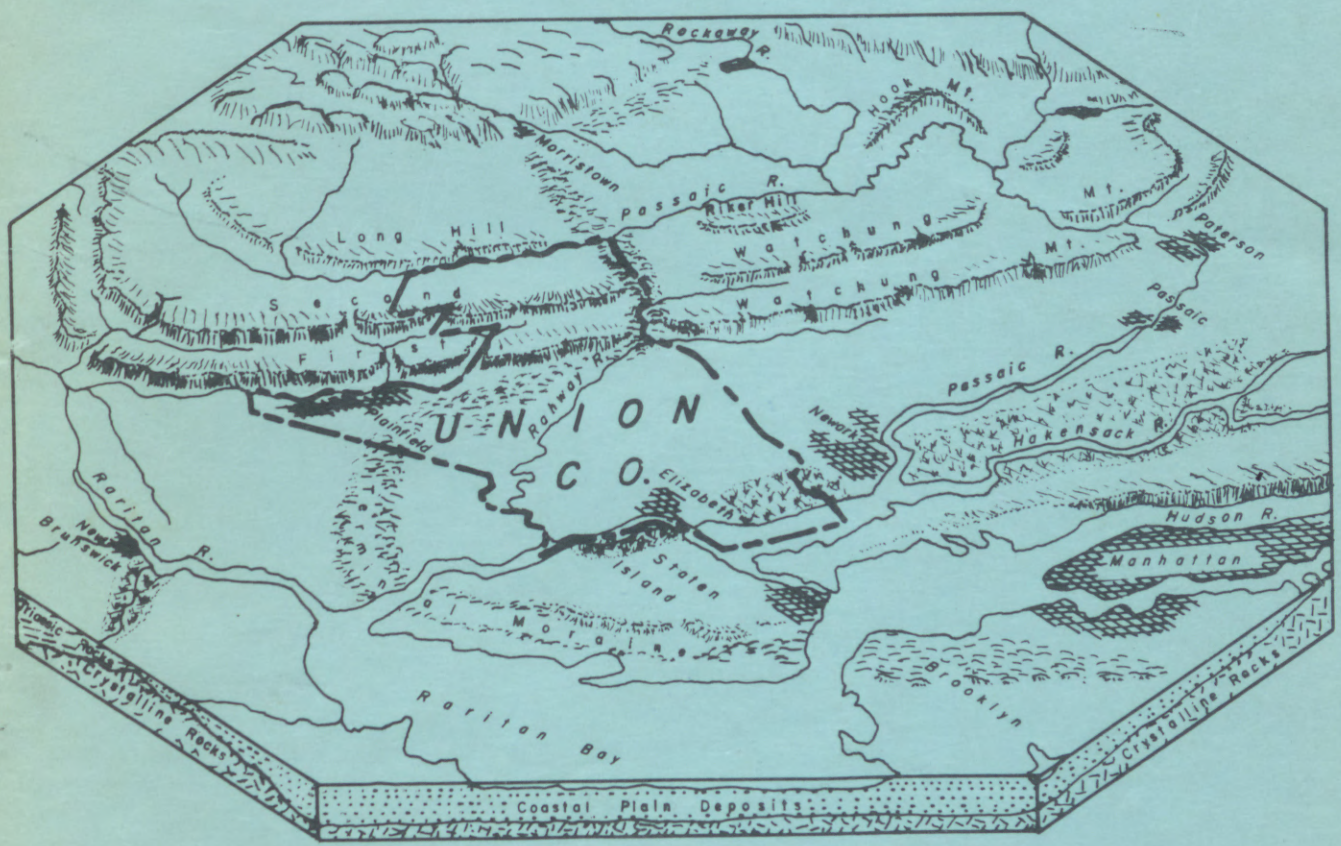
GEOLOGY AND GROUND-WATER RESOURCES OF UNION COUNTY, NEW JERSEY

U.S. GEOLOGICAL SURVEY, Water Resource Division

Water-Resources Investigations 76–73



Prepared in cooperation with

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF WATER RESOURCES

U.S. DEPARTMENT OF THE INTERIOR · MARCH 3, 1849 ·

GEOLOGY AND GROUND-WATER RESOURCES OF UNION COUNTY, NEW JERSEY

By Bronius Nemickas

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 76–73

Prepared in cooperation with

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF WATER RESOURCES

June 1976

UNITED STATES DEPARTMENT OF THE INTERIOR

Thomas S. Kleppe, Secretary

GEOLOGICAL SURVEY

V. E. McKelvey, Director

For additional information write to:

U.S. Geological Survey
Room 420, Federal Building
P.O. Box 1238
Trenton, New Jersey 08607

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS--Continued

TABLES

CONVERSION FACTORS

English	Multiply by	Metric
feet	0.3048	meters
gallons per minute	.06309	liters per second
gallons per minute per foot	.2069	liters per second per meter
million gallons per day	.04381	cubic meters per second
inches	25.4	millimeters
miles	1.609	kilometers
square miles	2.590	square kilometers

GEOLOGY AND GROUND-WATER RESOURCES OF UNION COUNTY, NEW JERSEY

By Bronius Nemickas

ABSTRACT

Ground water in Union County occurs in the voids of unconsolidated stratified drift deposits of Pleistocene age and in the joints and fractures of the Brunswick Formation and Watchung Basalt of Late Triassic age.

Wells (6 inches or greater in diameter) in the stratified drift deposits yield from 180 to 690 gpm (gallons per minute). The specific capacity of these wells range from 4.0 to 69 and average 19 gpm per foot of drawdown. High yielding wells in the stratified drift deposits are located primarily in the valley-fill deposits in the bedrock valleys that were cut by streams before the Wisconsin Glaciation in Pleistocene time.

Wells (6 inches or greater in diameter) in the Brunswick Formation yield from 12 to 870 gpm; the most productive water-bearing zones are commonly between depths of 200 to 600 feet. The specific capacity of wells in the Brunswick Formation range from 0.04 to 25 and average 3.5 gpm per foot of drawdown. Wells (6 inches or greater in diameter) in the Watchung Basalt yield from 20 to 164 gpm and the specific capacities of the wells range from 0.24 to 2.5 and average 1.2 gpm per foot of drawdown.

The quality of ground water from the stratified drift deposits is generally acceptable for most uses. Hardness ranges from 110 mg/1 (milligrams per liter) to 210 mg/1. The pH ranges from 6.4 (slightly acidic) to 8.5 (slightly alkaline). The quality of ground water from the Brunswick Formation is acceptable throughout the country for most uses. Hardness ranges from 71 mg/1 to 1193 mg/1. The pH ranges from 6.3 to 8.5. Calcium and magnesium are the predominant cations. Sulphate is the predominant anion in water having dissolved solids greater than 500 mg/1 and bicarbonate is the predominant anion in water having dissolved solids less than 500 mg/1.

Withdrawals of ground water from all aquifers in Union County by public supply are estimated to average about 16.0 mgd (million gallons per day) in 1968. The greatest quantity of ground water is withdrawn from the Brunswick Formation--about 11.6 mgd for public supply in 1968. The stratified drift aquifers yield substantial quantities of water--about 4.4 mgd in 1968--but the deposits are of limited extent. The Watchung Basalt is of minor importance as an aquifer in Union County.

INTRODUCTION

Purpose and Scope

The ground-water investigation of Union County was started in July 1967 by the U.S. Geological Survey in cooperation with the New Jersey Department of Environmental Protection, Division of Water Resources. It is part of a state-wide program of investigation of the ground-water resources of New Jersey. The purpose of the investigation was to compile and evaluate geologic and hydrologic data relating to the availability, source, occurrence, movement and chemical quality of the ground water in Union County.

Location and Extent of Area

Union County is located in northeastern New Jersey (fig. 1) between longitudes 74°28'W and 74°8'W, and latitudes 40°35'N and 40°45'N. It is bounded on the northwest by Morris County, on the north by Essex County, on the east by Newark Bay and Arthur Kill, on the south by Middlesex County, and on the west by Somerset County.

The County has a total area of 104.94 square miles of which 1.55 square miles is water. It is the state's second smallest county, but is one of the major manufacturing and industrial centers of the state. Elizabeth is the county seat; other major municipalities include Plainfield, Union Township, and Linden.

Previous Investigations

Salisbury (1894) discussed the surficial geology of the area as part of a regional investigation. Kümmel was first to investigate the Triassic Newark Group of New Jersey. He described the petrology and occurrence of the Newark Group in the annual reports of the State Geologist for 1896, 1897, and 1898. Origin of the Newark sediments and their relation to the Triassic igneous rocks was studied by Lewis (1906). Darton and others (1908) described the geology of the area in the Passaic folio. McLaughlin (1948) studied the continuity and correlation of the Newark Group of New Jersey and Pennsylvania. The paleotectonic folio of the Triassic System by McKee and others (1959) contains maps of the paleogeology, lithofacies and thicknesses of the Newark Group. The geologic history and geology of the State of New Jersey was presented by Kümmel (1940).

Information on streamflow, precipitation, evaporation and surface water quality was presented by Vermeule (1894). Collins (1923), Collins, Lamar, and Lohr (1932), and Lohr and Love (1954) published chemical analyses of water samples from wells owned by the Elizabethtown Water Company, Plainfield Division, and Rahway Water Company. Barksdale (1949) discussed ground-water depletion in the Rahway River basin. Barksdale and others (1958) discussed the water-bearing characteristics of the Brunswick Formation.

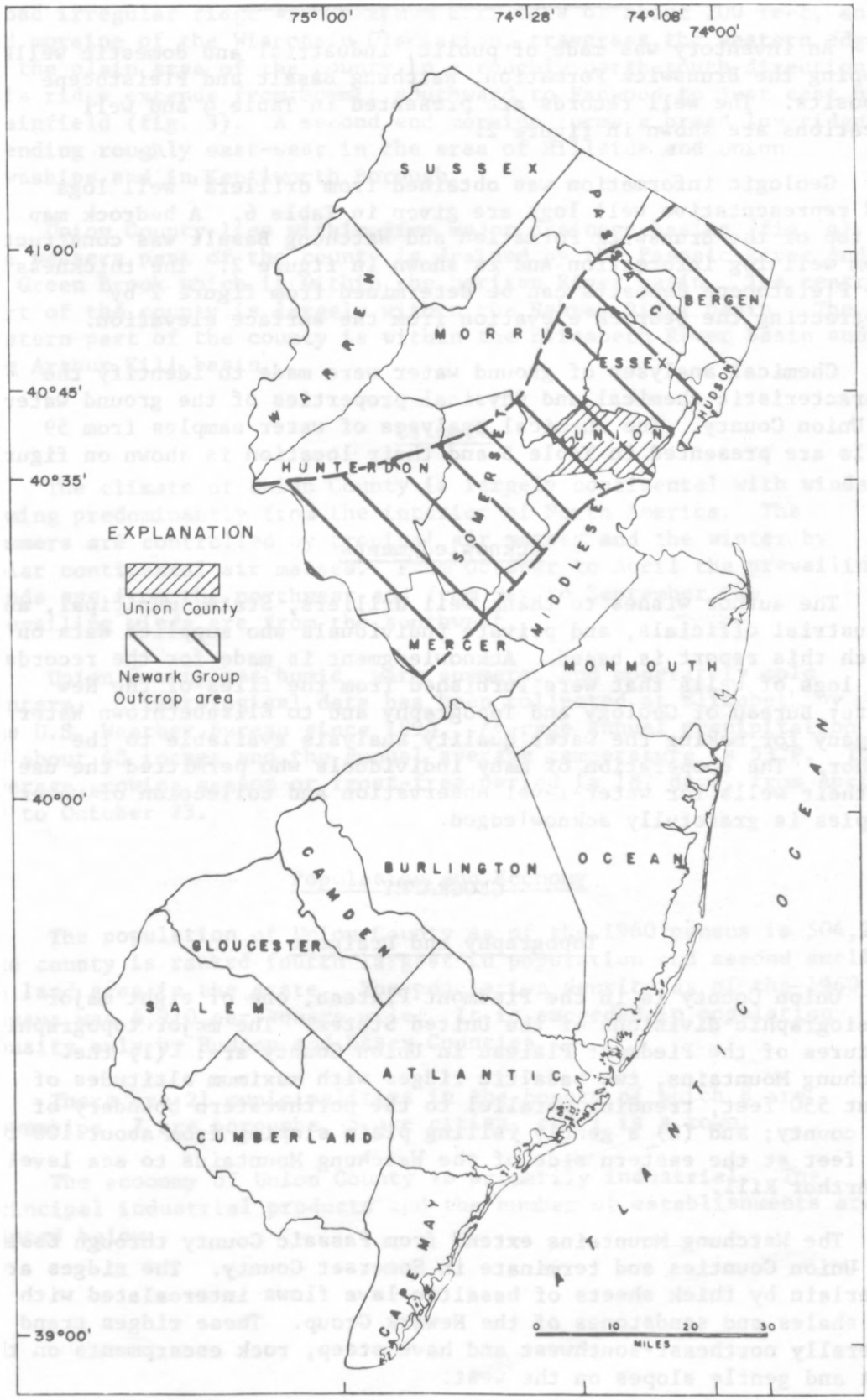


FIGURE 1.--LOCATION OF UNION COUNTY AND OUTCROP AREA OF THE NEWARK GROUP.

Methods of this Investigation

An inventory was made of public, industrial and domestic wells tapping the Brunswick Formation, Watchung Basalt and Pleistocene deposits. The well records are presented in Table 4 and well locations are shown in figure 2.

Geologic information was obtained from drillers' well logs and representative well logs are given in Table 6. A bedrock map on top of the Brunswick Formation and Watchung Basalt was constructed from well log information and is shown in figure 2. The thickness of the Pleistocene deposits can be determined from figure 2 by subtracting the bedrock elevation from the surface elevation.

Chemical analyses of ground water were made to identify the characteristic chemical and physical properties of the ground water in Union County. The chemical analyses of water samples from 59 wells are presented in Table 5 and their location is shown on figure 2.

Acknowledgments

The author wishes to thank well drillers, State, municipal, and industrial officials, and private individuals who supplied data on which this report is based. Acknowledgment is made for the records and logs of wells that were furnished from the files of the New Jersey Bureau of Geology and Topography and to Elizabethtown Water Company for making the water quality analysis available to the author. The cooperation of many individuals who permitted the use of their wells for water-level observation and collection of water samples is gratefully acknowledged.

GEOGRAPHY

Topography and Drainage

Union County is in the Piedmont Plateau, one of eight major physiographic divisions of the United States. The major topographic features of the Piedmont Plateau in Union County are: (1) the Watchung Mountains, two basaltic ridges with maximum altitudes of about 550 feet, trending parallel to the northwestern boundary of the county; and (2) a gently rolling plain sloping from about 100 to 150 feet at the eastern side of the Watchung Mountains to sea level at Arthur Kill.

The Watchung Mountains extend from Passaic County through Essex and Union Counties and terminate in Somerset County. The ridges are underlain by thick sheets of basaltic lava flows intercalated with the shales and sandstones of the Newark Group. These ridges trend generally northeast-southwest and have steep, rock escarpments on the east and gentle slopes on the west.

The rolling plain is broken by two topographic features. A broad irregular ridge with maximum altitudes of about 200 feet, an end moraine of the Wisconsin Glaciation, traverses the western edge of the plain area of the county in a roughly north-south direction. This ridge extends from Summit southward to Fanwood to just east of Plainfield (fig. 3). A second end moraine forms a broad low ridge trending roughly east-west in the area of Hillside and Union Townships and in Kenilworth Borough.

Union County lies within five major drainage basins (fig. 4). The western part of the county is drained by the Passaic River and by Green Brook which is within the Raritan River basin. The central part of the county is largely within the Rahway River basin. The eastern part of the county is within the Elizabeth River basin and the Arthur Kill basin.

Climate

The climate of Union County is largely continental with winds coming predominantly from the interior of North America. The summers are controlled by tropical air masses and the winter by polar continental air masses. From October to April the prevailing winds are from the northwest and from May to September the prevailing winds are from the southwest.

Union County has humid, warm summers, and moderately cold winters. Climatological data has been collected at Elizabeth by the U.S. Weather Bureau since 1894. Average annual precipitation is about 48 inches and the annual average temperature is 53°F. The average growing season or frost-free period is 187 days, from April 19 to October 23.

Population and Economy

The population of Union County as of the 1960 census is 504,255. The county is ranked fourth largest in population and second smallest in land area in the state. The population density as of the 1960 census was 4,910 per square mile. It is exceeded in population density only by Hudson and Essex Counties.

There are 21 municipalities in the county of which 8 are townships, 7 are boroughs, 5 are cities, and 1 is a town.

The economy of Union County is primarily industrial. The principal industrial products and the number of establishments are listed below:

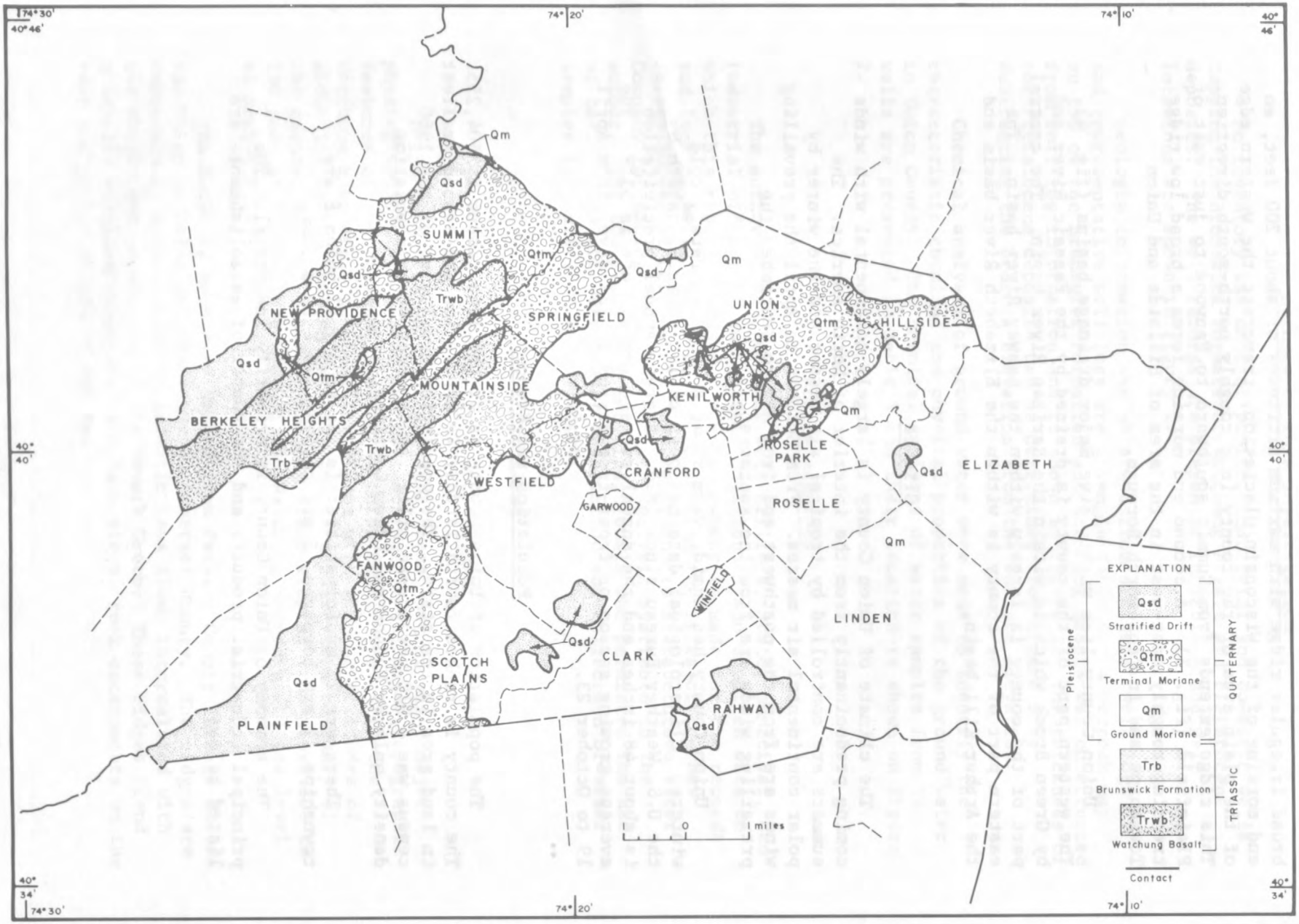


FIGURE 3.--GENERALIZED SURFICIAL GEOLOGIC MAP OF UNION COUNTY, NEW JERSEY.

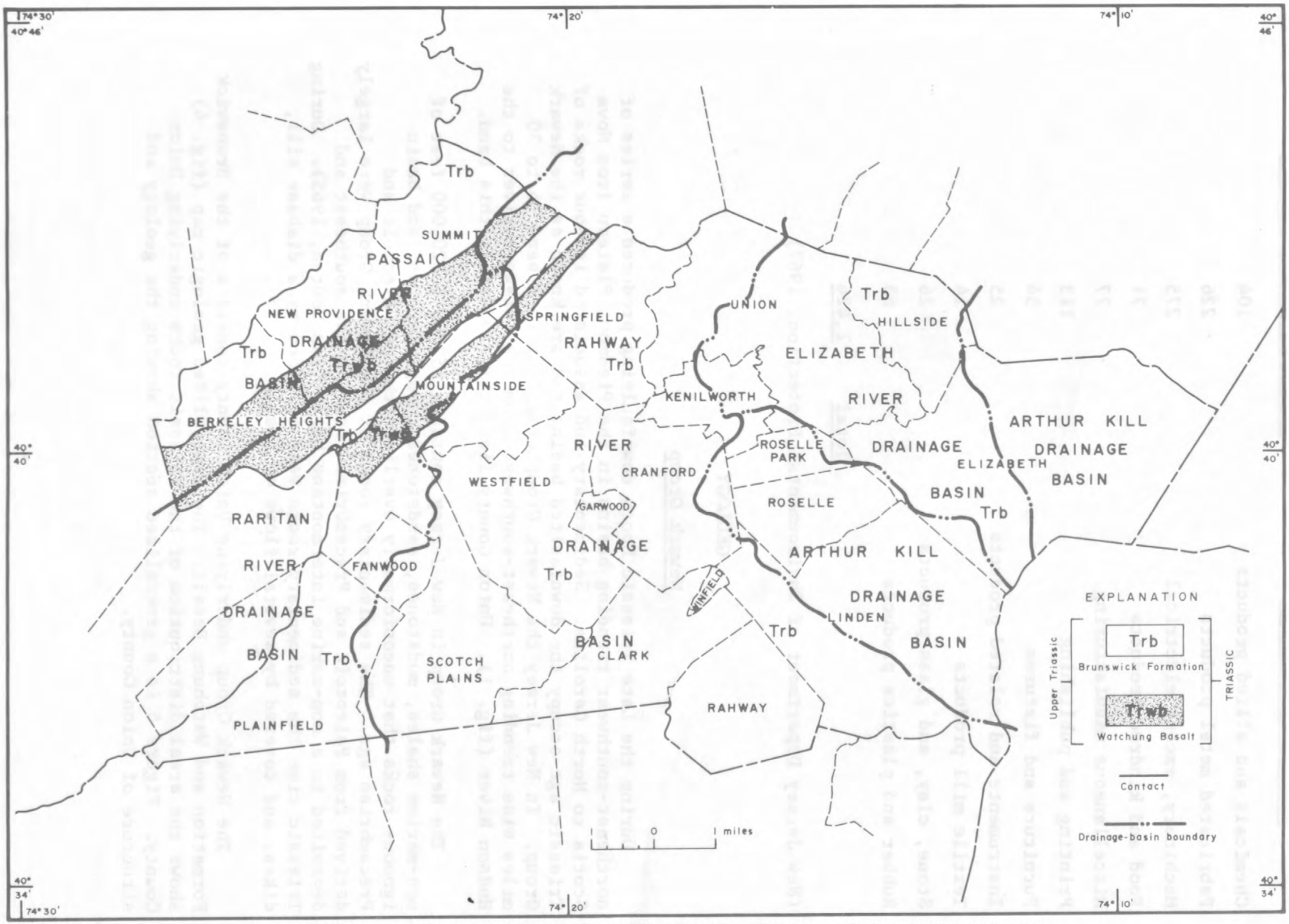


FIGURE 4.--GENERALIZED MAP SHOWING BEDROCK GEOLOGY AND DRAINAGE BASINS OF UNION COUNTY, NEW JERSEY.

Industrial Products	Number of Establishments
Chemicals and allied products	104
Fabricated metal products	226
Machinery, except electrical	275
Food and kindred products	71
Miscellaneous manufacturing	77
Printing and publishing	113
Furniture and fixtures	34
Instruments and related products	25
Textile mill products	14
Stone, clay, and glass products	26
Rubber and plastics products	63
Total	1,424

(New Jersey Department of Environmental Protection, 1967)

GEOLOGY

Newark Group

During the Late Triassic Epoch downfaulting produced a series of northeast-southwest trending basins in the Piedmont Plateau from Nova Scotia to North Carolina. Sedimentary and associated igneous rocks of Triassic age occupy the downfaulted basins and are known as the Newark Group. In New Jersey the Newark Group crops out in a band 16 to 30 miles wide trending northeast-southwest from the Delaware River to the Hudson River (fig. 1). Union County lies entirely within this band.

The Newark Group in New Jersey contains 15,000 to 20,000 feet of non-marine shales, mudstones, sandstones, conglomerates, and basic igneous rocks that unconformably overlie rocks of Paleozoic and Precambrian age. The sedimentary rocks of the Newark Group were largely derived from Paleozoic and Precambrian rocks to the southeast and deposited in a non-marine intermontane basin (Van Houten, 1965). During Triassic time the sedimentary rocks were intruded by a diabase sill, dikes, and covered by several flows of basalt.

The Newark Group underlying Union County consists of the Brunswick Formation and Watchung Basalt. The generalized geologic map (fig. 4) shows the areal distribution of the Triassic rocks underlying Union County. Figure 5 is a generalized section showing the geology and structure of Union County.

