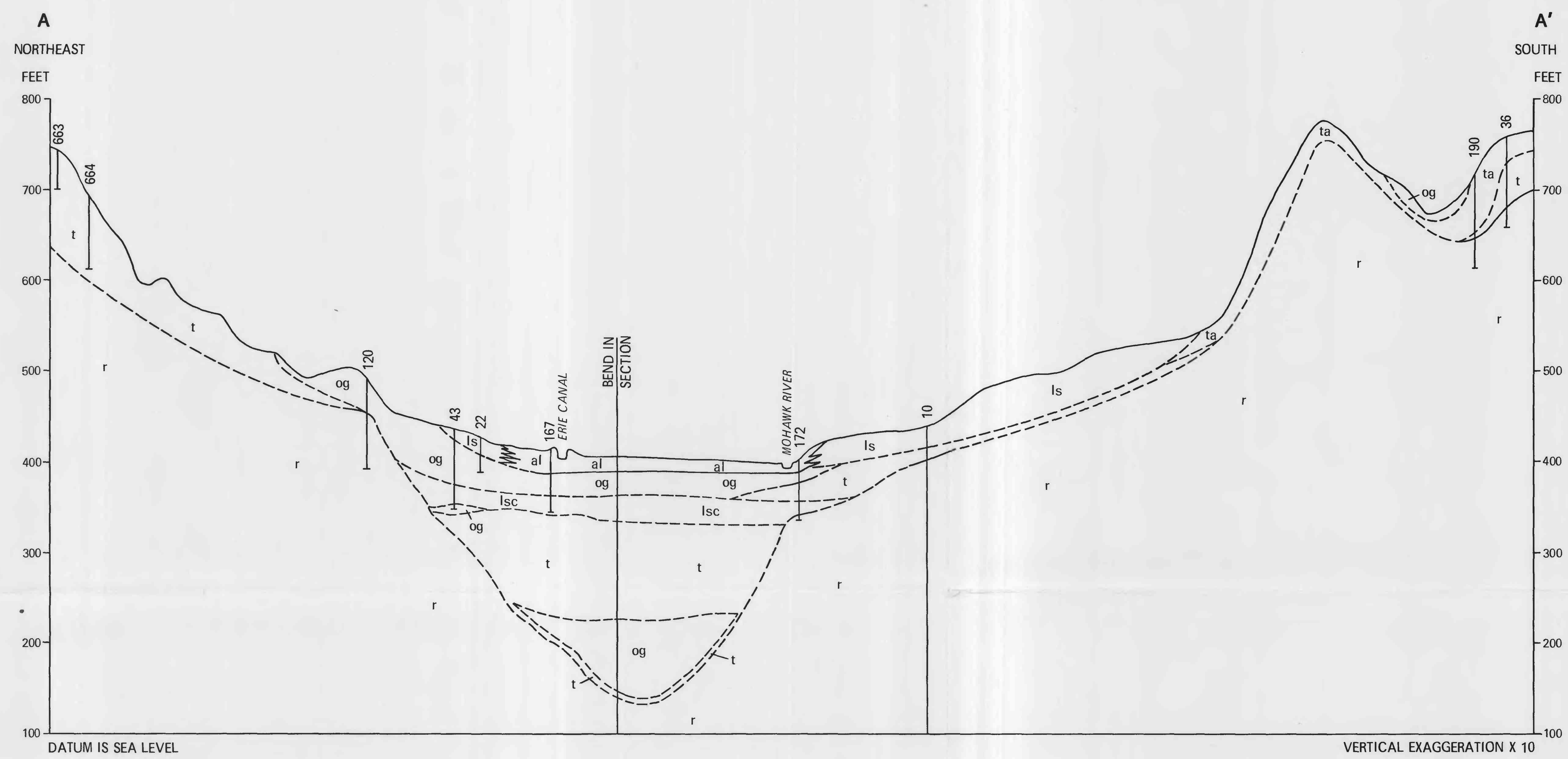
t TILL--Ice-contact, unstratified, unsorted mixture of clay, silt, gravel, and boulders. Highly impermeable with moderate to high clay content. Thickness variable (up to 150 feet) but generally less than 20 feet in upland areas.