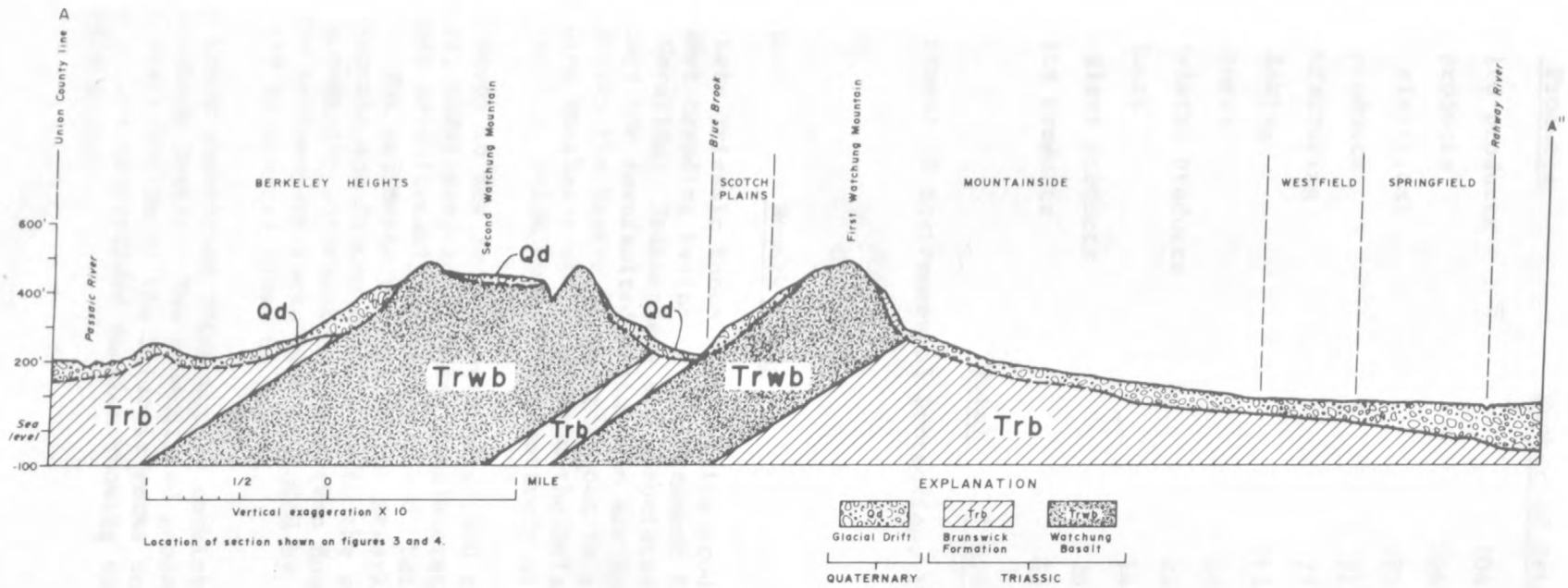


FIGURE 5.--GENERALIZED GEOLOGIC SECTION ACROSS UNION COUNTY, NEW JERSEY.

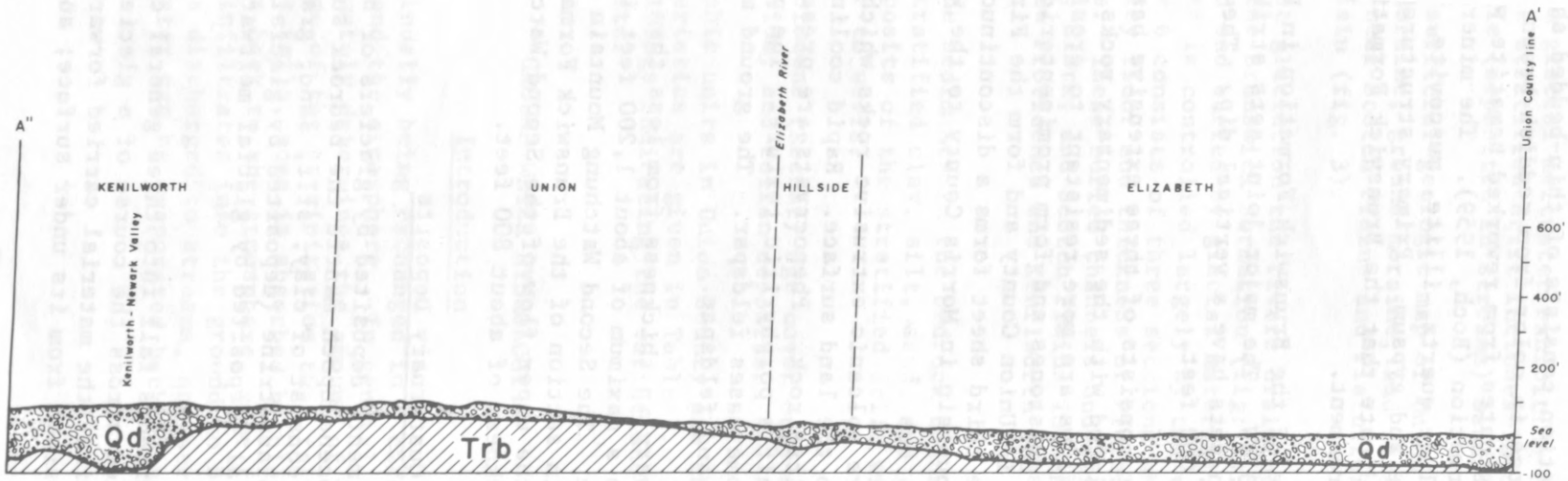


FIGURE 5.--CONTINUED

The Brunswick Formation consists of thin-bedded shales, mudstones, and sandstones which range in color from reddish-brown to gray. The reddish-brown color originates from reworked hematite which comprises 5 to 10 percent of the formation (Boch, 1959). The minerals of the Brunswick Formation include quartz, illite, muscovite, feldspar, and small amounts of calcite and gypsum. Primary structures such as ripple marks and mud cracks indicate that the Brunswick Formation was deposited in a shallow-water environment.

The regional strike of the Brunswick Formation in Union County is N50°E with dips 9° to 13°NW. The major joint sets strike approximately N45°E and N75°W and both sets have a vertical dip. The thickness of the formation is 6,000 to 8,000 feet.

The Watchung Basalt consists of three extensive basaltic lava sheets that are intercalated with the sedimentary rocks of the Brunswick Formation. The basalt flows are more resistant to erosion than the shales, mudstones, and sandstones and form prominent ridges. Two of the three lava sheets occur in Union County and form the First and Second Watchung Mountains. The third sheet forms a discontinuous ridge known as Long Hill and Hook Mountain in Morris County to the west of Union County.

The basalt flows are volcanic extrusive rocks which were formed by the outflow of lava onto the land surface. Rapid cooling of the flows produced a dense, aphanitic rock. Phenocrysts are present in the ground mass which give the basalt a porphyritic texture. The phenocrysts are usually augite and in some cases feldspar. The ground mass for the most part consists of augite and feldspar.

The basalt sheets vary in thickness from less than 300 feet in parts of the Long Hill flow to a maximum of about 1,200 feet in parts of the Second Watchung Mountain. The Second Watchung Mountain is a double flow sheet separated by a thin section of the Brunswick Formation. The thickest flow sheet is the upper flow of the Second Watchung Mountain which has a maximum thickness of about 800 feet.

Quaternary Deposits

Unconsolidated sediments deposited by glaciers or by glacial meltwater during the Pleistocene Epoch mantle the bedrock surface in Union County. These deposits consist of clay, silt, sand, gravel, and boulders. They are glacial, glaciolacustrine (deposited by glacial meltwater in lakes), or glacial fluvial (deposited by glacial meltwater in streams) in origin.

The Pleistocene sediments fall into three general classes: (1) end moraine--a moraine jointed across the course of a glacier at its farthest advance; (2) ground moraine--the material carried forward in and beneath the ice and finally deposited from its under surface; and (3) stratified

drift--deposits from glacial meltwater exhibiting both sorting and stratification. The stratified drift includes lacustrine (deposited in lakes) and fluviatile (deposited in streams) sands and clays.

Figure 3 is a surficial geologic map of Union County showing the extent of the end moraine, ground moraine, and stratified drift. West of the end moraine near Scotch Plains and Plainfield, stratified drift forms an outwash plain (fig. 3).

Before the last glaciation the rivers draining Union County cut deep valleys into the Brunswick Formation (fig. 2). Subsequently the valleys were filled and buried by glacial material. The thickness of the glacial deposits is controlled largely by the underlying bedrock topography. Figure 6 consists of three sections showing the altitudes of the bedrock valley floor and thickness of Pleistocene deposits in the bedrock valleys. These buried channels underlie parts of Hillside, Union, Springfield, Clark, and Scotch Plains Townships, and the Boroughs of Mountainside, New Providence and Kenilworth and the Cities of Summit and Rahway.

The Pleistocene sediments in the bedrock channels consist of unstratified and stratified clay, silt, sand, and gravel. Only the sand and gravel deposits of the stratified drift will yield large quantities of water to wells.

Deposits of Holocene (Recent) age cover only small areas and include river alluvium, and eolian deposits.

The stratigraphic units in Union County and their geologic and hydrologic characteristics are given in Table 1. Table 6 contains representative well logs indicating the variations in the lithologies of the geologic units.

GROUND WATER HYDROLOGY

Introduction

Water is continually being exchanged in a circulatory pattern between the earth and the atmosphere. In general, the amount of precipitation ultimately determines the amount of water available for man's use. Some of the precipitation that falls on land evaporates where it falls, some is absorbed by plants that later transpire the water back to the atmosphere, some flows overland to streams, and some infiltrates into the ground to become ground water. The ground water is discharged to streams, and streams flow to the oceans where the water can be evaporated back to the atmosphere.

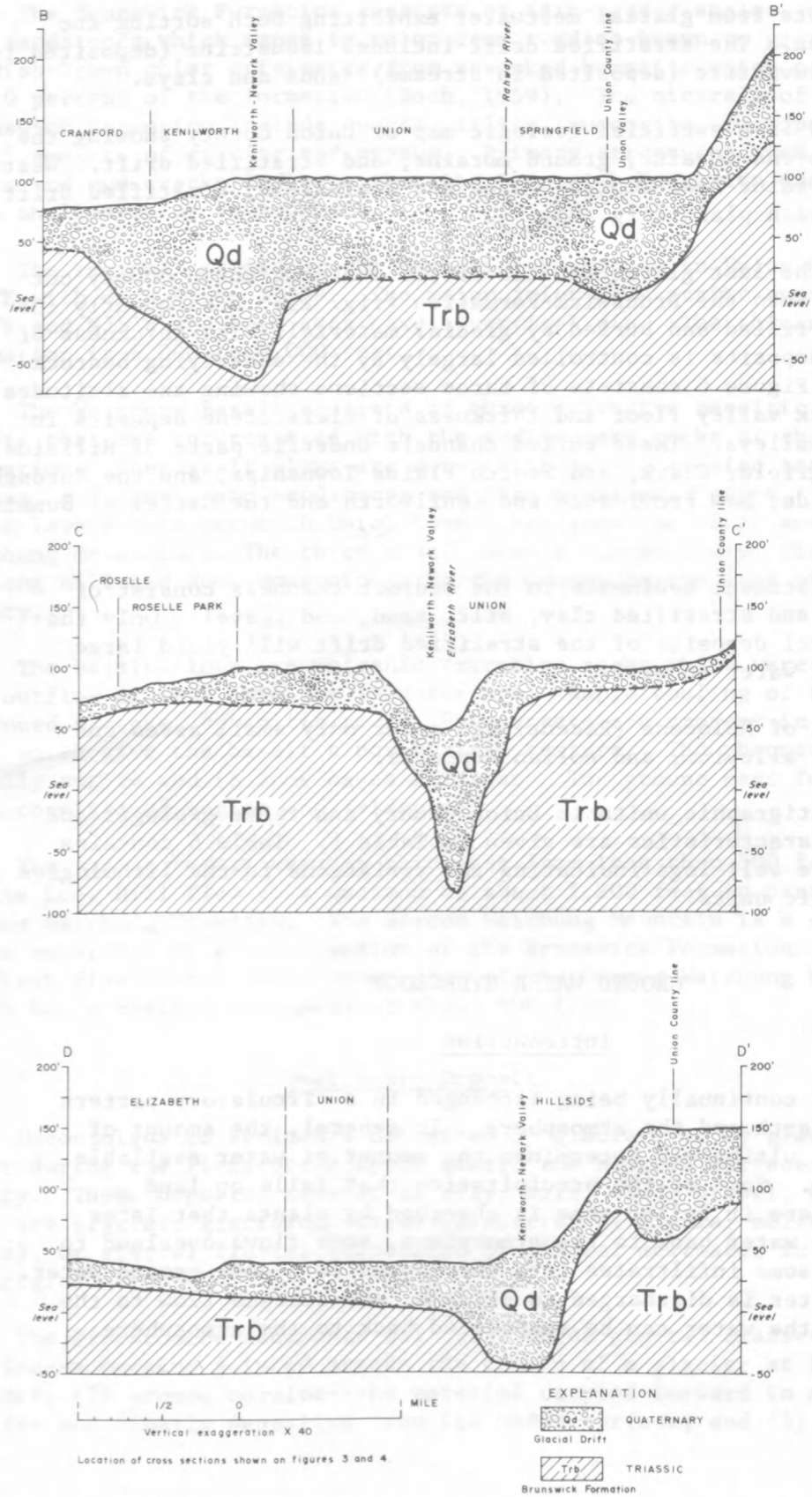


FIGURE 6.--GEOLOGIC SECTIONS SHOWING THE BURIED CHANNELS IN UNION COUNTY, NEW JERSEY.

Table 1.--Geology and hydrology of the rock units in Union County, New Jersey

Era	Period	Series	Formation or lithologic unit	Thickness (feet)	Lithology	Hydrologic characteristics
Cenozoic	Quaternary	Holocene	alluvium	0-25	Sand, silt, and mud in and along river channels.	Relatively impermeable deposits; retard intrusion of saline water through river beds.
			eolian deposits	0-10	Sand	Above water table; high rate of infiltration.
		Pleistocene	unstratified drift (till)	0-200	Unstratified clay, sand and gravel; reddish brown in color. Forms the ground and end moraine deposits. Deposited by glaciers.	Because of low permeability, it is not an important aquifer in the County.
			stratified drift	0-60	Sand and gravel lenses which are stratified. Occurs as lenses in the till in the bedrock channels and interbedded with till in the end moraines. Deposited by water.	Important as an aquifer in the City of Rahway and in Union, Hillside and Springfield Townships and in Kenilworth Borough. At the City of Rahway and Hillside Township wells induce recharge from rivers.
			Unconformity			
Mesozoic	Triassic	Upper Triassic	Newark Group: Brunswick Formation	6,000-8,000	Interbedded, soft red shales, mudstones, and sandstones. Adjacent to the Watchung Basalt it is altered to a hornfels.	Most extensive and most important aquifer in Union County. Water stored in and transmitted along fracture and joint systems which decrease in number and volume with depth. Both artesian and water-table conditions exist.
			Newark Group: Watchung Basalt	300-800	Basaltic lava sheets intercalated with the sedimentary rocks of the Newark Group. Two of the sheets crop out in Union County. The basalt is a dense, aphanitic, extrusive rock. Augite and feldspars are the chief minerals.	Minor aquifer in the county. Well yields are low to moderate.

Nearly all the ground water in Union County originates from local precipitation, which averaged 46 inches per year during the period from 1921 to 1950 (Parker and others, 1964, plate 3). Average annual runoff, which includes overland runoff and ground-water discharge to streams, ranged from 18 to 22 inches (1921-50) in Union County (Parker and others, 1964, plate 12). Average annual water loss caused by evaporation and transpiration was 26 inches (1921-50) in Union County (Parker and others, 1964, plate 4).

Recharge to the zone of saturation is supplied by infiltration from precipitation through the soil and percolation to the water table. The amount of water that reaches the water table varies throughout the year and is controlled by type, amount, and intensity of precipitation, slope of land surface, geology, soil moisture, vegetative cover and temperature.

The intensity and amount of rainfall affects the amount of recharge to the aquifer. Much of the water from a high-intensity rainfall may run off directly to streams instead of percolating down to the aquifer whereas gentle rains of long duration supply considerable ground water recharge.

Areas with steep slopes have a more rapid runoff rate and recharge in general is less than in areas which have gentle slopes and consequently less rapid runoff.

Ground-water recharge may occur along stream banks by influent seepage from the surface-water bodies after a heavy rainfall. The stream level rises at a faster rate from precipitation than does the water table. The water table slope is temporarily reversed and seepage of surface water to the aquifer occurs. This water is bank storage and is released to the stream once the surface level falls below the water table.

In some areas, wells located near streams that are in hydraulic continuity with the aquifer reverse natural gradients when they are being pumped and induce recharge from the stream to the aquifer.

Water-level Fluctuations

The U.S. Geological Survey maintains eight observation wells in the Brunswick Formation in Union County. The hydrographs of three of the observation wells are shown in figure 7.

The hydrograph of the Kenilworth well No. 4 (fig. 7A) shows the seasonal fluctuations of water levels in the area. The generally lower water levels of the period 1953-60 as compared with the period 1943-52 is a result of increased pumpage that occurred during this period. The decline in water levels starting in 1960 (fig. 7A) is attributed to the below average precipitation, when the northeastern states experienced a prolonged drought. The rapid recovery from the low point reached in July 1965 is attributed to the return of normal or above-normal precipitation.

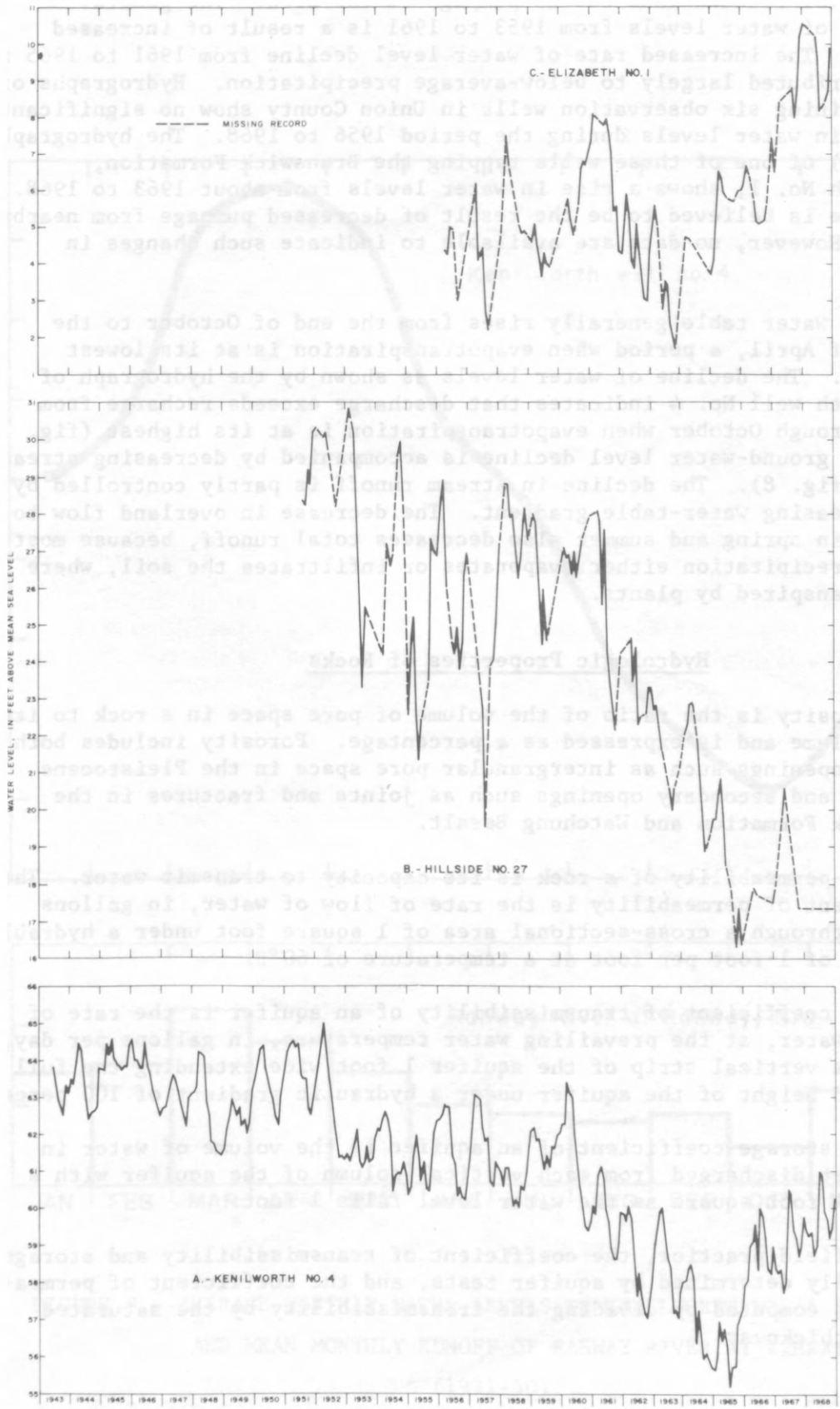


FIGURE 7.--HYDROGRAPHS OF THREE OBSERVATION WELLS IN UNION COUNTY, NEW JERSEY.

The hydrograph of the Hillside well No. 27 (fig. 7B) shows seasonal water level fluctuations due to pumpage in the area. The general lowering of water levels from 1953 to 1961 is a result of increased pumpage. The increased rate of water level decline from 1961 to 1965 is also attributed largely to below-average precipitation. Hydrographs of the remaining six observation wells in Union County show no significant decline in water levels during the period 1956 to 1968. The hydrograph (fig. 7C) of one of these wells tapping the Brunswick Formation, Elizabeth No. 1, shows a rise in water levels from about 1963 to 1968. This rise is believed to be the result of decreased pumpage from nearby wells. However, no data are available to indicate such changes in pumpage.

The water table generally rises from the end of October to the middle of April, a period when evapotranspiration is at its lowest (fig. 8). The decline of water levels as shown by the hydrograph of Kenilworth well No. 4 indicates that discharge exceeds recharge from April through October when evapotranspiration is at its highest (fig. 8). The ground-water level decline is accompanied by decreasing stream runoff (fig. 8). The decline in stream runoff is partly controlled by the decreasing water-table gradient. The decrease in overland flow to streams in spring and summer also decreases total runoff, because most of the precipitation either evaporates or infiltrates the soil, where it is transpired by plants.

Hydrologic Properties of Rocks

Porosity is the ratio of the volume of pore space in a rock to its total volume and is expressed as a percentage. Porosity includes both primary openings such as intergranular pore space in the Pleistocene deposits and secondary openings such as joints and fractures in the Brunswick Formation and Watchung Basalt.

The permeability of a rock is its capacity to transmit water. The coefficient of permeability is the rate of flow of water, in gallons per day through a cross-sectional area of 1 square foot under a hydraulic gradient of 1 foot per foot at a temperature of 60°F.

The coefficient of transmissibility of an aquifer is the rate of flow of water, at the prevailing water temperature, in gallons per day, through a vertical strip of the aquifer 1 foot wide extending the full saturated height of the aquifer under a hydraulic gradient of 100 percent.

The storage coefficient of an aquifer is the volume of water in cubic feet discharged from each vertical column of the aquifer with a base of 1 foot square as the water level falls 1 foot.

In field practice, the coefficient of transmissibility and storage are usually determined by aquifer tests, and the coefficient of permeability is computed by dividing the transmissibility by the saturated aquifer thickness.

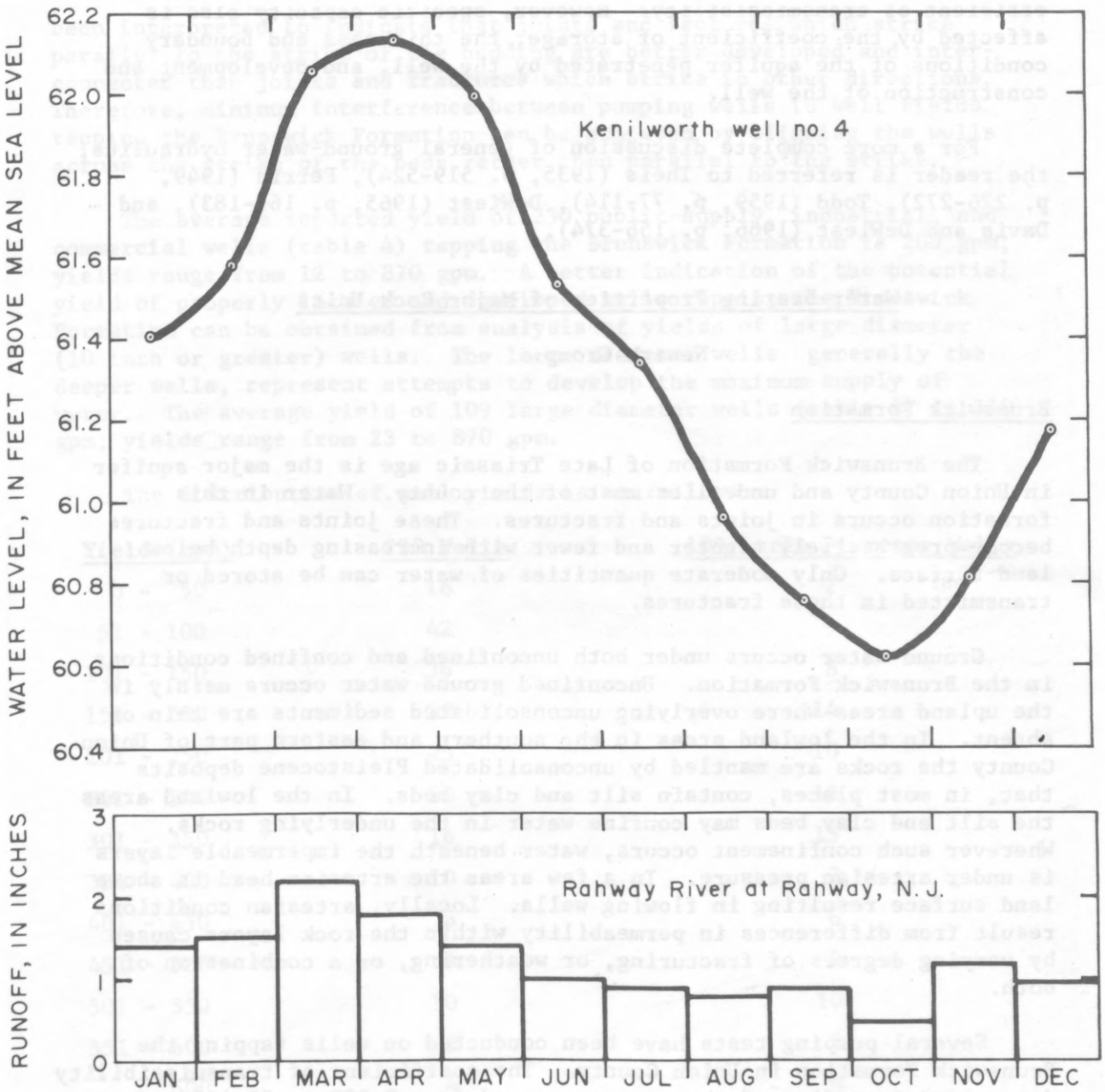


FIGURE 8.--AVERAGE MONTHLY WATER LEVELS IN KENILWORTH NO. 4 (1943-69) AND MEAN MONTHLY RUNOFF OF RAHWAY RIVER AT RAHWAY, N.J. (1931-50).