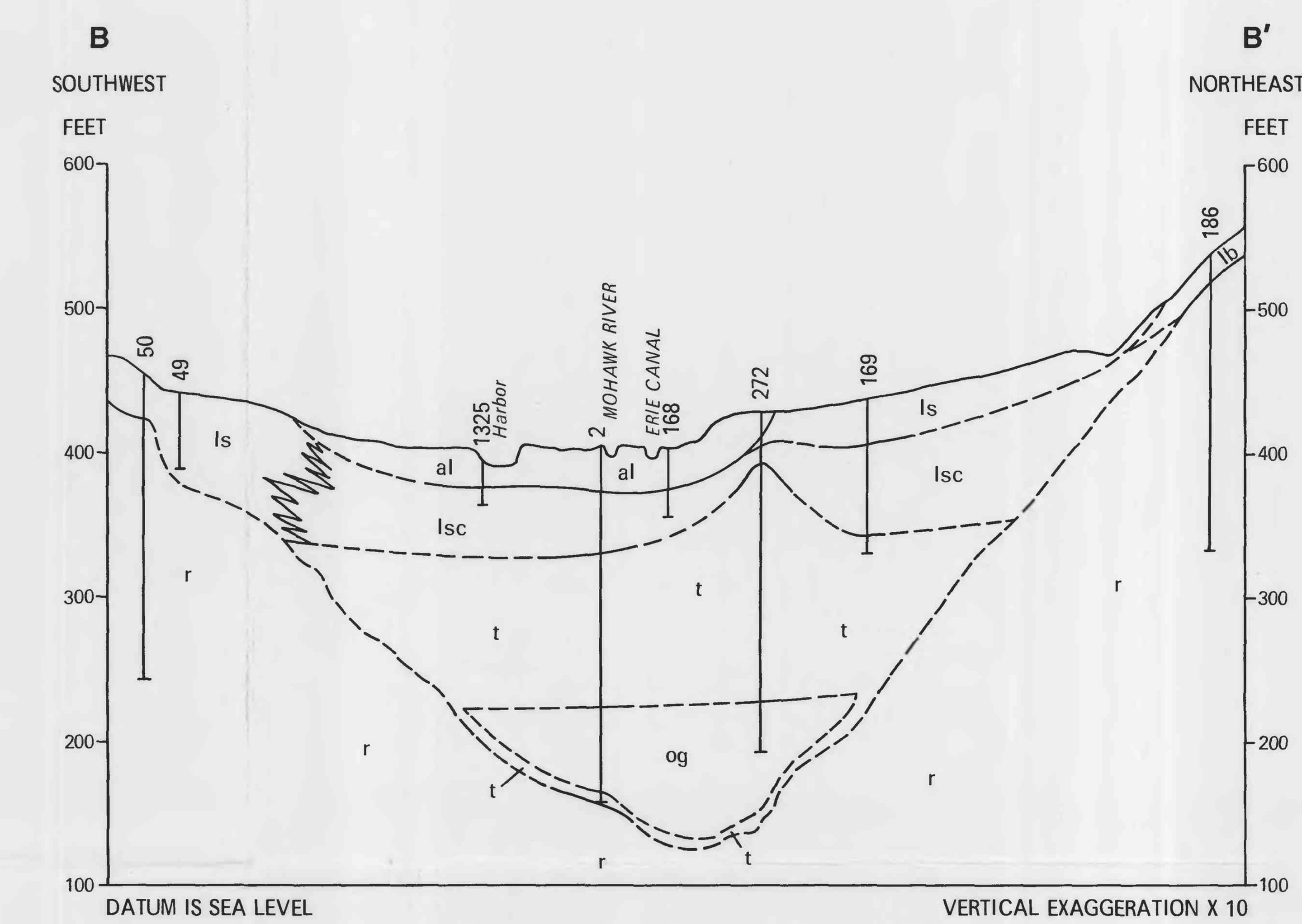
ta ABLATION TILL--A moraine or sheet of till that was deposited from a rapidly retreating ice margin. Ablation till consists of rock debris formerly embedded in or deposited on top of the ice sheet and deposited as the ice melted. Ablation till is generally loose and noncompacted and, therefore, much more permeable than till moraine or ground moraine. It also is generally coarser due to the removal of the silt and clay fraction by meltwater.

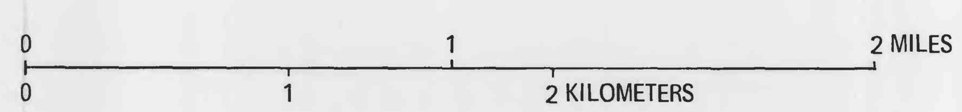
r BEDROCK--Upper Ordovician and Lower Silurian shale and sandstone with a few beds of dolomite.

288 WELL--Well that provided a geologic log used in construction of geologic section. Number is county well number (prefix Oe or He omitted).

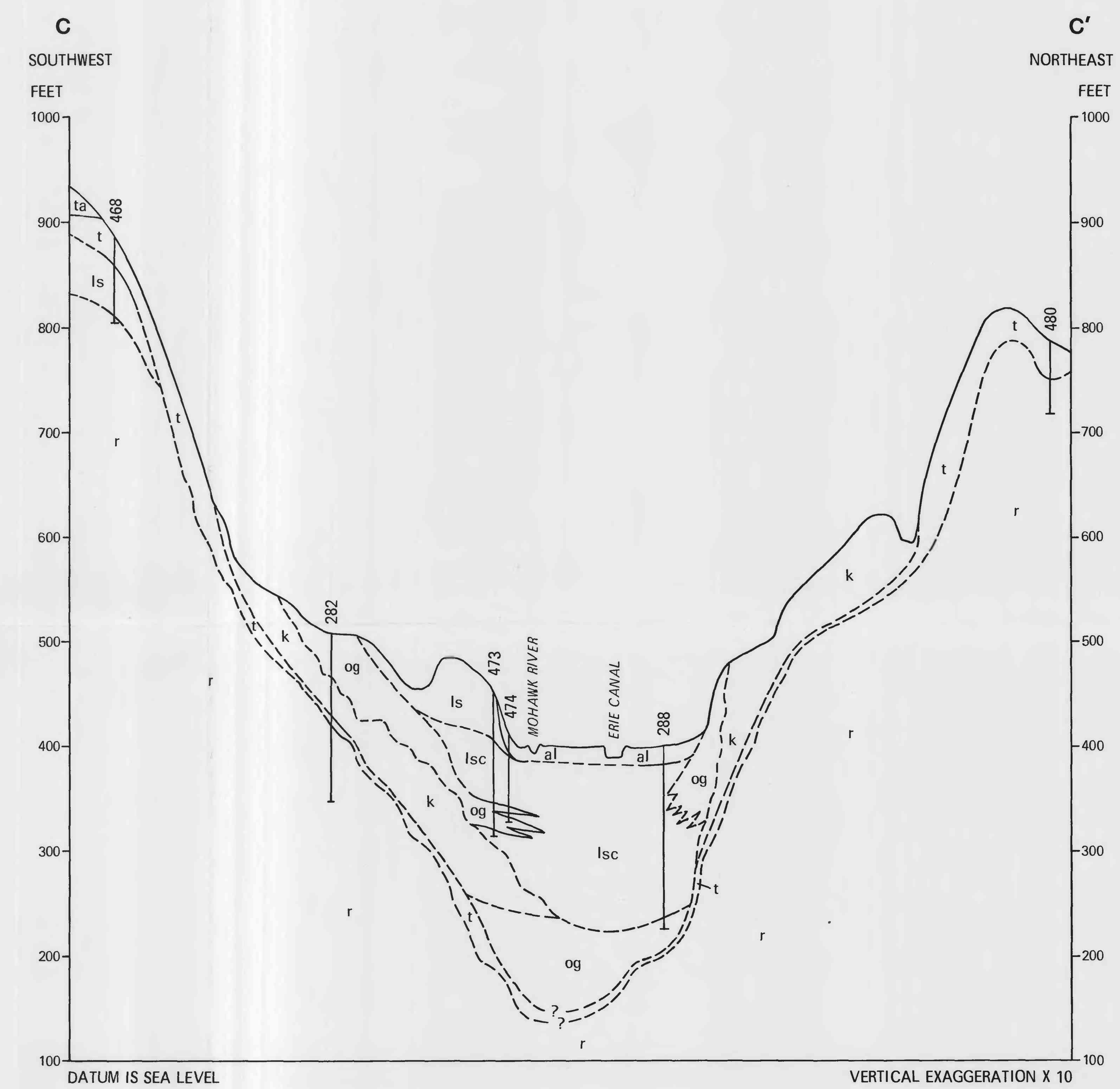
———— – – GEOLOGIC-UNIT BOUNDARY--Boundary of geologic units, defined as contact between differing sediment types and(or) bedrock. Dashed where approximately located.