The specific capacity of a well, the rate of yield per unit drawdown for some time interval, generally gallons per minute per foot of drawdown, can be a good measure of the transmissibility of the rocks. High specific capacities generally suggest a high coefficient of transmissibility, and low specific capacities generally suggest a low coefficient of transmissibility. However, specific capacity also is affected by the coefficient of storage, the thickness and boundary conditions of the aquifer penetrated by the well, and development and construction of the well.

For a more complete discussion of general ground-water hydraulics, the reader is referred to Theis (1935, p. 519-524), Ferris (1949, p. 226-272), Todd (1959, p. 77-114), DeWiest (1965, p. 161-183), and Davis and DeWiest (1966, p. 156-374).

Water-bearing Properties of Major Rock Units

Newark Group

Brunswick Formation

The Brunswick Formation of Late Triassic age is the major aquifer in Union County and underlies most of the county. Water in this formation occurs in joints and fractures. These joints and fractures become progressively tighter and fewer with increasing depth below land surface. Only moderate quantities of water can be stored or transmitted in these fractures.

Ground water occurs under both unconfined and confined conditions in the Brunswick Formation. Unconfined ground water occurs mainly in the upland areas where overlying unconsolidated sediments are thin or absent. In the lowland areas in the southern and eastern part of Union County the rocks are mantled by unconsolidated Pleistocene deposits that, in most places, contain silt and clay beds. In the lowland areas the silt and clay beds may confine water in the underlying rocks. Wherever such confinement occurs, water beneath the impermeable layers is under artesian pressure. In a few areas the artesian head is above land surface resulting in flowing wells. Locally, artesian conditions result from differences in permeability within the rock layers caused by varying degrees of fracturing, or weathering, or a combination of both.

Several pumping tests have been conducted on wells tapping the Brunswick Formation in Union County. The coefficient of transmissibility determined from five of these tests ranged from 5,900 to 25,400 gpd per ft; most of the values lie between 15,000 and 25,000 gpd per ft. The average coefficient of storage computed from these tests is about 0.00005.

Results of pumping tests indicate that the Brunswick Formation is anistropic; that is, its ability to transmit water is not equal in all directions. The greatest drawdowns caused by pumping are observed in wells aligned along the strike of the beds with respect to the pumping well. The smallest drawdowns are observed in wells aligned transverse to the strike (Vecchioli, 1967). These pumping test observations have been interpreted to indicate that joints and factures which strike parallel to the strike of the bedding are better developed and interconnected than joints and fractures which strike in other directions. Therefore, minimum interference between pumping wells in well fields tapping the Brunswick Formation can be achieved by aligning the wells across the strike of the beds rather than parallel to the strike.

The average reported yield of 230 public-supply, industrial, and commercial wells (table 4) tapping the Brunswick Formation is 200 gpm; yields range from 12 to 870 gpm. A better indication of the potential yield of properly located and developed wells tapping the Brunswick Formation can be obtained from analysis of yields of large diameter (10 inch or greater) wells. The large diameter wells, generally the deeper wells, represent attempts to develop the maximum supply of water. The average yield of 109 large diameter wells (table 4) is 310 gpm; yields range from 23 to 870 gpm.

The distribution of well yields is as follows:

Yield (gpm)	230 Wells	109 Large Diameter Wells
0 - 50	18	2
51 - 100	42	9
101 - 150	36	8
151 - 200	32	14
201 - 250	25	10
251 - 300	20	13
301 - 350	16	15
351 - 400	10	7
401 - 450	6	6
451 - 500	9	9
501 - 550	10	10
551 - 600	2	2
600	4	4

Figure 9 shows the cumulative frequency distribution of reported yields of wells in the Brunswick Formation. It can be seen on the graph that 50 percent of the 230 wells have yields equal to or less than 180 gpm; 50 percent of the large diameter wells have yields equal to or less than 300 gpm. Many of the higher yielding wells occur where the Brunswick Formation is overlain by relatively thick, saturated glacial deposits that readily pass water downward into the fractures in the Brunswick Formation.

The specific capacities of 205 wells (6 to 12 inches in diameter) in the Brunswick Formation range from 0.04 to 25 and average 3.5 gpm per foot of drawdown; 14 of the wells have specific capacities greater than 10 gpm per foot of drawdown. The depths of the wells range from 100 to 1,108 feet and average 387 feet.

Figure 10 is a cumulative frequency distribution graph of specific capacities of wells tapping the Brunswick Formation in Union County. In figure 10, specific capacities are related to the well diameter. The larger diameter wells have the higher specific capacities. Median specific capacities are 1.7 for 6 and 8-inch diameter wells, 2.0 for 10 inch diameter wells and 3.1 for 12 inch and larger diameter wells. The higher specific capacities in the larger diameter wells can be attributed to better well development, well site selection and decreased well entrance losses.

In table 2, specific capacities are listed in percentile on the basis of depth of well drilled below land surface. In order to minimize the effect of well diameter on specific capacity, separate listings for larger and smaller diameter wells are given. Wells between 200 and 600 feet deep, in general have higher specific capacities than wells of shallower or greater depths. This relationship suggests that the best water-producing zones in the Brunswick Formation are encountered between depths of 200 and 600 feet. Below 600 feet the fractures and joints are less enlarged and generally drilling to greater depths will not produce significantly greater well yields.

Wells tapping the Brunswick Formation generally draw water from several water-bearing zones. In areas where the rocks are exposed or covered by a thin layer of unconsolidated sediments the shallow water-bearing zones contain unconfined water to a depth of about 200 or 300 feet. If wells penetrate to depths between 200 and 600 feet one or more confined zones of greater permeability are intercepted. The wells that are drilled between 200 to 600 feet in general have the greatest yields.

Watchung Basalt

The Watchung Basalt is a minor aquifer and underlies the western edge of Union County. In this formation vesicles add primary porosity to the secondary porosity developed from the joints and fractures. However, all these openings constitute only a small part of the total volume of the basalt and their capacity to store and transmit water is poor.

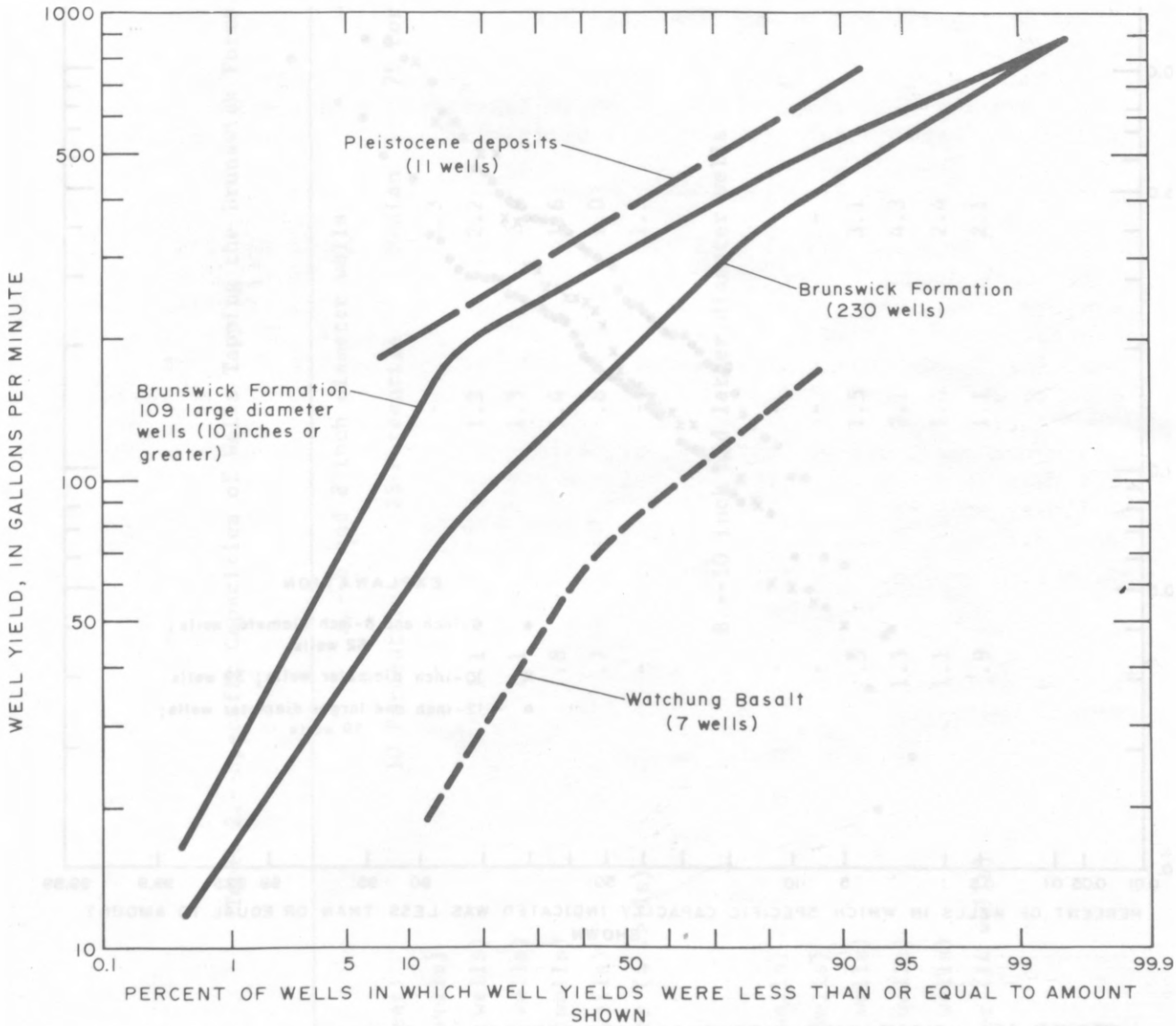


FIGURE 9.--CUMULATIVE FREQUENCY DISTRIBUTION OF YIELDS OF WELLS PENETRATING THE BRUNSWICK FORMATION, WATCHUNG BASALT AND PLEISTOCENE DEPOSITS.

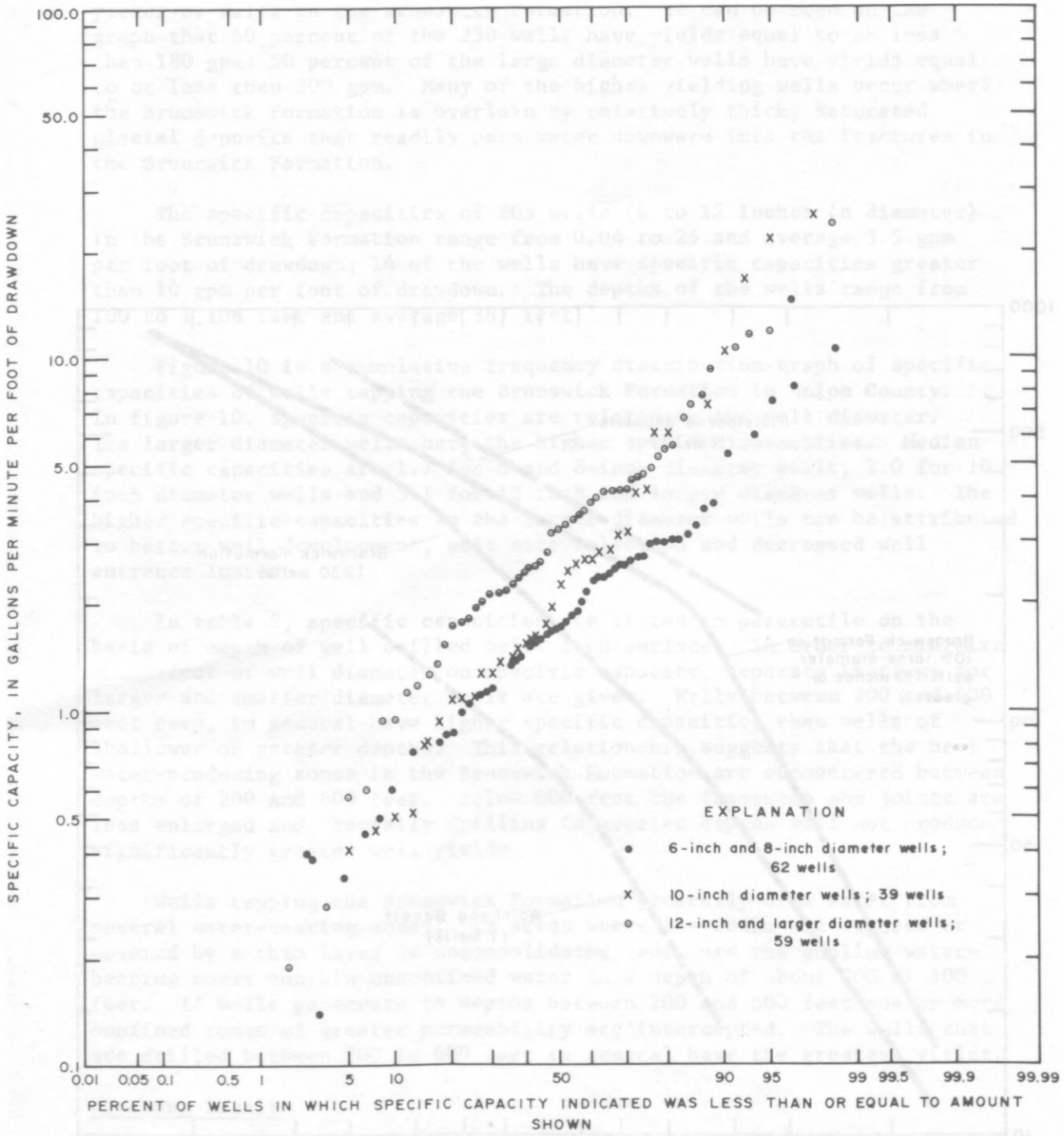


FIGURE 10.--CUMULATIVE FREQUENCY DISTRIBUTION OF SPECIFIC CAPACITIES OF WELLS PENETRATING THE BRUNSWICK FORMATION GROUPED ACCORDING TO WELL DIAMETER.

Table 2.--Specific Capacities of Wells Tapping the Brunswick Formation.

A.--6 and 8 inch diameter wells

Well Depth (feet)	10 Percentile	25 Percentile	Median	75 Percentile	90 Percentile
100 - 199 (4 wells)	-	-	2.3	-	-
200 - 299 (20 wells)	1.1	1.3	2.2	3.0	6.7
300 - 399 (16 wells)	1.1	1.3	2.4	3.0	6.9
400 - 499 (11 wells)	.8	1.4	1.6	1.9	2.5
500 - 599 (7 wells)	.7	.8	1.0	2.8	5.8
600 and greater (4 wells)	-	-	1.5	-	-

B.--10 inch and larger diameter wells

100 - 199 (2 wells)	-	-	-	-	-
200 - 299 (2 wells)	-	-	-	-	-
300 - 399 (29 wells)	.5	1.5	3.1	4.7	12.0
400 - 499 (22 wells)	1.3	2.1	4.3	6.9	11.5
500 - 599 (23 wells)	1.1	1.4	2.4	4.4	11.0
600 and greater (14 wells)	.9	1.1	2.1	2.8	4.3

Wells tapping the Watchung Basalt produce small to moderate quantities of water. Reported yields of seven industrial and commercial wells (Table 4) range from 20 to 164 gpm and average 85 gpm. The distribution of the yields is as follows:

Yields (gpm)	Number of Wells
0 - 50	2
51 - 100	3
101 - 150	1
151 - 200	1

It can be seen on the cumulative frequency distribution graph (fig. 9) that 50 percent of the wells have yields equal to or less than 80 gpm.

Specific capacities of the wells in the basalt range from 0.24 to 2.5 and average 1.23 gpm per foot of drawdown.

Pleistocene Deposits

Only sand and gravel aquifers of the stratified drift contain sufficient quantities of water to warrant consideration of their water-bearing properties. The most productive artesian and semi-artesian aquifers of the stratified drift in Union County occur as valley-fill deposits in channels that were cut into the bedrock before the last glaciation.

Areas of greatest thickness of valley-fill material and the altitude of the deepest bedrock valleys are shown below.

Valley	Location	Thickness of valley-fill material (feet)	Altitude of bedrock channel bottom (feet)
Kenilworth-Newark Valley	Newark	230	-220
	Hillside	102	-52
	Union	131	-78
	Kenilworth	180	-90
Summit Valley	Summit-New Providence	223	+17
Union Valley	Union-Springfield	91	-3
Rahway	Rahway	56	-26
	Scotch Plains	70	-10

Water in the stratified drift occurs under both unconfined and confined conditions. Unconfined ground water occurs where sand and gravel deposits are not covered by clay, silt, or glacial till. These sand and gravel deposits do not yield large quantities of water as they are generally less than 30 feet thick and are not areally extensive. The unconfined aquifers are recharged directly from precipitation on the outcrop area. Confined and semiconfined ground water occurs where sand and gravel deposits have been covered by lacustrine clay or silt, or by glacial till. These coarse deposits are largely confined to the buried valleys (figs. 2 and 6) so they are not visible at the surface and, therefore, their regional extent and distribution are not readily apparent. The confined and semiconfined aquifers are recharged by leakage through overlying confining beds. Some recharge may also be derived from the underlying and adjacent Brunswick Formation.

Reported yields of 11 wells, (table 4) tapping the stratified drift sand and gravel deposits, range from 180 gpm to 690 gpm and average 394 gpm. The distribution of the well yields is as follows:

Yields (gpm)	Number of Wells
100 - 200	1
201 - 300	2
301 - 400	5
401 - 500	1
501 - 600	0
601 - 700	2

The cumulative frequency distribution graph (fig. 9) shows that 50 percent of the wells have yields equal to or less than 380 gpm.

Specific capacities of the wells in the stratified drift range from 4.0 to 69 and average 19 gpm per foot of drawdown.

WATER QUALITY

The quality of ground water for most uses is as important as its availability. All naturally occurring water contains mineral constituents in various proportions as a result of leaching of soluble material from the atmosphere, soil, and rocks through which the water moves. Factors that control the chemical quality of ground water are: temperature, pressure, duration of contact with various rock types, and human activities.

Chemical analyses of water samples from 54 wells in the Brunswick Formation and 5 wells in the Pleistocene deposits are listed in table 5. The median, minimum, maximum, 10-percentile, and 90-percentile concentrations are given for all chemical constituents and properties of the ground water in the Brunswick Formation in table 3. Sampling sites are shown in figure 2.

Table 3.--Chemical quality of ground water in the Brunswick Formation.

Constituent or property	No. of Samples	Concentration in mg/1, except for pH				
		Minimum	10 percentile	Median	90 percentile	Maximum
Silica (SiO_2)	49	3.0	15	20	26	42
Iron (Fe)	50	0	0	.05	.24	1.0
Manganese (Mn)	24	0	0	.02	.15	.52
Calcium (Ca)	49	18	45	62	142	314
Magnesium (Mg)	49	3.0	8.0	16	36	101
Sodium (Na)	21	7.5	9.0	15	43	105
Potassium (K)	21	.8	.9	1.5	3.4	3.5
Sodium & Potassium (Na + K)	26	8.0	9.0	18.2	107	216
Bicarbonate (HCO_3)	27	52	87	155	223	254
Sulfate (SO_4)	50	25	37	89	454	1795
Chloride (Cl)	53	6.5	11	26	38	82
Fluoride (F)	45	0	0	.1	.45	.5
Nitrate (NO_3)	26	0	.12	5.6	17	22
Phosphate (PO_4)	12	0	.01	.10	.24	.29
Dissolved Solids	35	224	237	348	943	2660
Carbonate hardness	24	45	47	126	208	402
Non-carbonate hardness	24	0	14	80	316	1127
Total hardness (as $CaCO_3$)	49	71	158	232	520	1193
pH	48	6.3	7.3	7.8	8.3	8.5

The drinking water standards of the New Jersey Department of Health (1967) are as follows:

Chemical Constituents	Maximum Concentrations (mg/l)
Chloride (Cl)	250
Fluoride (F)	1.5
Hardness (as $CaCO_3$)	150
Iron (Fe)	0.3
Manganese (Mn)	0.05
Nitrate (NO_3)	30
Sodium (Na)	50
Sulfate (SO_4)	250
Total Dissolved Solids	500

The analyses of water samples from the Brunswick Formation in most cases indicate water of good quality. However, several samples contained iron and manganese in greater concentration than the maximum concentration recommended by the New Jersey Department of Health.

Also sulfate, dissolved solids, and total hardness exceed the maximum allowable limit in several samples. Treatment for hardness is necessary in some water-supply systems.

The relation of several cations and anions to dissolved-solids concentration in water from the Brunswick Formation are indicated by graphs in figures 11, 12, and 13. The calcium plus magnesium content, sodium plus potassium content and hardness as $CaCO_3$ increase directly with dissolved-solids concentration (fig. 11). The relationship between dissolved-solids content and sulfate and bicarbonate plus carbonate is shown in figure 12. The graph indicates that bicarbonate plus carbonate concentration increases directly with dissolved-solids concentration to the point at which the dissolved-solids concentration equals 400 mg/l and the bicarbonate plus carbonate content equals 230 mg/l. Above a dissolved-solids content of 400 mg/l, the bicarbonate plus carbonate concentration declines.

The relation between dissolved-solids content and sulfate concentration shown on figure 12 indicates that sulfate increases directly with dissolved solids. Water with high dissolved-solids content (above about 500 mg/l) is of the sulfate type, whereas water with less dissolved material is of the bicarbonate plus carbonate type. The relationship between dissolved-solids content and non-carbonate and carbonate hardness is shown in figure 13. The graph indicates that carbonate hardness in general increases directly with dissolved-solids content to the point at which the dissolved solids is about 500 mg/l and the carbonate hardness content is about 230 mg/l. Above a dissolved-solids content of 500

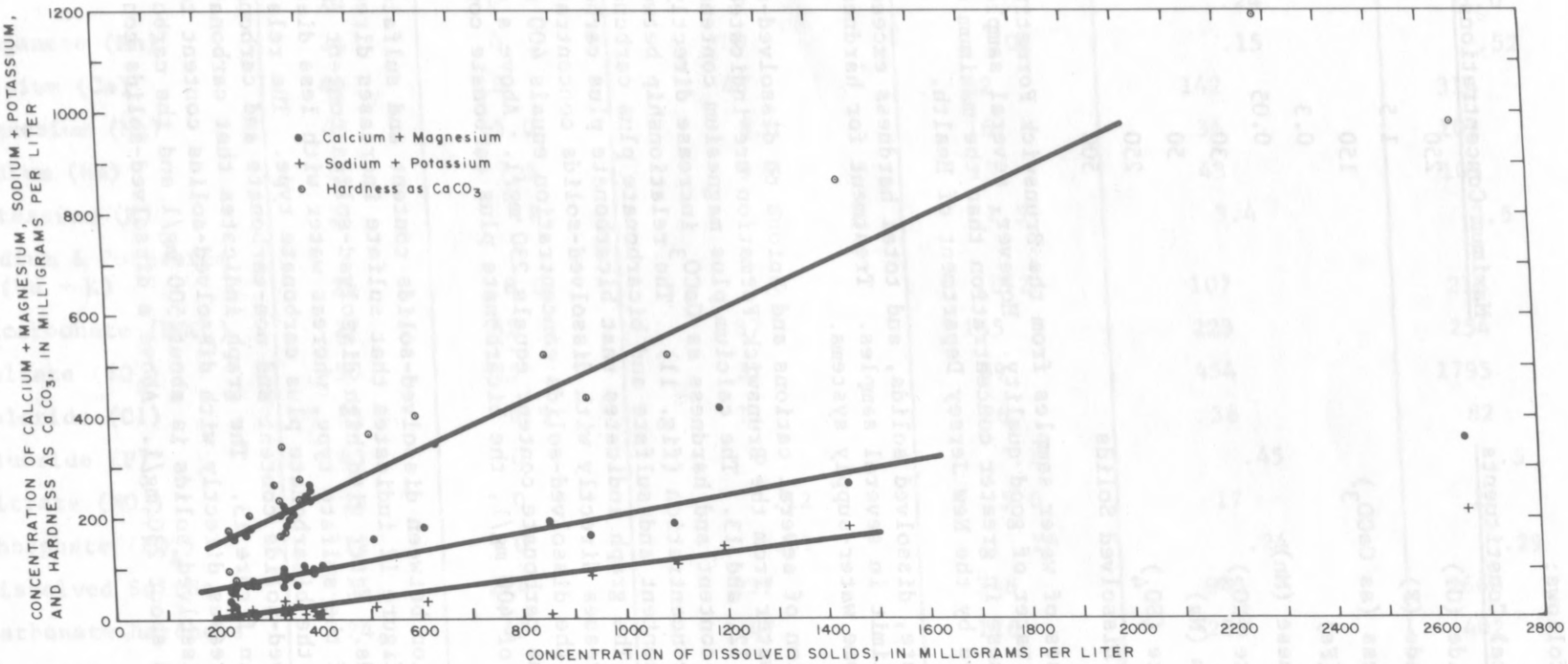


FIGURE 11.--RELATION OF CONCENTRATIONS OF CALCIUM PLUS MAGNESIUM, SODIUM PLUS POTASSIUM, AND HARDNESS AS $CaCO_3$ TO DISSOLVED SOLIDS CONCENTRATION IN THE BRUNSWICK FORMATION.

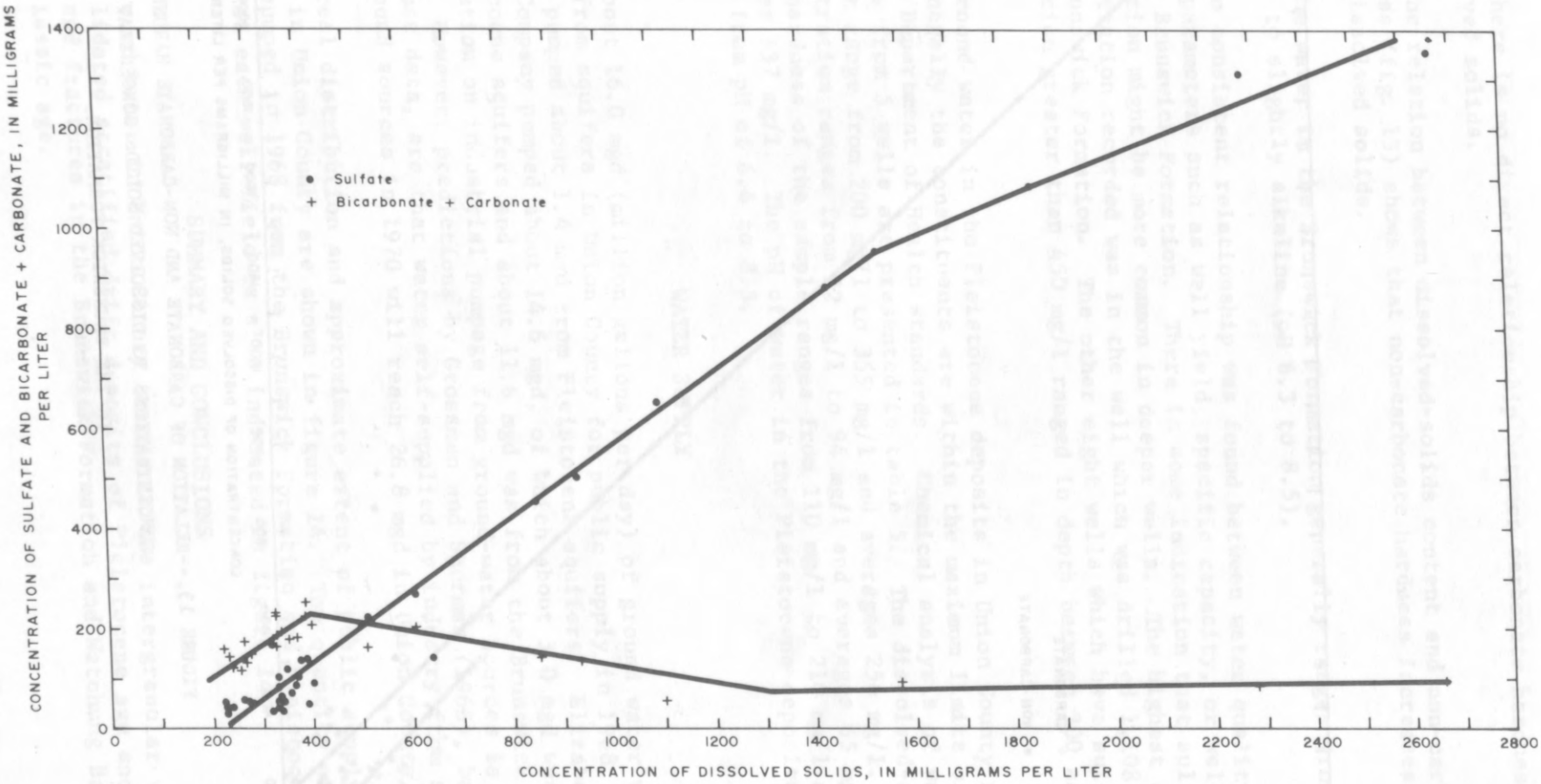


FIGURE 12.--RELATION OF SULFATE AND BICARBONATE PLUS CARBONATE CONCENTRATIONS TO DISSOLVED SOLIDS CONCENTRATION IN THE BRUNSWICK FORMATION.

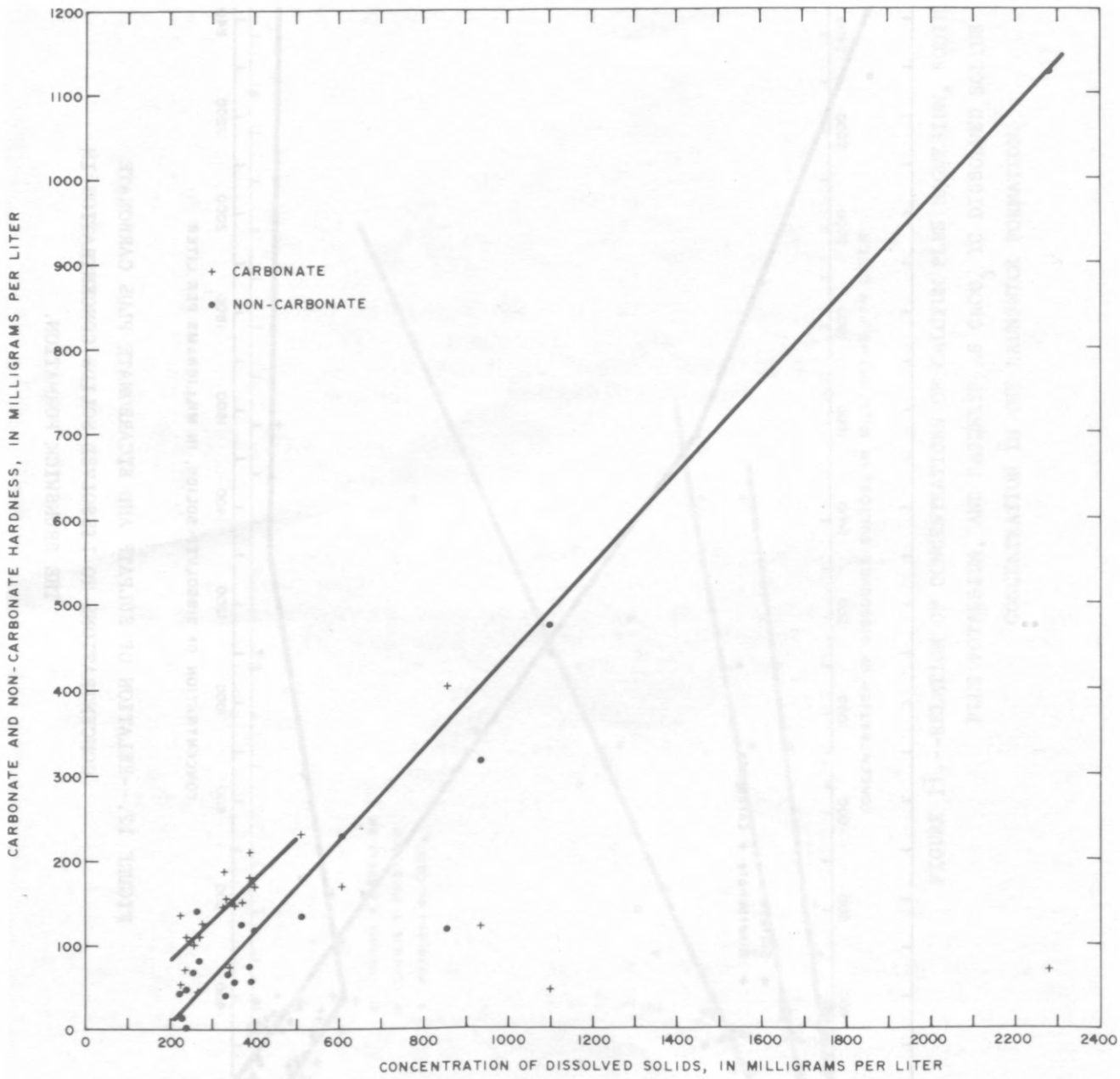


FIGURE 13.--RELATION OF CARBONATE AND NON-CARBONATE HARDNESS CONCENTRATIONS TO DISSOLVED SOLIDS CONCENTRATION IN THE BRUNSWICK FORMATION.

mg/1 there is no direct relationship between carbonate hardness and dissolved solids.

The relation between dissolved-solids content and non-carbonate hardness (fig. 13) shows that non-carbonate hardness increases directly with dissolved solids.

The water in the Brunswick Formation generally ranges from slightly acidic to slightly alkaline (pH 6.3 to 8.5).

No consistent relationship was found between water quality and other parameters such as well yield, specific capacity, or well depth in the Brunswick Formation. There is some indication that sulfate concentration might be more common in deeper wells. The highest sulfate concentration recorded was in the well which was drilled 1,108 feet into the Brunswick Formation. The other eight wells which have sulfate concentration greater than 450 mg/1 ranged in depth between 300 and 600 feet.

Ground water in the Pleistocene deposits in Union County is potable and generally the constituents are within the maximum limits of New Jersey Department of Health standards. Chemical analysis of water samples from 5 wells are presented in table 5. The dissolved-solids content range from 200 mg/1 to 355 mg/1 and averages 256 mg/1. Sulfate concentration ranges from 32 mg/1 to 94 mg/1 and averages 65 mg/1. Total hardness of the sample ranges from 110 mg/1 to 210 mg/1 and averages 137 mg/1. The pH of water in the Pleistocene deposits generally ranges from pH of 6.4 to 8.5.

WATER SUPPLY

About 16.0 mgd (million gallons per day) of ground water was withdrawn from aquifers in Union County for public supply in 1968. City of Rahway pumped about 1.4 mgd from Pleistocene aquifers. Elizabethtown Water Company pumped about 14.6 mgd, of which about 3.0 mgd was from Pleistocene aquifers and about 11.6 mgd was from the Brunswick Formation. Information on industrial pumpage from ground-water sources is incomplete. However, predictions by Grossman and Sherman (1963), based on water use data, are that water self-supplied by industry from surface and ground sources in 1970 will reach 26.8 mgd in Union County.

Areal distribution and approximate extent of public supply well fields in Union County are shown in figure 14. The quantity of ground water pumped in 1968 from the Brunswick Formation and Pleistocene deposits at each well field is also indicated in figure 14.

SUMMARY AND CONCLUSIONS

Ground water in Union County occurs in the intergranular voids of unconsolidated stratified drift deposits of Pleistocene age and in the joints and fractures in the Brunswick Formation and Watchung Basalt of Late Triassic age.

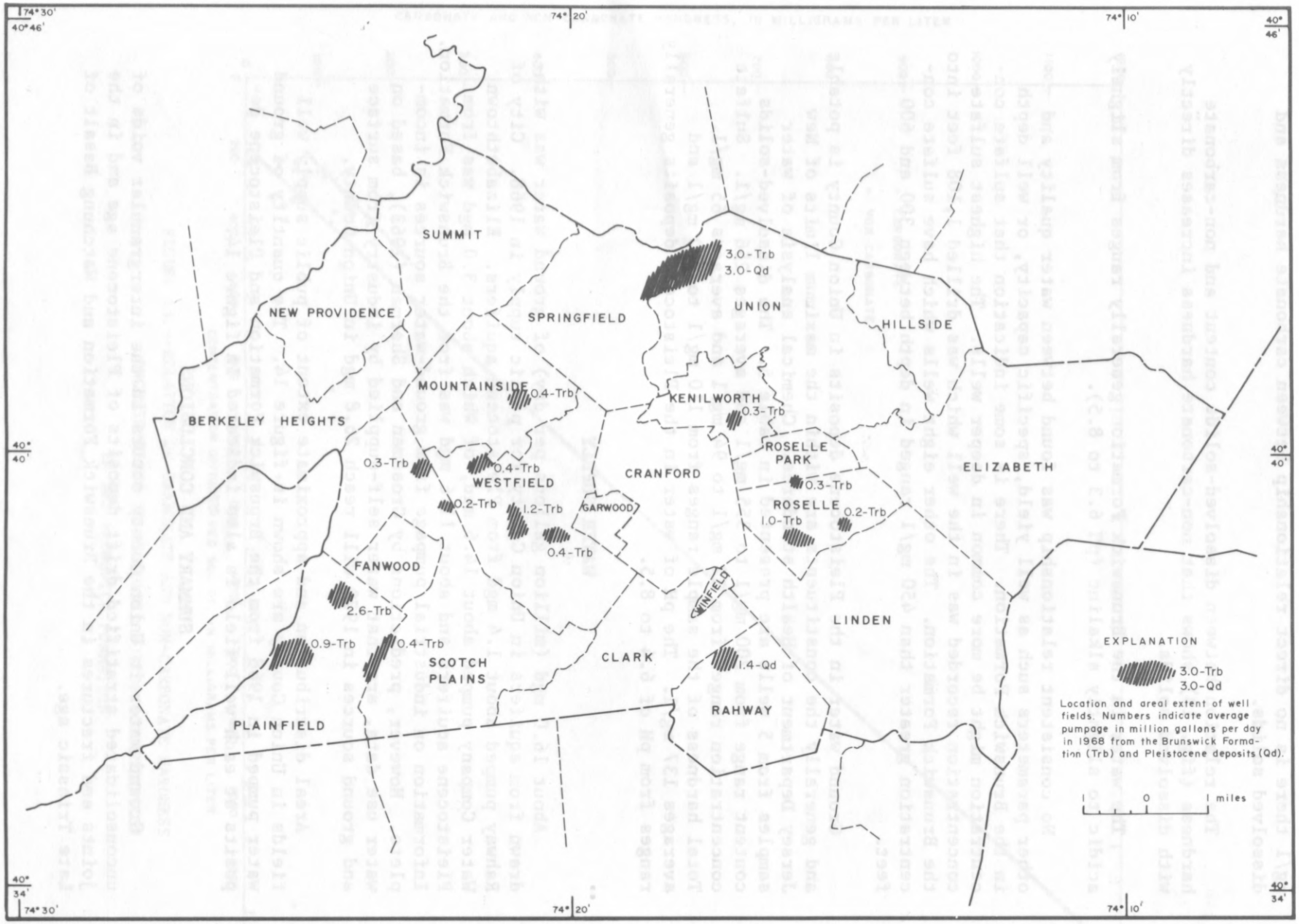


FIGURE 14.--MAP SHOWING LOCATION OF GROUND-WATER PUMPAGE FROM PUBLIC SUPPLY WELL FIELDS IN UNION COUNTY, NEW JERSEY.

The greatest quantity of water is withdrawn from the Brunswick Formation. The stratified drift aquifers yield substantial quantities of water, but the deposits are of limited areal extent. The Watchung Basalt is of minor importance as an aquifer in Union County. Withdrawals of ground water from all aquifers in Union County for public supply averaged about 16.0 mgd in 1968. About 11.6 mgd of ground water was pumped from the Brunswick Formation and about 4.4 mgd was pumped from Pleistocene deposits.

Wells (6 to 12 inches in diameter) penetrating the Brunswick Formation yield from 12 to 870 gpm; the average reported yield is 200 gpm. Specific capacities of wells in the Brunswick Formation range from .04 to 25 and average 3.5 gpm per foot of drawdown. The most productive water-bearing zones are commonly between depths of 200 to 600 feet.

Wells in the Watchung Basalt (6 inches in diameter) yield from 20 to 164 gpm; the average reported yield is 85 gpm. The specific capacities of wells range from .24 to 2.5 and average 1.2 gpm per foot of drawdown.

Wells (6 inches or greater in diameter) in the stratified drift deposits yield from 180 to 690 gpm; the average reported yield is 394 gpm. The specific capacities range from 4.0 to 69 and average 19 gpm per foot of drawdown. The high yielding wells in the stratified drift deposits are located primarily in the valley-fill deposits in the buried bedrock valleys.

Ground-water quality is generally acceptable for most use throughout the county except for hardness that ranges from soft to very hard. The pH of the water generally ranges from slightly acidic to slightly alkaline (pH 6.3 to 8.5). Ground water in the Brunswick Formation with high dissolved-solids content (above 500 mg/1) is sulfate water, whereas water with less than 500 mg/1 of dissolved solids is bicarbonate type. Calcium and magnesium are the predominate cations.

REFERENCES

Anderson, H. R., 1968, Geology and ground-water resources of the Rahway area, New Jersey: New Jersey Dept. Conserv. and Econ. Devel., Spec. Rept. 27, 72 p.

Barksdale, H. C., 1949, Depletion of ground water in New Jersey: Am. Water Works Assoc. Jour., v. 41, no. 6.

Barksdale, H. C., Greenman, D. W., Lang, S. M., Hilton, G. S., and Outlaw, D. E., 1958, Ground-water resources in the Tri-State region adjacent to the lower Delaware River: New Jersey Dept. Conserv. and Econ. Devel., Spec. Rept. 13, 190 p.

Collins, W. D., 1923, The industrial utility of public water supplies in the United States: U. S. Geol. Survey Water-Supply Paper 496, 59 p.

Collins, W. D., Lamar, W. L., and Lohr, E. W., 1932, The industrial utility of public water supplies in the United States: U. S. Geol. Survey Water-Supply Paper 658, 135 p.

Darton, N. H., Bayley, W. S., Salisbury, R. D., and Kümmel, H. B., 1908, Passaic Folio, New Jersey: U. S. Geol. Survey Geol. Atlas, Folio 157, 27 p.

Davis, S. N., and DeWiest, R. J. M., 1966, Hydrogeology: New York, John Wiley and Sons, Inc., 463 p.

DeWiest, R. J. M., 1965, Geohydrology: New York, John Wiley and Sons, Inc., 366 p.

Ferris, J. G., Ground water, in Wisler, C. O., and Brater, E. F., 1949, Hydrology: New York, John Wiley and Sons, Inc., 419 p.

Grossman, Max, and Sherman, A. L., 1963, Present and prospective use of water by the Manufacturing Industries of New Jersey: New Jersey Dept. Conserv. and Econ. Devel., Water Resources Circ. 11, 12 p.

Kümmel, H. B., 1940, The geology of New Jersey: New Jersey Dept. Conserv. and Econ. Devel., Bull. 50, 203 p.

Lewis, J. V., 1906, The origin and relations of the Newark rocks in New Jersey Geol. Survey Ann. Rept. for 1906, p. 77-96.

----------, 1907, Petrography of the Newark igneous rocks of New Jersey in New Jersey Geol. Survey Ann. Rept. for 1907, p. 97-167.

Lohr, E. W., and Love, S. K., 1954, The industrial utility of public water supplies in the United States, 1952: Part 1. states east of the Mississippi River: U. S. Geol. Survey Water-Supply Paper 1299, 639 p., 5 pts., 3 figs.

McLaughlin, D. B., 1948, The continuity of the Newark series strata: Michigan Acad. Sci. Papers, v. 32 (1946), p. 295-303.

New Jersey Department of Conservation and Economic Development, 1967, Location of manufacturing plants by counties, 1963: New Jersey Research Rept. 147, p. 7.

New Jersey State Department of Health, 1967, Potable water standards: 6 p.

Parker, G. G., and others, 1964, Water resources of the Delaware River basin: U. S. Geol. Survey Prof. Paper 381, 200 p.

Rogers, F. C., Lueder, D. R., Obear, G. H., and Zumpfer, W. H., 1952, Engineering soil survey of New Jersey, Report No. 5, Union County: Rutgers Univ. Eng. Research Bull. 19, 51 p.

Salisbury, R. D., 1894, Surface geology in New Jersey Geol. Survey Ann. Rept. for 1894, p. 3-143.

Theis, C. V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: Am. Geophys. Union Trans., v. 16, p. 519-524.

Todd, D., 1959, Ground water hydrology: John Wiley and Sons, Inc., 336 p.

Van Houten, F. B., 1965, Composition of Triassic Lockatong and associated formation of Newark Group, central New Jersey and adjacent Pennsylvania: Amer. Jour. Sci., v. 263, p. 825-863.

Vecchioli, John, 1967, Directional hydraulic behavior of a fractured-shale aquifer in New Jersey, in Proceedings of the Symposium on the Hydrology of Fractured Rocks: Internat. Assoc. Scientific Hydrology, Dubrovnik, 1965, p. 318-326.

Vecchioli, John, Nichols, W. D., and Nemickas, Bronius, 1967, Results of the second phase of the drought-disaster test-drilling program near Morristown, N.J.: New Jersey Dept. Conserv. and Econ. Devel., Water Resources Circ. 17, 23 p.

Vermeule, C., 1894, Report on water supply, in Final report of the State Geologist: New Jersey Geol. Survey Final Rept. v. 3.

TABLES

Table 4.--Records of selected wells in Union County, New Jersey

EXPLANATION

1. Location

404114N0742607.1 Sequential number 1 is given to the first well for which a record is obtained. Additional wells at the same location are numbered sequentially.

Latitude 40°41'14'N Longitude 74°26'07"

2. Aquifer

R3 Upper Triassic
BR Brunswick Formation
W1 1st Watchung Flow
W2 2nd Watchung Flow
QG Quaternary, Pleistocene
OO Glacial Outwash, Undifferentiated

3. Water level below land surface

F Flows

4. Pumping period

A Less than 1 hour

5. Water use

A Air condition
C Commercial
H Domestic
I Irrigation
N Industrial
P Public Supply
R Recreation
U Unused
W Recharge
Z Other

Table 4.--Records of selected wells in Union County, New Jersey

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
1	404114N0742607.1	BERKELEY HEIGHTS	ALMA PHARMAC	REHEIS 4	1965	210	303
2	404113N0742641.1	BERKELEY HEIGHTS	BERKELEY CHEM C	BERK CHEM 3	1956	210	200
3	404059N0742559.1	BERKELEY HEIGHTS	ALMA PHARMAC	REHEIS 3	1956	220	255
4	404058N0742557.1	BERKELEY HEIGHTS	ALMA PHARMAC	REHEIS 1	1949	235	160
5	404056N0742559.1	BERKELEY HEIGHTS	ALMA PHARMAC	REHEIS 2	1956	235	317
6	404018N0742638.1	BERKELEY HEIGHTS	W C SOPER	SOPER	1961	415	198
7	403946N0742621.1	BERKELEY HEIGHTS	H ROGERS	ROGERS	1948	420	283
8	403927N0742659.1	BERKELEY HEIGHTS	EMERSON CO CLUB	CLUB 1	1951	440	130
1	403801N0741826.1	CLARK TWP	GENERAL MOTORS	HYATT 3	1953	65	504
2	403759N0741832.1	CLARK TWP	GENERAL MOTORS	HYATT 1	1940	68	501
2	403759N0741832.2	CLARK TWP	GENERAL MOTORS	HYATT 2	1944	65	505
3	403754N0741816.1	CLARK TWP	U S GYPSUM CO	US GYP 2	--	70	300
4	403746N0741819.1	CLARK TWP	U S GYPSUM CO	US GYP 1	1946	70	505
5	403745N0741902.1	CLARK TWP	FIBRO CORP	FIBRO 3	1960	75	250
6	403744N0741903.1	CLARK TWP	FIBRO CORP	FIBRO 1	1957	75	250
7	403743N0741902.1	CLARK TWP	FIBRO CORP	FIBRO 2	--	60	250
8	403720N0741828.1	CLARK TWP	WM KELEMEN	KELEMEN	1957	70	100
9	403719N0741802.1	CLARK TWP	A FRANZISCO	FRANZISCO	1955	70	98
10	403717N0741751.1	CLARK TWP	J DWOYER	DWOYER	1958	70	106
11	403711N0741914.1	CLARK TWP	J WYZYNSKI	WYZYNSKI	1951	55	92
12	403709N0741800.1	CLARK TWP	FRANCIS MARTIN	MARTIN	1959	60	160
13	403707N0741919.1	CLARK TWP	PAUL MITRO	MITRO	1957	60	114
14	403701N0741904.1	CLARK TWP	S MURACH	MURACH	1956	76	133
15	403659N0741919.1	CLARK TWP	D E BREWER	BREWER	1951	85	94
16	403656N0741849.1	CLARK TWP	H NUHN	NUHN	1935	100	208
17	403640N0742000.1	CLARK TWP	W A RATH	RATH	1954	85	108
18	403630N0741842.1	CLARK TWP	BRUNO ENCHURA	ENCHURA	1958	80	100
19	403629N0741853.1	CLARK TWP	NJ HIGHWAY	HIGH 1	1952	90	150
20	403622N0742019.1	CLARK TWP	F LANZA	LANZA	1951	70	75
1	404025N0741920.1	CRANFORD TWP	CRANFORD POOL A	SWIM POOL 1	1954	90	155

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
1	41	8	41	R3 BR	65	12-65	270	10	27.0	8	A
2	67	8	67	R3 BR	15	7-56	80	175	0.5	8	N
3	48	8	48	R3 BR	18	2-56	192	147	1.3	8	N
4	--	8	--	R3 BR	--	--	250	80	3.1	--	N
5	52	10	52	R3 BR	24	2-56	62	176	0.4	8	N
6	28	5	28	R3 --	1	1-61	4	179	0.0	1	H
7	3	6	24	R3 W1	30	10-48	1	130	0.0	2	--
8	56	8	56	R3 W1	4	--	25	21	1.2	8	R
1	26	12	33	R3 BR	41	1-53	660	46	14.3	27	N
2	38	16	--	R3 BR	29	3-40	450	114	3.9	--	N
2	28	10	35	R3 BR	40	12-44	500	20	25.0	36	N
3	--	12	--	R3 BR	--	--	--	--	--	--	N
4	46	12	49	R3 BR	25	4-48	536	51	10.5	24	N
5	65	8	73	R3 BR	20	6-60	70	23	3.0	8	N
6	50	8	67	R3 BR	19	9-57	75	30	2.5	8	N
7	--	8	--	R3 BR	--	--	--	--	--	--	U
8	65	6	78	R3 BR	35	11-57	15	7	2.1	--	H
9	76	6	76	R3 BR	35	11-55	8	11	0.7	--	H
10	83	6	83	R3 BR	40	12-58	15	2	7.5	--	H
11	42	6	52	R3 BR	15	11-51	10	45	0.2	2	H
12	70	6	73	R3 BR	28	5-59	30	6	5.0	--	H
13	45	6	47	R3 BR	20	10-57	8	15	0.5	--	H
14	61	6	61	R3 BR	42	1-56	14	45	0.3	--	H
15	54	6	54	R3 BR	--	--	20	--	--	2	H
16	70	6	85	R3 BR	60	9-35	5	30	0.2	6	H
17	33	6	36	R3 BR	12	3-54	15	10	1.5	--	H
18	20	6	21	R3 BR	21	10-58	15	7	2.1	--	H
19	42	--	42	R3 BR	35	5-52	10	25	0.4	4	--
20	16	6	--	R3 BR	10	-51	10	--	--	--	H
1	44	8	48	R3 BR	30	6-54	50	50	1.0	4	R