TRACE OF GEOLOGIC SECTIONS SHOWN ON SHEET 2



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Sheet 3. Geologic Sections

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WATER-TABLE ALTITUDE

This map shows the configuration and average altitude of the water table, in feet above sea level, in the surficial stratified-drift aquifer. The map is based on water levels measured at wells that were inventoried by the U.S. Geological Survey during the late 1940's and late 1960's. The elevations of perennial streams were used to augment well data, mainly in the tributary valleys. In some areas, potentiometric head data from wells finished in bedrock were used to estimate the approximate position of the water table in the surficial sand and gravel aquifer. Water-table contours are drawn with a 10-ft contour interval where water-level and stream altitude data is adequate, while a contour interval of 20 feet was used in areas where data are lacking.

Direction of Ground-Water Flow

Ground water in valley aquifers generally flows downvalley along natural gradients and toward major streams under relatively steep cross-valley gradients. Ground water in the Mohawk River valley in the Utica area flows predominantly cross-valley (toward the river), with only a small gradient downvalley.

EXPLANATION

○ 407 — WELL--Shallow well that taps stratified-drift aquifer and yielded water-level data. Number is water-table altitude, in feet above sea level.

● 397 — WELL--Well that taps bedrock aquifer and yielded potentiometric head data. Number is altitude of potentiometric surface of bedrock aquifer, in feet above sea level.

—— 570 —— WATER-TABLE CONTOUR--Shows water-table altitude in the stratified-drift (water-table) aquifer. Contour interval 10 feet where data permit, otherwise 20 feet. Datum is sea level.

← DIRECTION OF GROUND-WATER FLOW--Shows general direction of ground-water flow in the surficial stratified-drift aquifer.

▬▬ AQUIFER BOUNDARY--Approximate limit of stratified-drift aquifer.

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

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Sheet 4. Water-Table Altitude

GENERALIZED BEDROCK TOPOGRAPHY

Bedrock in the Utica area consists primarily of two units, the Utica shale and Frankfort Shale, both of Late Ordovician age, which dip gently to the south-southwest. The Utica Shale is overlain by the Frankfort Shale. North of the Mohawk River, the Frankfort Shale is the caprock on Smith Hill, Bell Hill, and Hasenclever Hill, all part of a discontinuous north-facing cuesta collectively called the Deerfield Hills (Kay, 1953). The uplands are covered by a veneer of glacial sediments that generally thicken toward the Mohawk River valley. South of the Mohawk River, these Ordovician shales are overlain by sandstones and shales of Silurian age that form the northern margin of the Allegheny Plateau (Kay, 1953).

The Clinton Group, which includes the Oneida conglomerate is composed of shale, sandstone, dolomite, conglomerate, and red iron ore. This group is overlain by the Lockport Dolomite, then the Vernon and Camillus Shales (Halberg and others, 1962).

The area was uplifted and tilted before the onset of glaciation and has been glacially eroded into the major relief features of the region, the principal ranges of hills, and the Mohawk valley (Kay, 1953).

Well logs suggest a buried drainage channel within the broader Mohawk valley that was eroded deeply into the soft, underlying Ordovician-age shales.

SELECTED REFERENCES

Halberg, H. N., Hunt, O. P., and Pauszek, F. H., 1962, Water resources of the Utica-Rome area, New York: U.S. Geological Survey Water-Supply Paper 1499-C, 46 p.

Kay, Marshall, 1953, Geology of the Utica Quadrangle, New York: New York State Museum and Science Service, Bulletin 347, 126 p.

Rickard, L. V. and Fisher, D. W., 1970, Geologic map of New York, Hudson-Mohawk sheet: New York State Museum and Science Service, Map and Chart Series 15, scale 1:250,000.