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
2	404020N0741902.1	CRANFORD TWP	ELIZABETHTOWN W	NOMAHEGAN GS1	1911	68	250
3	404017N0741909.1	CRANFORD TWP	ELIZABETHTOWN W	SENECA RD GS1	1911	73	275
4	404003N0741803.1	CRANFORD TWP	E SHAHEEN	SHAHEEN 1	1950	70	117
5	403929N0741742.1	CRANFORD TWP	A VENNERI	VENNERI 1	1954	80	240
6	403925N0741715.1	CRANFORD TWP	GIBSON ASSOC	GIBSON 1	1956	80	271
7	403912N0741704.1	CRANFORD TWP	J BOCHNOUICH	BOCHNOUICH	1957	85	96
8	403911N0741735.1	CRANFORD TWP	LOUIS GONELLA	GONELLA	1957	90	98
9	403911N0741718.1	CRANFORD TWP	M WARGACKI	WARGACKI	1956	85	95
10	403903N0741734.1	CRANFORD TWP	CONST SPEC INC	CONST 1	1957	80	200
11	403857N0741713.1	CRANFORD TWP	T WICHNER	WICHNER	1957	85	101
12	403843N0741857.1	CRANFORD TWP	C FISCHER	FISCHER	1956	80	100
13	403831N0741713.1	CRANFORD TWP	BENDERSON DEV C	BENDERSON	1963	60	300
1	404111N0741217.1	ELIZABETH CITY	SCHWEITZER INC	SCHWEITZER	--	30	660
2	404055N0741302.1	ELIZABETH CITY	ELIZABETHTOWN W	GRASSMAN	1953	42	202
3	404053N0741125.1	ELIZABETH CITY	BLACK DIAMOND C	DIAMOND	1960	10	265
4	404052N0741221.1	ELIZABETH CITY	ELIZABETHTOWN W	N ELIZ OBS 2	1953	34	203
5	404026N0741155.1	ELIZABETH CITY	LONDAT AETZ CO	LONDAT 2	1965	18	300
6	404007N0741500.1	ELIZABETH CITY	WM EINHORN	EINHORN	1954	70	110
7	403951N0741011.1	ELIZABETH CITY	GENERAL CHEM CO	GEN CHEM	1965	5	500
8	403949N0741427.1	ELIZABETH CITY	LELAND TUBE CO	LELAND	1965	50	500
9	403934N0741340.1	ELIZABETH CITY	JOSEPH WALDO	WALDO 1	1953	40	150
10	403927N0741342.1	ELIZABETH CITY	J E BRYAN	BRYAN 1	1950	45	255
11	403904N0741137.1	ELIZABETH CITY	THOMAS-BETTS CO	THOM-BETTS	1950	30	500
12	403901N0741255.1	ELIZABETH CITY	M MARCUS	MARCUS 1	1952	10	600
13	403858N0741327.1	ELIZABETH CITY	VOLUPTE INC	VOLUPTE 2	1952	25	400
14	403848N0741126.1	ELIZABETH CITY	EXACT ANADIZ CO	EXACT	1965	15	467
15	403836N0741137.1	ELIZABETH CITY	PERK CHEM CO IN	PERK CHEM	1965	10	285
16	403814N0741216.1	ELIZABETH CITY	REICHOLD CHEM C	REICH	1967	10	400
1	403912N0741940.1	GARWOOD BORO	DIAMOND EXPAN	DIA EXP	1963	101	260
2	403912N0741920.1	GARWOOD BORO	NAT GYPSUM CO	NAT GYP 1	1913	85	136

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAMETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
2	66	10	--	R3 BR	--	--	160	--	--	--	--
3	73	8	--	R3 BR	--	--	160	--	--	--	--
4	36	6	36	R3 BR	10	12-50	25	12	2.1	--	A
5	46	6	--	R3 BR	25	8-54	100	75	1.3	4	--
6	23	8	32	R3 BR	12	6-56	274	92	3.0	8	--
7	21	6	21	R3 BR	30	12-57	10	6	1.7	--	H
8	36	6	36	R3 BR	26	8-57	10	15	0.7	--	H
9	23	6	23	R3 BR	32	1-56	10	36	0.3	--	H
10	33	8	35	R3 BR	25	12-57	60	45	1.3	8	N
11	22	6	22	R3 BR	38	12-57	10	9	1.1	--	H
12	20	6	21	R3 BR	12	3-56	15	13	1.2	--	H
13	12	10	22	R3 BR	36	6-63	383	53	7.2	8	--
1	--	8	--	R3 BR	24	4-56	--	--	--	--	U
2	29	6	31	R3 BR	17	6-53	--	--	--	--	U
3	70	8	92	R3 BR	30	9-60	150	120	1.2	5	N
4	94	6	94	R3 BR	40	6-53	--	--	--	--	--
5	40	8	40	R3 BR	--	--	30	--	--	--	U
6	20	6	20	R3 BR	16	5-54	15	6	2.5	--	H
7	59	10	106	R3 BR	8	12-65	70	178	0.4	8	U
8	24	8	33	R3 BR	34	10-65	100	166	0.6	8	N
9	30	6	33	R3 BR	28	4-53	12	22	0.5	--	H
10	10	6	35	R3 BR	8	9-50	60	52	1.2	6	H
11	40	8	61	R3 BR	43	8-50	264	122	2.2	10	Z
12	20	8	20	R3 BR	21	12-52	80	60	1.3	8	N
13	5	8	29	R3 BR	15	11-52	24	175	0.1	8	--
14	66	--	75	R3 BR	--	--	--	--	--	--	N
15	40	6	41	R3 BR	90	9-65	120	110	1.1	5	N
16	29	10	40	R3 BR	140	8-67	415	19	21.8	8	N
1	17	8	51	R3 BR	35	6-63	300	135	2.2	5	N
2	--	6	--	R3 BR	--	--	175	--	--	--	N

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
2	403912N0741920.2	GARWOOD BORO	NAT GYPSUM CO	NAT GYP 2	1945	85	188
2	403912N0741920.3	GARWOOD BORO	NAT GYPSUM CO	NAT GYP 3	1934	83	236
2	403912N0741920.4	GARWOOD BORO	NAT GYPSUM CO	NAT GYP 4	1945	85	380
3	403904N0741936.1	GARWOOD BORO	CIRCLE PLASTIC	CIRCLE 1	1962	90	302
1	404223N0741417.1	HILLSIDE TWP	LIONEL CORP	LIONEL 1	1952	100	903
1	404223N0741417.2	HILLSIDE TWP	LIONEL CORP	LIONEL 2	1941	105	720
1	404223N0741417.3	HILLSIDE TWP	LIONEL CORP	LIONEL 3	--	105	700
2	404218N0741406.1	HILLSIDE TWP	GILBERT PLASTCS	GILBERT 1	1948	125	200
3	404215N0741432.1	HILLSIDE TWP	COOPER ALLOY CO	COOPER 4	1952	85	536
4	404214N0741436.1	HILLSIDE TWP	COOPER ALLOY CO	COOPER 3	1948	80	482
5	404213N0741438.1	HILLSIDE TWP	COOPER ALLOY CO	COOPER 1	1942	78	350
6	404213N0741420.1	HILLSIDE TWP	LINDE AIR PROD	LINDE	1948	110	322
7	404211N0741436.1	HILLSIDE TWP	COOPER ALLOY CO	COOPER 2	1948	85	503
8	404211N0741418.1	HILLSIDE TWP	SCHACT STEEL	SCHACT	1933	110	372
9	404210N0741415.1	HILLSIDE TWP	HATFIELD WIRE	HATFIELD 2	1949	105	380
10	404209N0741418.1	HILLSIDE TWP	HATFIELD WIRE	HATFIELD 1	1949	105	621
10	404209N0741418.2	HILLSIDE TWP	HATFIELD WIRE	HATFIELD 3	1951	105	605
11	404208N0741430.1	HILLSIDE TWP	BENNET OIL CO	BENNET OIL	1935	110	298
12	404205N0741429.1	HILLSIDE TWP	INTERNAT MILK	INTER MILK	1935	100	299
13	404203N0741407.1	HILLSIDE TWP	ATLAS TOOL CO	ATLAS 1	1959	100	300
14	404155N0741358.1	HILLSIDE TWP	BRISTOL MYERS	BRISTOL E	1967	60	500
15	404150N0741352.1	HILLSIDE TWP	BRISTOL MYERS	BRISTOL B2	1939	60	400
16	404150N0741328.1	HILLSIDE TWP	BRISTOL MYERS	BRISTOL C	1952	60	404
17	404149N0741338.1	HILLSIDE TWP	SUN TUBE	SUN TUBE	1933	60	275
18	404148N0741345.1	HILLSIDE TWP	BRISTOL MYERS	BRISTOL A1	1930	60	186
19	404148N0741329.1	HILLSIDE TWP	BRISTOL MYERS	BRISTOL D	--	1952	55	400
20	404140N0741423.1	HILLSIDE TWP	MUNDET CORK CO	MUNDET 2	1941	55	365
21	404132N0741338.1	HILLSIDE TWP	EMELOID CO INC	EMELOID 1	1948	40	352
22	404131N0741332.1	HILLSIDE TWP	EMELOID CO INC	EMELOID 2	1966	40	461
23	404128N0741336.1	HILLSIDE TWP	DILLEN BECK MFG	DILLEN 1	1951	40	379

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
2	--	8	--	R3 BR	33	9-45	175	67	2.6	--	N
2	34	10	35	R3 BR	14	1-34	300	36	8.3	--	N
2	32	10	43	R3 BR	28	11-45	350	117	3.0	--	N
3	33	8	40	R3 BR	30	8-62	250	25	10.0	7	U
1	53	12	55	R3 BR	40	7-52	200	210	1.0	8	N
1	--	10	--	R3 BR	--	--	300	--	--	--	--
1	--	--	--	R3 BR	--	--	320	--	--	--	--
2	95	8	97	R3 BR	53	12-48	150	97	1.5	8	N
3	50	10	55	R3 BR	48	1-52	195	152	1.3	24	N
4	35	8	38	R3 BR	27	11-48	210	84	2.5	--	N
5	--	8	--	R3 BR	14	-42	--	--	--	--	N
6	83	10	84	R3 BR	42	9-48	300	50	6.0	8	--
7	30	8	39	R3 BR	27	12-48	122	140	0.9	8	N
8	70	12	72	R3 BR	18	2-33	350	67	5.2	22	--
9	20	8	45	R3 BR	52	6-49	150	140	1.1	--	N
10	30	8	47	R3 BR	48	5-49	35	102	0.3	8	--
10	65	10	66	R3 BR	70	8-51	140	130	1.1	8	N
11	76	6	78	R3 BR	25	11-35	100	--	--	--	--
12	65	8	68	R3 BR	37	7-35	200	49	4.1	--	--
13	45	6	51	R3 BR	87	10-59	165	73	2.3	8	N
14	22	10	49	R3 BR	55	8-67	159	117	1.4	8	N
15	63	10	--	R3 BR	28	-39	540	82	6.6	8	U
16	83	8	--	R3 BR	36	-52	400	--	--	--	--
17	102	10	--	R3 BR	35	-33	300	--	--	--	U
18	100	10	--	R3 BR	38	-30	500	--	--	8	U
19	53	12	--	R3 BR	--	--	--	--	--	--	--
20	--	--	--	R3 BR	--	--	--	--	--	--	--
21	92	8	92	R3 BR	12	10-48	195	168	1.2	8	N
22	84	10	89	R3 BR	30	1-66	230	37	6.2	8	N
23	79	8	80	R3 BR	7	1-51	240	140	1.7	8	N

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
24	404116N0741414.1	HILLSIDE TWP	ELIZABETHTOWN W	HILLSIDE 1	1950	30	400
25	404113N0741355.1	HILLSIDE TWP	ELIZABETHTOWN W	HILLSIDE 2	1950	30	600
26	404109N0741356.1	HILLSIDE TWP	ELIZABETHTOWN W	HILLSIDE 3	1950	25	400
27	404106N0741353.1	HILLSIDE TWP	ELIZABETHTOWN W	HILLSIDE 4	1951	30	400
28	404102N0741344.1	HILLSIDE TWP	ELIZABETHTOWN W	HILLSIDE 5	1951	30	300
1	404121N0741741.1	KENILWORTH BORO	CARPENTER STEEL	CARPENTER	1952	100	--
2	404111N0741746.1	KENILWORTH BORO	JACOB NUT MFG C	JACOB 2	1960	100	252
3	404109N0741740.1	KENILWORTH BORO	ELIZABETHTOWN W	STANDPIPE	1955	100	522
4	404106N0741719.1	KENILWORTH BORO	UNION CO PARK	COUNTY PARK	--	69	290
5	404100N0741733.1	KENILWORTH BORO	ELIZABETHTOWN W	UPSALA COLLEGE	--	110	190
6	404046N0741819.1	KENILWORTH BORO	GERING PRODUCTS	GERING 1	1937	95	396
7	404045N0741826.1	KENILWORTH BORO	GERING PRODUCTS	GERING 2	--	85	577
8	404044N0741621.1	KENILWORTH BORO	WHITE LABS INC	WHITE LAB 4	1952	95	251
9	404041N0741659.1	KENILWORTH BORO	VOLCO BRASS	VOLCO	1942	95	435
10	404040N0741631.1	KENILWORTH BORO	WHITE LABS INC	SERVICE 1	1946	93	470
11	404038N0741829.1	KENILWORTH BORO	ELIZABETHTOWN W	NORTH AVE 2	1965	80	300
12	404038N0741813.1	KENILWORTH BORO	MODERN MOLDERS	MOD MOLDERS	1954	90	300
13	404038N0741627.1	KENILWORTH BORO	WHITE LABS INC	SERVICE 3	1952	96	405
14	404036N0741631.1	KENILWORTH BORO	WHITE LABS INC	SERVICE 4	1952	89	403
15	404034N0741838.1	KENILWORTH BORO	ELIZABETHTOWN W	PLAIN DIV 3	1956	70	556
16	404034N0741618.1	KENILWORTH BORO	WHITE LABS INC	USGS 2	1952	85	250
17	404033N0741610.1	KENILWORTH BORO	WHITE LABS INC	WHITE LAB 2	1950	90	400
18	404030N0741839.1	KENILWORTH BORO	ELIZABETHTOWN W	PLAIN DIV 2	1954	75	532
19	404028N0741843.1	KENILWORTH BORO	ELIZABETHTOWN W	SOUTH AVE 1	1954	65	557
20	404027N0741840.1	KENILWORTH BORO	ELIZABETHTOWN W	NORTH AVE 1	1965	65	300
21	404027N0741644.1	KENILWORTH BORO	WHITE LABS INC	WHITE LAB 3	1952	82	251
22	404026N0741713.1	KENILWORTH BORO	ELIZABETHTOWN W	NEWARK AVE	1908	105	275
23	404025N0741827.1	KENILWORTH BORO	ELIZABETHTOWN W	SOUTH AVE 2	1954	70	532
24	404024N0741708.1	KENILWORTH BORO	ELIZABETHTOWN W	QUINTON AVE	1944	100	500
25	404022N0741709.1	KENILWORTH BORO	ELIZABETHTOWN W	RICHFIELD AVE	1941	95	401

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
24	10	12	21	R3 BR	6	6-50	525	94	5.6	36	U
25	24	12	32	R3 BR	4	9-50	313	146	2.1	8	U
26	22	12	25	R3 BR	F	11-50	550	77	7.1	8	U
27	21	12	21	R3 BR	F	2-51	870	73	11.9	8	U
28	20	12	25	R3 BR	F	2-51	730	70	10.4	8	U
1	--	--	--	R3 BR	--	--	200	--	--	--	--
2	68	6	70	R3 BR	--	--	--	--	--	--	A
3	180	12	182	R3 BR	39	3-55	448	125	3.6	10	P
4	--	6	--	R3 BR	8	3-50	--	--	--	--	U
5	--	6	--	R3 BR	47	3-50	--	--	--	--	U
6	155	8	160	R3 BR	--	--	100	--	--	--	N
7	135	10	140	R3 BR	--	--	250	--	--	--	N
8	44	6	47	R3 BR	62	3-52	68	72	0.9	--	U
9	54	8	--	R3 BR	28	--	338	227	1.5	--	N
10	40	12	47	R3 BR	53	4-46	530	113	4.7	9	N
11	123	8	124	R3 BR	35	11-65	400	165	2.4	--	P
12	138	8	138	R3 BR	20	2-54	75	20	3.7	6	N
13	47	12	49	R3 BR	61	6-52	495	102	4.9	47	N
14	29	12	41	R3 BR	53	7-52	495	144	3.4	51	N
15	90	12	110	R3 BR	19	9-56	200	171	1.2	24	P
16	29	8	31	R3 BR	35	3-52	465	97	4.8	--	N
17	55	12	55	R3 BR	23	--	450	177	2.5	8	--
18	--	12	110	R3 BR	6	2-54	350	143	2.4	24	P
19	90	12	96	R3 BR	6	1-54	338	174	1.9	24	P
20	74	8	74	R3 BR	35	10-65	400	165	2.4	--	--
21	44	8	49	R3 BR	43	3-52	80	97	0.8	--	U
22	47	8	--	R3 BR	31	-08	150	--	--	--	--
23	105	12	110	R3 BR	6	2-54	350	174	2.0	24	P
24	35	8	38	R3 BR	52	8-44	250	67	3.7	8	P
25	32	8	36	R3 BR	30	9-41	220	124	1.8	48	P

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
26	404012N0741650.1	KENILWORTH BORO	ROTARY PEN CO	ROTARY 1	1962	80	405
27	404001N0741649.1	KENILWORTH BORO	ROTARY PEN CO	ROTARY 2	1963	90	402
1	403855N0741434.1	LINDEN CITY	LAMPERT DAIRY	LAMPERT 1	1959	35	803
1	403855N0741434.2	LINDEN CITY	LAMPERT DAIRY	LAMPERT 2	1955	35	263
2	403837N0741323.1	LINDEN CITY	PARK PLASTIC CO	PARK 1	1950	20	255
3	403832N0741408.1	LINDEN CITY	UNITED LABS INC	UNITED LABS 1	1955	30	202
4	403821N0741421.1	LINDEN CITY	EASTERN PACK CO	EAST PACK	1950	25	400
5	403820N0741444.1	LINDEN CITY	HELSMUTH TOOL	HELSMUTH	1959	30	292
6	403820N0741259.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 3	1908	25	228
7	403819N0741312.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 2	1908	21	224
8	403817N0741436.1	LINDEN CITY	APPLIED PLASTIC	APPLIED	1967	20	450
9	403815N0741310.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 1	1908	22	400
10	403813N0741330.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 14	1908	15	305
11	403812N0741314.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 4	1908	22	230
12	403810N0741322.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 7	1908	15	327
13	403808N0741331.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 12	1908	15	327
14	403804N0741430.1	LINDEN CITY	M SAND	SAND	1949	25	155
15	403804N0741330.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 10	1908	15	252
16	403803N0741340.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 13	1908	15	305
17	403803N0741326.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 9	1908	15	256
18	403802N0741553.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 11	1908	12	302
19	403802N0741331.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 5	1908	10	303
20	403801N0741337.1	LINDEN CITY	STANDARD OIL CO	STAND OIL 8	1908	10	302
21	403752N0741419.1	LINDEN CITY	AUTOMOTIVE PROD	AUTO PROD 1	1957	25	245
22	403740N0741618.1	LINDEN CITY	HATFIELD WIRE	HATFIELD OBS 2	1960	40	223
23	403738N0741553.1	LINDEN CITY	GENERAL GUM PD	GENERAL GUM 1	1953	35	316
24	403738N0741540.1	LINDEN CITY	LINDEN ICE CO	LINDEN ICE	1959	35	550
25	403736N0741531.1	LINDEN CITY	IDEAL PLATING C	IDEAL	1966	25	240
26	403735N0741623.1	LINDEN CITY	HATFIELD WIRE	HATFIELD 2	1959	40	356
27	403734N0741621.1	LINDEN CITY	HATFIELD WIRE	HATFIELD 1	1959	40	350

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
26	28	8	44	R3 BR	33	8-62	120	107	1.1	8	N
27	34	8	47	R3 BR	55	11-63	165	31	5.3	8	N
1	10	6	63	R3 BR	26	7-59	12	274	0.0	8	C
1	8	6	123	R3 BR	9	4-55	30	201	0.1	6	C
2	15	6	33	R3 BR	7	5-50	60	58	1.0	6	N
3	40	6	47	R3 BR	9	10-55	60	36	1.7	7	C
4	--	8	--	R3 BR	11	8-50	100	138	0.7	--	C
5	--	--	--	R3 BR	18	-59	60	--	--	--	--
6	--	--	--	R3 BR	--	--	35	--	--	--	--
7	--	--	--	R3 BR	--	--	37	--	--	--	--
8	38	8	39	R3 BR	35	6-67	250	154	1.6	5	N
9	--	--	--	R3 BR	--	--	152	--	--	--	--
10	--	--	--	R3 BR	--	--	145	--	--	--	--
11	--	--	--	R3 BR	--	--	34	--	--	--	--
12	--	--	--	R3 BR	--	--	177	--	--	--	--
13	--	--	--	R3 BR	--	--	81	--	--	--	--
14	16	6	23	R3 BR	45	9-49	8	43	0.2	2	C
15	--	--	--	R3 BR	--	--	167	--	--	--	--
16	--	--	--	R3 BR	--	--	214	--	--	--	--
17	--	--	--	R3 BR	--	--	157	--	--	--	--
18	--	--	--	R3 BR	--	--	156	--	--	--	--
19	--	--	--	R3 BR	--	--	150	--	--	--	--
20	--	--	--	R3 BR	--	--	125	--	--	--	--
21	15	6	161	R3 BR	23	5-57	31	8	3.9	8	--
22	25	6	32	R3 BR	29	9-66	40	--	--	--	U
23	27	8	40	R3 BR	16	10-53	100	42	2.4	8	N
24	30	8	40	R3 BR	19	3-59	70	91	0.8	8	N
25	29	8	57	R3 BR	--	--	100	--	--	--	N
26	25	12	46	R3 BR	11	4-59	325	42	7.7	8	N
27	32	12	52	R3 BR	5	4-59	323	77	4.2	24	N

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
28	403734N0741551.1	LINDEN CITY	AUTO IJECT MOLD	AUTO MOLD 1	1967	35	250
29	403728N0741553.1	LINDEN CITY	GENERAL GUM PD	GEN GUM 2	1957	35	310
30	403728N0741528.1	LINDEN CITY	NESCO STEEL	NESCO 2	1937	20	208
31	403725N0741622.1	LINDEN CITY	HATFIELD WIRE	HATFIELD 1	1958	35	175
32	403723N0741437.1	LINDEN CITY	J MARTINAITISS	MARTINAITISS	1953	15	110
33	403722N0741541.1	LINDEN CITY	NESCO STEEL	NESCO 1	1949	30	266
34	403714N0741341.1	LINDEN CITY	STANDARD OIL CO	STAN OIL	1920	15	1556
35	403713N0741543.1	LINDEN CITY	LAYNE N Y CO	LAYNE 1	1955	30	308
36	403711N0741501.1	LINDEN CITY	DISTILLERS CO	DISTILLERS 1	1934	25	316
36	403711N0741501.2	LINDEN CITY	DISTILLERS CO	DISTILLERS 2	1934	25	307
37	403705N0741531.1	LINDEN CITY	W MELENCLUK	MELENCLUK	1952	25	96
38	403653N0741505.1	LINDEN CITY	BABB CO	BABB 1	1950	20	300
1	404114N0742039.1	MOUNTAINSIDE BORO	ELIZABETHTOWN W	PLAIN DIV 1	1951	150	454
2	404110N0742043.1	MOUNTAINSIDE BORO	ELIZABETHTOWN W	PLAIN DIV 2	1953	150	572
3	404105N0742021.1	MOUNTAINSIDE BORO	ELIZABETHTOWN W	SPRINGFIELD AV	1960	145	315
4	404104N0742036.1	MOUNTAINSIDE BORO	W E EITNER	EITNER 1	1952	140	189
5	404102N0742011.1	MOUNTAINSIDE BORO	ECKO LK HOLD CO	ECKO LAKE 1	1951	145	400
6	404101N0742222.1	MOUNTAINSIDE BORO	UNION CO PARK	PARK GS1	1931	430	365
7	404100N0742032.1	MOUNTAINSIDE BORO	STERLING PLAS C	STER PLAS GS2	1963	145	456
8	404100N0742025.1	MOUNTAINSIDE BORO	STERLING PLAS C	STER PLAS GS1	1966	150	590
9	404051N0742032.1	MOUNTAINSIDE BORO	P DE VESA	DE VESA 1	1949	138	85
10	404048N0742020.1	MOUNTAINSIDE BORO	BEST WAY PROD C	BEST WAY 1	1956	145	275
10	404048N0742020.2	MOUNTAINSIDE BORO	BEST WAY PROD C	BEST WAY 2	1968	145	475
11	404046N0742104.1	MOUNTAINSIDE BORO	ELIZABETHTOWN W	CENTRAL AVE	1960	140	300
12	404046N0741956.1	MOUNTAINSIDE BORO	MINDOWASKIN CO	MINDOWASKIN	1954	95	197
13	404042N0742040.1	MOUNTAINSIDE BORO	A K TOOL CO	AK TOOL 1	1953	140	300
14	404028N0742109.1	MOUNTAINSIDE BORO	K GLASSTETTER	GLASSTETTER	1958	170	110
15	404010N0742246.1	MOUNTAINSIDE BORO	A FREEMAN	FREEMAN 1	1958	210	150
1	404246N0742316.1	NEW PROVIDENCE BO	W E CLOSS	CLOSS 1	1960	315	512
2	404235N0742352.1	NEW PROVIDENCE BO	NILS J AHL	AHL	1954	255	155