EXPLANATION

● <152 WELL OR TEST HOLE--Marks location of well or test hole that yielded depth-to-bedrock data. Number is bedrock-surface altitude, in feet, above sea level. A "less than" (<) symbol preceding the number indicates that the well did not penetrate bedrock; thus the number indicates the altitude of the bottom of the well or test hole in unconsolidated material.

—— 350 —— BEDROCK-SURFACE--Shows altitude of bedrock surface approximately located. Contour interval 50 feet. Datum is sea level.

━━━━ AQUIFER BOUNDARY--Approximate limit of stratified-drift aquifer.

Base from New York State Department of Transportation Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

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Sheet 5. Bedrock Topography

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SHEET 6. SATURATED THICKNESS OF UNCONSOLIDATED DEPOSITS

SATURATED THICKNESS OF UNCONSOLIDATED DEPOSITS

This map depicts the total saturated thickness of the unconsolidated valley-fill material, which includes sand, gravel, lacustrine silt, clay, and till. The saturated thickness shown here includes deeper outwash deposits in the Mohawk River valley, which are separated from the upper aquifer by a layer of till. In many areas, the extent and distribution of permeable and impermeable materials are uncertain due to a lack of data; consequently lines of equal thickness in these areas are inferred.

The Mohawk River valley that proper contains two stratified-drift aquifer systems--a confined aquifer that consists of clean sand and gravel overlain by a till, and a surficial unconfined aquifer composed of outwash sand, gravel, and lacustrine and fluvial sand that is interbedded with lacustrine silt and clay. The confined aquifer has an average thickness of about 75 feet; it is thickest in the center of the valley and thins toward the valley walls. The unconfined aquifer, which is the aquifer of primary interest in this area, ranges from 20 to 75 feet in thickness. On the Mohawk River flood plain it is covered by a veneer of recent alluvium. This flood plain was once covered by a proglacial lake; tributary streams now enter it where meltwater streams once dropped sand to form deposits that range from 20 to 100 feet in thickness.

EXPLANATION

● 246 WELL OR TEST HOLE--Source of hydrogeologic data for construction of saturated-thickness map. Number shown is total saturated thickness of sediments (undifferentiated). The "greater than" (>) symbol preceding a number indicates that the well did not reach bedrock; thus the saturated thickness at that location is greater than the value shown.

—— 180 —— LINE OF EQUAL SATURATED THICKNESS--Shows lines of equal saturated thickness of the valley-fill sediments (undifferentiated). Approximately located. Interval 20 feet.

———— AQUIFER BOUNDARY--Approximate limit of valley-fill aquifer.

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

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Sheet 6. Saturated Thickness of Unconsolidated Deposits

GENERALIZED SOIL PERMEABILITY

This map classifies the soils of the area as to the approximate rate at which water passes vertically through the A and B horizons (generally less than 30 inches) of the soil profile. The values are given in relation to the less permeable soil horizon (A or B) as determined from infiltration rates obtained in recent soil surveys of Oneida and Herkimer Counties.

Soil permeability does not always coincide with surficial geologic units. Soils that developed on the valley floor of the Mohawk River are derived mainly from fine-grained flood-plain alluvium and, although moderately permeable, they may retard infiltration into the more permeable underlying outwash deposits. The outwash deposits that form high terraces and have not been covered with a fine-grained alluvium typically have higher permeability than those on the flood plain. Steep, narrow valleys may contain soils with a wide range of permeability, but the area covered by each type may be too small to show at this scale. The upland areas are generally covered with a virtually impermeable, clay-rich till. Steep slopes that have only a very thin soil cover allow most precipitation to run off as surface flow and, thus, have extremely low infiltration rates.

SELECTED REFERENCES

Kahl, A. D., Tallarico, V. J., and Shelton, W. L., 1975, Soil survey of Herkimer County, New York, southern part: U.S. Department of Agriculture, Soil Conservation Service, 169 p.

Person, C. S., Feuer, R., and Cline, M. G., 1960, Oneida County Soils: New York State College of Agriculture, 1 sheet, 1:125,000 scale.

EXPLANATION

Number on map	Infiltration-rate classification	Infiltration rate in inches per hour
1	low	0.06 -0.2
2	moderate	0.2 - 6
3	high	6 - 20

——— SOIL-PERMEABILITY BOUNDARY--Approximately located. Defined as the contact between soils with differing permeabilities.