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAMETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
28	22	6	29	R3 BR	34	11-67	75	10	7.5	8	N
29	8		86	R3 BR	15	3-57	90	35	2.6	9	N
30	35	--	--	R3 BR	15	-37	50	--	--	--	--
31	18	12	40	R3 BR	8	10-58	40	142	0.3	8	U
32	25	6	32	R3 BR	12	8-53	15	8	1.9	4	H
33	37	8	42	R3 BR	25	8-49	25	148	0.2	5	N
34	15	--	--	R3 BR	22	9-20	--	--	--	--	--
35	30	8	36	R3 BR	20	2-55	30	100	0.3	6	--
36	34	12	--	R3 BR	5	-34	65	115	0.6	8	N
36	35	12	--	R3 BR	3	-34	23	119	0.2	8	N
37	35	6	40	R3 BR	12	8-52	5	--	--	1	H
38	30	8	31	R3 BR	5	4-50	80	100	0.8	--	C
1	50	10	55	R3 BR	6	6-51	504	48	10.5	48	P
2	75	12	79	R3 BR	23	11-53	221	127	1.7	24	P
3	50	12	65	R3 BR	35	5-60	328	118	2.8	48	P
4	40	6	40	R3 BR	30	9-52	4	150	0.0	3	H
5	60	10	67	R3 BR	25	3-51	180	122	1.5	6	A
6	51	8	61	R3 W1	33	6-31	20	83	0.2	8	--
7	30	10	59	R3 BR	22	1-63	275	89	3.1	8	N
8	58	10	60	R3 BR	69	8-66	214	90	2.4	8	N
9	38	6	42	R3 BR	25	7-49	10	32	0.3	--	H
10	130	8	130	R3 BR	65	7-56	65	20	3.2	8	N
10	100	8	115	R3 BR	73	10-68	125	92	1.4	8	N
11	35	12	43	R3 BR	12	2-60	457	83	5.5	48	P
12	48	6	48	R3 BR	25	6-54	65	35	1.9	8	R
13	79	6	84	R3 BR	58	9-53	111	92	1.2	6	N
14	41	6	41	R3 BR	32	7-58	15	4	3.7	--	H
15	78	6	85	R3 BR	65	6-58	20	13	1.5	5	I
1	223	10	225	R3 BR	170	5-60	220	52	4.2	9	H
2	125	6	125	R3 BR	30	3-54	15	10	1.5	4	H

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE- OF LSD (FT.)	WELL DEPTH (FT.)
3	404222N0742310.1	NEW PROVIDENCE BO	CLEARWATER CLUB	CLEAR 1	1954	263	196
4	404157N0742318.1	NEW PROVIDENCE BO	F R PORKER	PORKER	1954	320	77
5	404147N0742405.1	NEW PROVIDENCE BO	AZOPLATE CORP	AZO 1	1962	230	310
6	404128N0742432.1	NEW PROVIDENCE BO	FABLOK INC	SPRING IND 1	1962	260	200
1	403757N0742355.1	PLAINFIELD CITY	ELIZABETHTOWN W	ROCK WELL 13	1950	130	803
2	403750N0742402.1	PLAINFIELD CITY	WIGTON ABBOTT C	WIGTON GS 1	1966	125	400
3	403719N0742523.1	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER B	1953	100	44
4	403718N0742521.1	PLAINFIELD CITY	L BAMBERGER CO	RECHARGE 1	1953	100	34
4	403718N0742521.2	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER A	1953	100	43
5	403717N0742521.1	PLAINFIELD CITY	L BAMBERGER CO	RECHARGE 2	1953	100	44
6	403716N0742518.1	PLAINFIELD CITY	L BAMBERGER CO	SUPPLY WELL 1	1952	100	501
6	403716N0742518.2	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER 4	1953	100	37
6	403716N0742518.3	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER 3	1953	100	44
6	403716N0742518.4	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER 7	1953	100	34
6	403716N0742518.5	PLAINFIELD CITY	L BAMBERGER CO	BAMBERGER 6	1953	100	43
7	403711N0742515.1	PLAINFIELD CITY	S ROSENBAUM	ROSENBAUM 1	1950	100	301
8	403708N0742349.1	PLAINFIELD CITY	ELIZABETHTOWN W	WATCHUNG AVE	1959	165	605
9	403705N0742532.1	PLAINFIELD CITY	TEPPER BROS	TEPPER 1	1950	90	427
10	403656N0742337.1	PLAINFIELD CITY	ELIZABETHTOWN W	PROSPECT ST	1960	160	350
11	403654N0742514.1	PLAINFIELD CITY	QUEEN CITY BOT	QUEEN CITY 1	1949	97	310
12	403652N0742508.1	PLAINFIELD CITY	SAFEWAY STORES	SAFEWAY 1	1951	95	303
13	403643N0742442.1	PLAINFIELD CITY	HYMAN OKUM	OKUN 1	1952	105	130
14	403634N0742524.1	PLAINFIELD CITY	H TAUB	TAUB 1	1953	90	200
15	403625N0742417.1	PLAINFIELD CITY	MUHLENBERG HOSP	MUHLENBERG 3	1962	95	502
16	403600N0742656.1	PLAINFIELD CITY	INT PLNFLD MOTR	INT MOTOR 2	1948	60	600
17	403554N0742628.1	PLAINFIELD CITY	ELIZABETHTOWN W	FIFTH ST WELL	1965	70	350
18	403550N0742716.1	PLAINFIELD CITY	NAT STARCH PROD	NATIONAL 6	1964	60	436
19	403548N0742718.1	PLAINFIELD CITY	NAT STARCH PROD	NATIONAL 1	1950	60	304
20	403546N0742723.1	PLAINFIELD CITY	NAT STARCH PROD	NATIONAL 2	1950	60	304
1	403728N0741636.1	RAHWAY CITY	TINGLEY RUBER C	TINGLEY GS 1	1932	40	222

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
3	33	8	50	R3 W2	8	3-54	99	39	2.5	8	--
4	14	6	14	R3 W2	13	1-54	8	27	0.3	4	H
5	45	8	46	R3 BR	30	7-62	128	157	0.8	8	N
6	20	8	49	R3 W2	20	1-62	164	66	2.5	8	N
1	90	12	91	R3 BR	88	7-50	119	202	0.6	24	U
2	58	10	82	R3 BR	81	6-66	201	134	1.5	8	N
3	30	6	34	R3 BR	--	--	--	--	--	--	U
4	33	17	17	QG OO	21	-53	--	--	--	--	W
4	43	6	36	QG OO	--	--	--	--	--	--	U
5	40	22	23	QG OO	--	--	--	--	--	--	W
6	48	12	53	R3 BR	26	9-52	200	94	2.1	8	C
6	35	6	35	R3 BR	--	--	--	--	--	--	U
6	40	6	40	R3 BR	--	--	--	--	--	--	U
6	31	6	31	R3 BR	--	--	--	--	--	--	U
6	39	6	39	R3 BR	--	--	--	--	--	--	U
7	40	10	45	R3 BR	80	2-50	230	70	3.3	8	A
8	114	12	114	R3 BR	101	3-59	350	81	4.3	41	P
9	40	12	42	R3 BR	16	4-50	560	84	6.7	24	N
10	105	12	114	R3 BR	91	1-60	328	103	3.2	24	P
11	37	8	53	R3 BR	55	3-49	146	69	2.1	24	U
12	25	8	44	R3 BR	33	5-51	80	70	1.1	8	A
13	80	6	83	R3 BR	15	12-52	25	45	0.6	5	H
14	63	6	63	R3 BR	25	4-53	15	7	2.1	1	A
15	47	12	54	R3 BR	48	6-62	137	146	0.9	24	--
16	60	8	67	R3 BR	8	7-48	257	152	1.7	8	N
17	80	12	84	R3 BR	35	6-65	300	165	1.8	8	P
18	61	10	72	R3 BR	25	2-64	380	17	22.4	--	N
19	64	10	65	R3 BR	17	1-50	400	24	16.7	24	N
20	60	10	66	R3 BR	12	2-50	320	78	4.1	24	N
1	38	8	--	R3 BR	--	--	120	--	--	--	U

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
1	403728N0741636.2	RAHWAY CITY	TINGLEY RUBER C	TINGLEY GS 2	1932	40	240
2	403707N0741724.1	RAHWAY CITY	CITY OF RAHWAY	RAHWAY CITY 1	1952	18	52
3	403707N0741656.1	RAHWAY CITY	KOOS BROS FUR	KOOS 1	1953	20	350
4	403706N0741727.1	RAHWAY CITY	CITY OF RAHWAY	RAHWAY CITY 4	1954	21	127
5	403705N0741722.1	RAHWAY CITY	CITY OF RAHWAY	RAHWAY CITY 2	1952	16	51
6	403704N0741723.1	RAHWAY CITY	CITY OF RAHWAY	RAHWAY CITY 3	1953	16	76
7	403658N0741708.1	RAHWAY CITY	CITY OF RAHWAY	RAHWAY CITY 6	1966	30	269
8	403657N0741657.1	RAHWAY CITY	C LENTZ	LENTZ	1959	25	111
9	403656N0741635.1	RAHWAY CITY	CITY OF RAHWAY	TEST WELL 2	1948	10	300
10	403653N0741551.1	RAHWAY CITY	MERCK CHEM CO	MERCK GS 1	1941	25	1108
11	403650N0741715.1	RAHWAY CITY	W MERSHEN	MERSHEN	1904	25	101
12	403650N0741637.1	RAHWAY CITY	D RYAN	RYAN	--	18	84
13	403649N0741645.1	RAHWAY CITY	NAT GROCERY CO	NAT GROCERY 1	1957	30	300
14	403646N0741622.1	RAHWAY CITY	QUINN BODEN CO	QUINN 1	1944	20	357
14	403646N0741622.2	RAHWAY CITY	QUINN BODEN CO	QUINN 2	1944	20	357
14	403646N0741622.3	RAHWAY CITY	QUINN BODEN CO	QUINN GS 1	1934	20	253
14	403646N0741622.4	RAHWAY CITY	QUINN BODEN CO	QUINN GS 2	1966	20	36
15	403637N0741624.1	RAHWAY CITY	P JENSEN	JENSEN 1	1952	20	100
16	403634N0741719.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 1	1948	37	53
17	403633N0741721.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 2	1948	37	52
18	403631N0741736.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 4	1948	35	49
19	403631N0741730.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 3	1948	34	49
20	403631N0741648.1	RAHWAY CITY	RAHWAY THEATER	ALDON 1	1948	20	349
21	403630N0741740.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 5	1948	10	23
22	403628N0741749.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 10	1949	23	28
23	403626N0741759.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 9	1949	11	24
24	403626N0741745.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 7	1949	25	18
25	403626N0741742.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 6	1949	18	29
26	403625N0741751.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 11	1949	15	20
27	403623N0741749.1	RAHWAY CITY	CITY OF RAHWAY	TEST HOLE 8	1949	11	21

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
1	--	8	190	R3 BR	17	7-32	100	37	2.7	12	U
2	29	10	13	QG 00	2	1-52	355	28	12.7	56	P
3	40	10	40	R3 BR	25	5-53	200	75	2.7	8	A
4	78	10	45	QG 00	37	9-54	425	15	28.3	72	P
5	26	10	12	QG 00	2	1-52	350	35	10.0	56	P
6	38	10	22	QG 00	6	11-53	355	34	10.4	72	P
7	56	10	43	QG 00	19	4-66	390	97	4.0	72	P
8	43	6	43	R3 BR	18	1-59	15	6	2.5	--	H
9	11	8	16	R3 BR	F	11-48	286	151	1.9	--	--
10	34	8	--	R3 BR	17	--	120	--	--	8	U
11	50	--	--	QG 00	19	-04	15	--	--	--	--
12	36	5	--	R3 BR	--	--	15	--	--	--	U
13	45	8	47	R3 BR	22	2-57	122	80	1.5	9	C
14	23	8	137	R3 BR	47	--	85	159	0.5	7	U
14	30	12	--	R3 BR	16	-44	150	124	1.2	50	U
14	15	6	32	R3 BR	13	--	82	107	0.8	8	U
14	35	8	35	R3 BR	--	--	23	--	--	--	--
15	40	6	40	R3 BR	1	7-52	5	--	--	--	H
16	47	6	48	R3 BR	16	--	--	--	--	--	U
17	46	6	46	R3 BR	14	--	--	--	--	--	U
18	43	6	--	QG 00	13	11-48	--	--	--	--	U
19	42	6	--	R3 BR	13	--	--	--	--	--	U
20	21	10	33	R3 BR	10	9-48	100	200	0.5	8	A
21	15	10	--	--	--	--	--	--	--	--	U
22	28	1	23	QG 00	--	--	--	--	--	--	U
23	24	1	19	QG 00	4	9-49	9	5	1.8	4	U
24	18	1	13	QG 00	4	8-49	12	2	6.0	5	U
25	29	1	--	QG 00	--	--	--	--	--	--	U
26	20	1	15	QG 00	3	9-49	25	1	25.0	8	U
27	21	1	16	QG 00	14	8-49	17	5	3.4	6	U

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
28	403617N0741757.1	RAHWAY CITY	CITY OF RAHWAY	TEST WELL 1	1948	20	301
29	403600N0741611.1	RAHWAY CITY	MAC LAC CO	MAC LAC 1	1923	10	151
29	403600N0741611.2	RAHWAY CITY	MAC LAC CO	MAC LAC 2	1925	10	150
29	403600N0741611.3	RAHWAY CITY	MAC LAC CO	MAC LAC 3	1952	10	150
1	403935N0741603.1	ROSELLE BORO	ELIZABETHTOWN W	SECOND AVE	1960	70	404
2	403933N0741622.1	ROSELLE BORO	ELIZABETHTOWN W	FIRST AVE	1957	70	508
3	403930N0741649.1	ROSELLE BORO	KARAGHEUSIAN IN	KARAGHEUSIAN 1	1928	75	173
3	403930N0741649.2	ROSELLE BORO	KARAGHEUSIAN IN	KARAGHEUSIAN 2	1931	75	164
4	403930N0741622.1	ROSELLE BORO	ALL DISC RECORD	ALL DISC 1	1963	70	300
4	403930N0741622.2	ROSELLE BORO	ALL DISC RECORD	ALL DISC 2	1968	70	450
5	403929N0741627.1	ROSELLE BORO	ALL DISC RECORD	ALL DISC G S 1	1960	65	200
6	403912N0741654.1	ROSELLE BORO	L MAY	MAY	1957	85	127
7	403910N0741407.1	ROSELLE BORO	G CUTTER	CUTTER	1941	40	251
8	403903N0741505.1	ROSELLE BORO	ELIZABETHTOWN W	CHANDLER AVE	1961	40	350
9	403858N0741603.1	ROSELLE BORO	ELIZABETHTOWN W	WALBERGA 3	1961	50	321
10	403854N0741603.1	ROSELLE BORO	ELIZABETHTOWN W	WALBERGA 1	1960	60	350
11	403853N0741548.1	ROSELLE BORO	ELIZABETHTOWN W	WALBERGA 4	1961	50	325
12	403851N0741550.1	ROSELLE BORO	NAT COLOR LAB	NAT COLOR	1964	50	282
13	403850N0741609.1	ROSELLE BORO	ROSELLE GOLF CB	R GOLF CLUB	1967	60	400
14	403848N0741547.1	ROSELLE BORO	ELIZABETHTOWN W	WALBERGA 2	1960	60	348
15	403842N0741631.1	ROSELLE BORO	FOOD FAIR CORP	FOOD FAIR	1951	70	304
1	403942N0741541.1	ROSELLE PARK BORO	E A LAVIN	LAVIN 1	1953	80	107
1	404006N0742314.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	GLENSIDE AVE	1957	225	540
2	404000N0742305.1	SCOTCH PLAINS TWP	B ADLERBERT	ADLERBERT 1	1954	195	147
3	403940N0742247.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	JERUSALEM RD 1	1948	221	650
4	403938N0742250.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	JERUSALEM RD 2	1950	215	665
5	403938N0742238.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	JERUSALEM RD 3	1950	230	708
6	403928N0742249.1	SCOTCH PLAINS TWP	CUSTOM MOLDERS	CUSTOM 1	1965	210	514
7	403925N0742234.1	SCOTCH PLAINS TWP	SCOTCH PLAINS T	SCOTCH PL 2	1964	205	450
8	403920N0742244.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	WALHEIM	1964	205	500

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
28	17	8	22	R3 BR	F	10-48	12	87	0.1	--	--
29	18	10	26	R3 BR	F	4-23	135	--	--	--	U
29	23	10	24	R3 BR	7	4-25	91	--	--	--	U
29	30	--	--	R3 BR	7	-52	5	--	--	--	U
1	18	12	35	R3 BR	17	9-60	172	135	1.3	48	U
2	29	12	37	R3 BR	28	9-57	457	111	4.1	24	P
3	33	8	36	R3 BR	--	--	113	--	--	--	--
3	26	12	35	R3 BR	13	4-31	183	13	14.1	--	--
4	24	8	36	R3 BR	18	8-63	215	72	3.0	8	N
4	--	8	43	R3 BR	30	6-68	168	100	1.7	8	N
5	8	6	28	R3 BR	27	4-60	178	73	2.4	8	N
6	28	6	29	R3 BR	23	7-57	15	5	3.0	--	H
7	--	--	--	R3 BR	--	--	25	--	--	--	--
8	36	12	45	R3 BR	9	4-61	317	134	2.4	48	P
9	15	12	33	R3 BR	21	7-61	361	110	3.3	48	P
10	10	12	26	R3 BR	20	11-60	361	144	2.5	48	P
11	16	12	42	R3 BR	27	9-61	488	132	3.7	48	P
12	12	8	42	R3 BR	40	4-64	239	79	3.0	8	--
13	18	10	31	R3 BR	50	1-67	503	69	7.3	8	I
14	26	12	41	R3 BR	13	12-60	668	28	23.9	48	P
15	30	8	32	R3 BR	33	8-51	150	67	2.2	7	A
1	10	6	21	R3 BR	15	6-53	10	45	0.2	--	H
1	5	12	38	R3 BR	76	11-57	135	119	1.1	9	P
2	49	6	56	R3 BR	45	7-54	25	64	0.4	6	H
3	130	8	132	R3 BR	98	10-48	300	50	6.0	24	U
4	120	12	125	R3 BR	112	4-50	351	78	4.5	24	P
5	140	12	142	R3 BR	128	6-50	150	84	1.8	24	P
6	110	8	117	R3 BR	140	8-65	62	60	1.0	--	N
7	99	8	99	R3 BR	115	8-14	150	185	0.8	8	I
8	109	12	109	R3 BR	105	3-64	197	92	2.1	8	U

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
9	403917N0742215.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	MORSE AVE	1960	200	400
10	403810N0742201.1	SCOTCH PLAINS TWP	F SPADAFARA	SPADAFARA 1	1953	130	100
11	403808N0742151.1	SCOTCH PLAINS TWP	A HOWARTH	HOWARTH 1	1948	120	110
12	403803N0742214.1	SCOTCH PLAINS TWP	HIGHLAND SWIM C	HIGHLAND 1	1953	120	150
13	403758N0742206.1	SCOTCH PLAINS TWP	C SPADER	SPADER 1	1953	110	100
14	403755N0742201.1	SCOTCH PLAINS TWP	C SPADER	SPADER GS 1	1953	105	100
15	403750N0742208.1	SCOTCH PLAINS TWP	C REMKER	REMKER 1	1952	115	110
16	403741N0742111.1	SCOTCH PLAINS TWP	SHACHAMAXON C C	SHACHAMAXON 3	1955	90	301
17	403730N0741945.1	SCOTCH PLAINS TWP	J AMBERG JR	AMBERG 26321	1951	55	200
18	403723N0742319.1	SCOTCH PLAINS TWP	ELIZABETHTOWN W	ABERDEEN RD	1965	130	350
19	403721N0742125.1	SCOTCH PLAINS TWP	H A KIEP	KIEP 1	1950	105	150
20	403717N0742213.1	SCOTCH PLAINS TWP	L SIEVER	SIEVER 1	1953	110	104
21	403705N0742212.1	SCOTCH PLAINS TWP	H TEMPE	TEMPE 1	1951	102	132
22	403655N0742214.1	SCOTCH PLAINS TWP	F M BRODHEAD	BRODHEAD 1	1948	110	155
23	403634N0742231.1	SCOTCH PLAINS TWP	K F JONES	JONES	1948	130	175
24	403620N0742250.1	SCOTCH PLAINS TWP	K HICKS	HICKS 1	1953	120	103
25	403617N0742230.1	SCOTCH PLAINS TWP	E DOUGHERTY	DOUGHERTY	1956	120	156
1	404308N0741913.1	SPRINGFIELD TWP	MILLBURN SPRING	MILLBURN 1	1956	140	645
2	404300N0741850.1	SPRINGFIELD TWP	SHORT HILLS W C	SHORT HILLS 2	1931	102	87
3	404253N0741847.1	SPRINGFIELD TWP	SHORT HILLS W C	SHORT HILLS 1	1930	92	78
4	404242N0741832.1	SPRINGFIELD TWP	SPRNGFLD TOOL	TOOL AND DIE	1950	100	230
5	404242N0741758.1	SPRINGFIELD TWP	ELIZABETHTOWN W	SPRINGFIELD 56	1950	80	400
6	404238N0741836.1	SPRINGFIELD TWP	SMITH AND SMITH	SMITH 1	1948	110	204
7	404230N0742023.1	SPRINGFIELD TWP	HOUDAILLE CONST	HOUDAILLE 2727	1965	300	341
8	404202N0741951.1	SPRINGFIELD TWP	BALTRUSOL GOLF	BALTRUSOL	1961	170	626
9	404151N0741852.1	SPRINGFIELD TWP	D K FLEMER	FLEMER 1	1949	100	108
10	404150N0741940.1	SPRINGFIELD TWP	J KRILL	KRILL 1	1960	130	85
11	404128N0742000.1	SPRINGFIELD TWP	M W MASS	MASS	1954	140	100
12	404123N0741847.1	SPRINGFIELD TWP	P S ELEC GAS CO	PUBLIC SERV 1	1952	100	380
13	404117N0741919.1	SPRINGFIELD TWP	HOWARD JOHNSON	H JOHNSON 1	1950	120	200

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
9	72	12	79	R3 BR	68	6-60	295	112	2.6	48	P
10	55	6	55	R3 BR	25	6-53	6	5	1.2	4	H
11	30	6	33	R3 BR	17	3-48	10	2	5.0	3	H
12	50	6	50	R3 BR	9	7-53	50	2	25.0	6	R
13	50	6	50	R3 BR	25	5-53	5	5	1.0	4	H
14	55	6	55	R3 BR	8	6-53	5	12	0.4	4	H
15	57	6	57	R3 BR	10	11-52	6	10	0.6	3	H
16	22	10	22	R3 BR	8	5-55	250	142	1.8	8	R
17	55	8	68	R3 BR	12	7-51	40	6	6.7	6	I
18	65	12	65	R3 BR	55	3-65	400	95	4.2	8	P
19	33	6	33	R3 BR	45	2-50	8	1	8.0	1	H
20	76	6	81	R3 BR	30	4-53	6	25	0.2	--	H
21	67	6	68	R3 BR	27	10-51	10	5	2.0	1	H
22	63	6	68	R3 BR	53	10-48	25	27	0.9	--	H
23	--	6	--	R3 BR	40	8-48	18	--	--	2	H
24	65	6	68	R3 BR	28	4-53	5	27	0.2	--	H
25	--	6	98	R3 BR	74	4-56	15	3	5.0	--	H
1	12	10	37	R3 BR	52	11-56	75	148	0.5	24	N
2	85	25	39	QG OO	12	3-31	677	25	27.1	3	--
3	78	25	45	QG OO	6	11-30	690	10	69.0	3	--
4	85	6	85	R3 BR	28	10-50	60	22	2.7	6	N
5	58	12	60	R3 BR	30	3-50	93	100	0.9	7	U
6	91	8	93	R3 BR	15	5-48	110	83	1.3	4	A
7	22	8	34	R3 --	--	--	--	--	--	--	--
8	75	10	80	R3 BR	40	7-61	150	160	0.9	8	I
9	16	6	30	R3 BR	10	3-49	21	50	0.4	6	H
10	37	6	37	R3 BR	34	9-60	8	1	8.0	1	I
11	38	6	38	R3 BR	8	5-54	15	7	2.1	--	H
12	40	10	40	R3 BR	9	12-52	60	131	0.5	8	C
13	42	8	44	R3 BR	30	4-50	110	70	1.6	4	A

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
14	404115N0741849.1	SPRINGFIELD TWP	P S ELEC GAS CO	PUBLIC SERV 2	1953	102	404
15	404113N0742001.1	SPRINGFIELD TWP	B CICCIA	CICCIA	1953	120	94
16	404053N0741944.1	SPRINGFIELD TWP	PRINCE FARM	PRINCE FARM 2	1954	115	420
1	404342N0742242.1	SUMMIT CITY	CIBA PHARMAC	CIBA 4	1940	210	600
2	404341N0742248.1	SUMMIT CITY	CIBA PHARMAC	CIBA 6	1947	220	600
3	404341N0742243.1	SUMMIT CITY	CIBA PHARMAC	CIBA 5	1944	220	580
4	404340N0742241.1	SUMMIT CITY	CIBA PHARMAC	CIBA 3	1940	225	503
5	404336N0742251.1	SUMMIT CITY	CIBA PHARMAC	CIBA 7	1949	220	729
6	404334N0742253.1	SUMMIT CITY	CIBA PHARMAC	CIBA 8	1954	220	687
7	404333N0742246.1	SUMMIT CITY	CIBA PHARMAC	CIBA 9	1954	220	623
8	404326N0742250.1	SUMMIT CITY	CIBA PHARMAC	CIBA 12	1959	220	838
9	404324N0742245.1	SUMMIT CITY	CIBA PHARMAC	CIBA 10	1958	230	719
10	404246N0742309.1	SUMMIT CITY	NAT GROCERY CO	NAT GROCERY 1	1955	275	348
11	404245N0742044.1	SUMMIT CITY	HOUDAILLE CONST	HOUDAILLE	1962	315	100
12	404205N0742130.1	SUMMIT CITY	COMMONWEALTH W	BALTRUSOL 18	1942	300	462
1	404312N0741649.1	UNION TWP	UNION TWP BD ED	BOARD OF ED 1	1964	150	208
2	404247N0741631.1	UNION TWP	C KRIVANEK	KRIVANEK 1	1953	135	150
3	404246N0741640.1	UNION TWP	MULBERRY METAL	MULBERRY 1	1956	140	402
4	404220N0741641.1	UNION TWP	ELSTC STP NUT C	ELASTIC 1	1942	110	405
5	404220N0741629.1	UNION TWP	ANSCO CORP	UNION 1	1950	100	400
6	404219N0741639.1	UNION TWP	ELSTC STP NUT C	ELASTIC 2	1942	110	408
7	404218N0741646.1	UNION TWP	ELAS STOP NUT	ELASTIC 3	1953	105	503
8	404213N0741736.1	UNION TWP	BARDY FARMS	BARDY FARMS 1	1955	95	450
9	404213N0741642.1	UNION TWP	STERLING PLASTC	STERLING 1	1953	105	340
9	404213N0741642.2	UNION TWP	STERLING PLASTC	STERLING 2	1941	105	162
10	404211N0741648.1	UNION TWP	INTERCHEMICAL C	INTERCHEM 2	1947	110	349
11	404209N0741644.1	UNION TWP	INTERCHEMICAL C	INTERCHEM 1	1945	110	344
12	404158N0741630.1	UNION TWP	KNIGHTS COLUMBS	KNIGHTS	1966	90	200
13	404154N0741648.1	UNION TWP	S S STUDIOS	S S STUDIOS 1	1954	105	218
14	404153N0741600.1	UNION TWP	FOOD FAIR STORE	FOOD FAIR 1	1955	100	485