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East 1978, NY, 1:24,000 scale

HYDROGEOLOGY OF THE STRATIFIED-DRIFT AQUIFERS IN THE UTICA AREA, ONEIDA AND HERKIMER COUNTIES, NEW YORK--PART 2 (EAST)

By
George D. Casey and Richard J. Reynolds

1988

Sheet 7. Generalized Soil Permeability

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

LAND USE

Land outside the urbanized areas in or near the Mohawk River valley and its larger tributaries is used mainly for farming, although some forest remains. Scattered throughout the rural area are small hamlets, wetlands, and areas excavated for sand and gravel. The villages of Ilion, Frankfort, Mohawk, and Herkimer are predominantly residential with some industrial, commercial, and open lands. The city of Utica is principally residential but uses a larger percentage of land for industrial and commercial use than the other developed areas. The Mohawk River valley is a major transportation corridor and contains a section of the New York State Thruway (I-90), the New York State Barge Canal, and the main east-west rail line. The Mohawk River at Utica has a mean annual discharge of approximately 1,000 cubic feet per second (G. D. Firda, U.S. Geological Survey, oral commun., 1986).

Land use is an important consideration in the development of a ground-water-protection program for this area. The high permeability of the surficial aquifer and relatively shallow depth to water in most places makes ground water in this area susceptible to contamination from surface sources such as landfills, salt-storage stockpiles, hydrocarbon-fuel storage, chemical plants, and other facilities having a potential for contaminant leakage.

The land-use classification shown here is based primarily on 1967-68 data that were published as Land Use and Natural Resources Inventory (LUNR) maps by Cornell University (1968) and updated from New York State Department of Transportation 1:24,000-scale topographic maps.

REFERENCE CITED

Cornell University, 1968, Land use and natural resources inventory (LUNR) map series, Utica west, Clinton, Rome, and Oriskany quadrangle: New York State Cooperative Extension, 4 sheets, 1:24,000 scale.

EXPLANATION

1	INDUSTRIAL--light and heavy manufacturing, petroleum- and chemical-storage facilities
2	EXTRACTIVE--sand and gravel mining (both active and abandoned)
3	COMMERCIAL AND SERVICES--includes urban areas, shopping centers, commercial strip development, communications facilities, and facilities without extensive grounds, such as hospitals, municipal buildings, government centers, schools, and universities.
3a	LANDFILLS--includes both active and abandoned landfills, open dumps, and junkyards
3b	SEWAGE-TREATMENT FACILITIES--land application of sewage; includes settling lagoons, both active and abandoned
4	TRANSPORTATION (land and air)--facilities include limited-access highways, airports, truck and train terminals and yards
4a	TRANSPORTATION (waterways)--includes barge canals, channels, locks, ports, docks, dams, and shipyards
5	FARMLAND (crops and pasture)--icludes both active and inactive agricultural areas, and area used for horticulture or domestic livestock
5a	FARMLAND--orchards and vineyards
6	FOREST--includes forest stands exceeding 30 feet in height and brush, tree, and shrub cover less than 30 feet high; forested public areas; forested recreation areas such as public and private campgrounds, ski resorts, public parks, and also wooded hospital grounds, school campuses, and correctional facilities.
7	RESIDENTIAL--includes high-, medium-, low-density residential areas, trailer parks, rural hamlets, estates of 5 acres or more, farm-labor camps, developed shoreline, and commerical strip development that is at least two-thirds residential
8	OPEN LAND--includes open recreation areas and open public areas such as golf courses, hospital grounds, school and college campuses, correctional facilities, and cemeteries
9	WATER AND WETLANDS--includes natural or manmade ponds, lakes, or reservoirs, streams and rivers averaging 100 feet wide or more, bogs and shrub wetlands, wooded wetlands, and marine wetlands
———	LAND-USE-BOUNDARY--Approximately located. Defined as a contact between areas of differing land use.

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER-RESOURCES INVESTIGATIONS REPORT 88-4195
SHEET 8. LAND USE

Base from New York State Department of Transportation
Ilion, 1978, Newport, 1978, Trenton, 1978, and Utica East, 1978, NY, 1:24,000 scale

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Sheet 8. Land Use