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
14	30	10	48	R3 BR	10	2-53	95	115	0.8	8	C
15	36	6	37	R3 BR	18	12-53	10	6	1.7	--	H
16	55	10	58	R3 BR	25	10-54	300	155	1.9	8	I
1	8	10	41	R3 BR	65	5-40	160	--	--	--	N
2	19	8	36	R3 BR	80	5-47	300	170	1.8	--	N
3	5	8	32	R3 BR	79	11-54	260	--	--	--	N
4	9	8	30	R3 BR	62	7-40	80	10	8.0	--	N
5	19	10	28	R3 BR	75	2-49	270	104	2.6	24	N
6	30	10	34	R3 BR	60	8-54	150	140	1.1	8	U
7	200	10	205	R3 BR	80	9-54	271	97	2.8	24	N
8	203	10	207	R3 BR	136	10-59	517	86	6.0	30	N
9	196	10	199	R3 BR	109	3-58	401	141	2.8	30	N
10	186	8	195	R3 W2	94	11-55	83	104	0.8	8	--
11	25	6	25	R3 W2	--	--	100	--	--	1	--
12	90	8	93	R3 BR	25	4-42	218	115	1.9	48	--
1	35	8	41	R3 BR	19	7-64	100	39	2.6	8	I
2	65	6	65	R3 BR	13	8-53	30	37	0.8	4	H
3	56	8	57	R3 BR	47	11-56	226	83	2.7	8	--
4	60	8	--	R3 BR	37	5-42	140	73	1.9	--	N
5	70	12	70	R3 BR	30	2-50	318	145	2.2	20	N
6	58	8	--	R3 BR	42	--	160	83	1.9	--	N
7	60	8	70	R3 BR	55	3-53	172	85	2.0	8	N
8	25	8	30	R3 BR	29	2-55	150	99	1.5	8	N
9	48	8	52	R3 BR	36	1-53	180	54	3.3	8	N
9	57	8	--	R3 BR	35	--	--	--	--	--	--
10	53	8	64	R3 BR	45	11-47	200	145	1.4	--	U
11	58	8	58	R3 BR	37	9-45	135	113	1.2	8	U
12	14	6	41	R3 BR	20	4-66	100	179	0.6	4	A
13	--	6	--	R3 BR	16	6-54	60	10	6.0	8	C
14	28	6	28	R3 BR	22	7-55	110	128	0.9	24	A

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
15	404152N0741659.1	UNION TWP	INTER PAINT CO	INTER PAINT 1	1952	90	315
16	404144N0741623.1	UNION TWP	WM KRATT CO	KRATT 1	1958	105	345
17	404143N0741602.1	UNION TWP	J MEARS	MEARS 1	1948	95	400
18	404136N0741716.1	UNION TWP	PYRO PLASTICS C	PYRO 1	1949	95	344
19	404129N0741437.1	UNION TWP	FORSTNER CHAIN	FORSTNER	1948	50	356
20	404128N0741514.1	UNION TWP	SUB GOLF CLUB	SUBURBAN 1	1958	90	586
21	404124N0741811.1	UNION TWP	ADAMS STAMP CO	STAMPING CO	1952	102	250
22	404120N0741754.1	UNION TWP	HAZEL IND INC	HAZAL IND INC	1966	105	278
23	404120N0741517.1	UNION TWP	GARDEN STATE BO	BOWLING 1	1958	90	425
24	404118N0741808.1	UNION TWP	CHRISTIAN	CHRISTIAN	1953	100	90
25	404113N0741831.1	UNION TWP	POTTER ENGIN CO	POTTER 3	1964	90	60
26	404113N0741826.1	UNION TWP	POTTER ENGIN CO	POTTER 1	1953	95	72
27	404111N0741836.1	UNION TWP	POTTER ENGIN CO	POTTER 2	1953	95	70
28	404108N0741826.1	UNION TWP	TEMPLE B ABRAHM	TEMPLE BNAI 1	1950	100	75
29	404104N0741411.1	UNION TWP	SCHERING CORP	SCHERING 1	1939	36	600
30	404103N0741413.1	UNION TWP	SCHERING CORP	SCHERING 2	1945	44	676
31	404101N0741412.1	UNION TWP	SCHERING CORP	SCHERING 3	1955	50	475
32	404058N0741538.1	UNION TWP	L LEHNBAUER	LEHNBAUER 1	1953	110	155
33	404049N0741447.1	UNION TWP	SECRETARY PEN C	SECRETARY 1	1949	70	150
34	404038N0741606.1	UNION TWP	G H M KROUSE	KROUSE 1	1953	110	80
35	404026N0741317.1	UNION TWP	W ZIMMERMAN	ZIMMERMAN 1	1948	35	151
36	404017N0741509.1	UNION TWP	SUCAD INC	SUCAD 1	1955	70	215
36	404017N0741509.2	UNION TWP	SUCAD INC	SUCAD 2	1955	70	235
37	404007N0741516.1	UNION TWP	THE VILLAGE CO	VILLAGE 1	1958	70	420
1	404022N0741950.1	WESTFIELD TOWN	F KUEBLER	KUEBLER 1	1955	110	115
2	403957N0742136.1	WESTFIELD TOWN	ELIZABETHTOWN W	WITTKE ROCK 2	1955	210	511
3	403954N0742138.1	WESTFIELD TOWN	ELIZABETHTOWN W	WITTKE ROCK 1	1955	220	506
4	403953N0742146.1	WESTFIELD TOWN	ADCOR REALTY CO	ADCOR 1	1962	205	600
5	403952N0742232.1	WESTFIELD TOWN	B L EMERY	EMERY	1954	240	240
6	403948N0742152.1	WESTFIELD TOWN	H F CORNWELL	CORNWELL	1954	215	230

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
15	20	6	20	R3 BR	13	2-52	90	86	1.0	8	N
16	56	8	60	R3 BR	30	9-58	210	70	3.0	9	N
17	32	8	32	R3 BR	40	4-48	72	160	0.4	8	A
18	30	10	326	R3 BR	14	4-49	250	173	1.4	8	N
19	56	10	57	R3 BR	21	11-48	275	169	1.6	8	N
20	25	12	26	R3 BR	30	4-58	250	162	1.5	8	I
21	--	6	--	R3 BR	--	--	--	--	--	--	--
22	71	8	74	R3 BR	38	--	--	--	--	--	N
23	36	8	41	R3 BR	51	7-58	250	30	8.3	8	--
24	--	6	90	R3 BR	24	8-53	30	45	0.7	2	H
25	58	12	38	QG OO	16	12-64	210	24	8.7	8	N
26	72	10	52	QG OO	12	8-53	400	29	13.8	8	N
27	70	8	54	QG OO	18	9-53	180	32	5.6	6	I
28	75	10	64	QG OO	19	5-50	300	15	20.0	4	I
29	23	10	50	R3 BR	2	10-39	225	178	1.3	8	N
30	27	10	80	R3 BR	8	5-45	575	172	3.3	8	N
31	23	12	50	R3 BR	22	5-54	550	141	3.9	30	N
32	25	6	25	R3 BR	35	9-53	15	15	1.0	8	H
33	2	8	27	R3 BR	14	4-49	198	86	2.3	4	C
34	38	6	38	R3 BR	27	1-53	5	--	--	4	H
35	22	6	28	R3 BR	12	7-48	50	36	1.4	8	A
36	27	6	27	R3 BR	15	9-55	60	25	2.4	8	--
36	20	6	20	R3 BR	10	10-55	70	30	2.3	8	--
37	22	8	33	R3 BR	15	12-58	128	115	1.1	8	--
1	38	6	43	R3 BR	25	11-55	50	35	1.4	8	I
2	88	12	92	R3 BR	72	11-55	525	57	9.2	24	P
3	108	12	108	R3 BR	94	10-55	401	35	11.5	24	P
4	20	12	44	R3 BR	60	6-62	292	128	2.3	8	C
5	125	6	127	R3 BR	150	8-54	15	30	0.5	5	H
6	102	6	103	R3 BR	15	8-54	25	75	0.3	5	U

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	LOCATION	MUNICIPALITY	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE OF LSD (FT.)	WELL DEPTH (FT.)
7	403937N0742223.1	WESTFIELD TOWN	ELIZABETHTOWN W	WESTFIELD 1921	1964	220	524
8	403936N0742156.1	WESTFIELD TOWN	ELIZABETHTOWN W	PROSPECT ST	1965	205	500
9	403926N0742213.1	WESTFIELD TOWN	ELIZABETHTOWN W	WESTFIELD 1922	1964	195	416
10	403918N0742039.1	WESTFIELD TOWN	L ARMSTRONG	ARMSTRONG	1954	125	170
11	403917N0742048.1	WESTFIELD TOWN	BORO OF WSTFILD	BORO WESTFIELD	1925	115	520
12	403917N0742046.1	WESTFIELD TOWN	TOWN OF WESTFLD	WESTFIELD 1919	1964	120	246
13	403913N0742100.1	WESTFIELD TOWN	ELIZABETHTOWN W	ELM ST WELL 1	1958	130	525
14	403912N0742047.1	WESTFIELD TOWN	WESTFLD REALTY	WESTFLD REAL 1	1949	130	250
15	403909N0742129.1	WESTFIELD TOWN	C F ENGLE	ENGLE	1940	160	265
16	403904N0742052.1	WESTFIELD TOWN	H STURKE	STURKE 1	1951	130	226
17	403902N0742108.1	WESTFIELD TOWN	Y M C A	YMCA	1937	135	210
18	403901N0742038.1	WESTFIELD TOWN	QUALITY MARKET	QUALITY 1	1948	130	133
19	403901N0742036.1	WESTFIELD TOWN	SAFEWAY STORES	SAFEWAY 1	1951	130	205
20	403856N0742054.1	WESTFIELD TOWN	ELIZABETHTOWN W	WESTF OFFICE 2	1953	125	502
21	403856N0742052.1	WESTFIELD TOWN	ELIZABETHTOWN W	WESTF OFFICE 1	1951	130	523
22	403805N0742022.1	WESTFIELD TOWN	H SPECHT	SPECHT 1	1952	95	130
23	403750N0742041.1	WESTFIELD TOWN	B BLADO	BLADO 1	1952	75	150
24	403749N0741942.1	WESTFIELD TOWN	W MC COLLUM	MC COLLUM 1	1948	65	111
25	403742N0741941.1	WESTFIELD TOWN	C A CUMADY	CUMADY 1	1947	58	116

Table 4.--Records of selected wells in Union County, New Jersey--Continued

LOCATION NUMBER ON MAP IN FIGURE 2	DEPTH TO CONSL. ROCK (FT.)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT.)	MAJOR AQUIFER	WATER LEVEL (FT.)	DATE WATER LEVEL MEAS.	YIELD (GPM)	DRAW DOWN (FT.)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER
7	134	--	--	R3 BR	--	--	--	--	--	--	U
8	80	12	80	R3 BR	80	6-65	300	220	1.4	8	P
9	80	--	90	R3 BR	--	--	--	--	--	--	U
10	53	6	54	R3 BR	50	9-54	20	50	0.4	5	H
11	--	8	80	R3 BR	--	--	150	21	7.1	1	--
12	17	--	40	R3 BR	--	--	100	--	--	--	--
13	12	12	27	R3 BR	22	12-58	495	120	4.1	24	P
14	30	10	33	R3 BR	18	2-49	200	132	1.5	10	A
15	80	8	83	R3 BR	27	8-40	135	85	1.6	8	U
16	--	6	--	R3 BR	17	7-51	80	13	6.2	8	H
17	36	--	--	R3 BR	26	8-61	130	90	1.4	24	--
18	27	6	32	R3 BR	15	11-48	50	99	0.5	3	U
19	29	8	44	R3 BR	17	9-51	90	9	10.0	6	A
20	30	12	40	R3 BR	46	10-53	350	104	3.4	26	P
21	52	12	58	R3 BR	22	5-51	500	110	4.5	26	P
22	65	6	65	R3 BR	12	9-52	5	3	1.7	2	H
23	48	6	48	R3 BR	12	10-52	25	8	3.1	3	H
24	44	6	50	R3 BR	20	3-48	8	--	--	--	H
25	54	6	60	R3 BR	29	12-47	10	11	0.9	A	H

Table 5.--Chemical analyses of water from wells in Union County, New Jersey

Geologic source: Qd, Glacial drift; Trb, Brunswick Formation; Trbs, Watchung Basalt
Source of analyses: BA, Bird Archer Co.; EWC, Elizabethtown Water Co.; M, Merck and Co.; RWD, Rahway Water Dept.; P, Permutit Co.; USGS, U.S. Geological Survey

(Results in milligrams per liter)

Location Number on Map (figure 2)	Location	Municipality	Owner	Local Well Number	Date of Collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)
4	404058N0742557	Berkeley Heights Twp.	Alma Pharmaceutical Co.	Rheis 1	1949	--	--	--
1	403801N0741826	Clark Twp.	General Motors Corp.	Hyatt 3	8-31-60	31	.05	.05
4	403746N0741819	Clark Twp.	U.S. Gypsum Co.	U.S. Gypsum 1	1946	--	0	--
19	403629N0741853	Clark Twp.	State of New Jersey Highway Department	Highway 1	7-26-60	21	.26	.02
5	403929N0741742	Cranford Twp.	A. Venneri	Venneri 1	9-03-68	23	.15	.09
2	404055N0741302	Elizabeth City	Elizabethtown Water Co.	Grassman Obs. Well	6-06-68	18	.24	0
4	404052N0741221	Elizabeth City	Elizabethtown Water Co.	North Elizabeth Obs. 2	9-20-64	--	--	--
2	403912N0741920	Garwood Boro	National Gypsum Co.	National Gypsum 2	8-19-60	25	.18	0
3	404215N0741432	Hillside Twp.	Cooper Alloy Foundry Co.	Cooper 4	7-17-68	22	.04	.04

Table 5.--Chemical analyses of water from wells in Union County, New Jersey

Geologic source: Qd, Glacial drift; Trb, Brunswick Formation; Trbs, Watchung Basalt
Source of analyses: BA, Bird Archer Co.; EWC, Elizabethtown Water Co.; M, Merck and Co.; RWD, Rahway Water Dept.; P, Permutit Co.; USGS, U.S. Geological Survey

(Results in milligrams per liter)

Location Number on Map (figure 2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved Solids at 180°C	Hardness as $CaCO_3$ (Total	Non-carbonate Hardness	Carbonate Hardness	Specific Conductance 25°C	pH	Geologic Source	Source of Analysis
4	--	--	--	--	--	17	--	--	--	--	252	168	--	--	--	8.0	Trbs Trb	?
1	167	25	43	1.4	144	454	11	.3	8	--	856	520	118	402	1060	6.9	Trb	USGS
4	--	--	--	--	--	434	10	--	--	--	--	638	--	--	--	7.3	Trb	USGS
19	34	3	9.8	.9	52	43	24	0	4.5	--	225	98	43	55	261	6.3	Trb	USGS
5	56	7.1	10	1.1	115	58	15	0	22	.1	258	169	68	101	438	8.4	Trb	USGS
2	90	8.2	11	1.3	223	54	33	0	15	.02	388	258	76	182	600	8.2	Trb	USGS
4	--	--	--	--	--	--	27	--	--	--	--	--	--	--	--	--	Trb	EWC
2	102	27	19	1.5	164	222	17	.1	8.3	--	511	366	135	231	711	7.3	Trb	USGS
3	46	22	28	2.1	180	72	34	.1	22	0	354	206	58	148	786	8.2	Trb	USGS

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Location	Municipality	Owner	Local Well Number	Date of Collection	Silica (SiO_2)	Iron (Fe)	Maganese (Mn)
15	404150N0741352	Hillside Twp.	Bristol Myers	Bristol B2	1940	42	1.0	--
17	404149N0741338	Hillside Twp.	Sun Tube	Sun Tube	1940	22	.1	--
18	404148N0741345	Hillside Twp.	Bristol Myers	Bristol A1	1940	30	.25	--
22	404131N0741332	Hillside Twp.	The Emeloid Co. Inc.	Emeloid 2	7-16-68	25	.04	.01
27	404106N0741353	Hillside Twp.	Elizabethtown Water Co.	Hillside 4	9-18-64	--	--	--
4	404106N0741719	Kenilworth Boro	Union County Park Commission	USGS Obs.	6-06-68	19	.46	0
16	404034N0741618	Kenilworth Boro	White Laboratories Inc.	Obs. 2	3-19-52	15	--	--
21	404027N0741644	Kenilworth Boro	White Laboratories Inc.	Obs. 3	6-06-68	15	.18	.52
22	404026N0741713	Kenilworth Boro	Elizabethtown Water Co.	Newark Ave. Well	8-08-68	18	Trace	--
24	404024N0741708	Kenilworth Boro	Elizabethtown Water Co.	Quinton Ave. Well	8-08-68	18	Trace	--
25	404022N0741709	Kenilworth Boro	Elizabethtown Water Co.	Richfield Ave. Well	8-08-68	16	Trace	--
3	403832N0741408	Linden City	United Laboratories Inc.	United Labs 1	5-28-68	22	.04	0
23	403738N0741553	Linden City	General Gum Products Co.	General Gum 1	5-28-68	19	.18	.08

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved Solids at 180°C	Hardness as $CaCO_3$ (Total)	Non-carbonate Hardness	Carbonate Hardness	Specific Conductance 25°C	pH	Geologic Source	Source of Analysis
15	314	101	141		87	1312	50	--	.4	--	2280	1196	1127	71	--	7.5	Trb	P
17	95	13	8		209	93	26	--	4.6	--	402	290	119	171	--	7.3	Trb	P
18	91	12	8		184	103	25	--	4.6	--	370	276	125	151	--	7.2	Trb	P
22	157	31	105	1.9	57	654	16	4.5	14	.24	1100	520	473	47	1400	7.6	Trb	USGS
27	--	--	--	--	--	25	--	--	--	--	--	--	--	--	--	--	Trb	EWC
4	57	8.5	11	1.0	150	52	15	0	17	.1	277	177	51	126	435	8.3	Trb	USGS
16	--	--	--	--	--	162	12	--	--	--	320	166	--	--	--	7.8	Trb	BA
21	90	9.6	11	1.1	228	43	36	.1	1.0	.08	331	264	76	188	584	8.3	Trb	USGS
22	36.8	13.61	--	--	--	25	21	.1	--	--	--	148	--	--	--	8.1	Trb	EWC
24	45.6	13.12	--	--	--	48	27	.15	--	--	--	168	--	--	--	8.1	Trb	EWC
25	61.6	12.15	--	--	--	32	29	.15	--	--	--	204	--	--	--	7.9	Trb	EWC
3	80	16	12	1.6	254	51	26	.1	5.3	--	390	266	58	208	558	8.2	Trb	USGS
23	110	30	30	3.4	207	270	20	.1	3.5	--	607	398	229	169	865	8.1	Trb	USGS

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Location	Municipality	Owner	Local Well Number	Date of Collection	Silica (SiO_2)	Iron (Fe)	Maganese (Mn)
29	403728N0741553	Linden City	General Gum Products Co.	General Gum 2	8-09-60	23	.09	.04
11	404047N0742104	Mountainside Boro	Elizabethtown Water Co.	Central Ave. Well	7-22-68	22	.05	--
9	403705N0742532	Plainfield City	Tepper Bros.	Tepper 1	7-25-68	10	.05	--
17	403554N0742628	Plainfield City	Elizabethtown Water Co.	Fifth St. Well	7-25-68	20	.05	--
9	403656N0741635	Rahway City	City of Rahway	Test Well 2	11-23-48	18	.08	--
9	403656N0741635	Rahway City	City of Rahway	Test Well 2	11-12-48	--	--	--
9	403656N0741635	Rahway City	City of Rahway	Test Well 2	11-23-48	4	.24	0.15
10	403653N0741551	Rahway City	Merck Chemical Co.	Merck GS 1	2-12-44	--	.2	--
10	403653N0741551	Rahway City	Merck Chemical Co.	Merck GS 1	6-28-44	--	.4	--
22	403628N0741749	Rahway City	City of Rahway	Test Hole 10	1949	--	.03	--
23	403626N0741759	Rahway City	City of Rahway	Test Hole 9	1949	--	.8	--
24	403626N0741745	Rahway City	City of Rahway	Test Hole 7	1949	--	.03	--
27	403623N0741749	Rahway City	City of Rahway	Test Hole 8	1949	--	.03	--
28	403617N0741757	Rahway City	City of Rahway	Test Well 1	10-15-48	--	.01	--
28	403617N0741757	Rahway City	City of Rahway	Test Well 1	12-16-48	3	.03	0

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved Solids at 180°C	Hardness as $CaCO_3$ (Total)	Non-carbonate Hardness	Carbonate Hardness	Specific Conductance 25°C	pH	Geologic Source	Source of Analysis
29	58	22	16	3.5	230	57	19	.1	.2	--	329	235	188	47	497	7.5	Trb	USGS
11	53.6	16.04	--	--	--	59	26	.3	--	--	--	200	--	--	--	7.4	Trb	EWC
9	60.8	4.37	--	--	--	83	45	.5	--	--	330	170	--	--	--	7.2	Trb	EWC
17	48.8	22.36	--	--	--	130	27	.5	--	--	--	214	--	--	--	7.7	Trb	EWC
9	502	68	154		90	1710	10	0	0	--	2640	1530	--	--	2700	7.6	Trb	RWD
9	266	71	78		95	1204	11	--	.2	--	1338	956	--	--	--	7.3	Trb	RWD
9	279	69	216		95	1358	10	.04	.12	--	2660	980	--	--	--	7.3	Trb	RWD
10	280	42	--	--	120	1795	82	--	--	--	--	--	--	--	--	7.3	Trb	M
10	260	42	--	--	126	--	83	--	--	--	--	--	--	--	--	7.3	Trb	M
22	--	--	--	--	--	94	18	--	--	--	200	110	--	--	--	6.4	Qd	RWD
23	--	--	--	--	--	32	20	--	--	--	255	144	--	--	--	6.6	Qd	RWD
24	--	--	--	--	--	58	9	--	--	--	210	142	--	--	--	7.3	Qd	RWD
27	--	--	--	--	--	84	21	--	--	--	355	210	--	--	--	7.0	Qd	RWD
28	90	70	121		95	659	8.7	--	--	--	1570	512	--	--	--	7.4	Trb	RWD
28	198	66	180		95	883	10	.03	.04	--	1445	765	--	--	--	7.6	Trb	RWD

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Location	Municipality	Owner	Local Well Number	Date of Collection	Silica (SiO_2)	Iron (Fe)	Maganese (Mn)
2	403933N0741622	Roselle Boro	Elizabethtown Water Co.	First Ave. Well	8-12-68	20	.10	--
3	403930N0741649	Roselle Boro	A and M Karagheusian Inc.	Kara 1	8-08-60	23	.08	0
8	403903N0741505	Roselle Boro	Elizabethtown Water Co.	Chandler Ave. Well	5-28-68	20	.08	0
9	403858N0741603	Roselle Boro	Elizabethtown Water Co.	Walberga 3	7-22-68	25	.1	--
10	403854N0741603	Roselle Boro	Elizabethtown Water Co.	Walberga 1	7-22-68	24	0	--
11	403853N0741548	Roselle Boro	Elizabethtown Water Co.	Walberga 4	7-22-68	25	.05	--
14	403848N0741547	Roselle Boro	Elizabethtown Water Co.	Walberga 2	7-22-68	25	.05	--
1	404006N0742314	Scotch Plains Twp.	Elizabethtown Water Co.	Glenside Ave. Well	8-23-68	--	0	.02
3	403940N0742247	Scotch Plains Twp.	Elizabethtown Water Co.	Jerusalem Rd. 1	7-22-68	21	.1	--
4	403938N0742250	Scotch Plains Twp.	Elizabethtown Water Co.	Jerusalem Rd. 2	7-22-68	22	.1	--
5	403938N0742238	Scotch Plains Twp.	Elizabethtown Water Co.	Jerusalem Rd. 3	7-22-68	17	.5	--
7	403925N0742234	Scotch Plains Twp.	Township of Scotch Plains	Scotch Plains 2	9-06-68	20	.11	.01
9	403917N0742215	Scotch Plains Twp.	Elizabethtown Water Co.	Morse Ave. Well	7-22-68	17	.1	--

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved Solids at 180°C	Hardness as $CaCO_3$ (Total)	Non-carbonate Hardness	Carbonate Hardness	Specific Conductance 25°C	pH	Geologic Source	Source of Analysis
2	68	16.52	--	--	--	89	38	.1	--	--	366	238	--	--	--	8.0	Trb	EWC
3	74	12	16	1.4	196	56	31	.1	10	--	339	234	160	74	523	7.3	Trb	USGS
8	74	9.5	17	1.8	191	67	24	.1	16	--	336	224	67	157	525	8.1	Trb	USGS
9	96	43.25	--	--	--	220	29	.4	--	--	--	418	--	--	--	7.8	Trb	EWC
10	85.6	31.1	--	--	--	143	36	.3	--	--	638	342	--	--	--	7.5	Trb	EWC
11	110.4	36.45	--	--	--	220	27	.3	--	--	--	426	--	--	--	7.9	Trb	EWC
14	71.2	30.13	--	--	--	160	30	.5	--	--	--	302	--	--	--	7.8	Trb	EWC
1	53.6	13.1	--	--	--	--	28	.1	--	--	--	188	--	--	--	7.3	Trb	EWC
3	106.4	23.33	--	--	--	225	28	.5	--	--	--	362	--	--	--	7.7	Trb	EWC
4	141.6	23.33	--	--	--	260	28	.5	--	--	--	450	--	--	--	7.8	Trb	EWC
5	50.4	15.52	--	--	--	120	27	.4	--	--	348	194	--	--	--	7.7	Trb	EWC
7	45	9.4	14	3.5	161	31	16	0	5.8	.04	224	151	14	137	410	8.3	Trb	USGS
9	50.4	15.52	--	--	--	110	28	.4	--	--	--	194	--	--	--	7.7	Trb	EWC

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Location	Municipality	Owner	Local Well Number	Date of Collection	Silica (SiO_2)	Iron (Fe)	Maganese (Mn)
18	403723N0742319	Scotch Plains Twp.	Elizabethtown Water Co.	Aberdeen Rd. Well	7-27-68	17	.1	--
1	404342N0742242	Summit City	Ciba Pharmaceutical Prod. Inc.	Ciba 4	8-01-68	27	0	.01
2	404341N0742248	Summit City	Ciba Pharmaceutical Prod. Inc.	Ciba 6	8-01-68	19	.01	.03
9	404324N0742245	Summit City	Ciba Pharmaceutical Prod. Inc.	Ciba 10	8-01-68	17	0	.06
7	404218N0741646	Union Twp.	Elastic Stop Nut Corp.	Elastic 3	7-18-68	17	0	0
18	404136N0741796	Union Twp.	Pyro Plastics Corp.	Pyro 1	7-18-68	18	.15	.26
28	404108N0741826	Union Twp.	Temple B'Nai Abraham	Temple B'Nai 1	7-16-68	19	0	0
2	403957N0742136	Westfield Town	Elizabethtown Water Co.	Wittke Rock 2	7-27-68	17	.05	--
3	403954N0742138	Westfield Town	Elizabethtown Water Co.	Wittke Rock 1	7-27-68	20	.05	--
13	403913N0742100	Westfield Town	Elizabethtown Water Co.	Elm St. Well 1	7-22-68	21	0	--
20	403856N0742054	Westfield Town	Elizabethtown Water Co.	Westfield Office 2	7-22-68	20	0	--
21	403856N0742052	Westfield Town	Elizabethtown Water Co.	Westfield Office 1	8-31-60	26	.17	.01

Table 5.--Chemical analyses of water from wells in Union County, New Jersey--Continued

Location Number on Map (figure 2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved Solids at 180 °C	Hardness as $CaCO_3$ (Total)	Non-carbonate Hardness	Carbonate Hardness	Specific Conductance 25 °C	pH	Geologic Source	Source of Analysis
18	45.6	15.07	--	--	--	48	21	.1	--	--	--	176	--	--	--	7.4	Trb	EWC
1	18	7.4	43	.8	144	43	6.5	.1	.2	.18	236	71	0	71	379	8.5	Trb	USGS
2	134	34	84	1.5	136	505	18	.3	0	.11	934	437	316	121	1210	8.4	Trb	USGS
9	45	18	36	1.5	167	103	18	.2	.4	.29	330	187	41	146	530	8.5	Trb	USGS
7	58	14	9	2	137	55	20	.1	22	.02	271	202	85	117	482	8.3	Trb	USGS
18	52	8	7.5	1.5	124	45	14	0	16	.18	238	158	48	110	380	8.4	Trb	USGS
28	60	7	9.5	2.5	140	50	15	0	19	.16	258	179	54	125	423	8.5	Qd	USGS
2	61.6	18.95	--	--	--	140	25	.05	--	--	388	232	--	--	--	7.8	Trb	EWC
3	66.4	18.47	--	--	--	139	24	.15	--	--	378	242	--	--	--	8.0	Trb	EWC
13	51.2	14.09	--	--	--	43	31	.15	--	--	--	186	--	--	--	7.8	Trb	EWC
20	50.4	18.95	--	--	--	37	38	.20	--	--	318	204	--	--	--	7.7	Trb	EWC
21	52	14	11	1.5	174	35	17	.1	10	--	266	187	142	45	399	7.4	Trb	USGS

Table 6.--Logs of Selected Wells in Union County, New Jersey

Representative well log in the Township of Berkeley Heights

Well 7

Owner: Mr. H. Rogers
Owners well number: Rogers
Lat. 403926N Long. 0742621
Altitude, 420 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till	3	3
Triassic (Watchung Basalt):		
Basalt	280	283

Representative well logs in Clark Township

Well 2

Owner: General Motor Corp.
Owners well number: Hyatt 2
Lat. 403759N Long. 0741832
Altitude, 65 feet

Pleistocene:		
Till	28	28
Triassic (Brunswick Formation)		
Shale, weathered	162	190
Sandstone, argillaceous, fine-grained	128	318
Shale	100	418
Sandstone, argillaceous, fine-grained; some shale	42	460
Shale	45	505

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in Clark Township--Continued

Well 4

Owner: U.S. Gypsum Company
Owners well number: U.S. Gypsum 1
Lat. 403746N Long. 0741819
Altitude, 70 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till	26	26
Gravel, coarse	9	35
Clay and gravel	11	46
Triassic (Brunswick Formation):		
Shale, weathered	140	186
Shale	201	387
Shale, sandy	40	427
Shale	78	505

Representative well log in the Township of Cranford

Well 6

Owner: Gibson Associates
Owners well number: Gibson 1
Lat. 403925N Long. 0741715
Altitude, 80 feet

Pleistocene:		
Till	23	23
Triassic (Brunswick Formation):		
Shale, red	220	243
Shale, hard, red	28	271

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Elizabeth

Well 4

Owner: Elizabethtown Water Co.
Owners well number: North Elizabeth obs. well 2
Lat. 404052N Long. 0741221
Altitude, 34 feet

	Thickness (feet)	Depth (feet)
Fill	7	7
Pleistocene:		
Clay, blue	12	19
Clay, red	30	49
Sand and gravel	1	50
Sand and clay	26	76
Till	12	88
Sand and gravel	1	89
Clay, red	4	93
Triassic (Brunswick Formation):		
Shale, red	110	203

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Elizabeth--Continued

Well 11

Owner: The Thomas and Betts Co. Inc.
Owners well number: Thomas Betts
Lat. 403904N Long. 0741137
Altitude, 30 feet

	Thickness (feet)	Depth (feet)
Fill	5	5
Pleistocene:		
Till	10	15
Sand and clay, red	22	37
Till	3	40
Triassic (Brunswick Formation):		
Shale, weathered	45	85
Shale	415	500

Well 16

Owner: Reichold Chemical Co.
Owners well number: Reichold
Lat. 403814N Long. 0741216
Altitude, 10 feet

Pleistocene:		
Till	29	29
Triassic (Brunswick Formation):		
Shale, red, fissures every 4' - 7'	21	150
Shale, red, fissures every 8" - 12"	100	250
Soft spot, tools dropped through	3	253
Shale, red; static water level 15'	129	382
Soft spot, tools dropped through; static water level 140'	4	386
Shale, red	14	400

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Hillside

Well 6

Owner: The Linde Air Products Co.
Owners well number: Linde
Lat. 404213N Long. 0741320
Altitude, 110 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till	29	29
Sand, fine-grained, red, clayey; some gravel	13	42
Till	19	61
Sand, fine-grained, red	2	63
Sand, coarse-grained, gray and brown	9	72
Till	11	83
Triassic (Brunswick Formation):		
Shale, red	239	822

Well 12

Owner: International Milk Co.
Owners well number: International Milk
Lat. 404205N Long. 0741429
Altitude, 100 feet

Pleistocene:		
Till	20	20
Clay and sand, red	23	43
Till or weathered shale (?)	25	68
Triassic (Brunswick Formation):		
Shale, red	231	299

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Hillside--Continued

Well 22

Owner: Emeloid Co. Inc.
Owners well number: Emeloid 2
Lat. 404131N Long. 0741332
Altitude, 40 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Sand, red	18	18
Gravel	3	21
Sand, fine, red	56	77
Sand and gravel	7	84
Triassic (Brunswick Formation):		
Shale, red	377	461

Well 23

Owner: Drillen Beck Mfg. Co.
Owners well number: Drillen 1
Lat. 404128N Long. 0741336
Altitude, 40 feet

Fill	6	6
Pleistocene:		
Clay, sandy	48	54
Clay, pebbles, and gravel (Till?)	25	79
Triassic (Brunswick Formation):		
Shale, red	300	379

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Hillside--Continued

Well 25

Owner: Elizabethtown Water Co.
Owners well number: Hillside 2
Lat. 404113N Long. 0741355
Altitude, 30 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay	10	10
Sand, coarse	10	10
Gravel	4	4
Triassic (Brunswick Formation):		
Shale, soft, red	66	90
Shale, hard, red	330	420
Shale, red	110	530
Shale, soft, red	70	600

Representative well logs in Kenilworth Boro

Well 3

Owner: Elizabethtown Water Co.
Owners well number: Standpipe well
Lat. 404109N Long. 0741740
Altitude, 100 feet

Pleistocene:		
Sand, gravel, and clay	20	20
Sand, fine, clayey	152	172
Clay and gravel	8	180
Triassic (Brunswick Formation):		
Shale, red	342	522

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in Kenilworth Boro--Continued

Well 12

Owner: Modern Molders
Owners well number: Modern Molders
Lat. 404038N Long. 0741813
Altitude, 90 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Sand, silty	25	25
Clay	113	138
Triassic (Brunswick Formation):		
Sandstone, red	162	300

Well 14

Owner: White Labs. Inc.
Owners well number: Service well 4
Lat. 404036N Long. 0741631
Altitude, 89 feet

Fill	6	6
Pleistocene:		
Sand and gravel	11	17
Sand and clay	12	29
Triassic (Brunswick Formation):		
Shale, reddish-brown	374	403

Well 15

Owner: Elizabethtown Water Co.
Owners well number: Plainfield Div. 3
Lat. 404034N Long. 0741838
Altitude, 70 feet

Pleistocene:		
Sand, fine; some clay	60	60
Sand and gravel	30	90
Triassic (Brunswick Formation):		
Shale, red	466	556

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in Kenilworth Boro--Continued

Well 23

Owner: Elizabethtown Water Co.
Owners well number: South Ave. 2
Lat. 404025N Long. 0741827
Altitude, 70 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay, gray	45	45
Clay and sand	45	90
Clay and gravel	15	105
Triassic (Brunswick Formation):		
Shale, red	427	532

Representative well logs in the City of Linden

Well 29

Owner: General Gummed Products
Owners well number: General Gum 2
Lat. 403728N Long. 0741553
Altitude, 35 feet

Fill	5	5
Pleistocene:		
Sand, red	30	35
Till	47	82
Triassic (Brunswick Formation):		
Shale, red	228	310

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Linden--Continued

Well 30

Owner: Nesco Steel Barrel Co.
Owners well number: Nesco 2
Lat. 403728N Long. 0741528
Altitude, 20 feet

	Thickness (feet)	Depth (feet)
Fill	7	7
Pleistocene:		
Clay, red	24	31
Till	6	37
Triassic (Brunswick Formation):		
Shale, red	174	211
Shale, hard, red	55	266

Representative well logs in the Boro of Mountainside

Well 1

Owner: Elizabethtown Water Co.
Owners well number: Plainfield Div. 1
Lat. 404114N Long. 0742039
Altitude, 150 feet

Pleistocene:		
Clay	10	10
Sand and gravel	5	15
Sand, clayey	10	25
Sand and gravel	25	50
Triassic (Brunswick Formation):		
Shale, red	125	175
Sandstone, red	279	454

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Boro of Mountainside--Continued

Well 2

Owner: Elizabethtown Water Co.
Owners well number: Plainfield Div. 2
Lat. 404110N Long. 0742043
Altitude, 150 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay	10	10
Sand, fine; some gravel	25	35
Sand and gravel	7	42
Gravel, sand, and clay	33	75
Triassic (Brunswick Formation):		
Shale, red	497	572

Well 8

Owner: Sterling Plastics Co.
Owners well number: Sterling Plastics GS 1
Lat. 404100N Long. 0742025
Altitude, 150 feet

Fill	1	1
Pleistocene:		
Clay	6	7
Sand and gravel	51	58
Triassic (Brunswick Formation):		
Shale, red	532	590

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Boro of Mountainside--Continued

Well 13

Owner: A. K. Tool Co.
Owners well number: AK Tool 1
Lat. 404042N Long. 0742040
Altitude, 140 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Sand and gravel	20	20
Sand and clay	59	79
Triassic (Brunswick Formation):		
Shale, red	221	300

Representative well logs in the New Providence Boro

Well 1

Owner: Mr. W. Closs
Owners well number: Closs 1
Lat. 404246N Long. 0742316
Altitude, 315 feet

Pleistocene:		
Sand	53	53
Clay, sand, and gravel	107	160
Clay	63	223
Triassic (Brunswick Formation):		
Shale, red	289	512

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the New Providence Boro--Continued

Well 2

Owner: Mr. N. J. Ahl
Owners well number: Ahl
Lat. 404235N Long. 0742352
Altitude, 255 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay, gray	90	90
Clay, red	35	125
Triassic (Brunswick Formation):		
Sandstone, red	30	155

Well 4

Owner: Mr. F. R. Porker
Owners well number: Porker
Lat. 404157N Long. 0742318
Altitude, 320 feet

Pleistocene:		
Till	14	14
Triassic (Watchung Basalt):		
Basalt	63	77

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Plainfield

Well 6

Owner: L. Bamberger and Co.
Owners well number: Supply well 1
Lat. 403716N Long. 0742518
Altitude, 100 feet

	Thickness (feet)	Depth (feet)
Fill(?)	10	10
Pleistocene:		
Sand and gravel	38	48
Triassic (Brunswick Formation):		
Shale, red	453	501

Well 16

Owner: International Plainfield Motor Co.
Owners well number: International Motor 2
Lat. 403600N Long. 0742656
Altitude, 60 feet

Pleistocene:		
Sand, fine	30	30
Sand and gravel	30	60
Triassic (Brunswick Formation):		
Shale, weathered, red	7	67
Shale, red	403	470
Sandstone, red	130	600

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Plainfield--Continued

Well 20

Owner: National Starch Products
Owners well number: National 2
Lat. 403546N Long. 0742723
Altitude, 60 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Sand	15	15
Gravel, sand, and clay	49	64
Triassic (Brunswick Formation):		
Shale, red	181	245
Sandstone, red	59	304

Representative well logs in the City of Rahway

Well 9

Owner: City of Rahway
Owners well number: Test well 2
Lat. 403656N Long. 0741635
Altitude, 10 feet

Pleistocene:		
Gravel, light brown	5	5
Sand and gravel, light brown	5	10
Triassic (Brunswick Formation):		
Shale, red	290	300

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Rahway--Continued

Well 16

Owner: City of Rahway
Owners well number: Test hole 1
Lat. 403634N Long. 0741719
Altitude, 37 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay, reddish-brown with some sand; reworked Triassic	5	5
Same as above; sand grains coarser	5	10
Same as above; sand grains still coarser	5	15
Sand and clay, reddish-brown; reworked Triassic	5	20
Clay and sand, reddish-brown, sand grains rounded, some broken as though they were crushed sandstone	5	25
Sand and gravel, predominantly quartzose, medium to coarse, pinkish-brown, rounded to subrounded, some angular; some clay	5	30
Sand and gravel, medium to coarse, pinkish-brown, rounded to subrounded, some angular; some reddish-brown clay	5	35
Sand and much gravel up to 1/3" diameter with clay coating, predominantly quartzose, rounded to angular, pinkish-brown	5	40
Sand and gravel, medium to coarse, pinkish-brown clay coatings on predominantly quartzose sands; much rounded Triassic red argillites and dark minerals	5	47
Triassic (Brunswick Formation):		
Shale	3	50

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Rahway--Continued

Well 17

Owner: City of Rahway
Owners well number: Test hole 2
Lat. 403633N Long. 0741721
Altitude, 37 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay with coarse sand and fine to medium gravel, mainly quartzose, rounded to subrounded some angular; some dark mineral grains present; reddish-brown reworked Triassic.....	5	5
Sand, fine to medium, clay gives reddish-brown color to the sand grains.....	5	10
Same as above; more clay, some sand and some coarse to fine gravel.....	5	15
Clay, very plastic, reddish to pinkish-brown, much sand and gravel inclusions, arenaceous phases, rounded to subrounded some angular.....	5	20
Sand with some gravel, grains are angular to subrounded to rounded, clay gives reddish-brown color to the sand grains.....	5	25
Sand and gravel, medium to coarse, up to 3/4" diameter, arenaceous phases, rounded to angular, mainly quartzose but have large amount of dark mineral; some clay.....	5	30
Same as above; but more sand less gravel which ranges up to 1/2" diameter.....	5	35
Sands and gravel, fine to medium to coarse, rounded to subrounded, some angular, mainly quartzose, occasionally ranging up to 1/4" diameter, pinkish-brown clay coating on sand grains; less clay than in sample above; more uniform texture than the above.....	5	40
Sand and gravel, medium to coarse, ranging up to 0.6", mainly angular to rounded quartz but much dark mineral grains present, sand grains are covered with bright pinkish-brown clay coating; many rounded Triassic rock pebbles.....	6	45

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Rahway--Continued

Well 17--Continued

	Thickness (feet)	Depth (feet)
Triassic (Brunswick Formation):		
Shale	5	51

Representative well logs in the Township of Scotch Plains

Well 1

Owner: Elizabethtown Water Co.
Owners well number: Glenside Ave. well
Lat. 404006N Long. 0742314
Altitude, 225 feet

Pleistocene:		
Clay	5	5
Triassic (Brunswick Formation):		
Shale, broken, red	22	27
Shale, red	513	540

Well 3

Owner: Elizabethtown Water Co.
Owners well number: Jerusalem Rd. 1
Lat. 403940N Long. 0742247
Altitude, 221 feet

Pleistocene:		
Till	15	15
Sand and gravel	115	130
Triassic (Brunswick Formation):		
Sandstone, red	121	251
Shale, red	399	650

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Scotch Plains--Continued

Well 4

Owner: Elizabethtown Water Co.
Owners well number: Jerusalem Rd. 2
Lat. 403938N Long. 0742250
Altitude, 215 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till(?)	22	22
Sand and gravel	17	39
Gravel, coarse	81	120
Triassic (Brunswick Formation):		
Shale, red	545	665

Well 5

Owner: Elizabethtown Water Co.
Owners well number: Jerusalem Rd. 3
Lat. 403938N Long. 0742238
Altitude, 230 feet

Pleistocene:		
Sand and gravel	85	85
Gravel	55	55
Triassic (Brunswick Formation):		
Shale, red	568	708

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Scotch Plains--Continued

Well 9

Owner: Elizabethtown Water Co.
Owners well number: Morse Ave. well
Lat. 403917N Long. 0742215
Altitude, 200 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay, red; large calcareous graywacke and basalt pebbles are present in the clay.....	72	72
Triassic (Brunswick Formation):		
Shale and sandstone, red; plant remains, leaves, stems; calcareous bed at 190 feet.....	328	400

Representative well logs in the Township of Springfield

Well 2

Owner: Short Hills Water Co.
Owners well number: Short Hills 2
Lat. 404300N Long. 0741850
Altitude, 102 feet

Pleistocene:		
Sand, clay, and gravel.....	5	5
Sand, coarse, brown; some boulders.....	5	10
Gravel, coarse; some boulders.....	5	15
Gravel and clean sand.....	5	20
Clay, red.....	10	30
Gravel and red clay.....	5	35
Gravel, sand, and clay.....	15	50
Sand, coarse.....	5	55
Sand, coarse, brown.....	25	80
Sand, coarse to medium.....	5	85

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Springfield--Continued

Well 2--Continued

	Thickness (feet)	Depth (feet)
Triassic (Brunswick Formation and Watchung Basalt fragments):		
Fragments of red shale and basalt.....	2	87

Well 3

Owner: Short Hills Water Co.
Owners well number: Short Hills 1
Lat. 404253N Long. 0741847
Altitude, 92 feet

Pleistocene:		
Sand, coarse; some gravel.....	5	5
Clay and gravel.....	7	12
Sand, coarse; some gravel.....	3	15
Sand, coarse; little gravel.....	10	25
Sand and gravel.....	15	40
Sand, fine, red.....	5	45
Sand, coarse.....	10	55
Sand, fine.....	15	70
Gravel.....	8	78
Triassic (Brunswick Formation):		
Sandstone, red.....	--	78

Well 6

Owner: Smith and Smith
Owners well number: Smith 1
Lat. 404238N Long. 0741836
Altitude, 110 feet

Pleistocene:		
Sand and gravel.....	91	91
Triassic (Brunswick Formation):		
Shale, red.....	113	204

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Springfield--Continued

Well 14

Owner: Public Service Electric and Gas Co.
Owners well number: Public Service 2
Lat. 404115N Long. 0741849
Altitude, 102 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay and pebbles (Till).....	30	30
Triassic (Brunswick Formation):		
Shale, weathered, red.....	10	40
Shale, red.....	364	404

Representative well logs in the City of Summit

Well 1

Owner: Ciba Pharmaceutical Prod. Inc.
Owners well number: Ciba 4
Lat. 404342N Long. 0742242
Altitude, 210 feet

Pleistocene:		
Till.....	8	8
Triassic (Brunswick Formation):		
Shale.....	592	600

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the City of Summit--Continued

Well 8

Owner: Ciba Pharmaceutical Prod. Inc.
Owners well number: Ciba 12
Lat. 404326N Long. 0742250
Altitude, 220 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till	24	24
Clay and sand	56	80
Clay	10	90
Clay and fine sand	113	203
Sand and clay	2	205
Triassic:		
Shale (Brunswick Formation)	595	800
Basalt (Watchung Basalt)	38	838

Well 9

Owner: Ciba Pharmaceutical Prod. Inc.
Owners well number: Ciba 10
Lat. 404324N Long. 0742245
Altitude, 230 feet

Pleistocene:		
Till	20	20
Clay and gravel	50	70
Clay and fine sand	80	150
Clay	33	183
Till	13	196
Triassic:		
Shale, baked (Brunswick Formation)	514	710
Basalt (Watchung Basalt)	9	719

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Union

Well 3

Owner: Mulberry Metal Products, Inc.
Owners well number: Mulberry 1
Lat. 404246N Long. 0741640
Altitude, 140 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Sand and gravel	25	25
Sand, gravel, and hard pan	31	56
Triassic (Brunswick Formation):		
Shale and sandstone, red	346	402

Well 14

Owner: Food Fair Stores Inc.
Owners well number: Food Fair 1
Lat. 404153N Long. 0741600
Altitude, 100 feet

Pleistocene:		
Till	4	4
Triassic (Brunswick Formation):		
Shale, red	481	485

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Union--Continued

Well 18

Owner: Pyro Plastics Corp.
Owners well number: Pyro 1
Lat. 404136N Long. 0741716
Altitude, 95 feet

	Thickness (feet)	Depth (feet)
Fill	3	3
Pleistocene:		
Clay	2	5
Till	7	12
Clay, red	2	14
Sand, red	3	17
Sand and loose rocks	3	20
Triassic (Brunswick Formation):		
Sandstone	4	24
Shale, red	39	63
Sandstone, red	18	81
Shale, red	14	95
Sandstone and shale	249	344

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Union--Continued

Well 22

Owner: Hazal Industries Inc.
Owners well number: Hazal Industries Inc.
Lat. 404120N Long. 0741754
Altitude, 105 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Till	20	20
Sand, fine	25	45
Gravel and sand	10	55
Triassic (Brunswick Formation):		
Shale, weathered	16	71
Shale, red	207	278

Well 25

Owner: Potter Engineering
Owners well number: Potter 3
Lat. 404113N Long. 0741831
Altitude, 90 feet

Pleistocene:		
Sand	35	35
Gravel	10	45
Sand, coarse	13	58
Triassic (Brunswick Formation):		
Shale, red	2	60

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Township of Union--Continued

Well 28

Owner: Temple B'Nai Abraham
Owners well number: Temple B'Nai 1
Lat. 404108N Long. 0741826
Altitude, 100 feet

	Thickness (feet)	Depth (feet)
Fill	6	6
Pleistocene:		
Till	10	16
Gravel, coarse	8	24
Sand and gravel, coarse, brown	18	42
Sand, coarse, brown	33	75

Representative well logs in the Town of Westfield

Well 2

Owner: Elizabethtown Water Co.
Owners well number: Wittke Rock 2
Lat. 403957N Long. 0742136
Altitude, 210 feet

Pleistocene:		
Sand and gravel	30	30
Clay	40	70
Clay, sand, and gravel	18	88
Triassic (Brunswick Formation):		
Shale, red	423	511

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Town of Westfield--Continued

Well 3

Owner: Elizabethtown Water Co.
Owners well number: Wittke Rock 1
Lat. 403954N Long. 0742138
Altitude, 220 feet

	Thickness (feet)	Depth (feet)
Pleistocene (Wisconsin Terminal Moraine):		
Sand and gravel	40	40
Clay	50	90
Clay and gravel	18	108
Triassic (Brunswick Formation):		
Shale, red	398	506

Well 7

Owner: Elizabethtown Water Co.
Owners well number: Westfield 1921
Lat. 403937N Long. 0742223
Altitude, 220 feet

Pleistocene:		
Clay, laminated, brown; and gravel	134	134
Triassic (Brunswick Formation):		
Shale, red	318	452
Sandstone, red	4	456
Shale, red	12	468
Sandstone, red	3	471
Shale, red	29	500
Sandstone, red	4	504
Shale, red	8	512
Sandstone, red	12	524

Table 6.--Logs of Selected Wells in Union County, New Jersey--Continued

Representative well logs in the Town of Westfield--Continued

Well 9

Owner: Elizabethtown Water Co.
Owners well number: Westfield 1922
Lat. 403926N Long. 0742213
Altitude, 195 feet

	Thickness (feet)	Depth (feet)
Pleistocene:		
Clay, red; and gravel	80	80
Triassic (Brunswick Formation):		
Shale, red	170	250
Sandstone, red	3	253
Shale, red	47	300
Sandstone, red	2	302
Shale, red	68	370
Sandstone, red	8	378
Shale, red	22	400
Sandstone, red	5	405
Shale, red	1	406
Sandstone, red	10	416

Well 21

Owner: Elizabethtown Water Co.
Owners well number: Westfield Office Well 1
Lat. 403856N Long. 0742052
Altitude, 130 feet

Fill	5	5
Pleistocene:		
Sand and gravel	47	52
Triassic (Brunswick Formation):		
Shale, red	471	523

POCKET CONTAINS:

1 ITEMS

pm